Met. O. 932

The Marine Observer

A quarterly journal of Maritime Meteorology

Volume L No. 270
October 1980

£1·75 net

Met. O. 932

THE MARINE OBSERVER

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

VOL. L **No. 270** **OCTOBER 1980**

CONTENTS

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

Published for the Meteorological Office by

HER MAJESTY'S STATIONERY OFFICE

© *Crown copyright 1980*

To be purchased direct from HMSO at any of the following addresses: 49 High Holborn, LONDON WC1V 6HB; 13a Castle Street, EDINBURGH EH2 3AR; 41 The Hayes, CARDIFF CF1 1JW; Brazennose Street, MANCHESTER M60 8AS; Southey House, Wine Street, BRISTOL BS1 2BQ; 258 Broad Street, BIRMINGHAM B1 2HE; 80 Chichester Street, BELFAST BT1 4JY, or from booksellers.

PRICE £1·75 NET or £7·66 per annum (including postage)

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 UK will supply bottles, preservative and instructions on request.

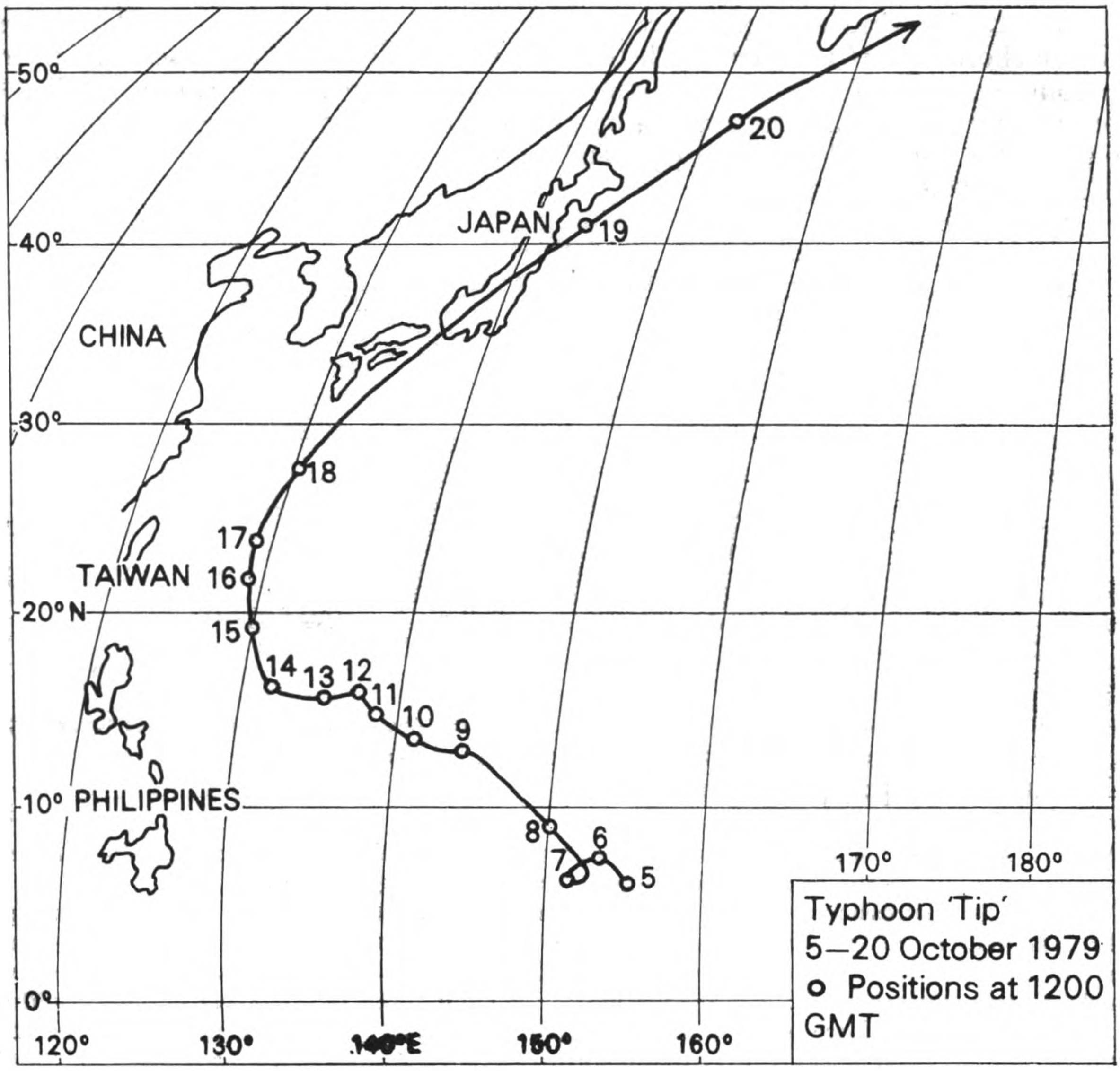
TYPHOON TIP

Tokyo Bay

m.v *Silverfjord*. Captain N. Sandes. At anchor Yokosuka. Observers, the Master and ship's company.

18–19 October 1979. Whilst at anchor off Yokosuka the vessel encountered typhoon Tip and the following are extracts from the logbook:

	GMT	
18th	1900:	Wind N, force 2–3, barometric pressure 1004·2 mb, overcast with continuous light rain, temp. 18·8°C.
	2130:	The wind suddenly backed to south and increased in strength.
	2200:	Wind S, force 7, barometric pressure 1000·2 mb, temp. 24.
19th	0035:	Moderate rain, stratus fractus cloud with a few breaks in the lowest layers.
	0100:	Wind SSE, force 7–8, barometric pressure 994·3 mb, temp. 24·7.
	0135:	Continuous moderate to heavy rain, rough sea.
	0150:	Heavy continuous rain, spray beginning to blow off waves.
	0200:	Wind SSE, force 9, barometric pressure 988·9 mb, very rough sea, short heavy swell, blowing spray and heavy rain.
	0300:	Wind SSE, force 9–10, barometric pressure 984·1 mb, temp. 23·0.
	0346:	Wind backed to SE, heavy rain.
	0400:	Wind SSE, force 10, barometric pressure 980·0 mb, rain now light.
	0430:	Wind SSE, force 11–12, rain ceased, air full of spray.
	0434:	Wind gusting to over force 12.



0500: Wind SSE, force 11, barometric pressure 979·4 mb.
0530: Wind S'E, force 12, barometric pressure 976·9 mb.
0556: Wind beginning to veer, barometric pressure rising.
0630: Wind S'W, force 12, barometric pressure 977·8 mb.
0655: Barometric pressure steady, small breaks in cloud.
0700: Wind SSW, force 12.
0730: Wind SSW, force 9.
0800: Wind SSW, force 6, low clouds dispersing, blue-sky patches becoming more widespread.
0930: Wind S'W, force 4, barometric pressure 985·5 mb, sky now clear except for a few high clouds.
1000: Wind S'W, force 2.

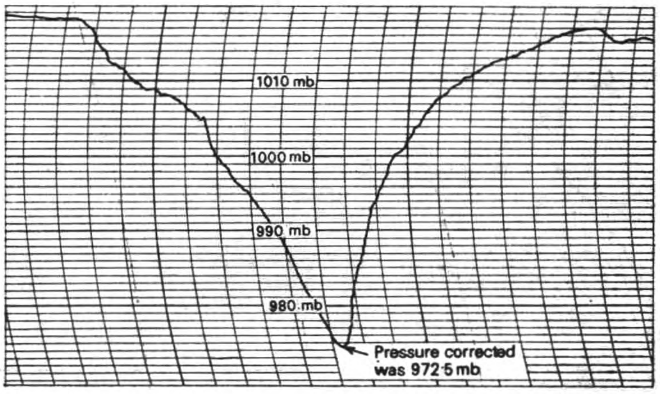
Position of ship: 35° 17'N, 139° 40'E.

Osaka Bay

s.s. *City of Edinburgh*. Captain J. E. Pritchard. At anchor Osaka Bay. Observers, the Master and ship's company.

18–19 October 1979. At 1400 GMT on the 18th the port of Kobe was officially closed and, in view of the close proximity of typhoon Tip, the vessel sailed out to anchor in Osaka Bay.

At 1500 the wind was ENE, force 5 and barometric pressure 998 mb. The vessel was anchored by 1630 after which time the wind veered and increased slightly to become NE, force 6 by 2100. The barometric pressure maintained a steady fall and reached its lowest value, 972·5 mb, by 0130 on the 19th, see barogram. From 2100 on the 18th the wind began to back and increase and reached its maximum speed of NW, force 8, by 0130.



From 0130 onwards the barometric pressure rose and the wind decreased to become respectively 1006·0 mb and W, force 4 by 0900.

Position of ship: 34° 40′N, 135° 30′E.

Note 1. The chart accompanying the observations from the *Silverfjord* and the *City of Edinburgh* indicates the track of Tip from the 5th to the 20th of October.

Note 2. The depression was first identified on 5 October about 180 n. mile south-east of Truk Island. On the 9th Tip passed over Guam early in the day as a tropical storm, by the end of the day it had been upgraded to a typhoon. On the 12th a reconnaissance aircraft reported a drop-sonde pressure of 870 mb—the lowest ever measured in a tropical cyclone. At this stage winds of gale force or more extended 200–300 n. mile from the storm centre. On the 16th the typhoon started to recurve to the north-east and on the 20th, having reached the Kuril Islands, it was downgraded to extra-tropical. It was, however, still an intense storm with a central pressure of 960 mb. On the 22nd the depression was moving over the Bering Sea and quickly dissipating.

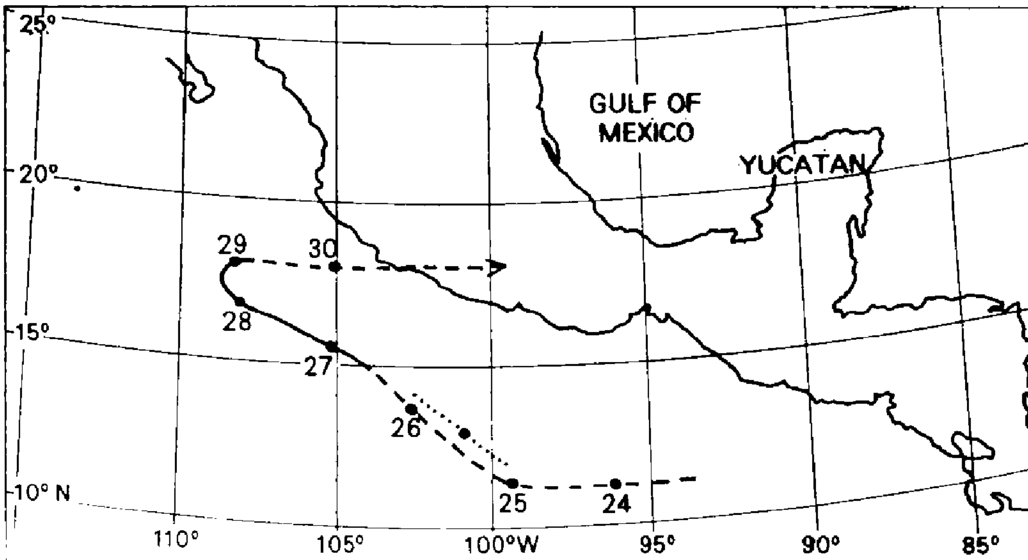
HURRICANE IGNACIO

Eastern North Pacific

m.v. *Ardmore*. Captain M. J. Carter. San Francisco to Talara (Peru). Observers, the Master and ship's company.

25–26 October 1979. The first indication of adverse weather was at 0800 GMT on the 25th when the wind freshened to NNE, force 4 and rain commenced to fall. By 1100 the wind had increased to E, force 8 and the rain had become heavy and continuous. The following are extracts from the deck logbook during the vessel's encounter with Ignacio:

	GMT	
25 Oct.	1400:	Wind E'N, force 8, barometric pressure 1005·9 mb, heavy rain, rough sea, heavy swell.
	1600:	Wind E'N, force 10.
	1800:	Wind E, force 10, barometric pressure 999·4 mb, heavy rain, very rough sea, heavy swell.
	1900:	Wind E'S, force 10, barometric pressure 997·1 mb.
	1930:	Continuous rain ceased but was followed by moderate or heavy showers.



2000: Wind SE, force 10, barometric pressure 999·1 mb.
2200: Wind SE'S, force 8, barometric pressure 1000·7 mb, moderate showers, rough sea, heavy SE'ly swell.
26 Oct. 0000: Wind S, force 8, barometric pressure 1004·2 mb.
0200: Wind SSW, force 8, barometric pressure 1005·3 mb, frequent heavy showers, rough sea, moderate S'ly swell.

The pressure continued to rise and by 0600 had reached 1010·4 mb.
Position of ship at 1800 on the 25th: 13° 18'N, 101° 06'W.

Note. Ignacio began as a depression on the 23rd near position 12°N 95°W. It was upgraded to tropical storm on the 25th and to hurricane late on the 26th, see chart. The storm reached its peak on the 27th when the central pressure was estimated to have been 938 mb.

After turning north on the 28th and later east on the 29th, it gradually weakened and finally dissipated over the Yucatan Peninsular on the 31st.

HEAVY WEATHER

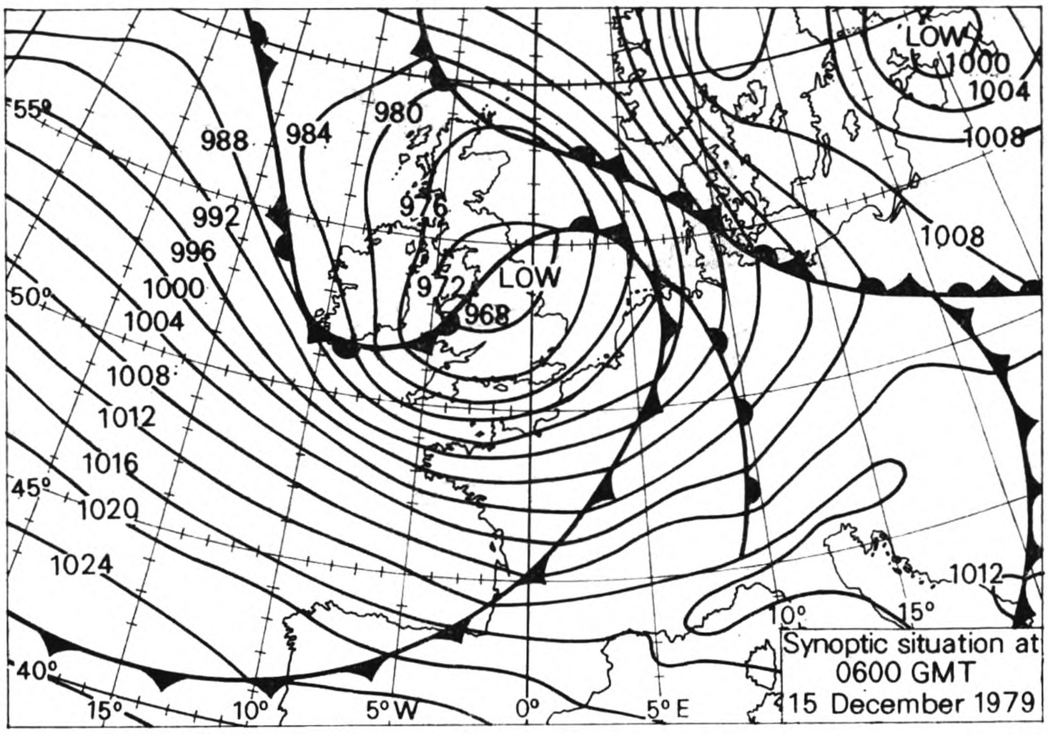
English Channel

m.v. *Viking Venturer*. Captain A. F. Bonehill. Le Havre to Southampton. Observers, the Master and Mr D. J. Pearce and Mr M. L. Bechley, 2nd Officers.

