Met.O. 879

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*A quarterly journal of Maritime Meteorology*

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# THE MARINE OBSERVER

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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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# October, November, December

*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 U.K. will supply bottles, preservative and instructions on request.

## VIGOROUS DEPRESSION

### North Atlantic Ocean

R.R.S. *Discovery*. Captain M. A. Harding. In vicinity of São Miguel, Azores. Observers, the Master and Mr. N. R. Austin, 3rd Officer.

20th November 1974. During the previous night preparations were made on board for a depression expected to pass to the north of the vessel. Through the night and following morning, conditions deteriorated and at the height of the storm the following observations were made:

GMT

0843: Wind s'E, force 9. Sea waves 7 m. Vessel placed head to wind, speed as required for steerage way only.

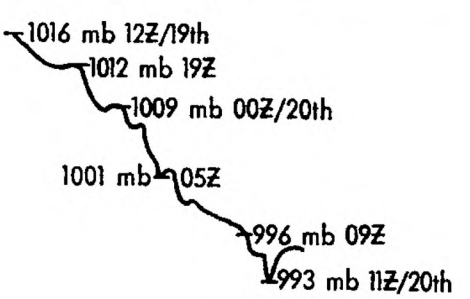
1036: Wind s'W, force 9–10. Sea waves 8 m. Very heavy driving rain, visibility less than 1½ miles.

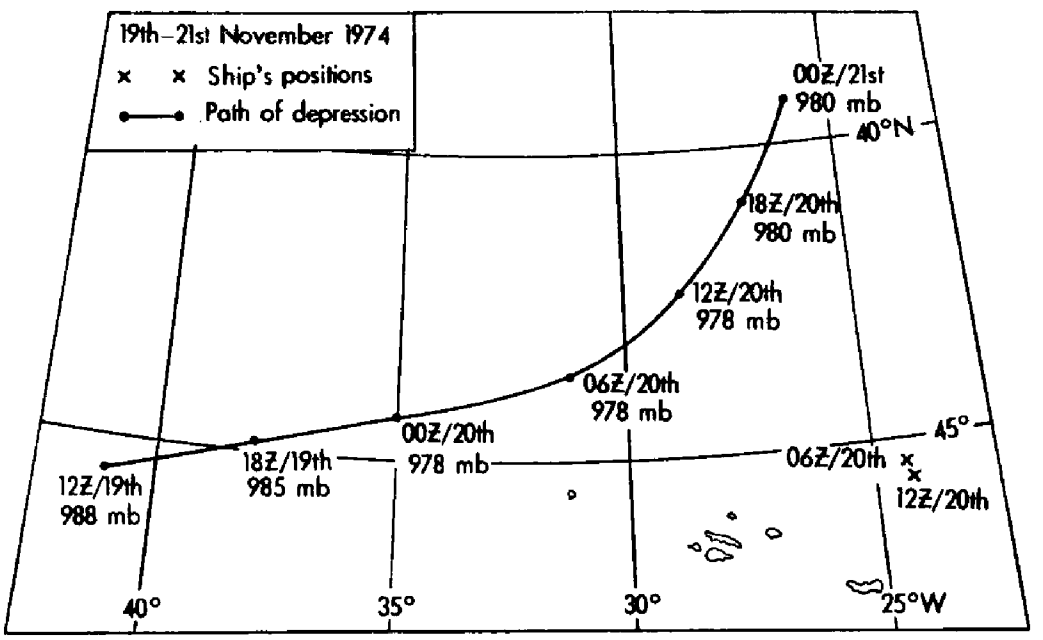
1042: Wind s'ly, force 11. Sea waves 9 m. Very heavy driving rain. Driving spray experienced.

1053: Wind shifted 3 points to sw's, force 12. Waves confused 9–10 m. Rain intense. Visibility less than 200 yd.

1055: Wind sw's, force 8–9. 7/8 cloud coverage, rain ceased. Very heavy spray.

1120: Wind sw's, force 7. Sea waves 9 m. 8/8 thick cumulus.






Position of ship at 0600: 39° 42′N, 24° 24′W.
Position of ship at 1200: 39° 30′N, 24° 12′W.

*Note.* The *Discovery* was affected by a vigorous depression which formed four days earlier over the western Atlantic and moved steadily eastward near the 40th parallel. By 0001 on the 20th it had deepened to 978 mb, and winds of 75 kt had been recorded near the centre. During the 20th the depression turned north-eastwards, as the chart shows, sparing the *Discovery* even more severe weather. The passage of the associated cold front just before 1100 is clearly illustrated by both text and barograph trace.

## LINE-SQUALL

### South African waters

m.v. *Wild Cormorant*. Captain I. Y. Batley. Abadan to Durban. Observers, Mr. G. F. Everitt, Chief Officer, Mr. J. Malinowski, Radio Officer and Mr. C. Mackenzie, A.B.

26th December 1974. From approximately 1500 GMT it was noticed that the barometer was falling by more than the normal diurnal variation. The wind was a steady NE'ly, force 6–7 and there was half cover of cloud comprising cumulus, altocumulus and cirrus.

At 1630, when approaching Durban on a course of 226°T, a heavy bank of cloud was observed directly ahead of us. As the vessel neared the cloud bank, it became increasingly 'threatening' in appearance, capturing the attention of the personnel on deck. Above a base of stratus, well-defined layers of altocumulus/altostratus appeared to be rolling over one another, the leading edge of each being slightly in advance of the one beneath. At least three separate layers were observed, the most noticeable feature being the exceptionally well-defined leading edge of each. Sheet lightning was visible within the cloud mass.

At 1700, when the vessel was about one mile from the stratus base and the foremost edge of the upper cloud approximately two miles astern, the wind suddenly dropped to flat calm and within 10 seconds had increased to SW/SSW, force 7–8, gusting to force 9. The sea appeared to boil as the well-defined waves from the north-east were buffeted from the opposite direction, the 'white horses' seeming to stand still, rear vertically, and then disintegrate into spray and foam. The base of a waterspout (approximately 60 m in diameter), with attendant smaller ones, was observed off the starboard bow, but there was very little vertical development.

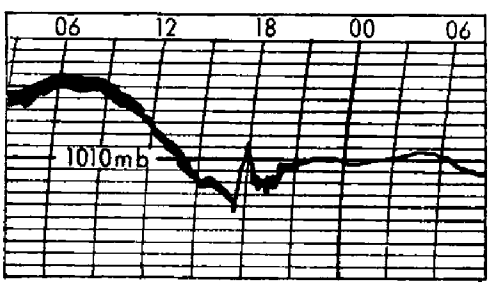
To the north-west the line of stratus appeared to be on the surface but the rest of the sky in that direction was bright and clear. Moments after the wind shift, light to moderate rain commenced and the sheet lightning became practically continuous with occasional forked lightning and simultaneous thunder extremely close to the ship.

At the time of the wind shift the barograph trace rose vertically by 3 mb, then by a further 3 mb over the next 12 minutes. The barogram chart shows the change to a certain extent, but there is some doubt as to the accuracy, or the ability of the barograph to keep up with the speed of events. Comparative uncorrected readings on the precision aneroid were as follows: 1700, 1001·2 mb; 1703, 1005·6 mb; 1705, 1003·2 mb; 1707, 1009·5 mb; 1709, 1007·4 mb. Amidst the fun and confusion of observing this violent phenomenon the reading of temperatures was completely overlooked. A reading at 1725 gave 22°C as compared to 27° at 1400; it felt as if most, if not all, of this drop occurred with the shift of wind.

The rain and lightning continued, with the wind decreasing and backing steadily, until 1735 when the vessel ran clear of the stratus. At this time the wind was a steady NE'ly and had decreased to force 3.

The barograph trace is quite poor because of excessive vibration due to the ship being in ballast condition.

Position of ship at 1630: 29° 10'S, 32° 00'E.




*Note.* The above dramatic account illustrates the vigorous nature of line-squalls not uncommon in these waters.

## CHANGES IN SEA TEMPERATURE

### Indian Ocean

s.s. *Act 1*. Captain R. Brownbill. Liverpool to Melbourne. Observer, Mr. I. M. Dunkley, 3rd Officer.

4th December 1974. At 0600 GMT, in position 41° 48'S, 54° 42'E, the sea temperature dropped suddenly, from the normal of approximately 14°C, to 8° and subsequently read 9°. At 1230 it rose again to 14·5°. This was exactly as happened on the previous voyage (and reported in 'Remarks of Log') at position 40° 36'S, 49° 40'E. It suggests that there is a remarkably strong 'tongue' of cold current from the south setting in this area.

Position of ship at 1230: 41° 30'S, 57° 42'E.

*Note.* This is another interesting report of Southern Ocean Current oscillations similar to that from the *Jervis Bay* published in *The Marine Observers' Log*, January 1975. Oceanographic atlases show a tongue of colder water extending north and north-east from Îles Crozet, together with a more northerly mean current set than normally expected in the Southern Ocean Current. Temperature contrasts in both reports, however, are considerably greater than the atlases indicate.

## WHALES

### North Atlantic Ocean

m.v. *Ulster Star*. Captain G. Easton. Santos to Lisbon. Observers, Mr. M. Power, 2nd Officer and Mr. K. Elvin, A.B.

14th October 1974. At approximately 1445 GMT, whilst the ship was in a moderate rain-squall, two whales were seen fine on the starboard bow close to the ship. As they came abeam the two whales made no effort to increase speed but continued to swim on the surface at a leisurely pace. As they arrived level with the bridge, with their flukes only a few yards from the ship's side, they both dived. It was then seen that one appeared to be injured as the sea was heavily stained a dark-brown colour. They did not stay submerged for more than a few minutes and they were both seen to blow on the starboard quarter, continuing their previous speed in an easterly direction. Both whales were about 12 metres in length and looked a dark grey in colour. They had a short, stubby, dorsal fin and on diving did not show their flukes. Both had small vertical 'blows' and we paid particular attention to see if the injured whale's blow was discoloured, but it appeared normal. No one on board is an authority on whales but it was thought that these were either Sei or Minke Whales. We would appreciate any information you can give us regarding this whale sighting.

Position of ship: 8° 02′N, 28° 42′W.

*Note.* Mr. S. G. Brown of the Whale Research Unit, Institute of Oceanographic Sciences, comments:

"The description of these two whales suggests that they were members of the group of baleen (whalebone) whales known as rorquals, which includes the Blue, Fin, Sei, Bryde's and Minke Whales. With a length of around 12 metres they are too large to be Minke Whales, but may have been Sei, Bryde's or small Fin Whales. Rather than one being injured, it seems more likely that the animals may not have been aware of the ship's presence until they were close alongside when, being startled, one or both of them defecated, hence the brown stain in the water. This reaction is commonly seen when the larger whales become suddenly aware of a ship, or are hit by an object, e.g. a 'dart' used in marking whales."

## WHALING

### Western North Pacific

s.s. *Benlomond*. Captain A. Yuill. Nagoya to Balboa. Observers, Mr. N. C. Reid, 2nd Officer, Mr. C. Gregory, 3rd Officer and Mr. T. Gallacher, Cadet.

22nd October 1974. During the morning watch several what were at first thought to be fishing boats were sighted. They were several miles away and appeared to be manœuvring at speed. This was thought strange as we knew of no boats which fished this area. About 30 minutes later we passed the carcass of a whale at a distance of approximately half a mile and it was then we realized that the boats were whalers. The carcass had been buoyed and looked rather bloated, but we believe that compressed air is pumped into the carcasses to keep them afloat. One of the markers sticking in the animal had an orange balloon attached to it and also what appeared to be a whip aerial. We could not make a positive identification of the type of whale as the sea was moderate to rough although one of the ship's crew who had served on a whaler believed it to be a Fin Whale. It appeared to be approx. 18–21 metres in length and had a prominent dorsal fin. Five whale-catchers were seen at one observation although there could have been more in the area. The previous night, the glow of ship's lights had been spotted on the horizon and they may have been those of the factory ship as they were very powerful and appeared to be deck lights. The nationality of the ships could unfortunately not be determined, but they were

thought to be either Japanese or Korean. Nobody aboard realized that whaling was carried out in this area and we would appreciate any further information you could give us. Air temp. 25·4°C, sea 24·3°.

Position of ship: 33° 40′N, 154° 20′E.

*Note.* Mr. S. G. Brown comments:

"This record relates to pelagic (factory-ship) whaling in the North Pacific. If the estimated length is correct, the animal was a Fin Whale which had been shot and then 'flagged' for collection later by the whale-catcher boat, or a buoy-boat from the factory ship. As the observers state, the dead whales are inflated with compressed air to keep them afloat; and a coloured buoy, and also a radar reflector and radio buoy are often attached to the carcasses to facilitate collection. Fin and the smaller Sei, Bryde's and Minke Whales are the only baleen (whalebone) whales allowed to be hunted in the North Pacific, but Sperm Whales are also taken.

"In the 1973 season, the last for which figures are available, three Japanese and three Russian factory ships operated in the North Pacific. The Japanese factories employed 22 catcher boats between them and the Russian factories 46 catcher boats. The numbers of whales which may be caught in the area are regulated each year by the International Whaling Commission. In the 1974 season the total catch limits were 550 Fin, 3,000 Sei and Bryde's together, and 10,000 Sperm Whales. In 1973 the total catches for both Japanese and Russian pelagic fleets combined in the North Pacific were 417 Fin, 1,813 Sei, 658 Bryde's and 6,132 Sperm Whales."

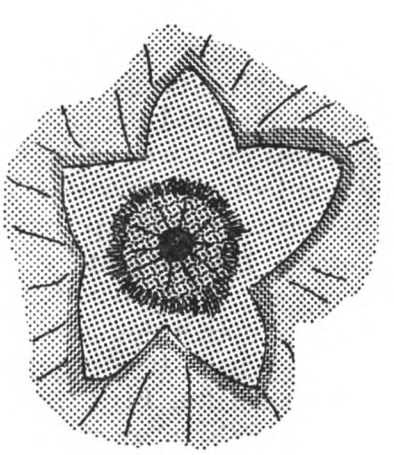
## MARINE LIFE

### Hobson's Bay, Melbourne

m.v. *Newfoundland.* Captain D. J. Houghton. At anchor. Observers not stated.

14th October 1974. While the vessel was at anchor in Hobson's Bay, Melbourne, a 'jellyfish' was observed in the water alongside the ship. In appearance it was like a large flower in bloom, with the colouring changing from a deep red in the centre to a delicate pink around the outside as it moved (see sketch); the outside of the animal curved over and then stretched out again. When seen from a distance it had the appearance of an inverted bell with a depth of 15–20 cm and an upper diameter of about 35 cm.

Position of ship (approx.): 38° 00′S, 145° 00′E.



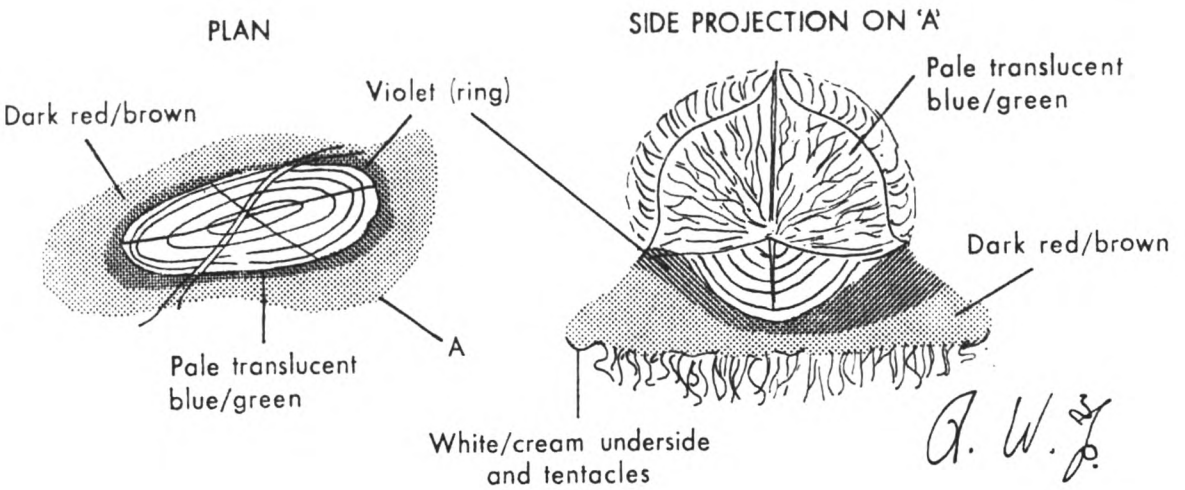
⟵ 35 cm (estimated) ⟶

### North Pacific Ocean

m.v. *Wild Avocet*. Captain L. E. Quigley, Kawasaki to Seattle. Observers, Mr. S. Chamberlain, 2nd Officer and Mr. A. Wymark, 3rd Officer.

11th December 1974. Between 1730 and 2400 GMT (0800–1400 SMT) the vessel passed through an extensive shoal of *Velella* numbering thousands. All appeared to be 'left-hand' and to be running before the wind on a port reach. The wind was WSW, force 6, with rough seas and squally showers. A specimen was obtained around lunch-time but as no formalin was to hand it could not be preserved. At times the shoal was very dense and at other times it was scattered. The specimen which we obtained was 5 cm long, 3 cm wide, and the sail was 3·5 cm high (see sketch), though some larger individuals were observed.

Position of ship at 1730: 44° 20′N, 148° 30′W.
Position of ship at 2400: 44° 49′N, 146° 12′W.




## BIOLUMINESCENCE

### Arabian Sea

s.s. *Titan*. Captain J. K. Winn. Wilhelmshaven to Persian Gulf. Observers, the Master and Mr. W. B. Westwood, 3rd Officer.

8th December 1974. At about 2045 SMT, when the ship was approximately 160 km north-east of Masirah, a glowing effect was observed coming from the water at the bow wave. In the next 15 minutes this effect increased in intensity and a bright-green glowing light was seen to come from the water which had experienced turbulence from the ship's bow wave. During the next couple of hours the phenomenon became more prominent and large bands of luminous organisms were seen to emit a brilliant green light. Moving parallel bands of about 50 by 20 m were seen to travel past the vessel as she moved through the water. The light also came from irregularly sized patches of luminous organisms. The organisms seemed to cluster together on the surface in extremely large numbers, and the propeller vibrations appeared to agitate the creatures to a state of luminescence.

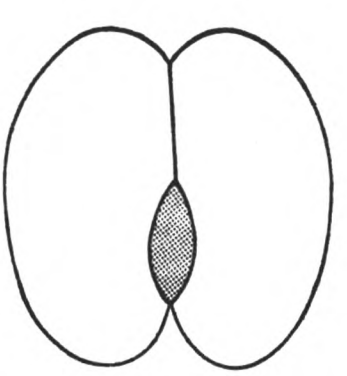
Various tests were carried out with the following results. Switching on and off the radar or flashing an Aldis lamp had no effect. However, disturbing the water surface caused extreme and rapid flashes of light, green in colour. A sample of sea-water was taken for further observations and the density was found to be 1·028 g/cm$^3$.

Later, when time permitted, the phenomenon was observed from the fo'c'sle of the vessel from where the luminescence appeared most prominent. It was obvious that the disturbance of the surface water caused by the bulbous bow was responsible for the vivid luminosity. The most amazing sight was that of flying-fish taking off just ahead of the bow wave and leaving a luminous trail about 5 metres in length just above the surface before finally returning to the water. The organisms had attached themselves to the backs of the flying-fish and had emitted vivid green light along the flight path.

The sea-water sample was then examined in greater detail and was seen to contain small marine organisms which were visible to the naked eye. These organisms resembled frog-spawn or sago and were seen to coagulate in clusters. They varied in size from 0·1 to 0·5 mm and, as shown in the sketch, seemed to consist of two cells with a nucleus between them, but details are limited owing to lack of magnification. When the sample was disturbed by hitting the bucket the organisms burst into luminosity; even loud sound waves were capable of activating them, and they settled at different levels in the bucket, although the majority remained on the surface.

The creatures were kept on board and continued to give out luminosity for about three days before they gradually died. An interesting side effect was luminosity in the toilets caused by the organisms being sucked up in the sanitary-pump intake; when the toilet was flushed, luminescence was clearly visible. This effect continued for about two nights and the water was seen to be rich in marine life. Owing to lack of preservative, it was found impossible to keep a good sample of the liquid, which, it was felt, would have been extremely interesting to marine biologists. It is hoped that this account will 'shed some light' on the subject. Air temp. 23·5°C, wet bulb 20·7°, sea 24·5°. No wind and sea calm.

Position of ship: 21°06'N, 60° 25'E.



Size 0·1 to 0·5 mm

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

"The very detailed and useful observations from the *Titan* leave no doubt that dinoflagellates were responsible, and the description of the organism closely resembles that of Noctiluca, a dinoflagellate often occurring in considerable numbers in the Atlantic, as well as the Indian Ocean. Mr. Westwood is to be congratulated on the detail of his observations which add considerably to the natural history of the group. The flying-fish must have been particularly spectacular!"

## BIRDS

### Western North Atlantic

m.v. *Carchester*. Captain J. Rendall. Manchester to Norfolk, Va. Observers, Mr. D. A. McKenzie, 2nd Officer and most of ship's company.

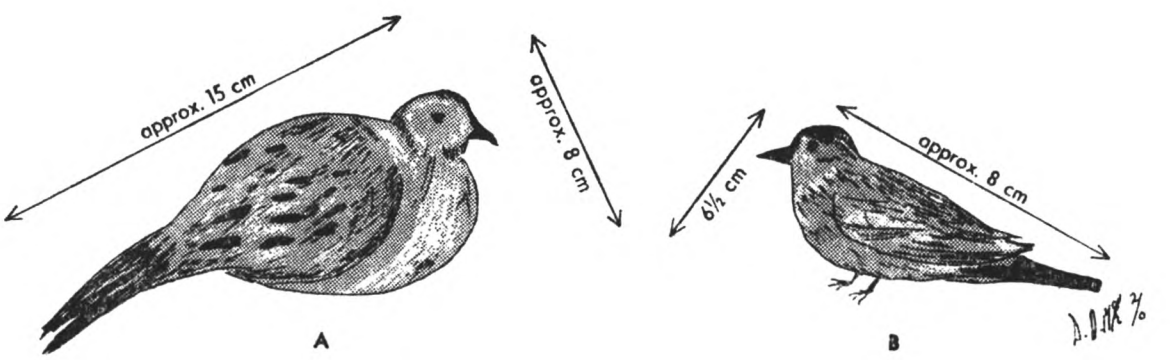
19th–21st October 1974. During the afternoon watch on the 19th a large number of land birds had been observed around the ship for some time. They were of two different species. The larger, 'A' in the accompanying sketch, were mainly sheltering behind hatches and coamings from the strong N'ly wind. They had certain similarities to a dove but with the following peculiarities: the breast was light brown and grey with a white down around the wings, the tail feathers were dark and light brown and the wings and back were dark brown with clearly defined dark speckled patches. The smaller species, 'B' in sketch, were flitting about all over the ship, into accommodation and alleyways, and some had been killed as a result of hitting aerials and wires. The bird sketched had been inside the wheelhouse for four hours and appeared to be quite unafraid, even perching on an offered pencil to be examined. Its beak was long and pointed (sharp too!), black on top and light below. Breast: very light greyish-white, yellow in patches. Head and body: olive-green and brown, dark browny-green tail feathers. Wings: olive-green/brown, with clearly defined white/yellow streaks. The yellow was very bright on throat and wing-bars. It refused crumbs which were left beside it.

