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THE ORGANIZATION OF
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PREFACE.

This monograph is the result of two lines of work. From 1899 to 1901 the author assisted Professor Emory R. Johnson with the economic investigations which he, as a member of the Isthmian Canal Commission, made to ascertain the relation of the proposed canal to the industries and commerce of the United States. This investigation required a minute study of the commercial effects which this waterway would have upon the management of the maritime trade of the United States, and upon much of the commerce of Europe with Pacific countries. This subject proved so interesting that the author continued the study of the question for two years subsequent to 1901, one year being spent in Europe and the other at the University of Pennsylvania.

The monograph, a result of this study, has been written with reference to the general reading public, and to high school and college students of commerce. For two years the author has conducted a course in the Wharton School of Finance and Commerce of the University of Pennsylvania dealing with the subjects considered in the monograph.

The author desires to acknowledge his indebtedness to Professor Emory R. Johnson, of the University of Pennsylvania, whose counsel has been of assistance throughout the preparation of the volume; and to Mr. Frank L. Neall, senior member of the firm of Peter Wright & Sons, of
Preface.

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Wharton School, University of Pennsylvania,
March 1, 1905.
CHAPTER I.

INTRODUCTION.

Character and Importance of Ocean Commerce.

If the world's trade were divided into two classes, on the basis of distance, it would be found that land traffic was pre-eminently the short-distance trade and that the ocean was the route used mainly by the long-distance trade. Owing to the ease of water transportation, men seek out the ocean routes for freight whenever possible, and, as from any sea all seas may be reached, the average length of water routes is several times as great as the land routes.

The ocean carrying trade is chiefly international trade, of which it comprises the most important part. The ocean is the great international highway, and, in the sense of ownership, the only international highway. Many land routes carry commodities that cross international boundaries, but the routes, like all the valuable land in the world, are within the jurisdiction of some particular country, and, further, are the property of particular persons or groups of persons. The ocean is more international because it is the property of all, and open and free to all. No nation claims more than three miles from its coast and beyond that any man from any nation may sail his ship where he will over the common ocean, which covers three-fourths of the surface of the globe and washes the shores of all important countries.

Besides being large and free the ocean furnishes the cheapest of all forms of transportation, and with these advantages it is natural that maritime commerce should be by far the greater element in international exchanges, as well as a very important part of many domestic trades.
While the ocean is the dominant factor in foreign trade, the relative importance of foreign trade itself must not be overestimated. In all the leading countries it is of secondary importance to the domestic trade. In Great Britain, with an insular position, and the highest degree of industrial development yet attained, it is estimated at one-third of the whole, and in the United States the vast foreign trade furnishes less than a tenth of the total exchanges of the country. The increase of local industries is likely to produce further decline in foreign trade, for it naturally follows upon the growth of manufactures within the customs' confines that there is a smaller proportion of human wants that remain to be supplied by foreign trade. But this fact of proportional decrease of foreign trade should not be allowed to obscure the more important fact that, while foreign trade may have a smaller part proportionally, it is growing rapidly in value, still faster in volume and promises to continue that growth in both of these particulars.

The actual amount of foreign trade is in itself enormous, and it is predominantly ocean commerce. In the case of Great Britain all of it goes by sea. In the United States about nineteen-twentieths is sea-borne. On the continent of Europe land boundaries are long, and the overland trade is important, but in no case, with the exceptions of the inland countries and the semi-inland like Austro-Hungary and the Balkan States, does it equal the over-sea trade.

Ocean commerce has a strong hold on the future because of the importance of the articles comprising it. They are essential to civilized life. The rising standard of life of civilized man makes greater dependence upon ocean commerce, because nearly every individual in the community has in his daily consumption some commodity or commodities which have come from over sea, and this consumption of foreign goods goes on now, not in the houses of the rich only, but to considerable extent in the cottages of the laborer throughout America and to a lesser degree in Europe also. Even the barbarous and semi-savage peoples have some
dependence upon commerce and almost invariably upon ocean commerce, because, with a practical absence of local manufactures they have come to depend upon the looms of Western civilization for part of their clothing, and parts of their food are sometimes obtained from over sea.

The commodities of ocean commerce are often the necessities. It is by no means always the case that ocean commerce is in necessities only. But if it is not, it is usually in commodities that are necessary to the maintenance of those habits of living that combine to make the standard of life of civilized man. Indeed, this rising standard of life is almost or quite a necessary accompaniment of or perhaps a part of the progress of civilization itself. The materials to support this rising standard are supplied by ocean commerce, which thus has, in the deeply fixed and increasing wants of both civilized and semi-civilized man, an explanation of its steady growth.

While the freights carried upon the ocean are a part of the daily round of business, and the daily life of peoples, the ocean remains a world apart. Its plants and animals, its odors and climate, differ from those of the land. The men who go down to the sea in ships affect a life different from that of the landsmen, and have their different modes of locomotion. The student of transportation finds that the rules and concepts that may be applied to his science by land, do not always apply to transportation by sea.

The most pronounced and far-reaching difference between ocean transportation and land transportation arises from the fact that the ocean is a highway without the efforts of man, and the navigator has but to provide his vehicle. By land roads must be made even for a pack train and with the railroad, the modern type of land transportation, the building of the roadway is much the greater part of the necessary equipment. For carrying upon the ocean the completion of the ship is all that is necessary, and if she be a sailer the winds of Providence will drive her into all seas and around the world. This fundamental difference in the ocean trade
produces many peculiarities unknown upon the land. Because of the smaller capital that is required upon the ocean, we find more individuals and groups of individuals acting independently than we do in the railway traffic of the land. The single vessel operated as a unit has as much independence as the great line of steamers, and in some respects more independence. Both are alike free to pass over the high seas, to take advantage of the government surveys thereupon and to enter the harbors that connect with the land. The activities involved in this part of the world's transportation furnish the questions to be discussed in this monograph: the work and types of the individual ships and the line of ships; the routes of the ocean and the care exercised upon them by governments; and the construction, management and activities of the harbor by which the ship reaches the land and finally completes her work.
PART I.—Traffic.

CHAPTER II.

THE CHARTER TRAFFIC.

From the standpoint of historical development, and also from the simplicity of the service rendered, the first subject to take up in a study of ocean traffic is the operation of the single vessel that is managed as an independent unit. Such vessels do not attract much attention. They come and go unnoticed in news columns of the public press unless per-chance they meet with accident, and the reading and travelling layman does not often have his attention called to them. They do not carry his mail, his baggage or his person. These choice and exacting services are rendered by the aristocrats of the deep, the great liners, whose names and performances and owning companies are known by tens of thousands of people scattered over all parts of the reading world. The advertisements of these ships, photographs included, reach the inland hamlets of the five continents, and their movements are heralded as news by numerous journals. They are very important. They carry passengers, mail and much freight with speed, regularity and high cost, and for that reason they do not and cannot do all of the ocean's work. The single ship gives a cheaper service and there is therefore a large part of the world's ocean carrying left for it to do, and it is done with little comment or public notice.

If every port in the world had a large trade, made up of a wide variety of articles shipped in fairly even quantities throughout the year, there would probably be no vessels operated singly. With such an even and dependable commerce
ships could be organized into lines which would handle the traffic in regularly recurring shiploads. But those conditions of evenness and variety and dependableness do not exist. The nearest approach is in the great commercial ports such as New York, Liverpool, London, Hamburg. In these ports the per cent. of traffic in the line vessels is increasing and that in independent vessels is decreasing. One cannot generalize on world commerce from the world's great ports, for they are few in number and the small ones are very numerous.

