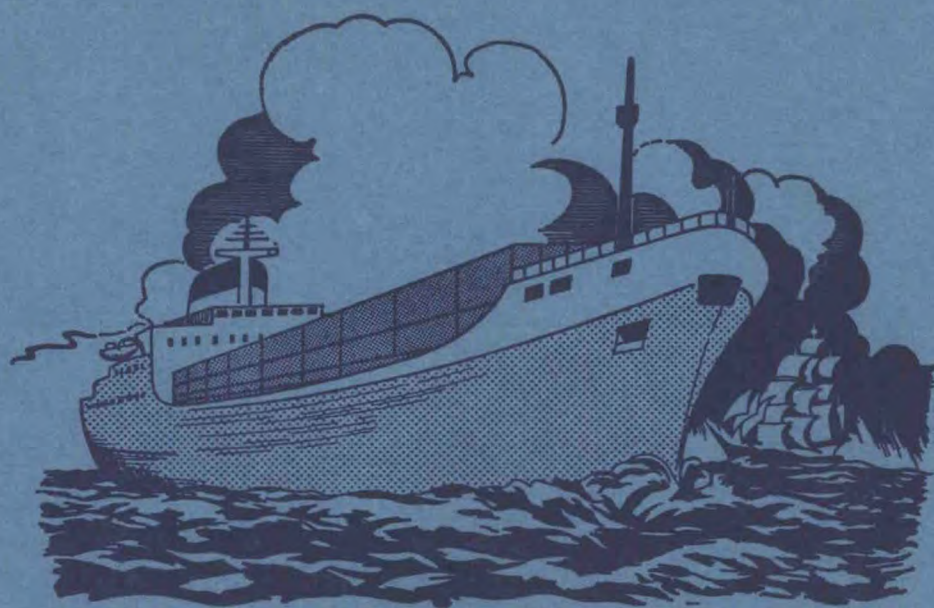


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The Marine Observer

*A quarterly journal of Maritime
Meteorology*



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THE MARINE OBSERVER

A Quarterly Journal of Maritime Meteorology
prepared by the Marine Division of the
Meteorological Office

Vol. LI

1981

THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME
METEOROLOGY PREPARED BY THE MARINE
DIVISION OF THE METEOROLOGICAL OFFICE

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| VOL. LI | No. 271 | JANUARY 1981 |
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Letters to the Editor, and books for review, should be sent to the Editor, 'The Marine Observer', Meteorological Office, Eastern Road, Bracknell, Berkshire RG12 2UR

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Editorial

'I have known the sea too long to believe in its respect for decency'
Joseph Conrad (1857-1924)

Joseph Conrad was born in the Ukraine and first went to sea in the French merchant service in 1875. Rather strangely, he served first as an Apprentice and then as a Steward before signing on as a deckhand in a British merchant ship in 1878. Thereafter he sailed on deck in the wool clippers on the London to Sydney trade for a number of years during which he passed his 2nd Mate's examination in 1880, obtained his Mate's Certificate in 1884 and his Master's in 1886. Conrad spent a total of 16 years in the British Merchant Navy before 'swallowing the anchor' and taking up a literary career. In literature, Conrad is admired for his descriptions of the dangers of life at sea of which he held not the romantic but the mariner's workmanlike view.

In the hard days of sail during the latter part of the nineteenth century, it certainly would not have taken Conrad very long to lose any preconceived thoughts of the sea being a kindly environment and, no doubt, he very soon built up a healthy respect for the vagaries of the ocean. This is true of every mariner. In the writer's experience, long before embarking on a seafaring career, recollections of a younger brother being swept off a rock by a rogue wave whilst on a sea-side holiday are still vivid. Fortunately, help was at hand and no harm done. Later, whilst undergoing training, a fellow Cadet slipped and fell overboard into a wind-against-tide sea and, despite being a strong swimmer, was tragically drowned.

In September each year a conference is held by the International Union of Marine Insurers. At the 1979 conference, held in Edinburgh, warnings were given of the upward trend in numbers of marine casualties which have proved dismally true. The latest conference, held in Seattle, met against a background of the worst peacetime losses in Merchant Shipping for many years. A study of the Casualty Returns issued by the Liverpool Underwriters' Association for the past 4 years reveals that the total losses, including constructive total losses, of ships exceeding 500 gross tons posted in their Loss Book in 1976 was 208—the corresponding figure for 1979 was 279 ships. Of particular interest, in the context of this journal, is the disturbing increase in the number of ships the loss of which is directly attributable to weather, the figures being 36 for 1976 and 59 for 1979. These figures do not take into account those losses due to such as stranding and collision in which weather was only a contributory factor. In the years 1976 to 1978 fires and explosions accounted for the greatest number of ship losses followed by strandings and then weather. In 1979 the order changed and losses directly due to weather became second. This trend has been sustained in 1980. In the months January to June, out of 120 total losses no less than 25 were directly attributable to weather and only 17 due to stranding.

As this Editorial is being compiled, news has come in of the tragic loss, apparently with all hands, of the *Derbyshire* some 650 nautical miles south of Tokyo Bay. This 169 044 tonnes deadweight ship was on passage from Seven Islands in Canada to Kawasaki in Japan laden with 158 000 tonnes of iron ore. She was a well-maintained and operated ship, fitted with modern navigational aids and owned by a reputable, long-established British shipping company with an excellent safety record. She is probably the biggest single British flag loss in maritime history and her disappearance could be one of the largest unsolved mysteries of the sea. In her last report by radio, the *Derbyshire* was hove-to in heavy seas in close proximity to typhoon Orchid. Possibly we shall never know exactly what caused her disappearance but if it was not directly attributable to weather then it appears likely that it was a contributing cause in the tragic loss of life.

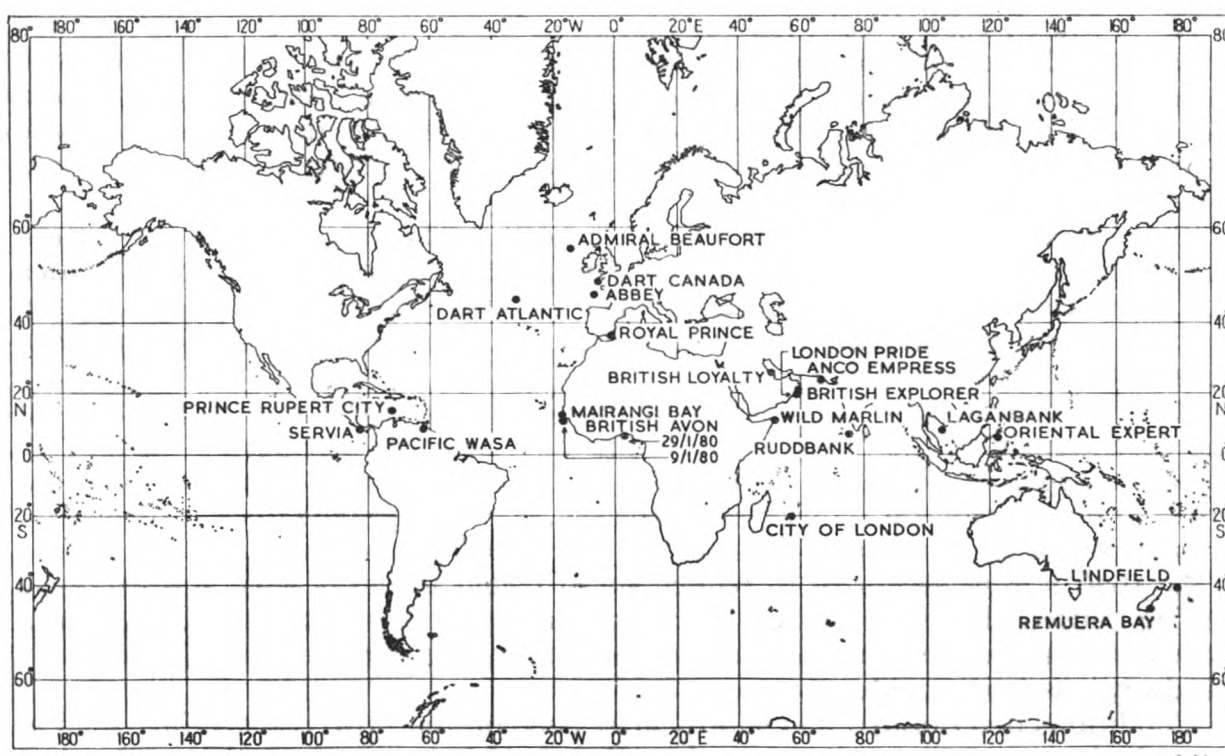
If there is one lesson which can be learned from the above figures, it is that it does not do to take chances, for the sea is without mercy and never forgives. As Max

Pemberton wrote: 'Study her a thousand years and she's not a day older—say that you've mastered her and she'll beat the life out of you, for she owns no master'.

From time to time in this journal, reference has been made to the fact that no matter how much the improvement in the design, machinery and navigational equipment of ships, the weather continues to play a large part in their safety as well as in their economic operation. One purpose of the Meteorological Office, indeed the purpose for which it was originally constituted over 120 years ago, is to warn shipping of gales and storms. For very good reasons, the Marine Superintendent of the Meteorological Office attends the Safety of Navigation Committee which meets under the auspices of the Department of Trade and often represents the World Meteorological Organization at the Inter-Governmental Maritime Consultative Organization's meetings and conferences. The Editorial to this journal a year ago quoted a letter written by the Marine Superintendent to all Masters of ships in the Voluntary Observing Fleet which stated that a new Meteorological Code is to be introduced in January 1982. Elsewhere in this edition are some introductory notes to this new Code. One of the main reasons for the change is to accelerate the exchange of data between meteorological centres and this should ensure that forecasts for shipping are improved. However, it is well to remember that the standard of our work and the quality of our services to shipping are still, as they always have been, directly proportional to the number of voluntary meteorological observations received from ships and it is only by continuance of our mutual efforts that we can ever hope to resolve some of the questions on the safety of life at sea.

May 1981 see an improvement in the world shipping industry, a decrease in the number of ships damaged or lost in heavy weather and good fortune to all our readers whether ashore or afloat.

C. R. D.



Position of ships whose reports appear in 'The Marine Observers' Log'



January, February, March

The Marine Observers' Log is a quarterly selection of observations of interest and value. The observations are derived from the logbooks of marine observers and from individual manuscripts. Responsibility for each observation rests with the contributor.

Observing officers are reminded that preserved samples of discoloured water luminescent water, etc. considerably enhance the value of such an observation. Port Meteorological Officers in the UK will supply bottles, preservative and instructions on request.

TROPICAL CYCLONE 'LAURE'

Indian Ocean

m.v. *City of London*. Captain J. I. Owen. At anchor Port Louis (Mauritius). Observer, the Master.

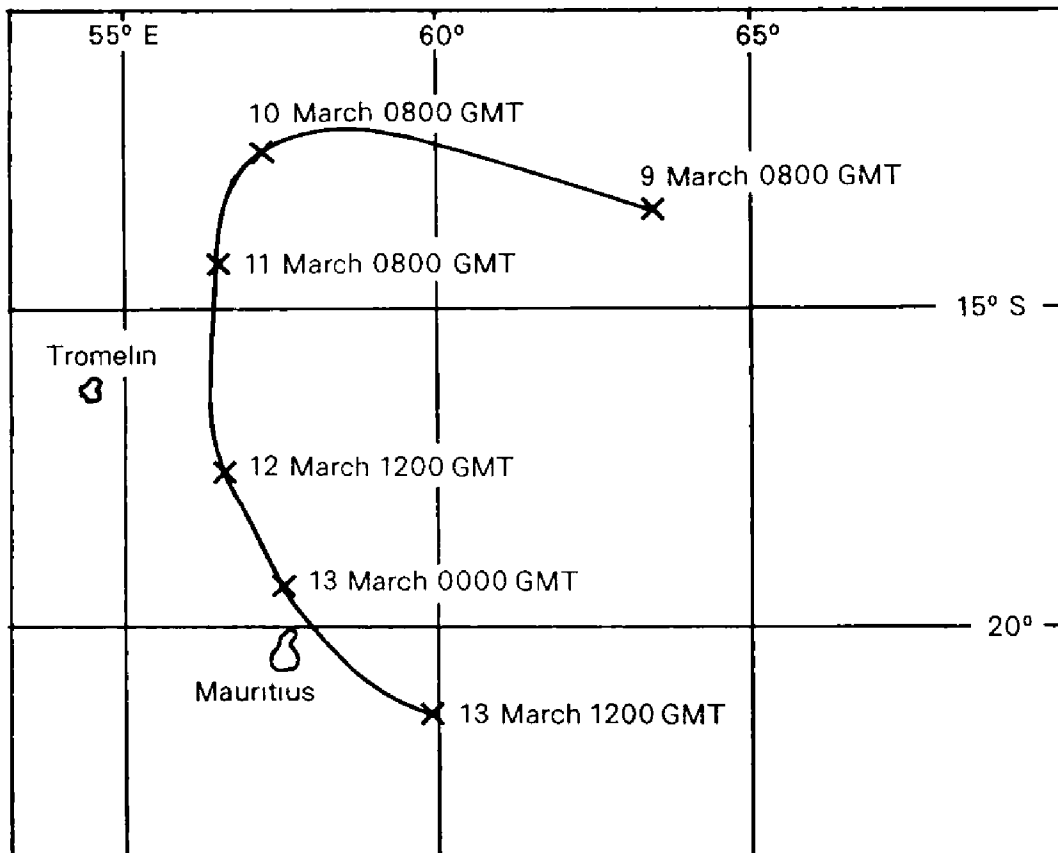
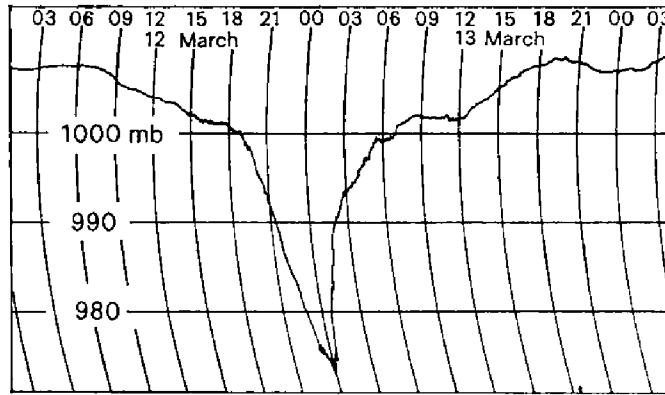
12-13 March 1980. Whilst loading bulk sugar on the 12th a cyclone warning was received and the vessel was ordered to prepare to leave Port Louis immediately. Securing for sea had already commenced, the pilot came on board at 1100 GMT and the vessel had cleared the port area one hour later. At this time the cyclone was believed to be east of Tromelin Island, only 200 n. mile north-west of Mauritius and moving south at 8 knots.

There was considered to be insufficient time to steam west and clear the path of the storm, it was, therefore, decided to proceed to the northern tip of Mauritius and await the next weather forecast. When this was received at 1200 it indicated that the storm was moving south-south-east at 8 knots and was still expected to pass to the west of the Island.

At 1430 a local radio broadcast announced that the storm was expected to hit the northern tip of the Island at 2300, this had, however, not been confirmed by radio message. At this time (1430) the wind was still easterly and the swell increasing but no cloud was observed in the sky. Having $8\frac{1}{2}$ hours to clear the danger area, a course of 040 degrees was set and full speed (15-16 knots) was ordered.

At 1626 it was necessary to reduce speed owing to heavy seas, and excessive rolling caused the course to be altered gradually to the northward. It was now apparent that we were much closer to the storm than expected and already little headway was being made.

Conditions deteriorated and shortly after 0000 on the 13th, the steering failed as spray had entered the steering console in the wheel-house. By 0530 the weather had improved sufficiently to permit emergency steering to commence. Approximate



courses were set to the west and north-west in order to clear the area and thereafter the vessel returned to Port Louis for repairs and to complete loading.

Position of ship: 20° 00's, 57° 00'E.

Note. The barogram illustrates the pressure pattern on the 12th and 13th. The chart indicates the track of the storm. The storm positions were confirmed by satellite pictures.

HEAVY WEATHER

S.W. Approaches

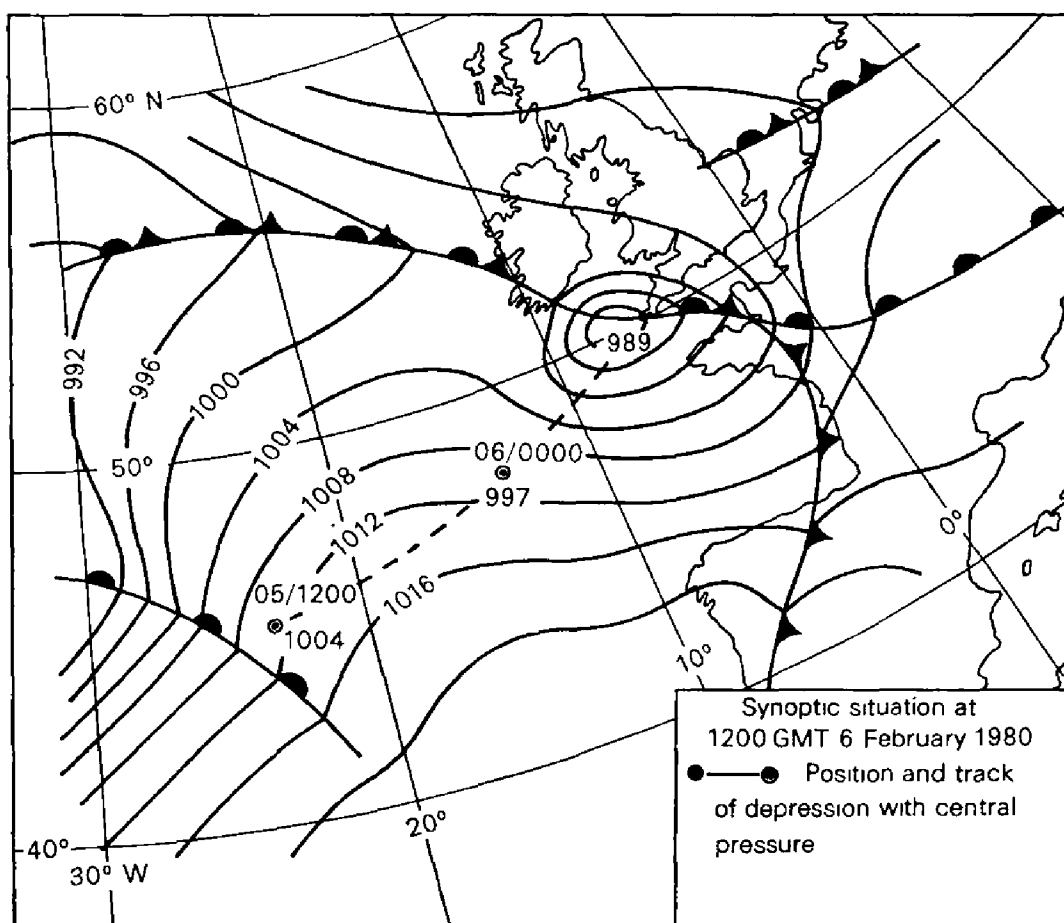
m.v. *Dart Canada*. Captain K. W. Keithley. Le Havre to Halifax (Nova Scotia). Observers, the Master and Mr C. D. Eke, 3rd Officer.

6 February 1980. At 0800 GMT the wind was s, force 7, visibility moderate, sky overcast with thick stratocumulus cloud and the barometric pressure falling rapidly. The 0600 surface analysis chart received at 0945 from Bracknell indicated a frontal

system approaching from the south-west. By this time the wind had veered to ssw and increased to force 8. The pressure was still falling rapidly.

By 1100 the wind had become w, force 10 and the cloud cover was beginning to break up showing glimpses of the sun. During the next 2 hours the wind veered further to wnw with gusts to 95 knots. The visibility was reduced to 400 metres by sea spray and the vessel's speed was reduced from 17 to 9 knots.

Position of ship: $49^{\circ} 31'N$, $5^{\circ} 58'W$.



