SHIPPING AND FREIGHT RATES IN THE OVERSEAS GRAIN TRADE

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Shipping—together with railway transportation—created the world grain market and has been largely responsible for its vast expansion during the past century. Enormous improvements in ships, with corresponding changes in port facilities, cargo handling, and shipping organization, brought freight rates down to a small fraction of their former size. Great reductions in transportation costs stimulated the agricultural development of newer countries, promoted international division of labor, enlarged the productive capacity of the world, greatly reduced the hazards to world food supplies from crop failures in particular countries, and helped to create new land values in some places and at least temporarily to depreciate land values in others.

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Demand for shipping services is exerted by thousands of individual articles that move by sea. But the large number of high-value manufactured and semimanufactured articles take up only relatively little space. The demand for cargo space exerted by such goods may vary widely, but this variation seldom causes a change in the level of ocean freights. Conversely, ordinary fluctuations in the level of ocean freight rates, and even marked changes over a period of years, are of minor import to such articles because freight charges are small in relation to prices.

By far the greatest part of the volume of seaborne commerce consists of a small number of commodities of low value per unit of bulk or weight. Within this group of bulk cargoes are foodstuffs. Of these the most important in international trade are grains, particularly wheat, imports of which are essential in the food supply of many countries. With such commodities, freight charges constitute a much larger fraction of the import price, and changes in the level of rates have larger effects.

Even fairly substantial changes in ocean freight costs may be little noticed by ultimate consumers—grain prices, for example, fluctuate widely for other reasons. Both temporarily and over a period of years, however, shipping freights play a significant role in determining the character, volume, and direction of the world's interchange of bulk goods. Large advances in rates, such as occurred during the World War, may impair the economic position of exporting countries or create problems of food supply in consuming centers dependent upon imports from overseas. Sustained reductions in ocean freight rates may affect the fortunes of countries performing the world's overseas transportation services and significantly alter the pattern of the economic life of nations, even though revolutionary effects on the distribution of world agriculture are not in prospect.

The past two years witnessed the most important advance in ocean freight rates since the World War. The rise that began in the middle of 1936 culminated in August–October 1937, and was followed by a notable decline. Such large changes in shipping costs over a short time materially affected the international grain market. This recent experience renders timely an examination of relations between maritime shipping and the world grain trade, with special reference to the world wheat situation and to the postwar period. In particular, it is pertinent to illuminate the complex subject of shipping freights,

to examine the factors that are responsible for the changing levels of rates on grain, and to consider the effects of such levels and changes on shipping and the grain trade.

I. CHARACTERISTICS OF THE SHIPPING INDUSTRY

Shipping as a carrying industry is essentially a modern development. Only when maritime commerce had expanded to the point where regular trade relationships had grown up between nations did shipping become a common-carrier business. Earlier, owning and operating of ships was largely incidental to buying and selling goods. As trading ventures became sufficiently numerous, there was a demand for ships operating as tramps do today, following no fixed routes but sailing wherever directed by merchant traders. With further growth in foreign commerce, liner services were eventually provided. The earlier sailing packet-boats were gradually supplemented by steamer lines. Just 100 years ago, in 1838, two British commercial steamships arrived in New York from England; one of these, the "Great Western," inaugurated the first transatlantic steam liner service.

Certain aspects of the shipping industry of today are more intelligible if one recalls that shipping was long an integral part of the merchant's business, and also that for centuries commercial and governmental interests were closely identified. National governments still strive to support their own shipping against foreign competition, particularly during periods of growing nationalism. Technological developments in ships and shipping, therefore, do not occur solely in response to demands for improved shipping services,[1] and the services provided over every sea lane do not represent simply the response to economic demand. A multitude of factors, both economic and noneconomic, determines the character of the tonnage used in carrying the world's goods—the number, type, services, ownership, and flag of merchant ships.

The World's Ocean Carriers

Of the numberless craft navigating the seas, lakes, and rivers of the world today, some 31,000 are commercial vessels of 100 gross tons[2] and over, large enough to be recorded by *Lloyd's Register,* the foremost authority on ship statistics.[3] Numerous barges, tugs and towboats, tenders, canal, river, and lake boats, pleasure craft, and naval vessels are excluded from the *Register* either because they are not used for commercial purposes or because they are under 100 tons gross.

Over half the 31,000 vessels on register are under 1,000 gross tons. Another 5,000 or 6,000 ships range from 1,000 to 3,000 gross tons. Such vessels are usually employed in coasting trade between domestic ports or in foreign trade between countries not distantly separated, as, for example, in the coal trade between Great Britain and ports of Northern Europe. These ships may be perfectly seaworthy, but few are engaged in transoceanic transportation. In the main, they are part of national systems of internal transport and hence of little interest here.[4]

Only about 8,000 ships are over 3,000 tons. Some of these are specially constructed bulk

[1] This is especially true with respect to ships that might be used as naval auxiliaries in time of war—cargo liners, tankers, and certain classes of combination cargo and passenger ships.

[2] Commonly used as the unit in general statistics on ships, a gross ton is not a measure of weight, but represents 100 cubic feet of space within a ship. Spaces exempt from inclusion in the measurement vary somewhat between countries.

[3] This is published by Lloyd's Register of Shipping, a "classification society" whose leading competitors are the Bureau Veritas of France and the American Bureau of Shipping. Its affairs are conducted separately from those of Lloyd's, the great association of underwriters. The classification societies render indispensable services to marine insurance underwriters. *Lloyd's Register,* easily the most comprehensive, shows for each vessel listed its "class" rating, its date and place of construction, dimensions, owners, kinds of engines, port of registration, and other details.

[4] Some confusion results from varying definitions of coastal trade. A voyage from San Francisco to New York, even if around the Horn, is coastal trade from the United States point of view. So also is a trip to Hawaii. Vessels engaged solely in these services are "enrolled," as distinguished from vessels "registered" for United States foreign commerce. Sea routes between European and Asiatic Russia are also long, for example, between Odessa or Leningrad and Vladivostok. For practically all other maritime countries, distances between domestic ports are short.

carriers suited to Great Lakes traffic[1] but not designed for oceanic trade involving voyages of several thousand miles or more. The bulk of the world's grain is carried by vessels of 3,000 gross tons and over, built for overseas voyages involving distances of 3,000 miles and upward.

Some 1,600 of all commercial vessels are sailing ships. Though mostly under 3,000 gross tons, these are used primarily on sea voyages. Since 1893, when their tonnage was first exceeded by that of steam-powered craft, sailing ships have declined in importance until now they account for only about 1.5 per cent of the world's tonnage.[2] In the international grain trade sailers are nowadays of negligible importance, though each year a few compete in a "race" from Australia to Europe with cargoes of wheat.

That part of the merchant shipping industry which provides an economically important means of communication and trade among the nations of the world is of small relative importance in terms of capital invested or persons employed. Any one of several large railway, utility, and industrial enterprises employs more capital and labor than all the ocean carriers of the world.

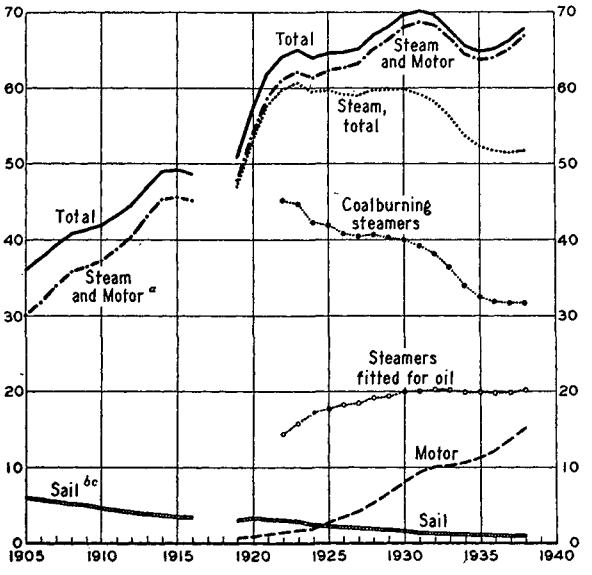
When specialized types of ships such as tankers, refrigerator ships, and vessels employed exclusively in lake shipping are excluded, less than 5,000 steam and motor vessels remain which could participate in the world's overseas grain trade. This round figure includes numerous passenger liners which actually do not carry grain.

Probably all of the seagoing ships suitable for transoceanic grain carrying are of steel construction.[3] Some are steamships and some are motorships. Some are fast and some are slow. Some are liners and some are tramps. They are owned or managed either by governments, corporations, or individuals, and they fly many different flags. Exclusive consideration of vessels engaged in the grain trade is not feasible, but since relatively few distinctions need to be established, *Lloyd's Register* statistics on ships engaged in all trades will serve present purposes.

Chart 1, using some of these data, summarizes certain broad changes in the size and composition of the world's merchant fleet. Today's ships are larger, faster, powered differently, and more specialized in their functions than those of a generation ago.[4] Their

CHART 1.—WORLD MERCHANT SHIPPING, JUNE 30, 1905–16 AND 1919–38*

(Million gross tons, except as noted)



* *Lloyd's Register of Shipping* data for tonnage on register, of 100 gross tons and upwards: for 1920–38 mainly as given in Table I, and prior to 1920 mainly from Chamber of Shipping of the United Kingdom, *Annual Reports*. See also note *a*.

[a] On June 30, 1914, steam and motor tonnage was divided as follows, in million gross tons: coalburning steamers, 43.9; steamers fitted for oil, 1.3; motorships, 0.2. For this and the later subdivision of steamer tonnage, see Bank of England, *Statistical Summary*, February 1934 and August 1938.

[b] Expressed in million *net* tons prior to 1919.

[c] *Lloyd's Register* includes sailing vessels with auxiliary power as steam or motor tonnage according to the type of auxiliary engine.

[1] For a description of Great Lakes shipping conditions, see H. S. Perry, *Ship Management and Operation* (New York, 1931), pp. 217–33.

[2] Some believe that sailing ships, or at least sailing ships with auxiliary engines, have not seen their last days. As internal-combustion engines become more adaptable, sailing ships with moderate-powered engines may increase in number and compete successfully in certain trades due to their economy of operation, in spite of their lesser speed and reliability. See, however, note *c* under Chart 1.

[3] All registered commercial vessels constructed of materials other than steel, e.g., iron, or wood and composite, now account for only about 2 per cent of the world's tonnage.

[4] For a discussion of construction, types, and uses of merchant vessels, see A. C. Hardy, *Merchant Ship Types* (London, 1924), and Robert Riegel, *Merchant*

total number is practically the same as just before the World War, but their aggregate tonnage has increased by approximately a third.

Except for about a million gross tons of sailing vessels, the world's commercial tonnage is now of the self-propelled type. Steamers continue to predominate, but Diesel-powered motorships, of negligible importance before the war, now account for nearly 23 per cent of the combined steam and motor tonnage. The chart reveals the extraordinarily rapid increase in motorship tonnage from less than a million gross tons in 1919 (then only a third as large as the sail tonnage) to 15.2 million in 1938, a net increase slightly greater than the statistical net gain for all tonnage during the same period. From its peak of 60.7 million gross tons in 1923, steam tonnage has declined to 51.7 million in 1938. Of the 2.8 million tons under construction on June 30, 1938, motorships accounted for 1.8 million and steamers for only 1.0 million.

Just before the war, barely 3 per cent of the world's merchant shipping used oil fuel. Today 52 per cent of this tonnage, and an even larger proportion of American vessels, use oil either directly in Diesel engines or for generating steam. The net shrinkage in steam tonnage from its interim peak in 1931 has been entirely in coal burners; steamers fitted for oil have for several years totaled about 20 million tons, and now constitute 39 per cent of all steam tonnage.

Low freights for many years were undoubtedly partly responsible for the increased building of more economical and efficient types of cargo carriers such as the motorship. The initial investment is higher for the motorship than the steamer, but costs of operation are lower and the paying cargo space is greater. Scandinavian countries have been particularly aggressive in its development, since they have been subject to more pressure to find improved bases for competition with ships of other flags. Although over a quarter of today's motorship tonnage is under the British flag, Norway ranks second with 18 per cent.[1]

In practically all vessel types the British continue to lead the world in merchant shipping, owning and operating over a quarter of the total tonnage. Britain's relative position is, however, less outstanding than before the war, when ships under the British flag constituted about 40 per cent of the commercial tonnage of the world.[2] The United States shares leadership with Great Britain in tanker fleets, and together they have over half of the total tanker tonnage.[3] In the aggregate, the American oceangoing merchant marine ranks second, accounting for 15 per cent of the total commercial tonnage, contrasted with 6 per cent just prior to the war.[4] The Japanese fleet has pushed up to third place, with around 7 per cent of the total commercial tonnage, followed by Norway with a slightly smaller proportion. Then comes the German fleet—second most important in 1914—followed by the Italian and the French.

In age composition the various merchant fleets differ considerably. A good many vessels built before the war are still in service. Ignoring sailers, tonnage over 25 years old on June 30, 1938 constituted the following percentages of four leading fleets: British, 9.5; American, 10.7; German, 13.5; and Japanese, 16.7. Corresponding percentages for tonnage over 20 years old are: 20.8, 28.2, 19.3, 32.5. Of these four, Britain alone has over half of her tonnage (56.8 per cent) in age groups up to 15 years, in contrast to less than 15 per cent of the United States merchant fleet; while

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Vessels (New York, 1921), Part I; and for more technical considerations, see E. W. Blockridge, *Merchant Ships and Shipping* (London, 1933).

[1] The Diesel engine was early found very reliable and economical for small Norwegian fishing vessels, and this doubtless contributed to its development for Norwegian tramps.

[2] See also p. 54, footnote 4. Not all ships registered in Great Britain, or any other country, are necessarily owned by nationals of such country. Ships owned by American interests have been operated under the British flag and laws in order to gain certain advantages. But this practice has disadvantages as well, for in subsidies and mail contracts each country tends to favor ships owned by its nationals, registered under its laws and flying its flag.

[3] Oil tankers are sometimes considered as a special type of tramp ship; however, most of them are not common carriers, but belong to "industrial fleets" operated by corporations for their private use.

[4] United States interests have the doubtful distinction of owning about half the sailing vessels remaining on the seas.

Japan has the highest percentage (23.6) under 5 years.

Each nation has specialized to a certain extent in the shipping services it provides, and this influences the composition of its fleet. Here the most important distinction to be made is between tramps and liners.

Shipping Services and Organization

The shipping employed in overseas transportation of grains includes vessels ranging from ordinary tramps to huge ocean liners. These are not interchangeable units. Liner services are provided by vessels operating over definite routes and on regular schedules; there are passenger liners, cargo liners, and cargo-passenger liners, according to their predominating traffic. Tramp ships, on the other hand, are not limited to fixed routes or ports, but offer their services in any part of the world where cargo may be obtainable.

Liners tend to concentrate upon the handling of small lots or "parcels" of manufactured goods having a high value in relation to their weight or volume. Here, speed and reliability of regular service are the important considerations. Tramps carry, often in full cargo lots, principally bulk goods of relatively low value in relation to volume, such as coal, grain, lumber, ore, and nitrate. Here, low cost of transportation is of chief importance.

Many liners also carry some bulk products, at rates competitive with those charged by tramps. Such shipments are known as "berth cargoes" and their carriage represents a supplemental and more or less special freight service. Liners often seek berth cargo to serve as ballast or otherwise assist in filling the holds of the ship, but it is not their main source of revenue.[1] Liner carriage of grains usually develops between ports having a diversified traffic, where regularly established services are in demand.

Liners, as a group, are distinguished from tramp ships by their greater size and speed, and by their carrying of passengers, though tramps on certain routes may carry a few passengers. Tramps and cargo liners, however, are not always readily distinguishable.[2] To meet peak demands, liner companies sometimes charter tramps during seasons of heavy traffic. Thus placed "on berth," they operate virtually as cargo liners (sometimes termed "tramp liners") so long as the owner or charterer sees fit. Or a cargo liner may operate as a tramp, though such diversion is infrequent. Modern cargo liners, carrying manufactured goods as well as foodstuffs and raw materials, have speeds ranging between 10 and 12 and even up to 15 knots—definitely higher since the war. The modern oceangoing tramp's speed seldom exceeds 10 knots—not much higher than formerly.

Some indication of the status of these types in 1925 is provided by the classification below which emerged from a study made in the

Classification	Thousand gross tons	Number of ships	Number of oil burners
Liners of 12 knots and over	13,661	1,640	562
Liners under 12 knots.....	9,822	1,734	849
General traders	7,603	1,503	...
Tankers	4,567	696	649
Total	35,653	5,573	2,060

United States Department of Commerce.[3] Here the "liners under 12 knots" are the cargo liners and the "general traders" the tramps. In the

[1] Years ago, liners were more dependent upon grain or some other type of ballast. Improvements in shipbuilding, including the general introduction of water ballast, freed the newer ships from such dependence on grain. See J. Russell Smith, *The Ocean Carrier* (New York, 1908), pp. 329–30.

[2] "The most difficult distinction to make is that between the tramp ship and the cargo liner. It may be thought that a precise statutory distinction would be found in the British Shipping (Assistance) Act 1935, which provided a subsidy to help tramp shipping. The draughtsman gave the task up in despair." See L. Isserlis, "Tramp Shipping, Cargoes and Freights," *Journal of the Royal Statistical Society*, Part I, 1938, CI, 60. Parliament preferred to define a tramp voyage as one "in the course of which all the cargo carried is carried under charter party but does not include any voyage during any part of which more than twelve passengers are carried." Since the war some tramps have operated back and forth over the River Plate/U.K. route and have thus acquired some of the characteristics of the liner.

[3] E. T. Chamberlain, *Liner Predominance in Transoceanic Shipping* (U.S. Dept. Comm. Trade Information Bull. 448, December 1926), p. 21. The world's seagoing shipping was considered vessel by vessel, taking into the computation only ships of 4,000 gross tons and over and qualifying for transoceanic trade.

first postwar decade, on the whole, the cargo liner was tending to displace the general trader.

> . . . . The carrying power of the lines under 12 knots in 1914 was 19 per cent of the total, compared with 29 per cent for the general trader or tramp. In 1925 when the general traders had available only 19 per cent of the world's oversea transport facilities, the liners under 12 knots offered 25 per cent of such facilities.

Thus the Department's study concluded.[1]

A later study reached very much the same conclusion: ". . . . it is doubtful whether tramp ships in 1933 provided as much as one-fifth of the total potential carrying power available to the shippers of the world."[2] According to Lohse, tramp *tonnage* accounted in 1933 for about 31 per cent of all merchant tonnage—29 per cent of British, 56 per cent of Japanese and Danish, 41 per cent of Norwegian, 44 per cent of French, 60 per cent of Italian, and 52 per cent of Swedish.[3] For Finland, Latvia, and Estonia the percentages were above 80, and for Greece and Yugoslavia above 90. Only the United States was credited with no tramp tonnage; but for Germany the percentage was merely 12 per cent of her total.

Between 1929 and 1936 (much of it between 1933 and 1936), however, the important British merchant fleet showed a material increase in tramp tonnage, while liner tonnage of all three general types—except passenger liners in 1929–33—diminished by substantial percentages (see Table II). Indeed, comparing 1936 with 1914, Britain's liner tonnage was slightly smaller while her tramp tonnage was a third larger. Depression conditions thus brought about a significant break in the earlier trend from tramps to liners.

As the liner's position in shipping generally was strengthened, the shift from coal to oil was accentuated.[4] Liners rather than tramps are responsible for the wide use of oil today. The Department of Commerce tabulation for 1925 showed no tramps listed as oil burners. A few motorships were employed in tramp trades in 1925 and their number is larger today, but despite the remarkable development in this type of propulsion, tramps remain predominantly coalburning steamships.[5]

Unlike many other carriers, tramp steamers are not highly specialized. They must be adaptable to varied types of cargo that may be available wherever they operate. Tramps engaged in the grain trade must usually find off-season employment in the carriage of other bulk cargoes—raw materials, ore, coal, and so on. Apart from special equipment used in stowing, ships carrying grain cannot be readily distinguished from the run of tramp ships, the general physical features of which have changed little since before the war.[6]

[1] Chamberlain, *op. cit.*, p. 22. E. S. Gregg, also of the Department of Commerce, in an article on "The Decline of Tramp Shipping" (*Quarterly Journal of Economics*, February 1926, XL, 338–46) calls attention to the fact that in 1924 over 80 per cent of the grain out of New York went in parcel lots by liners, and then adds (p. 342): ". . . . but the outstanding fact is that a large part of the grain and lumber in oversea commerce (two commodities formerly carried almost entirely in tramps) is now handled by liners." Such statements may be misleading unless it is borne in mind that they apply primarily to United States Atlantic ports, and not to shipments over practically all other important grain routes of the world.

[2] M. O. Phillips, "Tramp Shipping: Its Changing Position in World Trade" (unpublished Ph.D. thesis, University of North Carolina, Chapel Hill, N.C., 1937), p. 525. Phillips' conclusion is based upon Lohse's analysis of the importance of tramps and other types of vessels, in the study next cited.

[3] F. Lohse, "Die Entwicklung der Trampschiffahrt in der Nachkriegszeit" (inaugural dissertation at the Christian Albrecht University, Kiel, Germany, 1934). Lohse concluded that tramps with 22.7 million gross tons in 1914 accounted for 46 per cent of total steam, motor, and sail tonnage, and with 21.27 million tons in 1933 accounted for only 31 per cent. The small increase in tramp's speeds of about half a knot just about compensated for the decline in tramp tonnage, leaving potential carrying power approximately the same as before the war, but, relative to all shipping, less important.

[4] Among the factors contributing to pre-eminence of the British shipping industry was the favorable combination of a large merchant fleet and navy (which makes low-cost shipbuilding feasible), outbound coal cargoes, many coal-bunkering stations throughout the world, and large needs for imported foodstuffs. With the pronounced shift away from coal, British shipping has partially lost one of its former marked advantages.

In 1935, British tramps carried 20.6 million tons of coal, but only three-fifths of this originated in the United Kingdom, and less than two-fifths was carried by vessels of 3,000 gross tons and over which are responsible for the bulk of grain and raw material imports into the British Isles. Isserlis, *op. cit.*, pp. 84–85.

[5] See also p. 57 below.

[6] For a more complete description of grain carriers, see Perry, *Ship Management and Operation*, pp. 211–16.

Tramp ships are still owned largely by individuals or corporations of relatively small capital, possessing little property in addition to the vessels themselves. Catering to shippers requiring a large amount of vessel space at low cost and delivery of cargo at diverse ports, tramps obtain business through brokers acting independently in all parts of the world. Their shore expenses are ordinarily insignificant and their labor costs tend to remain low.[1]

Today liners are usually owned and operated by large corporations with extensive shipping interests, including in many instances the ownership and operation of port and terminal facilities—the only counterpart of the railway's principal investment in right-of-way, roadbed, and tracks. Although the shipowner incurs no investment or expense for maintenance of roadbed, ships themselves representing the principal capital assets, the business organization of a liner company may be quite as elaborate as that of a railroad company.

A comparatively recent development within the organization of the shipping industry is the growth of industrial fleets. Industrial carriers are engaged chiefly in the carriage of such freight as coal, ore, lumber, fruit, or petroleum, for the industrial or mercantile firms which own them. Some of these act as regular common carriers; others seek to fill unused space or to secure return cargoes that will assist in defraying operating expenses.[2]

Present-day organization of the shipping industry shows a marked tendency toward combination for many of the same reasons that have stimulated the growth of larger business enterprises generally. Shore expense for a large liner company is not much larger than for a small one operating only a few ships. Selling and advertising expenses per unit are proportionately smaller for the larger concerns. They also enjoy all the advantages of superior financial resources—buying power for capital equipment, supplies, and fuel—and added security from greater diversification of employment in numerous trades.

These considerations apply much less to tramp shipping, which faces smaller financial risks and enjoys greater flexibility of operations. If business conditions are extremely unfavorable, the tramp operator can lay up his ships, or even go out of business temporarily, without necessarily jeopardizing his future opportunities. Liner companies cannot afford readily to abandon the services, investments, and good-will they have built up over a period of years.

In addition to the factors stimulating combination in industrial enterprises generally, the shipping industry has been subject to governmental pressure to merge resources. Liner companies, in particular, have been counted upon to assure a nation's competitive position. Financial and other types of encouragement, as well as legislative mandates, have been employed to this end. The frank objective of many a government has been to eliminate competition between its own nationals, so far as feasible, in order to strengthen its front against foreign merchant marines.[3]

Economics of Cargo Transport

Regardless of size and extent of their investment, shipping companies incur relatively heavy overhead charges from the initial cost of vessels and the expense of maintaining them in operation. The shipowner tries to charge rates that will cover not only the specific costs attributable to each voyage or shipment, but will also contribute as much as possible toward the overhead. In the long run,

[1] Tramp crews are commonly hired for a single voyage. Thus the tramp operator escapes some of the responsibility incurred by liner companies. During recent years the demands of organized labor have impaired the profitability of liner companies more than tramps.

[2] The United Fruit Company is an example of a concern operating a fleet which serves primarily as an industrial carrier but also functions as a regular common carrier.

[3] The leading steamship lines of practically all the principal maritime countries except the United States have been brought together in government-sponsored or semiofficial consolidations or agreements. The Hamburg-American and North German Lloyd companies have a working arrangement to suit the German government. Great Britain has several large combinations and groups, such as the Peninsular and Oriental, Royal Mail Steam Packet Company, the Cunard White Star Company, and so on. The chief French lines have divided their respective fields of operation or pooled services, and reached agreements with smaller companies so that competition is kept well under control. Similar developments have occurred in Italy and Japan.

of course, the shipping company must do more than cover variable and fixed costs, including depreciation, if it is to make profits.

Since ships are the principal capital assets of their owners, they must be employed as continuously as possible. If the flow of trade is predominantly in one direction, liners operating on fixed schedules between specific ports run the risk of being profitably employed only half of the time. A tendency thus develops for shippers in the direction of the greater flow of traffic to bear most of the cost of a complete voyage, while exporters in the opposite direction are favored by low rates designed to promote business.

Similarly with tramp ships, if the direction of trade is very unbalanced this will be reflected in stiffer rates, for only a few vessels will have cargo both ways and others must charge higher rates to compensate for the lack of revenue on one leg of the voyage. The longer the route, the more important this factor becomes. While cost of service is affected by the distance to be covered and is a consideration in rate making, it is no more of a controlling factor than is the value of the service rendered to the shipper.

Also important to shipping is an even flow of traffic. It is quite as unsatisfactory to be employed on actual voyages only part of the year as to be running throughout the year but much of the time with light cargoes in one direction. Perishable or seasonal agricultural products make for an uneven flow of traffic. The grain movement, in particular, is at times responsible for rapid and substantial changes in the demand for shipping tonnage. Liner companies, though compelled to maintain a schedule, may find it advisable to decrease the frequency of sailings during seasons of small overseas movement. Tramps, though subject to the same influences with regard to balanced hauls as liners, are sometimes in a more favorable position because they can traverse the ocean highways of the world at will. They can delay their sailings and cut rates if necessary to get cargo. Even so, they are frequently forced to make extensive trips in ballast (without cargo). Hence owners of tramp ships also must figure on a round-trip basis.

Desirable as balanced cargoes are from an operating standpoint, the distribution of the world's available bulk cargoes is such as to produce unbalanced traffic over most of the principal trade routes.[1] The exact amount of unbalance varies from year to year, but a tendency prevails for traffic to flow more freely in one direction than another. Conditions which create this situation, such as the geographical location of agricultural products or other raw materials, manufacturing centers, and markets, are subject to very gradual change. In general, bulk commodities tend to flow in one direction and manufactured and semimanufactured articles in another.

The total tonnage of overseas cargo has never been computed, so great are the difficulties of measurement, but occasional estimates adequately demonstrate the predominance of the cargo movement in certain directions. For the year 1922, estimates were made of the weight of thirteen important classes of bulk cargoes—grains, sugar, coal, ores, lumber, fertilizer, cotton, etc.—transported over the world's principal ocean trade routes and particularly significant in the operation of tramp ships.[2] The aggregate movement was 137.4 million tons. No corresponding estimates are available for recent years, but in respect to the direction of traffic there is little reason to believe that the distribution indicated by that study has changed materially.

Eastbound tramp trades accounted for a flow, in terms of weight, roughly two and a half to three times that of westbound traffic.[3] The North Atlantic route shows the greatest unbalance in the easterly direction; the transpacific route from North America is unbalanced in a westerly direction, as is the major route from Australia. Australia, Argentina,

[1] Many large and important ports, as well as smaller single-commodity ports, have a one-sided commerce—a disadvantage in port operation and development.

[2] E. T. Chamberlain of the Bureau of Foreign and Domestic Commerce, "Tramp Ship Trades," *Commerce Reports*, July 7, 1924, pp. 13–15.

[3] Chamberlain's distinctions between "eastbound" and "westbound" traffic are perhaps not the best that could be made, particularly as the northerly or southerly movement between hemispheres must be visualized in terms of net easterly or westerly progress.

Canada, and the United States all originate more bulk cargo business destined chiefly for British and continental markets than is created within these areas for return transport, while European transatlantic shipments consist largely of less bulky finished or semi-finished manufactures.

Tramp owners can, in some ways, take more aggressive steps to assure continuous employment of their capital than can liner operators. Due to the peculiar distribution of available cargoes, however, the tramp owner cannot merely plan upon seeking certain business because this in itself seems to offer opportunities for profit. He can consider such business only in relation to other prospective business. In the eyes of the tramp operator, cargo becomes more or less desirable as its transportation to a certain part of the world will place his vessel in a position to secure its next employment. He may even have to plan upon where that employment, if obtained, might place his ship some months hence in relation to an advantageous seasonal demand for tonnage due to materialize at specified ports at that time.

One of the chief reasons why cheap, bulky commodities are transported overseas in large measure by tramp ships is that these commodities are normally limited in the amount of ocean freight cost they can bear and still move in international commerce. The tramp cannot perform a low-cost transportation service except as it is constructed for relatively low speed and large carrying capacity. These two factors are related.

Speed in ocean transportation is expensive. Costs for equipment and operation increase, not in proportion to increases in speed, but more nearly as the cube of the speed. Fortunately for the services the tramp is called upon to perform, speed is not nearly so important as low cost. With typical liner cargoes, just the reverse is true.

It might be thought that the faster tramp ship could earn more freight because it could make more voyages per year. A slight understanding of the fundamentals of marine transportation soon dispels this notion. Fuel cost per mile, for example, increases roughly as the square of the speed, and labor and labor maintenance costs also increase disproportionately. More important, the more powerful machinery requires larger capital investment, and the increased space required for equipment, fuel, and staff reduces the carrying capacity for pay cargoes.

The efficiency of a ship's power plant bears upon both its freight-earning capacity and its cost of operation. Reduction in engine weight and in space given over to fuel storage, as a result of increased plant efficiency, as well as improvements in ship design and construction, permit greater size and cargo-carrying capacity.[1] Before the war a tramp vessel of 4,000–5,000 tons deadweight[2] was considered fairly large. Now, twice that tonnage, or 8,000–10,000 tons deadweight, is regarded as good-sized. A modern cargo liner commonly has a total deadweight of 10,000 to 12,000 tons, and some are nearer 15,000 tons. The more or less spectacular increase in the size of passenger liners during the past few decades is well known.

Because of the predominance of tramp ships in the grain trade, the tramp's need for outbound cargoes, the relatively more abundant supplies of coal on the routes in which they are engaged, and the costliness of converting a coal-burning vessel into an oil-burner, most of the vessels engaged in the grain trade are coal-burning steamers. But they are more efficient than the prewar types.

A modern "economy type" vessel of about 7,800 tons deadweight can steam at 9 knots from a port in Great Britain to the River Plate and return on a daily fuel consumption of approximately 16½ tons of Welsh coal, an excellent "selected voyage" result. At 10 knots, fuel consumption would be increased to about 22½ tons per day. A good prewar performance for a vessel of similar specifica-

[1] Generally, increased ship size and improved construction have also permitted greater flexibility in employment. Vessels appropriately designed for coastwise service, for example, may now sometimes be shifted into overseas trades if there is a sustained increase in demand for tonnage in those trades.

[2] "Deadweight tonnage" expresses, in long tons of 2,240 pounds, the total weight of cargo, fuel, and stores which a vessel is capable of carrying when loaded to her "marks" or "load line" indicating the maximum draft for safe loading under the most favorable conditions.

tions, steaming at 10 knots, would be the consumption of around 28 tons of good Welsh coal a day. The economy of roughly 20 per cent in fuel consumption is believed to reflect the advances made in ship propulsion since prewar days.[1]

In designing a modern cargo vessel, the general objective is to provide as much cubic space as possible in relation to the carrier's deadweight tonnage. The use of oil as fuel assists in this, as oil can be stored in parts of a ship unsuited to coal and in spaces not otherwise utilized. Greater space in relation to deadweight permits the carrying of more light cargoes, or cargoes generally stowing over 50 cubic feet to the ton.[2] Additional freight can be earned in this fashion because a vessel can afford to haul a wider variety of commodities. This is especially important to the cargo liner. A roomy vessel can profitably carry a number of bulk cargoes measuring up to 50 cubic feet per ton, but it may also profitably carry light cargoes such as oats.[3] A less roomy vessel is restricted to heavier cargoes such as iron ore and coal, and hence has fewer opportunities for earning freight.[4]

In the design of tramps particularly, naval architects seek ways of increasing deadweight tonnage in relation to net tonnage.[5] Port dues, and Suez and Panama Canal dues, are all based on a ship's net register tonnage (measured according to special rules in the case of canals). For the same dues-paying space, the object is to increase the freight-earning capacity of the ship, typically by increasing its deadweight.

That this has been accomplished for tramp ships but not for cargo liners is suggested by special data on British shipping.[6] For each 100 net tons, the deadweight tonnage of British foreign-going tramps has steadily risen from 264 tons in June 1914 to 281 tons in June 1936. For the same computed space available for freight, in other words, tramps can now carry 6 per cent more weight of the same cargo.