During the decades that have made up the railway era many new lands have been opened to commerce, new products introduced, new ports established. In the vast majority of the many hundreds of ports upon the world ocean, the bulk of the commerce is limited to a very small variety of articles, often a single article, and that again is often shipped during only a part of the year. It is most likely to be a raw product, cheap and heavy, which must be carried at as low a rate as possible. This then is not work that can be done by the carefully organized line of vessels. This simpler, unorganized and cheaper service falls to the independent vessel that is for hire, and works as a unit wherever there is work to be done. These vessels are built and owned for just this work. The contract that the lessor and lessee sign when the vessel is hired is called a charter, and the ship is spoken of as being chartered, but if regularly for hire she is commonly called a "tramp." Such vessels carry a large share of the world's trade, and are utilized for any freight that may go in shipload lots. For the carrying of raw materials, and cheap, heavy or bulky goods, the regularity and promptness of the line vessel are not often required. Cheapness is the prime factor. This is true of a long list of commodities, of which grain is the most important; then come minerals, ores, coal, nitrate of soda, phosphate rock, salt, flint, chalk, china clay, sulphur and case petroleum; vegetable products are lumber, raw sugar, raw cotton, hemp and jute. Sometimes heavy manufactures, as
steel rails, locomotives and machinery are shipped in quantities large enough to make full cargoes.

As the prime requisite of the charter traffic is cheapness with safety, the combined efforts of the marine architect and the shipowner have been toward economy in cost of operation, while the managers of liners are often striving for regularity and speed regardless of cost. The economies of the tramp steamer fall under three classes:

1. Construction.
3. Management.

1. The tramp steamer is built on a sort of general average model to fit her for as many kinds of service as possible and to go into all oceans. The first object of the designer is to fit her for holding much cargo rather than making high speed. These two diverse objects in design give a great difference in the result. The sharp bow and curved ribs of the fast line steamer are replaced in the tramp by a blunt bow, a flat bottom and straight sides, producing in her model a strong resemblance to the cubical form of a section of a squared log.\(^1\) The keel of romance is replaced by a steel bottom as flat as the floor of a warehouse. The keel, as a center of construction, is inside rather than outside the line of the hull, enabling the ship to store freight in every foot of her depth. To prevent the rolling of the vessel, this freighter has bilge keels—fin-like strips of metal rivetted to her hull near the blunt angles between the bottom and the sides. With her flat bottom she can cross bars to enter the shallow harbors of any ocean, and engage in almost any trade. It need scarcely be stated that the carrying of passengers is not provided for in the building of these

\(^1\)The ship builders' term, "block coefficient of fineness," shows the per cent. that the ship's displacement is of the content of a circumscribing parallelopipedon of the following dimensions: length on the load line, draft and breadth. This coefficient for an ocean greyhound is about sixty-two per cent.; for a nine-knot tramp steamer about eighty per cent.
freight ships. The line vessels are usually built with some peculiarities of design fitting them for the particular trade of that line, and they lack the adjustability and the cosmopolitanism of the tramp.

The labor of handling ballast for the modern tramp is obviated by having in the bottom of the ship water-ballast compartments, which can be filled and emptied by machinery in a very short time, and while cargo is being received or discharged.

2. The economies of navigation group themselves around the central question of speed. It is a fact in mechanical engineering that high speed is attained at much greater expenditure of power per unit of speed than low speed. In automobile tests a four horse-power car has made fifteen miles per hour, but seventy horse-power was required for sixty miles per hour. The increase in fuel required is in a similarly high ratio, sometimes approaching in steamships the square of increase in knots per hour. The fast steamer, in addition to a form that does not make resistance in passing through the water, must have enormous engines and heavy coal consumption, and larger crew to handle it. These factors mean more expensive construction, less space for freight because of engine room, coal storage and crew quarters; more expensive operation because of greater wear of machinery, and costs of coal and crew. The advantage side of the account arises from the fact that there are more voyages in a year and consequent greater carrying power, and because of the speed higher freight rates may be charged. But at twenty, twenty-two or twenty-four knots per hour the cost of this service is more than traffic in raw materials can stand.

At the other extreme of the mechanical question is the fact that low speeds cost a surprisingly small sum. A steamer could make four knots per hour with modern engines at a very small percentage of the cost required for twenty knots, but she would make such a small number of voyages per year and command such low freights that it, like the
high speeds, would not be profitable for freight carrying. For freight carrying there is a point of equilibrium in speed above which additional speed costs more in outlay than it adds in income, and below which a lessened speed costs more in loss of earning power than it saves in operating expenses. This point of equilibrium rises with every improvement in engine construction. At present the usual speed for tramp steamers is about nine knots per hour, and it may be confidently expected to increase, some of the newest steamers being already somewhat above it.

These comparisons between the chartered vessels and the liner may be brought out more clearly by the examination of the actual facts of operation of typical vessels of each class.

The "Baron Eldon" is a British tramp steamer, built at Sunderland (1899) for general work. The gross tonnage is 3,705, net tonnage, 2,385, and the crew, 29 men, all told. Her dead weight capacity is 6,100 tons, and she has actually carried as cargo 5,360 tons of coal on one voyage and on another 5,550 tons of rice. Her coal consumption at nine knots per hour is 22 tons per day. The "Kaiser Wilhelm II" and the "Cedric" are two of the most modern of ocean giants, and built for the North Atlantic line traffic. The "Cedric" is not a racer, however, and has a displacement of 37,870 tons, will carry 18,400 tons of freight, 3,000 passengers, a crew of 350 and has a coal consumption of 260 tons per day at 17 knots per hour. The "Kaiser Wilhelm II," built to break all speed records, has a displacement of 26,000 tons, will carry 20,000 tons of freight, 1,888 passengers and has a crew of 600, with a coal consumption of 750 tons per day at 24 knots per hour. She could beat the "Cedric" by about two days in a voyage from New York to Liverpool, but to make this gain her crew is nearly doubled and the daily coal consumption nearly trebled. The coal consumed by the "Kaiser Wilhelm II" in one day would run the "Baron Eldon," with more than one-fourth as much freight and one-twentieth the crew, for thirty-four days,
and carry her from New York to Liverpool and back to New Orleans. In this comparison the fact should not be overlooked that the "Kaiser Wilhelm" carries 1,888 passengers. The "Baron Eldon" carries none, but the mere addition of staterooms and other passenger accommodation would not greatly reduce her freight capacity. The main difficulty lies in the fact that passengers do not desire so slow a vessel.

3. The economies of management are possible because of the lack of dependence upon other ships and because the work is always of a temporary nature. The tramp has no schedule, and is free from the exactions of any particular round of engagements or the disadvantages of any particular route. She undergoes no unnecessary dallying at ports waiting for sailing day. The coming of passengers, the arrival of mails, long time contracts to carry certain freight, none of these handicaps of the liner affect her movements. As soon as her special cargo is loaded she is dispatched without loss of time. No further time is lost in making unprofitable calls at intermediate ports, and as soon as her destination is reached she is free to unload and seek further employment. No announced schedule requires her to be run, half empty, over a certain route or to lie in port awaiting freight as advertised. She has the freedom of the seas to seek freight in any port in any continent, to take advantage of any local condition, any single shipment, that may appear to her advantage. If a bad harvest in America cuts off the grain export, the tramp that had been working in the North Atlantic may seek freights at the mouth of the Danube or South Russia or in the Indian Ocean or in the East Indies; wherever freight is offering, there may she go.

As there is no effort to hold patrons and develop a clientele, there is little expensive advertising done, and the simplicity of the cargoes requires a minimum of office force.

The business of managing this charter traffic is one of the most characteristic developments of the world commerce of the present era, the epoch of the ocean cable. Several thou-
sands of ships are scattered over the oceans of the commercial world, engaged in a traffic that is supplied by hundreds of ports in all climes and all continents, from Greenland to New Zealand. Every day scores or even hundreds of these independent vessels are seeking freight to carry. It is a complicated world puzzle to bring together the ships and the freight so that the one may be most profitably employed, and the other most economically carried. The work is done by the ship brokers and steamship agents, who receive their pay in the form of a commission or brokerage, a percentage on the transaction. In all shipowning countries these firms have their headquarters, and each one has agents and "correspondents" in many other countries, so that among them all they make a complicated web that reaches to all cities of commercial importance. The whole is so bound together by telegraph and cable that, like a spider's web, if touched by anything of importance at any point the whole structure vibrates with the news. The departure of a steamer loaded with sugar from a small port in Java or ore from Chile, is reported by telegraph in Europe and America. There is practically a complete record of all vessel movements published daily by Lloyds, the great British firm of underwriters. The men engaged in world commerce have, through their world telegraph, a world community of information.