Note. At midday on the 5th a small depression some 600–700 n. mile to the south-west of the British Isles was moving fairly quickly north-east and slowly deepening. On the 6th it slowed a little but deepened quite quickly to reach its lowest pressure at midday near Lands End, see chart. It continued to slow as it moved up the English Channel and filled.

This depression became quite intense over the S.W. Approaches with very tight pressure gradients and very strong winds around its centre.

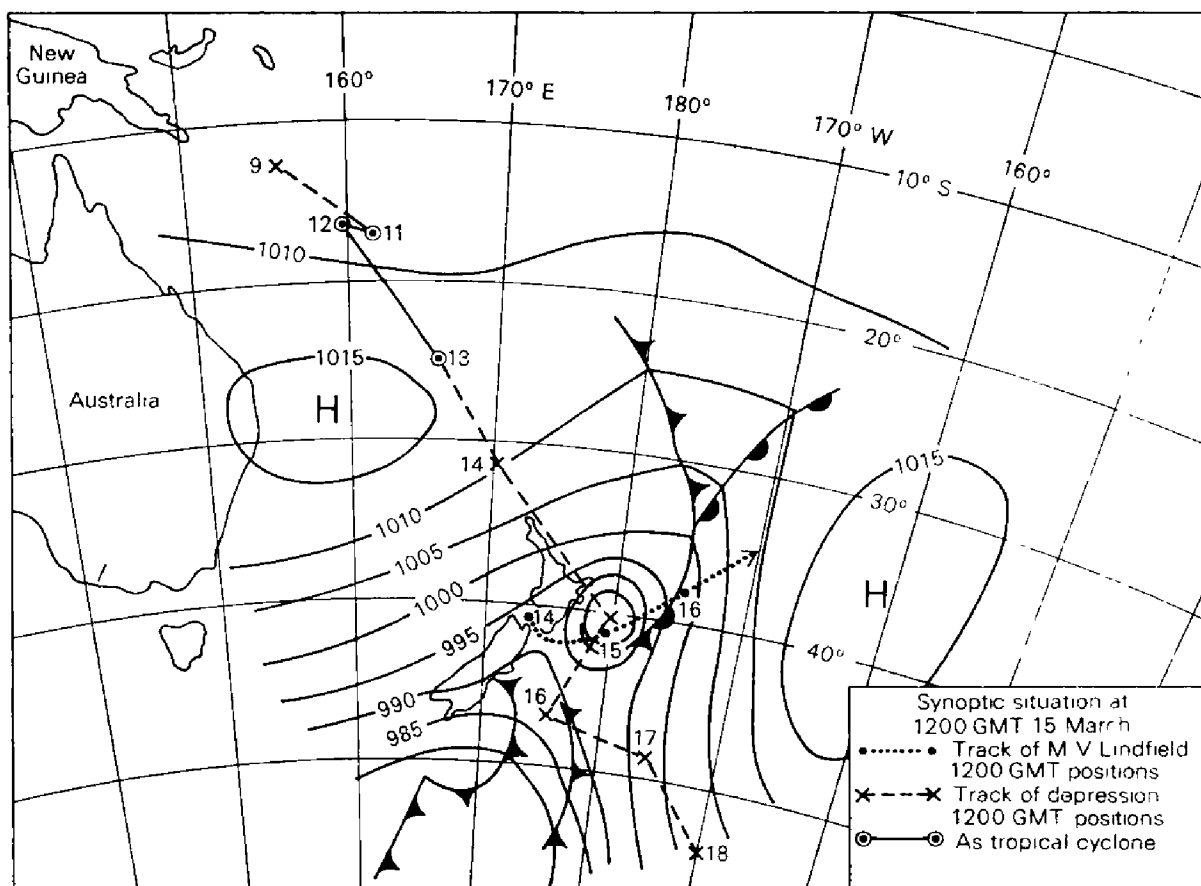
DEPRESSION

South Pacific Ocean

m.v. *Lindfield*. Captain W. R. Stevens. New Plymouth (NZ) to Balboa. Observers, the Master and ship's company.

15–16 March 1980. The vessel encountered an intense depression, formerly cyclone Sina, and the following are extracts from the logbook:

GMT
 15th 0000: Wind NE, force 5, barometric pressure 1006.1 mb.
 0600: Wind E, force 5, barometric pressure 993.4 mb.
 0800: Overcast with continuous heavy rain.



- 0900: Wind E, force 6, barometric pressure 981.9 mb.
 1200: Wind NE, force 4, barometric pressure 973.8 mb, overcast with continuous heavy rain.
 1400: Barometric pressure 972.5 mb.
 1600: Wind wsw, force 9, barometric pressure 976.0 mb, overcast with frequent rain showers.
 1800: Wind wsw, force 10, barometric pressure 982.8 mb, depression now centred in position 42°S, 176°W, moving south-east at 35 knots.
 2000: Wind wsw, force 10, cloudy, fine, driving spray, barometric pressure 987.9 mb.
 2200: Wind WNW, force 10, barometric pressure 991.6 mb.
 16th 0200: Wind WNW, force 9, barometric pressure 994.2 mb.
 0600: Wind w, force 5, barometric pressure 996.2 mb, depression now centred in position 45°S, 173°W, moving south-east at 30 knots.
 1200: Wind NW, force 3-4, barometric pressure 998.4 mb.

Position of ship at 1200 on the 15th: 40° 06'S, 179° 30'E.

Note 1. The synoptic situation at 1200 on the 15th is shown on the accompanying chart.

Note 2. A rather large area of shallow low pressure over the northern Coral Sea on the 9th drifted south-east and deepened to become cyclone Sina by the 11th. The storm continued to move south-east becoming extra-tropical on the 14th finally losing its circulation by the 19th.

HEAVY SHOWER WITH OIL

Gulf of Guinea

m.v. *British Avon*. Captain G. Barber. At anchor off Lagos. Observer, Mr I. O. Williams, 3rd Officer.

29 January 1980. At about 0700 GMT a very heavy rain shower began. The unusual

aspect of it was not the intensity but that it brought with it an oily dirt which covered the whole vessel. The dirt could not be hosed off and was eventually removed by scrubbing with a detergent solution. The wind was WSW, force 3 and the vessel was lying to the wind. Smoke, therefore, could be eliminated since this was blowing aft and the whole vessel was affected.

Approximate position of ship: $6^{\circ} 25'N$, $3^{\circ} 27'E$.

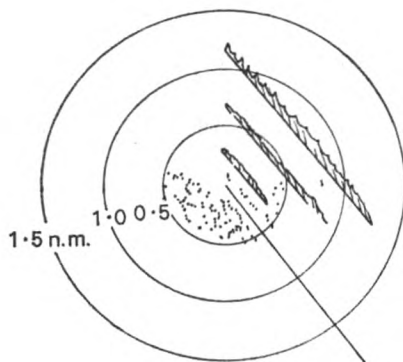
Note. Mr Williams suggests that the dirt may have come from industry ashore and that it may have been held in suspension for some time—this is a possibility. The harmattan which is a dry wind blowing from a north-easterly or sometimes easterly direction over north-west Africa carries with it from the desert great quantities of dust sufficient to form a thick haze which impedes navigation on the rivers. The southern limit in January is about $5^{\circ}N$ latitude. It is possible that oil particles may have adhered to the dust particles and subsequently been carried down in the heavy shower.

CURRENT RIP

Eastern North Atlantic

m.v. *British Avon*. Captain G. Barber. Europoort to Lomé (Togoland). Observer, Mr I. O. Williams, 3rd Officer.

9 January 1980. At 2205 GMT when the vessel was approximately 50 n. mile off the West African coast steering 148° , speed 14 knots, the off-course alarm sounded and when steering was switched to manual it was found that 15 degrees of helm were required to keep the vessel on course. Lines of distinct 'waves', wavelength about a quarter of a nautical mile, were observed approaching from the north on the radar screen, see sketch. The echo-sounder reading was steady at 200 metres. The vessel's steering was unaffected between the 'waves' but paid off, first to port then to starboard, as each wave was encountered. At 2220 the waves were still observed on the radar screen but, by this time, were having no effect upon the vessel's steering. The wind remained unchanged throughout the observation at NNE, force 4.



The vessel was, at the time, estimated to be 6 n. mile south-west of the 100-fathom line in an area where the North Equatorial current westbound and the Counter Equatorial current eastbound were in close proximity.

It was thought that the phenomenon may have been localized since it was observed for only about 15 minutes; other vessels, including one on a reciprocal course 3 n. mile inshore, seemed to be unaffected and no member of the ship's company had experienced similar conditions in this area before.

During daylight on 9 February 1980 similar conditions were experienced although to a lesser degree when the vessel was in the same locality on passage from Nigeria to north-west Europe. Similar lines were observed on the radar screen and they appeared on the sea surface as different colour shades. There was little apparent movement in the 'waves'.

Position of ship: 10° 40'N, 17° 04'W.

Note. This is another interesting report of a current rip from an area which appears to be particularly favourable for their occurrence. As in some of the previous reports, similar features have been noted, for example, the bands of broken water separated, in an earlier instance, by as much as a nautical mile.

It is thought that these disturbances are caused when the east-going Equatorial Counter-Current and the west-going North Equatorial Current flow in close proximity.

CETACEA

Mediterranean Sea

m.v. *Royal Prince*. Captain E. Buckle. Haifa to Leixoes (Portugal). Observers, the Master and ship's company.

31 March 1980. At 0830 GMT 3 Bottlenosed dolphins and about 12 Common dolphins were observed swimming in the vessel's bow wave. Three Bottlenosed whales were also observed lying quietly on the surface of the water; they were estimated to be 10 metres in length.

Position of ship: 36° 41'N, 1° 18'W.

Note. Mr D. A. McBrearty of the Department of Anatomy, University of Cambridge, comments:

'The Bottlenosed whale (*Hyperoodon ampullatus*) is a common species in the North Atlantic and Arctic Oceans and is usually seen in small schools of 2 or 3 individuals. It is believed to be one of the deepest diving of all cetacea with depths of 600 fathoms being recorded.

'Among the ziphiidae it shows a more well-defined pattern of migration than many other toothed whales. It travels north to the edge of the ice in summer and south as far as Cape Verde Islands in winter, occasionally going into the Mediterranean. The northward migration usually starts in March and the animals return south in July and August.'

Eastern North Atlantic

m.v. *Mairangi Bay*. Captain R. Wood. Rotterdam to Cape Town. Observers, the Master and ship's company.

12 March 1980. At 1410 GMT Mr Leavett reported from the forecandle that a whale was caught on the vessel's bow. The vessel's speed was reduced by 1.5 knots due to the extra resistance and vibration increased slightly. At 1424 the engine speed was reduced to 85 rpm. The depth of water was at this time 87 metres and judging by the direction the whale was lying across the bow it was heading for the coast in the region of the Casamance River, some 50 n. mile distant. At 1450 both engines were stopped and, as the way came off the vessel, the whale slipped clear; as it did so it sank tail first to show a typical rorqual under-belly of deep ridges.

The creature was about 13 metres long. The upper part was grey/blue in colour deepening towards the head, behind the head were almost white saddle marks. A few light-blue spots appeared on the lower part of the back. The blow-hole had 3 distinct ridges and grooves running away to the fin which itself was small and set two-thirds back from the head. The throat, though badly torn, was white with ridges extending back to just forward of the fin. The tail was very distinctive having a bulb-shape close to the base and a leaf-shape at the tip of each section. It was thought to be a Sei or Bryde's whale or a large Minke.

Position of ship: 12° 42'N, 17° 38'W.

Note. Mr McBrearty comments:

'This is indeed a most unfortunate occurrence and whilst it is unusual, it is not without precedence. Why it should happen I'm afraid I don't know, but I do know that Bryde's whales (*Balaenoptera edeni*), unlike Sei and Fin whales, frequently approach vessels at sea.'

It may be that this was a simple case of an error of judgement on the part of the whale or that some parasitic or other infection may have affected its hearing.'

Arabian Sea

s.s. *London Pride*. Captain A. Smith. Ra's al Ju'aymah (Persian Gulf) to Rotterdam. Observer, Mr B. Woodward, 3rd Officer.

12 March 1980. At 0230 GMT a number of dolphins was observed leaping in a random manner immediately ahead of the vessel. As we approached the school which could now be seen to be quite large, probably in excess of 100, most of them moved off in a north-westerly direction at a speed estimated to be 12 knots.

A small group of the creatures remained and as the vessel drew close to them they were seen to be of typical dolphin shape and proportion with small dorsal fins, pointed beak, dark-grey or black backs and light-brown almost sand-coloured lower parts. The 4 larger dolphins were approximately 2 metres in length; the 5 smaller creatures, presumably juveniles, were at the centre of the group.

Mr Woodward comments that he observed considerable difference in the behaviour of dolphins towards this vessel (250 000 tons dwt with a fairly blunt stem and no bulbous bow) and that towards smaller vessels with possibly finer lines. In the latter case the animals regularly come very close to the vessel, often playing in the bow wave. Rarely do they come close to this vessel and seem to make every effort to keep clear of it.

Position of ship: 19° 45'N, 58° 47'E.

Note. Mr McBrearty comments:

'The observer is to be commended on his observations of the apparent difference between the behaviour of dolphins to his vessel against that of smaller vessels. I doubt if this difference is due to the variation in tonnage, in fact I would expect that the larger vessel, having a bulbous bow and thus a larger pressure wave, would be an encouragement to bow-riding. If he is correct in his assumption that the dolphins avoid his vessel, then it must be either the smell of the oil or the particular note of the machinery.'

Arabian Sea

m.v. *Wild Marlin*. Captain F. G. Bevis. Sydney to Aden. Observers, the Master and ship's company.

1 January 1980. At 0300 GMT schools of Common dolphins, too numerous to estimate, together with 20 to 30 Common porpoises, were observed; they were accompanied by a number of sea birds which appeared to be feeding. The dolphins varied in length from 1 to 2 metres, the porpoises were a little over 1 metre. The vessel was within the 100-fathom line.

Position of ship: 11° 50'N, 51° 30'E.

Note. Mr McBrearty comments:

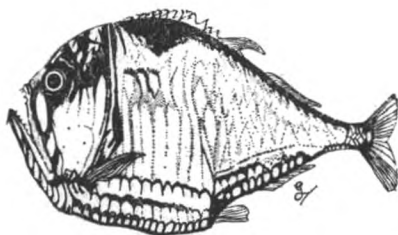
'Large schools of Common dolphins are a frequent occurrence in all tropical and temperate seas, this is not so in the case of the Common porpoise (*Phocoena phocoena*) which is the North Atlantic and North Pacific animal inhabiting cooler coastal waters. The only porpoise in the Arabian Sea is the black finless porpoise (*Neophocaenoides phocaenoides*). As the name implies, this animal does not have a dorsal fin but it does possess a dorsal ridge about 30 cm long by 2-3 cm high. The over-all length of the porpoise is about 160 cm.'

MARINE LIFE

Bay of Biscay

m.v. *Abbey*. Captain D. G. Pugh. Dunkerque to Saldanha Bay (S. Africa). Observers, Mr J. P. Jackson and other officers.

28 January 1980. A deep-sea hatchet-fish, see sketch, was found on board.



Position of ship: $47^{\circ} 00'N$, $7^{\circ} 00'W$.

Note. Dr F. Evans of the Dove Marine Laboratory, University of Newcastle upon Tyne, comments:

'This is the third record recently of a hatchet-fish from almost the same spot. The earlier reports were from the *Wimpey Sealab* in position $46^{\circ} 31'N$, $7^{\circ} 02'W$ (*The Marine Observer*, January 1978, page 12) and the *Timaru Star* in position $45^{\circ} 06'N$, $8^{\circ} 00'W$ (*The Marine Observer*, April 1979, page 62). I now believe they are all the same species *Argyropelecus olfersi*. They are deep-sea fish spending the day hundreds of metres below the surface but rising at night in the same way as plankton although over a greater distance.

'The fish are said to be fairly common over the edge of the Continental Shelf which goes some way to explaining these observations in the Bay of Biscay, but I shall certainly watch for more from the same locality.'

South Pacific Ocean

s.s. *Remuera Bay*. Captain J. H. Hutson. Port Chalmers (NZ) to Flushing. Observers, Mr R. D. Anderson, 3rd Officer and Mrs M. Brummit.

9 February 1980. At 1300 GMT a large fish was observed floating on the surface of the water; it was dark brown in colour, oval in shape and approximately $1\frac{1}{2}$ metres long and $1\frac{1}{4}$ metres wide.

The creature, which appeared to be lying on its side, was thought to be an ocean sun-fish.

Position of ship: $45^{\circ} 30'S$, $171^{\circ} 10'E$.

Note. Dr Evans comments:

'It is highly likely that this was indeed an ocean or common sun-fish, *Mola mola*. They are often reported from near the surface, sometimes lying on their sides. Various explanations have been given for this—that they are basking in the sun (unlikely) or that they are sick or disabled. I believe it equally likely that, like other deep-bodied fish, they will turn on their sides to alter their field of view, no doubt whilst watching for food.'

South China Sea

m.v. *Laganbank*. Captain T. D. Scott. Djakarta to Bangkok. Observer, Mr D. Jardine-Smith, 3rd Officer.

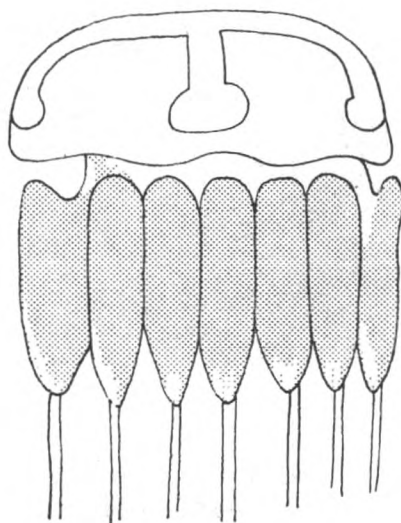
26 January 1980. Many jelly-fish were observed lying close to the surface of the water.

The bodies of the creatures varied in diameter from about 30 to 45 centimetres and were a milky opaque colour. The tentacles were short and thick and of a much darker brown colour. One jelly-fish was observed to have a large cross over the upper part of the body, see sketch.

Position of ship: $8^{\circ} 00'N$, $105^{\circ} 00'E$.

Note. Dr Evans comments:

'The jelly-fish illustrated in the sketch has the appearance of a species of Rhizostome which lacks tentacles around the outer margin, the mouth lips being drawn out in tentacular form. Large jelly-fish of this and similar type have, until very recently, been exported from Indonesia



to Japan for food. The tentacles are cut off and the disc is dehydrated (jelly-fish are over 95 per cent water), then held for a month in strong brine. The flat, dry papery product is used as an accompaniment to saki. The trade with Japan has now passed from Indonesia to China where even larger specimens of jelly-fish occur.'

BIRDS

Eastern North Atlantic

o.w.s. *Admiral Beaufort*. Captain G. Mathison. Ocean station 'Lima' ($57^{\circ} 00'N$, $20^{\circ} 00'W$) to Greenock. Observers, Mr A. Britain, Chief Officer and Mr R. J. Burness, Meteorologist.

16 March 1980. At 0830 GMT, whilst Mr Britain and Mr Burness were bird-watching from the bow of the vessel, they observed a number of birds approaching from the east; closer inspection revealed that they were Fulmars but amongst them a bird twice their body size and three times their wing-span was also observed. The birds turned to follow the vessel for about 2 minutes enabling the observers to make notes on the larger creature.

The bird's flight was similar to that of the Fulmar, gliding close to the water without flapping the wings. The neck and head were white. A dark-brown eye stripe starting in between the base of the bill and the eye encompassed the whole eye and extended further behind it than in front. The mantle was dark grey/brown. The back and whole upper wings were very dark sooty-brown (almost black but not glossy), the lower back, rump and most of the upper tail coverts were off-white. The tail was rounded wedge-shape with a thick dark sooty-brown terminal band, possibly sub-terminal on the central feathers.