Cargo liners engaged in British foreign trade, on the other hand, apparently have a smaller average capacity as measured by the relation of deadweight to net tonnage. The figures are 233 deadweight tons per 100 net tons in June 1936 as against 247 tons in 1914. But as the cargo liner's function begins to approach that of the express freighter, deadweight tonnage has less meaning. Ships carrying light high-value freight may perhaps utilize all available space capacity, but not all their weight-carrying capacity. Cargo liners handling mixed cargoes have been subject to special demands such as the necessity of providing refrigerated cargo space and additional machinery to provide faster speeds. These reduce net tonnage in relation to gross tonnage. Smaller space is available for freight, which means that 5 or 6 per cent less weight of cargo can be carried.

Tending to modify what may be termed the economics of overseas cargo transportation are certain noneconomic factors. Of chief importance are the actions and attitudes of governments toward their merchant marines.

If economic considerations alone were important, merchant ships would be constructed and operated in response to the volume and character of the international business being conducted or potentially available. Their type would be governed solely by the nature of this business, and their disposition over the trade routes of the world would be determined by the buyers and sellers in foreign markets setting in motion the machinery of ocean transportation. Actually, stimulation of foreign

[1] Illustration taken from C. D. MacMurray and M. M. Cree, *Shipping and Shipbroking* (London, 1934), p. 75.

[2] No data are at hand to indicate whether changes have occurred in the composition of the world's cargoes transported overseas in respect to weight-volume relationships. Over a period of years, should cargoes in the aggregate become lighter or heavier in relation to the space occupied, the design of cargo ships would be influenced.

[3] Wheat stows about 47 cubic feet to the ton, oats 65 to 70.

[4] If a vessel is specifically designed for carrying exclusively a commodity like iron ore, large cubical capacity is, of course, less important.

[5] Net tonnage represents the total cubical capacity of a ship available for carrying cargo and passengers, arrived at by deducting from the gross tonnage spaces used for housing machinery, the ship's crew, gear of various kinds, etc.

[6] Based on the Classification of Shipping Enquiries undertaken by the Chamber of Shipping of the United Kingdom in 1933 and 1936, as analyzed by Isserlis, *op. cit.*, p. 63.

trade may be a by-product of forced shipping development, either in building or the maintenance of ships in particular trades for "strategic" reasons.

The problem of supplying tonnage of types suitable for meeting commercial demands as well as "defense" needs is more or less difficult depending upon the geographic distribution of the sources of such demands. Moreover, the distribution of needs for ocean transportation services may vary not only because of changes in the economic development of the countries concerned, but by reason of the imposition of national regulations, tariffs, and various forms of restrictions tending to stifle trade.

British leadership on the high seas has been maintained for generations without extensive recourse to subsidies or other methods commonly employed by maritime nations to place their nationals in a favored competitive position. But even the British government resorted to a subsidy for tramp shipping in 1935. After several years of drastic contraction in overseas trade, the supply of shipping was so excessive that ocean freight rates were depressed below the point at which many owners could continue to operate. Under the British Shipping (Assistance) Act, a subsidy of £2,000,000 was provided for tramp ships, together with a fund of £10,000,000 for advances to shipowners for scrapping obsolete vessels and building new or modernizing existing tonnage. Government favors were also conditioned upon the improved organization of tramp services and the initiation of negotiations with other maritime powers for the stabilization of ocean freight rates.[1]

Government aid to merchant marines is now common, with a drift toward greater encouragement and financial help. Nowhere is this more true than in the United States. Some merchant marines that are artificially maintained, ostensibly for reasons of national defense, would undoubtedly shrink greatly without government subsidy. Competition is thus not merely between the individuals or shipping companies of different nations, but also between their governments. All of these influences are reflected, directly or indirectly, in the level of shipping freights.

[1] See also below, pp. 62–63 and 103–06.

Laid-up Tonnage and New Construction

Ordinarily there is too small a demand for new tonnage at any particular time to make large-scale construction feasible, and shipbuilding does not lend itself to mass-production methods. Only during the war emergency were fabricated ships built in large volume, and the products were not such as to encourage resort to this practice in time of peace.

Technological advances in shipping have been stimulated in some directions by the generally excessive supply of tonnage which has persisted since the war. Low freights make operating economies imperative. One level of rates is necessary to permit one type of ship to break even or operate profitably on a given route, while another level may apply to another type. Unless rates are abnormally low, both types can exist in the trade, but under depressed conditions the more efficient carrier naturally has the advantage while the less efficient may be laid up. Expansion of tonnage in 1925–29 was largely in more efficient types, which swelled the world's merchant marine in the face of low rates.

Idle shipping in the principal maritime countries, as shown in the upper section of Chart 2 (p. 60), was nearly 11 million gross tons early in 1922. This reflected both the low state of trade, at the worst of the postwar depression, and the large amount of uneconomical tonnage hastily built under war-time programs. Laid-up tonnage gradually fell during the succeeding years of recovery and "prosperity," but on January 1, 1930 it was still estimated at 3.2 million gross tons. Part of this, including practically all of the British tonnage, represented what may be called normal unemployment; another part, including most of the American, represented ships deserving only to be scrapped but on which the decision had not been taken. Particularly for the past decade, the quarterly data for idle tonnage in British ports (including some foreign vessels) are illuminating. These are shown in the lower section of Chart 2.

With the depression and drastic decline in world commerce, the number of ships laid up rose rapidly until, at its peak, 14.2 mil-

lion gross tons were idle on July 1, 1932. As recovery set in, trade increased and scrapping of obsolete ships took place on a large scale, with and without aid from government scrapping subsidies; consequently idle tonnage declined, reaching late in 1937 the lowest point since shortly after the war. Before the end of 1937, however, a downward spiral in prices started, trade contracted, ocean freight rates fell, and the volume of idle tonnage once more began to rise. Expanding trade in the middle 'thirties stimulated construction activity; and more substantial gains were made in 1937, when total world merchant shipping launched rose slightly above the 1909–13 average though not up to the 1913 peak. Significant changes in merchant tonnage launched are revealed by the summaries given here.[1]

Period	World output, in thousand gross tons	Output, in percentages of 1909–13 averages		
		World	British	Foreign
Average 1909–13	2,489	100	100	100
1922–26	2,045	82	64	111
1927–31	2,457	99	81	126
1932–36	1,121	45	28	72
1933 (postwar low)	489	20	9	37
1935	1,302	52	33	83
1936	2,118	85	56	131
1937	2,691	108	61	183
1913 (prewar peak)	3,333	134	127	145

Year	United Kingdom	Japan	Germany	Scandinavia	Netherlands	United States[a]	Other countries
	TONNAGE LAUNCHED (*thousand gross tons*)						
1909–13 av.	1,522	50	277	73	85	255	227
1935	499	146	226	253	57	33	88
1936	856	295	380	285	94	112	96
1937	921	451	436	334	184	239	126
	UNDER CONSTRUCTION, Dec. 31 (*thousand gross tons*)						
1935	743	119	254	172	104	33	118
1936	964	203	408	220	151	110	196
1937	1,125	305	369	272	289	204	335

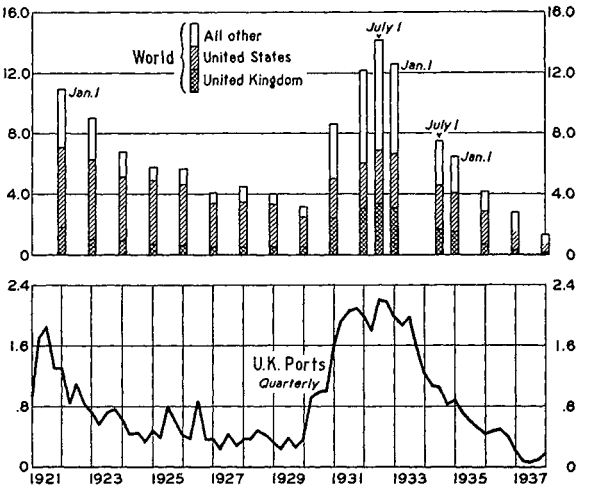
[a] Including a small amount of lake tonnage.

Since the war emergency passed, merchant tonnage under construction in British shipyards has been continually below the prewar level. Building by nations other than Great Britain has proceeded apace, while even in 1937 the British were not constructing new vessels at the prewar rate.[2] These statistics do not accurately reflect the changes that have occurred in Great Britain's relative position in world shipping, already mentioned; but one implication may be noted. British leadership in shipping has long been such that it has been possible to generalize upon the state of shipping by using the case of Great Britain. If present trends continue, this may no longer be safe.

Furthermore, when shipping services represent a nation's chief export, as they do for

CHART 2.—IDLE MERCHANT SHIPPING, 1921–37*

(Million tons: gross, for upper section; net, for lower section)



* Annual data for upper section, mainly as of January 1, in Table I; semiannual and quarterly data are not regularly available, but figures are plotted for July 1, 1932 to show the peak then reached. See also Chart 7.

Quarterly data for lower section from Chamber of Shipping of the United Kingdom, *Annual Report, 1932–33*, pp. 140–41, and *ibid., 1937–38*, pp. 86–87.

[1] Data from Chamber of Shipping of the United Kingdom, *Annual Report, 1933–34*, p. 60; supplemented for years 1935–37 by *Lloyd's Register* figures tabulated in "Commercial History of 1937," supplement to the *Economist*, Feb. 12, 1938, p. 53, or Bank of England, *Statistical Summary*, August 1938, p. 100.

[2] Heavy construction of warships has permitted many yards to continue operations during the past few years, and has sustained the British shipbuilding industry at a high level.

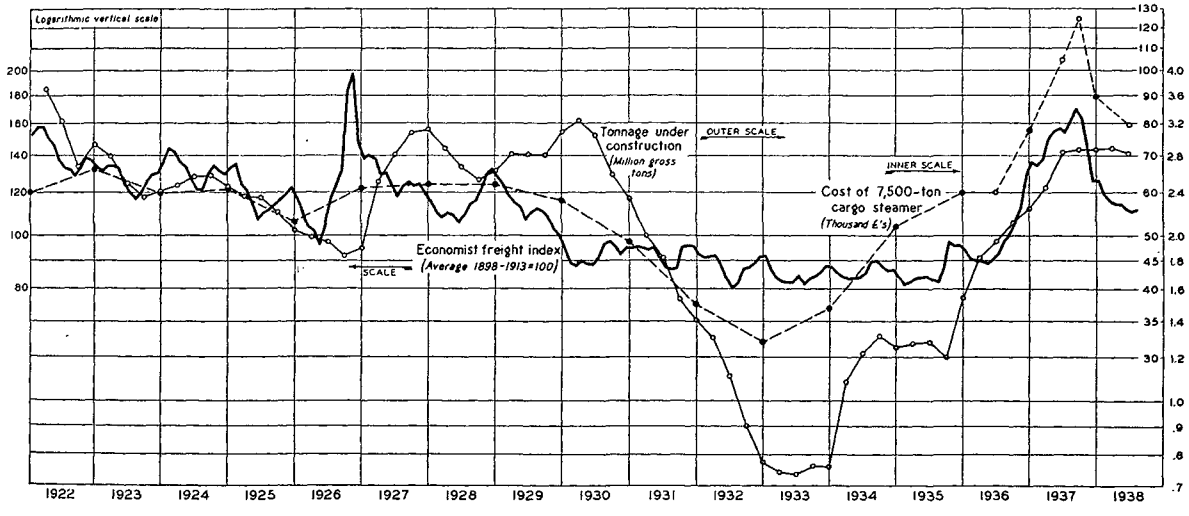
Great Britain,[1] changes in total ship tonnage also have profound significance. When the fact that shipping is a principal export is coupled with the fact that the United Kingdom is the leading international market for grains, and wheat in particular, an interrelationship of considerable moment becomes apparent.

Unit costs of new ships in general tend to parallel the cyclical movement of tonnage under construction, and both run broadly parallel to the course of ocean freight rates if short-lived peaks are disregarded. This is shown by the curves in Chart 3. Some important exceptions must be noted. In 1927–30 merchant shipbuilding was well maintained though freights were not, and tonnage under construction fell off only after rates had sunk to very low levels; in 1934, with costs very low, shipbuilding made a partial recovery from deep depression before freights began their advance, and in 1936 and 1937 responded to the sharp rise in freights; extreme advances in shipbuilding costs checked this rise before freights reached their peak.

Late in 1937 and early in 1938, costs of construction were higher than in any period in the history of shipping except during the war boom ending in 1920. According to unofficial data on the cost of a new, ready 7,500 ton (deadweight) cargo steamer built in Great Britain,[2] the postwar low of £32,000 occurred in 1932; but in June 1937 such a ship cost £105,000, so great was the competition for materials and shipbuilding facilities in a boom period marked by intensive rearmament. This figure compares with the all-time peak of £258,750 reached in March 1920. Prior to 1914 no tramp steamer ever cost £14 per ton deadweight to build, and costs of £7 or £8 per deadweight ton were more common.

Higher costs of new construction mean that higher freights are necessary to permit profitable operation. The farsighted shipowner

CHART 3.—OCEAN FREIGHT RATES, TONNAGE UNDER CONSTRUCTION, AND COST OF NEW CARGO STEAMER, 1922–38*



* *Economist* index of freight rates, as given in the issue of Feb. 26, 1938, p. 484; *Lloyd's Register* quarterly data on tonnage under construction, here taken chiefly from Chamber of Shipping of the United Kingdom, *Annual Reports;* and *Fairplay* data on the cost of a new 7,500-ton (deadweight) cargo steamer built in Great Britain.

[1] Shipping services to other nations by Great Britain represent a value even greater than British exports of cotton textiles or iron and steel, and nearly three times as great as exports of machinery or woolen and worsted manufactures. "Invisible" shipping "exports" are estimated at about £94 million in 1913, reached £130 million in 1929, were approximately £59 million in 1933, but rose to £115 million in 1937. See Chamber of Shipping of the United Kingdom, *Annual Reports* for 1933–34 and 1937–38.

[2] *Fairplay* (a leading British shipping journal), Jan. 13, 1938.

does not rush blindly to build unless higher freights promise to be more or less permanent. Yet shipowners apparently are not particularly good judges of the freight outlook.[1]

A large part of the remaining tonnage constructed during the war years and immediately afterwards is now obsolete, twenty years being the average useful life of merchant ships. But the incentive to replace older and slower cargo ships has been strong during recent years, and because of the low level of freights the age distribution of such vessels is now much more favorable than that for all kinds of ships as a group. Barring unusual circumstances, however, much tonnage now laid up for lack of employment will probably never be recommissioned.

Competition and Co-operation

Lack of anything corresponding to the railroad's fixed roadbed and trackage means that the shipping industry enjoys great freedom of action; but for the same reason and because of the lower initial investment required, normally competition in shipping is extraordinarily keen. Vulnerable though the railways have found their natural monopoly, nothing approaching it exists in shipping.

There are, however, significant differences in investment and degree of flexibility within the shipping industry, as already noted. It was natural for the liner companies to devise the shipping "conference," which is simply a means of regulating rate competition. Conferences vary in type and scope, but all have as their fundamental purpose the avoidance of disastrous rate wars and other competitive conditions which curtail earning power and jeopardize capital investment.[2] Under the stress of too unfavorable traffic conditions, or if any important line withholds co-operation, a conference breaks down.

Until the last few years nothing comparable to liner conference agreements existed in the tramp trades. Tramp owners have less at stake financially, and both the large number of different owners and the nature of the service they provide have rendered co-operation impracticable. The keenness of the competition among operators in all parts of the world for the available cargoes has been indicated by continuous fluctuations in charter rates.

Since February 1935, however, a scheme has been in operation, under British leadership, for regulating the highly individualistic tramp shipping industry.[3] Detailed scales of minimum rates have been established over the most important routes and have been observed, with few exceptions, by tramp fleets of all countries. The process may be called "rationalization," but the imposition of control is plainly intended. To quote the fourth report to the President of the Board of Trade on the Working of the Tramp Shipping Administrative Committee (1937):

> . . . . Soon after the institution of the minimum freight schemes it became necessary to impose restrictions on outward sailings in ballast of unfixed tonnage in the Australian and River Plate grain trades, and these were extended in 1936 to include the St. Lawrence trade. These restrictions are intended to avoid accumulation of uncharted tonnage and consequent depression of the

[1] In the same issue, *Fairplay*'s editor wrote: "As a body, shipowners were always wrong before the war in their readings of the industry's prospects, and since the Armistice they have been, to much the same extent, out in their estimates of the future." The quoted opinions of numerous leaders in the shipping industry confirm the generalization of "The Look-Out Man" to the effect that "Twelve months ago everybody who studied the matter saw that there was an improvement coming along, but few thought for a moment that freights would reach the height they did [in 1937] or would drop as they have done."

[2] Sometimes agreements regulate sailings and even allocate fixed proportions of the available business or revenue. Conferences are usually limited to operations over specific routes. A single shipping company may belong to numerous conferences, depending upon the number of areas in which its ships operate and on whether it is in the business of carrying passengers, freight, or both.

[3] As a condition of receiving aid under the British Shipping (Assistance) Act, 1935, British shipowners were forced to co-operate. They, in turn, successfully enlisted the co-operation of foreign owners in the maintenance of minimum rates. British tradition is against governmental aid, even though this act was not designed to enable British shipping to obtain competitive advantages over foreign subsidized competition. There are those, however, who feel the need for government intervention in British shipping when they reflect that twenty-five years ago Great Britain owned half of the world's vessel tonnage and there was practically no important competition. This position has radically changed, as other nations have greatly added to and improved their merchant fleets. Japanese tonnage, for example, has more than doubled since 1914. Most of the ships built since 1922, and those now under construction, are of types and qualities that provide the keenest competition.

respective markets. . . . . Experience has shown that this is the only satisfactory and effective way of adjusting supply to demand. . . . .

Regulations of this sort have definitely affected what might be considered a normal supply of tonnage at particular ports for the movement of crops and interfered with the ordinary process of determining ocean rates.[1]

The subsidy[2] and rate-control developments, though perhaps necessary for the preservation of merchant fleets during a critical period, were something new in tramp shipping. Should such measures be continued, it may be necessary to revise long-established ideas with respect to the freely competitive tramps and their role in the making of ocean freight rates.

Conference agreements on liner rates, and their recent counterpart on tramp-charter rates, nevertheless constitute only a limited approach to the relatively rigid system of railway tariffs. Public regulation of ocean freight rates, though not entirely absent, is negligible in comparison with the system under which railways operate in most countries of the world. There is almost no regulation of the business practices of shipping except that which may be self-imposed. Even if liners have largely withdrawn their rates from competition, they must still consider potential nonconference and tramp competition.[3]

II. THE FREIGHT MARKET AND FREIGHT RATES

Distribution of the world's shipping in accordance with needs for ocean transportation is normally accomplished through the operation of the freight market.

As already noted, liners meet the fairly constant requirements for cargo carriage between one country and another, while tramp steamers in large part meet the supplementary requirements, including those arising from the seasonal movement of agricultural products. Tramp or charter rates, therefore, most quickly reflect variations in demand for ocean transportation. Their level has been characteristically determined by free competition.[4] Many bulk cargoes, limited in the transportation cost they can bear, represent a marginal demand for tonnage; and changing levels of charter rates largely determine which cargoes shall be carried and which left behind. To a limited extent the same influences operate in the liner market. Here, however, rate changes are less rapid and the relatively high-value goods transported on liners can bear more substantial increases in rates without affecting the volume of traffic.

Ship operators may be free to send their vessels anywhere they choose without jeopardizing an investment in tracks or comparable equipment. In setting freight charges they may be free from governmental regulation and the necessity for generally considering the cost of rendering a specific transportation service. They may ask and receive rates depending upon what the traffic will bear at any given time. But what the traffic will bear depends not alone upon conditions in the shipping industry and the volume of cargo available for export at particular ports; it depends upon the diversity of desirable cargo.

The nature of the cargo available, usually the product of the type of economic development within the export country, also determines the tramp's competition from liners and

[1] Cf. *Times of Argentina*, Feb. 15, 1937, p. 13: "Another impediment to chartering for April/May is the edict of the Tramp Committee which prevents tramps coming out in ballast until fixed ahead. . . . ."

[2] The last payment under the British tramp subsidy was made in February 1937. The act had provided that payments should cease when the average level of freights exceeded that of 1929. In 1937, a profitable year for shipping, rates over practically all routes rose above 1929 levels. See Charts 7 and 16, pp. 74 and 118.

[3] Deferred rebates are an example of another competitive practice. Though outlawed in the United States (originally under the Shipping Act of 1916), the deferred-rebate system influences rates on some commodities handled by liners between other countries. Shipowners employ this device to assure the exclusive use by a shipper of a certain line or lines; in return, after a specified waiting period, the shipper receives a refund, usually around 10 per cent, on the freight charge paid.

[4] With stabilization schemes in effect, however, competition between tramps is no longer "free" when the prevailing rate level is the minimum, as during many months of 1938.

the liner's tramp or non-conference competition. Such influences are particularly important on bulk commodities which can be handled either in full cargo lots or in parcel lots. When tramp ships find profitable bulk cargoes in a trade where a liner service exists, the liner must fix very low rates if it desires to share in such business. If tramps cannot find suitable employment over the liner's route but there exists a volume of bulk goods to be moved, the liner's position is strengthened; it may develop a profitable berth cargo business in parcel lots.

In the long run, however, both tramp and liner rates are subject to the same general influences causing an increase or decline in the volume of world trade—operation of the business cycle, trade restrictions and discriminations, and other national policies. In their effects, these forces seldom distinguish between raw materials carried by tramps and semifinished or manufactured goods transported by liners. Hence, liner and tramp rates may be grouped together in considering the broad influences finding expression in ocean freights.

Operation of the Freight Market

Demand and supply factors are reconciled in the freight market by a process usually as nearly automatic as in commodity and financial markets. The wheat shipper, for example, is the buyer of freight service, and the shipowner is the seller. The actual movement of wheat overseas is assured when the shipper has bought wheat—in the country or f.o.b. port of shipment—and engages space for shipping it. The c.i.f. sale in most cases takes place either before or after the contracts are made which actually produce the movements, but nowadays the time lag is usually brief.[1]

The shipper may make a sale of wheat abroad, then promptly go into the market for freight. Or he may have anticipated his needs and contracted for cargo space in advance, which makes him a speculator in freights. A speculative shipper who puts wheat afloat unsold necessarily must arrange for freight and also in effect speculate in the freight market. The greater the distance overseas that such wheat is to be moved, the greater his risk on freights. Compensating for this, of course, is the additional time in which to effect the c.i.f. sale. Since there is no uniformity of practice or conditions, one cannot safely generalize as to how wheat is set in motion and handled until sold.

Moreover, there is a wide range and much overlapping in functions of concerns engaged in the grain trade. Firms or individuals engaged in that phase of the trade which involves dealing in the freight market are, however, relatively few compared with the thousands of organizations or persons frequently termed shippers. The bulk of the international grain movement is principally concentrated in a few large exporting or export-import organizations; and the extent to which these are financially or otherwise involved in the performance of related functions need not be considered here.

It is customary in booking freights to work through a specialized type of broker. Brokers constitute a vital and essential part of the machinery of the ocean freight market. These intermediaries may perform a wide variety of functions in addition to chartering operations.

The *freight broker's* service in the United States is chiefly securing cargo for liner operators. Freight brokers are active in the provision trade, where shippers are relatively few but the volume of each shipment is comparatively large. These brokers are not concerned with the details of papers and documents, since most foodstuffs from this country are destined for a few European countries where the regulations are simple.[2] Contracts for parcel space on liners are usually made through such brokers locally, or through local steamship agents performing essentially the same services.

The term *ship broker* in the United States may mean any one of several things. Almost all ship brokers arrange for chartering ships and preparation of the "charter party," the

[1] International shippers make considerable use of futures markets to hedge unsold or oversold shipments.

[2] *Freight forwarders*, on the other hand, serve the small inland shipper by relieving him of the numerous details involved in parcel export shipments of manufactured and other goods to all parts of the world.

contract between shipowner and charterer setting forth the responsibilities of each. But the ship broker in this country may also be a steamship agent, a dealer in the sale of ships, a marine insurance agent, or a speculator in freights on his own account. He may possess an organization suitable for loading, discharging, and operating ships, in addition to chartering them.

Some ship brokers are equipped, furthermore, to place a tramp ship "on berth"; they may act as charterers themselves, being responsible for providing a certain class of cargo on which full cargo rates are paid, but accept cargo from other shippers at rates mutually agreed upon. This practice is sometimes followed simply to fill unused space. At other times, particularly when liner rates are high, it becomes a speculative venture in competition with liners.

In Great Britain, where the largest volume of business is transacted, there are brokers specializing in the sale of ships, in chartering, and in loading. Because such a substantial amount of detailed knowledge is required, many chartering brokers narrow their field further by specializing in certain commodities or trades.

Wherever found, the chartering broker must have a wide knowledge of matters relating to freight and commodity markets, seasonal and other aspects of the world's trade, and costs of loading and discharging sundry cargo at different ports, including port dues and similar charges. He must know about fueling stations on different trade routes, the approximate cost of coal or oil at such stations, operating costs of various sizes and types of carriers, and many related matters.

Small tramp-ship operators depend more than large companies upon the broker for advice and finding employment for their ships. Even the larger concerns and general steamship companies with chartering departments of their own, however, frequently consult with and deal through brokers as a matter of policy. Shippers or exporters, on the other hand, do not attempt to arrange for space except through established agencies.

If an exporter's shipment is larger than space available in a liner, or is destined for ports not served by the liner, he will charter a tramp ship through a broker, generally some days, weeks, or months before his grain is to be shipped. When this practice is followed, the shipowner can dispose of his fleet to advantage over the world and the shipper can make a forward sale at a price which includes freight.

Every broker in freights has connections or correspondents in a large number of ports throughout the world. He may have branch offices or representatives in certain ports, as is often the practice of British brokers. Since his correspondents are usually other brokers, the broker's business can be conducted with a small staff. The principal expense in a chartering transaction is often the cable or telegraph tolls involved. Because of this extensive communication system, knowledge of developments affecting freights is rapidly disseminated, greatly facilitating the smooth functioning of the market.[1]

Since brokers are commonly associated with grain, produce, or maritime associations or exchanges, such as the Baltic in London[2] or the New York Produce Exchange, the mechanics of market transactions in grains and arrangements for their shipment and delivery overseas are advantageously combined. Without leaving the floor of one of these exchanges, one may arrange for chartering a ship or engaging space in a liner, and contracting marine insurance. A merchant requiring cargo space merely gives orders to his agent, wherever he may be located, to bid for a certain amount of tonnage at a certain port on a certain date and at a specified rate.

Shipowners having vessels to charter likewise give instructions to brokers representing them on the same exchanges as to the conditions and rates they are willing to accept. The general practice is to use a form of "charter party" worked out by some organization,

[1] A readable account of how tramps are chartered may be found in Joseph Leeming, *Ships and Cargoes* (New York, 1935), pp. 107–39.

[2] The Baltic Mercantile and Shipping Exchange is the world's chief center for tramp chartering as well as one of the leading commodity exchanges in Europe. Its membership includes shipowners, ship brokers, and buyers and sellers of bulk cargoes (such as grain, timber, oil, oilseeds, and coal) which are traded there.

mostly the Chamber of Shipping of the United Kingdom, for the particular route and particular goods or group of goods. These "charter parties" set out in great detail all particulars of the transaction except as to the quantity of the cargo, the freight rate, the time the ship will be ready to load, and so on, which are different in each transaction. The process of bargaining is limited therefore to an agreement on the form of charter party to be used, to points not determined in it, and to some changes in the more general rules of the charter party which may be thought desirable. When the agreed document is signed, a "fixture" is said to have been made, and the rate of freight agreed upon and other conditions of the voyage become the basis for charter-rate quotations.[1]

The beginning of a transaction involving the shipment of a grain cargo by tramp steamer may be with a local ship broker or the direct representative of a London broker. It makes little difference, since all have their connections with London, center of the world's ship-chartering activity; and these connections are extensively utilized in effecting charters for grain destined to the United Kingdom or the continent of Europe.

Merchants in grain, coal, cotton, and other bulk commodities or raw materials are engaged in appraising not only commodity market conditions but also conditions in the freight market. Together, they represent the demand for low-cost bulk commodity shipping. Their individual bargaining with shipowners results in the movement of those goods for which there is a sufficiently strong demand, and the elimination of goods representing a submarginal demand at the moment.

Ports where the best charters are obtainable attract the tramps. Inasmuch as liners must maintain schedules regardless of freight market conditions, a limited amount of space between specific points is usually available where they operate. However, the North Atlantic route to Europe is practically the only one with a volume of general traffic warranting regular liner services sufficient to handle a substantial proportion of the requirements for transoceanic grain transportation. On all other routes the tramp ship and hence charter rates of freight assume a dominant influence.

For this reason, national policies that encourage certain classes of shipping and hence modify simple economic relationships would seem to be of small importance to the international grain trade. Tramp shipping is the least "encouraged" branch of the industry. Yet, though obscured, these artificial influences are nevertheless present. Subsidized liner services may carry a relatively small part of the grain transported overseas, but they are often the determining factor in the rate level during the seasons of small movement, and hence affect tramp revenues. Over the longer period this must be reflected in charter rates.

The River Plate Trade

Not all trades or demands represented in the operation of the freight market are of equal importance. Normally the River Plate trade is most important in influencing freight rates on grain. It is primarily a market for tramps; it absorbs a large amount of tonnage in carrying Argentine grains some 6,000 miles to Europe; and it removes this tonnage from competition on other routes for a period of several months. Other trades remove tonnage from competition also, but ordinarily they cannot absorb so much for as long as three months.

In the River Plate trade perhaps there is ordinarily the freest interplay of supply and demand forces. Favorable rates attract a large amount of tonnage until too much congregates on the river and rates fall. Outbound tramp cargoes from Europe are few (coal is the chief one), and round-trip voyages must be planned primarily upon the basis of the freight that may be earned homeward. Within certain limits, any increase in rates from Argentina to Europe is promptly reflected in a decline of outbound rates.

When ships are dispatched to the River Plate in anticipation of business that does not materialize, the world freight market is af-

[1] Liner-rate quotations, particularly for berth cargo, are often "offering" rates, which do not necessarily represent business actually transacted or the fixed freight charge which would be incurred for business done at conference rates.

fected. Late in 1937, for example, grain crop prospects deteriorated in Argentina. For the short exportable surpluses excessive tonnage was concentrated in this part of the world. One report late in January 1938 stated:

> Present unaccomplished ocean freight charters[1] of 647,500 tons must be near the record low for this time of the year and compare unfavorably, not only with the exceptional figure of 4,291,800 tons at this time last year, but even with the 1,060,600 tons two years ago, when the wheat crop was very small. It looks as though the regular liners to foreign countries would be able to carry the greater part of this year's crops, so that tramp shipping cannot depend very much on the River Plate trade during the next few months.[2]

In consequence numerous vessels had to leave in ballast for Australia, Africa, Chile, and North America.

The tramp owner has alternatives, but he can hardly avoid a period in which his vessel is earning no freight if it is in position on the River Plate with no cargo available. If still in Europe, the ship can be sent to the Far East, perhaps pick up a coal cargo to Colombo, then move in ballast to Rangoon or Java for a homeward cargo of rice or sugar,[3] or to Dairen for soybeans or oilcake. Or it may find a coal cargo to Italy or other Mediterranean ports, and pick up a mixed load homeward. During late years, it could secure a cargo of scrap iron from the United States for the Orient or Europe. In any event, the shipowner must weigh the alternatives and risks to be taken because of rate fluctuations. The more accurately the probable fluctuations are estimated, the better his chances of keeping his fleet operating at a profit.

If unsuccessful in securing a wheat cargo early in the year, the owner with his ship already on the River Plate may wait for the maize crop. But here he is confronted with other risks and uncertainties. Weather can alter the condition of that crop after harvest as well as its size before harvest, and moist weather may delay shipments for weeks.

For a time the rate level over one route may depart from its usual relationship with rates over another. A merchant dealing in a commodity in which the freight item must generally be considered, and a commodity available in several parts of the world, may then find that it will pay to change sources of supply. More wheat may be shipped from Canada or the United States and less from Australia or Argentina.

In practice such tendencies never continue for long.[4] The disadvantages created for shippers from one export nation tend to be offset by a lowering of prices there. A redistribution takes place in the proportion of return going to the grower. Also, if demand shifts from the more distant sources to the nearer because of freight differences, many tramp ships operating in the long trades will shift to the shorter ones, thus increasing the supply of tonnage and tending to lower rates and equalize freight differences.

Supply and Demand Factors

Like the prices in any other market, ocean freight rates reflect the interplay of a variety of demand and supply factors. The supply of tonnage at any time may be viewed not merely in terms already discussed, but in another significant way. It includes vessels in active service, varying in age, condition, and efficiency as operating units; vessels undergoing repairs, reconditioning, alteration, or conversion; and vessels laid up idle, in various conditions. Outside the supply proper, yet intimately related to it, are vessels that are being broken up—the normal end of ships that have lived out their economical life; and those in course of construction, all the way from planning through keel-laying to launching and fitting out.

[1] "Unaccomplished charters" are like orders booked but not filled. They represent the prospective business ahead for varying periods within coming days, weeks, or months. Like orders booked, there may be some cancellations, but unless estimates of the tonnage to be moved are far off, total cancellations are usually small.

[2] First National Bank of Boston, Buenos Aires Branch, *The Situation in Argentina*, Jan. 25, 1938, pp. 1–2.

[3] For many years the Indian Ocean has been an important collecting area for empty tramps seeking cargo, but this practice has diminished with the rise of Dutch, German, and Japanese lines serving the Orient. Before the war the Black Sea was another place for tramps to gather, but with the postwar declines in Russian grain exports and the British coal trade to the Mediterranean, that area has become relatively unimportant.

[4] See Chart 5, p. 71.

When freight rates decline below profitable levels, the supply in active service declines: less efficient vessels are laid up, either for work in the shipyards or to lie idle awaiting better times; more ships are sent from active service or idleness to be scrapped; shipbuilding proceeds at a slower pace; fewer keels are laid, and the rate of launching falls off. The reverse occurs when freights rise to very profitable levels: reconditioning or alteration of active vessels is delayed; idle tonnage is put back into service; fewer ships are scrapped; shipbuilding is speeded up; launchings are accelerated and, if better rates seem likely to persist, new keels are laid in larger numbers.