The method of securing cargoes for ships, and ships for cargoes, is best described by the relation of some common incidents of every-day occurrence. A Liverpool shipowner had a steamer in the Mediterranean loaded with jute, which she was carrying from Calcutta to Dundee. The owner desired another cargo for the steamer at the end of the voyage. Knowing that there was nothing in Dundee he wrote to his agent in Newcastle, and himself made inquiries among the shippers of Liverpool. The Newcastle man suggested a cargo of coal to Hamburg, but it was declined, and he sought the aid of his correspondent in Dumbarton, but the iron trade of Dumbarton was not promising. Meanwhile
The days were passing, the vessel had reached Dundee and there was nothing provided for her. The Liverpool man was himself the correspondent of a London firm of ship brokers, who telegraphed him at this juncture that they had offers of a shipment of German coke to go from Rotterdam to Santa Rosalia, Lower California, and of another of Cardiff coal for Buenos Ayres. The first the shipowner declined, as being only suitable for a sailing vessel, and because of news from across the Atlantic he allowed the second to go to a steamer then lying at Antwerp. Three days before this he had cabled to his New York correspondent a description of the steamer, and offering her services to carry grain to the United Kingdom at a certain rate and saying that she could load after a certain date or between certain dates. As New York freight was dull, the firm in that city telegraphed their Boston and Philadelphia agencies. At the same time a Chicago grain exporter decided to export 150,000 bushels of corn, and telegraphed to his agents in New York and Philadelphia to secure offers of transportation. In the shipping exchanges of those cities the representatives of the Chicago exporter and the Liverpool shipowner bargained face to face. Offers were, however, made at the same rate by the New York representative of the owner of a ship then off Rio Janeiro with a cargo of Chilean nitrate bound for New York, and also by a Philadelphia broker who sought future employment for a vessel then in the Red Sea with a cargo of Java sugar for Philadelphia. The Liverpool owner was informed of this competition, and still having nothing for his steamer he cabled that he would charter his ship for threepence (6 cents) less per ton or for the same rate he would take freight to continental ports as far as Copenhagen. He added to his cablegram the word "range," which means in cable code that he would send the ship to the Delaware Bay with the understanding that she might be ordered to New York, Philadelphia, Baltimore or Norfolk to load. This offer secured the freight, for the representatives of the sugar ship and the nitrate ship
having more time at their disposal preferred to take chances rather than cut rates. The steamer, which, pending negotiations, was still lying at Dundee, proceeded to Newcastle to coal, and departed thence in ballast for the Delaware. Meanwhile the Chicago exporter found that railroad conditions made Norfolk the most convenient port to deliver his corn at the appointed time. When the steamer reached the Delaware Breakwater (just inside Cape Henlopen) the captain received telegraphic instructions to go to Norfolk. There he loaded a full cargo of corn and, as the final destination of the corn was still undecided, he sailed to the Channel port of Falmouth for orders. There he was instructed by signal to proceed to Copenhagen, where the corn was discharged and the vessel was ready for another contract which the agents had been trying to arrange since the day they learned of the final destination of the corn cargo.

That operation is typical of scores that are enacted daily. In almost every exchange of ideas connected therewith, the ocean cable or land telegraph plays an important part. The manager of a merchant fleet may control his ships almost as perfectly from his office in London, Liverpool, Hamburg or New York as does a chess player the men on a board before him. There are signal stations over the greater part of the world where the captain of a ship can receive cabled instructions from the central office. It is common to send vessels to sea with the final destination unknown, the captain reporting at some prearranged signal station where he receives further instructions. This is true of vessels with cargo en route to destination, or of vessels without cargo and seeking it. Nearly all of the grain ships going from the Pacific Coast of the United States to the United Kingdom sail to Cork, southwest Ireland, "for orders” announcing the final destination. Whether the cargo is to be finally consigned to a port in Britain or any one of four or five continental countries is decided by the grain shipper according to the latest market conditions. Vessels bound for northwest Europe, via Suez, often receive final orders at Gibraltar or
Falmouth or Lizard's Point. If coming up the South Atlantic, orders are received at Cape Verde or Madeira Islands. A typical case is that of a vessel, which, lying idle at Singapore, was ordered to proceed for orders to a signal station in Lower Burmah. While en route her owner in London sought cargo. By having the vessel go to Lower Burmah he had the possibility of getting a cargo of rice from Rangoon, or proceeding to Calcutta if cargo offered there. By ordering his ships from station to station the owner or manager on the shores of the North Atlantic keeps in touch with his scattered fleet in the Indian Ocean, Eastern Asia, Australia or the East Indies almost as easily as if they were a mile or two away in the harbor of his own city. Practically all of the voyages referred to, or to be referred to in this chapter, were arranged in part or entirely from the home ports on the North Atlantic, usually the ports of Great Britain. When the vessel is at sea she is out of the reach of her owner's telegrams, but when she touches land she is in the vast majority of cases in contact with some part of this world mesh of telegraph wires and cables. The map of ocean cables shows many parts of the world to be devoid of any connection, but a map of important ocean trade routes will show that these routes are all touched by cable at many points. In skirting the shores of each of the five continents the navigator is never far from a connection with the world cables. It is so also in Australia, the West and East Indies and the Philippines, and the more important islands of both Atlantic and Pacific are also connected. There is a vast stretch in the Central and Western Pacific, between Hawaii and Java, where there are no cables, but it is an unfrequented part of the world and crossed by no route of importance.

Science holds out the possibility that the wireless telegraph may place the owner in constant communication with his ship in all places and under all normal conditions.

The tramp vessel has earned the name by her absolute freedom of restraint to particular localities, routes or trades. In the constant search for freight she may traverse every
The Charter Traffic.

sea, and in the course of years often circumnavigates the globe many times. This roving tendency is increased by the fact that so much of the work done by these vessels is of a seasonal nature, a certain region shipping its product at a certain time only. California wheat is ready to ship at a different season from that of the Argentine Republic or India. The corn of the Mississippi Valley is ready to ship later than the wheat from the same region. There is a different sugar season for Hawaii, Peru, Java and Germany. There is a cotton season and a nitrate season, the latter being decided by the greater demand for nitrate fertilizers in the spring planting time of the northern hemisphere.

The seasonal nature of the traffic adds to the complexity of the business of ship management. The shipowner has to keep in mind not only the conditions of the contract he is making, but also the prospects ahead of the ship when she must again seek cargo. It is like a game of chess, in that each move must be made with regard to succeeding moves. The shipowner is glad to arrange a voyage that will release the ship in a good location to secure freight, and loath to send her to regions that are devoid of freight, and rates are made accordingly. A cargo of lumber would be taken at a lower rate to New Caledonia, with its export of ores, than to some coral isle in the mid-Pacific with no export but a few cocoa nuts. Thus the possibilities of two or even three voyages enter into the decision of the rates for one. The manager of vessels that happened to be in India or Java or South America would give, under usual conditions, a relatively more favorable rate for a full cargo to New York than to London, because he is reasonably sure of getting a profitable freight cargo away from an American port, and an unprofitable coal or ballast cargo away from Great Britain. As a result of judgments of this character steamers are sometimes started upon a chain of voyages requiring months to complete. For example, a man in London may have an opportunity to secure a cargo of goods from Liverpool to China, and he takes it because he thinks that by the time his
ship has reached China he can arrange for a cargo of Java sugar to New York or Philadelphia, and from that point he can get grain back to Liverpool or London; or the same man might send his ship from London out with a cargo to Australia, because she could there get a cargo of coal and take it over to Chile in season to secure a cargo of nitrate for a European or American port.

