is changing to the metric system at a time when a rationalized system of metric units, the Système International d'Unités (S.I.), is coming into international use. The S.I. derives all the quantities needed in all technologies from only six basic and arbitrarily defined units. This contrasts with the metric systems currently used, in which additional quantities are arbitrarily and indeed differently defined in different metric countries. Relationships between units are thus greatly simplified in the S.I., the introduction of which offers existing metric countries a unique opportunity to harmonize their measuring practices. This opportunity is now being seized. Already some 23 countries have passed or are preparing legislation to make the S.I. the only legal system of measurement and it is therefore a logical choice for the U.K.' Admiral Ritchie says 'now that this country is going metric, it is timely to conform to the I.H.B. resolution of 1929.' In view of the international standardization now taking place it would seem to be equally timely for the I.H.B. to conform to current international practice and to abandon the nautical mile in favour of the appropriate S.I. unit.

I renew the plea that a decision to retain the nautical mile should only be taken after proper discussion followed by a specific statement of why the retention of the nautical mile will be more advantageous (to all concerned) than a proper change to S.I. units.

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1. This *Journal*, 23, 388.
2. British Standards Institution (1967), *The use of S.I. Units*. (P.D. 5686.)

The Case for Revision of Routing

from The Trinity House and the Honourable Company of Master Mariners

THE Trinity House and Honourable Company of Master Mariners would, of course, have much preferred to comment on Commandant Oudet's latest article in the same edition as the article appeared (*Journal*, 23, 371). However, as we could only be afforded a weekend in which to give a considered reply this was clearly impossible, bearing in mind the grave and far-reaching issues involved.

We would wish to set out our reasons for re-consideration of the present routing:

After over three years' practical experience of the present routes, certain difficulties have arisen and require urgent consideration—difficulties due largely to the fact that the requirements for safe navigation of ships now in service bear little resemblance to the requirements in 1964, when the present routes were formulated. One of the main difficulties has been that of a dramatic increase in draught but this was predictable and should have been allowed for, indeed

Lloyd's had anticipated draughts of 72 ft. for 250,000-ton ships before routing started. How right they were.

In the last decade and particularly since the present routes were agreed in 1964, it has become apparent that:

(a) Tankers have increased from a maximum of 50,000 d.w.t. at 40 ft. draught to over 200,000 d.w.t. at over 60 ft. draught.
(b) Bulk and ore carriers of 40 ft. draught are commonplace.
(c) The average 8/10,000 ton cargo liner of 16 knots is rapidly being replaced by much larger container ships of 23–7 knots, the success of which requires fast reliable passages and tightly scheduled berth utilization.
(d) An increasing number of vessels are carrying highly dangerous toxic and volatile cargoes in bulk, e.g. corrosives, chemicals, liquid gas, &c.
(e) The greatest problems are those experienced by vessels *inwards* to Europe from the primary producing countries; a V.L.C.C. of 200,000 d.w.t. at 60 ft. draught would leave Europe in ballast at some 33 ft. draught.

Bearing in mind that tonnages and draughts will inevitably increase in the future, the requirements of the deep inwards ship must be given first consideration in any permanent form of routing.

Not only in routing and collision avoidance have we been overtaken by events, but equally all major maritime nations and their port authorities are striving to improve and alter their port approaches and berth facilities to meet the new and developing demands.

In the light of these three years' experience the acid test to which the present routing must now be submitted is—'Can ships of all tonnages and draughts proceed safely through the area in clear weather or in fog?': reference to the two charts with this article will provide the reply to this question.

In the area contained between Beachy Head and the immediate vicinity of the North Hinder light-vessel (in which ships may reasonably be considered to be in position for entering, leaving or navigating the precise area in which the recommended routes are defined on the charts) and neglecting estuary and harbour collisions and those with yachts and light-vessels:

(i) In the period 1 May 1964 to 31 May 1967 (i.e. 3 years and 1 month before routing) there were 30 collisions in the area (Fig. 1).
(ii) In the period 1 June 1967 to 30 June 1970 (i.e. 3 years and 1 month after routing was introduced) there were 37 collisions in the area (Fig. 2).

In the *Journal* of October 1969 (J. H. Beattie) attempts were made to justify 'the present deplorable, expensive and increasing collision rate' by quoting statistics of 'fog days' based on observations made at the South Goodwin and Varne light-vessels and presumably ignoring the fact that fog at these stations does not mean fog at Beachy Head or the North Hinder light-vessel. Indeed, after conceding the difference in fog days per annum at two stations only 8 miles apart (809 hr/annum to 576 hr/annum) the remarkable conclusion based on these vague assumptions for the whole area was that 'collisions per fog day have on average been reduced by 60 per cent, a dramatic figure'. No doubt Mariners experienced in the area, owners of sunk and damaged ships and underwriters will compare that statement with the chart showing collisions since routing began.