The demand for ocean shipping may be considered to include not only the active demand reflected in definite bids for space, but the potential demand which could become active if the combined barriers to international trade, including ocean freight rates, were moderately lower. Sometimes the level of rates is the decisive factor as to whether or not trade will take place; more commonly, other factors are decisive.

Sometimes an exporter is not able to compete in an overseas market with exporters of other countries because of tariff differentials and similar influences, unless he can obtain concessions in ocean freight rates, one of the elements in his marketing cost. A ship operator, purely on the basis of the cost of rendering a transportation service, would not be inclined to make the necessary concessions. However, he does so for a number of reasons. His vessel may be short of cargo in one direction, and he may be making the run over a route whether cargo is obtainable on one leg of it or not; hence he can figure that he is losing nothing, and there is always the possibility of developing a larger volume of traffic, once the exporter for whom he is rendering the service gains a foothold in the foreign market.

Raising protective barriers tends to reduce the demand for shipping; lowering them tends to expand it. Short harvests in importing Europe, or abundance of Argentine and Australian crops, usually increase demand. Abundant harvests in North America affect it less or little for two reasons: the tonnage required to move a given amount of grain from North America is smaller than from South America or Australia to Europe; and the storage facilities and holding ability in North America are far greater than in the Southern Hemisphere. Serious and protracted coal strikes, within Great Britain or in the United States, enlarge the demand for shipping and disrupt its normal course.

Some of the elements in demand are seasonal, for in many particular trades there is a fairly characteristic peak and trough within a year. Even in these instances the timing is not identical from year to year and the amplitude of the fluctuation varies widely. To a considerable extent, however, seasonal peaks and troughs in the different trades are compensating rather than cumulative.

Moderate ups and downs in demands upon shipping are met with comparative ease, without radical disturbance of rate levels. But a prolonged depression in ocean freight rates, accompanied by a large volume of idle tonnage through several years, paves the way for a striking advance in rates when a sudden increase in demand occurs after heavy scrapping and light building have combined to diminish the total supply. Moreover, often considerable time is required to recondition vessels that have long been idle, and owners are reluctant to order this work done unless rates promise to stay up.

The suddenness with which a change in demand occurs has a pronounced bearing on the course of rates. A 50 per cent increase by small stages over a decade is easily met, without marked disturbance to rates. A 50 per cent increase within a month or two will not permit a prompt adjustment of supply by drawing upon existing reserves. Given a year, and if idle-tonnage reserves are large at the outset, greater tonnage requirements can be supplied with a much more moderate rise in rates. Marked advances in rates occur, however, if reserves are small. Similarly, a slackening of demand has far less influence on rates if it is spread over three years instead of over six months.

Wars affect both the supply of and demand for shipping tonnage and completely change

the character of trade, alter trade routes, and generally render inoperative the normal process of freight-rate making through the ocean freight market. In time of war, shipping frequently becomes "the jugular vein, which, if severed, will destroy the life of the nation." This was the case during the World War. The shortage of shipping for transporting needed war supplies, as well as foodstuffs for civilian populations, became more important than the shortage of funds. Rates and costs ceased to be a primary consideration. Only under such circumstances will freights reach 400 shillings a ton for grain from Argentina compared with usual rates ranging from 15 to 25 shillings, or 46 shillings per quarter from the North Atlantic compared with less than 3 shillings. Wars of more limited scope, such as the present conflicts in Spain and China, influence the shipping supply and demand, with special effects on certain routes.

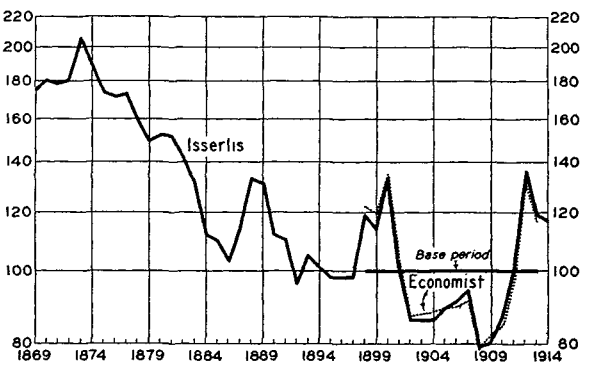
Freight Rates up to the War

Limitations of ocean freight rate data, changes in type of vessels, methods of propulsion, importance of trade routes and character of cargoes carried, and the significance of monetary units, all offer obstacles to direct historical comparisons of rates over a long period of years.

Index numbers, however, provide a useful device for considering ocean freight rates in general, whether they apply to grains, coal, or other bulk cargoes, and regardless of routes over which transported. The level of rates during one period may be compared with that prevailing at another. All available indexes of shipping freights are deficient in some respects, particularly in following short-term movements, yet they will serve present purposes.[1]

For at least forty years after the close of the Civil War, ocean freight rates showed a definite downward trend. Though interrupted for periods of a few years of increased shipping activity, each succeeding depression saw freights at a lower level than prevailed in earlier depression years. Chart 4 shows the indexes of shipping freights constructed by Dr. L. Isserlis[2] from 1869 to 1914 and by the London *Economist* from 1898 on. The former index is converted to the same base period as the latter, 1898–1913. From a high in 1873 of over 200, only a few years after the opening of the Suez Canal in 1869, rates maintained a more or less continuously declining tendency until 1908.[3] The all-time low of under 80 then reached was not even approached again until 1933. Although wholesale commodity prices were declining throughout a large part of this period, the fall in freights was greater than the fall in wholesale prices into the 'nineties and continued more than a decade after prices displayed an upward trend.[4]

Chart 4.—Indexes of Tramp Charter Rates, 1869–1914*



* Isserlis index as given in *Journal of the Royal Statistical Society*, Part I, 1938, CI, 122, here converted to the 1898–1913 base; *Economist* annual indexes from issue of Feb. 26, 1938, p. 484.

Just before the outbreak of the war, freights rose to approximately the level prevailing at the turn of the century and prior to the drastic decline following the Spanish-American and South African wars. In 1912, due to a combination of favorable factors, rates averaged

[1] See Appendix Note B.

[2] *Op. cit.*, p. 122. Dr. Isserlis has taken the mean of the highest and lowest rates as reported annually by the Angier firm for many years (*Fifty Years' Freights, 1869–1919*, compiled by E. A. V. Angier, London, 1920, and *Fairplay* since 1920), and expressed each year's rates as a percentage of the mean rates for the year immediately preceding.

[3] Grain freights from New York to Liverpool can be compiled from annual reports of the New York Produce Exchange. This series shows trends similar to but far steeper than those of the indexes plotted in Chart 4. Thus the peak in 1873 was 10.56*d.* per bushel and the average of 1870–79 was 7.85*d.*, while the average in 1901–10 was only 1.475*d.* and the low in 1904 only 1.125*d.*

[4] See chart in Isserlis, *op. cit.*, p. 75.

higher than at any time since the early 1880's. Commenting on developments during that year, Angier's Steam Shipping Report states:

> The past year will be memorable in that it has witnessed a "boom" in freights, which, having been for nearly a decade at an unremunerative level, at last rose sufficiently to enable shipowners to make a real profit. . . . .[1]

The usual reaction to a temporary "boom" in freights was a decline; this continued until the outbreak of the war, but still rates were left at a fairly high level.

After such a long period of declining freights it is not surprising that shippers should have protested against the rise that culminated in 1912. Only shipowners and governments are concerned when freight rates are absurdly low. High rates, on the other hand, usually generate complaints by shippers and attacks on shipowners. During the World War, when shipping was generally controlled by governments, and in the early postwar period, when all prices were grossly inflated, there were more important matters; but not just before the war.

The high freights in 1913 inspired David Lubin, the United States delegate to the International Institute of Agriculture at Rome, to submit a *Proposal for an International Conference on the Regulation and Control of Ocean Carriage by Means of an International Commerce Commission for the Purpose of Steadying the World's Price of Staples* (Rome, 1914). Lubin's contention was that inasmuch as seven-ninths of world trade was in "bulk traffic" such as agricultural staples, as against two-ninths in "package traffic" (manufactures), it was of utmost importance to regulate freight rates on the former group having characteristic day-to-day and hour-to-hour fluctuations. Rates on parcels were already subject to a form of regulation under the liner conferences. But the brief goes on to state:

> . . . . These [great shipping] trusts control not only the lines directly owned by them, but also control, to a great extent, the traffic of the "tramp ship," all of which practically gives them a powerful and dangerous monopoly . . . . these monopolies give rise to and maintain excessive and unjust rates, and, by the use of "fighting ships" and by rebates to large shippers, tend also to bring forth other and dangerous monopolies, monopolies in buying and monopolies in selling.

This proposal, at the close of a "trust-busting" era, is of some historical interest; but it attributes to shipping "trusts" a degree of influence upon ocean freight rates that, if it ever existed, is not borne out by the record during most of the past two decades. Freight rates have been generally at such low levels as to precipitate little investigation or protest by shippers or national governments. The plight of shipowners as a result of decreased freight revenues is the factor that has been emphasized.

Rates in the Postwar Period

Abnormal conditions in shipping caused by the World War, while in themselves of primary interest to historians, help to explain the course of ocean freight rates for a large part of the subsequent period.

Signing of the Armistice was followed by a period of acute stringency in ship tonnage, accompanied by an exceedingly high level of freights. Huge losses occasioned by the German submarine campaigns had not been compensated for, despite feverish building activity, particularly in American yards.[2] Shipping services and facilities had to be reorganized and reoriented, while emergency needs were such that every seaworthy bottom was in demand. Ships were in greatest demand in the North Atlantic, not only for bringing home American soldiers but for transporting foodstuffs and other supplies to impoverished countries of Europe until their disrupted economies could be put in order.

These temporary stimulants to maritime shipping were short-lived. With the cessation of army demands, approaching completion of the United States shipbuilding program, and the onset of economic depression, 1920 saw a plethora of tonnage. The United States alone had multiplied its steam oceangoing shipping sevenfold. Ocean freight rates tumbled as did commodity prices and values generally in the first postwar deflation.

[1] E. A. V. Angier, *op. cit.*, p. 136.

[2] Relatively few United States government contracts with private shipbuilders were cancelled when the war ended, and the colossal building program projected during hostilities was largely carried to completion after the Armistice.

The next several years constituted a period of reorganization and readjustment. But the surplus of tonnage over current trade requirements was much larger than in any previous depression. Low ocean freight rates and lower earnings or losses from shipping were the rule. Disruptions and realignments took place in shipping conferences. With approximately a third more ships than before the war, competing for 75–80 per cent of the amount of cargo moved in 1913, shipbuilding naturally reacted, and many ships were laid up. A world survey by the United States Department of Commerce indicated that 10.9 million gross tons of steam vessels were idle at the beginning of 1922, and 7.5 million as late as the middle of 1923.

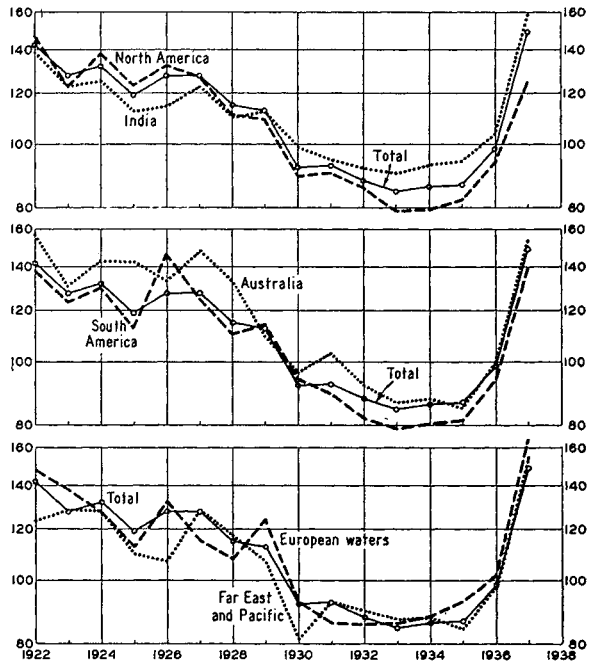
Beginning in 1922–23 ocean freight rates were again down to prewar levels. Characteristically, they were adjusted downward more rapidly than other prices. Chart 5 shows the *Economist* index in total and by six groups of routes for the years since 1922. This graph, omitting the war period and the years immediately following,[1] satisfactorily reveals the major changes in level and course of rates.[2]

In the 16-year period from 1922 to 1937, the *Economist* index of ocean freights averaged 11 per cent higher than in the 16-year base period 1898–1913. Postwar commodity prices, however, averaged about 44 per cent higher. If ocean freight rates are considered in relation to the general price level, they are found to have continued their long-term declining trend. When the average of the *Economist* shipping freights index is "deflated" by the Sauerbeck-Statist index of wholesale prices for the same two periods, the freight-rate level of these postwar years appears about 21 per cent lower than during the 16 years before the war (see Chart 15, p. 118).

Between 1922 and 1929 the broad trend of rates was downward. The most important interruption of this trend occurred in 1926 during the British coal strike (starting on May 1 and continuing through November), which caused an extensive reallocation of shipping. British coal exports ceased and imports became necessary. In May–November charters were effected to carry over 10 million tons of coal across the Atlantic to Great Britain, and 2.5 million came from other sources, including even India. Tonnage was also required to carry continental coal abroad, and from South Africa and Australia coal moved to South America and the Far East.

CHART 5.—ECONOMIST INDEXES OF TRAMP CHARTER RATES, ANNUALLY, 1922–37*

(Average 1898–1913 = 100; logarithmic vertical scale)



* Data compiled from the *Economist*. It will be observed that while rates on individual routes frequently depart from the general average, most such departures are not prolonged, and the general trends on all routes have been similar.

The dislocation of normal trade routes entailed long voyages and deprived grain-exporting countries of their normal quota of tonnage. Ship operators preferred coal cargoes from Hampton Roads to England, for example, to grain from the River Plate. Such employment was relatively more profitable, considering the shorter time traveling in ballast. Important tramp markets like the River Plate were left short of tonnage for grain. There were marked effects on grain prices,

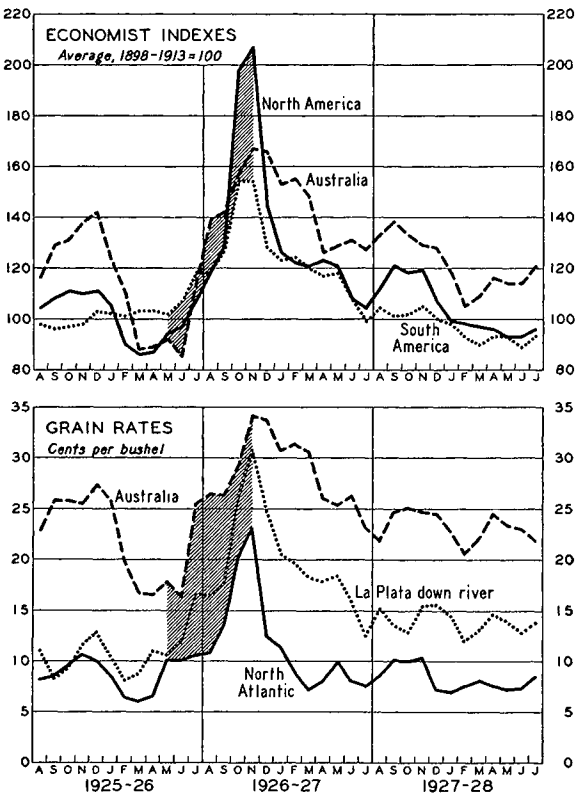
[1] For information on freight rates during the war period see C. E. Fayle, *The War and the Shipping Industry* (Oxford Univ. Press, 1927); J. A. Salter, *Allied Shipping Control* (Oxford, 1921); E. A. V. Angier, *op. cit.*

[2] For monthly grain rates on important routes during this period, see Chart 16, p. 118.

the distribution of stocks, and volume of international trade.[1]

Ocean freight rates consequently rose for a time to exceptional heights, as shown in Chart 6. The *Economist* route indexes show

CHART 6.—TRAMP CHARTER RATES, MONTHLY, 1925–26 TO 1927–28*



* Route indexes compiled from the *Economist*. Grain rates in Table III. The shading indicates the period of the British coal strike.

most clearly the striking effect of high coal freights. The advance in grain rates was less spectacular, but still pronounced, especially on the North American route. There, rates were first to respond to the abnormal situation, and competition between coal and grain cargoes for vessel space was greatest. Australian rates rose by smaller percentages than Argentine and North American rates. The Australian general index does not reflect the rise in coal freights; and grain rates from Australia early in 1925 had been unusually high, accompanying exceptionally heavy wheat shipments of the first few months of that year.[2]

By January 1927, however, rates had generally returned to their former level. On the North Atlantic route they dropped even lower during the year. None of the benefits of the "boomlet" in freights were long retained. Long voyages in ballast, and delays in loading and discharging coal cargoes as well as the high prices of bunkering coal, meant that the temporary rise in freights was by no means all gain to shipowners.

World economic conditions generally were good during 1927–29. Trade expanded, and the amount of laid-up tonnage fell to a low level. With the advent of depression in 1929–30, however, idle tonnage rose rapidly (Chart 2, p. 60). Violent disturbances in international credit relations, in commodity production and prices, and government measures to prevent or cope with them, operated to curtail international trade. Its physical volume fell more abruptly than perhaps in any previous period, presumably because this depression was exceptionally world wide. Large European grain crops in 1929, and subsequent increased use of tariffs and other national policies designed to economize foreign payments and promote self-sufficiency, especially contributed toward the shrinkage of trade. Industries producing foods and raw materials were hardest hit.

Consequently ocean freight rates suffered a further decline. From the 1928 level this was less marked than for most commodity prices, but only because freights had previously slumped to a level not much above the variable costs of many old ships. During the depression, rates settled at almost the lowest level ever known, and there was little or no profit in shipping. The *Economist* index remained for six or seven years at a level below the average for 1898–1913. The international

[1] See our world wheat surveys and review covering this period, in WHEAT STUDIES, III, 92–93, 152–56, 271–72, and IV, 16–17, 56.

[2] These high rates maintained the Australian average for 1925, while the indexes of rates fell on all other routes between 1924 and 1925. Hence the high rates in the latter half of 1926 failed to compensate for the low rates earlier in the year, which had followed the appreciably stronger rates prevailing through all but a few months of the year 1925. For these reasons, the *Economist* index for Australia shown in Chart 5 (p. 71) was lower in 1926 than in 1925.

movement of wheat, like that of many other commodities, was light. As the depression persisted, ship operators used up most of their financial reserves. When they were reduced to a precarious position, governmental measures were taken on their behalf.

During the second half of 1935 some improvement in freights became apparent. The charter market was stabilized by the agreement of tramp owners to establish minimum rates in the more important trades. Within an industry long accustomed to unrestricted competition, this year was significant for the unprecedented co-operation.

In 1936–37 the forces of recovery had so made themselves felt that a striking rise in ocean rates took place. Contributing toward the more active movement in international trade in commodities were the intensive rearmament programs of many countries. War risks in the Mediterranean with the Spanish civil war, and preparations for hostilities in China, were also factors in the rise in freights. Still more important, these developments occurred after a number of years of light shipbuilding and extensive scrapping of obsolete vessels which helped to bring the amount of idle tonnage to a new low since the war.

After rates had risen to a level somewhat higher than prevailed at the peak just before the war, the rising trend begun in 1936 was sharply reversed in the autumn of 1937, and by the middle of 1938 practically all the gain of the previous year had been lost. This most recent cycle in rates merits fuller discussion in a broader perspective.

Cyclical Fluctuations and the 1936–37 Rise

Cycles of prosperity and depression have an important bearing upon the fortunes of the shipping industry, but what may be termed the shipping cycle bears no fixed relationship to the general business cycle. A sustained increase in the volume of world trade tends eventually to bring advances in ocean freight rates, but a substantial rise in the level of rates comes only with full utilization of available carrying capacity. During the years of fairly general prosperity that preceded the great depression of the 1930's, the world's merchant shipping was never fully utilized; hence freights and shipping profits responded but slowly to improved conditions.

The shipbuilding industry, as distinguished from the business of operating ships, has characteristic cycles which differ frequently from both business in general and the shipping cycle. The shipbuilding industry may show signs of activity when freights are still low, and construction activity may not necessarily be indicative of the prosperity phase of the shipbuilding cycle. On the other hand, shipbuilding may be temporarily depressed, particularly during the last phase of a boom in shipping, when freights and the price of steamers available for immediate service are still high.

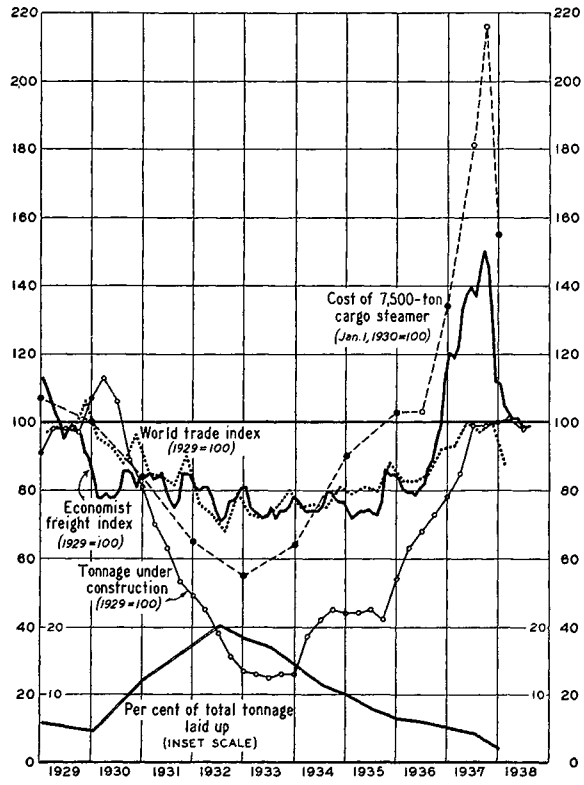
Conditions in both shipping and shipbuilding are similar to those in any other industry during the various phases of their individual cycles. Since shipping is an international business, booms and depressions in any part of the world leave their mark on the industry, but only when economic conditions are generally good or bad throughout the world are the effects especially pronounced.

It is particularly enlightening to examine developments during the decade beginning in 1929, for the end of that year signalized a change in direction of the majority of world economic indexes. Chart 7 (p. 74) permits examination of some relationships between freight rates and the more important factors bearing upon their behavior, as well as the responses characteristic of the shipping and the shipbuilding industries to developments outside and within each industry.

Any decline in the demand for shipping services is immediately reflected in a disproportionate fall in shipping freights. The chart thus shows rates falling more rapidly than trade and even anticipating the turn in 1929. Had freights really joined in the previous boom, their fall would have been more marked than it was. During the depression phase of the business cycle, tonnage becomes superabundant: witness the 20 per cent of all tonnage idle in mid-1932 (over 14 million gross tons). Charter rates, which fall first, largely determine the amount of shipping to be laid up and the amount to continue

in operation. Later, in the course of world trade contraction, liner rates reflect the same conditions. Services are reduced and ships laid up or special types of employment are found for them.[1] These changes in shipping

CHART 7.—THE 1936–37 ADVANCE IN TRAMP CHARTER RATES AND RELATED FACTORS*



* Data in Tables I and VI, or as indicated under Chart 3. The indexes are here expressed on substantially comparable bases, except perhaps for the steamer cost index.

conditions are revealed even more vividly by the curves showing the proportion of total idle tonnage than by the level of rates.

A decline in ocean freights is accompanied by a shrinkage in the cost of new tonnage.[2] The curve indicating the cost of a new, ready, 7,500-ton cargo steamer often roughly parallels the shipping freight index. At the peak of major cycles, however, when shipyards are crowded and material and labor costs have risen, such conditions are reflected in very high cost of new vessels, as in 1937. Even in 1938 costs of new tonnage remained relatively high despite the drop in freights, because of building activity for naval purposes.

With the onset of depression, shipowners curtail expenditures for new vessels, as shown by the drop in the tonnage-under-construction curve. They eliminate unessential improvements that may have been planned. Finally, ships are laid up as the gross freight revenue earned will no longer cover the variable costs of operation. If something more than fixed charges cannot be earned, it becomes more economical to lay up tonnage than to continue to operate. Vessels incurring the highest running costs are least able to pay their way and are laid up first. Removing part of the supply tends to check the fall in freight rates for a time. If the depression is prolonged, older ships are scrapped; improvements in design are devised under economic pressure; low prices, low wages, and cheap capital afford stimuli to building; and governmental assistance may be obtained to prevent disintegration of a country's merchant fleet when few owners can operate without loss. All these were represented in the past decade.

As economic conditions improve and world trade begins to expand, rates tend to rise. Higher rates permit some idle vessels to be recommissioned, but the augmented tonnage supply tends to check the rise. Small changes in rates are met and checked by large changes in the amount of idle tonnage.

Lack of elasticity in both demand for and supply of tonnage in periods of prosperity causes freight rates to fluctuate much more widely than the prices of goods. Chart 7 shows the spectacular jump in rates that occurred during 1936–37, as the proportion of total tonnage laid up fell to the lowest point since shortly after the war. A vigorous renewal of construction after several years of subnormal activity was indicated late in 1935 before freights shot upward. By the final quarter of 1936 the amount of available cargo space had become quite inflexible. In most

[1] The rise of special-cruise business, accelerated during the depression of the early 1930's, reflected this need for work. Several years earlier, liner tonnage had become too great for the requirements of transatlantic traffic.

[2] The sale price of ships, new or old, is often more dependent upon the freight market than on conditions in shipbuilding.

industries it is comparatively easy to increase production in a period of rising prices; but once laid-up ships have been put back into commission, it is much more difficult to expand ocean transportation facilities.

Historians will probably consider 1937 the peak of a shipping cycle. In the preceding half-century there had been several cycles in shipping and shipbuilding, one student placing the peaks in 1887–89, 1899–1900, 1905–07, 1912–13, and 1918–20.[1] Explanations may fairly readily be found for cycles that have completed their course, but forecasting the peak or trough of a cycle in progress is not easy. The precise nature of the relationship between cyclical fluctuations in shipping and freights and the business cycle has not yet been adequately studied.

Time Charter Rates

Had shipowners been better able correctly to forecast the strength and persistence of the demand for tonnage as late as January 1937, it is probable that the rise in rates culminating in September would have been smaller. The shipping industry suffers considerably from the lack of an effective futures market for freights, in which composite judgments on demand and supply factors might be expressed, and in which shipowners and shippers might "hedge." To only a very limited extent may this hedging need be met by contracting for tonnage some months in advance on a regular voyage charter basis, or by the time-charter market in which owners dispose of and shippers acquire tonnage for set periods (see p. 94).

Indexes based on time charter rates are difficult to compile. Two are currently available—a monthly one (from 1920) constructed by the Chamber of Shipping of the United Kingdom, and a quarterly one (from 1913) constructed by E. A. V. Angier for *Lloyd's List and Shipping Gazette*.[2] Obviously, when thousands of fixtures are averaged, the resulting figure gives only a very broad indication of the rate level for all tramp ships in all trades carrying all kinds of cargo.

Ordinarily time charter rates are somewhat lower than voyage charter rates because of the greater time element involved. Moreover, competition tends to reduce time charter rates to a level approximating costs plus a small return, and they are not affected by all the temporary conditions that are reflected in voyage charter rates. In so far as they reflect long-run and world-wide conditions, and the minimum level at which tramp shipowners can make a profit over a period of years, time charter rates may be "the most accurate indices to the general level of freights," as Angier asserts.[3]

Time charter rates often reach exceptional peaks when a serious shortage of shipping prevails, and even when one is only feared. From low levels in a period of shipping abundance, time charter rates tend to rise sharply if a sudden change in conditions causes or threatens shortage. This occurred after the outbreak of war in August 1914, when the shortage was severe and prolonged. Similarly, during the 1936–37 rise in voyage charter rates, time charter rates rose even more rapidly and reached higher levels. This is shown by the following index numbers which have been converted to a common 1935 base:

Index	1935	1936	1937
Economist, voyage charter	100	113	172
Chamber of Shipping			
Voyage charter.....	100	136	184
Time charter	100	122	256
Angier, time charter.....	100	111	218

In 1937, according to one authority,

> A great deal of business was done on this basis in all markets; in fact some trades were carried on almost wholly in this way, as the continuous rise in voyage rates and the difficulty of getting tonnage as and when it was wanted made merchants anxious to cover their requirements for as long as possible.[4]

[1] F. Cyril James, *Cyclical Fluctuations in the Shipping and Shipbuilding Industries* (Philadelphia, 1927), p. 67. Peaks of intermediate cycles are given as 1894–96, 1902–03, 1909–10, 1916–17, and 1922–24. In a study of "Reinvestment Cycles" in which shipbuilding for the Norwegian Merchant Marine was analyzed, Johan Einarsen (*Review of Economic Statistics*, February 1938, XX, 5) found distinctive five-year cycles in shipbuilding with peaks in 1884, 1890, 1895, 1899, 1906, 1912, 1916, 1920, 1925, and 1929.

[2] See Appendix Note B.

[3] In a note on his chart of Time Charter Rates.

[4] From Angier's Shipping Report, 1937, *Fairplay*, Jan. 13, 1938.

III. GRAINS IN SEABORNE TRADE

In practically every part of the world some form of cereal is an important element in the diet. In few countries is production nicely balanced with consumption. Most nations consistently export or import grains. A few are exporters during some periods and importers at other times, depending largely upon the sufficiency of domestic production or grain prices in the world markets. Grains are therefore continuously moving over various trade routes by both land and sea.

Aggregate world consumption of most agricultural products is greater now than before the war. Supplies entering international trade, in most instances, increased very substantially in the first postwar decade. Of the grains this was especially true of wheat, rice, and maize, the three most important staples. More recently, international trade in wheat has been below the average for 1910–14. Maize, though fairly important in the international grain trade, is more vulnerable to changes in ocean freights than are wheat and rice, since it is shipped mainly for animal feed for which the demand is more elastic than for foodstuffs.

The proportion of world production of the six principal grains[1] that enter into international trade is not large, as shown by the following rough comprehensive estimates for 1927–30, a period of relatively heavy trade:[2]

Grain	Estimated world production (*million tons*)	Quantity entering international trade (*million tons*)	Percentage of world production exported
Wheat	142	22.20	16
Maize	117	8.84	8
Rice	85	6.56	8
Oats	69	1.34	2
Barley	47	3.73	8
Rye	45	1.38	3

For a few countries the proportion of home production normally exported is very much larger. Argentina, Canada, and Australia, for example, are heavily dependent upon export markets, and ordinarily more than half of their total production of grains finds overseas outlets.

Importance of the Grain Traffic

Satisfactory quantitative measures of the importance of all grains in seaborne trade cannot be obtained, for either current or past years. Value of products is an entirely inadequate measure of international trade from the standpoint of transportation service.[3] On a weight basis, grains presumably would rank higher than in terms of value, but their relative importance to shipping would still not be clearly reflected.[4] Low-value products such as ore, coal, and lumber are important on this basis, yet cannot carry freight charges as high as grain.

In order to arrive at a suitable quantitative measure, one would need to compute for some specified period the total volume of tonnage employed full time in units of ton-days, and the number of ton-days employed in the movement of grain. Such an index of the utilization of ocean shipping would be the nearest coun-

[1] Millets, which include grain sorghums, are of considerable importance in Russia and in most of Asia and Africa. In vast territories they constitute a staple item in the diet of large population groups, serving the same general purpose as do wheat or rice in other areas of the world. In Russia millet is important as material for porridge consumed along with bread. Recently grain sorghums have become of material significance in the southwestern United States, but exclusively for feed use. No estimates of world production of millets are available, but they may rank as high as or higher than rye or barley. Since the quantity moving across international borders is very small, they are disregarded in this study along with such minor grains as buckwheat and spelt.

[2] Royal Institute of International Affairs, *World Agriculture—An International Survey* (London, 1932), p. 6. Rice data are expressed in terms of "cleaned rice."

[3] During recent years, foodstuffs of all kinds have accounted for only about one-fourth the total value of international trade. Two other groups of approximately equal importance—raw or partly manufactured materials, and manufactured articles—account for the other three-fourths. See League of Nations, Economic Intelligence Service, *Review of World Trade, 1936* (Geneva, 1937), p. 15. Within the foodstuffs classification, grains are the most important subgroup; but even wheat is responsible for only two or three per cent of the total gold value of world trade.

[4] If data were available, they would doubtless show that grains as a group, and wheat in particular, would rank considerably higher in seaborne trade than in total international trade, which includes goods moved by rail, truck, canal, river, and short coastal routes.

terpart of the railroad unit, ton-miles. In this case, however, the ton ought to mean not the weight of the cargo but the ship ton—gross or deadweight. Such calculations have not been made; the basic data are not available and complex questions of method are involved.[1] If calculations of such measures of demands on ocean shipping by different groups of commodities were feasible, they would doubtless show the grains ranking much higher than in terms of value or weight. A guess may be ventured that the percentage would lie between 20 and 25.

Of all the grains, wheat has the greatest significance and is most international in character. It is either grown and exported, or imported for consumption, by a larger number of nations than any other cereal. Its importance to the world's maritime carrier business, and hence its effect upon freight rates, easily surpasses that of any other grain. On the average, the volume of international trade in wheat probably equals the volume of trade in all other grains combined, and its demand upon ocean shipping is proportionately greater still.

Maize ranks second to wheat in volume of world production, in the volume that enters into international trade, and in the demand upon world shipping. The international movement today is largely from Argentina to Europe, though shipments to North America were of significant dimensions in two recent seasons when drought devastated the United States corn crop. Minor export routes are few —to Europe from the United States, the Danube countries, and South Africa.

Rice is second to wheat among the cereals used for the world's food, but its importance for ocean shipping is relatively much less. World rice production is only about 60 per cent that of wheat, and the proportion entering into international trade is roughly only half as large.[2] Since rice is of much greater importance to eastern and southern Asia than to western countries, the ocean routes over which most rice moves in international trade are confined to that part of the world. Tramp ships pick up rice cargoes at Rangoon for Europe or other parts of the world, but this business is small in comparison with the trade in rice within the Far East. From the standpoint of shipping, all these routes are of far less importance than those over which export wheat moves.