14–15 December 1979. Heavy weather associated with an intense depression (central pressure 968 mb) centred at 0600 GMT on 15 December over northern England, see chart, dictated a weather-avoidance course during the night sailing from Le Havre to a position 10 n. mile east of Barfleur and thence north to the Nab Tower.

The shipping forecast broadcast at 1750 on the 14th indicated south-west to west winds, force 7 to 9 increasing 10 at times; the forecast broadcast at 0015 on the 15th was essentially the same. At 0203 Niton Radio issued a warning of 'south-westerly storms, force 10 to 11, imminent, veering west soon'. This warning proved to be very accurate—at 0000 the reported wind was south-west force 9 and by 0300 it had increased to force 11.

At 0500, just after passing the Nab Tower, the vessel rolled over 40 degrees in a



Synoptic situation at 0600 GMT 15 December 1979

gust of wind estimated to be 85 knots and a small fish was swept onto the bridge-wing—normally 21 metres above sea-level.

Wave heights at 0000 were 4 to 5 metres, these gradually increased to 7 to 10 metres with particularly heavy seas at the 30- and 20-metre sounding contours south of the Nab Tower and in the New Grounds area east of Bembridge. At 0410 a large wave invaded 'D' deck (9 metres above the water line). There were equally large waves during the hour that followed.

Throughout the night the sky remained predominantly overcast and frequent lightning flashes were observed. There were, however, some clear periods lasting for about 15 minutes after which the wind increased in strength and heavy rain would follow.

The heavy weather led to the cancellation of our day sailing to France.

Position of ship at 0000 on the 15th: 49° 36'N, 0° 24'W.

English Channel

m.v. *Viking Venturer*. Captain R. H. Plant. Southampton to Le Havre. Observers, the Master, Mr G. L. Coulson, Chief Officer and Mr M. L. Bechley and Mr D. E. Beresford, 2nd Officers.

27–28 December 1979. The shipping forecast broadcast at 1750 on the 27th indicated for sea area Wight southerly winds gale force 8 to storm force 10 veering north-west and decreasing 6 to gale force 8. The synoptic situation at 0000 GMT on the 28th is shown on the chart accompanying this observation.

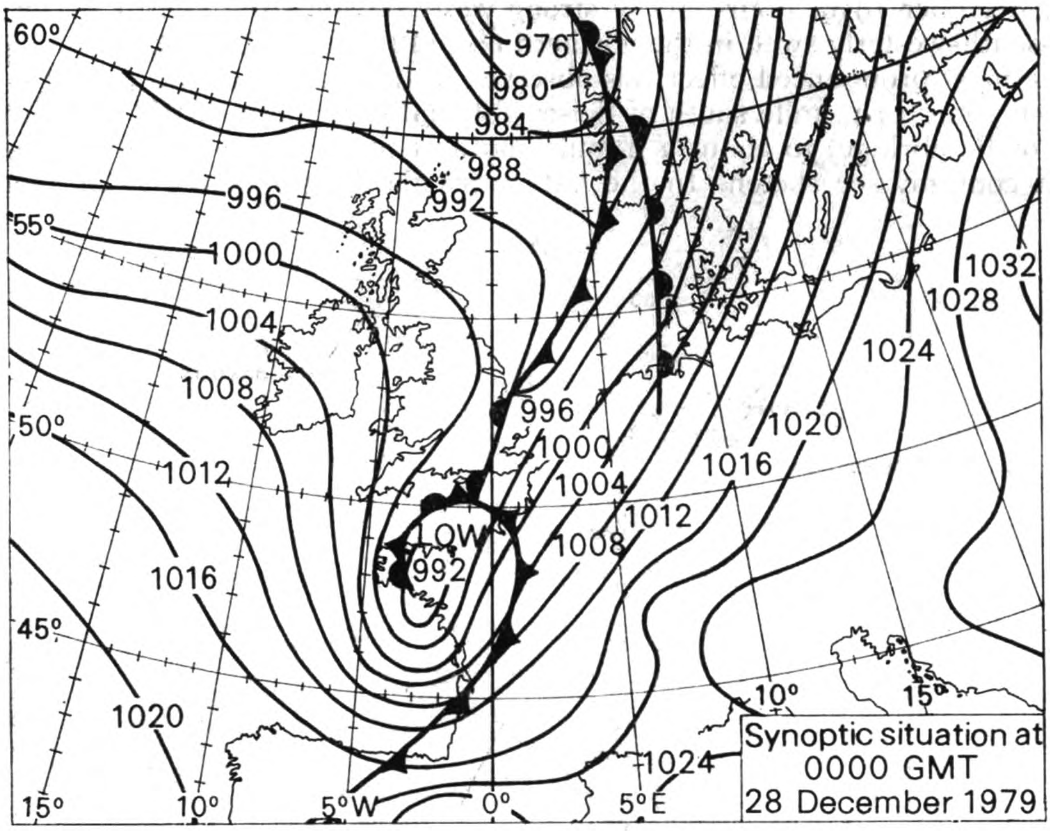
The following are extracts from the vessel's log:

GMT

27th 2300: Wind SSW, force 8, barometric pressure 997·0 mb, heavy rain.

28th 0100: Wind N'W, force 6, barometric pressure 994·1 mb, continuous moderate rain, very heavy confused swell, rough sea.

0200: Wind SW'ly, force 8–9, barometric pressure 990·4 mb, intermittent moderate rain, heavy swell, moderate sea.



0300: Wind S'E, force 9, barometric pressure 990·6 mb, intermittent moderate rain, heavy swell, confused sea.
0400: Wind SSE'ly, force 6, barometric pressure 990·0 mb, overcast.
0500: Wind SE, force 4, barometric pressure 989·8 mb, heavy rain, moderate swell.
0600: Wind NW, force 10, heavy rain.

At 0150 the wind backed sharply from 350° to 220° and within 2 minutes the pressure had fallen by 4 millibars. The wind was variable in strength sometimes decreasing to 15 knots but increasing at times to produce isolated gusts to 60 knots.

For much of the time the vessel was in touch with the Normandy Ferries' south-bound vessel *Dragon*, about 10–15 n. mile distant to the west-north-west. All this time the *Dragon* was only experiencing light northerly winds suggesting that the centre of the low pressure system lay between the 2 vessels.

At 0537 LH4 buoy at the western end of Le Havre approach was abeam. At 0556 the outer breakwater was passed and berthing attempted. At this time, however, the wind veered sharply to the north and immediately increased in speed from almost calm to over 50 knots. It was impossible to turn the vessel, consequently we moved out to sea to ride out the worst of the weather—the wind was by now gusting to over 80 knots.

By 0843 the wind speed had decreased to 35 knots. Once again berthing was attempted and finally achieved at 0930.

Position of ship at 0300: 50° 06'N, 0° 30'W.

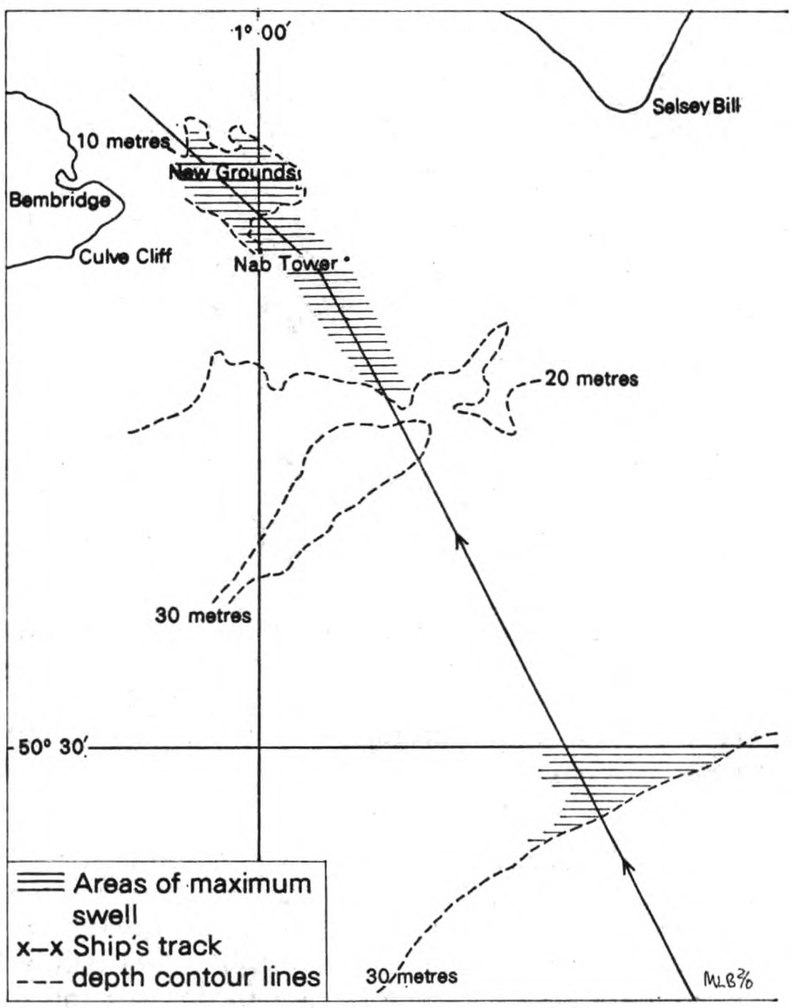
HEAVY GROUND SWELL

Eastern Approaches to the Solent

m.v. *Viking Venturer*. Captain R. H. Plant. Le Havre to Portsmouth. Observers, the Master, Mr A. P. Stapley and Mr W. J. C. Clarke, Chief Officers and Mr M. L. Bechley, 2nd Officer.

8 November 1979. Four days of strong westerly winds resulted in a long heavy west-south-westerly swell in the northern part of the English Channel.

The most pronounced effect was observed in the vicinity of the 30-metre depth contour some 14 n. mile south of Selsey Bill and in the area of the New Grounds (east of Bembridge) to about 3 n. mile south of the Nab Tower on the 20-metre depth contour, see sketch. In the latter area the length of the swell shortened



noticeably from about 150 metres to 50 metres with a consequent increase in height and steepness. Similar events, confirming the above, occurred on 26 November.

Position of ship: 50° 39′N, 0° 56′W.

CURRENT RIPS

East China Sea

s.s. *Osaka Bay*. Captain D. G. Brown. Kaohsiun (Taiwan) to Kobe (Japan). Observer, Mr P. P. van Bergen, 2nd Officer.

5 November 1979. Whilst the vessel was passing between the islands of Yonakuni and Iriomote a current rip was observed extending from 110° to 290° (T) about one nautical mile on either side of the vessel; it was approximately 200 metres wide, the wave height of the agitated water was about one metre.

Just before passing through the rip, the echo-sounder was recording soundings of 352 metres, shortly after passage through the rip soundings of over 1000 metres were recorded. The chart indicated that we should not have encountered such a depth until we reached a point about 10 n. mile further along the vessel's course of 042°. The current at the time was setting the vessel in a south-westerly direction. The wind was NNE'ly, force 4.

Position of ship: 24° 15'N, 123° 16'E.

Note. This is a very interesting observation in that the current set to the south-west.

The Japan Current (Kuro Shio) is particularly narrow and fast, flowing northwards between Taiwan and the island of Yonakuni. There is probably a counter current on the Pacific side of the Japan current but information about this is sparse; some observations, such as this, have been made and support this idea. There does not appear to have been any previous reports of rips in this area; this rip was probably caused by the direction of the current flow and the topography of the sea bed.

North Pacific Ocean

s.s. *City of Edinburgh.* Captain J. E. Pritchard. Jeddah to Tokyo. Observer, Mr F. Anderson, Chief Officer.

10 October 1979. At 2130 GMT a current rip was observed stretching from horizon to horizon in a south-east to north-westerly direction. Previously the maximum rudder angle to maintain course was 2° of starboard helm. On passing through the rip it was necessary to apply 12° of starboard helm on the automatic pilot as the vessel veered off course. The vessel's speed was 25 knots.

Weather conditions were: dry bulb 25·0°C, wet bulb 22·0, sea temp. 24, (sea temp. one hour earlier was 26), visibility 14 n. mile, wind NW'W, force 3, slight sea and moderate northerly swell.

Position of ship: 29° 56'N, 133° 00'E.

Note. This is an interesting observation in that there does not appear to have been any previous reports of rips in the area.

The position where the observation was made is south of the Japan Current (Kuro Shio) and in an area where, generally, currents are light.

There might be some convergence between currents which are south-going to the west and north-going to the east which would give rise to a rip. The orientation of the rip might indicate some influence by the topography of the sea bed.

LARGE WAVE

North Pacific Ocean

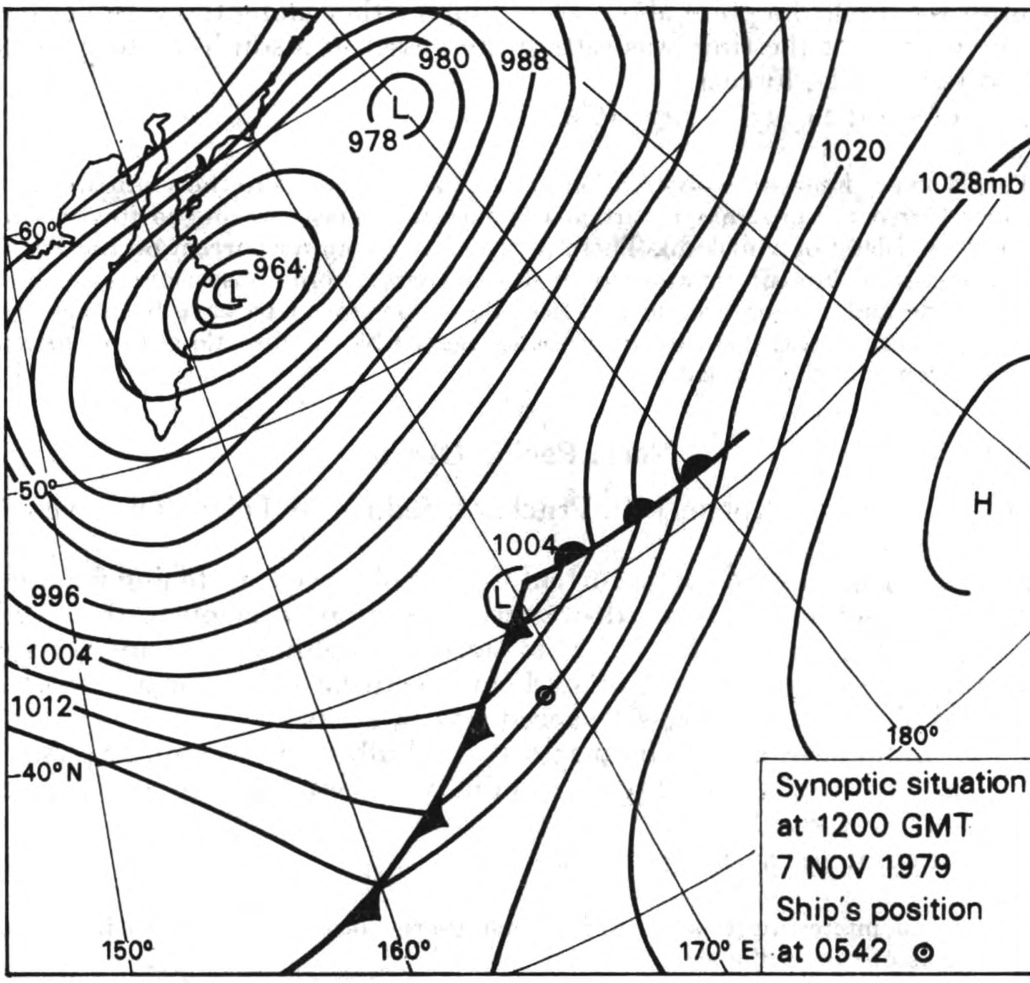
m.v. *Finnish Wasa.* Captain M. Baker. Vancouver to Tsingtao (China). Observer, Mr D. G. Green, 3rd Officer.