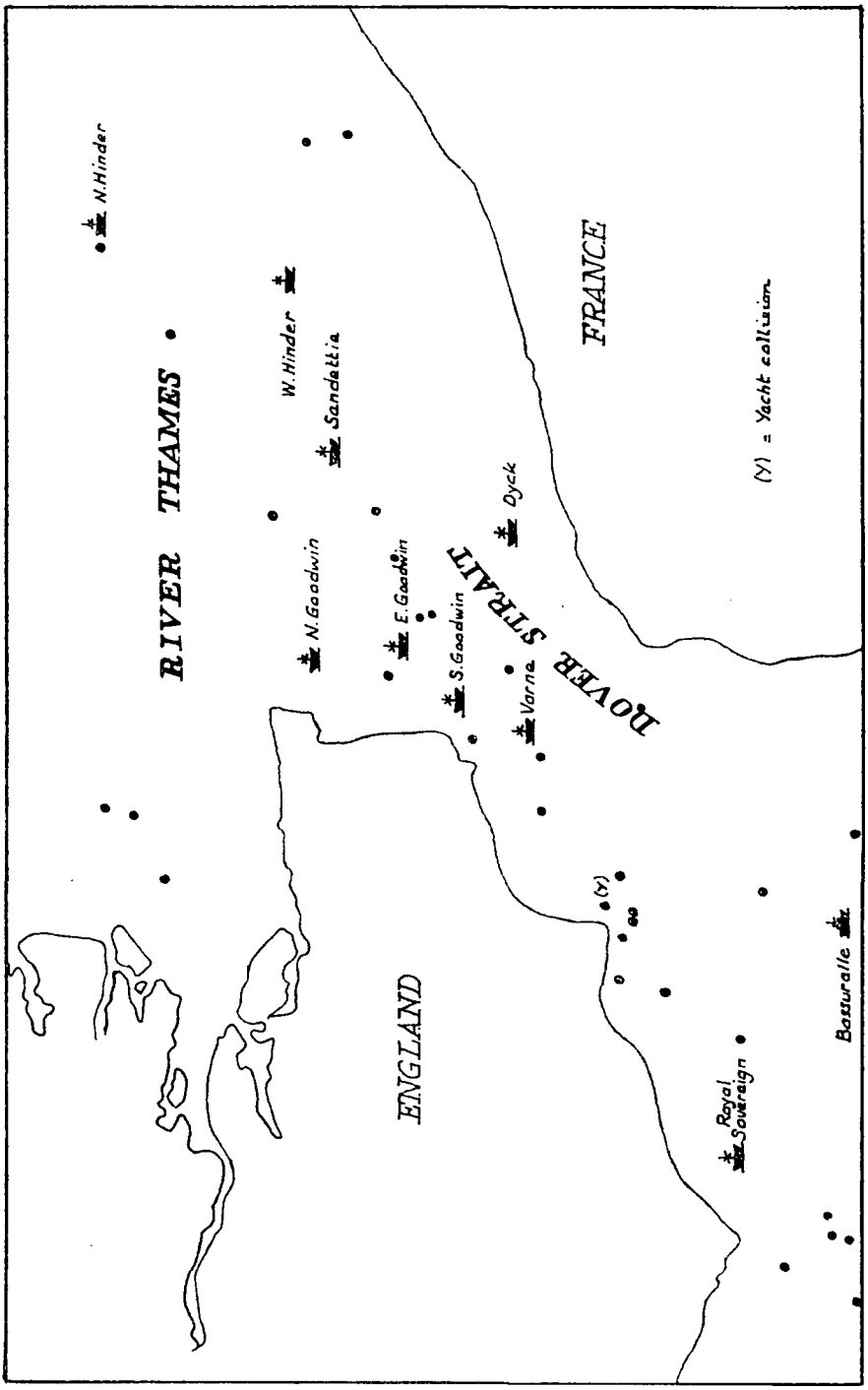

FIG. 1. Collisions in the Dover Strait before routing 1-5-64 to 31-5-67

https://doi.org/10.1017/S0373463300020816 Published online by Cambridge University Press

