The Liverpool Nautical Research Society

TRANSACTIONS

VOLUME IV

1948

THE LIVERPOOL NAUTICAL RESEARCH SOCIETY

" All delight is in masts and oars and trim ships to cross the stormy sea."—ODYSSEY.

TRANSACTIONS, VOL. IV. 1948

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Some Early Mersey Steamships and the Rise of Liverpool

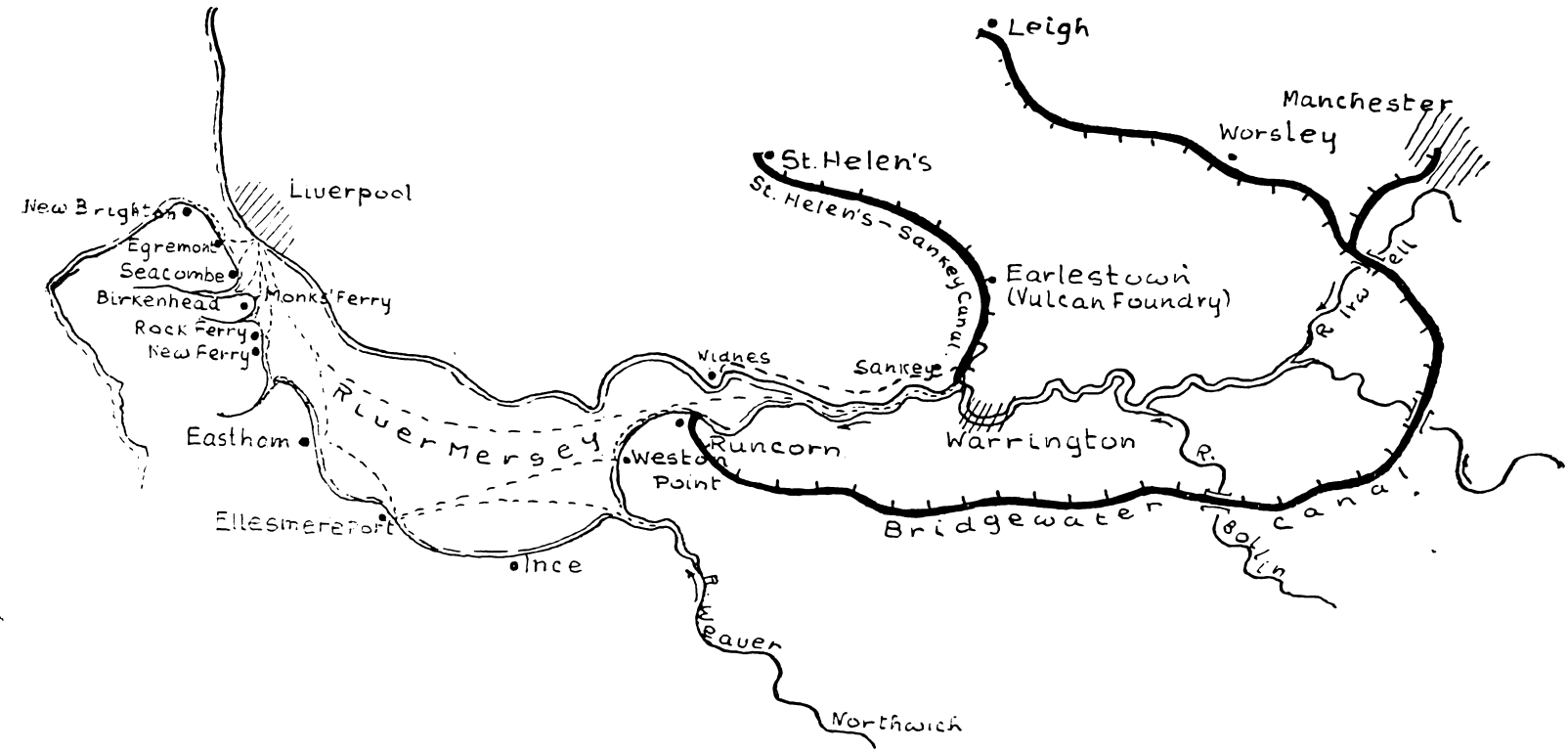
By Nigel W. Kennedy, F.G.A.

In the House of Lords a Woolsack occupies a prominent position, being symbolic of the former importance of wool production to our national prosperity. For the same reason a lump of Lancashire coal should find a home in our Town Hall, since the rise of Liverpool was largely due to the accessibility of cheap coal behind the seaport. The Duke of Bridgewater constructed his earliest canals to bring coal cheaply to the poor of Liverpool—now it is more usual to see coal being carried *up* the canals away from the city into South Lancashire. One may well ask " Why ? "

We are much indebted to the energetic activities of Mr. Wardle for authentic data relating to some of the earliest steamers plying on the Mersey, which has cleared up several problems of the past. It is believed that the first successful steamship to enter the river was *Elizabeth* which appeared in June, 1815, and I intend to deal shortly with the interesting period of marine development from that date up to 1840, when the first Cunarder *Unicorn* crossed the Atlantic.

I should first say something about some local experimental vessels, and try to visualise Merseyside of over one hundred and twenty-five years ago, and by means of extracts from our contemporary Press and local records build up some mental picture of the life of that distant yesterday, and of the immense handicaps under which our grandfathers lived. My late father actually knew Samuel Cunard, as well as D. and C. MacIver, and I have met at least one man who was a human link between 1815 and the present time.

In " Liverpool of To-day " (1885) we find the following passage, " In the latter part of the 18th Century the manufacturing towns of South Lancashire were connected with the ports on the Mersey by the famous Bridgewater Canal . . . Before the introduction of steam navigation, vessels might be detained in the River many weeks . . . waiting for a favourable wind . . . One lucky ship (*Harriet*—Barton and Co.—v. Baines, 1852) sailed out of the River an hour before the wind



MERSEY NAVIGATION—CONNECTION BETWEEN ST. HELEN'S—SANKEY CANAL AND BRIDGEWATER CANAL AT RUNCORN LOCKS.

changed, crossed to Barbadoes, and returned months later with a valuable cargo, before her (300) consorts had been able to leave the Port ! In 1824, Liverpool had a fleet of 10,000 sailing vessels carrying merchandise to and from all parts of the globe."

In Timbs' " Stories of Great Inventors," he states that " In the year 1755 an Act of Parliment was passed for the construction of a canal, 11 miles long, from Sankey Brook, on the Mersey, to St. Helen's . . . This was the first canal of its kind in the Kingdom . . . and in 1788 the celebrated Bridgewater Canal was begun . . . from Manchester to Runcorn, with a branch to Worsley." Earlstown, and the old Vulcan Foundry lie on the St. Helens canal, which is clearly shown on the little map.

It will be noted that a vessel proceeding from St. Helen's to Worsley or Manchester would have to enter the Mersey near Sankey and run down stream to Runcorn in order to reach the Bridgewater Canal. This point is of interest in view of the evidence of two other extracts which follow :—

> " Lately, at Newton Common, in Lancashire, a vessel heavily laden with copper slag, passed along the Sankey Canal without the aid of hauliers or rowers, the oars performing 18 strokes per minute by the application of steam power only ! After a course of ten miles the vessel returned to St. Helens whence she had set out." (*Monthly Magazine*, July, 1797, p. 75).

> " Sir—Seeing in your paper on 30th ultimo the enquiry relative to the first steamboat to be invented, and also . . . to one constructed at St. Helens . . . The engine . . . was constructed by John Smith, at St. Helens in 1793, and the first excursion was down the canal to the Newtown Races of the same year, loaded with passengers. On the Saturday following she sailed to Runcorn, and . . . down the Bridgewater Canal to Manchester. On her arrival . . . thousands of astonished people came to see her . . . on payment . . . and a party of exasperated mechanics nearly destroyed her. So far as my memory serves me—after 39 years— . . . the engine was on the old atmospheric principal, worked with a beam, connecting rod, double crank, in a horizontal line, with seven paddles on either side, and propelled her at 2 miles per hour. John Smith was an uneducated . . . mechanic . . . and was the first aeronaut who ever ascended in a balloon (sic) . . .

> The vessel was purchased at Liverpool. I can vouch for most of the above particulars . . . having been one of the party who made the first excursion. (Signed) William Bromilow, Merton Bank, Near St. Helen's." (From *Liverpool Mercury*, 20th July, 1832).

John Smith was, of course, regarded as insane by many, but in response to their jeers he is stated to have retorted " Those may laugh who will, but in twenty years you will see this River (the Mersey) covered with smoke." (*Liverpool Mercury*, July, 1885). Other local experiments include a stern-wheeler paddle steamer constructed by Bridgewater, and Brindle his assistant, at Worsley about 1799, for use as a tug, but was apparently discarded owing to damage to the banks. References have also been made at times to vessels built at Manchester and on the Mersey in 1813, but so far these have eluded me.