7 November 1979. At 0542 GMT a large wave, estimated to be 12–13 metres at least from trough to crest, was encountered. As the vessel negotiated the wave she was pooped and the stern dipped beneath the water to a considerable depth. The resulting pressure of water carried away a wooden door and frame from the after end of the accommodation up the starboard alleyway and smashed it into the forward cross alleyway bulkhead.

Within half an hour a cold front associated with a deep depression, central pressure 964 mb, centred off the west coast of Kamchatka, passed over the vessel; the rain belt marking the edge of the front was observed on the 24-n. mile range of the radar screen lying in a south-west to north-easterly direction. A change in the character of the pressure was also observed on the barogram.

Weather conditions at 0600 were: dry bulb 20·5°C, wet bulb 19·5, wind WSW, force 10.

Position of ship: 38° 03'N, 169° 22'E.



Note. From the beginning of the month a series of quite deep depressions formed in the Sea of Japan area; they moved north-east to the Bering Sea.

A large slow-moving anticyclone to the south-east helped to maintain strong westerly pressure gradients over the north-west Pacific for several days which generated large waves and swell.

The synoptic situation at 1200 on the 7th is shown on the accompanying chart, (from the remarks of the observer the cold front should be further south-east than drawn).

Over several days there were many reports of high seas in this general area of the Pacific.

DISCOLOURED WATER

Western North Atlantic

m.v. *Wiltshire*, Captain R. A. F. Edwards. Santos to Trinidad. Observers, the Master and ship's company.

28 October 1979. At 1130 GMT a distinct line of discoloured water was observed to the north of the vessel, as the line was crossed the colour changed from deep blue to a light green/brown—the water remained this latter colour for a few hours afterwards. The sea temperature rose slightly from 27·3 to 27·8°C and considerable variations were observed in the echo-sounder recorder trace whilst crossing the line (an accurate depth was unobtainable).

The water in the immediate vicinity of the line was very choppy, so much so that the splashing could be heard from the bridge-wing. For a brief period the direction of swell changed from 090 to 270°(T).

It was concluded that the outflow of the Oiapoque River was the cause of the phenomenon.

Position of ship: 5° 06′N, 50° 42′W.

Note. It is thought that this line marked the boundary between coastal and oceanic waters. The general flow of water off this coast is due to the Guiana Current which sets to the north-west. At the time of the observation, however, the tide was falling and there would have been a tidal flow along the coast to the east.

The effects of the tides in this area are not normally felt more than about 10 n. mile off the coast but the submarine topography, or the outflow from the Oiapoque River, may have caused a diversion of this coastal flow carrying it further northwards out to sea than usual.

ICEBERGS

Southern Ocean

s.s. *Remuera Bay*. Captain L. E. Howell. Wellington to Zeebrugge. Observers, the Master, Mr F. R. Barry, Chief Officer, Mr N. A. Cooke, 2nd Officer and Mr P. G. Posey, 3rd Officer.

4 December 1979. At 0850 GMT an iceberg, see sketch A, was encountered 145 n. mile west of Cape Horn; it was estimated to be 40 metres high and 220 metres long. The berg was clearly observed on the radar screen at a distance of 19 n. mile and, as dawn approached, it was seen with the naked eye at a distance of 15 n. mile.

(A) (B)

The iceberg was coloured chalky white, the tabular top appeared to be angled at about 20 degrees from the vertical.

Weather conditions were: dry bulb 6·0°C, wet bulb 5·0, sea temp. 6·6, wind WNW, force 5, good visibility.

A smaller iceberg, see sketch B, was observed at 1236 close to the vessel about 70 n. mile west of Cape Horn, this berg was estimated to be 10 metres high and 80 metres long. Heavy seas were breaking over the berg on the weather side. A small growler was observed close to the main berg; it was thought to have been broken off by the heavy seas.

When the vessel was approaching the steep weather side of the iceberg, it was first observed on the radar screen at a distance of 12 n. mile. When the vessel had passed, the down-wind sloping side was observed at a maximum distance of 4 n. mile on the radar. It was seen with the naked eye at about 6 n. mile.

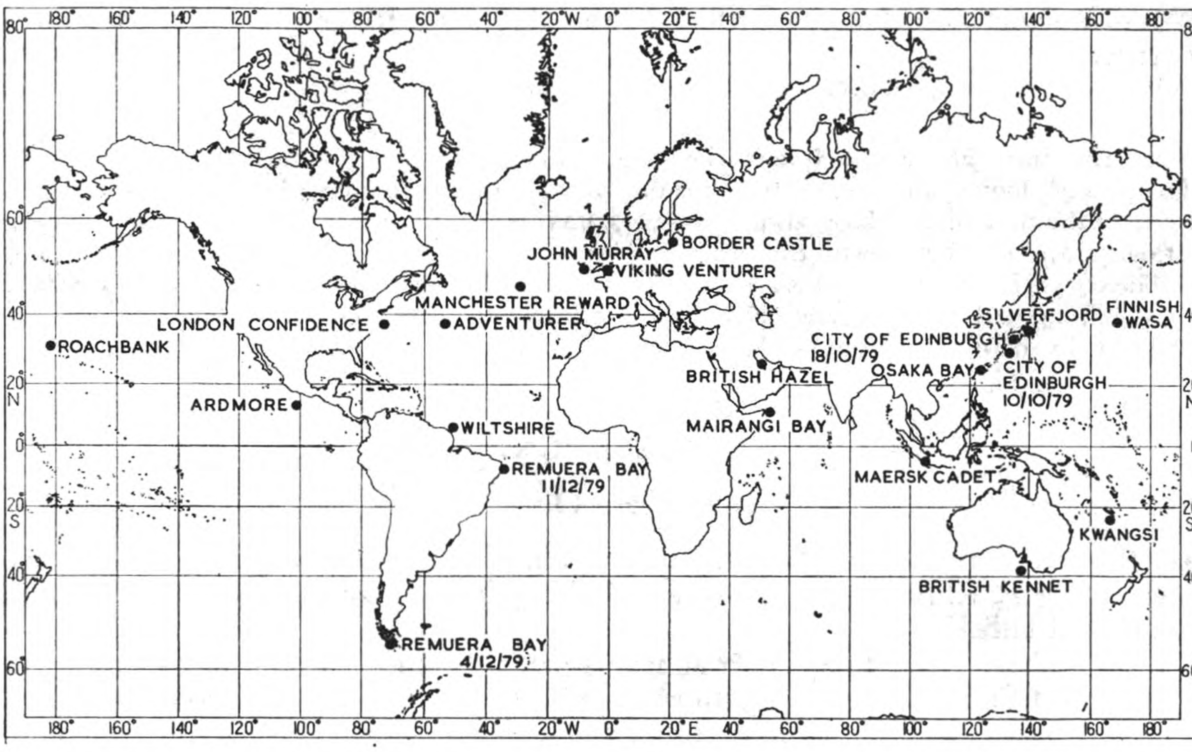
This berg was coloured white and a light green; the area just beneath the surface was a light bottle green.

Weather conditions at this time were: dry bulb 6·5, wet bulb 5·8, sea temp. 6·3, wind W'N, force 6, continuous light rain.

At 1540 a further moderate-sized weathered iceberg was observed close to Cape Horn. This was bright white and had a double-peaked top.

Weather conditions were: dry bulb 7·0, wet bulb 6·2, sea temp. 6·6, wind W'N, force 7, heavy rain squalls.

Position of ship at 0850: 55° 34′S, 71° 29′W.



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

ARCTIC SEA SMOKE

Baltic Sea

m.v. *Border Castle.* Captain A. E. Marshall. At anchor Klaipeda (USSR). Observer, Mr C. J. Harding, 3rd Officer.

31 October 1979. During the evening the air temperature fell gradually and when it had reached −3·0°C Arctic sea smoke was observed drifting towards the vessel in the moderate to strong east-south-easterly wind. The sea temperature was 12·2 and the 'smoke' estimated to be 0·5 metre in depth. The 'smoke' continued to increase in depth as the air temperature fell to −4·5 at 0000 on the 1st of November and by 0100 it was estimated to be 4 metres in depth and beginning to drift over the deck of the vessel which had a freeboard of approximately 10 metres. At 0600 the visibility was reduced in the 'smoke' to half a nautical mile. At 1000 the sea smoke dispersed as the temperature rose to −3·5.

Position of ship: 55° 43′N, 21° 10′E.

Note. The following is an extract from the *Meteorological Glossary*:

If, when cold air moves over warm water, the vapour pressure at the water surface exceeds the saturation vapour pressure at the air temperature, then evaporation from the water surface proceeds at a higher rate than can be accommodated by the air. The excess water vapour over that required to saturate the air condenses, and, in the unstable conditions present in the layer near the surface, the condensed water is carried continuously upwards to evaporate into the dried air above. 'Steam' or 'smoke' thus appears to rise off the water surface. If an inversion exists near the water surface, fog may be confined below the inversion and become dense.

The phenomenon occurs, for example, over inlets of the sea in high latitudes; over newly formed openings in pack ice; over lakes and streams on calm, clear nights; over damp ground heated by bright sunshine in cool conditions. Alternative names are 'frost smoke', 'sea smoke', 'steam fog', 'warm-water fog', 'water smoke' and 'the barber'.

DOLPHINS

Western Approaches

R.R.S. *John Murray*. Captain P. H. Warne. Barry to the Western Approaches. Observer, Mr D. Coverdale, Chief Officer.

The following are details of sightings of Common dolphins:

11 October 1979. At 1735 GMT one dolphin observed moving in a south-westerly direction, slight sea, moderate confused swell.

22 October. At 1720 eight dolphins observed, moderate sea, moderate swell.

23 October. Vessel hove to. At 1630 ten plus dolphins observed, moderate sea.

24 October. Vessel hove to. At 1615 ten dolphins observed playing around the vessel for 30 minutes, slight sea, moderate southerly swell.

Position of ship at 1735 on the 11th: 48° 32′N, 7° 14′W.

Position of ship at 1615 on the 24th: 50° 20′N, 8° 15′W.

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

'*Delphinus delphis*, as its name implies, is the most common dolphin encountered in the Western Approaches. It may be seen in very small numbers or in schools of a thousand or more.

'The colour pattern is most striking with dark topsides, white bellies and 2 light elongated lens-shaped patterns on the flanks. This cross-over or horizontal figure-of-eight appearance is most noticeable and is a great help to identification of the dolphin at a distance.'

North Atlantic Ocean

m.v. *Adventurer*. Captain O. M. Owen. New Orleans to Liverpool. Observers, the Master and ship's company.

6 October 1979. Approximately 30 Bottlenosed dolphins were sighted close to the vessel heading in a north-westerly direction at a speed of about 8 knots. They were swimming in family units with juveniles. The adult dolphins were about 4 metres in length and the juveniles 2 to 2½ metres in length.

Position of ship: 37° 40′N, 53° 30′W.

Note. Mr McBrearty comments:

'This observation is interesting in that the animals were described as being family units with juveniles. In the western Atlantic birth usually occurs in *Tursiops truncatus* during the period February to May although it is possible, in some cases, that it could occur during the period September to November.

'Birth length in *Tursiops* is of the order of 1 to 1.1 metres. Females of less than 2·3 metres are known to be sexually active, therefore those described as juveniles of 2 to 2·5 metres are certainly too large to be this year's calves, a length of 2 to 2·5 metres would take something like 5 years to achieve. The upper limit in length of adult Bottlenosed dolphins is thought to be of the order of 3·75 metres.'

Persian Gulf

m.v. *British Hazel*. Captain H. Phillips. At anchor Sitra (Bahrain). Observers, the Master and Mr A. P. Yates, 2nd Officer.

30 December 1979. At about 1430 GMT the attention of Captain Phillips and Mr Yates was drawn to a small group of dolphins about 150 metres distant on the starboard bow. Several groups had been observed playing and jumping in the 1- to 1½-metre waves formed in the fresh northerly breeze. Of particular interest on this occasion, however, was the behaviour of the sea birds in the vicinity—the larger birds swooped down and pecked at what was thought to be the dorsal fins of the dolphins whilst the smaller birds flew around making a lot of noise.

As the observers were discussing the possible effects of the pecking at the fins of the dolphins, a group appeared in which the dolphins were observed to be encircling a shoal of fish; the creatures were describing a circle some 3 metres in diameter and slowly rolling over onto their backs. It was at first thought that they were protecting their young, but, as they drifted down abeam of amidships, it was observed that the 'young' were not coming up for air. It then became clear that the dolphins were herding a shoal of fish and feeding on them. When the last of the fish had been eaten the birds departed and the group of dolphins, 15–20 in number, set off to join the larger group astern of the vessel.

Captain Phillips commented that it was the first time he had been privileged to observe dolphins feeding in this manner and that the leisurely way in which they conducted themselves created the impression of friends taking a meal together—there was no squabbling over the fish and, most surprising, no panic among the fish themselves. One flurry of activity did occur when a fish was caught by the tail instead of the head—an incident which prompted Captain Phillips to ask 'do dolphins paralyse the fish by catching them behind the gills?'

Position of ship: 26° 10′N, 50° 40′E.

Note. Mr McBrearty comments:

'Captain Phillips was indeed fortunate in having a grandstand view of the feeding pattern of these dolphins. All whales and dolphins swallow their prey whole. Those with teeth (Odontoceti) have a varying number depending upon the species—these may be from just 2 teeth in the lower jaw in the case of Sowerby's beaked whale (*Mesoplodon bidens*) to between 55–60 in each quadrant in some species of *Stenella* or long-beaked dolphin. The dentition is always the same type (Homodont), the teeth are not divided into incisors, pre-molars and molars (Polydont) as in other orders of mammal including man.

'In dolphins, teeth are used simply to grasp the prey which is then swallowed whole. If the dolphin does manage to take a fish head on it will, after the first bite, quickly flip it round the "right" way.

'In answer to the question "does the dolphin paralyse the fish by catching them behind the gills?", I should think that the answer would be "yes". The effect of perhaps 50–60 sharp "peg-like" teeth being clamped into the body of a fish would, I suspect, be sufficient to stun it long enough to be released and turned quickly without being able to escape—a couple of seconds is long enough.

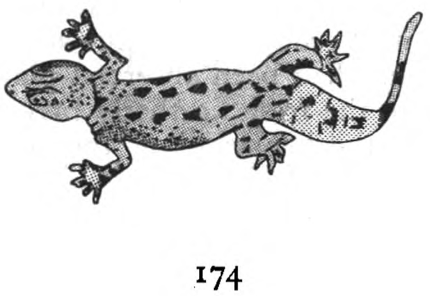
'Whilst describing this excellent account of feeding, Captain Phillips has unfortunately not given any identification data on the species of dolphin concerned in this record; I would think that the animals seen were either Bottlenosed dolphins (*Tursiops*) or the Humpback dolphin (*Sousa plumbea*). The actual numbers of teeth seen in the jaws of these 2 dolphins may vary individually but the average dental formula of *Tursiops* is $\frac{24/24}{24/24}$ and that of *Sousa* $\frac{36/36}{36/36}$.'

LIZARD

Arabian Sea

m.v. *Mairangi Bay*. Captain P. J. Clark. Genoa to Melbourne. Observers, the Master, Mr M. J. Power, 2nd Officer and Mr C. Saint.

27 December 1979. At 1345 GMT a lizard, see sketch, was found. It was placed in an old ice cream carton and given a small dish of water.



Reference to an encyclopedia indicated that it was probably a member of the Geckonidae family, one of the 20 or so common family of reptiles. It was further described as being 'cosmopolitan in its distribution over the tropical and sub-tropical parts of the world'.