Barley is probably the fourth most important grain in its demands on ocean tonnage. World output is only about one-third that of wheat, and the volume entering into international trade is about one-sixth that of wheat.

Rye and oats make small demands on ocean tonnage. Though the second most important food grain in Europe, rye has fallen to sixth place in the world output of cereals. The small fraction that crosses national borders largely moves by short sea voyages, or overland, mostly within Europe. Much the same is true of the feed grain, oats, the outturn of which considerably exceeds that of rye.

On a ton-mile basis, wheat and corn possibly make up over 80 per cent of the world demand upon ocean tonnage for international shipment of grains, and wheat may account for two-thirds to three-fourths of this subtotal.

Grain as Cargo for Tramps and Liners

Some indication of the part played by grains in the tramp shipping business is revealed by statistics obtained in connection with the operation of the British Shipping (Assistance) Act, 1935.[3] Grain was found to account for 13.7 per cent of the voyages made by British tramp ships eligible for a subsidy during 1935, for 20.5 per cent of the weight of cargo carried, and for 30.6 per cent of the freight charges earned. If vessels under 3,000 gross tons, which play only a minor part in overseas trade, are excluded, grain accounted for nearly 35 per cent of the freight revenue earned as against less than 22 per cent for coal and coke. These products are commonly trans-

[1] For example, how to divide the ton-days on triangular or multiangular routes, particularly when cargo shipped on one leg of the route is of dominant importance in making the voyage; or how to divide the ton-days on direct routes when the cargo shipped outward is carried at low rates only because the main cost of the voyage is borne by the return cargo.

[2] These percentages, based on the tabulation above, would be considerably higher if one used figures for "rough rice" instead of "cleaned rice."

[3] As analyzed and reported by Isserlis, *op. cit.*, pp. 83–84.

ported over shorter distances, occupy less vessel space per ton and carry lower freight rates; hence they account for more voyages and a far greater weight of cargo but yield less freight revenue. Though a smaller proportion of the grain trade may be in the hands of tramp shipping today than before the war, grain remains the most important cargo to this branch of the industry.

Grain is also considered desirable cargo for liners, but the degree to which they participate varies with the trade route and from year to year.[1] On one route only do they predominate. Elsewhere they may handle a little grain regularly, or the business may materialize only in poor seasons or after the major movement has been completed and tramps have largely withdrawn.

The great bulk of the overseas grain commerce still moves by tramp steamer, mostly in full cargoes.[2] Canadian shipments through Canadian ports, and Argentine and Australian exports, are predominantly so carried. On the average, more than 80 per cent of Australian wheat,[3] around 85 per cent of Argentina's grain exports, and some such percentage of overseas shipments from Canadian and Gulf ports, are normally handled by tramps. By contrast, about the same percentage of the United States Atlantic movement is by liners.[4] From New York to Europe, in particular, nearly all of the grain is handled by established liner services. Tramps nevertheless compete at times for this business. While waiting for charters, they lie off Norfolk within easy call of New York or other North Atlantic ports. In recent years quite a few have loaded cargoes at Albany, some completing their loading at New York.

Most of the wheat and other grains moving in international commerce is shipped in bulk rather than in bags. This has long been true, though until after the war bagged shipments predominated in several important trades, including the Pacific Northwest, Argentina, and Australia, as well as India. From the carrier's standpoint, bulk handling has net advantages which are generally recognized in lower freight rates quoted on bulk grain.[5] Sacked grain can be stowed almost anywhere in the ship, but a given quantity takes up less space in bulk. Moreover, except where no machinery other than the ship's winches is used, bulk grain is loaded and unloaded more rapidly, thus avoiding delays and expenses connected with longer layovers in ports.

The shift from bag to bulk has gone farther in ocean shipments than in the interior handling of grain. In the Pacific Northwest of the United States, for example, bags still predominate over bulk in interior handling, yet export shipments have been practically all in bulk since the early 1920's. Shipments of bagged grain from Argentina and Australia have dwindled while the trend of their total exports has been upward. Argentina has only recently begun constructing a grain-elevator system, yet the percentage exported in bags was only 15 per cent in 1925 and is smaller today. Of the leading Australian wheat states, New South Wales inaugurated a bulk-handling system in the early 1920's, and this has been considerably expanded; Victoria has one under construction; in Western Australia, Co-operative Bulk-Handling, Ltd., has recently developed an extensive and inexpensive sys-

[1] These variations, plus the absence of statistical information, account for discrepancies in statements made from time to time on the proportions handled by liners and tramps.

[2] Full cargoes, however, may be made up of different lots of grain and be sold in portions known as part cargoes or even parcels. The identity of different lots of bulk grain is maintained by means of separation cloths or mats.

[3] See Commonwealth of Australia, Royal Commission on the Wheat, Flour and Bread Industries, *Second Report*, 1934–35 (Canberra, 1935), p. 161. According to a letter from E. McCarthy of the Department of Commerce, Commonwealth of Australia, May 30, 1938, "Only a small percentage of wheat from Australia is shipped otherwise than on chartered vessels." M. O. Phillips (*op. cit.*, p. 561) obtained information in 1935 to the effect that cargo liners had invaded the Australian wheat trade and were estimated to handle 25 per cent of the business, the remainder going by tramps.

[4] Estimates secured by Phillips as of 1933 suggest that only 5 per cent of the grain shipments from New York went by tramps (*op. cit.*, p. 550). However, 1933 was hardly a typical year, as the United States wheat exports were far below the average of preceding years. For the same year, according to his informant, about 90 per cent of wheat exports from Argentina moved by tramp ship (*op. cit.*, p. 556).

[5] For example, under the minimum freight rate scheme for tramp trades, the ocean freight rate between Australia and Europe is 2*s.* 6*d.* per ton less for "bulk" wheat than for bagged wheat.

tem for bulk handling at country points, though only Bunbury is yet supplied with a terminal elevator; and South Australia alone has no system or project for bulk handling. Yet practically all the wheat shipped from New South Wales for several years and from Victoria during the past few years, and most of that from South and Western Australia more recently, has been shipped overseas in bulk. India, with very low wages, cheap jute bags, and adverse climatic factors to contend with, is exceptional in having no elevator system at all and none projected; and Indian wheat exports move chiefly in bags.

Grain is "clean" cargo. When shipped in bulk, it normally flows easily, can therefore be rapidly loaded, stowed, and discharged,[1] and can be used by liners as ballast. Bulk grain, however, may shift in rough weather without again seeking a level. Special demountable transverse bulkheads and longitudinal shifting-boards, fittings, or bulkheads therefore become necessary equipment for the cargo ship carrying grain. If a vessel is not equipped in this manner, the owner may be put to considerable expense in supplying the requisite fittings.[2] When a ship's hold is not completely filled with grain, several layers of sacked grain are laid over the loose grain to keep it in place. Other miscellaneous cargo, if any, may then be stowed on top. The use of sacked grain as an additional precaution against shifting depends upon the construction of the ship and its cargo-carrying spaces.

Grain, as a living seed, generates a certain amount of heat in transit. Grain cargoes must therefore be kept dry, and the vessel properly ventilated to prevent damage from sweating. It is of utmost importance that grain, whether shipped in bags or in bulk, be sufficiently dry before loading, especially if it is to be carried long distances and through warm regions.[3]

Disadvantages of grain as cargo are the seasonality in the grain movement and the marked changes in tonnage requirements attributable to crop variations in the different exporting countries. Such fluctuations are of particular importance to the tramp, but at times they affect the liner's business also. As grain is harvested and sales overseas are effected, a demand is created for cargo space. Ships are transporting grain from some part of the world to the principal markets every month of the year. Variations from month to month in the total world demand are substantial, but these fluctuations are less important than the length of time during which grain cargo is available in any one country and the volume that needs to be shipped. Experience indicates approximately when special demands for space will materialize and cease. Much less easily predicted is the magnitude of the demand. Peak demands for space over a particular route are not always readily met, and they generally cause ocean freight rates to rise on that route.

The least predictable element is that of weather. Affecting plant growth and maturity, it can gradually or quickly produce a material change in the crop outlook and alter the volume or proportion of grain available for export. Also changing the demand for transportation from a particular area, unfavorable harvesting weather may so affect the condition of the grain as to delay shipment to the ports and overseas. Material variations in the output of grains in the principal importing countries of Europe may change total demand for space and not merely the distribution of tonnage.

Large variations in crops are of special importance if they occur in certain parts of the world. Unexpected adverse developments in the wheat situation in Argentina or Australia may result in leaving a large volume of tonnage concentrated in those areas in anticipation of a normal movement, without prospect for employment because other cargo is not available in remunerative volume. So remote are these regions from the chief grain-import-

[1] Soft or moist grain moves slowly, while grain which has been overdried may have to be broken down with a shovel to make it run. Dusty grain, like dusty coal, slows up operations because of the dangers of suffocation and combustion.

[2] The British Board of Trade has laid down certain regulations covering the use of shifting-boards, and the proportion of grain in bags and in bulk that must be loaded, according to the size and type of carrying vessel.

[3] This is particularly true of maize. In years when the autumn is moist, little can be safely shipped (especially across the equator) until heavy frosts have come to dry it out.

ing areas, that such "out-of-position" tramps must be held idle awaiting other cargo or travel in ballast for thousands of miles to some other market.[1] In other parts of the world, sudden and abnormal changes are commonly of lesser import to shipping. If they occur in Canada or the United States but not in both, grain carriers suffer less because of the relative ease with which they can change their base of operations.

Not only weather may be responsible for significant changes in demands for grain. War developments also create abnormal movements. When ships are taken out of one trade for some special purpose, there are frequently no substitutes available and rates rise inordinately, creating hardships and affecting the volume of grain trade.

[1] See above, p. 67, and *Times of Argentina*, Apr. 4, 1938, p. 14. "Recently various carriers have been ordered in ballast for Curacao, which gives the impression that the owners want to get them in position to run through the Panama Canal for West Canadian or Australian cargoes or for a quick trip up to the St. Lawrence." Even so, large amounts of tonnage remained to meet further disappointment when the 1938 maize harvest was short and in poor condition for prompt shipment. Argentine grain shipments in January–June 1937 were high—around 10 million tons; in the same months of 1938 they were low—not quite 3 million.

[2] These include the desire to achieve handling economies and to reduce weather hazards; the farmers' need for cash (though physical movement and commercial sale are not necessarily simultaneous); the closing of the St. Lawrence and other waterways for the winter; and the fact that prospective seasonal price increases seem not to justify heavy expense for storage and interest. In recent years the movement has been accelerated by extensive use of the combine harvester and automobile truck.

[3] So much time is required for vessels to go out to Argentina and Australia that needs must be anticipated well in advance.

[4] The procedure to be followed may be set forth in the charter party as, for example, in clauses 22 and 23 of the Chamber of Shipping River Plate Charter-Party, 1914 ("Centrocon"). Clause 4 directs that the loaded steamer ". . . . proceed to St. Vincent (Cape Verdes) or Las Palmas or Teneriffe (Canary Islands) or Madeira or Dakar, at the Master's option, for orders (unless these be given him by charterers on signing Bills of Lading) . . . ."

[5] On occasions, when the owner can no longer afford to hold it, wheat shipped unsold becomes "distress cargo," with important influence on market prices. But there is no necessary relationship between the volume of "for orders" shipments and the usually much smaller volume of wheat shipped on open consignment.

For no other major group of commodities are such variations in requirements for ship tonnage so important. Few are subject to the same uncertainties, yet for equally few is it as essential that they be transported from surplus-producing areas to areas deficient in local production. These factors are, of course, reflected in the behavior of grain freight rates.

Commercial Aspects of Grain Shipment

In exporting countries generally, for manifold reasons,[2] growers and sellers tend to move each new grain crop as rapidly as possible. The primary movement of grain in the east of the United States and Canada is in general to lake ports and interior terminal points where storage facilities are plentiful. The movement to the Atlantic seaboard ports occurs in a more orderly way; usually the grain is moved to ports only after it has been sold for export and tonnage space arranged. Elsewhere, seaboard ports simultaneously perform the function of North American terminal points, and the grain moves directly into them. In most exporting countries, however, including Argentina and Australia, port storage space is insufficient for storing any large accumulation. Shippers must therefore make advance arrangements for having cargo steamers on hand to load as grain arrives from inland points.[3] Even so, congestion of port facilities occurs from time to time.

On the average, some 27–28 per cent of wheat and flour shipments to Europe during the past decade have been shipped "for orders." This means that when the grain carrier leaves the loading port, its port of discharge is not settled; and that before it comes within the range of intermediate ports specified in the charter party, the charterer will designate the port or ports of discharge desired.[4]

Grain shipped for orders may or may not have been sold at the time of shipment, but most commonly is covered by aggregate sales of cash grain or futures.[5] If the exporting firm is also the importer, grain may be put afloat more or less continuously with only a general destination. Later, ships may be diverted to one port or another, depending upon the need for supplies to fill orders secured by the firm's selling organization.

The proportion of grain shipped "for order" from various countries depends on the distance between the exporting and importing countries, the character of interior movement in the exporting countries, the financial power of exporters and the character of their organization, and the like. The distance between the countries is of large importance because it limits the time within which the grain has to find a "home." After the order has been given to the ship, the choice between prospective buyers is greatly narrowed down —to those in the port to which the ship has been ordered. When the ship arrives in the port, it must be unloaded at once, because charter parties provide for heavy demurrage, similar to that charged by railways. It is therefore considered good practice to dispose of the grain shipped for orders well ahead of the time the order has to be given to the ship.

Because of their nearness to the European markets, their relatively more abundant storage space, and the smaller participation of tramp ships in the trade, Canada and the United States do not generally ship grain "for orders" in the same volume as do Argentina and Australia.

Argentina accounts for the greater part of "for orders" shipments. This may be partly because so heavy a proportion of the Argentine grain trade is in the hands of a very few large European export-import concerns. During recent years, when the USSR has been a wheat exporter, a substantial number of Russian shipments have been for orders; and except that it is an official monopoly, the Exportkleb is in some respects similar to private concerns such as Louis Dreyfus & Company, Bunge & Born, and the Continental Grain Company, which dominate the trade in Argentina and operate all over the world.

The proportion of total shipments made for orders varies with conditions in the world's grain markets. When spot grain is at a discount, the shipper may select a longer route or a slower ship so as to delay his cargo in anticipation of better cash prices. Under these circumstances he saves on storage charges, as the ship serves as a warehouse while he pays only for transportation service. On long voyages from Australia or Argentina, and when grain is plentiful, these considerations tend to increase the amount of wheat shipped for orders. But truly speculative shipments, which were common in the heyday of the sailing vessel and before the development of futures markets, nowadays constitute only a small proportion of total shipments.

Necessarily the terms and conditions under which grain is sold in international markets and the terms and conditions of shipment cannot very well be considered as separate matters. Forms of contracts vary considerably between export countries and are being revised frequently to protect the interests of both buyer and seller. The London Corn Trade Association alone has over fifty different forms of contract. Without going into all the terms and conditions of sale, brief mention should be made of phases relating to the shipping of grain.[1]

With negligible exceptions all grain contracts in the international trade are "c.i.f." (cost, insurance, freight) contracts by which, for a stated price, the seller agrees to provide the commodity and deliver it to the ship in the port of shipment, to insure it, and to pay the freight on it to the port of destination.[2] The contract stipulates the classification of the vessel in which the grain is to be shipped and the port or ports of shipment and destination. If the contract is for a full cargo, the broad options in charter parties as to the port or ports of destination of the cargo are usually ceded to the buyer in toto. Part cargoes and parcels shipped in tramps are also frequently offered with an option of discharge at any of two or several ports. In all cases certain adjustments in freight rates are made depending upon the options selected; usually the larger the total quantity bought, the greater is the choice between the port or ports of destination. Liner delivery, of course, is limited to the ports of call on the regular schedule of the liner service.

[1] For more detailed information see A. A. Hooker, *The International Grain Trade* (London, 1936), and S. K. Thorpe, *Grain Trade Documents* (Liverpool, 1924).

[2] Other bases of contracts, such as f.o.b. ("free on board") or f.a.s. ("free alongside ship"), apply to domestic business or steps in the transaction which ultimately results in a c.i.f. sale to an overseas buyer.

Largely because the capacity of the vessel to be used and of each of its holds may not be known at the time c.i.f. sale is effected, and because the capacity of the vessel and holds is not in round figures, as sales usually are, the quantity of grain sold is determined with a margin. The usual margin is "10 per cent more or less" for cargoes and "5 per cent more or less" for parcels (only part of the marginal quality is settled for at the contract price, for the remainder of the price at the date of bill or bills of lading is used as the basis). The size of shipment is usually expressed in tons, quarters, or loads. Generally the "long ton" of 2,240 pounds is referred to. Typically the "quarter" for wheat and maize is equal to 480 pounds.[1] On the Atlantic coast of North America a "boatload" is 1,000 quarters,[2] rather than a designated number of tons varying with the capacity of the carrier. Orders from foreign buyers usually specify the quantity of grain in multiples of 1,000 tons, which is also the unit of futures trading on the Liverpool Corn Exchange.

In part owing to the uncertainty as to the time when the chartered ship will be ready to load, the time for shipment agreed upon by a c.i.f. contract is seldom less than a month. Predominantly, in fact, a calendar month is the customary period. Half a calendar month (first half of January, for example) is sometimes stipulated for shipments in the immediate future, or for sales of grain in process of shipping or afloat; for such transactions there are used also such conditions as "prompt shipment," "shipping-shipped," or afloat, or even the name of a specific vessel may be a part of the contract. For deferred shipments, two-months contracts are very frequent; for example, new-crop Canadian wheat is usually sold for shipment in October–November.

It is in the nature of a c.i.f. contract that the seller is responsible for the condition of the goods only at the time and place of shipment. The buyer has to accept it as it arrives, as it is (*tale quale*), having recourse to the insurance company for damages if any. Grain, however, may suffer damage en route if it has been shipped in poor condition. The seller, it is true, guarantees shipment in good condition, but it may be impossible to ascertain upon arrival whether the damage was due to poor condition of the grain when it was shipped, or to one or more other causes. Moreover, partly due to the nature of grain, the insurance company is not responsible for all damage to the grain, under the insurance policy usually required and provided in the international grain trade; and part of the damage remains uncovered. Grain importers, who naturally resist taking chances, have been successful in inducing exporters from several countries (including Argentina, Russia, and the Danube countries) to guarantee the condition of the grain upon arrival. Since this guarantee was first established for the shipments of rye (from Russia), it became known as "rye terms." C.i.f. contracts for grain and similar goods which contain this stipulation are called "Rye Terms" contracts, contrasting with "Tale Quale" contracts under which the seller guarantees good condition only at time and place of shipment. The exporters of the United States, Canada, and Australia are the most important ones among those who have been successful in resisting the demands of the importers for a guarantee of the condition upon arrival and are still selling their grain on "Tale Quale" contracts.[3]

Various methods of chartering tonnage for grain cargoes have been employed. At present the principal charter parties used are the Baltimore Form "C" in the North Atlantic, the "Centrocon"[4] in the River Plate grain trade, and the "Austral" in the Australian

[1] Definitions have varied to some extent, even for wheat, and still vary for oats and barley. See Hooker, *op. cit.*, pp. 11–12. As a unit of volume, the quarter is 10.6 cubic feet. Nowadays the commercial measurement of grain is by weight rather than by volume, and for this purpose a "quarter" of grain is defined as so many pounds.

[2] In other terms this is 4,800 centals or 480,000 pounds, equivalent to 8,000 bushels of wheat and approximately 8,571 bushels of corn. The "boatload" equivalent for parcels shipped from all other seaboards is 250 tons (1,166.66 quarters of 480 pounds).

[3] "Rye Terms" and "Tale Quale" terms also relate to the quality of the grain sold.

[4] Both the "Centrocon" (1914) and "Austral" (1928) are Chamber of Shipping of the United Kingdom forms. From the Northern Range (Atlantic) ports grain has been carried frequently on a modified or "net" form of the Baltimore C, which means that the charterer loads and unloads the cargo and pays all

trade. All voyage (trip) charter parties have in common certain clauses specifying in detail the terms and conditions under which the shipowner carries cargo for freight.

Port Requirements

There is some degree of specialization in port and port facilities as well as in vessels. Special needs in storage facilities, handling equipment, or type of labor are created by the character of a port's major business—grain, coal, ore, nitrate, lumber, petroleum, sugar, etc. In turn, the kind of trade and type of port influence the type and size of vessel using it.

Some ports are often congested, so that the "turnaround" is slow and expensive. Others impose certain surcharges or dues on the amount of cargo loaded or discharged. Some are handicapped by physical conditions (shallow shores) making the use of lighters mandatory; others have dangerous entrance or clearance, or are inadequately supplied with handling equipment or dock labor. Most port works are not owned by the shipping industry. For their use and maintenance (including dredging of rivers and harbors when necessary) shipowners commonly pay through port charges, while shippers pay for loading and discharge service. All such influences are reflected in relative freight rates from or to different ports.

Technological progress in ship construction and operation is of limited use unless there is corresponding development in ports and port facilities. Otherwise the advantages of greater cargo capacity, fuel economy, and greater speed may be more or less completely offset. Perhaps the most important consideration governing the size of vessels that may operate out of any port is the depth of water. Sometimes a port is handicapped by a natural obstruction and it becomes necessary to load by lighter, which may be considerably slower than loading alongside a dock, especially if direct loading from an elevator is feasible. Such handicaps increase the time a vessel must remain in port and incur expenses. When the shipowner has any alternative, he will be inclined to choose the port without these handicaps.

The bulk of the grain traffic moves predominantly toward large ports well equipped to handle varied cargo and heavy traffic. Large ocean liners have their own berthing places, while there is ample room and equipment for ships carrying full cargoes to unload rapidly and depart. But numerous smaller European ports are also well equipped for handling grains. When one port of discharge may be substituted for another with comparative ease, without materially affecting costs or rates, there is little interruption or obstruction to the conduct of the trade.

Charter rates are therefore the same for a wide range of ports of discharge, whereas in the newer exporting countries with much less highly developed port business, rates may vary appreciably between ports located even closer together but unequally navigable or differently equipped for handling grain cargoes.[1] Some of the more important illustrations, with special reference to a number of different ports in Argentina and Australia, are mentioned in the following section in which a considerable number of grain shipping routes and ports are discussed.

port charges. Freight paid on this basis is more or less "net" to the steamer.

For a discussion of charters and chartering practices, see R. E. Annin, *Ocean Shipping* (New York, 1920), pp. 239–355.

[1] There is a substantial difference in the usual type of handling necessary for grain in the ports of exporting and importing countries, which helps to explain certain features of the freight-rate structure.

Most of the grain in exporting countries arrives at the ports by rail, and the most practical way of loading bulk grain is by means of an elevator directly into the ship. Even if the grain is loaded in a more primitive manner, the ship usually needs a berth for convenient handling.

The common method of forwarding overseas imports of grain in the importing countries is by lighter. Lighters or similar craft are also frequently used for transshipment to smaller ports; if necessary, the lighters serve as convenient storage space. The most practical way of unloading bulk grain is, therefore, by means of floating elevators. Under these conditions, a berth is unnecessary for the ship; a ship which is not berthed may be unloaded simultaneously from both sides; and waiting for a berth, the most usual cause of delays, is eliminated. Sufficient depth of water and a sufficient number of floating elevators are all that is needed for a good grain-receiving port, and it is uncommon to send ships to ports which lack sufficient depth for them.

IV. GRAIN ROUTES AND PORTS

The principal markets for the surplus grain of exporting countries are in the British Isles and continental Europe. For many decades large portions of this densely populated area have depended upon distant sources of supply. Before the war, Russia and the Danubian countries produced much larger grain surpluses, and much larger quantities moved over the relatively short routes from the Black Sea through the Mediterranean to Mediterranean and European Atlantic ports, and via the Baltic and North Seas.[1] Since it was not then necessary to transport so much grain over so many thousand miles of ocean,[2] demands of the grain trade on shipping were smaller than since the war. During the past decade the United States, Canada, Australia, and Argentina have accounted for approximately 85 per cent of the world's net exports of wheat and flour.[3] Over three-quarters of all shipments have been destined for Great Britain or European countries.[4] Accordingly, the most important grain routes and ports and the most significant grain rates are those to the United Kingdom and continental Europe from North America, South America (Argentina), and Australia.

The map designated Chart 8 shows the major grain routes of the world, and certain minor routes, based primarily upon the average movement of wheat and maize during the eight calendar years 1929–36. The relative importance of the major routes may be measured by the wheat movement with one exception—the route between Argentina and Europe. Inclusion of maize greatly increases the importance of this route. The inter-Asiatic rice trade is also indicated on the map in a general way. The rice movement to other parts of the world is so small that its omission does not appreciably alter the picture.

Grain routes, obviously, are important components of the main arteries of world seaborne traffic. A dozen main divisions of seaborne commerce are recognized in British shipping circles. Transatlantic trade embraces routes between North and South America and the United Kingdom and Continent, including those via the Panama Canal from and to the west coasts of these continents. Another division is designated as Australian trade. The commerce of the United States and Canada to and from the Far East is known as the transpacific trade. Then there are trades between India and the Far East and the United Kingdom and Europe, from the Black Sea, from the Mediterranean, and others. For more specific examination of the sea routes over which most of the world's commerce in grain moves, the following classification is more useful:[5]

Division	Major grain route	Minor grain route
Transatlantic	Atlantic Coast of North America to U.K./Continent (wheat)	Gulf (U.S.) to U.K./Continent (wheat)
	South America (River Plate) to U.K./Continent (wheat, maize, etc.)	North Pacific (Canada and U.S.) to U.K./Continent (wheat)

[1] Broad changes in the international trade in wheat and flour (including overland shipments) are indicated by the following average net exports from the principal exporting countries, in three 5-year periods (August–July crop years) before and after the war, in million bushels:

Region	1909–14	1927–32	1933–38
Canada	95.6	277.8	179.0
Argentina	84.7	163.3	126.5
United States	108.5	143.2	18.5
Australia	55.2	110.1	104.3
India	49.8	(3.8)[a]	7.9
Russia	164.5	36.7	22.3
Danubian countries	109.0	50.1	44.8

[a] Net imports.

[2] Routes from Black Sea ports to European destinations, however, are roughly comparable (in terms of days) to the North Atlantic route.

[3] The percentage varies from 82 to 88, depending upon the sources used and years selected. The addition of lower Danube countries, exports of which are less important from the standpoint of shipping, would bring the percentage to over 90.

[4] Broomhall's data (WHEAT STUDIES, December 1937, XIV, 170) show 78 per cent to Europe in 1927–32 and 75 per cent in 1933–36. Shipments destined to other countries, accounting for the remaining quarter of exports, are widely scattered, i.e., China, Japan, Central America, Brazil, Egypt, North and South Africa, India, the United States, and others.

[5] No attempt is made to include all the lesser movements, examples of which are the flow of rice from Siam, India, and Burma to Europe and that of malting barley from California to Great Britain.

CHART 8
MAJOR AND MINOR GRAIN ROUTES AND PORTS

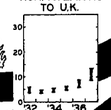
Wheat | Maize | Rice

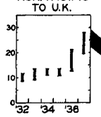
Grain Shipments to Europe
(Million long tons)
from
North America: *Wheat 6.2*
Argentina: *Wheat 3.0, Maize 6.0*
Australia: *Wheat 1.4*

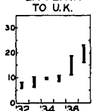
NORTH AMERICA
SOUTH AMERICA
EUROPE
ASIA
AFRICA
AUSTRALIA

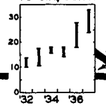
Vancouver
Portland
Montreal
New York
New Orleans
Galveston
Rosario
Buenos Aires
Bahia Blanca
Odessa
Nikolaev
Braila
Constanza
Novorossiisk
Karachi
Rangoon
Bangkok
Saigon
Fremantle
Bunbury
Adelaide
Melbourne
Newcastle
Sydney

4,000 - 6,000 miles To Orient
9,000 miles
4,500 miles
6,500 miles
6,000 miles
8,500 - 11,500 miles
10,500 - 12,500 miles
4,500 - 5,500 miles To Orient

NOR. ATLANTIC TO U.K.


NOR. PACIFIC TO U.K.


LA PLATA TO U.K.


AUSTRALIA TO U.K./CONT.


ARGENTINE GRAIN SHIPPING PORTS


NOTES

Trade data from official trade publications, the International Institute of Agriculture, Broomhall's *Corn Trade Yearbooks*, and Great Britain, Imperial Economic Committee, *Grain Crops...* (London, 1937).

Freight rates (in rectangles) from Table III, in cents per bushel.

Distances, rough estimates, in nautical miles.

P.S. KING

Division	Major grain route	Minor grain route
Australia	Australia to U.K./ Continent (wheat)	Australia to the Orient (wheat)
Trans-pacific	.....	North Pacific (U.S. and Canada) to the Orient (wheat)
India and Far East	.....	India to U.K./ Continent (wheat)
Black Sea	.....	Black Sea to Antwerp/Hamburg (wheat, corn, barley)

International trade in grains had declined steadily for five years until, in the crop year 1936–37, it sharply increased for a single year. Even at the lower level, however, the volume approximated the average for the five prewar years. From the standpoint of trade routes the significant fact is that the average length of haul has increased. Among the three major grain routes, the North Atlantic has latterly declined in relative importance of shipping employment provided, and the Argentine and Australian routes have gained.

Major Grain Shipping Routes

North Atlantic to Europe. — Traffic over transatlantic routes is by far the largest. It flows predominantly in the easterly direction. Ordinarily both Canada and the United States ship wheat in large volume, and smaller quantities of other grains. From Gulf and Atlantic ports the United States sends cotton and timber to Europe. Some fertilizers, ore, wood pulp, and coal provide inadequate return cargoes.

The North American grain movement is effected by some combination of routes from Canadian Atlantic, Pacific, and Hudson Bay ports,[1] and from the United States Atlantic seaboard, Gulf, and Pacific ports. Some Canadian grain moves through New York, and some United States grain through Canadian ports. Most important is the movement from the immense area tributary to the Atlantic, and the paths converge to form a major North Atlantic grain route. Here liner services are most highly developed; yet there is room for the tramp ship, especially in the handling of seasonal cargo. Atlantic export points in the United States north of Norfolk, Virginia—New York, Philadelphia, Baltimore, Newport News—comprise what are known in shipping circles as the "Northern Range" or "Atlantic Range" ports. The official designation of the major North Atlantic to Europe route, under the tramp shipping minimum freight scheme of co-operation, is "St. Lawrence and Northern Range U.S.A. (Eastwards)."

Both Canadian and United States grain moves through Montreal. It is the leading grain port of North America, and the most important seasonal port associated with the grain trade. Its facilities for handling grain are much superior to those of even so important a port as New York. It is on a direct water route from inland growing and shipping points to Europe, which means cheaper over-all transportation when the St. Lawrence is open. Its chief drawback is that, because of ice in the winter, a year's business must be done in less than eight months.

Other shipping points must be used when the St. Lawrence is closed to navigation—usually from late November until early May. Although the Canadian harvest is completed within a month, the St. Lawrence closes while the grain movement is still strong. Just before the river freezes every available ship on the Great Lakes is commonly employed in rushing grain to Buffalo and other lower lake ports. In following months elevator stocks are depleted by rail shipments to Atlantic seaboard ports, and some of the last cargoes remain in the holds of the lake steamers through the winter. During the closed season, Canadian grain moves to some extent through Canadian ports such as St. John and Halifax, but New York is normally the chief beneficiary of Montreal's enforced inactivity.

New York's big advantage as a grain port

[1] Shipment routes for Canadian wheat as they stood in 1925 are treated in C. P. Wright and J. S. Davis, "Canada as a Producer and Exporter of Wheat," Wheat Studies, July 1925, I, 251–60. See also A. E. Taylor, "Projected Waterways in North America as Related to Export of Wheat," *ibid.*, August 1932, VIII, 445–68. Beginning with 1931, Canadian shipments (chiefly of wheat) have been made from Port Churchill on Hudson Bay, typically in September–October; but in no shipping season has the total yet reached 5 million bushels, and the 7-year average is only half this amount. In recent years Norwegian vessels have taken cargoes direct from Fort William–Port Arthur. See *Commercial Intelligence Journal*, Aug. 20, 1938, p. 299.

lies in the volume and diversity of business handled. More regular liners ply between New York and European ports, and sailings are more frequent than for any other North American port. A large amount of Canadian as well as United States grain business is attracted here, since grain is a cargo that liners are willing to carry at very low rates and shipments can be made at almost any time.

Shipments from New York are predominantly by liners in parcel lots; from Montreal, while the port and the St. Lawrence are open, three or four tramp shipments are often made to one liner shipment.

Since late in 1932, under the operation of the British-Canadian Ottawa Agreements, shipments of Canadian wheat through United States ports have been discouraged and complicated, and to the United Kingdom largely stopped.[1] Nevertheless, Canadian grain continues to move by this route, especially in the four months from October to January, and chiefly for continental European destinations.

With a very uneven flow of traffic across the North Atlantic, ports are able to attract tramp shipping in proportion to their capacity for supplying full cargoes in one direction and absorbing them in the other. On the Atlantic seaboard, Canadian and American wheat has tended to flow through the port which could offer both regular tonnage and "distress space" at the moment.

Ports enjoying a favorable inland railway freight rate on grain, as well as adequate handling facilities, have certain obvious advantages. They have usually gone ahead while ports less favorably situated have slipped behind. Ports which enjoyed no export grain business before elevators were built have been able to operate newly-constructed elevators at capacity much to the advantage of the port.[2] This has been particularly true in Canada and the United States, though the drastic decline in United States grain exports during the past decade has more or less permanently counteracted this influence.