Let us now focus our mental telescope on Merseyside of these early days when Europe was in the throes of the long Napoleonic Wars, and Britain was preparing for an invasion which never materialised. Robert Fulton, having stolen the idea of a good steam engine from Symington and Bell, had failed in an attempt to interest Napoleon Buonaparte in a scheme for the Great Invasion by means of rafts drawn by steam tugs. His defeat at Waterloo, in 1815, gave rise to the name for the new suburb in the north end. The Liverpool (De)fencibles, like the more recent Home Guard, though less in the public eye, no doubt felt that they had won the War. Duke Street was then a fashionable road of fine houses, still to become famous as the birth-place of the poetess, Mrs. Hemans, and of William Ewart Gladstone. Link-light sockets were common on such houses, though few if any now remain, and many fine halls and staircases still stand as monuments to the craftsmen of the time. Gas-lights first appeared outside the Town Hall in 1816. Newspapers were printed, as a rule, twice weekly, and carried a Tax of 9d. per copy, and were on view in the newsrooms of the local inns (Angel, George, Bear's Paw and others). The town boundaries, now several miles within the city, then enclosed many large green fields, and several wind-mills occupied the site of St. George's Hall. Liverpool was apparently renowned as a rich town with some of the worst paved streets in the Kingdom ; the coach fare to Crosby was 14/- in 1824, and the railway was not seen until 1830. The banks of the

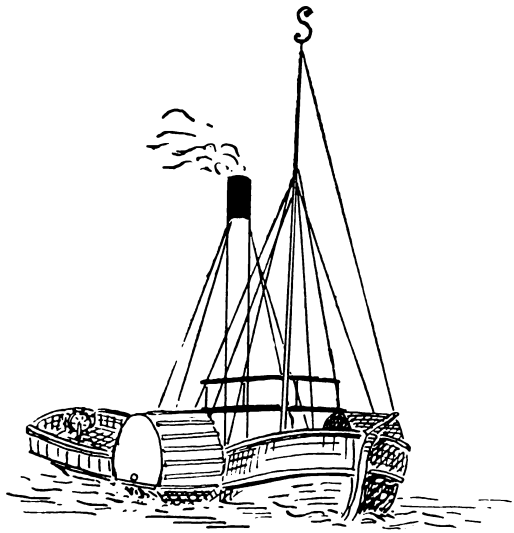
Mersey were dotted with busy windmills, and the River with the white sails of hundreds of vessels.

Good old days ! Well, not altogether. One was liable to be seized by Press Gangs for service in the Navy, and one unhappy solicitor was impressed on his way home one evening, and completely disappeared for four years, and by a most unjust turn of fate, on his return was again seized and compelled to serve a further period.

Liverpool Privateers, carrying " Letters of Marque " and often heavily armed, numbered about 150, and were the terror of Frenchmen, and they received many thousands of pounds in prize-money.

This was frequently stolen from sailors on being paid-off, by the syrens and other cut-throats of the city, but it is said that " Mother Red-Cap," whose old house still stands on Egremont Promenade, acted as unofficial banker to sailors, who would trust her with their money before risking a trip to Liverpool. The secret of her hiding-place died with her and it is believed that a large hoard still lies ready for the lucky finder, golden guineas having been found on the beach below the house.

Coglan's famous Floating Baths were opened in 1816, off the Pier Head, and were a familiar feature for many years, the river water entering through grills in the bottom, and being constantly renewed, an idea which, with modifications, might be copied with advantage. Numerous sailing boats formed ferry-services connecting Liverpool with many other riverside places, but under somewhat different conditions, since the Landing Stage had not been thought of. The vessels grounded, when women and children were carried on the shoulders of boatmen to dry land, and other passengers presumably jumped and hoped for the best. The most prominent buildings would of course be The Tower, Liverpool Castle, and St. Nicholas' Church, with the great Duke of Bridgewater's new warehouses, built in 1811, to the south, while the site of the Customs' House was still the old dock. Birkenhead had a population of about 700, and Monk's Ferry, the oldest on the River, was of little consequence until the coming of Lairds in 1824. "Woodside" was near the present Cattle Stage, while Tranmere was at the head of an inlet now forming Laird's Basin. Another Ferry opened later—the Railway Ferry—seems to have been south of Woodside on the quay forming part of Clover Docks.



UNSIGNED OIL PAINTING IN
THE WILLIAMSON ART GALLERY, BIRKENHEAD
" SEACOMBE FERRY, 1844."

The vessel might be *Sir John Moore* (1828), but more likely to be *Thomas Wilson*. Same vessel clearly illustrated in Gawthrop's " Liverpool in 1853 " but not named. *Note* the " S " (for " Seacombe ") at the masthead, also the typical black and white funnel of the Seacombe service.

Tranmere, Rock Ferry, and New Ferry were residential spots popular for shore bathing, though this is now difficult to believe. Wallasey Pool, now enclosed as the Great Float, separated Birkenhead and Seacombe, which with Liscard, had a population of 800, and built ships, maintained a fishing fleet, and made pottery, while the now very respectable Wallasey was then an insignificant little village hidden in the dunes, and described by Baines in 1824 as inhabited by " a primitive race " combining fishing with smuggling, and even the dreadful practice of wrecking, the wretched survivors being bludgeoned as they were washed ashore. New Brighton was a small fishing village until developed by Atherton and Tobin about 1830, when a steam service commenced, an interesting reflection since the present trans-River traffic from Wallasey now exceeds thirty-million annually.

The population of Liverpool increased from 90,000 in 1800 to 115,000 in 1811, and about 130,000 in 1821.

Bristol is of course the natural Gateway to the West, and until the coming of steam, Liverpool was merely a rival in the cotton and sugar trade with America, but the inland canals brought cheap coal to the Mersey, and Liverpool was not slow to benefit, as will be seen by a comparison of the revenue from Dock Dues from the two rival ports :—

	Bristol	*Liverpool*
Dock Dues, 1814	£18,242	£59,741
Dock Dues, 1822	£18,494	£102,405
Increase	£252	£42,664

A comparison of the cost of living is most fascinating as seen from the following extracts :—

> " It will be seen from the following tables that the prices of all necessities of life were *more than twice as high* (in 1809) than . . . at the present time " (Baines " History of Liverpool," 1852). This was, of course, due to the Napoleonic Wars.

	Price 1760	*Price* 1809
Bread, per gallon (sic)	8d.	2/4
Bacon, per lb.	6d.	1/2
Butcher's Meat, per lb.	4d.	8d.
Cheese, per lb.	4d.	10d.
Butter, per lb.	6d.	1/6
Soft Sugar (Demerara ?)	3d.	10d.

(From Billinges' *Liverpool Advertiser*, October, 1809)

> " In consequence of just complaints from householders . . . the Proprietors of the Sankey Navigation announced that they had appointed ' sworn agents ' at Liverpool, who would deliver coal to householders at an average price of 6/10 per ton . . . To accommodate the poor, coals to be sold at 4*d. per cwt. of* 120 *lbs.*" (1775) (By the Duke of Bridgewater) (Baines, p. 447).

Baines also tells us that " The sailing ships between Liverpool and America were already famous for their quick passages . . . During 1816 *Courier* (Capt. Price) sailed from Liverpool to Boston and back in fifty days." (Idem, p. 572.)

This, then gives us some sort of word picture of our Liverpool of other days, just prior to the advent of marine steam propulsion. The arrival of the first successful steamship at Liverpool was obscured by news from the Continent, and so little notice was taken of the event that for many years even the name of the vessel was lost sight of locally.

The story of the voyage of *Elizabeth* from the Clyde has been given elsewhere and is fairly fully preserved in a book " Doubly in Crown Service " by the daughter of Colin Watson, the ambitious young subaltern who brought her round in 1815, arriving at noon, 28th June, after having put in at the Isle of Man on the way. *Elizabeth*, built by John Woods, and on the stocks at the same time as the more celebrated *Comet*, was launched on 20th November, 1812. She was more successful on the Clyde than on the Mersey, where she never seems to have paid her way, and was soon laid aside, to be later fitted up as a horse-ferry named the *Safety*, and in 1835 she seems to have been plying under sail at Carlisle.

She was only 59 feet in length, with a beam of 12 feet, and depth of 7 ft. 6 in. drawing only 3 ft. 6 in. of water, with a tonnage of 40. She had two cabins, which were well appointed, and for her period, she compares very favourably with any up-to-date motor ship fitted with radar and television.

John Scott Russel gave a very good description of this little vessel, and said of her " She was probably the first remunerative vessel in the world . . ."

The second vessel, of which there is any account, to ply on the Mersey, was *Greenock* which on her arrival was renamed *Countess of Bridgewater*, under which name she is frequently referred to in the local Press for many years.

Like *Elizabeth* she came from the Clyde, and both ran between Liverpool and Runcorn and Warrington. She is offered for sale in an advertisement of 9th April, 1819, her later history being unknown to me.

Princess Charlotte was quite a famous Mersey steamer and was built by Mottershead and Heys, being launched at 11 a.m. on 25th July, 1816.

She was the third steamer of which we have records to ply on the River, and has no connection with either vessel of the same name on the Clyde or at Cork. She was owned by Samuel Smith, lessee of Eastham Ferry, and built to his order. Some years ago I was fortunate enough to meet Mr. Edwin Dod, great grandnephew of James Dod, of James Street, who was agent for Smith of Eastham, and a connection by marriage. Mr. Dod's father distinctly remembered the *Princess Charlotte* and was able to give valuable information as to her appearance. Samuel Smith saw *Elizabeth* on the River and decided to own a similar vessel himself, and later added several steamers to his little fleet. She plied until about 1823-4.