After the watch had finished the small passerine-type bird ('B') was taken down below, it being deemed more humane than letting it go in the wild weather conditions prevalent at the time. During the two days the bird was on board it was very noticeable how tame it became; after having a flutter or hop around the cabin it always returned to its home-made cage for a splash in its waterdish or just for a rest in the 'face-flannel' bedding provided. At first it would not look at any of the proffered titbits, until on the 20th it discovered a liking for fresh cheese, then it would sit pecking away into a lump of cheese until we removed it—fearing it might over-eat.

On the afternoon of the 21st, when off Norfolk, we took 'Jeremy' out on to the stern of the ship to let him go. At first he hopped about completely uninterested, but with gentle persuasion he fluttered off about 50 metres and landed in the water astern of the ship. Two minutes later three seagulls landed around him and, despite our shouts and efforts to frighten them off, one of them grabbed the small bird by the neck and made off inland with the other two gulls trying to take the prey away from the first.

Therein endeth the sad saga of Jeremy.

Position of ship at 1800 on 19th: 39° 36′N, 66° 48′W.



## Black Sea

s.s. *Hadra*. Captain D. Davies. At anchor off Batumi. Observers, Mr. G. S. Mycroft, 2nd Officer and Mr. M. Potts, Cadet.

2nd September 1974. A bird was observed in difficulties in the water, obviously being unable to fly off. It was valiantly rescued by means of a plastic 'dhobi' bucket from the end of the accommodation ladder by Cadet Mike Potts. The bird was apparently in great distress, shuddering quite violently. It was placed in the sun in a sheltered spot and within about three-quarters of an hour had dried out and recovered sufficiently to view observers with increasingly suspicious stares. Eventually it decided to wander around, and its movements looked not unlike those of a moorhen. The bird measured about 20 cm long, 10 cm high, 10 cm broad and, as shown in the photograph opposite page 188, appeared to be only a relative youngster. It eventually flew away, apparently no worse for its experience.

Position of ship (approx.): 41° 30'N, 41° 30'E.

*Note 1*. Although the *Hadra* observation rightly belongs to the July 1975 edition, the colour slide, making positive identification of the bird possible, was not available in time to meet the July printing deadline. It is included in this edition because of the very interesting note which follows.

*Note 2*. Captain G. S. Tuck, Chairman of the Royal Naval Birdwatching Society, comments:

"The slide identifies the bird as a Quail (*Cotornix cotornix*) and by the look of it a female, lacking the black throat band peculiar to the male.

"The length given as about 20 cm agrees well with the guide-book measurement of 18 cm.

"The feathers were naturally rather ruffled up after drying but the detail is sufficient to identify it, and the colour of the legs and toes, lacking any hind spur, adds to the solution.

"Apart from a few which occur and breed in Great Britain nowadays—it used to be fairly common—the species breeds in Europe eastwards to central Asia and migrates, often in large numbers, across the Mediterranean to winter in North Africa. During migration in early September and throughout October flocks can be seen, as I have seen them, flying very low over the sea with whirring flight, en route for North Africa and they may well fall into the sea with fatigue. The Arabs used to, and probably still do, erect long mist-nets on the shore and catch them in hundreds, for they are a delicacy on sale in the markets."

## North Pacific Ocean

s.s. *Manchester Concept*. Captain K. Lehepuu. Los Angeles to Keelung. Observers, Captain and Mrs. Lehepuu, Mr. F. Shepherd, Chief Officer, Mr. K. Whittaker, 2nd Officer and Mr. J. B. K. Tyson, 3rd Officer.

9th November 1974. At approximately 0500 GMT, when the vessel was about 390 miles west-south-west of Midway Island, a large owl was observed flying around the ship for a while, eventually landing. At the time the wind was variable, force 1 or 2, but the weather was overcast with rain squalls. A photograph of the bird in flight was taken [*see* opposite page 188] but attempts to get close enough to photograph it at rest were not very successful.

Estimates of the height of the owl varied from 25 cm to 35 cm. Its frontal plumage was cream-coloured turning to white underneath, with white furry legs. Its back was beautifully coloured dark-brown/black and yellow, somewhat resembling a leopard skin from a distance. The tail and wing tips were more brown with yellow streaks, the underside of the wings being pale-brown/orange. It had two small tufts over the eyes and had a habit of standing with its wings held out at right angles to the body.

After four or five hours, as the ship steamed into a heavy squall, the owl took flight, heading in a north-easterly direction, and was not seen again.

Position of ship at 0500: 25° 53'N, 175° 53'E.

### Western North Pacific

m.v. *Tacoma City*. Captain W. D. Jones. Nagoya to British Columbia. Observer, Mr. S. Gorford, 2nd Officer.

8th November 1974. Early in the morning an owl was discovered on board. Wind sw'ly, force 2. Weather at the time and for the previous three days was overcast with moderate rain. Nearest land, Kuril Islands, 280 miles away. The owl showed no signs of exhaustion, flying around the ship and sometimes perching on the accommodation, etc. Although the bird could only be observed from a distance, it appeared to be about 30 cm in height, grey/fawn in colour and had yellow rings around the eyes. It was not fed by any of the ship's crew nor was it seen to recover any scraps from the sea.

The owl stayed around for three days and then set off again. At no time during its stay did it display nocturnal habits.

Position of ship: 42° 24'N, 154° 17'E.

*Note.* These are but two sightings of owls selected from many received during the period.

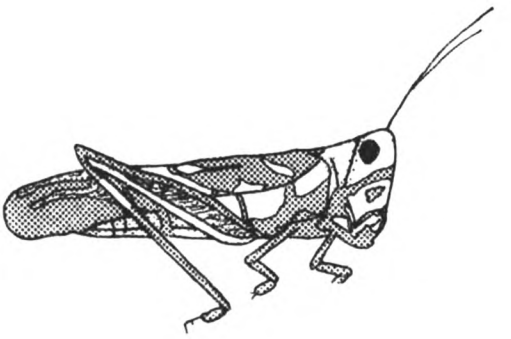
## INSECTS

### Eastern North Atlantic

s.s. *City of Oxford*. Captain R. Frame. Cape Town to Las Palmas. Observers, Mr. M. L. Kinnear, 3rd Officer and Mr. H. Beck, Cadet.

2nd October 1974. At 1200 GMT several of these insects (see sketch) were observed on the vessel and one was caught on the bridge wing. It was 4 cm in length and in colour was predominantly light fawn with light-brown patches on its body. It had double wings with 'armour plates' along the top of its body. When the insect had been studied it was released and, after several days, all the insects had disappeared.

Position of ship: 12° 12'N, 18° 01'W.



*Note.* Dr. D. R. Ragge, Department of Entomology, Natural History Museum, comments: "The insects found on the *City of Oxford* were grasshoppers, but it is impossible to tell which kind from the drawing. We should like to have specimens of any grasshoppers found in this way in future, especially if they were seen to arrive by flying on to the ship."

m.v. *Osaka Bay*. Captain J. Bentley. Southampton to Port Kelang. Observers, Mr. P. J. Barratt, Senior 2nd Officer and Mr. P. N. Dolphin, Radio Officer.

7th October 1974. At 1340 GMT a fair number of butterflies were observed flying around the ship and numerous medium-sized, partly green-coloured locusts were also seen on the deck and bulkheads. At the time, and for some time previously during the vessel's run down the north-west coast of Africa, there was a considerable amount of sand in the atmosphere, and unusually heavy deposits on board. Inspec-

tion of the air-conditioning system revealed that a number of the insects had been sucked into the filters and trapped. (A locust report was dispatched to London and specimens were retained for forwarding when we reached Cape Town.) The wind was mainly NE'ly, force 3, and there was no cloud.

Position of ship at 1340: 18° 33'N, 17° 49'W.

*Note 1.* Dr. R. A. French of the Entomology Department, Rothamsted Experimental Station, replied direct to the *Osaka Bay* as follows: "Thank you for your report and for specimen, which arrived in perfect condition. The 'locust' was *Oedaleus senegalensis*, the Senegalese Grasshopper".

*Note 2.* Locusts submitted and reported on, during the current period and in the same waters by the *Benledi*, *Act 6* and *Clan Ross* were also identified as *Oedaleus senegalensis*.

Numerous other ships of the V.O.F., notably the *Shonga*, *Serbistan*, *Stirling Bridge*, *Esso Caledonia* and *Act 1*, submitted specimens and reports of different types of locust, which were identified, but unfortunately, owing to lack of space, full details cannot be reproduced. However, Mr. I. B. Jones of the Desert Locust Information Section of the Centre for Overseas Pest Research comments:

"The drought which has affected West Africa for the last few years has ended and this has resulted in a tremendous upsurge in the locust and grasshopper populations. Densities of up to 1,000 per square metre over large areas have been reported, and extensive control measures have been carried out to prevent damage to crops."

## Persian Gulf

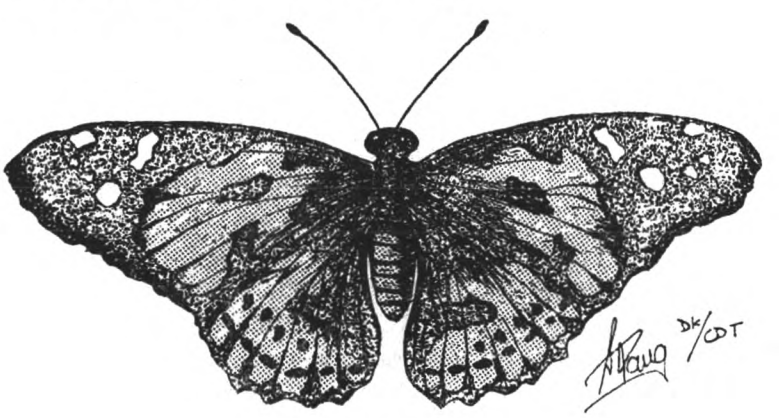
s.s. *Titan.* Captain J. A. Cliff. At anchor. Observers, the Master, Mr. W. B. Westwood, 3rd Officer and Mr. S. J. Pang, Cadet.

20th December 1974. In the early hours, while the ship was at anchor 13 miles north of Ra's al Khaymah and prior to the passage of a northerly moving rain-squall/thunderstorm, a colourful butterfly was found flopping about in the wheelhouse. It was captured and placed in a transparent box for further observation.

After careful scanning, a coloured sketch was drawn showing the approximate colours and pattern of the upper side of the butterfly. The wing-span of the specimen measured 60 mm, the length of the body, from head to the last segment of the abdomen, was 18 mm, and the antennae measured 15 mm and had a yellow-coloured knob at each tip. A proboscis, 10 mm when stretched, was coiled under the head and flicked continuously when the insect was excited. The underside of the wings had a brownish background with white along the veins. Tints of light-blue patches appear at the areas where there are black spots on the other side of the wings. The white patches also appear on the underside but are not so distinct.

Dusty golden and silvery coloured scales were spread over both sides of the wings, being quite dense at the roots of the wings and thinning out towards the edges. This 'dust' also covered the hairy parts of the head, the thorax and abdomen, and was luminous in the dark.

Position of ship (approx.): 26° 00'N, 56° 05'E.



*Note.* Mr. R. L. Smiles, of the Department of Entomology, Natural History Museum, comments:

"The butterfly caught on the *Titan* can be identified as *Cynthia cardui* (Linnaeus), the 'Painted Lady' a strongly migratory butterfly found throughout Europe, Asia and Africa.

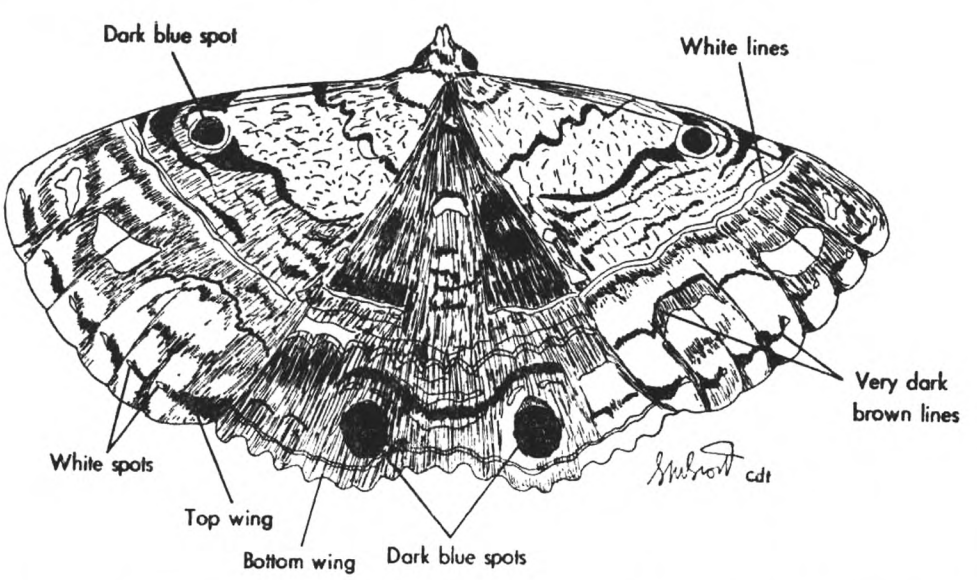
"The British population of this butterfly is maintained only by migration from southern European countries."

### Caribbean Sea

m.v. *Townsville Star*. Captain J. G. Reeve. Rotterdam to Cristobal. Observers, the Master, passengers, Mr. A. R. P. Geels, 2nd Officer and Mr. S. M. Scott, Cadet.

23rd October 1974. During the afternoon a dark-brown moth with a tip-to-tip wing-span of about 18 cm was found by a couple of passengers in their cabin. The position of the ship was then some 100 miles west-south-west of St. Croix Island. We were heading for Panama and it was thought that the moth had come on board during the previous night while the vessel was in the Sombrero Passage. As shown on the sketch by Cadet S. M. Scott the moth had four purplish-blue spots on the wings and the lines on the wings were even darker-brown in colour than the rest of the moth. At the passengers' request we did not catch it, for fear of harming it, and therefore could not examine the thing too closely. No trace of it was found the next day and it is thought that it flew out of the porthole during the night or that the passengers now own a beautiful moth-wing ashtray. Wind throughout was NE'ly, force 4. Cloudy with occasional showers.

Position of ship at 1800 GMT: 16° 54′N, 66° 42′W.




*Note.* Mr. A. H. Hayes, of the Department of Entomology, Natural History Museum, comments:

"This is *Otosema odorata* Linn., known as a Black Witch, a large, common South American moth of the family Noctuidae."

## ABNORMAL REFRACTION

### Arctic waters

m.v. *St. Jasper*. Skipper E. J. Johnson. Fishing near Spitsbergen. Observers, the Skipper and Mr. K. C. Stone, Radio Officer.

25th November 1974. At 1040 GMT the moon appeared over the Torrel glacier on the west coast of Spitsbergen, bearing 077°T. It was bright-orange in colour and

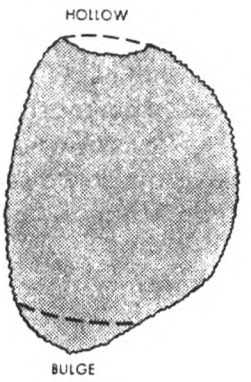
with distortions as shown in the sketch. The bulge was very pronounced, and the hollow only slightly less so, but the periphery was very ragged in appearance. The following details were noted:

1141: At an elevation of 2° the colour became a pale yellow, distortion still apparent though slightly less. Low clouds intervened and obstructed observations for a while.

1227: At elevation 4° 13′ only slight distortion.

1255: Elevation 6° 07′, moon's appearance and colour normal. We were amazed that the sextant still worked. It was assumed that reflection of light from the glacier was the main cause of the phenomenon.

Position of vessel: 77° 05′N, 12° 30′E.

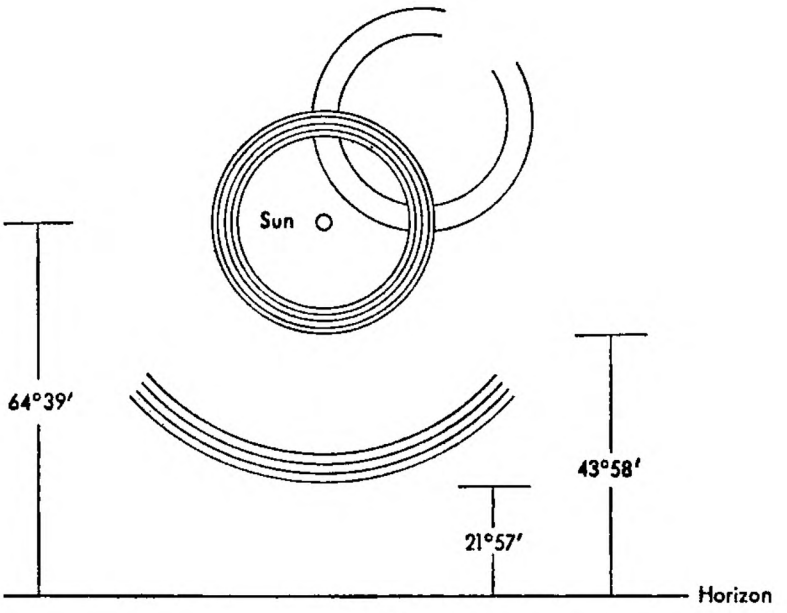



## SOLAR HALO

### Indian Ocean

s.s. *Benvannoch*. Captain I. R. Ansell. Durban to Penang. Observers, the Master and all navigating officers.

6th December 1974. At 0530 GMT the sun was observed to have a halo around it showing, faintly, the colours of the spectrum. A second halo, which was white in colour, was then seen to form with the sun outside. At its furthest point from the sun this halo was broken (see sketch). By 0535 another arc was forming below, and concentric with, the main halo. This arc also showed the colours of the spectrum.



At 0540 the altitudes of the sun and of the two coloured haloes were measured, but the altitude of the white halo was unobtainable. The measured altitudes are shown in the sketch.

Clouds observed at the time included cumulus, altocumulus, cirrus and cirrostratus.

The greatest brilliance was attained at 0540 and shortly afterwards the colourless halo disappeared. Increasing amounts of large cumulus then began to form and at 1015 the arc disappeared. By 1025 the main halo had also disappeared.

Position of ship: 20° 30′S, 57° 50′E.

*Note.* Allowing for atmospheric distortion, the diagram shows the familiar 22° halo and the much less common 46° halo. However, we have so far been unable to locate either a description or an explanation for the third phenomenon in this very interesting report.

## ROCKET SIGHTINGS

### Eastern North Atlantic

m.v. *Rothesay Castle.* Captain C. W. Gowans. Dar-es-Salaam to U.K. Observers, the Master and ship's company.

22nd November 1974. Between 1920 and 1938 GMT a small half-moon-shaped cloud was observed at an approximate altitude of 10° and on an approximate bearing of 260°. At first it was thought to be a reflection of the moon, but it expanded rapidly to an altitude of 35°.

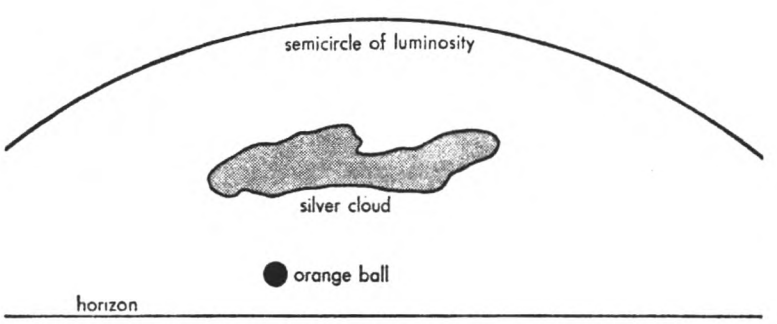
At approximately 1928 a large red rocket was observed rising from the horizon in the southerly edge of the original cloud. On reaching an altitude of 5° it brightened considerably and emitted a mushroom-type cloud. This cloud expanded into a full annulus and reached a greater altitude than the original cloud. Three minutes later another rocket was observed rising from the same position and forming a similar cloud which again expanded into an annulus.

The two rockets remained in the centre of the annuli and, on reaching an altitude of 30°, appeared to level off and head south. The cloud formation disappeared at 1938.

Position of ship: 34° 21′N, 12° 52′W.

s.s. *Esso Pembrokeshire.* Captain W. D. Templeman. Ra's Tannūra to Augusta (Sicily). Observer, Mr. A. Ramsey, Chief Officer.

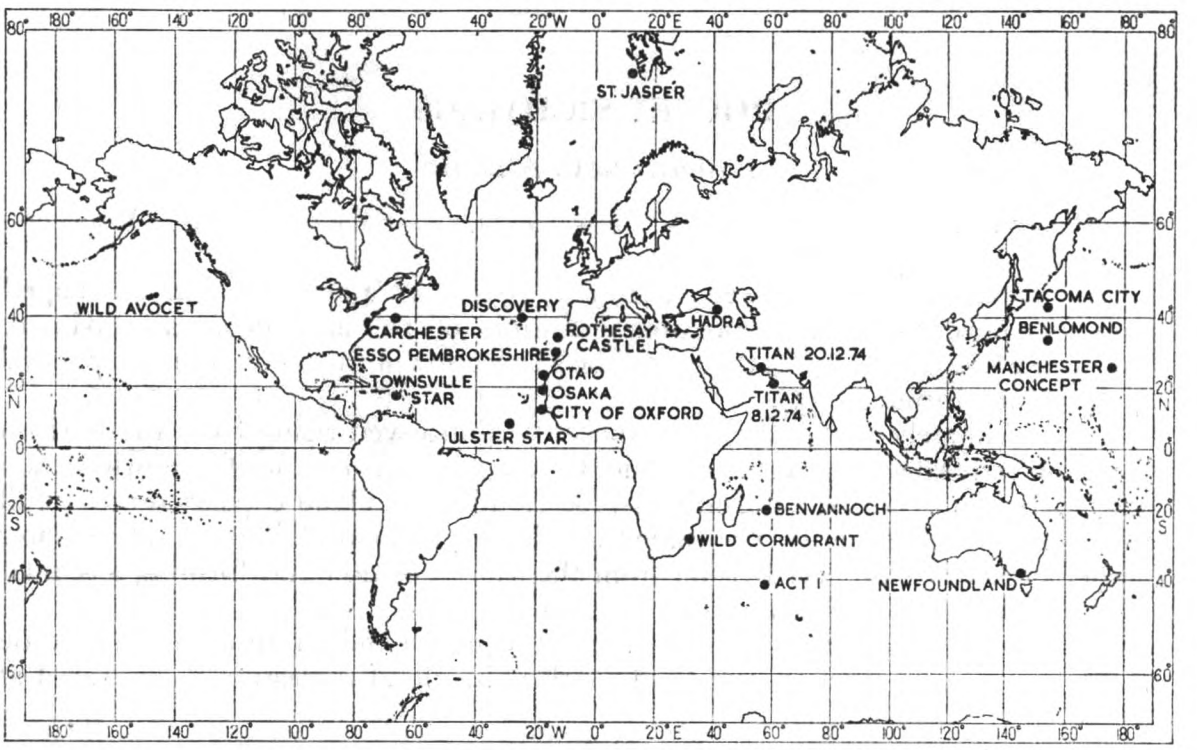
22nd November 1974. At 1930 GMT there was an unusual sighting in the sky to the westward of the vessel. The phenomenon was first observed as a small silver cumuliform cloud (moonlit night) at an altitude of approximately 10°–15°. This 'cloud' expanded quite rapidly into a large semicircle of luminosity which rose slowly in the western sky and gradually faded. While this was being observed an orange ball of light appeared in the same direction (see sketch). This light rose in



the sky to form a similar silver cloud and later a semicircle of luminosity as described before, only this time what appeared to be a rocket was observed in the centre of the luminosity. The rocket appeared to follow an erratic track and finally disappeared. The whole phenomenon repeated itself three times.