The whole underpart was white except for grey smudges on the axilleries. The under wing leading edge and tip were dark sooty-brown with progressively lighter grey/brown feathers leading back to the centre of the wing. The trailing edge was dark grey/brown with a narrow white central line on the under wing. The bill was long, thick, 'tubed' and broad at the base rather similar to a much larger Leach's Petrel bill. It was yellow in colour with a pinky-orange tip to the hooked upper mandible. The legs were pale pink.

The bird was observed for 2 minutes at ranges down to 30 metres through 10×50 binoculars.

The surface wind was W'N, force 5, it had been NW, force 5-6 for 2 days prior to the sighting.

Position of ship: $56^{\circ} 21'N$, $14^{\circ} 12'W$.

Note. Captain G. S. Tuck of the Royal Naval Birdwatching Society, comments:

'This bird, observed near Rockall Bank, was the Black-browed Albatross. This is an unexpected sighting but undoubtedly as quoted. We have had one beforehand observed at Bass Rock in the North Sea.'

Persian Gulf

m.v. *British Loyalty*. Captain D. Coombes. At anchor, Bahrain. Observer, Cadet J. Harris.

12 January 1980. At 0400 GMT a very large flock of birds was observed at a distance of about one nautical mile from the vessel. The birds, flying in formation line astern and approximately 25 abreast, were heading in a north-north-westerly direction at an estimated height of 3 metres above the water. The flock was seen to stretch to the horizon and a period of 29 minutes had elapsed before the last of the flock was seen.

Positive identification was not possible owing to the distance of the flock from the vessel, they appeared, however, to have long necks and legs and predominantly dark plumage.

Position of ship: 26° 10'N, 50° 43'E.

Note. Captain Tuck comments:

'These birds could well have been Socotra Cormorants, *Phalacrocorax nigrogularis*, which are frequently seen in very large flocks flying between islands in the Persian Gulf.'

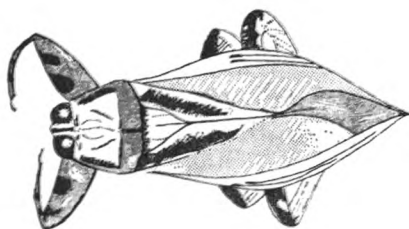
INSECT

Orinoco River

m.v. *Pacific Wasa*. Captain R. A. Reay. At anchor Puerto Ordaz (Venezuela). Observers, Mr M. J. Pinder, 3rd Officer and Mr C. Penny, Purser.

18 February 1980. The insect shown in the sketch drawn by Mr Penny was found on board the vessel by Mr Pinder.

Position of ship: 8° 21'N, 62° 43'W.



Note. Mr I. Jessop of the Department of Entomology, the British Museum (Natural History), comments:

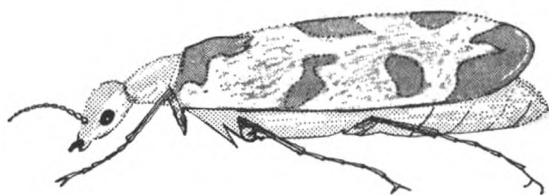
'This is the *Lethocerus annulipes* the common name for which is the Electric Light Bug or the Toe Biter.'

Caribbean Sea

m.v. *Servia*. Captain D. L. des Landes. Golfito (Costa Rica) to Wilmington (California). Observers, Mr B. F. Hawkins, Chief Officer, Mr D. Knight, 3rd Officer and Cadet C. Hallam.

6 February 1980. The insect illustrated in the sketch was found on board the vessel.

It was approximately 30 mm long, the abdomen measured 20 mm, the thorax



5 mm and the head section 5 mm. At its widest part it measured 15 mm and the wing-span was estimated to be 50 mm. The wings were a reddish colour with black markings as shown in the sketch. The abdomen was a red/orange colour.

Position of ship: $8^{\circ} 10'N$, $83^{\circ} 30'W$.

BIOLUMINESCENCE

Arabian Sea

s.s. *British Explorer*. Captain J. C. Wilson. Ain Sukhna (Egypt) to Jebel Dhanna (Trucial States).

The following reports have been received:

17 January 1980. Observers, Mr N. J. Southan, 3rd Officer and Mr P. Burns. At 1800 GMT bioluminescence in the form of 'milky sea' was observed all around the vessel. The illumination increased in intensity when the light from the Aldis lamp was directed onto the water. Occasionally very intense green 'flares' were also observed. A sample of the water was taken and found to contain a large number of very small particles. Some luminescence was observed when the sample was stirred but there was no effect when light was directed onto the sample. A second sample was taken at 2015 when once again luminescence was observed in it. The bow wave was not very large and the sea calm.

Position of ship at 1800: $17^{\circ} 20'N$, $56^{\circ} 24'E$.

18 January 1980. Observers, Mr S. R. Mitchell, 2nd Officer and Mr A. King.

Bioluminescence in the form of 'milky sea' was again encountered, on this occasion, however, it was restricted to the vessel's bow wave. Brighter and more-concentrated 'flares' were observed from time to time but never reaching the bright green peak of the previous evening.

Weather conditions were: dry bulb $23.0^{\circ}C$, sea temp. 24.0 , barometric pressure 1017 mb; wind NE, force 2, one okta of cloud.

Position of ship: $21^{\circ} 14'N$, $59^{\circ} 33'E$.

19 January 1980. Observers, Mr S. R. Mitchell, 2nd Officer and Mr A. King.

Bioluminescence was once again encountered. It was more intense than on the previous evening and appeared to run out and along the vessel's bow wave. Occasional green 'flares', less brilliant than on the 17th, were also observed.

Weather conditions were: dry bulb $20.0^{\circ}C$, sea temp. 22.5 , barometric pressure 1021 mb, wind calm, sea calm, 2 oktas of cloud.

Position of ship: $25^{\circ} 31'N$, $57^{\circ} 24'E$.

Note. Dr P. J. Herring of the Institute of Oceanographic Sciences, comments:

"These observations suggest that an area of dinoflagellate luminescence was encountered which would account for the surface luminescence and that of the water sample. Whilst dinoflagellates do not usually respond to illumination in the way described, other organisms may have been stimulated to greater activity by it, thereby causing more dinoflagellate luminescence. The green "flares" were probably comb jellies.

Celebes Sea

m.v. *Oriental Expert*. Captain F. G. Dagger. Goode Island (Torres Strait) to Manila. Observers, the Master and Mr P. D. Conolly, 2nd Officer.

15 February 1980. At 1800 GMT bioluminescence was observed during a heavy rain squall. It took the form of large pulsating patches, lime green in colour and about 100 metres in diameter. The patches were numerous but well scattered in the surrounding sea.

Other weather conditions were: dry bulb 26°C, wet bulb 24, sea temp. 30, barometric pressure 1008.4 mb.

Position of ship: 5° 42'N, 122° 40'E.

Note 1. The *Oriental Expert* is a Hong Kong Selected Ship.

Note 2. Dr Herring comments:

'It is probable that the heavy rain stimulated organisms close to the sea surface to luminesce. The pulsation of such large patches is not easily explained; mating swarms of small worms can provide this appearance and are known in this area. They normally appear for only 15 to 30 minutes about an hour after sunset in the period just following the full moon—conditions similar to those at the time of the observation.'

Arabian Sea

m.v. *Anco Empress*. Captain P. A. Messinger. Port Kelang to Karachi. Observers, the Master, Mr T. W. Morgan, 4th Officer and Mr C. Eaton.

6 March 1980. At 1552 GMT bioluminescence in the form of diffused white light in 'whirlpool' and 'cartwheel' formations was observed; within 3 minutes it completely encircled the vessel and extended to the horizon.

The 'cartwheel' formations were brightest at the centre with a halo effect surrounding the outer edges. As the vessel passed over 2 such formations the 'spokes' were estimated to be 2–2½ metres in width and the entire concentration, which was more than the width of the vessel (approximately 27 metres), was observed on both sides of the bridge-wing simultaneously. The 'whirlpool' formations, with a distinct central hub, varied from 1¼ to 2 metres in width and from 14 to 15 metres in length.

The phenomenon was observed for 40 minutes.

Weather conditions were: dry bulb 21.6°C, sea temp 22.6, barometric pressure 1012.8 mb, visibility very good, light airs, slight rippled sea.

Position of ship: 23° 56'N, 66° 54'E.

Note. Dr Herring comments:

'This is an interesting description of a "phosphorescent wheel" and the information on its dimensions is particularly valuable. The "whirlpool" formations are rather unusual features of this phenomenon. Reports of phosphorescent wheels are restricted to the Indo-Pacific region but their causes, usually attributed to seismic activity beneath the sea bed, are by no means certain.'

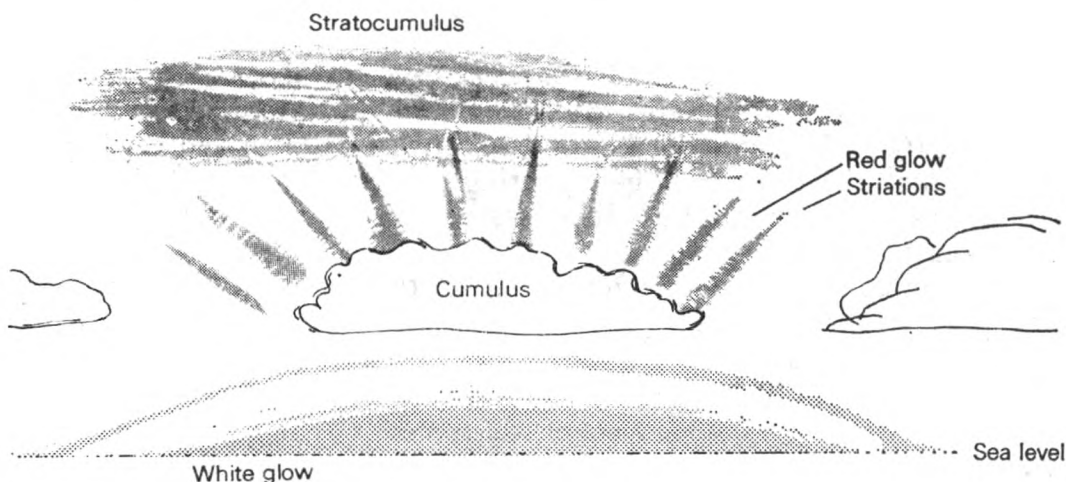
AURORA

North Atlantic Ocean

m.v. *Dart Atlantic*. Captain R. McLeod. Le Havre to Halifax (Nova Scotia). Observers, Mr S. J. Kitchen, 3rd Officer, Mr W. J. Ferry, Radio Officer, Mr P. Bowers and Mr P. Wearing.

15 February 1980. At 2315 GMT aurora was observed, see sketch.

In its initial stages it took the form of a white glow to the north which gradually extended over an arc of 45° of the horizon and to an altitude of 10°. Ten minutes



after being first noticed, a faint red glow was observed above the white between the top of a large cumuliform cloud and a layer of stratocumulus some 15° higher. The red glow deepened in colour and striations appeared within it. The whole observation lasted some 35 minutes.

Weather conditions at the time were: sea temp 10°C , barometric pressure 996.1 mb, wind SW, force 8, 4 oktas of cloud.

Position of ship: $45^\circ 48'\text{N}$, $32^\circ 24'\text{W}$.

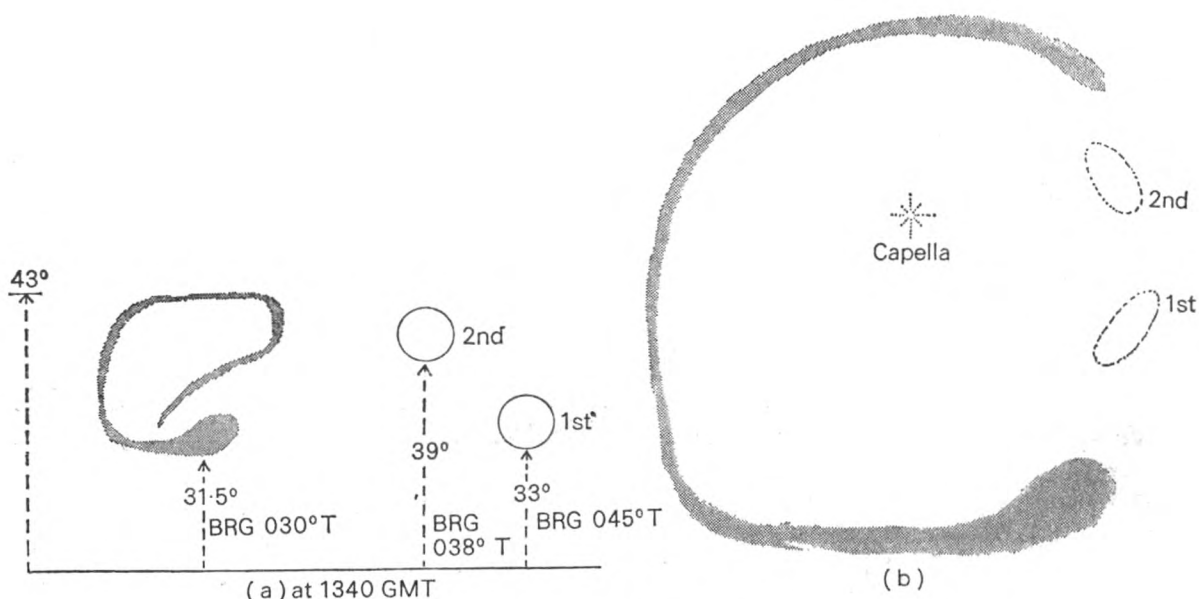
ROCKET EXPLORATION OF UPPER ATMOSPHERE

Arabian Sea

m.v. *Ruddbank*. Captain G. D. Scott. Kobe to Abu Dhabi. Observers, Mr D. K. Bennett, 3rd Officer and other officers of the watch.

16 February 1980. At 1325 GMT a light resembling the sun shining through stratus cloud was observed in the northern sky. Five minutes later a second light appeared, see sketch (a). After a further few minutes an effect similar to that of a rocket firework exploding occurred close to the 2 white lights and a red gas, which formed a small circle next to the lights, was emitted.

As the sun set the shape of the white lights appeared to change from circular to oval and the red gas expanded to the extent shown in sketch (b).



By dusk the red gas seemed to have formed an almost complete circle which extended from an area just above the heads of the observing officers to 20 degrees above the horizon. At this time there were 3 oktas of cumulus cloud present and the sky to the north was cloudless.

At 1345 the second light began to fade and eventually disappeared from sight. The first light and the red gas were observed for a further 5 minutes.

It was also interesting to note that a partial eclipse of the sun was observed on board the *Ruddbank* at 1000.

Position of ship: $7^{\circ} 22'N$, $75^{\circ} 02'E$.

Note. The vessel at this time was travelling close to the Indian rocket range at Thumba ($8^{\circ} 32'N$, $76^{\circ} 51'E$). A campaign was taking place there on 16 February in conjunction with the total eclipse observed that morning.

Shortly before sunset on that day a rocket was launched to release clouds of metal atoms into the upper atmosphere in order to study gravity and acoustic wave phenomena there. These atoms glow in the twilight and are observed from cameras on the ground.

The rocket released, firstly, 3 barium clouds (which glow with a greenish-white light) and, secondly, a streak of strontium atoms which glow with a red light.

It seems that Mr Bennett and his fellow officers saw only 2 of the barium clouds but otherwise his description is entirely consistent with the phenomenon caused by the rocket. The clouds were at a height of between 80 and 150 kilometres.

RESCUE AT SEA

Caribbean Sea

m.v. *Prince Rupert City*. Captain M. E. Jones. Vancouver to Dublin. Observers, the Master and ship's company.

6 February 1980. At 0315 GMT a low-flying aircraft was observed circling the vessel with landing lights flashing. The Master was called to the bridge and shortly afterwards the aircraft approached the vessel from astern on the starboard side and ditched abreast No. 3 hold.

Almost immediately after ditching the aircraft broke up; at this point the vessel was turned to starboard and the search for survivors began. Some 20 minutes later voices were heard in the sea on the port side and, when the survivors were sighted, the vessel was manoeuvred into the vicinity.

At 0415 the starboard lifeboat, which had been swung out in readiness, was launched and shortly afterwards 2 survivors were picked up and brought to the vessel. The survivors informed us that they were the only people on board the aircraft.

Due to the swell the lifeboat was brought back on board with twists in the falls; it was, therefore, necessary to make for Alta Vela (Dominican Republic) in order to provide a lee to bring the boat completely inboard. This was achieved at 2318 after which the vessel resumed her voyage to Dublin.

Position of ship: $14^{\circ} 47'N$, $72^{\circ} 54'W$.

The International Ice Patrol

(From information supplied by the United States Coast Guard; also from *Surveyor*, American Bureau of Shipping, and reproduced by kind permission of the Editor)

Introduction

Doctor Samuel Eyde, a European Doctor of Medicine, was crossing the Atlantic from the United Kingdom to the United States of America on board the *Mauretania* in April 1912. An emergency had caused him to miss his booking on the maiden voyage of the new luxurious White Star liner *Titanic*. On 14 April, whilst on board the *Mauretania*, Doctor Eyde and his fellow passengers were numbed by the news of the sinking of the *Titanic* and the loss of about 1500 lives following the liner's collision with an iceberg.

The Doctor pondered what might be done to prevent similar disasters in the future. He discussed the dangers of icebergs in shipping lanes and what could be done to minimize the problem with the Master of the *Mauretania* and with fellow passengers. Upon arrival in New York Doctor Eyde presented to US Senator William Smith of Michigan a proposal to establish an international ice patrol:

'R.M.S. *Mauretania*, April 18 1912. Shocked by the great disaster which has lately happened to the *Titanic*, every thinking human being would put the question whether such a catastrophe might have been avoided and how in the future we shall try to guard against its returning.

'In thinking over how the positions are for the great steamers as regards fog and icebergs during the months of April, May and June off the south of Newfoundland, it is wonderful that there are not more disasters of the same kind. It is now high time to take precautions to prevent catastrophies of the kind that happened to the *Titanic* which has shocked the American and British nations and also spread sorrow throughout the countries.

'The information that the great steamers receive today regarding the location of icebergs depends entirely upon reports given by ships that occasionally have seen them and by observations of low temperatures in the water that follows them.

'The movements of the icebergs depend largely on the winds and currents, so that a ship getting a report of an iceberg never knows the exact position of it after a time. A ship of the size of 25 000 tons striking an iceberg in foggy weather, even when going at low speed, would go down if, as in the case of the *Titanic*, the ice was low enough to permit her to ride over it.

'That kind of information of the whereabouts of the icebergs is insufficient to prevent disasters. To have full security from such calamities it is recommended that special ships be sent out. There must be a regular fully organized guard service.'

Doctor Eyde's proposal was one of many similar ideas which ultimately led to the founding of the International Ice Patrol (IIP).

History of the IIP

For many years icebergs have been feared by transatlantic navigators along the tracks in the vicinity of the Grand Banks of Newfoundland. In the days of slow steamers most of the vessels took a course directly across the Banks which carried them through the ice zone during the greater part of the year. Since the introduction of larger and faster ships, agreements have been entered into whereby definite routes have been established to the southward of the normal ice zone. If the ice zone were fixed, nothing would be required to assure reasonable safety along these routes. Unfortunately, the limits of the ice fields and bergs vary considerably in their location during the season as well as from season to season. Consequently a vessel might sail on a course that was clear at the time of her departure but encounter ice which had drifted into her path before she reached the Grand Banks.

Every spring and summer Arctic ice drifts southward into the North Atlantic Ocean and presents a menace to ships traversing the Ocean north of 40° latitude. The ice menace is greatest off Newfoundland where the presence of fog is added to the accumulation of icebergs, the concentration of traffic and the presence of fishing vessels have contributed to the likelihood of collision in the western North Atlantic.

A perusal of the history of navigation prior to the turn of the century impresses one with the great number of casualties that befell vessels in these waters. Collisions between east and westbound ships first claimed more attention than did the perils of ice. In 1855 Matthew Fontaine Maury in his *Sailing Directions* proposed separate lane routes with the eastbound lane just south of Cape Race and the westbound lane near the tail of the Grand Banks. Serious mishaps with ice continued to be frequent until 1875 when the Cunard Line adopted a series of tracks, the southern ones being laid south of the normal ice limits. The added safety of these precautions caused other large companies to join with the Cunard Line in adopting in 1898 the North Atlantic Track Agreement.