The tendency of the tramp steamer to rove is intensified by the fact that none of the world’s great trade routes has equal amounts of freight moving along it in both directions. North America sends across the North Atlantic more than twice as many tons of freight as Europe sends back. China and Japan import twice or more than twice as much (in bulk) as they export, and the Dutch East Indies, the west coast of South America and the Pacific Coast of the United States all export more than they import. As a consequence the tramp vessel cannot expect to secure cargo both ways and regularly run back and forth on the same route. Ordinarily the tramp must expect, if carrying a profitable cargo, to pass over a certain route in a certain direction, the direction of heaviest freight movement. The ideal of the manager is, therefore, to have his ship always discharge one cargo at the profitable or surplus end of another trade route. This is clearly impossible. The world’s freight cannot be carried without sending vessels to places where there is no return cargo. The fewer the voyages of this character, the greater is the profit and skill of the manager. But voyages without cargo must be taken even under the most careful management.

Lacking cargo the vessel must take ballast to steady her, and for this cause thousands of tons of useless sand, earth and stone are carried from country to country. But rather than take ballast for nothing the tramp vessel can afford to carry bulky cargo very cheaply, so it happens that coal and sometimes ores are carried practically as ballast substitutes, and at, or even less than, the actual cost of running the ship. The voyage must be made to secure profitable cargo at the
other end, and the cheap coal freight is that much clear gain. Shipowners are sometimes compelled to send vessels from England to the Pacific Coast of the United States with no choice but to carry sand or coal, and with plenty of competition for the coal. Under these conditions the product of the Welsh mines has been carried from Cardiff to San Francisco for eight shillings a ton, while the return cargo of wheat paid thirty-five or forty, or fifty or more shillings a ton, and gave the shipowner his profit.

The distribution of coal by ocean carriage may, in most cases, be considered a by-product of the charter traffic. There are some cases where coal is carried short distances in lines of vessels especially built for the purpose, but this represents but a small proportion of the total coal carriage. From the consideration of the by-product phase of the carrying trade it is evident that nations are in the best position to export their products cheaply when they import a greater quantity of merchandise than they export, for there is then competition among the shipowners to get the outgoing freight. For this reason the greatest coal exporter is Great Britain, the greatest importer of bulky freight. Next, in respect of the wide distribution of this product, come Australia and Japan, both fourth-rate coal producers, but countries whose imports are more bulky though less valuable than their exports. These countries are able to export coal widely, yet in none of them is coal so abundant or cheap as in the United States. The United States has not become an important coal exporter, except to adjacent countries, because the heavy exports of raw materials have employed more shipping than our imports required, so vessels come to us in ballast, and a ship that carries coal from an American port must usually return in ballast, making it necessary for the coal freight to pay for both voyages. This cannot be done, because the somewhat more expensive British coal is carried at very low rates as ballast cargo and undersells the American in most foreign ports. The American export of coal is limited almost entirely to Canada and Mexico and to the
West Indies, whence we are importing iron ore, sugar and woods, all of them bulky articles, and the outgoing vessels carry the coal. In contrast to this British coal goes more than half way round the world.

Another factor which the manager of chartered vessels must consider is the price of coal, which if imported varies exceedingly, being affected by the nearness of the port in question to a good supply of outgoing cargo for the coal-carrying ships. A recent schedule of prices of Cardiff coal shows that it is lower (twenty-two shillings per ton) at Constantinople than at Madeira Islands (twenty-five shillings and sixpence) because the Black Sea offers abundant outgoing cargo and the Madeira Islands do not. The working of this principle gives high-priced coal in remote situations, as at isolated and unproductive islands in mid-ocean. Exceptions to this rule are found where there is export cargo, as in Hawaii with sugar and in New Caledonia with ores to export, but in Tahiti, Samoa, Midway Island, Guam, the Aleutians, St. Helena, St. Vincent (Cape Verde) and in most other oceanic islands coal must continue to be high in price if taken there at all. This question will be taken up more fully in the chapter on coaling stations.

The successful manager of a fleet of tramp steamers must be an astute student of commercial geography, and have a view of the entire world. His business demands a knowledge of the commercial condition and requirements of every important country, and the crop conditions and crop prospects of the leading producing regions. This information is given by special reporters and published in the commercial press, where it becomes the basis of the grain speculators’ actions in the exchanges, and at the same time the guide to the shipowner in the disposition of his fleet. In addition to watching the world’s crops, he must also watch the world’s ships. To do this requires a skillfully kept bureau of information with elaborate catalogues keeping track of hundreds or thousands of ships. They must be watched, because it would be a calamity to all owners concerned if twenty tramps
should congregate in a port with cargo for ten, and it would be a successful stroke to be the owner of one of five that had a temporary monopoly of the traffic in the same port.

On the basis of this knowledge of freight and ships the manager must predict the future, place his ships accordingly, and thus stake his capital on his prediction. Sometimes the best foresight cannot prevent expensive mistakes. In 1901 there were glowing prospects of a large wheat crop in Australia and a heavy surplus for export. This promised employment for scores of vessels, and shipowners in America and Europe sought opportunities to get their vessels to Australia. Many of them accepted cheap freights or small cargoes out, depending upon the return cargo of wheat for the profit. The vessels were started before the wheat was harvested because the first vessels there would secure the freight. During the forty-five to sixty days necessary for these vessels to reach Australia the withering winds from the desert interior of that continent had blasted the wheat crop so that there was none to export. The shipowners had played and lost. Their ships were in Australian ports with nothing to do and each ship costing many, sometimes even hundreds of dollars a day. They had to be sent elsewhere seeking cargo. Some went to Java for sugar, some to Burmah for rice, some to India for jute or wheat, some to Chile for nitrate, some to Hawaii for sugar, and some steamers even were compelled to go to San Francisco and take wheat for the long and expensive voyage around South America—a traffic which before that time had been almost exclusively carried by sailing vessels and one in which steamers had no chance whatever of making profit.
CHAPTER III.

LINE TRAFFIC.

The chartered vessel, whether sail or steam, renders a cheap, safe service, but it is also slow and uncertain, and cannot meet all the requirements of modern commerce. It is suited to the carriage of raw materials, but rarely for manufactures, and this is an age of manufacturing. The raw materials carried by charter are often returned in manufactured form to the country of their origin and are usually transported in line steamers which sail on a schedule, enabling the importer to depend upon certain and prompt delivery at a date that can be approximately known in advance. The parts of modern ocean commerce requiring especial attention, the exchanges of articles of high value per ton, require, because of that value, the more dependable and expensive service of the line vessel.

The regular service in its turn stimulates trade by its regularity, and is a necessary part of the commerce of highly civilized states. Passengers cannot make their arrangements to sail on vessels whose time of departure is uncertain. Like the mails, the passenger traffic requires a definite schedule of sailings, which must be made out months in advance, and announcement made of the day and hour of sailing. Certain classes of valuable freight are scarcely less exacting and there are many lines of vessels carrying freight only that are made to follow an advertised schedule almost as punctually as do the passenger lines.

The distinction between line traffic and charter traffic is in some cases hard to point out. The difference between the work of the best trans-Atlantic liners and that of a typical tramp steamer or sailing vessel is unmistakable, but there is a point where the two kinds of traffic approach each other closely and, from the standpoint of the vessel, there are many
cases in which the distinction cannot be drawn at all, because many vessels pass repeatedly from one service to the other. This transition service is best explained by describing the methods of operating some of the cheaper all-freight lines.

With these, as all other lines, the amount of freight to be carried fluctuates, and the company will often own only enough vessels to attend to a sure minimum of business, and when temporary increase of traffic comes the managers turn to the ship market for additional vessels to be taken on time charter and operated in the line service so long as it seems expedient to do so. When trade decreases the charters of these vessels are allowed to lapse and the fleet is reduced. In this work steamers are often chartered for a year or even two years if rates promise, in the opinion of the charterer, to be steadily rising. Vessels are also taken into the line service for only a single voyage, particularly where there is much more traffic one way than the other. It is common for some of the lines regularly carrying freight from New York to Australia to charter vessels for the out voyage only. On this route returning freight is so scarce that the vessels owned by the companies often become tramps or are "put upon the berth" at the end of the voyage, and work their way back to New York by whatever indirect route offers the best chance of earning freights. In the trade between New York and China similar freight conditions prevail, and it is a common, almost a regular, occurrence for some of the companies operating steamship lines in that trade to announce the date of a steamer's sailing when they cannot give her name, because they have not yet chartered her. Any good tramp steamer may be secured for the assignment at the latest available date.