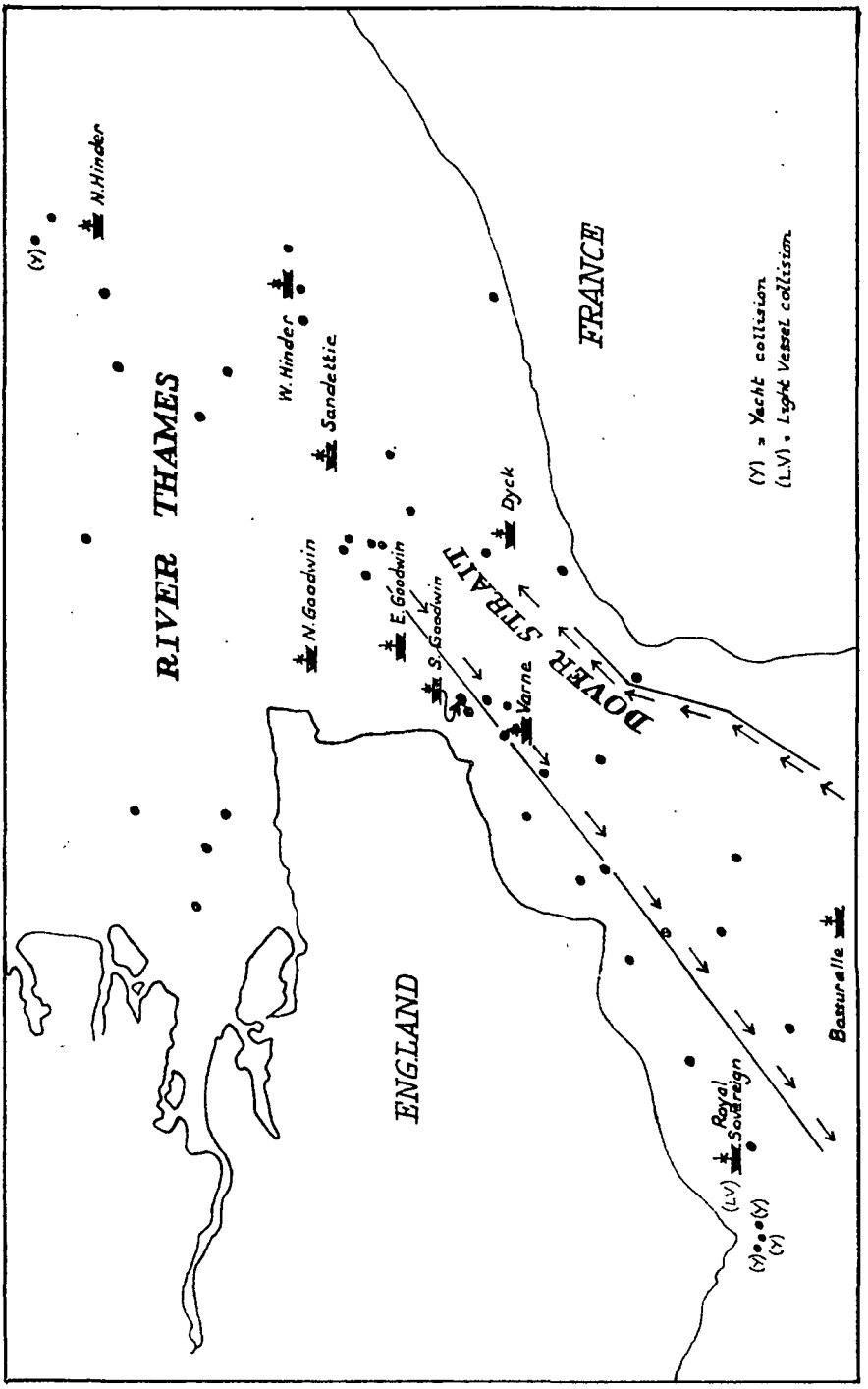

FIG. 2. Collisions in the Dover Strait since routing 1–6–67 to 30–6–70

https://doi.org/10.1017/S0373463300020816 Published online by Cambridge University Press

Following representations made to them by Shipmasters seriously concerned at the hazards they were experiencing with the new routing the Trinity House and Honourable Company of Master Mariners decided jointly to:

(a) Investigate and analyse routing problems in the Dover Strait and Southern North Sea.
(b) Try to devise a system that would take account of future developments in shipping.

We are well aware we are being wise after the event. The original International Routing Committee had members of both our organizations on it and the original proposals were broadly and in principle accepted by both the Trinity House and Honourable Company of Master Mariners.

The primary objective of any routing system in the Dover Strait and Southern North Sea must be to enable a deep inwards ship to do what prudence and seamanship would dictate, *i.e. proceed up the centre of the English Channel in the deepest water, take a centre track through the Dover Strait in deep water and then proceed up the centre of the North Sea avoiding proximity to shoal water, near approach to land, and unnecessary involvement with traffic from other ports.* If this objective could be attained and also provide safe and adequate tracks for outward vessels from Northern Europe at the same time, no effort should be spared to bring it about.

In any evaluation of routing in the Dover Strait and southern North Sea, it is essential as a first step to consult with and seek the opinion of the Masters of ships using the area.

Both the Trinity House and Honourable Company of Master Mariners can fairly claim to have as their main function concern for safety at sea and the welfare of all mariners, irrespective of nationality, and are in a position to claim for their members a great deal of first-hand experience of the problems involved.

Moreover it seemed to us that, having got agreement to routing in principle from the shipmasters of all nations in 1962, there was now a disquieting tendency for non-practising navigators of unknown expertise to make the rules without first consulting the man who would have to carry them out. A questionnaire was therefore produced jointly by the Trinity House and Honourable Company of Master Mariners, setting out on chartlets our proposals for a reversal of flow, and asking Masters whether they supported the present system, whether they approved the proposed reversal of the routes, and seeking alternative suggestions to improve either system.

When the questionnaire was produced time was not on our side as it was known that changes to the present routing were to be considered by Imco in May 1970, and it was therefore necessary to place a closing date on the returns. It so happened that Imco decided to defer the whole question pending a thorough survey of the southern North Sea which would determine more precisely the shoal water areas. Thanks to the goodwill and assistance of many Marine Superintendents and Pilots it became possible to circulate about 1200 questionnaires to British and foreign vessels. For obvious reasons, in the time available, the majority of the questionnaires went to British shipmasters.

By the end of June 1970, 462 of the questionnaires had been returned. A table is appended giving an analysis of the replies.

Bearing in mind that originally the International Chamber of Shipping in 1962 circulated some 10,000 shipmasters of all nations and had 3755 replies we are advised that our returns are average for this kind of survey.

Revision of routing in the Straits of Dover

Analysis of replies received to questionnaire issued by Trinity House and the Honourable Company of Master Mariners

