BRITISH MERCHANT SHIPPING

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BY
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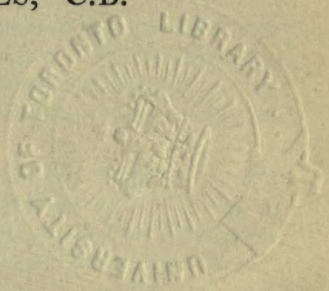

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PREFACE

In January, 1921, it was my privilege to deliver a lecture in the University of Liverpool on the subject of "British Shipping in Relation to British Trade," and shortly afterwards it was suggested that I should expand my paper into a book on British Shipping.

This volume is an attempt to carry out the suggestion. My aim in writing it has been to retrace the steps by which we, as a country, have come into the possession of our Mercantile Marine, and to describe the methods that we pursue in our task of maintaining it.

I thought at first that the subject of British Shipping was too vast to be dealt with adequately in one volume, for there is enough material in the past history and the present performance of our Merchant Service to fill a shelf. On the other hand, it would be useless to present that busy person, "the general reader," with a whole row of books and expect him to have time to cope with so bulky a work. Some day a complete history of Shipping, with all the details and ramifications of its management, ought to be written, but it will not be a one-volume affair.

In the meantime, I have been obliged to condense and omit where I should have preferred to expand.

Such literature as exists on the subject of British Shipping is mainly of a highly technical nature—too technical for the comprehension of either the general reader or the young man about to enter a shipping office. There are many excellent works by naval architects on the details of ship construction; there are books on the various types of marine engines; there are printed papers on Sea Casualties, Port Facilities, Stowage of Cargoes and other nautical subjects that have been read before Institutions and Institutes; there are histories of shipping covering the periods of sail and steam; there are paragraphs

in encyclopedias and articles in magazines; there are guides to navigation and handbooks to the Merchant Shipping Acts.

But, as far as I know, there is no one book comprising the various "things that a beginner in a steamship office ought to learn" if he wants promotion, and explaining to the general reader the daily round of happenings in the shipping business.

When, twenty years ago, I went down from Cambridge and entered a shipping office, I was put in a small room by myself—to be out of the way of everybody else, I suppose—and given for my reading a high pile of correspondence on the subject of freights. Much of it was meaningless to me. At the end of an hour I had made notes of several questions that I wanted to ask. I approached the manager of my department and asked him to tell me what a "Captain's manifest" was. He looked at me pityingly and said that it was "the manifest that goes in the ship's tin, of course." I was none the wiser, but I was wise enough to leave the remainder of my list of questions unasked.

The object of this book, then, is to describe, as simply as possible, and as far as the compass of a single volume permits, some of the problems and difficulties with which those engaged in British Shipping, both ashore and afloat, are daily confronted.

I acknowledge with gratitude the help that I have received from a number of sources: from Sir Charles Sanders, Mr. R. L. Scott, and Mr. Harald Dixon in regard to ship construction; from Captain H. W. Broadbent, R.N.R., and Captain J. W. Harris on the subject of officers' training and duties; from Mr. L. A. P. Warner, of the Mersey Docks and Harbour Board, and Mr. Ayliffe, of the Port of London Authority, in respect of port facilities; from the Editors of the *Liverpool Journal of Commerce*, the *Shipping World* and the *Syren*, from whose pages I have extracted much valuable information with reference to British Shipping; and finally, to my colleagues in the Booth Line, with whom, during the course of the last twenty years on both sides of the Atlantic, I have been engaged in trying to solve, in the stern school of practical work, many of the problems presented in this book.

C. J.

LONDON,
August, 1922.

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CHAPTER I

HISTORICAL SURVEY OF BRITISH SHIPPING

At annual banquets and other functions where shipping interests are represented and the loyal toasts are followed by that of "The British Mercantile Marine," it not infrequently happens that the proposer quotes Psalm cvii. : "They that go down to the sea in ships and occupy their business in great waters." It is also not unusual for the reply to refer—with an assurance based on custom rather than research—to Alfred the Great as "the founder of our Naval and Mercantile Fleets."

Now one thing is certain. Whatever the shipping may have been that the Psalmist had in mind, it was not British, and therefore does not come within the purview of this book. The case of Alfred, however, is different.

Amongst the many deep debts which we owe to Alfred, the very greatest, perhaps, from a national point of view, is his creation of our Navy. In 876 he gained a naval victory over the Danish fleet off Swanage. For a hundred years before that date, the Danes had been attacking our shores. Their black barks were first seen in 787, when, as the Anglo-Saxon Chronicle narrates :—

"This year first came three ships of the Northmen, out of Haeretha-land (Norway). And then the Sheriff rode to the place, and would have driven them to the Kingtown, because he knew not what men they were. And then and there did they slay him. These were the first ships of Danish men that sought the land of Angle-Kin."

The Viking attacks at first were mere plundering raids. Summer after summer saw a Danish fleet cross the North Sea to ravage one district or another, never far inland, sometimes to be defeated, sometimes not, but in either event to make off, after an inroad of a few weeks, with their booty. The incom-

parably superior mobility of sea-borne troops as compared with land forces enabled them to choose their own point of attack, and, before the quickly-raised English levies could reach them, to pounce upon some undefended spot, or more than one, in quite another direction.

So things went on for many years, and then came a further step. In 851 we meet in the Anglo-Saxon Chronicle with the ominous entry: "This year did the heathen folk, for the first time, bide over winter."

This was in the island of Thanet, the first permanent abode of the Anglo-Saxon invaders 400 years earlier. Both Danes and English seem to have realized the significance of this fact. The former were encouraged to reinforce their pioneers the next year by no fewer than 350 ships, ten times the average number of a Danish marauding expedition, and the greatness of the peril roused the English to a desperate effort of defence, which proved successful. The Danish crews, leaving their great mass of vessels at the mouth of the Thames, stormed first Canterbury and then London, and then poured southward across Surrey. With the whole West Saxon force, Ethelwulf, the son of Egbert and the father of Alfred, met them at Ockley, and there, according to the Anglo-Saxon Chronicle, "made they the greatest slaughter among the heathen host that ever we heard tell of, even unto this day." This victory, however, only afforded the English a momentary respite. The Danish raids continued: in 855 the invaders again wintered in the land, this time in the island of Sheppey; in 860 they stormed Winchester.

Alfred was born in 849 at Wantage in Berkshire and was, at his accession, twenty-two years of age. He set himself with indomitable courage to the task of resisting the overwhelming onset of the Danish host. To this end he decided to build up a navy. And this creation was absolutely his own.

For many years the English had ceased to be seafaring folk: for nearly 400 years we never hear of a sea-fight. Nor for all that time did any hostile fleet ever threaten our shores.

Thus, when at length the Danes began to pour into the country, the one thought of the defence was to meet and crush them on land. Though a hundred years had passed since "the first ships of Northmen sought Angle-Kin" in 787, the idea of meeting them on the water never seems to have occurred to

any one before Alfred, unless, indeed, it were to his brother and adviser, St. Neot. It needed a wonderful power of rising above contemporary prejudice to perceive that England's true line of defence is not her coast, but the waves around it. We are almost unable to realize how extraordinary a flash of genius was its first inception. And this was wholly Alfred's. Not one of the line of valiant Kings before him, his three brothers, his father, his grandfather, who, one and all, made so brave a stand against the Danes on shore, ever, like him, "fared out to sea with a ship-host" to fight them on their own element. This he had first done in 875, the year before the victory off Swanage, when he had defeated a small Danish squadron and taken seven ships.

Who these sailors were is a further question. It must be remembered that Alfred had to begin at the very bottom. The thought was his only and he had to find both the ships and the seamen to carry it out. Both must, at first, have been largely foreign; for neither English ships nor English seamen as yet existed. But there was no lack of adventurers, Danish, Norse, Frisian, and what not, haunting the Channel, and quite ready to hire out their services. Some of these pirates we know that Alfred took into his pay to begin with; adding, doubtless, a detachment of English warriors to each crew. But more and more as he went on his navy became wholly English. For he himself designed the ships, and had them built to his own plans, and himself trained the crews that manned them. Not content with merely copying the Viking ships, he made his longships—so the Saxon Chronicles inform us—twice as long as the Danish, and swifter, steadier and with more free-board than any war vessels that had hitherto been seen in England.

Nor did Alfred's navy die with him. Throughout the reigns of his descendants, Edward, Athelstan, and especially Edgar, we find the English fleet a most important factor in the national polity. What our fleet—both naval and mercantile—with all its glorious traditions is to us now we all know. But it is not always remembered that we owe all this to Alfred.[1]

In those days, and for several hundred years afterwards, the difference between a merchant ship and a man-of-war was much less marked than is the case to-day. Mr. Keble Chatterton, in

[1] *Alfred in the Chroniclers*, by Edward Conybeare (Elliot Stock), p. 26.

his fascinating book, *Sailing Ships and their Story*, tells us that "as in the Mediterranean the ships of burthen developed from the ships of war, so in the Anglo-Saxon times the merchantmen differed from the battleship only in being more beamy and consequently not quite so fast as the longships."

The expeditionary force that crossed the English Channel in 1066 was conveyed in ships that did not average above thirty tons burden apiece. We read in history how, before starting, there was trouble with the crew, how several ships foundered, and how, finally, wine played no small part in urging the unwilling men to embark on this expedition. Some of those who crossed the same channel as members of another expeditionary force some 850 years later in vessels of three thousand tons and over, which seemed none too large for comfort, can sympathize with the sufferings of the Norman *poilu* in his thirty-tonner.

After the Conquest, trade between England and France became less restricted than it had been before, and this led to an increase in the merchant shipping.

Under Henry I, as well as under Henry II, the maritime industry prospered. Ships were growing in size as well as in number; London and Bristol became the two chief ports of England; while good naval legislation under both these reigns encouraged the progress of shipping.

It was not, however, until Richard I went on a Crusade to the Holy Land that Englishmen had an opportunity of seeing the latest types of the ships of the Mediterranean.

Mr. Keble Chatterton, in the following passage,[1] describes how this opportunity occurred and shows its lasting effects on the design of the vessels that were subsequently built:—

"Near to Beirut the English espied in the distance a great ship with three tapering masts, strongly built, painted green and yellow, with 1,500 men aboard. On being hailed, she pretended at first to belong to Richard's colleague in the Crusade, the King of France, whose flag indeed she was flying, but she was soon discovered to be a Saracen ship, and after some difficulty was rammed and sunk by the English Viking-shaped and smaller vessels. In Hakluyt's account of this ship, she is described as a 'Carack.' The three tapering masts which astounded the Englishmen in their one-masted Viking ships and the tall sides of the carack, which gave Richard's men so much difficulty in assault from their comparatively small vessels of low free-board, would not fail to bring forth changes in English ship-

[1] *Sailing Ships and their Story*, p. 140.

building as soon as internal and external peace was assured and sufficient technical skill had been acquired. This big ship or carack class—call it what you will—marks a determined stand in naval architecture to build real ships as distinct from big boats. From her evolved the vessels that sailed across the Atlantic with Columbus, that carried Elizabethan explorers to all points of the compass, that fought the Armada and the Dutch, and became adapted in time to such wooden walls as the *Victory* and others, and which are not radically dissimilar from the modern full-rigged ships, though made of iron instead of wood with steel rigging and a much larger spread of canvas."

Having now traced the development of the construction of English ships from the days of Alfred until the reigns of the Angevin Kings, perhaps the time has come to see what was the nature of the cargoes carried.

Briefly it may be said that, from the days of the Plantagenets down to Tudor times, wool was to our export trade what coal became at the end of the nineteenth and beginning of the twentieth century.

In the thirteenth century the foreign trade of England was only nascent.[1] Raw wool, unwrought lead and tin, jet, cattle, fish and salted meat were the chief exports ; and the value of the wine that came in probably exceeded in this, as in the following century, that of all the other imports put together. The foreign merchant was a frequent visitor to England. As wool-buyers several leading firms of Florentines had regular relations with all the principal religious houses. Weaving and the dependent trades of dyeing, shearing and fulling were the most highly-organized which England could then show ; and even these had not passed beyond the stage of domestic industry.

In view of the importance of wool and woollen goods in the early stages of our export trade, it may be worth while to examine the growth of this particular trade and see to what extent foreigners were responsible for developing in England the industry of weaving.

We are told that, when in 1271 a commercial dispute arose between Flanders and King Henry and the order went forth for the banishment of Flemings, it was thought advisable to exempt those who had bought houses and settled in England for the purpose of working wool ; to these the King announced that he would guarantee the rights of native Englishmen.

[1] *England under the Normans and Angevins*, by H. W. C. Davis.

One of the places where the woollen manufactures of this Kingdom were first established was Kendal, in Westmorland. John Kemp, who got a "protection" order from Parliament, came over from Flanders in 1331 and settled there. In 1336–8 great numbers of weavers came over from Brabant, some say at the solicitation or secret invitation of King Edward.

Another account [1] mentions Kendal as

"a town of note principally for its manufactures of cloths, druggets, stockings, etc., in which the inhabitants have driven a good trade as early as King Richard II and King Henry IV; for in those reigns, we find special laws enacted for regulating Kendal cloths. The Cloth trade was first settled here by King Edward III, who brought certain Dutchmen into England, Reg: II, to teach the English how to improve their wool and placed them in several counties for that purpose, as in Essex, at Colchester and here.

"Before this most of the wool of the country was exported; which, being manufactured in the Netherlands, was such a source of riches, as to occasion the Duke of Burgundy to institute the Order of the Golden Fleece."

An Act was therefore passed in 1337, prohibiting further exportation, and this failing to stop the practice, a tax of fifty shillings a pack was imposed. This tax raised the enormous sum (in those days) of £250,000 a year.

The reign of Richard II was anything but prosperous for the commerce of the country, but his successor, Henry IV, entered into commercial treaties with Prussia and the Hanseatic League, much to the advantage of Shipping. Piracy had become so rampant in the North Sea, that merchants abstained from sending their goods across from one country to another. This Henry did his best to stop. Later, owing to the scarcity of money consequent on the war with France, during the reign of Henry V, and throughout the unhappy Wars of the Roses, there was little progress made in commerce or the ships for the conveyance of it. But towards the close of Edward IV's reign, after peace had been made, matters began to improve, and in the time of Richard III, England was sending her ships and merchandise to Venice, Genoa and other Mediterranean ports.

[1] For the history of the woollen trade at Kendal see Coxe's *Magna Britannia*, published 1727, and Nicolson and Burn's *History of Westmorland and Cumberland*, 1777.

"The fifteenth century," says a recent writer,[1] "saw the rise of modern commerce, and not of the grubby smoky variety with which we are familiar, but that of the Merchant Adventurers who were trading with Flanders, in the Baltic, and the Mediterranean—and the name Merchant Adventurers does suit these old fellows admirably: they were keen and hard men of business wanting to make money, but yet prepared to risk it, and always indulging in adventure. The Wars of the Roses weakened the nobility, and agriculture suffered, because then men commenced to be attracted by the towns and the more profitable work to be found there. The manufacture of cloth became a very important industry. Iron and coal were mined, and all this led to the development of foreign trade. Now this development meant a corresponding improvement of ships and it is for this reason that our fifteenth-century boat is found to be so much better than the fourteenth-century one. But they were still very small; Columbus's flagship, the *Santa Maria*, was only about 93 ft. in length, with a breadth of 25 ft. A model of her was made in Spain in 1893 and sailed across the Atlantic to the Chicago Exhibition. She took thirty-six days, her maximum speed was 6½ knots and we are told that the vessel pitched horribly. Compared to a liner of to-day she was the merest cockle-shell and it needed brave men to sail her into the unknown seas."

Henry VII is popularly regarded in English schoolrooms as a mean, selfish skin-flint, whose stingy ways enabled his son subsequently to have a good time. It would appear,[2] however, that his thrifty habits at home did not prevent him from promoting his country's commercial interests abroad. We find him using every available means to obtain a footing in fresh foreign markets for the main English products of his day—wool and woollen goods; to secure for English merchants the rights and privileges which would enable them to compete on equal terms with the foreigner and to curtail those privileges of the foreigner in England. As regards wool, the primacy of the English article was thoroughly established; with manufactured woollen goods, however, the case was different, since the Flemings still held the lead; and shipping also demanded artificial encouragement—firstly, because it was necessary to enterprise in the development of the export trade, at present largely carried on in foreign bottoms; secondly, because the King was, at least to some extent, alive to the strategic uses of a fleet which could be requisitioned for war purposes.

The present generation of steamship owners are familiar

[1] *A History of Every-day Things in England*, by M. and C. H. B. Quennell, 1918.

[2] *England under the Tudors*, by Arthur D. Innes.

enough with the powers of the Requisitioning Branch of the Admiralty and the Ministry of Shipping, and it is interesting to remember that their ancestors, the galley-owners and Merchant Adventurers of Tudor times, were subject to similar orders. Under Henry VII not only were merchantmen used for war purposes, but in times of peace men-of-war were hired out to men of business—a practice to which no parallel can be found in modern times.

It was for a long time the custom of English monarchs in times of peace to let out on hire the royal ships to merchants. Nor did Henry VII break away from this practice. Apart altogether from the importance which big ships possessed from a naval point of view, it was a profitable speculation to build large vessels. Merchants were glad to hire them, since it saved the necessity of having to build for themselves or of keeping them in commission when their voyages were ended. The larger the tonnage of the ship, the more popular were they to the hirers, for the reason that they not only held more cargo and were less likely to succumb to pirates, but that they could voyage to virgin fields where trade could be established. Henry, in addition to the ships he had inherited and built, also hired some himself, both from his subjects and from the Spanish. He even went so far as to purchase some vessels from the latter, but Spain eventually legislated to prevent Spanish-owned ships from being sold to foreign Powers.[1]

All through the Tudor period, the nation was steadily realizing its maritime capacities. Whether the strategic meaning of "ruling the seas," in either a commercial or naval sense, was understood or not, the sixteenth century witnessed the rise of the English sea power from comparative insignificance to an actual pre-eminence. The two Henrys fostered their fleets; when Elizabeth was reigning, the sea-faring impulse was beyond any need of artificial encouragement. But it is noteworthy that coast defence and ship-building were almost the only public purposes to which an appreciable share of Henry VIII's ecclesiastical spoils was appropriated. The King's ships were few, but they were supplemented by an ever-increasing supply of armed merchant-ships.

It would be a mistake, however, to suppose that England had

[1] *Sailing Ships and their Story*, Chapter VI.

led the other nations in overseas exploration. In the twentieth century Englishmen are so accustomed to the supremacy of their mercantile marine that they may regard it as one of their oldest and greatest contributions to the civilization of the world. Professor Pollard tells us that Parliamentary institutions have been our greatest gift to the world. "Civilized man," he writes,[1] "has drawn his religious inspirations from the East, his alphabet from Egypt, his algebra from the Moors, his art and literature mainly from Greece, and his laws from Rome. But his political organization he owes mostly to English conceptions." A British shipowner might be tempted to add merchant shipping to the debts which civilized man owes to Britain. But it was not always so.

Though Henry VII had, as we have seen, encouraged shipping and had passed a Navigation Act which required that goods shipped to England from certain foreign ports should be carried in English vessels; though Henry VIII was keenly interested in shipbuilding; nevertheless, in the matter of ocean voyages Spain and Portugal still left all competitors far behind.

In 1492 Christopher Columbus made his great voyage westward; in 1497 Vasco da Gama sailed for India round the Cape of Good Hope. When Henry VIII ascended the throne, Albuquerque had already founded a Portuguese empire in the Indian Seas and Spain was established in the West Indies. In 1513 Balboa sighted the Pacific from the Isthmus of Darien. In 1519 Cortes conquered Mexico; in 1520 Magelhaens passed through the straits that bear his name, and his ships completed their voyage round the globe in the course of the next two years; in 1532 Pizarro conquered Peru; Brazil and the River Plate were already discovered and appropriated.

All that England had done was represented by an expedition in 1497 which aimed for a north-west passage and hit Labrador and Newfoundland; and even this expedition, which sailed from Bristol, was captained, not by an Englishman, but by an Italian, John Cabot, and his son Sebastian. The English had also made some tentative efforts in the direction of Africa and four voyages to Brazil, of which the first two were under the command of William Hawkins, father of the more famous Sir John.[2]

[1] *The Evolution of Parliament*, p. 3.

[2] *England under the Tudors*, Chapters IV, XI and XXIII.

Thus, at the opening of Elizabeth's reign, Spain and Portugal were in possession of the inheritance of the explorers. Portugal held complete sway on the African Guinea Coast, and in the Indian Ocean; while the Pope had bestowed upon her as much of the New World as lies East of the mouth of the Amazon—in effect what lies behind the coast-line of Brazil. All that lies to the West of the mouth of the Amazon, and northward as far as Florida he had bestowed upon Spain. This territory included Mexico, Panama, Lima, Santiago and Valparaiso. In all these regions the Spaniards claimed an absolute monopoly and the right of excluding foreign vessels and foreign trade from those shores.

It was in defiance of that right and in order to obtain a share of the "spoils of Mexico" that the rovers of Elizabeth's day put out to sea. First, in their private capacity they challenged the power of Spain, and afterwards led the English fleets to their triumph over the Armada.

Sir Walter Runciman, in a volume entitled *Drake, Nelson, and Napoleon*, has given us an account of these bold sea-captains:—

"The great sailors of the Elizabethan Era—Hawkins, Drake, Frobisher, Howard, Davis and Sir Humphrey Gilbert—were the prototypes of the sailors of the nineteenth century. They discovered new lands, opened up new avenues of commerce and combined these legitimate forms of enterprise with others which to-day would be regarded as rank piracy. Since, however, they believed themselves to be the Ambassadors of God, they did everything in His name, whether it were the seizing of Spanish treasure or the annexing of new worlds by fair means or foul, believing quite sincerely in the sanctity of what they did with a seriousness and faith which now appear almost comic.

"These ancient mariners went forth in their cockle-shell fleet as full of hope and confidence as those who are accustomed to sail and man a Trans-Atlantic liner of the present day.

"Some of their vessels were but little larger than a modern battleship's tender. In addition to being ridiculously small and shabby in point of efficiency in rigging, sails and general outfit, it will always be a mystery how it was that so few were lost by stress of weather or even ordinary navigable risks. They were veritable boxes in design, and their rig alone made it impossible for them to make rapid passages, even if they had wished to do so."

It was in December, 1577, that Drake sailed from Plymouth on his great voyage round the world. He started for South America with five ships, himself on board the *Pelican*; but the

Straits of Magellan were scarcely passed when a storm parted the ships and the *Pelican* alone remained to carry on the adventurous voyage. In the following December Drake astonished Valparaiso by sailing in and seizing a prize and stores. Finally he made his way across the Pacific to the Cape of Good Hope and sailed into Plymouth Sound in September, 1580, just under three years from the day when he sailed. He was the first Commander who conducted an expedition round the world from start to finish.

It is interesting to note the attitude of those in authority towards these voyages of exploration *cum* piracy. While the Queen herself, and some of her courtiers, had a large pecuniary interest in the ventures of Hawkins, Cecil, we are told, conscientiously refused to have part or lot in them. Similarly, on Drake's return from his great voyage, the Queen claimed that her great subject had been doing to Spain nothing so bad as what Philip was countenancing in Ireland ; Cecil again abstained from taking a share in the profits of what he held to be a lawless exploit ; Walsingham applauded. Drake was knighted. The practice of sea-roving, piratical though it undoubtedly was, continued throughout the reign of Elizabeth, and was winked at more or less. James I, however, on his accession, determined to take away from it any semblance of approval and did his best to bring an end to these marauding expeditions.

To turn now from privateering to legitimate trade, we have seen in previous centuries how the English cloth manufacture, unlike our other trades, was dependent upon the foreign market. In James I's reign, we find[1] the clothiers still providing our commercial men with far the greater part of the goods which they exported.

" Our maritime commerce," says Mr. Trevelyan, " was conducted by Companies, each holding, by Charter from the Crown, the exclusive right of trading to some particular part of the world. The system derived from the privileges of the Merchant Adventurers Company, who had pushed our Cloth trade by monopoly in North Europe during the Middle Ages. But when, in the reigns of Elizabeth and James, new markets and new Continents were opened out beyond the Indian Ocean, the Baltic and the Atlantic, new Companies, with corresponding Monopolies, sent out ship after ship to explore, fight and trade in the snows of Archangel, the forests of Virginia, and the treacherous waters where Turk and Spaniard, Dutch

[1] *England under the Stuarts*, by G. M. Trevelyan, pp. 47 and 48.

and Portuguese guarded the treasures of the East. The danger of these enterprises, the loss of ships in storm and battle, the expense of maintaining consuls and provisioning forts, all fell upon the traders themselves, in days when Government made little pretence of protecting British subjects beyond the Ocean."

The granting of a monopoly of trade in particular regions—Russia, Guinea, the Levant and the East Indies—to companies of merchants had a definite justification. Individual private competitors could not conduct the trade on a large scale ; large corporations, on the other hand, secured against rivals, could face the risks and the heavy expenditure requisite to success, and could be granted a liberty of action which was impracticable for the private trader.

Hakluyt, in his List of Voyages,[1] gives " The Letters Patents granted by Her Majestie to certaine noblemen and Merchants of London for a trade to Barbary, Anno 1585," and also " A Patent granted to certaine Merchants of Exceter, and others of the West parts, and of London, for a trade to the rivers of Senega and Gambra in Guinea, Anno 1588." In these letters we can read how the noblemen and merchants, whose names are given in the Patents, " and none others shall and may have and enjoy the whole freedome and libertie in the saide trafique or trade, unto or from the saide countrey."

But the bestowal on individuals of the monopoly of trade in particular articles and in particular countries by the Royal privilege was manifestly bad in itself. A well-managed company, whose doors were open to all merchants wishing to invest in the trade, protected Englishmen in a particular part of the world at its own cost and so fulfilled the functions of a State ; such a Company claimed in return that no Interloper should drive an independent trade in those waters. Unfortunately, however, many of the monopolist concerns were ill-managed, and many refused to admit new members. Interlopers were persons, who not being members of the Companies chartered by the Crown, nor having a licence from them, traded on their own account to the countries to which the Companies had the sole trade. These Interlopers, the young blood of Commerce, would have been shut out from commercial enterprise, if they had not found

[1] *The Principal Navigations, Voyages, Traffiques and Discoveries of the English Nation*, by Richard Hakluyt.

vent in illicit trade. "The debt of English commerce," says Mr. Trevelyan, "to the Interlopers of the seventeenth century is scarcely less than its debt to the great companies which they defied. From the beginning to the end of the Stuart epoch, remote seas and shores resounded to obscure and unreported conflicts, not only of English with Dutch, Spaniards, and natives, but of English traders with each other."

We have seen how, during the sixteenth century, the greatest rivals of the English at sea were the Spaniards and how, under Elizabeth, we had defeated them. Since then two more antagonists had entered the field to challenge our supremacy of the Ocean. France, under the influence of Cardinal Richelieu, was obtaining a royal navy and a commercial policy. Holland had outstripped us already. Between the death of Elizabeth and the seizure of power by Parliament in 1642, the shipping and overseas trade of this country had begun to decline. The Government was out of touch with merchants and their needs. Though our armed trading ships showed stout fight against pirates of every nation, the royal navy did almost nothing to protect them, even in the Channel. The toll taken of British Shipping by the Turkish pirates in those days may remind the modern reader of the German submarine campaign of 1917. Between 1609 and 1616, Turkish pirates from Algiers, guided by English renegades, took 466 of our merchant ships ; in 1625 they carried off 1,000 of our seamen as slaves and took twenty-seven vessels in ten days—figures that would have done credit to the U-boats, even in the most active and intensive phase of their existence. Even the shore itself was not safe from insult. "Pirates rode, ravaging and kidnapping, up the wooded creeks of Devon and Cornwall, where Drake and Raleigh had prepared the death of Spain." [1]

Small wonder that the songs and ballads of those days, such as "The Golden Vanity," show us how great was the fear inspired by the "Turkish Enemy."

It was thus, with our shipping hampered and crippled, that we had to face the commercial rivalry of Holland. The merchantmen of that small country carried more than 50 per cent. of our trade in and out of our own English ports. In 1620 it was said that owing to Dutch competition, London-owned

[1] *England under the Stuarts*, by G. M. Trevelyan, p. 182.

shipping was only half of its former tonnage. The Dutch merchants not only carried goods at the cheapest rates, but enjoyed, on every coast to which they traded, the protection of the finest navy and the best admirals afloat. It was not until about the close of Elizabeth's reign that Holland had begun to build ships purely for fighting purposes, but by the year 1624 their men-of-war were superior to ours. They kept their ships well, and we find incidentally that it was the practice of the Dutchmen to tallow the bottoms of their ships while the English allowed their vessels to become overgrown with weeds and barnacles below the water-line.[1]

The competition between the two countries was bound sooner or later to end—as rivalry in fleet-building has ended both before and since—in collision.

The shock came during the Commonwealth and, though the Civil War of Charles I had had the same ill effects on our Navy as the Wars of the Roses, nevertheless under Blake the Dutch were beaten, and our Navy became again the finest in the world. Highly ruinous as this war was to Dutch shipping and commerce, it meant the rise of our own Navy and Merchant Service.

Two points will at once strike the student of the history of our Merchant Shipping during the Stuart Period. First, that, as in the days of Alfred the Great, merchant ships were still scarcely distinguishable from men-of-war. Second, that the difference in design between the vessels in the early part of the seventeenth century and those that were engaged either in trade or commerce two hundred years later was but comparatively slight. Indeed, so slight were the developments that took place between this and the time of the Battle of Trafalgar that the ships of the early Stuarts would not have looked out of place among the ships of Nelson's fleet.

To-day it is as difficult to think of the *Mauretania* taking the place of the *Queen Elizabeth* in a naval engagement as it is to picture the *Queen Elizabeth* passing Sandy Hook with a full complement of saloon and steerage passengers.

As regards design, so great have been the strides made in shipbuilding during the last fifty, twenty-five or even ten years, that it is hard for us to realize that for two hundred years the development should have been so small. We shall, however,

[1] *Sailing Ships and their Story*, p. 232.

see in a later chapter the nature of the subsequent changes and the causes that led to them.

Nor must it be forgotten that the whole volume of our overseas trade during the Stuart period was comparatively small. Sir Stanley Leathes reminds us [1] that

" compared with our modern trade the trade of Charles II was insignificant. In the time of Drake our bold seamen opened to us the Oceans and Seas of the whole world. But the trade grew slowly. We had to fight for it with the Spaniards, the Dutch, and afterwards with the French ; on the Spanish Main, in North America and in India. Moreover, you cannot buy from foreign countries unless you have things to sell which they desire. For a long time we had no abundance of good and useful things to sell. As our industries improved our foreign trade grew with them."

It was not, however, until the eighteenth and nineteenth centuries that this improvement took place. And in this connection, if we wish to examine the case of a particular commodity, we cannot do better than take cotton as an example, and see to what extent our ability to manufacture it at home affected our imports and exports.

Towards the close of the seventeenth century the value of the muslin and calicoes which England annually received from India was about £160,000. During the eighteenth century, the importation of Indian piece-goods into this country, despite legislative enactments intended to foster the home manufacture of cotton fabrics, by prohibiting the wearing of Indian muslin and calicoes, rose to the annual value of £1,250,000 and the acme of this increasing trade was reached in 1806, when our importations from India of such goods as are now the staple of the industry of Lancashire, amounted to £2,000,000.

" From this date there is a decline, great and rapid, until England becomes an exporter of what she had previously imported so largely, and is able, not only to furnish cotton goods of every variety and quality for the supply of all her own wants, but also to carry the produce of her looms ten thousand miles across the seas." [2]

As regards the actual voyages of British vessels and conditions on board ship in the eighteenth century, no better description

[1] *The People in Adventure*, pp. 222–228.

[2] " Cotton Weaving and Lancashire Looms," *Macmillan's Magazine*, Vol. VI, p. 446.

of them could be wished for than is given in a book called *A Mariner of England.*[1]

This is an account of the career of William Richardson, first in the Merchant Service and afterwards in the Navy, as told by himself. He gives us a vivid picture of his experiences. Born in 1768, his first voyage was as a lad of twelve made with his father in the coal trade from Shields to London and back. After three of these coasting voyages he was bound apprentice for seven years. He was to have £25 for his seven years' service and at the expiration of that time to be a freeman of Newcastle. His ship, the *Forester*, first made a coal voyage to London; afterwards she loaded coals for Lubeck in the Baltic, but as England was at this time (1781) at war with America, France, Spain and Holland, the captain dared not venture across the North Sea without a convoy. Safely escorted, the *Forester* arrived at Elsinore, where she came to anchor and cleared at the Custom House. "We then," writes Richardson, "laid in a stock of tea, sugar and gin, which are very cheap here, and then proceeded alone for Lubeck." Having discharged the coals, the *Forester* proceeded to Petersburg and, arriving at Cronstadt, went inside the Mole in order to load a cargo of iron, hemp and tallow.

The observant Richardson does not fail to comment upon the habits and appearance of the Russians; he also complains of his own arduous duties.

"The days are very long here in Summer, being near nineteen hours, and as the Ships' Companies work from sunrise to sunset, and then have to wet the decks to keep them from rending, and get their suppers, they have very little rest. I have often slept on a chest, being too weary to pull my clothes off."

After completing loading, they left for Hull, stopping for a convoy at Elsinore, where once more they took the opportunity to replenish their stores of tea, sugar and gin. From Hull the *Forester* returned in ballast to Shields, where she was laid up for the winter.

In the following spring she proceeded in ballast to Wyburg in Finland for a cargo of deals. "We soon got in our lading of large deals, not only the ship's hold, but her decks likewise full,

[1] *A Mariner of England; an account of the Career of William Richardson, from Cabin-boy in the Merchant Service to Warrant Officer in the Royal Navy, 1780–1819, as told by himself.* Edited by Colonel Spencer Childers.

and put to sea." Arrived at Newcastle, they delivered the deals there and then took in coals again for Petersburg, returning as before, with iron, hemp and tallow.

Early the next year they fitted the ship out again and made several voyages in the coal trade to London until July, when they "got a freight to load with tar at Archangel," proceeding to the White Sea in ballast.

In 1785 we find the *Forester* ordered off in ballast to Memel in Prussia for a cargo of timber to be delivered at Lynn in Norfolk.

Her next voyage was with coals out to Marseilles and home with cotton and sarsaparilla for London. In 1786 she loaded coals for Gibraltar and thence proceeded in ballast for "a place on the coast of Barbary named Arzeu, laying between Algiers and Oran," where she loaded wheat, dates and beeswax, and left for Gibraltar, "having on board two Jew merchants as passengers and the decks full of sheep, deer, poultry, and some cages of turtledoves." At Gibraltar they received orders to proceed to Cadiz where they discharged their cargo. "We took our departure from Cadiz laden with salt bound to Königsberg in the Baltic." Here they loaded with spars for Corunna in Spain and returned to Shields in ballast. In 1787 they took a cargo of coals to Cartagena in the Mediterranean; thence across the Atlantic to Philadelphia with salt; thence with a cargo of flour and biscuit, all in barrels, for Santander in Spain; and so home in ballast to Shields.

The following year they made a somewhat similar voyage: coals to Bordeaux; salt to Philadelphia again; here they got a freight of Nicaragua wood for London. Arrived at London, Richardson said good-bye to the *Forester* and returned to the coal trade between Shields and London. In 1789 he made thirteen voyages to London. It was not long, however, before he left the coast-wise trade, for we find that in 1790 he joined a slaver bound for Guinea.[1]

[1] Writing on the subject of overseas commerce in the reign of Elizabeth, Mr. J. R. Green says (*A Short History of the English People*, pp. 386–388):—

"A lucrative traffic had already begun with the coast of Guinea, to whose gold-dust and ivory the merchants of Southampton owed their wealth; but the guilt of the Slave Trade, which sprung out of it, rests with John Hawkins, whose arms (a demi-moor, proper, bound with a cord) commemorated his priority in the transport of negroes from Africa to the labour-fields of the New World."

He happened to be in London and noticed, he tells us, a fine ship fitting out with a tier of gun ports and copper-bottomed, a rare thing for a merchantman in those days. It was said she was going on a voyage of discovery, but she proved to be a slaver called *The Spy*, and Richardson accepted a berth as fourth mate. On his way to join the ship he narrowly escaped the clutches of a press-gang.

The Spy's cargo for Guinea consisted of brandy, muskets, swords, bars of iron, brass pots and pans, calicoes of showy colours, and other things with which to trade among the blacks. The sails were bent and the vessel dropped down to Gallions Reach, anchoring there to take in gunpowder. They then sailed down to Gravesend, where they received their river pay and a month's advance, the seamen having £2 5*s.* a month—comparatively high wages for those days, and only obtainable owing to the presence of press-gangs and shortage of what would now be called "man-power."

Finally they got under way and we find Richardson soliloquizing thus :—

"From a cold severe winter I was now going to meet a hot, burning summer near the equinoctial line ; from living on good fresh English beef and beer, to live on salt junk and an allowance of water with a gill of rum a day ; from a land of Christians to a land of heathens, and from a cargo of black coals to a cargo of black human beings—a great contrast indeed ! "

After crossing "the calms," and passing the Tooth Coast, Cape Palmas, and the Gold Coast, they finally came to anchor outside Bonny Bar at the mouth of the Bonny River in the Bight of Benin. The following day they proceeded up the river to the town of Bonny and moored the ship. "We found lying here twelve English and one French ship waiting for Slaves."

During the first two months the slaves were brought to the ship pretty regularly, but after that they came slowly.

"Poor creatures ! " writes Richardson, "it was pitiful to see the distress they were in on coming on board, for some of them thought that we wanted them for food. Some of the females fainted and one of them went out of her mind. Some people in England think that we hunt and catch the slaves ourselves, but that is a mistaken idea, for we get them by barter ; their petty Kings and traders bring them to the Coast and sell them there."

After receiving her full complement of slaves (450) *The Spy* left Guinea and proceeded to Jamaica. Arrived at Jamaica,

Richardson was sent on shore with a hundred of the healthiest male slaves in order to let the planters see what fine slaves they were. " The poor fellows were glad to be on shore again, and followed me about the town like a flock of sheep." They were sold at the rate of £44 each.

After a good cleaning all through, *The Spy* returned to London from Jamaica with a cargo of rum, sugar and mahogany.

Richardson next made a voyage to India as a quartermaster ; this time in *The Prince of Kaunitz*, " a fine ship of about 800 tons built at Bombay of teakwood," owned by a Scotchman and a Frenchman, and sailing under the Genoese flag. The crew were a mixture of English, Scotch, Genoese, Italians, French, Flemings and Prussians. Soon after his arrival at Calcutta, Richardson, who had left the ship, was " pressed " by a guard of soldiers, with orders to take every English seaman they met, and was sent on board H.M. frigate *Minerva*.

Here he leaves the Merchant Service for the Navy, and here in consequence we must take our leave of him, but not without acknowledging our debt of gratitude to him for the insight that he has given his fellow-countrymen into the voyages, cargoes and conditions of British Shipping at the end of the eighteenth century.

CHAPTER II

FROM SAIL TO STEAM

There can hardly have been any walk in life, or even a by-path, upon which the reign of Queen Victoria did not leave its mark. For the merchant, it meant a change from Protection to Free Trade ; for the soldier, a change from scarlet to khaki ; for the politician, from comparatively small constituencies to ever-extending electorates ; for the cricketer, from top-hats to flannel caps ; the list is practically endless. For the shipowner, the change was one from Sail to Steam.

At the beginning of Victoria's reign, the first steamships crossed the Atlantic in a fortnight ; at its close Cunarders and White Star liners, known to a sporting people as " greyhounds," were making the voyage in a week.

Before, however, examining the technical details in the change from sail to steam, it may be convenient to record the effect upon British trade generally, and upon the shipping trade in particular, of the relaxations, whether partial or complete, that were made, either immediately before or during this period, in two existing Monopolies. These were the Monopoly caused by the Navigation Laws and the Monopolies conferred by Charter on certain trading Companies.

As regards the first of these forms of monopoly, Navigation Laws had been in operation for a long time. A Supplemental Note to an edition of Adam Smith's *Wealth of Nations*, published in 1855, tells us that the origin of the Navigation Laws of England may be traced to the reign of Richard II.

Under Henry VII, as we noticed in the previous chapter, the leading principles of the Navigation Law were distinctly recognized in the prohibition of the importation of commodities from certain foreign ports, unless imported in English vessels, manned

by English seamen. In the reign of Elizabeth we find that this policy was pursued still further by the exclusion of foreign ships from the fisheries and coasting trade of this country.

It was not, however, until Cromwell's time that the monopoly reached the height of its exclusiveness. In 1651 Parliament passed the famous Act of Navigation. Holland was then our leading rival at sea, and the Act was intended to strike a decisive blow at her naval power. It declared that no goods whatever of the growth, produce or manufacture of Asia, Africa or America should be imported into England or Ireland or any of the plantations, except directly in ships belonging to English subjects, of which the Master and the greater number of the crew were Englishmen. Having thus secured the import trade from Asia, Africa and America to the English shipowners, the Act went on to secure to them, as far as that was possible, the import trade from Europe.

Such were the leading provisions of this famous Act. They were adopted by the Government of Charles II and continued until the beginning of the nineteenth century to be the rule by which our mercantile intercourse with other countries was mainly regulated.

Not content with this legislation, our jealousy of the naval and commercial greatness of the Dutch was such that we did not hesitate totally to proscribe all trade with them. A statute of Charles II prohibited all importation from the Netherlands and Germany of a long list of enumerated commodities, under any circumstances or in any vessels, whether British or foreign, under penalty of seizure and confiscation of the ships and goods.

The policy which dictated these Statutes met with general eulogy. Adam Smith declared that national animosity did, in this instance, that which the most deliberate wisdom would have recommended, because the object of the legislation was to diminish the naval power of Holland. In a characteristic passage he writes :—

" The Act is not favourable to foreign commerce or to the growth of that opulence which can arise from it. The interest of a nation in its commercial relations to foreign nations is, like that of a merchant with regard to the different people with whom he deals, to buy as cheap and sell as dear as possible. But the Act of Navigation by diminishing the number of sellers must necessarily diminish that of the buyers ; and we are thus likely not only to buy foreign goods dearer but to sell our own cheaper than if

there was a more perfect freedom of trade. As defence, however, is of much more importance than opulence, the Act of Navigation is, perhaps, the wisest of all the Commercial regulations of England."

It has, however, been doubted whether in point of fact the English Navigation Laws really weakened the naval power of the Dutch. Some writers have ascribed the decline of the commercial greatness of Holland to the abuse of the funding system and the excess of taxation. Be that as it may, a considerable relaxation of our Navigation Laws was effected in 1823 and 1825, principally in the latter year, by the measures introduced into Parliament by Mr. Wallace and Mr. Huskisson. The effect of these measures was to place the intercourse of all European countries at amity with the United Kingdom on the same footing.

Relaxations were also made, in 1825 and 1826, in the old navigation laws in regard to the Colonial trade, but, although they did much to obviate the hardships growing out of the previous rules and to give freedom to the Colonial trade, they did not entirely effect that object, because some regulations were subsequently continued. These, however, wholly ceased on January 1, 1850, just at the time when the sailing-ship was entering upon her final struggle in competition with the steamer.

After this period all that remained of the old monopoly was to be found in the coasting trade. This is still secured to British ships, and it is very doubtful whether it would have been expedient to interfere with it. Speaking generally, the coasting trade of a country should be most efficiently carried on by the agency of its own ships.

The second of the two forms of Monopoly that were relaxed or abolished in the early part of the nineteenth century was the monopoly granted to trading Companies by Exclusive Charter. These Companies, as we have seen, were flourishing in Tudor and Stuart times, and some of them were still in existence during the latter part of the eighteenth century, when they received a thundering broadside from the pen of Adam Smith.[1] He points out how these Companies, though they may perhaps have been useful for the first introduction of some branches of commerce, have in the long run proved universally

[1] *The Wealth of Nations*, Book V, Chapter I.

either burdensome or useless and have either mismanaged or confined the trade.

He admits that certain trades, which in those days were carried on with barbarous nations, did require extraordinary protection. For instance, an ordinary store or counting-house could give little or no security to the goods of the merchants who traded to the West Coast of Africa.

"It may not," said Adam Smith, "be unreasonable, when a company of merchants undertake to establish a new trade with some remote nation, to grant them a monopoly of the trade for a certain number of years. A temporary monopoly of this kind may be vindicated; but upon the expiration of the term, the monopoly ought certainly to determine, the forts and garrisons, if any have been established, to be taken over by the Government, their value to be paid to the Company, and the trade to be laid open to all the subjects of the State.

"By a perpetual monopoly all the other subjects of the State are taxed very absurdly in two different ways; first, by the high price of goods, which, in the case of a free trade, they could buy much cheaper; and, secondly, by their total exclusion from a branch of business which it might be both convenient and profitable for many of them to carry on."

Adam Smith describes the operations of the various Companies existing in his time—the Hamburgh Company, the Russia Company, the Eastland Company, the Turkey Company, the African Company, the Hudson's Bay Company, and the East India Company. He delights to record how complaints were made against them in and out of Parliament; how the clothiers of the West of England complained of the Hamburgh Company as of monopolists who confined the trade and oppressed the manufacturers of this country. Nor does he spare the East India Company. First he shows, how during the French War, which began in 1755, they defended Madras, took Pondicherry, recovered Calcutta and acquired the revenues of a rich and extensive territory. Then with scorn he points out to what use these riches were put:—

"This great increase in their fortunes only served, it seems, to furnish their servants with a pretext for greater profusion, and a cover for greater malversation than in proportion even to that increase of fortune.

"The conduct of their servants in India and the general state of affairs both in India and in Europe, became the subject of a parliamentary enquiry."

Finally, in 1813, after Adam Smith's death, the East India Company's monopoly was abolished, so that merchants

and shipowners, hitherto excluded from the trade, were now able to test how "convenient and profitable" it might be.

In 1814 the second ship that sailed from Liverpool to Calcutta, after the abolition of the monopoly, was the *Bengal*. This vessel was owned, in part, by the present writer's great-grandfather, Mr. James Cropper. There was fear of attack by the French, and merchantmen in those seas usually carried cannon. The Quaker principles of the owners of the *Bengal* would not allow of real arms on board, but they had wooden cannon mounted at the portholes to scare an ignorant enemy.[1]

Thus, by the relaxation of the two forms of Monopoly conferred by Navigation Laws and by exclusive Charters, trade became free or practically free to all, barriers were removed, and in this greater freedom took place the unequal struggle between sail and steam.

It is not easy to fix definitely the date when this struggle for supremacy may be said to have been decided in favour of steam. Authorities differ as to the causes. Some writers state that the final blow to sailing ships was dealt by the introduction of the compound engine in 1854[2]; others declare that the death-knell of the clipper was sounded by the great increase in building of iron screw steamers during the Crimean War. But, in spite of these final blows and death-knells, we find the question of this rivalry between "bought" and "unbought" winds still being debated even as late as 1869, that is to say, some thirty years after steamers had begun to cross the Atlantic regularly.

Though steam may have replaced sail in the coastal voyages and over short distances before that date, sail was still "fancied" by certain judges in the race with steam over a long course.

In an article[3] entitled "The State of the Shipping Interest in 1869" the writer points out that "most sorts of short passage traffic are now carried on by steamers; and it is probable that in the end they will engross the greater part of the coasting trade of most countries and the trade between foreign countries adjacent to each other. But it is believed by many good judges

[1] See *The Life of John Bright*, by G. M. Trevelyan, p. 23. A picture of the ship thus protected is now in the possession of Mr. Charles Cropper, of Ellergreen.

[2] Lindsay's *Merchant Shipping*, Vol. IV, p. 435.

[3] In McCulloch's *Commercial Navigation*.

that the improved class of sailing ships have little to fear from the competition of steamers in all the more distant branches of trade. This, however, would appear to be very doubtful."

Before directing our attention to the finish of the struggle, it is perhaps better to go back to the start, and then follow the various changes in order to see what were the principal events in ship construction that took place between the beginning of the century and 1869 (when the above quoted article was written), and what their effects were upon British Shipping.

Roughly, these events may be grouped under four main headings :—

1. American Competition.
2. The China Tea Trade.
3. The Gold Rush to Australia.
4. The Construction of Steamers.

American Competition

First, then, as to American Competition. We have seen how in 1813 the monopoly of the East India Company terminated, as far as trading was concerned. Private shipowners were now able to enter the lists. The effect of competition was a reduction in the average rate of freight per ton from India to Britain from £32 10*s*. about 1773, to £10 in 1830.

The East India Company about the year 1813 paid £40 per ton for their ships, as against about £25 per ton by other traders ; the latter sum was about the same as that paid in America. The East Indiaman had a crew in the ratio of 1 to 10 or 12 tons, while 1 to 25 tons sufficed for the West Indiaman. The speed of the western ship was greater, largely by reason of the difference in proportions and lines.[1]

But although these East Indiamen carried more hands than the West Indiamen and more than a sailing ship of like size does to-day, yet every night at sunset all light sails were taken off her and the ship was snugged down for the night.

The old bluff-bowed East Indiaman had had its day when the United States, now freed from war, introduced on the sea ships with clipper bows that cleft the waves instead of hitting them and retarding the passage of the hull through the water.

[1] *Two Centuries of Shipbuilding by the Scotts at Greenock*, second edition, pp. 11 and 12.

The marine architects in America threw convention still further to the winds by modifying the design of the stern in such a way that, instead of squatting and holding the dead water, the ship slid through it cleanly with a minimum of resistance. The one object of the American designer was to build a ship that should sail every other craft off the seas, and so obtain the maximum of trade-carrying. Besides the improvement in bow and stern, the Americans lengthened the ship until she became five or six times longer than her breadth, against four times the beam in the case of the East India Company's ships.

This gave an opportunity of adding a fourth mast to the ship and of carrying more sails. The sails themselves were improved in cut. In exact contradistinction to the East Indiamen, these American ships did not reef down in anticipation of the gale that was to follow hours afterwards, but took in sail reluctantly.

The part played by the American clippers during the period between the close of the Napoleonic Wars and the beginning of the American Civil War is one of vast importance in the development of the sailing ship. Even when steamers began to cross the Atlantic in 1840 these wonderful clippers were able to cross in about a fortnight.[1]

But once again in this our Island Story, the path of cribbing was the road to glory. The English nation, more than perhaps any other, has been characterized not so much by her inventiveness as by her skill in adapting other nations' ideas. Thus, her ships of to-day are the result of continually improving upon the designs of other nations. In the previous chapter we noticed how she got her first sailing ships from the Danes and Scandinavians. From the Mediterranean she derived considerable knowledge in maritime matters. From Spain she learned much of the art of navigation, of rigging and of shipbuilding. The Dutch taught us a good deal of seamanship and tactics. Finally, after the American clippers had raced all our big ships of the Mercantile Marine off the ocean, England learned to build clippers equally fast and superior in strength, and so regained the sea-carrying trade that she had lost.[2]

And so it came about that British shipbuilders and marine architects put their heads together and decided to meet the

[1] *Chatterton's Sailing Ships*, pp. 265 and 266.
[2] *Ibid.*, p. 18.

American on his own terms. "So a new chapter in British shipping begins," says Mr. Chatterton, "and headed by Mr. Richard Green, the famous Blackwall shipbuilder, England built for herself the real thing in clippers quite early in the 'sixties."

In 1850 the *Challenger* was laid down in Messrs. Green's yard, and defeated the American *Challenge* in an ocean race from China.

Other British firms built clippers, amongst whom were Messrs. J. Thompson & Co., of Aberdeen; Messrs. Steele, of Greenock; and Messrs. Scott, of Greenock. The last-named of these firms have published a record of the work done at their yard. The book is called *Two Centuries of Shipbuilding*, and is a valuable quarry of information in which students of the subject would be well advised to hew.

Built of teak planking with iron frames, these British ships were made to last, unlike the American short-lived, soft-wood vessels. But the end of wooden ships was approaching. Wood at last was to give place to iron as the material for constructing sailing ships as well as steamers, just as, later on, iron was to give place to steel. The adoption of iron meant a saving of about a third of the weight of the hull; moreover, as ships became longer, increased structural strength was found to be lacking in wood.

In the year 1856 Messrs. Scott completed the iron sailing ship *Lord of the Isles*. Although a fine-ended ship, she carried a large cargo on board, and made her first trip to Sydney in seventy days, which had not then been surpassed. In a race from Foo-chow to London in 1856 she beat two of the fastest American clippers, of almost twice her tonnage. She "delivered her cargo of tea without one spot of damage, and thus British ships regained their ascendancy in the trade which their American rivals had for too long monopolized." [1]

The question may well be asked how it was that the Americans, if they were supreme in 1840, failed to maintain their position after the 'fifties. Answers to this question vary, for there were a variety of reasons. It will, perhaps, be enough to quote two authorities who, between them, indicate the principal causes of the eclipse of the American clippers.

In an article to which reference has been made already,[2]

[1] Lindsay's *Merchant Shipping*, Vol. III, p. 294.

[2] In McCulloch's *Commercial Navigation*.

we are told that "this decline, though in the first instance caused by the lamentable Civil War which broke out in that year, is in a very great measure to be attributed to the high tariffs, which have recently been imposed upon almost every article required for shipbuilding purposes; and unless the United States revert to a policy of Free Trade, they can never hope to rival this country in its maritime commerce."

Mr. Basil Lubbock, whose views on the subject carry great weight, summarizes the position in the following passage:—

"Iron killed the competition of our American cousins, who, as long as wood was the chief factor, were able to give us a hard fight as to which should lead the world in shipbuilding.

"Yes, it was the advent of iron more than the North and South War, more than the sinkings of the *Alabama*, more than any slump in freights or foolish shipping legislation on the part of the United States, and more even than our adoption of Free Trade, which made the British nation the carriers of the world." [1]

The China Tea Trade

We now come to the second of the events, enumerated above, that had an important effect upon British Shipping, namely, the China Tea Trade.

The present writer remembers receiving a letter some years ago in a New York Shipping Office, in which it was stated that a consignment of eggs was being shipped from New Jersey to Barbados, and it was particularly requested that the eggs might be forwarded by the next steamer, and not left on the wharf, "because," so ran the letter, "eggs do not improve by laying." Tea, like eggs, does not improve by laying in a ship's hold and, therefore, the object of vessels employed in the China Tea Trade was to race home at top speed. Enormous prizes were held out as an inducement to encourage a quick passage, and the keenest rivalry existed between different ships in the race home.

In the space at our disposal we can do little more than recommend those who are interested in the subject to read the published accounts of those famous voyages; one race, however, must be described.

Three tea clippers, the *Ariel*, *Taeping* and *Serica* started from Foo-chow on May 30, 1866, and lost sight of each other until they reached the English Channel on September 6. *Taeping*

[1] *Colonial Clippers*, p. 195.

arrived in the London Dock at 9.45 p.m., while *Ariel* arrived at the East India Dock at 10.15 p.m., or with half-an-hour's difference after racing for over three months on end. *Serica* arrived only a few hours later.[1]

The effect of the opening of the Suez Canal in 1870 was to place most of the trade to the East into steamers. So passed the glories of the tea clippers.

The Gold Rush to Australia

The discovery of gold in Australia in 1851 gave a great impetus to our Antipodean trade. Prior to that date it was mainly conducted by small vessels, which were quite unsuitable for passenger traffic.

One of them, the *Rossendale* of 296 tons, which was advertised in the press of 1845 as sailing from Liverpool to New South Wales, was described as a splendid first-class English ship, well-known as a remarkably fast sailer with " spacious and elegant accommodation for passengers, and replete with every convenience."

Those who had the temerity to make the passage to Australia in the 'forties as steerage passengers had frequently to endure great hardships, as the following statement, which was made before a Parliamentary Committee, abundantly shows :—

" It was scarcely possible to induce the passengers to sweep the decks after the meals or to be decent in respect of ordinary personal cleanliness ; in many cases, in bad weather, they would not go on deck, as their health suffered so much that their strength was gone and they had not the power to help themselves. Hence the 'tween decks were like a loathsome dungeon. When the hatchways were opened, under which the people were stowed, the steam rose and the stench was like that from a pen of pigs. The few beds they had were in a dreadful state, for the straw, once wet with sea water, soon rotted. At that time the passengers were expected to cook for themselves and from their being unable to do this, owing to either ignorance or sea-sickness, the greatest suffering arose. Thus, though provisions might be abundant, the emigrants would be half starved."

The gold rush, however, soon led to great improvements in the emigrant ships. The first licences for diggers in Australia were issued in 1851, and the first ship to land Australian gold in the British Isles—the Aberdeen White Star liner *Phœnician* —arrived off Plymouth on February 3, 1852, after a passage of

[1] Chatterton's *Sailing Ships*, p. 270.

eighty-three days from Sydney. Other vessels followed with still larger consignments of the precious metal.

Tidings of this new Eldorado soon spread, with the result that the supply of tonnage in the Australian trade was quite unable to meet the demands of the gold-fever-stricken adventurers.

In London the frigate-built Blackwallers of Green, Money Wigram and Smith were diverted from the Indian trade; whilst Liverpool shipowners hired or bought American Transatlantic packets and clippers, besides placing orders in Boston and Nova Scotian shipyards.[1]

Owing to the enterprise of Liverpool shipowners in ordering new ships for the Australian trade, Liverpool became the starting-point of the gold rush—the chief emigration port in the British Isles, not even excepting London.

Though many of the ships were hired to the Government Emigration Department, these were only a fraction of the vast fleet sailing out of the Mersey between 1852 and 1857. The most prominent firms in the great emigration trade from Liverpool to Australia were: James Baines & Co., of the Black Ball Line; Pilkington & Wilson, of the White Star Line; James Beazley; Henry Fox, of the Fox Line; Miller and Thompson, of the Golden Line; and Fernie Bros., of the Red Cross Line.[2]

Foremost among these owners was James Baines, whose career has become a sort of romantic legend. In 1851 he owned one little Canadian-built ship which he had bought at a give-away price. In 1860 his fleet numbered eighty-six vessels manned by 300 officers and 3,000 men. In 1889 Baines died, it is said, in penury in a Liverpool common lodging-house—a striking example of the vicissitudes of fortune. One of his most famous ships was the *Marco Polo* of 1,625 tons net, built at St. John, N.B. Her master was the famous "Bully" Forbes who would carry on, it is said, even when it was highly dangerous to do so, padlocking his sheets and overawing his scared crew with a pair of pistols. Once his frightened passengers sent a deputation requesting him to reduce sail. He curtly refused, and told them it was a case of "Hell or Melbourne."

On her first outward run the ship carried 960 emigrants, only

[1] *The Colonial Clippers*, by Basil Lubbock, 1921, pp. 11-22.
[2] *Ibid.*

two adults dying on the passage, although vessels carrying half the number would frequently show a mortality bill of fifty to a hundred.

When the *Marco Polo* arrived out, there were forty or fifty ships waiting to sail because their crews had deserted. Forbes, after anchoring, promptly had his own crew imprisoned on a charge of insubordination, only releasing them when the sailing day arrived. The outward run occupied sixty-eight days ; the homeward seventy-six ; and the ship was only away from the Mersey for five months and twenty-one days.

A glorious spectacle these vessels must have presented when careering through a rising sea with every rag set. In the case of the *James Baines* we are told that she flew thirty-four sails, including three skysails, moonsail and sky sternsails. These crack emigrant ships carried bands, so that the passengers could indulge in dancing when the weather was favourable, and they also published a weekly newspaper, which was printed on board, and to which the passengers contributed, the captain acting as Press Censor.

Mr. Basil Lubbock has given us a number of interesting details in regard to the great quartette built for James Baines & Co., by Donald Mackay of Boston. This quartette consisted of the *Lightning, Champion of the Seas, James Baines,* and *Donald Mackay.* Of these the *James Baines* is considered to have been the finest and fastest. We are told that when she loaded troops for India in 1857 and was inspected by Queen Victoria at Portsmouth, the Queen remarked that " she did not know she possessed such a splendid ship in her Mercantile Marine."

The *James Baines* sailed for Melbourne on December 9, 1854, and broke the record by arriving out in sixty-three days. She took out 700 passengers (eighty in the first class), 1,400 tons of cargo, and 350 sacks of mails. Amongst her live stock were a bullock, 75 sheep, 86 pigs, and 100 dozen of fowls and ducks.

Practically the alluvial gold boom in Australia did not outlast the lives of the great soft-wood clippers of the Black Ball and White Star Lines. Many of the immigrants, after landing in Australia, abandoned gold-seeking for sheep and the question of the transportation of their wool to the London market became a question of prime importance. The sales took place in London during the three opening months of the year, and keen indeed

was the competition to ensure that cargoes arrived in time. The huge Liverpool emigrant ships were not suitable for the economical transport of wool, hides, tallow, wheat and the other Australian products to their central market in London. They were too big for the amount of cargo then offering, also the repair bills of these soft-wood clippers were an ever-increasing item to put against their freight receipts.