Position of ship: 30° 10′N, 12° 55′W.

*Note.* The *Rothesay Castle*, *Esso Pembrokeshire* and several other vessels, including the *Otaio*, observed sea-to-air guided missiles launched for routine training purposes from, it is believed, units of the U.S. Navy. The *Otaio*, same date and time as above, in position 23° 19′N, 17° 16′W, gave a similar detailed account of the phenomena.




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

## AURORA

The following notes have been received from Mrs. Mary Hallissey of the Aurora Survey:

"We list briefly in the accompanying table a summary of reports of aurora received for the months October–December 1974 at the Balfour Stewart Auroral Laboratory of the University of Edinburgh (also four reports received too late for previous editions). As we have so often said, the list is unworthy recognition and acknowledgment of the carefully noted and sketched displays. One of the most delightful sketches was sent by an observer in O.W.S. *Weather Monitor* of activity on 8th/9th October; detailed notes from observers in O.W.S. *Weather Reporter* of the 'fantastic display' on 15th/16th October and in O.W.S. *Weather Surveyor* of the display on 8th/9th November were translated back into all-sky diagram form and record classic progress of displays for the archives, while activity seen from the *Summity* at high latitudes in the trans-auroral zone on 20th–22nd October, associated with the tail-end of a prolonged period of moderately disturbed geomagnetic conditions, occurred in a zone where possible satellite-based cameras could give corroborative data from above.

"During the three months, the greatest geomagnetic activity was recorded in October; November was only slightly less active, but there were few occasions of above-moderate activity during December. Generally throughout the three months the active periods were links in the 27-day recurrence series, which formed an obvious pattern in the diagrammatic representation of the year's related auroral activity. This is an expected feature of the now imminent 'low' in the solar activity cycle, when there are few occasions of flare-induced activity. Geomagnetic activity was of such order of magnitude as to produce colourful and very active displays overhead for the Weather Ships at duty at Station 'India' and ships positioned a few degrees south of the 'auroral zone'. (It has been suggested that similar planetary geomagnetic activity figures at a time of solar maximum activity would result in visible aurora at some few degrees equatorwards.)

"We thank all who who have sent us reports and at this time of contraction and re-siting of the Weather Ship Stations, we should like especially to acknowledge the valuable reports received over the years from the many observers in the Weather Ships and the help given by the administrative staff at the O.W.S. Base in Greenock."

| Date (1974) | Ship | Geographic Position | | Λ | Φ *degrees* | I | Time (GMT) | Forms |
|---|---|---|---|---|---|---|---|---|
| 22nd July | *C.P. Discoverer* | 50°02'N | 63°30'W | 010 | 61 | +76 | 2115–dawn | RA, RR, N |
| 8th Aug. | *Manchester Crusade* | 49°56'N | 63°55'W | 010 | 61 | +76 | — | RB, N |
| 15th Sept. | *Manchester Challenge* | 55°20'N | 38°20'W | 040 | 65 | +73 | — | RB, RR |
| 26th | *Summity* | 61°07'N | 04°00'E | 090 | 62 | +73 | 2300–0230 | HA, RR, N |
| 2nd Oct. | *Summity* | 70°13'N | 21°09'E | 120 | 67 | +78 | 2045–2100 | RB, RR, N |
| 7th | *Weather Monitor* | 59°08'N | 19°18'W | 070 | 65 | +72 | 2150, 2250 | N |
| 8th | *Weather Monitor* | 59°06'N | 19°31'W | 070 | 65 | +72 | 2045–0030 | HA, HB, RB, P, N |
| | *Manchester Courage* | | | | | | 2200–2230 | RA, RR, N |
| 9th | *Weather Monitor* | 59°04'N | 19°25'W | 070 | 65 | +72 | 2009–0245 | HA, RR, N |
| | *Weather Reporter* | 56°24'N | 10°12'W | 080 | 61 | +70 | 2030–0120 | N |
| | *Weather Surveyor* | 53°06'N | 17°06'W | 070 | 59 | +69 | 2100–2300 | N |
| 11th | *Weather Reporter* | 58°20'N | 16°42'W | 070 | 64 | +72 | 0030–0400 | HA, RA, RB, N |
| 13th | *Dart America* | 47°54'N | 47°30'W | 030 | 58 | +70 | 0505–0530 | RR, N |
| 14th | *Weather Reporter* | 59°04'N | 19°13'W | 070 | 65 | +72 | 0230–0600 | N |
| | *Weather Adviser* | 54°48'N | 10°12'W | 080 | 59 | +69 | 1930–0045 | N |
| 15th | *Weather Reporter* | 59°12'N | 19°18'W | 070 | 65 | +72 | 0440–0600 | HA, RA |
| | | 59°12'N | 19°00'W | 070 | 65 | +72 | 2100–2315 | HA, RB, RR, P |
| 16th | *Weather Reporter* | 59°13'N | 18°58'W | 070 | 65 | +72 | 0010–0615 | RA, RB, RR |
| 17th | *Weather Reporter* | 59°05'N | 19°08'W | 070 | 65 | +72 | 1950–0605 | HA, RA, RB, RR, P, N |
| 18th | *Weather Reporter* | 59°01'N | 18°57'W | 070 | 65 | +72 | 2040–0200 | N |
| 19th | *Weather Reporter* | 59°05'N | 18°37'W | 070 | 65 | +72 | 0235–0545 | P, N |
| 20th | *Weather Adviser* | 52°36'N | 20°12'W | 060 | 59 | +69 | 0030–0415 | N |
| | *Weather Reporter* | 58°08'N | 16°23'W | 070 | 64 | +72 | 0145–0545 | N |
| | *Summity* | 68°41'N | 38°24'E | 130 | 63 | +78 | 1505–1530 | RB, RR, P, N |
| | | 69°13'N | 36°24'E | 130 | 64 | +78 | 1920–1928 | RR |
| | | 69°20'N | 36°00'E | 130 | 64 | +78 | 2032–0145 | HB, RR, N |
| 21st | *Summity* | 71°09'N | 23°29'E | 120 | 67 | +78 | 2005–2020 | N |
| 22nd | *Weather Reporter* | 56°02'N | 08°58'W | 080 | 60 | +70 | 0145–0545 | HA, N |
| | *Summity* | 68°35'N | 13°30'E | 110 | 67 | +77 | 1715–1815 | HA, RB, RR |
| | | 68°16'N | 12°50'E | 110 | 67 | +77 | 1905–1930 | RB |
| | | 68°00'N | 12°17'E | 110 | 67 | +77 | 2105–2200 | HA, RR, N |
| 23rd | *Weather Reporter* | 57°50'N | 14°51'W | 070 | 63 | +71 | 0345–0445 | N |
| 24th | *Weather Reporter* | 58°45'N | 18°00'W | 070 | 65 | +72 | 0545–0555 | RA |
| 26th | *Nina Bowater* | 49°00'N | 59°00'W | 010 | 60 | +74 | 0830 | RR, N |
| 27th | *Weather Reporter* | 59°06'N | 19°10'W | 070 | 65 | +72 | 2035–2223 | HA, RB, RR |
| 28th | *Weather Reporter* | 59°03'N | 18°59'W | 070 | 65 | +72 | 0545–0555 | N |
| 8th Nov. | *Weather Surveyor* | 59°02'N | 19°16'W | 070 | 65 | +72 | 1930–0600 | All forms |
| 10th | *Weather Surveyor* | 59°00'N | 19°08'W | 070 | 65 | +72 | 1940–0245 | HA, N |
| 12th | *Weather Surveyor* | 59°00'N | 18°18'W | 070 | 65 | +72 | 0200–0640 | HB, RB, N |
| | *Manchester Concorde* | 55°16'N | 40°00'W | 040 | 65 | +73 | 0630–0715 | RR |
| | *Weather Surveyor* | 59°04'N | 18°53'W | 070 | 65 | +72 | 2000–0245 | HA, HB, RA, N |
| 13th | *Weather Surveyor* | 59°03'N | 18°43'W | 070 | 65 | +72 | 1845–0152 | HA, RA, P |
| 14th | *Weather Surveyor* | 59°27'N | 18°16'W | 070 | 65 | +72 | 0600 | N |
| 17th | *Weather Surveyor* | 59°11'N | 19°13'W | 070 | 65 | +72 | 2312–0547 | HA, HB, RA, P |
| 18th | *Weather Surveyor* | 59°24'N | 19°28'W | 070 | 65 | +72 | 2150–0350 | HB, N |
| 19th | *Weather Surveyor* | 59°06'N | 19°05'W | 070 | 65 | +72 | 2245–0248 | N |
| 20th | *Weather Surveyor* | 59°20'N | 19°22'W | 070 | 65 | +72 | 1945–0555 | HA, HB, RA, N |
| 8th Dec. | *Weather Reporter* | 52°30'N | 20°43'W | 060 | 59 | +69 | 2345–0145 | N |
| 17th | *Weather Monitor* | 55°29'N | 08°35'W | 080 | 60 | +70 | 2000 | N |
| 21st | *Miranda* | 66°51'N | 24°15'W | 070 | 73 | +77 | 1920–2000 | HB, RR |

Key: Λ = geomagnetic longitude; Φ = geomagnetic latitude; I = inclination; HA = homogeneous arc; HB = homogeneous band; RA = rayed arc; RB = rayed band; R(R) = ray(s); P = Patch; N = unidentified auroral form.

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# The Global Telecommunication System of the World Weather Watch

By E. J. Bell, C.Eng., F.I.E.E.
(Assistant Director (Telecommunications) Meteorological Office)

## Introduction

The World Meteorological Organization (WMO) established at its Fifth Congress in Geneva in 1967 a major programme called the World Weather Watch (WWW), with a first plan for the period 1968–71. Later a revised plan was approved for the following four-year period 1972–75. The WWW plan has three basic and essential components, a Global Observing System (GOS), a Global Data-processing System (GDPS) and a Global Telecommunication System (GTS). The objectives of the WWW are to make available to all Members the required meteorological observational data and processed (including pictorial) information both speedily and reliably in a co-ordinated fashion. The WWW is an integrated global system, though it is usually seen as a three-tiered structure with global, regional and national levels.

## The Global Telecommunication System

The GTS consists of telecommunication facilities and arrangements necessary to meet the objectives of the WWW. Its functions include the collection and distribution of meteorological observational data and transmission of processed information. The GTS is required to accommodate the expected volume of meteorological information and effect transmission within the specified time limits to meet the needs of World, Regional and National Meteorological Centres. The GTS has been organized on a three-level basis, namely

(*a*) The Main Trunk Circuit (MTC) and its branches linking together the three World Meteorological Centres as well as a number of nodal centres called Regional Telecommunication Hubs (RTHs).
(*b*) Regional telecommunication networks.
(*c*) National telecommunication networks.

The outline network of the Main Trunk Circuit and its branches is shown in Fig. 1.

Certain engineering principles have been agreed for the GTS. These include the fullest use of land-line facilities and the installation at major nodal centres such as RTHs of equipment for the automatic selection, switching and editing of meteorological messages; there should also be provision for alternative routeing of traffic.

Special telecommunication procedures have been evolved and agreed for use throughout the GTS in order to ensure speedy operation through uniformity and compatibility. Meteorological information is compiled to a fixed bulletin format, and bulletins are conveyed within meteorological messages. Message format depends upon the mode of operation and the engineering of circuits and centres. Nevertheless both bulletin and message formats have been evolved particularly to facilitate automatic switching, selection and editing processes. Where it is necessary to operate data transmission and analogue facsimile over channels on a shared-time-division basis, observational data take precedence and the two modes of transmission must not interrupt each other.

Technical characteristics and operating specifications have been agreed for the GTS. These include such aspects as:

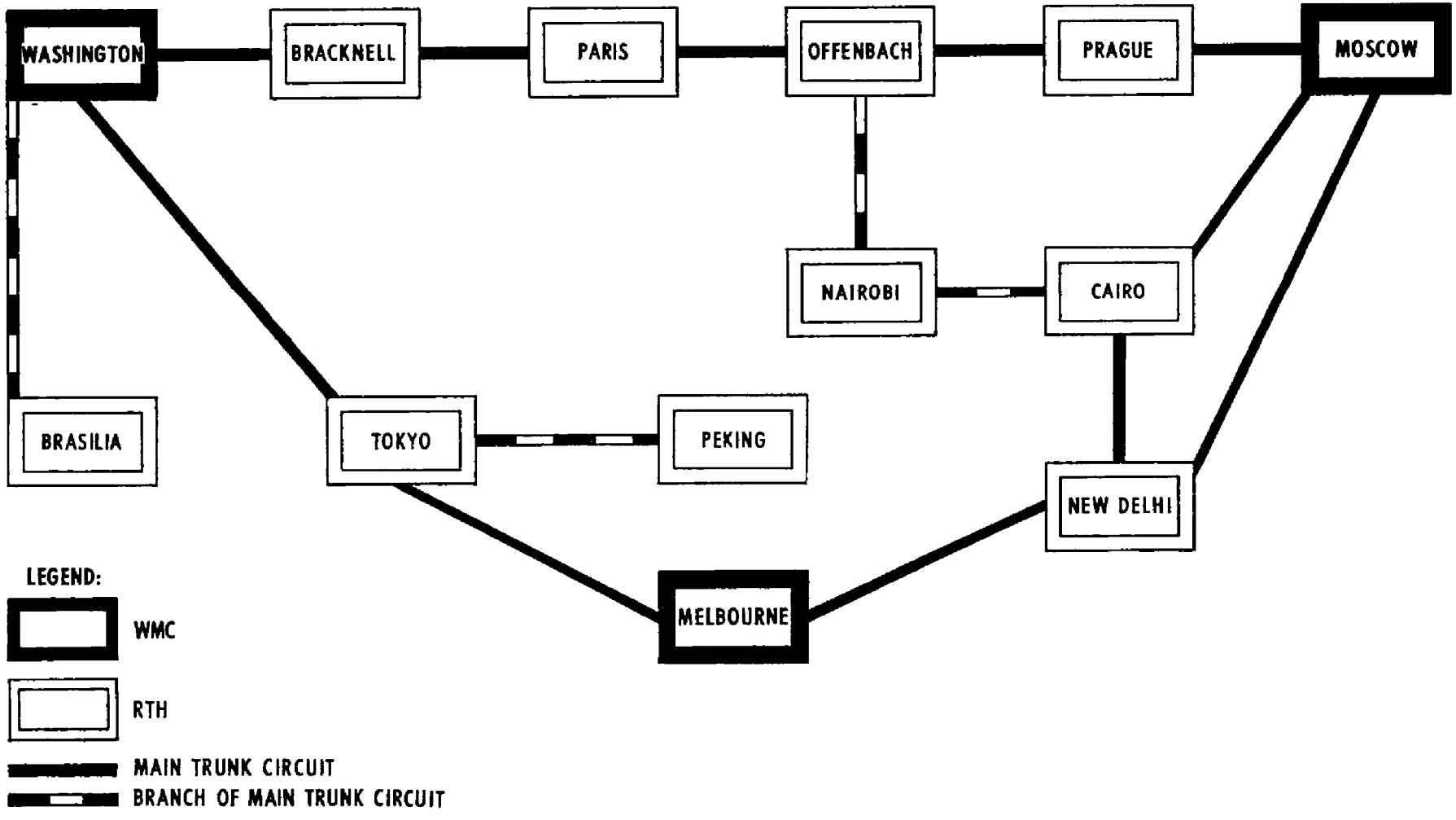



**Fig. 1. Routeing of the Main Trunk Circuit and its Branches.**

(*a*) The Main Trunk Circuit (see Fig. 1) shall be a segmented closed loop, operated continuously and in a segmented 'store and forward' mode, with designated RTHs forming the terminal ends of adjoining segments.
(*b*) Data signalling rates of 1,200 or 2,400 bits/s shall be used in the synchronous mode, with a backward channel (asynchronous 75-baud) for error control purposes. (Note: 2,400 bits/s equates on the GTS to a transmission speed of 300 characters per second).
(*c*) International Alphabet No. 5 and International Telegraph Alphabet No. 2 used as specified, with RTHs responsible for conversion between alphabets, and also as necessary conversion between signalling rates.

## Functions of Networks and Centres

The functions of the MTC and its branches include the rapid and reliable exchange of observational data required for making weather analyses and prognoses on a global scale, and also ensuring the exchange of processed information between the World Meteorological Centres (WMCs), including information received from meteorological satellites. The Regional Telecommunication Networks consist of an integrated system of circuits which interconnect RTHs and National Meteorological Centres (NMCs), together with radio-teleprinter and radio-facsimile broadcasts in accordance with regional plans. The principal functions of regional networks and centres are the exchange and distribution of observational data within the Region (a WMO Region corresponds approximately to a continent), the collection of observational data originating in, or received by radio stations located in, the Region, e.g. reports from ships and aircraft, and the exchange of data with adjacent regions.

The choice of telecommunication networks and facilities for the collection and transmission of meteorological information within a country is mainly a national matter, though countries are encouraged to organize their national systems to be compatible with the GTS and thereby more effective in meeting WWW requirements.

The Region VI (Europe Telecommunication Network, see Fig. 2) is now well advanced in its transition from the old 50-baud (6·6 characters per second) teleprinter system to its planned new configuration of automated centres interconnected by circuits used in the data transmission mode.

## Bracknell RTH

The British Meteorological Office provides at its Bracknell Headquarters a Regional Telecommunication Hub (*see* photograph opposite page 176) which has to meet three main requirements:

(*a*) To perform all the functions of a designated RTH on the Main Trunk Circuit (Bracknell operates effectively as the gateway centre between North America and Europe).
(*b*) To meet the commitments of a designated European RTH.
(*c*) To function as the U.K. national meteorological telecommunication centre.

A glance at Fig. 2 will show the Bracknell RTH connected to one world centre, two other regional hubs, and six national centres. The three major centres and Oslo are already automated with computer-controlled message switching systems and working with Bracknell at data speeds; Copenhagen is operating via Oslo for alphanumeric data, but direct to Bracknell for facsimile transmissions. Dublin and De Bilt (The Netherlands) are scheduled to be connected to Bracknell at 1,200 bits/s later this year. The direct teleprinter connections between Bracknell and Reykjavik, and to Brussels, are expected to be upgraded to data speeds in 1977 and 1979 respectively.

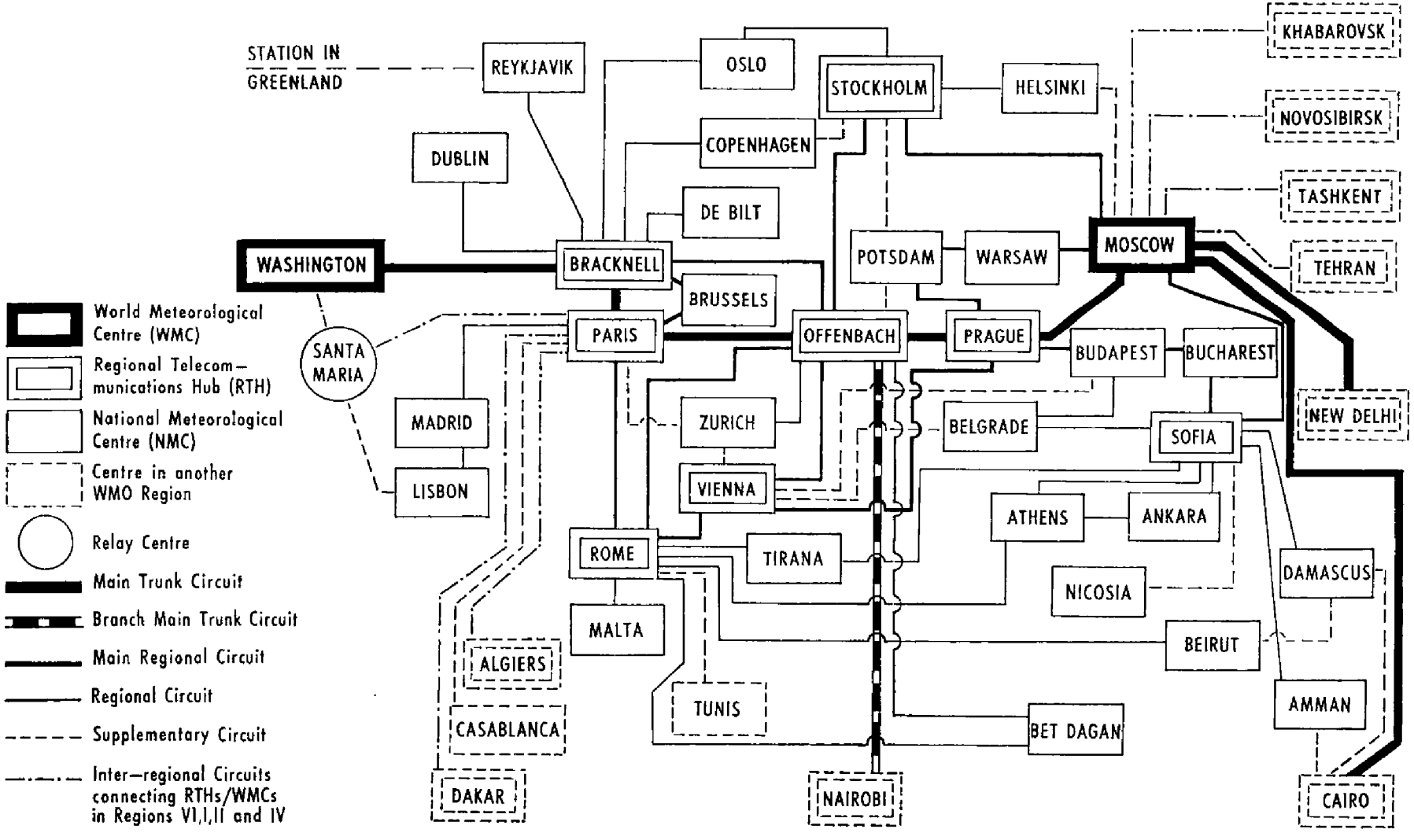



**Fig. 2. Regional Telecommunication Network for Region VI (Europe).**

The Bracknell radio broadcasts (RTT and radiofax) are in continuous 24-hour operation, each broadcast service being carried simultaneously on four different HF radio frequencies. Although part of the U.K. organization, they do of course provide services internationally. For example, the RTT broadcast is operated in terms of data content and radio reception coverage as a Regional Broadcast within the Region VI (Europe) Telecommunication Plan, as well as providing a national service. Coverage for radio-facsimile reception is not quite so good as for RTT; this arises purely from the medium-power radio transmission facilities available to us and not by intent.

The Ocean Weather Service (OWS) has been undergoing a rather uncomfortable reappraisal. Until July 1974 the North Atlantic Ocean Stations 'A', 'I', 'J' and 'K' were linked to Bracknell as their designated shore station. Ocean Station 'A' has now closed down. Low-speed morse transmission remains the ship-to-shore communication medium. Top priority is given by the Bracknell Centre to the handling of observational reports from these Ocean Stations, but it must be said that the efforts are occasionally frustrated by delays caused in the radio-communication channel. The North Atlantic region is notoriously bad for HF radio communication. If there is to be a new scheme of weather ships in the North Atlantic, we plan to install modern communication equipment in the British ships which is capable of higher transmission rates (using a printing telegraph system) and which at the same time is also capable of providing a communication channel less susceptible to adverse propagation effects and interference.