This elasticity of service is not possible with the lines having passenger service, specialized freight traffic and vessels especially adapted to the trade and built for it. A fleet of such vessels cannot be enlarged by chartering at will.

Another confusion in traffic distinctions is the berth traffic, which will be more fully described in the chapter on rates.
It is really a hybrid between charter and line service, in that a vessel which may have discharged either line or charter cargo is loaded with many consignments, like a liner; but dispatched for one irregular voyage only, like a tramp. When such a vessel is loading she is said to be "put upon the berth."

Despite this traffic of uncertain qualities there is a vast line traffic having pronounced differences from the charter traffic. From the standpoint of traffic these differences may be summarized in the two words, regularity and speed, or in two others, increased efficiency.

The high efficiency of the best modern lines is the slowly evolved and dearly bought result of centuries of experience and growth, and is found in increasing degree on those routes which have the greatest and most valuable commerce. While the development of the best type of modern line has taken centuries, every step of the progress is in sight to-day in the varying trades of different sections of the world. The annual trading vessel goes in August to Hudson's Bay and the coasts of Greenland, and the same kind of commerce may be found occasionally in some ports of Polynesia. Thence upward the stages of organization pass through all forms of service until we come to the splendid lines from New York to Europe. From this one port there weekly depart more of the fine, high-type passenger and mail steamers than there are days in the week.

The efficiency of the line of steamers is only obtained by incurring certain expenses that are not necessary if the vessel is working independently and carrying special cargoes. These expenses may be classed under the heads: 1. Maintenance of schedule. 2. Management and advertising. 3. Costly construction. 4. Speed.

1. The most important single factor about line service, the schedule and its maintenance, is one of the great cares and costs of the managers. When a vessel is scheduled to sail on a certain date, her time may be up before she is fully loaded, or she may be loaded or ready to load and have to
wait till the appointed time. Both are expensive to the owner. In keeping up a regular schedule it may be necessary to enter ports when the freights do not warrant the delay and the cost.

In contrast to this is the freedom of the chartered vessel, which sails as soon as she is ready, can be delayed without any further inconvenience than the loss of time, and proceeds only to such ports as best suit the particular conditions of a particular voyage.

Accidents fall with cumulative force upon a steamship line because of the effect upon the schedule. In addition to the direct loss due to the accident, the future sailings and service are often demoralized, and the fulfillment of outstanding contracts becomes a matter of great difficulty and financial loss rather than profit. If a ship is disabled a few days before time for putting to sea, her place must be filled, and it is difficult and often costly to secure a good steamer in an emergency or even to secure accommodations elsewhere for the passengers and freight that have been engaged. Such necessary shiftings may make a month or more of losses where high profits were expected.

2. Line traffic, particularly when an object is made of carrying passengers, requires a large amount of advertising to catch and keep the attention of the would-be traveller and to create the desire for travel. Allied to the advertising is the elaborate arrangement of offices and agencies in many cities for the selling of tickets and the securing of freight. At the port of sailing, the office of the steamship agents managing a high-grade steamship line requires an efficient force of clerks. The staff must be organized on the basis of its ability to manage the work at the times of greatest rush—sailing day—although it may be partly idle in the intervals.

To handle the line traffic in freight requires more clerical work and more warehouse room than the same amount of charter traffic, because of the greater number of shipments
to be received, invoiced, cared for till loading time, placed safely in the hold of the ship and finally assembled at point of discharging cargo. Such cargo is often spread out in separate lots over a large area of quay or warehouse space. The bulk shipment of grain or other uniform charter cargo can be discharged more easily into coasting or river craft alongside or it may be thrown in great heaps, so that it occupies less warehouse space than any other kind of cargo.

3. Many kinds of line traffic require special types of ship construction. First among these is the passenger service, which is provided for wherever the travel is sufficient to give passengers for a part of each year. Human freight is more exacting than inanimate cargo, and while the business is very profitable, it adds greatly to the cost of construction of the steamer, increases the crew and decreases the freight space.

Many kinds of freight require nearly as much special construction as do passengers. This statement applies especially to perishable goods requiring refrigeration. There is a large traffic in frozen meat between Great Britain and the southern hemisphere. The frozen carcasses are taken from a cold-storage warehouse in Argentina or Australasia and carried to Europe in the ship's freezing chambers. Another division of the refrigerator traffic is the larger and rapidly growing use of chambers where the freight is chilled, but not frozen. In this manner is carried the American fresh meat en route to Europe, and most of the ocean trade in fruits and dairy produce. Some other forms of special construction are found in ships prepared for carrying live cattle, and in tank steamers for the carriage of oil in bulk, and the fruit steamers that carry oranges and bananas from Caribbean and other tropical countries.

4. High speed is not a necessary part of all line traffic, but it is an essential factor and a large element of the cost in those lines carrying passengers and mail, and in some freight lines. The increased consumption of coal has been referred to in the chapter on the charter traffic. High speed requires, along with greater coal cost, greater crew to handle the
coal, larger bunkers and machinery space, and consequent lessened freight space. Machinery running at high speed wears out sooner and requires more repairing per mile than when operated at lower speed. The fast vessel is also more liable than a slow one to accidents at sea, especially collisions.

As a compensation for the various costs the line steamer has several strong advantages over the chartered vessel. 1. It can charge higher rates of freight on some goods. 2. It can secure more advantageous loads through mixing cargo. 3. It wins patrons and develops trade through acquaintance.

1. The liner monopolizes the passenger traffic, the carriage of the mails and because of its speed or regularity, or both, it can charge a higher freight rate for much valuable cargo in the transportation of which time is an important factor.

2. In the carriage of ordinary freight the liner has an advantage in its ability to secure mixed cargo, and stow into a given space more tons of freight than can usually be secured by the special cargo vessel, which ordinarily carries a cargo of one article only.

The question of the relation of the bulk of cargo to its weight is a very important one for the ocean carrier. The ship has a certain capacity in dead weight tons, and an absolutely inelastic amount of cubic space into which those tons must be stowed. It is important that both space capacity and weight capacity be utilized, and to do this there should be some heavy cargo to give the weight and some light to fill the space. A full cargo of either is unsatisfactory.

The ocean carrier solves the problem by basing his freight rate on two different units, one of weight and one of cubic contents. Both are called tons, the weight ton and the measurement ton, the latter consisting of 40 cubic feet. The shipowner exercises his discretion as to whether he receives freight on the weight or measurement basis, and, of course, uses the one most favorable to himself. The measurement ton happens to have its particular size because a weight ton of wheat occupies about 40 cubic feet, and as wheat has long
been a staple, and often the greatest staple of ocean com-
merce, shipowners came to think of their vessels in terms
of their wheat-carrying capacity, and this grain became the
norm for measuring other commodities. Freight goes by
weight or measure, at the discretion of the carrier. Hence a
shipping company's report of the number of tons of freight
carried, gives neither an accurate measure of weight nor
cubic content of the traffic, because it is usually composed of
unknown quantities of both kinds.

A mixed cargo will give a greater cargo tonnage than a
full cargo of either kind, because all vessels will contain more
heavy cargo than they can float, and they will float more
light cargo than their space can contain. A vessel that can
carry 1,000 tons dead weight would have four-fifths of her
space empty when carrying a full cargo of iron. On the
other extreme, a full cargo of wagons or wooden manu-
factures would not weigh more than 300 or 400 tons. In
one case the ship is wasting space, in the other carrying
power; but with 700 tons of iron or steel in the bottom of
the hold there is still space for possibly 700 tons of light
measured cargo, say, wagons—1,400 freight tons in all.
The possibility of making such combinations is constantly
before the managers of line vessels, and freight is sought and
rates are made with such arrangements in view. If 1,400
freight tons of wagons and steel rails can be put into the ves-
sel that can only carry 1,000 tons of rails alone, the agents
can well afford to take both articles at a rate somewhat lower
than could have been offered for a full cargo of either, and
yet have greater returns than would have come from a full
cargo of a single commodity at the full rate—1,000 tons at
$5 per ton equals $5,000 and 1,400 tons at $4 per ton equals
$5,600.