"Thus it came about," writes Mr. Lubbock, "that the wonderful American-built ships dropped out of the running. But their London rivals, the beautiful British-built hard-wood ships of half their size, having no heavy repair bills, being splendidly built of that imperishable wood teak, and being able to fill up their small holds quickly, continued to carry passengers outward and wool homeward until supplanted in their turn by the magnificent iron clippers of the Clyde, Liverpool and Aberdeen."

At the time when clippers were in their prime, during the middle of the nineteenth century, the largest and finest ships were employed in the China and Indian trade; those in the Australian trade ranked next; then followed the vessels employed in the trade with the Pacific, the Brazils, West Indies and Mediterranean; while among the worst descriptions of sailing vessels were those engaged in the Canadian, Baltic and coasting trade; though in the case of the latter trade, sailing vessels had been to a large extent superseded by screw steamers, especially in the coal trade.

So much for the past lives and functions of these sailing ships. But what about their future? One cannot tell. It may be that the installation of auxiliary power will prolong their lives. One authority, at any rate, offers a word of hope as to their future salvation.

In an article on "The Sailing Ship's Salvation,"[1] Mr. J. W. Eason writes in an optimistic vein. After pointing out the cost of operating high-speed steamers and the disadvantages of relying upon the wind alone, he alludes to the successes attained by sailing ships fitted with auxiliary engines.

"It is possible," he writes, "for things to cost us too dear. One day we may discover that it is not the height of wisdom nor the soundest economy for an 'Atlantic greyhound' to be driven from Liverpool to New York at the speed in vogue to-day. . . . There seems a decided chance for the sailing vessel to be re-born. . . . To use the free forces of nature is an

[1] In Brassey's *Naval and Shipping Annual*, 1920–21.

excellent proposition in theory, but unfortunately the particular forces of nature in question have not that constancy about them which reliable service requires; hence the ideal seems to be to supplement nature by a little human ingenuity.

"If ever there was a doubt as to the survival of the pure sailing ship, there is no possible shadow of doubt as to the enduring place now being steadily carved out for itself by the auxiliary (as the sailing vessel with a helping marine motor installed in her has come to be popularly called). To sail when the winds are favourable, and to 'taxi' in and out of port, and when a dead calm prevails, is surely the perfection of economy."

Time alone can tell whether we have seen the last and final stage of the sailing ship, or whether we are about to see the dawn of a new development of her usefulness.

And there, in the realms of speculation, we must leave this ever-fascinating subject of sails, for the time has now come to see what progress had been made in the construction of steamers during the clipper age.

The Construction of Steamers

In 1764, when James Watt was in his twenty-eighth year, occurred the well-known incident of the repair of the model of a Newcomen fire (steam) engine, belonging to the University of Glasgow, where Watt was working as mathematical instrument maker. The poor performance of this model fixed Watt's thoughts on the question of the economy of steam, and laid the foundation of his first and greatest invention.[1]

The first man to apply steam successfully to navigation, though not the inventor of marine engines, was Robert Fulton (1765–1815), an American engineer. Born in Pennsylvania, he went in 1796 to Paris and turned his attention to the adaptation of the steam engine for marine purposes. An experiment in 1803 answered all his hopes, and in 1807 he constructed a larger vessel, the *Clermont*, in New York, whither he had returned during the previous year. This vessel was followed by the steam frigate *Fulton* in 1814.

Meanwhile, on the banks of the Clyde, experiments were being made; in 1812 Henry Bell, the Scottish inventor, after several failures, built the *Comet*, with which he proved the commercial utility of the steam system. The *Comet* was the first practical steamship to run regularly on a European river.

[1] *Dictionary of National Biography.*

Within four years of the completion of the *Comet*, it was not unusual for five or six hundred passengers to enjoy in the course of one day water excursions on the Clyde.[1]

Among the earliest of the Clyde steamers were the *Active* of 59 tons, and the *Despatch* of 58 tons. The *Shannon*, built in 1816, plied on the Shannon between Limerick and Kilrush. By 1818—six years after the completion of the *Comet*—thirty-two steamers were running on the Clyde; and some of these were sent ultimately for traffic on the coast and on other rivers.

In three successive years—from 1819 to 1821—the largest steamer in the Kingdom came from Scotts' works. The record was marked in 1819 by the *Waterloo* of over 200 tons; in 1820 by the *Superb* of 240 tons; and in 1821 by the *Majestic* of 345 tons, which cost over £40 per ton and steamed ten miles per hour on a consumption of one ton of Scotch coal. Although modern steamers have been built more than one hundred times the size of these pioneers, with a cost per ton of less than one-fourth, and a fuel consumption per unit of work done of not more than a seventh, the records of these and other early ships are worthy of attention.[2]

The advantage of steam navigation for Channel service was at once recognized. A Parliamentary return issued in 1815 showed that for the space of nine days in the previous year only one mail packet could sail between Holyhead and Dublin owing to adverse winds, and even then the average passage was twenty-four hours.

It was, therefore, in Channel services that the three above-mentioned vessels were employed. The *Waterloo* inaugurated the steam service between Belfast and Liverpool. The *Superb* traded between the Clyde and Liverpool, and was afterwards, in 1824, sent to the Mediterranean to run between Naples and Palermo. The *Majestic* was also placed in the Clyde and Liverpool service; her draught, 10 ft. 6 in. forward and 12 ft. aft, was too great for the navigation of the upper reaches of the Clyde, and passengers were conveyed between Glasgow and Greenock in a tender. In her four cabins there was greatly increased accommodation for the passengers and she was probably the

[1] Muirhead's *Life of Watt*, pp. 428 and 429.

[2] *Two Centuries of Shipbuilding*, p. 17.

first steamer with a sleeping apartment exclusively for ladies.[1]

In 1835 the *City of Aberdeen*, built for the service between Aberdeen and London, marked noteworthy progress. She measured 187 ft. over the figure-head, and was of 1,800 tons, including the space for the machinery. Her poop was 60 ft. long and 45 ft. broad. According to contemporary testimony, she was, in her day, the strongest steamer built, having solid frames from gunwale to gunwale. She had additional bracing with African oak stringers; oak and iron trussings alternately bolted to the stringers formed a complete system of diagonal fastenings and bindings from stem to stern. The whole of the cabins, saloons and state-rooms were on one deck, and there was the important innovation of hot and cold baths. The speed was twelve miles per hour.

In the late 'thirties and the early 'forties there was a great development in oversea trading steamers. Several epoch-marking voyages had been made with the steam engine used intermittently. The *Savannah* had thus crossed the Atlantic from the United States in 1819, and the *Royal William* from Quebec in 1833. In 1835 the *Enterprise*, of 470 tons, rounded the Cape of Good Hope to India. In all these cases, however, sails were utilized whenever possible, and there was still great hesitancy in accepting the steam engine even as an alternative on occasions to the use of the "unbought wind." The advantage, however, of a rate of speed which, while low, would be constant, asserted itself in due course, and there followed within a few years regular mail steamship services in the North and South Atlantic Oceans, in the Mediterranean, in the Indian Ocean, and the China Seas.

One of the first notable steamship lines to be organized for oversea service was that which ultimately became the Peninsular and Oriental Company. It had its origin[2] in steamship service from Falmouth to Oporto, Lisbon, Cadiz and Gibraltar. Four steamers were built in 1836–1837, the *Tagus*, *Don Juan*, *Braganza* and *Iberia*. These ultimately carried the mails as far as Alexandria, whence they were conveyed overland to Suez, and from thence by the East India Company's vessels to Bombay.

[1] *Two Centuries of Shipbuilding*, p. 19.

[2] Sir Thomas Sutherland, in the *Pocket Book of the P. & O. Company* (1890), p. 15.

This service developed into the Peninsular and Oriental service, when in 1840, the Company took over the mail service on the Indian Ocean ; in 1847 they extended their operations to China.

In 1840, Sir Samuel Cunard (1787–1865) established the Atlantic service which still bears his name, and almost contemporaneously in 1841 was inaugurated the service of the Royal Mail Company to the West Indies.

Thirty years had now elapsed since Henry Bell with his *Comet* had proved the success of steam power and it may be well to see what progress had been made during those years.

In fact, there had not been much advance in the steam engine, except in size, power and, perhaps, reliability. Wood still continued to be the constructive material for all but the smallest ships. Paddle-wheels were still used. Speeds on service, even on the shortest routes, were seldom over 13 knots, and on the long routes under 8 knots. The most noticeable advance was in the size of vessels, which had grown steadily up to the 1,848 tons of the West Indian mail liner.

After 1840 we enter upon the period when iron took the place of timber as a constructional material, and screw propellers replaced paddle-wheels for ocean-going vessels.

Iron was first used in part in the construction, on the banks of the Monkland Canal as far back as 1818, of a canal barge named the *Vulcan*, which continued to work for over sixty years.[1] But the first vessel built entirely of iron was a small craft constructed in 1821 in England. It was not, however, until 1832 that the first sea-going ship was built of iron. Progress in the adoption of iron was slow, largely because timber had proved so serviceable, and, with lessened restriction upon its importation, had become much cheaper. As regards the method of propulsion, though the first successful application of the screw propeller was made about 1837, a screw steamer did not cross the Atlantic until 1845. This was the *Great Britain*, which was fitted with oscillating engines arranged to drive a large spur-wheel which engaged with a spur-pinion on the propeller shaft.

Another advance in steamship construction was made in the 'sixties by the application of the compound engine to long

[1] Lindsay's *Merchant Shipping*, Vol. IV, p. 86.

voyages. The first ships in which this system was installed were those belonging to Messrs. Alfred Holt & Co. It is true the Pacific Company had compound engines fitted in one or two ships prior to this, but these were only employed in the coasting trade. The Holt Steamship Line to China was inaugurated in 1865, and was the only one *viâ* the Cape of Good Hope which proved at once successful. The early Holt liners, sailing from Liverpool, never stopped until they reached Mauritius, a distance of 8,500 miles, being under steam the whole way, a feat until then considered impossible.[1] Then the vessels proceeded to Penang, Singapore, Hong-Kong and Shanghai.

The three vessels which started the Holt Line were named *Agamemnon*, *Ajax* and *Achilles*, and were built in 1865–6 of iron. They were each 309 ft. in length between perpendiculars, 38 ft. 6 in. beam, and 29 ft. 8 in. in depth, with a gross tonnage of 2,347 tons. They had sails fitted. Their compound engines, as already mentioned, were of historical interest. Another feature on these liners was that the propeller was abaft the rudder, which worked in an aperture in the deadwood, corresponding to that for the propeller in a single-screw ship.

These three pioneer ships of the Holt Line proved most economical. The *Achilles* came home from China in fifty-seven days eighteen hours net steaming time, or, including the stoppages at ports, sixty-one days three hours. She travelled during this period a distance of 12,352 miles on a consumption of coal which did not exceed 20 tons per day for all purposes.[2]

The non-stop voyage between Liverpool and Mauritius was made as early as 1866 in thirty-seven days, equal to 10 knots speed. The compound-engine system had at once an influence on the size of ships. Until 1862 no ship of over 4,000 tons had been built, with the exception of the *Great Eastern*; by 1870 there were fifteen; by 1880, thirty-seven.

We have now reviewed the main stages in the early development of steamship construction. Perhaps the most important point to be remembered in that connection is that the process was a gradual one and occupied a considerable space of time. The changes from sail-power to steam-power for propulsion and

[1] Lindsay's *Merchant Shipping*, Vol. IV, p. 434.

[2] *Proceedings of the Institution of Naval Architects*, Vol. XI, p. 152.

from wood to iron and steel for constructional purposes proceeded very slowly.

A student of the history of the transfer of sea-borne trade from sail to steam is tempted sometimes to suppose that the change was not only rapid, but also that it occurred at the same time as, or at any rate immediately after, the construction of certain pioneer vessels, which we have already noticed, such as Bell's *Comet* (1812). It would, however, be a mistake to suppose anything of the sort, for, in fact, thirty years elapsed between the construction of that vessel and the time when steamers began to ply regularly across the Atlantic; and even then the few steamships afloat were but a fraction of the totality of British ocean-going tonnage.

The fallacy may, perhaps, be due to the fact that articles on the subject of shipping in an Encyclopedia or other work of reference often record the dates of inventions and pioneer voyages; the student learns these dates and is led to connect immediate world-wide changes with those inventions.

Thus, a chronological table of early developments in steam propulsion might be drawn up by an editor and committed to memory by a student in the following way:—

1801. *Charlotte Dundas* was built by Symington in Scotland.
1807. Fulton constructed the *Clermont* in the Hudson River.
1812. Bell began to run his *Comet* on the Clyde.
1819. *Savannah* crossed the Atlantic in twenty-five days.
1821. *Royal Sovereign* and *Meteor* employed in Irish Channel mail service.
1838. *Sirius* and *Great Western* crossed the Atlantic—the latter vessel built under the advice of Brunel, the engineer of the Great Western Railway.
1840. Cunard steamers began to ply regularly across the Atlantic.

At that point the subject might be dropped, either for lack of space or because after 1840 there were, for some time, few outstanding events in shipbuilding, except the launch of the *Great Eastern* in 1858, and development of steam propulsion went steadily forward.

It must not, however, be supposed that the process was rapid or that in the twinkling of an eye British shipowners switched

over from sail to steam. Not in 1840 ; not in 1850 ; not in 1860 ; not, in fact, until 1865—twenty-five years after the " regular plying " in the Atlantic—did the amount of steam tonnage, added to the register of the United Kingdom during the year, exceed the amount of sailing tonnage.

Whether we examine the official returns " based upon information supplied to Lloyd's Registry by the Registrar-General of Shipping " or whether we have an opportunity of studying the records of any particular firm of shipbuilders, we find the same answer, namely, that the changes from sail to steam and from wood to iron and steel were very gradual.

Taking the official returns first, we find that in 1860 the amount of " sail " tonnage constructed was about 168,000 gross tons as compared with 93,500 gross tons under " steam " ; that is to say, the amount of sailing tonnage was almost double the amount of steam tonnage built in that year.

In 1865 the figures for construction of the two sorts of tonnage drew near together—250,000 tons of " sail " against 300,000 tons of " steam." In 1870, however, " steam " went right ahead ; in that year, 541 sailing vessels, amounting to about 123,000 tons, were added to the register, while 433 steamships, amounting to some 365,000 tons, were added ; the steam tonnage thus added being almost exactly three times that of sailing vessels. After 1870 a uniform rate of increase of production of steam vessels was on the whole maintained.

As regards the materials used for constructional purposes during this period of transition, the tonnage of wood and composite vessels added in 1860 was 161,180, increasing to 166,210 tons in 1865 and then falling away at a fairly uniform rate, until, in 1880, only some 20,000 tons were reported.

The tonnage of iron ships produced in 1860 was about 63 per cent. of that of wood ships ; then, while wood shipbuilding fell off, iron shipbuilding increased and in 1870 the tonnage of iron ships was more than five times that of wood and composite ships. The output of iron ships increased until 1883, when a maximum of 857,000 tons was reached. Steel, which had come into use during the 'seventies for the hulls of merchant ships, now replaced iron, and iron shipbuilding fell away rapidly.

Turning now from these official returns, we find the same story revealed in the records of a private firm. The same gradual

movement from sail to steam and from wood to metal; the same interlacing of the different types in the same shipyard.

No better shipbuilding records could be desired than those which have been kept for over a hundred years by the Laings of Sunderland.[1] As we turn over the fragrant pages of these old books, and note the neat handwriting and faded ink of a century ago, we see ample valuable evidences of the gradual changes in types of construction; we read first the dimensions of different sailing ships, the measurements and quantities of frames and keels, masts and yards, stays and shrouds, sheets and sails; later we come to details of iron and engines. It is the story of the transition from sail to steam recorded ship by ship as each was built, first by "Philip Laing of Deptford in the County of Durham, Shipbuilder," and afterwards by his son.

The increase of shipbuilding at Sunderland during the first half of the nineteenth century was remarkable; so much so that while in 1820 only sixty ships of the burden of 7,560 tons were built in that port, no fewer than 152 ships, of the burden of 68,479 tons, were built there in 1853.[2]

In this growth the well-known firm of Laings played an important part. Comparing the experiences of this one particular firm in the light of the official returns, already given, for the shipbuilding industry of the whole country, we find, on the whole, similar results as regards "interlacing." After building wood sailing ships for a period of over fifty years, Laings launched their first iron sailing ship, the *Amity*, in 1853. In the following year, 1854, they launched two iron screw steamers, *Great Northern* and *Alfred*. In the decade from 1857 to 1867 the pendulum at this yard swung definitely from wood to iron, with the result that in that period the firm completed fourteen wood and composite ships and seventy-four iron ships, both sail and steam.

In the year 1861 we find that Laings launched one wood sailing

[1] The present writer is deeply indebted to Sir James Marr and Mr. Hugh Laing of Sir James Laing & Sons, Ltd., for their kindness in allowing him to study and make notes from the old books of the Company. Two volumes in particular, one a Shipbuilding Cost Book and the other a volume of Ship particulars dating from 1799, are veritable treasure stores of information.

[2] McCulloch's *Commercial Dictionary*, 1882.

ship, the *Dunphaile Castle*; one iron sailing ship, the *India*[1]; and nine iron steamers.

After 1867 only two composite ships appear to have been built at this yard, namely, the *Beltana*, launched in 1869, and the *Torrens*, launched in 1875. The last-named, a vessel of 1,334 gross tons, must have been something of an anachronism in her day, for by the time she was built, wooden ships, as we have seen from the official returns, were rapidly passing away; possibly her owners were conservative-minded men or they may have deliberately chosen the composite, iron-framed, wood-planked, copper-sheathed hull for service in the Australian trade, where lack of dry-docking facilities, coupled with the need for a quick turn-round and a race home, made a clean bottom an important consideration.

It would be interesting to study the developments of other individual yards, where records have been preserved throughout the transition period, but we have not the space, even if documents were available, to give a detailed description of the early development of steamship construction at each yard. We have instead given typical examples marking the progress made; we have seen something of the transfer of sea-borne trade from sail-power to steam-power; and we have noted some of the causes that led to that result.

Then, as more recently, there had been times of anxiety at home and abroad; waves of prosperity and curves of depression; and there had been Wars—the universal tonic for shipping at all times and in all places.

In 1854 the Crimean War had given a very great impetus to the construction of iron screw steamers. The cessation of the Russian War, by putting an end to the extraordinary demand for ships for the conveyance of troops, was followed by an immediate fall in freights. And though this fall was in part, it was not wholly countervailed by the demand for tonnage to carry troops to India to quell the mutiny of the native army. Concurrently, too, with these circumstances, the vast additions made by the Norwegians, Danes, Swedes and Dutch to their

[1] It is interesting to note the effect of current events upon nomenclature of ships. In addition to the *India*, Laings had, in a previous year, launched the iron sailing ship *Sir John Lawrence*, and two of the nine iron steamers in 1861 were the *General Havelock* and the *Lady Havelock*.

mercantile marine contributed still more, by increasing competition beyond the demand, to lower the rate of freight.

But apart from these transitory circumstances, the main cause of the depression of the shipping interest at that time, in this country especially, was to be found in the too great increase in shipbuilding.

The mere substitution of steam for sail, even though there had been no actual increase in tonnage, would have been really equivalent to a large addition to our carrying power, because by the employment of steamers instead of sailing ships, the same amount of tonnage performs a much greater amount of work.

The truth is, that periodically shipbuilding is completely overdone.

CHAPTER III

TYPES OF SHIPS—PASSENGER STEAMERS

It is proposed in this and the two following chapters to give some account of the different types of vessels used in overseas trade. Variations in these types have developed in accordance with the necessities of the expansion of sea transport, both as regards passengers and cargo, and on the whole the predominant factor has been the safety of life and property at sea.

For ordinary commercial purposes, it is no longer necessary to deal specifically with sailing ships, and therefore as regards the designs or types of vessels it is sufficient to deal with steamships.

These may be divided into three main groups :—(*a*) Passenger steamers ; (*b*) Intermediate steamers ; (*c*) Cargo steamers. In connection with the last group, the particular cargoes of oil in bulk and frozen meat have necessitated specially constructed oil-carriers and refrigerated ships which must be treated separately.

Before, however, coming to examine the differences between the various classes of vessels, it will perhaps be well to consider certain aspects of ship construction which are common to all vessels of whatever type.

In a book of this sort, which is intended primarily for the general reader, there is, perhaps, little to be gained by going too closely into the minute details and terminology of ship construction. It is unnecessary to describe the various plates, frames, angle-bars, stringers and other parts of the vessel.

If the " willing student " in a shipping office can spare the time to attend evening classes on naval architecture, by all means let him do so. He will thereby learn what is meant by an intercostal keelson ; he will learn that in an ordinary three-

decked vessel the sheer strake is at the upper deck, from which the freeboard is measured, while the garboard strake is next the keel; he will learn that the functions of a deck stringer are to assist in connecting the deck beams to the side of the vessel and to stiffen the shell plating, as well as contributing some longitudinal strength. The present writer recollects spending laborious nights in such study. It is idle to pretend, however, that the average man during his upward climb of the office ladder will either remember or have occasion to use what he has learnt about intercostal keelsons and garboard strakes.

There is, however, one word the meaning of which has got to be learnt, namely, the word "ton." And the sooner the student masters the meaning of the different kinds of "ton" and "tonnage" the better, for the little word will pursue him in all its meanings throughout his career. Whether in the construction of a vessel, or in selling or insuring or breaking her up, or in complying with Board of Trade regulations, in paying light dues and dock dues, or in writing manifests and bills of lading, in arranging charters or in loading cargo, the word "ton" in one or other of its meanings is always to be found and must be understood.

Every schoolboy learns that twenty hundredweights make a ton, and therefore the idea remains firmly fixed in his mind, and is supported by what he sees and hears of railway-waggons and motor-lorries, that the word ton denotes weight.

Once, however, that schoolboy enters a shipping office he must grasp the fact that the word "ton" also denotes measurement—one ton representing so many cubic feet. More than that, in the Mercantile Marine, except in certain classes of heavy cargo, the word will almost invariably have a measurement meaning.

A ton, then, is a unit used in measuring the carrying capacity or burden of a ship, the amount of cargo, freight, etc. The word "tonnage" was originally used in connection with the wine trade between France and this country; it meant a vessel's capacity for carrying so many tuns of wine, which was spoken of as her "tunnage." And so the space occupied by a tun cask of wine came to be known, in shipping language, as a "ton."

Having seen that a "ton" denotes measurement as well as weight, we must next observe the different purposes for which

a ship is measured and, in consequence, the different kinds of measurement tons.

First, a vessel is measured for tonnage by the Board of Trade surveyors under the rules and regulations laid down in the Merchant Shipping Acts. For the purposes of registered tonnage one ton represents 100 cubic ft. It is on this tonnage, as a rule, that light dues, dock dues and other expenditure for services rendered are based.

Secondly, there is the earning power of the ship to be considered. For purposes of freight, one ton usually represents 40 cubic ft., unless that bulk would weigh more than 20 cwt., in which case freight is charged by weight.

Three terms are used in tonnage for the measurement of Shipping :—

(*a*) Gross tonnage.
(*b*) Net register tonnage.
(*c*) Dead-weight tonnage.

Of these (*a*) gross tonnage represents the total measurement capacity of the ship ; that is to say, the total of the internal cubic capacity of the vessel measured in accordance with the rules laid down in the Merchant Shipping Acts—one ton representing 100 cubic ft. ; (*b*) the net register tonnage is the measurement capacity after deduction for space occupied by the engine-room, propelling power, accommodation for the crew and stores. The net register tonnage thus represents the space in the ship available for use for transport purposes. In other words, it is supposed to represent the earning power of the ship. (*c*) Dead-weight tonnage is a term frequently used in the ordinary course of shipping business and represents the carrying power of a ship, as regards both cargo and bunkers. This varies in accordance with the differences in types of vessels—the heavier the cargo the less the space occupied in any given ship. Hence ships are designed for special trades, such as the ore trade, coal trade, etc., whilst other ships are designed as general carriers.

Shipping statistics sometimes show figures in gross tons, sometimes in net tons. To arrive at uniformity, gross tonnage may be converted into net tonnage on the basis of 8 tons gross to 5 tons net. This basis of conversion, whilst unreliable for individual ships, is sufficiently accurate where large amounts of tonnage are involved.

It may be useful to mention another term which is sometimes used in connection with tonnage, namely, "displacement" tonnage. A displacement ton does represent weight and the displacement tonnage of any ship is simply the weight of the water it displaces, which is really the weight of the ship. Three other points in regard to ship construction which are common to all vessels whether Passenger, Intermediate, or Cargo, should be carefully noted. They are: (*a*) the Classification of Vessels; (*b*) Load-line; and (*c*) the Certificate of Registry.

As regards the first of these, an important feature of shipping is the Classification of Ships undertaken by the various Classification Societies. The principal societies in operation in this country, or indeed in the world, are Lloyd's Register of Shipping, the British Corporation for the Survey and Registry of Shipping, and Bureau Veritas of France.

Each of these bodies has a classification register in which are inserted the names of vessels which have been examined by the Surveyors of the body and accorded in a Class or a Standard. This Class or Standard, such as the common phrase "100 A1 at Lloyd's," is the basis on which ships are insured by underwriters—the higher the standard, the less the insurance premium. These Classification Societies have certain rules for the construction of vessels which must be complied with both as regards new construction and repairs.

The load-line of a ship is fixed by definite rules of the Board of Trade. Previous to 1890 the law prescribed that a load-line should be marked on the sides of vessels, but there were no statutory rules or regulations determining at what point on the sides of a vessel the load-line for a particular ship should be placed.

To-day every ship (except sailing ships under 80 tons register employed solely in coasting trade, ships employed solely in fishing, and pleasure yachts) proceeding to sea from a port in the United Kingdom, must be marked upon each of her sides amidships with a circular disc with a horizontal line drawn through its centre. The centre of the disc is to be placed at such level as the Board of Trade may approve below the deck-line and indicates the maximum load-line in salt water to which it is lawful to load the ship.

A great many people all over the world have heard of the

Plimsoll line, but the number of those who understand what the " line " means or why it is called Plimsoll must be considerably smaller, and, in view of the fact that the phrase about a ship being " down to her marks " is so frequently used, it may be convenient to describe briefly the origin of the Plimsoll line.

Samuel Plimsoll (1824–1898) was a British politician and social reformer, who devoted his leisure to the amelioration of the lot of the poor—more particularly the poor seamen. His efforts were directed against what were known as " coffin-ships," that is to say, overloaded ships, often heavily insured, in which unscrupulous owners were allowed by the law to risk the lives of their crews. He entered Parliament as Liberal Member of Parliament for Derby in 1868, and from the first devoted himself to the question of Mercantile Shipping. In 1870 he opened his campaign by proposing a resolution condemning unnecessary loss of life and property at sea and insisting upon the compulsory load-line as the reform to be advocated. In vain he attempted to pass a bill dealing with the subject. He was not, however, the man to be easily discouraged. In 1872 he published an attack on shipowners, called *Our Seamen*, which raised a storm of controversy and made a great impression throughout the country. As a result, on Plimsoll's motion in 1873 a powerful Royal Commission was appointed under the chairmanship of the twelfth Duke of Somerset. The report of the commission did not confirm Plimsoll's favourite idea of a fixed load-line, but nevertheless, he resolved to support it. Accordingly, the Government brought in a Merchant Shipping Bill in 1875. This was so materially altered in the course of the debate that on July 22, Disraeli, the Prime Minister, announced that the bill would be dropped. Whereupon, Plimsoll lost his self-control, attacked the class of shipowners, applied the term " villains " to members of the House, and shook his fist in the face of Mr. Speaker Brand. He was ordered to retire by the Speaker and Disraeli moved " that the honourable gentleman be reprimanded," but, on the suggestion of Lord Hartington, agreed to adjourn the matter for a week. Finally, Plimsoll apologized to the House, but there is little doubt that this exciting incident had the effect of attracting public attention. The country as a whole shared Plimsoll's view that the bill had been stifled by the pressure of shipowners, and the popular agitation forced the

Government to pass a bill, which in the following year was amended into the Merchant Shipping Act, whereby powers of inspection were given to the Board of Trade. The mark that indicates the limit to which a vessel may be loaded is, to this day, generally known as Plimsoll's Mark. In very truth, the mark that you see on the side of a ship is the mark of the honourable member's fist. Thus a beginning was made to redress the old abuse of overloaded vessels, but it was only a beginning and, as is usual in cases of reform, further steps were required and taken.

In 1880 Plimsoll gave up his seat at Derby to Sir William Harcourt and never again entered the House, but his interest in the British sailor remained as keen as before, and he expended large sums of money and a good deal of his time in promoting further reforms.[1]

In 1890 the law prescribed that the load-line marking should be fixed in accordance with the tables of freeboard and the regulations issued by the Board of Trade. Therefore, the load-line, as now marked on the sides of vessels, represents the statutory mark which must not be immersed when a ship is loaded. Provision is made for loading to different marks when loading in winter, in summer and in the Indian summer in Indian seas, also when loading in fresh water.

In the fixing of the load-line the type of vessel and the structural strength and buoyancy of a vessel are the main considerations. The freeboard of a vessel is the height of the side of the ship between the load-line and the top of the deck at the side, and really represents the margin of safety. Freeboards are assigned to vessels by the Board of Trade and on behalf of the Board of Trade, by Lloyd's Register of Shipping, the British Corporation for the Survey and Registry of Shipping and the Bureau Veritas. Needless to say, the assignment of the freeboard gives the point at which the load-line is to be marked.

As regards the Certificate of Registry, every trading vessel above 15 tons register is required to be registered under the Merchant Shipping Act. The vessel is surveyed by a Board of Trade surveyor, who issues a statement to the Registrar of Shipping showing the particulars of the vessel, which include the principal dimensions—length, breadth, depth, etc., descrip-

[1] *Dictionary of National Biography.*

tion of propelling power and the tonnage. The Registrar of Shipping then issues to the owner of the ship a form containing these particulars which is the Certificate of Registry of the ship. The formalities of registration are connected with (1) the nationality of the ship and (2) the transfer of property and rights in the ship from one person to another. In relation to nationality, the certificate of registry is an important document in the hands of the Master during the navigation of the ship, and, in relation to transfer registration, is an essential formality in connection with any document evidencing the title of an owner or mortgagee of the ship.

Having thus briefly reviewed certain features and phrases common to the building of all types of vessels, we come to consider the purpose for which a ship is built. Briefly, a ship is built to suit the particular needs of the owner and to enable him to carry on his business.

It has been truly said [1] that the only functions of the merchant ship are to carry passengers and deliver cargoes, and this delivery connotes :—

1. Loading.
2. Transportation in safety.
3. Discharging in good condition.

What cargoes are to be delivered and through what ports such cargoes are to pass is determined by the flow of overseas commerce which is, in the main, governed by the needs of the consumers. Those are matters over which the shipowner has no control—it is for him to satisfy the needs as they arise. The ships provide merely the means of transport. Shipowners have nothing to do with the production or marketing of the commodities carried. They are merely the carriers of the goods offered to them for transportation ; they are the servants of the producer and the consumer. Shipowners have sometimes been regarded as very influential people, able to extort profit as they please. This, however, is a mistaken view of the position. It would probably be truer to say that in the servants' hall of British Commerce the shipowner is the general servant. He fetches and carries. He fetches the oil and carries the coal. He goes on errands with parcels. That is his job.

[1] By Sir Norman Hill, Secretary to the Liverpool Steamship Owners' Association.

There is an old saying that "Trade follows the flag" and by that we mean that wherever the British flag is planted, there business will come. That may be; but as regards Shipping, the flag, especially the house-flag, if it is wise, follows the trade. When a shipowner builds, buys or charters a ship, he does so with an eye on the classes of cargo to be carried and the ports to be served. In that sense the flag follows the trade; any attempt to fit an unsuitable vessel into a route and so force the trade to follow her particular flag would soon end in ruin.

Generally speaking, therefore, ships are built specially for certain trades and for particular routes and it can hardly be too often repeated in the ear of the student that "the ship is made for the cargo, not the cargo for the ship."

In our review, then, of the different types of merchant steamers we will first take the passenger liners.

The large passenger ships have been described so often in novels and newspapers and are so well known as "ocean greyhounds" or "floating hotels" that, as a result of all this puffing and blowing, the British public are apt to attach an excessive amount of importance to the records and runs of these fast liners, to the splendour of their upholstery and the costliness of their state-rooms. Our exports and imports may be on the decline, our harbours may be full of tramps laid up for lack of cargoes, but the man in the Underground as he reads about the wonders of the swimming bath and gymnasium in the latest launched leviathan, feels that all must be well with the British Mercantile Marine.

It must be remembered, however, that the maritime predominance of Britain is due more to that great fleet of moderate-sized intermediate and cargo ships which maintain long voyages with regularity and economy than to the much-advertised fast passenger liners on comparatively short routes.

A shipowner, and especially a liner-owner, ought to be the last man to damp the ardour of those who have a taste for reading about or travelling in the great sumptuously-equipped vessels with their veranda-cafés and squash racquet courts; he should be the last man, so to speak, to throw cold water on the swimming bath, but, in the interests of truth, the historian is bound to record that of the total number of ships, British and foreign,

included in a recent return, less than 2½ per cent. had a speed of over 16 knots.

There is little doubt, however, but that there is more joy in the breasts of the public over the performances of the 2½ per cent. than there is over the 97½ per cent. whose doings are not recorded.

Our great passenger liners belong to the country in much the same way as do our castles and cathedrals. When in July, 1921, a fire broke out in the *Mauretania*, while she was in port at Southampton, the nation eagerly searched for the latest news of the disaster. On the following morning *The Times* voiced the sentiments of the whole people in a leading article on the subject :—

"The *Mauretania* is a national asset, and she is more than that. She is a very valuable link in the relationship between this country and North America. Her name is as well known throughout the United States as in the United Kingdom, and enormous numbers of British and American travellers have crossed the Atlantic in her and retain, we believe, pleasant impressions of the passage. She has now fourteen years' service to her credit, including the exceedingly strenuous period of the War, in which she did magnificent work for the Allied and Associated Nations, and dodged the German submarines with better fortune than her sister ship the *Lusitania*. After so adventurous a career it would have been an anti-climax for the liner to have been destroyed by a fire in port in time of peace."

The *Mauretania's* record has been a notable one. At the time of writing, she is the fastest ocean liner in the world and one of the best known. The speed of which she has been capable is more than 25 knots. She was completed in 1907 in accordance with the terms of an agreement made in 1903 between the British Government and the Cunard Company, whereby two liners of a speed of from 24 to 25 knots were to be built for the Transatlantic mail and passenger service.

No student of the history of passenger liners should fail to notice these two great ships and it may therefore be well to make mention of them here.

The *Lusitania* was built by John Brown & Co., Ltd., on the Clyde and was first in the service, making her maiden voyage in 1907. The present writer remembers crossing the Atlantic in her in the autumn of that year when she broke the record, at that time held by the Germans ; nor is he likely to forget the enthusiasm manifested on board or the piercing welcome of the

syrens in New York Harbour as the *Lusitania* made her way to her berth, as an athlete, after winning a race, slowly approaches the pavilion. And if her early life was famous and associated with struggling against the Germans, her end, when she was sunk in May, 1915, with the loss of nearly 1,200 lives, men, women and children, was equally so.

Her sister ship, the *Mauretania*, was built by Swan, Hunter & Wigham Richardson, Ltd., on the Tyne. When she appeared in the service, she improved on the speed of the *Lusitania* and was able to attain an average speed for the Transatlantic voyage of 26·06 knots. She has a gross tonnage of 30,700 ; a length of 762 ft., a beam of 88 ft., and a moulded depth of 57 ft. She is fitted with turbines of 70,000 horse-power, driving four screws. Her lines are fine and graceful as a yacht ; to see them at their greatest advantage the best plan is to visit her in dock and to stand immediately in front of and looking up at her bows, with their hollow-ground razor effect.

The *Mauretania*, like many another fine vessel, had an honourable War record ; in June, 1915, she made her first voyage in Admiralty service, carrying troops to Mudros for the Gallipoli campaign. After about four months she was converted into a hospital ship, with all the facilities of a modern hospital. Later, she again became a troopship and in September, 1916, was used to carry Canadian troops from Halifax to Liverpool. Early in 1918 she became an armed cruiser, but was soon employed in bringing American troops to Europe. In seven voyages she carried more than 33,000 men. *The Times* was right in calling her " a national asset."

In 1914, within a few weeks of the outbreak of the Great War, the *Aquitania*—a larger but slightly slower edition of the *Mauretania*—made her appearance in the Transatlantic service of the Cunard Line. The *Aquitania* has a gross tonnage of about 47,000 ; a length of 901 ft., a beam of 97 ft., a depth (from boat deck) of 92½ ft., a speed of 23 knots and accommodation for nearly 5,000.

As we have already noticed, this type of mammoth ocean hotel is exceptional, but the particulars of her size, illustrated and described in a booklet published by the Cunard Company, are worth studying. To walk round either the *Aquitania* or the *Mauretania* one has to travel over a quarter of a mile, and to

climb from the keel to the top of the funnels would take one higher than the ascent of Nelson's Column in Trafalgar Square. Cheapside could be comfortably fitted into the hull of the *Aquitania*, while one of the *Mauretania's* funnels alone would block a street in Glasgow, and that vessel herself if propped up against the Great Pyramid would afford, for the first time, shade for that wonder of Egypt. These and other curious comparisons have been pictorially demonstrated.

But when we come to the list of Live-stock and Birds required for one voyage, one has to go back to the Old Testament itself for such a catalogue of flocks and herds, he-goats and she-goats. Here is the *Aquitania's* list for one voyage :—50 oxen, 200 sheep, 160 pigs, 70 lambs, 15 calves, 3,000 chickens, 180 turkeys, 350 ducks, 90 geese, 400 pheasants, 400 pigeons, 400 grouse, 550 partridges, 800 quail, 200 snipe.

The Jewish patriarchs of old might well have envied such a store. Nor is the list of Fish and Fruit any less magnificent in size and splendour. Twenty-five kegs of oysters, 1,000 lb. of fresh salmon ; 8,600 lb. of turbot, halibut and sole ; 250 boxes of apples ; 100 boxes of oranges, 100 boxes of pineapples, and 200 boxes of melons ; these, with 80 kegs of butter, each weighing 1 cwt., and 70,000 eggs, give one some idea of the extent of the catering department and the amount of the bills.

Yet, heavy as is the expenditure on such items as 200 sheep and 3,000 chickens, the bills are trifling compared to the cost of the coal. It is the price of coal rather than the price of calves that draws comments of a gloomy nature from the chairmen of steamship companies when addressing their shareholders. And it is only natural that this should be so when we remember the vast consumption of coal that is necessary to enable one of these monster liners to make a fast passage. Twenty-two trains, of thirty trucks, each truck containing 10 tons, are necessary to carry the coal required for one trip from Liverpool to New York.

Turning now to the White Star Line, we find in their *Olympic* what might be called a half-way house between the *Mauretania* and the *Aquitania*—slightly larger than the *Mauretania* and rather smaller than the *Aquitania* ; in point of age, younger than the *Mauretania* but older than the *Aquitania*. Built in 1911 by Messrs. Harland and Wolff of Belfast, the *Olympic*

has a gross tonnage of 46,400; a length of 852 ft., a beam of 92 ft., and a moulded depth of 59 ft. She, too, has been pictorially compared, in a booklet, with various public buildings, greatly to the disadvantage, as regards height, of the Woolworth Building, New York; Cologne Cathedral; the Grand Pyramid; and St. Peter's, Rome.

Of her consumption of poultry and game during one voyage we are not given details, but we may safely assume that the scale of living is commensurate with the grandeur of so fine a ship and that the number of trains required to carry her bunker requirements is as much a matter of pride as it is of anxiety to her owners.

The White Star Line, in the last few years, have owned two other huge passenger liners of the mammoth class, both of them short-lived—the *Titanic*, sunk on her maiden voyage in April, 1912, after collision with an iceberg, the *Britannic*, torpedoed by an enemy submarine in the Ægean Sea in 1916 while she was employed as a hospital ship.

At the time of writing,[1] the White Star Line have yet another monster in process of construction in Germany, namely, the *Majestic*, of a gross tonnage of 56,000 tons—"the world's largest liner."

Whether the *Majestic*, which started life in a German cradle, will mark the limit of development of the floating hotel class of vessel, who can say? All that can be said with certainty is that the tendency at present is away from the high speed of 25 knots. Before the War we thought nothing of embarking in the *Lusitania* or *Mauretania* on a Saturday evening in Liverpool and landing in New York on the following Friday morning. Such things happened in the "good old" pre-war days; they may happen again; with the present price of coal they seldom happen now.

We have now paid attention to some of the great leviathans; perhaps it may be said that certain other great vessels have not been mentioned—the *Berengaria*, for instance. A searcher in Lloyd's Register might discover the *Berengaria*, of 52,000 gross tons, owned by the Cunard Company, and he might ask why particulars of her have not been given. The answer to that is

[1] January, 1922.

that the *Berengaria* was not British either as regards her construction or original ownership, and therefore she does not properly come within the covers of this book. She was originally German, built in 1912 by the Vulcan Works at Hamburg, and known as the *Imperator*.

Only the fortunes of War and the clauses of the Peace Treaty caused her, as they have caused others, to change her name and nationality.

By the terms of the Treaty of Versailles (Part VIII, Reparations—Section 1, Annex III) Germany recognized the right of the Allied and Associated Powers to the replacement ton for ton (gross tonnage) and class for class, of all merchant ships and fishing boats lost or damaged owing to the War. The German Government agreed to cede to the Allied and Associated Governments the property in all the German merchant ships of 1,600 tons gross and upwards; in one-half reckoned in tonnage of the ships between 1,000 tons and 1,600 tons gross; in one-quarter reckoned in tonnage of the steam trawlers; in one-quarter reckoned in tonnage of the other fishing boats. These ships had to be delivered within two months of the coming into force of the Treaty. The actual distribution was on the basis of war losses, Great Britain having the chief share.

Many of the surrendered vessels were sold by the British Government to private firms.

Enough has been said about the mammoth vessels belonging to the British Mercantile Marine. Enough homage has been paid to their lounges and lifts, the silence of their carpets and the richness of their rugs. After all, they are hotels; the Ritz and Carlton are the barrack squares from which the steward's department of the great liners draw many of their recruits. It may well be that we shall see the portraits of Cunard *chefs* hanging on the walls of the Royal Academy.

Let us return to more ordinary steamers, for the 50,000-tonner is, and will remain, the exception. Moreover, the names Cunard and White Star were well known and established long before the days of even the 10,000-tonner.

For years—and even during recent years—the old rivalry in the North Atlantic passenger trade was carried on between those great companies with vessels of a much smaller class. In the 'eighties the *Umbria* and *Etruria* of about 8,000 tons

gross competed with the *Germanic* and *Britannic*. In the 'nineties the *Campania* and *Lucania*, of about 13,000 tons, vied with the *Majestic* and *Teutonic* in the passenger traffic. There are still admirers of the *Lucania*, who consider that for beauty her yacht-like lines have never been surpassed in a merchant ship. But for size, huge as she seemed, she was soon eclipsed by the *Celtic* and *Cedric* of the opposition line, and by the *Caronia* and *Carmania* of her own company. Each of these four vessels, built in the first decade of the twentieth century, exceeded the 20,000-ton mark, and wiseacres of the day declared with spirit that the limit had now been reached.

The *Carmania* had a distinguished War record. Early in the Great War she was commissioned for naval service and fought a successful action off Trinidad Island in the South Atlantic with the German armed merchant cruiser *Cap Trafalgar* in September, 1914. The *Cap Trafalgar* was sunk, nine of the crew of the *Carmania* being killed and six wounded.

Those who have read or seen the play called "Milestones" will remember the description of the evolution in ship-construction from wood to iron, and later from iron to steel. Similarly the evolution in size of passenger ships can be traced in round thousands of gross tons in the last fifty years. The figures increase with bewildering speed. The jumps occur with the steady upward regularity of an auction sale, tempered with slight pauses: 5,000 tons; ten; fifteen; twenty; thirty; forty; now fifty-six; shall we hear sixty? Will the hammer ever fall?

It must not be supposed, however, that the smaller passenger-ships are unpopular because they are less well known. Far from it. A famous Gainsborough may still fetch a "record" price in the auction-room, but that will not discourage the humbler collectors from making their relatively small purchases. And so it is with ships.

There appears to be a growing preference on the part of a great proportion of the travelling public for the moderate-sized ship. For though the sea-sick legion may hope for salvation in a "nice, large ship," they know in their hearts that the vessel has yet to be built that will not roll in a beam sea.

In the space at our disposal it is not possible to give a long list of passenger vessels of moderate size, showing their dimen-

sions and capacity, but it may be convenient to record one or two instances as a general guide to the reader.

Here, then, are the particulars of one vessel, primarily built for the Atlantic trade, but of such dimensions as to suit other passenger services. She had a length of 470 ft. between perpendiculars, a beam of 57 ft., and a depth of 39 ft., and was designed for a speed of 13½ knots. She carried 1,408 passengers, in addition to a crew of 154, and 8,400 tons of dead-weight on a draught of 27 ft. 1 in. The vessel was propelled by triple-expansion engines driving twin screws and provided with steam from six boilers. The power developed was about 5,500 indicated horse-power, and the coal consumption averaged about 90 tons per twenty-four hours.

Another vessel [1] is of interest as showing how all the appointments of an Atlantic liner may be carried out on a smaller scale in other trades. This particular vessel was built for a tropical trade. She had accommodation for 212 first-class passengers, 462 third-class passengers, and a crew of 176. The dining saloon, which was finished in white and gold, was capable of seating 203 persons at thirty small tables. On the promenade deck was a verandah *café*, smoking room, children's room, and a music room ; the latter with walls of pale green, having dove-coloured panels and a ceiling of finely-modelled plaster work.

She was provided with a wireless telegraphic installation and with submarine signalling apparatus, which at the time of her construction, in 1911, was not so common as now ; she carried a motor launch of large size on deck for use as a passenger and mail tender.

This vessel had a length of 440 ft., a beam of 54 ft., and a depth of 38 ft., the gross tonnage being 6,991 tons, and the dead-weight carrying capacity 6,180 tons. The machinery was of the twin-screw quadruple type, balanced on the Yarrow Schlick and Tweedy system in order to reduce vibration, the further provision being made that the port propeller should run a few revolutions faster than the starboard, in order to avoid that synchronism which involved the vibration of the whole ship. During the War she was converted into an auxiliary armed cruser, acting efficiently and without mishap practically throughout the whole course of the War.

[1] S.S. *Hildebrand.*

We must now pass on to consider the engines and propelling arrangements of passenger ships. We have seen in the previous chapter how in the middle of the nineteenth century the compound engine was introduced and applied to long voyages. This engine was developed into the triple-expansion system in 1882 and later into the quadruple-expansion type. Then followed the direct-driving steam turbine and afterwards the geared turbine. Later still, we come to the substitution of oil for coal, either by use in internal-combustion engines or by burning oil in place of coal to raise steam.

Taking the period up to the declaration of War, the quadruple-expansion engine had to a considerable extent superseded the triple-expansion engine for ships intended to make long voyages, and more especially for passenger liners in which a four-crank engine had to be fitted on account of the higher powers and greater smoothness of running demanded. For cargo steamers, even of large size, the majority of owners still preferred the three-cylinder engine, as it was considered that any gain in fuel economy due to the quadruple principle, was neutralized by the loss in cargo space, because of the greater length needed for the latter engine, and its increased first cost, weight and expense in maintenance.[1]

It was in the cross-Channel passenger service that the inherent limitations of the reciprocating engines became first apparent. In these cross-Channel vessels it is, on the one hand, of the highest importance to reduce weight wherever possible so as to minimize tonnage, and save harbour dues ; while, on the other hand, it is necessary to obtain very high speeds to suit the public convenience, and this on a ship restricted in size by available harbour accommodation. To meet these conditions and to provide the required powers by reciprocating engines, increase of piston speed and rate of revolution had to be achieved. Remarkable success was attained through careful design and the adoption of the highest quality of materials and workmanship.

In the meantime, significant developments were taking place in another direction. After a long period of research, Sir Charles Parsons, having achieved commercial success in driving electric generators by steam turbines, directed his attention to the application of the turbine to marine propulsion.

[1] *Two Centuries of Shipbuilding*, pp. 126–146.

The *Turbinia*, built in 1894, was the first vessel to be fitted with turbines, but, owing to difficulties in connection with the high-speed propellers, it was not until 1897 by the application of multiple shaft propellers that the expected results were achieved. In 1899 two destroyers—the *Viper* and the *Cobra*—were fitted with this type of machinery, and it was then that the complete success of the system was finally established, particularly for small craft. In 1901 the turbine passenger steamer *King Edward* was built for service on the River Clyde, and she was followed by the cross-Channel steamer *Queen* in 1902 and the *Brighton* in 1903. The success of those vessels led to the general adoption of the steam turbine for cross-Channel service.

Thus, the turbine was now fairly established in the cross-Channel service, but in the wider fields of ocean transport the reciprocating engine still reigned supreme.

The first moderate-sized ship fitted with turbines was H.M. cruiser *Amethyst* in 1905 and in the same year the Admiralty ordered the system to be installed in the battleship *Dreadnought*. At this time also two Transatlantic liners, the *Victorian* and the *Virginian* of the Allan Line, were fitted with turbines and they were followed later in the same year by the *Carmania*. In order to test the relative economy of the new machinery, the Cunard Company ordered to be built at the same time as the *Carmania* the *Caronia*, a twin-screw vessel of similar dimensions and form, but driven by quadruple-expansion engines. The results on service, however, did not warrant the adoption of the direct-acting turbines to drive a ship of this type at a speed of 18 knots, for it was found that the coal consumption of the *Carmania* was considerably greater than that of the *Caronia*.

Nevertheless, these results did not prevent the Cunard as well as others from employing turbines for liners of relatively higher speeds; both the *Lusitania* and *Mauretania* were fitted with turbines, as were also the *Aquitania*, *Alsatian* and *Calgarian*.

The results of the *Carmania*, however, did tend to interfere with the natural development of the system of direct-acting turbines in liners of less speed. Investigation proved that the turbines of the *Carmania* ran too slowly and that the propellers revolved at too great a speed to give a maximum overall propulsive efficiency. Various expedients were proposed to over-

come the difficulty, of which mechanical gearing is the simplest and most widely adopted. By the application and use of gearing the revolutions of the propeller can be reduced.

The first Atlantic liner fitted with geared turbines was the *Transylvania*, ordered by the Cunard Company in 1913. She had a length of 548 ft., a beam of 66 ft. 3 in. and a depth of 45 ft. Her gross tonnage was 14,500 tons and she carried 2,380 passengers in addition to about 8,400 tons dead-weight. The special feature of the vessel was the propelling machinery. The original design was prepared for reciprocating engines of the quadruple-expansion type driving twin screws.

When, however, the vessel was in the earlier stages of construction, the Cunard Company decided to substitute the geared turbine type of machinery for the quadruple-expansion engines. When it was decided to fit geared turbines it was too late to modify the stoke-hold arrangements, although less steam and fuel were required for the geared turbines, owing to their higher economy.

To take advantage of the relatively greater boiler power available under the new conditions, the turbines and gearing were designed for 11,000 horse-power, instead of the 9,500 horse-power originally planned for the quadruple-expansion type, which resulted in a higher speed, namely, 16·75 knots against 15·5 knots. In the turbine arrangement the electric generators and refrigerating plant were placed between the engine-room and the aft boiler room, in a space which, in the quadruple-expansion engine design, was given up entirely to coal, so that the space elsewhere in the ship required for electric and refrigerating machinery was saved and rendered available for cargo. There was also a considerable saving in the fore and aft length of the turbine-room—amounting to 12 ft. 6 in.—as compared with the reciprocating engine-room, notwithstanding the increased power of the turbines. The cubic capacity of the machinery space was reduced by 10 per cent., and about one-third of this was used for increasing the First-class, Second-class and more particularly the Third-class accommodation, so that the gain on this account was an important item. As regards the weight of machinery, the geared turbines enabled a reduction of 12 per cent. to be effected, which, in view of the increased power developed, was very satisfactory.

The turbines of the *Transylvania* ran at 1,500 revolutions per minute, which gave a high thermal efficiency, while, by means of the gearing, the speed of the propeller was brought down to 120 revolutions, giving good propeller efficiency. Each propeller was driven by an independent set of compound turbines, the pinion on the inner side of the main gear wheel being driven by a high-pressure turbine, while the outer pinion was driven by a low-pressure turbine. The trials demonstrated that the vessel was very handy, the starting, stopping and reversing of the turbines being accomplished with great ease. The most distinctive feature was the absence of vibration.[1]

The performance of the *Transylvania* on the Atlantic was a surer test than trial trip results, and an analysis made by her owners of the year's work as recorded in the logs of the vessel showed that, at the service speed of 15·5 knots, the geared turbines gave an economy of about 15 per cent. in coal, oil and stores over quadruple engines of corresponding power.

Naturally, therefore, the *Transylvania* marked an important stage in the development of turbine machinery, and since her date there has been a great increase in the number of vessels propelled by geared turbines.

Lastly, in our survey of the changes that have taken place in passenger ships during recent years, we come to oil.

The most noteworthy of the many developments in connection with ship construction has been in the direction of substitution of oil fuel for coal. This has been done either by use in internal-combustion engines or by burning oil in place of coal to raise steam. The advance in the use of the internal-combustion engine has been very marked, but has been far exceeded up to the present by the conversion of the ordinary steam engines to burn oil fuel.

There is to-day quite a large fleet of motor ships afloat or on the stocks in various yards. The British India Line passenger vessel, *Domala*, and her two sister ships of 9,000 tons gross each, with accommodation for 135 first- and second-class passengers, are examples. They are equipped with two Diesel sets of a total horse-power of 4,660, giving a service speed of 13 knots on

[1] The details in regard to the *Transylvania's* propelling machine have been taken from the account published by her builders, Messrs. Scotts, of Greenock.

about 16 tons of oil per twenty-four hours. The Pacific Steam Navigation Co. own several motor-ships, one of which, the *Losada*, is a vessel of 6,550 tons gross with engines of 3,200 horse-power. The R.M.S.P. Co. are also owners of this type of craft.

Another motor-ship, about which it may be of interest to give a few particulars, is the *Aba*, belonging to the British and African Steam Navigation Company, managed by Elder, Dempster & Co., of Liverpool. The *Aba* saw War service and was afterwards converted in 1921 into a motor-ship by Messrs. Harland & Wolff at Belfast for employment in the Liverpool and West African trade. Her owners claimed that the *Aba* was the world's first regular motor passenger ship on an ocean route. She is driven by two eight-cylinder Diesel oil engines, designed to develop 6,600 indicated horse-power at 120 revolutions per minute. All the engine-room auxiliaries are driven by independent electric motors, with the exception of a small emergency steam-driven air compressor. The deck machinery and the steering-gear are also electrically driven.

The *Aba* is 450 ft. long and of a gross register of about 8,000 tons. She has accommodation for 225 first-class passengers and has second-class passenger accommodation as well. It had hitherto not been thought possible to drive so large a passenger vessel by internal-combustion engines, but the *Aba* has proved herself capable of making the long non-stop runs which the West African trade demands.

Indeed, the very rapid increase in the use of oil engines for propelling vessels of all sizes, from the fishing-boat to the passenger liner, leads one to the conclusion that the marine internal-combustion engine has come to stay. It has proved itself to be economical in upkeep, reliable in operation and profitable in earning capacity—advantages which are accentuated in days of coal strikes and labour difficulties.

"Other things being equal," says Sir Westcott Abell,[1] "one ton of oi utilized in Diesel engines drives a vessel three times as far as one ton of coal burnt in the ordinary way under boilers, while, if oil be used as fuel with water-tube boilers and geared-turbine engines, the arrangement is twice as efficient as when coal is the source of energy. Besides this increased

[1] Brassey's *Naval and Shipping Annual*, 1921–22. Chapter on "The World's Mercantile Marine," by Sir Westcott Abell, Chief Ship Surveyor of Lloyd's Register of Shipping.

efficiency of power production, there are other advantages to be derived owing to the ease of bunkering, the avoidance of trimming at sea, and the reduction of *personnel* for firing and supervision; while to some extent there may be a saving in weight (including fuel for the voyage) and a gain in space available for cargo, since the oil fuel can be carried in spaces, such as double-bottoms, which cannot be used either for coal or cargo."

An increasing amount of interest, on the part of ship-builders, engineers and shipowners, is being taken in the different types of marine internal-combustion engines. Trials of vessels equipped with these engines are eagerly attended by representatives of British ship-owning companies, the Board of Trade, the Classification Societies and of Companies interested in the oil industry and in general engineering. A recent result [1] has shown that the consumption of oil worked out at from 4½ to 5 tons per twenty-four hours, which, at a price of £4 15*s.* per ton, makes a total cost for the day's running of from £21 to £23 15*s.*, as compared with an estimate of £34 for a coal-burning steamer of similar size and speed. To this, of course, must be added the space saved by the abolition of boilers and bunkers, the fuel oil being carried in the double-bottom of the ship, and also the very great saving in engine-room and boiler-room labour.

The Diesel engine is a slow-speed internal-combustion engine in which heavy oil, such as petroleum, constitutes the fuel. This engine was invented by a German, Rudolf Diesel (1858–1913), and differs from other types in that no definite explosion takes place, the ignition of the charge being effected by heat generated in compressing air, the expansion of the gases constituting the propelling power.

The consumption of oil in internal-combustion engines is, of course, the ideal method, but, for technical reasons, this is not always possible, and it is necessary to burn oil in the ordinary furnaces. This latter is not an economical procedure, because the volume of oil required to raise steam in boilers is much greater than the amount of oil required to develop the same horse-power by internal-combustion engines.

The reasons for burning oil fuel even under boilers are economy of operation, because of reduced number of stokers, increased capacity for cargo because of smaller bunkers, quicker and cleaner

[1] The trials of the Brocklebank Motor-Ship *Malia* reported in *The Syren*, Oct. 12, 1921.

re-fuelling of the ship, freedom from the Damoclean sword of coal-strikes, and the hope of lower, or at least not higher cost than coal.

It is easy, however, to dwell too much on the relative cheapness of oil fuel as compared with coal.[1] It must not be forgotten that both of these commodities fluctuate in price; experience has already shown, and is likely to show more clearly in future, that the rise and fall in the price of one commodity bears a distinct relation to that of the other. In this connection people have even been reminded of the comparison between the expense of sending a vessel through the Suez Canal and the cost of the longer voyage round the Cape.

As regards the increase in cargo capacity it has been estimated that 39 cubic ft. of oil have the equivalent heating value of 65 cubic ft. of coal; moreover, as we have seen, oil fuel can be carried in spaces, such as the double bottom, where it is impossible to load or trim the coal.

Three of the mammoth liners, which we have already noticed, namely, the Cunard *Aquitania* and *Mauretania*, and the White Star *Olympic*, have been converted from burning coal to firing with oil fuel. The conversion of a passenger liner to oil fuel involves, as may readily be understood, a great deal of work in connection with fire prevention, but to so perfect a state has this arrived that there is not a case on record to date of such a converted vessel having a fire on board. Indeed, if proper precautions are taken, oil burners are said to be safer than coal bunkers, because there is no risk of combustion in the bunkers.

Nor are the Cunard and White Star the only lines that have converted passenger steamers. The Royal Mail have converted their *Arlanza* and *Almanzora*; the P. & O. have adopted a similar policy with some of their ships, as have also the Pacific Steam Navigation, and other companies too numerous to mention.

[1] "The continued high price of oil suitable for motor ships prevents full advantage being secured from this interesting development in modern marine engineering, as, on the basis of the present cost of oil and coal in this country, there is relatively only a very small saving in the cost of fuel in the motor ship as compared with the coal-burning vessel."—Sir Owen Philipps at Annual Meeting of Shareholders of Lamport and Holt Line, March 17, 1922. Reported in *The Times*, March 18, 1922.

One difficulty in regard to oil fuel is the question of supply. For this reason it is not uncommon for boilers to be arranged so as to be capable of burning either coal or oil, as may be found most expedient; and while certain advantages accruing to the use of oil fuel exclusively are sacrificed, the steamers fitted with the alternative arrangements are more favourably placed for general trading, and are able to take advantage of the fluctuations in the coal and oil markets.

However, as time goes on, improvements in connection with the supply of oil fuel are continually being made. Coaling stations are still required, but, in addition, oil-bunkering depôts are being laid down on the various trade routes all over the world. Firms that formerly kept coal depôts and supplied coal to steamers are now, in their wisdom, turning their attention to oil fuel.

And wise they are, because the conversion of the bunker holds of liners into oil tanks has been on a very large scale. No object would be served and no help given to the student by recording the particular number of vessels or the exact amount of tonnage converted at the moment of writing, for the figures would be out of date before this book is published, but the details are given in Lloyd's Register and should be carefully studied.