The American (NOAA) meteorological satellites continue to provide APT automatic picture transmission scanning radiometer (SR) transmissions which are received by our own ground station. The pictorial information (cloud pictures) obtained from these satellites is recorded in the Bracknell Telecommunication Centre and passed to the Central Forecasting Office (CFO) for its use, and the signals as received from a satellite are also switched in real time to selected offices in the United Kingdom.

## Collection of ships' weather reports

As already indicated, a requirement of the WWW and its GTS is the speedy and reliable acquisition of observational reports. This is very much so regarding the reception of ships' weather reports, and with particular emphasis on the North Atlantic so far as European meteorological services are concerned. The Regional Association VI (Europe), at its meeting in Bucharest in September 1974, discussed the possible effects of (*a*) the reduction in the North Atlantic Ocean Station network, and of (*b*) the introduction on 1st January 1976 of the new watchkeeping hours adopted by the International Telecommunication Union's World Maritime Administrative Radio Conference (WMARC) held in Geneva last year. Because recent surveys had indicated a deterioration in the number and timeliness of ships' weather reports received from the North Atlantic for the 0000 and 0600 GMT observation periods, and also considering the possible impact of the new watchkeeping hours arising from the WMARC revision of Article 25 of the ITU Radio Regulations, the Bucharest meeting decided to establish a special working group to study the problems and to make recommendations on remedial actions. Membership of this special group includes experts nominated by the United Kingdom, France, the German Federal Republic, Norway and the U.S.S.R.

## WWW and the GTS 1976–79

The Sixth Session of the WMO Commission for Basic Systems (CBS) held in Belgrade last year paid considerable attention to the objectives of the WWW plan for the period 1976–79, carried out a detailed review and recommended a number

of amendments and changes. The Global Telecommunication System, being one of the three basic components of the WWW programme, was seen as an evolving system which needs to be kept under periodic review and improvement so that it can be adapted to changing conditions, can meet new (increased) requirements, and can incorporate with advantage the latest technological developments. One of the main tasks of the WWW during the coming four-year period 1976–79 is to reach full implementation of the GTS. Another task is to expand the GTS facilities where necessary in order to provide the data-handling needs of other WMO programmes and also of international programmes established jointly by WMO and other international organizations. Of particular note in this area are the Global Atmospheric Research Programme (GARP) with emphasis on the First GARP Global Experiment (FGGE), the Integrated Global Ocean Station System (IGOSS) and the Earth Watch programme of the United Nations Environment Programme (UNEP).

The CBS proposed that 'every effort should be made by Members concerned' for further development and improvement of the GTS and this must affect national as well as international telecommunication facilities and services. There is, as already stated, a need to expand GTS facilities, and this could include introduction of higher transmission speeds and improved telecommunication procedures. A pointer has been given to the possible introduction of a transmission rate of 4,800 bits/s, particularly on main trunk segments where feasible and necessary. Increased reliability of circuits and centres, and the provision of effective back-up facilities for use in case of outages are important factors which have been re-emphasized. There can be little doubt about the future traffic-loading effects upon the GTS arising from meteorological satellite systems. And by no means last or least will be the need to meet the increased requirements of the WMCs and Regional Meteorological Centres for selective distribution of observational data and processed information to meet the requirements of national users.

The draft WWW Plan for the next four-year period recognizes that despite improving satellite technology, there is a continuing need for observations over the oceans from mobile ships. Members of WMO are encouraged to 'recruit all ships which may traverse the data-sparse areas' of the oceans, and to obtain installations of automatic observing and transmission equipment on mobile ships whenever possible. Action should be taken to aid the prompt and accurate transmission of ships' observational reports to meteorological centres.

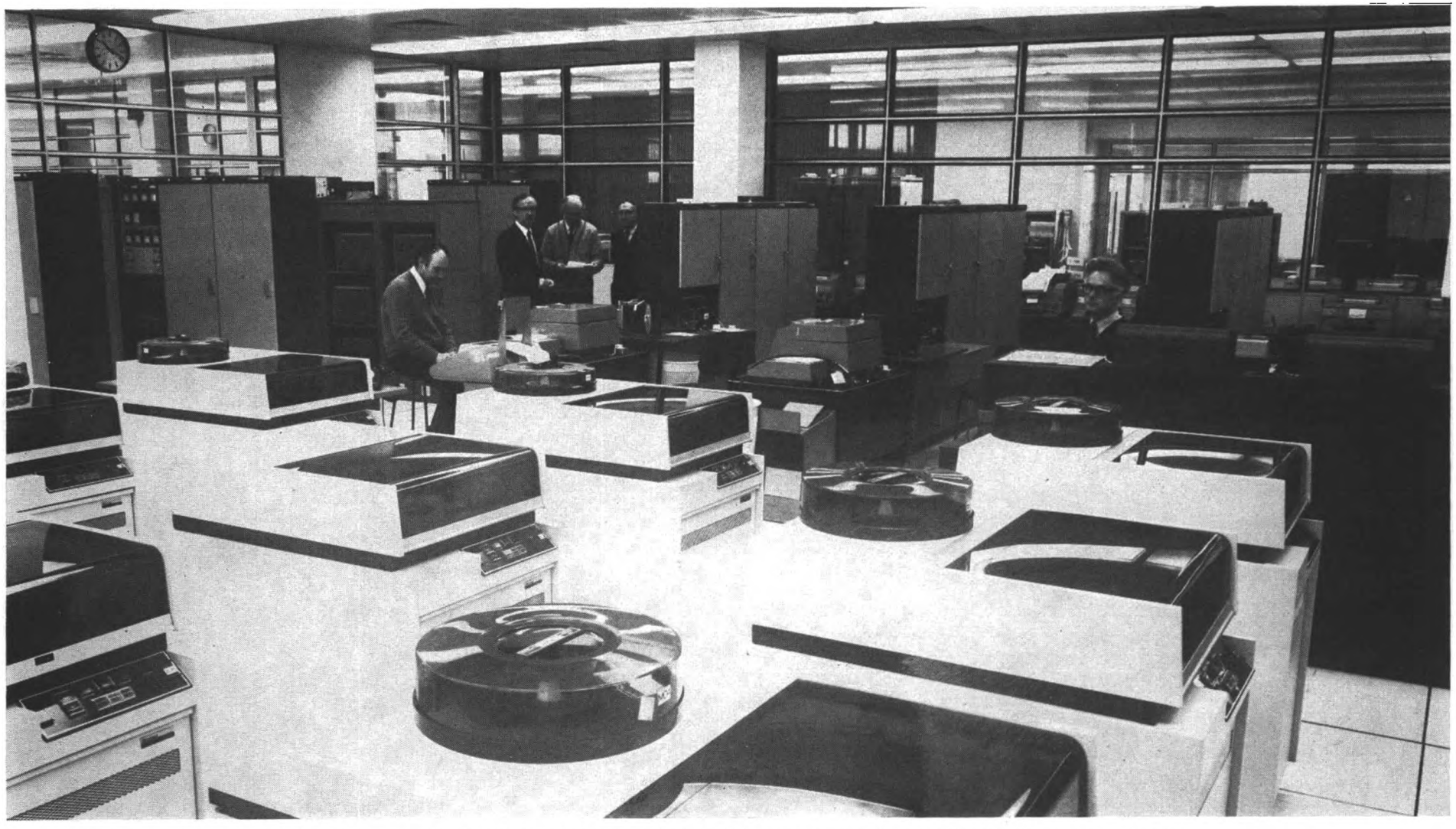
## Conclusion

Although the basic approach to the WWW concept is unchanged, some modifications have been desirable in order to take advantage of technological developments, and others necessary owing to growing demands for more information to be collected and exchanged accurately, reliably and within specified time linits. There seems little doubt that the demands placed upon the GTS by the WWW and other scientific programmes, for instance GARP and IGOSS, will exercise the minds of, and provide a challenge to, those concerned with meteorological telecommunications for many years to come.

ABBREVIATIONS USED IN THIS PAPER

| | |
|---|---|
| APT | Automatic picture transmission (Satellite) |
| CBS | Commission for Basic Systems |
| CFO | Central Forecasting Office |
| FGGE | First GARP Global Experiment |
| GARP | Global Atmospheric Research Programme |
| GDPS | Global Data Processing System |
| GOS | Global Observing System |
| GTS | Global Telecommunication System |

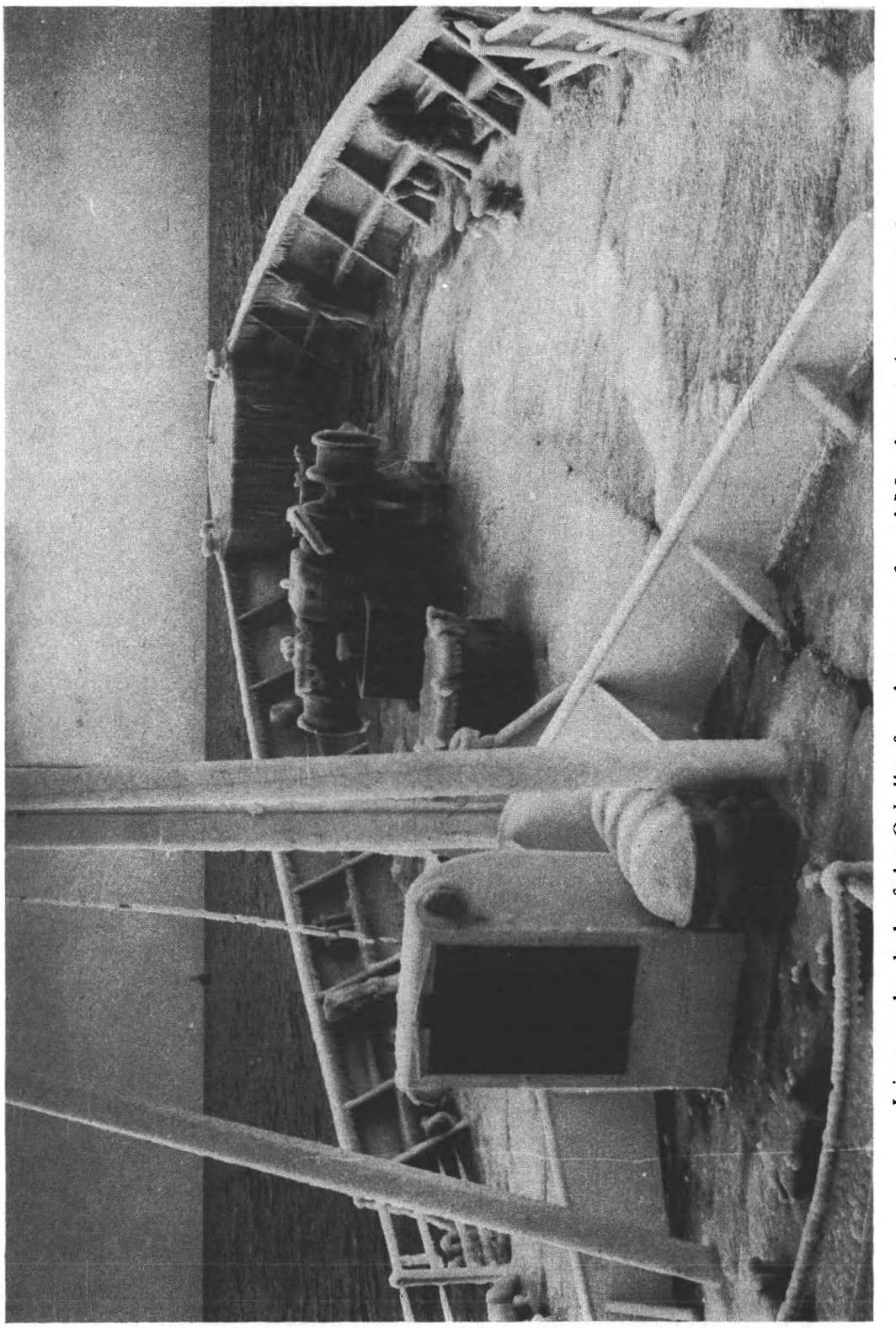
| | |
|---|---|
| HF | High Frequency |
| IGOSS | Integrated Global Ocean Station System |
| ITU | International Telecommunication Union |
| MTC | Main Trunk Circuit |
| NMC | National Meteorological Centre |
| NOAA | National Oceanic and Atmospheric Administration |
| OWS | Ocean Weather Service |
| RTH | Regional Telecommunication Hub |
| RTT | Radio-teleprinter (teletype) |
| SR | Scanning Radiometer (Satellite) |
| UNEP | United Nations Environment Programme |
| WMC | World Meteorological Centre |
| WMO | World Meteorological Organization |
| WMARC | World Maritime Administrative Radio Conference |
| WWW | World Weather Watch |



The automated complex of the Regional Telecommunication Hub (RTH) at Bracknell
(*see* page 172).

(*Opposite page* 176)

(*Opposite page* 177)



Icing on the deck of the *Othello* after the storm of 23rd March 1973 (*see* page 177).

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# The Frequency of Weather Conditions favourable for Ship Spray Icing on the Seas round Iceland during the 1972–73 Winter

By D. J. George
(Meteorological Office)

During the 1972–73 winter the trawler support ships *Miranda*, *Othello* and *Ranger Briseis* (the latter now renamed *Hausa*) provided support services to British trawlers fishing off Iceland; as had been the practice during every winter since 1968–69, Meteorological Office forecasters served aboard a support ship for spells of from five to seven weeks. A general account of this service is given by Smith,[1] Bannister[2] and George.[3] An important part of this service was the provision of a weather advisory service, with special emphasis on warnings of storms and icing in the north-west Iceland area.

Ship icing occurs when air temperatures are below the freezing point of sea-water (−1·8°C for water of salinity 34‰) and winds of Beaufort Force 5 or more cause spray, generated by the ship's motion against the waves and also blown from the wave crests, to freeze on the ship's hull and superstructure. The icing is often enhanced by driving snow and by rime from Arctic sea smoke. Under extreme conditions of very low air and sea temperatures and winds of storm to hurricane force very severe icing can build up at the rate of several centimetres per hour, and this had led in the past to many disasters to fishing vessels operating off the cold land and ice masses in winter.

The writer's first voyage to Arctic waters commenced on 19th March 1973 when he joined the chartered stern freezer trawler *Othello* (1,500 tons), under the command of the lively and experienced trawler skipper Neville Beavers, leaving Hull for north-west Iceland. After a passage with winds varying from Force 3 to 8 the *Othello* arrived on 23rd March off south-west Iceland, where the departing support ship *Miranda* (with meteorologist Russell Johnson on board) handed over support duties to the *Othello*.

Although the writer had travelled between the Falkland Islands, South Georgia, and Graham Land (Antarctic Peninsula) during summer seasons aboard the R.R.S. *John Biscoe* (800 tons) and had spent two winters at Antarctic land stations, no ship icing had been experienced. An introduction to Arctic ship icing was soon forthcoming, however. As the *Othello* steamed northwards off west Iceland the wind veered and increased to north-east, Force 7 to 8, and the air temperature fell alarmingly from −1 to −8°C. By the time the *Othello* had joined the trawlers in shelter in north-west Iceland next day, the ship was covered in ice to a thickness of 7½ centimetres on the hull and 2½ to 5 centimetres on the superstructure (*see* photograph on opposite page), much of which was removed with steam hoses and hand axes. After four days of fine weather another deep depression moved across north-west Iceland, bringing in its wake north to north-east winds of Force 8 to 10 and air temperatures around −10°C with severe icing, which again drove all trawlers into the fjords for shelter for two days. As late as 27th April a northerly storm produced low temperatures and moderate to severe icing off north-east and east Iceland. After completing the tour of duty on the *Miranda* and returning to Hull in May 1973, an investigation was made of the frequency of weather conducive to ship spray icing off Iceland during the previous winter according to day, month and location, in order that the conditions during that winter could be looked at in their entirety and compared at a later date with previous and subsequent winters.

## Method of analysis

Although it would seem preferable to base an analysis of ship icing on actual reports of icing received from ships, in practice it is found that reports are distributed unevenly according to area and date because, for various reasons, fishing fleets have favoured particular areas at particular times, thus introducing a random geographical and seasonal bias into the results. Moreover, actual reports of icing may be systematically biased towards low intensities because, on receiving warnings of moderate or severe icing, trawlers if possible make for areas less likely to be affected by icing and continue fishing there, or take shelter until the danger is over. The intensity of icing experienced by a ship also depends to some extent on the ship's course and speed relative to the waves, on the relative wind and on the ship's design and loading.

In order to avoid geographical, seasonal and qualitative bias it was decided to use the well-known ship icing diagrams by Dr. H. O. Mertins[4] (reproduced in the *Arctic Pilot*[5] and elsewhere [6, 7]) in conjunction with regular synoptic charts of weather in the north-east Atlantic area, to list days when spray icing was likely to have occurred ('spray icing days'). Mertin's diagrams are used successfully by forecasters and mariners for forecasting the incidence and severity of spray icing, using actual and forecast values of air temperature, wind speed and sea surface temperature, (although it is believed by some forecasters who have served on support ships off Iceland that Mertin's diagrams (based on icing experienced by German trawlers in that area) underestimate the severity of icing experienced by the smaller British side trawlers with low freeboard and much superstructure).

The routine 3-hourly synoptic charts prepared at the Central Forecasting Office at Bracknell (scale 1:4 million) which were used for the analysis, contain observations from ships and land stations in the Greenland–Jan Mayen–Faeroes–Iceland area, while charts of 5-day mean sea-surface temperature from the same source were used to assess sea-surface temperatures. Estimates of air temperature were made using available observations and allowing for advection over ice or open sea as appropriate. Estimates of surface winds were made using reported winds from ships and well-exposed land stations and by measuring the geostrophic winds, these being adjusted for curvature of the air trajectory, isallobaric effects and lapse rate according to standard forecasting practice. Spray icing days were listed for each fishing forecast area round Iceland for the months October to April, and are tabulated in Fig. 2, the winter's totals being shown in Fig. 1. It should be noted that although the limits of the three northern areas extend to 68°N, the analysis was confined to that part of each area south of 67°N. Trawlers do occasionally go north of 67°N in winter, but it was found when studying the synoptic charts that it was difficult on occasions to make reliable estimates of wind and air temperature because of the proximity of the ice edge.

## Monthly and geographical variation of probable spray icing days

Fig. 2 shows that the monthly variation of spray icing days was irregular, with a well-marked peak in February. There were 2 possible light icing days (in the north of north-west Iceland) in late October. In November there were 12 icing days, mostly light, with 4 moderate icing days, mainly in northern areas. December and January had remarkably few icing days—there were only 11 icing days in the two months, mainly light and confined to the northern areas. January is reputed to be the worst month for icing because, on average, the deepest depressions and stormiest weather with the coldest outbreaks of Arctic air occur in that month, and disasters involving British trawlers have occurred in January—two trawlers were lost in 1955, and three in 1968.

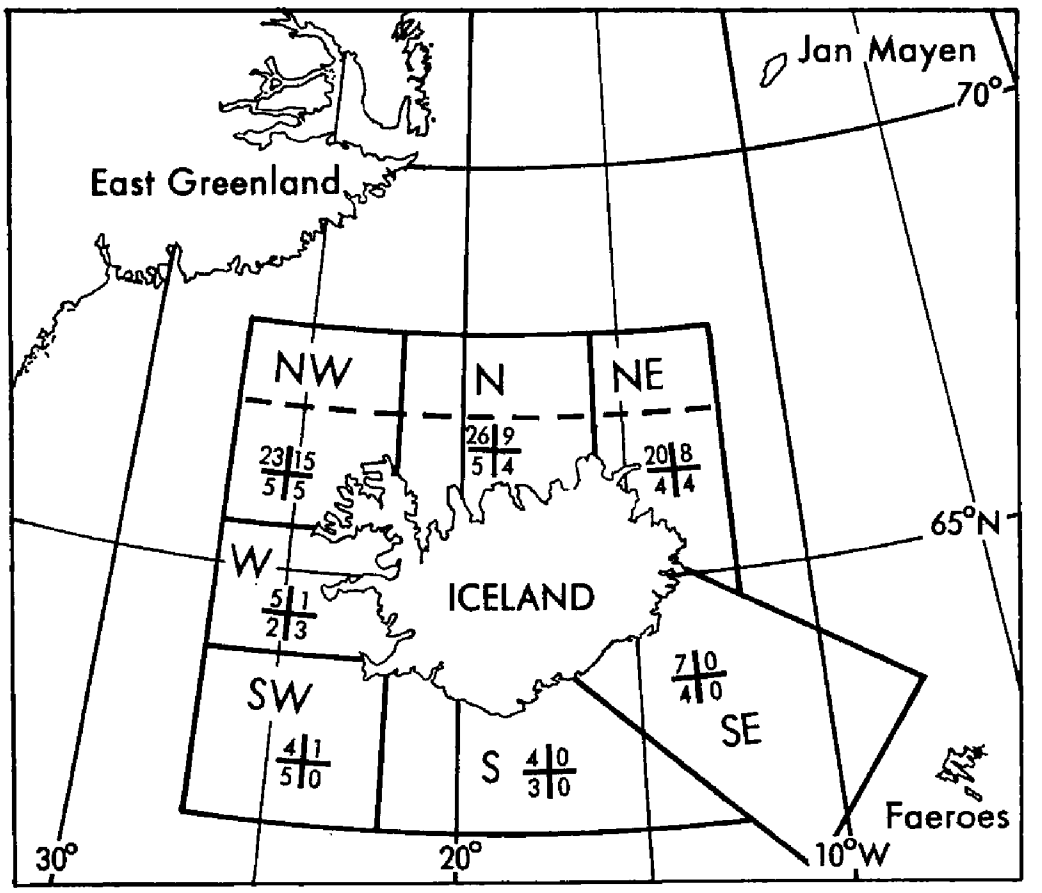


**Fig. 1. Trawler forecast areas round Iceland, with the total number of spray icing days during the period October 1972 to April 1973 inclusive.**

Intensity is shown thus:

| light | moderate |
|---|---|
| severe | very severe |

February was a bad month with 17 icing days, 6 days of which had probable severe or very severe icing, and although the northern areas suffered most, on 11th–14th February icing conditions affected all Icelandic areas, and—a relatively rare event—probably north Bailey and Faeroes too. The first half of March was free of icing days, and then two storms in the second half produced a total of 7 icing days, affecting all or nearly all areas on 4 days, some days being moderate icing days, and 2 with severe or very severe icing. The storms of late March continued into early April with severe icing in the eastern areas, then 3 days of light icing in the northern areas. The storm of late April affected the eastern areas, with severe icing in north-east Iceland.

It is evident that apart from the 11th to 14th February, other spells with significant icing were 23rd–24th February, 23rd–24th March, 29th March to 1st April and 27th–28th April—the last being notable for its lateness in the season.

The low frequency of icing days in December and January was due to the prevalence of mild and less windy weather caused by the passage of depressions to the north-west of Iceland or depressions becoming stationary in the Denmark Strait, cols over Iceland, or blocking highs in the east Atlantic–European sector.

