Volume Title: The Transportation Industries, 1889-1946: A Study of Output, Employment, and Productivity

Volume Author/Editor: Harold Barger

Volume Publisher: NBER

Volume ISBN: 0-87014-050-7

Volume URL: http://www.nber.org/books/barg51-1

Publication Date: 1951

Chapter Title: Appendix H Waterways: Basic Series

Chapter Author: Harold Barger

Chapter URL: http://www.nber.org/chapters/c3202

Chapter pages in book: (p. 253 - 264)

Appendix H

Waterways: Basic Series

Table H-1

WATERWAYS: FREIGHT TRAFFIC SUMMARY

Billion ton-miles (short tons, statute miles)

	Coastwise[a]	*Intercoastal*[a]	*Great Lakes*[b] *(domestic)*	*Inland*[c]	*Noncontiguous*[d]	*International, American-Flag*[d]	*Total*
1889	14.7	1.9	14.6	4.6	19.7		55.6
1920	37	22	73	5	11	285	434
1921	32	29	35	5	12	184	297
1922	46	50	57	4	11	205	375
1923	61	87	81	6	10	179	425
1924	66	70	61	7	11	186	401
1925	87	60	77	8	12	169	413
1926	88	70	83	10	13	180	444
1927	97	73	76	9	13	180	447
1928	98	65	77	9	13	168	431
1929	101	74	89	9	12	173	457
1930	97	63	69	9	13	151	402
1931	98	51	43	9	12	114	327
1932	91	40	20	8	12	87	259
1933	110	53	41	10	12	88	314
1934	111	59	42	9	13	99	334
1935	117	50	49	13	14	98	341
1936	145	47	71	15	15	96	388
1937	171	48	86	17	17	113	451
1938	161	41	42	18	14	84	360
1939	174	52	69	20	16	80	410
1940	183	47	88	22	18	118	475
1941	....	....	104	27	....	....	....
1942	....	....	112	26	....	....	....
1943	....	....	148	26	....	....	....
1944	....	....	106	31	....	....	....
1945	....	....	102	30	....	....	....
1946	210		87	28	26	352	704

[a] For 1889 from Census of Waterways, using average hauls in Table H-3. For 1937 see Tables H-3 and H-4. For other years, intercoastal shipments (U. S. Maritime Commission, annual reports 2610, 'Water-Borne Foreign and Noncontiguous Commerce and Passenger Traffic', and predecessors) were deducted from coastal and intercoastal shipments (U. S. Army, Chief of Engineers, Annual Report, Part 2), this operation being performed separately for each of the three coastal regions; the resulting tonnages were then multiplied by average hauls in Table H-4.

The Board of Investigation and Research, appointed under the Transportation Act of 1940, put combined coastal and intercoastal ton-miles for 1939 at 174 billion; the Board states that its intercoastal figure is "derived by use of

direct rail distance", but does not otherwise describe its method (*The National Traffic Pattern*, 79th Cong., 1st Sess., Senate Document 83, p. 22).

[b] For 1889 Census data: total lakewise shipments were multiplied by an average haul (578 miles) obtained from an analysis of the shipments between 34 principal pairs of ports. For 1925 and later years ton-mileage is given by the Army Engineers. For 1921-24 shipments from the same source were multiplied by an average haul extrapolated from the 1925 figure (750 miles).

The estimate for 1939 by the Board of Investigation and Research (see note a) is very close to our own, being 68 billion ton-miles. The ICC (*55th Annual Report*, p. 9) places combined Great Lakes and inland waterways at 96 billion ton-miles in 1939.

[c] The 1889 Census reports coal and lumber traffic on the Mississippi system at 2.6 billion ton-miles; other traffic was estimated in that year on the basis of a haul of 40 miles, comparable with that during the 1920's. For 1925 and later years ton-mileage is given by the Army Engineers. For 1921-24 shipments from the same source were multiplied by an average haul of 40 miles (1925 haul was 41 miles).

The estimate for 1939 by the Board of Investigation and Research (see note a) is 17 billion ton-miles. For an ICC estimate, see note b.