The creature was a tanned-brown colour with sets of 2 dark-brown spots running the length of the body and tail. It was approximately 12 centimetres long and seemed to have suction pads on the toes which enabled it to climb out of the box and escape—after several such attempts a cover was placed on the box. It was thought to be an insectivore but when offered dead flies and raw meat, both were refused. In fact, it survived the passage without food of any kind.

As the vessel came within 500 n. mile of the Australian coast the lizard became excited and was very active in its box at night thus illustrating the use of small animals by early maritime explorers in establishing approach to land.

On arrival at Melbourne the lizard was declared to the Quarantine officials and taken, by agreement, to Melbourne Zoo.

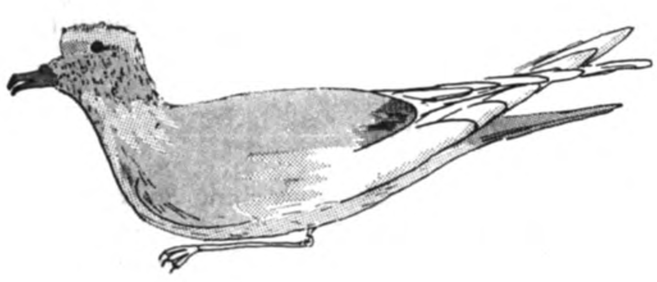
Position of ship: 10° 09′N, 53° 55′E.

BIRDS

North Atlantic Ocean

m.v. *Manchester Reward*. Captain J. B. Turnbull. Morehead City (North Carolina) to Rotterdam. Observers, Mr S. W. Douglas, 2nd Officer, Mr G. R. Green, 3rd Officer and Mr W. Atherton.

18 November 1979. At 0045 GMT the look-out reported hearing a loud thud and thought that something had come into contact with the vessel's funnel. At the end of his watch Mr Green investigated and found a small bird, see sketch, staggering around the boat deck.



The bird, now identified as a Storm Petrel, was 19 centimetres long, the over-all colour was slate grey but with fine white feathers at the base of the tail and darker grey patches in front of the eyes. The fluffy appearance of the feathers suggested that it was a young bird.

It was believed that the creature may have been caught in an updraught since the funnel was white and quite well illuminated by the deck lights.

After a preliminary examination it was considered that nothing was broken and all 'Fred' needed was a good rest. In daylight a closer examination was carried out confirming our earlier findings. The bird could both walk and fly; when taken onto the bridge-wing, however, no attempt to fly off was made.

At this time we were only 2 days from land so an empty beer case was found and became his temporary home. Fish, bread and milk were offered, Fred was observed to drink on numerous occasions, but not to take the food.

During his first day on board he explored the bridge and bridge-wing, walking and flying, but again no attempt to fly off was made. He was by no means a timid bird and sat quite happily on Mr Douglas' hand whilst the sketch was made.

At 1420 on the 19th Fred took off and was last seen heading in a southerly direction.

Position of ship at 0045 on the 18th: 47° 12′N, 28° 55′W.

North Pacific Ocean

m.v. *Roachbank*. Captain P. M. Ireland. Panama to Tsingtao. Observers, Mr S. J. Messruther, 2nd Officer and Mr P. N. Hill, 3rd Officer.

3 December 1979. At 0900 GMT an owl, see sketch, alighted on the vessel; at the time we were some 320 n. mile north-west of the nearest land (Midway Island), the surface wind was NE, force 5.

The bird was mainly dark brown with yellow stripes on the wings and dark-brown pin stripes on a fawn breast. The face was lynx-like, the eyes dark brown and there were black feathers around the beak and ear-like feathered tufts on the top of the head. It stood approximately 30 centimetres high and had a wing-span of about 75 centimetres.

Position of ship: 31° 03′N, 177° 19′E.

Note 1. Captain Tuck of the Royal Naval Birdwatching Society has identified the bird as being a Long-eared owl, *Asio otus*.

Note 2. The Long-eared owl nests from March to April usually in abandoned nests of other birds, e.g. crows or birds of prey, and squirrels; it also nests on the ground where there is good cover. The eggs are oval in shape and white in colour. It feeds on small mammals, birds and insects. The call, more of a moan than a hoot, helps to locate it during the hours of darkness. The 'ear-like feathered tufts' can be laid almost flat on the head. The eyes are a dominant feature.

The bird breeds in Central Asia, NW. Africa and N. America and takes partially migratory flights to N. Egypt, N. India and Mexico.

LADYBIRD

South Atlantic Ocean

s.s. *Remuera Bay*. Captain L. E. Howell. Wellington to Zeebrugge. Observer, the Master.

11 December 1979. At 1200 GMT a small insect was found alive on board the vessel, it was forwarded to the British Museum for identification purposes. The nearest approach to the Pernambuco coast during the previous night had been 15 n. mile. The wind, E'ly, force 4, had been onshore during the last 24 hours.

Position of ship: 7° 45′S, 34° 29′W.

Note. Mr M. J. D. Brendell of the Department of Entomology, British Museum (Natural History), comments:

'This small insect is an adult ladybird identified as *Coccinella septempunctata*, Linnaeus—the Seven-Spot Ladybird. This species has a European distribution and is quite common in Britain. I can only think that the discovery of the beetle on board the *Remuera Bay* whilst off Brazil was due to the warmer latitudes persuading it to come out of hibernation from somewhere within the vessel. It could well have been on board for quite some time having flown there on one of the vessel's earlier visits to European waters.'

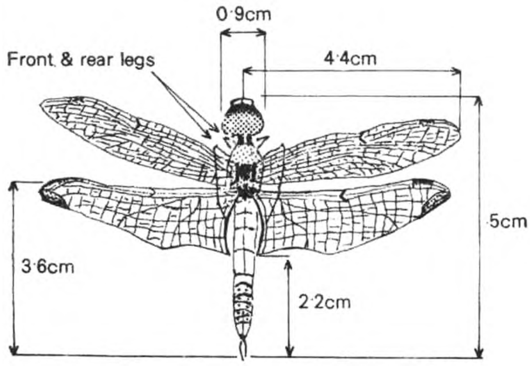
DRAGON-FLY

Sunda Strait

m.v. *Maersk Cadet*. Captain W. H. Walker. Port Elizabeth to Hachinohe (Japan). Observers, the Master and Mr M. Aldrich, 3rd Officer.

3 November 1979. During the first part of the passage through the Sunda Strait heavy rain was encountered. At 1230 GMT the rain ceased and it was believed that it was from that time onwards that the dragon-fly flew on board. At 1455 the vessel was at the nearest approach to land—one n. mile.

The creature's measurements are shown in the accompanying sketch. It was mainly light and dark brown in colour with black veins and transparent wings.



There were, however, 4 light-mauve patches on each wing and a light-brown stain on the rear wings. The wings were connected at the centre of the body, the upper and lower parts of which were covered with a donkey-brown fur. The eyes were large and had a deep-purple sheen. The long tail was jointed in several places, the only possible movement was at each joint. Two pronged pincers appeared at the end of the tail.

Position of ship at 1200: 6° 18′S, 105° 18′E.

Note. Mr Stephen Brooks of the Department of Entomology, British Museum, comments:

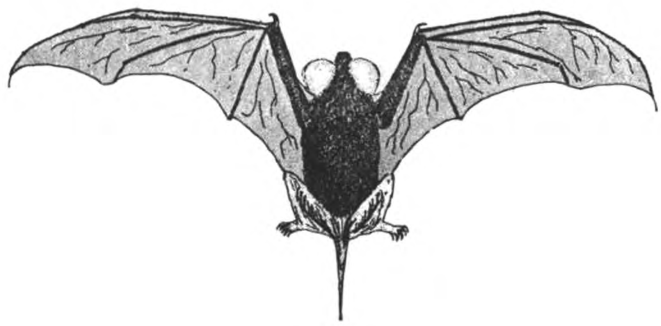
'The sketch is that of *Pantala flavescens* (Fabr.) (Libellulidae). This dragon-fly is found circumtropically and will often swarm and undertake long migratory flights.'

BAT

Australian Bight

m.v. *British Kennet*. Captain G. Luff. Kwinana (W. Australia) to Geelong. Observers, Mr J. Shelley, 2nd Officer and Mr M. C. Porter and Mr J. Bottomley, 3rd Officers.

22 October 1979. At 0100 GMT a bat, see sketch drawn by Mr Porter, was discovered in an exhausted condition on the poop deck, it was so tired that we were



able to handle it, take measurements and make the sketch. It measured 11 centimetres from nose to tail and 26½ centimetres from wing tip to wing tip.

Position of ship: 38° 06′S, 137° 00′E.

BIOLUMINESCENCE

Western North Atlantic

m.v. *London Confidence*. Captain F. G. B. Hewlett. St Croix (Virgin Is) to New York. Observer, Mr J. L. David, 3rd Officer.

28 December 1979. At 0800 GMT a small white light was observed on the port bow, it was at first thought to be a small vessel some 5 n. mile distant. A minute or so later several lights, now thought to be a group of fishing vessels, were seen on either bow.

Within 15 minutes of the first sighting bioluminescence was observed capping the approaching waves and the 'lights' merged to form a broad band taking on a more-familiar greenish hue. As the vessel progressed northwards so more bioluminescence was observed but without the clearly defined characteristics of the 'fishing fleet'.

The massed concentration of the light-reflecting plankton was probably the result of upwelling and confluence caused by the Gulf Stream passage as the vessel was approaching the axis of the Stream. The sea temperature had been falling during the days prior to the sighting and was now 18·6°C. Four hours later it had fallen to 13·7 indicating that the vessel had reached the 'cold' side of the Gulf Stream. Other conditions were: dry bulb 8·7, wet bulb 7·4, 4 oktas of cloud, barometric pressure 1017·5 mb, falling.

Position of ship: 37° 42′N, 72° 50′W.

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

'This is an interesting report of the deceptive nature of bright patches of luminescence. Their brightness must have been exceptional to give the estimated visual range. They were probably caused within an area of luminous plankton either by the mechanical effects of upwelling (or shear disturbances) in the Gulf Stream or by the movement of local shoals of fish or squid. As Mr David suggests, the local concentration of luminous plankton is probably related to the effects of the Gulf Stream.'

South Pacific Ocean

m.v. *Kwangsi*. Captain J. M. K. Kelly. Mount Maunganui (NZ) to Manila. Observer, Mr M. P. Lee, 3rd Officer.

The following are observations of bioluminescence submitted by Mr Lee:

16 December 1979. Bioluminescence in the form of pin points of light was observed. When the Aldis lamp was directed onto them the lights changed in colour from bluish-white to bright amber although no increase in the density was evident. 'Fireballs', caused by upwelling, about one metre in diameter were also present.

These were bluish-green in colour and became invisible under the light from the lamp.

An interesting feature of the pin-point lights was that, before having the light directed onto them, they were flashing then vanishing from sight. When the light was turned on, however, it was possible to track them to the limit of the range of the lamp, approximately 90 metres.

Position of ship: 30° 10′S, 170° 45′E.

17 December 1979. At 1200 GMT the Aldis lamp was directed onto the water and bright flame-like amber lights were observed, in smaller numbers, however, than on the previous night. Colour changes to blue were also noted. When the radar was turned on and off on 3 occasions there was a noticeable increase in the quantity of bioluminescence.

Position of ship: 24° 15′S, 166° 16′E.

19 December 1979. At 1200 GMT the Aldis lamp was directed onto the water and intermittent flashes (only 1 or 2 per minute), bright amber in colour, were observed. They were about the size of a golf ball, some, however, appeared elongated into a cigar shape.

At 1330 the activity increased during which the bluish-white flashes turned to amber under the light from the Aldis lamp.

Position of ship: 14° 12′S, 157° 12′E.

Note 1. The *Kwangsi* is a Hong Kong Selected Ship.

Note 2. Dr Herring comments,

'The lights from the Aldis lamp were probably reflected from the eyes of lantern-fish or squids; such reflections are usually described as red amber and look very like cats' eyes at night. These animals have a reflective layer at the back of the eye to increase their vision at night or in deep water. The cigar-shaped objects may have been whole small squids which are usually red-brown in colour and come to the surface at night.'

551.583

Climate

(Reproduced from *International Marine Science Newsletter*, Number 24, Winter 1979–80, by kind permission of the Editor)

The speech published below was presented to the 11th session of the Intergovernmental Oceanographic Commission (IOC) Assembly by Dr Roger Revelle, Chairman of the SCOR/IOC Committee on Climatic Changes and the Ocean. It is reprinted here as a background to what may become one of the Commission's most important programmes.

I am about to describe what I believe to be the most important programme that has challenged the IOC in many years and, for this reason, I beg your indulgence if I begin with a little lecture about climate.

Climate can best be described by what it is not—it is not the weather. The weather consists of those phenomena in the atmosphere that can be predicted to a useful degree in space and time. The modern theory of meteorology demonstrates rather conclusively that predictability is impossible for the weather after about 2 weeks. So far, weather forecasters have been able to make long-range forecasts which are more or less useful for several days and they hope that, by continuing their theoretical and observational studies, they will be able to gain a skill in forecasting which may be extended for from 10 days to 2 weeks.

What is climate?

Beyond 2 weeks what we can say about the atmosphere is that it has statistics that are called climate. The average, for example, of the temperature over a period of years at a particular place or over a particular region or over the globe itself; the average area of sea-ice covering parts of the oceans; the average wind speeds and directions—all of the phenomena of the atmosphere that are of importance to human affairs.

A characteristic of climate, besides the fact that there are averages which we can use for convenience over any time period we are interested in, is that the climate varies. It varies on all time scales and all space scales and the longer the record, interestingly enough, the more the variation. The greatest excursions of climatic conditions of which we are aware, but which fortunately none of us has experienced, was the transition from the Ice Age to the present world climate.

For the last 10 000 years, the climate has fluctuated over rather a narrow range—only perhaps 2° Celsius or less in the global average air temperature. There have been much greater variations in precipitation in particular places but, for the earth as a whole, probably a relatively small percentage variation in precipitation. The biggest climate change that we are aware of, especially in mid-latitudes, is the seasonal variation. We all know that the climate where we live is very different at one time of the year than it is at another.

The factors that control climate appear to be different from the factors that control the weather. The weather is determined by what the theoretical people call 'the initial conditions'. If we know the distributions of temperature, pressure, wind and water vapour at any one time, we can predict what will happen from these initial conditions for a few days.

On the other hand, climate—the average conditions over a time period and over a region in space—is controlled by what theoreticians call 'the boundary conditions', mainly the amount of radiation coming from the sun to the earth's surface and the temperature of the sea surface in the case of the atmosphere, plus the internal dynamics of this marvellously complicated and intricate thermo-dynamical/hydro-dynamical system.

'Talking or doing something . . . . .'

Climate and weather are both important in human affairs. Mark Twain said that everybody talks about the weather but nobody is able to do much about it. There are some possibilities now that we will be able to do a few things to change the weather.

People don't talk about climate so much but, in fact, it is of far greater importance than weather for many of our fellow human beings. Right now (Autumn 1979) for example in India, the Monsoon has hardly appeared in the Punjab this year. The Monsoon rains were very light. The result is that the Indian cereal crops will be seriously short at the autumn harvest. Similarly in the Soviet Union because of climatic variations from the average conditions, there is a serious shortage of wheat production.

From the standpoint of energy planners who want to know what kinds of energy and how much to use, if it were possible to forecast what the climate would be next winter, it would be of the greatest value—worth literally, in the United States alone, perhaps a billion dollars. In India, how much hydro-power will be available and how much thermo-electricity will have to be generated from imported oil, depends upon the amount of precipitation which varies as climate varies.

In architecture and construction planning the average climate is, of course, of obvious importance, but the variations in climate are also important. From the standpoint of human health and welfare, again both the average climate and the variations in climate turn out to be highly significant. In designing water supply systems for different purposes, a knowledge of the variations in climate from year to year is very useful, and, if we could possibly predict what next winter or next summer would be like, the results would be invaluable to water supply engineers.

