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## Note on Sources of Information

Except as noted elsewhere in this paper, all figures and other factual material used have been taken from the sources described in this note.

Whenever quarterly or monthly figures of any kind, in their original form, suggest the presence of seasonal influences, the data presented in the paper have been computed by seasonally adjusting the original figures.

### Railway Data in General

#### Official sources

All data for 1913 and earlier were taken from the Parliamentary Papers listed in Table 39. With four exceptions they were issued by the Board of Trade or one of its component units. Titles are too long, cumbersome, and variable to cite in detail. For this period only, Ireland is included.

For 1919 and later periods most data are from various issues of serial publications by the Ministry of Transport. Annual data: 1919-38 from *Railway Returns. Returns of the Capital, Traffic, Receipts and Working Expenditure, etc., of the Railway Companies of Great Britain . . .*; 1939-47 from *Summary Table of Statistical Returns of Railways of Great Britain, 1938 to 1944*, and same, 1945, 1946, 1947; financial data, 1940-47 from the annual publication, *Government Control of Railways*. Monthly and four-weekly data: 1920-39 from *Railway Statistics*.

We have obtained some further railway data for 1939 and later years from Central Statistical Office, *Annual Abstract of Statistics* and *Monthly Digest of Statistics*.

Detailed annual data for the nationalized part of the transport industry appear in the British Transport Commission's *Reports and Accounts*. For 1951, the Commission issued two documents, a general discussion in its *Report* and detailed figures in its *Financial and Statistical Accounts*. Monthly or four-weekly data appear in its *Transport Statistics* (first issue, January 1948).

#### Comparability from year to year

The summary figures for all railways in *Railway Returns* are presented on two bases: 1919-32, including the railways transferred to the London Passenger Transport Board in 1933; 1928-38, excluding those railways. (Figures on the latter basis were published retroactively for 1928-32.)

For passenger traffic only, the *Returns* also present figures for 1919-27 excluding the London tubes and the Metropolitan District railway. To make these figures comparable with those for 1928-38, the traffic of the Metropolitan (not to be confused with the Metropolitan *District*) must be deducted, and that of the White-chapel & Bow Joint line added. In preparing the data for Charts 8 and 11, we made these adjustments.

A new accounting system was introduced on January 1, 1928. Comparable figures were published retroactively for 1927 but no earlier years.

Wherever there is a break at 1927 in our tables and charts, the earlier segment is based on the old and the later on the new accounting system. Wherever there is a break at 1928 or 1932, the earlier segment includes the London underground lines and the later segment does not include them.

The change in accounting system or railway basis does not always change the figures. The new and the old accounting systems sometimes produce the same figure for 1927. LPTB had practically no freight; hence items pertaining to freight traffic, service, and equipment may not be affected. In such instances the three segments become two, or even one.

### Monthly and quarterly estimates

Except for passenger traffic, the data in *Railway Statistics. Monthly Digest of Statistics*, and *Transport Statistics* pertain to four-week periods, beginning in 1932; 13 sets of data are published each year. We estimated monthly ton-miles by apportioning those reported for each four-week period according to the number of days in that period that fell in each month. For example, we estimated April 1934 as follows:

| Period                 | Ton-Miles<br>in Period<br>(millions)<br>(1) | April                       |                      | Ton-miles in April          |  |
|------------------------|---|-----------------------------|----------------------|-----------------------------|--|
|                        |   | Days<br>in<br>Period<br>(2) | Formula<br>(3)       | Amount<br>(millions)<br>(4) |  |
| 4 weeks ended April 21 | 1,218                                       | 21                          | $21/28 \times 1,218$ | 914                         |  |
| 4 weeks ended May 19   | 1,212                                       | 9                           | $9/28 \times 1,212$  | 390                         |  |
| April                  | .....                                       | ....                        | Sum of (4)           | 1,304                       |  |

We found, however, that it would be too laborious to prepare monthly estimates on this plan for the numerous measures of railway operations, such as wagon-miles, train-miles, train-hours, and contented ourselves with quarterly estimates, made with the help of the ratios in Table 40. For example, coaching trains ran 92.09 million miles in the 16 weeks (112 days) ended October 8, 1932. We therefore estimate coaching train miles in the quarter ended September 30, 1932 to have been  $.815 \times 92.09$  or 75.05 million. Figures produced in this way were seasonally adjusted and finally divided by 3 to make them comparable with monthly data for earlier years.

