

HYDROGRAPHY AND NAVIGATION

by Captain L. OUDET, French Navy (Ret.)

For many centuries there were no laws at sea. The Captain was "Sole Master under God": a good axiom and one which would have sufficed had it not become a mere phrase, concealing a state of anarchy. Hence the necessity for the Regulations for Avoiding Collisions at Sea that became apparent during the 19th Century with the advent of steam as a means of propulsion. This code for safe navigational practice, which is slowly changing ancient ways, will be hereafter referred to as the Regulations.

Initially drawn up at international conferences meeting at long intervals, these Regulations are now the responsibility of a permanent consultative body, the Inter-governmental Maritime Consultative Organization (IMCO). However, prior to the establishment of IMCO in 1959, there already existed numerous governmental (national) bodies specializing in navigational safety—i.e. the various Hydrographic Services. Moreover, over thirty years before the creation of IMCO these Services had set up the International Hydrographic Bureau with the object of coordinating their activities for the betterment of navigation. The two organizations have different roles: IMCO is responsible for the Regulations, and the IHB for nautical documents, so that for twenty years each has led a virtually independent existence. In view of recent events one might ask if this situation can be allowed to continue.

To put an end to this state of affairs would not be simple. Reasoning alone will not suffice, since it is a question of reforming something that is already in existence and whose utility is undeniable. It will mean going back on certain established practices, yet avoiding a struggle for influence between the two organizations. Each has its own basic responsibilities, the abandonment of which would amount to failure in its appointed task. However, both organizations have the same end objectives, those of service to mariners and the safety of life at sea, and a relationship already exists between them for ensuring a certain degree of harmonization. But because this has not sufficed to maintain entire harmony, further cooperation must be fostered. The author does not pretend to be able to supply sure and total remedies. He is not himself a hydrographer, but he served 23 years in the French Hydrographic Service where he was responsible for editing Sailing Directions. He was thus constantly in touch with mariners and passed much of his time studying their problems. These problems sometimes were part of his work, such as maritime traffic, but sometimes were on the fringe of it, like the use of radar for preventing

collisions. Thus, he refrains from presenting himself in the role of arbiter, but rather seeks through this paper to offer a means of satisfying the navigational needs of mariners in the best possible way.

In volume of documentation, certainly, the navigational needs of the mariner are met for the most part by the Hydrographic Services. To judge this one can compare the two small works published by IMCO—the one on Collision Regulations, and the other on Ships' Routeing—to the mass of charts and books published by Hydrographic Services which are always to be found on a ship's bridge. These hydrographic works have been with us for so long and are so permanent that their importance risks being forgotten.

Their early beginnings were back in the days of the great explorers Christopher Columbus, Vasco da Gama and Magellan. However, their great wave of expansion was in the 18th Century with the voyages of Cook and Lapérouse, an age in which the sextant and chronometer were perfected, thus laying the foundations for modern hydrography. During the 19th Century hydrography was able to expand considerably, owing to the rarity of conflicts at sea. The present century has seen two major advances, one due to the IHB's work of coordination mentioned above, and the other to the improvements in scientific instrumentation. At the same time the size and number of vessels has considerably increased, as have ports, so that the mariner's hydrographic needs are just as "insatiable" as in the past.

But the same may be said of the works which form IMCO's contribution to navigation. Certainly, they are not in use all the time, but they serve as soon as the risk of collision arises, a risk that is one of the plagues of modern navigation. From this point of view improvements to these publications are just as important as for the case of nautical documents. However, if hydrography is a continuing task requiring time and patience, the prevention of collisions may be likened to that of Penelope, for it is work that is never done, on account of human shortcomings—those of the navigator carrying out the law but also of the experts, the less-than-omniscient law-makers. Rather than advance abstract arguments for ways of improving the law, let us examine three typical cases where its application presents difficulties.

The first directly concerns hydrography. Recently, a British survey vessel was surveying within the limits of a Regulated Route (Traffic Separation Scheme) in the Straits of Dover, and in order to cover the area with a close network of soundings was running tracks parallel to the traffic routes, first in the same direction and then in the opposite one. Although the vessel had indicated to shipping in the Straits that it was about to operate, and it displayed the regulation marks indicating that it was restricted in its ability to manoeuvre, it was reported to the authorities for each of the runs it made against the traffic. Under the Regulations there is in effect no exception when navigating in a Regulated Route to the obligation to follow the established direction of traffic flow. It is imperative that such an exception be established in order to allow for hydrographic operations, since not all traffic separation schemes have been established in areas where it is possible to navigate without regard to draught.

