1. The Movement of Goods

Traffic was intimately related to production of coal

Although we have no measure of the grand composite flow of all commodities we do have a measure of the flow, from its origin in the ground, of the commodity which, in raw or simply manufactured form, is the most important single source of traffic. After World War I, coal, coke, and the so-called patent fuel (the raw material and the two products are lumped together in the traffic statistics) accounted for considerably more than half of the total tonnage originated by the railways, and for about half of the total movement of goods (measured in ton-miles). Doubtless coal and related traffic was comparably important in earlier periods. The total flow of coal and its products is roughly measured by the statistics of coal production. Although coal traffic was not separately reported before the war, the great bulk of the "minerals conveyed" must have been coal. The relation between total flow of coal and railway traffic was close. For every cyclical wave in coal production, as far as we can tell from the prewar data, there was a corresponding cycle in mineral traffic (Chart 1). Whenever the mine operators increased their output from one year to the next, the railway companies enjoyed an increase in their minerals traffic. Whenever output diminished, the traffic diminished. Minor exceptions to these general observations occurred in 1856-58, 1884-85, and 1897-98. The very slight decline in production from 1919 to 1920 was accompanied by a slight increase in tonnage originated, but the sharper decline in output from 1920 to 1921 was accompanied by a sharp decline in tonnage (Table 1).

Statistics of ton-miles reflect not only the weight of shipments but the length of movement. They therefore measure freight traffic more comprehensively than statistics of tons originated or conveyed measure it. Ton-mile data were first collected for 1920. From that year to 1938

3

every cycle in production was accompanied by a cycle in coal and coal product ton-miles (Chart 2).[1]

Traffic cycles corresponded to trade cycles

In a looser and more general way, cycles in total traffic can be matched with the cycles that occurred, according to Burns-Mitchell, in general business activity. From 1857 to 1913, the railways carried more ton-

TABLE 1
Coal Production
Rail Tonnage Originated, by Kind, 1919-1921
(millions of tons)

| | COAL PRODUCTION | TONS ORIGINATED[a] | | | |
		General merchandise	Coal, coke, and patent fuel	Other minerals	Total
1919	229.8	68.4	180.1	56.4	304.9
1920	229.5	68.7	181.2	68.1	318.1
1921	163.3	50.5	128.3	39.1	217.9

[a] See note to Table 2.

nage in each[2] year of every business expansion than they did in the preceding year (Chart 1, top line). Traffic diminished from year to year throughout 3 of the 9 contractions. It diminished part of the time in 4 others. In the remaining 2 it increased, but the average annual gain was smaller in each case than in the immediately neighboring expansions. Indeed in every general business contraction the annual average change was either a fall or a smaller rise than in the preceding or following phase (Table 2). Total tonnage originated rose in the 1919-20 business expansion and fell in the 1920-21 contraction (Table 1). There was a cycle in total ton-miles for every business cycle from 1920 to 1938 (Chart 3).

[1] Annual coal production from Richard Meade, *Coal and Iron Industries of the United Kingdom* (C. Lockwood & Co., London, 1882), p. 296, through 1872, and from Secretary of Mines, *Annual Report*, thereafter. For source of monthly data, see Table 7, note a.

As in later charts and tables, the monthly data are seasonally adjusted. Cf. note on sources.

In this and other charts, asterisks mark peaks and troughs in the economic activities charted.

[2] With one exception: from 1911 to 1912 there was a slight dip, followed by a vigorous rise to 1913, the closing year of the reference expansion. A coal strike from February 26 to April 15, 1912 explains this exception. There was no dip in general merchandise conveyed.