CHAPTER IV

TYPES OF SHIPS—INTERMEDIATE STEAMERS

We come now to the second of the three main groups of steamers, namely, the Intermediate Ships. We have dealt with the first group, the Passenger Liners ; we shall examine later the purely cargo vessels ; for the moment we are concerned with the intermediate class, whose function is to carry both cargo and passengers. It is a little difficult to lay down precise definitions as to what does or does not constitute an " intermediate " boat. A vessel which might be considered a passenger boat in one trade might be regarded as an intermediate boat in another. If it were true to say that intermediate ships were those which carry both cargo and passengers, then the *Mauretania* would be an intermediate ship, for even the " floating hotels " have some cargo accommodation, and only a few vessels engaged in the passenger trade, such as excursion steamers and some of the cross-Channel boats, would really qualify to be called passenger ships. Common-sense must be used. Obviously, the primary object of the floating hotels is to attract and secure full complements of " guests " who shall be " satisfied " and tell their friends. Cargo is a secondary consideration. With the intermediate ships it is otherwise ; their first consideration is to get a full cargo, but they have also some accommodation for passengers who wish to travel at a slower rate of speed and a lower rate of fare than those in force in the fast passenger liners. Or it may be that in certain services there are no fast boats running because there is no demand for them, in which case the more leisurely " intermediate " liner will suffice to carry such passengers as are offering.

In any case, those who go down to the sea in intermediate ships know quite well what to expect and what not to expect.

The speed will be moderate; the fare may not be considered so, but it will in fact be less than that charged in the "greyhounds"; there will be no orchestra and no gymnasium.

In the eyes of the Law, however, whose vision is different from that of the shipowners and travellers, the floating hotels and steady-going intermediate boats are all in one class.

Under the Merchant Shipping Acts the expression "passenger steamer" means—

"every British steamship carrying passengers to, from or between any places in the United Kingdom, except steam ferry boats working in chains (commonly called steam bridges), and shall include every foreign steamship (whether originally proceeding from a port in the United Kingdom or from a port out of the United Kingdom) which carries passengers to or from any place, or between any places, in the United Kingdom."

The expression "passenger" includes any person carried in a ship other than the master and crew, and the owner, his family and servants.

The Act proceeds (in Section 15 of the Act of 1906) to define what is meant by taking on or landing passengers:—

"Where a passenger steamer takes on board passengers from a tender, or lands passengers by means of a tender, she shall be deemed to be taking the passengers on board from, or landing the passengers at, the port, from or to which the tender comes or goes, and passengers conveyed in a tender to or from a ship from or to a place in the United Kingdom shall for the purposes of any returns to be made under the Merchant Shipping Acts, be deemed to be passengers carried from or to a place in the United Kingdom."

Thus, if an intermediate ship of, say, 5,000 gross tons, with a speed of 12 knots and carrying 3,000 tons of cargo, leaves Liverpool with, say, twenty cabin passengers, she becomes "for the purposes of this Part of the Act" a passenger steamer. If, in addition, she were to carry more than fifty steerage passengers, she would also be an "emigrant ship," for the expression "emigrant ship" means—

"every sea-going ship, whether British or foreign, and whether or not conveying mails, carrying, upon any voyage to which the provisions of this Part of this Act respecting emigrant ships apply, more than fifty steerage passengers, or a greater number of steerage passengers than in the proportion—

"(*a*) if the ship is a sailing ship, of one statute adult to thirty-three tons of the ship's registered tonnage; and

"(*b*) if the ship is a steamship, of one statute adult to every twenty tons of the ship's tonnage; and includes a ship which, having proceeded from a port outside the British Islands takes on board at any port in the British Islands such number of steerage passengers whether British subjects or aliens resident in the British Islands, as would either with or without the steerage passengers which she already has on board, constitute her an emigrant ship."

The intermediate boat is built—as all boats should be built—to suit the particular class of cargo and the particular class and number of passengers that the service demands. She may not be spoken of by her owner as one of his "passenger" ships, for he may have faster boats in other services; he may never refer to her as an "emigrant ship," no matter what the Act may have to say on the subject, but in one particular item of expenditure he will have to reckon her among his passenger ships inasmuch as she will have to undergo an annual survey in order to obtain her passenger certificate.

The law provides that every passenger steamer which carries more than twelve passengers—and this covers the intermediate steamers—shall be surveyed once at least in each year, and shall not proceed to sea on any voyage with more than twelve passengers on board unless a certificate is obtained from the Board of Trade applicable to the voyage on which the steamer is about to proceed. A passenger steamer attempting to break this law may be detained until such a certificate is produced to the proper officer of Customs.

With the details of the work involved in putting a vessel through her surveys, we shall deal in a later chapter,[1] when we come to examine the problems connected with looking after a vessel at her home port after the termination of a voyage.

We are immediately concerned with what an intermediate ship is like and it is therefore necessary to give a description of one or two particular vessels.

In describing a ship, as in describing a horse or a house, there are certain particulars which are usually given—the sort of particulars that would enable a prospective buyer to decide whether it is worth his while to go and have a look at her or not.

In the case of a ship these particulars generally begin with

[1] Chapter XI: "At the Dock."

her age, the name of her builders, a description of her decks and her classification (whether 100 A1 Lloyd's or otherwise); then follow the principal dimensions,—the length, breadth and depth of the ship; the deck erections, including bridge, poop and forecastle; and the deck houses such as saloon-house, smoke-room and Marconi-house; then the figures for the tonnages are given, gross, net and dead-weight; the draft, fore, aft and mean; the freeboard figures; the cargo and store capacities in cubic feet, including the cold chambers, baggage-room, mail-room and magazines; the water-ballast arrangements in tons; bunkers in tons; the size of the hatches; the accommodation, showing the numbers of crew, and first-class and steerage passengers; the life-saving appliances, giving the number of life-boats with the dimensions of each; finally, there are the details of the deck machinery, engines, boilers, propellers, horse-power and speed.

The Deck Machinery includes the derricks (their number and lifting capacity in tons), windlass, steering-gear, winches, cranes, capstans, dynamos, refrigerating engines and fresh-water condensers (in gallons per hour).

Among the particulars of the Engines must be given the name of the builders, a description of the engines (whether triple-expansion or otherwise); their age; the diameter of the cylinders. As regards the propellers, it is necessary to give the number and type of propellers and also the number of blades on each propeller.

After a glance at so long and varied a list of particulars it will easily be understood that however well a man may know his own ship, or the ships of his Company, however keen he may be to master his business in all its details, it is practically impossible, especially where a Company owns a fleet of twenty or thirty vessels, for anyone, from chairman to office-boy, to carry in his head all the figures of all the particulars given above. The best he can hope to do is to carry the figures in his pocket or to keep them within easy access in a note-book. Sooner or later and usually without warning, either in the office or on board ship, he will want to know some fact about one or other of the items in the long list of particulars, some point about the cargo capacity or the cold chambers or the size of the hatches or the life-saving appliances or the derricks or boilers, or what

not, and it is just as well to have the information kept in some handy, portable form.

Taking the list as given above, it may be convenient, with a view to showing the actual particulars of an intermediate ship, to set down the exact figures and facts. Here, then, is an intermediate vessel—s.s. *Alban*, built in 1914 by the Caledon Shipbuilding and Engineering Company.

She has two decks and deep framing, and is classed 100 A1 Lloyd's. Her length between perpendiculars is 375 ft., her breadth 51 ft. 6 in., her depth moulded to the upper deck is 32 ft. 3 in.; her saloon-house is 44 ft. by 28 ft. 6 in.; her smoke-room, 16 ft. by 23 ft., and her Marconi-house 16 ft. by 9 ft.; her gross tonnage is 5,223 and her net tonnage 3,261; her draft (summer) is 26 ft. 2 in., her freeboard 6 ft. 5½ in. (summer). She has five holds, including reserve bunker. The capacity of her holds, reserve bunker and deep tank totals 4,451 tons (of 44 cubic ft. each) or exactly 195,879 cubic ft. In her 'tween decks there is a capacity of 2,180 tons or 95,911 cubic ft. In other words, her total cargo capacity (holds and 'tween decks, including steerage space) of 6,631 tons and 291,790 cubic ft.

Her cold chambers, with a temperature of 22° in the rooms containing ice, fish, poultry and meat, 32° in the handling room and 35° in the vegetable room, have a total insulated space of about 49 tons, or 2,151 cubic ft.

As to her water-ballast capacity, she can carry 1,447 tons altogether, including double bottom, fore and after peaks. Her total fresh-water capacity amounts to 34,270 gallons.

We now come to her bunker capacity—a most important point. She has room, in the permanent and reserve bunkers, for a total of 2,290 tons of coal. As regards the hatches, it is important to know the size of the hatches of a ship in connection with stowing cargo in the holds. For instance, bulky goods, such as motor-lorries, might be accommodated easily enough at the bottom of the holds of one ship, while in another vessel the hatches might be too small to permit of the lorries being lowered through the hatches. The intermediate ship which we are examining has four hatches measuring 19 ft. 6 in. by 16 ft. in the case of No. 1 hatch, 32 ft. 6 in. by 16 ft. in No. 2, 26 ft. by 16 ft. in No. 3, and 23 ft. 10 in. by 16 ft. in No. 4.

She has accommodation for a crew of 64, for 48 cabin passen-

gers and 108 steerage and she can seat 48 in the dining saloon. She carries five life-boats altogether, four of them measuring 28 ft. by 8 ft. 6 in. by 3 ft. 6 in., while the fifth—a smaller one—measures 26 ft. by 6 ft. 9 in. by 2 ft. 9 in.

Her derrick arrangements have been specially provided to meet the requirements of a trade in which there are heavy weights, such as locomotives and launches, to be carried on board for delivery at ports where the landing facilities are meagre. In a subsequent chapter on harbour facilities,[1] we shall have occasion to notice that there are ports which are little better than open roadsteads, where, for discharging cargo, a vessel must depend on her own gear.

This particular ship carries eleven derricks, one with a hoisting capacity at 50 tons, two at 10 tons, and eight at 5 tons.

Her steering gear is Hastie's, she has nine Dunlop Bell winches and she carries an anchor crane. She is fitted with one fresh-water condenser made by Quiggins, with a capacity of 209 gallons per hour.

We now come to the Engine Department. Her engines were built in 1914 by the Caledon Shipbuilding and Engineering Company, and are of the triple-expansion type ; there are three boilers, and nine furnaces with Howden's forced draught. She is a single-screw vessel—one propeller with four bronze blades. Her trial trip particulars showed her capable of a mean speed of 12¼ knots per hour, while her performances at sea have given an average of 11¼ knots with 2,300 horse-power.

Those, then, are the main particulars of the intermediate ship with which we have been dealing. The list of items is a formidable one, but further details could be given and should be included in a thoroughly compiled pocket-book on the subject. These further details might comprise the hull scantlings or measurements ; that is to say, the dimensions of the keel, stem-bar, stern-post and rudder ; the thickness of the floors ; the dimensions and spacing of the frames ; the particulars in regard to keelsons and side-stringers ; the number and thickness of water-tight bulkheads ; the sort and thickness of decks—whether wood or steel—whether pitch-pine or teak ; the thickness of the shell plating in different places—at the bottom, at the

[1] Chapter XII.

turn of the bilges and at the sides ; the height of the bulwarks and the dimensions of the bilge keels.

Having now given a description of a particular intermediate ship, it may be well to give the details of another and smaller type which approximates more nearly to the cargo-boat. For just as in the eyes of the law any ship carrying more than twelve passengers has to be surveyed as a passenger steamer, so in the eyes of the travelling public a vessel with passenger accommodation limited to twelve persons is frequently classed as a cargo-boat. How often has one heard travellers on their return home recording their adventures in distant seas : " We went in such a funny old cargo-boat ; only ten passengers besides ourselves, and nowhere to sit except in the dining saloon, where even between meals the table was usually spread with spoons and forks."

And all the time the vessel may have been a perfectly good intermediate boat, recognized by law as a passenger steamer. Here follow the particulars of just such a ship :—

The *Boniface* was built in 1904 by Messrs. Barclay, Curle & Co., of Glasgow. She was sunk during the Great War off the coast of Ireland. She had passenger accommodation for 16 persons in the saloon-house and steerage accommodation in the shelter deck aft for 74 persons. Her crew numbered 44. She had two decks and a shelter deck, and was classed 100 A1 Lloyd's ; her registered dimensions were 355 ft. in length by 48 ft. 7 in. in breadth by 24 ft. deep ; her gross tonnage was 3,799 tons and her net tonnage 2,450.

As regards her deck erections, she had a flush shelter deck with a saloon-house 24 ft. by 38 ft. and a chart-room, above the saloon-house, 12 ft. by 10 ft. She had a freeboard of 2 ft. 11 in. (summer) and her maximum draft (summer) was 24 ft. ; her dead-weight tonnage was 6,245 (maximum load).

She had five holds, including the reserve bunker, and a total cargo capacity, including deep tank, reserve bunkers, shelter deck and steerage, of 7,176 tons of 44 cubic ft. or 315,824 ft. Her water-ballast capacity, including after peak, fore peak and deep tank, amounted to 1,447 tons, and her fresh-water tanks could hold 8,196 gallons.

In her permanent bunkers she could carry 891 tons and in her reserve bunkers 1,225 tons.

The sizes of her hatches were as follows :—No. 1, 24 ft. by 16 ft. ; No. 2, 18 ft. by 16 ft. ; No. 3, 15 ft. by 15 ft. ; Nos. 4 and 5, 24 ft. by 16 ft.

She carried four life-boats, one cutter and one dinghy ; two of the life-boats were each 24 ft. by 6 ft. 9 in. by 2 ft. 9 in. ; the other two were each 27 ft. by 8 ft. by 3 ft. 3 in. ; the cutter was 18 ft. by 5 ft. 6 in. by 2 ft. 3 in. ; the dinghy was of the same dimensions as the cutter.

As regards her deck machinery, there were thirteen derricks on board ; one with a hoisting capacity of 20 tons, two at 10 tons, eight at 5 tons, and two at 3 tons. She had Harrison's steering gear, Dunlop Bell's winches, an anchor crane, and one fresh water-condenser (Breeze's make) with a capacity of 125 gallons per hour.

Her engines were built by Messrs. Barclay, Curle & Co. in 1904, and were of the triple-expansion type. There were two main boilers and six furnaces with Howden's forced draught. She had a single screw with four bronze blades. Her performances at sea showed an average speed of 10¼ knots with 2,100 horse-power.

Such is the sort of intermediate vessel that may be found in any of the trade routes and most of the ports—for there is nothing forbidding about her length and depth—and some of the rivers of the world, nosing about for pickings of cargo in remote, unhealthy, tropical places, like a cat in an ash-barrel. To such a vessel and her crew change of climate is nothing. Her decks are white with Canadian snow one day, and a fort-night later blistered with the equatorial sun. To-day, the radiator in the saloon splutters with steam, next week the electric fans will be all a-whirr, and "the old man" will be munching mangoes in his bath.

As an instructor in the business of Shipping, in port facilities, in navigation, in the daily routine of the ship, in the appearance and conduct of seamen, no type of vessel can rival the inter-mediate class. You can cross from Liverpool to New York in a fast and vast liner without being aware of the derricks and winches, without knowing that there was any cargo on board, without ever hearing an order given or watching it carried out, without even seeing a sailor or fireman.

In the intermediate vessel you are daily acquainted with

the business of the ship. You take an interest in the cargo; you watch a shipment of hides being loaded, or mules being slung over the ship's side; you learn the mysteries of the dog watch and, possibly, the names of the guiding stars. You are told when storms are expected, when the glass is falling or rising. You hear of the ailments and the characteristics and even the hobbies of members of the crew. This one sprained his ankle yesterday; that one can mend a clock. In port you learn to ask whether and when the ship is going to coal—will you be blackened by day or wakened by night to the monotonous chanting of negro stevedores and the crash of coal-tubs tipped into bunkers?

That is what the intermediate ship teaches you. That is British Shipping.

It was in just such a steamer that the present writer was one of a quartette of passengers who made a voyage in June, 1914, from Pernambuco to Para.

For some days we had waited in Pernambuco for that steamer. We were northward bound; she was coming from Buenos Ayres to pick us up. Every morning we would gaze out to sea across the breakwater hoping for a sight of her; in the afternoon we would explore Olinda and other places of interest and beauty outside Pernambuco. The next morning we were sea-gazing again. Other vessels came and went. The *Aragon*—then one of the "crack" passenger boats of the Royal Mail—appeared in the distance, called and proceeded, leaving behind a few passengers and a rumour that the Chairman was on board. Poor old *Aragon!* She was sunk in the War, but not until after she had served in Mudros Harbour as the headquarters of the Inspector-General of Communications in the Dardanelles Campaign. There, owing to the constant coming and going of officers bound to or from the Gallipoli Peninsula, she was known as the "United Service Club." Lying at her moorings in that harbour she was the jumping-off place for Cape Helles or Anzac or Suvla. In her dining-saloon one had one's last meal before catching "the ferry" for the Peninsula. For many and many an officer, the last tablecloth he ever saw was in her saloon and the last china plate he ever used bore the crest of the R.M.S.P. Co.

In June, 1914, however, while we waited at Pernambuco in

complete calm for our intermediate boat, the *Aragon*, outside the breakwater, had no reason to suppose that within a twelvemonth she would be anchored in one of the harbours of the Ægean Sea.

At last, to our great relief, our ship appeared. But our pleasure at seeing her in the distance was to a great extent mitigated by seeing, as she came nearer, that she was flying the yellow quarantine flag. Happily, the illness on board proved to be only a mild case of typhoid fever, and after removal of the patient—a member of the crew—to a hospital on shore, it appeared that the ship would not be detained. What was more serious was that one of the firemen on board had gone mad and after first expressing a desire to kill the Captain, transferred his desires in the direction of the newly-embarked quartette of passengers. This involved further formalities at the British Consulate and at last we put out to sea. It was then that we began to know something of the life on board an intermediate ship. In the Steward's Department there were four men, who were mainly responsible for ministering to the wants of the four passengers. These were the Chief Steward; the Assistant Steward, who, in addition to waiting at meals, also "did" the state-rooms; the Chief Cook; and the Assistant Cook. The last-named was a Scandinavian who had been signed on at the last moment in Buenos Ayres to replace an Englishman who had "jumped the ship" at that port. This Scandinavian was perfectly useless. The four were therefore reduced to three, for all practical purposes. On the first day out from Pernambuco the Chief Steward fell a victim to ptomaine poisoning and took to his bed. And then there were two. The next morning while we were having breakfast the Cook (unassisted by the useless Scandinavian) had an accident in the galley. The heavy iron front of the grate fell on his foot and broke a toe. And then there was one. So it came about that this admirable Second Steward, during the rest of the voyage to Para, performed all the duties of Chief Steward, Second Steward, Chief Cook and Assistant Cook. In the morning he called us, cooked our breakfast in the galley, brought it to the saloon and waited on us, and later on tidied up our state-rooms. So it went on all day. He never complained, he just worked the entire day.

W. S. Gilbert, in *The Yarn of the Nancy Bell*, has rolled many offices into one " elderly naval man."

> " Oh, I am a Cook and a Captain bold,
> And the mate of the *Nancy* brig,
> And a bo'sun tight, and a midshipmite,
> And the crew of the Captain's gig."

We learn, however, that the duties were only embodied in one individual by methods of cannibalism. In the case of the Assistant Steward in our intermediate ship the duties were combined by sheer grit and good fellowship.

In the construction of an intermediate steamer problems arise that are common to the two other main classes of ships. The owners decide that they want to build a vessel of certain dimensions of length, depth and breadth ; they decide upon the approximate speed, the coal consumption, the passenger accommodation (in the case of passenger and intermediate boats) and the cargo-capacity. Those are the main essentials. If the owners have a construction department of their own or their own naval architect, they say what they want, and forthwith the department proceeds to elaborate the plans, and then obtain quotations from builders. Where there is no such department, the figures for the dimensions and other particulars of the ship are sent by the owners to ship-builders, who are asked to submit tenders for the construction of such a vessel.

In the case of a Company that has its own Naval Architect's Department, there is often a tendency to spend more money on the ship than would be spent in cases where there is no such department. Captains of vessels and marine superintendents—not the old-fashioned, conservative sort, but keen, up-to-date young men—have been heard to declare that their Directors would be well advised to give up having their own Naval Architect's Department, and simply ask builders for tenders. If this were done, they declare, there would be no temptation to be continually re-opening a contract and altering the design of the ship after the tender has been accepted. On the other hand, like all " spending " departments, the Naval Architect contends that he saves the owners more money than any other department. The question whether a firm should or should not have a construction department is largely one of degree and one that

should be governed by the amount and the class of tonnage to be constructed. While it would be absurd, for instance, for the owner of five cargo steamers to maintain an expensive Naval Architect's department, it would probably be necessary for a Company owning a large fleet of passenger liners to have some such organization. During the time when the plans for a new vessel are being worked out, the Naval Architect's Office becomes the battle-ground where representatives of all the different interests in the ship meet in fierce conflict. It is then that the Board must exercise their control.

The Passenger Manager will want more than his share of the ship for passengers. The Superintendent Engineer will demand more space for the engine-room. The Superintendent Steward must have more accommodation for his stores and stewards. The Medical Superintendent cannot possibly manage with what the Naval Architect has allowed him for the hospital and surgeon's quarters. It would not be healthy. The Marine Superintendent thinks the crew's quarters too cramped and the chart-room on the small side. Then there is sure to be at least one director with dodgy ideas about larger bath-rooms and wider berths. So it goes on.

All these competing claims are urged with a vehemence that implies that it would be better to have no ship at all than the miserable thing suggested. No applicant cares what other department goes short so long as he gets the extra space which he so badly needs.

It would be precisely similar if a man, in setting out to build a house, were to consult his Cook and Housemaid. The former would like the house to be one vast kitchen; the latter one capacious housemaid's cupboard. At the same time, many a house would have been better designed had the Cook and Housemaid been consulted as to the plans.

Left to themselves, the Superintendents and experts would never settle their disputes, and, therefore, it is necessary to have a firm, wise and tactful Chairman, equipped with enough knowledge of his particular business to decide exactly what type of vessel is required for the trade, down to the last berth and bath-room, and with strength enough to restrain the experts.

The late Lord Salisbury is reported to have said: "If we listened to experts, we should have to put a garrison in the

Moon to protect it against an invasion from Mars." In the same sense, Lord Inchcape in one of his speeches remarked: "Experts are excellent advisers, but it is a fatal mistake to give them too much rope. If you do, in nine cases out of ten they will land you in bankruptcy."

In neither case were the noble lords referring to naval architects in particular, or to experts in matters of ship construction, but the underlying advice is the same. In government circles as in business offices, the same feeling prevails. The present writer during his period of service in Whitehall and even more especially during the Peace Conference in Paris, used to notice the same attitude of fear mingled with suspicion shown towards experts as he has seen so often in the shipowner's parlour. As in Downing Street so in the Quai d'Orsay. At times of difficult international negotiations the feelings of Statesmen towards experts seemed almost to amount to dislike. To refer to them at all appeared to be in the nature of a regrettable necessity. In fact, one came to regard experts as people who must always be ready with facts; who had better be kept waiting in ante-rooms with their large-scale maps and statistics; who might sometimes be summoned (with their maps and statistics) into the presence of the great; but whose advice must always be avoided, if possible.

Such is our English custom. We can almost hear the applause after the *dicta* of Lord Salisbury and Lord Inchcape. They express the general view—"Don't give the expert too much rope." We feel all the better and wiser for having said it. We cannot say it too often.

In the Shipping business it is the directing head of the firm who pays out the rope to the experts, when the time comes to build a new vessel.

In considering the question of tonnage[1] and the meaning of the word "ton," we noticed the importance attached to the earning capacity of the ship. A ship is planned with certain dimensions and from the very outset the owners must keep a close watch on the cost and the earning capacity of the vessel. Every cubic foot counts. Every nook and cranny should be capable of use, for if there are places and spaces in the ship that cannot be used they are paid for in the original cost of the ship; and if they are in the "earning" part of the ship, they have to pay their share of the tonnage and other dues.

[1] Chapter III, p. 44.

How to get the utmost amount of earning power out of a ship must be the constant concern of those responsible for the plans. We saw in the case of the *Transylvania* [1] that the installation of geared turbines instead of reciprocating engines of the quadruple-expansion type resulted in the cubic capacity of the machinery spaces being reduced by 10 per cent. Here was a clear case of increase in earning capacity, for about one-third of the space saved was made available for increasing the First-class, Second-class, and more particularly the Third-class accommodation.

Instances could be multiplied, showing how the earning capacity of a ship can be wasted or increased. Examples will occur to every one. A state-room can be converted into a bath-room, or vice versa.

Exactly the same problems connected with earning capacity take place on shore—in hotels (where guests are glad to sleep on billiard-tables in the rush of the racing season) and even in private houses (where the demands of a growing family encroach upon the empty spare rooms).

If rates and taxes should be levied on the cubic capacity of houses as they are on the tonnage of ships, we might well see the present housing problem solved. Few would be able to afford the luxury of a dressing-room. For most it would be a choice between the upper or lower bunk.

As regards the cost of the ship, in view of the fact that a ship is a wasting property, something has to be set aside each year for depreciation. It is necessary, therefore, that the freights and passage money received should not only cover working expenses and provide a return on the capital employed, but they must also be sufficient to replace that capital. Elsewhere [2] we shall deal with the necessity of getting as many voyages as possible out of a ship during her all too short life, but for the moment we are concerned with the problem of depreciation. It is clear that the first cost of the ship is a most important factor, from the depreciation point of view. Just as in the case of the earning capacity, every cubic foot must be scrutinized, for reason of revenue, so every shilling of the prime cost must be closely watched, on the expenditure side of the account.

These observations may sound superfluous and platitudinous

[1] Chapter III, p. 60. [2] Chapter XII, p. 198.

to the last degree. It might be said that "every one knows all that." Everybody may know that a ship is a wasting property, that the life of a ship is short—say twenty-five years on an average and then she goes to the ship-breaker. Everybody may know that the earnings are revenue, while depreciation forms part of the expenditure, and therefore it may be unnecessary to say so. Yet you have only to visit the nearest seaport and "go over" the ships that you find there to see to what extent these simple facts,—known to everybody—about revenue and expenditure have been overlooked by the owners.

CHAPTER V

TYPES OF SHIPS—CARGO STEAMERS

The British carrying trade before the War was divided, as it is now, between the liners with regular sailings, which traded on defined routes, and tramps, which were often chartered to third parties and traded wherever a cargo might be found. It has been estimated that of the British ocean-going steamers, that is to say, vessels of over 1,000 tons net or 1,600 tons gross, about one-third were liners and two-thirds were tramps. It is sometimes the fashion amongst liner owners to affect to look down upon tramp owners as a lower order of shipowners altogether. As a matter of fact, however, it is difficult to overrate the importance of the tramp owner in the Shipping economy of the British Empire before the war and during the war. Not only was he responsible for the larger part of our steam tonnage, but we were dependent upon him for the import and export, especially of the rougher classes of bulk cargoes, such as iron ore and coal, which are not as a rule suitable for liner business. It would be impossible for a country like Great Britain, with its enormous flow of trade, to depend wholly upon regular lines with scheduled sailings.

It is essential that there should be a large amount of "loose" tonnage, capable of supplementing the liner sailings and prepared to trade at short notice to any part of the world. Some of this "loose" tonnage is never employed in trade with Great Britain at all, but is used in voyages between one foreign port and another; in voyages, for instance, between North and South America. Such steamers may perhaps never come to Liverpool or London or other English seaports; they may be seen in New York or Santos or Rio; or they may be passed in mid-ocean by a fast passenger liner—in much the same way as tramps are passed by motor cars on a country road. Yet all the time in their distant

voyages from one foreign port to another they are contributing to the invisible exports of this country which help to balance our imports and pay our debts.

Above all, it must never be forgotten that, when war came, it was upon this pool of " loose " tonnage composed of tramps and other vessels employed in foreign trade that we were able to draw—as well as upon the liners—both for our own needs and for those of our Allies. Those who were watching the Shipping situation most closely during the anxious days of 1917 and 1918 were well aware of this fact ; the Requisitioning Branch of the Admiralty ; the Ship Licensing Committee ; the Shipping Controller and the Prime Minister ; they knew the great part in winning the war that was played by the old, shabby, weather-beaten tramp.

The variety of types of tramp steamers is so great that there seems no particular reason for singling out any one vessel more than another for special examination. It might be said of so many a steamer that " she represents all the features of a general carrier," but we have not the space to scrutinize them all. The following particulars have been selected because they are those of a vessel whose builders picked her out as a typical tramp. Moreover, the number of feet in her length, between perpendiculars, is the same as the number of days in the year, and perhaps that may be a simple, practical way whereby the student of these matters may remember roughly her size and dimensions.

This particular tramp, then, is 365 ft. long, by 51 ft. 2 in. broad, by 38 ft. in depth. She is an ordinary single-deck cargo steamer with poop, bridge, and forecastle. Her gross tonnage is 4,197 and her net register 2,647 tons, with a dead-weight capacity of 7,321.

In each well, that is to say, in the space between the poop and the bridge and in the space between the bridge and the forecastle, she has two large cargo hatches with mast, three winches and four derricks. In other words, she has four large hatches altogether. The size of the two hatchways forward of the bridge is 29 ft. 3 in. by 20 ft. each, while the size of the two after hatchways is 36 ft. by 20 ft. Her total cargo capacity measures 386,200 cubic ft.

Her saloon-house, with accommodation for the captain, officers, and engineers, is on the bridge deck amidships ; the top of the saloon-house is carried out to the side of the ship so as to

form the boat deck on which are the chart-room and wheel-house. The crew's quarters are in the fo'c'sle. The vessel carries two life-boats and two jolly boats ; she has six water-tight bulkheads, and in her fresh-water tank a capacity for 4,500 gallons.

Her engines are what are usually to be found in tramps, namely, triple expansion. Her propeller is of solid cast-iron with four blades. Her speed may be reckoned at 9 knots per hour.

The difference between a tramp and a cargo liner may be great or small or there may even be no difference at all. In any case the difference is usually one of occupation and upkeep rather than construction. On one voyage a vessel may be a tramp ; at the conclusion of the voyage she may be sold to a liner-owner, and on her next voyage she may proceed to sea as a cargo-liner. Alternatively she may change from being a cargo-liner into a tramp. Some liner-owners and more particularly their Marine Superintendents, take pride in sending their cargo-boats to sea with just the same high standards of paint and polish as their passenger boats. Moreover, in the liner services the master of the cargo boat may recently have been transferred or promoted from a passenger ship and his influence, too, will be exerted in the direction of what is sometimes called the " Royal Yacht touch." It is inevitable. But apart from the " spit and polish " aspect there is not a great deal of difference between the two kinds of vessel. A liner-owner may want to increase the number of his cargo boats and may find in an already built tramp just the very ship for his trade. That, as we have noticed before, is the really essential governing factor—the ship must suit the trade. " A vessel is made for the cargo, not the cargo for the vessel."

If, therefore, a tramp fits a liner service and is in other respects suitable, the liner-owner may do well in buying her.

When it comes, then, to examining the particulars, there may not be much difference—indeed, there may be none at all—between a cargo-liner and a tramp. For purposes of record, however, it may be convenient to give the dimensions of a typical cargo liner—the *Valemore*, built by Sir Raylton Dixon & Co., of Middlesbrough, and owned by Messrs. Furness, Withy & Co.

The *Valemore* is a two-deck, single-screw steamer with a complete closed-in shelter deck, with a forecastle on the shelter deck. Her length is 420 ft., her breadth 55 ft., and her moulded depth

30 ft. Her gross tonnage is 6,630, and her net register 4,197, with a dead-weight capacity of 9,900.

As regards cargo, which is the main point in a cargo liner, she has two large hatches at each end of the ship, with mast, four winches and six derricks. Her special features include a 25-ton derrick fitted at No. 2 hatch, and two deep tanks. Her total cargo capacity, including the deep tanks, amounts to 482,416 cubic ft. The saloon-house is amidships and its deck is carried to the side of the ship so as to form a boat deck upon which are the Captain's quarters, chart-room and wireless rooms with wheel-house and flying bridge on top.

The crew are berthed in the after end of the ship in the shelter 'tween decks.

There are two life-boats and two dinghies, electric light and wireless, eight water-tight bulkheads and fresh-water capacity for 5,000 gallons in two tanks.

The *Valemore's* engines were built by the North-Eastern Marine Engineering Co. and consist of one set of the triple-expansion type. She is fitted with a Wilson-Pirrie steam steering gear in a house aft on the shelter deck. Her sea speed is reckoned at 12 knots.

Elsewhere in this book,[1] in connection with the duties of an officer, we deal with the problem of loading and carrying a homogeneous cargo, that is to say, a cargo which is all of one kind, such as a complete cargo of grain, cotton or timber. Those cargoes can be carried in either tramps or cargo liners of the ordinary type. They require, it is true, special stowage and special care, but they do not require a specially constructed vessel for their conveyance.

Two sorts of cargo, however, namely, bulk oil and refrigerated cargoes, do need to be carried in vessels designed and fitted for the purpose and an account of them may therefore be properly included in this chapter on different types of ships.

In oil-tank steamers the engines and boilers are usually placed in the after part of the ship in order to lessen the danger of ignition of oil vapour. The engine and boiler spaces must be isolated from the oil tanks. This is done by means of coffer-dams. A coffer-dam is a vacant space between two transverse bulkheads, which extends from the keel to the top of the " expansion trunk "

[1] Chapter VI, pp. 110–112.

—an extension of the top of the tank up to the top of the coamings at the uppermost deck—for the full breadth of the ship.

When the engines are placed aft, a coffer-dam is only required on the fore side, whereas if they were placed amidships a coffer-dam would be required on the after side as well. One coffer-dam is thus saved and the necessity of a tunnel being carried through the after oil tanks is avoided.

The size of the tanks is limited to 28 ft. long. The tanks do not extend from side to side of the vessel as one compartment; they have an oil-tight sub-division at the middle line.[1]

In these oil-carrying steamers provision has also to be made for the expansion of the oil due to changes of temperature; the holds are so arranged that ordinary cargoes may be shipped when oil is not carried.

Among the various types of vessels which played an important part in the war, the oil-tank vessels—or "oilers" as they were sometimes called—deserve a prominent place. Not only did they bring to this country those supplies of oil and petrol which were vitally needed for naval and military purposes, but they also performed splendid service in the Dardanelles campaign by carrying in their tanks water from Egypt to Mudros. At Mudros the water was pumped into the tanks of small craft and so conveyed to the Gallipoli Peninsula. There, off Cape Helles, it was pumped into floating tanks connected with the shore by means of a pipe. This method of supply was far from satisfactory, for the floating tanks and pipe were liable to receive a direct hit from a Turkish shell and on such occasions the water ration, never ample, was reduced to a meagre minimum. No one who served in that campaign is likely to forget the discomforts of water shortage or the continual anxiety about the water supply, but few are likely to remember that if it had not been for the oil-tankers bringing water from Egypt the conditions on the Peninsula would have been even worse than they were.

Oil-carrying steamers often tow across the seas immense barges holding several thousand tons of oil. The barges are large, powerful vessels specially built for ocean traffic. These oil steamers load and unload at special wharves, and pumps are the only necessary apparatus for dealing with the oil.[2]

[1] Nicholls's *Seamanship*, 11th Edition, 1920.

[2] *Things a Sailor Needs to Know*, by Captain Wilson-Barker, R.N.R.

Turning now to the particulars of one or two oilers, we find that the *Narragansett*, which was the largest oil-carrying ship of her day, was built in 1903 by Scotts for the Anglo-American Oil Company. She carried in her sixteen separate compartments 10,500 tons of oil. She was 531 ft. long overall, with a total dead-weight carrying capacity of 12,000 tons on a draught of 27 ft. and a speed of 11 knots on service. Her coal consumption of 49 lb. per 1,000 [1] ton-miles dead-weight was considered a very satisfactory performance. While primarily for the Atlantic trade, the vessel was designed to undertake, if required, the much longer voyages of the Eastern service. She was sunk by an enemy submarine off the Scilly Islands on March 16, 1917, and no trace was found of the officers or crew.

Another oil-carrier, the *Tatarrax*, was built in 1912 and was constructed on the Isherwood system of longitudinal framing, the suitability of which was quickly recognized. This vessel had a length of 420 ft., a beam of 55 ft., and a depth of 32 ft. 10 in., the total dead-weight capacity being 9,614 tons, on a draught of 26 ft. The vessel had nine main cargo oil tanks below the main deck, each being divided into two compartments by a longitudinal bulkhead. The propelling machinery was of the quadruple-expansion reciprocating type, fitted, as in most oil-tankers, for reasons given above, at the after end of the ship. There were three boilers, and these were adapted for burning coal or oil alternatively, the oil-burning apparatus being of the Wallsend-Howden type. This alternative system promises to be very extensively adopted, as either kind of fuel can be used according to the price obtaining on the route along which the ship is travelling. In cargo ships the coal consumed in carrying 1,000 tons dead-weight one nautical mile at the present time is from 40 lb. to 60 lb., whereas the corresponding figures for oil fuel are about 27 lb. to 40 lb. On service the machinery of the *Tatarrax* proved most economical. Taking as an example one voyage from Japan to America, the average oil fuel consumed, according to the log, worked out at 1·04 lb. per indicated horse-power per hour for all purposes, while the main engines took only 0·9 lb. per indicated horse-power per hour—a very good performance. The

[1] A ton-mile has been defind as the equivalent of the work done in carrying a ton the distance of a mile.

speed for the whole voyage averaged about 12 knots with the engines running at about seventy-five revolutions per minute.

Another oil-tanker is the *Tascalusa*, built by Sir Raylton Dixon & Co. and owned by the Tank Storage and Carriage Company. She is a single-screw two-deck steamer, with poop, bridge and forecastle, constructed on the Isherwood system of longitudinal framing. She is 420 ft. in length, 54 ft. 6 in. in breadth, with a depth of 33 ft. from top of deck to bottom of keel; her gross tonnage is 6,500 and her net register 4,053 tons. She has a dead-weight capacity of 9,620 tons. The vessel was built for the carriage of oil in bulk in twenty holds and ten summer tanks. She has a pump room amidships with two large duplex Worthington oil pumps connected to each tank. There is the usual provision for shore steam connections with an arrangement for steaming out the oil pipes and oil tanks.

Vapour pipes are arranged on deck from each tank to an escape pipe with a valve lead up the mast. The *Tascalusa's* boilers are fitted for the consumption of either oil fuel or coal and the bunkers have capacity for about 800 tons of oil and 1,100 tons of coal with a deep tank forward, as a reserve oil fuel bunker, capable of containing 500 tons. There is a ballast pump in the engine-room and also in the fore-hold for the purpose of dealing with the water-ballast spaces at the ends of the ship. The coffer-dams are drained by means of ballast-pump and oil-pump machinery fitted aft. The accommodation for the captain and officers is in the saloon-house, while the engineers are berthed aft in the poop 'tween decks. The crew's quarters are in the fo'c'sle and the hospital is in the bridge 'tween decks.

The vessel carries two life-boats, one cutter and one dinghy and is fitted with electric light and wireless. Her engines, built by the North-Eastern Marine Engineering Co., are of the quadruple-expansion type; her screw is four-bladed and made of cast-iron. Her steam steering gear, by John Hastie, is in a house aft on the poop deck with an emergency gear fitted up to the after winch. The total cargo capacity of her holds and tanks amounts to 416,060 cubic ft. On her trials she showed a speed of 11 knots.

Lastly, in our review of different types of ships, we come to consider the question of vessels specially designed for the carriage of refrigerated cargoes. As far as ship construction is concerned,

this is a comparatively modern development, for it was not until the 'seventies of the last century that it was discovered how to maintain by means of machinery the required temperature in properly insulated chambers.

Up to that time, dead meat could be carried at sea only in an ice-chamber—an unsatisfactory method because the ice was liable to thaw. Since that time there have been many and great improvements, both in regard to the insulated spaces and refrigerating machinery and the cargo-handling gear, so that to-day vessels are constructed for the carriage of frozen meat and also for fruit, the temperatures being maintained by brine-piping and cold-air systems. Some of these refrigerated ships have insulated holds with a capacity of several hundred thousand cubic feet, and the refrigerating plants have now reached such a high degree of efficiency that any temperature required in the chambers may be maintained to within half a degree. The first method used for superseding the old ice-box was by machinery which reduced and maintained at a very low temperature certain chambers in which the meat could be stored. It was found, however, that this machinery was both cumbersome and costly owing to the amount of coal required. It was soon discovered that other gases—carbonic acid gas and ammonia gas—were more effective in giving the required temperature and the machinery less bulky and less expensive. This latter method of refrigeration is commonly called the brine-piping system. The sides and decks of the ship, which form the spaces where the refrigerated cargo is stowed, are carefully "insulated," that is to say, packed inside with about 9 or 10 in. of material which does not conduct the heat into the cold space from outside. The most common of these non-conducting materials now in use are silicate cotton, charcoal, cork or cowhair. Special insulated bulkheads are built round the hatchways to enable frozen meat or chilled cargoes to be removed from the refrigerated chambers without allowing the outside temperature to penetrate into them.

As regards the different levels of temperature at which different commodities are kept in the cold chambers, we noticed when examining the particulars of an intermediate ship [1] that the handling room was kept at freezing point, 32° F., while the rooms

[1] Chapter IV, p. 70.

containing meat, fish and poultry were equipped for a lower temperature, and the fruit and vegetable room for a temperature something above freezing. Those chambers, however, were provided for the purpose of containing ship's stores, not cargo.

To be more precise, and to quote from the chapter on Refrigeration in Captain Wilson-Barker's book, already referred to :—

"A temperature of about 15° F. is perfectly satisfactory for the preservation of frozen meat, and is also an economical temperature from the point of view of fuel consumption.

"Different varieties of frozen cargo are carried. For instance, sheep, poultry, fish, butter and milk can be frozen perfectly hard with a temperature maintained at about 15° F. Then there is *chilled* meat, such as beef and other large meat, which must be kept at an unvarying temperature of about 29° F. ; eggs, at a temperature of about 33° F. ; tinned goods (meats and fruits) and some fresh fruits, vegetables, and cheese, which can be kept at a temperature of about 38° F. ; beer, wines, etc., at a temperature of about 42° F."

It will be seen that the temperatures vary a good deal "in dealing with the carriage of refrigerated cargoes and great care must be exercised in determining the requisite temperature for each variety."

In olden times, when life was less complicated than it is now, the various countries of the earth were self-sufficing. But to-day in Great Britain and other lands where population has outgrown the food-producing capacity, it daily becomes more and more vitally necessary to draw upon the food resources of other countries, and as this can only be accomplished upon the required scale, both as regards transportation and distribution, by means of mechanical refrigeration, the very national existence of some countries may be said to rest upon ice. In this respect, therefore the refrigerated ship may be regarded as the spoon that feeds those nations that are in need of extra nourishment. The housewife may grumble about the price of meat, but she probably is unaware how much she owes to the scientists and engineers who have made it possible for her to obtain New Zealand mutton and Canterbury lamb at prices lower than those of home-grown meat.

The Great War has often been looked upon as the acid test of both men and things. True values were revealed. Old valuations and estimates had to be revised in the light of 1914–1918.

If we apply the acid test of the Great War to the refrigerated-cargo and cold-storage businesses, we find that this particular trade was classed among the all-important vital industries.

Up to the time of the War the scientific development of the cold-storage business had been left entirely to private enterprise and initiative. When, however, our food supplies became threatened by the enemy submarine campaign, the British Government, recognizing the necessity of mechanical refrigeration to national welfare, instituted under the Ministry of Food a Cold Storage Department with authority to organize and facilitate additional cold-storage accommodation throughout the United Kingdom.

Including the new cold stores erected in this way under Government control during the War, and in addition to several thousand private-owned small cold stores used in the businesses of butchers, fishmongers, poulterers and so on, the United Kingdom at the end of the War possessed public cold stores of a total capacity of 45,000,000 cubic ft. of insulated refrigerated space.[1]

This total capacity has been estimated as sufficient to accommodate some 18,000,000 carcases of mutton weighing about 450,000 tons.

At the same time as the Food Controller was keeping an eye on this colossal larder, the Shipping Controller was watching no less keenly the completion, delivery and sailings of the refrigerated ships. The main food-producing countries whose products come in such vessels to this country are Australia, New Zealand, South America and South Africa.

In order to give the student of the question of refrigerated ships some idea of this type of vessel, it will be well here to insert the particulars of such a steamer. The *Baronesa* is a refrigerated meat ship, built by Sir Raylton Dixon & Co. and owned by the Furness-Houlder Argentine Lines. She is employed in service between the River Plate and the United Kingdom. She has a length of 431 ft., a breadth of 61 ft. 4 in., and a moulded depth of 30 ft. 4 in.; her gross tonnage is 8,663 and her net register is 5,408 tons. In appearance she is a three-deck, twin-screw steamer with a cruiser stern, having her bridge and fo'c'sle on the shelter

[1] *Whitaker's Almanack*, 1921.

deck. The vessel is insulated throughout her holds and 'tween decks, each space being insulated separately and specially designed for the carriage of chilled meat; she is equipped with a complete set of refrigerating machinery by J. & E. Hall, Ltd., with two compressors fitted in a steel house in the shelter deck at the after end of the casing. No. 3 hold and 'tween decks are also arranged as a reserve bunker with coaling passages to the stokehold, in order to enable the vessel to carry sufficient coal for the round voyage. The *Baronesa* was built to the Board of Trade requirements for passenger ships and has accommodation for a total of sixteen first-class passengers. A saloon-house amidships on the bridge deck has accommodation for eight passengers in four rooms, and on top of the saloon-house is the boat deck house, containing captain's quarters, smoke-room and four state-rooms. The accommodation for the crew and the hospital are aft on the shelter deck. As regards cargo, there are five hatches, with two winches and four derricks to each hatch. The total capacity for insulated cargo amounts to 473,481 cubic ft. The *Baronesa* has two masts, four life-boats, two dinghies, wireless installation, seven water-tight bulkheads, and electric light. In addition to the insulated spaces for cargo, there are vegetable and meat rooms, for use on the voyage, and bonded store-rooms in the bridge 'tween decks. Her engines were built by Richardsons, Westgarth & Co., of Middlesbrough, and are of the triple-expansion type. Her total bunker space amounts to 2,048 tons and she is reckoned to steam at the rate of 13 knots per hour. She is equipped with a Wilson-Pirrie steam steering gear, fitted in a house aft on the shelter deck, and she has also got an emergency steering gear.

Many of these refrigerated ships carry very valuable cargoes of frozen meat. The point has been well put by Mr. Levig Chew, a writer on this subject: "To illustrate," he says, "the enormous responsibility which often hangs on the slender piston rod of a refrigerating machine, it may be mentioned that the value of the frozen meat carried in the refrigerated holds of some of the largest of these vessels often amounts to *£150,000*."

In 1921, when the *Almanzora* of the Royal Mail Line, homeward bound from South America with a cargo of frozen meat, went aground on a sandbank at the mouth of the Tagus, the anxiety of underwriters—as any director who attended his board

meetings during that week will remember—was not in regard to the relatively small damage that might or might not have been done to her engines, but rather on account of the huge loss that would have resulted if the refrigerating machinery had been prevented from working and had the cargo been, in consequence, spoilt.

CHAPTER VI

OFFICERS

It has often been said, and said with fairness, that there is a gulf fixed between the officers on board the vessels and the staffs in the office belonging to the same Shipping Company; and that this gulf is unnecessarily and undesirably wide. The two groups—officers and staffs—know practically nothing of one another's work and difficulties; and there is scarcely any means whereby either side can find out what the other is doing. Consequently, each thinks that the other has a beautifully easy time. The clerk working overtime, perhaps far into the night, in order to get a manifest finished, envies the officer his regular hours and pictures him, arms akimbo, on the bridge of his ship in a glassy sea. Similarly the officer, peering into the blackness of a foggy night, may perhaps give a passing thought to those lucky shipping clerks safe abed.

Officers will tell you that the staffs on shore do not seem to take an interest in the ships themselves. That is probably overstating the case; many a young man would be only too glad to get to know the ships and their officers, only their opportunities of ever seeing their ships—let alone going on board and talking to the officers—are so strictly limited.

The result is that the two groups have no connection. The office itself is no link because officers do not go there. The ship is no link because the office staff do not go on board. The Captains come to the office and are known to the staff, but the officers as a body are unknown. It is far from satisfactory that this should be the case. Both groups are working for the same firm; their futures and fortunes and families are all dependent on the results of the same voyages, on the safety of the same vessels. There ought to be a better connection.

Knowledge of the qualities and circumstances of the officers ought not to be limited to the Company's Marine Superintendent. At least one member of the Board should see and know the officers and be answerable to his colleagues on the subject. The gulf between officers and staffs is in some measure no doubt due to the physical and geographical reasons already stated, but it may also be partly attributable to lack of information on the subject.

A young clerk may see Captain So-and-so in the office and wonder how the Captain came to get his promotion; but unless he asks the Captain what steps he took to get his command—and it is most unlikely that he will ever bring himself to ask such a question—he will not find out.

It will be the endeavour of this chapter to answer as briefly as possible the young clerk's unasked question.

If this book, by describing certain features of the training, examinations and duties of officers and also the office work of a shipping staff, does something towards narrowing the gulf between officers and staffs, it will not have been written in vain.

First, then, as regards the training of officers. The old, picturesque idea was that your high-spirited English lad ran away to sea, and after serving for an incredibly short space of time "before the mast," was promoted to be mate and finally master. Well, that may be all very fine on paper or on film. In real life to-day, however, the cases of A.B.s becoming Masters are not numerous, though by serving four years before the mast, a man is as fully qualified to present himself for examination for second mate as is the cadet trained in the finest of liners.

We must look to the more usual, if less sensational, paths up which prospective Captains must climb. These may be divided roughly into three classes: (*a*) Training ships afloat; the *Conway* in the Mersey and *Worcester* in the Thames; (*b*) the Training College at Pangbourne, Berkshire, for cadets; (*c*) the training of apprentices who enter the service of a Steamship Company direct from school.

To take the *Conway* first as an example of Class (*a*). The *Conway* is a Cadet School ship for the Mercantile Marine, the Royal Naval Reserve, and Royal Naval Cadets, stationed in the river Mersey off Rock Ferry. The *Conway* as an educational institution was founded in 1859. In that year the Admiralty

lent the small 28-gun frigate *Conway* to the Council of the Mercantile Marine Service Association for the purpose of converting her into a school for the better training and educating of boys wishing to enter and prosper in the Merchant Service. In 1861 the Committee of Management found it necessary to requisition a larger vessel from the Admiralty and the 51-gun frigate *Winchester* became the *Conway*. The School continued to flourish and in 1875 the Admiralty placed the battleship *Nile* at the disposal of the Committee. She, in turn, was re-named, and as the *Conway* continues to do excellent service to this day.

She was originally an auxiliary screw battleship carrying 90 guns, but her machinery and guns have been removed and the decks, four in number, are, with the exception of necessary cabins for the staff, galley, etc., clear fore and aft. She is fully-rigged, and the upper deck makes a capital playground for the boys.

The *Conway* is controlled by the Council of the Mercantile Marine Service Association and an Honorary Committee of Management. The age of admission is from thirteen to sixteen, and the two years' course in the ship is recognized by the Board of Trade as one year's sea service. Appointments as Midshipmen R.N.R. are granted by the Admiralty at the end of each term and by the India Office to the Bengal Pilot Service and the Royal Indian Marine, either direct from the ship or after experience at sea.

The ship is well fitted for her purpose and all available space on the various decks is used. In the hold there is a gymnasium, games room, miniature rifle range and cinema.

The ship is moored well out in the stream of the Mersey, about a quarter of a mile from Rock Ferry Pier and communication with the shore is maintained by motor launches and rowing boats, which are run and managed by the Cadets, who also get a good deal of boat sailing in the summer months.

At Rock Ferry are the playing fields, some twelve acres in extent, with room for cricket and football grounds and grass tennis courts.

Such are the physical surroundings of the school ship that the young Cadet enters. What of the education ? The system is adapted to the future needs of the Cadets as officers in the Mercantile Marine, and a special point is made of engineering

instruction, both practical and theoretical, for which purpose there is a large workshop on board with hand and machine-driven tools, also a smithy and a small brass foundry.

Applicants wishing to enter the *Conway* are required to furnish Certificates of ability, good conduct and health, and to pass an entrance examination before joining. This consists of a paper each in elementary mathematics, English and French. Boys who are colour-blind are not eligible for the sea service. No boy, unless he has passed the Board of Trade tests for Form and Colour Vision and has obtained the Board of Trade Eye-sight Certificate, will be accepted by a Steamship Company as a Cadet.

Roughly, the school work may be divided into "Technical" and "Non-Technical." The more technical subjects are Navigation and Nautical Astronomy, and Plane and Spherical Trigonometry. The technical terms which Cadets require later on in their sea career are in constant use, so that they become quite familiar with them. The Engineering course comprises instruction and practice in the use of tools, both hand and machine, and the teaching of the elementary principles of Steam Engines, Boilers, Internal Combustion Engines, Ship Construction and Naval Architecture.

The "Non-Technical" subjects include Scripture, Geography, History, English, French and Mathematics.

In addition to the above subjects the Cadets are taught, by the Nautical Staff, Practical Seamanship, such as Management of Boats, Knotting, Splicing, Sail-making, Rigging Sheer-legs and Derricks, heaving the lead, and the manipulation of instruments used by Navigators such as Sextant, Chronometer, Station Pointer and Charts. The important subject of the "Rule of the Road" and Signalling are also studied.

Thus it may readily be imagined by the over-worked clerk in a Liverpool Shipping Office that the *Conway* Cadets, too, are not idle. He may wonder, however, what happens to them when they have obtained a happy release from their Examiners in Nautical Astronomy, Spherical Trigonometry, Mathematics, Sail-making, Sheer-legs and Signalling and bade an unhappy farewell to the old ship. What next?

On completion of their period of training in the *Conway*, the Cadets serve an apprenticeship of three years at sea, generally in a good Steamship Line, as Cadets or Midshipmen.

The terms on which Cadets are taken vary, but, speaking generally, the biggest and best lines offer the most favourable terms, requiring as a rule no premium at all, or only a deposit returnable on completion of agreement, and paying small salaries of from £12 during the first year to £40 during the third year of apprenticeship.

Amongst such steamship companies may be mentioned the Cunard Line, Canadian Pacific Ocean Services, Royal Mail Steam Packet Co., Pacific Steam Navigation Co., Clan Line, Hall Line, Anchor-Brocklebank Line, Ellerman Line, Asiatic Steam Navigation Co., British India Steam Navigation Co., Elders and Fyffes, Blue Star Line, Shaw, Savill and Albion Line, the New Zealand Shipping Co., the Booth Line, and others.

We come now to Class (*b*), namely, the Pangbourne College in Berkshire, which is owned by Messrs. Devitt and Moore's Ocean Training Ships, Limited. In the year 1909 this Company was registered with a nominal capital of £50,000, the object being to assist in carrying on a scheme for the training of boys to become efficient officers in the Merchant Service. Sailing ships were being rapidly replaced by steamers, and certain shipping companies regarded it as a matter of importance to encourage this training-ship scheme by investing money in it, and so making it possible for young officers to get the benefit of being trained "in sail" rather than "in steam."

The actual benefit of being trained in sail was that the conditions of life, the meagre supplies of material, stores, etc., which must be eked out during a long voyage, the making of new sails from old, new ropes from old, the eternal fight with and mastery of the elements, all helped to develop in the boy or man a spirit of resourcefulness and initiative second to none.

Two sailing ships were purchased, the *Port Jackson* and *Medway*, both of which ships were equipped and specially fitted for carrying cadets. The original Company was formed for trading and profit-making purposes, and these two vessels traded with Australia until the war.

In 1916, as the result of war, the *Port Jackson* was sold, and in 1917 the Nautical College at Pangbourne was opened, with the object of founding a shore establishment where preliminary instruction, plus a good general education, might be given to intending officers before actually going to sea. This undertaking

was approved by both the Admiralty and the Board of Trade, the approval of the latter carrying with it the privilege of allowing two years spent at Pangbourne to count as twelve months' sea-service.

Meanwhile, the *Medway* continued to make voyages in comparatively safe waters, carrying Cadets, who, after a year's training, were drafted into the Fleet as temporary Midshipmen R.N.R. In May, 1918, however, she was requisitioned by the Ministry of Shipping and purchased for the Government.

The company was thus left without any Training Ship in which to carry out the period at sea that was promised to the Cadets who had joined the College. Accordingly, the purchase money obtained for the *Medway* was used partly in the further equipment of the College, and partly in the purchase of the yacht *St. George*, in which the training of the Cadets could be completed.

Owing, however, to the cost of maintenance and the need for economy, the *St. George* is, at the time of writing, for sale. Thus the sea-going activities of the college have perforce been discontinued, but, instead, the managers of the college have concentrated their efforts, with great success, on bringing their scheme of education for future officers in the Merchant Service up to modern requirements both as regards technical subjects such as navigation, wireless telegraphy, naval architecture and engineering, and also the non-technical subjects such as are taught in an ordinaryEnglish public school.

As regards Class (*c*), namely, the direct entry, the system of training apprentices who enter the service of a steamship direct from school, differs materially from the two systems already described.

In Class (*a*) we saw a school for Cadets afloat; in Class (*b*) we saw a college for Cadets on shore; but in Class (*c*) there is no school or college included in the system. The boys therefore enter their time of sea-training with its attendant discipline at a later age than the boys who go through the *Conway*, the *Worcester*, or Pangbourne College.

A brief description of how a boy can become an officer, without going through a Cadet School Ship or College, may not be out of place.

In the first place, as regards a training "in sail," there are

so few sailing ships to-day that they may be ignored, so far as apprentices are concerned.

We may, therefore, turn at once to the training of apprentices in steamers. Boys of from fifteen to eighteen years of age may join a steamship company direct from school on an indenture of four years, and if four-fifths of that time is actually served away from a home port, the boy is eligible to present himself for examination by the Board of Trade for a Second Mate's S.S. Certificate of Competency.

Generally speaking, where apprentices are carried, it is usual to carry four in each ship, the training being more or less as follows :—

First and Second Years.—Elementary and rough work from which a general knowledge of the construction and working of a ship and her fittings is acquired. Under the guidance of a good Chief Officer the boys are taught, as was the case in sailing ships, that to know exactly how a job should be done, one must do it frequently oneself, no matter whether the job be dirty and somewhat menial, or clean, interesting and true "sailorizing." During this period the boys are given instruction in Navigation, Seamanship, Signalling, etc., steering, heaving the lead and other duties of a seaman. In most good companies sports are encouraged, boxing being probably an easy favourite. Usually, on the completion of two years' service, the boys have developed well physically, and are of more use and reliability than the average A.B.

Third Year.—From now on the boys are given less of the rough and dirty work and more of responsible duties, including supervision of stowage and discharge of cargo, occasional bridge duties under the Officer of the Watch, working up astronomical observations taken by themselves, and generally learning all that an efficient bridge officer should know. Much, of course, depends on the Captain and Officers under whom they serve.

Fourth Year.—On completion of three years' service an apprentice becomes a fully-qualified Able Seaman and may legally take the wheel or look-out as instructed at any time. As a senior or final year apprentice, he may be put to regular watch-keeping on the bridge under an officer, given charge of a hold and held responsible for the right handling and stowage of its contents, or, in some cases, be promoted to the rank of Fourth Officer

and enjoy the privileges of an officer though not in full charge of a watch.

On completion of four years' apprenticeship, a boy is usually eligible to sit for examination for Second Mate. After serving either twelve months as Second Mate or eighteen months as Third Mate in charge of a watch of not less than eight hours per twenty-four hours, he may present himself for examination for First Mate.

Before passing for Master, he must have served either two years as Third Mate, eighteen months as Second Mate, or one year as Mate while holding a First Mate's Certificate.

In view of the fact that many Liner Companies do not engage a junior officer unless he has obtained a Master's Certificate, it is obvious that there must be an interval between the time when a boy completes his four years' apprenticeship in a Liner Company and the time when he can return to that Company as Fourth Officer. During that interval he probably goes to sea in a tramp, whose owners are less particular about certificates, and there qualifies for the necessary examinations.

Thus, however deeply interested—whether financially or otherwise—a Liner Company may be in such institutions as those like the *Conway* or Messrs. Devitt and Moore's training-ships, the time will come, after a boy has finished his apprenticeship, when he must leave the Company and enter some one else's employ, in order to gain the experience in charge of a watch that is required before the various certificates can be obtained. It by no means follows that an officer after passing his examinations returns to the Company in which he originally served as an apprentice. It is to some extent a question of supply and demand. There may not be a vacancy for him; or, alternatively, he may wish to go elsewhere.

The majority of officers are satisfied when they have passed for Master, but some few others sit for a voluntary examination for "Extra Master"—the highest qualification that can be held at sea. If still not content to rest, an Officer may present himself for examination in "Steam" and, if successful, his Board of Trade Certificate is endorsed "Passed in Steam." This is supposed to qualify an officer to take charge of a set of engines and boilers in an emergency, but it is doubtful if ever this has really occurred. The knowledge acquired, if of no other value,

at least permits of a Master holding an intelligent conversation with his Engineer on matters concerning the latter's department.