The twin-hulled *Etna* which plied from Liverpool to Woodside from 1817 was formed from two 63-foot barges and had a single central wheel, and in 1819 a similar vessel, *Mersey*, was also in use to Birkenhead. Bronze tallies bearing the word " ETNA " on one side, were used as season tickets and known as " Etna Pennies." In 1824 there was an " Etna Slip " near the Salthouse Dock. The *Etna* sailed each half-hour and the trip is stated to have occupied about five minutes, which is scarcely longer than at the present time, but disembarking would take longer. The fare was 3d.—4d. on Sunday.

One cannot mention every steamer but several others are of interest, namely the *Duke of Wellington*, which is the first recorded steamship actually built on the River, her builder being William Wright of Runcorn. She was 69 feet long, and 59 tons, and launched in 1816, as was *Prince Regent* built by William Rigby at Runcorn. Boulton and Watt's Boiler Book refers to a boiler for a *steam Dredger* for the Mersey in 1817 which is the first reference of its kind I have located.

Another vessel, of which little is known, was *Conde de Pamella* launched by Mottershead and Heys, 26th September,

1820, and fitted with a 20 h.p. engine by Fawcett and Littledale, of the Phoenix Foundry, Liverpool. She was intended to ply on the Tagus, and a Press notice states that she made the trip from Liverpool to Lisbon in four days, or about 250 miles per day. Legend states that she later crossed the Atlantic, but so far no confirmation has been discovered.

Cross-Channel steamer services from the Mersey commenced in 1819, being inaugurated by two Clyde-built vessels *Robert Bruce* and *Waterloo*, joined in 1820 by *Superb* and *Majestic*, the vessels plying regularly to Douglas, Port Patrick, Greenock, Belfast and Dublin. Traffic rapidly developed and competition resulted, mainly between the famous City of Dublin Company and the St. George Company.

In *Liverpool Mercury*, 11th, 18th and 27th June, 1824, fares from Scotland to Ireland were advertised—successively at 5*d. then* 3*d. and then*—FREE ! It is stated that not only was a free passage offered, but that when the Waterford Steamship Co. offered a loaf of bread in addition to a free trip this was countered by the City of Dublin offering a bottle of stout !

By the year 1830 we find that frequent services by steamers are maintained from Liverpool to some twenty different ports. From this date the development of the marine steam engine and consequent expansion of trade was very rapid, and the Atlantic was conquered from both sides, with marked advantage to Liverpool.

It is impossible to do justice to the many trim little craft of those early days, and to the brave men who navigated them, but one should remember *William Fawcett*, the first steamer of the P. and O. line, built in 1828 by Caleb Smith of Liverpool and engined by Fawcett, Preston, her tonnage being 250, and her engines of 120 h.p. By a remarkable error this vessel has been confused with a smaller vessel of the same name, launched in 1829, and also engined by the same firm to ply on the Mersey.

In 1836 the City of Dublin Co. ordered the s.s. *Royal William* (not to be confused with the celebrated Canadian vessel of this name which made the first all-steam Atlantic crossing). She was built by Wilson, of Liverpool, being engined, of course, by Fawcett, Preston, of 600 tons and 220 h.p., and made the first passage between Liverpool and New York in 1838 in TEN DAYS.

Another famous steamship was Sir John Tobin's *Liverpool*, 600 tons, and 450 h.p., reconstructed in 1838 and lost off Cap Finisterre in 1846.

The ill-fated *President* was built at London in 1839, and came round to the Mersey, *under her own sail*, to be fitted with engines of 540 h.p. by Fawcett, Preston. She left New York on 12th March, 1841, with 136 passengers, and since then nothing has been heard of her.

The *Britannia* was the first steamer actually built for Samuel Cunard, but *Unicorn* was chartered previously. Both vessels sailed from Liverpool, *Unicorn* on 6th March, 1840, to take up duties at Halifax, Nova Scotia, where she remained.

One might devote a special Paper to Merseyside Ferries, but I can only say that by 1840 all the various Ferries seem to have been served by steam vessels, and about this time, in addition to having their distinctive funnel markings, or destination boards, they were distinguished by letters or other devices at the mast-head. " W " for Woodside ; " S " for Seacombe ; a Ball for Birkenhead (in allusion to James Ball who ran the service) ; a Star for Rock Ferry ; and a Locomotive for the " Railway Ferry." The diminutive and quaint covering for the original quayside station appears to be still visible south of the Great Western terminus at Woodside.

In Sir Joshua Field's Return of 1822 the number of steam vessels Registered at various ports is given as 23 on the Clyde, 22 on the Thames, 21 at Liverpool, 14 on the Tyne, 13 on the Humber and 10 on the Forth, which is an indication of the importance of Liverpool even at that date, and in 1838, 39 steamers were Registered at Liverpool, and 37 *unregistered*, of which, of course, there is now little trace.

Since the First World War Liverpool has rapidly lost prestige as a seaport. This has been partly due to preferment, and partly to the silting up of the River, a costly problem which must be solved if the Port is to survive. Unhappily the solution does not run hand in hand with ship design, and Liverpool is in the luckless position of having constructed, at immense cost, the largest dock and graving dock in the world, for vessels which never visit the Port, partly because the dues are too high, and mainly because they draw too much.

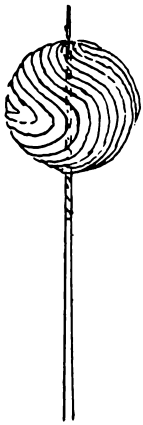
Will the owners of such large vessels *never* learn the lessons of the past, that no leviathan ever built has ever been able to

MASTHEAD DEVICES

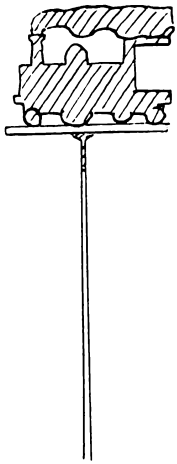
carried by the
Ferryboats

indicating their services
(1840—1870 approx.)

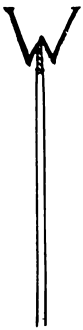
ROCK FERRY



BIRKENHEAD
(Gawthrop 1853)
(James Ball)



RAILWAY FERRY



WOODSIDE
("NUN" 1842 in
Williamson Collection)

SEACOMBE
(Gawthrop 1840—53)

make enough pay-loads throughout the year to justify her construction, and that experience has proved that vessels of about 25,000 tons and say 20 knots are required for normal trans-Atlantic trade ? Such vessels may safely use the Mersey approaches.

MERSEYSIDE STEAMER FERRIES

First recorded mention of steamers plying to various Ferries.

	Ferry	*Steamer*	*Date*	*Reference*
1	Runcorn	*Elizabeth*	28th June, 1815	Various
2	Ellesmere Port	*Countess of Bridgewater*	10th May, 1816	*Liverpool Mercury*
3	Eastham	*Princess Charlotte*	6th Sept. 1816	*Liverpool Mercury*
4	Woodside	*Etna*	24th April, 1817	*Liverpool Mercury*
5	Tranmere	*Regulator*	6th June, 1817	*Liverpool Mercury*
6	Birkenhead	*Mersey, Vesuvious*	1821-23	Gore's Directory, 1823
7	Seacombe	*Alice, Seacombe*	1823-25	Gore's Directory, 1825
8	Ince	*Vesuvius*	1828-9	Gore's Directory, 1829
9	Weston Point	*Duke of Bridgewater*	1828-9	Gore's Directory, 1829
10	Northwich	*Eagle*	1831-2	Gore's Directory, 1832
11	Egremont	— (*Sir John Moore*)	1831-2	Gore's Directory, 1832 (Vessel not named)
12	New Brighton	— (*Sir John Moore*)	1833-4	Gore's Directory, 1834 (Vessel not named)
13	Rock Ferry	—	1833-4	Gore's Directory, 1834
14	Monk's Ferry	*Abbey*	1838	Gore's Directory and Parliamentary Papers
15	New Ferry	?	?	
16	Railway Ferry	?	?	

Magazine Ferry—Only sailing vessels appear to have served this ferry between 1821 and 1841.

Seabank Ferry—(Bottom of Manor Road, Egremont) was projected about 1840 but never inaugurated.

Woodside and Seacombe Ferries were both formerly *inlets* near but not on the actual site of the present floating stages now bearing these names.

STEAMERS REGISTERED AT LIVERPOOL

From Parliamentary Papers, Returns, for the years given.

	1822	1828	1835	1838
Steamers Registered at Liverpool	21	47	28	39

MERCHANT SHIPPING WAR LOSSES 1939-45

BY A. L. BLAND

What I have to say to-night doesn't pretend to be a paper or a lecture—it is only a talk on what I am trying to do, how I am doing it and why I am doing it.

Why am I doing it ? Apart from personal interest in the subject, we have heard time and time again in this Society complaints that no records have been kept—or if they were—they have been lost or destroyed. So far as the recent war is concerned, I am hoping to remedy that and the result may be of use to investigators in days to come.