The steamer is also much safer to navigate with a full
dead weight rather than a light measurement load.

3. The line has also the advantage of getting regular
patrons, of making contracts for long periods and of reaping
the advantage of the increased trade that its regularity fos-
Line Traffic.

ters, but it must also maintain its reputation and preserve that regularity of performance during periods of depression and loss.

In view of the character of the freight carried and the work done by the steamship line, it is evident that the greater the variety and the quantity of trade from a port, the better the field becomes for line rather than charter traffic. The line depends for prosperity upon the steady flow of trade, and by the law of averages this is best furnished by the tens of thousands of different shipments that monthly pass from such ports as London, New York, Liverpool and Hamburg. It is in such all-round, complex and heavy trades that the lines have the leading and most rapidly increasing share of business. The percentage of line traffic is increasing in Hamburg, it is greater in New York than in Philadelphia or Baltimore, and plays but a comparatively small part in the trade of such undeveloped ports as Galveston, Pensacola, Sourabaya (Java) or Rosario (Argentine Republic).

The charter traffic is crowded out of the great ports because with the great quantity and variety of manufactured goods the articles that usually go to make charter cargoes are taken by the liners as ballast cargo to make the ship ride steadily in the water. It has now become an unusual thing for a full cargo of grain to be sent from New York, because nearly every great passenger ship can ordinarily take a partial cargo of it to advantage and a cheap rate is offered to secure it. This rate is less than the charter rate is or would be if there were one. This fact should be borne in mind when examining the chart on page 43.

It is significant of the tendency to line traffic that the greatest combination of shipping lines, the International Mercantile Marine, was organized for trade across the North Atlantic, the ocean having the heaviest and most varied trade in the world. While this company does business in many ports, its working headquarters are at New York, the city with the heaviest foreign commerce in the world. The International Mercantile Marine is the natural outcome of the
developments of the nineteenth century, and in a vast and already established trade this combination of lines will be able to affect large reductions in running expenses. It carries into the consolidation of many lines the advantages attendant upon wholesale production.

In the operation of steamship lines there are many economies that come with the increase of the size of the business. The larger the operations of the line the more cheaply may it perform a unit of transportation service. The saving comes from numerous causes.

1. The larger business can spread its organization and traffic arrangements over a wider area than can a small one. It can issue through bills of lading for a vast number of shippers, take their goods to a wider market and by this advantage hold their business. By carrying the freight of many scattered communities, the business is steadied because the local fluctuations have a tendency to equalize each other. A strike, a series of failures, a drought, an epidemic and quarantine, or any disaster that embarrasses trade is much more serious in its consequences to the steamship line that trades at two ports than to the line that trades with five or ten or fifty.

2. In the insurance and building of ships the large line has an advantage. The vessels can be built in pairs or in greater numbers, and the duplication reduces the cost. The International Mercantile Marine has gone farther than this, and practically includes in its organization one of the finest shipyards in the world, where building and repair work will be done at very favorable rates. The corporations owning many ships can also do their own insuring and thus save the profits of the insurance company. A line with ten steamers cannot risk carrying its own insurance, because the loss of one vessel in ten would be too great to bear. When the number under a single ownership becomes one hundred or more the insurance situation changes. The loss of one ship in a hundred is not sufficient to seriously embarrass a well-managed company, so the larger companies often set aside
Line Traffic.

a certain percentage of their earnings for insurance, and if the vessels are carefully navigated the insurance fund may accumulate for profits. In periods of depression some of the largest companies have paid small dividends from the surplus of the insurance fund. It is not necessary that the company's insurance department do all of the insuring. If the risk seems too heavy, a part of it may be carried by one of the regular insurance companies and a part by the steamship company. This method of combined insurance is much commoner than total private insurance.

3. The large company has a great advantage when it manages lines to different parts of the world and can shift its ships from one service to another. Every steamship line has seasons of heavy and of light trade, and the ships that can handle the traffic at the busy season are partly idle in the dull season, and it is a great gain if they can be placed upon another line and profitably employed, thus rivaling the tramp in adjustability. This method of using line ships has been best worked out by the German lines. Some of the fast passenger steamers that run from New York to Hamburg and Bremen in the summer, when travellers are hurrying to Northern Europe, are changed to the southern route in winter, and run from New York to the Mediterranean. The Hamburg-America Company operates lines connecting Hamburg with Canada, with New York and other ports in the Northern States, with the Gulf and Mexican ports, with the West Indies, with South America, both east and west; with South Africa, East Africa, the Mediterranean, India, East Asia, the East Indies and Australasia. There are lines built especially for passengers and others especially for freight. With this great variety of services, it is much easier for the company to keep its ships all well employed by transferring them from one line to another as the seasons and the replacing of ships require. As ships improve and the demands become more exacting, the older vessels of the best lines can be permanently transferred to the cheaper lines. Thus the vessels built for the New York service may be transferred
to Boston or Philadelphia or Baltimore, and then to a purely freight service in any part of the world, and finally they may end their days as coal storage hulks in some distant harbor.

4. When the traffic of a steamship company has once attained the size at which the management can afford to have offices of its own, the relative cost of office expenses decreases as the business increases. In the first stages of a steamship line its business is managed by some shipbroker or agent, who calls himself general agent, and is assisted by others in distant cities calling themselves agents. They are paid by a percentage on the freights secured. As the business of the line increases, this percentage after a time becomes large enough to pay the cost of an independent office. It thus comes about that all the larger trans-Atlantic lines have their own offices at the port of departure and frequently in many inland cities, to secure freight. In Chicago there are branch offices or agencies for steamship companies operating from all leading ports from Montreal around to New Orleans. The work that such an office force can do increases much faster than the number of men employed.

The International Mercantile Marine Company represents a consolidation of five such companies, each with an independent organization built up and practiced in the competition for the American freight. Much of the activity of these corporations was due to their keen competition with each other, and one of the first results of the union of the companies was the closing of some of the duplicate offices in New York and other cities. This saving went partly to reduce expenses and partly to make the organization of the new company more effective and wide reaching than any of its constituent companies had been.

5. Better use of the ships will result in a large saving to the consolidation. In the days when the five companies competed for the traffic several ships often sailed on the same day, and they were often partly empty. The new company operates them in regular succession, and a successful effort is made to do the same amount of work with fewer ships
more fully employed. One of the first acts of the new corporation was the sale of several ships that were building for one of the constituent companies. The cost price and the operating expenses of these new ships was a direct cash saving resulting from the combination.

Dock space can be economized in the same way that it is possible to reduce the number of ships. Each company had to have space enough for its busiest season and some of the space was idle most of the time. With the consolidation of companies, the more regular sailings give a more even distribution of work, the freight flows in a stream rather than in occasional accumulations and less space is required to handle it.

This more even employment of the shipping and the docks resulting from better distributed sailing days, is a gain to commerce in general, for commerce is improved by anything that increases its dependableness and its evenness.

6. The combined companies will make a considerable saving because of the ease of supplying ships in emergencies. If an accident detains or disables a ship, any of the four other companies stand ready to supply a substitute, and the contract of the International with the German companies provides that before going into the open ship market each company shall give the other the opportunity to supply extra ships. That practically places the ships of seven of the largest lines at the disposal of the American or German managers when an accident disables a ship.