In computing averages during, rather than aggregates for, a quarter, we simply

TABLE 39

## Sources of Data for 1913 and Prior Years

*References are to Accounts and Papers Published for Houses of Parliament<sup>a</sup>*

| SESSIONAL<br>YEAR | VOLUME<br>NUMBER  | PAPER<br>NUMBER  | SESSIONAL<br>YEAR | VOLUME<br>NUMBER | PAPER<br>NUMBER |
|-------------------|-------------------|------------------|-------------------|------------------|-----------------|
| 1847-48           | XXVI <sup>b</sup> | 938 <sup>c</sup> | 1863              | LXII             | 492             |
| 1850              | LIII              | 10 <sup>c</sup>  | 1865              | NLIX             | 456             |
| 1851              | LI                | 12 <sup>c</sup>  | 1867              | LXII             | 516             |
| 1851              | LI                | 313 <sup>c</sup> | 1868-69           | LIV              | 286             |
| 1852-53           | XCVII             | 252              | 1870              | LIX              | c. 229          |
| 1852-53           | XCVII             | 906              | 1875              | LXVII            | c. 1332         |
| 1854              | LXII              | 1844             | 1882              | LX               | c. 3329         |
| 1854-55           | XLVIII            | 1932             | 1886              | LXIII            | c. 4819         |
| 1856              | LIV               | 2147             | 1890              | LXV              | c. 6157         |
| 1857 <sup>d</sup> | XXXVII            | 2258             | 1899              | LXXXV            | c. 9457         |
| 1859              | XXV               | 2472             | 1908              | LXXXVI           | cd. 4894        |
| 1859              | XXV               | 2513             | 1913              | LX               | cd. 8938        |
| 1861              | LVII              | 2871             |                   |                  |                 |

<sup>a</sup> Sometimes referred to as "Parliamentary Papers" or "Sessional Papers."

<sup>b</sup> Entitled "Reports of Commissioners" rather than "Accounts and Papers."

<sup>c</sup> These reports were made by the Office of Commissioners of Railways. All others were made by the Board of Trade or a department thereof.

<sup>d</sup> Second Session.

took a straight average of the four-week figures. Thus the number of steam locomotives in stock during the four-week periods ending July 16, August 13, September 10, and October 8, 1932 was 22,189, 22,154, 22,109, and 22,061 respectively. The average of these figures is 22,128, which we take to be the average during the quarter ended September 30, 1932.

In addition to the monthly estimates of ton-miles we made quarterly estimates

TABLE 40

## Estimation of Quarterly from Four-Weekly Data

| QUARTER<br>TO BE<br>ESTIMATED<br>(1) | PERIOD TO WHICH DATA USED<br>AS BASIS OF ESTIMATE PERTAIN |                                       | RATIO OF DAYS IN<br>QUARTER TO DAYS<br>IN BASIS PERIOD,<br>91.25 ÷ (3)<br>(4) |
|--------------------------------------|---|---------------------------------------|---|
|                                      | <i>Ending<br/>date<sup>a</sup></i><br>(2)                 | <i>No of days<br/>included</i><br>(3) |   |
| First                                | March 18-27   | 84                                    | 1.086   |
| Second                               | June 10-19  | 84                                    | 1.086   |
| Third                                | Sept. 30-Oct. 9   | 112                                   | .815  |
| Fourth                               | Dec. 23-Jan. 1  | 84                                    | 1.086   |

<sup>a</sup> Varies from year to year over range indicated.

by the same method as for operating aggregates, so as to have ton-miles comparable with the operating data. The trough in monthly ton-miles came in December 1932, but the trough in quarterly ton-miles came in the second quarter of 1933. The monthly 1937 peak, June, falls within the peak quarter, i.e. the second quarter of the year, and the monthly 1938 trough within the quarterly trough, i.e. the third quarter. In marking off cycles on charts of operating data we use the quarterly chronology in years for which our data are quarterly.

## Supply of Commodities

Particulars of the tonnage of each of certain "selected traffics" originated by the railways, 1928-38, are contained in *Railway Returns*. We determined the commodities included in each traffic category by consulting *Railway Statistics* (which contains descriptive notes and more detailed figures) and the *General Classification of Merchandise*, January 1938 edition, published by the Railway Clearing House, London. We then attempted to compile figures on the total annual supply of the commodities in each group. Ideally such a figure should not only include production and imports of all the articles, and no others, but should be adjusted for changes in stocks at point of origin. No such adjustment was possible, however, and even the production and import data leave something to be desired.<sup>1</sup> Our supply estimates appear in Table 4, and changes in them are compared with changes in the aggregate tonnage of the corresponding selected traffics in Table 5. In the tables we assign each commodity group a number. The corresponding traffic descriptions, and the derivation of our figures on supply, are indicated in the following paragraphs.

