

The table at the foot of each day had spaces for course and distance made good, two blank spaces for northing or southing and for easting or westing respectively, meridian distance, latitude by observation or account, difference of longitude, longitude in, and bearing and distance of point of departure (e.g. *Hector*. L/MAR/B.486C).

In 1761 a new printed form was introduced, following exactly the manuscript layout just described. The exact form varied slightly from time to time according to the printer employed but remained in use for thirty years (e.g. *Hector*. L/MAR/B.486D).

About 1791 chronometers came into general use in the Company's ships and a new form of log-book was devised to meet the situation. The headings of the columns remained unchanged, the difference was in the table at the foot of the day. This now was in two lines. The top line had spaces for course and distance, difference of latitude by observation and by account, difference of longitude by account and by chronometer, longitude by lunar and by chronometer, variation p.m. and a.m. The lower line had spaces for departure, latitude by account, barometer and thermometer (e.g. *Walpole*. L/MAR/B.293L).

By 1810 an additional column was frequently, but not invariably, introduced before the wide column used for remarks. This column was usually headed 'Leeway' but whether so headed or not it was often used to give the bearing and distance of the commodore (e.g. *General Hewett*. L/MAR/B.37A).

It appears that originally the printed sheets were supplied loose and were ultimately bound up, together with blank pages where required for lengthy times in harbour when navigational details were not needed. About 1822 bound log-books with a title page, pages at the beginning for a list of the crew &c., were sometimes being used (e.g. *Duke of York*. L/MAR/B.94G).

Finally about 1827 some ships began using log-books printed with only one page for a day. These had the columns 'H', 'K', 'F', courses, winds, weather and a wide unheaded column. In this last, reverting to the custom which had been followed before 1758, latitude, longitude by chronometer, barometer and thermometer were inserted in addition to remarks. The table of navigational information which had previously graced the foot of each day disappeared (e.g. *Larkins*. L/MAR/B.104F).

Shipping Routes—an Eastern Maze

Captain P. A. Thompson

WHILE a great many areas in the world which contain shipping focal points have been designated as routing areas, and in most cases very successfully organized to ensure a safe flow of vessels through them, one area remains outstanding without any attempt having been made to regulate or control the traffic. This is the stretch of waterway in the Malacca and Singapore Straits from One Fathom Bank, lying some 28 miles to the westward of Port Swettenham, to Remunia Shoals off the SE. corner of Malaysia, a route containing many navigational hazards ranging from shoal-water to periods of seriously reduced visibility, and being used by high density traffic including vessels of every type and size.

Ships proceeding through these waters comprise not only vessels bound to

and from contiguous ports but also a large number which are in transit between ports lying outside the region. Figures published in Singapore in 1972 showed that nearly twenty thousand ships called at the port during the preceding twelve-month period, all of which must have used part if not all of the straits from Horsburgh Lt. Ho. to One Fathom Bank, and it was estimated that a big increase in this figure could be expected in the period between 1972 and 1980. Figures indicating the number of ships passing through the straits without calling at a local port were not given, but it seems unlikely that this trade can be expected to show any marked decrease during the same period; and this traffic contains a big proportion of the larger types of vessel now in service, OBO's, VLCC's and similar, many of them operating at very deep drafts. Passages through the straits have been made at drafts up to 72 ft. and there is reason to believe that this practice may become more common.

The possibility of a marine accident with its attendant risk of loss of life or property is of direct concern to many people within the industry, but the additional problem posed by pollution is the one which excites the bulk of public feeling and focuses the attention of local authorities. The existence of a risk of environmental pollution in the Singapore-Malacca Straits by oil or chemicals as a result of collision or grounding has been the subject of much local attention, and discussions have apparently taken place between the three countries most directly affected, Indonesia, Malaysia and Singapore, regarding their respective spheres of involvement should a casualty occur. In this connection views have been expressed that the waters of the two straits are within the dominion of the bordering countries and are not 'High Sea'; in the event of such claims being substantiated ships using these waters would be subject to any regulation or control imposed by the governments concerned.

Should this eventuality arise, steps to regulate and control traffic would doubtless be primarily designed with the object of protecting natural resources, including commercial fishing, and may well result in additional burdens being placed upon the economic operation of ships, such as longer passages to by-pass the straits if over certain sizes, unless the appropriate interests are adequately represented in any discussions. The publicity given to pollution incidents, even of the smallest magnitude, is sufficient to influence public opinion and may even bias a balanced assessment of the facts.

The two features governing the passage of ships through the two straits are those common to any similar situation elsewhere, the available depth of water and the width of navigable water for any given depth. Recent survey work in the straits has revealed the existence of shoal patches which constitute a major hazard to the safe passage of very deep draft vessels, along what has for many years been the normal route.

The discovery of these shoals, most of them in the Malacca Strait, has led to a complication of the traffic problem due to the development of two systems of 'lanes': the existing courses which were usually the shortest practical distance between the salient points, and the routes taken by large vessels which are obliged by their draft to keep to deep water. These two sets of courses cross and re-cross each other in a number of places and this interweaving, often at small angles of intersection, reduces the safety factor of the basic rules of seamanship due to confusion regarding intention of action and increases the chance of close-quarter situations, which in circumstances of reduced visibility could well lead to the marine equivalent of the multi-vehicle crashes on motorways in fog.