All of the leading Atlantic ports enjoy some grain export business at times, the volume varying with changes in their competitive positions and the size of United States grain exports. A difference of a fraction of a cent per bushel in the cost of ocean freights, insurance, and other marketing costs, between alternative routes to shipping points, may suffice to alter the route. Position of the grain and desired delivery date overseas also determine whether wheat will move from one port or another, in cargo or parcel lots.[3]

Argentina to Europe.—Practically the only regular export by tramp ships from Europe to South America is coal from Great Britain. Neither Argentina nor Uruguay possesses coal deposits of any importance, and fuel must still be imported despite the beginnings of a petroleum industry in Argentina. Such traffic in the southerly direction is heavily outweighed by the return cargoes of grains and meats from Argentina and less bulky cargoes from Brazil.

Next to North America, Argentina is the most important exporter of grains, but Argentine ports are farther removed from the main importing centers. Every month wheat, maize, and smaller amounts of lesser grains (also linseed) are being shipped from the River Plate. New-crop shipments of wheat begin about the first of the calendar year and usually reach their peak in March. Maize shipments begin in April–May and attain maximum volume usually in June or July; weather conditions sometimes retard shipments by making the grain unfit for shipment until later, and maize exports are sometimes fairly heavy even in October–December, most recently in 1936 when the United States crop was very short.

[1] To quote the latest annual report of the Liverpool Corn Trade Association: "It is well known that, since the date of the Ottawa Agreements, the former Fort William/Buffalo/New York route has, for all practical purposes, been closed to the United Kingdom Importers. The Customs would, of course, admit Canadian Wheat via this route, subject to the 2/- per quarter duty as though it was a foreign product, but the regulations have been so drawn, or are so construed by the United Kingdom Authorities, that the Preference to which Canada is entitled is, in practice, denied."

[2] R. S. MacElwee, *Port Development* (New York, 1925), chap. xii.

[3] Under these conditions, no single series of ocean freight rates provides a continuous measure of transportation costs between the Northern Range ports and Europe, such as is provided for routes from the River Plate and Western and South Australia to the United Kingdom and Continent. Hence the series included in Table III is a composite series.

The navigable river system consisting of the River Plate and the Rivers Paraná and Uruguay, together with the principal grain-shipping ports, are shown on the inset map in Chart 8. At the heart of this system is Buenos Aires. Through it pass the bulk of Argentina's imports. To the northwest, west, and southwest lie rich grain lands from which originate the maize, wheat, linseed, oats, barley, and rye cargoes that are shipped from numerous ports along the Paraná and the River Plate, and from a few ocean ports on the coast to the south.

All ports north of Buenos Aires are termed "up-river" ports. "Down-river" ports include not only Buenos Aires and La Plata, thirty miles apart on the River Plate, but also Mar del Plata, Necochea, and Bahia Blanca to the south along the Atlantic seaboard. The tabulation below summarizes, in thousand metric tons, the export shipments of wheat, maize, and linseed by groups of ports in 1937, a year of relatively large total exports:[1]

Port	Total	Maize	Wheat	Linseed
North of San Lorenzo....	825	214	208	403
Rosario and San Lorenzo	6,560	4,424	1,475	661
South of Rosario.....	2,337	2,109	90	138
Total up-river ports.....	9,722	6,747	1,773	1,202
Buenos Aires and La Plata	3,950	2,413	999	538
Bahia Blanca, Mar del Plata, and Necochea ...	1,340	.....	1,197	143
Total, 1937.....	15,012	9,160	3,969	1,883
1936.....	11,565	8,388	1,619	1,558

Up-river ports accounted in 1937 for some three-fifths of all grain shipments. Rosario, Bahia Blanca, and Buenos Aires, the three leading grain ports, typically send out three-quarters of all Argentine wheat exports, and Rosario and Buenos Aires ship more maize than wheat.

Rosario is about 200 nautical miles up river on the Paraná—navigable for some 300 miles. It is the center of the richest maize-producing territory and the principal port for shipments of maize and all grains combined. During certain times of the year, usually in the early months when the river level is several feet higher, larger vessels may load with safety at ports still farther up river.

The river between Rosario and Santa Fé requires continual dredging in order to maintain a 19-foot depth, which is inadequate for larger vessels. As a result, ports on the Paraná north of San Lorenzo not only take a higher freight rate but account for a small proportion of total Argentine grain shipments. North of Rosario are Colastine, Diamante, and Santa Fé—frequently referred to as the ocean port of Paraná, which is located opposite but is unable to accommodate vessels of the size that can berth at Santa Fé.

Even Rosario and San Lorenzo are at some disadvantage because of the Martin Garcia bar. The larger ships loading grain or linseed at one of these ports may be required to load additional grain by lighter after passing below this obstruction, in order to make use of their full cargo capacity. South of Rosario are such ports as San Nicolas and Villa Constitucion.

Bahia Blanca, about 500 miles by sea from Buenos Aires and some 20 from the open ocean, ranks with Rosario as a wheat port and handles significant quantities of lesser grains. When there are normal yields in all the wheat regions, Bahia Blanca becomes the leading port for Argentine wheat exports. Pending completion of elevators now under construction, it is the only port with an adequate bulk-handling system. Its facilities are such that six ships can be loaded simultaneously at a rate of 1,000 tons of grain per hour to each. Furthermore, it has over 30 feet depth of water compared with not over 25 feet at Buenos Aires and about 20 feet at Rosario. It offers wool cargoes, which stow well, in addition to wheat.

These factors are important, for handling facilities vary considerably in Argentine ports, rapid loading is often called for,[2] and at times dispatch has been abnormally slow. Congestion, inadequate handling facilities, loading dependent largely upon hand labor,

[1] *Times of Argentina*, Jan. 10, 1938, p. 27. Total shipments of three lesser grains, in the same unit, were as follows:

Year	Total	Oats	Barley	Rye
1937	721	384	244	93
1936	541	171	233	137

[2] In a record week in January 1937 about 502,000 tons of wheat, maize, linseed, and oats were shipped in 125 steamers.

and port strikes, have provided sources of irritation to ship operators as well as involved delays and additional expense.

Australia to Europe.—The trades to and from Australia are now predominantly liner trades but there is a large volume of tramp business in wheat, and lesser amounts in wool, ores, and special kinds of lumber. Both Australia and New Zealand are well served by liners from Europe. Those specially equipped with refrigeration carry frozen meat, butter, and fruit to the United Kingdom and Continent.[1] The traffic is unbalanced since Australia's imports are insufficient to even up the outbound cargo movement.

Longest of all grain routes, that from Australia to Europe is really a dual one—by way of the Suez Canal and via the Cape of Good Hope.[2] Before the war, traffic on the Good Hope route far outweighed that on alternative routes from Australia to Europe. By 1922 it was about evenly divided between Suez and the Cape.[3] Mail, passengers, express freight, and perishable cargoes commonly go via Suez. Tramps and cargo liners use this route also, but ordinarily prefer that via the Cape. Suez Canal tolls, the necessity of paying them in gold, low freight rates, and the strong liner competition for cargo on the Suez route, have tended to keep tramp shipping on the slightly longer Cape route.[4]

In the five years before the war, probably 40 per cent of Australian wheat exports were carried by sailing tramps. Today the few sailing ships remaining in the international grain trade ply between Australia and Europe. In the 1937–38 season twelve sailing vessels took part in the trade. They carried about 43,450 tons of wheat and a dozen passengers, and all but one took the route around Cape Horn.

Growing areas in Australia are comparatively near the seaboard. The range in export points is as wide as for the Atlantic ports of North America, but the distance from Australia to the European market is so great that relatively less importance attaches to the specific point of export within the continent. In most instances, a shilling per ton will cover the freight differences between the nearest and farthest port of shipment over the 11,000-mile route to Europe.[5]

Both the southern and western parts of Australia produce wheat for export, but neither South Australia nor Western Australia, where wheat production increased rapidly during the 1920's, enjoys the same liner services that make Sydney and Melbourne regular ports of call. New South Wales and Victoria are thus able to take advantage of liner bottoms for shipping wheat in parcel lots. The bulk of Australia's wheat exports normally goes by chartered ships, and several hundred tramps are usually employed in handling this traffic each year. The form of charter party used in the Australian trade, known as the "Austral," provides for loading at two ports in Western Australia, or at two in South Australia, or at Melbourne, Geelong, and Portland in Victoria, or at Sydney. Ships may be required to proceed via Panama, the Cape, or Suez, and to discharge at the usual range of United Kingdom, Continental, and Mediterranean ports.

In Australia, as in Argentina, the pace of

[1] In recent years, chilled meat has begun to move from Australasia, but as yet "this does not constitute a serious threat to the Argentine trade, owing to the superior competitive position of Plate producers." See S. G. Hanson, *Argentine Meat and the British Market* (Stanford University, California, 1938), p. 208.

[2] Steam and motor ships do not ordinarily go via Cape Horn, as sailing vessels did and still do.

[3] J. Russell Smith, *Industrial and Commercial Geography* (New York, 1913), p. 826; E. T. Chamberlain, "Liner Tonnage in Overseas Trades," *Commerce Reports*, July 27, 1925, p. 187.

[4] On Apr. 1, 1937 Suez Canal dues were reduced by 14 per cent. During the year the tonnage passing through the canal exceeded that of any recent year and the cargo carried was only 5 per cent lower than in 1929. Chamber of Shipping of the United Kingdom, *Annual Report*, 1937–38, p. 17. ". . . . Australian traffic via Suez, which had greatly decreased in 1936, experienced an appreciable revival. The diversion of this traffic via the Cape of Good Hope was less important than in the previous year. If it is true that the reductions granted by the [canal] company are not unconnected with this return to the Suez route, it must also be attributed in part to the effect of favorable economic circumstances, and especially of a period of relatively high freights." Annual report of the Suez Canal Company for 1937, printed in the *Economist*, June 18, 1938, p. 686.

[5] Under the minimum freight rate scheme, this is the differential in favor of Western Australian as compared with South Australian or Victorian ports, in shipments to United Kingdom/Continent/Mediterranean ports.

development in ports and port facilities for handling the grain trade has been somewhat slow. Shippers and shipowners have had little opportunity to shift their business to rival ports—they have been more or less compelled to make the best of conditions since cargoes other than grain have not been plentiful. Both nations have recognized their port deficiencies and made substantial progress in overcoming them during the past decade, under the stress of export competition from other countries. Even yet the dispatch of ships is slow at many ports, and the various costs incurred for labor, port charges, and so on, are considerably higher than those at modern European or North American ports.

Mounting port charges, irregular quantities of cargo offered in both directions, and heavy Commonwealth taxation (including the operation of the Navigation Act) for a number of years threatened to cause a rise in Australian freights. An "Australian Overseas Transport Association," formed in 1929, sought to decrease the number of ports of call, regulate berth cargoes, and secure greater business for liners.[1] Parcel rates by liners are now determined by the Oversea Shipping Representatives Association. They tend to run lower than full cargo charter rates by tramp steamers, although at times they have commanded a premium over cargoes.[2]

Minor Grain Shipping Routes

Gulf and North Pacific.—Both the Gulf and the North Pacific routes are usually of minor importance compared with the North Atlantic route to Europe,[3] but together they handle an appreciable volume of traffic and have tended to gain in importance. Gulf ports handle sizable American shipments in some years and are an unimportant factor in others. The Pacific Northwest usually exports some wheat even when the United States is a net importer.

Liverpool and London are farther from New Orleans or Galveston than from New York, but the cost of transportation by water is so much less than by rail that Gulf ports are the cheapest outlet for grain from a sizable wheat-growing area in the United States located along and west of the Mississippi and south of the Missouri.[4] For years this southwestern region has been the outstanding surplus-producing area of the United States. The hard red winter wheat that it produces is the type that ordinarily bulks largest in American exports. Galveston and New Orleans nowadays handle most of this movement; with shifts in the producing area, Galveston has enjoyed more favorable railroad rates and has gained relative to New Orleans. Shipments generally go by tramps, at rates which only recently were subjected to regulation.

The main wheat movement through the Gulf ports frequently overlaps the beginning of the heavy cotton movement. Since cotton is unsuited for handling in full cargo lots, ship operators seek some heavier cargo to help balance the loading. Heavy grains, such as wheat and corn, serve this purpose. Since cotton carries a comparatively high freight rate, shipowners can offer relatively low rates on grain because of their need for additional deadweight.

Wheat grown in large areas of Alberta and smaller areas of Washington, Oregon, and Idaho moves to the Pacific Coast for export to the Orient and to Europe via the Panama Canal. Generally more Canadian wheat goes to Europe than to the Orient, but in several recent years more United States wheat has

[1] See W. Millar Smith, *The Marketing of Australian and New Zealand Primary Products* (London, 1936), pp. 277–78. The cost of loading at Australian ports is high, ranging from 4*s.* 9½*d.* to 7*s.* 9½*d.* per ton, as compared with 2*s.* 11*d.* to 4*s.* 6*d.* for Canada. Costs of discharge in Australian ports run even higher.

[2] Late in 1934 and early in 1935, before the minimum freight scheme was placed in effect which checked the falling tendency in tramp rates and effectively raised their level, parcel rates were higher than cargo rates. They were again higher during several months of 1936, the initial increase in parcel rates being larger than for cargo at the outset of the 1936–37 general rise in freight levels. Appendix Note A contains a reference to a parcel-rate series from Australia, available from 1933.

[3] The crop year 1937–38 was an exception, primarily because of the extremely short crop in Canada.

[4] Formerly the Gulf route competed with the Chicago-Buffalo route to the Atlantic seaboard from as far north as southern Nebraska and the Ohio River. See T. H. Hammatt, *Methods of Merchandizing American Wheat in the Export Trade, Part I* (U.S. Dept. Comm. Trade Information Bull. 183, February 1924), p. 7. In the past decade practically no wheat from west of the Mississippi has been routed for export through Atlantic seaboard ports.

gone to the Orient than to Europe. Since the war the opportunity to use the Panama Canal has greatly facilitated the traffic to Europe, though for decades earlier sailers and steamers carried grain from California and the Pacific Northwest around the Horn to Europe. Ocean freight rates to the United Kingdom and the continent of Europe from the several North Pacific ports, principally Vancouver and Portland, are in general the same.

Western Canada is well equipped with country elevators, which are an important factor in the handling of grain in Canada and the United States generally. The Pacific terminals likewise have large storage capacity. During recent years grain received at the elevators in Vancouver and New Westminster, British Columbia, has ranged in volume from 100 million bushels in the crop year 1932–33 to 52 million in 1933–34, with small additional quantities at Prince Rupert and Victoria.[1] Most of this moves into export channels through Vancouver, the chief Canadian port. The business is distributed over the year, hence considerable cargo is available for tramp ships on the run to Europe as well as for the liners making Vancouver. Both tramps and liners share in the trade to the Orient also, tramps often carrying mixed cargoes such as grain and lumber.

The chief outlet for United States grain exports from the Pacific Northwest is Portland on the Columbia River, although Seattle and Tacoma on Puget Sound also ship considerable grain and some other ports participate. Total shipments of wheat and flour from these ports to foreign countries ran as high as 64 million bushels in the crop year 1927–28, but were less than 10 million bushels in four of the five years ending with 1936–37. Even yet, grain in the Pacific Northwest of the United States is commonly sacked at the farm, as in Argentina and most of Australia, and upon arrival at the port of shipment must be bulked and graded.[2] Because of the scarcity of regular liner connections between this region and Europe, most of the wheat exported to Europe moves by tramp ship. When the volume of exports is reduced to a mere trickle, business is insufficient to attract tramps, and liners pick up occasional parcels.

Black Sea to Northern Europe.—Intra-European grain shipments by sea are predominantly from the Black Sea via the Mediterranean. All four of the lower Danube countries ordinarily produce surpluses of various grains. Rumania has several ports well equipped for handling grain: Braila and Galatz on the Danube and Constanza on the Black Sea. The Bulgarian Black Sea ports, Varna and Bourgas, are not so well and modernly equipped. However, the Danube basin has adequate facilities for handling its present grain surpluses.[3] From the Black Sea ports (which are usually open all year) freight rates are usually lower than from the Danubian (which are closed for two or three months during the winter), because of the risks and difficulties encountered by seagoing ships upon entering the Danube.

When Russia is an exporter of wheat, the Black Sea (and the Sea of Azov) route is the natural outlet for her wheat-growing areas and is used almost exclusively. Her major export harbors on these two seas are Odessa, Nikolaev, and Kherson to the south, and Rostov-on-Don and Novorossiisk to the southeast. The leading grain ports, Odessa and Nikolaev, are kept open to navigation by icebreakers.

India to Europe.—Though never exporting a very large part of her grain production, India's participation in the world grain trade was formerly significant. But for the decade preceding 1936–37 India was frequently, and on balance, a net importer of wheat. The grain route from India to Europe is today only a minor one.[4]

[1] The "grain divide" of Canada has moved more and more to the east. Elevator facilities and low railroad freight rates have drawn increasing shipments to the Pacific. Moreover, Vancouver is an ice-free harbor, which is not the case for any eastern Canadian port.

[2] For an account of the marketing aspects of wheat in the Pacific Northwest see J. S. Davis, "Pacific Northwest Wheat Problems and the Export Subsidy," WHEAT STUDIES, August 1934, X, 377–83.

[3] Port facilities of Danubian and Black Sea ports are described by V. P. Timoshenko in "The Danube Basin as a Producer and Exporter of Wheat," WHEAT STUDIES, March 1930, VI, 249–51, and *Agricultural Russia and the Wheat Problem* (Food Research Institute, Stanford University, Calif., 1932), pp. 340–47.

[4] For an account of export shipping of wheat from India see C. P. Wright and J. S. Davis, "India as a Producer and Exporter of Wheat," WHEAT STUDIES, July 1927, III, 361–71, 378–90.

In the past two crop years, Karachi has employed a number of tramp ships to haul cargoes of sacked wheat to Europe. The greater part of India's export wheat is thus shipped. In periods of small export movement, tramps largely withdraw from the trade, and cargo liners carry the available parcels. Bombay, on the west coast also, was in the 'eighties the leading wheat port, but today it is a poor second to Karachi in importance:[1] it handles little grain, shipped mostly in liners. Despite the shorter distances to Mediterranean consuming centers, most of India's wheat exports go to Great Britain and smaller amounts to other countries of northwestern Europe.

Other routes.—On the South African route, liners carry manufactured goods to Cape Town and Natal, returning to Europe with maize (occasionally other cereals), wool, citrus fruits, ore, and general merchandise. At times, some full cargoes of maize are available for tramp ships. Tramps also take coal cargoes from Natal to India and Ceylon, as well as across the Atlantic to South America where they may pick up return grain cargoes for Europe.

Transpacific tramp trades involve carrying lumber from the Pacific Northwest to Australia and Japan, wheat to the Orient from the North Pacific and Australia (the North Pacific shipments via Panama to Europe are considered as transatlantic trade), and nitrates and other ores from the west coast of South America to United States Atlantic ports and Europe.

Grain, both wheat from India and rice from Burma and Siam, provides tramps with Europe-bound cargoes over the India–Far East trade route. In addition, cargoes of oilseeds, sugar, spices, cotton, jute, rubber, ores, and various special types of timber are available for both tramps and liners. Liner services in this part of the world generally place more emphasis on general cargo business than across the North Atlantic, where passenger traffic is of greater importance.

While the bulk of Australian wheat exports is destined for Europe, at times the movement to India and the Orient is substantial. In Far Eastern markets of Japan, China, Manchuria, and Vladivostok, Australian wheat competes mainly with that of the Pacific Northwest, with occasional competition from Canada and Argentina. Rates on this route come under the minimum rate scheme for tramp shipping in effect since 1935.

Significance of the "Long" Trades

In prewar years the grain movement to importing Europe was primarily from North America, Russia, and the Danube basin, with moderate shipments from Argentina, Australia, and India. Neither Russia, then the world's largest grain exporter, nor the countries of the Lower Danube, have regained their prewar positions. Canada, Australia, and Argentina expanded their wheat production and exports substantially, and Argentine maize as well as wheat became more important in the total grain trade. Prewar and postwar contrasts in sources of supply and overseas grain movement are therefore marked.

Rough calculations based upon Broomhall's data on shipments suggest that for the five years just before the war about 63 per cent of all wheat and corn entering into seaborne trade was transported a distance averaging 3,000–3,500 miles, another 30 per cent traveled 6,000 miles, and around 7 per cent involved voyages of approximately 11,000 miles.[2] For the five crop years 1927–32, when the total volume of trade had increased about 28 per cent, the same amount of grain was transported over the shorter routes but represented only half the total. The increase was all accounted for by shipments over the 6,000- and 11,000-mile routes, the former rising to 39 per cent of the entire movement and the latter to 11 per cent.

Between these two periods, the decline in shipments from Russian and Danubian Black Sea ports was offset by the increased movement to Europe from North America, leaving

[1] Calcutta, once India's principal grain-export port, has long since lost importance in this respect; but when India imports wheat (typically from Australia) it enters chiefly through Calcutta.

[2] The shortest routes include shipments from North America, Russia, and Danubian countries (Black Sea ports); the 6,000-mile group includes Argentina, Uruguay, and India; Australia alone accounts for the movement under the 11,000-mile classification.

the use of tonnage on the shorter trades roughly the same. India ceased to be a factor in the trade, and practically all of the additional trade in the 6,000-mile group resulted from greater Argentine exports of wheat and corn.

It may be assumed that a cargo of grain from Argentina provides roughly twice the employment of one from Atlantic North America or the Black Sea, and shipments from Australia provide roughly three times as much. On this assumption, if one ignores other factors, it would appear that the 28 per cent increase in the volume of trade should have led to a 44 per cent increase in the employment of ocean carriers, the difference being due to the growth in importance of the longer trades.

But other factors require consideration. The cargo-carrying capacity of tramp ships, which account for the bulk of the overseas grain movement, has been increased—perhaps by 6 per cent during the period (see p. 58); average speeds have increased, perhaps from 9 knots to 10; and, due to improved port facilities, bulk handling of grain, and so on, the time for turn-around has been substantially reduced. Such economies in the use of ships may fully offset the increase in demands arising from the changed distribution by routes. With nothing better than crude estimates, one cannot be sure; yet it seems doubtful whether *comparable volumes* of grain transported overseas nowadays provide more shipping employment than before the war.[1]

The supply of tonnage, moreover, has more than kept pace with the growth in the volume of trade. Except briefly during 1926 and 1937, recent years have witnessed no shortage of tonnage available for carrying the world's grain overseas. The shrinkage in volume of trade during the depression years has already been discussed.

The significance to shipping of longer routes in the grain trade may be further illustrated by contrasting two recent years—neither a representative one—in which there was a marked difference in the distribution of wheat supplies for export. Translating the export wheat tonnage to be moved overseas into terms of distance, the ton-miles involved (in millions) in the movement were as follows:[2]

Year	Total	North America	Australia	Argentina	Average miles per ton
1929–30	69,400	34,500	15,100	19,800	5,900
1936–37	63,300	17,500	24,600	21,200	6,500

Stated in another way, the average ton of wheat exported in 1936–37 had to travel some 600 miles farther than in 1929–30.

World wheat exports in 1929–30 were only 4 or 5 per cent larger than in 1936–37, but exports from the four major exporting countries were a fifth greater in the earlier year. With a uniform 20 per cent shrinkage in shipments, the cargo ton-miles of employment for shipping wheat from these regions should have fallen from 69.4 billion to 55.5 billion; the actual drop was nearer to 63.3 billion, or less than 9 per cent. In terms of employment, and amounts of cargo tonnage involved, this works out roughly as follows:[3]

Region and year	Trips or loads of 7,000 tons	Distance (*nautical miles*)	Speed (*knots*)	Days	One year's continuous employment for number of tramp ships
North America					
1929–30	1,030	4,800	10.5	19	107
1936–37	590	4,200		17	55
Australia					
1929–30	193	11,200	10.0	47	50
1936–37	313				81
Argentina					
1929–30	463	6,100	9.5	27	69
1936–37	497				74

If all the wheat shipped overseas from the major exporting countries had been trans-

[1] Such estimates do not imply that better utilization has been made of increased cargo-carrying capacity, or that the average number of days during which carriers have earned freight revenue has increased.

[2] In 1929–30 approximately 79 per cent of all export shipments were destined for Europe; in 1936–37, the percentage was 81. Roughly proportionate distribution of 80 per cent is assumed. Distances are taken as 11,200 nautical miles for Australia and 6,100 for Argentina. For North America 4,800 miles is used for 1929–30 and 4,200 for 1936–37 due to different degrees of participation of the North Pacific and the Gulf in shipments during the two years.

[3] The speed assumed on the Argentine run is low because of the predominance of tramps, including some old and slow boats which bring down the average (9.5 knots is probably high). For Australia, where there are relatively fewer old tramps operating and probably a higher liner participation, 10 knots is as-

ported by tramps; if, instead of the bulk of it being marketed over a period of a few months, there was a continuous even flow throughout the year; and if the carriers had turned right around upon discharge and returned for another load, loading and discharging involving no delays—there would have been in 1929–30 continuous employment for 226 ships throughout the year, and in 1936–37 continuous employment for 210 ships, each averaging 7,000 tons of cargo per voyage.[1] Thus 7 per cent fewer ships would have been needed, despite the fact that exports of wheat from these countries were 20 per cent smaller.

Making allowance for time of loading and discharge, coaling, delays in going from one job to another, incomplete use of maximum cargo capacity, and so on, the number of ships needed would be probably twice as great. Moreover, since the grain movement is irregular, the number of ships actually participating in it is much larger than would be required for exclusive employment if the movement were evenly distributed throughout the year. In addition to tramp ships, numerous liners carry parcels of grain and in the aggregate these parcel shipments scattered over several months are equal to many full shiploads. In all, probably several thousand seagoing vessels are in some degree involved in the transportation of the world's surplus grain supplies overseas.

V. OCEAN FREIGHT RATES ON GRAIN

Any appreciable change in the volume of freight offered for shipment in relation to the vessel space available in an important commercial area is felt throughout the world. Depending upon circumstances, the rate response may be slow or rapid, fleeting or sustained, slight or substantial. The grain movement is of sufficient magnitude to generate such alterations in the demand for cargo space and thus influence rates on other bulk commodities.

Ocean freight rates on wheat, corn (maize), and rye, the so-called "heavy" grains, are usually the same per unit of weight, therefore slightly lower per bushel on rye and corn. On barley and oats, which are lighter and hence occupy more cargo space per ton, rates per ton are usually higher by amounts varying with the route, trade customs, and so on. The seaborne grain movement, however, consists so largely of the heavy grains that rates on wheat and maize alone merit specific consideration.

Substantial quantities of wheat—equivalent to about 100 million bushels a year even in recent years of diminished volume—move overseas in the form of flour. Flour, however, is almost always transported by liners, and its movement is not subject to the seasonal and other changes characteristic of grains. Sacked flour is shipped to European destinations from New York commonly as liner berth cargo, along with provisions, cottonseed oil, grain, and similar commodities. Rates over a dozen recent years are shown in Chart 9 (p. 94). Ocean freights on flour generally are considerably higher than on grain, and tend to be more stable.

Types and Limitations of Rate Data

Liner rates include "conference" rates and "open" rates. With some recent exceptions mentioned below, rates on grain have not ordinarily been fixed by conference agreement, chiefly because grain is not a typical liner cargo. When the parties to a conference of liner operators cannot agree upon the rates to be charged or for other reasons desire no regulation of certain rates, or when the trade is one in which no conference exists, liner rates are "open." Such rates ordinarily reflect competitive conditions more accurately

sumed. Liners out of New York raise the average speed for the North American route. Tramp speeds are normally between 8 and 11 knots, with the average probably not over 10. The days computed, 17–19 for North America, compare with Broomhall's "average time of passage" statement (carried regularly each Monday in a supplement to the *Corn Trade News*) of 18 days; the 47 days for Australia compare with Broomhall's 45 days; and the 27 days for Argentina compare with Broomhall's 35 days. The major discrepancy is on the Argentine route, where, perhaps because of many slower ships and coaling time en route, the average time of voyage is really higher.

[1] Isserlis' analysis of tramp voyages in 1935 showed approximately this average cargo per trip, but nearly 7,500 tons for grain cargoes, for vessels of 3,000 gross tons and over. *Op. cit.*, pp. 81, 124.

than "conference" rates, since each line is free to impose any rate that will secure business.

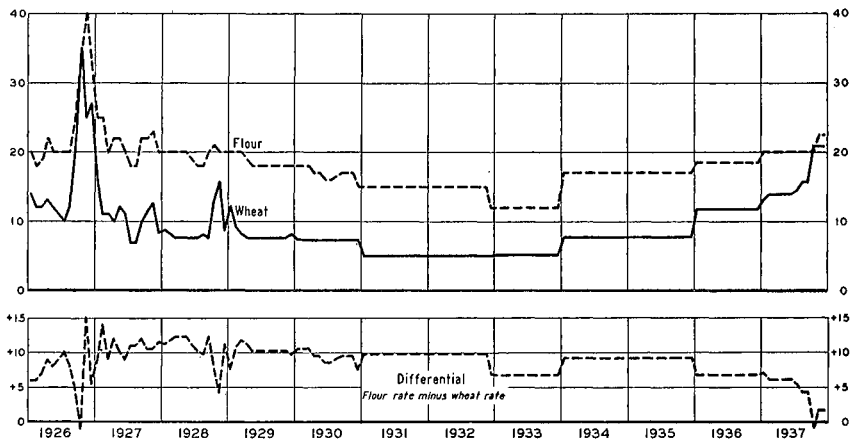
Of the "open" rates, a large group apply to "berth cargoes"—usually "parcels" of commodities that are commonly carried by tramp ships. Rates for berth cargo, known as "berth" rates, are usually very low. Even when these hardly cover handling costs, such business may not be unprofitable if the berth cargo is carried in lieu of ballast. When an ample volume of more profitable high-class freight is available, of course, the liner is less aggressive in bidding for berth cargoes.

All tramp rates are also "charter" rates of one kind or another, since tramps move under contractual arrangements with shippers. Quotations represent "fixtures" which have been made, i.e., when the shipper has chartered a certain vessel and a "charter party" has been executed.

There are various forms of charter rates. The charterer may desire the use of the shipowner's vessel for a single voyage or for a period of time. "Trip" or "voyage" charters, under which a large proportion of overseas commerce is carried, are effected for the full capacity of a vessel for a single voyage between specified ports, the freight rate being based on the type of cargo. "Time" charters are also used in the transport of grains as well as other commodities. These give the charterer the use of a vessel for a specified period of time by the payment of a monthly rental usually based on the vessel's deadweight tonnage.[1]

CHART 9.—OCEAN FREIGHT RATES ON FLOUR AND WHEAT FROM NEW YORK TO LONDON, MONTHLY, 1926–37*

(Cents per 100 pounds)



* *Northwestern Miller*, "Almanack Number," Apr. 27, 1938, p. 40. Flour rates are for shipments in bags; shipments in boxes are 5 cents higher, and in barrels and half barrels 5 cents higher still.

Earlier Almanacks give rates for earlier years, but the following caution appears in a representative issue: "Wheat rates in 1920–25 are merely approximate, for although the Shipping Board differential of 5c per 100 lbs. between wheat and flour was maintained as the basis, actual rates quoted by cargo vessels varied widely and full information regarding them is not available."

Numerous variations in form, of both voyage and time charters, are not always reflected in quoted rates, although a few of the options included in the agreement are customarily reported.[2] Voyage charter parties often leave unspecified the exact ports involved; thus, from "North Atlantic Range" or to "Antwerp–Hamburg Range" means any port within the specified range of ports that the charterer may subsequently designate. As already noted, tramps carrying grain frequently sail "for or-

[1] In normal times an average of 25 or 30 per cent of the Norwegian merchant fleet is employed in this manner, according to John O. Egeland, *Fairplay*, Jan. 13, 1938. This proportion is much higher than for ships of other nations.

[2] For voyage charters, for example, there are "gross forms" and "net forms," reflecting rate differences according to the division of loading and discharging expenses as agreed upon by shipper and shipowner. Under a "bareboat charter" the time charterer employs the vessel only, hiring his own crew, paying all port charges, making repairs on the vessel, and so on.

ders," and en route or at some intermediate point are given a routing to a particular port or ports of destination, the shipper having sold the cargo or made his decision as to its delivery after the ship left the loading port.

Since the shipping industry is in very limited degree regulated or controlled by government agencies, there is almost no compulsory rate reporting.[1] Not all rates are fully or reliably reported: an indeterminate number are not reported at all, and some reported rates do not reflect the basis upon which business was actually transacted. Published rates on goods moving in bulk by chartered ships represent a day-to-day report of business transactions, but rates on parcels carried by liners are often no more than "offering" rates. The fairly comprehensive records published in shipping journals result mainly from contacts of reporters with freight brokers or steamship companies.

Enormous fluctuations in charter rates signal extreme caution in the use of recorded data. For example, in the River Plate market, perhaps the best barometer of grain charter rates, within a year the high is often twice the low rate, and fluctuations of several hundred per cent sometimes occur. The full extent of these fluctuations is not revealed by the monthly averages of rates used generally in this study. Averaging a large number of specific rates often yields only a general indication of the prevailing rate level.

There are other reasons why averages based on fixtures reported for a particular week or month have no very precise meaning. A few fixtures may be for ships ready to load ("spot"); others for vessels available within a week or so ("prompt position"); still others for loading some weeks or months hence. There is nothing in any regular charter market corresponding to a futures market in grain. Nevertheless, exporters making forward sales may usually protect themselves against changes in freight rates by engaging space several weeks or months in advance. The protection thus afforded is somewhat analogous to the protection against price changes afforded by hedging in a futures market.

One might compute the January rate from the River Plate, for example, on the basis of rates charged by all ships loaded in that month regardless of when fixed.[2] This procedure, however, is open to objection, not alone because of the magnitude of the computation task. Each of the various options as to ports of loading and discharge, so common in charter parties for grains, carries a specified rate; and even if all fixtures were reported accurately and completely, there is no feasible method of determining which options were used and therefore what rates were earned. Freight differentials within a certain range of ports may be set forth in the charter party. But when the freight market is weak, the charterer is likely to demand all the options he may have any conceivable need for, and the shipowner is not in a position to be anything but lenient. Conversely, when freights are strong and space is at a premium, the owner's tendency is to grant only such options as are usually customary and to require the charterer to pay more dearly for others.