It is apparent from Fig. 1 that the three northern areas were affected by icing more frequently than the others—48, 44 and 36 days for north-west, north and north-east Iceland respectively compared with between 7 and 11 icing days for the

| Area | Date | NOVEMBER 1972 | | | | | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| NW | | | | | | | | | L | L | | | | L | L | L | | M | L | M | L | | | | | | | M | L | | 11 |
| N | | | | | | | | | L | L | | | | L | L | L | | L | L | L | L | | | | | | | L | L | | 11 |
| NE | | | | | | | | | L | L | | | | L | M | L | | L | L | L | L | L | | | | | | L | L | | 12 |
| W | | | | | | | | | | | | | | | | | | | | L | | | | | | | | | | | 1 |
| SW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| SE | | | | | | | | | | | | | | | | | | | | | | L | | | | | | | | | 1 |

| Area | Date | DECEMBER 1972 | | | | | | | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | |
| NW | | | | L | L | | | | | | | M | | | | | | | | | | | | | | | | | | L | | 4 |
| N | | | | L | | L | L | L | | | | L | | | | | | | | | | | | | | | | | | | | 5 |
| NE | | | | | | L | L | L | | | | L | | | | | | | | | | | | | | | | | | | | 4 |
| W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| SW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| SE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |

| Area | Date | JANUARY 1973 | | | | | | | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | |
| NW | M | M | | | | | | | | | | | | | | | | | | | | | | | | | | | | M | L | 4 |
| N | M | M | | | | | | | | | | | | | | | | | | | | | | | | | | | | | L | 3 |
| NE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | L | 1 |
| W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| SW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| SE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |

**Fig. 2. Distribution of spray icing days according to day, month and area during the 1972–73 winter.** L = light; M = moderate; S = severe; V = very severe.

*Note.* There were two days with possible light spray icing in the north-west Iceland area on 26th and 27th October.

other areas. Latitude and perhaps proximity to the ice edge are obviously important factors. North-west Iceland justified its reputation for being the worst area for icing—during the period December 1972 to April 1973 there were 33 icing days (out of 151 days), while in the bad winter of 1967–68, when the ice edge was close to the north-west peninsula, there were an estimated number of 45 icing days—

| Area | Date | FEBRUARY 1973 | | | | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | |
| NW | | | | M | M | M | | M | | L | S | V | V | V | | | L | M | M | | | | S | S | | | L | | 15 |
| N | | | | L | L | M | | | M | L | S | V | V | V | | | | M | M | | | L | S | S | | | L | | 15 |
| NE | | | | | | M | | | M | L | S | V | V | V | | | | M | M | | | | S | S | | | L | | 12 |
| W | | | | | | | | | | | S | V | V | V | | | | L | L | | | | | | | | | | 6 |
| SW | | | | | | | | | | | S | S | S | S | | | | L | L | | | | | | | | | | 6 |
| S | | | | | | | | | | | | S | S | S | | | | | | | | | | | | | | | 3 |
| SE | | | | | | | | | | L | | S | S | S | | | | | | | | | | | | | | | 4 |

| Area | Date | MARCH 1973 | | | | | | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | |
| NW | | | | | | | | | | | | | | | | | | | | | L | L | L | M | | | | | S | S | M | 7 |
| N | | | | | | | | | | | | | | | | | | | | | L | | M | M | | | | | S | V | M | 6 |
| NE | | | | | | | | | | | | | | | | | | | | | L | | M | M | | | | | S | V | M | 6 |
| W | | | | | | | | | | | | | | | | | | | | | | | M | L | | | | | S | L | | 4 |
| SW | | | | | | | | | | | | | | | | | | | | | | | M | L | | | | | S | L | | 4 |
| S | | | | | | | | | | | | | | | | | | | | | | | | L | | | | | | L | | 2 |
| SE | | | | | | | | | | | | | | | | | | | | | | | | L | | | | | | L | | 2 |

| Area | Date | APRIL 1973 | | | | | | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| NW | | | L | | L | L | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| N | S | | L | | L | L | | | | | | | | | | | | | | | | | | | | | | | | | 4 |
| NE | S | | | | L | | | | | | | | | | | | | | | | | | | | | | S | L | | | 4 |
| W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| SW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| S | | | | | | | | | | | | | | | | | | | | | | | | | | | L | L | | | 2 |
| SE | S | L | | | | | | | | | | | | | | | | | | | | | | | | | L | L | | | 4 |

**Fig. 2**—*continued*

nearly one day in three. (This total does not allow for the fact that many of the icing days in 1967–68 were hypothetical in the sense that although the atmospheric conditions were favourable, blowing spray would be reduced or non-existent due to the sea ice covering much of the north-west area.) The position of the ice edge during the 1972–73 winter was a little further north than normal, especially early and late in the season, as can be seen from Figs. 3–5.

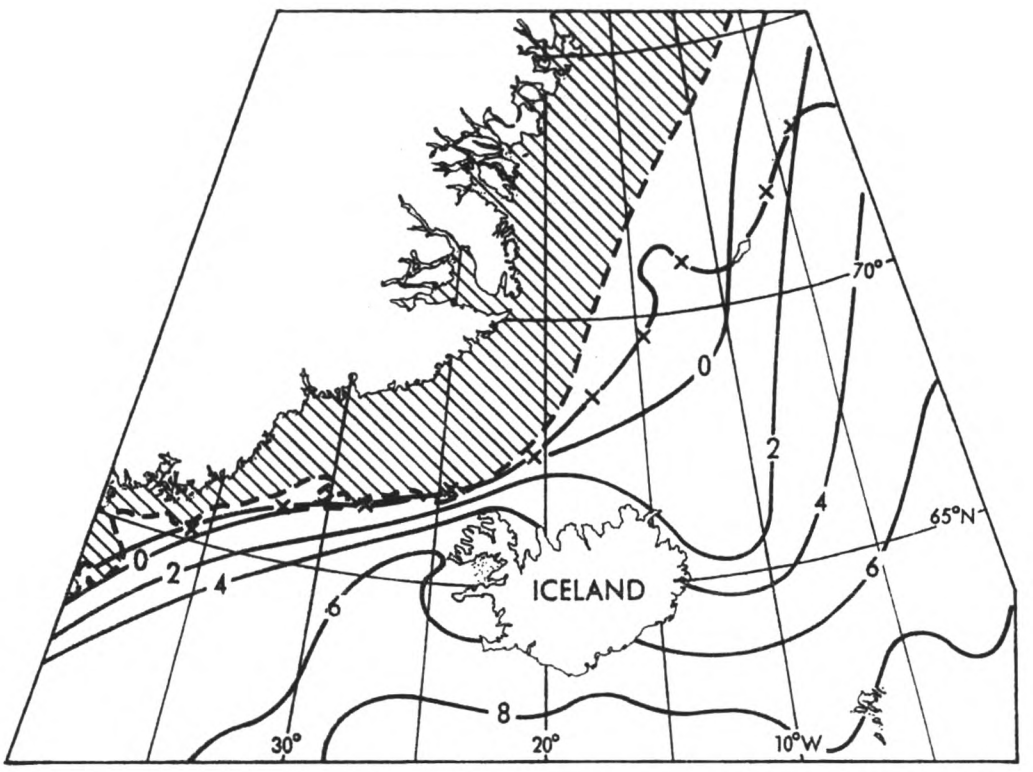


**Fig. 3. Five-day mean sea surface temperature isotherms (solid lines labelled in °C), and position of > 4/10 sea ice (hatched) at the end of November 1972.** The mean position of >4/10 sea ice at the end of November, based on the most recently available satellite and conventional observations over the period 1966–73, is shown (x – x – x).

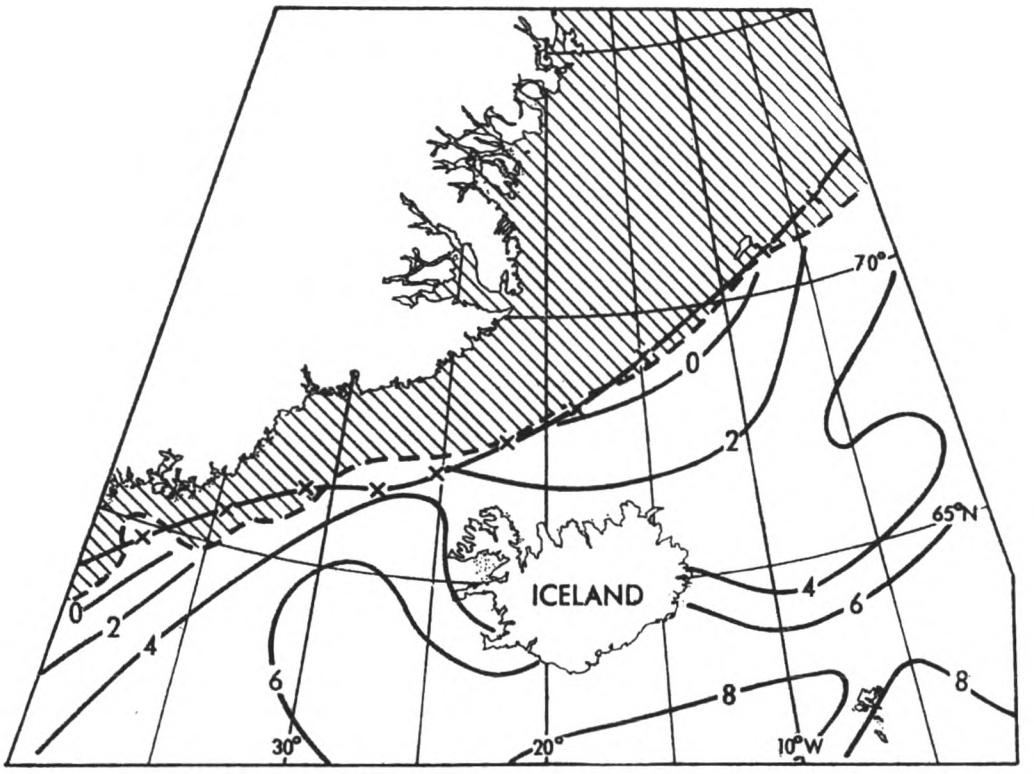


**Fig. 4. Five-day mean sea surface temperature isotherms (solid lines labelled in °C), and position of >4/10 sea ice (hatched) in mid February 1973.** The mean position of >4/10 sea ice at the end of February, based on the most recently available satellite and conventional observations over the period 1966–73, is shown (x – x – x).

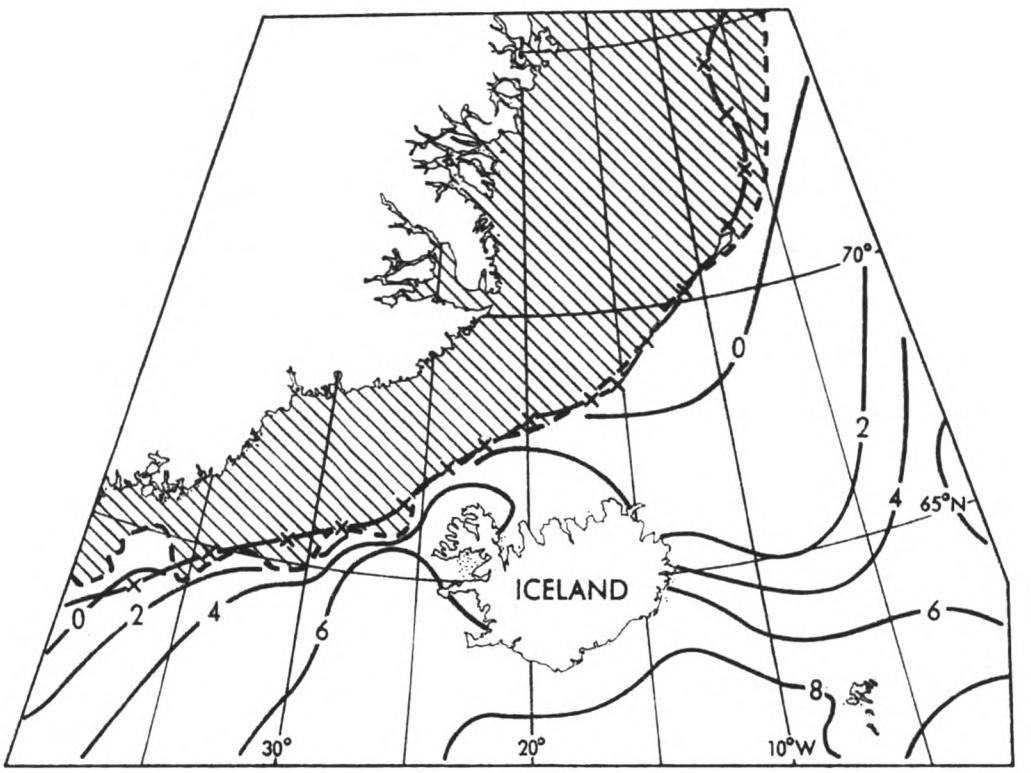


**Fig. 5. Five-day mean sea surface temperature isotherms (solid lines labelled in °C), and position of >4/10 sea ice (hatched) at the end of April 1973.** The mean position of >4/10 sea ice at the end of April, based on the most recently available satellite and conventional observations over the period 1966–73, is shown (x – x – x).

The spray icing estimates for 1972–73 compare well with charts showing the probability of ship icing in the northern hemisphere by Dunbar,[8] based on a 10 per cent frequency of air temperature below 0°C, combined with a wind speed of 17 knots and over. In November the edge of the 1 per cent icing zone extends to 65–65½°N over Iceland, and in January–March from 60°N 35°W to the Westmann Islands to 63°N 00°. As she says, the criterion of 10 per cent frequency of air temperature below 0°C is not an ideal one, and icing does occur, but rarely, south of this line.

## Total icing days in relation to monthly anomalies of pressure, wind, air and sea temperatures and sea-ice cover

Monthly charts are published in *The Marine Observer* showing the anomalies (departures from the long-term average) of pressure, wind directions (based on isobars of the pressure anomaly, and applying Buys Ballot's law), air and sea temperatures, and sea-ice cover. Sanderson[9] has shown that the excess or deficit of sea ice to the north and north-west of Iceland is associated with the presence or absence of a northerly wind anomaly, and a negative air-temperature anomaly. Table 1 shows how the monthly total icing days for all areas compare with the various anomalies for winter 1972–73.[10, 11, 12] It can be seen that northerly wind anomalies occurred in November and February, with a marked negative air-temperature anomaly in February, when icing days were most frequent. A southerly wind anomaly and positive air-temperature anomaly occurred in December and January, when icing days were fewer than usual.

## Conclusions

Study of the monthly frequency tables of probable spray icing days show that during the 1972–73 winter February was the worst month for icing, with relatively

**Table 1. Total monthly spray icing days off Iceland during the 1972–73 winter, in relation to anomalies of geostrophic wind, air and sea surface temperatures, and sea ice**

| Month | Total spray icing days, all areas | Pressure anomaly | Geostrophic wind direction anomaly | Air temperature anomaly | Sea surface temperature anomaly | Sea ice cover (> 4/10) at end of month compared with 1911–52 normal | Remarks |
|---|---|---|---|---|---|---|---|
| | | *mb* | | *degC* | *degC* | | |
| OCTOBER 1972 | 2 | — | — | — | — | A little less than normal to WNW of north-west Iceland and a little over normal to N of north-west Iceland | 2 icing days late in October in north-west area |
| NOVEMBER | 12 mostly light but 3 moderate in south-west or north-east | −10 in west Norway, −6 in east Iceland, and −3 in west Iceland | Northerly | −2 Cape Farewell to 30°W, +4 north-east Greenland, small over Iceland | Zero | 18 km SE of normal at end of November in Denmark Strait | |
| DECEMBER | 7 | −10 to −12 | South to East | 0 to +1 | A little colder than normal, up to 1 deg in west and south-west Iceland | Normal | All cases in three northern areas |
| JANUARY 1973 | 4 | −3 in east Iceland, −8 in west Iceland, −16 off Cape Farewell (centre) | SSW | +4 in north Iceland | A little colder to SW and a little warmer to E of Iceland | 18 to 37 km less than normal in Denmark Strait | All cases in three northern areas |
| FEBRUARY | 17 | −8 to −10 Iceland, −14 north-west Norway | NNE over north Iceland WNW over south Iceland | −6 in Jan Mayen, −2 in south Iceland, −4 in north and east Iceland | Negligible | Normal to NW, a little less to N of Iceland, extension to east of normal N of Jan Mayen | 4 days with very severe or severe icing in all or nearly all areas (11th–14th) |
| MARCH | 7 | −8 in Denmark Strait and north-west Iceland, −4 in south-east Iceland | SW | Zero | +1 to NE of Iceland | Normal | |
| APRIL | 6 | +7 in north-east Iceland, +11 in south-west Iceland, +16 at 58°N, 25°W | SE | −2 in Jan Mayen, to 68°N, but zero over Iceland, except north-east Iceland where −1 | −1 to SW of Iceland | 37 to 55 km greater than normal to NW and N of Iceland | Late storms in east and north-east areas 27th–28th |

little in the midwinter months of December and January because of unsuitable synoptic situations. There were a few notable icing days in March and late April.

A qualitative relationship between the frequency of spray icing days and published anomalies of pressure, wind, air and sea-surface temperatures, and sea-ice edge has been shown. This method may be useful for estimating icing severities in past winters where anomalies are available, but observations of icing are lacking. The frequency of spray icing days between 67° and 68°N may be 10–20 per cent higher than the given estimates for the three northern areas (south of 67°N).

It was found from a study of the synoptic charts that the situations favourable for icing are as follows:

(1) Deepening depressions moving north-east to the south of Iceland, or over Iceland (usually across the narrow peninsula separating Breidifjord from Hunafloi).
(2) Build-up of pressure over north-east Greenland.
(3) The duration of spray icing situations may be short with fast-moving depressions which move past Iceland and towards Norway followed by a col or weak ridge of high pressure, but may be prolonged with depressions becoming slow moving or retrograde off Norway and becoming rejuvenated, in conjunction with a build-up of pressure over north-east Greenland.

The degree of intensification of the east Greenland anticyclone is of paramount importance, as in its absence winds in the rear of a depression may only reach Force 8 with reduced spray intensity, whereas with building of pressure over east Greenland winds over the Denmark Straits may reach Force 10 or more, with very severe icing.

In storm-force northerly winds advection of cold air is so rapid that the effect of warmer seas on the air temperature is small (particularly if associated with a cold pool) and spray icing may be experienced even as far south as 61°–63°N.

The worst winters for spray icing in the northern areas are probably associated with an ice edge lying north-east to south-west some 100 to 300 km north of Iceland. When the ice edge is close to the north coast of Iceland, spray icing may be reduced in the northern areas owing to short sea fetch and reduced wave height, while spray icing may be worse off west and north-east Iceland.

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## PRESENTATION OF BAROGRAPH

Efforts to get the four recipients of Annual Barograph Awards together in Bracknell each year are seldom successful. As readers of the July 1975 edition are aware, barographs were presented to three of the shipmasters selected for the 1973 awards earlier this year, but CAPTAIN J. H. B. WESTON of P. & O. was unable to be present.

Captain Weston's ship the *Strathnairn* was in Millwall Docks, London, on 25th April and P. & O. General Cargo Division were kind enough to invite some senior officers of the Meteorological Office on board to make the presentation and later to lunch.

It is now many years since a presentation was made to a Master on his own ship and this occasion was welcomed very much by those who attended from the Meteorological Office. Mr. J. K. Bannon, Director of Services, when making the presentation, thanked Captain Weston for his valuable work in contributing meteorological observations to the Office.

A photograph of the presentation appears opposite page 189.

G. A. W.

## INDIAN EXCELLENT AWARDS

(From the Deputy Director-General of Observatories (Forecasting), India)

The year 1973–74 has been yet another year of active co-operation between the ships of the Indian Voluntary Observing Fleet (V.O.F.) and the India Meteorological Department for collecting meteorological information from the high seas. Year by year the ships traversing the oceans have a greater part to play in their contribution to the progress of science. While the Department appreciates the valuable meteorological work done by ships, we also look forward to more co-operation in the collection of more and more data from the oceans. The international community is already engaged in serious thought for developing a co-ordinated Marine Pollution monitoring programme. The ships would eventually be called upon to make visual observations and reporting of oil slicks, particularly on the main oil-tanker routes. Their co-operation would also be welcome for affording facilities for (*i*) making upper-air observations, (*ii*) sub-surface temperature measurement, (*iii*) collection of sea water samples, (*iv*) measurement of rainfall.

During the year ending 31st March 1974, 14 new ships were added to the strength of the Indian V.O.F. and 8 ships were decommissioned. At the end of the year, there were 215 ships on the V.O.F. list, consisting of 42 Selected Ships, 144 Supplementary Ships and 29 Auxiliary Ships. These ships rendered commendable service by recording and reporting valuable meteorological observations from their routes. Meteorological logs received from these ships during the year contained 23,682 meteorological observations.

This Department undertakes periodical studies of the in-transit delays of the weather messages from the ships to the coastal radio station and to the forecasting offices and takes remedial measures to eliminate delays, whenever possible, since such observations provide information on real-time basis, for forecasting purposes. Special encouragement is given to those of our ships which send crucial observations, in particular when a depression or a cyclonic storm is in its formative stage or when it is intensifying into a severe cyclonic storm. Due recognition is also given to other ships which transmit such important and very useful observations even though they do not belong to our V.O.F.

The meteorological work of the ships of the Indian V.O.F. during 1973–74 has been assessed, taking into account the quality and quantity of observations and also the percentage of recorded observations which have been actually transmitted to coastal radio stations. Allowance has been given to individual ships for the actual number of days spent at sea. The number of ships so selected to receive Excellent

Awards in the form of books is 15 while another 15 ships will receive Certificates of Merit. The captains and other officers who have served for at least six months on board these ships during 1973–74 are awarded the books/certificates. The names of these ships are given below.

| Name of Vessel | Owner |
|---|---|
| *State of Haryana* .. | .. Shipping Corporation of India Ltd. |
| *Vishva Prayas* .. | .. Shipping Corporation of India Ltd. |
| *Devaraya* .. .. | .. Shipping Corporation of India Ltd. |
| *State of Tamilnadu* | .. Shipping Corporation of India Ltd. |
| *Vishva Sandesh* .. | .. Shipping Corporation of India Ltd. |
| *Jalagirija* .. .. | .. Scindia Steam Navigation Co. Ltd. |
| *Jalagomati* .. | .. Scindia Steam Navigation Co. Ltd. |
| *Jalavikram* .. .. | .. Scindia Steam Navigation Co. Ltd. |
| *Jag Anand* .. .. | .. Great Eastern Shipping Co. Ltd. |
| *Jag Manek* .. .. | .. Great Eastern Shipping Co. Ltd. |
| *Satya Kamal* .. | .. Seven Seas Shipping Co. |
| *Dumra* .. .. | .. Damodar Bulk Carriers |
| *Indian Security* .. | .. India Steamship Co. Ltd. |
| *Indian Splendour* .. | .. India Steamship Co. Ltd. |
| *Mozaffari* .. .. | .. Mogul Line Ltd. |

The Excellent Awards were distributed at the National Maritime Day Function at Bombay on 5th April 1975. The Certificates of Merit for the following ships were handed over to the appropriate shipping companies for onward transmission:

| | | |
|---|---|---|
| *Vishva Jyoti* | *Vishva Mangal* | *Jalamatsya* |
| *Vishva Tej* | *State of Maharashtra* | *Jalagouri* |
| *Vishva Seva* | *Baranni* | *Jag Jawan* |
| *Vishva Dharma* | *Jawaharlal Nehru* | *Jag Kisan* |
| *Vishva Raksha* | *Jalajawahar* | *Indian Renown* |

## NON-MAGNETIC SCHOONER 'ZARYA' ON NEW RESEARCH VOYAGE

The three-masted non-magnetic schooner *Zarya* (Dawn) left Leningrad on 27th May, flying the flag of the U.S.S.R. Academy of Sciences, on her 16th research cruise, the purpose of which was the study of the magnetic field of the north-east Atlantic and the seas washing the shores of Europe.