We are concerned both with describing the climate and, if possible, eventually with predicting it. During my lifetime one of the articles of faith of oceanographers has been that the ocean somehow controls the climate—that the ocean, because of its slow response time and slow relaxation time, affects the climate over periods at least of months and possibly of years. We are getting some support for this idea from theoretical models and also from statistical analyses.

For example, there is a phenomenon called the Southern Oscillation, first discovered by Sir Gilbert Walker of the British Meteorological Office, in which there are what the climatologists call 'teleconnections', that is correlations between events thousands of miles apart; the climate over a very large area from the eastern part of Africa to the west coast of South America seems to be affected by one very large-scale phenomenon. This phenomenon is reflected in, and may be the result of, conditions in the upper layers of the western Pacific Ocean.

As another example, there is fairly good evidence that the average temperature and precipitation over North America can be predicted, even if only roughly at the present time, but nevertheless with some skill, from the anomalies of temperature over a large area of the North Pacific during the previous summer. Yet another example, the intensity of the Monsoon in India, the amount of rainfall and the duration of the Monsoon, seem to be related to cooling in the Arabian Sea and this, in turn, is related to the strength, duration, velocity and transport of the Somali Current off the Horn of Africa.

Influence of ocean weather

Interestingly enough, it may well be that the weather in the oceans determines short-range variations of climate in the atmosphere. We are now finding in the ocean a phenomenon that has been given the name of the 'mesoscale eddies'. These are strictly comparable hydrodynamically to the cyclones in the temperate latitudes of the northern hemisphere, the cyclones being phenomena that extend over 2000 kilometres and last for several days and which are the principal causes of weather in mid latitudes.

In the ocean the mesoscale eddies are much smaller in spatial dimensions, they are only 100–200 kilometres in diameter but they persist for periods of up to 4–6 months. The configuration of the eddies, their location, the velocities of motion and the temperature and heat transport, which are really the ocean weather may be, in fact, closely related to the variations in the average conditions over several months in the atmosphere.

Similarly, at greater depths in the sea, the eddies may have effects which persist for long periods, so the ocean weather at depths of perhaps 500–1000 metres, reflecting the mesoscale eddy phenomena in the upper layers, may persist for years and may give at least some possibility of forecasting the climate for years in advance. One of the concepts that we are starting out with is that the ocean weather lasting for a considerable time period may be related to variations in the atmospheric climate.

The climate of the ocean itself has an impact on human concerns and, in particular we believe, on fish abundance and fish locations. The abundance is closely related to the success of the recruitment of a particular fish population and this recruitment success may be related to changes in the ocean circulation, in other words in the ocean climate.

In the early planning of the World Climate Programme, it has been the policy of the World Meteorological Organization (WMO) and of the International Council of Scientific Unions (ICSU) that the oceanographic aspects should be the responsibility of the corresponding ICSU body, the Scientific Committee on Oceanic Research (SCOR) and the corresponding intergovernmental body, the IOC.

SCOR has acted here to appoint a Committee on Climatic Changes and the Ocean consisting of some 11 members and a group of about 15 corresponding members, the latter being the chairmen of those subsidiary bodies of SCOR and IOC which seem to be related to climate. For example, among the working groups of SCOR that are involved are those of 'El Niño', on Tropical Upwelling and on Arctic Oceanography.

The Committee on Climatic Changes and the Ocean met in early October (1979) in Miami, Florida, following a more specialized meeting which dealt with the problem of monitoring the ocean from the standpoint of climate. This was called the Planning Meeting for the Pilot Ocean Monitoring Study.

A great many decisions, at least preliminary decisions, were taken—decisions which should lead, and can lead, to future action. The Committee on Climatic Changes and the Ocean established 5 working panels and it will give you some idea, if I name these panels, of the concept the Committee has of the range and scope of its responsibility.

The first panel, to be chaired by Professor Robert Stewart of Canada, will be charged with maintaining collaboration and co-operation with the Joint Scientific Committee for the World Climate Research Programme and to develop those oceanographic programmes which will support and strengthen the meteorological programmes.

Sea ice as signal of climatic change

The second panel is on sea ice. Sea-ice variation is one of the strongest signals of variations in climate in both the ocean and the atmosphere, because a very slight variation in meridional heat transport from south to north in the polar regions causes variations in the extent of sea ice and there is a positive feedback relationship. If the sea ice extends a little bit, the albedo (reflectivity) increases, less radiation is received, the air and water are cooled and, therefore, the sea ice extends further. The problem with this positive feedback is, of course, what stops the ice from extending all over the ocean.

One of the important oceanographic aspects of the sea-ice problem is that in those areas where sea ice is continually formed, that is in areas of divergence in the sea ice where the sea ice is splitting and new ice is forming, the salinity of the water near the surface is increased and consequently its density is increased with the result that bottom water formation is accelerated and amplified.

The third panel will be one on climate and marine ecology. I have already mentioned the importance of variations in the ocean climate as far as fish location and the size and abundance of fish populations are concerned. Professor Alan Longhurst, also of Canada, is the biologist member of the Committee on Climatic Changes and the Ocean. We are aware that we must deal not with single species but with the entire ecosystem of the ocean as it is affected by variations in climate.

The fourth panel, and perhaps the most interesting because it is based on a rather new idea, is on 'high resolution palaeoclimatology'. What we mean by this is that, unlike the studies that have been made up to now of ocean bottom cores which give the variations of conditions over centuries and at the minimum over a few decades, it may be possible by studying sediments accumulated in certain special environments, for example, the Black Sea or the anaerobic basins off Southern California, to find year-by-year variations in past conditions as they are reflected in the sediments.

An equally promising idea is the study of the growth rings of corals. Corals in tropical waters grow very fast and we know that at least in the Pacific the greatest variations in ocean-water temperatures, greater than the seasonal variations, are those from year to year. This should be reflected not only in the rate of growth of the individual corals but also in the ratios of oxygen 16 to oxygen 18 and the carbon 13 to carbon 14 in the carbonate laid down by these organisms. Large molluscs, like the so-called man-eating clams of the Pacific, may also show the same kinds of variations in annual growth rings in the oxygen and carbon isotope ratios.

If this idea works out, it may be possible to multiply the numbers of time-series of climate over past decades and centuries, at least in terms of the temperature and possibly the salinity of the waters near the surface in the tropical and sub-tropical areas where these large invertebrate organisms grow. It may also be possible to get some similar time-series in high latitudes from corals that live at somewhat greater depths.

Finally, we established a fifth panel on theory to deal with ocean and atmospheric models and on coupled models of the ocean and the atmosphere. This panel will also provide help to theoreticians in ocean monitoring and sampling problems—not only what to monitor to test particular models, but where to monitor and what the sampling and network design of the observations should be.

We decided on 2 major ocean experiments. One of the most important unsolved problems of the relationship for climate between the ocean and the atmosphere is the amount of heat transported from low latitudes to high latitudes by the ocean. We know how much heat must be transported by the ocean and the atmosphere together, because we know what the amount of outgoing radiation from high latitudes must be compared to the incoming radiation at low latitudes. But how much is carried in the ocean and how much is carried in the atmosphere is not known within a factor of 2 and the role of the mesoscale eddies is not understood at all.

The CAGE Experiment

So we proposed what we called a 'CAGE Experiment', an experiment which will probably be conducted in the North Atlantic starting either near the Equator and going up to 25°N or starting at 25°N and going perhaps to 45°N, with east-west 'fences' across the ocean at these 2 latitudes. The cage would, of course, have to be bounded on all sides. It would be bounded on the east and west by measurements of the meteorological processes taking place at the continental shorelines which would tell how much heat is carried across from the sea to the land or from the land to the sea. It would have to be bounded on the top by the upper limit of the troposphere; how much radiation is going out of the troposphere and how much is coming in.

The second experiment, which will take years of preparation, will be what we have called 'the global ocean circulation experiment', an actual attempt to map the currents in the upper water layers of the entire ocean. This is made possible by the existence of satellites which for the first time make it possible for us to see the ocean as a whole on virtually a day-by-day basis.

Another major decision was to accept the idea that there should be standard hydrographic sections in the ocean, along which standardized measurements should be made at regular intervals, particularly where these are of interest to more than one country. We made a list of what we called 'pilot ocean monitoring sections', including several of those which have been occupied repeatedly by our colleagues from the Soviet Union, a long section along the meridian of 137°E which has been occupied for many years by the Japanese, a similar section going out from the coast to ocean weather station PAPA which is occupied by the Canadians, and a few others.

Long time-series of data

We also decided on 2 conferences we would like to hold in the next 2 years. One would be a conference on experience that has been gained from time-series. There are a great many time-series of oceanographic measurements, for example, the Soviet Union has for nearly 70 years conducted measurements along a section which shows marked variability from year to year. Similarly, my own Institution, the Scripps Institution of Oceanography, has measured the temperatures and salinities along the California Coast for about 70 years and there are many other long time-series of observations. Few of them, as far as I know, have ever really been examined to find out what could be learned from them. What we propose is to call a conference of people who have made these series, ask them to give us all the interpretation they can, all the ideas they can glean from these sections and also, of course, what the unknowns still are.

The second conference would be on the impact of the oceans on global climate. We want to gain greater understanding of the ideas that I have been touching on very generally about the relationships between ocean phenomena and atmospheric phenomena in so far as climate is concerned.

We also considered the problems of data management and instrumentation. The present systems of ocean data management are inadequate from the standpoint of attempts to predict short-range variations in climate, variations from several weeks to several months, because the data do not come in soon enough. The bathythermograph observations from ships-of-opportunity in the North Pacific coming in over the WMO network, pass through about half a dozen hands with all the errors that are likely to be experienced by repeated manipulation or repeated transmission of the data.

Moreover, much of the data comes in about 3 months after they are taken, so an attempt to use these Pacific Ocean data to say what the climate during the next season in North America will be is completely impossible—the data are just not available until the climate is upon us. We need an automatic data transmission system for these bathythermograph observations so that they will be immediately transmitted to a data centre where they could be compiled, manipulated and used.

Potential of satellite measurements

There are a whole series of exciting new instrumental possibilities, the most important being, perhaps, those that are related to the satellites. It turns out that at least 4 countries or groups of countries may be putting up satellites that can observe the ocean—the European Space Agency, Japan, the Soviet Union and the United States.

The satellites may have at least 4 very important measurement capabilities, the most important being the measurement of sea level. If we could map the sea level of the ocean, we would be mapping the geostrophic currents at the surface, that is the total current motion at the surface related to the pressure field. If we could at the same time know the temperature and the density distribution below the surface and thereby the baroclinic circulation, we would have a real understanding of the large-scale motions in the oceans. The problem of the reference velocity can be solved if you have these 2 measurements, that is, both the surface measurements and the measurements giving the baroclinicity.

Other things that the satellites can measure are wind stress on the sea surface, currents near the surface by doppler signals of various kinds and, very roughly at the present time, the surface temperature. By very roughly, I mean with errors of several degrees, 2 to 3 degrees or more, due to the moisture content of the atmosphere. The problem is to correct the signal received from the sea surface by removing the part due to atmospheric moisture. We need to be able to measure the ocean temperature from satellites to within a degree Celsius because the inter-annual variations are of the order of a degree Celsius.

In general with the satellites we need not ground truth but sea truth and one of the most important kinds of sea truth will be the measurement of sea level from tide gauges. So we should have an extensive programme, particularly on islands, of tide gauge installation, maintenance and operation. Member states of the IOC can contribute to this important part of the monitoring programme.

One of the most successful components of the first Global Atmospheric Research Programme Experiment, and of previous Experiments, has been the drifting buoys, which are now scattered, several hundred of them, all over the Southern Oceans and they have behaved very well. Unfortunately, these buoys give only meteorological information at the present time, that is surface ocean temperature and atmospheric pressure. What needs to be done is to develop these buoys so they will also measure the temperature of the water and maybe even the salinity of the water below the surface and the currents in the upper water layers.

One of the most successful monitoring programmes of the last few years has been the use of ships- and fleets-of-opportunity and this is related to the enormous growth in open-ocean shipping over the past 15 years. It is actually possible now to obtain fairly continuous bathythermograph measurements over a broad area in the Pacific and also along a series of tracks across the Pacific. There are still big gaps between these tracks but it may be possible to fill these out with buoys.

Finally, the standard instrument of the oceanographer is the oceanographic research ship. One of the problems with the oceanographic research ships is that they are becoming more and more expensive; the rate of increase in their cost is far greater than the rate of inflation. A ship that used to cost $800/day 20 years ago now costs $8000/day, so that oceanographic research ships have to be carefully husbanded and used only for those things for which they are absolutely necessary. But they are absolutely necessary for many kinds of monitoring observations.

Synoptic mapping of the oceans

Between all of these different kinds of instruments, it should be possible, as I suggested earlier, to make ocean synoptic maps of the same kind that we now obtain of the atmosphere. Unfortunately, these maps may need to be in considerably greater detail than maps of the atmosphere because of the size of the mesoscale eddies. Here we have some hope of a new type of measurement which has been given the fancy name of 'acoustic tomography' in honour of the 2 scientists who recently won the Nobel Prize for inventing X-ray tomography. Instead of X-rays the travel time of an acoustic signal from one buoy to another will be measured.

If we have a sufficient number of buoys and a sufficient number of paths along which the sound signal is received, we can make an essentially 3-dimensional map of the temperature distribution of the water within a certain level of accuracy. Here the oceanographers are utilizing the ideas, the theory and the experience of the seismologists, who have developed inverse theory as a powerful tool in understanding the interior of the earth. It may be possible to use the same kind of theory and acoustic signals to understand the mesoscale eddies in the ocean and perhaps to arrive at statistical descriptions of these eddies which will be sufficient for giving us forecasting skill in climate.

In concluding, let me say that there are 2 important aspects of the world climate problem. One is in statistics, that is the average conditions and the variance, the second is actually the possibility of forecasting climate. We cannot forecast it now, we may never be able to forecast it, but if we could the results would be so valuable that the gamble is worth taking. I conclude by emphasizing what I have said at the beginning, that the World Climate Programme and the possible role of the IOC in that programme represents the greatest challenge and the greatest responsibility that this body, in my experience, has ever had.

TURTLES

Two reports of turtle sightings during May 1979 were received, one from R.R.S. *Bransfield* in position 33° 12'N, 17° 01'W, the second from m.v. *Resolution Bay* from about 100 n. mile south-south-west of Madeira to 150 n. mile north of the Island. Both reports were sent to the British Museum (Natural History) from where they were forwarded to Professor L. D. Brongersma, D.Sc., HFZS at the Rijksmuseum van Natuurlijke Historie in the Netherlands. Professor Brongersma has now sent to us the following interesting and informative comments:

'These 2 reports both mention the presence of turtles in the Madeira area at about the same time; indeed, turtles do appear to be common in the area.

'Five species have been reported from Madeira, of these the Loggerhead is the common species. The other 4 (Green Turtle, *Chelonia mydas*; Hawksbill, *Eretmochelys imbricata*; Kemp's Ridley, *Lepidochelys kempi*; Leathery Turtle, *Dermochelys coriacea*) are rare and only a few specimens have been reported from Madeira. The light-brown colour with darker markings in the report by the *Resolution Bay*, together with the length of half a metre, point to these turtles being half-grown Loggerheads. The larger specimen observed by the *Bransfield* is more difficult to identify. If the length of one metre is the overall length (including head, neck, shell and tail) it may also have been a half-grown to two-thirds grown Loggerhead. If the length mentioned is that of the shell, it could have been an adult Loggerhead. Without further information, however, a definite identification is not possible. The frequency with which the Loggerhead is observed in this area makes it likely that a Loggerhead was sighted.