Averages of reported rates must be used with due regard to the nature of the quotations on which they are based. They are least open to objection when used, as in the present study, in considering the general level and course of rates over a considerable period. For other types of analyses, such as the cost of transporting grain overseas from a

[1] In 1935 the United States Shipping Board Bureau issued an order through the Department of Commerce requiring all common carriers operating in United States foreign trade to file their rates and charges except on those commodities shipped in bulk without mark or count. "This order has been very helpful in terminating the secrecy existing as to common carrier rates in foreign trade, and has for the first time made available to the public the rates which are actually charged in this service," according to H. S. Perry, "The United States Shipping Industry," *Annals of the American Academy of Political and Social Science*, September 1937, CXCIII, 91. Grain rates, however, are not among those required to be reported.

[2] Since 1934 the International Institute of Agriculture, more interested in export-import price comparisons than in the freight market, has systematically followed the practice of reporting grain rates relating "to contracts made, often during a period extending back several months, to operate during the weeks specified." See *Monthly Crop Report and Agricultural Statistics*, April 1937, XXVIII, 307S. Since 1936, the average rates reported by the International Institute of Agriculture have on several occasions notably differed from those reported by other sources.

specified country, or the earnings of shipping companies, averages provide only crude approximations. For such purposes, reported rates would need to be weighted according to the volume moved at each rate. For comparisons of shipment costs with price spreads, "prompt position" rates are generally most significant.[1]

Ocean freight rates on grain from Argentina are fairly easy to follow. On the average, probably 85 per cent of the exports are handled by tramp steamers, and there is a somewhat standard relationship between the rates charged for berth cargo in liners and prevailing charter rates for tramps.[2] During much of the time the berth parcel rates that are quoted, though about 2*s.* 6*d.* per ton lower, are purely nominal. Yet so long as this differential exists, the series of berth rates provides a simple guide to the general course of ocean freight rates in the River Plate market, without the numerous ups and downs characteristic of charter rates.

Differentials in rates between ports several hundred miles apart tend to remain nearly constant, even in the absence of agreements. Under the minimum rate scheme, a basic rate is set from Argentina to "picked ports" in the United Kingdom. Rosario and some other "up-river" ports take the base rate. Ports farther up to Santa Fé take a rate 1*s.* 3*d.* per ton higher, and "down-river" ports—Bahia Blanca, Buenos Aires, La Plata, and Montevideo (Uruguay)—take the same amount less than the base rate. Although the distribution of exports between Argentine ports varies from year to year, up-river shipments tend to predominate; hence quotations from up-river ports taking the base rate are somewhat more significant if one series of rates among several is to be selected. Inasmuch as rates are quoted for heavy grain, the varying proportions of wheat to maize handled by different ports presents no difficulties. During some weeks of the year, however, fixtures are made largely from a few ports; hence in order to have a continuous series of comparable quotations it would be necessary to adjust available quotations by applying the more or less standard differential between ports.

The same procedure may be used in following grain rates from Australia to Europe. Rates from Western Australian ports, for shipments in bulk, are generally 1*s.* per ton less than from other Australian wheat ports except Sydney; there, due to the superior handling facilities, they are usually quoted only 6*d.* higher, ex silo, than from Western Australian ports.[3] Rates for wheat shipped in bags run 2*s.* 6*d.* higher than for bulk shipment from all ports except Western Australian, where the differential has been 2*s.* under the minimum rate scheme.

By selecting a specific port in Argentina or Australia, and following the grain rates from that port to Europe, it is possible not only to appraise changes in the level and course of rates over this route, but to obtain some measure of the cost of moving wheat from the exporting country to the European market. If, over a period of years, the representativeness of one port changes, another can be substituted. Since the bulk of shipments from these countries is by tramp ships, liner rates may usually be disregarded and only charter rates followed.

No similarly convenient procedure, however, can be used in considering grain rates from the United States or Canada. The several North American routes differ materially in distance and time required, and the numerous ports of shipment are widely scattered. The

[1] Such rates are usually directly related to the price spread between spot wheat prices in an exporting market and importers' c.i.f. quotations on prompt shipments. The corresponding price spread against spot wheat quotations in an importing market is not always directly related to shipment costs; but when such a relation exists, the pertinent freight rate is usually the "prompt position" rate. The price of spot wheat in importing markets is not determined on the basis of the freight actually paid on the shipment. Price spreads between futures in exporting and importing markets may depend on freight rates for late shipments rather than on prompt position rates.

[2] When this relationship is disturbed, it occasions comment. In the *Times of Argentina*, Sept. 13, 1937, the editor wrote: "As one agent put it to us on the Bolsa last week-end, 'I have no idea what the current rate is for parcels. With open charter rates at 35/- up-river/U.K., parity would be 2/6 less for parcels; but shippers are offering no more than 31*s.*, whereas a shilling more would be but logical.' "

[3] When the new terminal elevators ("silos") are completed at Williamstown and Geelong, the wheat ports of Melbourne, these ports will presumably get the Sydney rates.

whole situation is very different from that in Australia, where the greater distance to overseas markets renders of small importance the variations in the length of the route due to the choice of route or the location of loading ports.

Moreover, there is considerable fluctuation in the direction of flow of the North American movement from season to season and year to year. Grain tends to flow along the cheapest route, and this is determined by taking into account ocean freight rates, rates from the inland terminals to shipping points, port and insurance charges, and sometimes Canal dues also. Ocean freights, being less stable than the other costs, precipitate numerous changes of minor or major importance in routing over a period of years.

When the United States is actively exporting, numerous Atlantic, Gulf, and Pacific Northwest ports may be used, but the volume of shipments may be affected by the addition or absence of Canadian grain. When the United States is a net importer, the Gulf route is used but little or not at all, Pacific Northwest shipments from United States ports are greatly reduced, and New York and Albany handle Canadian grain, principally during periods when the St. Lawrence River is closed to navigation.

Further complicating the problem of ascertaining the freight cost to Europe from the vast North American continent is the shifting in means of ocean transportation used. When the major part of the grain movement from New York is in parcels by liners, tramp charter rates from New York are obviously less significant. On the other hand, when tramps are carrying most of the grain from the Gulf ports, the liner rates quoted have little significance. This was the situation in the early months of 1938. New York tramp and liner rates, though down to the minimum agreed upon by shipowners, were out of line, and tramps in the Gulf trade were getting practically all the available business. To remedy this condition the minimum freight scheme was extended to Gulf trades beginning August 25 of this year.

Were liner rates as meaningful as tramp charter rates, it would still be possible to follow grain rates regularly on a fairly comparable basis. But quoted liner rates, predominantly "open" "berth" rates—"quoted" or "offering"—have often not represented the actual figures at which business was done. Only since 1935, when tramp agreements were effected, have minimum liner rates on grain likewise been fixed by agreement for most routes to United Kingdom and Continental ports, a few remaining "open," as for certain French and Mediterranean ports.

Charter rates from the St. Lawrence, principally Montreal (usually quoted in shillings per quarter of 480 pounds), provide a representative measure while the St. Lawrence is open to navigation, but the North American grain movement is by no means completed when the river is closed. Vancouver becomes an important North American grain shipping port particularly during the month or two following the close of the St. Lawrence, yet rates via the Panama Canal to Europe are hardly comparable with those from Montreal or New York.[1]

Since no general view of ocean freight rates changes is obtainable by considering rates from any one port in North America, it becomes necessary to consider the North Atlantic range as a whole and the North Pacific separately. This is satisfactory for purposes of examining trends, but it would be totally unsuited to more detailed appraisals.

Rate Levels and Export Competition

The limitations of rate data do not preclude some significant comparisons of rate levels. Most of the expansion in grain acreage and production in the 1920's took place outside Europe. Effective competition with European agriculture by Argentina and Australia, as well as by Canada and the United States, was

[1] In addition to United States Atlantic ports and Montreal, the Canadian ports of St. John and Halifax ship grain in varying amounts upon which rate data are published. But when a large volume of wheat is being moved from the Pacific to Europe via Panama, this longer route must also be taken into account.

Composition of rates from the Northern Range ports has, in the past, varied according to whether New York happened to be handling most of the business or whether grain fixtures were also reported from Baltimore, Philadelphia, Boston, Albany, or other ports on the United States Atlantic seaboard. These differences have largely disappeared under the minimum freight scheme.

greatly promoted by low shipping freights,[1] though grain quality and marketing efficiency were also important factors. In more recent years, extreme nationalistic measures have led to increased wheat production in Europe, despite still lower levels of ocean freights.

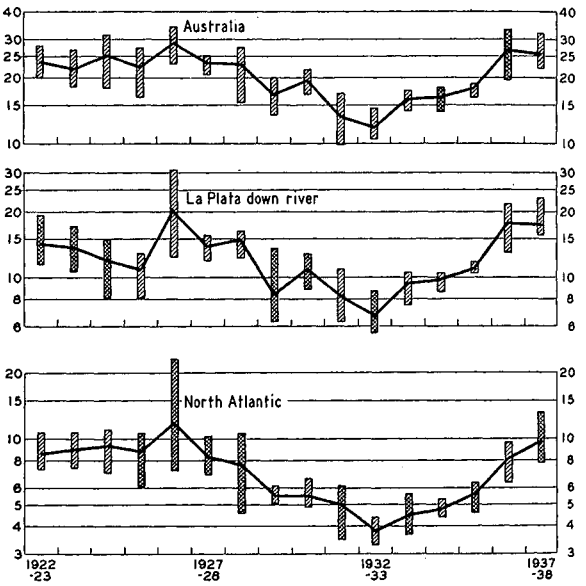
Competition is not alone between the older European countries and the newer surplus-producing countries as a group; it is strong between the chief exporting nations on both price and quality. From the standpoint of competition, how the various elements of cost that are reflected in prices are incurred is not so important as what they total. But the total cost cannot long exceed the price received in international markets without seriously affecting the fortunes of grower, shipper, or shipowner.

The minimum freight schemes thus tend to create temporary inflexibility in levels of rates. Over a term of years, however, ocean freight rates on the various trade routes tend to move in the same direction. As Chart 10 shows, the magnitude of the fluctuations varies a good deal, but rate relationships between routes are fairly constant.[2] Developments which produce changes occur gradually, strengthening or weakening the position of one country relative to another in foreign marketing.

In the international grain trade, there are few periods during which no important changes take place in the distribution of exportable surpluses, prices, and the volume of trade. Rarer still are periods during which the freight market is simultaneously quite stable. However, the crop years 1931-32 and 1932–33 constitute a period, perhaps as nearly ideal as can be found since the war, in which equilibrium temporarily prevailed in the various supply and demand factors in the grain trade, as well as in the ocean freight market. When changes are small and of minor importance over a two-year interval, it should be possible to appraise fairly the comparative level of freight rates over different routes.

CHART 10.—RANGE AND ANNUAL AVERAGES OF MONTHLY AVERAGE GRAIN FREIGHTS TO U.K./CONTINENT, CROP YEARS 1922–23 TO 1937–38*

(Cents per bushel; logarithmic vertical scale)



* Based on data in Table III (North Atlantic routes) and Table IV. The heavily shaded bars indicate the widest range in the year. For monthly data see Chart 16, p. 118.

That this two-year period is suitable for present purposes is suggested by the remarkable correspondence with results secured by averaging rates over a 15-year period extending from 1922–23 through 1936–37—a period which included violent fluctuations in crops and marked gyrations in the freight market. One would ordinarily hesitate to lump all these variables together in the form of averages. The selection of a period by the criteria mentioned, plus the confirmation of the longer-term averages, provides some assurance that the results tabulated below are representative of the differences in rate levels over different routes that tend to prevail over an extended period of time. The rates are all over routes to the United Kingdom and continental Europe expressed in U.S. cents per bushel.[3] For comparative purposes, the aver-

[1] The situation from the standpoint of European agriculture is summarized in a League of Nations study, *The Agricultural Crisis* (Geneva, 1931), II, 23–24.

[2] See also Chart 5, p. 71, for similar evidence in freight rate indexes.

[3] Although the combined North American exports differed by less than 10 per cent in the two years, the distribution between Canadian and United States differed considerably, the United States movement being smaller and the Canadian larger during the crop year 1932–33. This does not affect the reliability of the results for the three major routes or the North Pacific route, but may render the data for New York subject to criticism.

age rates have also been presented as percentages of the Argentine (River Plate) freight rate.[1]

Region	Two-year average 1931-32 and 1932-33		15-year average 1922-23 to 1936-37	
	Average rate (*U.S. cents*)	Percentage of River Plate rate	Average rate (*U.S. cents*)	Percentage of River Plate rate
Australia	12.5	168	20.3	168
North Pacific ...	10.4	140	16.9	140
Argentina	7.4	100	12.1	100
Canada	4.4	60	7.2	60
North Atlantic ..	4.4	59	7.1	59
New York	3.6	48	5.5[a]	45[a]

[a] A 14-year average, 1936–37 excluded for lack of quotations.

The average level of grain rates from Australia to Europe is 68 per cent higher than from Argentina, whereas North Atlantic rates average 59 to 60 per cent of Argentine rates. Perhaps in few years will these relationships be as uniform as during the period 1931–32 to 1932–33. In 1938, when rates fell to the established minima on all major routes, Australian rates were only 24-38 per cent higher than the Argentine minimum, while North Atlantic rates were approximately 51 per cent of River Plate rates. This suggests that the minimum for the River Plate trade was fixed relatively high.

Because of many variables for which it is impossible to make adequate allowances, it is more difficult to measure changes in relative levels of rates over the different routes during the past 15 or 20 years. Every selection of shorter periods, however, shows a decline in the general level of North Atlantic, North Pacific, and Canadian Atlantic rates relative to Argentine rates, while the evidence is inconclusive for Australian rates or for rates from New York.

St. Lawrence rates have plainly declined relative to New York rates. Despite the shorter distance to the United Kingdom, Canadian Atlantic rates for many years averaged about a shilling per quarter higher than New York rates. In 1922–23 to 1923–24 Montreal rates were approximately 27 per cent higher. The above tabulation shows them only 20 per cent higher. Higher underwriters' charges on the St. Lawrence route accounted for a large part of these earlier differences. For the two-year period 1933-34 to 1934–35, however, there was no difference between Montreal and New York rates. The fact that, under the minimum freight scheme, no distinction is made between grain rates from the St. Lawrence and from United States Northern Range ports indicates that the parity level currently prevails.

The extent of the significance of comparative levels of ocean freight rates in export competition depends upon the other charges that go to make up the total spread between the price on the farm and the European miller. On wheat, for example, the price spread between farms in Kansas or Western Canada and the Liverpool miller may be roughly 30–40 cents, of which the ocean freight charge may represent anywhere from a fifth to a half, depending principally upon the freight market. Between the Argentine farm and the Liverpool miller, ocean freight may account for half or more of the spread of around 25–30 cents. If the producer of wheat is located in Western Australia, South Australia, or Victoria, ocean freight will represent about three-quarters of a total spread not much larger than for Argentina. If, however, wheat must be hauled a greater distance by rail, as in New South Wales, the total spread is increased 3 or 4 cents and ocean freight charges become relatively less important.

Between these overseas countries and the miller in Germany, France, or Italy, the price spread is strikingly higher because of prevailing import restrictions of one kind or another. Variations of 5, 10, or even 20 cents in ocean freight rates shrink into comparative insignificance when the total price spread is from one to two dollars a bushel.

Seasonal Variations in Rates

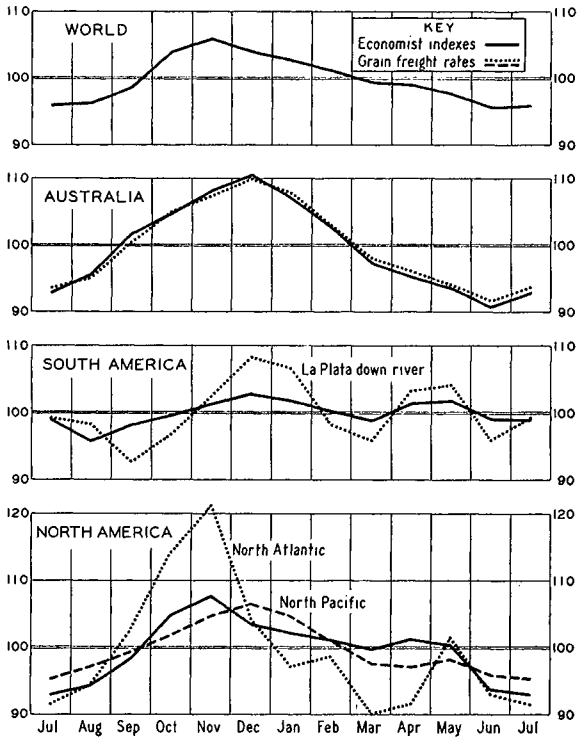
Because of the heavy movement of agricultural products, a characteristic peak volume of world trade is usually reached during the fourth quarter, the low point normally in the first quarter or the third.[2] With seasonal expansion or contraction in the volume of

[1] Data from Table IV.

[2] See League of Nations data in Table VI.

trade, ocean freight rates in general tend to rise or fall. As shown by the topmost curve in Chart 11, the *Economist* Index of Shipping Freights typically rises rapidly between September and October, reaches its peak in November, and then gradually tapers off to a low point in June or July. The *Economist* regional or route indexes, particularly those for routes from Australia and South America to European destinations, reflect the seasonal movement in grain freights as revealed in averages for corresponding months over a period of years.

CHART 11.—SEASONAL INDEXES OF OCEAN FREIGHT RATES*



* Data in Table V.

The comparisons and contrasts between the various curves in this chart merit brief comment. The closest correspondence between grain rates and other charter rates is for Australia, the smallest for the North Atlantic route to Europe. These differences are readily explained.

The indexes embrace freights on outbound and homebound voyages of tramp ships. In the case of Australia, however, wheat is the principal tramp cargo carried to Europe, and there are practically no outbound tramp cargoes; hence grain rates overshadow rates on every other cargo and the seasonal curves are almost identical. Seasonal variations in rates from Australia to Europe, moreover, follow closely the seasonal movement of world shipping freights, except that the amplitude is greater and the peak comes a month later.[1] The percentage range in grain rates is normally smaller than for Argentina and North America.[2] Australia's remoteness and isolation serve to dampen many of the temporary competitive and other influences that are quickly reflected in trades less remote from the important markets.

Grain is the chief tramp cargo from Argentina also, but the index covers some other tramp cargoes from parts of South America other than Argentina. This traffic is predominantly overbalanced in the northerly direction, yet southbound coal cargoes figure in the index. Consequently it is less heavily weighted with grain freights; and it is not surprising to find that, while the direction of seasonal movement in rates is commonly the same, the seasonal variation in grain rates is greater than for charter rates in general.

The least correspondence between grain and other rates is shown for the North Atlantic route. Rates on liners, which carry a large portion of the grain shipped overseas, are not reflected in an index of voyage charter rates. Moreover, on this route tramps have found more diversified cargoes. Sometimes other cargoes are more important than grain, so that the relative weighting of grain rates has been less. For example, during 1936 and 1937 the principal tramp cargo from Atlantic and Gulf ports was scrap, of which immense quantities (probably 3.5 to 4 million tons) were exported to Japan, Italy, and the United Kingdom and Continent.[3]

The closest relationship between grain ship-

[1] With the same exception as to the peak, the correspondence is even closer between the seasonal index for grain rates from North Pacific ports to Europe and that for shipping freights in general.

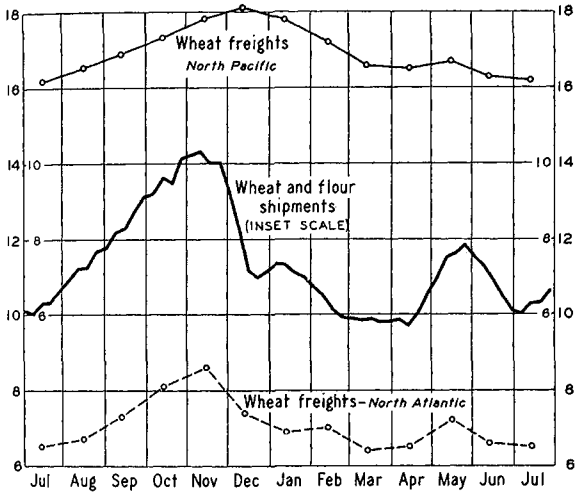
[2] In Chart 10 (p. 98) this is inadequately reflected in the generally shorter bars on the Australian route.

[3] Angier's Shipping Report, 1937, *Fairplay*, Jan. 13, 1938.

ments and grain rates, however, is to be found on the North Atlantic route, as indicated by Chart 12. Rates tend to rise or fall during months of greater or smaller wheat and flour shipments. Owing to harvest timing and navigation factors, seasonal characteristics of shipments are quite well defined.

CHART 12.—AVERAGE SEASONAL COURSE OF TOTAL WHEAT AND FLOUR SHIPMENTS, AND OF FREIGHT RATES ON WHEAT TO EUROPE, FROM NORTH AMERICA*

(Million bushels; cents per bushel)



* Shipments data (Broomhall) are 3-week moving averages of averages for corresponding weeks in August–July crop years 1924–25 to 1933–34; freight rates data are 15-year averages for identical months in crop years 1922–23 to 1936–37, based on Table III.

Wheat exports from North America typically increase in volume during the late summer months, reaching a peak in November just before the St. Lawrence closes. Ocean freights attain their peak during the same month. Shipments are substantially reduced during the winter, when the routing is changed to Atlantic seaboard ports, the smallest movement commonly occurring in March. As soon as the St. Lawrence is again open to navigation, a bulge in shipments takes place; this is accompanied by a rise in freights, which have a second but lower seasonal peak in May.

A somewhat similar seasonal behavior of rates is indicated for the North Pacific route to Europe via the Panama Canal. The highest rates are normally in December, when the closing of the St. Lawrence tends to increase the amount of Canadian grain routed via the Pacific; Vancouver enjoys its greatest volume of business at this time. A slight seasonal rise in freights on the North Pacific route characteristically occurs during May. This probably reflects diversion of tonnage to the St. Lawrence, for North American shipments via the Atlantic are generally enlarged at this time so as to dispose of as much of the old crop as possible before the new one is available.

No similarly close correspondence between variations in shipments and rates prevails for Argentina and Australia, as shown in Charts 13 and 14 (pp. 102, 103); and the grain rate series of the two countries show quite different seasonal characteristics.

In both countries, rates ordinarily average highest during December, and a second but lower peak occurs in rates from the River Plate in April–May. A firmness in rates just as crops begin to be exported in growing volume seems to be a common characteristic of routes heavily dependent on tramps. This may be attributable to a temporary relative scarcity of tonnage available for prompt positions, as shippers who have contracted for space in advance tend to utilize a large proportion of the tonnage assembled early in the shipping season.

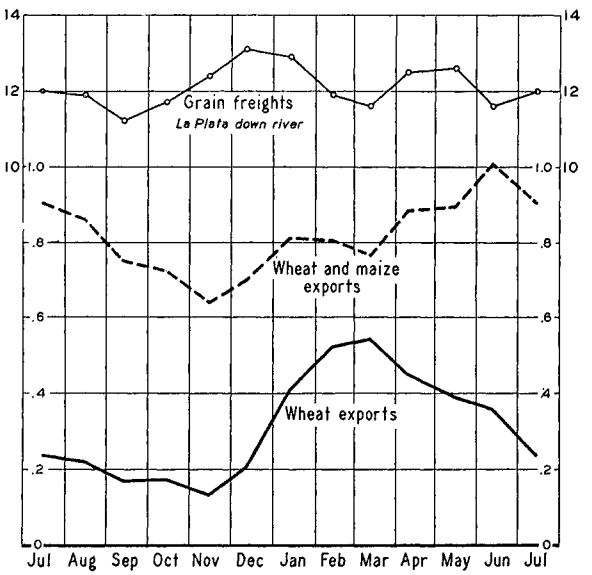
Wheat begins to move from Australia in growing volume normally about mid-December, increasing rapidly and reaching a high in January. Shipments then taper off gradually, although the volume continues large for about three months. In Argentina wheat shipments begin to increase late in December and normally attain their maximum volume in February–March. Usually the Argentine maize crop is ready as wheat shipments begin to taper off, and the enlarged movement of the two grains combined tends to sustain or strengthen rates. Because of the combination of wheat and maize, the export movement from Argentina is somewhat better distributed than it is from North America or Australia.

Ocean freights from Argentina tend to rise during October and November, though Argentine exports of wheat and maize normally decline in these months. Tramp operators know that the season of heavy shipments is

temporarily over and that the larger movement of new-crop wheat will not begin until mid-December or January. In the meantime, October and November are the months of heaviest North American shipments and the period when freights in general are at their seasonal high. The tramp operator can take advantage of this situation. Likewise, if he is interested in cargoes from Australia, which become abundant beginning in December, he must get his ship into position.

CHART 13.—AVERAGE SEASONAL COURSE OF TOTAL WHEAT AND MAIZE EXPORTS, AND OF FREIGHT RATES TO EUROPE, FROM ARGENTINA*

(Million metric tons; cents per bushel)



* Export data (from official sources) are averages for corresponding months in August–July years 1924–25 to 1933–34; freight rates data, for wheat and maize, computed as indicated in note to Chart 12.

As a consequence of these relatively more attractive alternatives at the moment, Argentine rates tend to remain firm and even rise as large amounts of tonnage are withdrawn from the River Plate for other employment. At the same time, advance chartering begins for space in the early months of the year when the new-crop wheat movement is in full swing. When fixtures are made at rates higher than prevail at the moment, this affects the indexes here used and also, at times, acts as a prop to current rates.

After much advance chartering has occurred and the wheat movement begins in large volume, Argentine rates tend to decline. They are usually lower in January than in December. Many tramps have been attracted to the River Plate. The large North American movement is over, and normally it is late for employment in the Australian trade. With a plentiful supply of tonnage, and a large number of shippers having already chartered, prompt-position rates tend to ease.

Again in July, rates from Argentina to Europe move upward as shipments of wheat and maize decline. This is also probably due to a shortage of tonnage in relation to the supplies to be shipped. Unless Argentine maize shipments have been retarded by weather conditions or economic factors, the peak in offerings for shipment overseas has passed, and there is a withdrawal of tonnage for the North American movement soon to begin. World shipments over all routes contract to a seasonal low in the month of July, but only in North America is that month the seasonal low in grain rates. Ships not already on the River Plate will hesitate to make the voyage south just as the available business is tapering off, while employment is almost certainly assured from North American ports.

During other months of the year, supply and demand factors are in such relationship that Argentine rates generally respond to local demands for tonnage as expressed by the volume of shipments. Conditions in other trades continue to influence Argentine rates, but the international grain trade creates less conflict in its demands upon shipping.

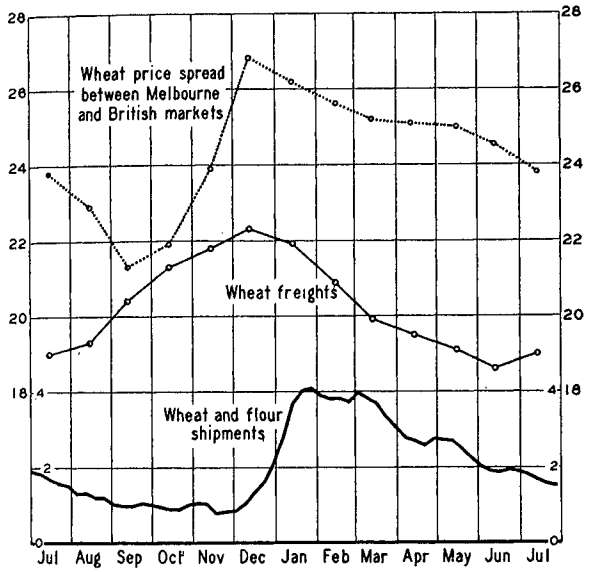
Seasonal fluctuations in wheat rates from Australia are also influenced by factors other than purely local relationships between the amount of cargo available and the supply of shipping tonnage. Freights normally rise from a low in June until they reach a high in December, while shipments tend to decline from June to November. The highest rates ordinarily prevail in December, about a month before shipments reach their peak.

The rise in Australian rates from June to November, while shipments are at a low level, is explained by two facts. Some of the tramps that might be employed in the Australian trade have more attractive alternatives

closer at hand in North America. During the months of small wheat movement from Australia, liners are in a position to handle all or most of the available business, leaving few full cargoes for tramps.

CHART 14.—AVERAGE SEASONAL COURSE OF TOTAL WHEAT AND FLOUR SHIPMENTS, AND OF FREIGHT RATES ON WHEAT TO EUROPE, FROM AUSTRALIA*

(Million bushels; cents per bushel)



* See note to Chart 12. The price-spread curve at the top is based on monthly average prices of Australian wheat in Melbourne and in British markets (parcels), based on August–July years 1922–23 to 1936–37; data in WHEAT STUDIES, October 1937, XIV, 66.

Chart 14 also shows average seasonal variations in the spread between Melbourne and Liverpool prices of Australian wheats, over the same 15-year period used in computing average seasonal variations in freight rates. During these years Liverpool prices averaged highest relative to Melbourne in the month of December, when ocean freights averaged highest and shipments from the new crop were just beginning. The price spread averaged about 4½ cents more than the freight. From December to June, freights and the price spread both tended to decline, but after February the freights declined more than the price spread, so that by May the spread exceeded the freight by nearly 6 cents. The slight difference between the seasonal course of the Melbourne-Liverpool price spread and the seasonal course of freights during December–June is at least partly attributable to a characteristic of the Liverpool price quotations. These are generally for prompt shipments during the early months of the shipping season, but often for wheat afloat or already arrived in later months. The price spreads based on Liverpool c.i.f. quotations for wheat about to arrive, compared with spot quotations at Melbourne, have no necessary relation to freight rates currently being quoted. They may tend to be most closely related to freights quoted a month or two earlier. Part of the discrepancy between the course of freights and that of the price spread may reflect a tendency for prompt position freights at certain seasons occasionally to move out of line with the rates actually being paid by most shippers, on tonnage engaged earlier.

During August–November the Melbourne-Liverpool price spread averages less than freights plus other shipment costs. After June or July, Australian wheat supplies are often so far depleted that prices at Melbourne rise above a parity with Liverpool and exports to Europe are discontinued for a time. This is especially likely to be the case in September and October.

EFFECTS OF TRAMP RATE CONTROL

As previously observed, the British Shipping (Assistance) Act of February 26, 1935 inaugurated an experiment in co-operation which is unique in the annals of an industry traditionally unhampered by regulation.[1] To comply with a condition of the law, a Tramp Shipping Administrative Committee was set up, composed of twelve tramp and three liner shipowners. Although the act was designed primarily to promote British shipping interests, the co-operation of foreign operators was generally secured, and they too have benefited from the operation of the minimum freight schemes promulgated by the Committee.

The first schedule of minimum rates was

[1] In 1934 an International Tanker Pool scheme was adopted, and it continues in effect; but the differences between tankers and general traders are so numerous that this represents no significant exception to the statement in the text.

agreed upon for the River Plate grain trade. This was a graduated scale of rates designed to raise the level from around 12 shillings per long ton current in February 1935 to 16*s.* 3*d.* by the end of April.[1] The minimum rates became the prevailing rates for the remainder of 1935 and over half of 1936. By additional increases they were raised to 17*s.*, 19*s.* 6*d.*, 22*s.* 6*d.*, and finally to 25*s.*[2] On March 28, 1935 a similar scale was adopted for the Australian trade to Europe and to Far Eastern ports.[3] Effective August 10, minimum rates on grain were also fixed for St. Lawrence and Northern Range (United States) ports. Over these three major grain routes rate control has been operative since 1935.

The most recent extension of the rate control scheme was to United States Atlantic ports south of Cape Hatteras and in the Gulf of Mexico on August 25, 1938. Here also, rates were stepped up gradually, but after September 15 were to be on a 3*s.* 6*d.* per quarter base for Gulf ports and 3*s.* 3*d.* for Southern Atlantic ports. These rates represent a marked increase.

At the same time that minimum freight rates were established for tramp cargoes, minimum rates for liner parcels were also fixed by agreements among liner companies. The co-operation of liner conferences in establishing a satisfactory differential between berth and charter rates has contributed toward the sucessful operation of the tramp schemes, to the advantage of liner companies as well as to tramp operators. How the relationships between rival tramps and liners work out is thus described by one liner operator:[4]

> We have conference rates out to South America, but we have nothing to hold on to homewards except the Tramp Administrative Committee's minimum rate, so it is of considerable benefit to us to co-operate. But let me say at once that these benefits are not all on one side. Many a time we have had to sail from the Argentine only partly loaded because we refused to accept our completion parcels, which were available, below the minimum rate. So you will see our support is also invaluable to the tramp scheme.

Unquestionably the controls were a factor in the rise of freights which occurred in 1936 and 1937; but reduction of surplus tonnage, increased trade, and longer voyages transporting grain from Argentina and Australia were even more important. Poor European harvests in 1936, the need for United States importations of corn from Argentina, and heavy demands for tonnage to carry scrap and raw materials to those countries rushing to rearm, all contributed to the rise of freights.

Minimum rates were successively stepped up by the Tramp Shipping Administrative Committee until July–August 1936. Then freights began to rise of their own accord, with increased demand for shipping tonnage. As freights rose further in response to improved conditions, the committee increased the minima on all routes, though until the fall of 1937 these were well below the going market.[5] In 1938, after freights had fallen drastically, the minimum levels again became the market rates, and to date (October 1) the

[1] Rates were based on a "handy size" steamer (5,500 tons carrying capacity) loading from San Lorenzo or Rosario to picked United Kingdom ports, with reductions of 3*d.* for vessels of 7,000 tons, 6*d.* for 8,000 tons, and 1*s.* for vessels over 8,000 tons.

[2] The later advances particularly aroused complaints from shippers. The *Times of Argentina* said editorially on Feb. 22, 1937: ". . . . In no case should more than 20/- be fixed for this market, for this allows a modern tramp to come out in ballast and more than pay its way on the round trip. . . . . The raising of the official level above cost has somewhat incensed the shippers and we can rest assured that if they can break the influence of the Committee, they will do so with glee . . . . it would be better for that policy to be based on costs and . . . . in no case should large profits be guaranteed. . . . ."