This cruise opened a new page in the research history of the *Zarya*, said Professor Mikhail Ivanov, scientific director of the expedition. The schooner, which has served for more than 20 years, has been completely reconstructed and equipped with the latest instruments, enabling her once again to sail on the high seas. A radical streamlining of the ship was undertaken at the request of the scientists, who were reluctant to part with the schooner.

Professor Ivanov recalled that the ship, launched in 1952, has a registered displacement of 580 tons and sail area of 730 square metres. She does not have a single iron object on board. Her hull is built of pine and spruce, while the metal parts from engine to anchor are made of brass and bronze alloys or non-magnetic steels. During her previous 15 cruises, including several voyages round the world, she has logged hundreds of thousands of miles. Soviet scientific expeditions explored more than half a million kilometres of magnetic profiles throughout the world ocean.

These data make up the basis of the latest navigation charts, and have helped to decipher the structure of the sea bottom and discover a whole number of abyssal mountain ranges and rifts. In the Baltic, for example, observations from the *Zarya* led to the discovery of a broad belt of oil- and gas-bearing structures off the shores of the U.S.S.R., Poland and the German Democratic Republic.

During the current cruise the scientists will investigate the variations in the earth's magnetic field and its anomalies in the Baltic Sea, and the Atlantic Ocean, the Mediterranean and the Black Sea.

*Editor's note.* We are grateful to the Novosti Press Agency (APN), London, for permission to publish this Bulletin from the Novosti Information Service, Moscow.

## ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM APRIL TO JUNE 1975

The charts on pages 190 to 192 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: Eurasian sector, all data up to 1956, North American sector, 1952–56 (for north of 68°N)[1] and all data up to 1963 (for south of 68°N).[2] Surface pressure: 1951–66.[3] Air temperature: 1951–60.[4] Sea-surface temperature: area north of 68°N, 1854–1914 and 1920–50,[5] area south of 68°N, 1854–1958.[6]

### April

Ice remaining in the Gulf of St. Lawrence at the beginning of the month soon cleared. With the anomalies for cold north-westerly winds over Davis Strait, the retreat of the ice edge, to be expected at this time of year, was delayed and by the end of the month an excess of ice beyond normal had succeeded the deficit of the previous month. South-east of Greenland, the previous ice deficit was extended to the north-east towards the Denmark Strait with an anomaly for south-westerly winds. In the vicinity of Jan Mayen, however, north-westerly anomalous flow encouraged movement of the ice beyond its normal position. The large deficits of ice over the Baltic and Barents Seas, which had been the most consistent feature of the ice season, persisted.

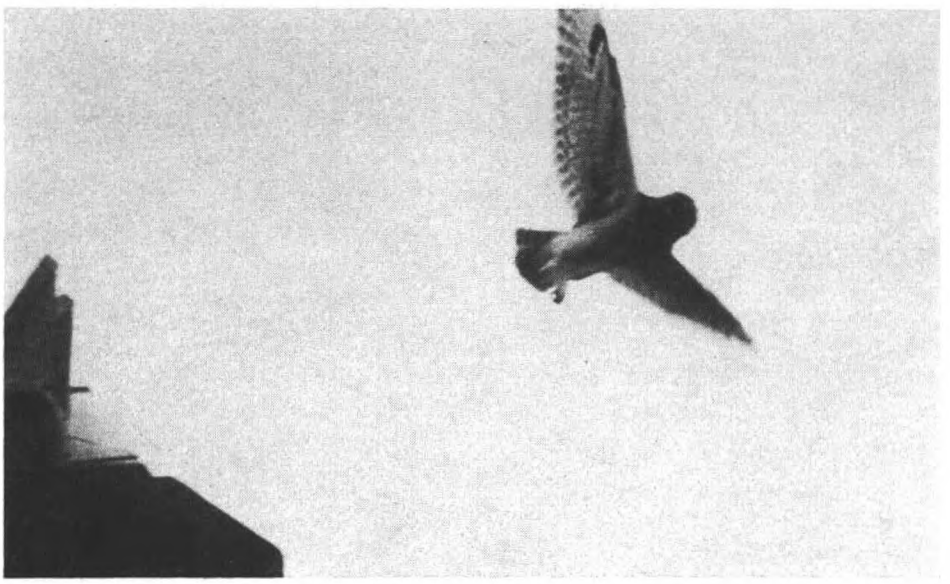
### May

The initial break-up of ice in Hudson Bay took place on the eastern side instead of on the western side (as happens more often) owing to an anomaly for south-easterly winds. The melting of ice near northern Newfoundland was rather slower than usual but over Davis Strait the retreat of the ice edge was resumed and indeed there was a deficit by the end of the month which is not readily explained by the weak anomalies of temperature and wind. The divergence of the anomalous wind flow towards south-east Greenland spread ice to the north-east, giving an excess around Jan Mayen, and to the west, around Cap Farvel. The deficit of ice persisted in the Barents Sea. The Baltic cleared of ice completely during the month.

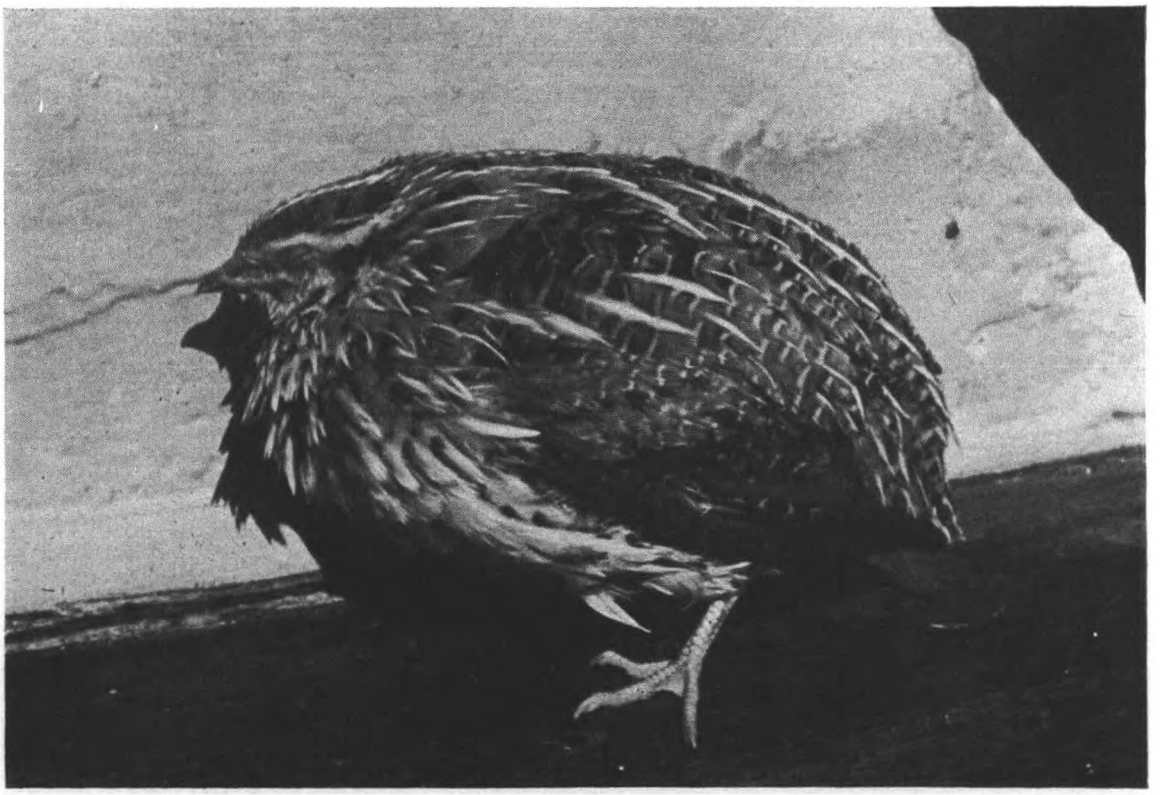
### June

With the anomaly for south-easterly winds and warmer air than normal, the break up of ice in Hudson Bay and Straits continued from the eastern and southern sides and was somewhat ahead of normal at the end of the month. The retreat of the ice from Newfoundland and along the coast of Labrador was still a little slower than usual and further north towards Davis Strait there was also a slight excess. However, in Baffin Bay, the break-up was progressing quickly, helped a little by the slightly higher-than-normal temperatures. The excess of ice to the west of Jan Mayen was still in evidence, but to the north of Jan Mayen and to the

(*Opposite page* 188)



The owl seen on board the *Manchester Concept* (*see* page 162).



The quail found on board the *Hadra* (*see* page 162).

*Opposite page* 189)

Mr. J. C. Matheson (right) the recently retired Port Meteorological Officer, London, handing over to his successor, Captain R. C. Cameron (*see* page 197).

Captain J. H. B. Weston (right) receiving his barograph from Mr. J. K. Bannon (*see* page 186).

west of Iceland there were deficits. The large deficit of ice in the Barents Sea was maintained. There were less than the normal number of icebergs reported off Newfoundland generally, though a count in the vicinity of Belle Isle Strait showed rather more than 200 icebergs.

P. A.

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## Baltic Ice Summary: April–June 1975

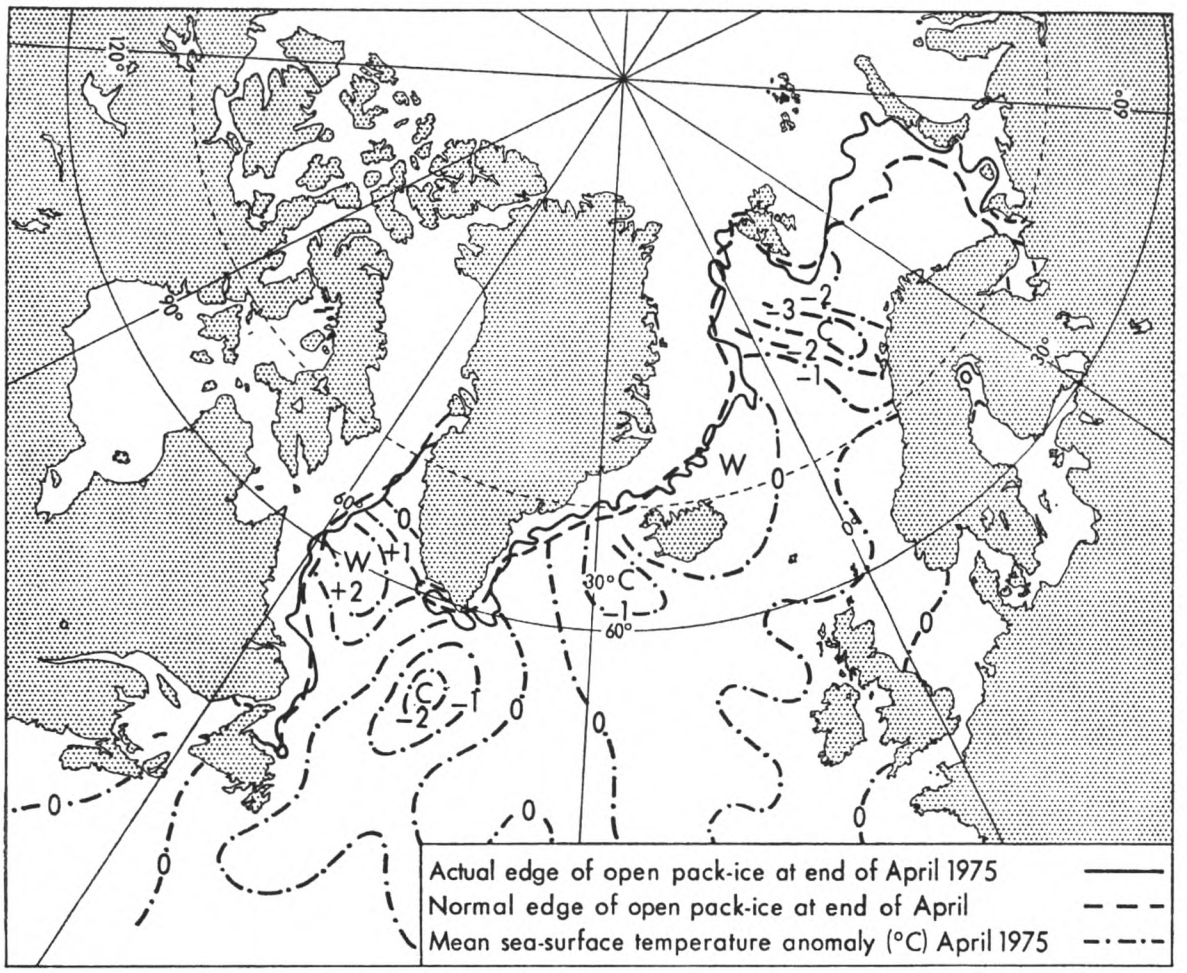
No ice was reported at the following stations during the period: Riga, Klaipeda, Ventspils, Tallin, Helsinki, Mariehamn, Turku, Mantyluoto, Vaasa, Bredskar, Sundsvall, Kalmar, Göteborg, Visby, Emden, Lübeck, Hamburg, Bremerhaven, Kiel, Flensburg, Stettin, Gdansk, Stralsund, Rostock, Aarhus, Copenhagen, Oslo, Kristiansandfjord.

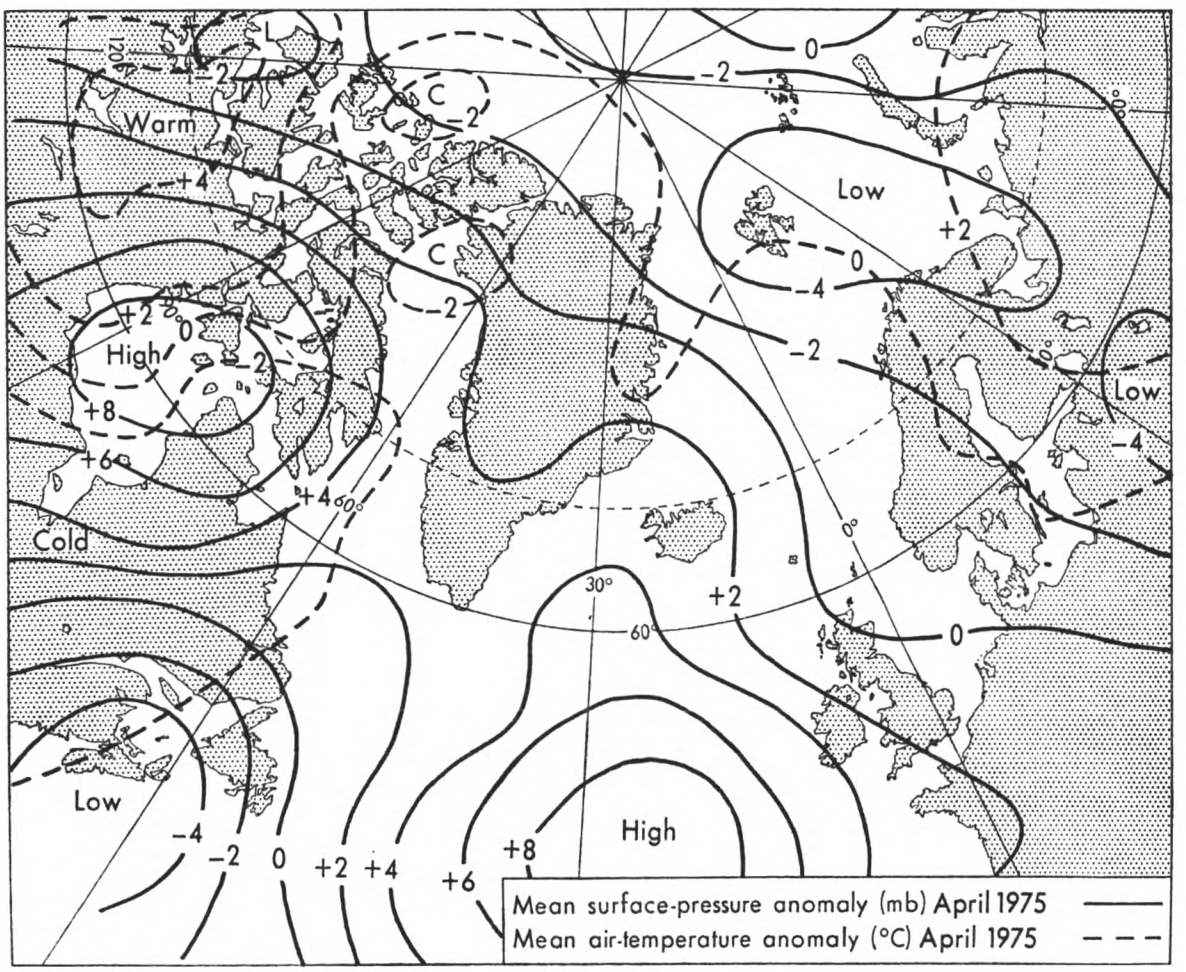
No ice was reported at any of the stations during June.

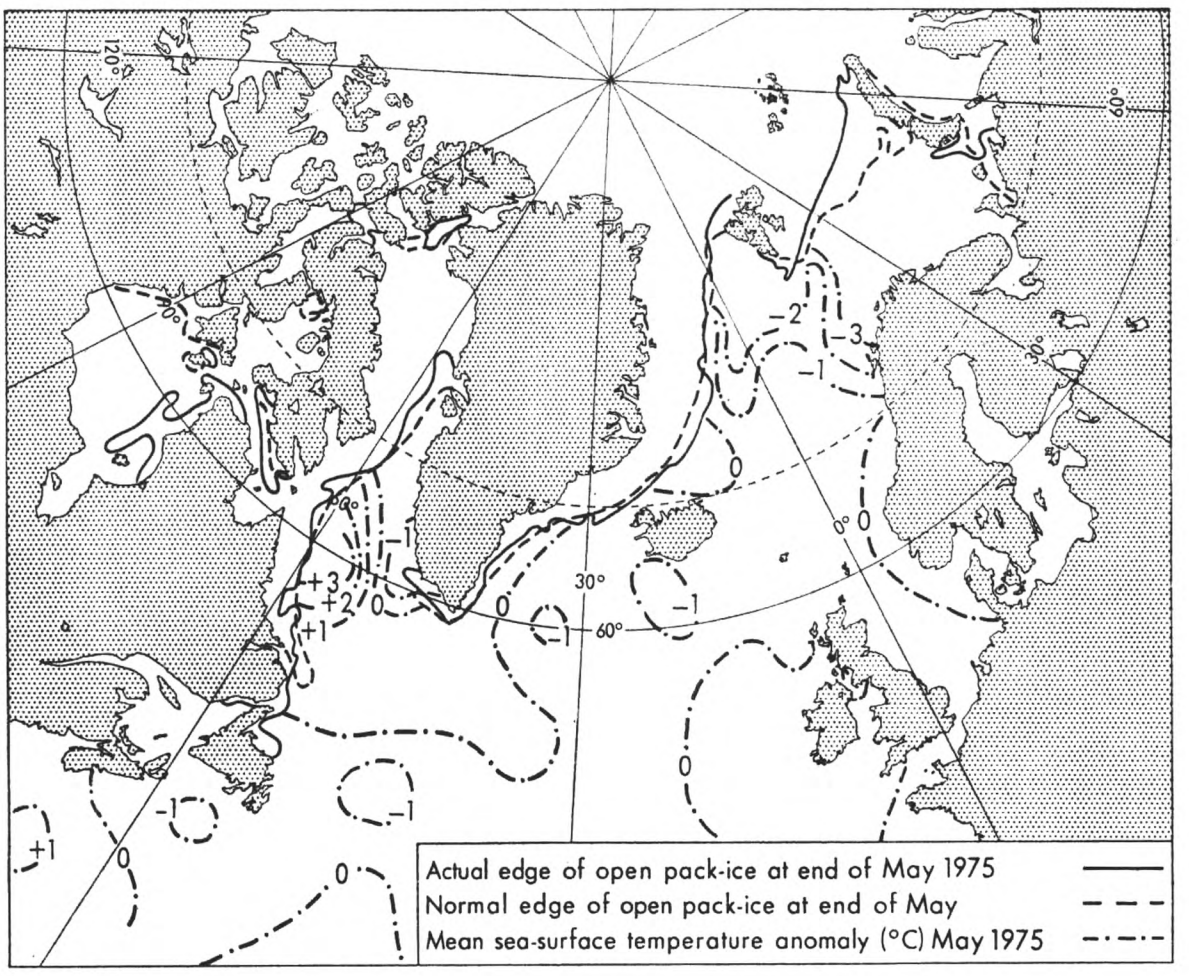
| Station | April | | | | | | | | | May | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Length of Season | | Ice Days | | | Navigation Conditions | | | Accumulated Degree Days | Length of Season | | Ice Days | | | Navigation Conditions | | | Accumulated Degree Days |
| | A | B | C | D | E | F | G | H | I | A | B | C | D | E | F | G | H | I |
| Leningrad .. | 1 | 5 | 5 | 0 | 0 | 4 | 0 | 0 | 167 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — |
| Pyarnu .. | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — |
| Viborg .. | 1 | 18 | 18 | 12 | 6 | 1 | 15 | 0 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — |
| Oulu .. | 1 | 30 | 30 | 27 | 0 | 0 | 30 | 0 | — | 1 | 13 | 4 | 0 | 0 | 0 | 13 | 0 | — |
| Roytaa .. | 1 | 30 | 27 | 0 | 24 | 0 | 26 | 0 | — | 1 | 19 | 19 | 0 | 18 | 0 | 18 | 0 | — |
| Luleå .. | 1 | 30 | 30 | 30 | 0 | 6 | 24 | 0 | 27 | 1 | 6 | 6 | 3 | 0 | 3 | 0 | 0 | 275 |
| Skellefteå .. | 1 | 15 | 0 | 0 | 0 | 0 | 12 | 0 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — |
| Stockholm .. | 1 | 22 | 22 | 0 | 0 | 21 | 0 | 0 | 141 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — |

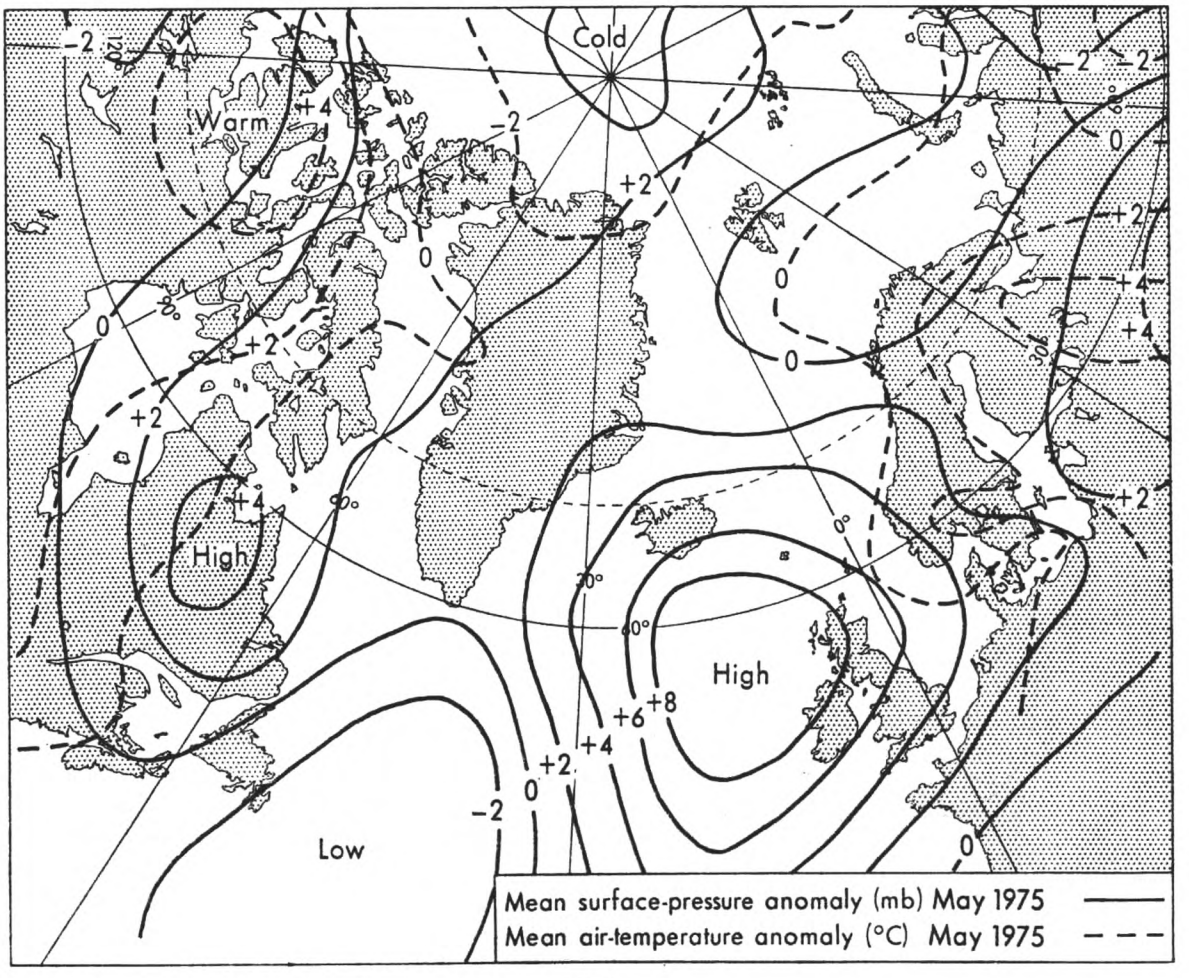
CODE:
A First day ice reported.
B Last day ice reported.
C No. of days that ice was reported.
D No. of days continuous land-fast ice.
E No. of days of pack-ice.
F No. of days dangerous to navigation, but assistance not required.
G No. of days assistance required.
H No. of days closed to navigation.
I Accumulated degree-days of air temperature (°C) where known.*

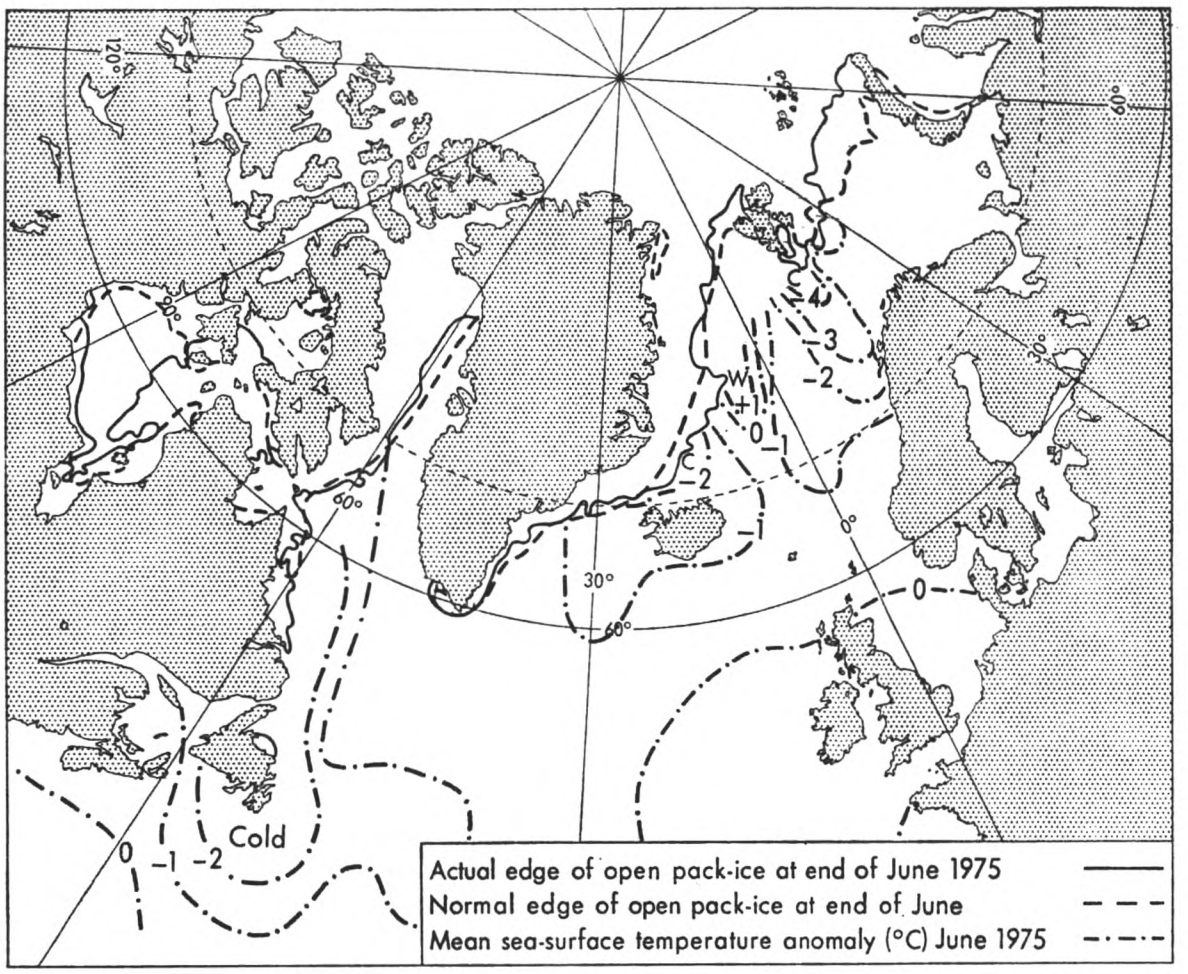
* These figures give a rough measure of the first probability of the formation of sea ice, and later the progress of the growth and its thickness. They are derived from daily averages of temperature (00 + 06 + 12 + 18 GMT) and are the sum of the number of the degrees Celsius below zero experienced each day during the period of sustained frost.

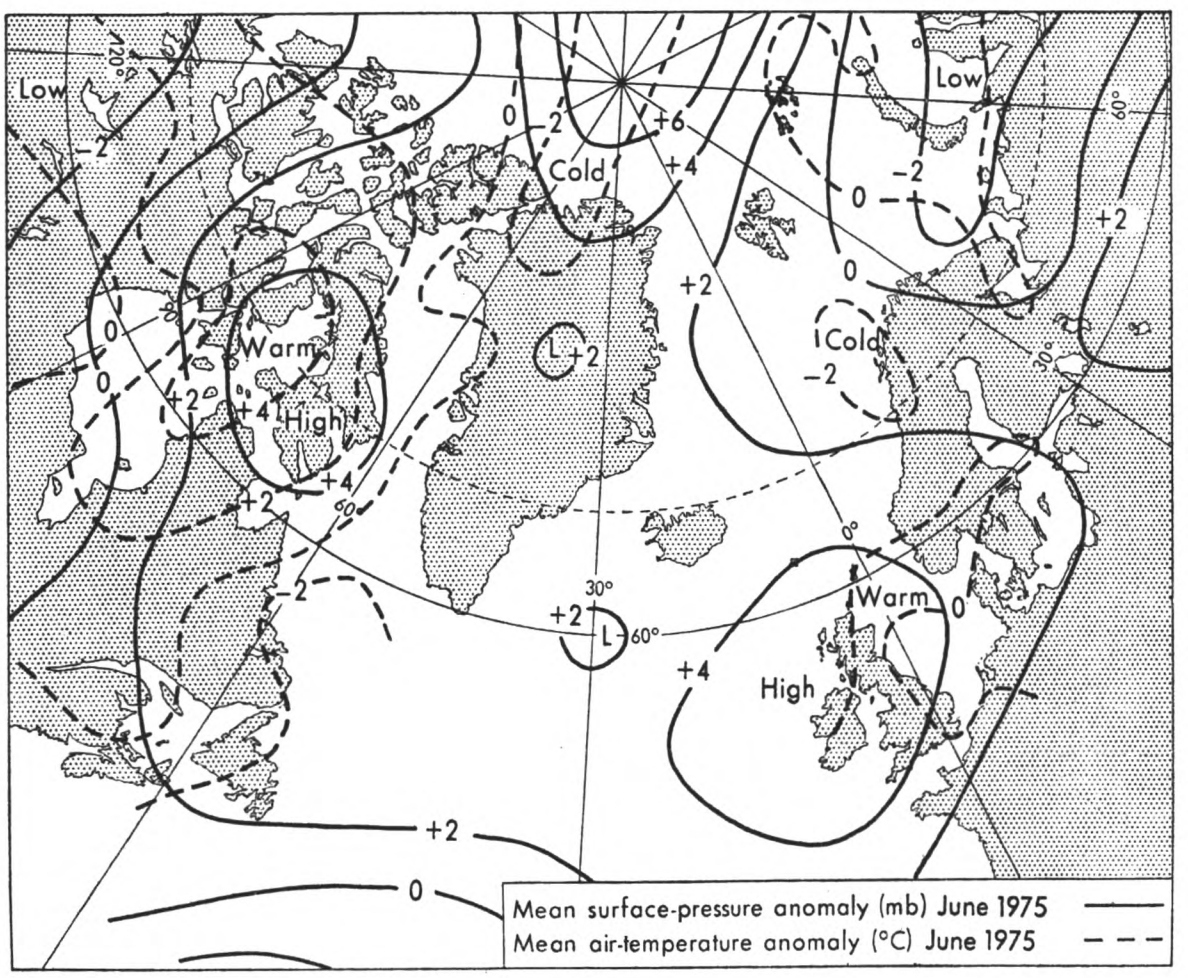

120°
60°
30°
W
C
Actual edge of open pack-ice at end of April 1975
Normal edge of open pack-ice at end of April
Mean sea-surface temperature anomaly (°C) April 1975


120°
60°
30°
Warm
Cold
High
Low
C
Mean surface-pressure anomaly (mb) April 1975
Mean air-temperature anomaly (°C) April 1975


Actual edge of open pack-ice at end of May 1975
Normal edge of open pack-ice at end of May
Mean sea-surface temperature anomaly (°C) May 1975


Cold
Warm
High
High
Low
Mean surface-pressure anomaly (mb) May 1975
Mean air-temperature anomaly (°C) May 1975


120°
60°
30°
60°
Cold
0
−1
−2
−3
−4
+1
0
−1
−2
−1
0
Actual edge of open pack-ice at end of June 1975
Normal edge of open pack-ice at end of June
Mean sea-surface temperature anomaly (°C) June 1975


Low
120°
60°
30°
60°
0
−2
+6
+4
Cold
Low
−2
0
+2
0
+2
Warm
+2
+4
High
L +2
Cold
−2
+4
−2
+2
L
+4
High
Warm
0
+2
0
Mean surface-pressure anomaly (mb) June 1975
Mean air-temperature anomaly (°C) June 1975

# Book Review

*Sea Survival*, by Dougal Robertson. 155 mm × 130 mm, pp. 148, *illus*. Elek Books Ltd., 54–58 Caledonian Road, London N1 9RN, 1975. Price: £5·95.

The author may be known to some readers for his earlier book *Survive the Savage Sea* written after his ordeal in the Pacific when he and his family spent 37 days on a life-raft after his yacht was sunk by Killer Whales. Since those days in 1972 Dougal Robertson has carried out considerable research into survival at sea and this manual has been written to give fellow users of the sea the benefit of that research and his personal experience.

Those who have been compelled to abandon a ship at sea realize only too well that little and insufficient time can be devoted to preparation as strenuous efforts are usually made up to the most critical stage to keep the craft safely afloat. However, the first pages of this book deal with the essential preparation, making distress signals and entering the water or survival craft. Very sensible attention is drawn to hypothermia and treatment of these cases, a subject of which many mariners do not have a great deal of knowledge. Attacks by sharks and other dangerous fish on small craft or persons in the water and methods of defence are described.

Amongst the most serious situation facing shipwrecked survivors when they realize they may be adrift for many days is that of victualling and much of this manual is devoted to ways and means of supplementing or obtaining supplies of food and water from the oceans. Descriptions of numerous fish, birds and mammals that may be caught and methods of catching are given adequate coverage but readers are not misled into believing that there is abundance of such life to be hunted or that the task is an easy one. Those fortunate enough to enjoy good cuisine may not relish the idea of killing, preserving and eating raw turtles but no doubt the author's information could prove to be of considerable value to the unfortunate occupants of lifeboats or rafts struggling for survival.

The methods of catching, storage and use of rainwater and the weather systems associated with rainfall are described in sufficient detail. Signs of approaching land and handling craft in surf, beaching and living off the land are also covered. The author appears to have commented on all aspects including morale although little information is given on keep-fit exercises. One can always row!

The manual contains many diagrams and good illustrations, particularly of sea-birds and clouds. Inside the back cover are ocean charts containing a very considerable amount of information but to make use of these they would need to be carried in the survival craft, perhaps together with the book. Unfortunately they are paper charts and some of the printing is, of necessity, rather small. An ocean navigator may only need to refer to them once or twice a day but being paper charts they are unlikely to last very long in an open boat or raft under heavy weather conditions.

This is an interesting manual and, as little is taught on the subject of survival at sea after shipwreck, it could, if given wide enough circulation amongst mariners and yachtsmen, on occasions contribute to the saving of lives which might otherwise be lost.

G. A. W.

# Personalities

OBITUARY.—We regret to record the death of CAPTAIN L. HENSHALL, aged 47 years, on board the *Centaur* on 2nd May 1975.

Leonard Henshall, whose home was in Bridlington, was promoted Master in 1967 and commanded the *Clytoneus*, *Menestheus*, *Protesilaus*, *Laomedon* and *Memnon* prior to his appointment to the *Centaur*.

Captain Henshall sent us his first meteorological logbook in 1949 from the *Denbighshire*. Since then we have received from him a further 24 logbooks of which 19 have been classed as Excellent. He received Excellent Awards in 1950 and 1971.

We extend our sincere condolences to his family.

C. R. D.

OBITUARY.—We regret to record the death of CAPTAIN W. RAISBECK at his home in South Shields in April. During his career Captain Raisbeck had served with the Fenwick, Constantine, Gillie and Blair, Chapman, and Turnbull Scott Lines and latterly as Chief Officer with R. S. Dalgliesh Ltd. until his untimely death. During his recent service aboard the *Oakworth* and the *Tamworth* he sent us four meteorological logbooks.

C. R. D.

OBITUARY.—It is with regret that we have to record the sudden death of CAPTAIN E. J. RIDOUT on 6th June at the age of 63. Captain Ridout served with Messrs. Trinder Anderson & Co. for 30 years until his retirement in 1972 and commanded many of the Company's vessels. He first appeared on our records in 1950 when he sent us a logbook from the *Armadale* and since then we have received 39 books bearing his name of which 12 were classed as Excellent. He received an Excellent Award for his services in 1951.

C. R. D.

OBITUARY.—We regret to record the death of CAPTAIN J. E. W. WILSON, O.B.E. in early June.

Captain Wilson retired in December 1963 after nearly 50 years' service with the Johnson Warren Line. His record with the Meteorological Office went back to May 1930 and during 33 years of observing he received no less than nine Excellent Awards and was one of the first recipients of an inscribed barograph for long service.

A full notice of his career at sea appeared in the April 1964 edition of *The Marine Observer*.

C. R. D.

RETIREMENT.—CAPTAIN H. DISHMAN retired from the sea and the service of W. A. Souter & Co. in June. Harry Dishman also served with Nisbet & Co. of Glasgow and sailed with Captain MacVean during part of his career at sea. We received our first logbook from Captain Dishman in July 1956, from the *Blairclova*, and since then he has sent us 31 logbooks of which 2 were classed as Excellent.

We wish him good health and happiness in his retirement.

C. R. D.

RETIREMENT.—CAPTAIN J. MACVEAN retired from the sea and the service of W. A. Souter & Co. in June. James MacVean served his time with Nisbet & Co. of Glasgow and sent in his first logbook, again from the *Blairclova*, in October 1952. Since then we have received 27 logbooks from him of which 4 were classed as Excellent.

We wish him health and happiness in his retirement.

C. R. D.

RETIREMENT.—MR. J. C. MATHESON, Port Meteorological Officer at London, retired on 11th July 1975.

Born at Alness, Ross and Cromarty, on 3rd August 1915, a son of the manse and educated at Rothesay Academy and Aberdeen Grammar School, John Cowan

Matheson went to sea at the age of fifteen, serving his Apprenticeship with the Donaldson Line of Glasgow. He then served with the Clan Line as Fourth to Chief Officer, luckily 'keeping his feet dry' during the Second World War except when rescuing the crew of the torpedoed Royal Mail Liner *Navasota* off southern Ireland in December 1939.

In July 1949 he joined the Meteorological Office as a Nautical Officer and was appointed Port Meteorological Officer at Cardiff. In 1955 he was promoted to Senior Nautical Officer and transferred to London as Port Meteorological Officer there. His face must be very familiar to many Masters and ships' officers of the V.O.F. for during the course of his duties at Cardiff and London he must have made several thousand individual visits to Selected and Supplementary ships as well as to the Nautical Colleges within the London area. In addition to his other duties, Mr. Matheson has for many years been giving lectures on the work of the Marine Division of the Meteorological Office to Nautical Colleges and also at the Meteorological Office College at Shinfield Park near Reading.

Over the years Mr. Matheson has made several important contributions to the pages of this journal. These include articles on 'Dew-point and cargo ventilation' (October 1956), 'The Thames Navigation Service' (October 1960) and 'The Work of a Port Meteorological Officer' (October 1961). The latter gives an excellent account of the work Mr. Matheson has been carrying out daily for the past 26 years in his service for the Meteorological Office to shipping and seafarers.

We wish him good health and happiness in his retirement to his new home in North Wales.

Captain R. C. Cameron from our Ship Routeing Service succeeds Mr. Matheson as Port Meteorological Officer at London, and they are shown together in the photograph opposite page 189.

C. R. D.

RETIREMENT.—Captain R. G. Rippon retired in 1974 after 37 years' service with Ocean Fleets.

Richard Gordon Rippon was born in Whitby, Yorks., and comes from a family with long sea-going connections on both sides, his father having held a Master's Certificate in Sail.

Captain Rippon signed indentures with R. B. Chellow S.N. Company in September 1930 and joined the *Penrose* during that month. He obtained his Second Mate's Certificate in 1934 and was appointed Third Mate of the s.s. *Statira* in the same Company in January 1935.

On obtaining his First Mate's Certificate in March 1937 he joined Alfred Holt and Company, as Ocean Fleets were then known, and served with them until his retirement last year.

While he was serving in 1943 as Second Officer aboard the *Centaur*, which had been taken over as a hospital ship by the Royal Australian Navy, the ship was sunk without warning by a Japanese submarine off the Queensland coast. The *Centaur* was a small ship of only 3,200 gross tons and sank in a matter of minutes. Out of a complement of 322 only 60 survived after having drifted around for 36 hours on broken rafts and wreckage before being picked up.

Captain Rippon obtained his Master's Certificate in 1940 and was appointed Master of the *Glenlogan* in 1955. His record with the Meteorological Office goes back to 1958 when he commanded the *Eumaeus*. Since then he has sent us no less than 37 logbooks of which 23 were classed as Excellent.

We take this opportunity of thanking him for a splendid effort on our behalf and wish him good health, happiness and a long comfortable retirement.

J. D. B.

## THE LIGHTER SIDE

From Mr. D. T. Evans, 3rd Officer m.v. *Antrim**

A SELF PORTRAIT:

The Synoptic Hour is here again
And so, the Met. Report.
Cloud amounts, type of low
And temperature quickly sought.
Such efficiency in one so young
A trait so rarely seen.
Surely 'He', without a doubt
Is the Met. computer's dream.

A GOLDEN BAROGRAPH:

Mistaken readings, slips and trips
It's Oh! quite easily done.
So a little time with 'Your' report
And a barograph can be won.

*Both poems translated from the Welsh original by D. T. Evans.

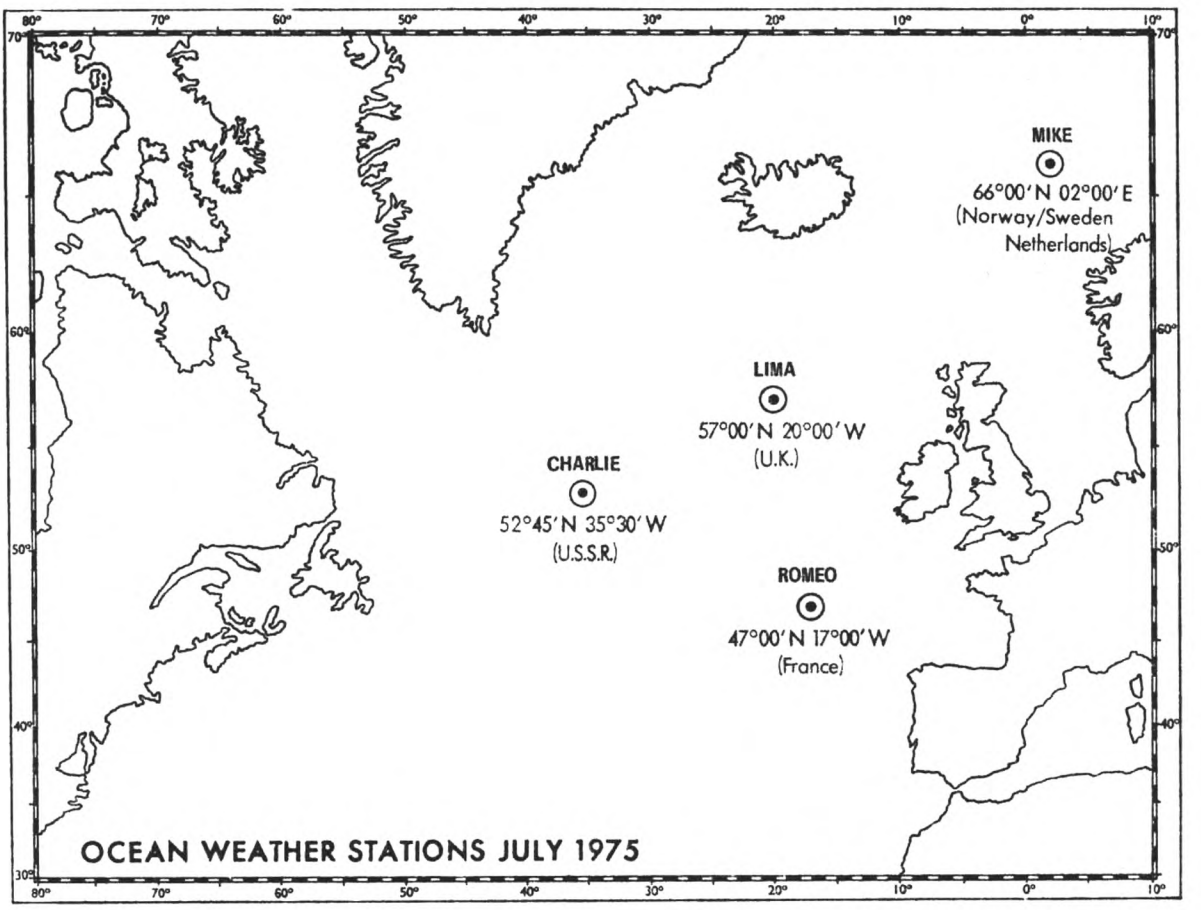
# Notice to Mariners

## NORTH ATLANTIC OCEAN STATIONS

As a consequence of the termination of the International Civil Aviation Organization Joint Financing Agreement on North Atlantic Ocean Stations (N.A.O.S.) on 30th June 1975, the United Kingdom ceased to operate ships on ocean stations 'I' and 'J' on 1st July 1975, but commenced operating on station 'L'. Pending the entry into force of the new Agreement adopted by a conference of Plenipotentiary Delegates held in November 1974 for the joint financing of these stations under the auspices of the World Meteorological Organization, the governments operating the ships decided to commence operation of the network in accordance with the Agreement. The decision to provide, during the interim period, a network of ocean weather stations in the central and eastern North Atlantic, was taken in view of the importance of such a network for forecasting and for providing meteorological services for various users in the North Atlantic, the Mediterranean and Europe and to a very large extent even the whole of the northern hemisphere.