CHART 1

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CHART 1

Tons Conveyed by Railways
Total, 1856-1868, 1871-1913
Minerals, General Merchandise, 1856-1868, 1872-1902, 1903-1913
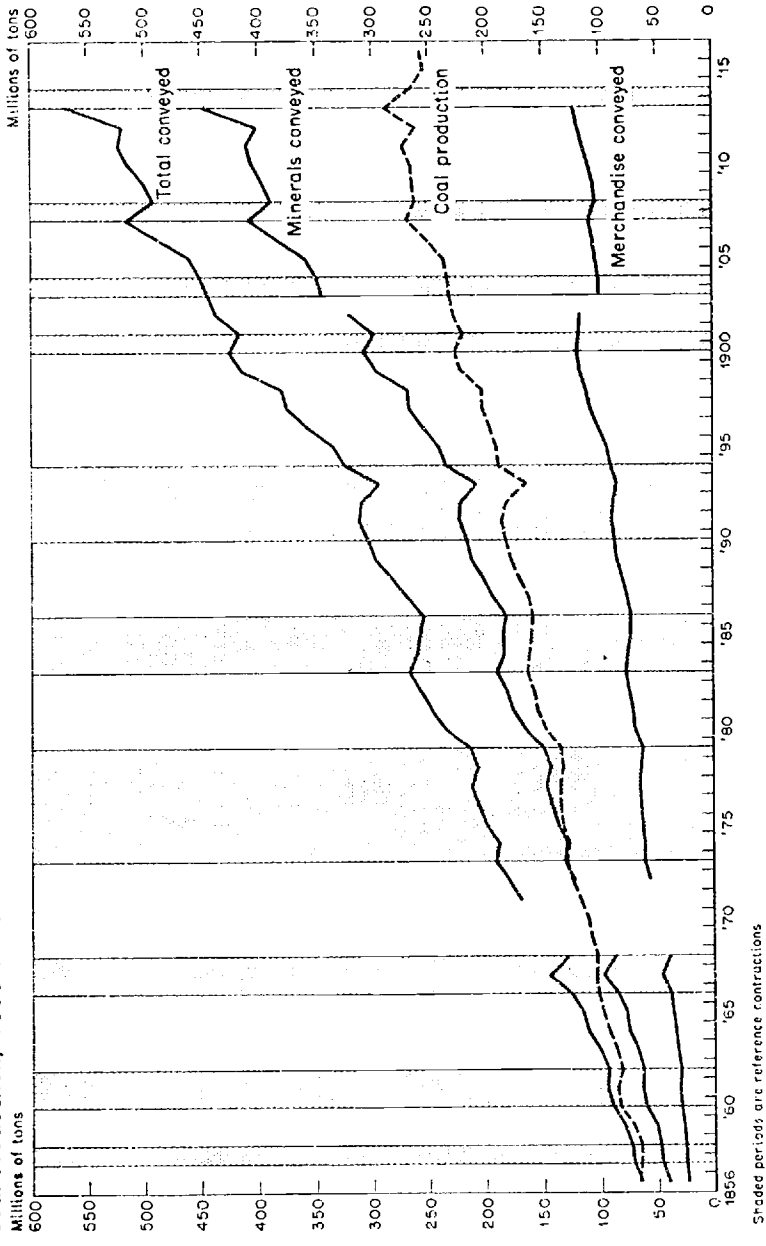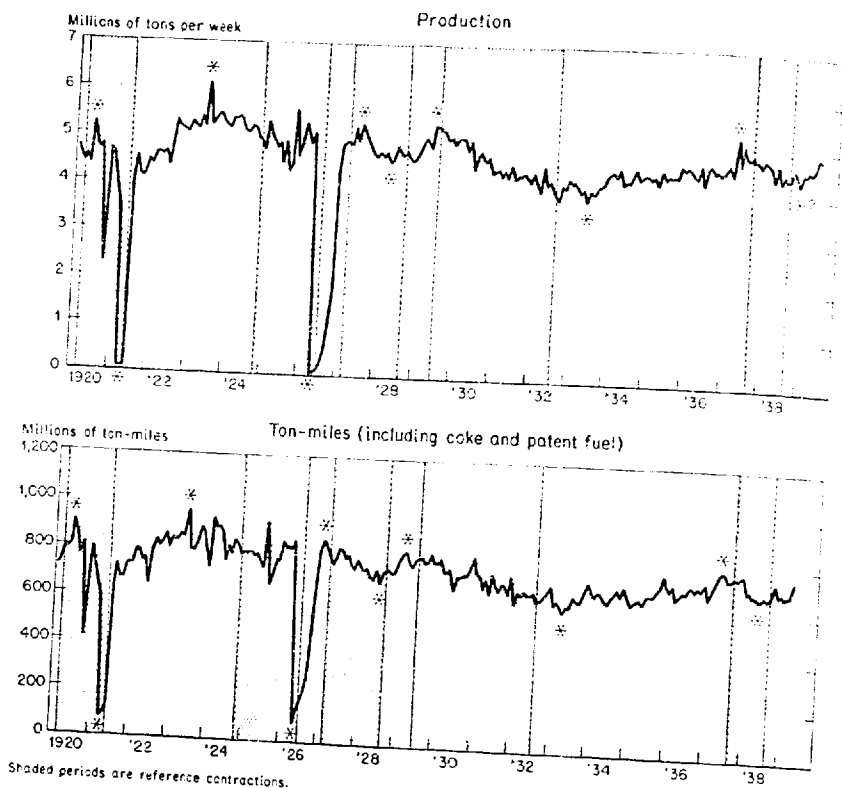Coal Production, 1856-1916

Shaded periods are reference contractions

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CHART 2

Coal: Production and Movement by Rail
January 1920-April 1939

Millions of tons per week   Production

Millions of ton-miles   Ton-miles (including coke and patent fuel)

Shaded periods are reference contractions.

Since the cycles in total traffic corresponded so closely to those in minerals or coal traffic, there would be no point in discussing separately the relation of the latter to the trade cycle. For the study of business conditions, moreover, the figures for merchandise, i.e. nonmineral commodities, are of greater interest. In terms of employment, value of product, etc., coal is not as important as it is in terms of railway tonnage. The revenue the railways themselves receive for carrying coal is less than proportionate to the tons carried.

In general, merchandise traffic increased from year to year throughout each business expansion (Chart 1). From 1901 to 1902, however, it fell slightly.[3] There were declines in traffic corresponding exactly in

[3] There are no figures for 1869 or 1870; the figure for 1871 is not comparable with that for other years, and that for 1903 is not comparable with 1902 or earlier years.

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TABLE 2

TABLE 2

Tons of Freight Conveyed
Change per Year between Peak and Trough in Business, 1857-1913

REFERENCE DATE	LEVEL OF BUSINESS	TONS CONVEYED (MILLIONS)[a]	PERCENTAGE CHANGE To peak from preceding trough	PERCENTAGE CHANGE To trough from preceding peak	ABSOLUTE CHANGE Millions of tons	ABSOLUTE CHANGE Years elapsed	ABSOLUTE CHANGE PER YEAR To peak from trough	ABSOLUTE CHANGE PER YEAR To trough from peak
1857	Peak	71.3	......	......	......	...	......	......
1858	Trough	73.1	......	2.52	1.8	1	......	1.8
1860	Peak	89.9	22.98	......	16.8	2	8.4	......
1862	Trough	93.7	......	4.23	3.8	2	......	1.9
1866	Peak	124.1	32.44	......	30.4	4	7.6	......
1868	Trough	126.6	......	2.01	2.5	2	......	1.2
1873	Peak	191.0	50.87	......	64.4	5	12.9	......
1879	Trough	212.2	......	11.10	21.2	6	......	3.5
1885	Peak	266.4	25.54	......	54.2	4	13.6	......
1886	Trough	254.6	......	-4.43	-11.8	3	......	-3.9
1890	Peak	303.1	19.05	......	48.5	4	12.1	......
1894	Trough	324.5	......	7.06	21.4	4	......	5.4
1900	Peak	424.9	30.94	......	100.4	6	16.7	......
1901	Trough	415.9	......	-2.12	-9.0	1	......	-9.0
1903	Peak	443.7	6.68	......	27.8	2	13.9	......
1904	Trough	449.9	......	1.40	6.2	1	......	6.2
1907	Peak	515.9	14.67	......	66.0	3	22.0	......
1908	Trough	491.6	......	-4.71	-24.3	1	......	-24.3
1913	Peak	568.2	15.58	......	76.6	5	15.3	......