Before 1912 nothing had been done towards the establishment of any system for guarding against the danger from floating ice along the transatlantic steamship lanes in the vicinity of the Grand Banks. However, following the almost universal demand for a patrol of the ice zone to warn vessels of the limits of danger from day to day during the season—a consequence of the sinking of the *Titanic*—a patrol of the ice regions was carried out throughout the remainder of dangerous periods of that year by 2 US Navy ships. During the season of 1913 the patrol was undertaken by the Treasury Department and performed by the US Coast Guard cutters *Seneca* and *Miami*.

The British Government also took up the question of ice observation and ice patrol for the season of 1913, with the result that the steam trawler *Scotia* was chartered and fitted out for this service, the expense being shared by the British Board of Trade and the various British steamship companies operating across the Atlantic. The work of the *Scotia* was confined almost entirely to ice and weather observations off the coast of Newfoundland. This was greatly hampered by fog and storms but much useful information was gathered and the *Scotia* co-operated with the US cutters, so far as conditions permitted, in disseminating ice information to passing vessels.

At the International Conference on Safety of Life at Sea convened on 12 November 1913 in London the subject of patrolling the ice regions was discussed. The Convention signed on 30 January 1914 by the representatives of the various maritime powers of the world provided for the inauguration of an international derelict-destruction, ice-observation and ice-patrol service. This consisted of 2 vessels which should patrol the ice regions during the seasons of danger from icebergs and attempt to keep the transatlantic lanes clear of derelicts during the remainder of the year. The Government of the United States was invited to undertake the management of this triple service and the expense was to be defrayed by the 13 countries interested in transatlantic navigation. As the Convention would not go into effect until 1 July 1915 the Government of Great Britain, on behalf of the several countries interested, inquired on 31 January 1914 as to whether the United States would undertake the work at once under the same mutual obligations as provided in the Convention. The proposition was favourably considered by the US President and on 17 February 1914 he directed the (then) Revenue Cutter Service to begin as early as possible in that month the International Ice Observation and Ice Patrol Service. Each year since, with the exception of wartime years, a patrol has been maintained by the US Coast Guard.

The second International Conference on Safety of Life at Sea was convened on 16 April 1929 in London. Eighteen nations participated all of which signed the final Act on 31 May 1929. Because of fear in the United States Senate as to ambiguities in Article 54 dealing with control, the 1929 Convention was not ratified by the United States until 7 August 1936 and even then this was accompanied by 3

reservations. At the same time Congress enacted legislation on 25 June 1936 requiring the Commandant of the Coast Guard to administer the International Ice Observation and Ice Patrol Service and prescribing in a general fashion the manner in which this service was to be performed. This remains today the basic Coast Guard authority to operate the International Ice Patrol.

Due to advances in nautical science and the improved techniques developed during World War II, it was felt necessary to convene a third Convention as soon as practicable after the end of hostilities. Such a recommendation was made in 1943 to the Secretary of State and when approval was given the Commandant of the Coast Guard was instructed to undertake the work of drawing up a set of United States proposals for the revision of the 1929 Convention. Following informal conversations between the United States and the United Kingdom it was agreed to convene a Conference on 23 April 1948 in London and invite those nations party to the Convention in order to discuss its revision. This Conference resulted in the International Convention for the Safety of Life at Sea, 1948, signed on 10 June 1948 and ratified without amendment by the United States Senate on 20 April 1949. No basic changes affecting the Ice Patrol were made in the Conferences held in 1960 and 1974.

The funding of the International Ice Patrol is computed by determining the total tonnage of each signatory nation passing through the ice-patrol area and by distributing the cost of the operation in proportion to the tonnage as a whole. In other words, the patrol is financed on a 'pay-as-you-benefit' basis.

The IIP in the North Atlantic

The Coast Guard commences the service of ice observation and ice patrol whenever the presence of ice begins to threaten ships in the North Atlantic—usually in February of each year. The patrol covers a region of about the size of the State of Pennsylvania and is in the general region of the Grand Banks of Newfoundland. During a large part of the ice season, which usually extends from February to July, this region is blanketed in fog created by the confluence of the Gulf Stream and Labrador Current—through this area passes the world's heaviest seaborne traffic.

By 1963 aircraft, radar and Loran were being used to ensure better detection of the position of icebergs. Both aircraft and ships were based at Argentia, Newfoundland at the Headquarters of the IIP.

Long-range multi-engine Coast Guard patrol planes conducted the primary observation work. Ice reconnaissance flights were made on the average of 3 times weekly and searched out an area of over 33 000 square nautical miles. Under severe ice conditions when a continuous surface patrol was required, or when fog or other weather conditions rendered aerial search ineffectual, US Coast Guard ships were assigned to constant patrol of the sea lanes. These cutters were especially designed for US Coast Guard duty—service conditions such as rescue at sea, ice-breaking, weather patrols and rough-weather duties determined their scantlings and the arrangement of their structure as well as their mechanical and electrical requirements and equipment.

Information concerning ice, growlers and icebergs was collected by patrol vessels from aerial surveys and from sightings reported by ships and aircraft operating in or crossing the area. Wherever practicable commercial ships were requested to report by radio their position, course and speed together with a brief description of the ice sighted, every 4 hours when in the ice area. This information was summarized each day in radio reports broadcast to all shipping twice daily.

The use of Loran offered a much better opportunity to check the exact location of bergs and ice after they were sighted. Beforehand patrol vessels were sometimes fogbound for days. Their position had to be determined by dead reckoning and radio direction finder bearings. With the advent of Loran the position of the patrol

or aircraft could be plotted within approximately 1 n. mile so that fog no longer interfered with this phase of operations. Loran also afforded a more efficient means of tracking bergs in their daily movements.

In addition to this regular work, officers of the patrol vessels studied the ice situation particularly with regard to the currents in the vicinity of the Grand Banks—the physical properties of the ice, its drift, erosion and melting, temperatures of sea water and atmosphere in the vicinity of the ice, habits of birds and seals with regard to ice, and, in short, all kinds of information that might help the navigator in those regions. They also rendered assistance to vessels in distress, giving medical aid to crews of passing vessels, removing obstructions to navigation and extending such other assistance to the mariner as was practicable. Scientific observations and experiments to further oceanographic knowledge in the North Atlantic Ocean were also carried out.

In 1977 the International Ice Patrol was directed from the Ice Patrol Office at the United States Coast Guard Base, Governors Island, New York. The Office gathers ice and environmental data from a variety of sources, maintains an ice plot, forecasts ice conditions, prepares the twice-daily Ice Bulletin, replies to requests for special ice information and executes operational control of the Aerial Ice Reconnaissance Detachment, the Ice Patrol oceanographic cutter and the Surface Patrol cutter when assigned.

Ocean Currents

To appreciate the protective value of the IIP it is necessary to know something of the conditions which bring about the presence of icebergs in the waters traversed by shipping and to have some understanding of ocean currents, the source of bergs and a general idea of weather and oceanography prevailing in the North Atlantic. Ocean currents are the main factors which affect the movement of icebergs. In most cases the influence of wind is small compared with the effects of the currents.

Figure 1 indicates the general distribution of warm and cold water south-east of Newfoundland during the ice season. The offshore boundary of the shaded area is known as the Cold Wall. Inshore, in the shaded area and over the Grand Banks is the area of persistent fog which prevails during the period May to July. Note the salient of the warm Atlantic Current which extends northward to 51°N in longitude 44°W . Ships trading between European and United States ports are advised to follow the prescribed tracks which are laid south of the normal fog and iceberg waters.

Figure 2 indicates the drift of icebergs from their source into the North Atlantic. It is estimated that 7500 sizeable bergs break off from the west Greenland glaciers each year. An average of 400 of these drift south of latitude 48°N (Newfoundland) and approximately 35°N south of latitude 43°N .

Ice

Ice may be considered in 2 general categories: glacial ice and sea ice. Glacial ice is broken from continental sheets and consists of icebergs and fragments called growlers. It is found only in areas of the world adjacent to coastal glaciers and where transported thereto by ocean currents.

Sea ice occurs anywhere the sea surface becomes cold enough to freeze. This may occur throughout the year in polar regions and along coastal shelves and estuaries during winter in higher latitudes. In certain regions, notably the Grand Banks of Newfoundland, Arctic sea ice has been known to be transported great distances southward into the Atlantic Ocean.

Sea ice is classified according to its concentration, size, age and topography. By concentration is meant the degree of coverage of the sea surface ranging from 'open water' to 'consolidated pack-ice'.

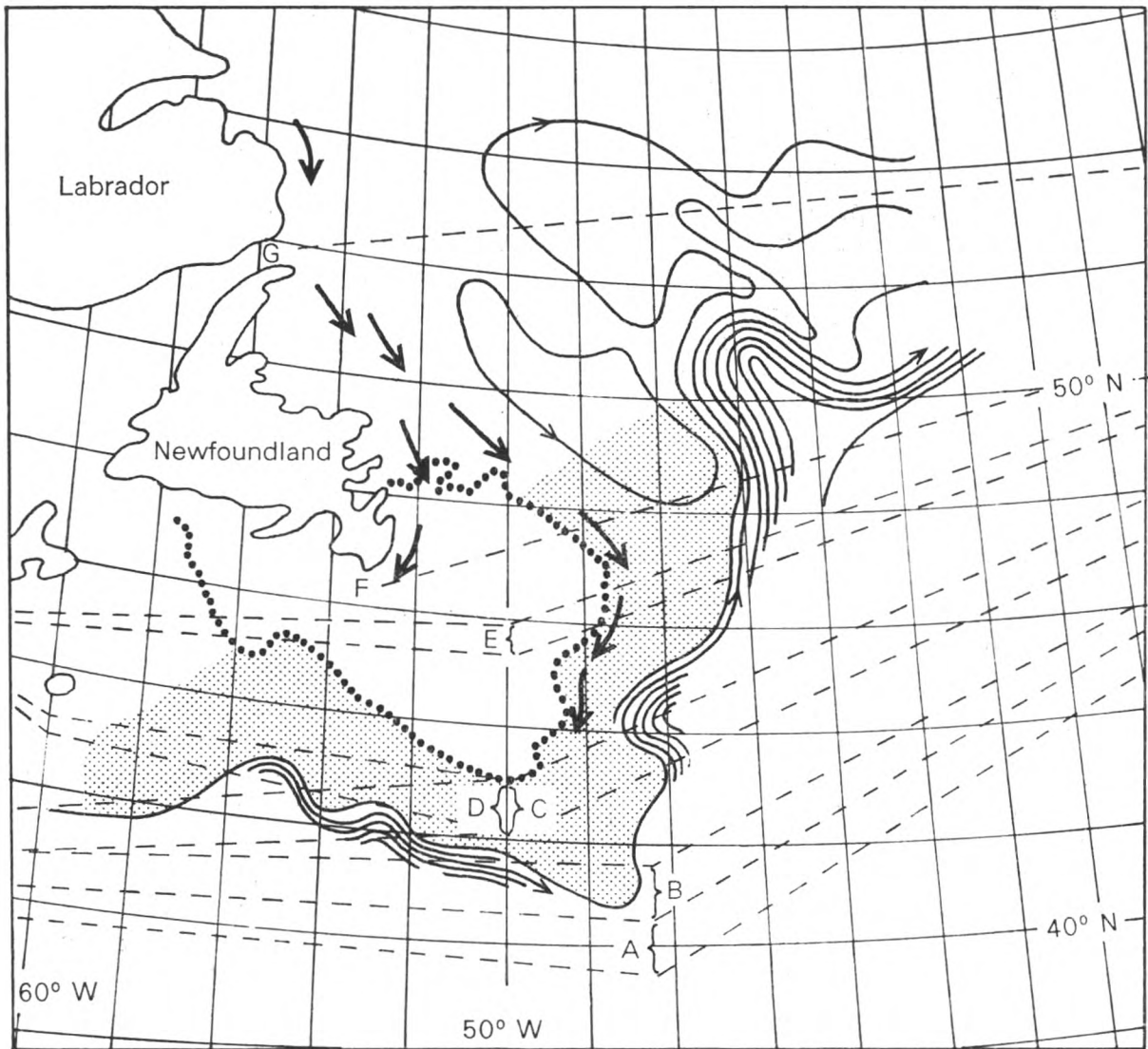


Figure 1. The general distribution of warm and cold water south-east of Newfoundland during the ice season

Sea ice is described also by the size of the floes ranging from small fragments known as brash and small floes to the giant floes and ice fields. Further employed are age terms 'young ice' which is soft and brittle; 'first-year ice' which in one season has become hard and tough; and 'multi-year ice' which is old and extremely tough. The topography of sea ice refers to the amount of 'rafting' or 'hummocking' of the ice which by piling up due to wind or tidal pressure presents the greatest barrier to navigation.

While icebergs are the greater danger to a ship at night and in fog, sea ice, because of its more widespread occurrence, presents the greater impediment to navigation. Much of the damage to hulls and propellers is caused by sea ice, whereas infrequent sinkings and major damage are the result of iceberg collision.

There are 2 reliable signs of sea ice: 'ice blink' and an abrupt smoothing of the sea and swell. Ice blink is a luminous yellow haze over the horizon and on the underside of a cloud layer. The phenomenon is caused by the higher percentage of light reflected from the ice surface as compared with the darker surrounding sea. Ice blink can be seen long before the ice is visible on the horizon.

The extreme distribution of sea ice south of Newfoundland is shown in Figure 3. The ice shown in the illustration is formed by winter conditions off the Labrador coast and the Gulf of St. Lawrence. Its spring drift is shown by arrows.

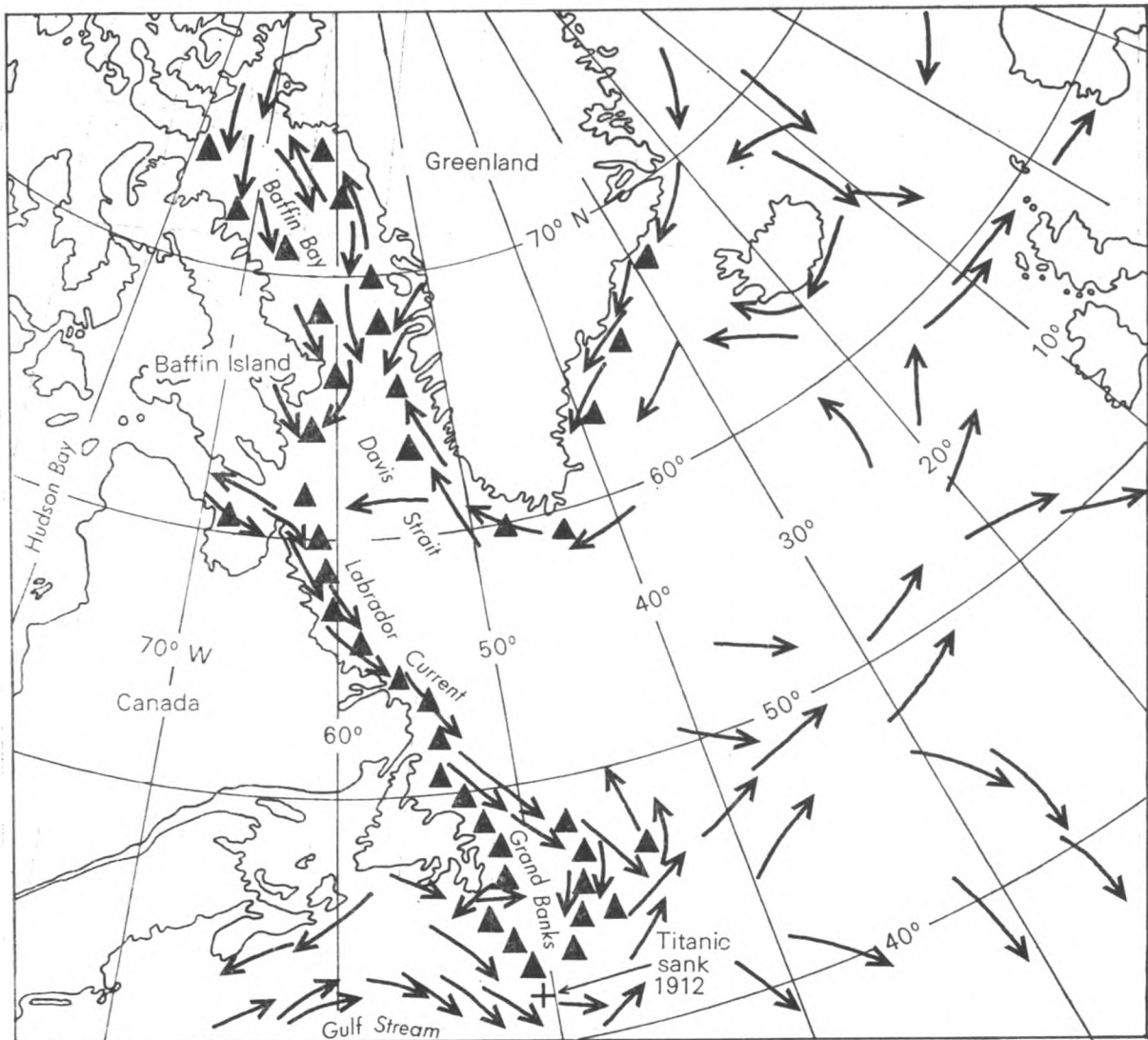


Figure 2. The drift of icebergs from their source into the North Atlantic

Icebergs

An iceberg is a sizeable piece broken off from an ice sheet which covers certain land areas in the far north and south. Such a sheet forms when the temperature is so low that one layer of snow cannot melt before the next fall occurs. As the ice sheet increases in thickness so its edges begin to creep toward sea level, urged by the weight of the accumulation of successive years of snowfall. Greenland, with the exception of a coastal fringe, is covered by a high, thick ice cap which produces nearly all the bergs seen in the North Atlantic. There are approximately 100 glaciers along the west coast of Greenland yet the principal iceberg producers are concentrated in a total of 20. Bergs that are liberated from the coastal waters of west Greenland accomplish a journey of approximately 1800 n. mile before they reach the Grand Banks, the rate of their drift in the slope current along the Labrador coast being more constant than in the Arctic. Bergs calved from the west Greenland glaciers one summer usually spend their first winter in the vicinity of Melville Bay, their second winter in the neighbourhood of Cape Dier and reach the Grand Banks during the following spring and summer. There are of course, bergs which take longer or shorter travel periods than this. Most of the bergs disintegrate before reaching the Grand Banks.