[d] For 1889 from Census, using average hauls to and from North Atlantic ports (4453 miles), South Atlantic ports (3266 miles), Gulf ports (4029), and Pacific ports (5126 miles) computed from detailed data for 1927 (the earliest for which a simultaneous breakdown of receipts and shipments by U. S. coastal districts and foreign trade regions is available). For 1928-40 noncontiguous and 1927-40 international receipts plus shipments between U. S. coastal districts and individual foreign trade regions or territories (Maritime Commission, annual reports 2610 and predecessors) were multiplied by the estimated average hauls shown in Tables H-5 and H-6, where illustrative calculations are given in detail for the year 1939. Noncontiguous ton-miles were extrapolated from 1928 back to 1923 using total shipments and receipts (*Statistical Abstract of the U. S.*) and from 1923 to 1920 on the basis of shipments of sugar from Hawaii and Puerto Rico to the United States (*Statistical Abstract*): figure for 1946 extrapolated by total receipts and shipments at San Juan, Puerto Rico, and Honolulu (Army Engineers). International ton-miles were extrapolated from 1927 back to 1921 on the basis of total ocean-borne American-flag receipts and shipments (Maritime Commission, annual reports 399, 'Comparative Summary of Water Borne Foreign Commerce'), and from 1921 to 1920 using American-flag imports plus exports (value) deflated by BLS wholesale prices (*Statistical Abstract*); for 1946 American-flag receipts plus shipments, by foreign trade areas (as in Table H-6; data from U. S. Bureau of the Census release, series FT 973, April 30, 1947) were multiplied by average hauls for each foreign trade area derived from Table H-6. The Maritime Commission has published no comprehensive receipts and shipments from returns by vessel operators for years since 1940; and the Census Bureau compilations, which are collected from customs houses and begin in 1946, offer no breakdown by U. S. coastal regions (as in Table H-6) and do not cover noncontiguous trade. American-flag international receipts and shipments through Great Lakes ports are actually available only for 1938, 1939 and 1946; for all other years total 'oceanborne' ton-miles were adjusted upward to cover Great Lakes traffic by the 1939 ratio (1.020; see Table H-6). Trade with the Philippine Islands, in 1937 and earlier years classified by the Maritime Commission as noncontiguous, has throughout been regarded by us as international.

Table H-2

WATERWAYS: PASSENGER TRAFFIC SUMMARY

Million passenger-miles (statute miles)

			International American-flag	
	Intercoastal[a]	*Noncontiguous*[b]	Between U. S. and foreign ports[c]	Cruises[d]
1928	108	187	1246[e]	
1929	128	250	1212	28
1930	119	182	1114	37
1931	104	147	948	48
1932	95	111	825	54
1933	115	109	776	76
1934	140	142	809	81
1935	153	174	861	118
1936	124	186	1102	121
1937	126	198	1105	168
1938	....	205	759	153
1939	....	218	823	104
1940	....	238	715	92

[a] New York is the eastern terminal for practically all intercoastal passenger traffic. Accordingly, West Coast arrivals plus departures (U. S. Maritime Commission, annual reports 157, 'Water Borne Passenger Traffic') were multiplied by the following estimated navigational distances from New York (via Panama): Los Angeles and San Diego, 5,600 statute miles; San Francisco, Seattle and Portland, 6,100. No data for years since 1937 have been published.

[b] Arrivals plus departures at U. S. ports by U. S. coastal districts and noncontiguous territories are available in Maritime Commission, reports 2610 and predecessors (annual). These were combined each year with the average hauls in Table H-5, except that the distance between Pacific Coast and Alaskan ports was taken as 900 miles. No data have been published for years since 1940. Travel between the United States and the Philippine Islands is excluded throughout.

[c] Arrivals plus departures at U. S. ports in American-flag vessels are reported for 1927-29 and 1938-40 separately by U. S. coastal districts and foreign trade regions in sources mentioned in note b. For these years the data were combined with the hauls shown in Table H-6. For 1930-37 the data were apparently not published with the breakdown indicated; accordingly figures for these years are interpolated, using total American-flag arrivals plus departures and graduating the change in over-all average haul (from 1,940 miles in 1929 to 2,160 miles in 1938) along a straight line. No data have been published for years since 1940. The figures include travel between the United States and the Philippine Islands throughout the period. Great Lakes travel was not reported before 1938, but allowance (less than 1 percent of total) has been made for its inclusion.