[a] In tonnage conveyed, the weight of a shipment passing over several railroads is counted several times, once for each railroad. In tonnage originated (Table 1) it is counted only once.

CHART 3

Ton-miles, All Commodities and All except Coal, Coke, and Patent Fuel
January 1920-April 1939

Shaded periods are reference contractions.
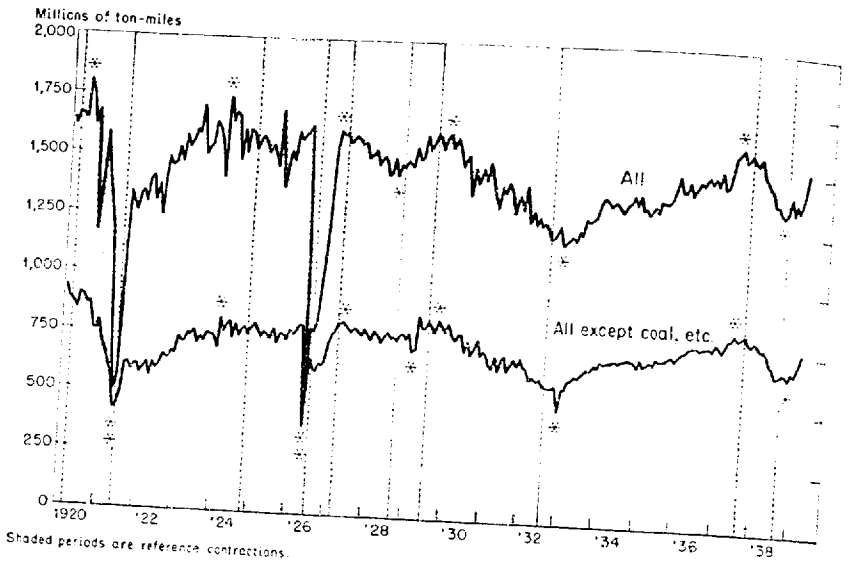
time to the reference contractions of 1883-86 and 1907-08. Tonnage also diminished during part of 1860-62, 1866-68, 1873-79 (only the last two years) and 1890-94. A decline in 1900-1901 continued beyond the end of the business phase. In the business contractions 1857-58 and 1903-1904, on the other hand, the amount of merchandise conveyed increased, but not as fast, in either case, as in the succeeding business expansion. If allowance is made for the rate as well as the direction of change, merchandise conformed positively to the reference chronology without exception (Table 3).[4]

Similarity of direction, however, is a closer kind of correspondence than rate of change. In this sense, before the war, even the changes in general merchandise traffic corresponded more closely to the changes in coal production than they did to the reference chronology. In 11 pairs of years for which we have traffic data, coal production fell while busi-

[4] For the reference chronology in monthly, quarterly and annual form, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), p. 78. The authors drew up an annual chronology in order to supplement their studies of monthly or quarterly data with data available only in annual form; if they had worked from annual data only they might have recognized fewer and somewhat differently dated cycles (pp. 81, 261-2).

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TABLE 3

Tons of General Merchandise Conveyed
Change per Year between Reference Peaks and Troughs, 1857-1913

				CHANGE FROM PRECEDING DATE		
					Per year	
		YEARS FROM			To peak	To trough
REFERENCE DATE	LEVEL OF BUSINESS	PRECEDING DATE	TONS CARRIED	*Total*	*from trough*	*from peak*
				(m i l l i o n s o f t o n s)		
1857	Peak	....	25.0	....	....	....
1858	Trough	1	25.6	0.6	....	0.6
1860	Peak	2	29.5	3.9	2.0	....
1862	Trough	2	30.3	0.8	....	0.4
1866	Peak	4	38.6	8.3	2.1	....
1868	Trough	2	39.6	1.0	....	0.5
1873	Peak	5	60.9	21.3	4.3	....
1879	Trough	6	62.9	2.0	....	0.3
1883	Peak	4	76.9	14.0	3.5	....
1886	Trough	3	72.7	−4.2	....	−1.4
1890	Peak	4	87.3	14.6	3.6	....
1894	Trough	4	90.1	2.8	....	0.7
1900	Peak	6	118.5	28.4	4.7	....
1901	Trough	1	117.9	−0.6	....	−0.6
1903	Peak	2	100.0*	`	*	....
1904	Trough	1	100.3	0.3	....	0.3
1907	Peak	3	108.3	8.0	2.7	....
1908	Trough	1	103.2	−5.1	....	−5.1
1913	Peak	5	121.4	18.2	3.6	....

* 1903 figure not comparable with previous years; rate of change 1901-03 not comparable with 1903-04.

ness expanded, or vice versa. In 8 of these instances, merchandise followed coal rather than general business activity.[5]

Was railway participation inversely related to the state of trade?

Although railway traffic is positively related to the total flow of commodities, the relation is not necessarily constant. Both domestic produc-

[5] The eight instances are 1860-61, 1866-67, 1874-75, 1875-76, 1876-77, 1890-91, 1893-94, 1903-04. The other three are 1856-57, 1878-79, 1911-12. In 1897-98 business was expanding but coal production was 202.1 million tons in both years.