Figure 4 is a schematic representation of the drift of icebergs from the west Greenland glaciers to the North Atlantic shipping tracks. An approximate journey

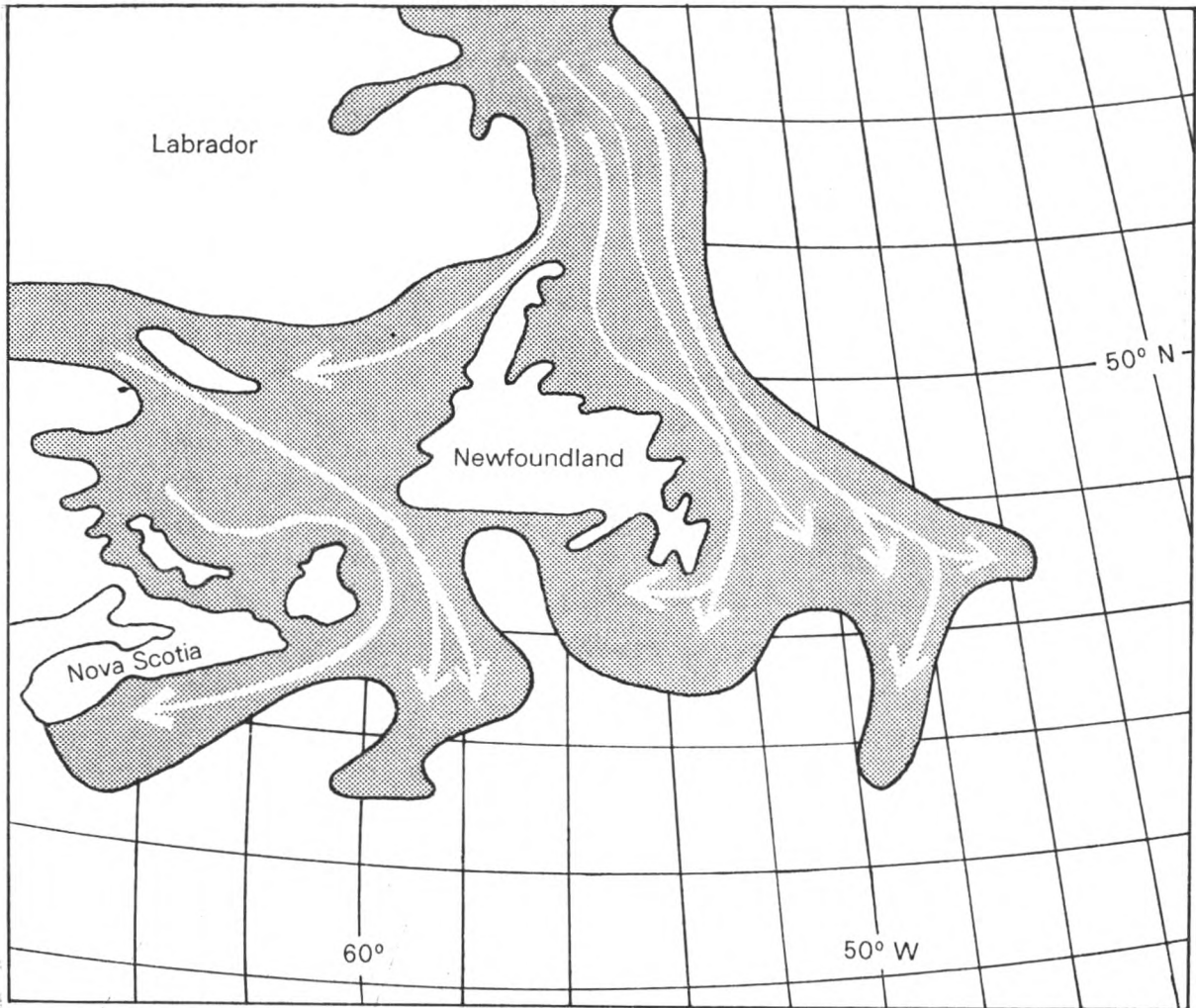


Figure 3. The extreme distribution of field ice south of Newfoundland. Spring drift is indicated by arrows

of 300 n. mile from the Fjords to the Grand Banks is often performed in about 11 months. Three of the variables are presented as follows: the train of icebergs by the solid line; the pack ice by the dashed line, the critical winter winds by the shaded area.

The size of Greenland icebergs frequently reaches 65–100 metres above the water line and 500 metres in length and breadth. Such a berg may present $1\frac{1}{2}$ million tons of ice. Bergs larger than this, though common in the Antarctic are rare in the North Atlantic. The density of berg ice usually varies between 0.82 and 0.87 which means that about 80 per cent of the mass of the berg is below the surface of sea water. An Arctic berg with an underwater depth greater than 200 metres has never been reported.

Icebergs are sighted at various distances depending upon the visibility, height of berg and of the observer. Large bergs can usually be seen on a very clear day by an observer with height of eye of approximately 22 metres at a distance of 18 n. mile. In clear weather, but with a low-lying haze around the horizon, the tops of bergs have been seen at 9 to 11 n. mile. In light fog or drizzle a berg is visible at 1 to 3 n. mile. There is a tendency to over-estimate the distance believing that one can see further than is actually the case. In dense fog a berg cannot be seen at any appreciable distance ahead of the ship where it takes form as a luminous white mass if the sun is shining, otherwise it first appears as a dark sombre shape. In a light, low fog an observer can see a berg from aloft sooner than from deck, but in a dense fog it is best to station a lookout in the bow also. On a clear, dark night a lookout will not pick

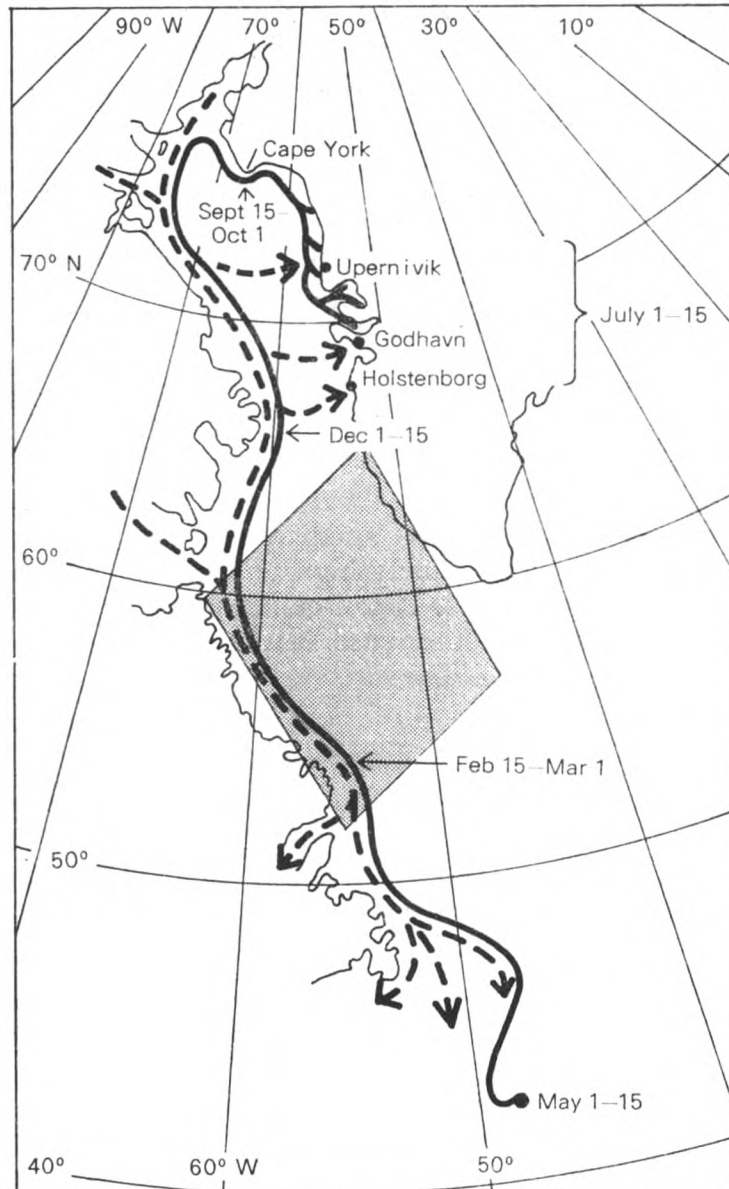


Figure 4. Schematic representation of the drift of icebergs from the west Greenland glaciers to the North Atlantic shipping tracks

up a berg at a greater distance than a quarter of a nautical mile, but if its bearing is known, an occasional light spot is discernible with binoculars at a distance of 1 nautical mile due to the swell breaking against it. With a full moon and favourable conditions, a berg can, of course, be discerned at greater distances, possibly 3 n. mile. Much depends on the relative positions of moon, berg and ship.

In 1945-46 and again in 1959 the IIP conducted comprehensive tests by radar as a reliable aid in iceberg detection. The results of the test may be summarized as follows:

1. Berg ice will reflect radar waves 60 times less than a ship of equivalent cross-sectional area.
2. A berg is normally detected by radar at a range between 4 and 15 n. mile depending on its size. However, fog, prevalent on the Grand Banks in spring, introduces radar propagation conditions which will reduce this.
3. A growler up to 5000 tons of ice will not be detected at a greater range than 4 n. mile.
4. Water is a better reflector than ice. Therefore, sea clutter may obscure a dangerous growler even with the expert use of anti-clutter devices.

In summary, whilst radar is the second best aid a mariner can have, it cannot be relied upon to assure a safe transit through ice-infested waters.

Echoes from the ship's whistle are not to be relied upon, both because the shape of the berg may prevent any echo and because echoes are often obtained from fog banks.

The US Coast Guard has experimented with means of accelerating the disintegration or melting of bergs. These have included gunfire, mines, depth-charges and bombing. However, the use of conventional explosives or combustibles proves a difficult proposition. In addition to the operational hazards of approaching and boarding a berg in a seaway, the theory of explosive demolition shows that 1900 tons of TNT are required for the break-up of an average-sized iceberg (70 000 cu. ft.). Further, to melt such a berg would require the complete theoretical heat of combustion of 2.4 million gallons of petrol. Such practices are, of course, economically as well as scientifically unsound.

In 1959 and 1960 the Ice Patrol conducted a series of tests using the combustion of thermite. Early experiments by a Canadian scientist indicated that thermite, which explodes in ice with an extremely high temperature, would have a thermal 'shock' or fracturing effect on bergs. Patrol experiments demonstrated that, under operational conditions, such was not the case. Natural deterioration remains the most practical consideration in a berg's life span.

In Arctic seas of near-freezing temperatures, an iceberg may last indefinitely. Once it reaches the shipping lanes where the Gulf Stream effects may produce sea temperatures higher than 15°C, a berg will disintegrate within 1 to 2 weeks.

All the early work with iceberg drift and deterioration considered the entire population of icebergs because of IIP's limited detection capability. When icebergs were near the southern, western or eastern boundaries of the defined ice area, they were considered highly dangerous to shipping and a surface patrol vessel would be assigned to follow these bergs until they melted. Only this continuous contact could assure that the iceberg being tracked remained the same piece of ice. Because of changes in the berg's shape by calving, rolling and melting, even repeated aircraft flights could not make positive identification in most cases. During the 1960s interest in predicting the behaviour of individual icebergs increased for a number of reasons. Firstly, IIP now had confidence that aircraft could spot and position bergs reliably over wide areas during periods of good weather. Since the lack of good weather has been a severe problem, a means to predict the position between sightings is needed. Secondly, even with accurate drift prediction the berg's rate of deterioration must be estimated so that it will not be carried on the ice plot for much more than a day after it has melted, or worse, be eliminated from the ice plot prior to melting.

Answers to questions of drift and deterioration prediction require that many individual icebergs be studied over an extended period of time. These studies require that the researcher be certain he is working with the same bergs and not other icebergs in the same area. Early identification attempts made use of dye to colour the sides of the berg. Kollmeyer (1966) used test tubes filled with various dyes and shot them on an arrow from a bow to mark a position on the face of an iceberg. This mark was used as a reference during a deterioration study. Over the years IIP aircraft have repeatedly 'bombed' bergs with dye to aid their identification. This has limited utility because rolling and melting of the iceberg soon washes the colour away. Dye has a life of 1 to 2 days depending on weather conditions and melting and rolling of the ice.

In 1974 the US Coast Guard Oceanographic Unit began a project to determine the best way to tag an iceberg for identification and relocation. The first approach was to encircle a berg with a floating line. The 0.95 cm line made of polypropylene was provided with additional floatation along its length, Figure 5. Radar reflectors and a radio transmitter were included as elements in the line.

Two tagging attempts were made using this method. On the first, 3 bergs were

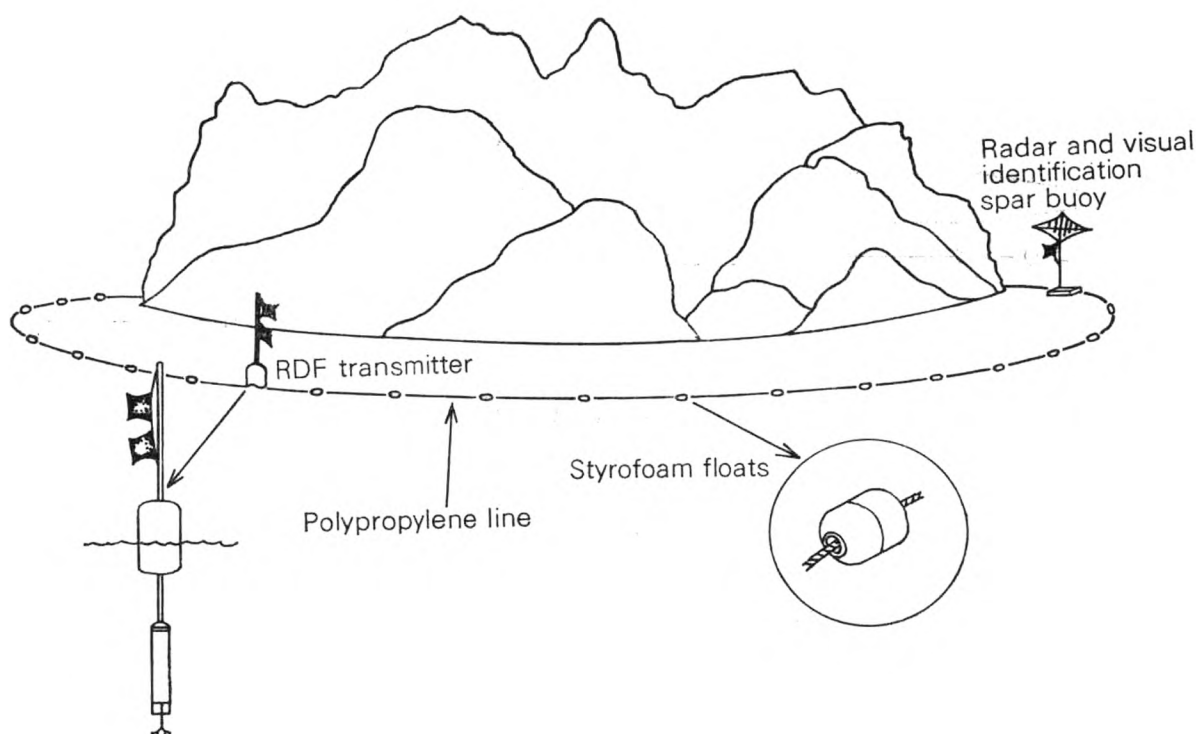


Figure 5. An iceberg tagging scheme using a floating-line technique

tagged. The arrays were carried away in a storm and only 1 was recovered. The line on the recovered array was broken in 2 places. The second attempt had quite different results. The weather was fairly calm and several bergs were tracked in dense fog for 9 days. However, the tagging arrays slipped repeatedly over or under the bergs. This necessitated early recovery of the equipment which drifted away from the iceberg, although the line circle remained intact. This result was completely unexpected and probably was caused by the berg snagging the line and rolling out of the loop. It should be remembered that these icebergs were in an advanced stage of deterioration and quite likely to roll.

A similar experiment was carried out in 1976. After consultation with the US Coast Guard, a much heavier line was used. Since the experiment was conducted at nearly 60°N , the icebergs could be expected to be more stable. The array was tracked using the NIMBUS-6 satellite system, but no attempt was made to verify whether the iceberg remained with the transmitter. The transmitter was not recovered.

The development of an instrument package which can be attached to an iceberg requires solutions to 3 problems; rolling, melting and calving. In 1975 the US Coast Guard Research and Development Centre tried a new approach to tethering an instrument package to a berg by using a large steel dart with a trailing line which was attached to a floating instrument package. This solves the problem of rolling and melting but not calving. It is not likely that any system can survive calving since the anchoring piece of ice would drift away rapidly from the iceberg itself, or any conceivable line would be parted by the weight of several hundred tons of ice falling from the side of the berg. After several trials of the dart which included about 2 dozen drops, the present design, Figure 6, was arrived at. The requirements were that it be easy to ship and assemble, cheap to build and have stability and penetration for low altitude drops.

The dart was attached to 300 metres of floating polypropylene line with a small section of cable to reduce chafing. For a drop from 60 to 90 metres altitude with this length the line is still leaving the aircraft after the dart has hit. This results in the line laying smoothly on the surface and with little or no pull on the instrument

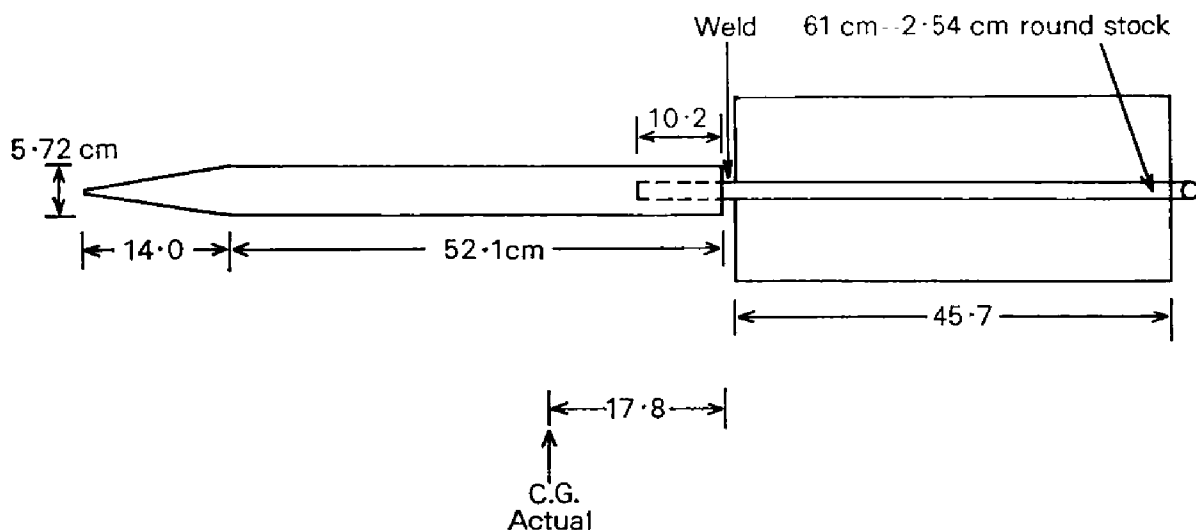


Figure 6. Iceberg tethering dart

package. The instruments can then be allowed to free-fall or be lowered by parachute.

A final instrument package has not been developed for the tagging system. In tests, a modified sonobuoy has been used as an expendable transmitter.

Further development of an expendable instrument package is planned permitting the tracking of icebergs both from the surface and from satellite.

Research and development

During the 1977 season IIP continued the research and development programme on remote sensing to provide an all-weather iceberg detection and identification tool. The National Aeronautics and Space Administration (NASA) provided a solid state Side-Looking Airborne Radar (SLAR) which was installed in the US Coast Guard aircraft. Extensive SLAR data on icebergs and ships were accumulated during the season and this shows good potential for providing the all-weather iceberg detection and identification capability required to conduct effective and efficient surveillance. Development of effective methods for data interpretation should eventually eliminate the problem of dependence upon visual reconnaissance in Ice Patrol operating areas where fog and low cloud cover are so prevalent.

Buoys, the position of which can be ascertained by means of satellite systems such as the Buoy Transmit Terminal (BTT) and Air Deployable Remote Access Measurement Systems (ADRAMS) type, although barely past the test and evaluation stages, have proved to be invaluable tools to the Ice Patrol. These buoys continue to serve a variety of uses including location, speed and direction of ocean currents, tagging of selected icebergs for drift studies and improved season forecasting and prediction using data from buoys dropped on icebergs in the vicinity of the Davis Strait or along the Labrador coast. ADRAMS deployed onto icebergs on each side of the Davis Strait functioned well and were tracked for more than 4 months using the NIMBUS-6 satellite. The continued use of these buoys will greatly improve Ice Patrol operational effectiveness at relatively minimal cost.

The season also saw a continuation of the iceberg drift project. Using the integrating current drogue developed in 1976, a set of iceberg drift data was collected which included current, wind and iceberg velocities.

Areas in which IIP research and development are directed remain unchanged. In order of priority the primary problems are: (a) all-weather detection and identification of icebergs; (b) iceberg drift prediction; (c) iceberg deterioration. Although advances have been made in developing systems and devices to solve

some of these problems, it is paramount that this vigorous research and development programme continues.

A NEW METEOROLOGICAL CODE FOR SHIPS' OBSERVATIONS

In September 1979 the Marine Superintendent of the Meteorological Office wrote a letter to the Master of every ship in the British Voluntary Observing Fleet (VOF) which contained the following:

'The World Meteorological Organization (WMO) is deploying considerable resources to ensure that your observations are exchanged world-wide and that they are put to maximum use. A revision of the ship's code to speed this exchange is likely to be introduced on 1 January 1982'. This letter was reproduced in its entirety in the Editorial to the January 1980 edition of this journal.