The above enumeration of economies is not claimed to cover, but rather to suggest the advantages that result from the growth and combination of steamship lines and the extension of organization in the world's carrying trade. The presentation of economies, and the mention of the International Mercantile Marine, should not be taken as a prediction of the success of that particular company. Along with the economies of consolidation it has taken the burden of a high capitalization.2

2 For a discussion of this point see "Political Science Quarterly," March, 1904.
Why cannot all ocean freight be handled by such great corporations?

The possibility of the organization of ocean commerce into traffic for steamship lines is directly increased by anything that increases the evenness and regularity of industry, and consequently of the export and import of goods. As the strength of a chain is the strength of its weakest link so the line traffic is in a measure limited by the amount of traffic to be had at the lowest season. The surplus, the spurts, may be partly taken by the lines, but they are quite as apt to fall to the share of the tramp. Wars, droughts and crop failures from natural causes must apparently continue, but if the great fluctuations of industry resulting from panics and depressions may some day cease, there will be an extension and perfection of organization in the ocean carrying trade.
CHAPTER IV.

OCEAN FREIGHT RATES.

The rates of ocean transportation differ from the rates in land transportation both in cost per ton mile and in the greater freedom and force of competition. The rates are lower in ocean transport because the roadbed costs nothing. The chief reasons for the greater freedom of competition may be classed under three headings:

1. The ease of transfer of shipping from country to country over the world ocean.
2. Lack of alternative employment for the tools of ocean transportation.
3. The freedom of roadway and the consequent freedom from investment of fixed capital.

1. The ocean is a world route free for all, reaching all maritime countries and all ports, and the ship, complete in itself, is able to go wherever freight is to be secured. The cheapness and ease of movement over the ocean make the whole world the possible field of operations of any ship. Wherever the open sea extends there she is at home and may compete. This mobility and ease of concentration is not possessed by any other agent of transportation. The railway train is tied to the tracks controlled by its own company, the wagon and team are physically unable to move any great distance, and landsmen generally are ordinarily bound by their homes to a comparatively narrow field of operations.

2. Competition in transportation may be limited, if there are other fields of activity for the carrier, when freight rates become too low to be profitable.

The owners of ships have no outlet but the carrying trade, and they must continue to compete for that or give up their ships. It is otherwise with the older agents of transportation. The caravans and the wagon trains, the dog sledge
The Organization of Ocean Commerce.

and the carriers in the forest, all possess other avenues of employment. The carriers and the drivers of the dogs may go hunting or go at other work. The members of the caravan and the wagon train may employ themselves and their animals at agricultural labor, and by this relief set limits to the extent that they may be driven by competition. Within these limits competition is free, but there are no such limits to the carrying trade of the ocean. The ship must be operated or become a total loss, and it is not unusual for them to be entirely idle at times. But the railroad, even under the fiercest competition, has a certain amount of local traffic of which it cannot be deprived. Compulsory idleness or loss of profitable work falls heavily upon shipping because of the very rapid depreciation through disuse, and when traffic is dull the costs of operation are proportionally higher than with the railroad. Thus the railroad, although possessed of no alternative employment, fares better than the ship, both in respect to loss of traffic from hard times and from the financial losses resulting from loss of traffic.

3. The most fundamental difference between ocean transportation and land transportation as typified in the railroad, is in the element of fixed capital, the roadbed and terminal facilities, which are so all important with the railroad and upon which the steamship company spends so little. This may be called an organic difference between the two. It profoundly affects the making of rates, for the railroad has a tendency to combination, monopoly or agreement, resulting in fixed and settled rates, while the ocean is free, open to competition and the scene of ever-shifting rates.

This non-competitive characteristic of the railroad did not exist among the early lines in the first decade of railroad experience, but it is now generally recognized and is becoming increasingly evident. The first railways were built with the idea of continuing the freedom of the country road. The public highway, like the ocean, was free to all; any person's wagon could use it. The laying of the first rails was the application of no new theory. It merely made it easier
for the horses. Anyone could use the new highway as he could a new turnpike. When the steam engine came it was with the idea that it would pull the wagons of the community just as the stage coach had carried their packages. But this practice of public use did not survive, because it was not suited to the new conditions of steam transportation. The wagons needed to be of uniform pattern, strong build and special form. The rapid improvements in the locomotive and the track required large capital, and the railway and the rolling stock soon passed into the hands of the private companies owning the tracks. The community recognized its public right or proprietorship, as it still does, by giving a permit (charter) to the company and imposing certain conditions upon it before the road can be built. Further than this, the first railroads were chartered by legislatures acting upon the idea that other roads would be built, that they would compete and in the end give as much advantage of competition as exists on the wagon road or the ocean. This theory has not been fulfilled in practice. The competing railroads have in many cases become actually or practically united so far as rates are concerned. This consolidation or agreement arises because of the essential difference in the physical requirements necessary for the transportation by railroad and upon the ocean.

The mere tools of transportation constituting all or nearly all of the property of the wagon- or shipowner, are but a small fraction of the railway's property. Its strength lies in the road itself, the route, the strategy of location. It is in these forms of investment that the greater part of the railroad company's capital is placed. The steamship company has no such investment, except the possible rental of wharves or warehouses. The railroad must own land. The terminus in the great city is costly, not so much because of the building itself, but because of the great expense of buying valuable lots and houses to make room for the approaching road and in building the costly roadway. All this capital is fixed, cannot be moved or put to any other use. Competi-
tion may injure the business by making rates and income so low that no interest can be paid on this capital. Consequently the railways unite. The union may be a voluntary agreement to maintain rates or it may be an involuntary consolidation, brought about by the bankruptcy and sale of some of the weaker roads to the stronger after the financial wrecks wrought by competition. The result is that one railway corporation comes to be supreme in a certain territory, often a large territory, and within this there can be no other independent carrier capable of competing.

To be independent, a carrier must control the unit of transportation. By railway the unit is not only the cars and engine, but the road itself, often a hundred times more costly. By sea the unit is a ship. The shipper may load his ship and sail away to any ocean, continent or island. He pays nothing for the privilege of going, nothing for the maintenance of way and may easily build another ship or hire one, and any other individual may do the same. Hence, while land transportation tends toward monopoly, ocean transportation tends toward freedom of competition.

There is a certain amount of fixed capital concerned in the ocean carrying trade, that employed in the construction of the terminus, the harbor.

From the standpoint of public interest, and the investor's interest, these improvements may be divided into two classes. (a) The wharves, docks, freight sheds and freight-handling appliances—structures directly employed in the loading and discharge of ship's cargo. (b) The waterway approaching the harbor, the channel, which usually must be deepened, lighted, buoyed and kept in order by constant expense. There is also a large difference in the relation of private enterprise to these two classes of terminal improvements.

(a) Wharves, docks and appurtenances. These may sometimes be the property of private individuals and of shipping corporations, but it is never necessary for the ship-owner to own terminal facilities before being able to discharge or load his vessel, although it may be more con-
convenient. From time immemorial the waterways, and along with them the harbors, have been free and public as the land highway. The practical working out of this idea makes it possible for the occasional ship to find a place to discharge even in a harbor like that of Philadelphia, where the piers are held in private ownership. Here the captain of an incoming vessel asks the harbor officials for accommodations, and may be assigned to any temporarily unused private wharf. Here we see full private ownership overridden by the sense of public right. In no country is private ownership allowed to interfere with the right of all parties to use the harbor. In many of the harbors of Europe and America the harbor improvements are owned by state, national or municipal governments for the benefit of the community, and where private companies are permitted to build wharves or docks the permission is always hedged about with provisions making private monopoly impossible, and usually making the improved facilities open to all alike upon the payment of a uniform toll, similar in theory and practice to that levied by the turnpike companies as return for service rendered. These improvements for toll collections are not considered a part of the business of transportation, nor have they been commonly undertaken by the persons and corporations engaged in the business of ocean transportation.

(b) Channel improvements are of a nature so costly, and in their use so ill-suited to the derivation of income and so closely allied to national sovereignty, that this field of activity has been-usually left to the action of governments, either municipal or state. In Great Britain some of this work has been done by voluntary associations of private individuals, but not for private gain.