CHART 4

Coal, Coke, and Patent Fuel
Ratio of Tonnage Originated by Railways to Total Supply
1921-1938

Shaded periods are reference contractions.
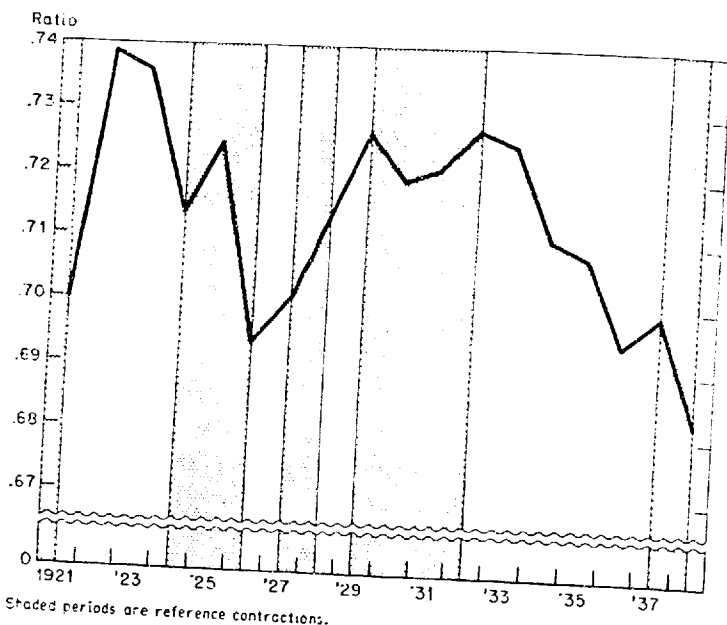
tion and imports can be disposed of in ways which do not involve rail
movement. The percentage share of the railroads in total flow may
fluctuate with business conditions. We have endeavored to find out
whether it has done so in recent years. (The necessary data are not
available for earlier times. Since 1920 the alternatives to rail shipment
have been greatly expanded by the development of motor transport
facilities.)

The ratio of railway tonnage of coal, coke, and patent fuel to the
total supply of these commodities has ranged from 68 to 74 per cent
since 1921 (Chart 4).[6] In 1921-24 and 1929-32 there was considerable
fluctuation within the phase. No consistent contrast between expan-
sions and contractions in direction of movement strikes the eye. Thus
there was a net rise in 1921-24, a net fall in 1924-26. Although the ratio

[6] Supply = production of coal, coke (at coke plants and at gas works) and manu-
factured fuel, plus imports of coal, coke ("gas" and "other sorts"), and manufac-
tured fuel. Data from Secretary of Mines: *Annual Report* and *Statistical Abstract*.
Gas house coke in 1921 estimated by applying to the 1921 coal used the 1922-26
average ratio of coke produced to coal used.

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declined in 1932-37, it did so less rapidly than in 1937-38. On the other hand the rate of rise in 1927-28 is slightly greater than in 1926-27. The ratio conformed inversely in the peak-to-peak cycle 1929-37, showing a slight net rise in the contraction and a marked fall in the expansion. All in all, we can hardly say that the railway share in the disposal of these important commodities was consistently related to business conditions.

For other commodities in the aggregate, we do not have enough data for similar comparisons. We have, however, been able to construct at least crude measures of the total flow of thirteen commodities from 1928 to 1938 (Table 4; for details, see the appended note on sources of data: supply of commodities. Production data for earlier years are so limited that we have not ventured to construct similar measures for them). These accounted for between 46 and 51 per cent of railway tonnage other than coal and coal products. From the 1928 traffic data and the supply estimates, we computed the tonnage of each commodity the railroads would have originated if their traffic had varied in proportion to supply since 1928 (Table 5). Finally we added these thirteen hypothetical figures and computed the ratio of the aggregate actual to the aggregate hypothetical tonnages originated. It declined steadily throughout the period (Chart 5). But in 1928-29 the fall was less rapid than in 1929-32 and in 1932-37 it was decidedly less steep than in either 1929-32 or 1937-38. The data suggest that the railroads tend to lose part of their share in the disposal of commodities other than coal, etc. to other outlets in business contraction and to regain it in expansion. Progressive improvement of highways and motor trucks, and growing familiarity of traders with the possibilities of this comparatively new means of transport, prevented the railway companies from regaining their share in 1928-29 or 1932-37. But general business expansion did slow up the process of diversion.[7]

Fluctuations of traffic varied in length and amplitude

Judging from annual figures, some of the disturbances in rail traffic itself (i.e. those measured between high and low points in tonnage

[7] Not all of the loss in relative position should be attributed to highway developments. Reorganization of the iron and steel industry, for example, may have eliminated some interplant transport entirely. See Import Duties Advisory Committee, *Report on the Present Position and Future Development of the Iron and Steel Industry* (1937), pp. 42-3.