[d] For 1929-40 arrivals and departures on cruises in American-flag vessels are reported in the sources mentioned in note b. The data were multiplied by the following lengths of haul (in statute miles representing half the lengths of the cruise): from North Atlantic ports — African (7,900), Bermuda (780), Cana-

dian (1,500), Caribbean (2,300), European (5,800), Havana (1,400), Mediterranean (5,800), North Cape (5,500), Pacific (11,200), Sea (200), South American (6,100), West Coast of Americas (5,200), World (15,000); from South Atlantic ports — Caribbean (1,600); from Gulf ports — Caribbean (1,600), Havana (680), Mediterranean (6,800); from Pacific ports — Pacific (6,000), World (15,000); from Great Lakes ports — Canadian (1,000). For 1928 cruise passengers were not reported. No data have been published for years since 1940.

[a] Travel between U. S. and foreign ports, raised to include cruises on 1929 basis.

Table H-3

DOMESTIC FREIGHT TRAFFIC OF 76 PRINCIPAL SEAPORTS, 1937[a]

Short tons, statute miles

	New England	*Middle Atlantic*	*South Atlantic*	*East Gulf*	*West Gulf*	*Pacific Southwest*	*Pacific Northwest*
New England							
Tons (th.)	2,149	1,240	174	47	113	75	21
Av. haul (miles)	100	350	1,050	1,925	2,350	6,015	7,000
Ton-miles (mil.)	215	434	182	90	266	449	149
Mid-Atlantic							
Tons (th.)	17,782	12,440	961	216	2,007	1,778	453
Av. haul (miles)	500	300	800	1,680	2,100	5,880	6,890
Ton-miles (mil.)	8,891	3,732	769	362	4,214	10,458	3,124
South Atlantic							
Tons (th.)	255	1,520	96	3	35	50	21
Av. haul (miles)	1,050	800	200	950	1,400	5,280	6,265
Ton-miles (mil.)	268	1,216	19	3	49	266	133
East Gulf							
Tons (th.)	96	1,260	86	95	80	204	58
Av. haul (miles)	1,925	1,680	950	200	525	5,140	6,125
Ton-miles (mil.)	186	2,116	81	19	42	1,051	355
West Gulf							
Tons (th.)	9,709	46,506	6,298	2,082	9,587	313	195
Av. haul (miles)	2,350	2,100	1,400	525	200	5,290	6,270
Ton-miles (mil.)	22,817	97,662	8,817	1,093	1,917	1,654	1,220
Pacific Southwest							
Tons (th.)	366	1,388	100	45	201	9,157	6,114
Av. haul (miles)	5,925	5,790	5,190	5,050	5,200	250	1,080
Ton-miles (mil.)	2,170	8,037	517	229	1,044	2,289	6,604
Pacific Northwest							
Tons (th.)	538	1,740	154	66	119	1,994	386
Av. haul (miles)	7,000	6,890	6,265	6,125	6,270	980	200
Ton-miles (mil.)	3,766	11,986	962	405	745	1,954	77

SUMMARY, 76 PORTS

	Coastwise	*Intercoastal*	*Total*
Receipts and shipments (thousand tons)	132,488	7,885	140,373
Traffic (million ton-miles)	166,386	48,719	215,105
Average haul (miles)	1,260	6,180	1,530

Notes to Table H-3

[a] This and the succeeding table show how ton-miles in coastwise and intercoastal trade were derived for 1937. The U. S. Maritime Commission has traced coastwise and intercoastal commodity movements for that year by distributing the commerce of 76 principal ports into receipts and shipments from and to 7 regional districts. We have here reproduced some of the basic data from Appendix 4 of the Commission's 'Economic Survey of Coastwise and Intercoastal Commerce.' The table contains a distribution of the receipts and shipments of these principal ports (ports having traffic volume of 200,000 short tons and over) into a two-way classification which requires brief explanation. The Commission divided the Atlantic, Gulf, and Pacific coasts into the following geographic regions:

New England: Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut.