From the time a qualified Master actually becomes a Master, his one ambition is to get—not his ship, but himself—ashore. Of the few who do obtain shore positions, probably over 50 per cent. go back to sea within a few years, regretting their attempt to "swallow the anchor." This is difficult to explain, but is nevertheless a fact.

With the object of answering the shipping clerk's question how a man becomes a Master, it is necessary to ascertain what sort of examinations are held by the Board of Trade.

As we have seen, the first certificate to be obtained is that of Second Mate (Steamship). Candidates for this examination are required to understand and give satisfactory answers on the following subjects :—

Ship Construction, also—

(1) The standing and running rigging of steamships.
(2) Bending, unbending, setting, reefing, taking in and furling sail.
(3) Sending masts and yards up and down.
(4) The use of sails.
(5) Management of ships' boats in heavy weather.
(6) Dunnaging and stowing cargo.
(7) The Rule of the Road as regards both steamers and sailing vessels, their regulation lights, and fog and sound signals.
(8) The signals of distress, and the signals to be made by ships wanting a pilot ; also the liabilities and penalties incurred by the misuse of these signals.
(9) The marking and use of the ordinary lead and log lines.
(10) The use and management of the rocket apparatus in the event of a vessel being stranded.
(11) Seeing everything in readiness and clear for getting under way, and the precautions to be then observed in a steamer with regard to steering-gear and connections, engines, propellers, etc.
(12) The construction, use and action of sluices and of water-ballast tanks in steamships.
(13) Engine-room and other telegraphs used on board ship, and deck appliances generally.
(14) The care and usage of patent logs and leads.

And any other questions of a like nature appertaining to the duties of a Second Mate that the examiner may think necessary to ask.

In addition to the above examination, the Candidate will also be examined orally in the following *viva-voce* subjects :—

(1) The Morse and British movable semaphore alphabets, the International Code of Signals and the British Signal Manual.
(2) Weights and measures.

If a candidate fails in any seamanship subject, he will not be re-examined until after a lapse of six months. Whether the whole or part of this period must be served at sea must depend upon the subjects in seamanship in which the candidate failed, but the amount of further sea-service to be required will be left to the discretion of the examiner. Failure in the *viva-voce* subjects is considered the same as failure in navigation.

After serving the necessary time afloat as Third or Second Mate, the Officer may present himself for the Board of Trade Examination for First Mate (Steamship Certificate).

In addition to the qualifications necessary for a Second Mate's certificate, a First Mate is required to show a knowledge of the following subjects :—

(1) Shifting large spars, rigging sheers, taking lower masts in and out.
(2) How to moor or unmoor a ship, to keep a clear anchor, and to carry out an anchor.
(3) How to manage a steamship in stormy weather.
(4) How to rig purchases for getting heavy weights, anchors, machinery, etc., in or out.
(5) How to dispose various kinds of cargo and weights in a stiff and in a tender vessel.
(6) The ventilation of holds, and the stowage of explosives.
(7) The stowage of grain and other cargoes.
(8) How to rig a sea anchor and what means to employ to keep a vessel disabled or unmanageable, out of the trough of the sea and lessen her lee drift.
(9) How to get a cast of the deep sea lead in heavy weather.
(10) Accidents, and how to deal with them.
(11) The effects of the screw race upon the rudder, and the effect produced on the direction of the head of the ship by going (ahead) (astern) with a (right) (left) handed screw when the rudder is (ported) (starboard); also the effect of twin screws under the same conditions, and when going ahead with one and reversing the other, etc.
(12) How to turn a steamship short round.
(13) Any other questions of a like nature appertaining to the duties of a First Mate of a steamship which the examiner may think necessary to put to him.

Candidates will also be required to answer *viva-voce* questions on—

(1) How to keep a ship's log book.
(2) How to calculate the capacity of holds and bunkers.
(3) How to calculate freight and commission.

Finally, our officer, who has now obtained his Certificates as Second and First Mate, presents himself at the proper time for Examination for Master (Steamship Certificate).

In addition to the qualifications already enumerated for the grades of Second and First Mate, a Master will be required to show a knowledge of the following subjects :—

Ship Construction, Stability, etc., also—

(1) Construction of jury rudders for iron vessels ; also construction of rafts.
(2) Resources for the preservation of the ship's crew in the event of wreck.
(3) Management of a steamship in heavy weather.
(4) Rescuing the crew of a disabled vessel.
(5) Steps to be taken when a ship is on her beam ends, or in any danger or difficulty, or disabled or unmanageable, and on a lee shore.
(6) Heaving a keel out, or, as it is more commonly called, " Heaving a ship down."
(7) How to proceed when placing a ship in dry dock, and directing repairs, and when putting into port in distress with damage to cargo and ship.
(8) How to use steam appliances in the event of fire.
(9) The best arrangement for towing vessels under different circumstances.
(10) Economy in coal consumption.
(11) Any other questions of a like nature appertaining to the management of a steam or sailing ship which the examiner may think it necessary to ask.

Candidates will also be required to answer *viva-voce* questions on the following subjects :—

(1) The Law as to the engagement and discharge and management of the crew and the entries to be made in the official log.
(2) How to prevent and check an outbreak of scurvy on board ship.
(3) The law as to load-line marks, and the entries and reports to be made respecting them.
(4) Invoices, Charter-party, bills of lading, Lloyd's Agent, nature of bottomry, bills of exchange, surveys, averages, etc.
(5) The prevailing winds and currents of the globe.
(6) The trade routes.
(7) Tides.

As will be seen, before he can defeat his examiners, the young officer has to master a very formidable list of subjects. The list

has been given here because it may enable " those in the office " to see what are the sort of difficulties, problems and duties with which " those on the bridge " are confronted.

To examine in detail all these problems and duties would require more space than can be allotted in this book to such a scrutiny. Many of these subjects, such as the Rule of the Road and Signalling, could hardly be described satisfactorily without diagrams and coloured illustrations. Others are of so highly technical a nature, such as those connected with navigation, winds, currents and tides, that they do not come within the province of a book that is intended primarily for the general reader and the office staff. Moreover, there are already in existence numerous publications, beautifully illustrated, in regard to seamanship, as well as text-books on various technical subjects.

There is, however, one problem of a not too technical nature with which both the Officer and the Office are closely concerned, namely, the stowage of cargo and, for this reason, it is proposed here to select that subject for examination in detail.

Questions of one sort and another connected with an officer's duties are continually arising and being brought to the Board-room for discussion and settlement. Accidents, great and small, form part of the daily round of a Steamship Company's life. A variety of these cases have to be decided by the Directors. On all such questions the Board will be well advised to consult their Marine Superintendent. On some of the more technical of them the Board will be as much in the Marine Superintendent's hands as a Cabinet Minister is in the hands of his Permanent Official.

On others, however, such as the question of stowage, any director, manager or clerk, gifted with an ordinary amount of common-sense can, after a little experience as regards the main essentials of loading a vessel, form his own opinion.

One of the most important duties of an officer is to supervise the loading of cargo. Stevedores, who are trained to handle different classes of goods, stow the cargo while the ship's officers superintend the work. Officers, therefore, should familiarize themselves with the peculiarities of different kinds of cargo, so that when the vessel is loaded, they can be satisfied that both cargo and ship are safe from damage likely to occur through the shipping of water or the moving of the cargo while on the voyage.

The problems of stowing cargo in a ship are different in kind,

but not in degree from those of packing clothes in a portmanteau.

Bottles of tonic or lotion in the week-end suit-case present difficulties by no means dissimilar from those connected with stowing barrels of oil and other liquids in the holds of steamers.

In the same way, dunnage, old sails, burlap, and cargo-mats perform much the same function as holland boot-bags and tissue paper. Their object is to keep the goods from " damage or deterioration " and in as good order as possible during the journey.

In the loading of a ship the first point to be ascertained is the amount and nature of the cargo. This information comes in the first instance to the owners or charterers of the ship, or their agents, and should be passed on by them to the Captain of the ship. They should let " the old man " know what cargo he is likely to load. The next step is for the representatives of the interests concerned in the stowage,—Owner, Master and Stevedore,—to examine the estimated list of cargo and agree as to the " laying out " of the ship, subject to the satisfaction of the Marine Superintendent who remains responsible to the owners as regards the stowage.[1]

Let us assume that the cargo to be loaded is a mixed cargo. Just as in packing a trunk, no one would put fragile hats at the bottom and heavy boots on top of them ; so in loading a mixed cargo the question of weight also arises : very careful attention must be paid to the nature and shapes of the goods to be carried. Generally speaking, heavy material such as copper, steel rails, or barbed wire should be distributed in the lower holds and 'tween decks, with light cases above. If, however, in the case of very heavy goods, for instance, all are put into the bottom of the ship until the ship is loaded down to her marks, she will roll heavily in a sea and not only be uncomfortable but in danger. By distributing the heavy material in the ship and placing a certain amount of it in the 'tween decks, the angle of roll is diminished, and the ship is made " easier " in a seaway.[2]

Where cargo is being shipped for several ports it should be arranged so that it can be conveniently discharged at each port

[1] At out-ports and places where the Company does not employ a Marine Superintendent, the Master is responsible to the owners.

[2] *Things a Sailor Needs to Know*, by Captain D. Wilson-Barker, R.N.R. (1918).

in rotation in the order visited. To facilitate the unloading at the different ports, it is a good plan to have a patch of colour placed on each package before it is loaded. For instance, supposing that a ship were taking 1,000 barrels of flour, amongst other cargo, from New York to three ports in South America. The barrels for the first port might have a red splash of paint on them ; the barrels for the second port a green splash and those for the third port a blue splash. This is a common practice and a satisfactory one. The present writer remembers once seeing a very old man on a pier in Brooklyn engaged in the work of putting blobs of paint on packages of cargo. The man was known by every one as " Old Stencils " ; he appeared to have no other name and to lead an easy, simple life, with his pot and brush, but he was an important link in the chain of loading and discharging cargoes.

It is necessary for officers to note particularly the order and condition of cargo when first received. It is the duty of the officer in charge of the hold to look after the interests of the ship. He should inspect the cases or packages as they come on board and, if any appear to be damaged, notify the Chief Officer at once. The Chief Officer should not give a clean receipt for cargo unless its condition warrants it, otherwise the ship may be held responsible for loss or damage which it may have sustained prior to shipment.

Except at the home ports or ports where the Company has its own house, wharfingers, etc., the mate usually gives the receipts for cargo when it is received on board,[1] and it is important that these receipts should correctly specify the quantity and condition. He should see that a correct account or tally of the cargo is taken on the ship's behalf, and that its apparent order and condition when received is duly noted. He should also see that any instructions of the Master relative to the stowing of the cargo are duly carried out and that when the cargo is a miscellaneous one, a record of the position which each part of the cargo occupies in the hold is kept in the cargo book.

In the case of a dispute arising with respect to the tally, if it is not possible to rectify it at the time, a note explaining the circumstances should be made on the receipt.

[1] *See* page 161.

In the stowage the first consideration must be given to safety; that is to say, the cargo must be stowed so that the ship will be stable and seaworthy, and it must be secured in such a manner that it cannot shift if the vessel encounters bad weather. Then care must be taken to stow it so that it will not be damaged either by contact with, or proximity to other kinds of cargo which would injuriously affect it, or from water which may find its way into the interior of the vessel, or from the sweating of iron-work.

Any cargo having a strong odour must not be stowed near other kinds of cargo which would be spoilt by absorbing the smell. Some cargoes, such as hides, must be placed quite apart from other goods which they may damage. Sometimes hides are shipped in bales dry or they may go aboard in what is known as the " green " state, or in a wet-salted condition; in any case, they smell horribly strong—especially goat skins. Other cargoes, such as tea and coffee, require the greatest care in stowage in order to avoid contact with fumes or gases of any kind or with moisture. Tea is specially liable to injury from any of these causes.[1]

If paraffin or turpentine is being carried and leakage has occurred, saturating the ceiling or deck in the hold, it renders that part of the ship unfit for the carriage of such cargo as grain or flour.

Care must also be taken to prevent cargo from being pilfered or damaged whilst being stowed and officers should keep a sharp look-out for any broaching or stealing.[2]

Dunnage consists of planks and pieces of wood which are used in order to form a raised foundation on which to stow the cargo to keep it clear of the floor and prevent it from getting damaged by water; also for filling in spaces where cargo cannot be stowed and otherwise securing it and preventing it from shifting.

Officers should attend to the laying of the Dunnage; the bottom layer of dunnage should be placed athwartships and built up to the required height, which would depend somewhat on the nature of the cargo. About 6 or 7 in. on the floor and 12 in. or so in the bilges is generally sufficient. As the cargo is being stowed it should be kept an inch or two clear from the ship's

[1] *Things a Sailor Needs to Know*, p. 210.
[2] Nicholls's *Seamanship*, 11th Edition, 1920.

side. Modern steamers, however, usually have interior wood fittings (called cargo battens) along the ship's sides, which renders further dunnaging along the sides unnecessary.

The reason why more dunnage is placed in the bilges than on the floor is because when a ship rolls, any water that there may be in the bottom of the ship will wash from bilge to bilge, thus exposing the cargo there to greater risk of damage. In the case of a vessel with 'tween decks, sufficient dunnage should be laid to keep the cargo clear of the deck, an inch or so for cases and a little more for bales or bags. It should be laid athwartships so that in case of leakage the water may run freely to the scuppers.

We have seen how dunnage is used for the purpose of wedging cases and packages closely together in order to prevent them from getting loose. But there is another danger to which cargo is liable, in addition to shifting. It has been known that the friction of one case against another has gradually produced such a heat as to cause a fire. Therefore, quite apart from the question of saving the cargo from the results of shifting, it is also necessary for the protection of the ship to guard against the effect of movement.

There are different ways of stowing different classes of cargo. In loading a mixed cargo the dead-weight or heaviest portions of the cargo should be stowed amidships ; liquids, if any, should be put in the ends of the hold at the bottom ; bales, cases, etc., in the 'tween decks or upper part of the lower hold.

We have already noticed the importance of distributing the weight of a mixed cargo and here we may consider in that connection the difference between a " stiff " and " tender " vessel and the stability as affected by the stowage of cargo. Stability has been described as the effort which a ship makes to right herself when heeled over from any external cause. There are certain features in the construction of vessels which affect their stability, and if a vessel's form and dimensions are such as to give her considerable stability she becomes known as a " stiff " vessel. In the opposite case she would be known as a " tender " or " crank " vessel.

The stability which a ship possesses by reason of her build may, however, be entirely altered by the manner in which her cargo is stowed ; a stiff ship may be made tender, or a tender ship

made stiff. It has been suggested that it would be well if in every vessel a record were kept of the manner in which her cargo was distributed in the hold and of her subsequent behaviour at sea, because such a record would be a valuable source of information for future guidance in loading. Officers when newly joining would thereby have the means of ascertaining the relative amount of cargo which should be placed in the lower hold and 'tween decks. In practice, however, the character of a ship and her behaviour at sea—whether she is " tender " or " stiff "—is pretty well known to the owners, masters and officers. You may hear it said of her : " She's that tender, the Captain has to stand in the centre of the bridge " ; or, in a higher flight of picturesque exaggeration : " that's why the Captain parts his hair in the middle."

The stiffer a vessel is the more quickly she will roll in a seaway ; her motions will be much more violent. A tender vessel, on the other hand, is generally steadier in a seaway ; she rolls more slowly and therefore her motion is easier and she is less liable to ship heavy seas. Thus it will be seen that it is not desirable to have a vessel very stiff and that sufficient stability being ensured for safety, a " tender " vessel is preferable to a stiff one.

Stowing all the heaviest weights in the bottom, and keeping as much cargo as possible in the lower holds, will have the effect of making the vessel " stiff." Raising the weights and putting more cargo in the 'tween decks will have the effect of making her more " tender." Deck cargo tends to make a ship very tender or unstable unless her under-deck cargo has been suitably stowed to counteract this effect.

If heavy weights are stowed at the ends of a vessel the ship will be liable to pitch heavily and ship heavy seas at the bow and stern ; she will also be subjected to severe straining in a seaway. If, on the other hand, the heavy weights are concentrated towards the middle of the ship, the bow and stern will rise more easily to the force of the sea and she will not be so liable to ship seas over her bow and stern.

Hitherto, we have been considering problems connected with the stowage of general or miscellaneous or mixed cargoes, and the instances given have been those of hides, flour, tea, barbed-wire and other goods in cases, bags, bales, barrels or packages.

We now come to the consideration of the homogeneous cargo, that is to say, a cargo which is all of one kind, such as a complete cargo of grain or cotton.

The expression " grain " means any corn, rice, paddy, seeds, nuts or nut kernels. A vessel is said to be laden with a grain cargo when that portion of the cargo consisting of grain is more than one-third of the registered tonnage of the vessel. The law relating to the carriage of grain in British ships can be found in the Merchant Shipping Act.

When a grain cargo is laden on board any British ship all necessary and reasonable precautions must be taken in order to prevent the grain cargo from shifting.

There are heavy penalties for sending a ship to sea without taking such precautions. The Master and Agent shall each be liable to a fine not exceeding £300. The owner is also liable to the same fine unless he can show that he took all reasonable means to enforce the proper loading of the grain and the observance of the law and was not privy to the breach thereof. Where grain is carried in the holds or the 'tween-decks it is necessary to have " shifting-boards " fitted fore and aft, to prevent the grain from moving when the ship is rolling heavily. These shifting-boards must extend from deck to deck or from deck to keelson and be properly secured. A trunk-way or " feeder " has also to be built in the hatchway and filled with grain, in order that any space occasioned in the lower hold by the grain settling down may be automatically filled. If the grain is in bulk, the shifting-boards must be grain-tight. They must be of 2-in. yellow pine or 3-in. spruce.

As regards stowage of grain in the 'tween decks, a vessel is allowed to carry oats, cotton-seed and barley in the 'tween decks in bulk. All other grain must be in bags.

Other cargoes of a homogeneous nature that may be mentioned are cotton and timber. Of these, cotton presents a special difficulty owing to the risk of fire from spontaneous combustion.

Cotton is most liable to catch fire when the temperature is high and the cotton has been in contact with any oily substances or has been shipped more or less wet. Care should therefore be taken to keep the cotton clear of such substances, including wet paint.

When a fire breaks out in a cargo of cotton the best thing to do is to force steam into the hold or compartment where the fire may be, all apertures being tightly battened down. Steamers are often fitted with injectors leading into the holds, by means of which steam can be turned on from the boilers. If not properly fitted, temporary means would have to be adopted. Steam pipes leading to the winches could be utilized. A resourceful engineer would soon have holes cut in the hatches or even in the deck, and the pipes quickly inserted and fitted. All the pressure available from the boilers should be used.[1]

Timber cargoes are divided into "heavy wood goods" and "light wood goods." Heavy wood includes any square or round timber, or any pitch-pine, mahogany, oak, teak or other heavy logs. Heavy wood goods may be carried as deck cargo. The conditions are that they must only be carried in covered spaces; they must be carried only in such class of ships as may be approved by the Board of Trade for the purpose, and they must be loaded in accordance with Regulations made by the Board of Trade with respect to the loading thereof.

Light wood goods include any deals, battens, planks, and other light wood. Such cargoes are frequently carried on deck and any one familiar with the traffic of a seaport is acquainted with the sight of cargo vessels entering or leaving port with their decks piled high with timber. The expression "deck cargo" means any cargo carried either in any uncovered space upon deck, or in any covered space not included in the cubical contents forming the ship's registered tonnage.

Those who have seen cargoes of timber carried on the deck of a steamer in the uncovered space between the poop and the centre-castle of the ship, may have wondered whether there is any limit to the height to which deck cargoes may be stowed. The answer is that in the case of an uncovered space on a deck forming the top of a break, poop or other permanent closed-in space on the upper deck, the extreme height is 3 ft. above the top of that closed-in space. In the case of an uncovered space not being a space forming the top of a permanent closed-in space on the upper deck, or a space forming the top of a covered space, the extreme height is the height of the main rail, bulwark or plating

[1] Nicholls's *Seamanship*, p. 308.

or one-fourth of the inside breadth of the ship, or 7 ft., whichever height is the least. In the case of a covered space the extreme height is the full height of that space.

In all cases the deck cargo must be properly stowed and secured so as to prevent shifting. Substantial rails or bulwarks must be fitted for the full length of the deck cargo extending to a height not less than 4 ft. above the top. The uprights shall be placed not more than 4 ft. apart and their heels shall extend down to and rest upon the deck of the vessel. Spars, deals, battens, guard-ropes or chains shall be attached longitudinally to these uprights not less than 12 in. apart. If ropes or chains are used, they shall be set up taut, and securely attached to each upright.

Two other sorts of homogeneous cargoes requiring special stowage are refrigerated cargoes and bulk oil, but these have already been noticed in connection with the construction of vessels specially designed and fitted for their conveyance.

We have now noticed some of the points in regard to stowage that must be observed by officers in respect of cargoes of both miscellaneous and homogeneous natures.

There is, however, another class of cargo to which attention must be drawn, namely, explosives and dangerous goods. The young officer on board ship and the young clerk in the Shipping Office are both of them soon made acquainted with these "hazardous goods." The clerk is obliged to insert particulars about them in a separate manifest, called the "hazardous" manifest, while the officer has to pay special regard to their stowage. Of all possible accidents at sea the most to be dreaded is fire and special precautions must therefore be taken in the stowage of hazardous cargo.

By the Merchant Shipping Act every person who sends any dangerous goods on board any vessel is required to mark distinctly on the outside of the package the nature of the goods. He is also required to give to the Master or Owner a written notice of the nature of the goods, together with the name and address of the sender.

By dangerous goods is meant such goods as vitriol, naphtha, benzine, gunpowder, petroleum and nitro-glycerine.

As regards stowing gunpowder, a magazine must previously be constructed in a suitable place, preferably in the 'tween decks,

and when it is being received on board, all fires must be put out until it is stowed and secured.

All magazines or partitioned-off spaces for explosives must be so placed that their doors open out to a hatchway. No iron of any sort may be used in their construction and no fastenings but copper nails.

Drums of liquid ammonia and other dangerous liquids should be carried on deck only, because, in case of leakage, it may be necessary to jettison all or part of the goods. They should be stored in a part of the ship remote from living quarters, away from the influence of any heat, and should be protected from the rays of the sun.

So much for the different sorts of cargo and the officers' duties in regard to the stowage.

It is not enough, however, for the officer merely to see that the goods are stored safely and in accordance with regulations. He must also keep a record, by means of "cargo plans," showing where each particular lot of cargo is placed.

Many steamers call at various ports, and the cargo for each port must be so placed that it is easily accessible when the port is reached. Plans of the ship are usually supplied to the Captain, and, in the case of a vessel having to call at several ports, it is a good plan to colour on the draft plan with coloured chalks the cargo that has to come out at a particular port.

Just as we saw the convenience of putting a patch of colour on each package before it is loaded, in order to facilitate the unloading at the different ports, so in the case of these cargo plans, it is well to adopt a similar sort of colour scheme. Not only can the destination of the cargo be identified by a certain colour, but its nature and quantity may be written on the plan.

To sum up, in the loading of cargo it is of great importance that the officer in charge should bear in mind two main points—the safety and accessibility of the cargo—and at the same time he must take into consideration the general stability of the ship. He should satisfy himself that the cargo for any one port is not covered by cargo for any subsequent port. It may also be necessary so to stow the cargo that clear ground stowage may be had at any port of discharge for cargo which the ship has to load. This is at times a difficult problem. He must remember that if cargo is carried past the port of delivery, the ship may be subject

to serious fines and there will be stoppage in delivery of the cargo at the next port. It is also probable that either outward or homeward bound, he may call at several ports and load cargo at each of them for one place as their final destination.[1]

The passing of the sailing ship and the installation of the submarine cable have given rise to a considerable curtailment of the powers once exercised by the ship-master in the employment of the ship, with a corresponding relief from the great responsibilities which were previously associated with such powers.

To-day the responsibilities of the master, at any rate in most trades, are confined to the command of the vessel, including those duties already noticed, such as navigation, discipline and care of the ship's company and cargo. To-day the master has little or nothing to do with the engaging of cargo. It is the owner or charterer who transacts the business of the ship and enters into engagements for its employment. Formerly, the master did a large part of such work ; in foreign ports he would cultivate the acquaintance of shippers of cargo ; in the case of a mixed cargo he would, before booking, balance the advantages of different classes of merchandise. Even as recently as twenty years ago the present writer saw a skipper of the old school at work in his chart-room, pencil in mouth, calculating with infinite trouble the voyage earnings of his ship and entering the results in a grubby little note-book. True, he had no voice in the engagement or selection of the cargo ; true, too, that the work of calculating the freight was all done in the agent's office down-town—it was at a foreign port—where one or other of the skipper's friends could and would willingly tell him to the nearest dollar the amount of the ship's earnings ; but " the old man " had been brought up in an earlier school and remained self-reliant as far as figures were concerned, watchful over the freight-tariff, regretful of old days at Galveston, where, probably with the same note-book in hand, he had accepted a little more grain and shut out a few bales of cotton and had in consequence made an extra shilling or two for the owners.

Times changed. Later on he forsook the sea for a farm in Cheshire and seldom came to Liverpool, until on August 5, 1914, he turned up at the office, white-haired and wheezy—a

[1] *Things a Sailor Needs to Know*, by Captain Wilson-Barker, R.N.R.

martyr to asthma—and offered his services to his old firm, in any capacity ashore or afloat in order to replace a younger man. In such hands the owners' interests were safe. Of such stuff are the officers of the British Mercantile Marine.

CHAPTER VII

THE CREW

Formerly, under the old Navigation Laws, no British ship could be navigated except by a crew three-quarters of which were British subjects, besides the master; and every ship of 80 tons burden and upwards had to carry to sea a certain number of apprentices in proportion to her tonnage. These restrictions, however, were repealed from time to time during the reign of Victoria. The crews of British ships may now consist wholly of Englishmen, or, except as regards the principal officers, wholly of foreigners, or they may be mixed together in any proportion; and it is no longer necessary to carry to sea a single apprentice.

The Merchant Shipping Act of 1894 repealed most of the earlier Shipping Acts and reproduced their provisions, with some amendments, in a consolidated form. It remains the principal Act, but since it became law a number of Acts modifying its provisions have been passed.[1] The principal Act is divided into fourteen parts, of which the second deals with Masters and Seamen.

In the hierarchy of the Church of England there appear to the uninitiated to be an infinity of ranks—bishops and suffragan bishops, deans and rural deans, honorary canons and minor canons; yet the Prayer Book only recognizes three orders of Ministers—Bishops, Priests and Deacons. Similarly in the Mercantile Marine a glance at any crew list reveals an immense number of rungs in the ladder—officers and engineers, bosun and carpenter, donkeyman and lamp-trimmer; yet in the Merchant Shipping Act there are but two classes—Masters and Seamen.

In this Act, "Master" includes every person (except a pilot)

[1] *Shipmaster's Handbook to the Merchant Shipping Acts*, by Sanford D. Cole, 1920.

having command or charge of any ship; "Seaman" includes every person (except masters, pilots and apprentices duly indentured and registered) employed or engaged in any capacity on board any ship.

A student of the subject of the ship's *personnel* will naturally wish to know something of the hierarchy existing in the fo'c'sle and it may therefore be convenient here to describe the various ratings on board ship and the nature of their duties.

A ship is, as we have seen, divided roughly into three departments—deck, engine and stewards. As regards the crew, the two latter departments require little comment. The duties of the stewards on board a "floating hotel" are familiar enough to any one who has stayed in a hotel on shore; the duties of the firemen and trimmers are equally obvious to anybody who has visited the boiler-house and furnaces of a factory. With the deck hands, on the other hand, the case is different and some description of their duties is necessary.

In the first place it must be remembered that the change from sail to steam has reduced to a great extent the importance of the deck hands. Many of them are little better than ordinary labourers. The higher ratings, however, still have important work to do.

First, then, we come to the *Bosun*, who may best be described as the Foreman of the Deck Department. He should be and usually is an experienced seaman, promoted to Bosun from A.B. He carries on the routine and other work of the deck department under instructions from the Chief Officer, though also under the immediate orders of the Officer of the Watch. The Bosun does not as a rule keep watch, but is on day work.

The *Carpenter* ranks with the Bosun and in many ships shares quarters with him. His routine duties include the sounding of bilges and ballast tanks, attention to fresh-water tanks, regular oiling of boat davits and tackle, windlass, and steering-gear. He attends the windlass when entering or leaving port or whenever the anchors are in use. Any repairs to woodwork, hatches, boats or decks, as and when required, are in his hands. He is familiarly known as "Chips"—in much the same way as the Marconi operator is called "Sparks."

The *Lamp-trimmer* is an able seaman selected for this special duty. He attends to the trimming and cleaning of all the lamps

and the placing of oil or electric lamps in position for working cargo at night-time. In many ships he acts as the Bosun's mate.

The *Quartermaster* is an able seaman chosen for the duties of steering the ship and bridge work, including also signalling, attention to the patent log and patent sounding machine. Usually, four quartermasters are carried, two in each watch. In port they also keep " watch and watch " on the gangway. In the Merchant Service the correct name should be *Steersman* or *Helmsman*. A quartermaster is, strictly speaking, one who directs the steering of an A.B. or Steersman, as in the Navy, only taking the wheel himself in narrow waters or when specially required.

The *Look-Out* men are able seamen whose eyesight has been tested and found satisfactory. They are stationed either in the crow's-nest on the foremast, or on the fo'c'sle-head. A Look-Out man reports by bell to the Officer of the Watch when any object is observed in the following way :—

(*a*) Light or object on Port Bow . . 1 Bell.
(*b*) Light or object on Starboard Bow . 2 Bells.
(*c*) Light or object ahead . . . . 3 Bells.

Ordinary Seamen are usually boys who have been more than one year at sea and remain in this rating until three years have been served, when they become qualified A.B.'s. They work with the seamen under the orders of the Bosun. Some of these boys qualify as *Wireless Watchers* and sign the Articles as " O.S. and Wireless Watcher." At sea they keep watch and watch in the Wireless Room, calling the Wireless Telegraph Operator when required. In port they carry on their ordinary deck duties.

Deck boys are boys of less than one year's service.

Turning now to the Engine Department, the *Donkeyman* acts as a greaser at sea and in port keeps steam on the donkey boiler, or auxiliary boiler, for cargo and general purposes.

The *Store-Keeper* is usually a day-man at sea, assisting the Engineers in overhauling auxiliary machinery. In port he is mainly employed in issuing stores and working gear.

As regards the Watches, in large ships, or indeed in any ships, where more than eight A.B.'s (including four Quartermasters)

are carried, it is customary, after choosing four Quartermasters and four Look-Out men, to place the remaining A.B.'s and the ordinary seamen and boys on day duty. The hours of duty vary according to the class of ship, that is to say, whether Passenger Liner or Cargo Steamer. In the former it is, of course, necessary to have the decks washed and a great deal of cleaning done in the early hours of the morning. Nowadays, it is not customary to work seamen at loading or discharging cargo, but at times it is necessary to do so. The Articles of Agreement contain a clause to the effect that the crew shall work coal and cargo if required.

The cleaning of holds, re-arranging of dunnage and mats, watching of cargo against pilferage, working steam-winches, renewing and keeping in good order all cargo gear, all come within the term " seamen's duties."

Various regulations have been enacted with respect to the hiring of Seamen, their conduct while on board, and the payment of their wages. These regulations differ in different countries, but in all they have been intended in the first place to obviate the disputes that might otherwise arise between Masters and Seamen in regard to the terms of the Contract between them ; secondly, to secure due obedience to the orders of the former ; and, thirdly, to interest the latter in the completion of the voyage.

In the Merchant Shipping Act this contract between the Master and Seamen is called " the agreement with the crew," but in ordinary parlance on board ship and at the office it is known as " the ship's articles " or simply " the Articles."

It is one of the documents which is carried in the ship's box along with the Crew List (of which further mention will be made later on in this chapter), the Certificate of Registry, the official log, bills of health, manifests, and other papers.

It may fall to the lot of a clerk in a shipping office very early on in his career to be responsible for packing up the ship's box previous to the departure of a vessel and woe betide the young man should he omit the Articles from the box. He will be lucky if he meets with no more than an old-fashioned look from " the old man."

In the existing law regulating the conditions in the " Articles " it is laid down that the master of every ship, except ships of less than 80 tons registered tonnage, exclusively employed in the coasting trade, shall enter into an agreement with every seaman

whom he carries to sea as one of his crew from any port in the United Kingdom. Every such agreement with the crew shall be in a form approved by the Board of Trade, and shall be dated at the time of the first signature thereof, and shall be signed by the master before a seaman signs the same.

And here, in passing, let it be noticed how well accustomed the members of the British Mercantile Marine are to filling up Government forms. During the Great War the public generally became used to standing in queues and signing forms. At the end of the Great War—in June, 1919—in the Galerie des Glaces at Versailles the plenipotentiaries, headed by President Wilson, first stood in a queue and then signed a form.

But for years and years before the War, the crews of British Steamers had been wont to stand in queues, in shipping offices at home or at British Consulates abroad, and sign Board of Trade forms. Masters of British ships are equally accustomed to them. Thus the Articles " shall be in a form approved by the Board of Trade " ; the Official Logs shall be kept " in forms approved by the Board of Trade " ; the Crew Lists shall be made out " in a form approved by the Board of Trade." There is no getting away from it ; shipping control existed long before the days of the Shipping Controller.

In order to understand what sort of contract it is that the master enters into with the Seamen, it is necessary to refer again to the Merchant Shipping Act. There we find that the agreement with the crew shall contain the following particulars :—

(*a*) The nature, and, as far as practicable, the duration of the intended voyage.
(*b*) The number and description of the crew, specifying how many are engaged as sailors.
(*c*) The time at which each seaman is to be on board or to begin work.
(*d*) The capacity in which each seaman is to serve.
(*e*) The amount of wages which each seaman is to receive.
(*f*) A scale of the provisions which are to be furnished to each seaman.
(*g*) Any regulations as to conduct on board and as to fines, short allowance of provisions, or other lawful punishment for misconduct which have been approved by the Board of Trade as regulations proper to be adopted, and which the parties agree to adopt.

Members of the crew cannot legally claim payment of wages beyond the amount specified in the Articles. If extra payment is verbally agreed on without being specified in the Articles it is not recoverable.

Alterations in the Articles (except additions made for the purpose of shipping substitutes or persons engaged after the first departure of the ship) are inoperative unless proved by written attestation as prescribed by the Act to have been made with the consent of all persons interested.

It will thus be seen that the Articles are very important documents and by no means can they be regarded as scraps of paper signed by a gullible seaman in ignorance of what he is doing. The Act provides that they shall be signed by each seaman in the presence of a Mercantile Marine Superintendent or Shipping Master; and that the Superintendent shall cause the agreement to be read over and explained to each seaman or otherwise ascertain that each seaman understands the same before he signs it, and shall attest each signature. When the crew is first engaged the Articles are signed in duplicate, one copy being retained by the Superintendent; the other is delivered to the Master, and contains a special place for the descriptions and signatures of substitutes engaged subsequently to the first departure of the ship.

Now it frequently happens that, for one reason or another, it is necessary to engage substitutes abroad; death, sickness, transfer to another ship, or perhaps a desire for more remunerative pay on shore—all these causes lead to changes in the Articles. In New York, for instance, the high wages paid for work connected with the building of skyscrapers have always attracted sailors with "good heads," accustomed to look down from insecure heights.

In cases of engagement of seamen abroad, the provisions of the Merchant Shipping Act respecting the Articles apply subject to the two following modifications. In a British possession the master engages the seaman before some officer, either a Superintendent or an Officer of Customs. In a foreign country the master, before carrying the seaman to sea, has to procure the sanction of a British Consular officer, and engage the seaman before that officer.

We pass now from the "signing on" of the crew at the beginning of a voyage, and the engagement of substitutes during the voyage, to the "paying off" or discharge of the seamen at the completion of the voyage.

Seamen on foreign-going ships must be, and seamen on home-trade ships may be, discharged before a Mercantile Marine

Superintendent and the Master of the ship must insert certain particulars in the Seamen's continuous discharge books.

The Merchant Shipping Act provides that when a seaman is, on the termination of his engagement, discharged in the United Kingdom, " he shall, whether the agreement with the crew be an agreement for the voyage or a running agreement, be discharged in manner provided by this Act in the presence of a Superintendent."

As regards the report of a Seaman's character, where a seaman is discharged before a Superintendent " the master shall make and sign, in a form approved by the Board of Trade, a report of the conduct, character and qualifications of the seaman discharged, or may state in the said form that he declines to give any opinion upon such particulars, or upon any of them, and the Superintendent before whom the discharge is made shall, if the seaman desires, give to him, or endorse on his certificate of discharge, a copy of such report."

That is the wording of the Act. In practice, however, experience has taught masters to be very careful on the subject of defining the " conduct, character and qualifications " of the seamen. There is always a fear lest the seaman may bring an action against the master for defamation of character, consequently the master has but two labels which he sticks upon a man's character, namely, " good " and " very good."

The captain in estimating the conduct of his crew divides them into good and bad—in Biblical language, sheep and goats. The good are labelled " very good," the bad are labelled merely " good." Thus anyone charged with the duty of engaging a crew can see at a glance by looking through a seaman's " discharge book " whether the master's entries at the end of each voyage are favourable or unfavourable. The entry " very good " means that the seaman is worth engaging ; the entry " good " means " no good." At the same time there is no risk of being sued for giving a man a bad report. A simple, but effective arrangement.

Not only must the discharge but also the payment of wages of seamen on foreign-going ships be carried out at the Mercantile Marine Office.

The custom is that the captain or his clerk, before the seaman is discharged, makes up an account of the wages, showing the

amount earned and the deductions to be made for advances, allotments, tobacco, cash advanced abroad, etc. This account of wages is then taken by the Captain to the Mercantile Marine Office, or the British Consulate in a foreign country ; the seaman is then and there paid the sum due to him ; and both he and the captain sign a form of release.

These formalities are all prescribed in the Merchant Shipping Act. " When a seaman is discharged before a Superintendent in the United Kingdom he shall receive his wages through, or in the presence of, the Superintendent." Again, the Master of every ship " shall, before paying off or discharging a seaman, deliver at the time and in the manner provided by this Act, a full and true account, in a form approved by the Board of Trade, of the Seaman's wages and of all deductions to be made therefrom on any account whatever." It is also laid down that " the master shall, during the voyage, enter the various matters in respect of which the deductions are made, with the amounts of the respective deductions as they occur, in a book to be kept for that purpose, and shall, if required, produce the book at the time of the payment of wages."

As regards the settlement of wages, " where a seaman is discharged and the settlement of his wages completed, before a Superintendent, he shall sign, in the presence of the Superintendent, a release of all claims in respect of the past voyage or engagement ; and the release shall also be signed by the Master or owner of the ship, and attested by the Superintendent."

The question may naturally be asked, " What wages does a seaman receive ? " A return published in 1913 by the National Committee on Sea Training showed that the wages obtainable per month in the North Atlantic and Australian trades were as follows :—

	North Atlantic Trade.						Australian Trade.		
	First Grade.			Other Ships.					
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
Boatswain	8	10	0	7	10	0	7	0	0
Boatswain's Mate . .	6	0	0	6	0	0	6	0	0
Quartermaster . . .	5	5	0	5	5	0[1]	5	5	0
Able Seaman . . .	5	0	0	5	0	0[1]	5	0	0
Ordinary Seaman . .	2	0	0	2	0	0	2	0	0
	to 3	0	0	to 3	0	0	to 3	0	0

[1] 10*s.* per month extra when sailing as Mail Boats.

The rate of wages varies to some extent in different countries and has varied to a large extent during recent years. We are, however, concerned only with British Shipping and mainly with crews signed on and paid off in the United Kingdom. A table drawn up by the Employers' Association of the Port of Liverpool shows that whereas in 1914 the wages of an A.B. were at the rate of £5 per month, they rose to about £14 10*s*. per month in 1920; in 1914 the wages of a fireman were at the rate of £5 10*s*. per month, and in 1920 £15 per month; in 1914 the wages of a steward were £4 per month,[1] and in 1920 £13 15*s*. per month.

In other words, the wages paid at the end of the period 1914–1920 amounted to about three times what they had been in pre-war days. Since 1920, however, there has been a reduction in wages. This is not the place nor is this the book in which to dwell upon the negotiations that have been carried on and continue to be carried on between the associations of Shipowners on the one hand and the Unions concerned on the other in regard to questions of work and wages. Trades Unionism has its own bibliography. It is enough to say that the groups of both employers and employed are well organized and that the machinery of conferences is seldom idle for any length of time. So complete is the system of the Unions that it is to-day practically impossible for a Seaman—be he sailor, fireman or steward—to sign on the Articles of a British Ship unless he belongs to a Union.

As has been already indicated, deductions in respect of advances and allotments have to be made from the total wages earned by a Seaman. The advance is made, either to the Seaman himself or on his behalf to some creditor of his, such as a boarding-house keeper with whom he has lodged prior to sailing. The amount of the allotment is entered in the Articles in a space opposite the seaman's name and the payments are made by the owners of the ship on his behalf at stated times—usually once a week. A Steamship Company with a large number of steamers usually divide their fleet into groups and allocate a particular day in the week to each group. Thus, supposing there were a Company called the Street Line, Ltd., owning twelve steamers named after streets; it might well be that the allotment notes of s.s. *Piccadilly* and s.s. *Strand* were to be paid on Wednesday; and on Wednes-

[1] £4 5*s*. per month in the North Atlantic trade.

day there would arrive at the allotment office of the Street Line a motley array of wives, mothers, grandmothers, children and sisters of members of the crews of the good ships *Piccadilly* and *Strand*, to whom the allotment notes were payable. Allotment day is irreverently known as " White Stocking " day.

In the matter of advances and allotments both the owners and the crew have their interests to be protected and once more we find in the Merchant Shipping Act the necessary provisions designed to obviate the disputes that might otherwise arise. The Ship's Articles and other forms " approved by the Board of Trade " have been drawn up to meet the situation. As to the advance notes, the Articles " may contain a stipulation for payment to or on behalf of the Seaman, conditionally on his going to sea in pursuance of the agreement, of a sum not exceeding the amount of one month's wages payable to the Seaman under the agreement."

With a view to checking the fraudulent practices of some men who sign on simply to obtain something under the advance note and without any intention of going to sea, the Act provides that " where a seaman who has been lawfully engaged and has received under his agreement an advance note, after negotiating his advance note wilfully or through misconduct fails to join his ship or deserts therefrom before the note becomes payable he shall, on summary conviction, be liable to a fine not exceeding £5, or at the discretion of the Court, to imprisonment for not exceeding twenty-one days."

As regards the allotment notes " any stipulation made by a Seaman at the commencement of a voyage for the allotment of any part of his wages during his absence shall be inserted in the agreement with the crew, and shall state the amounts and times of the payments to be made " ; further, " the seaman may require that a stipulation be inserted in the agreement of the allotment by means of an allotment note of any part (not exceeding one-half) of his wages in favour either of a near relative or of a savings bank."

As a measure of precaution, owners sometimes instruct their captains to the effect that when advances have been given, the date of first payment of the allotment should be put off one or two weeks according to the total amount of the advance and allotment.

The remainder of the sections in the Merchant Shipping Act relative to Masters and Seamen deal with a variety of questions, included in which are :—Property of Deceased Seamen ; Leaving Seamen Abroad ; Distressed Seamen ; Volunteering into the Navy ; Provisions, Health and Accommodation ; Protection of Seamen from Imposition ; Provisions as to Discipline ; Mercantile Marine Offices ; Registration of and Returns respecting Seamen.

All these are questions of importance. At any moment one or other of them may arise and require the attention of the shipowners. We have not the space to examine all these subjects in detail, but any one in a shipping office who is responsible for dealing with such matters and any young beginner, who may be drafted into any department and should therefore train himself for all, would be well advised to obtain and study some handbook to the Merchant Shipping Acts such as that by Mr. Cole to which we have already referred.

There is, however, one matter whose importance can hardly be exaggerated—namely, the keeping of the official log, as required by the Merchant Shipping Act. With a view, therefore, to stressing the necessity of obtaining a thorough understanding of the sections in the Act dealing with the official logs, we propose, before leaving that part of the Act which we have been examining, to show in some detail the provisions in question.

Every beginner in a shipping office knows—a knowledge probably derived from reading nautical stories in his youth—that a log is kept on board every ship. What entries the log contains is another matter. He understands that a log bears much the same resemblance to a diary as a knot does to a mile. He therefore assumes that the entries refer to the speed of the ship, the weather, the ports visited and the cargo carried. He probably does not stop to consider whether more than one log is kept on each ship.

The present writer, at any rate, remembers that he, for his part, did not become aware of the existence of more than one log until a vessel belonging to his firm ran ashore during a snowstorm on the coast of New Jersey. Then, when it came to examining the evidence, it appeared that there were three logs : firstly, the " scrap " log, kept in pencil, in a rough and ready style; secondly, the ordinary ship's log ; thirdly, the official log.

It is with the last of the three that we are now concerned.

In the Act it is laid down that "an official log shall be kept in every ship (except ships employed exclusively in trading between ports on the coasts of Scotland) in the appropriate form for that ship approved by the Board of Trade."

As regards the method of making entries the wording of the Act is as follows :—

"Every entry in the official log book shall be signed by the Master and by the Mate, or some other of the crew, and also :—

"(*a*) If it is an entry of illness, injury, or death, shall be signed by the Surgeon or Medical Practitioner on board (if any) and

"(*b*) If it is an entry of wages due to, or of the sale of the effects of a seaman or apprentice who dies, shall be signed by the Mate and by some member of the crew besides the master, and

"(*c*) If it is an entry of wages due to a seaman who enters His Majesty's Naval Service, shall be signed by the Seaman, or by the Officer authorized to receive the Seaman into that Service.

"Every entry made in an official log book in manner provided by this Act shall be admissible in evidence."

As regards the nature of the entries required in the official log book, we find that they extend over a wide field and that many of them directly affect the crew. The Master of a ship for which an official log is required shall enter in the official log book the following matters, that is to say :—

(1) Every conviction by a legal tribunal of a member of his crew, and the punishment inflicted.

(2) Every offence committed by a member of his crew for which it is intended to prosecute, or to enforce a forfeiture, or to exact a fine, together with such statement concerning the copy or reading over of that entry, and concerning the reply (if any) made to the charge as is by this Act required.

(3) Every offence for which punishment is inflicted on board, and the punishment inflicted.

(4) A statement of the conduct, character and qualifications of each of his crew, or a statement that he declines to give an opinion on those particulars.

(5) Every case of illness or injury happening to a member of the crew, with the nature thereof, and the medical treatment adopted (if any).

(6) Every marriage taking place on board, with the names and ages of the parties.

(7) The name of every seaman or apprentice who ceases to be a member of the crew, otherwise than by death, with the place, time, manner and cause thereof.

(8) The wages due to any seaman who enters His Majesty's Naval Service during the voyage.

(9) The wages due to any seaman or apprentice who dies during the voyage, and the gross amount of all deductions to be made therefrom.
(10) The sale of the effects of any seaman or apprentice who dies during the voyage, including a statement of each article sold, and the sum received for it.
(11) Every collision with any other ship, and the circumstances under which the same occurred; and
(12) Any other matter directed by this Act to be entered.

The last heading includes the following matters which are directed by other sections of the Act to be entered:—

Tonnage of deck cargo, Disrating of seamen, Statement as to provisions or water, Wages and effects of seamen left behind, Refusal to take anti-scorbutics, "Every" collision whether with another ship or not, Boat drill,[1] Draught of Water and Clear-side, Load-line particulars, Orders of a Naval Court.

If an official log book is not kept in the manner required by the Act, or if an entry is not made at the time directed, the Master shall be liable to a fine. If any one wilfully destroys or mutilates any entry or wilfully makes a false entry in an official log book, he shall "be guilty of a misdemeanour."

Within forty-eight hours after the ship's arrival at her final port of destination in the United Kingdom, the master has to deliver the official log book of the voyage to the superintendent before whom the crew is discharged.

Having now seen something of the machinery provided by the State for the running and, as far as possible, the smooth working of the great human factory known as "the forecastle," it is time to see what quantity of raw material is required; how much of it is British; how much foreign; and what steps have been taken by the State to maintain the supply of that raw material.

In July, 1917, a Committee appointed by the Chamber of Shipping of the United Kingdom and Liverpool Steamship Owners' Association reported that—

"in order to maintain the British Merchant Service provision has to be made for about 9,000 young men and lads joining each year, the average term of service at sea being about fifteen years. The conditions of service and pay compare favourably with those on shore, but there stands in the way of the lad desirous of going to sea the difficulty of obtaining any preliminary training. Having regard to the nation's absolute dependence

[1] *See* Chapter VIII, page 143.

on its Mercantile Marine, the training for Seamanship should be recognized as a paramount national duty. The shipowners are ready to find the opportunities for the training, but it is only just that the cost should be shared by the country at large."

This question of the sea-training for British boys, coupled with the cry of " British Seamen for British Ships," was by no means a new one. The problem had attracted a good deal of interest in 1898 and 1899, to carry the story no further back. At that time the number of British seamen employed in our Mercantile Marine was falling rapidly year by year, and the number both of foreigners and of Lascars employed in it was rising in even greater proportion. There was much correspondence in the Press, and there was a very widespread disbelief in the efficacy of a palliative Act of Parliament, passed in 1898. That Act—the Ritchie Act of 1898—made a grant to shipowners who carried boys in their ships by a remission of light dues without any conditions as to separate accommodation or supervision. That grant was allowed to lapse in 1905, because it gave an unfair preference to ships making short voyages. Meanwhile it was known that the situation as regards British seamen was serious. Conditions were far from satisfactory ; the change from sail to steam had, it was said, reduced employment at sea to mere unskilled labour. The press gang and the reformatory ships had in previous years given every British Mother a dread lest her sons might follow the seafaring life with all its risks of bad companionships, and now that dread was increased by fears of fellowship with foreigners and Lascars.

No one quite knew what Lascars were. Not long ago three friends were having lunch at a Club in London. One was a politician ; one a Civil servant ; the third a business man. In the course of conversation Lascars were mentioned. The Civil servant said that Lascars came from the Malay Peninsula ; the politician thought they came from the Western side of India ; the business man did not know where they came from ; all he knew about them was that whenever they were on board a ship that got into trouble they tried to save themselves rather than be drowned, and this conduct on their part was always regarded as " very un-English."

No wonder that the British mother dreaded lest her son should " run away " to sea.

In 1899 the Navy League promoted a deputation to the Board of Trade on the subject of sea training. Mr. Ritchie (President of the Board of Trade) and Mr. Goschen (First Lord of the Admiralty) received the deputation but gave them little satisfaction. The deputation's proposal for the establishment of training ships wherein boys could be fitted for sea life was scouted, because Mr. Ritchie refused to lay before Parliament the further proposal that shipowners should be paid for employing the boys when trained. Finally, the suggestion that a system of pensions at sixty for Merchant Seamen should be instituted was declared to be both undesirable and impossible.

After that little or nothing was done by the nation to improve the position. Indeed the situation became worse. The returns showed that in 1903 the persons employed in our Mercantile Marine were divided as follows: British, 176,500; Foreign, 40,000; Lascars, 41,000. That year marked the turning of the tide as regards foreigners, but the numerical strength of the Lascars continued to increase.

On Trafalgar Day, 1910, the Navy League opened a new campaign in the old struggle by convening a conference of the various bodies interested in sea training, under the chairmanship of Mr. Geoffrey Drage.

The problem with which the Conference was confronted was, in the main, how to replace by British subjects the foreigners employed as deck hands. It was suggested that the way to achieve this end was to train the boys for a sea life; and here, as always, the difficulties arose. The Conference concerned itself very largely with the question of who was to pay for such training. The tendency was to look to the County Councils, on the ground that this was a species of technical education, but it was also emphasized that such a scheme was national and that therefore legislation would be necessary.

Out of the discussions there emerged two points about which much ignorance prevailed. Firstly, it was not a fact, as was widely supposed, that boys could not be trained owing to any lack of training ships. Training ships and institutions on shore already existed, but could not receive their full complement of boys simply because they depended chiefly, with the exception of the *Exmouth*, upon voluntary contributions which were not forthcoming in sufficient volume. The *Exmouth*, which is for

Poor Law boys, is supported by the Metropolitan rates. Secondly, neither the Navy nor the Merchant Service would, if they could help it, receive boys from reformatory ships. It was therefore suggested that it would be advantageous if reformatory ships were altogether abolished. If that were done there would no longer be any excuse for the statement often repeated, that the easiest way for a boy to get sent to sea was to fall into the hands of the police. The Conference appointed a Committee to pursue the inquiry and to formulate plans.

The first step taken by the new Committee—or the National Committee on Sea Training, as it was now called, was to send a deputation to the Board of Trade. This took place in February, 1911, when a large deputation, consisting of Mr. Drage (chairman), the Duke of Somerset, Lord Brassey, Admiral Brand and a number of representatives of Shipping Companies, Training Ships and County Councils, were received by Mr. Buxton, the President of the Board of Trade.

The deputation submitted their recommendations, of which the two first and most important were as follows :—

(1) That the Board of Trade should grant a capitation allowance to all recognized training ships, and institutions on shore training for the sea (excluding industrial and reformatory establishments) for all boys trained reaching the standard in seamanship required for first-class boys in the Royal Navy (e.g. as to helm, lead, compass, pulling an oar, knotting and splicing), and able to swim.

(2) That a money allowance should be granted to shipowners by the Board of Trade for carrying a certain number of indentured boy sailors (apprenticed in a form approved by the Board of Trade) according to the tonnage of their ships.

The allowances suggested by the National Committee were £20 per head for the Training Institutions, payable at the rate of £10 a year during the two years' training ; and £20 per head for the shipowners.

Mr. Concannon, of the White Star Line, speaking for the shipowners, pointed out that there were two separate problems about which a good deal of misunderstanding had arisen. The first was in regard to the training of officers, which, however, was not the concern of the deputation. The cadets from the middle classes were able to pay a premium and certain shipowners were experimenting with special ships, such as the *Mersey*, of the White Star Line, the *Port Jackson* of Messrs. Devitt & Moore.

The second problem was the case of the deck boys. There was no inducement whatever, except the patriotic one, for shipowners to take them. The cost was heavy because two boys, when not shipped as ordinary seamen, had to be taken in the place of one man. The boys were only paid half the wages of an A.B., but there were two mouths to feed and two berths to find. Shipowners could not be expected to carry them without some assistance from the Government. Separate accommodation ought to be provided for these boys to keep them from the seamen in the forecastle, and if there was a subsidy, it was proposed that a petty officer should be told off specially to supervise them.

To these proposals Mr. Buxton promised his favourable consideration. Few of those who went on this deputation to the Board of Trade in 1911 expected that their effort would bear any fruit; indeed the present writer remembers how on his return from Whitehall Gardens to Liverpool he met the president of the Liscard Sea Training Homes, who said to him: "Your deputation opened its mouth too wide." Happily, however, these gloomy prognostications were falsified, for in less than two years from that date the mouth of the deputation had, as will be seen later, received from the Government something at any rate on which to bite. Meanwhile, Mr. Drage's Committee pursued its labours and the second National Conference on Sea Training was held on Trafalgar Day, 1911.

In 1912 two events occurred that were to have an important effect on the Sea Training problem. The first was the sinking of the *Titanic*; the second was a statement by Mr. Lloyd George, then Chancellor of the Exchequer:—"That if the Board of Education under its existing statutory powers can and will frame general regulations providing for a capitation grant to each boy who attains a certain standard of practical efficiency, he, as Chancellor of the Exchequer, will advise that the Treasury should find the necessary money."[1]

The disaster to the *Titanic* awakened in the public mind a feeling of deep apprehension. It was known that the number of British Seamen in British ships had long been decreasing. The public was not so well aware of the absence of expert knowledge among that diminishing body. The facts were emphasized

[1] *The Times*, August 15, 1912.

by the following sections in Lord Mersey's report upon the *Titanic* disaster :—

Section 13.—That in cases where deck hands are not sufficient to man the boats, enough other members of the crew should be trained in boat-work to make up the deficiency. These men should be required to pass a test in boat-work.

Section 14.—That, in view of the necessity of having on board men trained in boat-work, steps should be taken to encourage the training of boys for the Merchant Service.

Section 15.—That the operation of Section 115 and Section 134 (*a*) of the Merchant Shipping Act, 1896, should be examined with a view to amending the same, so as to have greater continuity of service than hitherto.

The National Committee took the opportunity of explaining their position in a letter to the Press in May, 1912, of which the following is an extract :—

" Recent experience has brought home to the general public that it is desirable in time of emergency that all ratings, even stokers, firemen, and stewards, should have at any rate an elementary knowledge of seamanship and be thoroughly disciplined. Since 1859, there have been innumerable inquiries by Royal Commissions and Departmental Committees into the decline in the number of British trained Seamen. Among the causes of that decline are, of course, the substitution of steam for sail power and the increased use of machinery. The remedy proposed by almost every Commission and Committee has been that of a Treasury subsidy for training establishments for boys of good character. This, however, has not been granted, though since 1908 some training establishments have received a small grant from the Board of Education for technical instruction ; but it is understood that even this grant is being considered. Seamanship is, in fact, the only form of technical instruction for which no organized system exists in the United Kingdom."

Throughout 1912 the Committee kept up a continuous and increasing bombardment. A renewed fire of correspondence was concentrated upon the Board of Trade, who replied with a form of gas attack, with which those acquainted with Whitehall have been long familiar ; they said in words, that " the matter was still under consideration."

Next a creeping barrage was put down on the local authorities. The County Councils were attacked, but they, in turn, entrenched themselves behind the Treasury, saying that the matter was one of national rather than local importance, and that they were unwilling to move unless the Government made a supplementary grant. Some local authorities who desired only to train skilled

men said that: (1) The employment at sea was mere unskilled labour; (2) the wages were low; (3) the conditions of labour were bad; (4) there were deductions from the wages, low as they were; (5) the prospect of rising was infinitesimal; (6) the shipowners preferred the untrained boy; (7) moreover, the boys when trained did not keep to the sea.

To this indictment the Committee replied by quoting from a report of the Liverpool Steamship Owners' Association for the year 1912:—

"The Association (Liverpool Steamship Owners) is strongly in favour of the recommendations (of the National Committee on Sea Training) as it is satisfied that the Mercantile Marine Service offers a good opening for British boys. On the vessels engaged in the foreign trade of the United Kingdom the seaman is on an average employed for forty-two weeks in the year. During this time he is fed and lodged by his employer. If he falls ill his wages continue in full until he is discharged from his ship; his medical attendance and maintenance have to be provided by his employer until he is cured or is returned to a port in this country, and the cost of his return to such a port has also to be borne by his employer.

"The accommodation for the crew varies on different vessels, but it has during the last fifteen years been greatly improved. The great bulk of the British tonnage now afloat has been built within that period, and the service should not be judged by old sea stories or by the accommodation afforded on old and outclassed ships.

"The minimum scale sanctioned by the Board of Trade secures both in quality and quantity food that compares most favourably with that found in the home of a workman on shore. The conditions of service also compare favourably with those current on shore, but there stands in the way of lads desirous of going to sea the difficulty of obtaining the necessary training."

With regard to the individual objections of the local authorities, enumerated above, the Committee dealt with each point in their next annual report, pointing out, in particular, that the inquiries into the loss of the *Delhi*, *Oceana* and *Titanic* had shown the necessity of sea training not only for deck hands, but also for a proportion of other ratings; as to the prospect of rising, that must depend upon the boy himself and the training he had received. "If he rises to be boatswain's mate or boatswain there is a large increase, and there are many instances of boys rising to be officers."

The Committee stuck to their guns, advocating a national system of sea training for boys of good character, and in connection therewith—

(1) An Exchequer grant to sea-training institutions.
(2) An Exchequer grant or other inducement to shipowners to enable them to supply separate accommodation, supervision and instruction to boy sailors.

At last, before the year closed, the long-drawn struggle ended. On December 16, 1912, the Chancellor of the Exchequer (Mr. Lloyd George), on behalf of His Majesty's Government, acceded to the first request and promised a Grant of £10 per head per annum for boys in sea-training institutions, subject to regulations which were to be issued subsequently by the Board of Education.

The second request, for a grant to shipowners, was refused.

In the preamble of the Merchant Shipping Act of 1844 we read: "The prosperity, strength and safety of the United Kingdom do largely depend on a large, constant and ready supply of seamen, and it is therefore expedient to afford them all due encouragement and protection."

Thus by the end of 1912 some "encouragement" at any rate had been given to sea-training institutions in their work of supplying the Merchant Service with seamen. It must be remembered, however, that the output of all the various institutions only supplied a fraction of the total of 9,000 young men and lads that were required, according to the Liverpool Steamship Owners' Association, in order to meet fully the needs of the British Mercantile Marine, assuming an average of fifteen years' service.