Questions	*Replies*		
	Yes	*No*	*No Answer*
1. Have you had experience of the existing system?	440 (95·3%)	20 (4·3%)	2 (0·4%)
2. Do you consider there are defects in the present system?	421 (91·1%)	32 (7%)	9 (1·9%)
3. If you consider the present system has defects do you see a solution in:			
(a) Amendment of the Collision Regulations?	64 (13·9%)	347 (75·1%)	51 (11%)
(b) Modification of the present system?	140 (30·3%)	265 (57·4%)	57 (12·3%)
(c) The introduction of a completely new system?	294 (63·7%)	130 (28·1%)	38 (8·2%)
4. Do you favour the 'roundabout' in the Sandettié area being considered by Imco?	161 (34·8%)	289 (62·6%)	12 (2·6%)
5. Is there any other modification of the present scheme you would prefer?	91 (19·7%)	324 (70·1%)	47 (10·2%)
6. Do you favour the 'reversal of flow' scheme outlined in this brochure?	326 (70·5%)	125 (27%)	11 (2·5%)
7. Do you consider that the 'reversal of flow' scheme needs modification?	76 (16·4%)	286 (62%)	100 (21·6%)
8. If the 'reversal of flow' scheme were adopted			
(a) Would you anticipate any difficulty resulting from the change?	176 (38·1%)	261 (56·5%)	25 (5·4%)
(b) Do you consider the proposed changes in Navaids adequate?	344 (74·5%)	65 (14%)	53 (11·5%)
(c) Do you consider the 'gates' in the 'separation zone' should be marked?	133 (28·8%)	271 (58·7%)	58 (12·5%)
9. Do you consider the Coastal Route Limits satisfactory?	411 (88·9%)	32 (7%)	19 (4·1%)

Total issued: 1200. Replies received by 7th July 1970: 462

Trinity House, London E.C.3.

7 July 1970

On Question No. 6 as to whether the Trinity House and Honourable Company of Master Mariners 'Reversal of flow' proposal was preferred to the present system, of 462 replies 326 (70·5 per cent) supported our proposals.

The result broken down into tonnage groups, &c., is set out in the table following:

	In favour of reversal of flow per cent	Not in favour of reversal of flow per cent
Total of all replies to date 462	326 70·5	136 29·5
Foreign flag (i.e. non-British) Deep Sea Masters 57 replies	42 73·7	15 26·3
Masters of vessels between 7000 and 20,000 gross tons 256 replies	186 72·3	70 28·7
Masters of vessels between 20,000 and 50,000 gross tons 86 replies	62 72·1	24 27·9
Masters of vessels between 50,000 and 120,000 gross tons (approx. 80,000 to 230,000 d.w.t.) 10 replies	9 90	1 10
Cross Channel ferries running from ports between Harwich/Folkestone, to ports between Boulogne/Zeebrugge. (Note: French flag, 5. British, 10. Belgian 22) *Total*: 37 replies	25 67·6	12 34·4
Deep Sea Pilots (British and Foreign) not being Pilots licensed for ports in the area 12 replies	9 75	3 25

Commandant Oudet in his article pays tribute to the part played by Captain Lynes of the Cross Channel service in producing the original scheme. We endorse this tribute but the late Captain Lynes was in the same position as the rest of us in 1962, i.e. it seemed the present system was the best solution *at that time*, and who are we (or Commandant Oudet) to suggest what would have been Captain Lynes's opinion in 1970. It would seem much more relevant to consider the opinion of 37 of the serving Masters of Cross Channel ferries (French 5, British 10, Belgian 22) now engaged in the area Harwich/Folkestone/Boulogne/Zeebrugge, of whom 25 or 67·6 per cent are in favour of reversing the routes and these are men who each make an average of up to 500 crossings annually.

Commandant Oudet states: 'If one accepted the reversal of flow in the Strait the traffic going in the normal direction at either end would somehow have to cross over—this would greatly increase the risk of collision'. This would appear so, if merely considering the problem as a chartwork exercise but to the users of

the area this is not a problem. On a north/south line drawn from Portland Bill to the Casquets there are some 45 miles of deep water. According to the charts, ships having rounded Ushant are required to approach and pass the rocky area of the Casquets between 2½ and 5 miles off the light. It was obvious to many seafarers that this was inviting unnecessary hazard and after initial trials many of the largest ships are doing what is more seamanlike and passing well off Ushant outside the separation zone and proceeding up mid-channel well north of the Casquets. Several masters replying to the questionnaire have said the reversal of flow must be extended mid-channel off the Casquets to points well off Ushant.

There are now many ships coming up mid-Channel which, before passing south of the Bassurelle light-vessel, have to do the very thing to which Commandant Oudet objects.

Since the introduction of routing the practice of shipping deep sea pilots at Brixham (Tor Bay) for vessels inwards to Europe has shown a threefold increase. Up to 100 ships a month (some of them the largest in the world) have now adopted this as routine. This creates a situation where ships from of 55+ ft. draught pass Ushant—cross all inward and outward Channel traffic to ship a pilot at Brixham and then *re-cross* all this traffic to pass south of the Bassurelle.

Attention is also drawn to the fact that at present the whole of the North American/Canadian trade vessels making landfalls at Bishop Rock or the Lizard have to cross the outward streams at a narrow angle to pass south of the Bassurelle.

At the northern end of the area, i.e. vicinity of the North Hinder light-vessel, there is a comparable trend. A single day on the Maas Pilot Cutter would be enough to show Commandant Oudet that ships having cleared the Maas do *not* keep north of the incoming stream by steering to a position well north of the North Hinder light-vessel to gain the western side of the seaway between the North Hinder and the Galloper. Almost without exception they haul straight down from the Maas buoy to the Goeree light-vessel to pass close north or south of the North Hinder, eventually edging across to the west side of the Strait before reaching the Sandettié area. They do this for two seamanlike reasons: (1) shorter distance; (2) efficient position fixing off the Goeree and North Hinder in an area of frequent fog to enable safe passage and entry to the Strait of Dover.