TABLE **4**

Supply of Thirteen Groups of Commodities, 1928-1938
(thousands of tons)

GROUP NUMBER	COMMODITY	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
1	Creosote, tar, and pitch	2,352	2,537	2,338	1,990	1,950	2,075	2,287	2,350	2,565	2,764	2,686
2	Grain, flour, and milling offals	15,296	15,764	14,585	16,221	15,490	16,358	16,617	16,435	16,647	16,287	16,659
3	Gravel and sand	5,420	6,288	7,674	8,654	8,083	9,894	11,824	13,370	15,688	17,924	19,252
4	Iron ore	24,151	23,022	22,667	18,991	20,316	18,793	18,514	18,734	20,215	16,880	16,856
5	Iron and steel blooms, billets, and ingots	15,656	18,810	15,714	9,734	9,094	10,161	14,300	15,398	18,621	21,168	16,961
6	Iron and steel, other descriptions	9,042	10,082	7,749	5,626	5,511	7,129	9,001	9,927	12,002	13,171	10,190
7	Limestone and chalk	11,365	12,346	9,960	7,762	6,706	7,876	10,059	10,889	12,965	14,333	11,519
8	Oil cake	14,879	16,199	15,673	14,008	12,695	13,905	16,332	17,483	19,208	21,959	21,470
9	Pig iron	1,284	1,364	1,137	1,240	1,216	1,112	1,307	1,469	1,364	1,537	1,544
10	Road-making and road-repairing material	6,557	7,533	6,350	3,988	3,662	4,180	6,000	6,397	7,820	8,984	7,026
11	Timber	14,263	14,728	16,440	18,489	16,153	16,065	17,385	18,002	20,408	21,765	22,634
12	Potatoes	7,090	7,690	7,513	6,112	6,091	7,272	8,408	7,960	8,725	9,430	6,819
13	Vegetables, other than potatoes	5,021	5,036	3,892	3,987	5,228	4,751	4,618	3,956	4,120	4,270	4,550

CHART 5

Ratio of Annual Tonnage Originated by Railways to 1928 Tonnage
Adjusted for Changes in Supply
Thirteen Groups of Commodities, 1928-1938

Shaded periods are reference contractions.
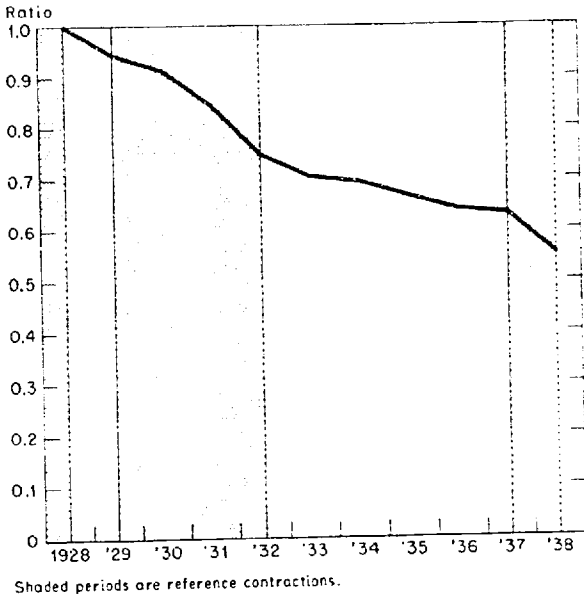
rather than between reference dates) have lasted much longer or
attained greater proportions than others (Table 6). Some phases en-
dured about a year; one expansion continued for seven years and several
contractions for three. From 1928 to 1929, tonnage increased 8 per
cent, from 1868 to 1873, 51 per cent. Declines ranged from 1 per cent
in 1861-62 to 24 per cent in 1929-32. If we add the slight 1908-11 rise
(which some observers might prefer to regard as merely a part of a
1908-13 expansion of 16 per cent) at one end of the scale, and phases
which owe part of their amplitude to the great strikes at the other, the
range becomes even greater.[8]

[8] The percentages for expansions are not comparable with those for contractions, of
course, since, e.g., a change from 100 to 200 million tons is a 100 per cent rise, but
a change from 200 to 100 million is a 50 per cent fall.

Monthly figures would yield larger amplitudes between approximately the same
dates. On the other hand, if such data could be substituted, the six-year expansion
1901-1907 might break up into three smaller phases.

TABLE 5

Hypothetical and Actual Tons Originated, Thirteen Commodity Groups, 1928-1938
(thousands of tons)

LINE NUMBER	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
1	1,983	2,139	1,971	1,678	1,644	1,756	1,928	1,981	2,162	2,331	2,260
2	6,223	6,413	5,934	6,599	6,302	6,655	6,761	6,687	6,769	6,626	6,777
3	3,336	3,870	4,723	5,327	4,975	6,090	7,277	8,229	9,656	11,032	11,983
4	10,587	12,739	10,626	6,583	6,150	6,871	10,076	10,412	12,592	14,314	11,469
5	3,322	3,704	2,847	2,067	2,025	2,619	3,307	3,647	4,409	4,839	3,854
6	8,883	9,650	7,785	6,067	5,242	6,156	7,862	8,511	10,132	11,203	8,847
7	5,026	5,472	5,294	4,732	4,288	4,697	5,517	5,906	6,489	7,417	7,253
8	1,176	1,250	1,042	1,136	1,114	1,019	1,197	1,346	1,250	1,408	1,414
9	3,624	4,163	3,509	2,204	2,024	2,310	3,316	3,536	4,322	4,965	3,883
10	8,892	9,182	10,249	11,527	10,070	10,015	10,838	11,223	12,723	13,567	14,111
11	5,789	6,278	6,134	4,990	4,973	5,938	6,865	6,499	7,123	7,699	5,568
12	1,638	1,643	1,270	1,301	1,765	1,550	1,506	1,290	1,344	1,393	1,484
13	1,371	1,307	1,287	1,078	1,153	1,067	1,053	1,063	1,148	958	957
14	61,850	67,810	62,671	55,289	51,665	56,737	67,503	70,330	80,119	87,752	79,860
15	61,850	64,161	57,251	46,787	38,711	39,892	46,822	46,773	51,070	55,308	44,032
16	1.0000	.9462	.9135	.8462	.7493	.7031	.6936	.6651	.6374	.6303	.5514
17	121,283	124,815	113,336	96,628	84,186	87,203	97,614	97,675	104,867	110,525	92,984
18	.51	.51	.51	.48	.46	.46	.48	.48	.49	.50	.47

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Line
(1-13) Each computed as follows: supply figures on corresponding line, Table 4, divided by 1928 figure, same line, that table. Actual railway tonnage, 1928, multiplied by resulting ratio for each later year.