Middle Atlantic: New York, New Jersey, Pennsylvania, Delaware, Maryland and Virginia.

South Atlantic: North Carolina, South Carolina, Georgia, and east coast of Florida.

East Gulf: West coast of Florida, Alabama and Mississippi.

West Gulf: Louisiana and Texas.

Pacific Southwest: California.

Pacific Northwest: Oregon and Washington.

The vertical listing of these seven regions represents the point of origin and the horizontal listing the point of destination. The table may be read as follows: Principal ports in the New England region shipped 3,723 thousand tons of cargo to the principal ports of the five Atlantic and Gulf coast regions; 2,149 thousand tons to New England, 1,240 thousand tons to the Middle Atlantic region, etc., making up an estimated total of 1,187 million ton-miles of traffic out of New England ports; while 96 thousand tons were shipped in the intercoastal trade to the Southwest and Northwest Pacific regions from New England.

Each cargo movement was originally recorded twice, as a shipment and as a receipt. The totals differ because only 76 principal ports are covered. In each case we have entered the higher figure in the table, whether a shipment or a receipt.

Average hauls are shown in statute miles and were estimated by us by weighting the distance between ports by the relative importance of each port.

Table H-4

DERIVATION OF COASTWISE AND INTERCOASTAL TON-MILES, 1937[a]

Short tons, statute miles

Region	*Shipments* (th. tons)	*Ton-Miles* (mil.)	*Average Haul* (miles)
Atlantic coast			
Coastwise	37,145	19,319	520
Intercoastal	2,269	13,811	6,087
Gulf Coast			
Coastwise	76,082	133,296	1,752
Intercoastal	769	4,278	5,560
Pacific coast			
Coastwise	26,192	18,306	699
Intercoastal	4,694	29,731	6,334
Total, all coasts			
Coastwise	139,419	170,921	1,226
Intercoastal	7,732	47,820	6,185
GRAND TOTAL	147,151	218,741	1,487

[a] Data are the same as those in Table H-3, but have been raised to include commerce of small ports omitted in preceding table. The adjustment, of the order of 5 percent, is based upon the presumably complete data collected by the Chief of Army Engineers (*Annual Report,* Part 2).

Table H-5

DERIVATION OF NONCONTIGUOUS TON-MILES, 1939[a]

Statute miles

	North Atlantic	*South Atlantic*	*Gulf*	*Pacific*
Alaska — dry cargoes				
Long tons (th.)	1	....	....	805
Haul (miles)	7,900	....	....	1,100
Long ton-miles (mil.)	10	....	....	884
Alaska — tanker cargoes				
Long tons (th.)	....	....	....	107
Haul (miles)	....	....	....	2,200
Long ton-miles (mil.)	....	....	....	240
Hawaii				
Long tons (th.)	490	2	102	2,021
Haul (miles)	7,700	7,100	7,000	2,400
Long ton-miles (mil.)	3,785	16	715	4,867
Pacific Islands				
Long tons (th.)	....	....	....	6
Haul (miles)	....	....	....	5,100
Long ton-miles (mil.)	....	....	....	32
Puerto Rico				
Long tons (th.)	1,240	54	572	69
Haul (miles)	1,600	1,300	1,800	5,000
Long ton-miles (mil.)	1,998	71	1,011	346
Samoa				
Long tons (th.)	....	....	....	3
Haul (miles)	....	....	....	4,700
Long ton-miles (mil.)	....	....	....	16

SUMMARY

Receipts and shipments (thousand long tons)	5,474
Traffic (million long ton-miles)	13,991
Receipts and shipments (thousand short tons)	6,131
Traffic (million short ton-miles)	15,670
Average haul (miles)	2,600

[a] This table shows the derivation of the 1939 figure for noncontiguous ton-miles in Table H-1. Similar computations were made for each of the years 1928-40. The first line for each territory is the sum of receipts and shipments through all United States ports in the coastal districts indicated by the column heading (data from U. S. Maritime Commission, annual reports 2610 and predecessors). We based the haul on the shortest normal navigational distances between principal ports, weighted by traffic of the ports. The ton-mileage figure results from multiplication (in some cases a larger number of significant figures was used than shown in the table). Dry and tanker cargoes are shown separately for Alaska because of the significant difference in haul; in all other cases dry and tanker cargoes are combined.