The distances for vessels approaching the North Hinder from northern points are as follows:

S2	—North Hinder	123 miles
Texel	—North Hinder	106 miles
Ijmuiden	—North Hinder	85 miles

Irrespective of the 'flow direction' arrows at present shown on the charts, safe navigation in poor visibility dictates that a vessel outward bound from the Elbe/Weser via the Texel or S2, or a vessel from Scandinavia and the Skaw via the S2 together with traffic from Ijmuiden must ascertain its position by passing fairly close to the North Hinder light-vessel (it is estimated that only some 25 per cent of ships are at present fitted with Decca Navigator) before setting course for the 28-miles run to Sandettié. Therefore, there are not, as Commandant Oudet appears to think, ships on the starboard hand of an imaginary channel and others on the port hand, but a large number of ships between the North Hinder and S2/Texel spread out (depending on the precision of their navigation) on nearly reciprocal courses.

Should, however, the routes be reversed, it would be most desirable to allow

ships to pass southbound as near to the North Hinder, Sandettié, &c., as they appear to wish to do at present. The northbound ship, on the other hand, would be quite happy to pass well off these areas for the simple reason that he still has a long way to go and is running out of a restricted area of navigation into the full width of the North Sea. Similarly, at the southern end of the Strait outward ships would pass 7–10 miles off the Casquets to some 10 miles off Ushant knowing that the bulk of inwards traffic was passing well north.

Commandant Oudet states: 'It is not surprising that the Trinity House and Honourable Company plan has been poorly received even in Great Britain. It is quite possible that it will not get as far as Imco where, in any event, its chances of success are practically nil'. For Commandant Oudet to make this statement in the Institute of Navigation *Journal* is in itself surprising and one may reasonably wonder who is in a position to advise him as to the United Kingdom's opinion and express concern that he can apparently forecast the decisions of Imco. It is sufficient to say the plan proposed by the Trinity House and Honourable Company of Master Mariners is supported by the Hull Trinity House Pilotage Committee, Newcastle-upon-Tyne Trinity House and the great majority of sea-going Masters who answered our questionnaire.

At a recent meeting of the Safety of Navigation Committee of the Board of Trade, those present were advised by the Mercantile Marine Service Association that they had independently circulated a simple form of the present plan and the proposed reversal of routing to some 2300 Masters of their Association. Of the 500 replies received at that time, two-thirds supported the plan for reversal.

The difficulties of the present routing are as follows:

(a) Having entered the present system by passing south of the Bassurelle light-vessel all vessels bound in a north-easterly direction along the French coast are required by the Collision Regulations to give way to all west-bound ferries on the Dover/Folkestone to Boulogne/Zeebrugge routes by altering course towards shoal water on the French coast. The ferry sailings on these services are now peaking at approximately 100 per day.

(b) The area bounded by the north end of the Sandettié Bank, Bergues Bank and Fairy Bank can only be described as chaotic at the present time, where in a restricted area, all north-east bound traffic has to give way to the traffic outward bound from the Scheldte, Ostend and Zeebrugge and, at the same time, haul away to port to find the main shipping channel to the west of the Fairy Bank.

(c) All deep-draught vessels after passing the north end of the Sandettié are faced with proceeding to the North Hinder and being 'boxed in' between the SW.-going streams and the shoals close to starboard and then, if bound for the Texel, Elbe, Weser or Scandinavia, crossing the traffic bound from Maas and Ijmuiden *or* crossing *all* the southbound streams to gain the deep water to the westward before proceeding up the North Sea. The latter track is that recommended by one of the largest tanker companies to enable their very-deep-draught ships to join their surveyed deep-water route to the north-east. This same surveyed route forms the northern part of our north-bound proposals *without* any involvement with the southbound stream.

(d) A vessel bound for any port north of Rotterdam is needlessly involved with traffic from the Maas, Scheldte, Dunkirk, &c.

We consider that some of the deepest water is not fully utilized at present, i.e.:

(i) the centre of the English Channel,
(ii) the two-mile wide and approximately 90 ft. deep channel between the Varne and Ridge shoals where northbound deep-draught ships would be protected by the shoals on either side for a distance of some 13 miles or about half their distance run through the Straits,
(iii) the deep water between the Goodwins and the Falls,
(iv) the deep water lying to the eastward of the Falls.

Commandant Oudet states: 'The plan is practically the same as one of the first drafts to be submitted to the Dover Strait Working Group—two NEMEDRI-type routes, one on the French and the other on the English side of the Strait. Here, eight years after its initial rejection, the scheme turns up again to divide the Dover Strait into two streams, one reserved for British traffic, the other for the rest. The Strait is not big enough for that, a fact which is acknowledged in the United Kingdom as much as elsewhere.'

What are the facts?

(a) Under the present scheme at the narrowest part of the Strait between the South Foreland and Calais we have the following, even neglecting crossing traffic:

(i) North and southbound light-draught traffic between the English coast and the South Goodwin light-vessel, i.e. through the Downs.
(ii) North and southbound deep-draught traffic for Thames and U.K. northern ports between the South Goodwin and the edge of the English coastal area.
(iii) Southbound main stream between the English coastal zone and SW. Sandettié buoy.
(iv) Northbound main stream between SW. Sandettié buoy and the French coastal zone.
(v) North and southbound traffic in the French coastal zone.

Eight Streams, and as if this were not enough, Icotas at a *one-day* meeting held 'to solve the problems', proposed a further northbound stream between the South Falls and the SW. Sandettié buoy, thus making *Nine Streams*. We are astounded at this suggestion.