My ambition is to have a record of all Merchant Shipping of all nations, friend and foe alike, lost from any cause during the Second World War, and what is perhaps more difficult, to have that record all in one, or at the most in two volumes, for easy reference.

That covers " why " and " what " ; " how " I am doing it, I hope will be evident by the time I have done this evening.

It all started some twenty years ago, when my son, now in the Royal Navy, was a youngster of five or six. I found that much of his spare time was spent on the docks looking at ships and he was full of questions when he came home as to whom they belonged, where did they sail to, and what kind of cargoes did they carry. We had many happy weekends on the docks together and one of his first treasures was a J. of C. Flag sheet.

Then we started the idea of marking in a Lloyd's Register every ship we saw, both here and at other U.K. ports when on holiday ; if one was lost or broken up, she was marked in red in the book and the reason given. As I was able to take all the supplements home from the office as soon as the new volume came out, we were able to keep the record fairly complete. My son entered the Navy in January, 1939 and he would send notes of the ships he had seen abroad for me to mark in the record ; then came the war and such things were banned from letters but I decided to carry on as best I could.

Merchant losses were published in detail until about April of 1940, but after that I was dependent upon roundabout

methods such as hearsay reports in offices and on the docks which covered many of our local ships—oblique references in the press—perhaps an award to a Merchant Seaman would give the clue. Official accounts occasionally disclosed the names of ships and so on.

One of the oddest bits of information I received was from a German leaflet dropped during a raid on the North East Coast giving a list of what they claimed to have sunk ; it looked fantastic at the time, but alas much of it proved to be true later on.

The first step was to account for every ship taken out of the Register and by checking one volume with the next I was able to build up the lists as the war went by. The additions and deletions were controlled by Naval Intelligence working with Lloyd's and many ships known to have been lost were kept in the book for years afterwards. This was done to mislead the enemy and it was not until the preparation of the 1945-6 Register, which was issued after V.E. Day, that hundreds of ships were taken out.

For this reason I have taken the 1944-5 volume as my basis as you will see afterwards, and I am working backwards and forwards from that.

Later in 1945 the issue of Lloyd's Daily List was resumed and much additional information in regard to losses all over the World began to come to light. Even to-day the story is not yet ended as vessels are being salved that have been damaged or under water for years and written off as losses, whilst on the other hand ships are still being mined and lost for that reason.

I have quite a collection of small books issued during the last eighteen months by the leading steamship companies recounting their share in the struggle ; incidentally I am sorry to say that Liverpool owners have not been to the fore in this matter ; in fact one very well-known Liverpool liner company seem to think it a matter of shame that anyone should know what their ships did during the war.

Now I don't believe in quoting a lot of statistics in a talk of this nature, but to give you some idea of the magnitude of the task, I have prepared some approximate figures—which I give with all reserve as they are still incomplete ;—

STATISTICS :

War Losses	*Tons*	*No. of Ships*
British Empire	11,500,000	
U.S.A.	5,300,000	
Norway	2,100,000	
Holland	1,000,000	
Other Allies	2,500,000	
Neutrals	1,900,000	
	24,300,000	approx. 8,000
Marine Losses	3,000,000	1,000
Enemy Losses		
Japan	6,000,000	2,500
Italy	2,000,000	1,000
Germany	4,000,000	2,000
	39,300,000	14,500

These figures are in no way official but are the nearest estimate that I can give to the true facts. At first I was inclined to think that they were an under-estimate, but the amount of tonnage previously recorded as sunk or scuttled that has been reclaimed during the past two years will probably make the figures more accurate than at one time I thought possible.

You may have a better idea of the task involved if I say that if I dictated only the names of all vessels lost at the rate of two per minute, it would take over five days and five nights without stopping to complete the task.

In a general survey of the position I must forego the details and I think the most effective way will be to tell you how far I have gone with each section in turn :—

BRITISH EMPIRE.—This is naturally the largest and most important group—the one we are most interested in—and which so far has been allotted most of my time.

A really firm basis was found when the R.N. and Merchant Navy official blue books of War Losses were published in 1947. The only snag, from my point of view, being that ninety per cent of the locations were shown as latitude and longitude, so that I first had to convert them to approximate positions with the aid of a large atlas.

The only serious gap in my information is an official list of British ships lost through *Marine* causes during the war, and when I get this I should be reasonably complete.

Before I outline the trend of Merchant tonnage losses, you may be interested in the following figures :—

BRITISH COMPANIES

	Percentage of pre-war Tonnage lost
Athel Line	84
Runciman's ...	73
Harrison, J. and C.	71½
Elders and Fyffes	65
Blue Star Line	64½
Donaldson...	63½
General Steam	60
Anchor Line ...	59
Furness Withy Group	59
Canadian Pacific Rly.	54

There may be other Companies more hardly hit than the above but I have not had time to check their figures, and I sincerely hope I may find none higher than those given.

It may be noted that the higest losses were suffered by the Tramp Owners rather than the Liner Companies which may perhaps be explained by the fact that the Liners were less vulnerable to air and torpedo attack owing to their higher speed and that they were running most of the time in troop convoys which during the earlier part of the War were able to claim a better escort from our sadly limited resources.

Now I should like to turn to the chart for a moment :

First just note the main convoy routes :—

Halifax across the North Atlantic to the Western Approaches.

Round the United Kingdom.

Gibraltar and the Mediterranean.

Freetown to the Cape and round Africa.

The Cape across the South Atlantic to the West Indies and the States.

Iceland to Murmansk.

Now an examination of the Blue Book proves it to be a most exact barometer of the progress of the war at sea. First we must remember that so far as the sea battle was concerned, there never was a " phoney " war and our Naval and Merchant forces had to be on their toes from the word " Go," and never let up until the end. In other words, from the sinking of the *Athenia* on September 3rd, 1939, to the torpedoing of the *Avondale Park* on May 7th, 1945.

By the end of 1940 some 4½ million tons of Allied and Neutral shipping had been lost, and during the following year 1941, a slightly smaller tonnage had gone, but still over 4,000,000.

The losses caused by submarine attack did not become seriously heavy until June, 1940, but for the whole of that year the losses due to mines were greater. This, of course, covered the period of the magnetic mine, and losses by air attack were greater still, and this included the period of the attack on Norway and the Low Countries, followed by the fall of France and the Dunkirk evacuation.

During 1941 the submarine losses remained fairly constant although more widely spread. The losses due to mines were greatly reduced but the losses by air attack were terribly high during March, April and May. It was during this period that over fifty per cent of the Greek Mercantile Marine became the sport of the Luftwaffe ; in most cases they were just a sitting target in harbour.

Our own losses were mainly in the North Atlantic and Bay of Biscay by torpedo and further afield due to forays by the *Graf Spee* and the *Deutschland* or armed merchant raiders.

Round our own coasts the never-ending battle went on against mine, torpedo and air attack, and after the Germans obtained control of the North Sea and Channel coasts the menace of " E " boats was added to the list.

The difficulties our seamen had to encounter in this phase of operations have been graphically described by Captain Mackay, M.B.E.—master of s.s. *Fendris*—a ship well known in this port and owned by the Moss-Hutchinson Line.

(*Editor's Note.*—Here, but deleted, the lecturer gave a very interesting extract from Captain D. M. Mackay's personal account of a typical voyage in a large convoy

bound northwards from the Thames during the height of the German offensive in the North Sea.)

By the end of 1941 the German submarines were working farther and farther afield, and whilst losses in home waters continued to fall, the strain on our resources increased and even convoys up the East Coast of Africa were no longer reasonably safe.

Then at the end of that year came Pearl Harbour and the Japanese poured south—finding our ships practically defenceless and unable to reply effectively to air, surface or underwater attack.

As a result of this onslaught no route in the Seven Seas was safe ; the Dutch and ourselves were overwhelmed in the East Indies and the Pacific, whilst the Germans found a happy hunting ground in the Caribbean and the U.S. Atlantic Coast against the quite unready U.S. Merchant Fleet.

As may be expected 1942 was the blackest year of all and the total Allied Merchant losses rose to nearly 8,000,000 tons, or nearly as much as 1940 and 1941 together. This rate of loss went on until July, 1943, when as if by magic the rate of loss suddenly dropped to 100,000 tons per month and remained below this figure until the end of the war.

This was due to a combination of several defence measures coming to fruition about the same time. The American building programme of anti-submarine ships began to take effect—the number of our escort ships at last became adequate and, what was more, we had sufficient frigates and sloops to provide escort groups operating ahead or on the flanks of the convoys, additional to the close escort ; this enabled the " U " boat wolf packs to be hunted down long before they came within sight or torpedo range of the convoy itself. Further, the use of escort carriers and M.A.C. ships gave us air cover for the whole North Atlantic crossing which we had not had before.

Losses continued to diminish even in 1944, and, as you remember, the Normandy landings, thanks to superb air and escort cover, were remarkable for the low figure of ship losses.

By the time May, 1945, came, only three ships were sunk, all by torpedo, and from then to September no total loss was reported at all so evidently the Japanese had shot their bolt too.