1. *Creosote, tar, and pitch*. Production and imports of creosote not included in any year; no data 1928-30. Domestic production of creosote was from 13.3 to 19.5 per cent of total supply shown here, 1931-38. Imports include both coal tar and pitch and "other sorts."
2. *Grain, flour, and milling offals*. Production of barley, beans, oats, peas, rye, wheat. (The railway classification indicates that beans and peas are covered by the traffic category.) Any beans, peas, or rye grown in Scotland not included. No data on output of mill products. Total imports of grain and flour, as classified in the import statistics, minus: macaroni, spaghetti and vermicelli; maize starch for use as food; and farinaceous substances for use as food, all of which are separately rated in the railway classification. Also imports of cereal by-products as totaled in the import statistics, and of seeds for expressing oils. Original import data in cwt. (112 lbs.) converted to long tons by dividing by 20.
3. *Gravel and sand*. Production less quantities for road-making and ballast. The merchandise classification provides that gravel for roads shall be classified as

<sup>1</sup> Because of the paucity of industrial statistics we were unable to prepare supply figures for 6 of the 19 "selected traffics." For similar reasons we have done nothing with any of the somewhat different commodity groups for which commodity statistics were published, 1921-27.

road-making and road-repairing material. It does not specifically provide for sand for roads but we assume such sand would be so rated. Gravel and sand for ballast are presumably used by railroads and not comparable with revenue traffic.

4. *Iron ore.* Production including and imports excluding manganese ore.

5. *Iron and steel blooms, billets, and ingots.* Production of steel ingots (converter acid and basic, open hearth acid and basic, and electric). Imports of steel blooms, billets and slabs, and ingots. Special steels not included in either production or imports.

6. *Iron and steel, other descriptions.* The supply of materials is assumed to indicate roughly the flow of products. Supply as for No. 5, plus production of steel castings (electric and all other) and imports of: steel bars, rods, angles, shapes and sections; plates and sheets; other iron and steel.

7. *Limestone and chalk.* Production of limestone, less quantities for road-making and ballast. Comment on sand for roads, and on ballast under No. 3, applies. Total production of chalk.

8. *Oil cake.* Estimated from imports of oil seeds (except desiccated and flaked coconut intended for food). *Final Report on the Fifth Census of Production*, Part III, p. 364, shows for each kind of seed the quantity crushed and the output of cake and meal in 1934 and 1935. We computed ratios of output to input, averaged them for the two years, and applied them to inputs. The factors are .326 for coconuts, .664 for cottonseed, .678 for flaxseed, .307 for ground nuts (peanuts etc.), .469 for palm kernel, .616 for rapeseed, and .700 for soya beans. (Imports of undecorticated ground nuts were multiplied by .67 to give the decorticated equivalent, which was then added to decorticated imports before applying the .307 factor.) Imports in the form of seed and meal added to these production estimates.

9. *Pig iron.* Production (excluding ferro-alloys). Imports.

10. *Road-making and road-repairing material.* Production of igneous rocks, gravel and sand, limestone, and sandstone for road-making and ballasting, less ballast used by railroads (latter from *Railway Returns*). Ballast converted from cubic yards to tons by dividing by 1.21, a ratio confidentially furnished by a large American railroad.

11. *Timber.* No production data available. Annual production is estimated to be roughly 50 million cubic feet or about 1 million tons (W. F. Hiley, *The Economics of Forestry* (Clarendon Press, 1930), p. 51; Interdepartmental Home-Grown Timber Committee of the Forestry Commission, *Interim Report*, 1933, Appendix II, p. 10), less than one-seventh of the supply (imports) shown here. Imports of hewn, sawn (not further prepared) and planed or dressed timber, plus those of pitprops and other pitwood. Original data converted to tons on basis of following ratios: Hewn and sawn oak, 40 cubic feet. Mahogany, teak, persimmon, hickory, cornel and unspecified hardwoods, 45 cubic feet. Walnut, 50 cubic feet. Planed or dressed hardwoods, all softwoods, also pitprops and other pitwood, 1.32 loads per ton. Exceptions, 1936-38: hewn fir, pine, spruce, etc., and pitprops, 0.55 fathoms per ton; other hewn softwoods, all sawn softwoods, planed or dressed softwoods, 0.4 standards per ton; planed or dressed hardwoods, 45 cubic feet per

ton; other pitwood reported in tons. Conversion factors from *Annual Statement of the Trade of the United Kingdom*, Vol. I, 1938.

12. *Potatoes*. Production, imports.

13. *Vegetables, other than potatoes*. Production of carrots (except in Scotland), marigolds, onions (except in Scotland), sugar beets, turnips and swedes. Imports of onions, converted from cwt. by dividing by 20.

Production data are from various annual issues of: Imperial Institute, Mineral Resources Dept., *The Mineral Industry of the British Empire and Foreign Countries* (creosote, tar and pitch, iron ore); Ministry of Agriculture and Fisheries, *Agricultural Statistics* (grain, potatoes, other vegetables); Secretary of Mines, *Annual Report* (gravel and sand, limestone and chalk, road-making and road-repairing materials); National Federation of Iron and Steel Manufacturers, *Statistics of the Iron and Steel Industries* (Iron and steel,<sup>2</sup> pig iron<sup>2</sup>). Import data are from Board of Trade, *Statistical Abstract for the United Kingdom*, or Customs and Excise Dept., *Annual Statement of the Trade of the United Kingdom with British and Foreign Countries*, Vol. I.

<sup>2</sup> 1938 figures from *Statistical Abstract*.

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