Here, indeed, is the counsel of despair—the resurrection of the very problem the original routing was to solve. Two opposing tracks passing through the four-mile gap between the Falls and the Sandettié are now reintroduced by Icotas as their recommendation to Imco for the solution of the deep-draught problem. Surely it must be apparent that a vessel northbound from between Gris Nez and the Ridge heading to pass, say, one mile west of the SW. Sandettié buoy will be virtually end-on to the southbound vessel passing, say, one mile off the South Falls buoy. Imagine the confusion here on a foggy night with perhaps six ships southbound and two northbound within an area of three or four miles radius, and that would only be the *average* amount of traffic on late Saturday or early Sunday when vessels have cleared from Continental and U.K. ports for the week-end. Should Imco even consider this suggestion seriously—and no doubt there will be talk of more centre-line buoys to confuse and restrict the flow of traffic—then steps should be taken to ascertain sea-going opinion which will, without doubt, condemn the idea out of hand.

(b) We, on the other hand, suggest that there is no valid reason why the coastal traffic should not be one-way at focal points, i.e. off Dungeness, the South Goodwin light-vessel and Cap Gris Nez, in the opposite direction to the adjacent main stream.

We would thus have in the same area as (a):

Six Streams as against Nine

(i) The Downs Route—two-way traffic.
(ii) Mainly southbound in the English coastal zone.
(iii) Northbound main stream.
(iv) Southbound main stream.
(v) Mainly northbound in the French coastal zone.

We regard the Dover Strait as being two waterways divided naturally by sandbanks wherein ships in the main stream and the adjacent coastal stream keep clear of each other by keeping to the right.

It does not appear to have occurred to our critics that one of the main problems at present is a direct consequence of their insistence that the Dover Strait is a 'narrow waterway'. Consider a vessel in the English coastal zone northbound (and the same holds good for the opposite direction in the French coastal zone) which is keeping to the right or east side of the zone; every time it has to alter to starboard under the Collision Regulations for crossing traffic it finds itself, due to the narrowness of the zones, *heading over and often into the main traffic zone* and this, of course, is going in the opposite direction. This may explain some of the collisions on the edge of the English coastal zone particularly as vessels in the main stream also have to starboard for crossing vessels and *head over into the congested coastal zone.*

Under our proposals the opposite would happen, i.e.:

(i) the vessel in the coastal zone would be starboarding further into its own coastal zone and automatically give way to the main stream;
(ii) the vessel in the main stream would be starboarding into its own zone away from the coastal area.

To forestall the obvious rejoinder that the two main streams would be starboarding into each other it is pointed out that if they did they would go aground first as the central neutral zone lies mainly along sandbanks and shoal water and even where this does not apply there cannot be any point where the two main streams of traffic are passing less than 7 miles one from the other.

In the January 1970 *Journal* of the Institute, Commandant Oudet states: 'There is, moreover, an even more cogent reason which makes this proposal (the Trinity House and Honourable Company of Master Mariners' proposal) unacceptable, and that is that the relative positions of the one-way routes are imposed by the Collision Regulations.' This is, of course, a reference to the Narrow Channel Rule 25 and it is rather difficult to square Commandant Oudet's statement with the *nine* different streams of traffic advocated. It is submitted that at no time have the Dover Strait or North Sea with their many thousands of route combinations been considered as 'narrow channels' requiring any practical consideration of a 'starboard hand' rule. 'Narrow channels' under the Collision Regulations have never been defined in the Admiralty Courts but channels of 2 to 3 miles with crossing traffic have been considered *not* to be narrow

channels for the purposes of Rule 25. Referring to the passage between Duncansby Head and the Skerries (Admiralty Court Case *Anna Salen—Thordhovdi* 1954) Mr. Justice Willmer said, 'For myself I certainly see difficulties in applying the 'narrow channels' rule to a passage which is nearly four miles wide: I should hardly have thought that 'narrow' was the word to use, for it is not a particularly narrow passage.' At its narrowest point the Dover Strait is some 18 miles wide.

With regard to the Continental coastal zone, or lack of one, Commandant Oudet is not very satisfied and we would agree but nothing appears to have been done about it until we made a study of the problem. We put forward the circulated proposals with diffidence as we did not wish it to appear that we were telling our Continental neighbours what they should do in their own waters. However, the proposed extensions of the coastal line have been received in the spirit they were offered and we understand from them that it would be eminently sensible to *restore* the buoyage in the Ruytingen Pass and open up this route again to the eastwards. This opinion is from men who have spent a lifetime in these waters.

The coastal line could thus be amended to run from the Outer Ruytingen Buoy–West Hinder light-vessel—thence parallel to our line as far as the Buitenbanken before linking up with the Goeree light-vessel. There is a bonus for the Dunkirk/Scheldte traffic here in that the West Dyck Shoal can be crossed in 5½ fms. in line with the Ruytingen Pass and, with the aid of a couple of buoys to mark the passage, the distance between Dunkirk and the Scheldte could be *reduced* by some 20 miles for the deeper ships unable to go directly to the eastwards from Dunkirk.

It is relevant at this stage to remind Commandant Oudet that the original coastal zone line for the English side drawn up by the Working Party of which he was a member rendered it hazardous for a ship to navigate in safety inside that zone between the Royal Sovereign and Dungeness if of any appreciable draught and it was only the most forceful protest by Trinity House that led to its being corrected internationally soon after routing commenced.

The question of priority for vessels on the main routes in the Dover Strait and North Sea has been touched on by most mariners including Commandant Oudet. It is certainly not unanimously held that 'on track' ships should have priority even though it is held by many to be desirable. The difficulties are legion, particularly in conditions of poor visibility, and have been dealt with many times in this *Journal*.