Table H-6

DERIVATION OF AMERICAN-FLAG INTERNATIONAL TON-MILES, 1939[a]

Statute miles

	North Atlantic	South Atlantic	Gulf	Pacific	Great Lakes
Caribbean					
Long tons (th.)	5,114	211	1,411	254	....
Haul (miles)	1,500	1,200	1,400	5,000	....
Long ton-miles (mil.)	7,906	258	1,933	1,271	....
East Coast South America					
Long tons (th.)	602	43	365	94	....
Haul (miles)	6,100	5,900	6,800	9,600	....
Long ton-miles (mil.)	3,671	258	2,495	906	....
West Coast South America					
Long tons (th.)	1,572	9	6	189	....
Haul (miles)	5,200	4,500	4,500	5,900	....
Long ton-miles (mil.)	8,115	42	25	1,122	....
West Coast Central America and Mexico					
Long tons (th.)	5	1	[b]	100	....
Haul (miles)	3,100	2,500	2,400	2,400	....
Long ton-miles (mil.)	17	2	1	236	....
Gulf Coast Mexico					
Long tons (th.)	308	....	135	....	....
Haul (miles)	2,300	....	900	....	....
Long ton-miles (mil.)	713	....	124	....	....
United Kingdom					
Long tons (th.)	480	107	633	52	....
Haul (miles)	3,600	4,200	5,500	9,100	....
Long ton-miles (mil.)	1,748	453	3,479	479	....
Baltic, Scandinavia, Iceland, Greenland					
Long tons (th.)	315	....	13	....	....
Haul (miles)	4,600	....	6,400	....	....
Long ton-miles (mil.)	1,450	....	83	....	....
Bayonne — Hamburg Range					
Long tons (th.)	761	190	564	47	....
Haul (miles)	4,100	4,600	5,900	9,500	....
Long ton-miles (mil.)	3,084	879	3,304	450	....
Portugal and Spanish Atlantic					
Long tons (th.)	32	....	21	....	....
Haul (miles)	3,500	....	4,700	....	....
Long ton-miles (mil.)	110	....	98	....	....
Azores, Mediterranean and Black Sea					
Long tons (th.)	513	5	126	6	....
Haul (miles)	5,900	6,200	7,000	11,000	....
Long ton-miles (mil.)	3,016	29	885	71	....
West Coast Africa					
Long tons (th.)	145	....	28	....	....
Haul (miles)	4,300	....	5,500	....	....
Long ton-miles (mil.)	626	....	151	....	....
South and East Africa					
Long tons (th.)	330	....	6	....	....
Haul (miles)	8,900	....	10,000	....	....
Long ton-miles (mil.)	2,926	....	65	....	....

Table H-6 — INTERNATIONAL TON-MILES (concluded)

	North Atlantic	*South Atlantic*	*Gulf*	*Pacific*	*Great Lakes*
Australasia					
Long tons (th.)	74	....	....	45	....
Haul (miles)	10,800	....	....	7,800	....
Long ton-miles (mil.)	797	....	....	349	....
India, Persian Gulf, Red Sea					
Long tons (th.)	255	11	100	8	....
Haul (miles)	9,400	9,400	10,600	11,100	....
Long ton-miles (mil.)	2,403	100	1,057	94	....
Straits Settlements, Dutch East Indies					
Long tons (th.)	144	[b]	....	20	....
Haul miles)	11,700	11,100	....	9,200	....
Long ton-miles (mil.)	1,685	4	....	179	....
South China, Taiwan, Philippines					
Long tons (th.)	292	24	10	338	....
Haul (miles)	13,100	12,500	12,400	7,600	....
Long ton-miles (mil.)	3,831	301	122	2,575	....
North China (incl. Shanghai) and Japan					
Long tons (th.)	38	4	78	223	....
Haul (miles)	11,200	10,500	10,500	5,200	....
Long ton-miles (mil.)	421	46	818	1,165	....
Pacific Canada					
Long tons (th.)	7	....	1	777	....
Haul (miles)	7,100	....	6,400	1,100	....
Long ton-miles (mil.)	52	....	9	838	....
Great Lakes Canada					
Long tons (th.)	64	....	....	....	3,072
Haul (miles)	1,700	....	....	....	420
Long ton-miles (mil.)	107	....	....	....	1,302
Atlantic Canada, Newfoundland					
Long tons (th.)	59	....	49	9	53
Haul (miles)	690	....	2,700	6,800	840
Long ton-miles (mil.)	41	....	130	63	44