'The fishermen of Madeira who go out to fish with hook and line for the black Scabbard Fish, *Aphanopus carbo*, which at night rises to a depth of about 200 fathoms, regularly meet Loggerheads and bring them ashore. In the past they were slaughtered primarily for human consumption—a stew being made from the flesh, liver and some of the bones. The cleaned-out skin and shell were stuffed and sold to the tourists to take home as souvenirs. Today the turtles seem to be used exclusively for stuffing although sometimes flesh and bones are still used for preparing stews. In July 1979 a man who used the shingle beach behind the fish market in Funchal as his workshop told me that during the months of May and June he had stuffed 200 Loggerheads; during the winter he would get fewer specimens. As there may well be others who are active in this trade, it is estimated that some 2000 Loggerheads are taken and killed from Madeiran waters. Stuffed turtles with the shell polished and varnished are on sale in some of Funchal's curio shops, but large numbers are exported to the Canary Islands there to be sold to the tourists.

'It has been suggested, among others by the author of these comments, that many, if not most turtles in the Madeira area come from the Western Atlantic. As a strong indication of this the occasional presence of Kemp's Ridley (3 specimens have been taken off Madeira) may be taken; the only known nesting beaches are found in Mexico on the Gulf coast. That turtles do indeed cross to Madeira is proven by a Loggerhead, captured on 25 May 1979 off Porto Moniz (north-west Madeira) and which had been tagged and released on 9 June 1972 on the beach of Hutchinson Island, Florida. In 7 years its weight had increased from 650 grams to 11 kilograms and the length of its shell from 15·4 cm to 42 cm.

'Records of sightings of turtles in this area (and from all other parts of the oceans) are always very welcome, and the frequency in various parts of the oceans and in different seasons of these animals. It would be most interesting if some idea could be given of the number of turtles observed and whether they were more or less close together in groups or spread out over a large area.

'When one plots the sighting records on a chart of the North Atlantic, one finds a large concentration around the Azores, Madeira and between these islands and the approaches to the Straits of Gibraltar. Records are also fairly numerous in the Western Atlantic off the coast of North America. From 30° to 45°N records are scarce between 30° and 50°W and absent from 50° to 60°W. Turtles may be scarce or absent in these areas but the low number of or lack of records may also be due to fewer ships crossing those parts of the Atlantic. If indeed most turtles observed around the Azores and Madeira do come there from the Western Atlantic, they will have to move back to the Western Atlantic to return to the nesting beaches from which they originally came. Do they move westwards against the current or do they make use of the North Equatorial Current?—there is no evidence to support either hypothesis. Any observations, therefore, on turtles being sighted in the area 30° to 45°N, 50° to 60°W, and between 20° to 30°N from about 20°W to American waters would be most valuable. Equally valuable would be observations on large concentrations of turtles in other areas, e.g. in the Mediterranean.

'From personal experience I know how difficult it is to identify from the bridge a turtle partly submerged and swimming at some distance from the ship. However, identification may be helped by mentioning any features observed or which have distinctly been seen to be absent, e.g. where it has been observed that the shell is smooth (and whether it has been seen to be covered by scutes), this excludes the Leathery Turtle of which the shell shows ridges or keels lengthwise over the shell. Remarks on the colour are also of value. If the length is mentioned it would be helpful to know whether the overall length (head to tail) is meant, whether it is the length of the shell or only of that part of the shell that emerges above the surface of the water.

'Zoologists are apt to ask for the impossible and I am no exception to this rule, but I fully understand that the ships do not cross the oceans to collect records of sightings and I also understand that a constant watch for turtles cannot be kept. However, any information whatsoever will be greatly appreciated.'

AURORA NOTES OCTOBER TO DECEMBER 1979

By R. J. Livesey

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

Aurora observations for the period are shown in the accompanying table. These are ever welcome and swell the information obtained from land observers so that we are able to make some assessment of auroral activity between geomagnetic latitudes 52 to 68 from the Great Lakes of North America to North Cape in Europe.

This period was notable for the general lack of visual auroral activity on the larger scale, so far as it was observed within the observing region. During October minor activity was reported on the 4th, 8th, 9th, 16th and 19th. A minor storm was reported on the 21st. Further isolated reports were received for the 25th, 26th and 29th. During November there were isolated reports on the 4th and 9th and a minor storm on the 12th and 13th. Some aurora was present on the 15th and the month ended with minor displays on the 23rd, 24th and 25th. December was unusually quiet and isolated incidents only were observed on the 11th, 18th and 19th.

Concurrent with the lack of visual aurorae, the National Aeronautics and Space Administration (NASA) and other radio observers noted an increase in the scintillation and in the electron density in the high ionosphere over the polar cap with complimentary disturbance of the equatorial ionosphere; the result was anomalous radio transmission conditions in VHF. The situation began in October 1978 and returned suddenly to normal in January 1980.

During this period major southward movements of the northern auroral oval were detected neither by radio nor by means of visual aurorae; at the same time the earth's magnetic field was much less disturbed. On the other hand, the number of sunspots observed in November were at their highest value in the current cycle of activity and dropped back again by the end of December, although this should not yet be taken to be an indication that the cycle has passed its peak. Superimposed upon the overall variation in sunspot activity are a variety of random and periodic fluctuations.

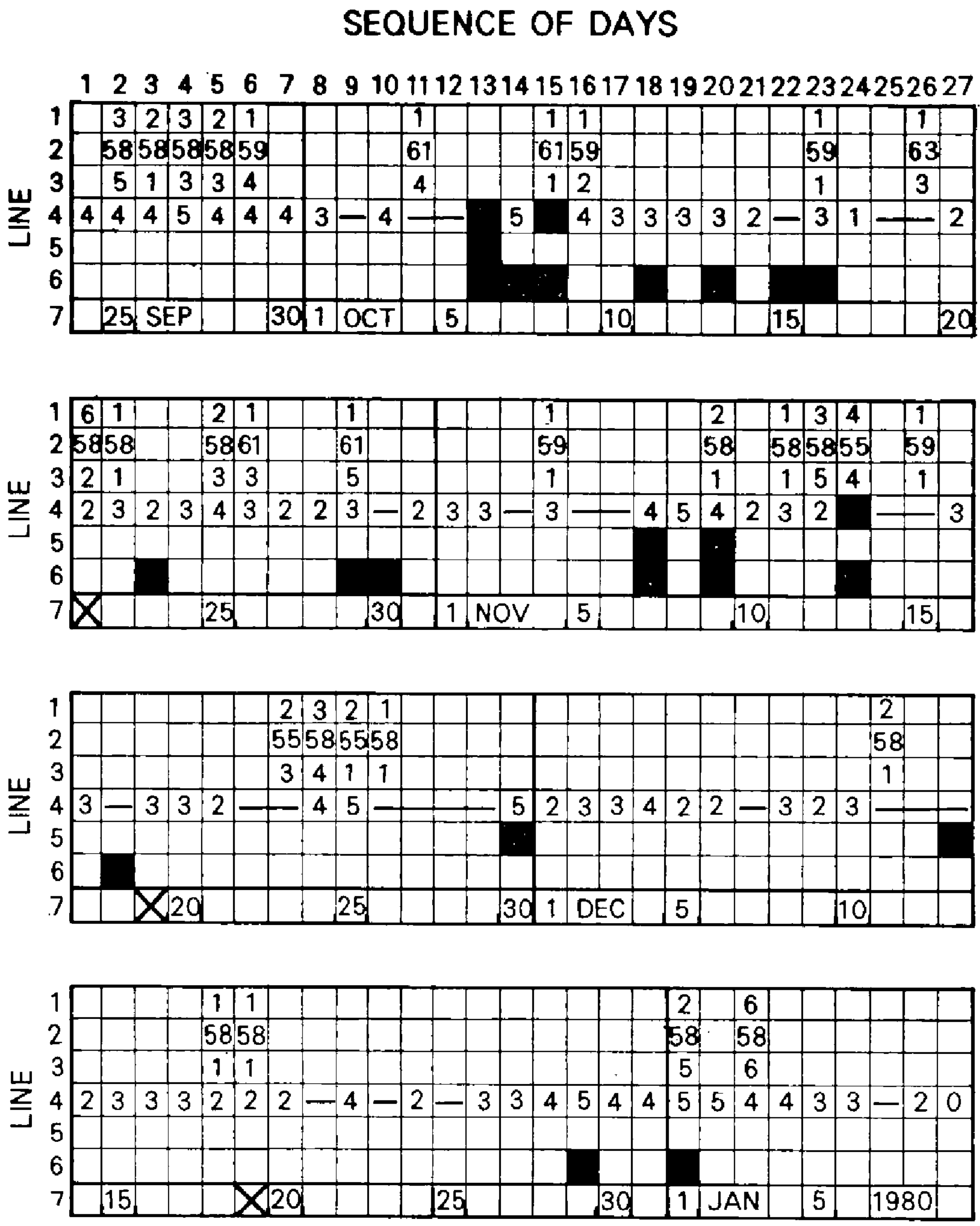
Details of the period are shown on the Bartels Diagram. Events are plotted in sequences of 27 days approximating to the rotation period of the sun as we see it. Thus, events recurring vertically above one another in these sequences are likely to be caused by the same activity on the surface or in the surrounding atmosphere of the sun.

In each sequence line 1 indicates the number of observers reporting the presence of aurora in a period of 24 hours beginning at noon GMT. Line 2, in this case, gives the geomagnetic latitude in the northern hemisphere of the observer furthest from the magnetic pole and hence from the auroral zone at geomagnetic latitude 67, thereby giving some indication as to how far the aurora has migrated in the magnetic field. Line 3 is an index of the strength of the activity averaged over all observers on a scale of 1 to 7. It should be borne in mind that high-latitude observers are likely to see activity further up the scale than low-latitude observers when interpreting the meaning of this index in relation to the number of observers and the degree of migration. Space prevents the full plot of each individual observer's data on this diagram although this is in fact done on our analysis sheets.

On line 4 is plotted the maximum value of the planetery magnetic index obtained on that day. The degree of disturbance of the earth's magnetic field is measured logarithmically on a scale of 1 to 9. Where the value has exceeded 5 the date has been marked with a square to indicate highly disturbed magnetic storm conditions. Where a straight line is shown the field has quietened down to a minimum. On line 5 is noted the presence of what is termed a storm sudden commencement when the earth's magnetic field is impacted by a cloud of ionised particles from the sun and the field is distorted. The data for the magnetic studies were kindly given to the British Astronomical Association by the Institute for Geophysics in Goettingen, West Germany.

On line 6 is indicated the presence of radio effects caused by auroral ionisation activity as measured in the United Kingdom and principally due to Mr John Branegan situated in Fife. On line 7 is given the date at the commencement of each 24-hour aurora period while the cross marks the time of new moon.

From perusal of the diagram it will be noted that activity falls off towards the end of the period, which is in marked contrast to similar diagrams for the beginning of 1979 that are plentifully annotated. It will also be apparent that aurorae, magnetic



Bartels Diagram

storms and radio aurorae are not simply related. When things do not happen it may sometimes be difficult for visual-aurora observers to sustain interest but as the diagram shows it is just as vital to know when the aurora goes quiet as when it is present. The observer must, therefore, sustain his interest over the quiet period in order to be able to spot activity when it manifests itself again. As the peak of auroral activity in the solar sunspot cycle tends to lag behind the sunspot peak it is to be hoped that there are some interesting auroral storms yet to come. Let us hope that you will all have clear skies and opportunities to observe when they occur.

Date 1979	Ship	Geographic Position		Time (GMT)	Forms
19 Oct.	*King Alfred*	56° 03′N	26° 07′W	1800–2300	G, hA, RdB, hA
21	*King Alfred*	58° 40′N	02° 30′W	2035–2130	G, RdA
26	*Glen Park*	49° 18′N	65° 07′W	0725–0810	mR, aR, R, aR
9 Nov.	*Challenger*	58° 39′N	5° 30′W	2010–2020	R
13	*King Alfred*	50° 24′N	59° 00′W	0200–0345	hA, hRdA, RdA, CR, aR
25	*Admiral Beaufort*	57° 00′N	20° 00′W	0145–0445	qN, RdB
25	*London Earl*	56° 15′N	23° 10′W	0150–0400	N, R, hA, P, hA, R
25	*Admiral Beaufort*	57° 00′N	20° 00′W	2115–2345	N, qN

KEY: A=arc, a=active, B=band, C=corona, G=glow, h=homogeneous, m=multiple, N=unspecified, P=patch, q=quiet, R=rays, Rd=rayed.

Marine Aurora Observations October–December 1979

ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM MARCH TO MAY 1980

The charts on pages 192 to 194 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 icebergs limits will be displayed during the iceberg season (roughly February to July). In any month when sightings have been abnormally frequent (or infrequent) this will be discussed briefly in the text.

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

March

Over eastern Canada there was an anomaly for southerly or south-westerly winds instead of the colder northerlies that had persisted during February. In the Gulf of St Lawrence and north-east of Newfoundland ice disintegrated or retreated northwards to give an overall deficit where there had previously been some excess of ice. In the Davis Strait the ice edge remained well to the west of its usual position.

There was little change in the pattern of sea-ice anomaly east of Greenland. In the Denmark Strait and the Greenland Sea, where there was again an anomaly for southerly or south-easterly winds ice remained further north than usual. In the Barents Sea some excess from the preceding months persisted but there was a deficit in the south. Ice in the Baltic remained more extensive than normal by the end of a rather cold March.

April

Over substantial areas the anomalies of the previous month were reversed—in particular the Canadian Arctic became colder than normal and Scandinavia warmer. Previous deficits of ice over the Davis Strait were much reduced and some excesses developed. An anomaly for south-westerly winds opened up an extensive lead north of Newfoundland with the main pack edge drifting out to sea further east than normal. South-east of Greenland the ice edge lay close to its normal position and over the Greenland Sea, though deficits persisted, they became less extensive than previously. Melting of ice in the Barents Sea proceeded rather rapidly leaving general deficits by the end of the month. There was also rapid melting in the Baltic but not all the excesses of ice had disappeared by the end of April.

May

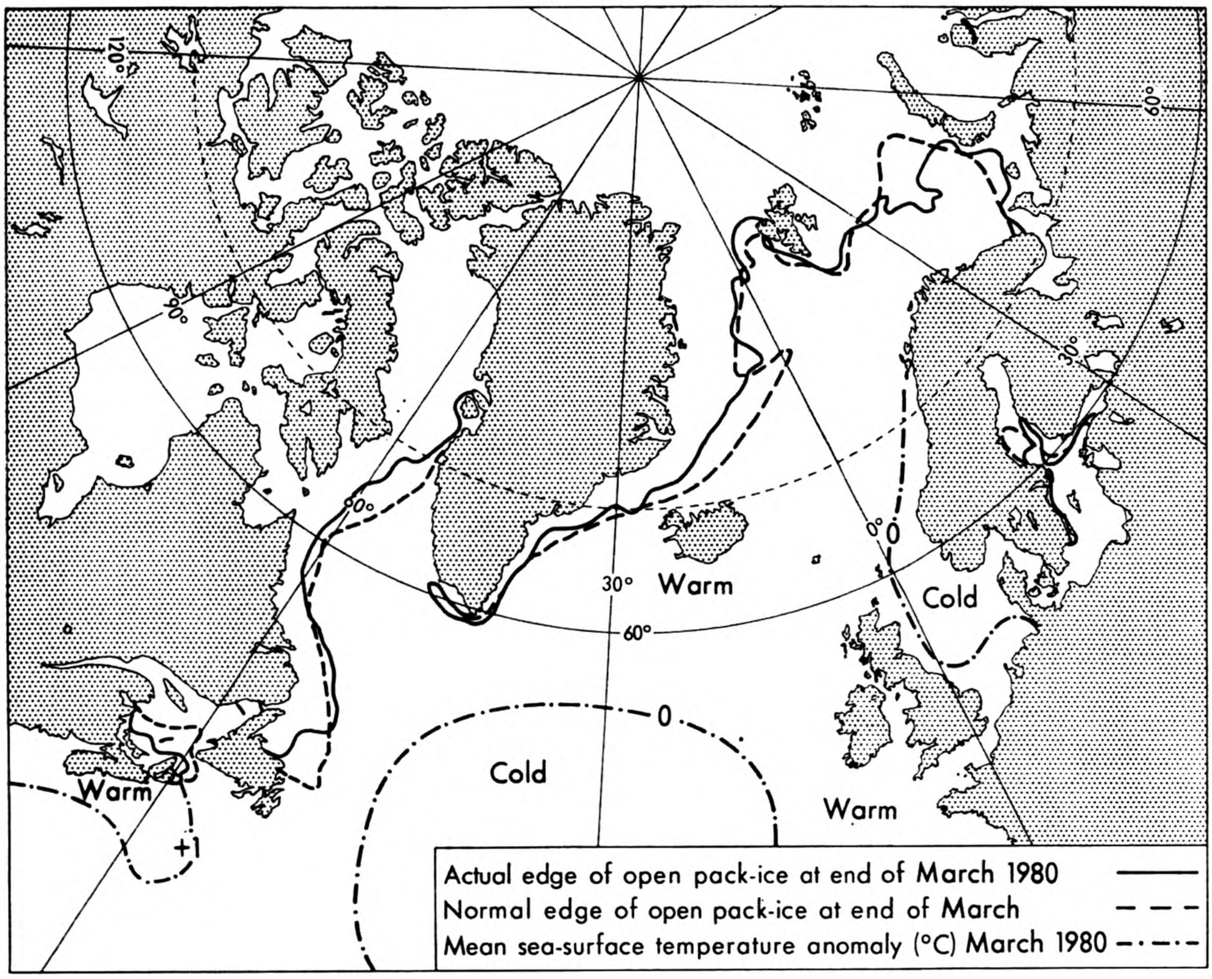
Anomalies were mostly weak but on the whole temperatures were above average over north-eastern Canada and Greenland. The retreat of the ice edge was ahead of normal in the Davis Strait, off the coast of Labrador, south-east of Greenland and in the Greenland Sea. The development of ice to form an excess over the Barents Sea by the end of the month is surprising in view of the weak anomalies there during May.