A return on this subject, showing the output of the institutions, was published by the National Committee on Sea Training in 1913. The number of boys borne at that date in the *Indefatigable*, *Arethusa*, *Mercury*, *Warspite*, *Exmouth*, the Liscard Navy League School and Dr. Barnardo's Homes, averaged about 2,000, of which some 450 went into the Royal Navy and 550 into the Merchant Service. The total average period of training was twenty months.[1]

During the War the National Committee on Sea Training suspended its annual conferences, but, after an interval, continued their campaign in the Press and in Parliament. The War brought home to the people of this country—to some of them for the first

[1] In 1914 the number of boys under training in the principal sea-training institutions for boys of good conduct was on the average 1,840; the output of boys to the Royal Navy was 535 and to the Mercantile Marine 529.

time—the vital importance of the Mercantile Marine as well as of the Royal Navy. For years the majority of British people had eaten their daily bread without stopping to consider the part played by merchant ships in producing the British loaf. Then came the War. A few months of German U-boat activity succeeded in teaching the British a lesson about their shipping that many years of peace had failed to drive home.

The connection between the food queue and the fo'c'sle was easily recognized.

In this favourable atmosphere the Committee once more addressed themselves to the task of emphasizing the urgent need of a national system of sea training for boys in both sea services ; they further drew public attention to the fact—made evident by the War—that discipline and training were equally important for both. The Committee pointed out that there had been much talk of the debt we owe our seamen, and suggested that the best way of paying that debt would be to give them the means of learning their trade and rising as high in it as their capacities and services deserved.

In May, 1917, a letter appeared in *The Times*, in which the Committee urged in particular that there should be a standardized system of training for boys desiring to enter the Sea Services, which should be on the same lines up to a certain point, say thirteen years of age, and thereafter have a special division for each. They also recommended that there should be a pension scheme for the trained merchant seamen who keep the sea and retain their membership of the R.N.R., and that the funds of the Greenwich Hospital should be utilized in that connection. " It is not generally known," wrote the Committee, " that that institution was originally founded for the benefit of both Services, and that under 7 and 8 William III., cap. 21, a sum of £410,000 was actually taken from seamen in the Mercantile Marine in deduction from their wages, not a penny of which they ever received (according to an official statement made by the Registrar-General of Seamen in the report of the Royal Commission on the Manning of the Navy, 1859, p. 390), so that there is a nucleus of such a fund owed by Parliament to the Merchant Service." As to the shipowners, the Committee suggested that, as an inducement to give a preference to trained boys, and in lieu of the old remission of light dues for this purpose, or a pecuniary

grant in its place, shipowners should be allowed to ship boys who have been for two years in an approved training ship or institution with, if possible, three months on a sea-going tender, in the same proportion to able seamen as ordinary seamen are now shipped. After two years at sea, such boys or young men should be permitted to qualify as A.B.

In July, 1917, a further series of letters appeared in the papers on the subject of Merchant Seamen ; in one letter it was pointed out that owing to the failure in the numbers of British Seamen [1] there were large numbers—

(*a*) of foreigners and Scandinavians ;

(*b*) of coloured seamen, not including—

1. Asiatics :
   - (i) Lascars.
   - (ii) Chinamen.
   - (iii) Arabs.
2. Negroes from the West Indies, West Africa and elsewhere.

During the remainder of the War [2] the chief event with which the Sea Training Committee were concerned was the Education Bill of 1918. A letter was sent to the Press urging the Minister of Education to make special provision in his Bill for a system of sea training for boys. A leading article in the same strain appeared in the *Educational Supplement* of *The Times*. Debates took place in the House of Commons on the subject. On June 10, 1918, the Minister of Education was asked to make a declaration in regard to a National scheme of sea training in connection with an amendment to the Bill then under discussion. This he did in the following statement :—

" I have been in consultation with the Board of Trade and the Admiralty and with leading representatives of the Shipping industry upon the subject. We are all agreed that it is desirable to establish some national scheme for the training of boys who desire to enter the Mercantile Marine. I had an assurance from the Government that, should it be possible to reach an arrangement with the Shipping industry, the Government will meet the Shipping industry. We have thus every hope that a scheme will be shortly devised."

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[1] This point has more recently been emphasized again by Mr. Geoffrey Drage in an article in the *Nineteenth Century* for April, 1922.

[2] In 1918 the Sea-Training Committee sustained a great personal loss in the death of the first Lord Brassey. His place on the Committee was taken by Lord Inchcape.

Subsequently, the Minister of Education appointed a Departmental Committee [1]—

"to prepare a draft of a National Scheme of Training for the Sea Service with the object of maintaining a supply of well-trained seamen, regard being had to the provisions of the Education Bill, and to the powers and duties of local Education Authorities, and the facilities provided by existing institutions."

The Committee reported in June, 1919—the month that saw the signing of the Treaty of Versailles—but the report was not published by the Government until November, 1919.

The Committee advocated the establishment of a National Corporation for Sea Training and suggested that the cost should be borne by (*a*) the State, (*b*) the Local Authorities, and (*c*) the shipowners, and that the shipowners' contribution should be based on the total cost of the scheme and should be fixed at 25 per cent. of the capital and current expenses of the scheme.

On May 10, 1920, the Minister of Education refused to accept the recommendations made in the report on the ground that he would "not be justified in asking the Chancellor of the Exchequer to finance such a scheme as is recommended by the Committee, especially in view of the small proportion which would be met from sources other than the public funds." This refusal was repeated on June 1.

Thereupon, in the same month, the Sea Training Committee wrote to the Press, reminding the public of the large sum of not less than £410,000 owing from the Treasury to the seamen of the Mercantile Marine for two centuries, but recognizing that, in view of the state of the national finances, it was not the time to ask for additional expenditure, pending an improvement in financial prospects.

Since then, owing to the extreme need of economy in the national budget, the Sea Training Committee have taken no further action up to the present time.[2] They are waiting for the clouds to roll by. The Geddes axe has recently fallen upon the just and unjust causes, and it is hardly a favourable moment for appealing to either the public or Parliament—no matter how worthy the object may be. When, however, the present bad

[1] *See The Times*, August 1, 1918.
[2] April, 1922.

times give place to good, those interested in Sea Training will be found preparing to fight once again for their Cause. It is difficult to think of any cause more deserving than this struggle to do something towards improving the lot of British Merchant Seamen.

CHAPTER VIII

SAFETY AND SANITATION AT SEA

All classes of the travelling community are deeply concerned in the reduction of the dangers attaching to ocean voyaging—shipowners, ship-builders, and marine underwriters have laboured assiduously to evolve that dream of the ages—the unsinkable ship. That goal is not yet in sight, though great progress has been made.

When the ill-fated White Star liner *Titanic* was built, the public was led to believe that the unsinkable ship had at length arrived. These hopes, however, were dispelled when on April 10, 1912, this magnificent vessel while on her maiden voyage had her side ripped by a submerged mass of ice and sank with about fifteen hundred souls.

Five years later, in 1917, when the Government were really and rightly alarmed about the shipping situation, in view of the submarine campaign, a Committee, under the chairmanship of Lord Curzon, who represented the War Cabinet, was appointed to examine the question of building "unsinkable" mammoth ships according to designs that had been prepared in the Admiralty. The Committee had personal interviews with representatives of the Admiralty and the Ministry of Shipping and with Lord Pirrie, the head of Messrs. Harland & Wolff. The problem of the unsinkable ship was very thoroughly explored and it was found that there was a great deal to be said on both sides. At that time, as will be remembered, there was great shortage of steel and man-power, and these factors had a bearing on the problem of the unsinkable ship.

Those who regarded the construction of an "unsinkable" mammoth ship as a legitimate experiment, argued that such a vessel as the one proposed could be hit by mines, or by three

or even four torpedoes in either or both engine-rooms without being sunk. She would be saved by her " double skin " construction, and she would have no side lights except on the upper deck. They were of opinion, therefore, that the ship would be practically unsinkable. They admitted that the number of ports which could accommodate the vessel was small, but pointed out that only a small number—say New York, Boston, Quebec and Halifax on the other side of the Atlantic, and Liverpool, Southampton and Belfast on this side—would be likely to be required. The ship could be loaded or unloaded either in the open river or at any quay of sufficient size.

They urged, as regards man-power, that the big ship would offer great economies in officers and crews as compared with a larger number of ordinary " standard " cargo vessels. Further, they claimed that there would be a saving in convoys, which would merely be required in the danger zone : elsewhere, her speed, which would be far greater than that of the ordinary cargo ship, would be a sufficient protection.

Those, on the other hand, who condemned the idea of the " unsinkable " ship stated their case with equal vigour and perhaps even greater warmth. They pointed out in the first place that the amount of steel (from 16,000 to 18,000 tons) required for the construction of one mammoth ship would be sufficient for no less than eight standard ships. They estimated that an " unsinkable " ship would take at least fourteen months in building, whereas a standard ship could be constructed in about four and a half months. They stated that the same carrying capacity would not be obtainable in the mammoth ship as in her equivalent in standard ships because of the delay in loading and discharging the bigger ship. Finally, they were strongly of opinion that the mammoth, as designed, would not turn out to be unsinkable. They held that she would be relentlessly pursued and attacked by the enemy, that if hit by torpedo or by mines in either of the engine-rooms and still more in both, she would sink ; if hit elsewhere she would have to be towed into harbour and that the experiment would prove to be an expensive failure.

In the end the experiment was never carried out—the " unsinkable " ship, as planned, was never built.

The present writer will always remember the two streams of

admiration and scorn that were poured upon the idea, and he will always regret that the experiment was not made. If the ship had been built and if she had been hit by mine and torpedo amidships we should now be in a position to say whether the "unsinkable" ship is a possibility or a dream. At present we do not know.

The sinking of the *Titanic* was, of course, an extraordinary disaster, and it appeared all the more extraordinary because, owing to improvements in construction, there had been so few disasters of any magnitude during recent years. It also served, as a result of the Board of Trade inquiry that followed the tragedy, to stiffen up the rules on board ship in regard to life-boats, boat-drill and other precautions.

Mr. Joseph Conrad, writing about the inquiry, gives us a brilliant impression :—

"It was discovered on the very second day of the *Titanic* Board of Trade inquiry that the water-tight doors in the bulkheads of that 'wonder of naval architecture' could be opened down below by any irresponsible person. Thus, the famous closing apparatus on the bridge, paraded as a device of greater safety, with its attachments of warning bells, coloured lights and all those pretty-pretties, was, in the case of this ship, little better than a technical farce."

He continues :

"There is not much mystery about a ship. She is a tank. She is a tank, ribbed, joisted, stayed. The *Titanic* was a tank, eight hundred feet long, fitted as an hotel, with corridors, bedrooms, halls and so on, and for the hazards of her existence I should think about as strong as a Huntley and Palmer biscuit-tin. I make this comparison because Huntley and Palmer biscuit-tins, being almost a national institution, are probably known to my readers. Well, about that strong, and perhaps and perhaps not quite so strong. Just look at the side of such a tin and then think of a 50,000 ton ship and try to imagine what the thickness of her plates should be to approach anywhere the relative solidity of that biscuit-tin. In my varied and adventurous career I have been thrilled by the sight of a Huntley and Palmer biscuit-tin kicked by a mule sky-high, as the saying is. It came back to earth smiling, with only a sort of dimple on one of its cheeks. A proportionately severe blow would have burst the side of the *Titanic* or any other 'triumph of modern naval architecture' like brown paper—I am willing to bet."

He then goes on to leave with us suggestions for greater and better precautions. He suggests that there should be continuous bulkheads—a clear way of escape to the deck out of each water-

tight compartment; that it is advisable to make each coal bunker of the ship a water-tight compartment by means of a suitable door; that the man-handled davit should be eliminated; and that there should be boats for all, with motor-engines. In 1913, the year after the *Titanic* disaster, the Rules for Life Saving appliances were amended and superseded those that were then in force. Subsequently, the Rules of 1913 were in turn superseded by Rules which came into operation on July 1, 1914.

These Rules provide that all foreign-going passenger steamers shall carry lifeboats sufficient to accommodate the total number of persons carried, or which the ship is certified to carry, whichever number is the greater, and a life-jacket must be carried for each person on board. Davits are not to be fitted in the bows, but the stowage of boats in the after-part of the ship is allowed, provided that the boats are not brought into dangerous proximity to a propeller on being lowered into the water.

The Board of Trade take power to accept any life-saving appliance in lieu of a life-saving appliance required by the Rules, subject to such conditions as they may impose, if they are satisfied that under those conditions it will be as effective as the appliance required by the Rules.

All boats and other life-saving appliances must be kept fit and ready for use, and fitted and arranged to the satisfaction of the Board. A certain proportion of motor life-boats may be carried.

As regards boat drill, the Act lays down that the master of every British ship shall enter in the official log book a statement of every occasion on which boat drill is practised on board the ship [1] and on which the life-saving appliances on board the ship have been examined for the purpose of seeing that those appliances are fit and ready for use.

There is no express statutory provision requiring boat drill to be practised, but many Steamship Companies issue their own instructions on the subject to the masters in their Service, with the result that boat drill is carried out at regular times during each voyage. Moreover, as we have seen, the Act requires that life-saving appliances are to be kept ready for use and the

[1] *See* Chapter VII, page 128.

Board of Trade have issued standard regulations as to mustering at boat stations and preparing boats for lowering into the water.

In the short period between the *Titanic* inquiry and the outbreak of war, many ingenious devices were invented in connection with safety at sea. Some of the larger passenger liners were equipped with these latest inventions. We find, for instance, that in the case of the *Transylvania*, ordered by the Cunard Company in 1913, her equipment included a complete arrangement for emergency lighting, power-controlled water-tight doors which could be operated from the bridge, submarine signalling, ventilation and heating by thermo-tanks, apparatus for indicating on the bridge the presence of fire in any compartment, and boat turning-out gear and transporters.

In a paper on "Sea Casualties and Loss of Life," [1] Sir Westcott Abell, the Chief Ship Surveyor of Lloyd's Register, has presented a critical analysis of marine risks based upon figures relating to British-owned ocean-going vessels during the twenty-three years 1890–1913. He does not deal with the War years because during that period there were abnormal losses due to enemy action. The result of his researches leaves no doubt that ships are safer than they were and that the risks of disaster and loss of life have been very considerably reduced.

In 1890 the number of British steamers engaged in foreign trade was about 3,600. Their white crews numbered over 100,000. The death-roll amounted to 350 from shipwreck, 127 from accidents and 263 from disease. As compared with these figures, in 1913 the number of steamers was about 4,100 and the hands employed about 160,000. The death-roll was 204 from shipwreck, 84 from accidents and 319 from disease.

Turning to the passenger-lists, we find that in 1890 the number of passengers carried from the British home-ports to non-European countries was about 486,000 and the number of deaths was 560 from shipwreck, 22 from accidents and 546 from disease.

In 1913 the number of passengers carried was about 1,075,000 ;

[1] Read before the North-East Coast Institution of Engineers and Shipbuilders, November, 1921. I am grateful to Sir Westcott Abell for providing me with a copy of this paper. It has been published by Messrs. Spon, Ltd., Haymarket, and should be read by students of the problem of sea casualties.

there were only 50 deaths from shipwreck, 17 from accidents, and 1,113 from disease.

In summarizing his investigation, Sir Westcott Abell states that the chance of a serious casualty occurring to an ocean-going passenger ship and involving loss of life is 1·2 per cent., while the chance of loss of life of a passenger by reason of such casualty is ·02 per cent.

Assuming that one million passengers are carried per annum, it would only be possible, if ships were brought to absolute perfection in accordance with the latest developments of naval architecture, to prevent the loss of passenger life to the extent of 70 per annum. But even in this case it must be remembered that the most perfect ship is under the control of the human element and hence she may run ashore or incur other perils also due to the human factor.

In this connection it cannot be too often remembered and repeated that shipping always has been and always will be a "risky" business. Shipowners, shipmasters and underwriters must ever bear this point in mind. Underwriters do in fact talk about their occupation in terms of "risks"; they write "risks"; but shipowners and shipmasters are perhaps too prone, as a result in some cases of long immunity, to regard their work as "safe as houses."

How lives at sea can best be protected from marine accidents is a matter for dispute. There are two schools of opinion. One school holds that risks must be guarded against by severe and increasing legislative action on the part of Governments; by regulations in regard to "boats for all," "unsinkable" ships, double bottoms, double skins, more bulkheads and so on. The other school claims that shipowners themselves can be left at liberty to deal with the problem; that it will not "pay" the shipowner—to put it bluntly—to lose lives and mail-bags and cargoes; and that therefore he can be trusted to do what is necessary. Further, it can be shown how improvements in ship construction and marine engineering, rather than Government regulations, have led to the substantial progress that has been made, as a whole, in regard to the safety of ships and life at sea; the change from sail to steam, the introduction of wireless telegraphy, sound-signalling and other inventions have all played their part—and a bigger part than the rules about

"boats for all," for it must always be remembered that life-boats attached to the ship will go down with her; when a serious collision occurs and the vessel begins to sink, no King Canute can compel her to pause in the act of sinking until all the boats have been lowered and manned.

Sir Westcott Abell reaches the conclusion that if any reliance whatever can be placed in the results shown by the figures analysed, "the regulations now in operation with regard to design, construction and operation of ocean-going vessels are as effective as is humanly possible in our present state of knowledge, and, indeed, it is conceivable that a certain amount of elasticity in administration might be admitted, to meet economic requirements, without unduly prejudicing the safety of life at sea."

Over the whole period of the twenty-three years, from 1890 to 1913, more than four times as many passengers died at sea from disease as from marine accidents. This being the case, and in view of the great increase in the number of passengers carried during recent years, it is important to ascertain what steps are taken by shipowners to safeguard the health of both passengers and crew. Even apart from the humanitarian aspect of the case, it is in the commercial interests of owners to prevent illness on board as far as possible. Infectious disease on shipboard is a very serious matter from the point of view of the expense, delay and worry of quarantine.

Many Steamship Companies have their own Medical Superintendents who, in addition to being responsible for the medical *personnel* and arrangements on board ship, are continually engaged in carrying on a campaign against the four great enemies of the ship's doctor—Mosquitoes, Rats, Bugs and Cockroaches.

There does not appear to be much literature respecting the sanitary arrangements and the prevention of disease on board ship, but students of the subject would be well-advised to read *Ships' Hygiene*, by the late Dr. W. Melville-Davison,[1] in which such matters as cleanliness, water-filters, vermin and disinfection are examined.

Of the four above-named enemies of the medical department on board ship, the Mosquito is on some voyages the most to be dreaded and in other voyages the least to be considered. For instance, if a vessel calls at a port where yellow fever and malaria

[1] For some years Medical Superintendent of the Booth Line.

are prevalent and has to lie alongside a wharf where the sanitary conditions are bad, or has to receive her cargo from lighters that are swarming with mosquitoes, it may well be that mosquitoes, the known carriers of those diseases, will find their way on board and take their toll of the crew, as many a seaport cemetery bears witness.

On the other hand, voyages in northern latitudes, such as the New York-Liverpool run, present no such problems.

In all probability the vast majority of steamers sooner or later visit ports where mosquitoes and either yellow fever or malaria, or both, are to be found, while a large percentage of our ocean-going vessels are frequently employed in calling at those places and a few of them spend all their lives in such service.

As regards yellow fever, scientific discovery has taught us that never in any circumstances can direct contagion take place from man to man. A man suffering from yellow fever could sleep in the same bed with another man and yet not transmit the disease to him. It is the *Stegomyia calopus*, or tiger mosquito, which is known to be the carrier of yellow fever from man to man and, once infected, this mosquito would remain infected to the end of its life. The question may therefore be asked, why a mosquito, after being infected with yellow fever at, say, a Brazilian port, and going on board a ship bound for, say, Calcutta, is not a danger on arrival in India. Might there not be a risk of the infected mosquito carrying yellow fever *to* the East just as cholera has been brought *from* the East, as the result of a better and more rapid system of communication by water ?

The answer is that although the *Stegomyia* mosquito is known to exist over the whole length of the coast-line of China and India and that, therefore, there is every facility for the rapid spread of an epidemic, if once yellow fever were introduced into that part of the world, nevertheless the voyage from yellow-fever areas to the East by the Suez Canal or round the Cape of Good Hope or Cape Horn at present takes longer than the life of the mosquito, which, under satisfactory conditions, may last one or two months. The introduction of yellow-fever convalescents is in itself absolutely without danger because man cannot transmit the disease to man.

The voyage, however, from a yellow fever infected port in

the North of Brazil to the East by way of the Panama Canal might be short enough for a risk to be incurred and some measure of disinfection might be advisable.[1]

This matter of disinfection is always troublesome. Fumigation of holds by sulphur is always a questionable procedure from the Shipowner's point of view, however efficacious it may be from that of the sanitarian. Cargo is apt to be damaged by contact with the fumes of sulphurous acid gas; food stuffs especially are not, and never will be, able to bear fumigation with sulphur, and food stuffs form a large proportion of the cargoes of modern steamships. Tea, coffee and cocoa are absolutely ruined by it. Certain raw materials, such as rubber, will undoubtedly be spoilt by contact with this gas.

Moreover, passengers and to a less extent members of the crew, have no desire to live in an atmosphere redolent with the smell of sulphur. Sulphur, unfortunately, is the only drug which has any effect upon mosquitoes.

Rather, therefore, than destroying the mosquitoes with suphur on board ship, every effort should be made to prevent them from coming on board, or at any rate getting a lodgment there. Let us see how this can best be done.

There are three ways in which infected mosquitoes can be introduced into a ship: by direct contact with the shore if she is lying alongside a wharf; by lighters which bring off the cargo, if she is lying anchored in a river or bay; and by the mosquitoes being blown on to her from the shore. This last could hardly happen if the ship were lying more than 400 yards from the land, but it does certainly take place when ships are anchored 100 or 200 yards from the shore.

The most frequent source of nuisance from mosquitoes is the lighters. These almost always contain a large quantity of residual water in their bilges, from which larvæ of mosquitoes can always be recovered, and it is to this bilge-water that attention must be turned. As far as possible, it ought to be reduced to a minimum either by efficient pumping or by filling up the bilges with a mixture of cement and cinders. It is advisable to put kerosene down in all bilges at least once a fortnight. The cost of so doing is very small and the gain is great. Lighters that have been notorious hot-beds of mosquitoes and capable

[1] *Ships' Hygiene*, p. 30.

of introducing hundreds into any ship alongside which they might be, have by these simple methods of precaution been rendered free from these troublesome insects, much to the benefit of the crews of the ships, not only in health but in comfort.

Nevertheless, even after attention has been paid the sanitary conditions of wharves and the cleanliness of lighters, some mosquitoes are certain to visit the ship. The object must therefore be to reduce the number as far as possible. There are two ways of doing this, namely, by the exclusion of the mosquitoes, and the prevention of breeding by any stray ones which may have gained access to the ship. The first of these can be accomplished by screening and the second by attention to the system of water supply used for domestic purposes.

The old-fashioned precaution against insects was the mosquito net, but the modern system of screening the doors and ports with gauze wire is far more efficient. The mosquito net did give a certain amount of protection, but sleeping under it was at best a stuffy business, and any one who has had experience of the two forms of protection will always vote for the screening of ports and doors. The screening, however, must be absolutely thorough. Very often on board ship, for purposes of ventilation, in addition to the ports and doors, there are narrow openings around the tops of the cabins, and these, too, must be protected with screens.

Great attention must be paid to the screening of the doors, for the door is the easiest means of ingress to the insect and is very likely to be left open; in order, therefore, to lessen the danger of "the open door" it is essential to provide as far as possible a system of double doors, so that the intervening space may receive any mosquitoes which enter from outside, the second door preventing their penetrating into the living quarters. If it can be arranged, all mosquito doors should open outwards, because if a door opens inwards, any insect resting on the panel is taken into the room, whereas if the door opens outwards, the insect is pushed out into the passage. Unfortunately, with rooms opening into a central fore-and-aft alley-way, it is not always possible to open the door outwards. To facilitate the closing each door should be fitted with a strong spring and spring catch.

As regards the sort of gauze wire to be used, many varieties

have been tried, such as ordinary copper wire, nickel, steel and bronze, all of which have proved unsatisfactory. They oxidize easily, and soon become weak. It must always be remembered that sea air is much more destructive to copper and steel than the air on shore. Moreover, salt water coming into contact with steel and copper works great havoc. Nickel appears to possess many advantages, but the cost is prohibitive. After exhaustive experiments with various metals it would seem that oxidized phosphor-bronze is the best material for the wire. It stands the sea air and will bear immersion in salt water longer than any of the other varieties. The mesh advocated as giving at once the greatest strength and the most air is 16 × 16 per inch.

It may perhaps be thought by the critical reader that too much stress has been laid on this particular question of the protection of a ship against mosquitoes. Perhaps so; but let him arrive at a tropical sea-port, let the first news which the pilot or ship's agent brings on board be to the effect that there is an epidemic of yellow fever on shore, and our traveller will be among the first to bless the owners of the ship if her living quarters are properly screened with gauze wire. On the other hand, if no precautions have been taken, he will be the first to curse the owners and go on shore to buy a mosquito net, in which he will spend an uneasy and airless night.

Of all the vermin found on board ship none are more destructive or cause greater annoyance and loss than rats. They damage the cargo, they eat the corn (in grain-laden ships), they worry the passengers, they gnaw the woodwork, they transmit (by the medium of their fleas) the plague, and finally, at the end of the voyage, they are reported by the Captain of the ship to the owners in the Board-room.

Thereupon, the Chairman will ask the Medical Superintendent what steps are being taken to exterminate the rats or he may ask what success the virus is having. But both he and the Medical Superintendent know perfectly well that there will always be some rats on board as long as ships are ships. At best it is merely a question of keeping the numbers down. And the public know it. Even the dwellers in Midland towns who have never been to the coast know that rats infest ships, that they leave a sinking ship, and that, in fact, a ship would not

be quite "healthy" without them. The phrase is used proverbially and particularly in a political sense.

In spite of the inequality of the struggle, shipowners continue to wage war on the rats. Many ways have been tried to defeat them. The official rat-catcher has become an institution and does a great deal of good. The ship's cat does her bit. Various poisons have been advocated from time to time, such as phosphorus, arsenic and strychnine, whilst the gases of sulphur and carbon have been used. All these undoubtedly kill rats, but where a ship is concerned, the dead bodies are liable to decompose and the resultant stench usually causes the poisoning to be discontinued. Moreover, when such deadly poisons as those mentioned are being used, it must be remembered that they are just as deadly to human beings and domestic animals as they are to rats, and even when the greatest care is taken, there is always a possibility of food stuffs becoming contaminated as the result of these poisons being laid about for the rats.

Several sorts of virus have been put upon the market and great things have been claimed for them. This one absolutely destroyed all rats; that one made them come on deck and die there in neat rows, like game spread for a photograph at a fashionable shoot; another one gave rise to no smell; yet another was perfectly harmless to man and domestic animals, but contagious from rat to rat. Generally speaking, it may be said that good results have followed from the use of a high-virulence or ship-rat virus. The virus should be carefully laid down and persistently used, if the number of rats on board ship is to be reduced.

Not only from the standpoint of general hygiene and prevention from disease, nor yet because of the disquieting effect which the sight of a rat produces upon nervous passengers, but also from the point of view of saving money and avoiding complaints of shippers in regard to damaged cargo, shipowners must carry on their eternal warfare against the rat.

Bugs and fleas make their appearance even in well-kept ships. Bugs are introduced into ships, as a rule, through the medium of bedding or clothing belonging to members of the crew or passengers, and once they get into a ship it is a difficult matter to dislodge them. They get into all sorts of cracks and

fissures and make their way behind bulkheads, where they lay their eggs.

There was an old idea that certain woods repel bugs whilst others attract them, but recent research has proved that this is not so, since bugs live on blood alone and not on moist wood or dirt.

Bed-bugs have been held [1] to be responsible for the transmission of anthrax, cerebro-spinal meningitis, leprosy, plague, skin diseases, tuberculosis and typhus fever.

But apart from its disease-producing possibilities, there is probably nothing which incites a greater feeling of disgust amongst passengers than the sight of a bug and once a number of them have been domiciled in the crew's quarters or in the steerage accommodation it is a very easy matter for them to be carried into the saloon.

With a view to exterminating bugs, various means have been adopted. Fumigation with sulphur has been tried, but with little result, because sulphur has no action on the eggs and when these hatch out the state of affairs is as bad as before this means of destruction was tried. "Washing down with paraffin," says Captain Wilson-Barker, "and the squirting of this oil into all cracks and crannies, unget-at-able in the ordinary way, is the best means of getting rid of these insect pests and their eggs."

The last of the four enemies of the Medical Superintendent that we have immediately under review is the Cockroach. Cockroaches are a frequent and terrible nuisance on board ship. They have an unpleasant smell and attack almost everything eatable; by some people they are looked upon as domestic scavengers, since they destroy the more objectionable bed-bug.

Dr. Davison, on the other hand, condemns the cockroach as a transmitter of diseases, more particularly beri-beri and scurvy. In three cases of beri-beri on one voyage he was satisfied that the parasite causing the disease was obtained from the intestinal contents of the cockroach.

"Far," he writes, "from regarding the cockroach as a harmless and necessary scavenger, hunted by the housewife for the sake of its depredations, and by monkeys, cats, rats, birds and frogs as an article of diet, I

[1] By Dr. W. Melville-Davison.

consider it, with the possible exception of the mosquito, the greatest enemy of the human race, but with this difference. As a foe, the mosquito is an aggressive one, and its activities are limited by seasons and geographical location, also by the fact that in many instances it has become a vegetarian; the cockroach, on the contrary, has not changed its habits in any way. It comes like a thief in the night, its attacks are insidious and its influence is as pernicious as it is widespread and far-reaching."

As regards the means which have been adopted to rid ships of this pest, good results have been obtained from arsenic or phosphorus mixed with flour, oatmeal or honey, though, as we have already observed in regard to the destruction of rats, it is dangerous to use poisons that are just as deadly to human beings and domestic animals. Borax is an old remedy, but, although it is an excellent insecticide, the cockroaches will not eat it unless it is mixed with other materials. Fumigation destroys the insect, but the eggs require different treatment, and for this purpose boiling water or paraffin is recommended; the boiling liquids should be poured into the crannies and crevices and other haunts from which the insects emerge.

CHAPTER IX

AT THE OFFICE

"Our large trading cities," says Ruskin,[1] "bear to me very nearly the aspect of monastic establishments, in which the roar of the mill-wheel takes the place of other devotional music; and in which the worship of Mammon and Moloch is conducted with a tender conscience; the merchant rising to his Mammon Matins with the self-denial of an Anchorite, and expiating the frivolities into which he may be beguiled in the course of the day by late attendance at Mammon Vespers."

It would be a mistake, however, to suppose that in a Shipping Office the hours are very late or the nature of the business always very secret or sacred. There are, it is true, occasions when amalgamations, re-organizations and deals of one sort or another are in the early stages of consideration, and at such times the heads of the business will, if they are wise, keep their proposals to themselves. There are also days when those of the Staff who work in the outward freight department may have to stay late at the office in order to get the bills of lading "figured" and the manifests written against time—the time of the ship's departure. But in the main, the routine work of both Board and Staff falls into and runs smoothly along regular grooves in which secrecy and overtime are the exception rather than the rule.

A desire to learn what goes on in a Shipping Office has sometimes been expressed, coupled with the cautious sentiment on the part of the inquirer that perhaps the matters discussed and the methods of conducting a steamer business are of too confidential a nature to be divulged. An outsider might perhaps in this way get behind the scenes and find out how the ship-owning trick is done; he might start doing it himself; or one

[1] *The Political Economy of Art.*

shipowner might discover how a competitor manages his concern. "It wouldn't do."

To the contrary. There is nothing mysterious about running a shipping business. Any one can learn how it is done; any one can start owning steamers, if he has the necessary courage and capacity and capital; and, as far as competition is concerned, the main features of management are almost identical in every shipping office. There are no tricks to be learnt, but an almost infinite number of rules to be observed. Some of them we have noticed already. To have the right type of ship for the trade; the right number of ships in the service; the right schedule of sailings; the right size of offices; the right staff at home; the right agents abroad; efficient arrangements for docking ships and handling cargoes; proper attention paid to marine insurance and proper respect paid to passengers; care in making appointments and care in promoting or parting with those appointed; vigilance in obtaining and retaining business. Such are some of the problems with which shipowners are confronted in what Ruskin calls the "Mammon Matins" and "Mammon Vespers."

Let us go inside the place of worship and see the ritual as it is practised.

The congregation of worshippers in a full-fledged passenger liner office is composed, in the main, of the following:—The Partners or Board of Directors, as the case may be; the Management; the Secretariat; the Inward and Outward Freight Departments; the Passenger Department; the Book-keeping and Cash Departments; the Construction or Naval Architect's Department; the Medical Superintendent's Department; in addition there are groups of individuals who may be classed, on the *dramatis personæ* plan, as typists, office-boys, messengers, commissionaires, and others.

Taking these groups *seriatim*, the Partners or Directors may have reached the position that they occupy by inheritance or promotion or purchase. More rarely a man without any previous connection with the Company will be invited to join the Board because in some way or other he brings grist to the Mill—be the grist in the shape of brains or reputation or influence. Shareholders are supposed to like to see a title in the list of Directors on the prospectus or Annual Report of a Company, but in most Shipping Companies since the war there has been

very little difficulty in satisfying the shareholders in that respect.

Those then are the men who direct the policy of the Company and are responsible for the conduct of the business to the shareholders, by whom they are elected. They form, as it were, the Cabinet acting through and in consultation with the Management in a manner not entirely dissimilar from the way in which His Majesty's Ministers govern the Country through the permanent official channels, the main difference being that the Directors of a Company are usually less " transient " and in the majority of cases less " embarrassed " than the occupants of the Treasury Bench.

With the Board of Directors rest, amongst other matters, decisions in regard to expenditure. The Directors deal with questions of salaries and pensions ; contracts for coal ; contracts for all the whole range of ships' stores and supplies—from paint for the Deck Department and oils for the Engine Department down to milk and cream for the Steward's Department ; the building, buying, chartering or selling of tonnage, including tugs and lighters ; the placing or carrying of the firm's insurance business ; all these are matters for the attention of the Board, or probably, in each case, of a sub-committee composed of one or two members of the Board, together with representatives of the management and the departments concerned. One director may specialize in salaries and pension schemes ; another in contracts ; a third in ship construction ; a fourth in marine insurance and so on. In this way a great many problems may be explored and conclusions reached. Moreover, a great deal of the time of the whole Board can be saved by such sub-committees, and the decisions reached in committee can be ratified and recorded afterwards at regular Board Meetings.

In addition to these special *ad hoc* Committees dealing with, say, stores, or salaries, there may be a permanent committee composed of one or two directors and representatives of the Management and Secretariat, sitting every morning, for the purpose of dealing with questions arising out of the daily correspondence or telegrams. To such a Committee the head of any department or his representative will bring any letter or inquiry that he does not feel prepared to answer himself, and then obtain an authoritative decision from the Committee. There may also be a weekly Committee Meeting, composed of

the same individuals, before whom will come the Shore Superintendents, who have their offices and their work at the Dock, namely, the Marine Superintendent, the Medical Superintendent, the Superintendent Engineer and Superintendent Steward. They will each report upon the work of their departments for the week. If a vessel has arrived in port during the week, her Captain and Chief Engineer may be summoned to attend this weekly Committee in order to answer or raise questions in regard to the voyage just completed.

To a great extent the items of expenditure that may be dealt with and decided in a Sub-Committee must obviously depend upon their magnitude.

Questions of expenditure and investment involving large sums such as the purchase of a competitor's fleet or the entry into a new trade, will obviously be a matter for the whole Board. It is here that the Directors' commercial sense will be required. What is meant by Commercial Sense has never been satisfactorily defined. Men who pride themselves chiefly on the possession of this particular sense, and deplore the lack of it in their colleagues or friends, have often come seriously to grief when they have entered new fields of enterprise or purchased existing businesses.

An able Civil servant once illustrated what he meant by a Commercial Sense in the following way. He was sitting over his wine after dinner. In order to demonstrate what he meant, he raised his glass of wine to his nose ; he sniffed it sagaciously, first at one nostril, then the other ; then he said : " That seems all right, I'll take a million pounds' worth." He lowered his glass. Then he raised it again ; held it up to the light ; smelt it ; put it down again and said with a shrug : " That proposition doesn't interest me." He added : " Now, *that* is commercial judgment ; that is what old Lord X does in the City. He smells a thing and decides, as it were, by his nose, whether to turn it down or take a million."

It is, however, only on rare occasions that a shipowner is called upon to exercise these special nasal powers. More often he is using what common-sense he has got in deciding whether, for instance, that contract for paints and varnishes should be placed with Supplier A or Supplier B, or whether, following the example of Solomon, he should suggest that the contract might

be divided between them. Or, again, he may have to decide whether Mrs. Michael O'Flanagan, charwoman, widow of a donkey-man of many years' service in the Company, should be relieved of her duties as charwoman and retired on pension, and if so, what the amount of the pension should be; alternatively, whether she should continue her scrubbing for another year. This would seem a matter for reference, in the first instance, to the Medical Superintendent's Department.

In addition to these duties at his own office, it is quite likely that the Shipowner will perform similar functions in the office of some Railway or Insurance Company, or Bank, of whose Board he may be a member, for it not infrequently happens that Shipowners are invited to become directors of Banks, Railways, and other Companies, the idea being that the shipowner brings grist in some form or other to the mill. This grist may take the direct form of cargoes, banking accounts, or hulls, or more often, in view of the fact that those contributions have already been made, the grist may take the less visible form of experience and information. Here, perhaps, we can take leave of the Members of the Board and their functions. As far as inheritance goes and as contrasted with other walks of life—scholars, tenant farmers, politicians, cricketers—the shipowner's business does not last through many generations. In Tripos Lists; at " Lord's " ; in the House of Commons ; on the land—you may find chips of old blocks in plenty, but not often in Shipping Offices. Here and there a member of the family of the founder of the business may be on the Board, for the sake of his name or by reason, perhaps, of the fact that he represents a large share of the capital, but with the exception of one or two shipowning families whose members still attend to the daily management of their business, there are few Shipping Companies, as a glance at the list of names on the Directorates will show, whose Boards contain representatives of the third generation.

Considering that shipowning is one of our great traditional national trades, this fact may seem surprising. The reason for it is probably to be found in the explanation that those ups and downs in the Shipping world, to which allusion has already been made in these pages, have either, on the one hand, lifted these shipowning families into circumstances in which the hunting

field or the House of Commons offered greater attractions than those of " the office " ; or, on the other hand, lowered them to a position in which they were obliged to part with their vessels.

As we have noticed, the partners or directors, as a general rule, conduct their business through the channels provided by the Management and Secretariat.

Obviously, therefore, the importance of the position of the General Manager or Manager, as the case may be, varies according to the amount of time and attention that the Directors themselves give to the management of the business. In some firms, the directors give their whole time and keep all the decisions, great and small, in their own hands. In others, the directors are only part-time contributors and in consequence the position of the General Manager becomes much more important. In extreme cases, though the admission would not be made by either side, the Managers tell the directors what to do. Whatever their relative positions may be, the Managers must be familiar with the entire business at all points ; it is their duty to see that the decisions and policy of the Board are carried into effect, using the various departments concerned as and when required. Whatever the subject and no matter how small it may be, the Management must either know or get to know all the facts about it. It may be a large affair, of the sort indicated above in a list of problems with which Directors are confronted, such as Contracts or Construction ; Schedules of Sailings or Chartering of Vessels. It may, on the other hand, be a small matter, such as the installation of a new telephone, or the appointment of a new typist—no matter what the particular problem may be, the Manager should be cognizant of what is happening and the office machinery should, in fact, be such that the case must come before him.

As regards the composition and functions of the Secretariat in a Shipping Office, these must vary a great deal according to the size of the Company. In a relatively small Limited Company with only a few steamers, it may be that one individual may be both Manager and Secretary. In larger establishments there may be a General Manager, with a Manager and Assistant Managers to help him, as well as a Secretary and perhaps one or more Assistant Secretaries. In such cases the Management and Secretariat may be in separate rooms with walls, or at any

rate partitions, between them. The Secretariat are in the main responsible for seeing that the Articles of Association are observed; that the proper number and kind of meetings are held; the Secretary is responsible for preparing the Agenda papers and convening the meetings; for recording the Minutes and circulating draft copies to those entitled to receive them. Further, it is the Secretary who has to deal with a steady stream of correspondence of an official nature relating, amongst other subjects, to share-holding matters.

Having now taken a glance, as it were, at the desks of the directors, managers and secretaries, and having caught sight of the sort of letters and memoranda that might be found on their files, it is perhaps time to turn to what might be called the three main revenue-earning departments, namely, the Inward Freight Department, the Outward Freight Department and the Passenger Department, each with its own Manager and Staff. Of these, the Inward and Outward Freight Departments are mainly concerned with two documents—the Freight Tariff and the Bill of Lading. These are the Alpha and Omega of their existence. These are the storm-centre of telephone inquiries, telegrams, letters, claims, consultations, personal interviews. If inward and outward freight are both payable at the same port, then upon the ship's arrival at that port, the Inward Freight Department, in conjunction with the Cashier's Department, collect payment from and issue permits to the consignees of the cargo to take delivery of the goods. Meanwhile, the Outward Freight Department are making preparations for the outward cargo and the outward Bills of Lading. At this point it may be convenient to ascertain precisely what a Bill of Lading is.

A bill of lading is a formal receipt subscribed either by the master of the ship, in his capacity of carrier, or by the agent for the shipowner, acknowledging that he has received the goods specified in it on board his ship and binding himself (with certain exceptions) to deliver them in the like good order and condition, as received, at the place and to the individual named in the bill or his assigns on his or their paying him the stipulated freight. Each individual shipper who sends goods on board receives a bill of lading for the same. The bill of lading, therefore, is the evidence of and title to the goods shipped.

The exceptions, referred to above, limiting the liability of the carrier, are numerous and varied, for there are many different forms of bills of lading in use, but there is one clause which appears in a great number of them to the effect that " The Act of God, perils of the sea, fire, barratry[1] of the Master and Crew, enemies, pirates and thieves, arrests, and restraints of princes, rulers and people, collisions, stranding and other accidents of navigation " are excepted. Bills of lading are not, as a rule, immediately given by the Master on receiving the goods. The usual practice is for the master or his deputy to give what is known as a Mate's Receipt for the goods,[2] which is afterwards delivered up by the Shipper or his representative on receiving the bill of lading from the office. Several sets of bills of lading are made out on printed forms ; one of these should be remitted by the first post to the person to whom the goods are consigned, a second being sent afterwards ; a third is retained by the Shipper ; a fourth is sent by the shipowner or his representative to the agent at the port of destination ; a fifth is retained by the Shipowner. The forms of bills of lading vary very much and their clauses have been and remain the subject of judicial consideration and decision in a vast number of reported cases. Even at the present time of writing, shipowners are busily occupied in discussing with their legal advisers The Hague Rules of 1921. The essential particulars, however, which are common to most bills of lading, may be stated as follows :—

1. Name of Shipper.
2. Name of Ship.
3. Place of loading and destination of ship.
4. Description of goods shipped.
5. Place of delivery.
6. Persons to whom delivery is to be made.
7. Freight to be paid.
8. Excepted perils.
9. The Shipowner's lien for freight.

As regards the third of these nine points, namely, the destination of the ship, there is a usual clause, given as an example in Lord Justice Scrutton's book on this subject,[3] which reads : " With

[1] Chapter XIV, p. 249.
[2] Chapter VI, " Officers," page 106.
[3] *Charter-Parties and Bills of Lading.*

liberty to call at any ports, in any order, to sail without Pilots, and to tow and assist Vessels in distress, and to deviate for the purpose of saving life and property." The inclination of English Courts has been to construe clauses, giving a liberty to deviate, somewhat strictly against the shipowner.

The bill of lading does not always contain a clause as to the shipowner's lien. Without any express provision for it, the shipowner has by the common law a lien for freight. As we have already noticed, the list of excepted perils varies much in different forms of bills of lading. In the older forms it usually included perils of the seas, robbers and pirates, restraint of princes, fire and barratry. The list, however, has grown in modern times and is still growing; the tendency being to exempt the shipowner from liability for all loss which does not arise from his own personal default or from the negligence of his managers or agents in failing to provide a vessel seaworthy and fit for the voyage at its commencement.

In the report of the Imperial Shipping Committee on this subject,[1] we find the following paragraphs:—

"By the Common Law of England the shipowner is responsible for the safe carriage and delivery of goods committed to his charge as a common carrier, unless prevented by certain definite causes such as the Act of God, or the King's enemies; but there is nothing in English Law to stop him from contracting out of the whole or any part of his liability, and, by a practice which has gradually extended since about 1880, British shipowners do habitually in their Bills of Lading contract themselves out of their Common Law liability to a large extent.

"The liability of the shipowner relates to risks of two kinds. There are 'navigation risks' due to perils of the sea and other incidents of navigation, and there are 'carriers' risks' which are those of loss or damage to goods arising in the course of their receipt, stowage, custody and delivery by the shipowner and his servants. The present demand for legislation is to prevent the shipowner from contracting out of his liability in respect of 'carriers' risks' only; by general consent of all the parties concerned, he should continue to be free to relieve himself of his liability in respect of 'navigation risks.'"

In consequence of this tendency towards exemption of the carrier from liability, there has been an increasing amount of accusation levelled at the heads of shipowners.

With these accusations Sir Norman Hill, Secretary of the

[1] Imperial Shipping Committee: Report on the Limitation of Shipowners' Liability by clauses in Bills of Lading (1921), paragraph 11.

Liverpool Steamship Owners' Association, has dealt very faithfully.[1]

"The Bills of Lading," he says, "used by the regular Steamship Lines have been the subject of discussion and complaint as long as I have had anything to do with Shipping, and that is for thirty-five years. Many hard things have been said about them, and the shipowners who use them. They are regarded by some as crafty and secret devices to free the Steamship Line from all responsibility. They have been condemned as evading the Common Law, and as encouraging, if not actually instigating, carelessness, recklessness and even dishonesty. They have been described as unconscionable bargains extorted by the all-powerful shipowners out of their trembling and helpless customers, the cargo owners. And yet in the last thirty-five years the cargoes carried by the regular steamship lines under these forms of bill of lading have enormously increased and these discredited and dishonest documents have become the security upon which the transport of the greater part of the oversea trade of the world is financed.

"On the other hand, the Tramp bill of lading has been held up to admiration as a model of simplicity; and yet one of the most marked features in the last thirty-five years has been the establishment of regular Lines using the Liner form of bill of lading in trades which were formerly entirely dependent on the employment of Tramp tonnage. How are we to reconcile the complaints with the facts? Whatever may be the demerits of the Liner bill of lading it is certainly not a secret device. It has been attacked and abused for the last thirty-five years not only by the individual importers of the goods, but also by Chambers of Commerce all over the Country. It has been attacked in Parliament, and it has been examined by Parliamentary and Departmental Committees.

"By this time, even the most innocent amongst the cargo owners must have some general idea that the Steamship Lines offer their services, and carry on their business, under bills of lading which in substance provide that the goods are shipped and carried at the risk of their owners and on no other terms. A similar practice is in operation on the railways, and a very considerable proportion of rail-borne traffic is sent at owners' risk, but I have never heard it suggested that the railway note is a crafty and secret device. The Trader gets the conditions he asks for at a lower rate, and as a good man of business he does not expect to get anything beyond what he pays for."

With the rights and wrongs, and the pros and cons, in this perennial controversy that rages round the subject of Bills of Lading, the Inward and Outward Freight Departments are not primarily concerned. To the man in the Outward Freight Department, the bills of lading are merely so much raw material for his own particular part of the mill. They come to his

[1] Sir Norman Hill in a paper on "The Hague Rules, 1921."

department for the process of having the freight entered, checked, calculated and checked again. When he has put the bill of lading through his machine it becomes the finished article, ready to go to the shipper or his assigns.

After the bills of lading have been filled up with the necessary facts and figures, it is then time for the outward freight department to start compiling the Manifests which are made up from the bills.

Briefly, a Manifest is a list of the cargo on board. To define the word at greater length, a manifest is a document containing the name and tonnage of the vessel; the name of the Master and the name of the place to which the vessel belongs; a description of all the packages on board, with the marks and numbers; the names of the respective Shippers and Consignees. The manifest must be dated and signed by the Master at the port where the goods are taken on board.

Very often there are two separate sorts of manifest—one known as the Consular Manifest, which is required for customs purposes; and the other known as the Captain's Manifest, which belongs to the Company. Every vessel carrying goods must have a manifest to be delivered to the Custom House officers at the port of destination. It is one of the ship's papers which in time of war are usually inspected when a vessel is boarded either to search for contraband or for other purposes.

To the outward freight department there also belongs the duty of securing cargo, and, to this end, it is not unusual for some particular representative of the department to be specially detailed to call on the shippers and merchants, to go regularly to the Shipping Exchange, and to keep himself and his firm informed as to the general movement of freights.

As regards the actual rise and fall in the freight market, there is no space in a book of this sort, nor indeed would any useful purpose be served by so doing, to record the various rates of freight prevailing, before, during, or since the war, for all the different kinds of commodities of which the flow of overseas commerce is composed. It might be possible to collect statistics showing the average rates of freights paid on certain classes of goods—grain, wool, timber, coal, iron-ore, cotton, hides, nitrates, rubber, manufactured articles and so on—for definite periods during the last fifty or a hundred years. It would be of historical

value, and it would be interesting to see in each case what proportion the rates of freight contributed to the cost of the goods delivered, but it would not appear, except from the point of view of history, to be of any great help to a young man faced with the problems of modern shipping.

In this connection, though masses of figures would be tedious, a few striking examples of the charges which freights represent in commodities in common use may be of interest. The following figures, given in a statement made in 1921 by a representative of the Union-Castle Line, and quoted in *The Times*, refer to the high-freight period of 1920 before the substantial reductions in freights were made. Yet, even so, a glance at the figures shows how small is the freight factor. A freight of 2*s.* 0¾*d.* per case of soap of 63 lbs. represented less than ½*d.* per lb.; a freight of 7*s.* 2½*d.* per bag of rice of 227 lbs. amounted also to less than ½*d.* per lb.; a freight of 11*s.* 3*d.* per case of 167 lbs. of raisins, about ¾*d.* per lb.; a freight of 4*s.* 1½*d.* per case of 104 lbs. of jams, less than ½*d.* per lb.; a freight of 2*s.* 5¼*d.* per case of currants of 51 lbs., about ½*d.* per lb.; and a freight of 5*s.* 5¼*d.* per case of 100 lbs. of chocolate, less than ¾*d.* per lb.

Since those rates were in force, the freight market has come steadily down.[1]

The freight situation has recently been clearly described in the following sentences [2]:—

"What is the position at the moment? The all-powerful shipowners are at their wits' end to secure freights to cover their working expenses. Voyage after voyage is being made at a dead loss. Vessels by the hundreds are lying idle in port. It will be said that the present position is exceptional; but looking back over the thirty years preceding the War it is the fact that the cargo interests were masters of the freight market during at least twenty of those years. In the trade of the world it is only in two or three out of every ten years that the cargoes offering exceed the carrying power of the shipping available, and it is only under those conditions that the shipowner is in a position to dictate his terms in regard to either freight or conditions. Whenever there are two ships offering for one cargo, the

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[1] "At the end of 1919 we were being paid 10*s.* per quarter on wheat from Canada. At the end of 1921 the rate was 3*s.* 6*d.* That is a fall of 65 per cent. in two years on a staple cargo. Other instances, more marked still, might be given."—Sir W. J. Noble at Annual Meeting of Shareholders of the Cairn Line, March 17, 1922. Reported in the *Observer*, March 19, 1922.

[2] Extract from a speech by Sir Norman Hill on October 31, 1921.

cargo interests can and do dictate their terms and when their chance comes they use it to force down the freights.

"There is something really comic in the description of the helpless down-trodden cargo owners, backed as they are by the bankers and underwriters, when we think of their power in the freight market. It is the free-est market in the world. There is only one sea, and, unless a state imposes restrictions, its ports are open to all ships under all flags, and nothing that the shipowners can do by combination or conference or any other form of co-operation, can deprive the cargo owners of the advantages of such a market."

Another document with which the Management and the Freight Departments are closely concerned is the Charter-party. If an owner has not got enough tonnage for the needs of his trade, he proceeds to charter the most suitable ship that he can find in the market. Alternatively, if his freight departments cannot fill the space in his own ships, he will try to "let" his superfluous tonnage to other owners or to shippers of cargo. The charter-party is the contract by which a ship is let. A ship may be let like a house to some person who takes possession and control of it for a specified term. The person who hires a ship in this way occupies during the currency of his term the position of shipowner.

The charter-party may transfer to the charterer the whole possession and control of the ship, so that for the time being he is the "owner" and the master and crew are his servants, but as a rule it does not give the charterer more than the right to the use of the ship and the services of the shipowner's servants.

In some cases it is the shipper of cargo who charters the ship because he requires the whole cargo space of the vessel to carry, for example, a full cargo of grain. In other cases a vessel is chartered, for reasons given above, by one owner to another owner, who has no intention of shipping any cargo on his own account, but places the vessel on the berth to receive cargo from shippers who ship under bills of lading. The charterer receives the bill of lading freight and pays the charter-party freight, the difference between the two being his profit or loss.

Charter-parties may be for a specified voyage or voyages, or for a specified period of time. A charter-party for a voyage is a formal agreement between the owner of the ship and the charterers, by which it is agreed that the ship shall load at a

certain place and shall proceed to a specified destination. There are clauses which provide for the amount of freight to be paid and the manner and time of payment; for the time, usually described as "lay days," to be allowed for loading and discharging, and for the "demurrage" to be paid if the vessel is detained beyond the lay days. Demurrage is a fixed sum per day or per hour agreed to be paid by the charterer for any time during which the vessel is so detained. Then there is usually a clause requiring "the cargo to be brought to and taken from alongside at merchant's risk and expense"; a clause as to the master signing bills of lading; a clause commonly called the "*cesser* clause," by which the charterer's liability under the charter-party is "to cease" on shipment of the cargo, the shipowner taking a lien on the cargo for freight, dead freight and demurrage, and a clause providing for the commissions to be paid to the brokers on signing the charter-party, and other matters of detail. The clauses in charter-parties, like the clauses in bills of lading, vary greatly, but the above is probably a sufficient outline of the ordinary form of a charter-party for a voyage.

A "time" charter-party is a contract between the owners and charterers, by which the owners agree to let and the charterers to hire the vessel for a specified term for employment, either generally in any lawful trade or upon voyages within certain limits. A place is usually named at which the vessel is to be re-delivered to the owners at the end of the term, and the charter-money is payable until such re-delivery; the owners almost always pay the wages of the master and crew, and the charterers provide coals and pay port charges.

In this connection, there are clauses to the effect that the owners provide and pay for all provisions and wages and for the insurance of the steamer, and for all deck and engine-room stores and maintain her in a thoroughly efficient state in hull and machinery for and during the service; and that the charterers provide and pay for all the coals, fuel, water for boilers and port charges, pilotages, consulages, tug assistance, dock dues and agency commissions and expenses.

As regards the coal, there is a clause which provides that the charterers at port of delivery shall take over bunkers "presently on board," estimated at so many tons at such and such a price per ton, and the owners at the port of re-delivery shall take over

and pay for all coal remaining in steamer's bunkers at the current price of the day at such port.

The charter-money is usually fixed at a certain rate per gross register ton per month, and made payable in cash without discount monthly in advance, and provision is made for suspension of hire in certain cases if the vessel is disabled. The master, though he usually is and remains the servant of the owner, is required to obey the orders of the charterers as regards the employment of the vessel, the charterers agreeing to indemnify the owners from all liability to which they may be exposed by the master signing bills of lading or otherwise complying with the orders of the charterers; and the contract is made subject to exceptions of the kind that we have already noticed in bills of lading and "voyage" charter-parties.

It is clear that under a "time" charter-party the shipowner to a large extent parts with the control of his ship, which is employed within certain limits, according to the directions of the charterers. But, as has been already observed, the shipowner continues in possession of his vessel by his servant the master, who remains responsible to the owner for the safety and proper navigation of the ship.

Sometimes, by arrangement with the owners, the charterer is allowed to have on board, as a supercargo, his own representative, whose business it is to look after the interest of the cargo.

What the Bill of Lading is to the Freight Departments, so is the Passage Ticket to the Passenger Department.

The Passage Ticket shows the name of the steamer, the name of the captain, the name of the passenger, the cabin number and the berth number, the port of embarkation and the hour and date of departure. The ticket also contains an acknowledgment of the receipt of such and such a sum, in consideration of which the steamship company engages to provide passage, from this place to that place "in the above-named steamer, subject to the conditions on the back hereof."

On the back of the ticket are printed in small type the conditions on which the passage ticket is issued. These conditions are intended to protect the shipowner, and passengers sometimes complain about them in much the same way as shippers of cargo grumble about the clauses in bills of lading. Passengers have

been known to say that they do not see the conditions on the back of the ticket until after they have paid for and received the ticket, but there is nothing to prevent a prospective passenger from seeing the conditions before he takes out his passage. There is no mystery about them. They are in many respects similar to the clauses in a bill of lading, and in some of them the phraseology is almost identical, as may be seen in the following "condition," which states that "the Company is not responsible for any loss, damage, injury, delay, detention (or maintenance or expense during same) of or to passengers or their baggage or effects, or for the non-commencement or non-continuance or non-completion of the voyage by whatever cause or in whatever manner the matters aforesaid may be occasioned and whether arising from Act of God, king's enemies, restraint of princes, rulers or people, disturbances, perils of the seas, rivers or navigation, collision, explosions, fire, theft and robberies, barratry of master or mariners"—the language reminds us of the bills of lading.

Then there are conditions as to the amount of the passage money to be forfeited in the event of passengers not embarking after booking their passages; as to the vessel's liberty in respect of her course, ports of call, deviation, being towed and sailing with or without pilots; as to refusal to receive on board any person suffering from any infectious disease; and as to the steps to be taken in the event of any person being found to be suffering from a disease of that character in the course of the voyage; as to the risks and expenses resulting from quarantine; as to the passenger staying on board during the vessel's stay in port; as to regulations for the maintenance of order and cleanliness on board; as to smoking; as to the settlement of accounts with the steward; as to charges for excess luggage; as to the passenger's liability (by Act of Parliament) to a penalty for taking on board gunpowder or explosives; as to transferring passengers from one state-room to another (except where the whole state-room is specially engaged); and as to the shipowners' exemption from responsibility for loss of or damage or delay to the passenger or his luggage arising from strikes, lock-outs or labour disputes.

These are some of the principal "conditions" that appear on the backs of passage tickets issued by different companies. They have been drawn up from time to time, after years of

experience, in some cases after consultation amongst passenger managers, with a view to avoiding disputes and claims. The conditions can hardly be considered exacting or unfair; they are in the main cautionary and in line with conditions prevailing in other forms of transport. If you ride on top of a 'bus you put your arm over the side at your own risk; the Company do not accept any responsibility in the matter; yet you do not complain if you buy your 'bus ticket before you see the "warning" nor do you make a claim on grounds of "deviation" when the street is "up" and the 'bus route is in consequence altered.

Such then are the passage tickets. They are the goods of which the passenger manager is the salesman. His methods of disposing of his goods are much the same as those pursued by all salesmen of all commodities all over the world: popularity, energy, advertisement, civility, posters. Notices in newspapers; attention at the counter; cultivating tourist agents, hotel keepers, railway officials, consuls, lecturers; souvenirs for passengers, picture-postcards, calendars, ash-trays, pocket-books. These, at any rate, are some of the flies that fishers for passengers cast upon the waters of the travelling public. There is no close season. The stream is flogged from January to December.

CHAPTER X

ACCOUNTS AND STATISTICS

The component parts of the office of a Passenger Liner Company may be arranged for purposes of convenience into three main groups, each with three sub-divisions. The groups may be headed: (1) Administration, (2) Revenue, and (3) Accounts. With the two former we have already dealt. We have seen how the Administration group was composed of the Board, the Management, and the Secretariat. We also saw how the Revenue group was divided into Inward Freight, Outward Freight, and Passengers.

We now come to the third group, which we have classed under the heading Accounts. A fourth group called Technical, comprising the Medical and Construction Departments, might be added, but we have dealt with the work of the Medical Superintendent in a separate chapter [1] and with the Construction Department in connection with the different types of ships.[2]

Turning, then, to that part of the office or those departments in the office which we have labelled Accounts, we find the Cash, the Book-keeping, and the Costing Departments. Of these the Cash Department is mainly concerned with the receipt of cheques and cash on account of freight and passage money, and with the payment of wages, dues, disbursements, debenture interest and dividends. The Cashier must steer his official course by three main objects: the amount of his bank balance, the amount of his receipts, and the amount of his payments. In framing his estimates and statements, whether for the day, or week, or month, he must keep those three points in view.

As in other kinds of business, the connection between the

[1] Chapter VIII. "Safety and Sanitation at Sea."
[2] *See* page 76.