Quite the contrary, many of these schemes are in shallow water areas, and many more in places where the bottom is unstable, so that repeated hydrographic attention is needed. Many governments have, in fact, already noted this defect in the Regulations, and it is possible that by the time this article appears this matter will have been remedied. I have noted it in order to demonstrate the necessity of associating hydrographers more closely with the activities of IMCO, not only in order that hydrographic vessels should retain the right of carrying out their appointed and absolutely essential tasks, but also—and this is most important—that the opinion of hydrographers may be sought in the formative stages of regulations regarding conditions of navigation within the zones where traffic separation schemes are envisaged so that errors may be avoided.

A second case where the Regulations run into difficulties is illustrated by the *Amoco Cadiz* catastrophe. After suffering a breakdown of steering gear whilst en route between two Regulated Traffic Zones, the vessel was cast upon the coast by a storm, and this in spite of assistance from a salvage tug. No doubt a farsighted navigator would have chosen to navigate outside, to seaward, of the regulated traffic zone rather than pursue the theoretically "safest route" of the Traffic Separation Scheme. Such schemes are frequently close inshore, and up to that time there was no provision for diverting vessels carrying polluting cargoes from such Regulated Routes. Pressed by public opinion, and shocked by the environmentally tragic circumstances, the French Government then proposed special measures to IMCO for keeping this danger away from French coasts, and these were adopted. However, these measures had the consequence of restoring to some degree the collision risks which the traffic separation schemes had theoretically eliminated from this region, for example by necessitating considerably more crossing traffic than was necessary with the supplanted scheme. I need go no further into the matter here as this outline will suffice to show the dangers concerning IMCO decisions made without adequate reference to the navigator.

The third case is perhaps less spectacular than the others, but is a good example of the test provided by experience of the Regulations over a period of time. Traffic separation off Cape Finisterre has been in force for several years, although the scheme is not considered very safe owing to the multiplicity of fishing grounds, to such an extent that large vessels have tended to navigate to the seaward side of it. It is true that the turn required is a small one (28°), but the width of the zone (15 n. miles) renders positioning difficult there in poor visibility. Furthermore, the area is frequented by many fishing vessels, and the coastal configuration is such that a 28° turn in a single manœuvre, as laid down in the Regulations, is far from essential. Capes Finisterre, Torinana and Villano necessitate a turn stretching over more than 15 n. miles, so that a vessel's changes of heading to round these capes can normally be effected at any point off these salient features. However, the Spanish Government has in any case dropped the Finisterre traffic separation scheme because of its highly adverse effect on the fisheries industry since the 1972 Regulations became effective.

All the difficulties about which I have spoken concern traffic separa-

tion schemes; however, I should here add that this navigational principle has led to far better results than had been envisaged. In order to surmount these difficulties it seems best to preserve the routing measures on which maritime traffic has been based, without allowing ourselves to be prejudiced by the fact that these measures have been unable to prevent present-day difficulties. It would be preferable to count on these measures, in spite of the difficulties, because of the success they have obtained at sea, for it must be remembered that on land the rules of the road do not suffice to eliminate the frequency of collisions. The problems lie not with the concept of routing measures, but in the design and regulation of such measures without adequate consultation.

It was a Norwegian insurance expert, Mr. Thorolf WIKBORG, who ascertained back in 1954 that the majority of collisions were between ships on opposite courses. He also noted that more than 50 % took place between Ouessant and the River Elbe, and it was he who upset the theory of collisions in foggy weather being "thanks to radar". It is noteworthy that such valuable discoveries were made by Norwegian marine adjusters belonging to the Shipowners' Mutual Insurance Company. Unlike other companies, this company does not make profits from the difference between the premiums paid and reimbursements for damage, so that it is more concerned than any other company with the dangers of navigation. I should add that Mr. WIKBORG did not arrive at his conclusions in his office, but on the bridge beside ship's captains.

In 1958 and after, several navigators were to exploit WIKBORG's findings: Rear Admiral GARCIA-FRIAS (Spain), Captains ROBICHON and OUDET (France), and Captain POLL (Belgium). In 1960, the Institute of Navigation, U.K.—now the Royal Institute—decided to use its influence to try to bring about improved maritime traffic conditions in the Straits of Dover where anarchy reigned and collisions were increasingly numerous. The chart of the area shows a veritable graveyard of wrecks. In cooperation with the Institutes of Navigation of Germany and France, the U.K. Institute set up a Working Group in which all members were mariners, including those representing official and private organizations. The British and French Hydrographic Services took a particularly active part in the work. The British Hydrographer, Rear Admiral IRVING, in his capacity of President of the Institute of Navigation, was Chairman for the first and last meetings of the Working Group. The French Hydrographic Service was represented at all the meetings, Ingénieur Général GOUGENHEIM being in the chair at the second meeting during which a proposal was adopted that was later to prove of capital importance. This was to organize a referendum among mariners to determine their opinion on the advisability of instituting recommended routes in the Straits.