Many books could be written concerning the amazing adventures of individual ships, but may I close this section of my talk with three typical cases of ships which were written off as total losses and yet to-day are sailing the seas as good as ever they were :—

s.s. *Torun.*—A Polish steamer, owned by the Polish Steamship Agency, a typical Baltic trader, about 2,000 tons gross, built in 1926. When the Germans invaded Poland, she was sunk by the Poles as a block-ship at Gdynia. The Germans raised her and used her for carrying supplies to their garrisons in Norway. She was torpedoed by a British submarine off the Norwegian coast and sank in shallow water ; the Germans raised her again and next she was sunk by the R.A.F. in the Keil Canal. After the war she was salved once more, and when last I saw her, she was discharging at our own wharf at Birkenhead and looked none the worse for her adventures.

s.s. *Dalesman.*—A typical Harrison liner, built on the Clyde in 1940, of 6,343 tons gross.

During the air attacks on Crete she was set on fire in Suda Bay in May, 1941, and last seen as a blazing wreck likely to founder or go ashore.

Reported as a total loss no further clue was found until the occupation of Trieste after the war when the German ship *Pluto*, taken as prize, was found to be the old *Dalesman.* She had been salved by the Germans and used by them for carrying troops in the Mediterranean. She had been damaged again by Allied air attacks at Trieste.

She was taken over by the Admiralty and renamed *Empire Wily*, repaired in Italy and eventually sold to her original owners, for whom she is once more sailing as *Dalesman.*

s.s. *New Westminster City.*—A high-class tramp steamer owned by the Reardon Smith Line, of Cardiff ; built in 1929, of 4,747 tons gross. She left the Mersey in March, 1942, to join a North Russian convoy ; she was loaded with ammunition, medical supplies and a number of aircraft for the first R.A.F. wing to go to Russia. Of the 32 ships that set out from Reykjavik only 14 got through, the remainder being lost. The *N. W. City* got to Murmansk all right, but within 24 hours of her arrival she was set on fire by air attack and badly damaged by the blowing up of much of her ammunition cargo.

Later the fire was put out and she was towed to an anchor in shallow water ; she was abandoned as unseaworthy and her crew sent home. Four years later she was patched up sufficiently to bring a cargo of timber to the U.K. from North Russia, and after being practically rebuilt she is running for her owners once again.

NETHERLANDS.—This was one of my first successes. My letter to the Netherlands Shipping and Trading Committee in London was sent on to the Ministry of Marine at the Hague. Shortly after, with a personal letter from the Director, I received a full statement—evidently specially typed for the occasion—of all deep sea vessels and sea-going tugs lost during the War.

Correspondence with the K.P.M. at Amsterdam cleared up many queries in the Dutch East Indies and all I am really short of now are Coasting and Fishing vessels of Netherlands Registry, of which alas there seems to be a great number to be accounted for.

UNITED STATES.—Thanks to the kindness of our Chairman, one of the first contacts I made abroad in 1946 was with the United States, and the War Shipping Admin. office sent me a copy of an official list handed to the American press in June, 1945.

This only gives the War Losses of U.S. tonnage to May, 1945—the end of the war in Europe—and whilst it was a foundation on which to build, it did not give me any marine losses, nor the many vessels under the Panama flag. The location of the loss was only very vague, e.g., North-East Atlantic, which covered everything from North Russia, Iceland, British Isles, European Coast down to Gibraltar. Also the manner of loss was not given.

So in 1947 I tried again and was able finally to make contact with Col. Hugh Butler, the Director of the Research Division of the U.S.N.C., and in return for one of our own blue books he sent me a bound copy of duplicates from their own elaborate files of U.S. and Panama Ships.

The summary of the report is interesting, as it shows, so far as ship losses are concerned, how comparatively cheaply the U.S.A. achieved their victory in the Pacific. Of about 600 vessels lost by enemy action, only some ten per cent were sunk by the Japanese and the other ninety per cent by Germany and Italy.

As we ourselves were fighting for six years in by far the most dangerous sea zones, it helps to explain the enormous share that British flag losses bear to the total.

SCANDINAVIA.—With the losses of Norway, Sweden and Denmark, I was again very fortunate. I saw a notice in the Shipping Press that the Norsk Veritas had published a list of all vessels taken out of their register during 1946, and in response to my enquiry they sent me the deletions for 1939 to 1945 inclusive. Moreover, they have placed the Society on their posting list for regular information in future.

The only drawback from my point of view is that the records are all printed in Norwegian, but by purchasing a small Norsk Dictionary and aided by the similarity of many shipping words in any language, I have been able to manage all right. Further assistance from the Norsk Veritas in clearing up the fate of many Scandinavian vessels which fell into German hands during the occupation has enabled me to complete my enquiries.

FRANCE.—Through the kindness of Commander Talbot-Booth I was given a letter of introduction to Henri Le Masson —the editor of " Flottes de Combat "—the French equivalent of " Jane's Fighting Ships."

He has been most helpful, and as with several other correspondents to whom I have referred, I have been able to reciprocate by sending them copies of our own Blue Book of British Merchant Losses.

As M. Le Masson says in one of his letters, no complete list of French vessels lost during the war has been established. So many of their ships were bombed or scuttled in shallow waters, that many may be salved. The hulls all have to be surveyed and decisions made as to whether salvage is possible or economical ; in fact Lloyd's List every week contains examples of ships salved after being under water and written off as losses four years ago.

The official book will not be issued until the salvage programme is complete and such ships will be shown in a special chapter.

The details of vessels sunk in harbours would need a paper for themselves; but as an example, over 1,000,000 tons

of shipping was found sunk in Hamburg alone in May, 1945. This was the result of Allied bombing and German scuttling.

JAPAN.—When I was seeing Lloyd's in London last summer, they told me that their surveyors at Hong Kong, Manila and Shanghai have been quite unable to obtain any information on Japanese losses from the U.S. Naval Authorities ; they were known to have captured all the Japanese Admiralty archives but would not release a crumb of information. As a result the current issue of the Register still contains hundreds of Japanese vessels known to be lost.

Imagine my relief when my French Correspondent in Paris wrote to say he had just seen an announcement in an American journal that the Joint U.S. Army and Navy Committee had published a book containing the official list of Japanese Naval and Mercantile losses from all causes from 1941 to 1945.

I at once wrote to Colonel Butler in Washington and by return received a copy which is on loan to the Society. The most comprehensive and ambitious book so far published on the subject. If all countries dealt with the matter similarly, my task would be quite straightforward.

The only difficulty here for record purposes is that so many of the ships were built after the end of 1941 and therefore details of construction, size, etc., are lacking in both British and American publications.

The Japanese adopted an awkward system from the student's point of view, of immediately replacing a lost ship with another of the same name but not the same size, and so on to the end of the war.

RUSSIA.—The losses of Soviet ships are likely to be my biggest problem of all. The Iron Curtain has so far proved impenetrable. During the whole of the War period the Russian Authorities have admitted the loss of a few vessels by marine risk, and then only in places outside their vast domain where other evidence can be obtained.

If their own statements are to be believed they lost no vessels by enemy action during the whole war. Admittedly they didn't send many of their own ships to fetch war material from the Allies—they were not interested until the goods were delivered to them—and the perilous North Russian

Convoys were largely composed of British and American vessels.

When you remember the hard fighting up and down the Baltic, the fall of Odessa and Sevastopol and other operations in the Black Sea, the whole idea that the Soviet Merchant Fleet escaped scot-free is fantastic. I am therefore quite satisfied that the present Lloyd's Register contains many Russian ships that have long ago gone to the bottom of the sea.

Much information is still wanted from the smaller fleets, such as Italy, Greece, Yugo-Slavia and others.

If therefore any member can assist me with information, however scanty, rest assured it will be checked carefully and I shall be very grateful, particularly if the date, place and manner of loss can be given.

MINIATURE SHIP MODELS

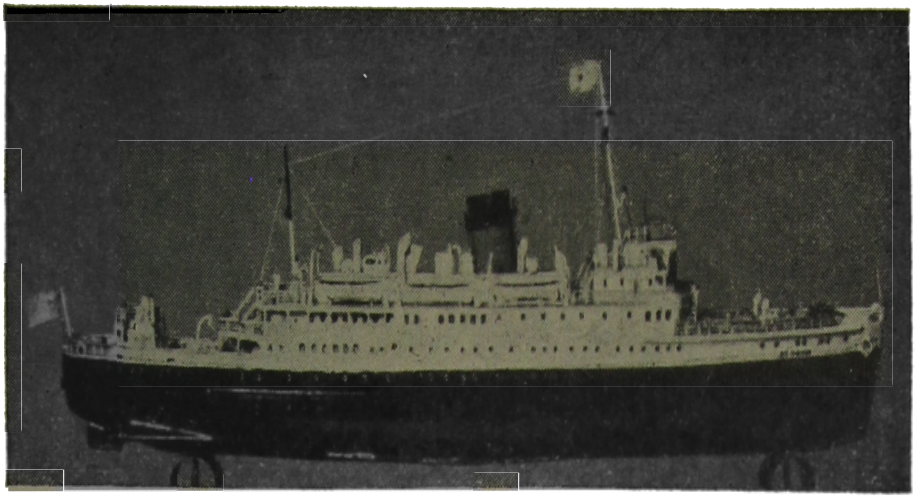
BY KEITH P. LEWIS

This paper has its origin in some notes supplied to a member of this Society who is making a compendium on ship-modelling in general with supplementary appendices contributed by workers interested in various specialised aspects. It was suggested that my own composition should form the basis of a paper to be read during the 1948-49 Syllabus, and although I protested that my very contemporary models were not covered by the purest definition of the word " research," our Chairman insisted that methods of shaping and handling materials, to represent small-scale replicas of ships of the present-day, could be applied to the construction of models of ships whose designs and histories have in the past formed the subject matter of papers read before this Society. As I am the humblest of students in maritime affairs prior to the year 1900, I must ask you, gentlemen, to perform half this task yourselves, mentally adapting, if you so desire, my methods for consideration in the light of your own particular model-making problems.