(14) Total, lines 1-13.

(15) Actual revenue tons originated, 13 commodity groups.

(16) Ratio of actual to hypothetical, line 15 ÷ line 14.

(17) Actual revenue tons originated, all commodities except coal, coke, and patent fuel.

(18) Ratio of actual, 13 commodity groups, to actual, all commodities except coal, etc. line 15 ÷ line 17.

TABLE 6

Expansions and Contractions in Tons of Merchandise and Minerals Conveyed, 1861-1913; Originated, 1920-1938[a] Duration and Percentage Change (Annual Data)

DURATION (YEARS)				PERCENTAGE CHANGE			
EXPANSIONS		CONTRACTIONS		EXPANSIONS		CONTRACTIONS	
					Per		Per
Dates	*Duration*	*Dates*	*Duration*	*Dates*	*Cent*	*Dates*	*Cent*
1893-1900	7	1883-86	3	1921-23	58	1923-26	−37
1901-07	6	1923-26	3	1862-67[b]	55	1920-21	−31
1862-67	5	1929-32	3	1868-73	51	1929-32	−24
1868-73[b]	5	1891-93	2	1926-27	49	1867-68[b]	−13
1878-83	5	1861-62	1	1893-1900	45	1937-38	−11
1886-91	5	1867-68[b]	1	1878-83	29	1891-93	−5
1932-37	5	1873-74	1	1901-07	24	1907-08	−5
1874-77	3	1877-78	1	1886-91	22	1927-28	−5
1908-11	3	1900-01	1	1932-37	19	1883-86	−4
1921-23	2	1907-08	1	1874-77	12	1877-78	−2
1912-13[b]	1	1911-12	1	1912-13[b]	9	1900-01	−2
1926-27	1	1920-21	1	1928-29	8	1861-62	−1
1928-29	1	1927-28	1	1908-11	7	1873-74	−1
		1937-38	1			1911-12	−1

[a] Livestock excluded, 1861-1921; included, 1921-38.
[b] 1868 assumed to be a trough and 1913 a peak because of level of coal production.

Greater growth from cycle to cycle in earlier times

Before World War I traffic contractions were merely rather mild interruptions in a history of persistent growth. Traffic lost in such a phase was regained or more than regained in a year or so. and substantially more than regained by the end of the following expansion (Chart 1).

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After the war, on the other hand, each cycle attained about the same high level as, or one somewhat lower than, its predecessor (Chart 3). The cessation of growth in rail traffic from cycle to cycle is explained, at least in part, by the increasing comparative attractiveness of a new means of transport, the motor truck. At the beginning of registration statistics in 1922, there were only 133,000 commercial goods vehicles in Britain; the number (seasonally adjusted, as usual in this paper) rose steadily to 488,000 at the outbreak of World War II (cf. Chart 6).

Proportion of durables rose and fell with business

Production of durable goods and of commodities used in making them generally fluctuates more over the course of a cycle than that of other goods. If it did so in Britain from 1920 to 1938, we should expect similar changes in the composition of freight traffic. We cannot make a complete count of durables tonnage, since the statistics classify only about two-thirds of the freight other than coal. But the ratio of such

CHART 6

Motor Cars, Motor Cycles, and Commercial Goods Vehicles with Licenses Current, 1922-1952
(At end of February, May, August, and November)

16
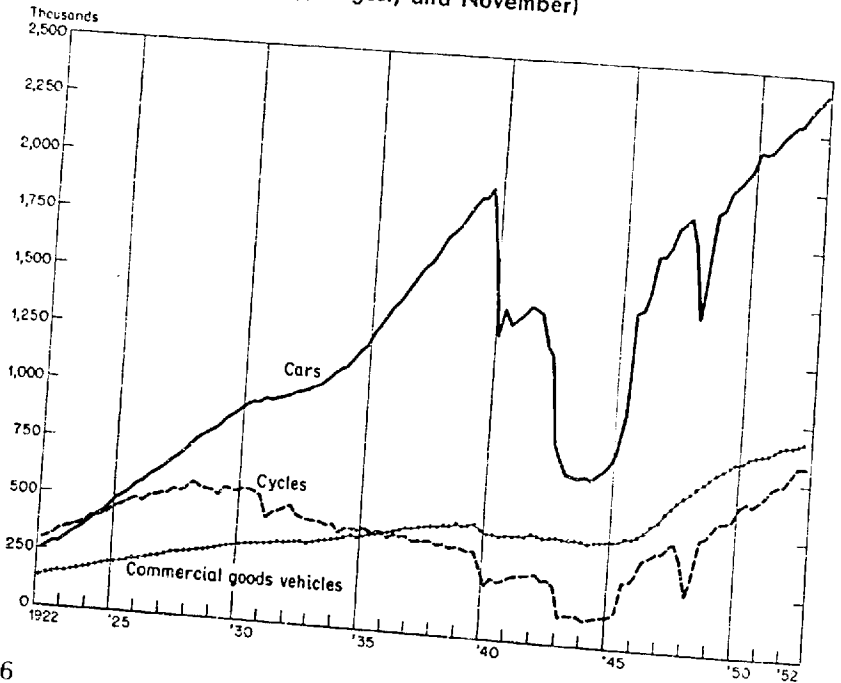
durables as there are figures for did tend to rise in expansion and fall in contraction (Chart 7, lower group of curves). Between 1923 and 1938, however, the relation is obscured. The ratio increased in 1924-26, diminished in 1926-27, apparently increased a little in 1927-28, declined in 1928-29. But the rise in 1924-26 was less rapid than in 1921-24, the fall in 1928-29 less precipitous than in 1929-32. It may be that the range of articles included in durables broadened from 1927 to 1928; we are therefore uncertain how to interpret the seeming rise in that contraction.[9]