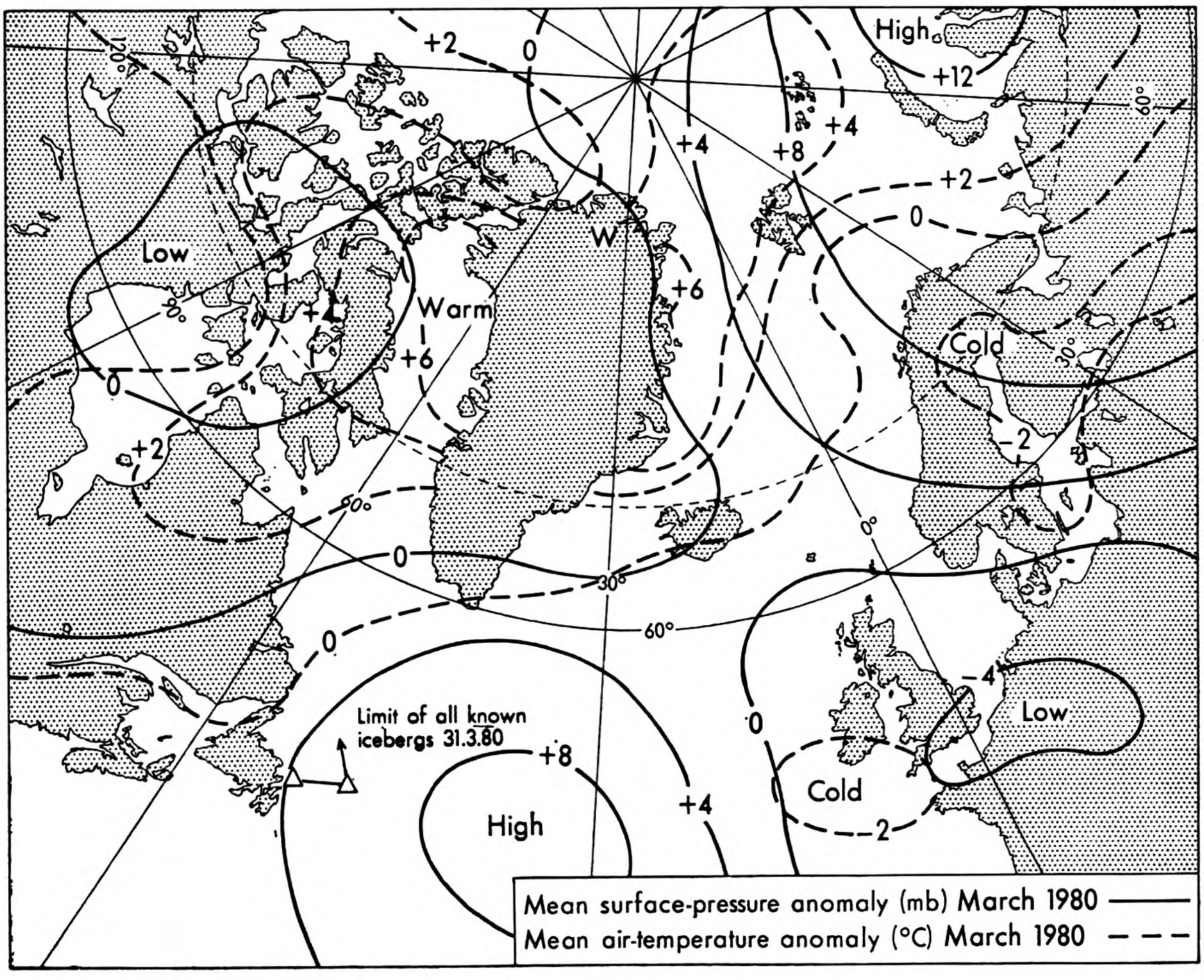
REFERENCES

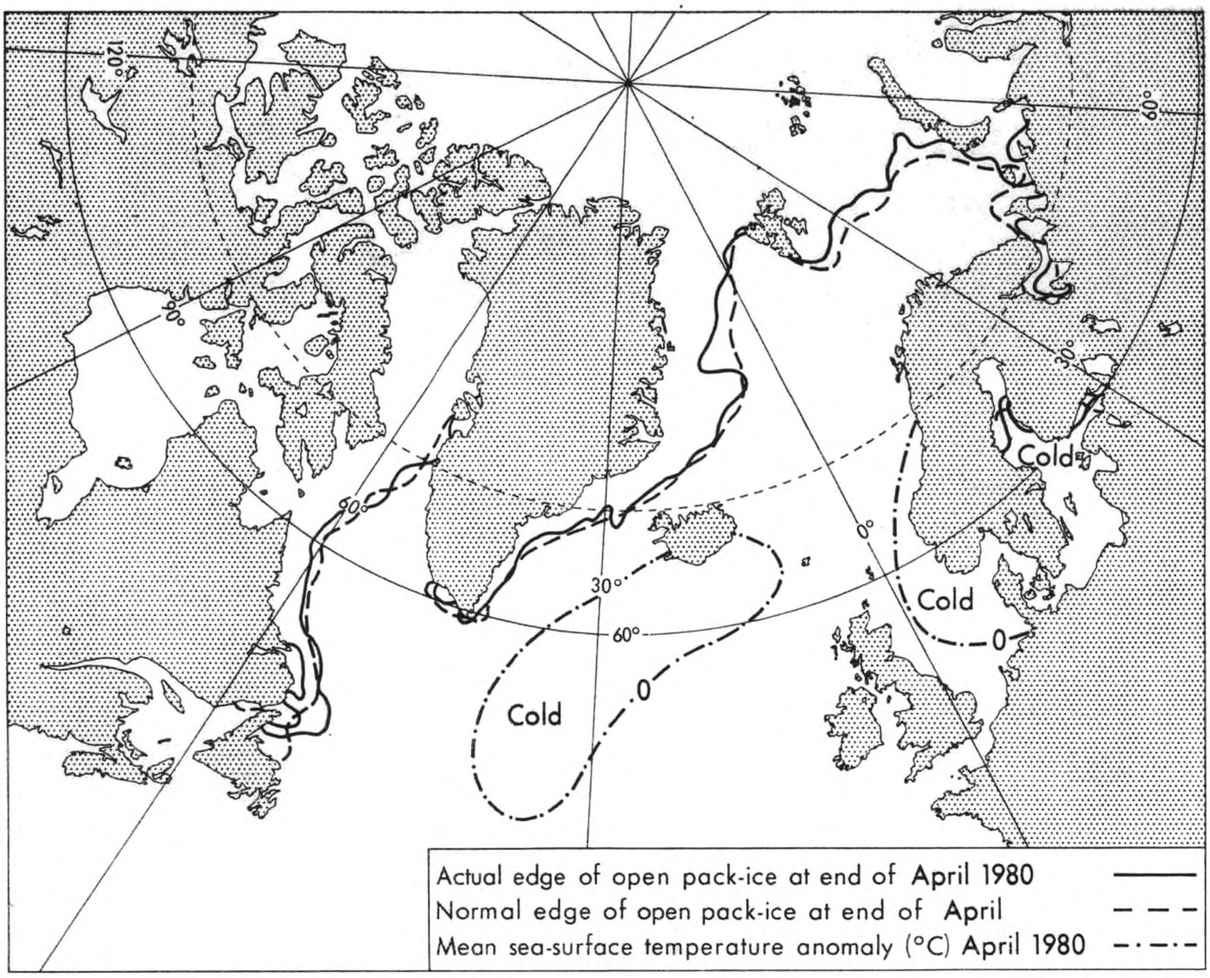
Meteorological Office, London 1966 Monthly meteorological charts and sea surface current charts of the Greenland and Barents Seas.
Sea ice normals (unpublished) and various publications.

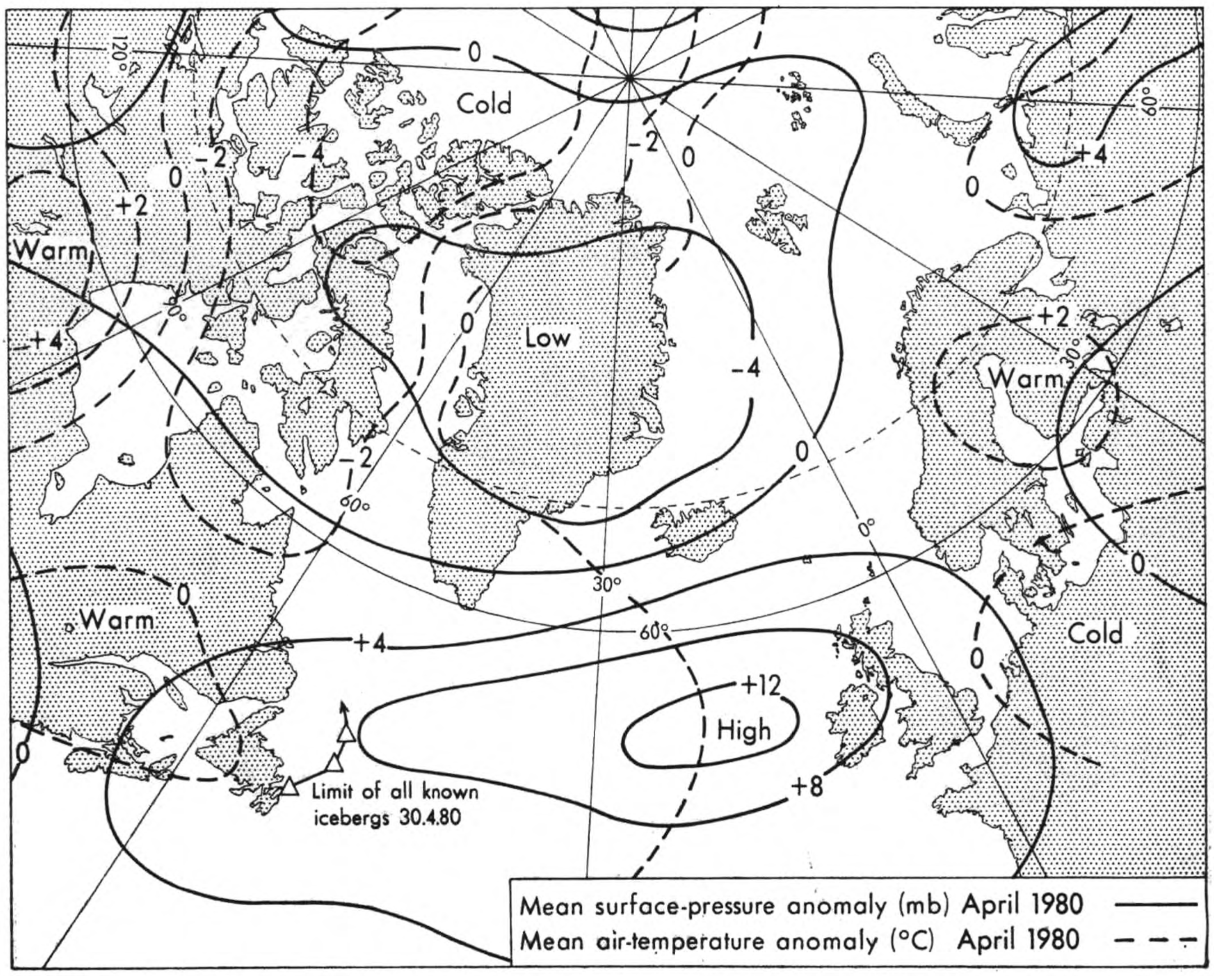
US Department of Commerce Weather Bureau, Washington, DC 1965 World weather records, 1951–60. North America.

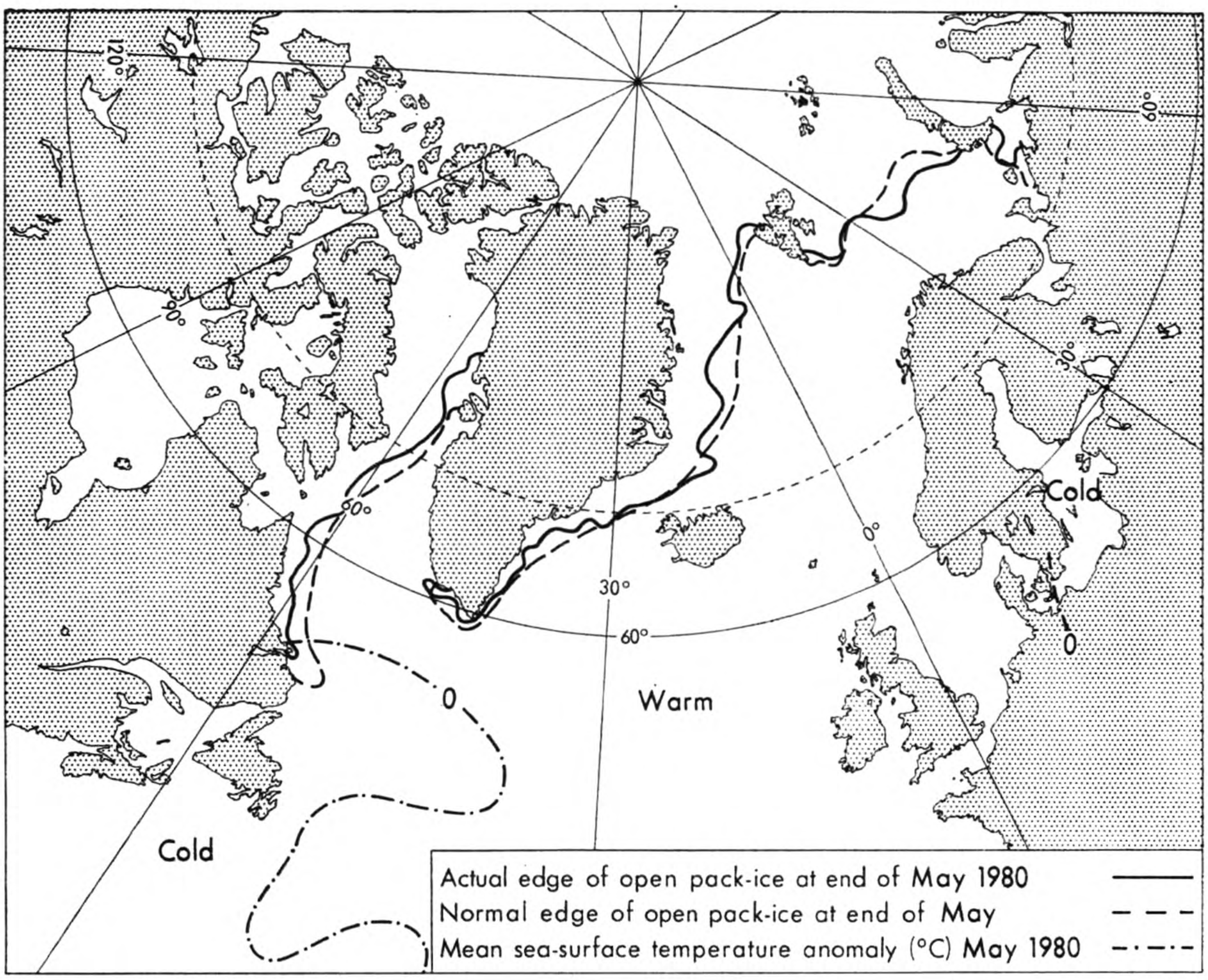
US Naval Oceanographic Office, Washington, DC 1967 Oceanographic atlas of the North Atlantic Ocean, Section II: Physical properties.