Cash Department and the Book-keeping Department is a close one. Recently there has been a tendency to call the book-keeper by the title of accountant and to call his department the Accountant's Department, but confusion is liable to arise thereby, in view of the fact that the auditors, who visit the office periodically in order to audit the Company's balance sheet, are probably representatives of a firm of chartered accountants. These chartered accountants, who audit the balance sheet, report to the shareholders of the Company whether, in their opinion, the balance sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs.

The head of the Book-keeping Department holds a position of great importance; he is responsible for the drawing up of the balance sheet and the profit and loss account. His duty therefore is to keep his eye on the assets and liabilities of the Company and to be continually aware whether, and to what extent and for what reason, the voyages of the steamers are showing profits or losses. Questions of income taxation as regards his Company are also his concern. On these matters he will naturally report freely and frequently to the General Manager and the Directors.

Among the assets will appear the value of the steamers, tugs, lighters, and other property belonging to the Company; and there may be outside investments; for instance, the Company may own Government securities. Among the liabilities, if the Company is a limited one, there will be the amount of the capital issued and the amount of any mortgage debenture stock that there may be. The reserve fund and pension fund are included among the liabilities and there may be contingent liabilities in respect of contracts for new steamers.

As regards the Company's profits or losses, these are in the main determined by the results of the voyages of the vessels owned by that Company. It is conceivable that a Steamship Company might have such large outside investments, apart from steamers, that the interest on those investments would be sufficient to provide dividends for shareholders and even cover a certain amount of loss resulting from voyages, but it is probable that the shareholders, after a few years of such trading, would prefer to be without the steamers altogether. For a time, for a term of years even, a Shipping Company may have to live on

its fat by reducing its Reserve Fund, but there are limits to this process of self-consumption.

Perhaps, therefore, the most important of all the statements, statistics and estimates prepared in the Book-keeping Department is the Statement showing the result of a voyage, for it is the sum of these results during the year that shows, at once, the volume as well as the value of the business done.

Shipowners, in talking to one another about the state of trade, will refer to the voyages rather than the ships as being profitable, or the reverse. "All our voyages are leaving losses," or "All our voyages are showing red figures," which means the same thing, are comments frequently heard in times of depression. In brighter times you may hear them say: "Recent voyages are leaving a nice profit; it's a relief to see black figures again."

Since Shipping people generally think and speak in terms of voyages, and since the accounts of the Company are kept to a great extent under the headings of voyages—s.s. *So-and-So*, Voyage No. So-and-so—it may be useful to examine the matter a little more closely and see what are the items which the statement of a voyage-result contains.

First, at the top of the statement, is placed the name of the ship and the number of her voyage. Her maiden voyage is No. 1, and whenever she leaves her home port, she begins a fresh voyage. The "voyage," for the purposes of book-keeping, begins on the day on which the vessel starts loading and ends, after the completion of her journey, on the day on which she completes the discharge of her cargo. This period, known as the "voyage," is divided into Outward and Homeward, the dividing point being usually taken at the port of call farthest from the home port.

The voyage-result is the balance of earnings and expenditure of the vessel in question during the period described. The earnings are composed of the outward and homeward freights (less allowance for any transhipping, local freights and commissions that there may be), and the outward and homeward passage money.

These four items may be shown simply in four totals, or they may be amplified by subdivision into ports of call and the amount of earnings at each port. Supposing, for instance, that the vessel were leaving London and calling at two Continental ports

on her way to South Africa, where she was going to discharge at three ports, then the Statement might show the amount of cargo in tons loaded at London and at Continental ports A and B respectively, for delivery at the South African ports A, B and C. Similarly, for the return journey, a small table of figures might be inserted showing the cargo loaded at the South African ports for Europe; alternatively, there might be a statement showing the quantities of the different commodities carried, with the amounts of the freight money. In any case, however, the main fact on the "earning" side of the statement is the total sum, in sterling, of the outward and homeward freight and passage money.

Having ascertained the gross earnings for the voyage in question, it is necessary to find out the total amount of the expenditure or disbursements.

Here a word of caution is necessary, because different Companies include different items under the heading "disbursements." One firm, in estimating the voyage-results, may include such items as a share of the vessel's Insurance, Depreciation on Capital Value, and Establishment Charges. Another firm, in its voyage-results, may make no provision for or allocation of those charges, but simply include such items as coal, wages, repairs, provisions and stores.

A full list of the disbursements for a voyage, having regard to the fact that time in port is included in the period, would comprise the following items:—

Coal.
Stores.
Port expenses.
Cargo expenses.
Wages.
Repairs and renewals.
Insurance (for the period).
Depreciation on capital value.
Establishment charges.
Agency fees or commissions.

It is advisable that when two shipowners are comparing notes about the cost of running their steamers and their voyage expenses, they should understand exactly what items are or are not included in the list.

The list of disbursements can be totalled in two columns, Outward and Homeward, and these two added together give the total figure which we require to set off against the previous total figure, showing the earnings. If the disbursements are smaller than the earnings, the voyage shows a profit. If, on the other hand, the earnings do not cover the disbursements, the balance can be shown in red figures. No one can say that these " voyage results " are complicated documents ; they are, however, of great importance to the shipowner as a guide to the state of his business.

These statements, however, showing the results of each voyage, useful and indeed necessary though they are, as a barometer, must be supplemented and read in conjunction with other statistics.

Taken and examined by themselves, the voyage results, if they contain tables showing the quantities of cargo loaded and discharged at each port and the number of passengers in each class embarked and disembarked at each port, might be a sufficient guide as to the volume and even, studied over a period of twelve months, the seasonal nature of the flow of traffic. They might contain all that anybody, except those in the departments concerned, need know about the earnings of the different voyages, but on the expenditure side more detailed statistics are required. It is here that a decision must be made how far to go along the path that leads into the statistical wood. Some men are " statistic mad," as the saying is ; others, on the other hand, are content with " a few figures on the back of an old envelope." It is impossible to lay down a rule. Firms, like individuals, vary in their appetite for statistics, but, speaking generally, there are certain figures in connection with the expenses of operating ships that ought to be ascertained.

It is in this connection that the Costing Department can be of great value. There is no particular secret or difficulty about finding out the cost of either running or laying up a particular ship, nor is there any mystery in the matter of each vessel's catering average per head for the voyage ; again, it is easy enough to calculate the average speed of the ship in knots and also the average coal consumption per day. These are questions of simple arithmetic, but the answers to them are of vital importance to the owners and should always be closely examined.

In bad times some of the problems with which a shipowner is confronted are :—whether to lay up his ships, when to lay them up, which of them to lay up, and when to send them to sea again. For the purpose of dealing with these questions, a shipowner should have a statement prepared, showing the approximate difference between the expense of running each of his steamers and laying her up.

In such a statement, it will be necessary to show first of all the "laying up" expenses. These may be put into three groups: (*a*) Wages and incidental expenses, (*b*) Repairs, and (*c*) Port insurance. These expenses can be shown per month—so many pounds sterling for an average month's laying-up expenses. The sum of these three gives the total monthly expenses and this figure can be reduced to a daily average—so many pounds a day for s.s. *So-and-So* while lying idle. Next, we take the approximate monthly running expenses of the same ship, excluding overtime and assuming that only essential repairs are effected. These expenses are mainly: Coal, wages, provisions, stores, repairs and insurance, and their total gives the monthly figure which can be reduced to a daily average and therefore compared with the corresponding daily average for laying up.

To take a particular case: s.s. *So-and-So* :—

Laying up	Wages and Incidentals	£500 per month.
	Repairs	200 „ „
	Port Insurance	200 „ „
	Total laying up	£900 per month.
	„ „ „	30 per day.
Running Expenses	Coal	£2,000 per month.
	Wages	2,000 „ „
	Provisions	500 „ „
	Stores	300 „ „
	Repairs	500 „ „
	Insurance	700 „ „
	Total Running Expenses	£6,000 per month.
	„ „ „	200 per day.

The owner of s.s. *So-and-So* would thus be able to see at a glance that she costs £200 a day when running, and £30 a day when

laying up, and that the difference between the expenses of the two is £5,100 a month.

If he has similar calculations worked out for each of his ships and tabulated in a list, he will be in a position to select which ships to lay up and which to run.

The catering average, which may be worked out either by the Costing Department or in the Superintendent Steward's office, is another important document. It shows how much it costs to feed the first class and steerage passengers, respectively, per head per day during a particular voyage. The Company will have their own standard of a fair average figure and if the actual result shown in the catering average for a voyage is much in excess of the standard allowance, it is not unlikely that there will have been waste in the steward's department on board that ship. The owners will then question the Superintendent Steward at the next weekly Committee,[1] if it be the practice to hold such meetings, when the results of the voyage are under review, and the Superintendent Steward, who, if he is wise, will already have spoken to the Ship's Steward on the subject, will explain the cause of the excessive cost.

In recent years the cry of Anti-waste has been raised in the Press and on political platforms, but it was heard long before the Great War, and before the Coalition Government was ever thought of, in the galleys of merchant steamers.

Alternatively, if the actual result of the voyage shows a figure considerably below the standard allowance per head, the Steward will probably be regarded as a stingy fellow who has not fed his passengers and crew well enough, and here again the owners must ask the Superintendent Steward for an explanation.

For the purposes of this return the crew must be divided into first class or "aft" and third class or "forward," according to the quality of provisions consumed. Roughly speaking, the numbers of crew and passengers must be converted into days by reckoning each individual who spends a day on board as one day; if he spends six days on board, he is reckoned as six days. If the voyage lasts 100 days, and there are twenty members of the crew "aft" and thirty "forward," they are reckoned as 2,000 days and 3,000 days respectively. Similarly, the number of days spent on board by each passenger are added up and in

[1] *See* page 156.

this way we arrive at the total number of days per man per day for both first class and third class.

Turning now to the store bills, these are grouped into bills for account of the first class, bills for account of the third class and bills for joint account. All the bills, arranged in these three groups, for the provisions consumed during the voyage, must be added together.

First of all must be taken into the three accounts—aft, joint and forward—the value of the stores remaining from the previous voyage ; to these figures must be added the amount of the bills at the Home port ; from their totals must be deducted the value of the stores on hand at the end of the voyage under review ; and to this balance must be added all the bills contracted for stores taken on board at each port of call during the voyage.

By adding these bills together, under the headings—aft, joint and forward respectively,—we arrive at three totals. By dividing the total amount of the " aft " store bills by the total number of days first class, by adjusting the joint account between the two classes, and by dividing the total amount of the " forward " store bills by the total number of days third class, we reach the average cost per head per day in each class during the voyage.

Coal is so large an item in a steamer's disbursement account that special attention must be paid to it and special statistics prepared on the subject. Here, again, different Companies have slightly different forms, but in general the purpose of the statements is the same, namely, to ascertain the total quantity of coal consumed on the voyage ; the consumption, in tons per day, at sea ; the number of hundredweights consumed per 10 knots run ; and the speed under way, shown in knots. As in the case of other forms of statistics in the shipping business, there are no patent rights as regards the sort of statements in use. The majority of offices use much the same kind of forms, and owing to the transfer of clerks from one firm to another, it is only natural that the documents in different offices should bear a resemblance to one another.

Having stated the facts that we wish to ascertain in regard to the coal consumption, it is now necessary to see what materials are required upon which to work. The chief materials in this connection are the coal bills showing the amount of coal taken

on board, or, alternatively, the letters from the owners to their Chief Engineer, notifying him of the quantity of coal supplied at each port, and the logs showing the distance run and the time taken between one port and another.

This Coal Statement, like the other steamer statistics that we have noticed, should be headed at the top with the name of the ship and the number of her voyage; the date on which the voyage begins and the date on which it ends.

Turning to the total quantity consumed on the voyage, we must first find out the amount of coal (in tons) that was remaining on board from the previous voyage; to this must be added the amounts supplied at all ports at home and abroad during the voyage; from this total must be deducted the coal remaining on board at the end of the voyage, and the balance will be the amount consumed both under way and by the donkey boiler in port.

In order to determine how many tons were consumed per day at sea, and how many knots the vessel steamed, it is necessary to open the log and follow the voyage from port to port, entering in the Coal Statement the name of each port, the exact hour of arrival at and sailing from each port, the hours at sea and the hours in port, with a special note of any hours that may be spent in "lying to" or detention. For example, suppose that a vessel left London on April 1 at 4 p.m. outward bound for South America, calling at Spanish and Portuguese ports on the way; and suppose that she arrived, without detention, at Vigo in Spain, her first port of call, on April 4 at 8 a.m. and sailed again from Vigo at 10 a.m. on the same day for her next port; then our first entry in the Coal Statement would read: "London to Vigo, at sea 2 days 16 hours; detention *nil*; in port 2 hours." At the foot of such a statement the column containing the days and hours "At sea" can be added up and the amount of days divided into the quantity of coal "consumed under way," thereby giving the figure for the average number of tons consumed per day at sea. In a separate column should be entered the figures for the distances run between each port; and this information, too, can be extracted from the logs. Having now got the figures for the total number of hours at sea and the total distance run, we can divide the one into the other and thereby ascertain the number of knots under way.

This work of extracting information from logs and compiling statistics may seem laborious. It is laborious. It takes time to work out all the calculations showing the exact number of hours and tons, but unless the hours are stated exactly and unless the quantities of coal and distances run are correctly entered, the result of the calculation is valueless, for nothing is more useless than inaccurate statistics.

Statistics, to be of value, should be simple, comparative, and, above all, accurate. Simple, because shipowners have other work to do besides puzzling out complicated masses of figures that refer to past voyages. The work of untying the knots in the calculations and disentangling the skein should be performed either by the Costing Department or, in a smaller and less highly organized office, by one of the clerks. Statistics are like sign-posts; they indicate the direction; they cannot be too clear. If the information that is required relates to a vessel's speed, let the answer be clearly shown—so many knots.

Again, statistics should be comparative. Even if the figures displayed are both clear and accurate, and prove that the catering average of s.s. *So-and-So* on a particular voyage was, say, five shillings per head per day, and that the same vessel on the same voyage burned fifty tons of coal per day, such information will not be enough for the owners, unless and until they are studied in relation to the results of other voyages of the same ship and the results of other vessels of the same line.

For example, the owners will not be content with merely being told or being shown that the catering average for a particular ship was five shillings; they will want to know whether her previous voyages showed something more or something less than five shillings and whether her Chief Steward was the same man. Similarly, they will not be satisfied simply to know that a ship consumed 50 tons of coal per day; she may have consumed 40 tons per day a year ago, or the class of coal may have been different, and these facts must be investigated. Other vessels of greater speed, belonging to the same firm, may burn 100 tons a day. Comparisons, we are told, are "odious," but in steamer statistics, at any rate, they are of great value, and should always be made.

Hitherto we have been considering statistics that are mainly concerned with that part of the ship's life which she spends at

sea. The catering average may include a few meals eaten during the vessel's stay in port, but these will only form a mere fraction of the totality; similarly, in the coal average there may be a small quantity of coal consumed in the donkey boiler of a vessel lying at her berth, for cargo purposes, but as compared with the consumption at sea it is almost negligible. In both cases, the statistics are drawn up to show what happened on the voyage at sea rather than in port.

There is, however, a separate and a wide field in which statisticians may labour, namely, in connection with the expenditure at the dock while the ships are in port.

A student of the subject of steamer disbursements—and of all the subjects in a shipping office it is one of the most important—will soon discover what large sums of money are spent in the upkeep and repairs of the vessels themselves and in the handling of outward and inward cargo, stores and coal. The student, if he is well advised, will apply himself to a close study of such disbursements and of any statements or statistics that may be prepared in the Costing Department in connection with them.

As we have noticed elsewhere, every steamer is divided into three principal departments—Deck, Engine and Steward's—and each of these three has its own headquarters in offices at the dock. In a separate chapter [1] we shall consider the functions of the Superintendents of those departments, but for the moment we are concerned with the bills incurred in those offices. In addition to those three departments, there are the Medical, the Linen, the Allotment, the Wharfinger's and the Stevedores' and Porters' Departments.

As the labour engaged in each department is paid by the week and as each steamer in port is charged with the cost of the work done on her account, the statistical sheets can be drawn up in two ways—per steamer and per week.

In the case of the former, the statement will be headed with the name of the vessel, the date of her arrival in port, the date of her sailing, and the number of days in port. Immediately underneath this information, for purposes of comparison, may be written the corresponding facts about the previous voyage. Thus, if on the present voyage s.s. *So-and-So* arrived in port on

[1] Chapter XI.

April 1 and sailed again on the following June 2, her stay in port would be reckoned as sixty-three days and this would compare with forty days for the previous voyage, if on that occasion she arrived on June 1 and sailed on July 10.

Having stated these facts, we next proceed to find out and set down the expenses incurred in each of the above-named departments, sub-dividing those expenses as required.

The wages paid in the Deck Department can be allocated under separate headings according to the work done, as follows :— Shore pay, carpenters and joiners, painters and scalers. The Engine Department may be sub-divided into :—Shore pay, boiler-makers, fitters, scalers, shopmen and electricians. The expenses of the Steward's Department can be grouped under :— Supervising, cleaning, empties, linen, stocktaking. The Medical Department may have a bill for the surgeon's shore pay. The Wharfingers' Department will probably have both inward and outward accounts; and the same applies to the Stevedores' Department.

These items can be tabulated in two columns, one for the present voyage and the other, for the sake of comparison, for the previous voyage, with a third column showing the amount of increase or decrease in each item of expenditure in each department. The totals of the two first columns will give the grand total of all the disbursements in port for the two voyages respectively.

Turning now to the weekly return, it is easy to draw up a statement showing the dock wages paid during the week ending on any given Saturday. Here, too, the wages can be shown under the headings of the different departments, so much for the Deck, so much for the Engine, and so on throughout the list. A second column, for comparison, can be added showing the corresponding figures for the wages paid during the previous week, while a third column shows the increase or decrease in red or black figures, as the case may be.

These instances of returns in regard to disbursements at the Dock at the home port are extremely simple. Other statistics of the same sort that may be prepared in the Costing Department or elsewhere, relate to the analysis of wages paid at foreign ports, and the average cost of loading and discharging different sorts of cargo at foreign ports. The student of the subject will no

doubt discover for himself new paths in this particular field of statistics. In any case, he will become aware of the large sums spent in dock wages both at home and abroad, and will probably feel the need of some convenient means of scrutinizing this form of expenditure.

CHAPTER XI

AT THE DOCK

Superintendents and Surveys

Elsewhere in this book, the student of shipping questions is recommended to take an early opportunity of visiting a vessel in port and seeing for himself how cargo is handled at the dock.

There he will find, if the ship is loading or discharging cargo, a scene of busy activity in which his senses of sight and smell and hearing will be fully brought into play; the constant movement of trucks and lorries of various shapes and weights; the fragrance of fruiterers' and grocers' wares; the roar and rattle of winches and slings; the latest mechanical devices for hoisting and storing bales and barrels.

It is not, however, with port facilities or the handling of cargo that we are immediately concerned, for we shall deal with those matters in another chapter,[1] but rather with those offices on the dock where the Company's Shore Superintendents carry on the work of looking after the ships during their stay in port.

The observations in this chapter apply mainly to Liner Companies with appropriated berths and staffs and offices at the home port, at the dock.

The responsibility for the care and maintenance of ships, the finding and appointment of the crews to man them, the surveys and the discharge and loading of cargo, is usually shared by four or more Superintendents, known respectively as the Marine Superintendent, the Engineer Superintendent, the Catering Superintendent and the Superintendent Stevedore and Wharfinger.

[1] Chapter XII.

Each of these four Superintendents is the head of a department with an office at the dock. Just as a ship is divided into three departments—Deck, Engine and Steward's—so we find similar and corresponding divisions at the Dock.

Taking them *seriatim*, the Deck Department on shore is under a Marine Superintendent who has one or more assistants to help him. The officials are usually selected from the captains of the Company's steamers, because an intimate knowledge of the steamers, trade routes and ports served by the steamers is desirable, if not essential.

The office staff consists of clerks, time-keepers and messengers. The workmen controlled from this department are as follows :— Carpenters, joiners, painters, scalers, polishers, shore-gang labourers, and sail-makers.

The Engine Department has at its head a Superintendent Engineer with one or more Assistants. These are frequently selected from the Chief Engineers of the Company's vessels, but not to such an extent as in the case of Marine Superintendents. The Engine Department's office staff consists of clerks, Draughtsmen, time-keepers and messengers. The workmen employed by this department in looking after the vessels in port are engineers, boiler-makers, plumbers, electricians, boiler-scalers and numerous labourers.

The Steward's Department is under a Catering Superintendent, or, as he is called in some Companies, Superintendent Steward. The work of provisioning the ship for sea, preparing bedding and linen, cleaning saloons and passenger rooms and maintaining all furniture (except such as requires repairing) in good condition is controlled from this department. It is, in short, housekeeping on a grand scale.

The Stevedore and Wharfinger's Department may be under one Superintendent with Assistants, or may have a Head Stevedore and a Head Wharfinger. The work of loading and discharging, receiving and delivery of cargo, is carried out by this department which, as regards loading and discharging, must be in close touch with the Marine Superintendent, who is always directly responsible for the stability of the ship and the placing of the cargo for various ports.[1]

In addition to the above departments at the dock, there is

[1] *See* page 105 in regard to Stowage of Cargo.

often, in Passenger Liner Companies, a Linen Department, usually in charge of a Lady Superintendent, and also an Allotment Office. The latter is an office in the neighbourhood of the dock at which relatives of members of the ships' crews may call for weekly payments left by seamen to their account.[1] It occasionally, but not generally, happens that the Linen and Allotment Departments are centred in one office and run by one Lady Superintendent.

Such, then, are the principal departments at the Dock. As regards their duties and responsibilities, to which reference has been made above, the appointment of crews and the loading of cargoes are treated in separate chapters.[2]

This, however, seems the proper place in which to describe the various surveys that a vessel has to undergo. It is at the dock in the home port that a great deal of the work in connection with these surveys is done.

First, then, let us consider the Board of Trade Survey for the Passenger Certificate. In our review of the different types of steamers, we noticed that every passenger ship which carries more than twelve passengers from a British port must be surveyed once at least in each year in the manner provided in the Merchant Shipping Act, the certificate being valid for one year from the date of issue.

Should the certificate expire while the ship is away from the United Kingdom, it is permissible to continue the carrying of passengers until her next return, except in the case of ships touching at ports in the United States of America. A Board of Trade Passenger Certificate may be obtained in many ports in the British Dominions and Colonies, such certificate being of equal value to those obtained in the United Kingdom.

In the event, however, of the certificate expiring in any U.S.A. port, the ship may not carry passengers from that port until she has passed a survey held by officials of the American Department of Commerce, the equivalent to our Board of Trade, but she may again embark passengers when and if calling at other ports (other than those in the U.S.A.) prior to her final arrival in the United Kingdom.

Cargo ships and vessels carrying not more than twelve passengers are not regularly surveyed by the Board of Trade. These

[1] *See* page 124. [2] Chapters VII and VI respectively.

ships must, of course, be built to Board of Trade requirements and a surveyor may visit them at any time to inspect any part of them, but it is seldom, unless, for example, some complaint regarding accommodation or life-saving appliances has been lodged by a member of the crew, that such visits occur. It should be added that although a vessel of the last-mentioned type may carry up to the number of twelve passengers from a British port, or indeed from any port other than those in the U.S.A., she may not carry any passengers at all from the U.S.A., unless a certificate is obtained. This regulation, however, was evaded in the past by signing a few passengers on the ships' articles of agreement as members of the crew.

Turning now to the Merchant Shipping Act, we can find out the manner in which vessels must be surveyed.

The law provides [1] that the owner of every passenger steamer must cause the vessel to be surveyed by Board of Trade surveyors—a shipwright surveyor and an engineer surveyor. These surveyors, if satisfied as to the survey, deliver to the owner declarations of survey.

The declaration of the shipwright surveyor contains statements of the following particulars :—that the hull of the steamer is sufficient for the service intended ; that the boats, life-buoys, lights, signals, compasses and shelter for deck passengers are such as are required by the Act ; the time (if less than one year) for which the hull and equipments will be sufficient ; the limits (if any) beyond which, as regards the hull and equipments, the steamer is in the surveyor's judgment not fit to ply ; the number of passengers which the steamer is fit to carry ; that the Certificates of the master and mates are such as are required.

The declaration of the Engineer Surveyor deals with the following details, namely, the condition of the machinery, the safety valves, the fire hose, and the certificates of the Engineers.

Within fourteen days after the receipt of the surveyors' declaration of survey, the owner must transmit it to the Board of Trade, which will then issue in duplicate a passenger steamer's certificate, that is to say, a certificate stating, according to the declarations, the limits (if any) beyond which the steamer is

[1] Part III of the Merchant Shipping Act, 1894, as amended by the Merchant Shipping Act, 1906.

not fit to ply; and the number of passengers which the steamer is authorized to carry. The certificate, when issued, is transmitted in duplicate by the Board of Trade to a Superintendent or some other public officer at the port mentioned by the owner of the steamer for the purpose, and notice is given by the Board of Trade to the master or owner or his agent that, on payment of the proper fees, both copies of the certificate will be delivered to him.

As regards the general equipment of passenger steamers, the law provides[1] that a sea-going passenger steamer must have her compasses properly adjusted from time to time; that she must be provided with a hose capable of being connected with the engines and adapted for extinguishing fire in any part of the ship; that she must be provided with a safety valve on each boiler, so constructed as to be out of the control of the Engineer when the steam is up, and, if the safety valve is in addition to the ordinary valve, so constructed as to have an area not less, and a pressure not greater, than the area of and pressure on the ordinary valve. A home-trade passenger steamer must be provided with such shelter for the protection of deck passengers as the Board of Trade may require.

For purposes of the Passenger Survey, the vessel must be placed in dry dock for the examination of hull and cables, sea-connections, rudder, shaft and so on. The life-boats and their equipment are inspected while the boats are on board and the boats are again inspected after being placed in the water, with masts and sails rigged in place.

Should a ship be deficient in some particular thing, which cannot be provided or put right at the moment, a certificate may be granted for a limited period of less than twelve months, on the recommendation of the Surveyor. Where such deficiency concerns life-boat accommodation or life-saving appliances, the number of persons to be carried is reduced accordingly.

So much for the Board of Trade Passenger Survey. The next type of survey to be considered is that which the Classification Societies, such as Lloyd's, require. The difference between a Passenger Survey and a Lloyd's Survey, is that the former is, as we have seen, held by Board of Trade Surveyors for the

[1] Section 285.

purpose of reporting to the Board of Trade that the ship concerned is in all respects seaworthy, that she has accommodation for the number of persons shown on the passenger certificate, and that her life-boats and life-saving appliances are adequate. Lloyd's Survey, on the other hand, is a general examination of the ship and machinery held by Surveyors of Lloyd's Register of Shipping for the purpose of reporting to that Society the condition of the ship for re-classification. It is not concerned with the carrying of passengers.

All ships classed in Lloyd's Register of Shipping must be put through very complete surveys by the Society's Surveyors four years from the date of classification or of the last survey. One year of grace—a fifth year—is allowed, during which time the survey must be completed; thus, it is not necessary to complete all the work in connection with the survey at one time. The surveys are numbered as follows:—

After 4 years—Number One Special Survey
„ 8 „ —Number Two „ „
„ 12 „ —Number Three „ „
„ 16 „ —Second Number One Special Survey
„ 20 „ —Second Number Two „ „
„ 24 „ —Second Number Three „ „
„ 28 „ —Third Number One „ „
And so on.

A considerable amount of overhauling and repairs is necessary at each survey and this naturally increases with the age of the ship. Number Three Special Survey, upon the completion of twelve years, involves a complete opening up of *all* parts of the ship, and while the next two surveys may not be so severe, the Second Number Three Survey is even more so.

At this point, the student may inquire as to what is meant by the "opening up of all parts of the ship," and what is the nature of the work. The answer is to be found in the following summary of the surveys:—

Number One Survey.—All limber hatches and ceiling margins have to be lifted in order to expose the margins of double-bottom tanks for the testing of these tanks under pressure. "Limber hatches" are planks covering the limbers, or bilges, the spaces between the ship's side and the margin or side of the double-

bottom tanks. The "ceiling" is the wood covering of the tank tops; in other words, the floor of a hold.

The double-bottom tanks, peak-tanks, deep-tanks and any other tanks of which the shell or bulkheads of the ship form part have to be opened and cleaned for internal examination. Bunkers to be cleared of coal for general examination. Engines and boilers to be opened up (literally) for Surveyors' inspection. Tail shaft to be drawn and shaft bearings exposed. Hull, rudder and sea-connections, that is to say, main injection and other inlet pipes and valves, to be examined when the ship is in dry dock. Water-tight doors and all deck equipment, winches, windlass pumps, anchors, masts and rigging to be examined. Chain cables are not inspected on the occasion of this survey.

Number Two Survey.—All of the work described above in Number One Survey has to be repeated, *plus* the removal of the wood ceiling in way of hold pillars or stanchions or on any part of tank-top for the examination of tank-top as required by the Surveyor. Cables to be ranged in dry dock and examined.

Number Three Survey.—This survey, on completion of twelve years, is, as we mentioned, a severe test. It involves all of the work of Numbers One and Two, *plus* the removal of all wood ceiling on tank-tops, spar ceiling (which is the name given to planks or battens along the ship's sides in the holds and reserve bunkers), pipe casings, all linings under ports in ship's shell, deck sheathing and wood deck in places to expose steel deck. Scaling of hull inside and out. Mast coats and wedges to be removed for examination of masts and mast coamings. The whole of the several parts mentioned above to be scaled for examination and repaired or renewed as required. Engines and boilers to be completely opened up for inspection and testing.

The Second Number One, Second Number Two and Second Number Three.—These surveys are similar to Number One, Number Two and Number Three respectively, but more severe. Cables are examined at each survey. In the Second Number Three Survey the shell plating has to be drilled to test the thickness of plates.

In addition to these Surveys there is a Lloyd's Annual Boiler Survey. This applies to all steamers classed with Lloyd's, whether passenger or cargo.

There are no other regular surveys, but if at any time an alteration is made in the structure of a ship or in her crew space, the Board of Trade require to re-measure the ship for tonnage. Lloyd's would have to approve any big structural alteration affecting the strength or seaworthiness.

Ships not classed in Lloyd's but with the Bureau Veritas or British Corporation have to undergo surveys similar to those mentioned above, but under the inspection of officials of the particular Classification Society.

Such, then, are the various surveys which vessels are obliged to undergo. The Marine Superintendent and the Engineer Superintendent must either be in attendance themselves or be represented by one of their assistants during the progress of the Survey. These officials have, however, as we have already seen, a great many other duties. Perhaps the best way of understanding the functions of each of the departments at the dock will be to take the case of a passenger and cargo (intermediate) liner arriving at her home port after a voyage of several months' duration. Let us see what happens.

In the first place, the Marine Superintendent at the dock is advised by the Head Office of the expected time of the steamer's arrival. He then makes the following arrangements :—

(1) He instructs the Company's pilot when and where to join the steamer.
(2) He makes arrangements for a discharging berth, appropriated or otherwise.
(3) He arranges for Tugs for docking, boatmen for running the mooring lines and a shore gang for handling them.
(4) He sees that there are stevedores, if required, for prompt handling of the passengers' baggage.

The next event is the docking of the ship. Usually, the steamer is docked under the supervision of an Assistant Superintendent who, if satisfied that the work is being carefully and efficiently done, will in no wise interfere with the Captain and Pilot in charge. The safe manœuvring of a ship is essentially a " one man job," in which interference from outside is apt to lead to confusion, hard swearing and damage.

Arrived in her berth, the ship is now " taken over " by the Company's dock staff, and here let it be said that in no business is co-operation between departmental chiefs more necessary. The Engineer Superintendent, the Catering Superintendent and

Stevedore usually board the ship at once in order to interview the Chief Engineer, Chief Steward and Chief Officer respectively. The Stevedore receives a stowage plan [1] from the Chief Officer and a start is made in the work of discharging the cargo.

At the earliest convenience after the ship has been docked there come to the Dock Office the Chief Officer, Chief Engineer and Chief Steward, each with his requisition and repair lists, showing what is required in order to make good the stores consumed on the voyage and what is necessary in the way of repairs and renewals. These lists are then closely scrutinized by the Superintendents of the departments concerned. The lists are almost invariably in excess of real requirements and are presented by the above-named Officers in the sure and certain expectation of having them cut down in the Superintendent's office. In this they are seldom disappointed.

After the requisition lists have been finally approved, the stores are ordered by the Superintendents and the time of delivery is arranged. As a rule these Stores are previously contracted for under contracts made at the Head Office as already described.[2] Thus in ordering, say, paints and varnishes for a certain vessel, the Superintendent at the Dock is responsible for the *quantity* ordered for and supplied to the ship, but the *price* of the paints and varnishes will have been fixed previously in a contract made at the " up-town " office. *Quality* is usually determined by the prices which the owners are prepared to pay, but the recommendations of Superintendents receive consideration.

As regards the necessary repairs, these are put in hand at the earliest moment. Nowadays, many Companies have their own workshops and skilled workmen—engineers, boiler-makers, carpenters and joiners, scalers and painters, sail-makers and riggers, and, in the case of Passenger Lines, their own linen supply and repair shops. When such is the case, the placing of repair orders merely means the passing of a chit from one Superintendent to another.

When, however, the work cannot be undertaken in this manner, tenders are invited or the work given to some reputable firm on a cost, plus percentage, basis.

[1] *See* page 113 in regard to stowage.

[2] *See* page 156.

Meanwhile the discharge of cargo is proceeding under the supervision of the Company's Stevedore and the ship's officers, who report to the Marine Superintendent if there is any damaged cargo. The responsibility of ship's officers in this connection varies greatly in different Companies, but in most cargo liners the officers are responsible for the cargo turning out in as good condition as that in which it was received.

During the time when cargo is being discharged the opportunity is taken to perform much of what may be termed "routine dock work." This comprises the overhauling of machinery, boats and life-saving appliances, rigging, crew's living quarters, passenger accommodation and the scraping and painting of the hull and top-sides where necessary.

We now come to the question of dry-docking the ship. Dry-docking is usually done, when required, when the discharge of cargo is completed, and is arranged by the Marine Superintendent after consulting his Engineer colleague. A few Companies do the actual work of dry-docking with their own men, but the majority give it out to some experienced firm of ship-repairers who accept responsibility for the ship from the time she enters the dry dock until she is safely floated out of it. Here, again, the Marine and Engineer Superintendents are working in co-operation, the one attending to the scraping and painting of ship's bottom, ranging and examination of chain cables, while the other looks after the repairs to rudder, propeller, shaft, sea-connections, both of them endeavouring to get the work finished in an agreed time. An examination of the ship's bottom for damage of any kind is made by representatives of both departments.

In the meantime, while the vessel is in dry dock, holds are being cleaned and prepared for stowage of outward cargo and the cargo gear is overhauled, repaired or renewed, as the case may be, all the work being done by the shore-gang.

All is now ready for receiving the outward cargo. The stowage is arranged, as we have seen, to the satisfaction of the Marine Superintendent, and a stowage plan prepared by the time that the steamer reaches her loading berth. Bunkering is done as convenient, for there is no hard and fast rule about it, but it should be completed as early as possible in order that the ship may be cleaned before proceeding to sea. Unfortunately it is

no uncommon thing to see a fine ship leave dock for sea direct from the coal tips.

Though all departments know beforehand of the sailing date, it is customary for the Marine Superintendent to pass an order to the Engineer Superintendent for steam on the main boilers at least twenty-four hours before it is required.

On the day prior to sailing an inspection of the ship is held by the Superintendents of all the departments—Deck, Engine and Steward's—when they satisfy themselves and each other that repairs are completed, passenger accommodation and living quarters clean, steering gear, telegraphs, telephones and steam whistle in good working order, so that each Superintendent can give his own department a clean bill of health.

The stage is now set for the last scene of the drama of the ship's visit to her home port. It is her sailing day. The Blue Peter flies at her mast-head. Once again the Marine Superintendent orders the tugs and Pilot, this time to move the ship to the dock gates, and if there are not enough members of the crew who have joined the ship in a sufficiently sober state to work her through the docks, this duty is performed for them by their less-tempted or less-treated brethren in the shore-gang. Reports from each department that all hands are on board are made to the Marine Superintendent, who finally gives the order for the ship to proceed to sea.

CHAPTER XII

PORT FACILITIES AT HOME

A book on merchant shipping could hardly be considered complete without some reference to the facilities provided at the ports for the loading and unloading of cargoes. Moreover, it is at the docks, and at the docks only, that the details of the shipping business, particularly those relating to the vessels themselves, can really be mastered.

In the office a beginner may learn the names of the different ships owned by his firm; their gross and net tonnage; their length, breadth and depth; the names of their builders and engine-makers; the number of decks of each vessel and the number of cylinders; the horse-power and the port of registry; the bunker capacity (in tons) and the cargo capacity (in cubic feet); the ports of call, and the names of the firm's agents at each port. All this information he can find within a few feet of his desk and if he be an earnest young man, he will tabulate it in his pocket-book for purposes of quick reference and pat answer.

He may even go further and ascertain the different costs: the cost per ton, per day, per knot, per head—and yet, with all these facts at his finger ends and all these memoranda in his pockets, he may pass within sight of one of his ships—lying perhaps in the Thames or the Mersey—and not recognize her.

The docks then provide the best place for the study of ships and cargoes. A sea voyage might seem to afford a better opportunity, but, in fact, those who are engaged in the shipping business go to sea much less frequently than might be supposed. When their holidays come, their inclination is to escape from what is technically called "shop"; when they do make a voyage on business, their chance of seeing all parts of the ship

is limited and the likelihood of their seeing the cargo is probably nil. In foreign ports they go on shore, at sea the hatches are battened down.

At the Docks, however, the vessel can be explored from stem to stern, from keel to crow's-nest; state-rooms, fo'c'sle, glory-hole, galley, engine-room, chart-room, bridge. Above all, in dock it is never rough. No weather can disturb the examination. The vessel herself is captive and in chains.

"A ship in dock," says Mr. Joseph Conrad,[1] "surrounded by quays and the walls of warehouses, has the appearance of a prisoner meditating upon freedom in the sadness of a free spirit put under restraint. Chain cables and stout ropes keep her bound to stone posts at the edge of a paved shore, and a berthing-master, with brass buttons on his coat, walks about like a weather-beaten and ruddy gaoler, casting jealous, watchful glances upon the moorings that fetter a ship lying passive and still and safe, as if lost in deep regrets of her days of liberty and danger on the sea.

"The swarm of renegades, dock masters, berthing-masters, gatemen and such like, appear to nurse an immense distrust of the captive ship's resignation. There never seem chains and ropes enough to satisfy their minds concerned with the safe binding of free ships to the strong, muddy, enslaved earth. 'You had better put another bight of a hawser astern, Mr. Mate,' is the usual phrase in their mouth. Gangs of dock-labourers swarm with muddy feet over the gangways. It is a moving sight this, of so many men of the earth, earthy, who never cared anything for a ship, trampling unconcerned, brutal, and hob-nailed upon her helpless body."

The Ports of the World present a wide range of differences; they vary all the way from a roadstead in an open bay, like Funchal in the island of Madeira, where for loading and discharging a vessel must rely upon her own derricks and tackle, to a port, like Hamburg, where there are wharves and warehouses and all the most modern appliances for quick dispatch.

Many of the great seaports of the world are situated on rivers, near the mouth of the river, but far enough up the river to be sheltered from the force of the sea. Such ports are New York at the mouth of the Hudson, and Liverpool at the mouth of the Mersey. Other ports such as London, which is about 67 miles from the North Sea, are situated at the point where, in olden days of piracy and marauding, the ocean and river vessels could meet as far as possible from the dangers of the high seas. Of these up-river ports, Antwerp, on the right bank of the Scheldt, is about 60 miles from Flushing; Rotterdam is 18

[1] *The Mirror of the Sea.*

miles from the North Sea; Hamburg, on the Elbe, about 70 miles from the mouth of that river. The river Amazon and its tributaries afford, perhaps, the most striking examples of up-river harbours, one at Manaos, which is about 1,000 miles from the mouth of the river, and another at Iquitos in Peru, about 2,000 miles. These two places, however, could in no sense be called seaports, though they can be visited by ocean-going vessels of a certain draught.

Some modern ports such as Manchester and Houston, Texas, were inland cities until they were connected with the ocean by canal.

Another type of port is one where a breakwater has been built in order to check the force of the waves. In early days the hull of some old vessel was sometimes sunk at the entrance to a small harbour; similarly, even as recently as 1915, during the Dardanelles campaign, ships were sunk off Cape Helles at a spot which was locally known as "W" Beach, or Lancashire Landing, in order to give protection from the sea for the landing of troops and supplies.

The modern breakwater, however, is usually a solid structure of rubble and masonry erected to form or protect a harbour. Instances of this sort of port can be seen at Cherbourg, where the breakwater is nearly three miles long, Plymouth, Pernambuco, Alexandria and other places too numerous to be mentioned.

The factor which determines whether harbour works are to be built with docks or piers is the range of tide. The difference in the water level of the harbour at low and high tide is of great importance. The rule has been that a range of tide of more than twelve feet makes it necessary to have locks and docks.[1] New York has a range of tide of only four and a half feet. This is very little compared to Liverpool or Havre, with a range of 25 ft. to 30 ft.

Since this book is concerned with British Shipping, the principal ports of this country must first be described. Later on it will be of interest to observe the conditions prevailing at foreign ports of call.

The first, question, then, is what are docks? Docks are artificial basins for the reception of ships.[2] They are of two sorts, wet

[1] *Ports and Terminal Facilities*, by R. S. MacElwee, 1918.

[2] McCulloch's *Dictionary of Commerce and Commercial Navigation*, 1882.

and dry. Wet docks are generally constructed with gates to retain the water. Ships are admitted at high water; and, the gates being shut, they are kept constantly afloat. The construction of wet docks has done much to facilitate and promote navigation. A large vessel, particularly if loaded, could not be allowed to come to the ground or to lie on the beach, like a fishing-boat at low-water, because she would run grave risks of sustaining considerable injury and perhaps being destroyed; and even the smaller class of vessels would be strained and otherwise hurt if they were left dry.

When vessels enter a wet dock, in which the water is maintained at the level of the high tide, they remain constantly afloat in it without any danger of touching ground, and can load and unload their cargoes in perfect safety.

A dry or graving dock is intended for the building, repairing or examination of ships. The ships to be repaired or examined are admitted into it at high water and the water either ebbs out with the receding tide, or is pumped out after the gates are shut.

The word Docks in the plural is generally used to include a range of dock basins together with adjoining wharves, warehouses and offices.

It has been said [1] that the great object in all Port work is to reduce the length of time which it is necessary for the ship to spend in port. Time is of vital importance, for a ship is a wasting property. Let us assume that the average life of a ship is twenty-five years, after which time she passes into the hands of the ship-breakers. In those twenty-five years, as overseas commerce is now carried on, the ship spends about one half of her time in port, engaged in loading and discharging, in overhauls and repairs. The other half of her life she spends at sea under steam. In view, therefore, of the comparatively short life of a ship and the fact that she is a wasting property, it is necessary that she should be kept at her task of delivering cargoes as constantly as possible. It cannot be too clearly understood, first of all, what an important link in the chain of transport a Port is, and, secondly, how necessary it is that a Port should be, geographically, in the right place and well served by inland transport in order that the cargoes, both inward and outward, may be rapidly dealt with, and ships turned round

[1] In a lecture by L. A. P. Warner on "Port Management."

quickly. Provided that the inland distributive facilities are equated to those of sea-carriage, an even flow of trade should be assured through a Port, but should one or other of these fail, difficulties must ensue.

Mr. MacElwee [1] has stated that " a port is the funnel for the passage of wares between lands across the seas and the interior of a country. Like the drainage basins of a river system, a port has as its hinterland an economic drainage basin for which it is the outlet. The size of the hinterland and, therefore, the importance of the port, depend upon the nature of its physical connection with the hinterland."

Another authority on Port problems, Sir Norman Hill,[2] has compared the transportation service to a system of water supply ; the railways being the in-flow pipes, the warehouses on the docks the reservoirs, and the ships the outflow pipes, or *vice versa*. The crux of the matter, he says, is to be found in maintaining a steady flow of traffic through the transit sheds ; material must not be allowed to accumulate in the reservoir.

These authorities, then, whether English or American, while employing different metaphors, arrive at the same conclusion as regards the position of a port in the general scheme of transport.

The time has now come to examine at close quarters these links, funnels and reservoirs.

The twelve great Ports of this country are London, Liverpool, Manchester, Bristol, Southampton, Hull, Newcastle, Cardiff, Grimsby, Glasgow, Leith and Dundee. There are other ports of great importance to the country, but they are either specialized ports, dealing mainly with such commodities as iron-ore, or some other special commodity or special trade, or else they are ports which are unable, owing to physical limitations, to deal with the larger ocean tonnage. Of smaller ports there are large numbers, but these are mainly occupied with the coastal, fishing and short sea trades. They act as valuable secondary centres of distribution to the big ports, from which they are supplied by coasting vessels.

The two greatest Ports of the country are London and Liverpool and the part they play in the supply of the country is very

[1] *Ports and Terminal Facilities*, p. 27.

[2] One of the Chairmen of the Port and Transit Executive Committee during the War.

great. In the last peace year before the war, they dealt respectively with the following percentages [1] of the country's Imports of :—

	Liverpool. per cent.	London. per cent.
Grain and Flour	20·0	20·5
Meat	37·5	37·4
Sugar	19·0	34·4
Tobacco	68·7	20·0
Cotton	76·4	1·8
Wool	21·9	49·5
Rubber	35·7	54·0
Timber	7·9	18·2

As regards shipping tonnage for the years ended March 31, 1914 and 1921, the tonnages of vessels, foreign and coastwise, which arrived and departed with cargoes at London and Liverpool were :—

	March 31, 1914. Net reg. tons.	March 31, 1921. Net reg. tons.
London . . .	28,112,027	21,690,128
Liverpool . . .	23,798,729	17,899,979

Each port has its peculiar problems dependent upon the natural or physical conditions of its situation and approaches and the needs of the population which it serves.

To take London first. Originally, the Thames at spring tide spread wide over marshlands, but it is now confined by embankments.

In early days the river channel had little water in it at low tide, and, even at present, mud flats are exposed in front of the river quays when the tide is out. There is a tidal rise of some 14½ ft. at Southend-near-the-Sea, this rise becoming 16½ ft. at Gravesend, 18¼ ft. at Deptford, and 21 ft. at London Bridge.[2] For this reason the system of wet docks behind lock gates has been established at great expense. Although ocean-going ships prefer the security of the enclosed waters of Docks, the river is largely used by such ships for loading and discharging, both at wharves and at moorings.

The Port of London Authority have recently constructed a

[1] These percentages are given in Mr. Warner's paper on " Port Management."

[2] *See English Port Facilities* : a report made to the United States Shipping Board by Captain Chambers, U.S.N., 1919.

double-decked jetty in the river near the entrance to Tilbury Dock for the use of ocean-going vessels. It is equipped with the latest type of cranes. The whole of the petroleum imported [1] into London is discharged from steamers in the river.

It is singular that, notwithstanding the obvious utility of wet docks and the vast trade of the metropolis, there was no establishment of this sort on the north side of the Thames until nearly a century after a wet dock had been constructed at Liverpool. Before that time, however, a wet dock had been built on the south side of the river. This dock was without stores or sheds, and is to-day part of the Surrey Commercial Docks. This basin appears to have been opened as early as 1661 and Pepys refers to it in his Diary as "Sir N. Crisp's project of making about Deptford a wett-dock to hold 200 sail of ships."

The inconvenience arising from the crowded state of the Thames at the periods when fleets of merchantmen were accustomed to arrive, the insufficient accommodation afforded by the quays and wharves, the necessity under which many ships were placed of unloading in the river into lighters, and the insecurity and loss of property thus arising, had been long felt as almost intolerable grievances; but so powerful was the opposition to any change made by the private wharfingers and others interested in the then existing order of things, that it was not until 1793 that a plan was projected for making wet docks on the north side of the river on anything like an adequate scale for the port of London. The proposed dock was to be for the special trade of the West India merchants. There had been great losses, due to pilfering and fraud, whereby both the owners and the revenue were greatly prejudiced. There was also lack of room for the constant increase of shipping, but, although the owners made out a strong case, it was not until 1799 that the Act for the construction of the West India Docks was passed. This Act provided for a compulsory use of the Docks by the West India ships for a period of twenty-one years, the docks to be enclosed and surrounded by a strong wall not less than 30 ft. high, with a ditch not less than 12 ft. wide and 6 ft. deep outside this wall, this ditch to be kept filled with water.

	Gallons.	Percentage of U.K. Imports.
[1] London Petroleum imports in 1918	349,690,637	26·4 per cent.
Liverpool ditto	128,276,271	9·7 „ „

The construction of the West India Docks began in 1800 and they were partially opened in 1802. They stretch across the isthmus joining the Isle of Dogs to the Middlesex side of the Thames. They originally consisted of an Import and Export Dock, to which was added in 1829 the South Dock, formerly the City Canal. This canal was intended to facilitate navigation by enabling ships to avoid the circuitous course round the Isle of Dogs. It was, however, but little used for that purpose.[1]

The West India system was a huge success. For many years it paid a dividend of 10 per cent. and by the end of 1819 had accumulated a reserve of *£400,000*. The construction of other Docks followed quickly on the heels of and in proximity to the West India Docks. In 1805 the London Docks were opened for the use of vessels bringing tobacco, rice, wines and brandy from elsewhere than the East and West Indies. In 1806 the East India Docks, for vessels from East India and China, became available to the trade.

The Acts of Parliament establishing all the above-mentioned docks constituted them as monopolies. Much feeling, however, was created between the proprietors of these docks and the wharfingers and lighter-men, who, previous to the establishment of the dock system, had operated from the river quays. Opposition increased to the point at which the efforts of the dock companies to secure a renewal of their monopolies failed, and it became evident that dock systems created in the future would be on a non-monopoly basis.

The first of the new enterprises was the St. Katharine Docks, a small system established near the Tower of London for short-voyage vessels. They were sanctioned by Parliament in 1825. The Millwall Dock lies just to the south of the West India Docks. It has a considerable railway system surrounding it and is used largely for grain importations. There are several granaries, in front of which are detached piers parallel to the quay wall, so that barges may be placed between the ship and the quay. Under this system a ship may be loaded or discharged from barges lying on both sides thereof. Grain is conveyed from ship to barge or warehouse on belt conveyers which also operate inside the grain elevator. The granary is capable of unloading 1,500 tons of grain per day of eight hours.

[1] McCulloch's *Dictionary of Commercial Navigation*, 1882.

The largest dock system in London is that of the Victoria and Albert Docks. These are situated a short distance below the East India Docks and extend three miles parallel with the river bank. The Victoria Dock was sanctioned by Parliament in 1850 and the Albert in 1875. In addition to these basins, a new dock, the Royal Albert Dock Extension (South) was opened by the King in 1921. This, the newest of the London Docks, is on the south side of the Albert Dock and covers some sixty-four acres in extent. It is provided with the jetty system of detached piers parallel to the quay wall, which we noticed in the case of the Millwall Dock. The width of the jetty itself is about 22 ft., or only such as is necessary for the operation of electric luffing cranes. The space between the edge of the jetty and the edge of the quay accommodates lighters. The cranes have sufficient reach, not only to plumb any part of the ship's hatch when the ship lies alongside the jetty, but also to reach over the space between the jetty and the quay, in order to handle goods from ship to quay or from quay to ship.

Inasmuch as London does a very large lighterage business, it will be seen that at those docks which are provided with the jetty system of detached piers the lighters are used in lieu of railway trucks and the space between the jetty and the quay takes the place of a railway track. With these jetties it is practicable to load and unload a ship on both sides at the same time. The arrangement also lends itself to coaling both sides of the ship at once.

Since no modern dock can be said to be complete without facilities for the dry-docking and repair of ships, a dry dock, 750 ft. long, has been constructed at the new Albert Dock at the extreme western end of the wet dock. On the side of the dry dock is placed an electric travelling crane for lifting loads up to 25 tons at a radius of 80 ft. Air-compressor plant for operating pneumatic tools for ship repairing purposes has also been installed.

So far we have been dealing with dock systems that are close enough to the City of London to permit of carting over the paved roads. The Victoria and Albert Docks are, it is true, at a distance requiring a somewhat long haul to the heart of the city, but, on the other hand, the territory around them is such that railway development has been possible. Before proceeding to examine the situation and accommodation at the Tilbury Docks, further

down the Thames, it may be well to give the reader some information as to how to reach and "get the hang" of that part of the river and those docks which have already been described.

In Liverpool it is easy enough to get a comprehensive view of the docks along the Lancashire side of the Mersey by taking a journey on the Overhead Railway along the line of docks from one end to the other.

In New York a trip in a ferry from the Jersey shore to Manhattan will give you a good general idea of the piers in the North River, while an excellent bird's-eye view of the East River can be obtained from the Brooklyn Bridge or from the windows of one or other of the many sky-scrapers overlooking that part of the Port.

In London, however, the difficulty of seeing the docks is much greater. There is no convenient Overhead Railway along them, nor is there a sky-scraper on the Isle of Dogs. At the time of writing, even the penny steamer to Greenwich is not running. Unlike the wharves and shipping in New York and Liverpool, the London docks are hidden from the view of the average Londoner and require some finding.

To quote again from Mr. Joseph Conrad [1]:

"This stretch of the Thames from London Bridge to the Albert Docks is to other watersides of river ports what a virgin forest would be to a garden. It is a thing grown up, not made. It recalls a jungle by the confused, varied and impenetrable aspect of the buildings that line the shore, not according to a planned purpose, but as if sprung up by accident from scattered seeds. Like the matted growth of bushes and creepers veiling the silent depths of an unexplored wilderness, they hide the depths of London's infinitely varied, vigorous, seething life. In other river ports it is not so. They lie open to their stream, with quays like broad clearings, with streets like avenues cut through thick timber for the convenience of the trade. I am thinking now of river ports that I have seen—of Antwerp, for instance; of Nantes or Bordeaux, or even old Rouen, where the night-watchmen of ships, elbows on rail, gaze at shop-windows and brilliant cafés, and see the audience go in and come out of the opera house. But London, the oldest and greatest of river ports, does not possess as much as a hundred yards of open quays upon its river front.

"Behind the growth of the London waterside the docks of London spread out unsuspected, smooth and placid, lost amongst the buildings like dark lagoons hidden in a thick forest. They lie concealed in the intricate growth of houses with a few stalks of mast-heads here and there overtopping the roof of some four-story warehouse."

[1] *The Mirror of the Sea*, p. 130.

It will probably be one of the earliest desires of a young man on entering a shipping office in London, and perhaps one of his earliest duties, to go down to the docks—these hidden lagoons.

For a first visit into the unexplored forest the following path is recommended, provided that the day is clear. Take a 'bus from Aldgate Station along Commercial Road and East India Dock Road, past Stepney, Limehouse, and Poplar. Get off the 'bus at the entrance to Blackwall Tunnel. Enter the Tunnel Gardens, immediately to the left of the entrance to the Tunnel, and walk through the gardens until you come to the river's edge close to the entrance of the East India Dock. Stand facing the river, looking across to the Greenwich side, up Blackwall Reach, with the Isle of Dogs on your right. Then retrace your steps to the mouth of the Tunnel and go through it in the 'bus. Proceed as far as Greenwich Hospital and there turn to the left, enter Greenwich Park, walk straight up the hill to the Observatory and on reaching the great Clock (at which you will not be able to resist setting your watch), halt and turn about. Below you at the foot of the hill is spread the broad bending line of the Thames and with a map the main positions become quite clear. It is not as near as an overhead railway, nor as bird's-ocular as a sky-scraper, but this view from the Observatory will serve.

Descend the hill and make for the water's edge in front of the Hospital. You can now face *down* Blackwall Reach, with the Isle of Dogs on your left. This gives you the key of the position and you can return with it in your pocket to London. So much for the docks from St. Katharine's to the Albert Docks.

The Tilbury Docks, constructed by the East and West India Dock Company and opened in 1886, are some twenty-five miles down the river from Tower Bridge. The site, therefore, lends itself to a better development, and on account of the deeper channel of the river, so close to the sea, it has been possible to construct the Tilbury system for the deepest draught and largest ships frequenting the port. The docks are lined with transit sheds of great width and capacity, which in turn are flanked by railway lines.

In 1912 the Port Authority decided to provide accommodation especially for ships desiring to load or discharge a part only of their cargoes and, for the construction of a jetty, a site was selected immediately above the entrance to the Tilbury Docks,

where deep water in a sheltered position, convenient railway access and other facilities were available.

The construction of this new Tilbury cargo jetty, which was begun in 1913, was brought practically to a standstill by the War, but in the Autumn of 1918, special facilities were obtained for carrying on the work and it has since been executed and brought to completion by the Port Authority.

The accommodation consists of a double-deck jetty, 1,000 ft. long and 50 ft. wide, parallel to and at a distance of 160 ft. from the shore. The upper deck of the jetty has been equipped as a quay with cranes, railway tracks, capstans and bollards, and the space between the upper and lower decks has been enclosed to form a transit shed. The jetty has been designed for large vessels to berth on the river side. The quay cranes are capable of loading and discharging cargo from the largest vessels into railway trucks, or into the transit shed, or into barges lying between the jetty and the shore. In addition, cranes are provided at the back of the jetty for dealing with barge traffic.

Amongst other schemes of development at the Tilbury Docks, it is proposed to build a passenger landing-stage in the river, on the east side of Tilbury Basin. The proposals include a floating landing-stage 1,700 ft. long, equipped with the most modern facilities for rapidly embarking and disembarking ocean passengers ; it is also intended to extend the present station towards the river and to provide a large baggage hall and waiting-rooms.[1]

The history of the various dock systems in the Port of London is a long story of quarrels. We have already noticed the opposition on the part of the wharfingers and lightermen towards the construction of docks in the opening years of the nineteenth century. Moreover, it may be said that almost from the date of the first dock authorization by Parliament, there was for many years bitter controversy between the several dock companies. These quarrels went to such a length that finally it seemed that through competition these Companies would ruin each other and lose for the port in general the prestige and volume of trade that had been gained in the past.

With a view to improving this situation, Royal Commissions were appointed at various times. The last of these was set up

[1] "Improvements in the Port of London," by C. R. S. Kirkpatrick, 1918 ; reprinted from *The Docks Gazette*.

in June, 1900, and reported in June, 1902. The conclusion arrived at was that the port was in danger of losing part of its trade by reason of the inadequacy of the river channels and of docks. The division of powers among different authorities and the financial condition of the docks were also pointed out as further handicaps. The Commission recommended that a new authority should be created, into which should be absorbed the property powers and obligations of all the dock companies. In 1903 the Government brought in a Bill in the sense of the report of the Royal Commission. In the following year, however, the bill was dropped. At last, in July, 1908, a comprehensive Bill was introduced into the House of Commons and passed with great promptitude.

By this Act—the Port of London Act of 1908—was established what was henceforth to be known as the Port of London Authority for the purpose of administering, preserving, and improving the Port of London. It consists of twenty-nine members—ten appointed and eighteen elected—with a Chairman elected by the Authority.

The following undertakings were transferred to the Port Authority as from March 31, 1909 :—The Thames Conservancy (all rights, powers and duties of the Conservators of the Thames in respect of the river below Teddington) ; London and India Docks Company ; Surrey Commercial Dock Company ; Millwall Dock Company ; and some of the powers and duties of the Watermen's Company—the latter an ancient labour guild empowered from early days to license lightermen.[1]

Powers were conferred upon the Authority to collect tolls on goods—a new departure for the port and one which in itself went far to vindicate the contentions of the now superseded dock Companies. The dock waters, quays and warehouses thus passed into the hands of the new Authority, the quays and warehouses of the Wharfingers along the river front being left, as before, independent undertakings.

[1] With regard to the transference of the powers and duties of the Watermen's Company to the Port Authority, the whole of the powers were not transferred and the Watermen's Company still exists. The powers and duties which the Authority took over from the Company relate to (*a*) the registration and licensing of craft and boats, (*b*) the licensing of lightermen and watermen, and (*c*) the government, regulation and control of lightermen and watermen (including the appointment of plying places and of inspectors).

One of the most striking features of the Port of London is the extent to which ocean cargoes are received, both for export shipment and for internal distribution by water, in barges and lighters. The proportion of traffic handled by means of lighters in London is far greater than the proportion so handled in any other port in the United Kingdom. Just as Liverpool is a carters' port, so London is a lightermen's port.

No cargo coal is shipped from London, this business being confined to other ports nearer the coal-fields. All the coal received in London by water comes to the river-front quays where it is transferred from colliers to barges. So far as bunker coal is concerned, these barges are taken into the wet docks and placed alongside such ships as require bunkering. Labourers shovel the coal from the barge into tubs, these tubs being hoisted on board ship either by the ship's own tackle or by winches on lighters alongside. The greater part of the bunkering is done in this fashion.