These difficulties are inherent in the present system whereas under our proposals the main stream automatically has priority over its adjacent coastal stream. What must be considered is this:

With the traffic flow as at present, the whole of the main stream has to give way by starboarding towards shoal water and out of its 'zone' for vessels outward bound from every estuary they pass on their way up and down the North Sea.

To take a simple example for northbound ships which, for the sake of argument, we will consider as 50 per cent of the total North Sea traffic:

(i) 50 per cent of the traffic approaches the outward stream from the Dyck (from Dunkirk, Calais) and has to starboard for the 2 per cent which this traffic represents;

(ii) 48 per cent continues to the Sandettié and has to give way to 8 per

cent outwards from the Scheldte by starboarding towards shoal water, and so the picture continues, the 'many' starboarding out of 'zone' for the 'few' all the way up and down the North Sea.

Under our proposals the opposite will apply—*all* starboarding by the main stream of ships (in this case for vessels inwards to the estuaries) will be into deep water and within the zone. *All traffic from the estuaries wishing to enter or cross the adjacent main stream must give way to the ships already in the main stream.* This is the *practical* way to stop deep-draughted ships in the main stream from being put into impossible situations. When we add to this the greatly reduced number of course alterations on both main routes, which enable ships to be more accurately plotted in fog by other vessels without having the situation continually confused by frequent course alterations as at present, we are entirely satisfied that our proposals are seamanlike and desirable.

Surely proposals, supported as far as we are able to ascertain by the great majority of practising mariners, affording two tracks separated by a central neutral area drawn mainly along banks and shoals to enable two main streams of traffic to proceed up and down the North Sea with *separation* between the two lines of traffic of *not less than 7 miles over a distance of some 160 miles* (from Beachy Head to the North Hinder), *must* be preferable to the present system with its proven hazardous situations.

In conclusion, while we acknowledge and respect the sincerity shown by Commandant Oudet in his efforts to improve safety at sea we also acknowledge and respect the sincerity, ability and experience of all those seamen we have consulted. Their views are expressed here; we support those views, which reinforce our own, and consider that since they are the men involved, full and immediate attention should be given to them.

Editorial comment:

The Institute is glad of the opportunity to publish this reply by Trinity House and the Honourable Company of Master Mariners to criticisms of their plan for revising the routing scheme in the Dover Strait.

One point at issue in the present discussion is what actually happens at sea in the Dover Strait. This has been the subject of numerous unofficial inquiries, conducted for the most part on behalf of Icotas. Imco, however, is now sponsoring a survey of the traffic pattern, to be conducted by various national administrations, and this should solve the argument. Another point so far as very deep draughted ships are concerned is where the deepest water in fact lies, especially in the Sandettié area, and here the results of the survey at present being conducted by the British and Netherlands hydrographic authorities should shed more light on the situation. Until the results of these two investigations are made known there is perhaps little that can be added to what has already been said, in the *Journal* and elsewhere, on the revision of the routing scheme in the Strait.

At the same time the comments of Trinity House and the Honourable Company do from the point of view of the Institute working groups raise one or two matters which are probably best dealt with straight away.

1. PRINCIPLES. The principles of routing have recently been defined by Imco in a document entitled *Ship's Routeing and Traffic Separation Schemes* which is

clearly intended to be the standard work on the subject throughout the world. The publication, which will be reviewed in the next number of the *Journal*, describes all the routing schemes in operation or projected and lays down the codes of behaviour to be observed within them. One of these is that ships navigating along lanes should keep to starboard of the separation line, separation zone ,or focal point in the case of a 'roundabout'. At this juncture when routing is in its infancy and so little information about its effects is at hand, it seems improbable that any scheme which contradicts this general principle will prove internationally acceptable.

2. COLLISION STATISTICS. The research on collisions in the Dover Strait carried out by Trinity House and the Honourable Company shows that in the period of 37 months immediately before routing there were 30 collisions in the Dover Strait and in the 37 months after routing, 37 collisions. This suggests that the accident rate is now about 25 per cent worse than before routing. However, the differences are so small in relation to the number of collisions that, even if the incidence of fog is completely ignored, no significant conclusions can be drawn (to have any substantial statistical significance, on the figures quoted, the number of collisions in the second 37-month period would have to be less than 14 or more than 46).

It is also suggested that statistics on 'fog days' taken only at the South Goodwin and Varne light-vessels are not a good enough indication for the Strait as a whole. Further work has therefore been carried out to establish the average of 'fog days' at seven Trinity House visibility reporting stations at the North, East and South Goodwins, the Varne and Royal Sovereign light-vessels and at Beachy Head and Dungeness lighthouses. These figures are given in Table I over the period 1963–1970 (regretably they are not available for all the seven stations in the years 1960–1962). In the frontispiece to this *Journal* the number of 'fog days' has been plotted against the number of collisions and the very close correlation between the two can be seen. From this and the fact that most collisions occur in fog it is safe to conclude that 'collisions per fog day' is a more reliable indication of the accident rate than simply comparing the number of collisions, as has been done by the Trinity House and Honourable Company and in some other earlier work. However, even this ignores any increases or decreases there may have been in the number of vessels at risk, although the volume of trade has been clearly increased between 1960 and 1970.