My own activities in this direction started when as a schoolboy I anticipated Mr. Kaiser in his prefabrication by constructing ships of sorts from corks and pins—although I made no attempt to insert the results into the bottles from which the corks had been withdrawn. I graduated to wood as my childhood receded along with parental reluctance to permit my use of tools of construction with supplementary lethal purposes. Besides the ubiquitous pen-knife and broken razor-blade, my tool-chest contains small chisels and gouges normally employed in mechanical dentistry.

In this paper I propose to deal broadly with my methods and to submit myself thereafter to any cross-examination you may care to make based on your inspection of the models I have brought along this evening.

There are two types of model-maker in all branches of the craft; the one who aims for a realistic and true-scale representation of the object of his attention, a good finish



MINIATURE MODEL OF THE GREAT WESTERN RAILWAY STEAMER
St. David (1947), SCALE 75 FT. TO THE INCH.

By courtesy of the Editor "*Shipbuilding and Shipping Record.*"

being applied to a clean result achieved from the use of selected materials, and the other who takes a pride in the odds and ends with which he stocks his workshop. I would refer particularly to the popular boast that such and such a model was made using " only a pen-knife " or from empty cans, and am reminded of those supreme examples of misapplied ingenuity which were given publicity in the days before newsprint restrictions : cathedrals made from so many thousand match-sticks or a sheep's skull rigged to form an apology for a ship. Happily the standards set by craftsmen up and down the country have placed amateur ship-modelling on its present high plane—even though there will always be a press and public who yearn for the spectacular in preference to the accurate and well-finished product. Materials and tools are these days in short supply and much improvisation is necessary, but the model-maker with a will to succeed cannot help but do so, and if he is reduced to using a humble source of supply for some of his materials, he will see to it that the fact is concealed by skilful fashioning and finishing rather than made a subject for bravado !

An evil influence before the war was the so-called " construction kit " which placed many a budding maker of period models on the wrong track at the outset. Decorative effect was the primary aim and the result doubtless looked good atop the domestic book-case. These seem to have disappeared from the shops since the end of hostilities, but a new menace has arisen in the form of a cheap construction set which makes a miniature of some famous liner. Often a creditable resemblance is the outcome of carefully following instructions but it is usually spoilt by applications of the poor quality paints supplied with the " kit." Stereotyped methods of construction are disseminated wholesale and when the embryo craftsman feels himself competent to strike out on his own, it is to tread well-trodden paths and to set for his little shipyard a low standard of ultimate attainment.

I shall not seek to be dogmatic in describing my own methods—circumstances and physical capacity count for a lot in assessing individual ability. Everything I describe has been tried and used unless otherwise stated, when I shall make suggestions which might be useful to those possessing better tools or having greater skill in the handling of certain materials. I might be digressing when I mention that I am a teetotaller and a non-smoker, but I have been told that the

foregoing of these pleasures (from taste rather than principle !) gives me a steadiness of hand denied to those who indulge. I shall not comment on this as I only know one side of the picture. I have been blessed with excellent eyesight for close work, and although finding a table-lamp indispensable, I have no need for a watchmaker's glass—yet.

Seeing ships almost every day of the week gives me a taste for the subject and helps in a way which I shall describe later on in this paper.

Scale

I work at a scale which is a little greater than 75 feet to the inch. This unusual choice was the result of the gift of a set of plans of the old *Mauretania* by the late Mr. H. N. Leask in 1935 in response to a request for some suitable model-making data. The model was duly made from the plans which, directly photostatted from an engineering periodical, were to this out-of-step but, to me, very convenient scale, and all other members of my " fleet " have followed suit. I suppose that I should snap out of it and get down to a standard scale such as 64 feet to the inch, but the desire for comparison between models is too strong an inducement towards carrying on as before. To others who may consider miniature ship-modelling, I would recommend the latter scale ; the methods I shall describe are equally applicable to it.

Drawings

Though a student of nautical research within a very limited field, I have never been able to marry this latter activity with model-making. My researches have been largely into the activities of undertakings, institutions and fleets, only the barest recognition details and dimensions of the vessels concerned having interested me. All my models are therefore " contemporary " and born of my environment. For future construction however I plan a four-masted barque, a " seventy-four " of the early nineteenth century and an *Amphion* class cruiser of the 'eighties, but here again contemporary vessels have probably influenced my taste : it is barely ten years since the Erikson barques visited the Mersey, and the boy's training-ships which used to lie in the Mersey near my home came within the scope of the other two classes and were a constant source of interest to me.

Back-numbers of technical publications contain so-called " general arrangement " plans of contemporary ships. Post-war issues are not so comprehensive because of paper restrictions, but practically every ship of consequence was so covered before the war by the journals I shall enumerate, the exceptions being vessels built for certain private firms and many of those built by Messrs. Harland and Wolff who, I have been given to understand, are averse to the reproduction of such plans. The following are some of the best sources of such data :—

" Shipbuilding and Shipping Record "
" Shipbuilder and Marine Engine-Builder "
" The Motor Ship "
" Shipping World "

Of the actual " plans," little need be said except that the detail shown varies in many instances. The better ones show every deck fitting whilst others confine themselves to the arrangement of passenger accommodation to the exclusion of working effects and even those portions of the decks not supporting cabins or public rooms. Windows are occasionally shown sectionally in the walls of deckhouses on larger-scale plans and these are a great help. Sometimes the boat-deck fittings are reproduced and even the bridge and " monkey island," such plans being invaluable to the model-maker, particularly if the sheer plan is full-hull and in the nature of an outside profile. Often though the sheer is sectionalised and the missing information, such as ports, windows, etc., from the plans or, if this does not satisfy, recourse can be made to good photos. An irritating feature of many such sheer drawings is the " sawing-off " of the funnel and the depicting of masts and derricks in " stump " form. Photographs are of some assistance here and in the absence of any definite information, the old adage, " if it looks right, it is right " has to be observed. Occassionally heights of funnels, masts, etc., are contained amongst statistical information in the text of the descriptive article of which the drawings form a part, and it is a wise move to read through these carefully, noting useful points.

Your plans should be scaled down by redrawing with the aid of proportionate dividers or a graph, keeping a weather-eye open for inconsistencies of scale caused by inaccurate block-making or paper-shrinkage. This is a subject in itself and when I have tackled it my methods have been so heretical in their roughness that I propose to say nothing rather than to lead

anyone astray or invite censure from members of my audience ! I prefer to use a method which is open to much criticism and demands a certain knowledge of process photography and its attendant apparatus. I photograph the original plan on to a negative of the size popularly known as " miniature," and project it at the correct scale to a piece of bromide paper which, after exposure, is developed and fixed. There are many complications in this, not the least of which is the danger of distortion. Anyone who has used a photographic enlarger will appreciate the finer details of the broad principle involved, but for model-makers not accustomed to processing their own plates, films and papers, the method is best left severely alone in favour of the more generally accepted tenets of draughtsmanship. Nevertheless, the labour saved by the photographic process is considerable.

Again bordering on heresy, I shall say that I do not use hull lines. In the first place they are seldom if ever published covering ships of my " period," and frankly the effort of securing them for such small models seems hardly worth while. I find it better to collect as many views as possible of the vessel selected for modelling both on the stocks and afloat, to study her builder's model, if available, and the ship herself: in short, to become " shipmates " with her to such an extent that the portrayal of her lines in three dimensions becomes almost instinctive. I appreciate that this is a difficult matter for the model-maker living away from a large port and he should adopt a firmer basis on which to work, even if this means securing hull lines and cutting templates therefrom. All this is not to say that the inland model-maker should not see ships on every possible occasion in the same way that his more favourably placed comrade on the coast should try to familiarise himself with lines when opportunity offers. In this way both can acquire the ability of forming a mental picture of a ship and with it some insight into the shipwright's craft.

The Hull and Fittings

I shall not enter into the age-old controversy of the waterline model versus the full-hull. Suffice to say that I prefer full-hulls and recommend them to others. The impression of a ship at sea can be obtained, I believe, by inserting the hull into an artificial sea made of putty or a grade of fine-quality cement, from which it can be removed at will if it has been first greased. I make my hulls hollow and some of the larger units of my fleet have occasionally taken the water for the

benefit of those who insist that a ship is not a ship until she is shown in her native element. I think, too, that it is in some ways an honest policy to make a full-hull irrespective of partisanship over its merits in relation to the waterline. We have all seen models in the latter category at all scales whose body lines if produced to their logical extremities below the waterline would result in an impossible hull form.