The formal reasons for this revision are contained in the Final Report of the Commission for Basic Systems of WMO which met in Washington in November 1978 which states, *inter alia*:

- (a) That the present code forms available for reporting of synoptic surface observations no longer meet the data requirements of the various WMO programmes.
- (b) That the present . . . SYNOP (Land Station) and SHIP codes cannot accommodate the resolution of data . . . in an efficient way unless the structure of the existing codes is entirely changed.
- (c) That new automatic and manual data-processing centres require, for greater efficiency and economy, the utilization of a non-ambiguous common code form which could be used by different types of surface station,

and recommended

That codes FM12—VII SYNOP (for Land Stations) and FM13—VII SHIP for reporting surface observations from different types of surface station . . . be introduced for international use as from 1 January 1981. However, because of the time required to promulgate the new code, the date of commencement was subsequently changed by WMO to 1 January 1982.

Over the past few months the Marine Division has been very active in the process of revising the appropriate publications and forms to accommodate the new code. It is hoped to commence distribution of these to the VOF early this year in order that observers may make themselves fully conversant with the new code before commencing to use it in the 0000 observation on 1 January 1982.

Full details and explanations of the new code are, of course, contained in the revised publications. The purpose of these notes is to explain the reason for the new code and to give marine observers an idea of how it appears. The new code in its symbolic form for Selected Ships is as follows:

YYGGi_w 99L_aL_aL_a Q_cL_oL_oL_oL_o i_Ri_XhVV Nddff 1s_nTTT 2s_nT_dT_dT_d
 4PPPP 5appp 7wwW₁W₂ 8N_hC_LC_MC_H 222D_sv_s os_nT_wT_wT_w 2P_wP_wH_wH_w
 3d_{w1}d_{w1}d_{w2}d_{w2} 4P_{w1}P_{w1}H_{w1}H_{w1} 5P_{w2}P_{w2}H_{w2}H_{w2} 6I_sE_sE_sR_s ICE c_iS_ib_iD_iz_i

From this it is immediately apparent that the new code is considerably longer than the old, there being 19 groups compared to 14. The reason for this is that, with the exception of the first 5 groups, each group is pre-fixed with a Group or Section Indicator; for example, the figure 4 before PPPP and the figures 222 before D_sv_s. The reason for the Section and Group Indicators is that some parts of the new code are common for all surface stations be they land or sea, automated or manual.

Obviously, the code in its full format includes groups for precipitation and other elements not observed by a ship and also caters for the limitations inherent in observations received from automated stations. Hence, in the above code form, certain groups are omitted and, therefore, the Group Indicators are not consecutive. The provision of Section and Group Indicators allows for certain groups to be omitted from the radio message without destroying the sense of the observation. In the logbook to be used with the new code the Group and Section Indicator figures will be pre-printed in the appropriate columns to reduce the writing involved in making out the observation. Thus, although there are more groups in the new code, the number of entries to be made for each observation will be almost the same as in the present code.

Referring to the new code in its symbolic form above, most of the symbols will be familiar to experienced observers and these retain their meanings quoted on page 58 of the present *Ship's Code and Decode Book* (Met. O. 509) and page III-3 of the *Marine Observer's Guide* (Met. O. 477). New symbols, together with a very brief explanation of their meaning, are as follows:

| | |
|-----------------|--|
| i_R | indicator for precipitation group—set at and pre-printed in the logbook as the figure 4. |
| i_X | indicator for type of station and weather data—indicates whether station is manned or automatic and whether weather data is included in the observation. |
| s_n | sign of temperature—indicates whether temperatures are positive or negative. |
| TTT | air temperature in degrees and tenths. |
| $T_d T_d T_d$ | dew-point in degrees and tenths. |
| PPPP | corrected barometric pressure, omitting thousand figure if necessary. |
| ppp | barometric tendency expressed in tenths of a millibar. |
| $W_1 W_2$ | past weather. |
| $d_{w1} d_{w1}$ | direction of first swell waves in tens of degrees. |
| $d_{w2} d_{w2}$ | direction of second swell waves in tens of degrees. |
| $P_{w1} P_{w1}$ | period of first swell waves in seconds. |
| $P_{w2} P_{w2}$ | period of second swell waves in seconds. |
| $H_{w1} H_{w1}$ | height of first swell waves in half metres. |
| $H_{w2} H_{w2}$ | height of second swell waves in half metres. |

Introduction of the new symbol s_n to indicate whether temperatures are positive or negative means that there will be no requirement to add 50 to a negative temperature as at present. A new publication *Dew-Point Tables for Screen Readings*, Met. O. 938, will be issued to Selected Ships in order that dew-points may be easily read off to the tenth of a degree. The new symbol ppp for barometric tendency will allow for tendencies in excess of 9.9 millibars and thus obviate the extra group required at present in these cases. The present W for past weather has been expanded to $W_1 W_2$ and the code figures for this will be selected in such a way that $W_1 W_2$ and ww together give as complete a description as possible of the weather between observations. It must be clearly understood that the above are only very brief descriptions of the new symbols; full details will be given in the appropriate publications.

In the new code it is mandatory for all types of observing vessels other than light vessels to report the first 5 groups and the group 222D_sv_s. However, one of the chief advantages of the new code is that if any other group is omitted, due to the information content being unavailable or considered insignificant, there will be no necessity to add 30 or 60 to GG as at present. A further advantage is that the period of both sea and swell waves will be entered in seconds and there will be no necessity to refer to a code table.

The code form for Supplementary Ships will be as follows:

YYGGi_w 99L_aL_aL_a Q_cL_oL_oL_oL_o i_Ri_XhVV Nddff 1s_nTTT
 4PPPP 7wwW₁W₂ 8N_hC_LC_MC_H 222D_sv_s os_nT_wT_wT_w
 6I_sE_sE_sR_s ICE c_iS_ib_iD_iz_i

Supplementary ships not equipped to make sea-surface temperature observations will omit the group os_nT_wT_wT_w and, of course, the ice accretion and/or ice groups will only be included when applicable. It should be noted, however, that the group 222D_sv_s must always be reported as this contains a Section Indicator and without it the sense of the observation would be lost.

With the introduction of the new code at 0000 GMT on 1 January 1982 the present Selected Ship's Meteorological Logbook and the Supplementary Ship's Meteorological Logbook will become obsolete and a new Ship's Meteorological Logbook will be used by both Selected and Supplementary ships. Obviously, only certain columns of the new logbook page will apply to Supplementary Ships and those appropriate will be lightly shaded or stippled so that they are clearly identifiable. Owing to the number of extra groups in the new code it has been necessary to increase the size of the logbook and it is hoped that this will not prove an inconvenience in smaller ships where space may be at a premium.

The new code for Auxiliary Ships which at present report on the SHRED form will be as follows:

YYGGi_w 99L_aL_aL_a Q_cL_oL_oL_oL_o i_Ri_XhVV Nddff 1s_nTT/
 4PPPP 7wwW₁W₂ 222D_sv_s 6I_sE_sE_sR_s ICE c_iS_ib_iD_iz_i

There will be no necessity to commence the observation with the code letters SHRED and, as Auxiliary Ships cannot report air temperature to 1/10 degree, a solidus will be included in the appropriate group. A solidus will also be entered for h—height of the lowest cloud. The notes regarding the importance of including 222D_sv_s in the paragraphs concerning Supplementary Ships are applicable to Auxiliary Ships. A new form to replace the present SHRED form is being prepared.

The new code for Trawlers making non-instrumental observations is as follows:

YYGGi_w 99L_aL_aL_a Q_cL_oL_oL_oL_o i_Ri_XhVV Nddff
 7wwW₁W₂ 222D_sv_s 6I_sE_sE_sR_s ICE c_iS_ib_iD_iz_i

A solidus will be entered for h—the height of the lowest cloud. Again, the notes in the paragraphs concerning Supplementary Ships regarding the importance of including the group 222D_sv_s are applicable. A new 'Weather Observations from Trawlers' form is being prepared.

The MARID code for ships reporting sea-surface temperatures will remain unchanged.

The opportunity has been taken to incorporate certain other changes into the new Ship's Meteorological Logbook. The code symbols and explanations contained in pages 5, 6 and 7 of the present book have been omitted as these are repeated in other Marine Division publications. The Ice Report pages have also been omitted as the data now entered in them should be covered by the ICE group amplified, if necessary, in the Remarks Column. Minor modifications have been made to the Sea-Surface Current Observation pages; these include date and time columns for both the 'From' and 'To' sections of the entry pages, the introduction of new code figures for Satellite Navigator in the Type of Fix column and also Doppler and Electromagnetic Logs in the Log Type column. Further, a code table has been introduced for Mean Draught; this has become necessary as some ships report the draught in metres and others in feet. In addition, Freak Wave reports and a page

for recording comments on Marine Meteorological Services have been incorporated into the new Logbook.

It has always been, and will remain, the Marine Division's contention that voluntary marine observers should not be asked to report more data than is absolutely essential. The new code may at first appear somewhat daunting but we are sure that upon closer examination and, perhaps, after a little practice, the code will present few problems and the logic of the changes commend it to all marine observers. Finally, voluntary marine observers should bear in mind that the purpose of the change—that is to speed the exchange of meteorological data world-wide—should ensure that forecasts for shipping in all sea areas are improved.

SPECIAL LONG-SERVICE AWARDS

Commencing in 1948 the Director-General of the Meteorological Office has made special awards to the 4 Voluntary Marine Observers whose contribution to the Meteorological Office has been outstanding over a prolonged period.

All officers who have provided us with meteorological records over 17 or more years and who have compiled at least one meteorological logbook in the last year are considered for the special awards. Personal cards are scrutinized and length of service combined with the number and quality of records decide the order of placings. The 17 years are rarely continuous and frequently cover periods of up to 30 years.

The Director-General is now pleased to make special awards to the following shipmasters whose records were calculated to the end of December 1979:

1. Captain R. M. Michael, P. & O. Lines, whose first meteorological logbook was received here in 1952 from m.v. *Empire Windrush* (New Zealand Shipping Company) has, during his 21 years of voluntary service, provided us with 35 meteorological logbooks.
2. Captain B. Hammond, ex Panocean-Anco Limited, whose first records were received here in 1949 from m.v. *Waiwera* (Shaw Savill Line) has, during his 23 years of voluntary observing, provided us with 39 meteorological logbooks.
3. Captain J. A. McKay, Manchester Liners Limited, sent us his first meteorological logbook in 1956 from s.s. *Manchester Trader*. During his 22 years as a voluntary observer, Captain McKay has supplied us with 36 meteorological logbooks.
4. Captain J. K. Currie, Cayzer Irvine Shipping Limited, sent us his first meteorological logbook in 1954 from s.s. *Clan Mackinnon*. During his 23 years as a voluntary observer, Captain Currie has supplied us with 40 meteorological logbooks.

As in former years, the awards will be in the form of appropriately inscribed barographs and it is with great pleasure that we congratulate these 4 shipmasters on this acknowledgement of their many years of zealous voluntary observing at sea on behalf of the Meteorological Office.

The 4 Masters have been notified of the awards and of the arrangements which will be made for their presentation.

J. D. B.

AURORA NOTES JANUARY TO MARCH 1980

BY R. J. LIVESEY

(Co-ordinator of Auroral Observing, the Solar Section of the British Astronomical Association)

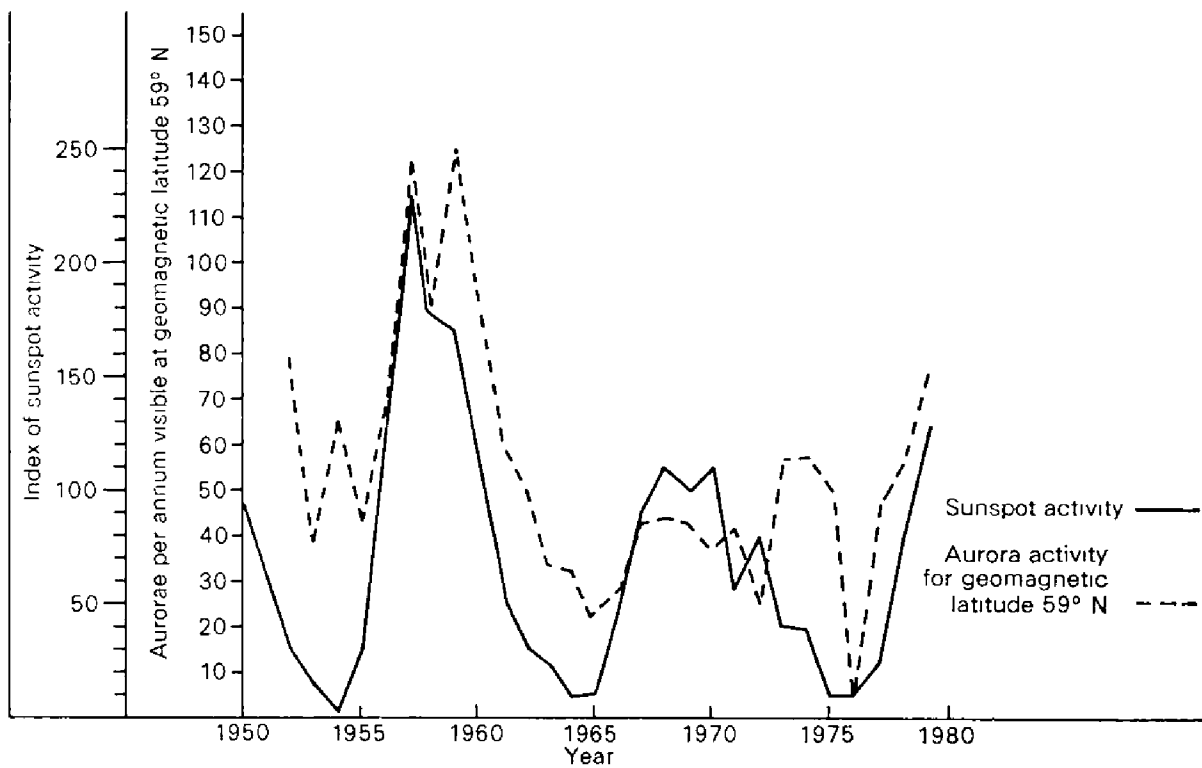
The period generally has been quiet. Active aurorae were reported on the 1st, 3rd and 4th of January, but not widely observed. One observer suspected glows on the

13th and 14th. Radio auroral activity was noted on the 1st, 13th, 14th, 27th, 28th and 29th of the month with accompanying disturbance to the earth's magnetic field.

February distinguished itself with the big storm on the night of the 15th-16th and, to date, 13 reports have been received from all over the North Atlantic Aurora Zone. It was observed down to geomagnetic latitude 54 in the United States and was spectacular in Scotland. Activity waxed and waned all night. At 2250 GMT over Glasgow the sky suddenly changed from quiet conditions to a brilliant green multi-banded rayed corona with sheets of red to the west and among the rays to the north. The phenomenon was clearly visible to observers surrounded by sodium lights and haze in the centre of the city. It was also accompanied by a radio aurora and a magnetic storm. For the remainder of February minor magnetic events were reported on the 6th and 25th and a radio aurora on the 23rd. A single report of auroral glow on the 18th was received from O.W.S. *Admiral FitzRoy*.

During March reports were received of radio aurorae on the 1st, 5th, 6th and 24th, a magnetic event on the 26th and minor isolated auroral activity on the 4th, 10th, 12th and 15th. The *Miranda*, a frequent reporter of visual aurorae, made a number of sightings on the 6th, 7th, 8th, 12th, 15th and 26th; this vessel was steaming in the region of the Aurora Zone where the aurorae are most frequently present.

Analysis of recent sunspot counts indicates that the peak of the current cycle appears to have taken place in November 1979. As previously reported, auroral activity rapidly diminished in October 1979 and does not appear to have recovered, at least to its pre-maximum intensity. However, short-term fluctuations are to be expected while the maximum of auroral and magnetic activity for this cycle is not likely to show until the later declining years of the sunspots.



Recent work by Legrand and Simon in France on geomagnetism together with work by Howard and LeBonte in the United States on wind currents in the solar atmosphere suggest that activity on the sun starts at the poles and, over a period of 22 years, works itself towards the equator. During this drift, sunspots form in solar mid-latitudes and, through the course of the 11-year sunspot cycle, these appear

progressively equatorwards. Each 22-year cycle starts at 11-year intervals so that, whilst the previous cycle reaches the lower latitudes and has just passed its sunspot peak, the new cycle is appearing at the poles. Thus, there is a time when 2 activities are superimposed upon each other; the one is the effect of polar disturbances on the sun and the other is the declining sunspot cycle. Legrand proposes that the disturbance of the earth's magnetic field takes up about 17 years or so of the 22-year solar activity cycle.

The significance of the above proposals to auroral observers is that the overlap of the 2 activity cycles respectively in the polar and lower latitudes comes at the decline of the sunspot cycle and at the peak of auroral and geomagnetic activity. During the last sunspot cycle between 1964 and 1976 when the sunspot peak came at the end of 1968, the peak of geophysical disturbance lay between 1973 and 1976.

| DATE 1980 | SHIP | GEOGRAPHIC POSITION | TIME (GMT) | FORMS |
|--------------|------------------------------|-------------------------|-----------------|---------------------------------|
| 15 Feb. | .. <i>Admiral FitzRoy</i> .. | .. 57° 08'N 19° 45'W .. | .. 2040-2240 .. | aR, aRdB, qN, qRdB, qN, qRdB |
| 15 | .. <i>Dart Atlantic</i> .. | .. 45° 48'N 32° 24'W .. | .. 2315-2350 .. | N, R |
| 18 | .. <i>Admiral FitzRoy</i> .. | .. 56° 47'N 19° 26'W .. | .. 2245 .. | N |
| 6 Mar. | .. <i>Miranda</i> .. | .. 70° 25'N 17° 10'E .. | .. 2308-2315 .. | RdA |
| 7 | .. <i>Miranda</i> .. | .. 70° 29'N 17° 29'E .. | .. 1905-2245 .. | HB, RdA, P, qRdA |
| 8 | .. <i>Miranda</i> .. | .. 70° 31'N 17° 05'E .. | .. 2030-2345 .. | qRdB, R, P, R, B, HB |
| 12 | .. <i>Miranda</i> .. | .. 71° 01'N 19° 02'E .. | .. 2200-2345 .. | qRdB, qHA |
| 15 | .. <i>Miranda</i> .. | .. 70° 46'N 18° 36'E .. | .. 2125-2145 .. | R, RdA, HB |
| 26 | .. <i>Miranda</i> .. | .. 72° 04'N 24° 50'E .. | .. 2350 .. | R, HB |

KEY: a=active, A=arc, B=band, H=homogeneous, N=unidentifiable form, P=patch, q=quiet, R=ray.
Rd=rayed.

Marine Aurora Observations January to March 1980

ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM JUNE TO AUGUST 1980

The charts on pages 38 to 40 display the actual and normal ice edges (4/10 cover), sea-surface and air temperatures and surface-pressure anomalies (departures from the mean) so that the abnormality of any month may be readily observed. (The wind anomaly bears the same relationship to lines of equal pressure anomaly as wind does to isobars. Buys Ballot's law can therefore be applied to determine the direction of the wind anomaly). Southern and eastern iceberg limits will be displayed during the iceberg season (roughly February to July). In any month when sightings have been abnormally frequent (or infrequent) this will be discussed briefly in the text.

The periods used for the normals are as follows. Ice: 1966-75 (Meteorological Office). Surface pressure: 1951-70 (Meteorological Office). Air temperature: 1951-60 (US Department of Commerce, 1965). Sea-surface temperature: area north of 68°N, 1854-1914 and 1920-50 (Meteorological Office, 1966), area south of 68°N, 1854-1958 (US Navy, 1967).