In the foregoing comparisons, coal, etc. is included in total traffic. After 1927, changes in coal tonnage originated reflected primarily cyclical variations in the demand for that commodity. In the phases between 1921 and 1927, the dominant cause of the decline in coal traffic was the cutting off of supplies by the strike. To be sure, the shortage of fuel severely curtailed the production and shipment of other commodities, including those important durables, iron and steel. But the disturbance in iron and steel was not as severe as in coal (Table 7). The strikes tended to raise the ratio of durables to all freight, including coal. The ratio of durables to all traffic except coal was more consistently related to business fluctuations. It rose and fell in accordance with business in all phases except, perhaps, 1927-28 (Chart 7, upper curve). The first trough also coincided with that in business instead of coming a year later as in the case of the ratio to all traffic including coal.

[9] The categories are as follows (identity of language does not guarantee identical content as between the two groups of years):

1920-27	1928-38
Bricks	Bricks, blocks, and tiles
Cement, plaster, and whiting	Cement and lime
Gravel and sand	Gravel and sand
Iron and steel	Iron and steel blooms, billets, and ingots, etc.
	Iron and steel, other descriptions
	Iron and steel scrap
Ironstone and iron ore	Iron ore
Limestone (other than road-making or agricultural)	Limestone and chalk
Pig iron	Pig iron
Stone and other material for road-making	Road-making and road-repairing material
Timber	Timber

The Ministry of Transport failed to obtain data on cement, plaster, and whiting for 1926; hence comparable figures for 1924-26 and its adjoining phases must exclude these articles.

TABLE 7

Production Measures and Ton-Miles
Per Cent Change in Each between its Peaks and Troughs or Quasi-Troughs, 1920-1938

	PEAK 1920	QUASI-TROUGH Before 1921 strike	After 1921 strike	PEAK 1923 (except as noted)	QUASI-TROUGH 1925	PEAK 1927	TROUGH 1928	PEAK 1929	TROUGH 1932 (except as noted)	PEAK 1937	TROUGH 1938
Production of coal											
Date	June	Feb.	Aug.	June	Aug.	July	April	June	June 1933	April	Dec.
Amount, millions of tons per week[a]	4.77	4.03	4.23	5.51	4.53	5.10	4.59	5.12	3.94	4.75	4.12
Production of steel ingots and castings											
Date	Sept.	Feb.	Sept.	June	Aug.	April	April	Aug.	Sept. 1931	Dec.	July
Amount, thousands of tons[b]	745	436	443	724	601	915	679	852	420	1163	754
Production, industrial											
Index, 1924 = 100[d]	c	c	3Q 90.3	3Q 1924 102.0	3Q 95.9	3Q 110.3	3Q 90.4	3Q 112.7	2Q 1931 84.6	3Q 126.7	3Q 88.3
Ton-miles, coal, etc.											
Date	June	Feb.	Aug.	June	Aug.	Jan.	July	Mar.	April 1933	May	Mar.
Amount, millions	853	652	676	866	766	939	713	794	604	775	675

Ton-miles, other											
Date	°	°	Sept.	Feb., 1924	Aug.	May	Feb., 1929	Oct.	Dec.	June	Nov.
Amount, millions			602	750	750	801	726	808	540	809	668

Ton-miles, total											
Date	June	Feb.	Aug.	Feb., 1924	Aug.	Jan.	July	Nov.	Dec.	June	Aug.
Amount, millions	1729	1294	1245	1598	1516	1584	1476	1595	1198	1575	1339

% change in amount or index, from preceding date										
Production of coal	-16		30	-18	13	-10	12	-23	21	-7
Production of steel										
ingots and castings	-41		63	-17	39	-19	25	-51	176	-35
Production, industrial			13	-8	17	-10	13	-28	57	-18
Ton-miles, coal, etc.	-24		28	-12	8	-14	11	-24	29	-13
Ton-miles, other			25	0	7	-9	11	-33	50	-17
Ton-miles, total	-25		28	-5	4	-7	8	-25	31	-15

a Computed from data in *Board of Trade Journal*, various issues, and Secretary of Mines, *Annual Report*, 1926, p. 82. Each of the underlying monthly figures is an average of four or five weekly figures. Weeks ending on first, second or third day of a month are assigned to the previous month.

b From various issues of *The Iron and Coal Trade Review*.

c Peak not determinable; cf. Chart 3.

d From London and Cambridge Economic Service, *Monthly Bulletin*, various issues. Prepared by J. F. W. Rowe. Data are quarterly.

Amounts are averages for month indicated, preceding and following month, e.g. 853 million ton-miles is average coal ton-miles in May, June, and July, 1920.