It may be said, in general, that in the Port of London most of the transit sheds are one story high, though there are a few exceptions. There are, however, many warehouses alongside the quays, some of which have several floors. Different docks have special facilities for special cargoes; at the Albert Docks there are cold-storage warehouses into which frozen meat is carried from the ship's hold by means of belt-conveyers; at the Millwall Dock is a suction grain elevator; at the Tilbury and other docks there are modern, electrically-operated luffing cranes with jibs of sufficient reach to operate over the out-board side of vessels moored alongside; these cranes can handle flat platforms which are loaded in the ship's hold with package goods; in this way as many as sixteen packages can be unloaded in one operation. The Surrey Commercial Docks are used almost exclusively for the handling and storage of timber, although there are some grain and provision storehouses.

As regards tugs, the arrangement is that tugs inside the dock basins are all owned and operated by the Port of London Authority, the moving about of all ships and barges inside the basin being done by the Port Board.

Enough, perhaps, has been written to give some idea of the position and functions of the Port of London, and attention may,

therefore, now be turned from the banks of the Thames to those of the Mersey.

We are told that King John was the founder of Liverpool.[1] On his accession to the throne, desiring to prosecute to the best advantage his scheme for the complete conquest of Ireland, he determined to form a port at Liverpool. Up to that time there was no port in Lancashire and the Dee rather than the Mersey was the river out of which expeditions sailed for Ireland. Not only Chester but what are to-day quiet villages, such as Shotwick or Parkgate, on the Cheshire side of the estuary, were then and for some time afterwards important ports of embarkation.

Mr. H. E. Young in *A Perambulation of the Hundred of Wirral* records how " in the thirteenth century, before the Dee had silted up, Shotwick was an important port, and many a company of Wirral archers, under the Stanleys, the Pooles, and others, assembled here to be taken to Ireland."

From a very early period Chester had considered Liverpool a mere dependency and claimed the right to control her trade, constant friction between the two towns resulting. The matter was finally, under the Commonwealth, decided in 1658 in favour of Liverpool, a decision which was upheld in 1660 after the Restoration.

It was not, however, until the reign of Queen Anne that the first wet dock was constructed by improving a natural " poole " that existed in the Harbour. After much opposition an Act was passed authorizing the forming of a dock at Liverpool on a piece of ground (now the site of the Custom House) " containing four acres or thereabouts being a parcel of the waste belonging to the Corporation lying in or near a certain place called the poole on the south side of the said town of Liverpool." Rates were authorized to be levied on shipping varying from 2*d.* to 1*s.* 6*d.* per ton. The dock was opened in 1715, but not completed until 1720.

What surprises the modern visitor to the Liverpool Docks is not that a dock was built so soon as the reign of Queen Anne but that the port could have managed to exist at all without a system of docks and lock-gates, having regard to the great range of the tide and the velocity of the current at the mouth of the

[1] *The Port of Liverpool : Its Rise and Progress.* Apublication of the Mersey Docks and Harbour Board.

Mersey. The total range between high and low water at Spring tides is as much as 33 ft., with about 11 ft. at neap tides. The current at times, it is said, has a velocity of 4½ knots per hour.[1]

In a very few years a single dock was found insufficient for the commerce of the port, and therefore a second one was constructed, to which the name of the Salthouse Dock was afterwards given, from a large salt warehouse which stood near the ground on which it was formed. In 1761 a third dock was built called George's Dock, in honour of the King. This was reconstructed in 1825 and closed in 1900.

After the American War of Independence, the increase of commerce and shipping was so rapid that it was found necessary in 1785 to apply for powers to build additional docks. Under the powers then obtained the King's Dock, opened in 1788, and the Queen's Dock, opened in 1796, were built, increasing the number of docks to five and the area to upward of twenty-eight acres.

In 1811 the Prince's Dock was opened. These original docks were built in what is to-day the centre of the dock system. In 1825 an Act was passed giving power to extend the docks to the north and south, and under this Act were constructed the Brunswick Dock for the use of the timber trade (opened in 1832), the Clarence Dock (1830), the Waterloo (1834), the Victoria and Trafalgar Docks (1836). The Albert Dock and warehouses were opened by Prince Albert in 1846. "The docks are wonderful," he wrote to Queen Victoria, "and the mass of shipping incredible."[2]

In order that vessels could discharge and receive passengers and goods at all times of tide, it was necessary to construct a floating landing stage, and in 1847 a stage 500 ft. long and 80 ft. wide, supported on iron pontoons, was constructed. Ten years later, to meet the requirements of trade, a new stage was constructed, more than 1,000 ft. long. In the year 1874, just after the two stages had been united by a new construction, it was destroyed by a fire. Two years later a new stage was completed and opened for traffic. To meet the requirements of the port, extensions have been made at various times until now the total length is 2,534 ft. The stage is connected with the shore by a

[1] *English Port Facilities*, 1919.

[2] *Queen Victoria*, by Lytton Strachey, p. 143.

number of bridges and mooring chains. The deck of the stage is about 6 to 8 ft. above the water level, and gangways are arranged in fixed positions at the southern end for ferry passengers. For ocean liners movable gangways are used, and high-level bridges, adapted to the towering decks of transatlantic vessels, have been provided. The Riverside Railway Station was constructed in 1895 in a position on the river wall parallel to the stage for the convenience of travellers who desired to proceed immediately to or arrive from London, and mechanical conveyers are provided for the transfer of luggage from the steamers to the railway station or *vice versa*. Additional accommodation for ocean-going passengers is at present being provided in the shape of a continuous upper deck with a covered shelter about 1,100 ft. long, with four movable overhead gangways, to enable passengers to pass to and from the upper deck to vessels at the stage. Commodious waiting room accommodation will be furnished under the upper deck, as well as medical officers' rooms for the examination of passengers. An additional baggage examination room is to be constructed on a level with the Princes Parade, easy of access to the railway station, with two electrically-driven conveyers for the transferring of baggage.

From 1846 onward the construction of docks proceeded apace. In 1848 no fewer than five docks, namely, the Salisbury, Collingwood, Stanley, Nelson and Bramley-Moore, were opened. These were all at the north end of Liverpool, nor is this remarkable, seeing that the Mersey between Liverpool and Birkenhead flows towards the north, into the Irish Sea, and deeper water for vessels of increasingly deeper draught is obtainable at the north end.

The Wellington Dock was opened in 1849, the Sandon [1] in 1851, and in 1852 the Huskisson.

Macaulay, writing at this time, that is to say, during the middle of the nineteenth century, has left us in his History [2] a brilliant sketch of Liverpool as it was then and as it had been in earlier times. Nor was Macaulay unacquainted with Liverpool, for his sister Margaret had married Mr. Edward Cropper, who lived at Dingle Bank, " a spot whose natural beauty nothing can spoil

[1] Called after Lord Sandon (afterwards second Earl of Harrowby), who was M.P. for Liverpool 1831–1847.

[2] Macaulay's *History of England*, Vol. I, Chap. 3.

until in the fulness of time its inevitable destiny shall convert it into docks."[1]

Macaulay had been describing Manchester, Leeds, Sheffield and Birmingham. He proceeds :—

"These four chief seats of our great manufactures deserve especial mention. It would be tedious to enumerate all the populous and opulent hives of industry which, a hundred and fifty years ago, were hamlets without parish churches, or desolate moors, inhabited only by grouse and wild deer. Nor has the change been less signal in those outlets by which the products of the English looms and forges are poured forth over the whole world. At present, Liverpool contains more than three hundred thousand inhabitants. The shipping registered at her port amounts to between four and five hundred thousand tons. Into her Custom House has been repeatedly paid in one year a sum more than thrice as great as the whole income of the English Crown in 1685. Her endless docks, quays and warehouses are among the wonders of the world. Yet even those docks and quays and warehouses seem hardly to suffice for the gigantic trade of the Mersey, and already a rival city is growing fast on the opposite shore. In the days of Charles the Second, Liverpool was described as a rising town which had recently made great advances, and which maintained a profitable intercourse with Ireland and with the sugar colonies. But the population can hardly have exceeded four thousand ; the shipping was about fourteen hundred tons, less than the tonnage of a single modern Indiaman of the first class ; and the whole number of seamen belonging to the port cannot be estimated at more than two hundred."

Macaulay was right. The docks at the time when he was writing did not suffice for the gigantic trade of the Mersey. Still more docks had to be built. In 1859 the Canada Dock was opened for the special accommodation of the timber trade which had out-

[1] Sir George Trevelyan's *Life of Lord Macaulay*, Chap. 5. Dingle Bank was subsequently sold to the Dock Board and in 1920 the house was pulled down to make way for the erection of tanks for the storage of oil fuel. Large areas of the land have now been leased to certain of the leading oil companies for the erection on this and the Parkhill Estate of oil-storage tanks, with the object amongst other things of supplying fuel oil for bunkering purposes, and great progress has been made by the Companies with their installations. The following summary shows the state of this work in 1921 :—

	No.	Total Capacity.
Oil tanks supplied	12	80,500 Tons
Oil tanks under construction . .	1	1,000 „
Tanks proposed	5	25,500 „
	18	107,000 Tons

grown the limits of the Brunswick Dock. In 1864, at the extreme south end of the estate, the Herculaneum Dock was constructed, and in 1873 further powers were obtained for the formation of docks at both the north and south ends. At the north end the Brocklebank, Langton and Alexandra Docks were opened in 1881 and the Hornby Dock in 1884. At the south end the Herculaneum Dock was enlarged and additional accommodation for the coal trade was provided. The Harrington Dock was opened in 1883 and the Toxteth in 1888.

In 1913 an important addition was made to the Mersey dock system by the opening of the Gladstone Dock, which was built to meet the needs of the largest liners. The graving dock is 1,050 ft. long by 120 ft. wide. It has been so constructed as to be capable of serving either as a wet or as a dry dock and forms the initial stage of the large scheme, the completion of which has been kept in abeyance for a time first by the depressed state of trade, and then by the War. A fresh start, however, has now been made and the work is being pressed forward with dispatch. The scheme embraces :—

(1) A dock (to be called the " Gladstone Dock ") with river lock entrance, 1,070 ft. in length, and 130 ft. in width, and having a sill 30 ft. below Old Sill datum.
(2) A lock 645 ft. long and 90 ft. wide, between the Hornby Dock and the aforementioned dock.
(3) A branch dock (to be called the " Gladstone Branch Dock No. 1 ") opening out of the dock, immediately to the north of the present timber storage ground, and having treble story sheds on the north and south sides.
(4) A branch dock (to be called the " Gladstone Branch Dock No. 2 ") also opening out of the dock, to the north of the proposed " Gladstone Branch Dock No. 1," and having treble story sheds on the north and south sides.

These docks have been given the name " Gladstone " after a former Chairman of the Board—Robert Gladstone.

From the Gladstone Dock at the north end of Liverpool to the Herculaneum Dock at the south, the river is fronted for a length of about seven miles by a system of docks and basins having a water area of over 400 acres and a linear quayage of over twenty-seven miles, containing every type of accommodation from that necessary for the great Atlantic liners, such as the *Aquitania*, to the lesser requirements of small coasting vessels.

Speaking generally, railway communications come in from the east, while the line of docks runs north and south. The imports into Liverpool are distributed over a much wider area than those into London. Besides food imports, Liverpool deals with the bulk of the cotton imports required for the Lancashire district. The export trade from Liverpool is also a very large one and the exported goods are collected over a wide area.

The extent to which carts and drays are employed in carrying goods between the ships and the warehouses and the ships and the railways is a special feature of Liverpool, and one that has not failed to catch the eye and comment of an American Commission :—

"While the Mersey Dock estate possesses over 80 miles[1] of railway tracks around the great docks, it is interesting to note that over 90 per cent. of the traffic of the port is handled to and from the ships and warehouses in horse-drawn drays or 'lorries.' From early morning till late at night there is one continuous procession of these four-wheeled, heavily-laden drays travelling along the border highway of the great estate. The platform bodies project over the wheels, giving a large loading surface. The horses are powerful beasts and are usually hitched up in tandem style with from one to three horses to each dray. It is said that some of these powerful Clydesdale horses draw loads of ten tons each over the Liverpool pavements. This requires, especially on the heavy traffic streets, surfaces which are hard and durable with low tractive resistances and good foothold for the horses."[2]

Motor vehicles have been rapidly taking the place of horse-drawn vehicles, until at the present time (1922) it is estimated there are as many motor vehicles on the Dock roads as horse-drawn vehicles.

The Birkenhead Docks on the other side of the Mersey are worked as a part of the Port of Liverpool and are all under the Mersey Docks and Harbour Board. These are well placed in regard to the railways for export traffic and are used largely for this purpose by the ocean-going vessels trading to the Far East.

With regard to coaling arrangements, as at London, the approved method of bunkering is from barges alongside, while the ship is taking in cargo. There is also at Liverpool, as there is not in London, a large business in cargo coal. Coaling is sometimes done by means of mechanical elevators in the barges.

[1] There are now (1922) over 102 miles.

[2] *Report of Connecticut Rivers and Harbours Commission for* 1910.

These self-contained barges hold about 1,000 tons of coal each and are equipped with a chain-belt elevator running the entire length of the barge. Another way of coaling is by means of a crane which lifts the coal trucks bodily off the railway lines alongside certain docks and dumps their contents straight into the ship. This method of coaling is employed at the Bramley-Moore Dock. At the north and east sides of this dock is the High Level Coal Railway, where upward of a million tons of coal have been shipped annually. There are nine cranes and one tip capable of shipping coal at the rate of 2,300 tons per hour.

The Herculaneum Branch Dock, at the south end of Liverpool, is used mainly in connection with steamers and barges loading coal. There are at this dock two movable hydraulic coaling cranes capable of lifting coal trucks 22 tons and 19 tons gross respectively.

With the exception of two tugs, the property of the Mersey Dock Board, and kept for fire and emergency use, all tugs and barges are privately owned. In contradistinction to the London practice, privately owned tugs enter the basins for the purpose of shifting vessels.

We now come to the question of port management at Liverpool.

In the year 1857 the control of the Docks in Liverpool was vested in the Mersey Docks and Harbour Board together with the Conservancy Powers, and in the following year the direction of the Pilotage of the port was also entrusted to the Board.[1]

The Board is a Public Trust composed of twenty-eight members, of whom twenty-four are elected by the Dock rate-payers and four appointed by the Government. This Trust is governed by Acts of Parliament, and must be run for the benefit of the community and not for profit. Its capital expenditure is met by money borrowed from the public, at rates of interest which are fixed for the term of the loan. Any surplus revenue must be devoted to maintaining and bettering the estate, reducing rates and dues on ships and goods, or reducing the capital debt.

The chief form of income is from the rates and dues which have to be paid on each vessel and on all goods coming into or leaving the port. The dues on the vessels are calculated at so much a ton on the net register tonnage of the vessel, coupled with her

[1] This description of the Mersey Dock Board is taken from Mr. Warner's lecture on Port Management, to which reference has been made previously.

farthest port of departure or destination. The rates on the goods are based, to a great extent, on their comparative value, but the rates and dues must all vary from time to time in accordance with the state of trade, and cost of working and maintaining the port.

All dues both on ships and goods are paid to the Rates and Dues Department of the Board. Vessels arriving from foreign ports must pay their dues before reporting to the Customs, which they must do within twenty-four hours after arrival, and the dues on imported goods, before delivery.

No outward bound vessel is allowed to leave without a Customs clearance note, which cannot be obtained unless it has previously been endorsed by the Rates and Dues Department, signifying that the rates have been duly paid, and in the same way shipowners or their agents have to furnish the manifests of outward bound vessels from which particulars are taken of any short payment of outward dues on goods, and application made for the deficiency.

Mr. Warner, in his paper, has defined the duties of some of the principal officers on the staff of the Mersey Dock Board, and it may be of interest to members of shipping staffs to know what those duties are.

The Engineer-in-Chief is responsible for all new Constructional Works ; the repair and maintenance of existing works, as well as for the dredging operations in the River Channels and Docks. The Engineer has a large staff of experts to deal with all sides of the work which he has to perform, including Electrical, Mechanical, Dredging and Constructional work. In addition to being an Engineer he is also, for all practical purposes, a Shipowner, as he has under his charge a fleet of vessels that include Dredgers and Hoppers.

The Harbour Master is responsible for the allocation of berths to incoming vessels, the docking of such vessels and the general superintendence of all the Board's docks and basins. He has a large staff of Dock Masters, Pier Masters, Head Gatemen and Dock Gatemen.

The majority of the large Shipping Companies whose vessels trade regularly to the Port of Liverpool have special berths appropriated to their use, for which appropriation they pay a nominal sum per square yard per annum on the shed area. This

charge does not entitle the berth-holder to the exclusive use of the berth, but merely gives him the privilege of using the same berth or berths on each occasion upon which his vessels arrive.

Other Shipowners approach the Harbour Master on the arrival of the vessel for the purpose of having a berth allocated to her. The Harbour Master has no jurisdiction over vessels lying in the River, but on approaching the entrance to the system of docks in which a berth has been allotted to any particular vessel, the Dock Master takes charge of her and the Master or Pilot on board and the attendant tug-boats are required to observe strictly the orders he gives. The vessel, after entering the dock, is passed to the berth allotted to her, under the supervision of a Pier Master or Head Gateman. As soon as possible after the vessel has docked, the Master or other responsible officer is required to attend at the Dock Master's office for the purpose of furnishing particulars of the tonnage of the vessel, the port from which she came, and the nature of her cargo. The Harbour Master is solely concerned in the docking and berthing of the vessel, and does not in any way interfere with the discharge of her cargo.

The Chief Traffic Manager is responsible for the supervision of all operations performed on the Dock quays, including the discharge of vessels, the stowage of goods on the quay and their ultimate delivery. He is also responsible for seeing that quay rent is charged on all goods not removed from the quays within the prescribed periods, namely, forty-eight hours from the day of landing from a sailing vessel, or seventy-two hours from the day of landing from a steamer. The principal duty of the chief traffic manager is to do all in his power to ensure the free flow of traffic through the transit sheds. These are erected alongside each quay and play a most important part in the work of the Port; they should never be permitted to be utilized for storage purposes as they form the funnel through which the cargo is poured. If this funnel is blocked no cargo can pass and the ship arriving from overseas has to wait idle with her cargo on board and might just as well be on the high seas for all the value she is either to her owner or the country.

The Mersey Dock Board do not, except at certain of the Warehouse Docks, undertake the loading or discharging of vessels, or the quay porterage of goods on the Dock quays, such operations being performed by Master Stevedores, Master Lumpers and

Master Porters respectively, all of whom are licensed, but not employed by the Board. Many of the large Shipping Companies employ their own staffs to do this work, whilst other shipowners or consignees employ what are known as Working Master Stevedores, Master Lumpers or Master Porters—men whose sole business it is to undertake such work on behalf of others.

The Chief Warehouse Manager is responsible for the receiving, weighing, sampling, stowing and delivering of goods warehoused with the Dock Board, in fact the ordinary duties of a Warehouse-Keeper, plus a small amount of discharging and quay porterage work at the Warehouse Docks. The Board have provided warehouse accommodation, not for the purpose of entering into active competition with private warehouse owners, but as a convenience to the users of their docks and as a means of clearing their quays —one of the penalties for allowing goods to remain on the dock quays beyond the prescribed period being the removal and warehousing such goods at the owners' or consignees' expense.

The principal articles stored at the Board's warehouses are tobacco, wool and grain.

The Marine Surveyor and Water Bailiff is responsible for the control of all traffic in the river; the periodical survey of the dock entrances, river and channels, including the preparation of charts showing the soundings taken; the removal of wrecks in the river, and the working of the Landing Stages and the Riverside Station, the latter having been erected by the Board adjacent to the Liverpool Landing Stage for the convenience of passengers arriving or departing on liners and requiring to proceed direct to or from London or elsewhere.

The Marine Surveyor and Water Bailiff is also responsible for the lighting and buoying of the channels and the control of the lighthouses and telegraph stations around the coast in the vicinity of the Mersey.

Those, then, are some of the principal duties of the above-mentioned officers of the Dock Board. In the case of the Marine Surveyor, who is responsible for the Lighthouses in the immediate neighbourhood of the Mersey, it is interesting in this respect to contrast the powers given by Parliament to the Mersey Dock Board with those given to the Port of London Authority.

The Dock Board controls the lighting and buoying of the

Mersey ; the Port of London Authority, on the other hand, does not control the lighting and buoying of the Thames. For though in 1902 the Royal Commission on the Port of London had recommended that the powers of Trinity House, as regards the lighting and buoying of the port, should be transferred to the proposed new Authority, Trinity House had protested against this proposal as far as it affected itself, and the Government had listened to its complaint. Trinity House therefore remains responsible for the lighting and buoying of the Thames.

Here, perhaps, in connection with port facilities, may be a convenient place in which to insert a word about Trinity House —with whose name all shipping people are familiar.

Trinity House, the first general Lighthouse and Pilotage authority in the kingdom, was a body of importance when Henry VIII. granted the institution its first charter in 1514 *inter alia* " for the relief, increase and augmentation of the shipping of this realm of England." Since that period the duty of erecting and maintaining lighthouses and other marks and signs of the sea has by Royal Charter and Acts of Parliament been entrusted to the Corporation of Trinity House.

In the present day the principal duty of the Corporation, as a Public Department, is the administration of the Lighthouse service of England and Wales with certain statutory jurisdiction in regard to Lighthouses and other sea marks in Scotland, Ireland and the Channel Islands, whilst the Corporation are also the Chief Pilotage Authority in the United Kingdom.[1]

The Lighthouse Service of Trinity House is maintained out of the general Lighthouse Fund, this fund being provided by means of special dues, called Light Dues, levied on shipping using the ports of the United Kingdom. The accounts in connection with the Lighthouse Service are rendered to the Board of Trade, who have Statutory Control over the expenditure and are submitted annually to Parliament.

Any one interested in Shipping who has the opportunity of visiting Trinity House and seeing the collection of models of lighthouses and vessels, ancient and modern, as well as the many other objects of art and interest, inside that charming Georgian house on Tower Hill, would be well advised to go there.

[1] *See Whitaker's Almanack.*

CHAPTER XIII

PORT FACILITIES ABROAD

In the previous chapter we have examined in some detail the formation and functions of the two principal seaports of Great Britain, namely, London and Liverpool. Had there been space in this book, it would have been preferable to take each of the other large ports of this country, such as Bristol, Manchester, Glasgow, Newcastle and Southampton, and study the conditions prevailing at each. Such a survey, however, could not be confined within the limits allotted in this work to the subject of ports. Moreover, many of the problems and facilities existing at the ports of London and Liverpool which have been described are similar to those of other British ports.

It would seem better in the circumstances to employ the space that remains by sweeping with our telescope the seaports in other countries in order to obtain a glance, however rapid, at the state of things in such places.

In order to discover the relative importance of the ports of the world and ascertain with some degree of assurance which are the most important, it is necessary to examine the statistics showing the movement of vessels and the flow of traffic. It might seem that nothing could be simpler than to arrange the different ports of the world in a table of precedence by merely adding up the tonnage entrances and clearances of the ships of the different nations using those ports.

It must be remembered, however, that there is a wide variation in the measurement of vessels. In Belgium, for instance, the basis of measurement is different from that of England. Again, some ports measure the movement of traffic by the value of merchandise. This is the usual practice in the United States. The weak spot in this method of calculation is easily seen in cases where there is a sharp rise or fall in prices. With a rise in

prices the comparative movement of the various ports will be out of proportion to the actual increase in traffic. Indeed, the statistics may show an actual increase in value when there has, in fact, been a decrease in volume, or *vice versa.*

Then there may be different ways of expressing values in these statistics ; the values used in the case of Imports may represent the cost, insurance and freight, while in the case of Exports the values may represent the cost and charges of delivering the goods on board the ship, that is the " free on board " values. But even if there existed a generally recognized world standard, such standardized values would afford no satisfactory basis from which to estimate the weight or bulk of the total volume of cargoes passing through a port.

Another plan is to measure the commerce of a port by the tonnage of merchandise alone, apart from the tonnage of the ship. This method is also unsatisfactory, because, for example, a port such as Cardiff, where practically all the movement is in coal, would, by such a system of statistics, appear to be a far more important commercial centre than it really is.

Moreover, as we have already seen, the little word " ton " is full of traps. Tons may be cargo tons, register tons, gross tons, long or short tons.

Nevertheless, while it may not be possible to obtain an absolutely accurate and uniform return as to the trade at the various seaports of the world, it appears from statistics compiled, showing the value of Imports and Exports and also the entrances and clearances of vessels, that during the years immediately preceding the Great War the following were the six principal seaports of the world :—New York, London, Liverpool, Hamburg, Antwerp and Rotterdam.[1]

The figures, in round numbers, for these totals may be summarized roughly as follows :—

Ports.	Year ended.	Total Values of Import and Exports.	Net Tonnage of Ships.	
			Entered.	Cleared.
New York . .	June,1913	$1,966,000,000	14,500,000	14,500,000
Hamburg . .	Dec. 1912	$1,960,000,000	13,500,000	13,800,000
London . .	Dec. 1912	$1,866,000,000	10,800,000	8,700,000
Liverpool . .	Dec. 1912	$1,816,000,000	7,300,000	7,400,000
Antwerp . .	Dec. 1912		11,500,000	11,500,000
Rotterdam . .	Dec. 1912		11,500,000	11,500,000

[1] MacElwee's *Ports and Terminal Facilities,* Chap. II.

New York

New York City, the commercial capital of the United States, stands on the island of Manhattan, situated at the mouth of the Hudson River. The Port of New York also includes Brooklyn and Long Island City on Long Island, as well as Jersey City, Hoboken and Weehawken on the New Jersey side of the Hudson River, the whole embracing an immense water front. The harbour is land-locked on every side and the most perfect protection is afforded to shipping.

In studying the conditions at a seaport, one of the most essential points to be considered is, as we have seen, the water. In the first place, is the water deep enough naturally for the needs of the port, or must a channel be dredged? Secondly, if the water is of sufficient depth, whether naturally or artificially, are the range of tide and velocity of current such as to permit of piers being built out into the harbour, or is it necessary to construct a system of docks with lock-gates?

As regards the first question, the natural depth of the water in New York Harbour is not sufficient to allow the largest liners to proceed to their berths. The recent 50,000-ton class of ship, such as the *Aquitania* or the *Majestic*, requires a channel of at least 40 ft. and a channel has therefore been dredged to that depth.

In this respect New York is less fortunate than one or two of her sister ports. At Boston, for instance, there is a depth of 35 ft. at low water, which would enable the largest vessels to enter at high tide when the depth is 44½ ft. San Francisco has a natural depth of 60 ft. in nearly all parts of the harbour.

The answer to the second question is that the range of tide at New York, being only 4½ ft.,[1] is such as to make the pier system possible, and the ratepayers are thereby saved the expense of constructing and maintaining docks and locks similar to those that have been found necessary in London and Liverpool.

In New York Harbour, therefore, there are piers for the accommodation of ocean-going ships on both the west and east sides of New York City, on the New Jersey side of the Hudson and on the Long Island side of the East River.

These piers are owned partly by the City and partly by private

[1] *See* above, page 197.

individuals and firms. They are, in the main, built of wooden piles, but are being replaced gradually by steel and concrete structures.[1] Pile construction, where marine borers are not present, in water full of sewage is remarkably permanent. Wooden piles when constantly submerged are practically immune from decay. This condition may be maintained to a height of the mean between high and low tide. Up to that point it is possible for the pile to remain always wet. Air, heat and moisture are necessary for the decay of wood. As, therefore, the part of the pile below the water-line is not so liable to decay as the part that is exposed to the air, the modern plan has been to cut off the piles at low water and cap them with concrete.

In pier-building as in shipbuilding the question of length must be treated in connection with that of width. At New York 1,000 ft. is about the limit of length per pier allowed by the War Department, who are the responsible authority concerned, although in South Brooklyn there are piers of 1,700 ft. There are, however, certain considerations which affect the question of length. The longer a pier is, the wider it must be, because the more traffic must be handled at the shore end. The longer the pier the larger the number of carts and trucks which will be required to deal with the increased amount of cargo.

At New York the transit shed is limited in dimensions by the size of the pier. There is little choice in the proportions of the shed and the result has been that the pier and transit shed have come to be considered as one and the same institution.

Recent New York practice has been to make the shed a little less than 120 ft. wide and about 900 ft. long (where the pier is 1,000 ft. in length) or an area of about 100,000 square ft., which would afford a capacity for about 10,000 tons of cargo.[2] The more modern sheds are of two stories, the upper deck for incoming and the lower deck for outgoing traffic. When a ship is discharging, the cargo is spread out to afford opportunity to sort it according to marks and consignees. Likewise in loading, time is of vital importance and the stevedore can only work rapidly and load correctly when cargo has been assembled beforehand and sorted according to ports of destination and nature of the

[1] Urquhart's *Port Dues and Charges*, 1914.
[2] MacElwee's *Port and Terminal Facilities*, 1918.

goods. Stowing according to ports of destination is very important when the ship is to call at several ports, as for instance on a voyage from New York to South America.

As we have seen in our survey of the docks at London and Liverpool, there are three ways of getting cargo to and from the ship, namely, by rail, by lighter and by road.

At most ports in the United States the railways have been brought to the water's edge. The water front, the railway pier, and even the line of ships berthing at the pier have all come to be regarded by certain railways as part of their own systems. New York, however, is an exception to this rule. Owing, perhaps, to her peculiar geographical position, she has no railway line—or belt line, as it has been called elsewhere—connecting the piers and the wharves of the port in such a way that a railway truck loaded at any pier may travel to any other pier or to any railway line.

Without any railway facilities of this sort in New York City, the local delivery of cargoes has to be made partly by cart, but mainly by lighters.

The lighter is regarded as less economical than the "belt" line in handling railway freight destined for the interior of the United States, but more economical than the dray for other freight. There are three categories of lighters at the Port of New York—private, chartered and public. The private lighters are those that belong to railway or other Companies that take care of that particular Company's own lighterage work.

The chartered lighters belong to private firms which do not operate their lighters but lease or charter them. Often when railway companies have insufficient lighters of their own they charter such additional lighters as they require. This is particularly true of floating derricks for lifting heavy pieces.

The public lighter-owners are common carriers as distinguished from private carriers. They sell their services to the interested public at prices determined by supply and demand. In other words, they charge what the traffic will bear.

The New York lighter is a wooden scow with high freeboard, square ends, and a somewhat greater length over all than on the water-line. There are three principal types of lighters: over deck, covered deck, and open hatch. The lighter has undergone a rapid change in size within recent years. A generation ago

the New York Harbour lighter was a small sloop, pointed at the bow, carrying a mast and mainsail. It had a loading capacity of not over 90 tons. To-day a lighter of less than 300 tons capacity is considered uneconomical and those of the more modern construction carry 600 to 700 tons. The percentage of profits in operating a 600-ton lighter is more than twice the percentage of profits on a 300-ton lighter.[1]

A more recent development is the steam lighter. This is a large tug with the machinery well aft and a forward deck for the accommodation of cargo. A steam lighter has greater speed than an ordinary lighter, is more mobile, has power for handling heavy pieces by winches and derrick and can also tow a scow lighter. Steam lighters have a capacity of from 300 to 500 tons.

Another form of lighter that is a familiar sight in New York Harbour is a type of float which carries the railway cars themselves. When such cars are pushed on to a car-float and ferried from one point to another in the harbour it is called "floatage" rather than lighterage. In this way some 1,500 to 2,000 cars are floated over from the mainland to Manhattan Island and back again every day. About 90 per cent. of this traffic is for consumption on the island and not for export. Most of the export and import traffic at the Port of New York is, as we have seen, handled by the ordinary lighters.

Carting at New York is regarded as a necessary evil, because it aggravates the congestion in the city streets, but because of its flexibility and convenience in moving small quantities of cargo it cannot be eliminated.

As with the lighter at New York, the dray falls into three classes as to ownership and operation. First, there is the "teamster," who is a public carrier and offers his services and equipment for hire. Secondly, there is the business firm which has its own private team or motor truck. And, thirdly, there are lines of teams hired by the railways on a kind of charter basis.

As regards cranes, it may be said in general that American ports do not use cranes to anything like the same extent that they are used in European ports, and in particular that piers of the usual New York type, by their very nature are not capable of either accommodating cranes or furnishing them with sufficient

[1] MacElwee's *Ports and Terminal Facilities.*

tonnage to make them economical. In such ports as London and Liverpool the crane equipment is supplied by Port Authorities who are not looking to a large return on the invested capital; moreover, in the case of wet docks such as there are in English ports, with wide and solid wharves, there is much more space for operating cranes than is possible at New York, where, as we have seen, the piers are relatively narrow and the transit sheds are correspondingly restricted.

Throughout this brief sketch of the Port of New York in which we have seen the extent of the tonnage using the port, the value of cargoes moved, the depth of water, the range of tide, the types of pier and transit sheds, the appliances and equipment for handling and dispatching merchandise, it may be felt, perhaps, that too much stress has been laid upon such details as lighters and drays. It must be remembered, however, that in the daily office routine of a Shipping Company or their agents, it is these very details that absorb the time of the staff. It is that error in the teamster's bill, for conveying the ship's box from the office to the pier, that is a cause of trouble to the clerk whose duty it is to make up the steamer's disbursement account. It is that missing lighter of lard and bacon for which the wharfinger is waiting, as he stands on the end of a pier in Brooklyn looking across to the Jersey side, wondering whether the ship will have to be delayed or sail without the bacon.

Hamburg

Hamburg is situated on the right bank of the river Elbe, about seventy English miles from the mouth of the river. Steamers drawing 30 ft. have no difficulty in reaching Hamburg direct at ordinary high water and the navigable channel has been deepened to such an extent that the biggest ships can have free access without lightening below.

The city of Hamburg is the largest shipping port on the continent of Europe, with numerous basins, patent slips, shipbuilding wharves, engine works, spacious quays with all modern appliances for quick dispatch, and commodious dry docks able to lift the largest craft afloat.[1]

We saw how at New York, owing to the absence of a "belt" railway, the contents of a goods train from the interior are

[1] Urquhart's *Foreign Port Charges.*

moved by lighter to the ship's side. At Hamburg, on the other hand, there is a harbour railway with about 185 miles of tracks, owned by the city and operated by the permanent port authority. This harbour or " belt " railway takes the cars from the termini of the various railways and switches them to the desired quay ; thereby all the through railway freight arriving at Hamburg from the interior is taken in unopened cars direct to the ship. When the freight comes from the interior by river barge, the barge is floated alongside the ship in stream or at a quay, as the case may be, and the cargo thus reaches the ship's side without re-handling.

This " direct method," however, does not mean that the lighter and the dray, which play so important a part in the ports of New York, London and Liverpool, are eliminated at Hamburg.

On the contrary, the following analysis [1] of the removal of goods from the ships using the quays, and not including the ships in mid-stream, shows the extent to which each of these carriers shares in the work :—

By river barges	17	per cent.
By rail	18	„
By dray	20	„
By lighter	45	„

The lighter movement of freight at the port of Hamburg has reached large proportions. All the warehouses of the Free Port and most of the private warehouses of the town have waterside delivery, that is, a canal on one side and a street on the other. Carloads of railway freight are moved by the belt railway, but " broken " or less than carload lots are usually placed in lighters and so conveyed to the ship's side.

It will be seen that the lighters at New York and Hamburg have very different services to perform. At New York the lighters move large consignments and the large lighter is in vogue because ton for ton the larger the movement the more economical it is. This rule holds only when most of the lighter service is for trainload lots.

At Hamburg, where lighters move " broken " carload lots or drayload lots, the smaller lighters are more economical. A small lighter full every trip will cost less per ton to operate than a large lighter only partially filled. For conditions at Hamburg small

[1] MacElwee's *Ports and Terminal Facilities.*

lighters are best suited. They are of steel construction with pointed bows, a 2-foot deck and coaming round an unobstructed hold. The usual capacity is 50 to 75 tons. Open lighters are covered by tarpaulins in bad weather. Formerly, these small lighters were poled from place to place; they were punted and floated from the harbour to the warehouses and back again, taking advantage of the rising and falling tide for the major part of their journey, going in with the flood and out with the ebb. More recently, however, the usual method of moving the lighters about has been to tow them by motor-boats.

In order to assist the movement of vehicular traffic, a tunnel has been built under the river Elbe for the use of drays, motors and pedestrians. This tunnel connects the town side of the Elbe with the Free Port on the other side, where the great quays and shipyards are located. It is only about half a mile long and its length is shortened to a great extent by the fact that it is reached by elevator lifts at each end instead of having "ramp" approaches, such as exist at the mouths of the Blackwall Tunnel under the Thames.

Cargo at the sheds in the port of Hamburg is handled by means of cranes. In the new basins the cranes are spaced every 100 ft. and the usual rate of discharge is 250 tons of general cargo per hour. This rate may be compared with the record of the *Saxonia* a few years ago at Boston of 190 tons an hour; the *Lake Champlain* at Liverpool of 250 tons an hour; the record at New Orleans (for side port delivery) being 130 tons an hour.

As regards warehouses at Hamburg the principle of co-operation between private persons and the municipality, applied to various activities in the harbour, has been adopted with success. By 1858 the needs of the harbour had become so acute, owing to the growing demands of the interior, that action was necessary. The Hamburg Chamber of Commerce therefore decided to investigate the requirements of the leading merchants, shippers, brokers, ship agents, ship-builders, skippers and others practically interested in harbour development. The result was the report of the year 1858 which, to all intents and purposes, settled nearly all the questions of harbour policy. One question was that of the warehouses.

The discussion of 1858 established the principle that every one of the harbour facilities from the basins dug by the

municipality to the quays, sheds and warehouses, must be prevented from becoming the monopoly of any one group of individuals. So far as the quays and mooring posts were concerned, the solution was not so difficult, but when it came to the building and operation of warehouses, public opinion was not ready to support municipal ownership, and yet there was a firm conviction that such important institutions as the warehouses should be under State control.

The result was a compromise which consisted in the formation of a privileged stock company, known as the Free Port Warehouse Company. The company was to build and operate the warehouses in the municipal harbour, and the municipality became a large stock-owner in this privileged company.

Allusion has been made in this chapter to the " Free Port " of Hamburg, and it may therefore be convenient before passing on to our next seaport to define exactly what is meant by the free-port system and its effect upon transit cargo and re-export business.

The modern " free port " is an area of a port separated from the Customs area of a nation. Ships may enter such a port, discharge, load and depart without customs formalities. The goods may be stored, re-packed, manufactured and re-exported without Customs examination. Only when the goods pass the barrier to reach the consuming public of the country do they pay the necessary duty.

It will thus be seen that there is a distinction between a " free " port and a " free-trade " port. A free port may be located in a country which is otherwise protectionist. It is then a sort of isolated partially free-trade area within the political area of a tariff-protected country. For instance, Hamburg is a real free port ; it is situated in Germany, which is a protectionist country, but nevertheless goods which are dutiable in Germany may be imported duty-free into the free zone at Hamburg. Thus far, but no farther.

Under a free-port system the re-export business can be carried on without Customs interference and it is this same transit trade which brings so much other business in its train. We noticed in a previous chapter how during the sixteenth and seventeenth centuries the Dutch rose to great importance in the shipping world. In those days the great ships brought the products of

all the known world to Amsterdam to be warehoused and re-distributed to the minor ports of Europe. This carrying and distributing trade made Amsterdam the centre of banking, commerce and shipping. Later, when London captured this transit trade from the Dutch, she in turn became the banking and insurance centre. To London great fleets of merchantmen brought cargoes of spices, coffee, sugar, tobacco and treasure. London became great commercially in a large measure because she was a cargo-clearing house for the reception, division, storage and trans-shipment of fleet-loads of wares from all over the world. In this way London has grown to be the world's chief consignment market.

Similarly, the rapid growth of Hamburg during the twenty-five years prior to 1914 must be attributed in a considerable degree to the free-port system which enabled her to conduct a large re-export business with Scandinavia and Russia, with Holland and the rest of Europe.

The statistics show that before the War Russia bought 52 per cent. of all her imports from Germany, and it must be borne in mind that much of this traffic consisted of American goods warehoused in the Free Port of Hamburg and re-shipped to Libau, Riga, Helsingfors, or Reval by Baltic steamers. This 52 per cent. credited to Germany included American products from Quaker oats and Remington typewriters to Yale locks. This immensely profitable business would have been difficult and in many cases impossible without the institution of the Free Port with its equipment for handling and warehousing cargo and freedom of re-exportation.

Rotterdam

Rotterdam is about eighteen miles from the North Sea. Vessels bound for Rotterdam enter by way of the New Waterway Canal at the Hook of Holland. There are no bridges across this canal, and ships drawing up to 30 ft. can come up to Rotterdam in about two hours. There is a complete system of railways, extending to all the quays and alongside every warehouse, connected with the main line, so that the quays are in direct railway connection with the interior of Holland, Germany, Switzerland and other countries.

The Port of Rotterdam is equipped with coal-hoists, floating

cranes, hand, steam and electric cranes ranging in lifting power from half a ton to 60 tons. Apart from railways, Rotterdam is connected with Holland and Germany by numerous canals and rivers, and an extensive fleet of river steamers and lighters is employed for the conveyance of goods in all directions.

The best feature of the port is to be found in the " belt " or harbour railway ; the weakest point lies in the shortage of warehouse facilities. With regard to the former, the first railway from Rotterdam was the one to The Hague and Amsterdam, opened in 1847. This road was built and operated by the Hollandsche Company. The line to Utrecht and Emmerich, up the Rhine Valley, was built by the Rhine Company ; and, finally, the railways to the south were built by the Netherlands Government and operated by the State Railway, called for short the " S.S." or " Staat's Spoorweg."

When the Port of Rotterdam began to build rail connection with the water front there were these three Companies—the Hollandsche, the Rhine, and the State Railway—entering the port. In 1890 the State Railway absorbed the Rhine system and to-day only the two remaining companies, the State and the Hollandsche, are to be considered in the belt-line development.

The Port of Rotterdam was managed for the city by the Rotterdamsche Handelsvereeniging. They built the first tracks at the harbour and then turned them over to the State Railway for operation.

That arrangement, however, was not satisfactory, and was later replaced by the present system of municipal ownership and joint operation. The foundations (dykes, bridges, ballast, etc.) are paid for and kept in repair by the municipality ; the superstructure (rails, sleepers, turn-tables, etc.) by the State Railway. The State Railway pays the municipality so much on all freight hauled over the city's belt-line and contributes towards the maintenance of the tracks. When it became necessary to build harbour basins on the other bank of the river, the right of constructing the tracks and operating them was given to the other railway—the Hollandsche—under almost the same form of agreement as that entered into with the State Railway. Each company has " running rights " over the harbour tracks of the other.

The Port of Rotterdam is poorly supplied with warehouse facilities, there being but one on the water's edge.[1] This is perhaps largely due to the old prevailing custom of storing goods in the lower part of the merchant's private houses, which are especially built for this purpose.

There are four kinds of bonded warehouses in Rotterdam, subdivided according to the control exercised by the Custom House authorities :—

1. The free bonded warehouse.
2. Private bonded warehouses.
3. Fictitious bonded warehouses.
4. Warehouses not controlled by the Custom House authorities.

The free bonded warehouse is an institution managed for the account of the municipality under the supervision of a Board of Control, some members of which are appointed by the Crown. The Custom House authorities keep constant watch over these bonded warehouses and superintend the carrying of dutiable goods to them. The duties need only be paid when the goods leave these establishments.

The private bonded warehouses are intended for goods liable to a high excise duty, such as spirits, wine, etc. These warehouses are in private hands, but are entirely under the control of Customs officials ; they must be built in accordance with Customs regulations and nothing can be either stored or released without official authority.

The fictitious bonded warehouses are for goods liable to low duties, such as petroleum, cotton-seed, tobacco, mineral waters, etc. The Customs authorities confine themselves to controlling the quantities stored from time to time. These warehouses, therefore, possess the same advantages as the other kinds, without their drawbacks as regards continual supervision.

The warehouses not controlled by the Customs authorities contain either goods that come in free or goods upon which the duties have been paid.

Antwerp

Antwerp, the principal seaport of Belgium, is situated on the right bank of the river Scheldt, about sixty miles from Flushing.

[1] *Report of the Connecticut Rivers and Harbours Commission*, 1910.

Vessels drawing 30 ft. can come up to Antwerp at high water neaps.

The early history of the port is interesting. Before its capture by the Spaniards under Farnese in 1585, Antwerp was one of the greatest commercial cities in Europe, but it suffered much by that event. In 1648 under the terms of the Treaty of Westphalia, it was stipulated by Spain and Holland that the navigation of the Scheldt should be shut up—a stipulation which was observed until the occupation of Belgium by the French, when it was abolished.

In 1803 Napoleon, who intended to make Antwerp a great naval establishment, undertook the construction of docks on a grand scale for the accommodation of ships of war; and of late years new docks have been opened and spacious sheds have been built on almost all the quays.

Owing to the range of tide—about 13 ft.—between low and high water, there is a landing stage, constructed on the floating pontoon plan, similar to the Prince's Landing Stage at Liverpool.

An extensive system of railway line, amounting to some ninety-seven miles of tracks, connects the quays with all the chief goods stations in the port, forming thereby a complete chain of links between the ship's side and the interior of the country.

We have now made a tour of the six largest seaports of the world and have seen something of the facilities that British ships may find in those places. It must be remembered, however, that there are hundreds of other ports, varying in importance, all over the world, that are regularly served by British ships. Some of them can offer the luxuries of wide wharves and gantry cranes and belt-line railways; others but a few old barges propelled, trireme fashion, by a "howling herd" of cheerful negroes.

Never mind. It is not only upon the box mattresses of the Ritz or Waldorf-Astoria that a good night's rest may be found. Many and many a fine cargo has been picked up by the ship's own tackle out of lighters in an open bay.

"A ship anchored in an open roadstead, with cargo-lighters alongside and her own tackle swinging the burden over the rail is accomplishing in freedom a function of her life. There is no restraint; there is space; clear water around her, and a clear sky above her mast-heads with a landscape of green hills and charming bays opening around her anchorage. She is not

abandoned by her own men to the tender mercies of shore people. She still shelters, and is looked after by, her own little devoted band, and you feel that presently she will glide between the headlands and disappear. It is only at home, in dock, that she lies abandoned, shut off from freedom by all the artifices of men that think of quick dispatch and profitable freights. It is only then that the odious, rectangular shadows of walls and roofs fall upon her decks, with showers of soot." [1]

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[1] *The Mirror of the Sea*, by Joseph Conrad.

CHAPTER XIV

MARINE INSURANCE

It might perhaps be argued that in a book on British Shipping there is no need to insert a chapter on Marine Insurance and that to do so would be like admitting a distant relative or even a domestic servant at a wedding into front pews strictly reserved for "the family."

In the large and happy family of Merchant Shipping, however, Marine Insurance plays a very important part—no matter what the precise relationship may be, whether ancillary or cousinly, and, since hardly a month goes by in a Shipping Company's office without some allusion being made to Marine Insurance, either in respect of the hulls owned by the firm or of those parcels of cargo, varying from coal to typewriter carbons, which are perpetually being shipped to the firm's agents abroad, it seems a proper subject for inclusion in this volume.

Underwriters may claim that their business is of vital importance to the welfare of Merchant Shipping and that without the practice of Marine Insurance, Shipowners would cease to exist. Shipowners, on the other hand, may say that underwriters can only live by vessels, cargoes and freights, and may denounce Insurance Companies as parasites, like bankers and brokers, who neither produce goods nor carry them. The present writer, who is a director of both a Shipping Concern and an Insurance Company, is not going to commit himself. He would prefer merely to remind his readers that there are some old buildings so overgrown with creepers that the masonry is only held together by the ivy. To separate them would cause the collapse of both. Each depends upon the other for the security of its position.

In view, then, of the fact that the student of Merchant Shipping is perforce also the student of Marine Insurance, the sooner

he familiarizes himself with the meaning of the various phrases and initials used, such as T.L.O. (Total Loss Only) and F.P.A. (Free of Particular Average), the wiser he will be.

There must be few people who are not acquainted in some degree with fire and life insurances. The security afforded by insurance to individuals and families is a luxury which nobody in tolerably comfortable circumstances is willing to forego. Hence the great number of companies established for the purpose of affording this security; and hence the knowledge on the part of the public generally of the nature and principles of the engagements into which these companies enter.

But marine insurance is a subject which is of more immediate interest only to merchants, shipowners and underwriters; unless, indeed, we include that relatively small portion of the community who have occasion to emigrate overseas with their household effects, or to fill some official position abroad. The general principles, however, of all insurance are the same; and in treating of marine insurance it will be necessary to notice little beyond such topics as are peculiar to that branch of the business.

The practice of marine insurance, no doubt from the extraordinary hazard to which property at sea is exposed, seems to have long preceded insurance against fire and upon lives. According to several authorities the practice of Marine Insurance in something approaching its present form dates from the fourteenth century.

It has, however, been contended by some writers that the practice of marine insurance is of even greater antiquity and that traces of it may be found in the history of the Punic Wars. Livy mentions that during the second of these Wars the contractors employed by the Romans to transport ammunition and provisions to Spain, stipulated that Government should indemnify them against such losses as might be occasioned by the enemy or by tempests in the course of the voyage. "Impetratum fuit, ut quæ in naves imposuissent ad exercitum Hispaniensem deferenda, ab hostium tempestatisque vi, publico periculo essent."[1]

This passage, however, does not warrant the inference that has been drawn from it by some writers. Insurance is a contract

[1] *Hist.*, Liber XXIII, c.xlix.

between two parties, one of whom, on receiving a certain premium (*pretium periculi*), agrees to take upon himself the risk of any loss that may happen to the property of the other. In ancient no less than in modern times, every one must have desired to be exonerated from the chance of loss arising from the exposure of property to the perils of the sea.

But though in the case referred to, the carriers were exempted from this chance, they were *not* exempted by a contract or by an insurance, but by the Government themselves taking over the risk. The object of the Government was, obviously, not to make profits by dealing in risks, like an insurance company, but rather to induce individuals the more readily to undertake the performance of an urgent public duty.

It is interesting, nevertheless, to observe, in the arrangement mentioned by Livy, as being in force during the Punic Wars, what may have been the germ of the Government War Risks scheme for insurance of vessels during the Great War of 1914–18. This scheme, carried into effect during the earliest days of the War, enabled shipowners to conduct their business, and munitions to be transported to France, Gallipoli and elsewhere, just as during the Second Punic War stores and provisions had been sent to Spain.

It is generally held that a knowledge of the principles of insurance was first brought to England and practised amongst us by the Lombards who were established in London during the fourteenth century.

Villani, a fourteenth-century Florentine historian, says that when the Jews were expelled from France in 1182 they adopted some system of insurance of their property. We do not know what authority he had for making this statement, but the statement itself proves that when Villani wrote, prior to 1348, insurance was an established practice in North Italy.[1] The Lombard merchants of those days had in their hands all the banking and oversea trade of Europe as far as the Crimea on the east, and London and Bruges on the west and north. The Lombard merchants, especially the Genoese, spread all over middle Europe and established themselves as bankers in every country, leaving their mark in commercial centres in street names (as in Lombard

[1] See *Sea Insurance*, by William Gow (Macmillan & Co.).

Street, London) and in commercial terms still existing in the vocabularies of all trading nations.

It is uncertain whether insurance was introduced into England direct from Italy or by way of Flanders. The earliest policies issued in England which have yet been discovered are in Italian, but the subscriptions are in English. The earliest known policies in English are one of 1555 on the *Sancta Crux* "from any porte of the Isles of India of Calicut unto Lixborne" and one of 1557 on the *Ele* from Velis Malega to Antwerp.

Towards the end of the seventeenth century we find the foundations of that world famous institution known as Lloyd's.

To-day Lloyd's is an association of merchants, shipowners, underwriters, and ship and insurance brokers, having its headquarters in a suite of rooms in the north-east corner of the Royal Exchange, London. Originally, it was a mere gathering of merchants who met for purposes of business or gossip in a coffee-house kept by one Edward Lloyd in Tower Street, London, the earliest notice of which occurs in the *London Gazette* of February 18, 1688.

There have been other celebrated bearers of that short Welsh surname; in banking as in politics it has been "a name to conjure with"; but it is doubtful whether any of them has given the name so wide a circulation as the keeper of that coffee-house in which was instituted what has gradually become one of the greatest commercial organizations in the world. The establishment existed in Tower Street up to 1692, in which year it was removed by the proprietor to Lombard Street, in the centre of that portion of the city most frequented by merchants of the highest class. Shortly after this event Mr. Lloyd started a weekly newspaper furnishing commercial and shipping news, in those days an undertaking of no small difficulty. This paper took the name of *Lloyd's News*, and, though its life was not long, it was the precursor of the now ubiquitous *Lloyd's List*, the oldest existing paper, except the *London Gazette*.

In Lombard Street the business transacted at Lloyd's coffee-house steadily grew, but it does not appear that throughout the greater part of the eighteenth century the merchants and underwriters frequenting the rooms were bound together by any rules, or acted under any organization. By and by, however, the increase of marine insurance business made a change of system

and improved accommodation necessary, and after finding a temporary resting-place in Pope's Head Alley, the underwriters and brokers settled in the Royal Exchange in March, 1774. One of the first improvements in the mode of effecting marine insurance was the introduction of a printed form of policy. Hitherto various forms had been in use, and to avoid numerous disputes the Committee of Lloyd's proposed a general form, which was adopted by the members in January, 1779, and remains in use, with but a few slight alterations, to this day.

The two most important events in the history of Lloyd's during the nineteenth century were the re-organization of the association and the passage of an Act in 1871 granting to Lloyd's all the rights and privileges of a corporation sanctioned by Parliament.

As regards the former event, the frequenters of the coffee-house were not permitted to enjoy for long the monopoly of marine insurance, for in the year 1720 Parliament allowed two Marine Insurance Companies to be established in London. These were the Royal Exchange Assurance Corporation and the London Assurance Corporation.

In the year 1810 a Select Parliamentary Committee was appointed to inquire into the monopoly of marine insurance which was held by the members of Lloyd's and the two Marine Insurance Companies. When the repeal of this monopoly was proposed, the underwriters of Lloyd's joined the two Chartered Companies in opposing the scheme; pamphlets were written and speeches made with a view to demonstrating how much merchants and shipowners would suffer were the law to allow them the free use of their discretion in insuring their property, and how much more conducive to their interests it was that they should keep to the old, well-worn path of monopoly.

The select Committee recommended that the monopoly should be abolished, but the House of Commons decided that Lloyd's had rendered a great service to the country during the war with France by supplying the Government with information in regard to maritime matters and, together with the two Marine Insurance Companies, by insuring the arrival at British ports of merchant ships and their valuable cargoes. The House, therefore, resolved that no alteration should be made, but ten years later, in 1820, an Act was passed by which Marine Insurance in this country was thrown open, and since that date many other

marine insurance companies have been formed. These companies, although competitors with the underwriters at Lloyd's for insurance business, are yet supporters of the Corporation and its system of collecting maritime intelligence from and diffusing it to all parts of the world.

As regards the Act of 1871, the three main objects for which the Society of Lloyd's exists are laid down :—First, the carrying out of the business of marine insurance ; secondly, the protection of the interests of the members of the association ; and, thirdly, the collection, publication and diffusion of intelligence and information with respect to shipping. In the promotion of the last-named object an intelligence department has been developed which, for wideness of range and efficient working, has no parallel among private enterprises. By Lloyd's Signal Station Act of 1888, powers were conferred upon Lloyd's to establish signal stations with telegraphic communications ; and by the Derelict Vessels (Report) Act of 1896, masters of British ships are required to give notice to Lloyd's Agents of derelict vessels, which information is published at Lloyd's.

The rooms at Lloyd's are available only to subscribers and members. The former pay an annual subscription of five guineas without entrance fee, but have no voice in the management of the institution. The latter consist of non-underwriting members who pay an entrance fee of twelve guineas, and of underwriting members who pay an entrance fee of £100.

All underwriting members are also required to deposit with the Committee of Lloyd's securities in proportion to the amount of business that they transact and all underwriters' accounts are audited annually by approved Auditors, who report the result of these Audits to the Committee.

The management of the establishment is delegated by the members to certain of their number selected as a "Committee for managing the affairs of Lloyd's." With this body lies the appointment of all the officials and agents of the institution, the daily routine of duty being entrusted to a Secretary and a large staff of clerks and other assistants.

The mode employed in effecting an insurance at Lloyd's is simple. The business is done mainly by brokers who write upon a slip of paper the name of the ship, the nature of the voyage, the subject to be insured, and the amount at which it is valued. If

the risk is accepted, each underwriter subscribes his name and the amount that he agrees to take or underwrite, the insurance being effected as soon as the total value is made up.

Thus the larger part of the insurances at Lloyd's is effected by brokers. Some merchants do transact their own business. But the majority of merchants and shipowners give their orders for insurance to others, who undertake the work for them and are responsible for its proper management. These latter persons are called marine insurance brokers.

Little need be said about the circumstances that influence the rate of premium demanded by the insurers. It must be obvious that premiums will vary according to the seasons, the class and quality of the vessel, the known character of the shipowners, the nature of the cargo and voyage, and the state of political relations. All these are matters upon which each individual underwriter must exercise his own discretion, partly from general experience and partly from particular information; exaggeration of risk and consequent exorbitancy of premium for any length of time are out of the question, where so many underwriters in addition to the companies are in competition with one another, and where merchants and shipowners have the means of effecting their insurances abroad.

The English law of Marine Insurance, as it now is, may be said to have been created by Lord Mansfield, who became Chief Justice of the King's Bench in 1756. He made use of all the Continental ordinances and codes extant in his day, accepting his legal principles largely from them.[1] The customs and practices of trade he learnt from mercantile special jurors, who in the course of time became experts in Marine Insurance matters. Until 1906, however, there was neither code nor ordinance to refer to, for though in 1894 Lord Herschell had introduced his Marine Insurance Bill in which he had endeavoured "to reproduce as exactly as possible the existing law relating to marine insurance," and though after Lord Herschell's death, Lord Chancellor Halsbury had taken up the Bill and introduced it in the House of Lords in 1899 and again in 1900, it was always blocked in the House of Commons, until 1906, when it was taken up by Lord Chancellor Loreburn in conjunction with Lord Halsbury. This Act "to codify the law relating to Marine Insurance" known

[1] *Sea Insurance*, by W. Gow.

by its short title as the Marine Insurance Act, 1906, was finally passed by both Houses and became law on January 1, 1907.

In the Act are defined the meanings of those words and phrases, used in the language of underwriters, that are so puzzling to beginners, and the student of the subject of marine insurance would be well advised to read through the various sections of the Act in order to see what sort of a contract it is into which the merchant or shipowner (or broker) on the one hand and the underwriter on the other are entering.

The merchant or shipowner in the course of his business is faced with the risk of loss or damage from certain perils or dangers. This risk he may either "run" entirely himself; or he may take a proportion of the risk himself, leaving the remainder to be insured by an underwriter; or he may wish to have the whole liability assumed by an underwriter. The underwriter assumes the liability for a certain agreed sum of money. Thus a contract of Marine Insurance is a contract of indemnity "whereby the insurer undertakes to indemnify the assured in manner and to the extent thereby agreed, against marine losses, that is to say, the losses incident to marine adventure."

A contract of Marine Insurance is a contract based upon the utmost good faith, and if the utmost good faith be not observed by either party, the contract may be avoided by the other party. Every material circumstance known to the Assured which would influence the judgment of a prudent insurer in fixing the premium or determining whether he will take the risk must be disclosed before the contract is concluded.

In addition to the perils of the sea there is a certain amount of land risk, at some particular stage of the voyage or in connection with the launch of a ship, which also has to be faced. The Act makes special provision for these mixed sea and land risks: "a contract of marine insurance may, by its express terms, or by usage of trade, be extended so as to protect the assured against losses on inland waters or on any land risk which may be incidental to any sea voyage." Similarly, under the Act, underwriters are allowed to protect shipbuilders and shipowners against the hazards involved during the construction, launch or fitting out of vessels.

The Act defines the meaning of marine adventure and maritime perils.

There is held to be a marine adventure in every case where—

(1) Any ship, goods or other moveables are exposed to maritime perils. Such property is in the Act called "Insurable Property."
(2) The earning of any freight, passage-money, commission, profit or other pecuniary benefit is endangered by the exposure of insurable property to maritime perils.
(3) Any liability to a third party may be incurred by the owner of, or other person interested in or responsible for, insurable property by reason of maritime perils.

By the words "maritime perils" are meant the perils consequent on or incidental to the navigation of the sea, that is to say, perils of the seas, fire, war perils, pirates, rovers, thieves, captures, seizures, restraints and detainments of princes and peoples, jettisons, barratry, and any other perils, either of the like kind or which may be designated by the policy.