JUNE

Pressure anomalies were small and temperature anomalies in the vicinity of ice fields were also rather weak. The tendency in recent months for ice to break up earlier than usual continued. There were appreciable deficits in Hudson Bay and Strait, in Foxe Basin and in the Beaufort Sea. However, in Baffin Bay and Davis Strait break up became slower so that by the end of the month ice cover was near normal despite previous deficits. South-east of Greenland ice was again less severe than normal and extensive shore leads developed. Although the ice edge remained farther south than normal over the Barents Sea an unusually extensive polynya developed south of Franz Josef Land.

JULY

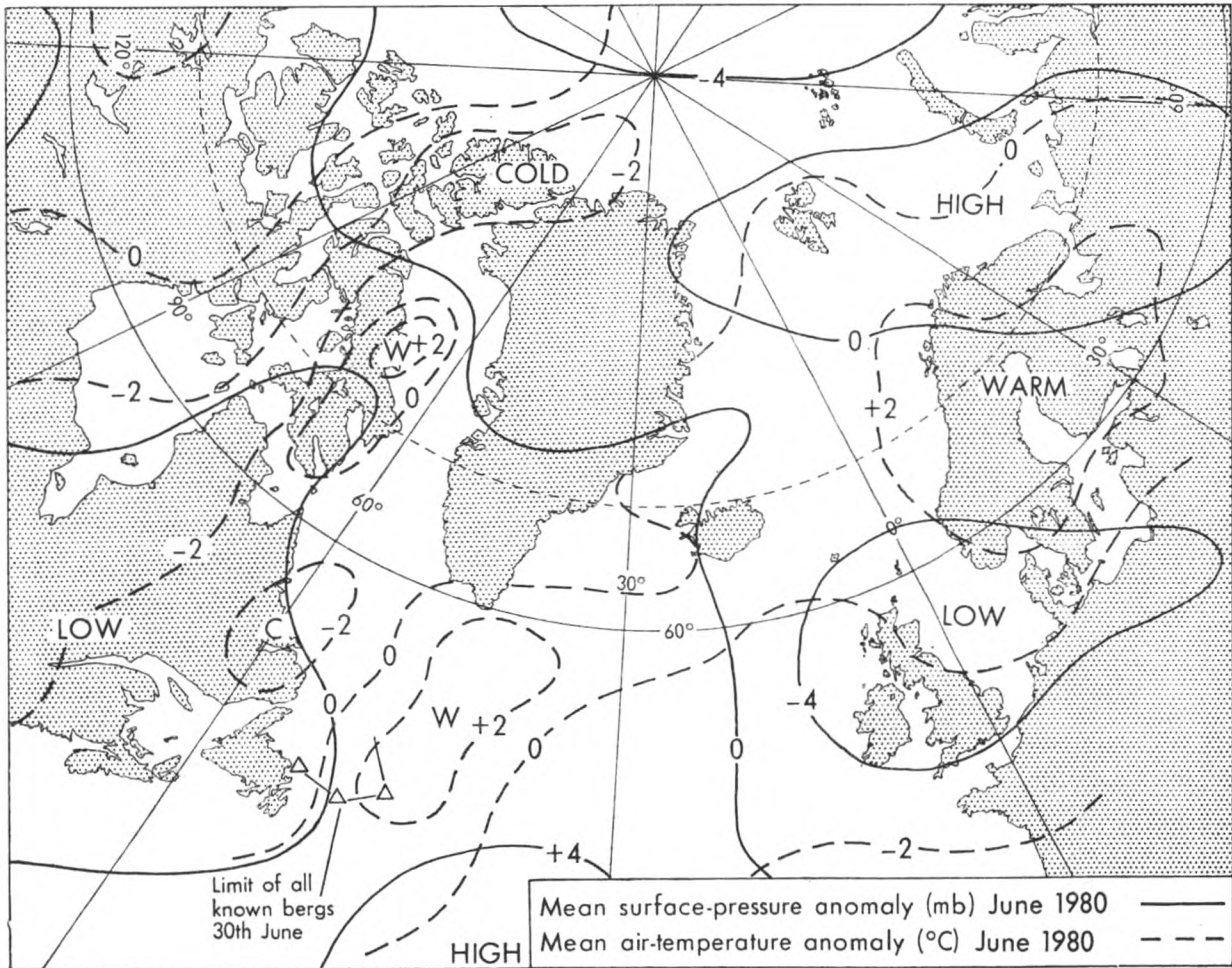
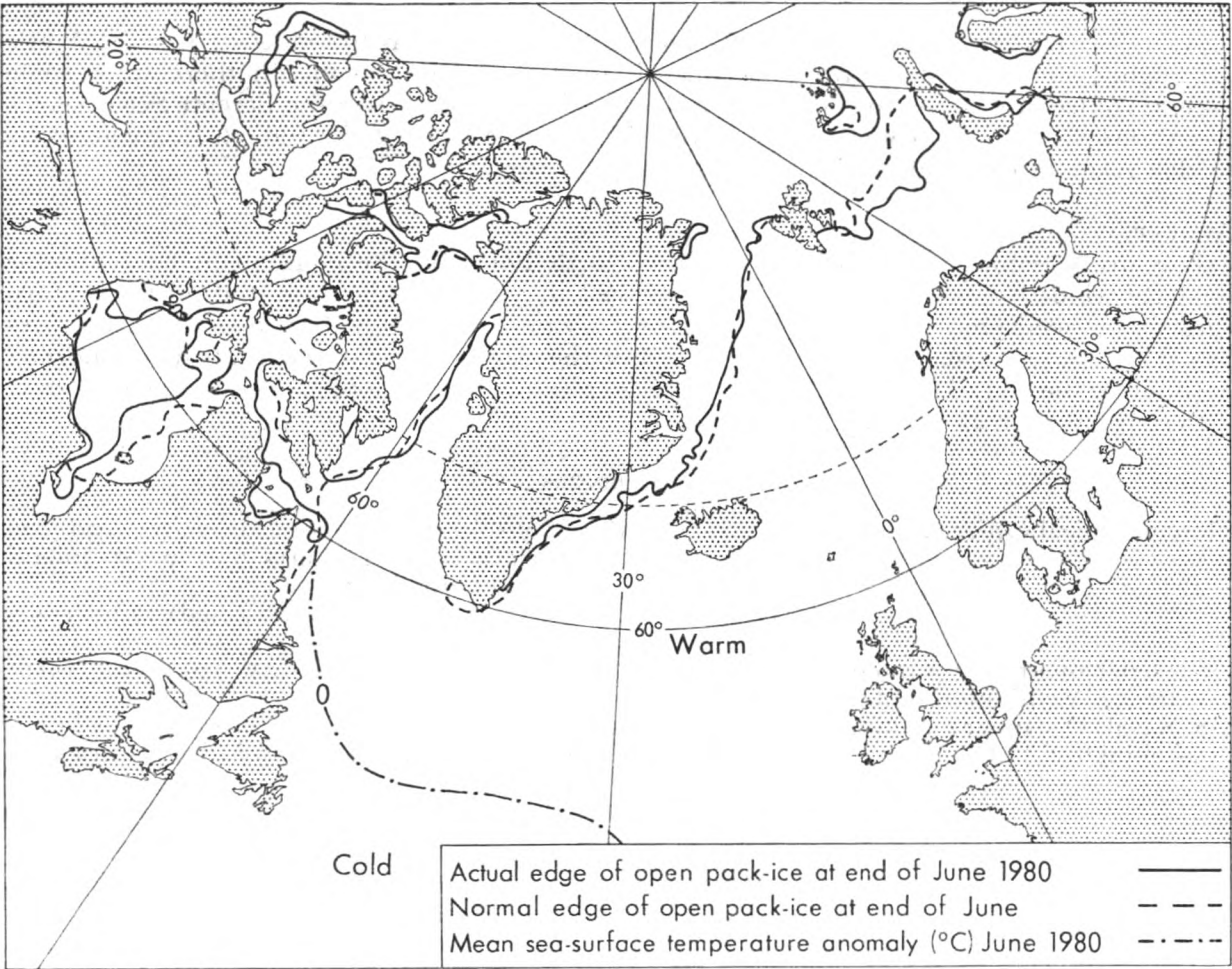
Again there were no strong anomalies but there was a widespread tendency over the Arctic for slightly lower temperatures than normal. By the end of the month there were some excesses of ice in Foxe Basin and the Greenland and Kara Seas. Over the Barents Sea excesses of ice during the previous month were mainly converted to deficits though this cannot be readily related to anomalies of pressure and temperature.

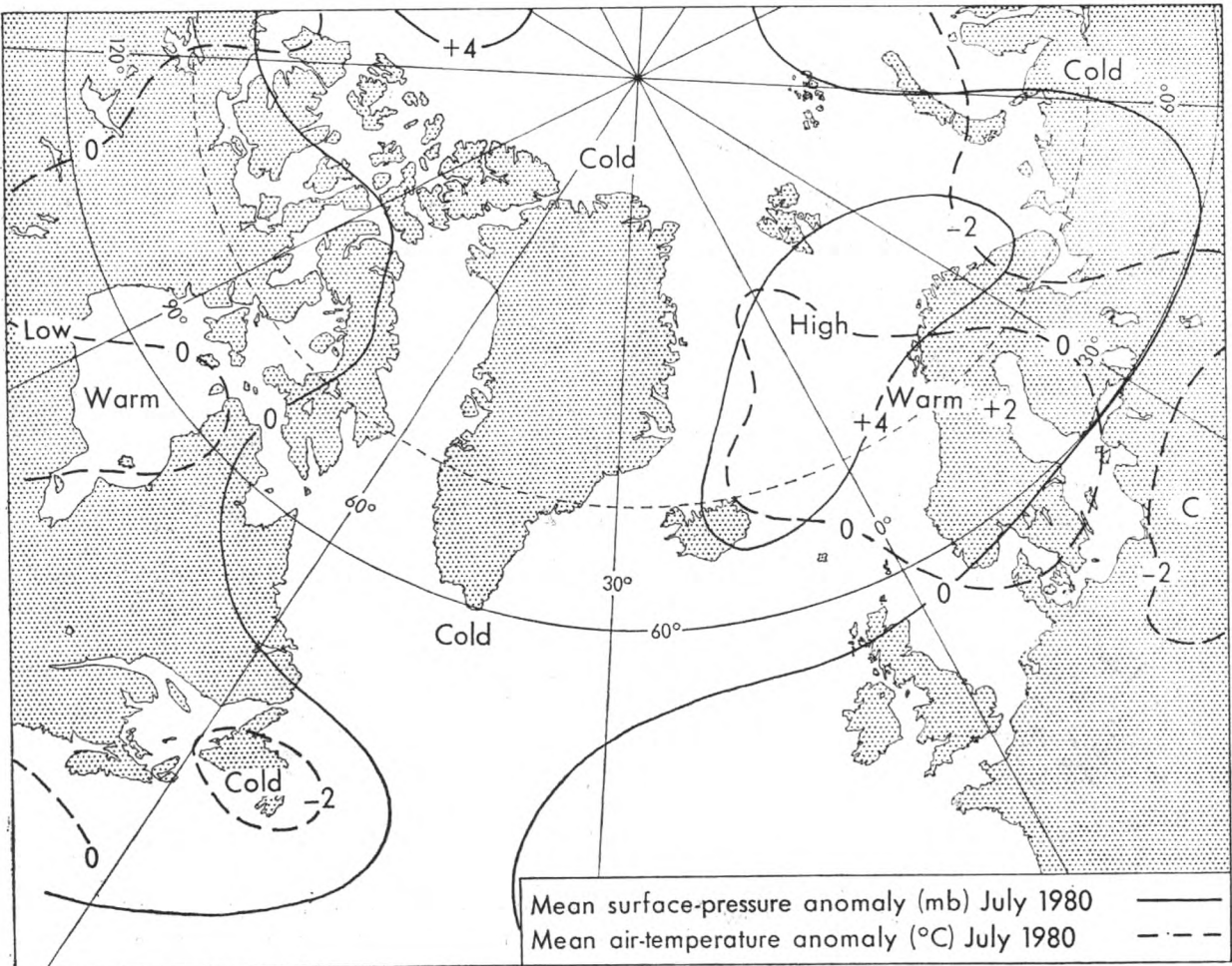
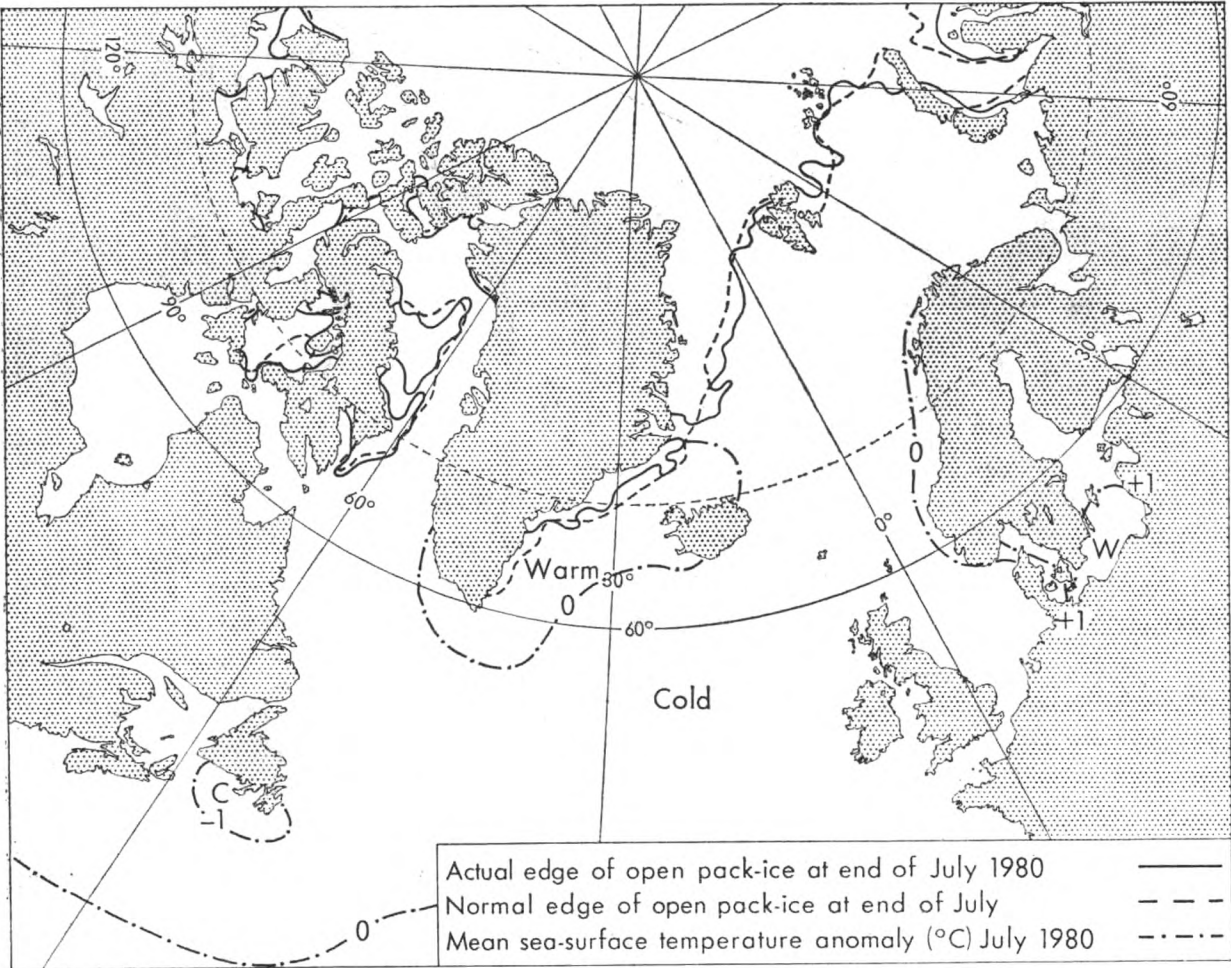
AUGUST

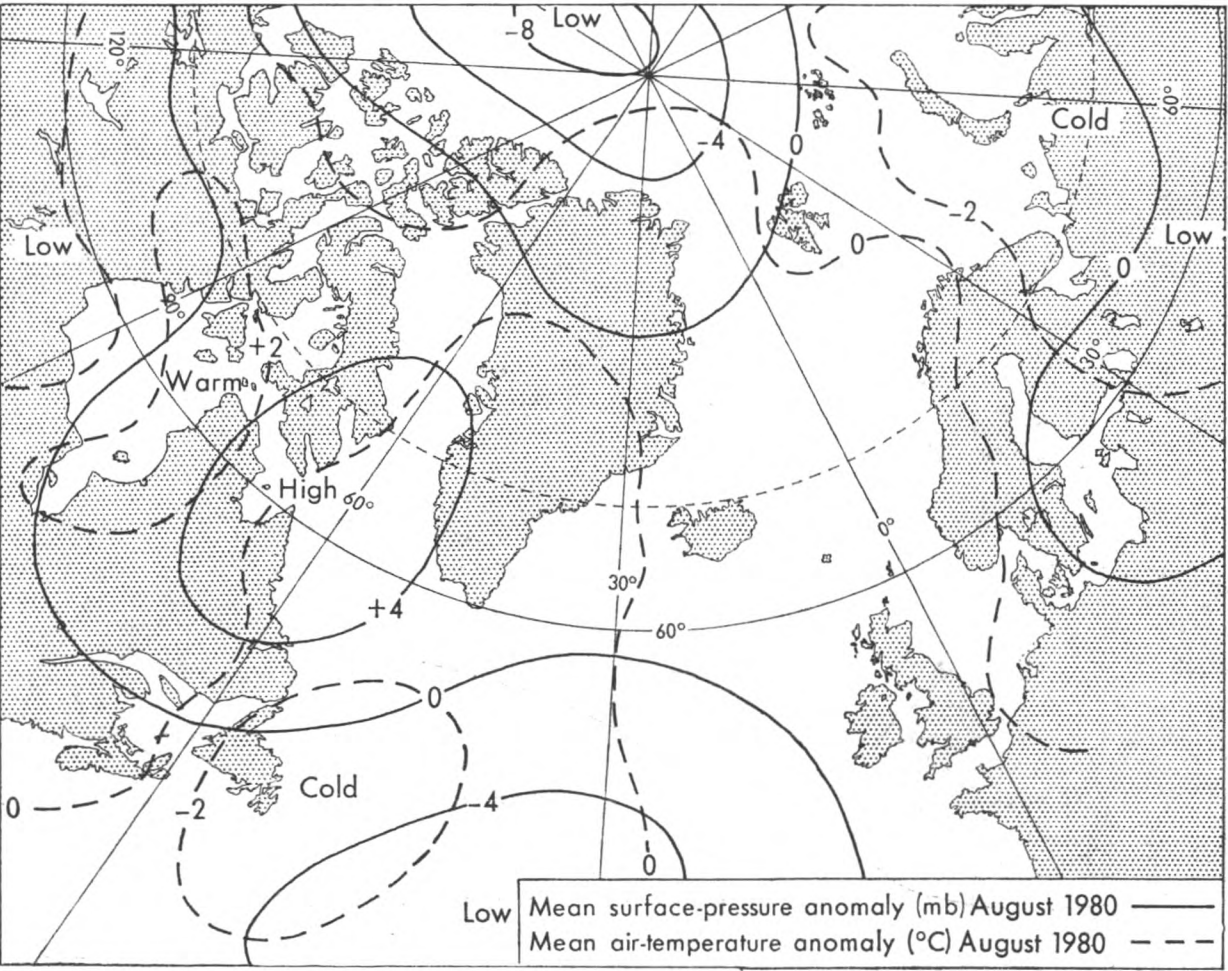
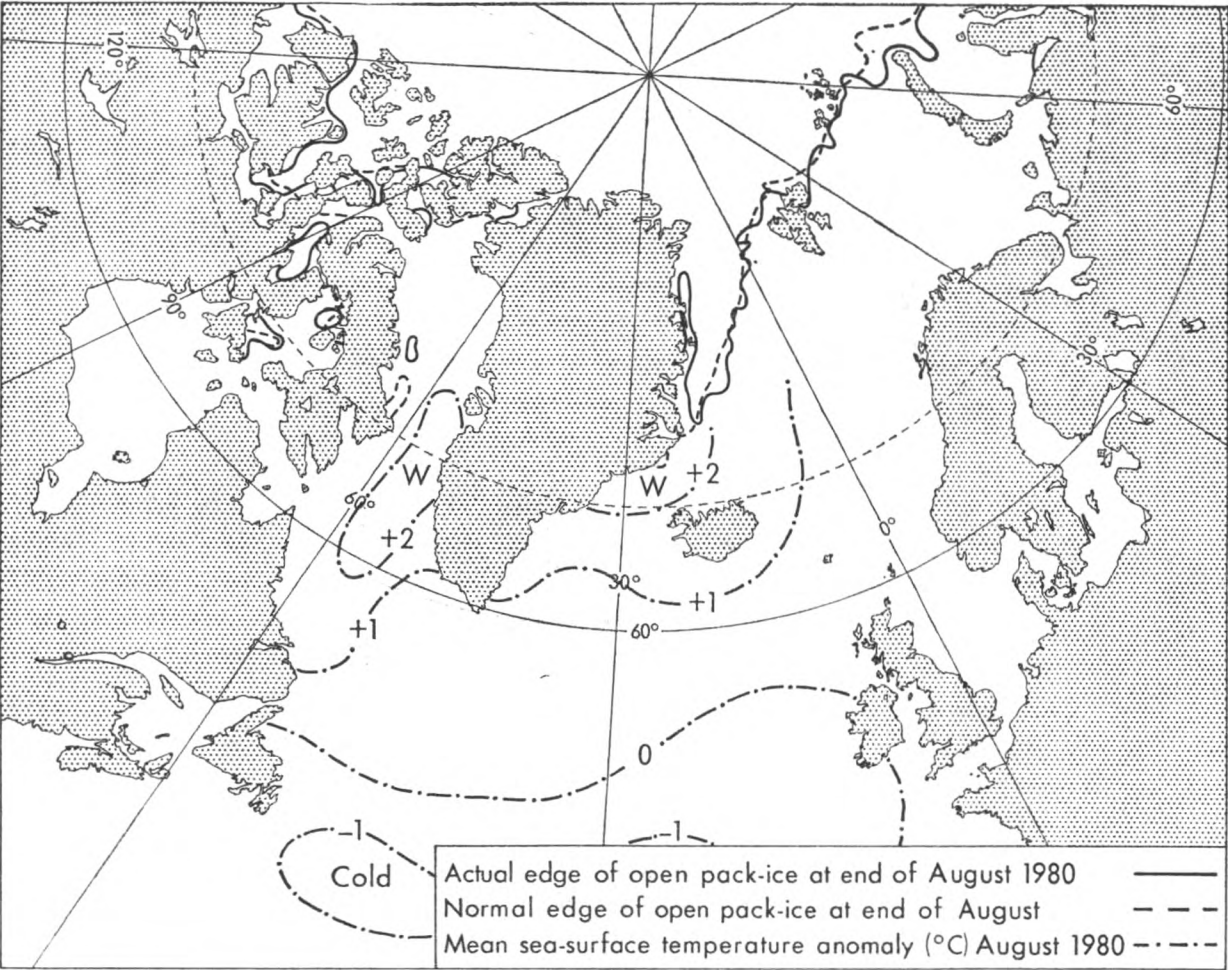
Pressure was lower than normal near the North Pole and the consequent tendency for westerly winds over northern Greenland resulted in an unusually wide lead off the eastern coast and a persistence of ice east of the normal area over the Greenland Sea. Over the Kara Sea there was a substantial recession of ice but the edge still remained south of its normal position by the end of the month. In remaining areas the coverage of ice was much as normal with only small areas of excess and deficit.