[3] Rates were for cargoes up to 8,250 tons net cargo, with a reduction of 6*d.* per ton for vessels carrying more than this. The Japanese tramp owners did not join the arrangement for the Far Eastern trade.

[4] In a speech before shareholders of Lamport and Holt Line, Ltd. (London, Mar. 23, 1938) by Philip Haldin, printed in the *Times of Argentina*, Apr. 18, 1938, p. 19.

[5] The minimum rates in force in 1935 to 1937 may be summarized as follows:

Trade	Unit	Lowest	Highest	Period
St. Lawrence..	Quarter	1*s.* 6*d.*	1*s.* 9*d.*	Mar. 21, 1935 to Apr. 15, 1936
		2 0	2 6	Apr. 16, 1936 to Jan. 29, 1937
		2 9	2 9	Jan. 29, 1937 to Dec. 31, 1937
River Plate ...	Ton	13 6	22 3	Feb. 14, 1935 to Oct. 23, 1936
		22 3	22 3	Oct. 23, 1936 to Jan. 29, 1937
		25 0	25 0	Jan. 29, 1937 to Dec. 31, 1937
Australia[a]	Ton	22 0[b]	24 6	Mar. 28, 1935 to Oct. 9, 1935
		24 6	27 0	Oct. 10, 1935 to Jan. 29, 1937
		31 0	31 0	Jan. 29, 1937 to Dec. 31, 1937

[a] Basis Western Australia, bulk grain.

[b] In this period, 20*s.* was the low rate for "prompt" shipment, and 22*s.* for "forward" shipment.

schemes appear to have prevented a further decline. Even at the minimum levels maintained in 1937 and in early 1938, the highest set by the committee, the official organ of shipping in Great Britain commented: ". . . . it is doubtful whether present [minimum] freights in markets as a whole with the present volume of employment are sufficient to provide even for depreciation."[1] In further defense of its control scheme the Tramp Shipping Administrative Committee states:

> How little effect minimum freight rates have had on the interests of consumers may be judged from the proportion which the present minimum rates for carriage of wheat bear to the price of a quartern loaf of bread, costing 9*d.*, as follows:—3,000 miles from Canada .26*d.*, 6,000 miles from Argentina .497*d.*, 11,000 miles from Australia .625*d.*[2]

In addition to establishing minimum rates, the committee imposed various restrictions on outward sailings in ballast of unfixed tonnage on all routes under control. Furthermore, it brought time charters as well as trip or voyage charters under its jurisdiction when, on November 5, 1936, it ruled that "any time charter entered into shall contain a stipulation that the vessel shall not be loaded with grain from the St. Lawerence for any destination covered by the St. Lawrence schemes." This was subsequently extended to United States Northern Range ports.

Inasmuch as the tramp subsidy feature for British shipping was automatically canceled under the terms of the original act of 1935 when the average level of freights rose above that prevailing in 1929, as they did in 1937, the Administrative Committee has had a somewhat different status since the beginning of 1938. With the official basis for its existence removed, it has been enlarged, made more representative of British tramp and liner shipping, and assisted by subcommittees on which other countries co-operating in the freight schemes are represented.[3] An international Consultative Committee has also been set up under the International Shipping Conference to advise on questions of freight co-operation policy—including the extension of minimum freight schemes and the need and possibility for a compensation fund for vessels withdrawn from the market in the interests of adjusting supply to demand.

In the second quarter of 1938, a laying-up scheme was proposed by the Tramp Shipping Administrative Committee. Its object was

> to facilitate the orderly withdrawal of the world tonnage surplus to the requirements of the markets from time to time by the creation of a pool, to which members entering vessels would be bound to pay a percentage of all gross freights in respect of such vessels under charters entered during the duration of the pool, the pool funds being applied in paying laid-up allowances in respect of such vessels entered which may be laid up.[4]

The plan was to apply to vessels in all trades, whether regulated by minimum freight schemes or not. Similar proposals have often been made in the past, without result, and this phase of the program for "rationalization" of tramp shipping has not yet been put into effect.

Most voluntary co-operative arrangements are at least threatened with breakdown under adverse conditions. The fact that tramp owners generally were in such a bad financial plight made co-operation feasible in the beginning. Even Greek operators, who had set the competitive pace with their secondhand ships during the depression, were brought into the scheme.[5] From mid-1936 until the fall of 1937, freights ruled above the established minima, so that there was no difficulty in keeping the plans in operation. The current situation is more critical since shipowners are strongly tempted to undercut the mini-

[1] Chamber of Shipping of the United Kingdom, *Annual Report 1937–38*, p. 11.

[2] Fourth report to the President of the Board of Trade on the work of the Tramp Shipping Administrative Committee, *Fairplay*, Feb. 4, 1937. The four reports to date have been issued as "white papers," Cmd. 5004, 5084, 5291, 5363.

[3] Chamber of Shipping of the United Kingdom, *Annual Report, 1937–38*, pp. 28–30.

[4] From the "official summary" of the Committee's scheme, printed in the *Times of Argentina*, May 16, 1938, p. 14.

[5] Greek tramp shipping had made inroads particularly in the River Plate trade. Operating the oldest ships, purchased at depression prices, they were able to compete successfully even during the years of very low freights. In fact, during 1932 and 1933, a considerable amount of British and Norwegian tonnage abandoned this trade, but Greek, Italian, and Yugoslavian tramps increased.

mum rates rather than be totally deprived of employment. By the middle of 1938 shippers' complaints against the minimum rates were becoming numerous;[1] rumors of downward revisions were current especially on the River Plate, and of breaking the minimum on the St. Lawrence; and agitation increased for bringing Gulf rates under the co-operating scheme as both St. Lawrence and Northern Range points were losing business.[2]

Thus far, however, the minimum freight schemes have held. As to the future of the "rationalization" plans one can only guess. Yet it is perhaps significant that, after several years of experience, many of the original misgivings within shipping circles have disappeared, and that ambitious proposals for adjusting tonnage supply to current demands, in order to maintain rates, seem to have the support of the industry. No control, stabilization, or rationalization program can long resist an economic tide or trend moving in the opposite direction, but it is within the realm of possibility that adjustments will be made in the future with less hardship and economic waste than in the past.

VI. ELEMENTS IN THE OUTLOOK

In a study of this character, there is no point in attempting to forecast ocean freight rate developments in the near future. But some consideration of the prospects for the longer term can hardly be omitted, even if it stops short of prediction. Various considerations affecting the outlook are involved.

Tonnage requirements for the international movement of grain have varied since the war due to fluctuations in the aggregate volume of exports, but they have also been altered because of a redistribution of supply sources. In general, the movement over the shorter routes has been radically reduced, and that over the longer routes substantially increased. There are at present no signs of any rapid reversal in the distribution of supply sources. Thus, the long trades from Argentina, Australia, and the North Pacific to Europe constitute a favorable factor for shipping and have helped to sustain employment, despite smaller European grain requirements during the past decade and increased efficiency in shipping.

Also tending to sustain shipping employment, however, have been other factors of less permanent duration such as the long trades created by a series of poor harvests in North America and by demands in recent years from Europe and the Orient for American scrap metals. Offsetting whatever favorable influence the more stable long trades in grain may have is a factor perhaps more important to shipping than the distribution of supply sources—the effects of restrictive measures upon the volume of the grain trade. Restrictions now imposed upon the trade, particularly in wheat, cause shifts not only in the length and direction of movement, but in consumption and trade volume.

Just before the war, when world wheat production was fairly well adjusted to consumption, the wheat trade was stabilized perhaps as much as any commerce on a world scale is ever stabilized. There were fewer barriers to trade.[3] Then the war brought radical changes in the distribution of production and trade. Now, as European nations have again undertaken to supply their own requirements and raised obstacles to imports, repercussions of these changes are being felt.

[1] "At the annual conference of the Victorian Wheat Growers' Association . . . . the President . . . . moved that in view of the excessive charges of overseas freights the conference commended the reported intention of the Federal Government to foster a revival of the ship-building industry in Australia. . . . ." —*Wheat and Grain Review* (Melbourne) April 1938, p. 5.

[2] After Gulf rates were brought under the scheme late in August, a storm of protest broke out as affected United States wheat shippers filed complaints with the Maritime Commission against the Tramp Shipping Administrative Committee, alleging that the rates reflect "a concerted effort by the British interests to force the movement of grain through the Canadian ports." See *Southwestern Miller*, Sept. 27, 1938, p. 40.

[3] For a comparison of tariffs and a discussion of other barriers, see Helen C. Farnsworth, "Decline and Recovery of Wheat Prices in the 'Nineties," WHEAT STUDIES, June–July 1934, X, 318–20. Prior to 1928–29 there were few barriers to trade other than tariffs; milling quotas, mixing specifications, direct price-fixing, price-supplementing subsidies, international agreements to limit exports, etc., have since been extensively employed.

If prices are low enough, fairly high barriers can be surmounted. If, however, low prices are feasible only as a result of growers' and shipowners' sacrifices, production and exports will be discouraged. Changes will not take place suddenly. Probably a period of years would elapse before those involved became convinced that unprofitable operations were not traceable to temporarily abnormal conditions. By that time some reversal in trend may have occurred which would make the flow of trade easier and provide an incentive for the grower to continue planting crops.

In the meantime both shipowners and shippers would be attempting to derive a profit from the highly competitive grain trade. Enforced shrinkage in the volume would accentuate the ever-present conflict of interest in which ocean freight rates are made. A continuation of tendencies effectively raising obstacles to the grain trade cannot have other than an adverse effect upon both the agricultural economy of several important surplus-producing countries and the shipping industry, particularly tramp shipping. Such developments would be reflected in the ocean freight rate level.

Although an important influence, the fortunes of the grain trade constitute only one factor in the complex shipping and trade situation. Were such restrictive influences confined to the grain trade, the outlook would be somewhat different. But ocean freight rates depend upon the volume of all international seaborne trade and the total supply of ship tonnage. Both of these broad demand and supply factors are subject to a variety of economic influences, but they are also substantially affected by developments in trade, agricultural, and merchant marine policies of the more important nations of the world.

Since the onset of world-wide economic depression in 1929, world trade has been restricted by numerous policies inspired by nationalistic motives.[1] For related reasons, governments have still further encouraged the artificial maintenance of shipping services and the construction of new vessels by the granting of various forms of subsidies. Though strenuous efforts are being made in some quarters to remove the obstacles to international commerce and to eliminate the friction caused by national shipping competition, both the demand for and supply of vessel tonnage are being influenced by factors noneconomic in character. Moreover, certain long-term economic influences affect the outlook for world trade, shipping, and freights. Some of these elements can be appraised in a general manner while others cannot.

International trade has been based on international specialization. Much of it has been between old and new countries economically, an exchange of manufactured goods for foodstuffs and raw materials. Expansion of production and trade in staple foods can profitably go only so far. Beyond a certain point, as productivity and incomes increase, not only is a smaller proportion of incomes spent upon food, but per capita consumption of the cheaper types which enter world trade tends to decline.

With the maturing of nations, differential advantages between new and old countries become less marked. Products of the soil are cheapened by developments in the science of agriculture. New countries develop industrially. Industry encroaches upon agriculture and competes with foreign manufactures formerly imported. The economic advantages of international specialization tend to diminish. Credit advances are less needed and this factor tending to sustain trade is largely removed.

With longer-term forces working toward a narrowing of the economic advantages of nations in international trade, changes and disturbances may become more numerous and severe. If a large part of foreign commerce is thrown into a border-line category, interested nations would be strongly tempted to apply restrictive or other measures designed to tip the scales and produce at least temporary competitive advantages. But additional interference would only tend further to stifle trade. This is part of the argument by the British economist, D. H. Robertson.[2] Not only

[1] Despite such restrictions, the volume of world trade in 1929 was 25 per cent greater than in 1913; and even in 1932 it did not fall below three-quarters of the 1929 level.

[2] "The Future of International Trade," *Economic Journal*, March 1938, XLVIII, 1–14.

the shrinkage in volume, but the shifts, too, would have profound repercussions upon shipping and ocean freight rates.

But there are others who see in these tendencies little basis for extreme pessimism. Over the longer period there exists, says Boehler, ". . . . a remarkable constancy of relations between the different economic factors which resist state interference and political change as well as cyclical fluctuations and war influences. . . . . "[1] There may be an increasing tendency for many nations to attempt greater self-sufficiency in foodstuffs and raw materials for some time to come; but because of unavoidable reactions ". . . . one may expect that this tendency will find a growing objective resistance, so that in the long run the relations between inland production and imports will not be changed."[2]

Changes have been occurring in the character, distribution, and volume of international trade for many decades. Likewise, changes have been taking place in that part of international trade which involves transportation of goods overseas. In looking ahead for a period of five or ten years it might be safe to reason that, on the whole, the tendencies working toward a shrinkage in world trade would probably be in the ascendancy. But if a period of several decades is considered as the longer term, then one might seriously question the prediction that a permanent decline has set in, just as one may reasonably question the long-term trend predictions as to population growth.

The level of ocean freight rates, however, depends not alone upon the ultimate resultant of the various conflicting demand forces, but also upon a similar set of factors influencing the supply of ship tonnage. More important than aggregate tonnage figures are the overseas carrying capacity of today's merchant ships and the tonnage laid up without employment. The practical effect of increased carrying capacity per ship is to reduce the number of vessels required to transport the world's goods. Although total steam and motor tonnage has increased from 45.4 to 66.9 million gross tons between 1914 and 1938, world trade expansion has not kept pace with the enlargement of transport capacity, nor has it been as great as might be expected from normal population growth coupled with technological developments and raised living standards.

For several years prior to 1936 the amount of idle shipping was abnormally large, being 20 per cent of the tonnage of existing ships as recently as 1932. From 1924 to 1936 freights were not sufficient to meet normal depreciation charges.[3] Only by mid-1936, after such low rate levels had stimulated the breaking up of over 7.5 million gross tons of shipping and when the percentage of tonnage idle was down to 6, did there seem to be an opportunity once more for shipping to enjoy "three years' prosperity."[4]

The 1936–37 rise in freights brought greater profits but was accompanied by rising costs. Government rearmament programs increased shipbuilding activity, normally beneficial to merchant shipping, but also increased building costs of merchant vessels. At the close of 1937, a 9,000-ton (deadweight) cargo vessel built in Great Britain cost £135,000, or approximately twice the prewar cost, and 50 per cent more than eighteen months earlier.[5] Operating, labor, fuel, and supply costs likewise rose.

Higher costs temporarily tend to offset the greater efficiency of the newer ships, but over the longer term technological developments will doubtless continue so that the long-term trend of costs in the shipping industry is probably still downward. Though the nature of the shipping business fixes many of the conditions of operation so that the unit costs of trans-

[1] See especially "Memorandum on the Technical Long Term Factors in the Reduction of the Volume of Overseas Trade," by Dr. Eugen Boehler, in *The Improvement of Commercial Relations between Nations—The Problem of Monetary Stabilization*, Joint Committee Carnegie Endowment, International Chamber of Commerce, Paris (printed in Belgium), June 1936, p. 14.

[2] *Ibid.*, p. 25.

[3] According to the editor of *Fairplay*, Mar. 18, 1937.

[4] The shipping industry generally figures on a ten-year cycle, of which three years' prosperity must make good seven years of depression. See address of the President of the Chamber of Shipping of Great Britain, before the annual meeting of that organization in 1937.

[5] *Fairplay*, Jan. 13, 1938. This contrast is even more striking than that shown in Table I for a 7,500-ton vessel.

portation cannot be reduced in the same manner as unit costs of producing a simple manufactured article—for example, simply by obtaining a larger volume of production with essentially the same machinery and labor—developments of the past few decades nevertheless demonstrate that the opportunities have not all been exploited.

Furthermore, the technique of co-operation, particularly in tramp shipping, is still in its infancy. There are many reasons why one would not ordinarily expect the development of effective co-operative schemes within this industry.[1] For many years, however, the industry has experienced fortunes that are perhaps not ordinary. Tramps, after the war and up to the beginning of the present decade, were apparently losing ground to liners, particularly the cargo liners which enjoy the benefits of the freight conference system.[2] Though the decline of tramp shipping may have been arrested in recent years, the improved position is probably only a relative matter as overdeveloped liner services were curtailed with the shrinkage in world trade. Conferences of liner companies and consolidations do not seem to have had adverse effects upon shippers' interests. In their longer-term movements, liner rates and tramp charter rates have run closely parallel. About the only noticeable effect of combinations and the conference system has been to reduce the amplitude and frequency of rate fluctuations. With the lines standing to gain by co-operation in the existing tramp rate control schemes, it is probable that their influence and experience will tend to keep individual shipowners in line if it can be shown that all are likely to benefit.

At best, however, control or rationalization schemes are usually a factor of transitory importance in the outlook for ocean freight rates.

[1] Any agreement must include all nations to be effective and the wide variety of charter forms must necessarily be somewhat standardized. Perhaps in few other trades are there so many opportunities for hidden concessions as in the chartering of tramp ships.

[2] Steamship conferences of liner organizations may, in general, have become a more decisive factor in the stabilization of rates, but it is doubtful that this generalization applies to the grain traffic, which is still dominated by the tramp on most of the world's principal grain routes.

For perspective, Chart 15 (p. 118) deserves attention. Two indexes of ocean freight rates, reduced to a common base, are "deflated" by an index of wholesale prices in Great Britain, expressed in terms of the same base. The indexes, and the "deflating" procedure also, are open to criticism; yet the process roughly eliminates the influence of changes in currencies and price levels, which tend to obscure certain underlying trends. Ignoring the war years, the most striking fact is the broad downward trend in the adjusted indexes shown. In the light of this historic trend, the pre-depression level of rates appears less abnormally low than it seemed at the time, when the high levels of 1915–20 were so recent; and the 1937 level appears distinctly high.

The reduction to more nearly normal proportions of laid-up tonnage during the past few years was the result of an expansion in trade based upon factors none too reassuring from the longer-term view. A disquieting outlook internationally, rising raw material prices, and actual warfare or preparations for war, accelerated the pace of trade. Trade based upon abnormal shipments of scrap steel, metals of military importance, and oil, is not a firm base for confidence in the outlook for revival of foreign commerce. The same factors that promote trade of this character also fortify motives for increased self-sufficiency.

Likewise, the influences which contributed to a temporary world trade revival in 1936 and 1937 operated to increase the supply of shipping tonnage. On the one hand, nationalism finds expression in actions which can have no other effect than to reduce the demand for shipping, and, on the other hand, adds to the supply through the encouragement of shipbuilding and operating for "strategic" reasons.

Even with high construction costs, shipowners tend to order new ships when government assistance is forthcoming. Although this applies more to liners than to tramps, an excessive tonnage of cargo liners has the same effect of depressing general freight levels. Because nationalistic policies are involved in both demand and supply influences, localized and internal conflicts of interests seem inevitable.

If the forces currently operating to con-

tract world trade and increase shipping tonnage persist, it is difficult to see how current minimum freight levels can be long maintained, barring unforeseen developments such as general war or inflation. Much will depend on whether the recent depression will spread and continue or be overborne by powerful recovery forces. Higher operating and shipbuilding costs, plus rate stabilization measures, may prevent ocean freight rates from falling as low as they were for many years after the war; but it remains to be seen whether further progress in the "rationalization" of the shipping industry will durably support the level of rates, or merely postpone disastrous declines in rates.

Notwithstanding certain possibly offsetting influences, technological progress will continue. The function of the tramp ship in transporting seasonal agricultural products, such as grains, will be performed for some time to come. That it can be performed at a still lower cost is possible. That it will be performed at lower rates of freight, assuming comparable currencies and barring additional wars, is probable.

V. D. Wickizer, now lecturer in economics at the University of California (Berkeley), wrote this study while on the staff of the Food Research Institute as acting associate economist. Joseph S. Davis gave counsel throughout and particularly assisted in the final stages, and other colleagues, including N. Jasny, made helpful contributions. The charts were drawn by P. Stanley King.

APPENDIX NOTES

A. SOURCES OF OCEAN FREIGHT RATE DATA

Rates charged for transportation of freight overseas apply to such a wide range of products, trade routes, and conditions, and so diverse are the uses to which such information might be put, that it is not surprising to find few systematic selections, compilations, and publications of ocean freight rate data well adapted to analytical uses. Within an industry of traditional secrecy about its affairs, the task of compilation is difficult, the reported information is frequently incomplete or not wholly reliable, and the emphasis is upon current data which largely serve the purposes of those primarily interested.

Most rates on grains are charter rates applying to cargoes to be transported by tramp ships and originate from fixtures that are reported. There is always a problem of selecting "representative" fixtures as a measure of prevailing rates. Some rates are for prompt positions, others represent an agreement which becomes operative some weeks or months later. Probably no two compiling and reporting agencies will consistently select the same fixtures, options, points of loading and discharge, and rates. When chartering is relatively inactive, the differences may not be large, but in periods of rapidly changing freights the discrepancies between sources may be substantial.

Practically all original freight rate quotations are in terms of shillings and pence sterling per long ton of 2,240 pounds or, chiefly in the case of North America, per quarter of 480 pounds. Unless otherwise stated, this may be implied in connection with the sources enumerated below, and wheat and maize may be considered as the grains referred to in the mention of freight rates on grain. Liner rates for parcels are commonly quoted in sterling per quarter, but in some cases —notably the berth rates on liners operating from the United States on the North Atlantic route— in United States cents per 100 pounds.

As classified below, some sources are useful for current information on rates, others primarily for reference purposes.

Current Quotations

1. International Institute of Agriculture (Rome). —Weekly quotations (also current monthly averages) of ocean freight rates on wheat and maize over the principal routes of shipment appear, without discussion, in *Monthly Crop Report and Agricultural Statistics* bulletins, which are also included in the Institute's *International Review of Agriculture.*

In the bulletin for April 1937 appears the statement: "These are average rates for entire cargoes,

and relate to contracts made, often during a period extending back several months, to operate during the weeks specified." This practice was adopted in 1934, but prior to 1936 there was no notable divergence between the various series carried by the International Institute and those from other sources.

In effect, the current quotations on ocean freight rates published by this source are sometimes for prompt positions and sometimes represent rates arrived at as the result of advance chartering. There is no method of determining which except by a regular comparison with series available from other sources. Were it not for this serious defect, the International Institute of Agriculture would provide the best source on grain rates available to the analyst, for its compilations have been the most systematic over a period of years.

2. Broomhall's *Corn Trade News* (Liverpool).—This leading trade daily, and its weekly Special American Edition, publishes a table headed "Latest Grain Freights." This provides weekly quotations on prompt position wheat rates over the principal routes of shipments at the time, together with comparisons of rates a week, a month, and a year earlier. A brief discussion of rates and changes is given in addition to the tabulation. Most of the rates published apply to tramp ships. From New York, St. John, and Galveston, rates are often for "berth parcels," presumably by liners.

Broomhall's rates are as of a particular day—the "latest" available to the publisher. They may at times represent the high or low quotation of the week, and sometimes appear to be the rate at the close of the previous week rather than the Monday or Tuesday just prior to publication to which they are said to apply. This makes little difference except in periods of rapid change in rates.

3. *Times of Argentina* (Buenos Aires).—This weekly shipping journal contains a regular feature, "The Freight Market," which discusses conditions in the River Plate market, lists the fixtures effected during the previous week, and includes a table of berth rates on parcels by liners. Although no formal tabulation of selected or representative rates is attempted, one who follows this market from week to week is provided with a reliable source of information.

4. Commonwealth Bureau of Census and Statistics (Canberra), *Monthly Summary of the Wheat Situation in Australia.*—This gives each month a tabulation of current rates, both cargo and parcel, from Australia to the United Kingdom and Continental ports, with data for several prior years. In the past, charter rates have been recorded only quarterly, in March, May, September, and December. Beginning in March 1937 they have been reported monthly, giving a range of low and high quotations. The series on parcel rates, extending back to January 1933, is probably the most valuable feature of this tabulation, although generally parcel rates are less significant, since shipments are made predominantly by tramp ships.

The rates are as of the last day of the month, and so do not agree with monthly rates from other sources arrived at by taking averages of weekly averages or of one quotation a week.

5. *New York Journal of Commerce.*—This daily carries a regular feature, "Ocean Freight and Charters," which discusses the market, giving chief attention to North American chartering. It quotes "asked rates" to various ports of Europe from New York by liners (some in cents per 100 pounds) as well as cargo rates from the Gulf, St. Lawrence, etc., based upon reported fixtures.

6. *Chicago Journal of Commerce.*—This daily has, since early in 1937, included a grain trade feature section in its Tuesday edition. It contains a discussion of the chartering market for North America and reports Gulf and St. Lawrence fixtures in detail, but carries no formal tabulation of rates.

7. *Fairplay* (London).—This weekly shipping journal contains a general discussion of the freight market and a tabulation termed "Representative Fixtures During the Week," which does not, however, always indicate the cargo involved. Under a regular feature, "River Plate News," grain rates on that route are frequently mentioned.

8. *Lloyd's List and Shipping Gazette* (London).—The daily freight market reports of this publication are probably the most authoritative and are, of course, invaluable to one following day-to-day developments in freights in all parts of the world. The absence of any formal summary of daily fixtures somewhat limits its usefulness for most analytical purposes.

9. *London Grain, Seed and Oil Reporter.*—In connection with its daily sales report, this publication includes in unorganized fashion scattered information on freight rates. In its "Review of the Week" (Friday), freights are discussed more fully, usually by reprinting the discussions from the *Daily Freight Register.*

10. Miscellaneous.—Various interests in the shipping or brokerage business make compilations of rates which are reprinted in shipping journals. For example, J. E. Turner and Company (London) Ltd., issue a *River Plate Weekly Report,* which is reprinted in *Fairplay* and *Times of Argentina;* the Chartering Department of the General Steamship Corporation, Ltd. (San Francisco) issues a monthly *Pacific Coast Freight and Charter Market Report,* which is reprinted in various United States newspapers and shipping journals; and brief discussions and news items on grain freights appear from time to time in the various milling journals.

Practically all shipping magazines carry discussions of the freight market in more or less detail, but none includes rate tabulations in a form suitable for most analytical purposes. In addition to the shipping journals mentioned above, regular features discussing the freight market are carried in such publications as the *Nautical Gazette* (New York; published every other week) and the *Pacific Shipper* (San Francisco, weekly).

The larger daily newspapers in the United States, Canada, and abroad, which include comprehensive financial or commercial sections, also discuss freights from time to time, particularly when some spectacular movement occurs.

Reference Publications

Chiefly of interest to the analyst are the reference publications listed below, which summarize for a period of years the ocean freight rate data on grains that appear currently. Practically all are subject to the limitations imposed by averaging rates, usually on a monthly basis.

1. International Institute of Agriculture (Rome), *Yearbooks of Agricultural Statistics.*—These give monthly and yearly averages of freight rates on wheat and maize over selected routes and are available for years since 1927. Previously the weekly averages were reproduced.

In its monthly bulletins, quotations are given for both *up-river* and *down-river* ports from La Plata to U.K./Continent, but only the *up-river* quotations are averaged and summarized in the *Yearbook.*

For the Canada–United Kingdom route, entire cargo rates are used for the period during which the St. Lawrence is open to navigation (Montreal to U.K.); during the other months, parcel rates in liners from St. John to Liverpool are used.

The *Yearbooks* also include rates on wheat and maize from the Black Sea to Antwerp/Hamburg Range, New York to Liverpool, North Pacific to United Kingdom, and Australia to United Kingdom/Continent.

2. Broomhall's *Corn Trade Year Book.*—This summarizes, in monthly averages based upon one quotation per week, the rates published in Broomhall's *Corn Trade News* for certain of the more important routes. Formerly these summaries included a maximum of four routes. From 1932 on, six routes are given—Northern Range to U.K., Karachi to Liverpool, River Plate (down-river), Australia to U.K., Montreal to Liverpool, and North Pacific to U.K.

3. Chamber of Shipping of the United Kingdom, *Annual Reports.*—These include a tabulation by weeks for one year of freights over seven important routes, three of which are primarily for grains. Also included are monthly data on grain rates from Canada to U.K. and from Gulf ports to U.K./Continent.

4. Dominion Bureau of Statistics (Ottawa), *Report on the Grain Trade of Canada.*—These annual reports contain tabulations of grain rates from various Canadian ports to United Kingdom, Continental ports, and the Orient. The period covered is usually the crop year. Freights are expressed in cents per bushel, conversions being made at current rates of exchange. In some cases, instead of monthly averages, a low-high range is given, which at times is so large as to suggest that no distinction is made between prompt-position rates and those determined as a result of advance chartering.

5. *Angier's Steam Shipping Report,* appearing annually in *Fairplay's* Special Annual Returns Issue, published in January.—This review of the ocean freight rate situation over all routes for the year just closed provides one of the longest records obtainable. The reports have been prepared by the Angier family regularly for 100 years. A 50-year collection of these reports compiled by E. A. V. Angier is available in one volume, *Fifty Years' Freights, 1869–1919* (published by *Fairplay,* London, 1920).

In connection with these reviews a tabulation is given showing the high, low, and present rates on grain cargoes over a generous number of routes during the year reviewed.

6. *Statistisches Jahrbuch für das Deutsche Reich.*—This tabulates on a monthly basis grain rates on the principal trade routes, and also includes ocean freight rates on a fairly wide variety of other products shipped by both tramps and liners.

B. INDEXES OF OCEAN FREIGHT RATES

Perhaps the most systematic compilation of ocean freight rate data has been undertaken by organizations which sponsor and publish indexes of freights. Such index numbers provide the best guide to the course and level of shipping freights in general. Practically all of those indexes mentioned below are compiled and reported upon a monthly basis. They do not ordinarily supply information currently upon specific rates by commodities and trade routes, such as are needed for various comparisons over longer periods.

All of the better known indexes now published are based on charter rates charged by tramp ships under trip or voyage charters,[1] as reported by the sources listed in Appendix Note A. Only two indexes are for time charter rates. Obviously, these must be general in character, there being no ready way of determining where, when, or how ships so chartered have been used. Trip or voy-

[1] The Federal Reserve Board index, mentioned below, for a few years covered rates across the North Atlantic, where liners predominate and such rates are significant even though sometimes difficult to obtain.

age charter indexes, on the other hand, can be constructed on the basis of routes, commodities involved, and direction of traffic movement.

PRINCIPAL INDEX NUMBERS

1. The *Economist* (London) "Index of Shipping Freights."—Published monthly, this is described in the *Economist Monthly Supplement* for July 21, 1923, p. 3. Data are "based on 28 representative routes for tramp tonnage, divided into six groups: (1) European waters, (2) North America, (3) South America, (4) India, (5) Far East and Pacific, (6) Australia . . . ."

The general index represents the unweighted arithmetic mean of the six group indexes, which are calculated in the same manner, either from the percentages relating to each maritime route or from the averages for traffic to and from the United Kingdom.

The index numbers are expressed in terms of averages for the base period 1898–1913. Currently the *Economist* also gives the general index on a 1913 and on a 1929 base.

2. Chamber of Shipping of the United Kingdom (London), "Index Numbers of Shipping Freights." —This is published monthly in the *Statist* (London), and reprinted in shipping journals, e.g., *Fairplay*, the *Times of Argentina*, etc., and also without detail in the *London and Cambridge Economic Service Monthly Bulletin*, which does, however, carry the back figures for the total index for several years.

The original index was begun and its construction was described in the *Statist* of October 29, 1921. It is described in detail by Dr. L. Isserlis in a paper read before the Royal Statistical Society, December 21, 1937, and published in that Society's *Journal*, Part I, 1938, CI, 86–95. In January 1938 the index was revised and the base period shifted from 1920 to 1935. The index employs data from as many of the 97 routes as quotations are conveniently available. The actual weight of cargo carried by British tramp ships and freights earned in the year 1935 provides the basis for weighting the new index.

The main difference between the old and new index numbers is that "in the old index number Grain is given much more weight relatively to Coal than in the new" (p. 93). The revised index is published on a commodity rather than a route basis as formerly. Coal, grain, timber, ore, fertilizers, sugar, iron and steel and scrap, are the seven commodity groups used. The Chamber's new index is the only one providing considerable detail on different important tramp cargoes.

It has been subject to criticism, however, because of its heavy weighting with grain freights. Perhaps more serious is the procedure of dropping quotations from the index when they are not available. This accounts for some of the discrepancies in direction of movement of different indexes. *Fairplay*, Aug. 14, 1930, p. 409, states: "While the Chamber of Shipping figures indicate a decrease of 1.42% in July as compared with June, *Lloyd's List*, in its statistics, records an increase of 2.10% from which it would appear that absolute reliance cannot be placed on the figures of one or the other sources." Discussion following the presentation of a new index for the Chamber of Shipping by Dr. L. Isserlis at a meeting of the Royal Statistical Society in December 1937 suggests a better explanation for differences. Between January and March 1936, the *Chamber of Shipping Index* fell 7 per cent in February and rose 5 per cent in March. The *Economist* and *Lloyd's List* index numbers agreed that there was a downward movement in freights over those three months. The incorrect movement of the *Chamber of Shipping Index* showing a rise in March was due to omitting in February the quotation from Northern Range to West Italy, which happened to be much higher than the general average.

The latest revision of the Chamber's index continues to give a fairly heavy weighting to grains; and inasmuch as the basis for revision was 1935 data, during which year the minimum-freight scheme went into effect, it is possible that the average rates on grain for that year may be high in relation to rates on other commodities.

The Chamber of Shipping also compiles an *index of time charter rates*, the base for which presumably will also be shifted from 1920 to 1935.

3. *Lloyd's List and Shipping Gazette* (London), "Lloyd's List" Special Index (of Whole Cargo Rates). — This monthly index is infrequently quoted, permission to reproduce being confined to *Lloyd Anversas* in Belgium, *Göteborgs Handels och Sjöfarts Tidning* in Sweden, and *Scheepvaart* in the Netherlands.

Data are based on five routes or subgroups for tramp shipping—Europe, North America, South America, East Indies, etc., and Pacific, etc. In addition to a classification by areas, there is a classification by cargoes, index numbers being prepared on coal freights, grain freights, and "other" freights for the world as a whole.