Having seen what adventures may be covered by Marine Insurance and what is the nature of the maritime perils against which protection is given by Marine Insurance, we must now pass on to find out what persons are entitled to be insured. The contract being a contract of indemnity against maritime perils, it is evident that no one can derive benefit from it who has not some pecuniary interest exposed to those perils and the Act therefore provides that every contract of marine insurance by way of gaming or wagering is void. A contract of marine insurance is held to be a gaming or wagering contract—

(*a*) Where the assured has not an insurable interest and the contract is entered into with no expectation of acquiring such an interest.
(*b*) When the policy is made "interest or no interest," or "without further proof of interest than the policy itself," or "without benefit of salvage to the insurer," or subject to any other like term.

The assured must be interested in the subject matter insured at the time of the loss, though he need not be interested when the insurance is effected. Proof of ownership is an essential preliminary to the recovery of a claim. If Mr. A. were to insure his ship for the space of twelve months and at the end of six months were to sell her to Mr. B., Mr. A.'s interest in the vessel having ceased, so also ceases his insurer's liability unless the policy be sold with the ship. Mr. B., if he wishes to be protected, must make a new insurance or purchase Mr. A.'s policy. While, therefore, proof of ownership has to be exhibited, in general

practice no difficulty arises from this, because the fact of ownership is sufficiently well known. The bill of lading is, in most cases, satisfactory proof that the cargo was on board, as well as of the amount of freight.

The insurer under a contract of marine insurance has an insurable interest in his risk and may re-insure in respect of it. Unless the policy otherwise provides, it is permitted to the underwriter of any marine risk to re-insure the same in whole or part, and the original assured has no right or interest in the re-insurance which his underwriter may effect.

Reinsurance is defined to be a contract by which, in consideration of a certain premium, the original insurer throws upon another the whole or part of the risk for which he has made himself responsible to the original assured to whom, however, he alone remains liable on the original insurance.[1] Such reinsurance is totally distinct from and unconnected with the original insurance ; the object of reinsurance being to enable the underwriter to indemnify himself against the consequences of his own act whenever he finds he has undertaken a risk on imprudent terms, or bound himself to a greater amount than he may be able to discharge. This means of protection, formerly illegal in this country, was made lawful by 27 and 28 Victoria, c. 56., s. 1 (t), and is now incorporated in the Marine Insurance Act, 1906, Section 9, and has resulted in a very great development of this branch of Insurance, companies having been formed, especially on the Continent, to deal exclusively with it.

There are different classes of reinsurance, such as—

1. Specific reinsurances against particular risks wholly or in part, such as the risk of total loss only, fire, collision, etc.

2. Reinsurance covers applying to certain classes of risks, such as hulls ; particular cargoes, such as cotton, sugar, wheat, etc., for a period of time, and

3. Reinsurance treaties whereby the original underwriter reinsures the whole or certain sections of his business *en bloc*, usually for one or more years.

In the latter event, the ceding underwriter is enabled to accept much larger lines than he intends to retain, and as he usually stipulates for an overriding commission and profit commission on the result of the business from his reinsurers, he is in a position

[1] *See* Arnould's *Marine Insurance* (Stevens & Sons).

to make a larger profit or sustain a smaller loss than his reinsurers to the extent of these commissions, which is a distinct disadvantage from the market point of view, as it tends to an unfair reduction in rates and possibly even less discrimination in the acceptance of the risks. The advantage of these treaties is, of course, that by spreading the risks over a wider area, a much smaller interest is obtainable in a larger number of risks which, on the law of averages is much more likely to result in a net profit.

While it is not as a matter of law necessary that the policy of reinsurance should appear on the face of it to be a contract of reinsurance, it is an almost universal practice in English policies to insert a clause specially drawing attention to the fact, such as "Being a reinsurance of and to pay as may be paid thereon." This clause, however, does not mean that any loss paid by the original underwriter is recoverable, for if the original insurance was void in law, the reinsurers are not liable even though the original insurers may have paid, and further the reinsurers are entitled to demand full proof that the original underwriter was strictly liable for the loss before they can be called upon to pay him. On the other hand, it is not necessary that the original underwriter must have paid the claim before recovering from his reinsurer, it is sufficient for him to show that he is liable to enable him to recover from his reinsurer.

Other persons, besides the owners of vessel and cargo, entitled to be insured are lenders of money on bottomry in respect of the loan; the master or any member of the crew of a ship in respect of wages; in the case of advance freight, the person advancing the freight; where the subject-matter is mortgaged, the mortgagor and the mortgagee.

In addition to finding out the fact of the genuine and legal insurable interest and what persons are entitled to be insured, it is also necessary to ascertain the insurable value of the subject-matter insured.

The question is dealt with in Section 16 of the Marine Insurance Act, and the measure of insurable value is there defined. Where no special contract is made between the assured and underwriter, the insurable value is fixed by the law as follows:—

(1) In insurance on SHIP, her value at the commencement of the risk, including outfit, provisions and stores for the officers and crew, money advanced for seamen's wages, and any other disbursements

incurred to make the ship fit for the voyage, *plus* the charges of insurance upon the whole.

Note.—The insurable value, in the case of a steamship, includes also the machinery, boilers, coals and engine stores, if owned by the assured, and, in the case of a ship engaged in a special trade, the ordinary fittings necessary for that trade.

(2) In insurance on FREIGHT (whether paid in advance or not) the gross amount of the freight at the risk of the assured, *plus* the charges of insurance.

(3) In insurance on GOODS, the prime cost *plus* the expenses of and incidental to shipping, and the charges of insurance.

(4) In insurance on any other subject-matter, the amount at the risk of the assured when the policy attaches, *plus* the charges of insurance.

The law provides that a contract of marine insurance is considered to be concluded when the proposal of the assured is accepted by the underwriter whether the policy be then issued or not; and for the purpose of showing when the proposal was accepted reference may be made to the slip or covering note or other customary memorandum of the contract, although it be unstamped.

As we have already seen, the broker usually offers risks by means of an abbreviated description of the risk in question called a *slip*. The underwriter signifies his acceptance of the whole or part of the venture by signing or initialling this slip, putting down the amount for which he accepts liability, or by signing and delivering to the assured (whether principal or broker) a similar document made out in his own office called a *covering note*. "These documents," says Gow, "are merely first sketches of the contract—memoranda meant to serve as the groundwork of the contract in its final form, but so fragmentary and incomplete that they can only be explained when taken in conjunction with the complete text of the final contract." [1]

These slips or covering notes are of no legal value, but they are treated by the insuring public with the most jealous care. They are not accepted in any English Court as evidence for anything but the date of the acceptance of a proposal to insure.

It is the policy and the policy alone that is accepted as evidence. The Act prescribes that a contract of marine insurance is inadmissible in evidence unless it is embodied in a marine policy; the policy may be issued and executed either at the time when the contract is concluded or afterwards.

[1] Gow's *Sea Insurance.*

Certain matters must be specified in the policy, namely :—

(1) The name of the assured.
(2) The risk covered, that is, both the subject-matter insured and the perils insured against :
(3) The voyage, or period of time covered by the insurance.
(4) The sum or sums insured.
(5) The name or names of the underwriters.

A marine policy must be signed by or on behalf of the insurer, and where a policy is subscribed by two or more insurers, as, for example, in the case of underwriters at Lloyd's, each subscription, unless the contrary is expressed, constitutes a distinct contract with the assured.

Policies are divided into :—

(*a*) Voyage Policies, in which the subject-matter is insured from one place to another or others.
(*b*) Time Policies, in which the subject-matter is insured for a definite period of time.

A contract for both voyage and time may be included in the same policy. The law provides that a time policy which is made for any time exceeding twelve months is invalid, and so it comes about that once a year at least in a shipowner's office the question of the insurance of his fleet is examined. He will then scrutinize the list of his vessels, the amounts of their values, the proportion (if any) of the risk which he himself will take, the terms, the rates of premium and the list of Insurance Companies with whom his brokers place the business. If he owns a large fleet he may find it convenient to divide the vessels into two groups, one half running off in June, the other in December. A beginner in a shipping office should try to make himself familiar with the details of the insurance of his firm's vessels.

Policies are further divided into :—

(*a*) Valued Policies.
(*b*) Unvalued Policies.
(*c*) Floating Policies.

(*a*) A Valued Policy is a policy which specifies the agreed value of the subject-matter.

(*b*) The law allows the assured to insure for a definite sum his interest in the subject-matter without stating any value attributed by him to that subject-matter. A policy of this nature is termed an Unvalued Policy ; it does not specify the value of the subject-matter insured, but, subject to the limit of the sum insured,

leaves the insurable value to be subsequently ascertained. Unvalued Policies are nowadays very rare.[1]

(*c*) A Floating Policy is one on which the wording is made wide enough to cover the cargo by whatever vessel or vessels it may be shipped, the nature of the cargo itself being either specifically described or expressed in language broad enough to include the various classes of insurable property which the assured wishes the underwriter to cover. A Floating Policy describes the insurance in general terms and leaves the name of the ship or ships and other particulars to be defined by subsequent declaration.

As regards the premium, unless otherwise agreed, the duty of the assured or his agent to pay the premium, and the duty of the underwriter to issue the policy, are concurrent conditions and the underwriter is not bound to issue the policy until payment of the premium.

Where a marine policy is effected through a broker, the broker is directly responsible to the underwriter for the premium, and the underwriter is directly responsible to the assured for the amount which may be payable in respect of losses.

In the foregoing pages dealing with the Marine Insurance Act, we have noticed various matters connected with the insurance of a marine venture, such as the interests insurable, the value insurable, the different kinds of policies and the liability for payment of premiums. We must now proceed to consider the second great section of knowledge bearing on Marine Insurance, which is the cause as well as the object of the whole business of Marine Insurance, namely, the consideration of the various sorts of loss, damage and liability attaching to the contract of Marine Insurance. Afterwards, we shall consider the different kinds of loss and damage, as well as the responsibility for sacrifices that may fall on the interest assured and the extent to which the underwriter binds himself to bear that responsibility.

The first kind of loss to be considered is that caused by a peril of the seas. According to one definition: "Perils of the seas comprehend those of the winds, waves, lightning, rocks, shoals, collision, and in general all causes of loss and damage to the property insured arising from the elements and inevitable accidents, though sometimes considered not to include capture and detention."

[1] *Sea Insurance*, by W. Gow, p. 24.

The only other peril of the elements specified in the ordinary form of policy is that of fire. It has been held that if a ship is destroyed by a fire it is of no consequence whether this is occasioned by a common accident or by lightning and that in the case of a fire loss caused by negligence of the mate there is no authority in English law for holding underwriters not liable for the loss. One form of fire arising in the fuel, stores or cargo of a vessel, but often affecting the hull as well, is what is called spontaneous combustion, generally arising from a damaged state of the cargo or from some inherent quality. It appears that underwriters on goods are not liable for damage done to those goods by a fire arising from the condition in which they were shipped. But the underwriters are liable for the damage done by the fire to other goods in the same hold. The freedom from liability of the underwriters, however, on the harmful cargo must be taken with a certain limitation. If the cargo is notoriously liable to combustion, such as certain cargoes of coal, and the rate of premium demanded is obviously based on the excessive liability of this class of cargo to fire, then the underwriter would be held to have had this fact in mind when he accepted the risk.

The rest of the perils may be naturally grouped into two classes :—

(1) Perils arising from the action of persons on board the insured vessel, namely, jettison and barratry.
(2) Perils arising from the action of persons not on board ; namely, men-of-war, enemies, pirates, rovers, thieves, letters of mart and counter-mart, surprisals, takings at sea, arrests, restraints of kings, princes, and peoples of whatever nation, condition or quality.

As regards the first group, jettison has been described as " the throwing overboard of a part of the cargo or any article on board of a ship, or the cutting and casting away of masts, spars, rigging, sails, or other furniture for the purpose of lightening or relieving the ship in case of necessity or emergency."

We shall have more to say about this particular peril of jettison when we come to consider the question of general average.

Barratry is more difficult to define. The schedule to the Marine Insurance Act gives the authoritative explanation that it includes every wrongful act wilfully committed by the master or crew to the prejudice of the owner or, as the case may be, the charterer. The following are cases which the Courts have

declared to be barratrous: scuttling a ship; intentionally running a ship ashore, with the object of throwing her away; setting a ship on fire; abandoning the voyage on which the venture started; illegally selling a vessel and cargo and appropriating the proceeds; deviating from a vessel's proper course for the captain's private business or convenience. This last example shows the distinctive feature of barratry. Deviation in itself is not barratrous; deviation with criminal intent is, but the complicity of the owner in any malpractice would deprive it of the character of barratry.

As regards the perils arising from the actions of persons not on board the insured vessel, little explanation is required; "men-of-war" are obviously the authorized armed sea force of a nation. The only risk from men-of-war would be from those under an enemy flag, and therefore the "enemies" mentioned in the foregoing list of perils may have been intended to designate privateers and other foes not belonging to the Government. The very word "privateer" calls up memories of a by-gone age and the same may be said of "letters of mart" by which Kings once granted to their subjects a limited form of commission to privateer. To this picturesque band belong also "pirates and rovers." The words "surprisal" and "takings at sea" were used in an earlier time than our own. In the Great War the word "capture" was used instead.

So much for the different kind of perils and adventures. We must now consider the question of the losses caused by those perils and see what provision the Marine Insurance Act makes for those losses.

The first points that the student must understand are that there are two kinds of loss—total loss and partial loss; and two kinds of total loss—"actual" and "constructive."

Section 56 of the Act puts the case very clearly and simply. A loss may be either total or partial. Any loss other than a total loss is a partial loss. A total loss may be either an actual total loss or a constructive total loss.

It is important to grasp the difference between actual and constructive total losses. Actual total loss of a ship or her cargo may occur through any of the major perils attending navigation, such as sinking, burning or stranding. There are, however, many cases in which a vessel is not *actually* lost because she may

still be visible ; but she is " as good as lost " because the expense of salving and repairing her would eat up the whole of her value.

To meet the situation the Act prescribes that there is a constructive total loss where the subject-matter insured is reasonably abandoned on account of its actual total loss appearing to be unavoidable, or because it could not be preserved from actual total loss without an expenditure which would exceed its value when the expenditure has been incurred.

In his book on *Sea Insurance*, Mr. Gow has given us the following illustration of a Constructive Total Loss (C.T.L.) :—

" It has repeatedly occurred that a ship has run on rocks and has damaged herself seriously below the water-line, although she sits upright and to the landsman's eye looks quite sound or only slightly damaged. But any one experienced in the building, repairing, or owning of ships knows that if she were removed from that position she would either sink in deep water or cost so much to bring to a place of safety and repair, that to incur removal and repair would simply mean throwing good money after bad. The natural course for the owner in these circumstances to adopt is to turn to his underwriters and say : ' I believe this ship is as good as lost, I tender her to you and ask you to pay me the sum insured on your policies, as I am not willing to take the risk of her being salved and repaired at a cost greater than her value when she is salved."

To return to the Act, we find that where there is a constructive total loss the assured may either treat the loss as a partial loss, or abandon the subject-matter to the underwriter and treat the loss as if it were an actual total loss. Where the assured chooses to abandon the subject-matter he must give the underwriter notice of abandonment. If he fails to do this, the loss can only be treated as a partial loss.

In examining the question of losses, we have so far been considering cases of total loss only, whether actual or constructive. We now come to the second kind of loss, namely the partial loss. Just as we found that losses were subdivided into " total " and " partial," and that total losses were subdivided into " actual " and " constructive," so also we find that partial loss are subdivided under the Act into two classes, Particular Average Loss and General Average Loss.

" Average " is a word that is constantly being used in a shipping office as well as in the underwriter's and it may therefore be convenient to explain its meaning and also show the difference between " general " and " particular " average.[1]

[1] See *General Average*, by Richard Lowndes (Stevens & Sons).

Average, in modern law, is the term used in maritime commerce to signify "damages or expenses resulting from the accidents of navigation." Average is either *general* or *particular*. The difference between the two has been tersely defined by describing general average as the "Act of Man" and particular average as the "Act of God."

General average arises when sacrifices have been made, or expenditure incurred, for the preservation of the ship, cargo and freight, from some peril of the sea or from its effects.

Losses such as the following come under general average and illustrate the meaning of the term:—Jettisoning of cargo; cutting away masts; slipping anchor and cable; damage to any part of a vessel in the endeavour to float her when stranded. The average is termed "general" because the sacrifice is borne generally by all interested in the ship, cargo and freight, each one's share of the sacrifice being proportional to the value he had at stake.

For instance, where a ship runs ashore and, in order to lighten the vessel and get her off, part of her cargo is thrown overboard or jettisoned, as it is called, then there will be general average. It implies a subsequent contribution from *all* the parties concerned in the adventure (namely, ship, cargo and freight) rateably to the values of their respective interests to make good the loss thus occasioned.

The object of the law of general average is to put one whose property is sacrificed upon an equal footing with the rest, not upon a better footing. Thus, if boxes of soap to the value of £1,000 have been thrown overboard for the general safety, the owner of the soap must not receive the full £1,000 in contribution. He himself must bear a part of it, for the soap formed part of the adventure for whose safety the jettison was made; and it is owing to the partial safety of the adventure that any contribution at all is received by him. He, therefore, is made to contribute with the other saved interests towards his own loss.

Particular average signifies the damage or partial loss happening to the ship, cargo or freight by some fortuitous or unavoidable accident, such as damage to hull or machinery through fire, collision, or stranding, or damage to cargo by storms, capture, wet or rotting. A particular average loss, unlike a general average loss, is borne only by the underwriter of the interest on

which it falls. The term "average" originally meant what is now distinguished as general average; and the expression particular average, although not strictly accurate, came to be afterwards used for the convenience of distinguishing those damages or partial losses for which no general rateable contribution from all parties could be claimed.

Although nothing can be more simple than the fundamental principle of general average, that a loss incurred for the advantage of all the co-adventurers should be made good by them all in equitable proportion to their stakes in the adventure, the application of this principle to the varied and complicated cases which occur in the course of maritime commerce has given rise to many diversities of usage at different times and in different countries.

The difficulty of bringing together the rules in force in the several maritime countries has been to a large extent overcome —not by legislation but by framing a set of rules covering the principal points of difference in such a manner as to satisfy, on the whole, those who are practically concerned and to lead them to adopt these rules in their contracts of carriage and insurance.

Congresses dealing with the subject were held in Glasgow, under the presidency of Lord Brougham, in 1860; in London (1862); at York (1864), when a body of rules known as the York Rules was agreed to; at The Hague (1875); Bremen (1876); and at Antwerp (1877), when some changes were made in the York Rules. Thus altered the body of rules was styled the York-Antwerp Rules. A further conference was held in Liverpool (1890), when important changes were introduced, and finally, in 1892, at a Conference held at Genoa, it was formally declared that the only international rules of general average having the sanction and authority of the "Association for the Reform and Codification of the Law of Nations" were the York-Antwerp Rules as revised in 1890, and that the original rules were rescinded.

Perhaps it may be thought that we have stressed with unnecessary weight the subject of these international Rules, but the writer remembers that very early in his commercial career he saw in a letter some reference to the York-Antwerp Rules and was unable for some time to obtain an answer as to why those two cities were specially mentioned.

As regards the responsibility for the sacrifices that may fall on the interest assured, the liability to pay general average contributions falls primarily upon the owner of the contributing interest—ship, goods or freight. But in practice the contributions are paid by the insurers of the several interests. Merchants have only to concern themselves with the subject if they are uninsured, and yet in an ordinary policy of insurance there is no express provision requiring the underwriters to indemnify the assured against this liability. The liability is a common-law liability, the Act providing that, subject to any express provision in the policy, where the assured has paid, or is liable to pay, a general average contribution, he may recover therefor from the underwriter.

The policy commonly contains clauses which recognize such an obligation, as, for example, a warranty against average " unless general " ; or an agreement that general average shall be payable " according to York-Antwerp Rules " ; but it does not directly state the obligation. That is assumed. The explanation seems to be that the practice of the underwriter to pay the contribution has been so uniform and his liability has been so fully recognized that express provisions were unnecessary.

We have examined the different classes of losses, both total and partial, together with their subdivisions, and we now come finally to consider what is called in the Act " the Measure of Indemnity," that is to say, the sum which the assured can recover in respect of a loss on a policy by which he is assured.

The Act provides that where there is a loss recoverable under the policy, the underwriter or each underwriter, if there be more than one, is liable for such proportion of the " measure of indemnity " as the amount of his subscription bears to the value fixed by the policy in the case of a valued policy, or to the insurable value in the case of an unvalued policy.

It would seem easy enough in the case of a total loss, arising from named perils, to fix the amount recoverable by the assured from the underwriter.

In the case of a partial loss, however, it is obviously more difficult. The law prescribes, as regards the vessel, that where she is damaged, but is not totally lost, the measure of indemnity is as follows :—

(1) Where the vessel has been repaired the assured is entitled to the reasonable cost of the repairs, less the customary deductions, but not exceeding the sum insured in respect of any one casualty.
(2) Where the vessel has been only partially repaired the assured is entitled to the reasonable cost of such repairs, computed as above, and also to be indemnified for the reasonable depreciation, if any, arising from the unrepaired damage, provided that the aggregate amount shall not exceed the cost of repairing the whole damage, computed as above.
(3) Where the ship has not been repaired and has not been sold in her damaged state during the risk, the assured is entitled to be indemnified for the reasonable depreciation arising from the unrepaired damages, but not exceeding the reasonable cost of repairing such damage, computed as above.

Now it has been said that " people are never so unreasonable as when they are discussing what is reasonable," yet here, in each of the above quoted sub-sections of the Act, we find the word " reasonable " and it might well seem that grounds for dispute are thereby provided. Also, it might be supposed that the words " less the customary deductions " open the doors of argument.

It must be remembered, however, that the word " reasonable," as regards repairs, is stripped of a good deal of its vagueness by the practice of obtaining tenders from more than one firm. In cases where it is possible to get repairs carried out by two or more firms, it would certainly not be " reasonable " to put the work into the hands of any one firm without asking for tenders from others. As regards the " customary deductions," Phillips, in his *Law of Insurance*, says, " It is a general *custom*, in adjusting losses on the vessel, to deduct one-third of the expense of labour and new materials in repairing or replacing parts of the vessel injured or destroyed by the perils insured against, on account of the new or repaired part being better than the old." This is designated The Allowance of " One-Third New for Old." There is, in fact, a whole mass of commercial usage of great antiquity on the subject.

Again, it might appear that in cases where, as frequently happens, repairs or re-fit on owner's account are carried on at the same time and by the same workmen who are engaged upon repairs resulting from sea peril for which underwriters are liable, it might be difficult to separate the items and fix the measure of indemnity.

But here again and above all it must never be forgotten that Marine Insurance is a business whose roots are very deep. The form of policy now used has been adopted by English underwriters generally for many, many years, both by private underwriters at Lloyd's and elsewhere in London, Liverpool, Glasgow, Hull, Newcastle, Cardiff and Belfast, as well as by all the Marine Insurance Companies at their Home and Overseas offices and agencies. It has stood the test of time. What exactly constitutes the full force and effect of the policy has been discovered from the decisions of the Law Courts in the course of over three hundred and sixty-five years during which this form of policy has prevailed. As Mr. Gow says : " In dealing with the measure of indemnity granted by a marine insurance policy, we are dealing with a tradition which can be traced back to August, 1555."

CHAPTER XV

TRADE ROUTES AND CARGOES

At the time of the Paris Peace Conference in 1919, when the whole world was watching the doings and decisions of "the Big Four," an official in the Ministry of Shipping remarked to the present writer that as far as Great Britain was concerned, the Passenger Liner business was in the hands of a Big Five, namely, Lord Inchcape, Sir Owen Philipps, Sir Alfred Booth, Sir John Ellerman and Sir Frederick Lewis. The passenger business is, however, not the only trade that has become concentrated in the hands of a Big Five. Banking and Drapery—to mention only two other branches of industry—have, we are told, already moved in the same direction, and there are many men who hold the view that the tendency of modern commerce is towards combination and that the day of the relatively small independent firm is almost finished. Be that as it may, the Government official's remark about the Big Five in Shipping was true enough, for the steamers controlled by those five individuals were to be found on all the main trade routes between this country and Egypt, India, the Far East, South Africa, Australia, North America and South America.

It is not, however, with individuals that we are mainly concerned in this chapter, because individuals come and go, but rather with the trade routes and with the companies whose vessels are employed in those services. It might be argued perhaps that companies, like individuals, come and go, and instances might be given of certain lines that have dropped out of existence, but in the main, during the last fifty years, the leading steamship lines, though they have been controlled by different individuals, from different offices and even in different cities—in Glasgow or Liverpool or London—have nevertheless

in a large measure kept their identity, their house flags, and the colour of their funnels.

Some of these companies in the course of time have extended their spheres of operation. For example, the Royal Mail Steam Packet Company was originally formed to carry on a Mail Service with the British West Indies; later on services were added between England and Brazil and the River Plate; more recently the company have entered the North Atlantic trade between Southampton and New York.

To give a list of the various steamship lines and the places that they occupy in the different trade routes may seem in the nature of an advertisement, but a book of this sort could hardly be considered complete without such a list, because, in the first place, those steamship lines, whether we appreciate the fact or not, do play a great part in our national existence; and, secondly, the beginner in a shipping office will find it useful, if not essential, to know with some degree of accuracy the different services of the various established lines.

In the opening chapter of his excellent book on Seaborne Trade,[1] Mr. Fayle has given us a list of the main trade routes and in subsequent chapters he mentions the different kinds of cargo carried on those routes. The student of the subject would be well-advised to read that volume, for while Mr. Fayle is mainly concerned with the story of sea-borne trade during the Great War, he has described the pre-war conditions as regards trade routes, and cargoes, and we now know that, as far as British Shipping is concerned, the post-war arrangement of trade routes is almost the same.

The question arises in what order to deal with these main trade routes, and perhaps the simplest plan is to follow the example set by the newspapers and take the list as we find it, for example, in *The Times*. Curiously enough, the trade routes, like the shipowners already mentioned, are grouped in a Big Five.

The "Big Five" routes are:—

1. Egypt, India and the Far East.
2. Australia and New Zealand.
3. Canada and the United States.

[1] "History of the Great War based on Official Documents." By Direction of the Historical Section of the Committee of Imperial Defence. *Seaborne Trade*, Vol. I, by C. Ernest Fayle (John Murray).

4. Africa (West, South and East).
5. South America.

In addition to these great trunk lines there are also the North Pacific route, from the Far East to the West Coast of America, and the Australian-American route across the Pacific, both of which have been extended owing to the opening of the Panama Canal, though these routes are of relatively minor importance, as compared with the Big Five, as far as British Shipping is concerned. There is also an important route between North and South America. Then there are, as Mr. Fayle points out, "innumerable cross tracks and branches" which supplement the main routes and assist in the distribution of their trade. There are the short sea voyages to and from Norway, the North Sea and Baltic ports, the Mediterranean, the Atlantic coast of Europe, islands in the Atlantic, such as Madeira, and, finally, there are the Coastal trades of the United Kingdom and the Cross-Channel Services.

We might, for the purpose of this chapter, have taken a list of the British liner companies such as may be seen in *Whitaker's Almanack*, or may be extracted from the advertisement sheets of newspapers, and examined the contents of the holds of vessels belonging to those companies. By such means it might seem that we should arrive at the facts about the trade routes and their cargoes; it must be remembered, however, that some companies, such as the Royal Mail Steam Packet Company, whose case we have already noticed, the White Star and the Harrison Lines—to name but three—have vessels employed on more than one trade route, and therefore the more orderly geographical method of scrutinizing the Big Five routes and seeing what vessels are to be found in them would appear better than studying the steamship companies *seriatim* and seeing where their vessels trade.

Thus, we will begin with the first of the Big Five trade routes—*Egypt, India and the Far East.*

The British companies whose vessels may be found on this trunk line are the Aberdeen, Anchor-Brocklebank and Bibby Lines, the various branches of the British India Steam Navigation Company, the Clan Line, the Ellerman Combination, the Blue Funnel, Glen, Harrison, Henderson, Moss, P. & O. and Wilson lines.

This trade route may be conveniently divided into three sections. First, the Mediterranean Section from the United Kingdom ports through the Straits of Gibraltar to Egypt; secondly, the Middle Section from the Suez Canal to India; and, thirdly, the Far Eastern Section. Vessels, therefore, belonging to the companies that do not trade East of Suez, such as the Moss Line, are only to be found in the first section of the route; others, such as steamers of the Anchor Line, which go to India, but not to the Far East, make voyages in the first two sections; while companies, such as the Blue Funnel and P. & O., with services in the Far Eastern Section, send their ships all the way along the whole of this trunk route, to and fro, through the Mediterranean, through the Suez Canal, through the Middle and Eastern Sections.

Outwards, from the United Kingdom, the British products, conveyed eastward, are mainly composed of textiles, iron and steel and other manufactured goods carried as parcels in liner cargoes. Coal is carried to the Mediterranean ports and Egypt, but coal is so important a factor in relation to the whole of our British overseas trade that we are treating it as a separate general subject at the end of this chapter, apart from the question of particular trade routes.

Homewards, the cargoes from Egypt and the East are large in quantity and varied in nature.

Taking the Mediterranean Section first, the exports from Egypt to this country are chiefly cotton, cotton-seed, hides and skins.

The Second or Middle Section of the route covers the trade of the East from Aden to Singapore with its centre at Colombo. The Third, or Far Eastern Section, comprises the traffic of the China and Japan Seas, the Philippines, and the Malay Archipelago.[1]

From the Middle Section the cargoes shipped to the United Kingdom are mainly wheat and jute from India; tea from India and Ceylon; tin from the Malay Peninsula; rubber from Malaya and Ceylon; rice from India and Burma; while barley, oil-seeds, skins and hides are other items in the Indian export trade.

In the Far Eastern Section of the route the British liner companies are the Blue Funnel, Glen, and P. & O. The principal

[1] *Seaborne Trade*, page 119.

cargoes are silk, tea, straw plait, and copper from China and Japan, hemp from the Philippines, rubber from the East Indies, sugar from Java and beans from China.

Such, then, are the main cargoes that we should discover in British vessels homeward bound on this trade route if we were to remove the hatch-covers and look inside the holds.

It must not be imagined, however, that the liner companies whose names have been mentioned above enjoy unmolested the carrying of those cargoes. Far from it. There are other pebbles on the beach. There is the severe competition of many foreign lines to be met; and there is the tramp tonnage, by which the wheat and jute of India, the Burmese rice crops and the sugar from Java are lifted. Tank steamers are also employed in this trade route for the conveyance of oil from Borneo, Mesopotamia and elsewhere.

The second place in our list of the Big Five trade routes is filled by *Australia* and *New Zealand*.

In this trade the outward cargoes from Great Britain are in the main similar to those enumerated in the case of the Indian and Eastern trade—textiles and manufactured goods—while the imports into the United Kingdom are wool, frozen meat, grain and butter, which account for a large share of the homeward traffic. With the exception of wheat, these are all mainly liner trades. The principal liner companies in this trade route are the Blue Funnel, Commonwealth and Dominion, the Commonwealth Government Line, Federal, New Zealand Shipping Company, Orient, P. & O., Shaw Savill and Albion Line and the White Star Line.

The Australian and New Zealand route is really a double route, or a bow with two strings, because while part of the traffic, including the bulk of the mail and passenger service and cargoes in respect of which a quick passage is desired, goes through the Suez Canal, part, on account of the heavy dues imposed by the Canal and for other reasons, follows the old route round the Cape of Good Hope.

Some of the lines which make use of the Cape route are the Aberdeen, Blue Funnel, and White Star Lines.

There is also a third route through the Panama Canal, which is used by the White Star, Shaw Savill and Albion Lines, and by the New Zealand Shipping Company. In the same way a

service to Fiji and Australia, also *via* Panama, is maintained by the Commonwealth Government Line.

In connection with the Australian trade special mention must be made of the inauguration during the War of the services of the Commonwealth Government Line. A few years ago, towards the end of the Great War, and immediately after it, while vessels were still under Government requisition and freights high, there was a good deal of talk about the nationalization of the British Mercantile Marine. With the subsequent fall in freights, which occurred in 1920 and 1921, little more was heard in England of nationalization, and shipowners have been left in peace to the contemplation of their losses.

It may be of interest, however, to notice briefly the experiments that have been made in Australia and Canada in the state ownership of Shipping.

It was in 1916 that Mr. Hughes, the Australian Prime Minister, while on a visit to London, arranged for the State purchase of fifteen cargo steamers, with a total lifting capacity of about 106,000 tons, at a cost of some £2,000,000.[1] This was the beginning of the Commonwealth Government Line. It was, in its inception, a War measure. Its object was to provide for the transportation of Australian produce at a time when, on the one hand, the Australian harvests were awaiting shipment to the markets of Europe, and, on the other hand, the supply of British tonnage necessary for the conveyance of Australian products was rapidly becoming restricted owing to the submarine campaign and the increasing demands of our Allies for more ships.

Of these original fifteen vessels, purchased in 1916, two were sunk by enemy action and two others were subsequently sold. Mr. Hughes, speaking about the remaining eleven some five years later in Australia, said[2]: "They have been engaged in Australian and United Kingdom and general trade. From the time they came to hand in the United Kingdom, until to-day, they have been run in the interests of the country, and they have been run on business lines."

[1] For these and other particulars in regard to the Commonwealth Line the writer is indebted to the kindness of Mr. H. Larkin, General Manager of the Line. In an article in the *Australian Trade Journal* of April, 1920, Mr. Larkin explained the origin, progress and policy of the Line.

[2] Commonwealth Parliamentary Debates, November 16, 1921.

As time went on, the size of the fleet grew. To the original nucleus were added seventeen ex-enemy vessels, and later on the fleet was further augmented by other vessels, some built in this country and others in Australia, until, in 1922, it numbered fifty-two vessels (forty-three in commission and nine building), with a total dead-weight tonnage of about 400,000 tons.

Among these vessels are five, known as the "Bay" Class, built for service between London and Australian ports *via* Suez and Colombo with sailings at four-weekly intervals. These are twin-screw passenger and cargo steamers with geared turbines, a sea speed of 15 knots, and an extensive refrigerating plant, for the carriage of refrigerated cargo such as meat, butter and fruit.

Thus, in a few years, the Commonwealth Government Line, starting on a relatively small scale, has made considerable progress.

The policy of the Commonwealth Government in conducting this Line has been defined by Mr. Hughes, the Prime Minister, both in Australia and on his visits to England. The Commonwealth Line, he has said, is not run with the object of ousting private enterprise, nor attempting to create a Government monopoly, but merely to foster and assist in the advancement of Australian trade, to promote trade between Great Britain and the Commonwealth and to afford security that in all circumstances adequate means of transport at reasonable cost and under equitable conditions will be provided for Australia's exports and imports.

On the other hand, in spite of these assurances, it is not unnatural that the private British Shipowners in the Australian trade should regard with some measure of disfavour the entry of the Commonwealth Government Line into their midst. In a railway train the latest comer into an already crowded compartment is seldom really popular.

The views of the private owners have been voiced by Sir Kenneth Anderson, the Chairman of the Orient Line, at a meeting of his Company:—

"I know," he said, "we are assured that there is no intention to damage the shipping interests of this country, interests as vital to Australia as to Great Britain, and I believe therefore it is just as wide of the mark to suppose that the Commonwealth Government consciously and deliberately desire

to suppress the private shipowner, as it is to suggest that the private shipowner hankers after the exercise of an extortionate monopoly, but the blow will be none the less severe because it was not intended, and even if eventually it does not result in driving the shipping interests of this country out of the Australian trade, it must in any case immediately and inevitably act as a strong deterrent to their development. If, therefore, the policy was designed to assure and improve communications with Great Britain, it appears ill-calculated to produce that result."

If the Commonwealth Government Line is still a young concern as compared with the old-established, privately-owned lines, the Canadian Government Merchant Marine Ltd. is an even younger institution.

Early in 1918, owing to the serious loss of world tonnage, previously noticed in the case of Australia, and in view of the consequent restriction in shipping facilities, the Canadian Government decided to create, own and operate a strong merchant fleet. To this end orders were placed with ship-building firms throughout Canada for the construction of some sixty cargo steamers with an aggregate dead-weight of about 400,000 tons.

So rapid was the progress made in carrying this decision into effect that four years later saw the building programme completed and the vessels of the Canadian Government Merchant Marine Ltd., each flying the distinctive house-flag and each bearing a name preceded by the title "Canadian," trading in practically all the important routes of the world.

Meanwhile, during this period of construction in Canadian yards, the world's shipping trade entered into a period of great depression. Once again, as had happened after the Crimean War [1] and other wars, the supply of tonnage, ordered in the feverish haste of war scarcity, soon overhauled the demand upon it, reduced by war consequences. From shortage of shipping the pendulum swung, with diabolical speed and without so much as a tremor of hesitation, right over to surplus, on a scale as unprecedented as the war itself.

Lord Milner, in delivering the Chairman's Speech at the Annual Meeting of a Marine Insurance Company,[2] referred to these unpleasant facts:—

[1] *See* page 41.

[2] Indemnity Mutual Marine Assurance Co., 1922, reported in *The Times*, February 10, 1922.

" The rapid production of ships," he said, " both here and abroad, has restored the world's tonnage to the pre-war basis, and yet there are to be seen in every port and estuary in the United Kingdom and elsewhere an unprecedented number of ships laid up. · Ships can only remain in service when cargoes are obtainable and when freights pay the cost of working."

Thus, while the glass of freights was steadily falling from set fair to stormy, the number of vessels delivered from Canadian yards to the Government Merchant Marine was steadily rising.

As in the case of Australia, the declared intention of the Canadian Government in starting a State-owned service was not to compete with private companies on existing trade routes, but to supplement those routes by inaugurating new ones with a view to opening up trade with Canada in parts of the globe hitherto untouched by the Canadian trader.

In order to show the progress made in carrying out the policy of the Canadian Government to operate a merchant fleet of their own, it may be convenient to mention, in brief outline, the services already established by the line since its inception early in 1918.

In December, 1918, a service was put into operation between Montreal and South America. Two new 8,000-ton vessels, the *Canadian Pioneer* and *Canadian Planter*, were amongst the ships employed in this trade, which was, however, actually inaugurated by the arrival at Rio of the *Canadian Voyager* from St. John, N.B., with a general cargo of dried fish, paper, canned foods and steel. The satisfactory results of this venture induced those responsible for the direction of the company to start a new service between Montreal and the West Indies ; accordingly, in May, 1919, the *Canadian Adventurer*, *Canadian Trader* and *Canadian Sower*, each of about 2,000 tons dead-weight, were allocated to this route. Soon afterwards, a short service was instituted to Newfoundland, the ships in this trade being the *Canadian Miner* and the *Canadian Sealer*, both of about 2,000 tons.

As regards the Trans-Pacific route, in September, 1920, by an agreement with Messrs. Alfred Holt & Co. (the Blue Funnel Line), a joint service was established between Vancouver and the Far East.

In the trade route between Montreal and the Far East *via* the Suez Canal, a joint service, run in conjunction with the

British India Steam Navigation Company, was opened in 1920. This joint service includes Mediterranean ports, Egypt, India, the Straits Settlements and Java.

Several services have been established between Canada and the United Kingdom, amongst which may be mentioned those between Montreal and London, and Montreal and Glasgow. In 1920 it was decided to open up direct communication between Canada and South Wales and this was started with the sailing of the *Canadian Voyager* from Montreal to Cardiff and Swansea in that year. The increasing trade of Canada in exporting her perishable dairy produce rendered necessary the provision of cold-storage space and to this end the *Canadian Victor*, *Canadian Commander*, and *Canadian Leader* were suitably equipped.

Thus it will be seen how rapidly and thoroughly the work of the Canadian Government Merchant Marine in building up a mercantile fleet has been executed. Its vessels sail from Canada to ports in the United Kingdom, the Mediterranean, Egypt, South Africa, India, Ceylon, Straits Settlements, Java, Australia, New Zealand, China, Japan, the Philippine Islands, South America, and the West Indies. Not by any means the least important item in the programme of this enterprising line has been the impetus given to the development of Inter-imperial Commerce.

Of all the trade routes the *Canada and United States* route is probably the one that is best known to the average Englishman. It has been estimated that the trade of this route before the War employed one-sixth of the world's entiremercantile tonnage,[1] and the reason for traffic on such a vast scale is to be found, first, as regards cargoes, in the dependence of Europe upon the food-stuffs and raw materials of Canada and the United States, and, secondly, as regards passengers, in the desire of Europeans to seek their fortunes on the other side of the Atlantic. For the successful seekers and their descendants there is the return to "the old Country" in the saloon—for the less successful, the steerage.

Among the principal food-stuffs imported into Britain from North America are wheat and flour, bacon and hams, cheese and lard; while amongst the raw materials imported are cotton, petroleum and copper. Tobacco, leather and timber are also

[1] *Seaborne Trade*, p. 100.

leading items of the import trade into the United Kingdom by this route.

The export trade from Britain to North America is of far smaller dimensions. North America does not require our coal, except in times of emergency such as a coal strike in the United States, because she produces enough, not only for her own needs but also for a certain amount of export to South America, Europe and elsewhere. The outward trade from the United Kingdom on the North Atlantic route consists mainly in relatively small lots of manufactured articles and transhipment goods, and is almost entirely in the hands of the liner companies.

It, therefore, follows that, in view of the large quantities of grain and cotton to be carried eastward and the comparatively small cargoes going westward, in normal times there must be—and there are—numbers of ballast voyages made by ships going out from Great Britain to load cargoes at North American ports. This is one of the " features " of the North Atlantic trade route and in contrast to conditions prevailing in the South Atlantic trade where, as we shall see later, the ships that leave Britain to fetch food-stuffs and raw materials from Brazil and the River Plate, frequently take out cargoes of coal to those places.

The carriage of cargoes to and from the United States, Canada and Newfoundland involves not only a greater amount of tonnage than any other trade route but also perhaps a greater variety of ships. Every type of vessel that we considered in the earlier chapters of this book is to be found in this trade : the " floating hotels " with their passengers who have been successful enough to pay for their own passages, or alternatively to have them paid for by their fathers or firms ; the intermediate liners ; the cargo liners pure and simple, carrying no passengers, but running to a schedule as regular as those of the " crack " ships ; the tramps, bringing the American cotton crop to the Lancashire mills ; the " tankers " distributing in England the petroleum of the American and Mexican oil-wells. There they all are. The question arises : Whose are they ? The answer, as regards the liners, may be found in the following list of companies whose vessels trade regularly on the North Atlantic route :—The Anchor, Atlantic Transport, Cairn, Canadian Government Merchant Marine, Canadian Pacific, Cunard, Dominion, Donaldson, the Furness Withy group, Harrison, Johnston, Lamport

and Holt, Leyland, Manchester Liners, Royal Mail, Warren, White Star, and Wilson lines.

As a pendant to this great route might also be added the West Indies route, which is to a great extent a branch of the North American. The imports into Britain by this route from the Caribbean Sea consist mainly in sugar, cocoa and fruit, and the vessels employed in the regular service are those belonging to Messrs. Elders & Fyffes, the Harrison and Scrutton lines and the Royal Mail Steam Packet Company.

We pass now to the fourth of the big trade routes on our list, namely, the *African* route.

But for the construction of the Suez Canal this route would be much more important than it is to-day. As it is, only part of the Australian and New Zealand trade goes by way of the Cape of Good Hope, the remainder going through the Suez Canal and, as we have seen, to a small extent, through the Panama Canal.

The African route derives its chief importance from the commerce of the South African Union, but the volume of trade is also substantially increased by contributions from ports on both the West and East African coasts. The East African trade is carried on partly through the Suez Canal and partly by way of the Cape. In addition to this great trunk route round Africa, there is a direct service between South Africa and New York, in which British tonnage is regularly enployed.

Taking the African trunk route and following it in the direction in which the sun moves, from East to West, we find that the main imports into East Africa are piece-goods, building materials, iron and steel, while the principal exports are ivory, hides and skins, rubber, grain, copra, cotton, coffee and fibre. Among the British companies whose vessels are employed in this trade are the Clan, Harrison, and Union-Castle lines.[1]

In the South African trade are to be found vessels belonging to those lines just mentioned and, in addition, those of the Aberdeen and other lines which use the Cape route on the way to Australia. In some trades it may be difficult to say which is the most important firm of owners, but in the South African trade

[1] The information in this chapter as regards the different cargoes is to a large extent derived from Urquhart's *Dues and Charges in Foreign and Colonial Ports*; as regards the vessels, from various Directories of Shipping Companies and Shipping Lists.

it is safe to say, without fear of serious contradiction, that the premier place is occupied to-day, as it has been for years, by the Union-Castle Line. The exports from South Africa consist mainly of wool, hides and skins, ostrich feathers, fruit, wine, gold and diamonds—a varied list as regards value and bulk—while the principal imports are manufactured goods, such as clothing and haberdashery, cottons and woollens, iron-work and leather, hardware and cutlery.

A list of the cargoes brought to Britain from West Africa has that almost romantic quality that belongs to tropical products; it suggests intense heat and natives in loin-cloths; here it is:—palm-oil, kernels, rubber, cocoa, hides and skins, ground nuts, gum, wax and ivory. Not less picturesque and perhaps even more suggestive of wild life is the list of imports into West Africa:—cotton goods, tinned provisions, hardware, rum and gunpowder.

The principal shipping lines in the West African trade are those belonging to or—like the British and African Line—managed by the Elder Dempster Company.

The *South American Route* is the fifth and last of the Big Five routes which we are considering. This route, since the opening of the Panama Canal, encircles the whole of South America. Starting in the North-East, the route passes along the coast of Brazil and the River Plate; is continued through the Straits of Magellan, or round Cape Horn, to the Pacific Coast of America, where it joins the Trans-Pacific routes that we have already noticed [1] from the West Coast of America to the Far East and Australia.

The principal British liner companies trading in the South American route are the Booth, Furness, Harrison, Houlders, Houston, Lamport and Holt, Maciver, Nelson, Pacific Steam Navigation, Prince, and Royal Mail lines. In addition to the main-trunk line between Britain and South America, there is also an important route between the East Coast of South America and New York, in which are employed vessels belonging to the Booth, Houlder, Houston, Lamport and Holt and Prince lines.

Once again it must be emphasized that the British lines in this route as elsewhere have to face the competition of foreign vessels. In the Brazil trade, for instance, the coasting service

[1] Page 259.

is maintained exclusively under national flags, in accordance with what is known as the *cabotagem*, or protective law of Brazil, whereby the coastal commerce of the country, with the exception of passengers and live-stock, is carried entirely in Brazilian bottoms; in the route between New York and Brazil there are ships under the United States and Brazilian flags; and in the main route between Brazil and Europe there are, in addition to the British lines, French, Italian, Portuguese, Dutch and Scandinavian services. Before the War, Germany occupied a strong position in the Brazilian carrying trade, the principal German services being those of the Hamburg-Amerika and Hamburg-Süd-Amerika Companies. As time goes on, something of that old position seems not unlikely to be regained.

Besides the regular liner services in the South American route, there is also a considerable amount of British tramp tonnage, employed mainly in the carriage of coal from Britain outwards, and in the conveyance of grain from the Plate ports or of nitrates from Chile homewards.

Unlike the United States of America, South America is not self-sufficing in respect of coal and is therefore obliged to obtain her requirements either from Britain or the United States or both. It follows that vessels outward bound from the United Kingdom to lift the Argentine grain crops are frequently able to take cargoes of coal outward and therefore there are not so many ballast voyages outward in the South American trade as we noticed in the North Atlantic route. The Brazilian, Argentine and Uruguayan markets absorb large quantities of British coal, but in spite of this fact, more tonnage is required to carry the grain and it therefore happens, as may be seen by reference to the freight market reports of operations on the Baltic Exchange, that many ships are drawn in the course of the year to the Plate ports in ballast by the demands of grain shippers.

Apart from these bulk or "tramp" cargoes of coal outwards and grain homewards, the principal exports from the East Coast ports of South America are, as regards Brazil, coffee and rubber, and, as regards the River Plate, frozen meat. Santos is the principal port from which coffee is shipped, the chief market being in the United States; while from Para in North Brazil the rubber is exported to both Europe and North America. In addition to these two main exports,—coffee and rubber—

upon the demand for which so much of the financial stability and purchasing power of Brazil depends, there are also exported Brazil nuts, cotton and cotton-seed, timber, sugar, hides and skins.

Among the Argentine exports, besides grain and frozen meat, are wool, flax seeds, hides and skins.

With the exception, however, of the grain cargoes, the export trade of both Brazil and the River Plate is mainly in the hands of the liner companies. The carriage of frozen meat, in particular, is essentially a liner trade, requiring, as we have seen,[1] large and costly vessels fitted with refrigerated machinery.

Leaving now the East Coast and passing through the Straits of Magellan or round the Horn into the Pacific Ocean, we continue our study of the South American trade route on the West Coast—proceeding northward along the coasts of Chile, Peru, Ecuador, Columbia, and, finally, Panama.

We find on examination that both in volume and value the trade of the Pacific ports is less than that of the East Coast, which we have just reviewed.[2]

One of the leading items on the list of exports from Chile is nitrate of soda, which is required in Europe both for agricultural purposes and in the manufacture of explosives. In return for the nitrates and for use in the nitrate industry coal is imported into Chile. From Valparaiso and the Southern ports of Chile are shipped wheat, barley, oats and wool, and copper from Coquimbo. Bolivia exports tin, but, as she has no coast line, the cargoes are shipped from Chilean or Peruvian ports. From Peru we obtain raw cotton, alpaca, sugar and rubber, but the rubber which comes from the eastern side of the Andes is carried down the Amazon through Brazil and is actually shipped from the Atlantic port of Para in North Brazil; this particular commodity ought not therefore to be included in a list of exports from the Pacific Coast. From Ecuador the chief article of export is cocoa.[3] With the exception of nitrates,

[1] Page 88.

[2] *Seaborne Trade*, p. 159.

[3] Fuller information in regard to the products and exports of Ecuador, Peru and Bolivia may be obtained from chapters on those countries by Sir Clements Markham in *The International Geography*, published by George Newnes, Ltd.

the products of the West Coast of South America are mostly carried by the liners, and although there is a certain amount of tramp tonnage employed in lifting the nitrates, a large part even of the nitrate export is shipped in liner parcels. The leading place in the Pacific Coast section of the South American route is occupied by the Pacific Steam Navigation Company, which provides regular services on a fixed schedule with frequent stoppages at the ports along the coast.

Such, in brief outline, are the main trade routes of the world. In the space at our disposal, it is impossible to penetrate as as we should like into the tempting details of all the tracks followed, the vessels employed, the ports served and the cargoes carried. Perhaps, however, enough has been said to whet the curiosity of the beginner in a shipping office so that he may find out for himself something about the other fellow's business—in shipping you cannot mind your own business efficiently unless you pay some attention to your neighbour's—and may imagine, while reading the shipping advertisements in a newspaper, or in turning over the sheets of a mercantile atlas, or in scanning the pages of a directory of steamship companies, something of the sights and sounds and smells to be found on the wharves in distant lands.

Here we can only compress the matter into two copy-book sentences, and leave it at that. Outwards, all over the world, British liners and tramps carry coal and manufactured articles. Homewards from the ends of the earth they return laden with all manner of stuff.

In some parts of these trade routes we find that the liner companies, both British and foreign, are grouped into Conferences.

Beginners in shipping offices will be almost certain to ask: "What is the object of a Conference?" and therefore it may be well to answer the question at once by giving the definition that appears in the Report of the Departmental Committee on Shipping and Shipbuilding.[1]

There it is said that the object of Conferences is to prevent rate wars and to place the shippers from each country on an equal footing, by producing equality of rates and stable condi-

[1] *Final Report of the Departmental Committee appointed by the Board of Trade to consider the position of the Shipping and Shipbuilding Industries after the War*, 1918, pp. 58 and 71.

tions in the great ocean trades. This aspect of the matter was clearly brought out in the report of the Royal Commission on Shipping Rings and the student of the question is recommended to read the general conclusion stated in that report.

Before the war the developments of the Conference System were to a great extent due to the severity of German competition. Germany's organization and the expansion of her overseas trade had made her an important maritime country and every weapon was used by the German lines not only to obtain admission to the Conferences but, when admitted, to extort further concessions not always justified by the magnitude of their trade. In order to avoid a continuous series of rate wars, which would have conferred little advantage, the British lines frequently compromised with the Germans, a common basis of division being the reservation of the United Kingdom trade to the British lines and the reservation of the trade from German ports, and sometimes from Dutch and Belgian ports as well, to the German lines. It was, in fact, an arrangement "to keep off one another's territory." [1]

We have now seen something of the great trade routes wherein the liner companies carry on their business, and we have referred to the Conferences whereby they endeavour to induce the stranger to "keep off the grass" and the poacher to keep out of their preserves—always, it would seem, with an eye to the welfare of the grass and the game.

There remains for consideration the all-important question of coal.

"It is recognized," says Sir Norman Hill, "that the material prosperity of the 43 million people living within these islands depends, in great measure, on the selling price at which our exports of manufacture and coal can be placed on the markets of the world. That price must be low enough to induce the producers in other countries to give us in exchange the food without which we cannot exist and the raw materials without which we cannot manufacture." [2]

Other writers and speakers on the same subject have emphasized the importance of our coal exports to our national prosperity.

[1] *Report of Departmental Committee on Shipping*, p. 58.

[2] Chapter in Brassey's *Naval and Shipping Annual*, 1921–22, by Sir Norman Hill, Secretary of the Liverpool Steamship Owners' Association.

Sir Owen Philipps, in a speech delivered in June, 1921, alluded to the fact that coal exports from Great Britain had dropped from about 73 million tons in 1913, the last normal pre-war year, to only about 25 million tons in 1920, mainly owing to restricted output and excessive costs at the mines, and pointed out that if the large number of steamers then laid up were to be employed it was essential that the price of coal should come down to a lower level owing to the difficulty of regaining lost markets.

The need for plentiful supplies of cheap coal has, perhaps, by now been proclaimed *ad nauseam*, and the student of shipping problems may declare that he is weary of hearing over and over again the same cry from politicians, statisticians, journalists and chairmen of companies. At the same time, he must never forget—and it is better to be told the fact too often rather than not at all—that our modern mercantile marine has been largely built up on the carriage of outward coal cargoes to balance inward cargoes of food and raw materials; and that just as it is difficult to exaggerate the importance of our coal exports before the war, so it is difficult to exaggerate the part that dear coal has played in handicapping British shipping since the war.

Oil fuel has, as we have noticed in a previous chapter, made wonderful progress recently, but coal must continue to be a powerful force not only in relation to shipping, but also to our other exports.

Sir Leo Chiozza Money, in a newspaper article,[1] has pointed out the far-reaching effects of the loss of the oversea coal trade, diminishing as they had done both "visible" and "invisible" exports: "But they do not stand alone. All British exports, whether of pig-iron or of soap, of cottons or of machinery, are in effect coal exports, since they are based upon relatively cheap power derived from coal."

For the purposes of our survey of the part played by coal in the shipping industry, we are, however, immediately concerned with the coal itself whether in the bunkers as fuel for the voyage or in the holds as cargo for delivery overseas.

We have already noticed the vast quantities of coal consumed during a single voyage of a fast Atlantic liner,[2] and we also noted the item when we were considering the question of a ship's disbursements.[3] It may now be convenient to give one or two

[1] In *The Observer*, June, 1921. [2] Page 53. [3] Page 178.

figures for the prices paid for bunkers during recent years. These prices are subject to chronic fluctuation and we have neither the space in which to follow the fluctuations month by month and year by year, nor does it seem that any useful purpose would be gained by doing so.

The following figures, however, given by one shipowner, are a good indication of the increased price which shipowners generally had to pay for bunkers after the war; they show the difference in cost of bunkers between the immediately pre-war and post-war years. They are a fair example. In 1902 the cost, including rail and freight charges, in all ports at which this particular owner purchased coal, averaged 22*s.* per ton; in 1903 the average was 22*s.* 3*d.* per ton; ten years later, in 1913, the price was almost the same, namely 22*s.* 11*d.* per ton. Then followed the war and the violent upward curve in price, culminating in 1920 with 120*s.* 1*d.* per ton. Since then the price of coal has dropped heavily.

So much for the price of bunkers. We turn now to the quantities of coal exported.

Before the war our coal represented about 75 per cent. of the total weight of our exports, the balance of 25 per cent. being made up mainly of our manufactures. Our coal exports found employment on the outward voyage for about three-quarters of our ship-carrying power. When the exports of coal, which form such a large part of our total exports, fall off, it must necessarily follow that there is also a falling off in the tonnage entering our ports.

As we have seen, our coal exports, which had been about 73 million tons in 1913, had dropped in 1920 to about 25 million tons. It may be worth while to examine this remarkable fall and loss of business a little more closely in the light of subsequent events.

Early in 1921 our coal exports were about two-thirds below the normal pre-war level. Half our coal-loading plants, dockers and coal-carrying ships were idle, while the United States were sending coal into continental European markets. This was bad enough, but worse was to come. On April 1st there began what proved to be the longest and greatest coal strike on record. The stoppage lasted until the end of June. Manufacturing industries were paralysed and Britain became an importer of

coal on a commercial scale for the first time in her history.

The subject of that coal crisis is so important that it deserves the closest attention of students of shipping problems. While in this book we are avoiding as far as possible massed columns of statistics and are only giving a few figures of the sort that "hit you between the eyes" in order to show the extremes, the tops and bottoms of curves, at the same time we recommend the student to examine carefully for himself the Board of Trade returns during those critical months in regard to coal exports and compare them with former and subsequent periods.

Taking the month of April, we find that in April, 1921—the first month of the great strike—our coal exports totalled 607,000 tons as compared with 6,351,000 tons in April, 1913. In other words, our shipments for that particular month were reduced to less than one-tenth of their pre-war dimensions. Questions will probably arise as to where the coal went in April, 1913, and what markets accounted for the greatest reduction in 1921. The answer is that in April, 1913, the largest receivers of British coal were France, Germany, Italy, Sweden, and Russia.

Of these France was by far the most important customer. In April, 1913, we exported to France 1,125,000 tons as compared with 119,000 tons in April, 1921 ; to Germany shipments during these periods under review showed a reduction from 815,000 tons to 9,000 tons ; to Italy from 794,000 to 98,000 ; to Sweden from 436,000 to 19,000 ; to Russia from 347,000 tons to nothing at all.

There were also reductions on a similar scale in our shipments to Egypt and South America, to Denmark and the Netherlands.

It was during the period from 1919 until the first half of 1921, owing to the high costs of coal production in Great Britain, that these old-established markets, in which hitherto we had known no successful rival, were gradually invaded and captured by the American coal exporter who stepped in and did a large volume of business. Since that time, however, there have been drastic wage reductions in British coal-fields, together with a great increase in production, and recent official returns give undoubted evidence of the advance that we are making in our export trade. It is an advance that has been noteworthy in regard to France and the Netherlands. The export of American coal to those places has dwindled correspondingly. Signs are

not wanting that as time goes on, with lower cost of coal-production, increased output and lower freights—themselves made possible by cheaper bunkers—we shall recapture a large share of our coal export trade, which is so essential to the prosperity of this country.

We have left to the end of our list this most important of all our outward cargoes. Once more we recommend the beginner in a shipping office to pay special attention to the question of coal, whether for bunkers or cargoes : he should learn the names of the principal coal-fields, whether at home or abroad, from which his company can obtain their bunker supplies ; he should be familiar with the prices ruling and the rates of freight at which cargoes of coal may be shipped.

In short, if he wishes to specialize in any particular part of his business, he will find no subject more interesting or important for that purpose than that of coal.

Coal cannot compete perhaps with some of the other inward and outward cargoes that we have noticed as far as romance is concerned. Yet who can stand on a quay and watch a vessel coaling without wishing to make the voyage in her ? Some there are, like the author of *Moby Dick*,[1] who are drawn to the sea without having to be roused by such a sight as that of a vessel loading or discharging. He it was who went a-whaling as a cure for the spleen and to regulate the circulation.

" Whenever," he writes, " I find myself growing grim about the mouth ; whenever it is a damp, drizzly November in my soul ; whenever I find myself involuntarily pausing before coffin warehouses, and bringing up the rear of every funeral I meet—then I account it high time to get to sea as soon as I can."

Those who live mainly in shipping offices may find a " damp, drizzly November " in their souls and yet be unable " to get to sea." The younger of them can at least volunteer for service abroad in some place or port where their Company trades. If they are wise they will do so and thereby realize something of the romance of sea-borne cargoes.

Perhaps the shipping business hardly carries with it to-day quite the same romantic spirit of adventure that it bore in the days of sailing ships. This age of steam and oil is one that can

[1] Herman Melville.

scarcely hope to compete in emotion with the days when the wind ruled supreme without a rival.

We may be able to see to-day a number of large steamers all at one time in London or Liverpool, but we have nothing to compare with the sight that was common enough in our grandfathers' day; when, after a long stretch of contrary winds, a change took place and a favourable breeze set in, a whole fleet of sailing ships would at once be hauled out of dock and start upon their several voyages.

Times are changed and shipowners cannot offer those sights and thrills any longer, but those who enter the shipping business can still enjoy, perhaps to a greater degree than ever before, the feeling that in taking part in the work of British Shipping in its relation to British trade they are helping to maintain the "safety, honour and welfare of our Sovereign and his Dominions."

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