In the Malacca Strait three particular points exist which are most in need of lane-routing; the approaches to and the main-channel at One Fathom Bank; the vicinity of the shoal patches in latitude $02^{\circ} 32' N$. 23 miles to the west of Port Dickson, and the main channel off Pulau Pisang at the southern end of the strait. In these positions the courses of deep draft ships are most likely to be in conflict with those of other ships following the shorter route and the larger vessel may be constrained in its ability to manoeuvre owing to the presence of shoal water, a fact not always realized by the other vessel who may be asserting her rights as a 'stand-on' vessel and maintaining course and speed.

In the Singapore Strait the picture is very much more intricate, due not only to the depths of water and available width of channel, but also to the complex pattern of 'feeder' and crossing routes. It is estimated that there are a total of twenty secondary routes joining or leaving the mainstream of traffic following the general through route in its run from the Brothers Lt. Ho. to Horsburgh Lt. Ho., each one being used in reciprocal directions.

Three points of traffic congestion occur in the Singapore Strait; at Horsburgh Lt. Ho. at the eastern entrance to the strait, where eastbound ships diverge upon their various courses and westbound ships converge; from the pilot station east of St. John's Island to Raffles Lt. Ho.; and at the junction of the Singapore and Malacca Straits between Tanjong Piai and the Brothers Lt. Ho.

Commencing at the eastward approaches, vessels departing from or arriving at Horsburgh do so on courses varying between NNE. and SSE., or the reciprocal, and there appears to be a marked lack of intent on the part of many of them to consider this stretch of water as a 'Channel' within the terms of the Rule of the Road at Sea and keep to their respective starboard sides. Many vessels passing along a line between Raffles Lt. Ho. and Horsburgh Lt. Ho. apparently do so by making one course line only, approximately $073^{\circ}/253^{\circ}$. This course line passes very close south of the banks off Tanjong Datok, in following it eastbound ships leave virtually no sea-room for an alteration of course to starboard by any westbound ship they may meet in an end-on encounter, or in a crossing situation where the eastbound ship is showing a port aspect to the other ship. A similar case exists when inward ships are passing Horsburgh Lt. Ho. close to port, leaving no room for outward bound ships to alter between them and the shoal. As a matter of interest the difference in distance between Raffles and Horsburgh, direct course, as opposed to keeping to the starboard side is one mile, a poor economy in return for reduced safety.

Between Horsburgh Lt. Ho. and St. John's Island are a number of points where secondary routes join and leave the main-stream. Vessels arriving at and sailing from the bauxite loading berth off Telok Remunia in both easterly and westerly directions, vessels proceeding in and out of both Rhio and Johore Straits bound east or west, and vessels from Singapore's eastern anchorage departing eastbound, all these join the main stream at different positions and varying angles.

Just off Singapore, in a stretch of water just over 5 miles in length, is the location which is liable to offer the greatest congestion. This strip, which is little more than one mile in width, is the bottle-neck through which all through traffic and a large amount of local traffic is funnelled. At the eastern end of this bottle-neck is the site of the eastern Singapore pilot boarding station, frequently with a milling group of ships approaching at slow speed to pick up pilots or,

having disembarked one, waiting the opportunity to proceed into the appropriate traffic lane, dependent on destination.

The area to the west of St. John's Island, in addition to subsidiary lanes joining, leaving and crossing the main route, is also frequented by large numbers of fishing craft at certain periods, and close northward is the projected site for the establishment of a Single-Buoy-Mooring for the use of VLCC's, the use of which will involve these vessels making an approach across the traffic at very low speeds whilst being in the position of 'give-way' vessel to westbound traffic. Approaching the vicinity of Raffles Lt. Ho. is the position at which the westbound mainstream splits, depending on the channel chosen, Main or Philip Channel, and the spot where eastbound ships from these two channels meet.

Westward of longitude $103^{\circ} 40' E.$ is comparatively open water with depths for most vessels. This area is crossed by a number of routes, westbound ships from Selat Sinki, Main and Philip Channels and Durian Strait, all converge upon the Malacca Strait, meeting others on east or southerly reciprocal courses and crossing traffic from Selat Sinki to Durian Strait or vice-versa. The critical section which appears to be most in need of urgent attention is that part from Raffles Lt. Ho. eastward to the Singapore Pilots boarding station 2 miles eastward of St. John's Island and the most difficult in view of the restricted space. It would seem that the solution here lies in the establishment of a stringently conducted two-lane system capable of accepting any size of vessel.

Immediately west of Raffles Lt. Ho. in the Main Strait the provision of additional buoyage to mark the 10-fathom contour, including the unnamed bank in the centre part, could provide two-lane separation for most vessels although the alteration of course rounding Raffles Lt. Ho. westbound may inhibit large ships from taking this route.

The institution of a system of 'traffic lanes', and ensuring that they are followed, is not going to be an easy task in this region. The limited space available in the critical parts of the straits will mean that some lanes would be of minimal width, with no room for neutral zones inserted between opposing flows, and this will leave no room for careless navigation or a low standard of ship handling.

The benefits of routing systems in narrow waters are not always apparent from the figures, but it is hard to imagine that the Dover Strait and similar plans have not brought about improvements in safety records. The size and speed of ships today, together with high traffic density at strategic points, requires the type of control and direction which has had to be accepted in the aviation industry. Demands that the right to 'freedom of navigation' on the seas must be upheld are fair comment, but only in open spaces. The independent minded should be at liberty to pursue their own way on the wide areas of the oceans but must accept regulation of direction when operating in close waters.