I carve my hulls from yellow-pine. Having scaled down the plans, a rectangle of wood should be cut to the extreme dimensions of the proposed hull. I find it a good idea when a ship " breaks down " to a lower deck astern to treat the height above keel of the extreme forward end of the forecastle head as the maximum depth for model-making purposes, the portion astern being cut away as required later in construction. The extreme width should, in the absence of lines, be the width of the visibly widest part of the main deck plus an estimated allowance for tumblehome. The sheer should next be cut, a difficult operation which is best undertaken with a vice and a spokeshave but which should have precedence over the shaping of the hull. If the ship is to be hollowed out and a separate deck fitted, an allowance should be made for the thickness of this. The plan of the vessel can be described with a chisel, this and the previous operation being assisted by tracing the forms required from the plans with tracing and carbon paper. Carving the hull can best be done with dentists' chisels, gouges, ordinary razor-blades and the inevitable pen-knife. As the artist has to come very much to the fore, little can be said except " take it steady " and make your growing model as ship-shape as possible. Points to notice on the prototype or builders' model are whether or not the bow has a hollow entrance or is inclined to be full, and the degree of fineness or fullness astern, be the latter " counter " or " cruiser."

It is advisable to add the rudder after carving, cutting it from thin card, as a projection of this nature tends to break away when other parts of the hull are being worked at. Similarly the forefoot has a habit of wearing or breaking-away and it might be necessary when all the rough work is completed to take the bull by the horns and cut out a sizeable piece from the offending extremity, inserting a new one to be worked into shape with chisel and sandpaper. Errors and accidents can be rectified and repaired with plastic wood, a medium which will be found very handy for a number of tasks at this stage, but a correct job first time is, of course, more satisfying.

Flare at the bows is a rock upon which I have perished more than once. Not only is it difficult to match port and starboard but there is a temptation once a reasonable result has been achieved to overdo things and to have to reduce the fullness of the whole ship in trying to retrieve the balance. It is this business of flare which makes it so necessary to carve the sheer plan before shaping, otherwise the forecastle deck plan becomes finer the lower one brings it.

Fine sandpaper finishes off this part of the job and hollowing-out follows. A dentist's gouge and chisel will again see this through, too literally unless the greatest care is exercised. I carve mine until I can just see light through the skin of the hull. The sides amidships tend to collapse inwards due to some strains and stresses latent in the wood and two or three " beams " are necessary in order to rectify the position. Decks I make from a brand of three-plywood, one millimetre in thickness, which was obtainable before the war. As it is no longer available, I shall have to seek a substitute when my diminishing supply is exhausted and this will probably be a home-made product of veneer and card. The greatest accuracy is necessary when cutting the sheer for if port and starboard are not strictly identical, a twisted deck will result with even worse horrors when the completed ship is viewed end-on. Seccotine or Tenasitine are the best glues for attaching the deck to the hull and for most adhesive work in miniature ship-modelling, though it will probably be found necessary to thin either of these with water for some exceptionally delicate jobs.

I make no attempt to rule deck-planking and consider that the grain of the top layer of the plywood is sufficient representation. If the ship has solid bulwarks on her well-decks, these should not be treated as part of the hull but built up of cardboard before painting. Copal varnish or a quick-drying enamel forms the best " undercoat " ; the former I leave severely alone as a result of bitter experience, but if an enamel is used it should be rubbed-down with powdered pumice and water. I use Chinese lacquer for the outer coats, generally rubbing-down the first three on larger models. Each takes several days to dry after application, but the time need not be wasted as many small fittings can be made and stored during these periods. No more painting is done after the third rubbing-down until the ship is complete, when the hull is carefully washed with soap and water to remove the

marks of glue-smeared fingers. When thoroughly clean, final colours can be applied and, in my case, not rubbed-down. Some model-makers prefer a matt finish and will probably wish to give a final slight friction with the pumice-cloth to the final coat which should then be applied before fitting out the hull as it is next to impossible to rub-down the completed ship without damaging delicate parts.

The building-up of the superstructure follows on the fitting of the deck, deckhouses being made of thin card, not always cut to pure rectangles in shape but in the form of a mild parallelogram or trapezium according to the sheer or camber of the deck where their walls are to be sited. Incidentally, within limits, thin card lends itself to a certain amount of persuasion in a direction not usually attempted. Windows I cut out and glaze with thin celluloid but portholes I " ring " with copper-wire shaped around a fine hypodermic syringe needle. After glueing in position (using tweezers and a needle to assist) a dab of grey-green (not black) paint gives both extra strength and effect. Upper decks which overhang are made from the same thin plywood as the first deck, in my case sandpapered down to a lesser thickness and painted white on the underside. Stanchions are made of wood, both 'tween decks and those supporting railings, the horizontal members of the latter being made from copper-wire. All fittings, wherever possible, should be painted in advance of installation. Winches and windlasses are built-up of card and wire. Bollards and capstans are of wood. Life-boats can be carved out of wood and left solid or formed from papier-mache, painted and fitted with thwarts. Gravity davits I make from thin card, building them up in accordance with the prototype—or as nearly as possible. I recommend this method in preference to sliding over the job with goosenecked wire terminating in the bowels of the boats themselves. Luffing davits I built up in the same way from card except that the actual arm is of thin metal strip. Radial davits are, of course, of wire. Cowl ventilators I carve from wood and they tend to try the patience, but until very recently I knew of no other way which gave a reasonably satisfying result. As I have yet to try this new idea I shall say nothing about it except that it is very satisfying at 25 feet to the inch. The behaviour of the materials used at a scale three times smaller might not cause such elation. The average cargo-liner, for your cold comfort, can boast between sixty and eighty cowl ventilators.

I make my masts and derricks from split bamboo. Models are rigged with fine silk, stretched between glued points, but where a rope is to be shown lying slack, human hair laid, but not stretched, between dabs of glue gives the right effect. Conversely, human hair cannot be stretched taut as its springy nature gets the better of the glue after a few days.

The funnel or funnels are made of paper rolled around a piece of dowelling cut to the cross-section (round, oval or pear-shaped) required, but slightly less than the full diameter of the fittings as depicted on the working plan. A few turns of the paper bring the funnel to correct size. The edge of the paper should lie in a position where it will be partly concealed by a waste-steam pipe, if possible (split bamboo or wire), and with skill can be almost completely camouflaged by bevelling with a very sharp razor-blade. Copal varnish should first be applied, thinly inside and out and the colouring when dry. Paint on a funnel cannot be satisfactorily rubbed-down so these coats should be very carefully applied. Beading can be represented by strips of thin paper glued on *after* the varnish but *before* the colouring is applied.

I make my own anchor chain link by link. This is a tough assignment and all I can say is that practice makes perfect, the material being wire and the tools tweezers and two fine needles. An alternative method failing the acquisition of eye-glass chain of suitable gauge would be to twist the wire into the appearance of chain when viewed from a distance, and to hope for the best.

Conclusion

One could write a book on one's own branch of ship-modelling. Time does not allow of the detailed description and necessary diagrams of methods employed to make the many fittings on a modern ship, and even so, much depends on the capacity of the model-shipwright, so that such a procedure might be a waste of paper on a craftsman who is skilled with a soldering iron and scorns paper, wood and glue. To my mind, the key to the fashioning of these basic materials into a tiny reproduction of a specimen of the high-watermark of Man's conquest over Nature is to have patience, good eyesight, a steady hand and, above all, a love of the subject of one's model. Without the latter, one's labour is in vain ; with it, there are no limits to an unconscious ingenuity which manifests itself in a seemingly effortless skill. Gentlemen, have a try at it !

STEAM AT SEA

By ALEX. M. FLETCHER

Mechanically propelled vessels were in use long before the force of the wind was harnessed to their propulsion. At first paddles were used as an extension of the user's arm, then oars used as a true lever. The oar-propelled ship lasted for thousands of years as the pride of the sea; and for war purposes was only ousted with the coming of the gun. The last big naval battle in which oar propelled warships played a major part was the Battle of Lepanto (1571). The use of oars seriously limited the size of the ships, especially beam and depth, and limited still more the carrying capacity—most of the space available having to be used for oarsmen.

Paddle wheels had been suggested at an early date. One authority states that a Roman army was carried to Sicily in boats driven by paddle wheels turned by oxen (Volturias), but this is not substantiated. In 1838 the Keeper of the Archives of the Spanish Navy claimed to have found a record of Blaco de Garay having a power-propelled boat in Barcelona Harbour in 1543; part of the machinery being a "vessel of boiling water." Little, if any, credence is placed in this story.

Unless we accept this, there is no record of any attempts to apply steam to navigation until we come to the time of Savery who, in 1638, in his "Navigation Improved," described his patented method of driving paddle wheels by a capstan. He tried to interest the Navy in this, but was met with the answer, "What have interloping people, that have no concern with us, to do to pretend to contrive or invent things for us?" —a spirit, unfortunately, not dead to-day in official circles.