The introduction of the locomotive has revolutionized the practice of the greater part of the world concerning the rights of the public in regard to the use of railways by all carriers, but steam has produced no similar change of practice with regard to waterways, harbors and ports. The relation of the harbor to the public welfare is too vital and
too evident to permit it to be given away or sold, or compromised in any kind of grant or charter to private parties. Every seaport town has unlimited ambition for trade, for foreign trade, for many lines of ships, for connection with all parts of the world. Such a desirable situation can only be attained, if attained at all, by having the most free and favorable access to the high seas, the universal highway. Any monopoly of the harbor for private rather than public gain would certainly handicap the community. This act is recognized in the action of all communities. No city will sell its commercial birthright to any shipowning firm, because no firm can offer in return so complete a service as every city desires. The greatest of shipping companies reaches but a small proportion of the world's commercial ports; supplies but a fraction of the variety of transportation necessary for a world trade.

Theories often outlive the facts that gave them rise, as is seen in the way legal theory in this country regards competition as the governing force in railway matters.

In ocean commerce, however, the facts and the theory are alike alive. New harbors are being opened and old ones improved, and the public must and does constantly exercise some form of control and guidance.

The idea of public or community right in a harbor is kept more distinctly alive because in the beginnings harbors are usually only sheltered places, where the ships are met by small boats that carry the freight to the shore; changes come gradually, developing around this idea of the public highway and preventing the entrance of monopoly.

While the sense of public right has prevented monopoly the shipowning class has not, through most of its history, desired to own harbors and make fixed investments on shore that depended upon ships for the profit. It has rather been the desire of the shipowner to preserve the mobility of his capital and enlarge his fleet, so that he could trade first with this city, then with that, taking advantage of the best harbors and the best trades everywhere. It paid better to multi-
ply ships than it would have paid to undertake to improve harbors. Harbor improvements that can be utilized by the commerce of an entire port are often not capable of earning interest directly on the investment. If the dues were high enough for such profit, commerce might be driven to other ports. The same result would probably follow if the steamship company had to get money from freight rates to run the ships and pay for a harbor, too. Failure would probably result to the private company, because of the competition of some more favorable port. But a community can afford to raise such money by taxation and get its return in the indirect profits that come from increased commerce—increased industries, land values, population and power.

During the latter years of the nineteenth century conditions arose having in them the possibility of profit for a single corporation owning, improving and monopolizing a harbor, but it is quite as much as a part of land as of ocean transportation. The unprecedented accumulations of capital have produced railroad systems with thousands of miles of track and operating in connection with steamship lines, which serve as their feeders, and which are often under the same management or ownership.

Nearly all of the American transcontinental railroads have steamship lines to China and Japan, and the Southern Pacific has also a line from New Orleans to New York. The Canadian Pacific runs steamers from Canada to the United Kingdom and from Canada west to the Orient. Some of the British railway companies operate steamship lines to the Continent and, lastly, the International Mercantile Marine Company represents in a remarkable degree the united action of several of the greatest American railroad companies. A corporation of such magnitude, having even greater interests and alliances on land than upon the sea, might be willing to take over at cost the harbor of Philadelphia or Boston and make a profit from the operation. Their willingness to do this is, however, uncertain, the possibility of profit is uncertain; but it is certain that the physical pos-
sibility of such a transaction has come at a late day and when
the public control of private business has advanced so far
that it will never even be considered. The ocean and the
harbors are open to all, are free to competition and will
remain so. The typical ship and line of ships, so far as
freight rates are concerned, represent so much movable
capital devoid of connection with fixed capital on shore.

What is the effect of this freedom upon the making of
rates for ocean freighting?

This question can be best answered by an examination of
the practice of ocean carriers in dealing with the two types
of cargo that are presented: first, the full cargo, loading an
entire vessel; and, second, partial cargo, which may be five
hundred tons, a single ton or a single package.

1st. Full cargo and partial cargo shipments differ radically
in the conditions of rate making. The man with a small
shipment is necessarily dependent upon some form of
co-operative enterprise, whereby his small freights may be
combined with others, and he must pay the current rates.
In this respect the small shipper by sea may be likened to the
shipper by railroad who has less than a carload lot. The
large shipper over sea may be likened to the man who can
secure the more favorable carload rates by land, but this
likeness may not be carried too far. The independent unit
is much larger by sea than by land, and much more inde-
pendent because of the greater freedom of competition. The
ocean owes this freedom of competition to the unchartered
tramp vessel that may be seeking cargo. For the man who
is able to dispatch a whole cargo at one time, ships are to be
had for purchase or for the hire, and can be secured for a
single voyage, for a month, a term of months or for a year,
and are, during the period of the lease, the property of the
man who has hired or "chartered" them. The charterer may
arrange these contracts under a great variety of conditions,
if he will but pay the price then current in the world's ship
market. What the price may be is forever uncertain and
is decided by a vast amount of bargaining, dependent upon
the supply of ships and the demand for them. The bargain-
ing for a horse trade at an oriental fair could not be freer
and more absolutely decided by supply and demand. The
rates for chartering depend upon the number of ships within
reach. If ships are abundant, they are cheap, very cheap,
and may be had below actual running expenses; if they are
scarce, and freight is plentiful, they are very dear and the
business becomes exceedingly profitable.

These fluctuations of rates may be general, world wide
and of considerable duration, or they may be local in extent
and of short duration. It may come about that several ships
happen by combinations of winds, weather, accidents and
previous freighting arrangements to be ready to receive
cargo in the same port when there is not enough freight for
more than half of them. Some of the ships must go else-
where and bear the loss of a ballast voyage. The managers
of any of the vessels would, of course, find it profitable to
reduce the freight rate to some point that would still leave a
margin over the probable income to be derived from going
in ballast to the next available port and engaging freight at
the there existing rates. If one vessel offers a low rate, all
must do so, and the rate in that over-supplied port falls.
Later, if there happens to be an excess of freight over ships,
it may rise as suddenly as it fell.

An excellent example of temporary fluctuation was
afforded during the war between China and Japan in 1894.
Ocean traffic was dull, rates were low and idle ships were
common. At the outbreak of hostilities some were engaged
to carry supplies from Europe and America to the Orient,
and many others were sent thither from the North Atlantic
during the summer in the hope of securing service in the
transportation of war supplies. In September the European
markets demanded heavy grain movements from the United
States, and the supply of available vessels being deficient
rates in some ports rose 300 per cent. in two weeks. But the
demand was not enduring, unemployed vessels hurried back
from the Pacific and Indian Oceans to share in the good
times, and in two months rates in the Atlantic had declined nearly as much as they had advanced.

It sometimes happens that a revival of world commerce produces throughout the world an excess of freight over shipping. Every ship is eagerly sought for, and rates rise and rise until a high equilibrium is produced by the increased cost of transport, making it impossible for some of the freight to bear the cost of carriage. At such a time the shipowner's profits are great, and he desires and builds more ships until another equilibrium is produced, a low equilibrium, set by the point at which the shipowner thinks declining rates will make his business unprofitable. This point in practice is difficult and well-nigh impossible to determine, certainly impossible to attain or maintain; because the amount of available freight can never be foreseen far in advance, and it requires several months to complete a ship, once it is begun. The probability of an oversupply of ships being produced during a period of prosperity is greatly increased by the fact that any person or group of persons with sufficient ready money or credit, can have a ship or ships built and put upon the ocean to compete for the world's carrying trade. There is no expensive lobbying to secure the charter as for a railway, no vexatious and expensive buying of real estate for right of way. Explicit inspection laws make shipbuilding as simple for the investor as housebuilding. The inducement of the great profits that prosperity sometimes brings often tempts the uninitiated to indulge in shipowning ventures, which result in increased depression because of oversupply of ships when prosperity wanes. As a result of the great freedom of competition in rate making and the occasional high profits and consequent rapid increase of tonnage, the shipping business is subject to extremes of prosperity and depression which follow each other in rather rapid cycles.

In this connection a brief sketch of the progress of ocean shipping and freight rates during the past six years will be instructive.