The base period is the year 1923. The general index of whole cargo rates is also shown on an adjusted basis to eliminate the influence of seasonality.

In publishing its "Special Index" *Lloyd's List and Shipping Gazette* reproduces in one of its daily issues each month the detailed route and subgroup numbers which indicate the precise composition of the general index number for the month involved.

Compiled for *Lloyd's List* by E. A. V. Angier (Hall, Angier & Co., London) is a quarterly *index of time charter rates*, based upon average rates paid for cargo tonnage of all sizes, all periods, and all trades, many thousands of fixtures being uti-

lized. The index is available from 1913 on. The base year is 1900 but, from 1930 on, the index has also been calculated with 1929 as the base year.

Other Indexes

In addition to the three voyage charter indexes of worldwide scope listed above, there are a number of regional, restricted, or discontinued indexes of ocean freight rates. Some of the better known of these are listed below.

1. *Denmark:* A general index is published in *Statistiske Efterretninger* and described in the issue of May 23, 1925. It represents the simple arithmetic average of 26 indexes relating to as many world routes selected with a view to indirect weighting. Seventeen of the routes converge on Denmark, Finland, or Sweden.

2. *Germany:* An index of Germany's seaborne trade, weighted on the basis of the volume of traffic on the different routes in 1925, is published in *Wirtschaft und Statistik* and described in the issue of January 15, 1926.

3. *Sweden:* An index representing simple arithmetic averages is published in *The Index* (Stockholm). It pertains to shipments of English coal and American cereals to Sweden, and shipments of Swedish wood and pulp to England.

4. *United States:* (*a*) A monthly index of *berth rates* on the North Atlantic, beginning in 1920, was formerly published by the Federal Reserve Board and described in the August 1921 issue of the *Federal Reserve Bulletin* (VII, 931–34). Regular publication was discontinued in June 1925 with the statement that current figures could be obtained upon request.

b) A quarterly index of trip charter rates since 1920 was compiled by the U.S. Department of Commerce (Transportation Division) and published in *Commerce Reports* (described in the issue of August 28, 1922), and in *Survey of Current Business* until discontinued in 1931.[1]

Additional References

Below are listed sources available to the analyst less concerned with current information and more interested in ocean freight indexes over a period of years.

1. The *Economist* (London) for February 26, 1938 (p. 484) gives a complete record of the Economist Index of Shipping Freights, annually for six routes and total, from 1898 to 1937 inclusive, and monthly for the all-route total from 1920 through 1937.

2. Annual reports of the Chamber of Shipping of the United Kingdom (London) usually give detailed indexes as well as actual rates for the year reviewed, and general indexes of voyage and time charter rates back to 1920.

3. The *Statistical Year Book of the League of Nations* (Geneva) includes several indexes of ocean freight rates, varying from time to time. The 1936–37 *Year Book* reproduced indexes from four countries, monthly for several years, and annually since 1926, all converted to a 1929 base. Included in this number were indexes from Germany (Statistisches Reichsamt), Denmark (Statistiske Departement), United Kingdom (*Economist*), and Sweden (Svenska Handelsbanken).

4. A quarterly index of *Time Charter Rates* from 1913 (chart) is "Calculated and drawn for 'Lloyd's List and Shipping Gazette' by E. A. V. Angier, F.I.C.S. (Hall, Angier & Co., Ltd., 91, Bishopsgate, E.C. 2)," London.

[1] One of the Department's difficulties, apparently, was in finding a regular record of grain or other charters, due to the decline of the tramp and the rise of liners in the Atlantic seaboard and Gulf trades.

APPENDIX TABLES

TABLE I.—WORLD MERCHANT SHIPPING STATISTICS, 1920–38

(Million gross tons, except for last three columns)

Year	Ships of 100 gross tons and upwards*							Shipping employment, values, and freights					
	On register, June 30[a]				Under construction, June 30[b]	Launched, year ending June 30[c]	Lost or scrapped, year ending June 30[d]	Idle tonnage, Jan. 1†			Cost of new, ready 7,500-ton (d.w.) cargo steamer‡	Chamber of Shipping freight indexes§	
	Total	Steam	Motor	Sail				World total	United States	United Kingdom		Voyage charter	Time charter
1920.....	57.3	52.9	1.0	3.4	7.6	5.9	.5	...	...	...	£105	100.0	100.0
1921.....	62.0	57.6	1.2	3.1	6.2	4.3	.5	...	...	...	60	37.6	36.3
1922.....	64.4	59.8	1.5	3.0	3.2	2.5	.7	10.9	5.3	1.8	66	29.7	26.6
1923.....	65.2	60.7	1.7	2.8	2.5	1.6	1.4	9.0	5.3	1.0	60	28.4	21.6
1924.....	64.0	59.5	2.0	2.5	2.5	2.2	1.6	6.8	4.3	.9	61	29.6	23.2
1925.....	64.6	59.7	2.7	2.3	2.3	2.2	1.0	5.8	4.2	.7	53	25.3	22.0
1926.....	64.8	59.2	3.5	2.1	1.9	1.7	1.2	5.7	4.1	.6	61	28.0	24.5
1927.....	65.2	59.0	4.3	1.9	2.8	2.3	.9	4.1	2.9	.5	62	27.8	24.9
1928.....	67.0	59.7	5.4	1.8	2.7	2.7	1.2	4.5	3.0	.5	62	25.8	22.5
1929.....	68.1	59.8	6.6	1.7	2.8	2.8	1.4	4.0	2.8	.5	58	24.9	24.7
1930.....	69.6	59.9	8.1	1.6	3.0	2.9	1.2	3.2	2.0	.5	49	19.1	17.7
1931.....	70.1	59.3	9.4	1.4	1.8	1.6	1.3	8.6	2.6	2.4	38	19.9	14.2
1932.....	69.7	58.3	10.0	1.4	1.1	.7	1.7	12.2[e]	3.0[e]	3.1[e]	32	18.8	13.3
1933.....	67.9	56.4	10.2	1.3	.7	.5	2.7	12.6	3.6	3.1	37	18.1	14.5
1934.....	65.6	53.8	10.6	1.2	1.2	1.0	2.1	7.5[f]	2.9[f]	1.7[f]	52	18.9	14.6
1935.....	64.9	52.4	11.3	1.2	1.3	1.3	1.4	6.5	2.6	1.5	60	19.0	15.9
1936.....	65.1	51.7	12.3	1.1	2.0	2.1	...	4.2	2.2	.7	78	22.6	19.3
1937.....	66.3	51.5	13.7	1.0	2.8	2.7	...	2.8	...	.3	90	34.9	40.5
1938.....	67.8	51.7	15.2	1.0	2.8	2.9	...	1.3	...	.2	..	....	....

* Data of *Lloyd's Register of Shipping*, in part as reprinted in annual reports of the Chamber of Shipping of the United Kingdom, and in annual "Merchant Marine Statistics" published by the U.S. Department of Commerce.

† Chiefly estimates by the Bureau of Foreign and Domestic Commerce (U.S.), in *Commerce Yearbook*, 1930, II, 661, and *ibid.*, 1932, II, 705, and in *World Economic Review, 1935*, p. 81. For 1937 and 1938 the figures are estimates by Chamber of Shipping of the United Kingdom, *Annual Report, 1937–38*, p. 18.

‡ Data in thousands, as of December 31, from *Fairplay*, Jan. 13, 1938. In March 1920, the cost of such a vessel was figured at £258,750; in June 1937, at £105,000.

§ From annual reports of the Chamber of Shipping of the United Kingdom; average for 1920 = 100.

[a] Includes lake tonnage, chiefly on the Great Lakes. On June 30, 1914, United States lake tonnage on register was slightly under 2.4 million gross tons; since 1929 it has been fairly constant at between 2.5 and 2.6 million.

[b] Excludes United States and Canadian lake tonnage. The excluded item is small; since 1920, when it was 156,000 gross tons, it has only once (1923) reached 80,000 tons.

[c] Returns incomplete for Soviet Russia except in calendar years 1926 to 1929, and for Spain in 1937 and 1938.

[d] Tonnage lost each year runs between 300,000 and 500,000 gross tons. The balance represents tonnage scrapped.

[e] For July 1, 1932 the corresponding estimates were 14.2, 3.4, and 3.5.

[f] As of July 1.

TABLE II.—UNITED KINGDOM TONNAGE CLASSIFICATIONS AT SELECTED DATES, 1914 TO 1936*

(Tonnage in thousand tons)

Date	Number	Tonnage			Gross tonnage by types						Gross tonnage in various trades[a]				
		Dead-weight	Net	Gross	Tramp	Cargo liner	Mixed liner	Pass. liner	Tanker	Other	Coasting	Mixed[b]	Home[c]	Mixed[d]	Foreign[e]
1914, June 30	3,450	17,495	7,890	12,792	3,285	4,613	3,560	775	545	14	335	140	184	320	11,799
1929, June 30	3,632	21,704	10,163	16,819	3,890	6,028	3,769	1,219	1,864	50	317	187	187	963	15,115
1933, Oct. 1	3,468	21,250	9,532	15,846	3,903	5,416	3,221	1,238	2,005	63	360	219	161	923	14,120
1936, June 30	3,525	20,321	9,086	15,308	4,333	4,941	3,129	852	1,986	67	452	239	311	905	13,334

* Condensed from much more elaborate data for these dates given by L. Isserlis, in *Journal of the Royal Statistical Society*, Part I, 1938, CI, 96–99.

[a] Exclusive of unspecified types of vessels.

[b] Partly in "coasting" and partly in "home" trade.

[c] Elbe and Brest limits.

[d] Partly in "home" and partly in "foreign" trade.

[e] Excluding trade between Elbe and Brest limits.

TABLE III.—OCEAN FREIGHT RATES ON WHEAT AND CORN TO EUROPE, MONTHLY AND ANNUAL AVERAGES FOR CROP YEARS 1922–23 TO 1937–38*

(Cents per bushel)

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	NORTH ATLANTIC TO UNITED KINGDOM[a]												
1922-23	7.5	7.6	8.5	10.7	10.1	8.6	7.3	7.3	9.5	8.8	8.9	8.2	8.6
1923-24	7.4	7.6	9.4	10.4	8.7	8.9	10.7	9.7	8.9	10.2	8.7	7.7	9.0
1924-25	8.9	11.0	10.9	10.8	9.4	9.4	9.7	8.8	8.6	9.1	7.0	8.5	9.3
1925-26	8.2	8.5	9.6	10.6	10.0	8.5	6.4	6.1	6.6	10.1	10.1	10.6	8.8
1926-27	10.8	13.6	20.2	23.1	12.5	11.4	8.9	7.2	8.0	9.9	8.0	7.6	11.8
1927-28	8.5	10.1	9.9	10.3	7.2	6.9	7.6	8.1	7.6	7.2	7.3	8.4	8.3
1928-29	9.5	9.8	10.6	10.4	7.6	8.0	6.6	4.9	4.6	7.1	6.3	6.1	7.6
1929-30	6.1	6.1	5.6	5.3	5.5	5.6	5.3	5.3	5.3	5.6	5.3	5.1	5.5
1930-31	5.8	5.9	5.5	5.0	4.9	5.1	6.1	5.5	5.3	6.6	5.1	4.9	5.5
1931-32	4.8	4.8	5.6	6.1	...	4.9	6.1	5.4	5.2	4.9	4.2	3.5	5.0
1932-33	3.7	4.4	4.3	4.0	3.7	3.7	...	3.3	3.6	3.8	3.4	3.6	3.8
1933-34	3.7	3.8	4.3	4.7	4.8	4.7	5.5	5.6	4.8	4.4	4.1	3.9	4.5
1934-35	4.4	5.3	5.2	4.8	4.6	4.6	4.6	4.5	4.5	5.0[b]	5.0	4.6	4.8
1935-36	4.7	4.6	4.9	6.2	6.2	5.4	5.5	5.4	5.7	5.8	6.3	6.3	5.6
1936-37	6.3	6.8	6.9	7.1	7.7	8.4	8.4	8.4	8.8	9.6	9.4	9.1	8.1
1937-38	8.9	10.4	13.0	13.3	9.4	9.0	10.2	8.6	7.8	8.8	9.2	9.2	9.8
Average 1922-37	6.7	7.3	8.1	8.6	7.4	6.9	7.0	6.4	6.5	7.2	6.6	6.5	7.1
	NORTH PACIFIC TO UNITED KINGDOM												
1922-23	21.7	19.7	21.3	22.5	23.0	22.5	22.0	22.5	23.3	23.2	23.2	22.4	22.2
1923-24	21.7	21.1	22.2	22.0	22.0	22.8	23.1	21.4	19.8	20.1	19.0	18.8	21.2
1924-25	18.4	19.6	22.3	22.0	22.0	22.4	23.2	21.6	21.6	22.3	20.8	20.2	21.3
1925-26	21.5	20.7	20.4	21.0	22.8	21.7	19.4	17.1	17.4	19.2	18.9	19.8	20.0
1926-27	19.7	22.0	26.5	29.8	27.4	24.8	23.9	24.3	23.8	21.2	21.6	21.0	23.9
1927-28	21.2	22.1	21.4	20.6	20.3	20.1	19.7	18.7	17.7	17.3	17.3	17.6	19.5
1928-29	19.0	18.8	18.8	20.5	21.2	21.5	20.1	19.7	18.7	18.7	18.7	18.5	19.6
1929-30	18.5	18.5	16.0	16.2	16.0	14.7	12.0	12.2	12.8	13.3	13.5	13.2	14.7
1930-31	14.2	14.9	15.1	13.8	15.0	14.6	14.6	14.2	13.8	15.3	14.5	13.7	14.5
1931-32	13.7	....	11.8	11.8	10.5	10.2	10.7	11.6	11.3	10.4	8.9	8.6	10.9
1932-33	9.8	10.5	10.1	10.0	10.0	10.5	10.2	9.0	9.0	9.8	9.5	11.2[c]	10.0
1933-34	11.2	11.5	11.5	13.3	13.4	13.6	13.6	13.0	13.0	13.0	11.5[c]	10.8	12.4
1934-35	13.5	13.5	13.6	13.6	12.6	11.8	11.1	11.0	11.0	10.9	10.6	10.6[c]	12.0
1935-36	10.6	11.2	13.4	13.5	13.7	13.9	13.6	12.8	12.6	12.8	12.9	12.8	12.8
1936-37	13.1	12.6	15.1	16.4	21.4	21.4	21.3	19.8	21.7	23.2	23.1	23.7	19.4
1937-38	25.7	28.2	28.2	24.0	19.6	24.7	18.1	18.4	16.7	16.6	16.6	16.5	21.1
Average 1922-37	16.5	16.9	17.3	17.8	18.1	17.8	17.2	16.6	16.5	16.7	16.3	16.2	17.0

* Averages of Friday rates published in *International Crop Report and Agricultural Statistics*, except that from June 1936 averages of Tuesday rates (converted from sterling rates per long ton) are taken from Broomhall's *Corn Trade News*, for all routes except the North Atlantic. See also footnote *c* and Appendix Note A. Dots indicate lack of quotations, and monthly averages are based on the weekly quotations available. These are charter rates for entire cargoes except as indicated in note *a*. Because of changes in British and United States currency bases and relationships, especially prior to April 1925 and between September 1931 and October 1934, these series in United States cents per bushel differ from ones expressed in sterling per long ton or per quarter.

[a] May to November rates are for Canada to the United Kingdom (Montreal-Liverpool). December to April rates are for Northern Range ports to U.K./Continent, except for years 1928–29 and 1933–35 which are rates for parcels in liners from New York to Liverpool.

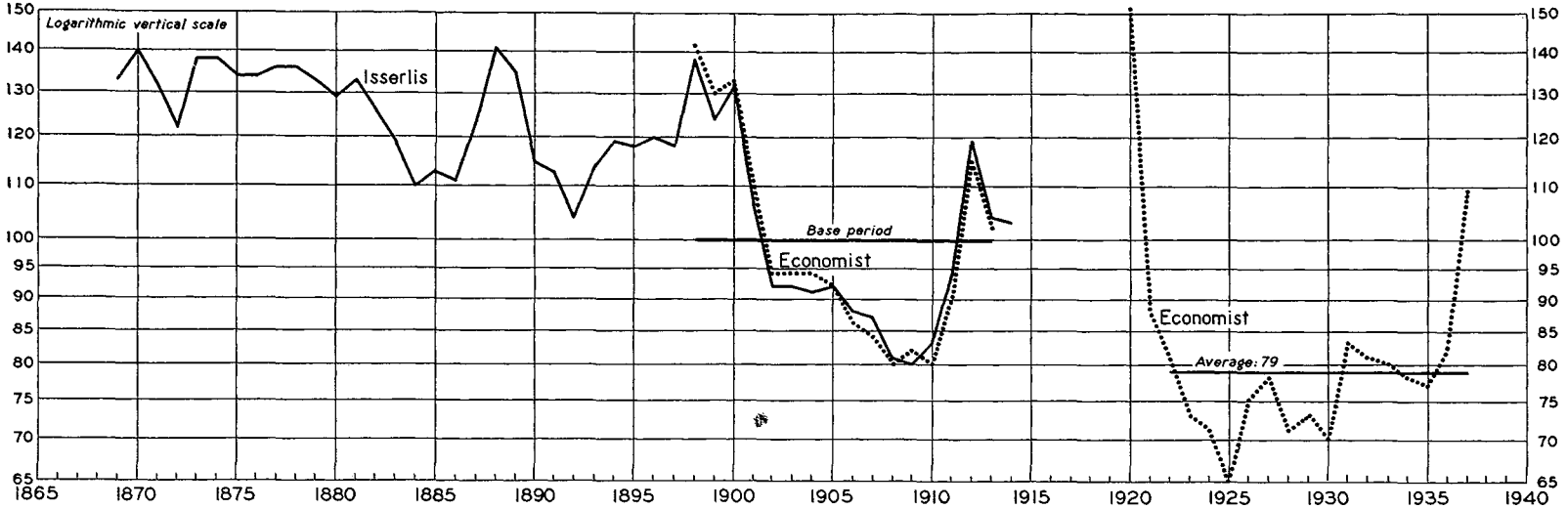
[b] Minimum rates adopted by Tramp Shipping Administrative Committee and scheme of co-operation placed in effect.

[c] Broomhall's data.

TABLE III (*Continued*).—OCEAN FREIGHT RATES ON WHEAT AND CORN TO EUROPE, MONTHLY AND ANNUAL AVERAGES FOR CROP YEARS 1922–23 TO 1937–38

Crop year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	LA PLATA DOWN RIVER TO UNITED KINGDOM AND CONTINENT												
1922-23	12.6	11.6	14.0	15.1	16.1	14.8	12.5	12.7	17.0	19.2	13.8	12.4	14.3
1923-24	11.6	11.6	10.5	10.7	12.4	15.1	17.2	16.6	16.0	16.3	14.0	12.4	13.7
1924-25	13.9	13.8	13.7	12.7	14.8	14.9	12.8	10.5	9.6	9.7	8.1	9.1	12.0
1925-26	11.0	8.2	9.3	11.5	12.8	10.4	8.1	8.7	10.9	10.6	11.8	16.6	10.9
1926-27	16.4	17.6	26.1	30.8	24.7	20.6	19.6	18.2	17.8	18.4	15.9	12.5	19.9
1927-28	15.2	13.5	12.8	15.4	15.6	14.4	11.9	13.0	14.6	13.9	12.8	13.8	13.9
1928-29	13.1	12.3	13.5	14.9	16.1	16.2	16.2	15.6	15.8	15.7	14.4	15.3	14.9
1929-30	13.5	10.2	8.1	7.9	8.4	8.4	6.8	6.4	8.1	6.7	6.3	9.0	8.3
1930-31	11.4	10.0	8.8	9.4	11.3	11.0	12.8	12.0	12.0	11.9	10.6	10.2	10.9
1931-32	10.9	10.0	9.0	8.0	7.3	7.9	8.1	8.2	8.3	7.5	6.4	6.3	8.2
1932-33	6.1	6.7	5.7	5.6	7.0	7.2	6.6	6.1	6.2	7.5	7.4	8.7	6.7
1933-34	8.5	7.5	8.0	9.7	10.5	10.1	10.2	9.5	9.5	9.2	10.0	9.8	9.4
1934-35	10.3	10.3	10.1	9.5	9.9	9.7	8.6[b]	8.8	9.6	10.3	10.4	10.5	9.8
1935-36	10.5	10.4	10.8	11.0	11.1	11.1	11.2	11.2	11.1	11.1	11.4	11.7	11.0
1936-37	13.0	13.7	14.4	14.1	18.9	21.5	16.6	17.0	21.4	20.7	21.4	21.3	17.8
1937-38	22.8	23.2	20.7	17.3	16.1	16.1	16.1	16.0	16.0	15.9	15.8	15.7	17.6
Average 1922-37	11.9	11.2	11.7	12.4	13.1	12.9	11.9	11.6	12.5	12.6	11.6	12.0	12.1
	AUSTRALIA TO UNITED KINGDOM AND CONTINENT												
1922-23	20.9	20.7	25.5	27.9	27.7	26.8	24.3	23.4	24.2	21.7	20.4	20.0	23.6
1923-24	19.8	21.1	22.4	22.9	23.2	25.2	26.7	24.6	19.9	18.7	18.2	18.8	21.8
1924-25	19.5	25.4	27.3	28.8	28.3	30.1	31.3	26.3	22.9	22.7	19.6	17.9	25.2
1925-26	22.8	25.8	25.8	25.5	27.3	25.7	19.7	16.7	16.5	17.8	16.3	25.5	22.3
1926-27	26.4	26.3	29.2	34.1	33.7	30.7	31.4	30.6	25.9	25.3	26.3	23.1	28.5
1927-28	21.8	24.7	25.1	24.7	24.5	22.7	20.6	22.1	24.4	23.3	22.9	21.8	23.2
1928-29	25.6	26.6	26.5	27.5	27.6	26.4	25.2	22.4	18.9	17.2	15.4	17.6	23.1
1929-30	19.1	20.0	19.6	16.6	16.3	16.0	14.0	13.6	15.5	16.0	17.1	16.8	16.7
1930-31	19.8	21.7	20.8	19.3	19.8	19.6	19.5	19.1	18.6	18.7	17.8	16.8	19.3
1931-32	16.9	14.3	14.4	14.5	13.1	12.5	12.8	13.8	13.5	11.8	10.4	9.9	13.2
1932-33	11.0	12.2	12.1	11.7	12.0	12.3	11.8	10.5	10.8	11.3	11.8	14.4	11.8
1933-34	14.2	14.2	14.6	16.7	17.5	16.9	16.7	15.4	15.5	16.1	16.3	16.4	15.9
1934-35	16.6	17.3	18.1	17.8	16.8	16.3	14.4	14.1	14.9[b]	15.5	16.0	16.3	16.2
1935-36	16.3	16.2	17.3	18.1	18.2	17.9	18.1	18.0	17.9	18.0	18.5	18.7	17.8
1936-37	19.4	19.9	20.2	20.6	28.0	28.9	27.0	27.6	33.0	32.2	32.2	30.8	26.6
1937-38	30.8	31.6	31.9	28.2	23.8	25.7	23.0	22.2	22.2	22.2	22.0	22.0	25.5
Average 1922-37	19.3	20.4	21.3	21.8	22.3	21.9	20.9	19.9	19.5	19.1	18.6	19.0	20.3

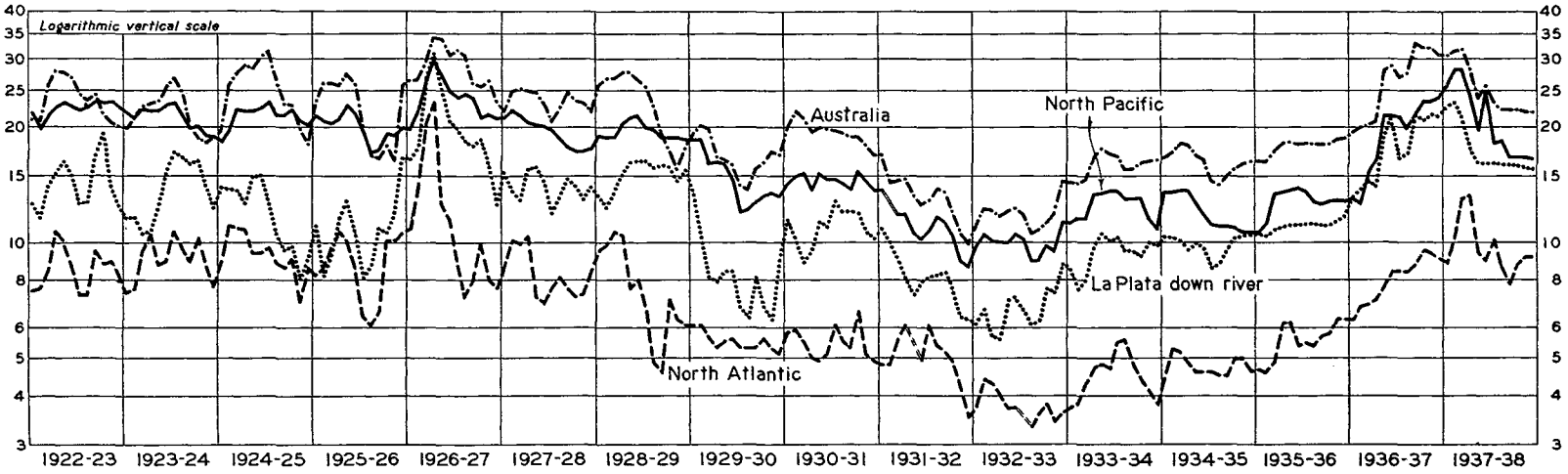
CHART 15.—DEFLATED INDEXES OF OCEAN FREIGHT RATES, 1869–1914 AND 1920–1937*



* Indexes used in Chart 4, "deflated" by dividing by Sauerbeck-Statist index of wholesale prices after its conversion to the common base, 1898–1913.

CHART 16.—OCEAN FREIGHT RATES ON WHEAT AND CORN TO EUROPE, MONTHLY, CROP YEARS 1922–23 TO 1937–38*

(U.S. cents per bushel)



* Data in Table III.

TABLE IV.—OCEAN FREIGHT RATES ON WHEAT AND CORN TO EUROPE, ANNUAL AVERAGES AND RANGE IN MONTHLY AVERAGES FOR CROP YEARS 1922–23 TO 1937–38*

(Cents per bushel)

Year August–July	Canada to U.K.			Northern Range (U.S.) to U.K.			New York to Liverpool[a]			North Pacific to U.K.		
	Average	Low	High	Average	Low	High	Average	Low	High	Average	Low	High
1922–23.....	9.2	7.5	11.6	8.0	6.9	10.1	5.5	4.3	8.4	22.2	19.7	23.3
1923–24.....	9.4	7.4	11.2	8.6	7.0	10.7	6.8	4.1	6.8	21.2	18.8	23.1
1924–25.....	9.4	7.0	11.0	8.8	7.2	9.7	6.3	4.6	8.7	21.3	18.4	23.2
1925–26.....	9.0	6.6	10.6	8.0	6.1	10.0	7.0	4.8	10.4	20.0	17.1	22.8
1926–27.....	12.0	7.6	23.1	12.1	7.2	21.2	9.7	4.6	22.0	23.9	19.7	29.8
1927–28.....	7.7	5.3	10.3	7.7	6.8	10.4	5.6	4.5	7.4	19.5	17.3	22.1
1928–29.....	8.5	5.3	10.6	9.1	6.8	11.7	6.1	4.5	9.5	19.6	18.5	21.5
1929–30.....	5.5	5.3	6.1	5.4	5.3	5.6	4.7	4.0	5.3	14.7	12.0	18.5
1930–31.....	5.6	4.9	6.6	5.4	4.9	6.1	4.6	4.6	4.9	14.5	13.7	15.3
1931–32.....	4.9	3.5	6.1	4.9	3.0	5.4	3.9	3.2	4.9	10.9	8.6	13.7
1932–33.....	4.0	3.4	4.4	3.7	3.0	4.8	3.3	3.1	3.9	10.0	9.0	11.2
1933–34.....	4.3	3.7	5.7	5.6	5.4	5.8	4.7	3.5	5.6	12.4	10.8	13.6
1934–35.....	4.9	4.4	5.3	...	...	...	4.6	4.5	4.7	12.0	10.6	13.6
1935–36.....	5.6	4.6	6.7	5.7	4.6	6.3	4.6	4.6	4.7	12.8	10.6	13.9
1936–37.....	7.9	6.3	9.6	8.2	6.3	9.3	...	...	...	19.4	12.6	23.7
1937–38.....	10.2	8.6	13.3	10.5	7.8	14.7	10.1	8.1	12.1	21.1	16.5	28.2

Year August–July	La Plata down river to U.K./Cont.			Australia to U.K./Cont.			Black Sea to Antwerp/Hamburg[b]			Karachi to U.K.	Gulf to U.K./Cont.[c]
	Average	Low	High	Average	Low	High	Average	Low	High	Average	Average
1922–23.....	14.3	11.6	19.2	23.6	20.0	27.9	...	...	...	15.4	11.0
1923–24.....	13.7	10.7	17.2	21.8	18.2	26.7	...	...	...	15.0	10.2
1924–25.....	12.0	8.1	14.9	25.2	17.9	31.3	...	...	...	14.7	11.3
1925–26.....	10.9	8.1	12.8	22.3	16.3	27.3	...	...	...	13.1	11.5
1926–27.....	19.9	12.5	30.8	28.5	23.1	34.1	...	...	...	15.8	10.3
1927–28.....	13.9	11.9	15.6	23.2	20.6	25.1	...	...	...	13.2	10.8
1928–29.....	14.9	12.3	16.2	23.1	15.4	27.6	...	...	...	13.1	10.6
1929–30.....	8.3	6.3	13.5	16.7	13.6	20.0	...	...	...	9.9	9.4
1930–31.....	10.9	8.8	12.8	19.3	16.8	21.7	7.1	6.7	7.6	12.5	7.3
1931–32.....	8.2	6.3	10.9	13.2	9.9	16.9	5.5	4.4	6.9	11.2	7.1
1932–33.....	6.7	5.6	8.7	11.8	10.5	14.4	4.8	4.3	6.3	...	5.2
1933–34.....	9.4	7.5	10.5	15.9	14.2	17.5	6.8	5.7	7.3	...	5.3
1934–35.....	9.8	8.6	10.5	16.2	14.1	18.1	6.5	6.1	7.0	...	...
1935–36.....	11.0	10.4	11.7	17.8	16.2	18.7	6.6	6.3	7.4	...	...
1936–37.....	17.8	13.0	21.5	26.6	19.4	33.0	11.0	8.4	12.8	20.6	13.6
1937–38.....	17.6	15.7	23.2	25.5	22.0	31.9	11.5	7.3	16.5	17.9	12.9

* Source note to Table III applies with exceptions noted below. "Low" and "High" refer to low and high monthly averages, not to the lowest or highest quotation for the month.

[a] Rate for parcels in liners.

[b] From *International Crop Report and Agricultural Statistics* throughout.

[c] Data prior to 1936 are from annual reports of the Chamber of Shipping of the United Kingdom. Broomhall data for 1936 and following are for berth parcels.

TABLE V.—SEASONAL INDEXES OF OCEAN FREIGHT RATES*

Month	*Economist* index					Grain freight rates			
	World	North America	South America	Australia	India	North Atlantic	North Pacific	Argentina	Australia
Aug.	96.2	94.3	95.8	95.6	96.6	94.4	97.1	98.3	95.1
Sept.	98.5	98.4	98.1	101.7	99.5	102.8	99.4	92.6	100.5
Oct.	104.0	104.9	99.6	104.8	100.9	114.1	101.8	96.7	104.9
Nov.	105.9	107.7	101.3	108.2	104.4	121.1	104.7	102.5	107.4
Dec.	104.0	103.5	102.8	110.5	102.9	104.2	106.5	108.3	109.9
Jan.	102.6	102.1	101.8	107.1	101.6	97.2	104.7	106.6	107.9
Feb.	101.1	101.1	100.3	102.7	101.2	98.6	101.2	98.3	103.0
Mar.	99.4	99.8	98.8	97.4	100.6	90.1	97.6	95.9	98.0
Apr.	99.0	101.2	101.4	95.3	98.8	91.5	97.1	103.3	96.1
May	97.7	100.4	101.8	93.6	98.8	101.4	98.2	104.1	94.1
June	95.6	93.8	99.1	90.7	97.0	93.0	95.9	95.9	91.6
July	95.9	93.0	99.0	92.9	97.5	91.5	95.3	99.2	93.6

* Averages for identical months in 15 crop years 1922–23 to 1936–37, adjusted to show percentages of corresponding 15-year averages. Basic data from the *Economist*, and Table III above.

TABLE VI.—INDEXES OF WORLD TRADE AND SHIPPING ACTIVITY, 1925 AND 1929–37*

(1929 = 100)

Year	Quantum of world trade[a]					Net tonnage ships cleared in 42 countries	Active tonnage in world merchant marine[b]
	Year	Jan.–Mar.	Apr.–June	July–Sept.	Oct.–Dec.		
1925	83.5[c]	..	..	..	...	79	90.0
1929	100.0	97	99	98	106	100	100.0
1930	93.0	95	93	88	96	99	99.0
1931	85.5	85	84	82	90	91	92.0
1932	74.5	76	73	68	79	85	86.0
1933	75.5	73	72	75	80	88	87.0
1934	78.0	75	76	75	81	91	90.0
1935	82.0	79	81	80	88	94	92.0
1936	85.5	83	83	84	91	95	95.0
1937	97.0	92	99	96	100	98	99.5
1938	....	88	..	..	...	..	....

* League of Nations, Economic Intelligence Service, *Monthly Bulletin of Statistics* and *World Production and Prices, 1936–37*, p. 74, and *ibid., 1937–38*, p. 77.

[a] Based on values in gold divided by prices in gold; data for 75 countries until March 1937, then for 76 countries because of the separation of Burma from India.

[b] As of June 30.

[c] Corresponding averages for 1926, 1927, and 1928 are 86.0, 92.5, and 96.0.