Denis (Dionysius) Papin, in 1690 (Acta Eruditorium, Leipsic) *described* the first steam engine with a piston—the steam was condensed by removing the fire from underneath the cylinder, which also served as a boiler. Born in France, Papin came to England as a result of the persecution of the Hugenots, and later became Professor of Mathematics at Cassel (Germany) and whilst there (1707) fitted another steam engine in a boat on the River Fulda. The engine was a retrogression of his earlier design and is believed to have been largely made by Newcommen and Savery. In this engine condensation of steam caused atmospheric pressure to force water into the

engine and lift the weighted piston; on steam being readmitted above the piston, the weight forced the water into a tank from which it flowed on to a water-wheel and turned paddles. There is some evidence that the boat was a success and that it was destroyed by the " Federation of Fulda Boatmen " who accused him of taking the bread out of their mouths. Papin died in poverty—details of his death are not known but it is thought that it may have occurred in London in 1747.

Jonathon Hulls is next to come on the scene. In 1736 he took out a patent for " A machine for carrying ships and vessels out of or into any harbour." It is doubtful if he put his invention into practice, and he met with a lot of ridicule :

" Jonathon Hull with his paper skull
Tried to make a machine
To go against wind and tide,
But he like an Ass,
Couldn't bring it to pass,
So at last was ashamed to be seen."

A drawing in his pamphlet of 1737 shows an adaptation of Newcommen's engine, rotary action being achieved by a counterpoise and a system of ropes running over grooved pulleys, acting as a ratchet. He may have made a model and, at any rate, ordered his engine from the Eagle Foundry, Birmingham. Like Papin, he died in poverty.

Active development now moved over to France and America. In France, the Marquis of Jouffrey had—after many failures—a steamer running on the Saone at Lyons, using paddle wheels and an engine built in France on the lines of a Watt's engine, but with a rack and ratchet device on the piston rod. The French Government refused support and Jouffrey's experiments came to nothing. In America, Watt's engine caused Wm. Henry (the inventor of the rug carpet and of the screw wood-drill) to experiment with steam navigation and he made two successful models (1763-1782). James Ramsey, in 1787, had a steam-boat running on the River Potomac. He used a system of jet propulsion with a Watt-type engine driving a pump, which sucked in water at the bow and forced it out at the stern. The boat was successful and Ramsey was given the exclusive right to navigate with steam-boats the rivers of Virginia, New York, and Maryland.

He was before his time, however, and his ideas were not utilised. He died in London in 1793, when lecturing to a meeting on some of his schemes.

John Fitch was contemporary with Ramsey and, after making several models, made a steam-boat in 1787 with an arrangement of paddles at the sides. He was granted the exclusive right of navigation by steam on certain rivers in New Jersey and made several steamers—including a small screw-driven one in 1796. He committed suicide through disappointment.

Meanwhile, in Scotland, Patrick Miller had designed a double-hulled boat with a paddle wheel between the two hulls. In 1788 this boat was fitted with an engine made by Symington, which turned a flywheel without the use of Watt's awkward beam. Symington is probably entitled to the credit of making the first really practicable steamer, as in 1802 he built a tug-boat for Lord Dundas named the *Charlotte Dundas*. This was a stern-wheeler which towed two loaded barges at 3 m.p.h. against a strong wind on the Firth-Forth Canal. The *Charlotte Dundas* was laid up owing to the opposition of the canal proprietors, but the Duke of Bridgewater ordered a number of similar boats to be used on the Bridgewater canals. The death of the Duke led to the cancellation of the order and Symington ceased his experiments in disgust.

In America several men were hard at work, especially Colonel John Stevens and Robert Fulton. Stevens, who became the pioneer of railways in America, made a number of small steamers using high-pressure steam and screw propellors (1805). With his sons he constructed many steamboats—abandoning screws—but Fulton's success with the *Clermont* barred him from the State of New York and his steamer *Phoenix* was in consequence the first steam-ship to make an open sea passage.

Robert Fulton, also famous for his ideas about submarines and ironclad warships, was the first man to make a commercially successful steamship. After experiments in France, he returned to America and built the *Clermont* in 1807. The engine was built by Boulton and Watt, and the *Clermont* was notable for her wedge-shaped bow and stern. Fulton had visited Scotland and, according to Symington, had made a trip in the *Charlotte Dundas*, promising Symington some form

of payment for his help and information. Fulton denied this, but there seems to be no doubt that he was aware of Symington's work and benefited from the latter's experience. The *Clermont* ran successfully on the River Hudson from New York to Albany, a 36-hour run, and founded the first regular service.

The close of the experimental period was marked by Bell's *Comet* (1812). Its boiler was built by David Napier who became famous as a steam ship builder (and whose choice of funnel colouring is probably responsible for the present-day colouring of the Cunard, I. of M.S.P. Co., and other famous modern lines). It is recorded of Napier that, in order to study the effect of the shape of a ship's bow an its movement through the water, he made a voyage to Ireland, strapped in a chair fastened to the bowsprit of one of the sailing packets of his day, and rejoiced in the storminess of the crossing. At first the *Comet* had double paddle wheels on each side, but these were later replaced by single wheels and the boat was lengthened by 20 feet. The *Comet* ran successfully for eight years on the Clyde and started the fashion for music on excursion steamers—a piper was included in her crew.

A period of rapid development followed. In America, Fulton and Stevens led the way in a very rapid growth of river and lake navigation, held back for some time by legal difficulties caused by the monopolies in steam navigation granted by the American Government. The other centre of development was the Clyde, especially with its application of steam to the Irish Cross Channel trade. This led to the formation of such famous companies as the St. George S.P. Co. (1822—present descendants are the Liverpool and N. Wales S.P. Co., and the British and Continental Steamship Co.); the City of Dublin S.P. Co. (1824—the original name is still registered by the Coast Lines group, but the operating company is the B. and I. S.P. Co.); and the I. of M. S.P. Co. (1830). Space forbids enumerating the similar historic Clyde lines, now mainly linked up in the Coast Lines grouping.

The Atlantic trade was a great attraction to the early engineers, and the honour of being the first steamship to cross the Atlantic has been claimed for several ships, including the *Conde de Pamella*, *Savannah* (1819); *Royal William* (1) (1833—built on the St. Lawrence). Cunard was one of the shareholders); but probably the honour of being the first ship to use steam for the majority of the distance across the

Atlantic belongs to the *Curacoa* (1827), built in Dover, later sold to the Dutch Government and used for a time on a service to the Dutch West Indies.

Atlantic rivalry began in earnest in 1838, when the British Queen S.P. Co. and the Great Western Steamship Co. had plans for the Western run. The British Queen Company encountered difficulties over their vessel and, to maintain prestige, chartered the *Sirius* from the St. George Steam Packet Company. She sailed from the Thames for New York on March 28th and left Cork on April 4th. The *Great Western*, built by Patterson of Bristol with engines by Maudsley, left London on 31st March, and in spite of a fire in the stoke-hold left Bristol on April 9th. The *Sirius* arrived in New York on April 22nd, the *Great Western* arriving four hours later.

Liverpool came into the picture in the same year when the Transatlantic Steamship Company (Junius Smith, an American, was the prime mover) put the *Royal William* (2) on the berth. Built in 1836 by Wilson's and engined by Fawcett's (both of Liverpool), she was very economical with coal (6¼ lb. per h.p. hour) and helped greatly to popularise the idea of steam on the Atlantic. The question of a Mail contract was now mooted, and was secured by Cunard, with his partners, Burns and McIver, after keen competition from the Great Western Steamship Company. The Atlantic Steamship Company, as the Cunard partnership was originally known, planned for a fleet of four sisterships to maintain a twice monthly service, except during the four winter months. Built by Napiers, the *Brittania*, first of the fleet, sailed from Liverpool on 4th July, 1840. There is no doubt that much of Cunard's success was due to the conception of a fleet of sister-ships. With the inaguration of a regular Atlantic Ferry, the fate of the Clipper Ship was sealed.

Before closing this talk, however, the two other ships associated with Brunel must be mentioned. The *Great Britain*, launched in 1844, was not only the largest ship afloat at her launch but was the first large ship to be built of iron and the first large ship to use the screw. Part of her success was due to her shipwreck in Dundrum Bay, where she stood up to ten months hammering before being towed off. She was sold to Gibbs, Bright for the Australian trade and ended her days, quite recently, as a coal hulk at the Falkland Isles. The *Great Eastern*, built by Scott Russell, earned notoriety right

from the day of her unsuccessful launch in 1859. The only ship yet built to hold the record of being the largest ship afloat throughout her entire career, she was never used on the service for which she was designed. She made her maiden voyage to New York in June, 1860. Her only successful use was when she laid the transatlantic cable. She ended her days as a floating advertisement for Lewis's, of Liverpool, anchored off Tranmere beach. She was broken up at Liverpool.

THE LIVERPOOL NAUTICAL RESEARCH SOCIETY

(Founded 1938)

President :
E. B. ROYDEN, ESQ.

The objects of the Society are :—

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3. To disseminate such information by publications or by any other available means ;

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