5,000 mariners were contacted, of whom 75 % replied; amongst these about 95 % were in favour. The plan upon which the Group agreed was not actually conceived by any of its members, but was the brain-child of Captain LYNES, at the time commanding a British Railways cross-channel ferry (*) and who had effected the crossing more than 4,000 times. This

(*) The name of this vessel was *Maid of Orleans* — a name symbolic of Franco-British cooperation.

plan was placed before IMCO in 1962 and approved by them in 1964; it was put into operation in 1967, by which time many mariners had already begun to observe it voluntarily. Three years were in fact needed to obtain a buoyage agreeing with the recommended direction of traffic flow, and Lloyds was instrumental in exerting pressure to expedite administrative actions. Since that time, other traffic separation schemes have been studied by similar Working Groups, and still other schemes have resulted from various initiatives. By 1977 there existed more than 100 traffic separation schemes, about 60 of which were IMCO-approved and the rest of a national character.

This then is the situation for present-day navigation. In order that navigation should have the necessary tools for safety, appeal was made to the Institutes of Navigation, founded in the post-war period to be of assistance in the use of the new techniques of navigation made available as a result of scientific progress. These institutes are private bodies and can thus welcome all men of goodwill and professional competence who have the interests of navigation at heart. As well as appealing to both mariners and scientists of the various disciplines it is natural that these institutes should be of particular interest to hydrographers who by profession belong to both these categories. Hydrographic Offices find their Institute of Navigation a valuable medium through which to advance the art of navigation. Thanks to their constant contacts with mariners—their sole customers—Hydrographic Offices are able to study mariners' needs, and can themselves include in Sailing Directions the recommendations suggested by experienced mariners. When this procedure is not considered sufficiently effective, the Institutes of Navigation afford oral and written means of communication, and thus lead to fruitful exchanges. As to the potential of the Institutes for advancing further towards concrete achievements, proof in plenty of their effectiveness is provided by what has been said about the Straits of Dover, where it was a question of a major innovation. The secret of their effectiveness is simple: it is to continue to listen humbly to the mariner, and to remain at his service.

IMCO's difficulties arise from the fact that it embodies the authority of governments and is subject to pressures to impose constraints whose origins are sometimes of more political than professional nature. IMCO is nevertheless a consultative body, and it would seem in the light of what has been said that the various Hydrographic Offices should be amongst the organizations it consults, both through the integration of hydrographers into national delegations and through the medium of the I.H. Bureau. The safety of navigation is one of its first pre-occupations, and this is most right. By taking the opinion of hydrographers IMCO should be able to reconcile safety more satisfactorily with the necessarily operational character of navigation.

The beneficial association of Hydrographic Services and the Institutes of Navigation, furthermore, could likely be of even greater help to IMCO. It can be seen from the above that certain present difficulties in navigation arise from the imperfections of the Collision Regulations, and from the Traffic Separation Schemes where experience has shown the need for frequent and often urgent partial revision. Working Groups set up by

the Institutes and the Hydrographic Offices, assisted by observers from IMCO, would be most competent to study interpretation of the pertinent sections of the Collision Regulations as well as local navigational problems and make direct recommendations to ensure realistic, useful rules and measures. These could be tried out on a temporary basis, and as such presented in the form of Notices to Mariners, as part of the formal IMCO approval process.

Such a suggestion may appear heretical. Nevertheless, when the mariner on his bridge comes up against a problem for which his documentation provides no solution, what else can he do except resort to that self-same type of interpretation. This is what the author has done since his first article in 1953 on the subject of radar, and now as age slows his activity he would like to see many others continue the good work.

AN EXACT UNDERTAKING

2nd February 1682/3

"I made my court at St. James's, when I saw the sea charts of Captain Collins, which that industrious man now brought to show the Duke, having taken all the coasting from the mouth of the Thames, as far as Wales, and exactly measuring every creeke, island, rock, soundings, harbours, sands, and tides, intending next spring to proceed till he had finish'd the whole island, and that measured by chains and other instruments. A most exact and useful undertaking. He affirmed, that of all the mapps put out since, there are none extant so true as those of Jo. Norden, who gave us the first in Qu. Elizabeth's time; all since him are erroneous".

From the "Memoirs of John Evelyn, Esq., F.R.S."
New edition in five volumes, published by
Henry Colburn, London, 1827.

Captain Greenville Collins was appointed by Samuel Pepys, Secretary of the Admiralty, in 1681 "to make a survey of the sea coast of the Kingdom", the King conferring upon him the title of Hydrographer to the King.

On this occasion Captain Collins was showing the first of his sea charts to James, Duke of York, who three years later became Lord High Admiral when he succeeded to the throne as James II.

Greenville Collins charts were published in atlas form in 1693 under the title "Great Britain's Coasting Pilot".

John Norden (1548-1626) was a topographical surveyor — Collins' atlas being the first major publication of charts of the British coasts.