The two kinds of ton-miles do not add up exactly to the total, as the seasonal adjustment was carried out separately for each of the three sets of figures.
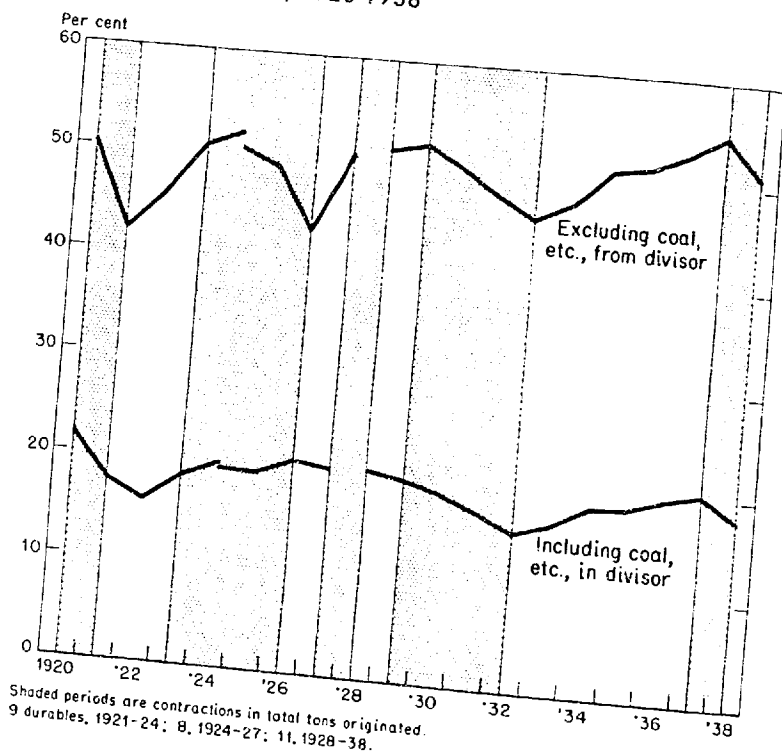
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Fluctuations in traffic normally were moderate

Cyclical fluctuations in railway freight traffic are normally much less severe than those in the production of durable goods. We can illustrate the difference by comparing ton-miles with the production of steel ingots and castings. But first we must note that the business cycles between 1920 and 1926 were peculiar in that the contractions were marked off from the expansion by two great strikes. The first of these, in 1921, centered in the coal industry but affected other industries by cutting off their supply of fuel. The second was more general. We shall begin our discussion with the cycles between 1927 and 1938, which are free of this complication.

In that later period, fluctuations in coal production were milder, percentagewise, than those in steel production (Table 7, last 6 columns). Coal is used not only to produce durable goods, but to produce

CHART 7

Percentage Ratio of Tons of Selected Durable Commodities
to Total Tons Originated, 1920-1938

Shaded periods are contractions in total tons originated.
9 durables, 1921-24: 8, 1924-27: 11, 1928-38.

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nondurable goods, to generate electricity, which in turn serves a great variety of purposes, and to heat buildings; many of these uses are quite stable. Fluctuations in coal ton-miles, although not identical with those in coal production, were likewise milder than those in ingot production. Ton-miles other than coal include the movement of nondurables as well as durables; fluctuations in "other" ton-miles were likewise mild compared with those in steel production.

As to the strike cycles, consideration of Charts 2 and 3 and of a similar chart for ingots suggests that the effects of the first strike were felt from April through June 1921 (with some lag in the case of steel production and "other" ton-miles) and that the effects of the second were felt from May through December 1926. The strikes depressed all six aspects of economic activity, but affected some much more than others (Table 8). The mining of coal practically ceased. Its movement was maintained better than its production — imports and stocks must have moved by rail — but coal ton-miles diminished much more than industrial production or other ton-miles. Ingot production did not fall quite as far as coal production, but the loss of fuel nevertheless closed the steel industry down almost completely.

If we were to compare the percentage decline in, say, the movement of coal from its 1920 peak to its absolute trough in 1921 with the percentage decline in some other economic activity, the outcome of our comparison would be influenced by the peculiar effects of the strike on amplitudes of fluctuation. But the decline from 1920 to the *verge* of the strike period, and the rise from the first few months after the strike period to the peak in 1923 (or 1924), is free from this distortion. We may take the last three months before the strike period as a quasi-trough for comparison with 1920, and the first three months after it as a quasi-trough for comparison with 1923 (or 1924).

A similar procedure would not work in the vicinity of the 1926 strike. The economic activities considered did not decline steadily from their 1923 or 1924 peaks to the verge of the strike. On the contrary, all of them showed an upturn after August 1925. Their level in the three months just before the strike differed little from their level at their respective 1923 or 1924 peaks, and their level immediately after the strike differed even less from their level at their 1927 peaks. We therefore take the third quarter of 1925 as a quasi-trough. We measure the percentage drop in each activity from its 1923 (or 1924) peak to this

TABLE 8

Production Measures and Ton-Miles before, during, and after Periods of Strike Disturbance, 1921 and 1926

| | AVERAGES FOR | | | | |
	Three preceding months (1)	Three lowest months (2)	Three following months (3)	PERCENT (2) of (1) (4)	PERCENT (2) of (3) (5)
1921					
Months included	Jan., Feb., March	April, May, June[a]	July, Aug., Sept.[b]		
Production of coal	4.03	0.06	4.23	1	1
Production of steel ingots and castings	436	27	443	6	6
Production, industrial	87.8	54.4	90.3	62	60
Ton-miles, coal	652	96	676	15	14
Ton-miles, other	595	442	602	74	73
Ton-miles, total	1,294	559	1,245	43	45
1926					
Months included	Feb., March, April	May, June, July	Jan., Feb., March. 1927		
Production of coal	5.01	0.06	4.90	1	1
Production of steel ingots and castings	680	36	802	5	4
Ton-miles, coal	825	123	826	15	15
Ton-miles, other	789	542	782	69	69
Ton-miles, total	1,614	665	1,608	41	41

[a] For "other" ton-miles, May, June, July.

[b] For steel ingots and "other" ton-miles, August, September, October.

For sources and units of measurement, see Table 7. The quarterly data of the industrial production index do not fit the time pattern of the strike in 1926; the index is therefore not shown for 1926.

quasi-trough, and its net percentage rise from the quasi-trough to its 1927 peak.

The data for peaks and quasi-troughs, 1920-27 (Table 7, first six columns) yield conclusions like those derived from the data for peaks and troughs, 1927-38. Again the downswings and upswings in total traffic are less severe, percentagewise, than those in steel production; they are closer, in amplitude, to those in general industrial production.