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| US Naval, Oceanographic Office, Washington, D.C. | 1967 | Oceanographic atlas of the North Atlantic Ocean, Section II: Physical properties. |







Personalities

RETIREMENT.—CAPTAIN J. E. BURY retired as Elder Brother and Member of the Board of Trinity House on 28 July 1980.

James Edwards Bury was born in Canada in 1915 and came to live in England in 1926. He first went to sea as an Apprentice in 1931 with Walter Runciman Limited. On passing his 2nd Mate's examination he joined Anchor Line as 4th Officer but obtained his qualifying time for his 1st Mate's Certificate with McLay McIntyre in the timber trade. He joined the New Zealand Shipping Company in 1940 and was in command of their ships from 1953 to 1963.

Captain Bury was appointed an Elder Brother and Member of the Board of the Corporation of Trinity House, London in 1963. In 1973 he became Nether Warden of the Corporation. During the years 1977 to 1979 he was Master of the Honourable Company of Master Mariners. From 1973 to 1980 Captain Bury was Chairman of the Buoyage Committee of the International Association of Lighthouse Authorities which has been responsible for the creation and introduction of the IALA Buoyage System.

We received the first meteorological logbook bearing Captain Bury's name from the *Yoma* in 1938. During the years that followed to 1963 he sent us a further 18 logbooks of which no less than 15 were classed as Excellent. He received Excellent Awards in 1955, 1960, 1962 and 1963.

We extend our best wishes to him in his continuing employment as Chairman of an engineering company in Eltham.

RETIREMENT.—CAPTAIN O. TUCKER retired on 15 July 1980 after serving 45 years at sea.

Oswald Tucker was born in 1920 and educated at Bygate Modern School in Northumberland. In 1935 he signed indentures as Apprentice with the Anne Thomas Steamship Company of Cardiff and joined the *Llanover*. In 1940 he joined the Ben Line and remained with them for the remainder of his career. During the war years he served in the Mediterranean and Indian Ocean theatres, but managed to 'keep his feet dry' throughout.

Captain Tucker obtained his Master's Certificate in 1945 and was promoted to command of *Benrinnes* in 1953. During the latter part of his career he was Senior Master of the Ben Line.

Captain Tucker sent us his first meteorological logbook from the *Empire MacKendrick* in 1946. Since then we have received a further 36 books bearing his name of which 10 were classed as Excellent. He received Excellent Awards in 1974 and 1978.

We wish him a long, healthy and happy retirement in his home at Whitley Bay.

RETIREMENT.—CAPTAIN M. T. MORTON retired on 17 September 1980 after serving 43 years at sea.

Malcolm Thomson Morton was born in 1920 and first went to sea in the Catering Department of the *Empress of Britain*. In 1940, due to the war circumstances, he changed to the Deck Department and served for 1½ years in the tanker *Geo. W. McKnight* belonging to the Anglo-American Tanker Company. During the years 1941 to 1943 he served with various companies on the North Atlantic trade before joining Cunard Line. Whilst serving in the *Aseania* he took part in the Sicily, Anzio and South of France campaigns followed by troop-carrying between India, East Africa and the Mediterranean and then between North Africa and Italy. After

passing his 2nd Mate's examination in 1945 he joined Strick Line and whilst serving in *Floristan* he saw Hiroshima only a few months after the bomb attack. Thereafter he served in the London and North Eastern Railway vessel *Sheringham* and between 1947 and 1951 with Clan Line.

Owing to ill-health, Captain Morton left the foreign-going trade in 1952 and joined British Railways as 2nd Officer, having obtained his Master's Certificate in 1950. In 1964 he was promoted to command of the *Isle of Ely* and, in 1974, was elected to the Honourable Company of Master Mariners. During the latter part of his career Captain Morton commanded the passenger ferry *St George* on the Harwich to Hook of Holland service.

Captain Morton sent us his first meteorological logbook from the *Clan Macniel* in 1948. Since then we have received a further 8 books bearing his name of which 4 were classed as Excellent. He received an Excellent Award in 1949.

We wish him health and happiness in his retirement.

RETIREMENT.—Mr W. F. SHEPHERD, Radio Officer, retired on 30 June 1980 after serving 34 years at sea.

William Francis Shepherd was born at Ringmer in Sussex in 1920 and was educated at Meeching School in Newhaven. He first went to sea in 1935 on board the ocean-going yacht *El Tovar*. In 1946 he joined the New Zealand Shipping Company as Radio Officer and, with the exception of one voyage in the *Tekoa*, served continuously in the passenger vessels *Rangitata*, *Rangitiki*, *Rangitoto* and *Ruahine* until they were sold in 1968/69. Thereafter he served in *Surrey* and *Manapouri* until 1971 when he transferred to Overseas Container Lines and served aboard *Encounter Bay* and *Botany Bay* in the UK/Australia trade. Altogether Mr Shepherd completed 77 voyages to the Antipodes and in recent years has rounded Cape Horn 4 times; he states that he enjoyed every minute of it and wishes it were just starting again.

We received the first meteorological logbook bearing Mr Shepherd's name in 1950 from the *Tekoa*. Since then he has sent us a further 58 logbooks of which no less than 38 were classed as Excellent. He received Excellent Awards in 1950, 1962, 1963, 1964, 1965, 1966, 1968, 1969, 1970, 1971, 1972, 1974, 1977 and 1980.

We wish him a long, healthy and happy retirement.

RETIREMENT.—Mr J. GILHOOLEY, Radio Officer, retired in July 1980 after serving nearly 30 years at sea.

John Gilhooley was born in 1918 and after 12 years service with the Royal Navy joined the Marconi International Marine Company in 1950. Apart from a short break between 1953 and 1954, he remained with Marconi until his retirement. After 1954 he served continuously in ships of the Ben Line but was compelled to retire owing to ill health.

Mr Gilhooley sent us his first meteorological logbook from the *Benattow* in 1963. Thereafter we received a further 26 logbooks bearing his name of which 12 were classed as Excellent. He received Excellent Awards in 1970, 1974, 1975, 1977 and 1978.

We wish him a speedy return to health and a long, happy retirement.

RETIREMENT.—Mr L. V. O'SULLIVAN, Radio Officer, retired in May 1980 after serving over 41 years at sea.

Leonard Vincent O'Sullivan was born in 1917 and joined the Marconi International Marine Company as Radio Officer in February 1939. Mr O'Sullivan had the misfortune to serve on 3 ships during the war which were sunk by enemy action; the *Windsor Wood* in June 1940, the *Le Crest* in August 1940 and the *Aurillac* in April 1941. He escaped injury on all 3 occasions.

After the war Mr O'Sullivan served on a number of ships but between the early 1960s and April 1970 he made 23 consecutive voyages in the *Port Sydney*. His last vessel prior to his retirement was the *Reynolds*.

We received the first meteorological logbook bearing Mr O'Sullivan's name from the *Port Sydney* in 1964. Since then he has sent us a further 15 books of which 10 were classed as Excellent. He received Excellent Awards in 1965, 1966 and 1968.

We wish him a long, healthy and happy retirement.

Fleet Lists

Corrections to the list published in the July 1980 edition of *The Marine Observer*.
Information regarding these corrections is required by 30 September each year. Information for the July lists is required by 31 March each year.

GREAT BRITAIN (Information dated 23.9.80)

The following coasting vessels ('Marid' ships) have been recruited.

| NAME OF VESSEL | MASTER | OWNER/MANAGER |
|-------------------------|--------------------|------------------------------------|
| <i>Barra Head</i> | —, Alvis | Christian Salvesen (Shipping) Ltd. |
| <i>Emerald</i> | A. F. Wigham | Stephenson Clark Ltd. |
| <i>Midhurst</i> | B. J. Pratt | Stephenson Clark Ltd. |

The following vessels have been deleted:
Arco Severn, Bass Shore, Doric Ferry, Navigator.

GREAT BRITAIN (Contd.)

The following ships have been recruited as Selected or Supplementary ships:

| NAME OF VESSEL | DATE OF RECRUITMENT | MASTER | OBSERVING OFFICERS | SENIOR RADIO OFFICER | OWNER/MANAGER |
|------------------------------|---------------------|---------------------|---|----------------------|---------------------------------------|
| <i>Alumia</i> .. | 15.5.80 | J. Whyte .. | J. Richardson, E. Gander, C. Latham .. | K. R. Crattan .. | Cunard S.S. Co. Ltd. |
| <i>Atlantic Splendour</i> .. | 3.7.80 | E. G. Brady .. | N. Howlett, J. F. Allen .. | A. Cartledge .. | Associated Maritime Co. Ltd. |
| <i>Baltic Progress</i> .. | 17.7.80 | - Kremer .. | R. Barker, D. Torr, N. Murphy .. | R. Hollows .. | United Baltic Corp. Ltd. |
| <i>Bay Fisher</i> .. | 29.8.80 | W. H. Eggert .. | D. Reed, D. W. Little .. | R. C. Lee .. | James Fisher and Sons Ltd. |
| <i>Booker Courage</i> .. | 5.9.80 | E. G. Puddifer .. | - Grant, - Woodward .. | .. | Booker Line Ltd. |
| <i>Boston Sea Lance</i> .. | 27.8.80 | F. Surtees .. | R. A. Alty, M. Bedford .. | .. | Klondyke Shipping Co. Ltd. |
| <i>British Normans</i> .. | 14.7.80 | J. A. M. Wilson .. | P. Jones, J. Higgins, D. Phillips .. | P. W. Wales .. | B.P. Tanker Co. Ltd. |
| <i>Cast Tern</i> .. | 28.8.80 | C. M. Schiller .. | K. Summers, A. Dunning, J. Lacy .. | R. Durston .. | J. & J. Denholm Ltd. |
| <i>Celtic Crusader</i> .. | 1.8.80 | H. Prigg .. | .. | .. | C. M. Willie & Co. (Shipowners) Ltd. |
| <i>Crown Prince</i> .. | 1.8.80 | E. A. Jones .. | N. C. D. Hope, M. G. Price .. | .. | Furness Withy (General Shipping) Ltd. |
| <i>Eredine</i> .. | 21.5.80 | J. M. K. Kelly .. | F. A. Wright, H. C. Ratcliffe, R. Goodwin .. | Kan Kai Chuen .. | John Swire & Sons Ltd. |
| <i>Hampshire</i> .. | 19.3.80 | M. M. Reeves .. | J. Haines, W. J. M. Hargreaves, J. A. Corcoran .. | J. Harding .. | Bibby Line Ltd. |
| <i>Icybank</i> .. | 16.6.80 | J. F. Beckett .. | E. R. Mainland, M. Lynham, A. Sommerstone .. | - Grant .. | Bank Line Ltd. |
| <i>Kingsnorth Fisher</i> .. | 15.8.80 | G. W. Watt .. | L. B. Fant, H. McWilliam .. | S. G. Price .. | James Fisher and Sons Ltd. |
| <i>Lady Lucienne</i> .. | -5.80 | G. A. Parks .. | .. | .. | Denholm MacLay Co. Ltd. |
| <i>Lauderdale</i> .. | 8.7.80 | I. E. W. Denholm .. | T. Collins, G. Crosby, P. Carr, J. Cribb .. | B. Elvin .. | P. & O. S.N. Co. |
| <i>London Viscount</i> .. | .. | G. Jacobs .. | R. Bancroft, M. Kinch, D. Wyllie .. | L. Rowe .. | London & Overseas Freighters Ltd. |
| <i>Lord Strathcona</i> .. | .. | D. A. Tipping .. | T. Fisher, A. Edwards, B. P. Philip .. | G. D. Pople .. | Canadian Pacific Steamship Ltd. |
| <i>Markhor</i> .. | 10.6.80 | D. T. MacLachlan .. | M. Butler, J. D. Cook, M. Coleman .. | P. Lavery .. | Cunard S.S. Co. Ltd. |
| <i>Maron</i> .. | 30.4.80 | S. McInnes .. | R. Harvey, D. W. Morrison, M. Russel .. | G. Scullion .. | Ocean Transport & Trading Ltd. |
| <i>Menior</i> .. | 17.7.80 | J. Cairns .. | S. Feldman, S. Stafford, J. Miller .. | D. McLeod .. | Ocean Transport & Trading Ltd. |
| <i>Pacific Crane</i> .. | 21.8.80 | - Cairns .. | D. Roberts, G. Minns .. | R. Briggs .. | James Fisher and Sons Ltd. |
| <i>Pholas</i> .. | 30.6.80 | B. Boyer .. | P. D. Codd, P. J. Godding .. | P. Nee .. | Coe Metcalf Shipping Ltd. |
| <i>Prince Rupert City</i> .. | .. | H. W. Finn .. | T. Nuyant, G. Whitfield, B. Middleton .. | P. Hartwell .. | Sir Wm. Reardon Smith & Sons Ltd. |
| <i>Ravensraig</i> .. | 19.6.80 | A. MacKinnon .. | D. Galbraith, W. Taylor .. | C. Beavistock .. | Sir R. Ropnor & Co. Ltd. |
| <i>Regents Park</i> .. | 21.7.80 | H. E. Hoyle .. | R. M. Frederick, J. D. Gray, M. A. Smith .. | J. T. Miller .. | Denholm MacLay Co. Ltd. |
| <i>Rounton Grange</i> .. | -8.80 | .. | .. | .. | Furness Withy (General Shipping) Ltd. |
| <i>Selbydyke</i> .. | 1.9.80 | W. Murrak .. | P. T. Robertson, M. Lunn .. | .. | Klondyke Shipping Co. Ltd. |
| <i>Snow Hill</i> .. | 10.7.80 | A. R. Tinsley .. | S. Smith, E. Allison, J. Clamp .. | .. | Salen (U.K.) Ship Management Ltd. |
| <i>Stena Oceanica</i> .. | 3.9.80 | T. Rowat .. | .. | R. Burton .. | Denholm MacLay Co. Ltd. |
| <i>Stonegate</i> .. | 29.7.80 | S. B. Briggs .. | P. Myers, M. Lowe, C. Carkeet .. | - Sheridan .. | Turnbull Scott Management Ltd. |
| <i>Tor Felicia</i> .. | 26.3.80 | M. McGee .. | D. McIver, D. Anderson .. | D. Streeter .. | Tor Line Ltd. |
| .. | .. | .. | .. | A. Rance .. | .. |

GREAT BRITAIN (Contd.)

The following ships have been recruited as Selected or Supplementary ships:

| NAME OF VESSEL | DATE OF RECRUITMENT | MASTER | OBSERVING OFFICERS | SENIOR RADIO OFFICER | OWNER/MANAGER |
|------------------------|---------------------|-----------------|---|----------------------|----------------------------------|
| <i>Venetia</i> .. | .. | R. D. M. Watson | K. Reynolds, W. Barnes, J. Kirk | W. MacKay .. | Harrison (Clyde) Ltd. |
| <i>W. A. Mather</i> .. | .. | M. Allen | G. B. Clements A. Leach, C. Harrison .. | P. Duffy .. | Canadian Pacific Steamships Ltd. |
| <i>Wadhurst</i> .. | .. | A. R. Soulsby | M. Poullain, W. McNaughton .. | H. Segrave .. | Stephenson Clark Ltd. |
| <i>Willowbank</i> .. | .. | P. Simpson | J. D. Corking, J. P. Anthony, M. Blair .. | C. Penhaglion .. | Bank Line Ltd. |

*These ships were inadvertently omitted from the Fleet List published in July 1980.

The following Selected and Supplementary Ships have been deleted:

Apollo, Canterbury Star, Cast Dolphin, Cast Orca, Cast Seal, City of Hull, City of Liverpool, City of London, Devonbrook, Dunelmia, Durhambrook, Echo, Foochow, Gene Trefethen, Gomba Challenge, Invincible, Jamaica Producer, Kirkella, Kurd, Leven Fisher, Lindfield, Linguist, Manchester Vigour, Mayfield, Ripon Grange, St. Benedict, Sinbad Saxon, Townsville Star, Trader, Whitehorn.

BRITISH COMMONWEALTH

HONG KONG (Information dated 12.9.80)

The following ships have been recruited since the list published in the July 1980 edition of *The Marine Observer*:
Cheongwind, Hugheverett, Victoria I.

The following ships have been deleted:
Benrines, Sinkiang, Taifookshan, Taipoosek.

NEW ZEALAND (Information dated 1.8.80)

The following ships have been recruited since the list published in the July 1980 edition of *The Marine Observer*:
Forum New Zealand, N.Z. Caribbean, Stena Constructor.

The following ships have been deleted:
Bounty, Karetu, N.Z. Waitangi, Pacific Installer, Columbus Virginia.

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