SUMMARY

Receipts and shipments (thousand long tons)	20,550
Traffic (million long ton-miles)	71,014
Receipts and shipments (thousand short tons)	23,016
Traffic (million short ton-miles)	79,536
Average haul (miles)	3,500

[a] This table shows the derivation of the 1939 figure for American-flag international ton-miles in Table H-1. Similar computations were made for each of the years 1927-40, and also (with no breakdown between U. S. coastal districts) for 1946. The first line for each foreign trade region is the sum of receipts and shipments (dry-cargo and tanker) in American-flag vessels through all U. S. ports in the coastal district indicated by the column heading (data from U. S. Maritime Commission, annual reports 2610 and predecessors; for 1946, U. S. Bureau of the Census release, series FT 973, April 30, 1947). We based the haul on the shortest normal navigational distances between principal ports, weighted by traffic of the ports. Hauls for Great Lakes traffic are from U. S. Army, Chief of Engineers, *Annual Report*, Part 2, 1940, pp. 17, 29; between Great Lakes ports and Atlantic Canada 100 miles was added to the lakewise haul in order to allow for distance along the St. Lawrence River. The ton-mileage figure results from multiplication (in some cases more significant figures were used than are shown in the table).

[b] Less than 500 long tons.

Table H-7

WATERWAYS: EMPLOYMENT

Thousand workers

	Passenger and freight vessels[a]	*Total employment*[b]		*Passenger and freight vessels*[a]	*Total employment*[b]		*Passenger and freight vessels*[a]	*Total employment*[b]
1889	97	....	1930	....	159	1940	....	142
			1931	....	144	1941	....	144
1916	106	....	1932	....	130	1942	....	107
			1933	....	135	1943	....	139
1920	178	....	1934	....	145	1944	....	205
			1935	....	148	1945	....	247
1926	136	....	1936	....	142	1946	....	200
1927	134	....	1937	....	151			
1928	134	....	1938	....	134			
1929	126	167	1939	....	140			

[a] Based on Census of Water Transportation, 1889, 1916 and 1926; figures do not include shore employment, nor employment on ferries and tugs. The figures have not been adjusted to represent equivalent full-time employment.

For 1889 the figure is said to equal "the number of persons . . . employed during the month of report. This number of men constituted what is called the number making the ordinary crews of vessels" (*Eleventh Census: Transportation,* Part II, p. 11). The total reported for the coasts, Great Lakes, Mississippi valley and Lake Champlain is 94,092 persons. Employment on other inland waterways was estimated at 3,080, the assumption being that ton-miles per worker was the same as for the Mississippi valley river system.

For 1916 and 1926 the employment reported is the number of persons "ordinarily required" for the operation of the active fleet (U. S. Bureau of the Census, *Water Transportation,* 1926, p. 20).

The figure for 1920 assumes that the change in gross tonnage per vessel employee between 1916 and 1926 was linear, and that the ratio of active to total tonnage was somewhat greater in 1920 than in either 1916 or 1926. The figures for 1927, 1928 and 1929 are an extrapolation due to Simon Kuznets and are based largely on tonnage cleared.

[b] Full-time equivalent. Includes ferries, tugs and harbor craft; also shore employees. Source: *Survey of Current Business,* July 1947, National Income Supplement, Table 24; also *Survey,* July 1948.