Now that three years' routing experience has been gained it is possible to compare more realistically the collision experience before and after routing and this is shown in Table I. Comparing the three years after routing with the four years before, and using the index of collisions per fog day, it can be seen that the accident rate has dropped (by some 20 per cent) since routing. If the whole period of 1960–67 is compared, the collisions per fog day seem to have been reduced by some 30 per cent, though there is not the same confidence in these figures as the visibility reporting for 1960–62 was on only one or two stations. Once more the differences are probably too small to draw firm conclusions. Certain general points, however, can be made.

In making comparisons between before and after routing, the peculiar situation in the year before routing should be noted. This was extraordinary in that not only was the amount of fog unusually low, but there were only 3 collisions and the accident rate was very low indeed. It may be that some vessels started routing during this year, or that vessels were proceeding with more caution just

TABLE I. COLLISIONS IN THE DOVER STRAIT

	Before routing								After routing				
Month	60/61	61/62	62/63	63/64	64/65	65/66	66/67	Average collisions per fog day 1963–7	67/68	68/69	69/70	70/71	Average collisions per fog day 1967–70
June	1	2	1	5	—	—	—	—	—	1	1	4	—
July	—	1	3	1	—	1	—	—	—	—	1	—	—
August	—	—	—	—	—	—	1	—	—	5	1	1	—
September	—	3	—	—	1	—	—	—	—	—	3	—	—
October	—	1	2	—	—	—	—	—	—	—	1	—	—
November	3	2	—	—	—	—	—	—	3	—	—	—	—
December	—	—	1	—	1	—	—	—	—	1	—	—	—
January	—	1	1	5	—	3	2	—	—	1	—	—	—
February	7	—	2	2	—	—	—	—	—	1	—	—	—
March	3	3	1	—	3	—	—	—	1	4	—	—	—
April	3	1	1	2	5	3	—	—	1	—	2	—	—
May	2	—	—	4	—	2	—	—	—	—	—	—	—
Total	19	14	12	19	10	9	3	—	5	13	9	5	—
Fog days	35·5	30·1	27·4	40·4	26·9	20·2	13·9	—	23·6	36·8	26·4	—	—
Collisions/fog day	0·53	0·46	0·44	0·47	0·37	0·44	0·22	0·38	0·21	0·35	0·34	—	0·30

Notes 1. There were 86 collisions between 1 June 1960 and 30 May 1967 (average 12·3/year).
There were 32 collisions in the 39 months after routing (average 9·8/year).
2. There were 28 collisions in the 39 months before routing (average 8·6/year).

Sources Collisions from *Lloyd's List*.
Fog days in 63/70 from an average at 7 Trinity House lighthouses and light-vessels.
Fog in 62/63 at Dungeness and Beachy Head only. Fog in 60/62 at Dungeness only.

prior to routing (the major tanker companies, for example, were routing their ships through the Strait well before the scheme was introduced by Imco). Another fact which may be significant is that after a good first year of routing, the situation has deteriorated in the second and third years and the fourth year has started poorly with five collisions already.

In comparing the Trinity House and Honourable Company sample of accidents with the sample from which Table I has been compiled, it is only right to point out that there are some small differences. First, the latter sample includes collisions with light-vessels, since light-vessels or vessels at anchor are involved in about 10 per cent of all collisions here. This sample also excludes any collisions at the Wandelar and in the area of the North Hinder, which are outside the area of the actual routing scheme, but it does include some to the south, not shown in the other sample. Table I now excludes a number of collisions shown in error in earlier work.

The work of Trinity House and the Honourable Company draws attention to the need to look at accident black spots within the present routing scheme. In the document accompanying the questionnaire sent out to the masters at sea, it is stated that most of the collisions have been in the Sandettié area. The new Trinity House and Honourable Company Fig. 2, however, shows 7 out of 37 collisions in this area, all well to the south of the Sandettié light-vessel. The sample for Table I shows 8 out of 32 in the area, only one of which is between the Sandettié and Fairy Banks, where vessels are said to be experiencing difficulties. The area between the Sandettié Bank and the South Falls remains a black spot by number of collisions. The worst accident black spot is still between the South Goodwin light-vessel and the Varne Bank and on the one-way southbound lane. One area which has improved is at Dungeness, where 25 per cent of all collisions used to occur. A more exact comparison of collisions per fog day at Dungeness shows that the figure dropped between 1960–67 and 1967–70 by about 30 per cent (though here again one must be cautious because of the size of the sample).

Since most collisions occur in fog, this suggests that the main accident problem is a fog rather than a visual one. What is now wanted is more facts surrounding the 32 accidents since routing. For example, the most recent accident involved a collision on the centre line of the northbound one-way lane with a fishing vessel. Only one accident appears to have involved a crossing vessel, and that a ferry. Four collisions have been with anchored vessels or light-vessels. The majority of collisions are still head-on meetings and of the two overtaking accidents, one was caused by a vessel altering to avoid a head-on meeting with a vessel navigating against the recommended one-way traffic.

3. QUESTIONNAIRE. The questionnaire issued by the Dover Strait working group (and *distributed* through the International Chamber of Shipping) internationally to the masters of some 10,000 ships had as its object to establish what masters at sea thought about two alternative schemes for dealing with the problem of congestion in the Strait, viz. recommended one-way routes or re-marking the Strait so as to induce a separation of traffic. The accompanying document and the questions were agreed with authorities which (at the time) were far from enthusiastic about routing. Great care was taken to introduce no bias either in the descriptive statement or in framing the questions and as a result the answers were very easy to interpret without ambiguity. It is not so easy perhaps to draw definitive conclusions from the Trinity House/Honourable Company questionnaire because the accompanying document only described the merits of a single scheme.