The network will consist of the following stations:

| | | |
|---|---|---|
| 'C' | 52° 45′N, 35° 30′W | Manned by ships of the U.S.S.R. |
| 'L' | 57° 00′N, 20° 00′W | Manned by ships of the United Kingdom |
| 'M' | 66° 00′N, 2° 00′E | Manned by Norway/Sweden and the Netherlands |
| 'R' | 47° 00′N, 17° 00′W | Manned by France. |




# Notice to Marine Observers

## APPOINTMENTS OF NEW PORT METEOROLOGICAL OFFICERS AND NAUTICAL OFFICER

Captain Robert Craig Cameron has been promoted to Senior Nautical Officer and appointed as Port Meteorological Officer in London to succeed Mr. J. C. Matheson who retired in July (see page 195 and photograph opposite page 189).

Captain Cameron left H.M.S. *Conway* in 1949 to serve his apprenticeship with Blue Star Line. On obtaining his 2nd Mate's Certificate he remained with Blue Star and was subsequently promoted to Master in 1968. In 1970 he joined the Ocean Weather Ships and two years later was transferred to the Ship Routeing Service of the Meteorological Office, Bracknell, where he remained until his present appointment.

Mr. Peter Malcolm Swan has been appointed Port Meteorological Officer in Hull to succeed Mr. W. A. McCrindle who has transferred to the Ministry of Defence, Navy.

Mr. Swan began his seafaring career as an apprentice with the New Zealand Shipping Company and remained with them until he obtained his Master's Certificate in 1967. After serving with the Indo-China Steam Navigation Company of Hong Kong and the Union Steamship Company of New Zealand for short periods, Mr. Swan decided to 'swallow the anchor' and worked in Australia for two years for an American seismic survey company. In 1971 he returned to the U.K. where he took up a position with the Inland Revenue Department for a time before deciding to return to sea. For the past two years he has served in the Ocean Weather Ships, being Acting Chief Officer for the latter part of this period.

Captain Clive Randolph Downes has been appointed Nautical Officer in the Marine Division of the Meteorological Office. On leaving H.M.S. *Conway* in 1951 Captain Downes served his apprenticeship with the Shaw Savill & Albion Company and remained with them for the whole of his sea-going career, being in command for the last eight years.

C. R. D.

## NAUTICAL OFFICERS OF THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE, GREAT BRITAIN

**Headquarters.**—Captain G. A. White, Marine Superintendent, Meteorological Office (Met.O.1a), Eastern Road, Bracknell, Berks. RG12 2UR. (Telephone: Bracknell 20242, ext. 2456.)
Captain G. V. Mackie, Deputy Marine Superintendent. (Telephone: Bracknell 20242, ext. 2543.)
Mr. J. D. Brown, Nautical Officer. (Telephone: Bracknell 20242, ext. 2461.)
Captain C. R. Downes, Nautical Officer. (Telephone: Bracknell 20242, ext. 2738.)

**Mersey.**—Mr. W. G. Cullen, Master Mariner, Port Meteorological Officer, Room 709, Royal Liver Building, Liverpool L3 1HN. (Telephone: 051–236 6565.)

**Tyne.**—All enquiries to Mr. W. G. Cullen above.

**Thames.**—Captain R. C. Cameron, Port Meteorological Officer, Movement Control Building, South Side, Victoria Dock, London E16 1AS. (Telephone: 01-476 3931.)

**Bristol Channel.**—Mr. D. J. F. Southon, Master Mariner, Port Meteorological Officer, 33 The Hayes, Cardiff CF1 6NU. (Telephone: Cardiff 21423.)

**Humber.**—Mr. P. M. Swan, Master Mariner, Port Meteorological Officer, c/o Principal Officer, Dept. of Trade, Trinity House Yard, Hull HU1 2LN. (Telephone: Hull 223066, ext. 27.)

**Clyde.**—Mr. H. M. Keenan, Master Mariner, Port Meteorological Officer, 118 Waterloo Street, Glasgow G2 7DN. (Telephone: 041-248 4379.)

**Forth.**—All enquiries to Mr. H. M. Keenan above.

**Southampton.**—Captain D. R. McWhan, Port Meteorological Officer, Southampton Weather Centre, 160 High Street below Bar, Southampton SO1 0BT. (Telephone: Southampton 20632.)

# Fleet Lists

## BRITISH COMMONWEALTH

(These lists were not available in time for inclusion in the July 1975 edition)

## INDIA (Information dated 1.4.75)

| Name of Vessel | Owner/Manager |
|---|---|
| Selected Ships: | |
| *Akbar* | Mogul Line Ltd. |
| *Andamans* | Shipping Corporation of India Ltd. |
| *Dumra* | Damodar Bulk Carriers |
| *Dwarka* | British India S.N. Co. Ltd. |
| *Indian Reliance* | India S.S. Co. Ltd. |
| *Indian Renown* | India S.S. Co. Ltd. |
| *Indian Security* | India S.S. Co. Ltd. |
| *Indian Success* | India S.S. Co. Ltd. |
| *Jag Kisan* | Great Eastern Shipping Co. Ltd. |
| *Jaladhanya* | Scindia S.N. Co. Ltd. |
| *Jaladharma* | Scindia S.N. Co. Ltd. |
| *Jaladhruv* | Scindia S.N. Co. Ltd. |
| *Jaladuhita* | Scindia S.N. Co. Ltd. |
| *Jalaganga* | Scindia S.N. Co. Ltd. |
| *Jalagirija* | Scindia S.N. Co. Ltd. |
| *Jalagouri* | Scindia S.N. Co. Ltd. |
| *Jalajawahar* | Scindia S.N. Co. Ltd. |
| *Jalajyoti* | Scindia S.N. Co. Ltd. |
| *Jalakanta* | Scindia S.N. Co. Ltd. |
| *Jalakrishna* | Scindia S.N. Co. Ltd. |
| *Jalapalaka* | Scindia S.N. Co. Ltd. |
| *Jalavikram* | Scindia S.N. Co. Ltd. |
| *Jalavishnu* | Scindia S.N. Co. Ltd. |
| *Jalazad* | Scindia S.N. Co. Ltd. |
| *Karanja* | British India S.N. Co. Ltd. |
| *Lok Sevak* | Mogul Line Ltd. |
| *Maharaja* | South East Asia Shipping Co. Ltd. |
| *Mohemmedi* | Mogul Line Ltd. |
| *Mozaffari* | Mogul Line Ltd. |
| *State of Assam* | Shipping Corporation of India Ltd. |
| *State of Bihar* | Shipping Corporation of India Ltd. |
| *State of Gujarat* | Shipping Corporation of India Ltd. |
| *State of Haryana* | Shipping Corporation of India Ltd. |
| *State of Kutch* | Shipping Corporation of India Ltd. |
| *State of Maharashtra* | Shipping Corporation of India Ltd. |
| *State of Orissa* | Shipping Corporation of India Ltd. |
| *State of Punjab* | Shipping Corporation of India Ltd. |
| *State of Tamilnadu* | Shipping Corporation of India Ltd. |
| *State of Travancore-Cochin* | Shipping Corporation of India Ltd. |
| *State of Uttar Pradesh* | Shipping Corporation of India Ltd. |
| *Vishva Maya* | Shipping Corporation of India Ltd. |
| *Vishva Prabha* | Shipping Corporation of India Ltd. |
| *Vishva Sudha* | Shipping Corporation of India Ltd. |
| Supplementary ships: | |
| *Apj Ambika* | Apeejay Lines Ltd. |
| *Apj Anjali* | Apeejay Lines Ltd. |
| *Apj Sushma* | Apeejay Lines Ltd. |
| *Aradhana* | Shipping Corporation of India Ltd. |
| *Bailadila* | Shipping Corporation of India Ltd. |
| *Bande Nawaz* | Hind Shipping Agencies |
| *Barauni* | Shipping Corporation of India Ltd. |
| *Bellary* | Shipping Corporation of India Ltd. |
| *Bhaskar* | Shipping Corporation of India Ltd. |
| *B.R. Ambedkar* | Shipping Corporation of India Ltd. |
| *Chanakya* | Shipping Corporation of India Ltd. |
| *Chhatrapati Shivaji* | Shipping Corporation of India Ltd. |
| *Chennai Jayam* | South India Shipping Corporation |
| *Chennai Perumai* | South India Shipping Corporation |
| *Chennai Selvam* | South India Shipping Corporation |
| *Chidambaram* | Shipping Corporation of India Ltd. |
| *Desh Bandhu* | Shipping Corporation of India Ltd. |
| *Devaraya* | Shipping Corporation of India Ltd. |
| *Gandhi* | Shipping Corporation of India Ltd. |
| *Harsha Vardhan* | Shipping Corporation of India Ltd. |
| *Indian Industry* | India S.S. Co. Ltd. |
| *Indian Prestige* | India S.S. Co. Ltd. |
| *Indian Resolve* | India S.S. Co. Ltd. |
| *Indian Resource* | India S.S. Co. Ltd. |
| *Indian Splendour* | India S.S. Co. Ltd. |
| *Indian Strength* | India S.S. Co. Ltd. |
| *Indian Tradition* | India S.S. Co. Ltd. |
| *Indian Tribune* | India S.S. Co. Ltd. |

## INDIA (*contd.*)

| Name of Vessel | Owner/Manager |
|---|---|
| *Indian Triumph* | India S.S. Co. Ltd. |
| *Indian Trust* | India S.S. Co. Ltd. |
| *Indian Valour* | India S.S. Co. Ltd. |
| *Indian Venture* | India S.S. Co. Ltd. |
| *Jag Anand* | Great Eastern Shipping Co. Ltd. |
| *Jag Anjli* | Great Eastern Shipping Co. Ltd. |
| *Jag Asha* | Great Eastern Shipping Co. Ltd. |
| *Jag Dev* | Great Eastern Shipping Co. Ltd. |
| *Jag Jawan* | Great Eastern Shipping Co. Ltd. |
| *Jag Jiwan* | Great Eastern Shipping Co. Ltd. |
| *Jag Jwala* | Great Eastern Shipping Co. Ltd. |
| *Jag Jyoti* | Great Eastern Shipping Co. Ltd. |
| *Jag Laxmi* | Great Eastern Shipping Co. Ltd. |
| *Jag Ravi* | Great Eastern Shipping Co. Ltd. |
| *Jag Rekha* | Great Eastern Shipping Co. Ltd. |
| *Jag Shakti* | Great Eastern Shipping Co. Ltd. |
| *Jagat Neta* | Dempo S.S. Ltd. |
| *Jagat Swamini* | Dempo S.S. Ltd. |
| *Jagat Vijeta* | Dempo S.S. Ltd. |
| *Jaladharati* | Scindia S.N. Co. Ltd. |
| *Jaladhir* | Scindia S.N. Co. Ltd. |
| *Jaladurga* | Scindia S.N. Co. Ltd. |
| *Jaladuta* | Scindia S.N. Co. Ltd. |
| *Jalagomati* | Scindia S.N. Co. Ltd. |
| *Jalagopal* | Scindia S.N. Co. Ltd. |
| *Jalajaya* | Scindia S.N. Co. Ltd. |
| *Jalakala* | Scindia S.N. Co. Ltd. |
| *Jalakendra* | Scindia S.N. Co. Ltd. |
| *Jalakirti* | Scindia S.N. Co. Ltd. |
| *Jalamangala* | Scindia S.N. Co. Ltd. |
| *Jalamani* | Scindia S.N. Co. Ltd. |
| *Jalamatsya* | Scindia S.N. Co. Ltd. |
| *Jalamayur* | Scindia S.N. Co. Ltd. |
| *Jalamohan* | Scindia S.N. Co. Ltd. |
| *Jalamokambi* | Scindia S.N. Co. Ltd. |
| *Jalamorari* | Scindia S.N. Co. Ltd. |
| *Jalamoti* | Scindia S.N. Co. Ltd. |
| *Jalapankhi* | Scindia S.N. Co. Ltd. |
| *Jalarajan* | Scindia S.N. Co. Ltd. |
| *Jalarashmi* | Scindia S.N. Co. Ltd. |
| *Jalaratna* | Scindia S.N. Co. Ltd. |
| *Jalatarang* | Scindia S.N. Co. Ltd. |
| *Jalaveera* | Scindia S.N. Co. Ltd. |
| *Jalayamini* | Scindia S.N. Co. Ltd. |
| *Jalayamuna* | Scindia S.N. Co. Ltd. |
| *Jameela* | Karala Lines Ltd. |
| *Jawaharlal Nehru* | Shipping Corporation of India Ltd. |
| *Kamishka* | Shipping Corporation of India Ltd. |
| *Laxmi* | Shipping Corporation of India Ltd. |
| *Lal Bahadur Shastri* | Shipping Corporation of India Ltd. |
| *Lok Adhar* | Mogul Line Ltd. |
| *Lok Nayak* | Mogul Line Ltd. |
| *Mahabharat* | South East Asia Shipping Co. Ltd. |
| *Mahabhakti* | South East Asia Shipping Co. Ltd. |
| *Mahabir* | South East Asia Shipping Co. Ltd. |
| *Maratha Progress* | Chowgule Steamships Ltd. |
| *Maratha Providence* | Chowgule Steamships Ltd. |
| *Netaji Subhash Bose* | Shipping Corporation of India Ltd. |
| *Onge* | Shipping Corporation of India Ltd. |
| *Prabhu Daya* | Tolani Private Ltd. |
| *Rama* | Shipping Corporation of India Ltd. |
| *Ratna Usha* | Rarnakar Shipping Co. Ltd. |
| *Red Snapper* | Central Institute of Fisheries Operatives |
| *Sagar Deep* | Shipping Corporation of India Ltd. |
| *Samudra Gupta* | Shipping Corporation of India Ltd. |
| *Sanchi* | Shipping Corporation of India Ltd. |
| *Satya Kamal* | Seven Seas Transportation Ltd. |
| *Satya Sohan* | Seven Seas Transportation Ltd. |
| *Shahjehan* | Shipping Corporation of India Ltd. |
| *Shankara* | Shipping Corporation of India Ltd. |
| *Shompen* | Shipping Corporation of India Ltd. |
| *State of Himachala Pradesh* | Shipping Corporation of India Ltd. |
| *State of Kerala* | Shipping Corporation of India Ltd. |
| *State of Madhya Pradesh* | Shipping Corporation of India Ltd. |
| *State of Meghalaya* | Shipping Corporation of India Ltd. |
| *State of Mysore* | Shipping Corporation of India Ltd. |
| *State of Rajasthan* | Shipping Corporation of India Ltd. |
| *State of West Bengal* | Shipping Corporation of India Ltd. |
| *Tamil Anna* | Poompuhar Shipping Co. Ltd. |
| *Tamil Periyar EVR* | Poompuhar Shipping Co. Ltd. |
| *Tasneen* | Indo-Oceanic Shipping Co. |
| *Varuna Yan* | Thakur Steamship Co. Ltd. |
| *Vishva Abha* | Shipping Corporation of India Ltd. |
| *Vishva Aditya* | Shipping Corporation of India Ltd. |
| *Vishva Amitabh* | Shipping Corporation of India Ltd. |

## INDIA (*contd.*)

| Name of Vessel | Owner/Manager |
|---|---|
| *Vishva Aparva* | Shipping Corporation of India Ltd. |
| *Vishva Asha* | Shipping Corporation of India Ltd. |
| *Vishva Bhakti* | Shipping Corporation of India Ltd. |
| *Vishva Bindu* | Shipping Corporation of India Ltd. |
| *Vishva Chetana* | Shipping Corporation of India Ltd. |
| *Vishva Dharma* | Shipping Corporation of India Ltd. |
| *Vishva Jyoti* | Shipping Corporation of India Ltd. |
| *Vishva Kalyan* | Shipping Corporation of India Ltd. |
| *Vishva Kanti* | Shipping Corporation of India Ltd. |
| *Vishva Karuna* | Shipping Corporation of India Ltd. |
| *Vishva Kaushal* | Shipping Corporation of India Ltd. |
| *Vishva Kirti* | Shipping Corporation of India Ltd. |
| *Vishva Lalita* | Shipping Corporation of India Ltd. |
| *Vishva Madhuri* | Shipping Corporation of India Ltd. |
| *Vishva Mahima* | Shipping Corporation of India Ltd. |
| *Vishva Mamata* | Shipping Corporation of India Ltd. |
| *Vishva Mangal* | Shipping Corporation of India Ltd. |
| *Vishva Marg* | Shipping Corporation of India Ltd. |
| *Vishva Nayak* | Shipping Corporation of India Ltd. |
| *Vishva Nidhi* | Shipping Corporation of India Ltd. |
| *Vishva Pratap* | Shipping Corporation of India Ltd. |
| *Vishva Pratiba* | Shipping Corporation of India Ltd. |
| *Vishva Prayas* | Shipping Corporation of India Ltd. |
| *Vishva Prem* | Shipping Corporation of India Ltd. |
| *Vishva Raksha* | Shipping Corporation of India Ltd. |
| *Vishva Sandesh* | Shipping Corporation of India Ltd. |
| *Vishva Seva* | Shipping Corporation of India Ltd. |
| *Vishva Shakti* | Shipping Corporation of India Ltd. |
| *Vishva Shobha* | Shipping Corporation of India Ltd. |
| *Vishva Siddhi* | Shipping Corporation of India Ltd. |
| *Vishva Suman* | Shipping Corporation of India Ltd. |
| *Vishva Tarang* | Shipping Corporation of India Ltd. |
| *Vishva Tej* | Shipping Corporation of India Ltd. |
| *Vishva Tirth* | Shipping Corporation of India Ltd. |
| *Vishva Umang* | Shipping Corporation of India Ltd. |
| *Vishva Usha* | Shipping Corporation of India Ltd. |
| *Vishva Vandana* | Shipping Corporation of India Ltd. |
| *Vishva Vibhuti* | Shipping Corporation of India Ltd. |
| *Vishva Vijay* | Shipping Corporation of India Ltd. |
| *Vishva Vikas* | Shipping Corporation of India Ltd. |
| *Vishva Vinay* | Shipping Corporation of India Ltd. |
| *Vishva Vir* | Shipping Corporation of India Ltd. |
| *Vishva Vivek* | Shipping Corporation of India Ltd. |
| *Vishva Yash* | Shipping Corporation of India Ltd. |
| *Visve Svaraya* | Shipping Corporation of India Ltd. |
| *Vivekananda* | Shipping Corporation of India Ltd. |
| *Yerewa* | Shipping Corporation of India Ltd. |

Auxiliary Ships:
India has 30 Auxiliary Ships.

# SINGAPORE (Information dated 1.3.75)

| Name of Vessel | Master | Observing Officers | Radio Officers | Owner/Manager |
|---|---|---|---|---|
| *Golden City* | G. F. Hanke | G. T. Tuwaidan, Salim Bin Mat, Ho Kee Quat | Soeprihatin | Guan Guan Shipping (Pte.) Ltd. |
| *Golden Haven* | D. W. Tulloch | F. H. Caunang, R. Katiandagho | U. Maung Twan | Guan Guan Shipping (Pte.) Ltd. |
| *Golden Horse* | W. E. Appleton | Charles Luntungan, Simon A. Torureh, Wong Keat Nyan | M. V. Rajendran | Guan Guan Shipping (Pte.) Ltd. |
| *Golden Lion* | R. A. Fraser | O. Moeller, J. H. R. Pinontoan, Yap Boon Chye | P. J. Thusen | Guan Guan Shipping (Pte.) Ltd. |
| *Golden Season* | S. V. Bateman | H. E. Damping, K. Udjung | P. Rumenban | Guan Guan Shipping (Pte.) Ltd. |
| *Golden Tower* | G. W. Scott | Michael Venner, George M. Kogaam, R. Sumampow | Aik Maung | Guan Guan Shipping (Pte.) Ltd. |
| *Keningau* | E. E. Fenwick | K. K. Srivastara | K. A. Menon | Straits Shipping (Pte.) Ltd. |
| *Kimanis* | J. Carter | Hou Hee Phat | Gui How Meng | Straits Shipping (Pte.) Ltd. |
| *Kim Hock* | Skajem Lars Fredrik | Rompas Martin, Maung Hla Min, Djustin Simarmata | Maung Kyaing, Saw Thaung Ngwe | Straits Shipping (Pte.) Ltd. |
| *Klias* | E. Robinson | Raymond Chee | P. V. Abraham | Straits Shipping (Pte.) Ltd. |
| *Kunak* | G. Coupar | Lim Soon Hoe | Chua Tien Shek | Straits Shipping (Pte.) Ltd. |
| *Mahsuri* | R. A. Cooper | Arnie Darhl, Tan Kin Seng, Tan Chin Hong | Leong Chee Ming | Austasia Line (Pte.) Ltd. |
| *Neptune Agate* | George Fung | Fong Kam Tong, Mohan Das Nair, Harun Jaafar | Jackie Dharmawidjaja | Neptune Orient Lines Ltd. |
| *Neptune Amber* | S. K. Menon | Tay Juet Hui, Chan Yew Meng, Ngoh Beng Poh | Ng Twan Hock | Neptune Orient Lines Ltd. |
| *Neptune Beryl* | D. E. Blazey | Lim Gam Hing, Leong Peng Tuck, P. S. Menon | Chew Siong Theng | Neptune Orient Lines Ltd. |
| *Neptune Emerald* | Hasan Madon | S. M. Berry, Ng Yew Choon, Kong Chuan Bong | David Lange | Neptune Orient Lines Ltd. |
| *Neptune Jasper* | Liew Kong Kiew | Lee Teng Yaw, Ngoh See Wee, Chia Thang See | Pan Boon Pin | Neptune Orient Lines Ltd. |
| *Neptune Sapphire* | H. Schiemann | Han Tuck Kong, Teo Buan Suang, Ahmad Fuad Sukri | Maung Thaung Tint | Neptune Orient Lines Ltd. |
| *Neptune Topaz* | M. T. Khin | Lau Chye Gin, Wee Hock Leng, Tan Song Boon | Terrance Than Hla | Neptune Orient Lines Ltd. |
| *Neptune Zircon* | R. M. Fowler | Ng Gim Leong, V. T. James, Tan Chor Koon | Thang Weng Choong | Neptune Orient Lines Ltd. |
| *Thorscape* | R. Røed | T. Lysnes, T. Didriusen, B. Solberg | Haugene | Norse Oriental Line |

# INDEX TO VOLUME XLV, 1975

[*Subjects of* Book Reviews, Editorials, Notices to Marine Observers, Notices to Mariners, Photographs *and persons named in* Retirement *and* Obituary *notices, are indexed under these general headings.*]

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