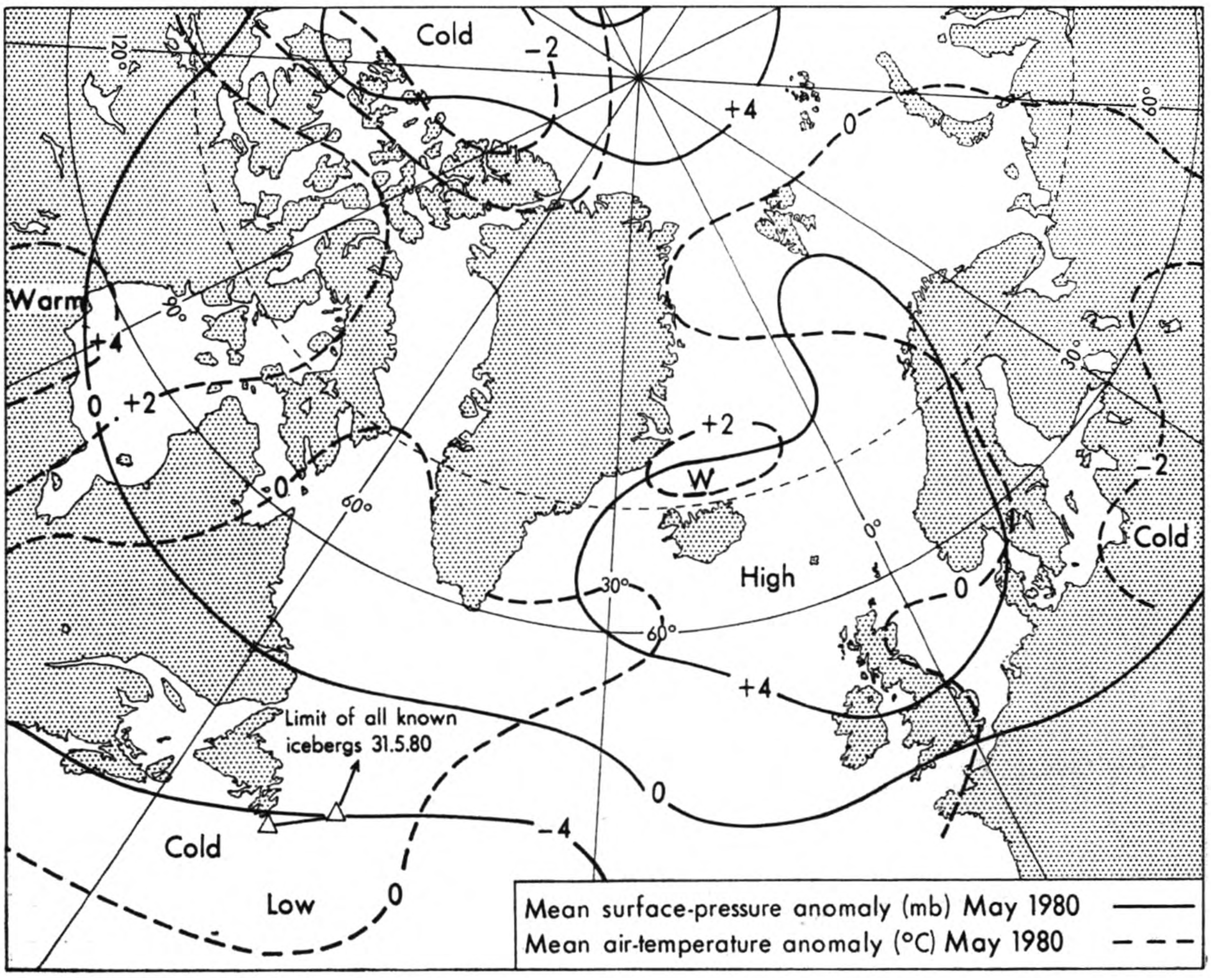

Warm
Cold
Cold
Warm
Warm
+1
0
Actual edge of open pack-ice at end of March 1980
Normal edge of open pack-ice at end of March
Mean sea-surface temperature anomaly (°C) March 1980


High
+12
+2
0
+4
+8
+4
+2
0
Low
Warm
+4
+6
+6
W
Cold
-2
+2
0
0
0
Limit of all known icebergs 31.3.80
+8
High
+4
0
Cold
-2
-4
Low
Mean surface-pressure anomaly (mb) March 1980
Mean air-temperature anomaly (°C) March 1980


Cold
Cold
Cold
0
0
30°
60°
90°
120°
60°
30°
0°
Actual edge of open pack-ice at end of April 1980
Normal edge of open pack-ice at end of April
Mean sea-surface temperature anomaly (°C) April 1980


Cold
Low
High
Warm
Warm
Warm
Cold
0
-2
-4
+2
+4
+8
+12
Limit of all known
icebergs 30.4.80
Mean surface-pressure anomaly (mb) April 1980
Mean air-temperature anomaly (°C) April 1980


Cold
Warm
Cold
0
Actual edge of open pack-ice at end of May 1980
Normal edge of open pack-ice at end of May
Mean sea-surface temperature anomaly (°C) May 1980


Cold
Warm
Cold
High
Low
Cold
W
Limit of all known icebergs 31.5.80
Mean surface-pressure anomaly (mb) May 1980
Mean air-temperature anomaly (°C) May 1980

BALTIC ICE SUMMARY: March–May 1980

No ice was reported at the following stations during the period: Visby, Emden, Bremerhaven, Hamburg, Flensburg, Kiel, Lübeck, Rostock, Stettin, Gdansk, Copenhagen, Aarhus, Oslo, Kristiansandfjord.

Station	March									April									May								
	Length of Season		Ice Days			Navigation Conditions			Accumulated Degree Days	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	A	B	C	D	E	F	G	H	I
Lulea ..	1	31	31	31	0	0	28	3	1519	1	30	30	30	0	0	30	0	—	1	10	10	8	0	7	3	0	—
Skelleftea	1	31	31	31	0	0	31	0	—	1	30	30	30	0	0	30	0	—	0	0	0	0	0	0	0	0	—
Bredskar ..	1	31	17	6	4	6	24	0	—	1	30	30	19	0	11	10	0	—	1	9	9	0	0	0	0	0	—
Sundsvall ..	1	31	31	31	0	0	31	0	—	1	26	26	16	0	20	6	0	—	0	0	0	0	0	0	0	0	—
Sandarne ..	1	31	31	18	0	15	16	0	—	1	25	25	18	7	10	15	0	—	0	0	0	0	0	0	0	0	—
Oxelsud ..	8	31	15	0	2	15	0	0	—	1	7	7	6	0	7	0	0	—	0	0	0	0	0	0	0	0	—
Kalmar ..	1	31	31	0	17	31	0	0	—	1	8	8	0	0	8	0	0	—	0	0	0	0	0	0	0	0	—
Göteburg ..	3	4	2	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Stockholm	1	31	31	31	0	31	0	0	498	1	28	28	7	13	23	0	0	—	0	0	0	0	0	0	0	0	—
Helsinki ..	1	31	31	31	0	X	X	X	829	1	23	23	16	3	X	X	X	—	0	0	0	0	0	0	0	0	—
Turku ..	1	31	31	31	0	X	X	X	800	1	22	22	16	0	19	0	0	—	0	0	0	0	0	0	0	0	—
Mariehamn	1	31	31	31	0	31	0	0	—	1	22	22	16	0	18	0	0	—	0	0	0	0	0	0	0	0	—
Mantylouto	1	31	31	31	0	X	X	X	—	2	24	10	0	0	X	X	X	—	0	0	0	0	0	0	0	0	—
Vaasa ..	1	31	31	31	0	X	X	X	936	1	25	25	22	0	X	X	X	—	0	0	0	0	0	0	0	0	—
Norskar ..	1	31	31	0	29	X	X	X	—	1	30	30	0	19	X	X	X	—	0	0	0	0	0	0	0	0	—
Oulu ..	1	31	31	31	0	X	X	X	—	1	25	25	24	0	X	X	X	—	0	0	0	0	0	0	0	0	—
Roytta ..	1	31	31	0	31	0	24	0	—	1	30	30	10	20	X	X	X	—	0	0	0	0	0	0	0	0	—
Leningrad	1	31	28	26	3	0	29	0	901	1	29	22	0	19	3	19	0	—	0	0	0	0	0	0	0	0	—
Viborg ..	1	31	31	31	0	0	31	0	—	1	30	29	4	5	0	29	0	—	0	0	0	0	0	0	0	0	—
Tallin ..	1	31	31	0	31	0	31	0	—	1	28	28	0	18	4	14	0	—	2	6	5	0	0	3	0	0	—
Riga ..	1	31	31	12	9	24	6	0	601	1	12	12	0	0	6	0	0	—	0	0	0	0	0	0	0	0	—
Pyarnu ..	1	31	31	31	0	0	0	31	—	1	27	27	19	3	6	2	18	—	0	0	0	0	0	0	0	0	—
Ventspills ..	1	27	25	0	5	19	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Klaipeda ..	1	30	24	0	11	16	0	0	—	9	11	3	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Stralsund	1	2	2	0	0	2	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Stettin ..	6	6	1	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—

X Navigation conditions not reported.

CODE

A First day ice reported.
B Last day ice reported.
C No. of days when 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.

INDIAN EXCELLENT AWARDS

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

During the year 1978–79 there has been active and continued co-operation between the India Meteorological Department and the ships of the Indian Voluntary Observing Fleet (IVOF) in the collection of meteorological information from the high seas and this is very much appreciated; we look forward to more co-operation in the future. It is becoming increasingly realized that the ocean and the atmosphere should be observed and studied together because they continually affect each other in a number of ways.

On 31 March 1979 there were 271 ships on the Fleet List, this included 34 Selected, 205 Supplementary and 32 Auxiliary ships; 71 ships sent in less than 5 logbooks and 46 ships sent in less than 10 logbooks. In all 1086 logbooks were received by this office.

It is essential that observations made by ships are transmitted as expeditiously as possible to the nearest coastal radio stations to facilitate their reception on a real-time basis at the forecasting offices. Special encouragement is given to the ships which send crucial observations; the *Chidambaram* sent in such observations when a depression was in its formative stage and when it was subsequently intensifying to become a severe cyclonic storm. Due recognition was given to this ship which transmitted important and urgent observations. Recognition is also given to ships which transmit important and urgent observations even though they do not belong to the IVOF.

The meteorological work of the ships of the IVOF during the year 1978–79 has been assessed taking into account the quality and quantity of observations and also the percentage of recorded observations which have actually been transmitted to coastal radio stations. Allowance has also been made to individual ships for the actual number of days spent at sea. As usual the number of ships selected to receive Excellent Awards in the form of books is 15 and those for the award for Certificate of Merit is 10. The Masters and other officers who were on board the ships for at least 6 months during the year are awarded books or certificates.

The names of the ships which received Excellent Awards are as follows:

Name of Ship	Owner
Nancowery	Shipping Corporation of India
Harshavardhan	Shipping Corporation of India
Chidambaram	Shipping Corporation of India
Vishva Anand	Shipping Corporation of India
Vishva Shakti	Shipping Corporation of India
Vishva Dharma	Shipping Corporation of India
State of Nagaland	Shipping Corporation of India
Chhatrapati Shivaji	Shipping Corporation of India
Zakir Hussain	Shipping Corporation of India
Satyamurti	Shipping Corporation of India
Kanchanjunga	Shipping Corporation of India
Jalamangala	Scindia Steam Navigation Co.
Jalayamini	Scindia Steam Navigation Co.
Akbar	Mogul Line Ltd.
Jalazad	Scindia Steam Navigation Co.

Certificates of Merit have been awarded to the following ships:

State of Gujarat	*Vishva Tej*
State of Andhra Pradesh	*Jag Jiwan*
Annapurna	*Jalakirti*
Ratna Nandini	*Vishva Vibhuti*
Vishva Tirth	*Shompen*

The Excellent Awards were distributed at the National Maritime Day function held on 5 April 1980 at Bombay. The Certificates of Merit were handed to the Shipping Companies concerned for onward transmission to the officers who qualified for them.

Book Reviews

Journal of a voyage to the Northern Whale Fishery (first published in 1822), 215 mm × 130 mm, pp. 515, *illus.* Price: £13·95.
The Polar Ice and The North Pole (first published as papers in 1815 and 1828 respectively), 210 mm × 135 mm, pp. 97. Price: £7·95.
My Father (first published 1851), 190 mm × 115 mm, pp. 232, *illus.* Price: £7·95.
All by William Scoresby. Facsimile editions published by Caedmon of Whitby, 9 John Street, Whitby, Yorkshire, YO21 3ET.

William Scoresby (1789–1857), honoured in his day as the 'Arctic Scientist', was the author of some 20 articles and 2 major books on that subject.

Apprenticed at the age of 13 to his father, master of the whaler *Dundee*, young William spent the next 20 summers in the Greenland Sea. His education continued in the winter months—first at Whitby learning the mathematics for navigation—then, from 1806 at Edinburgh University, where he studied Chemistry and Natural Philisophy. It was an ideal training; well-planned and executed observations were aided by his facility with mechanical apparatus and a talent for drawing—this is apparent in his books. Scoresby bequeathed his papers and apparatus to the Whitby Literary and Philosophical Society in whose Museum they may still be seen.

Journal of a voyage to the Northern Whale Fishery ranges over the whole Arctic scene. In Scoresby's view, God's most dramatic landscape was no mystery but a legitimate subject of enquiry from the life history of the great whales to the microscopic structure of the snowflake. He sought to explain mirage phenomena. He measured the temperature and pressure of the depths of the sea. He studied the forms of ice and the colours of the water. He tried to improve the magnetic compass whose errors so frequently brought about shipwreck in fog-bound unchartered regions.

The second volume contains 2 papers. *The Polar Ice* is a comprehensive discussion on the origins of the ice, its shapes and movements and its effects on adjacent air and water, together with a discussion on the art of ice-navigation. In *The North Pole* Scoresby examines the reasons for Parry's failure to reach the Pole overland in 1827. In his opinion the expedition's sledges were excessively heavy and the journey was attempted too late in the year when the ice-surface was in a treacherous condition.

In 1851 Scoresby looked back at his father's life. *My Father* recounts how the elder Scoresby had become a sailor and entered the whaling trade where he introduced the weatherproof crows-nest together with various techniques which made him for many years the most successful of the Whitby captains.

These good-quality facsimile editions are written with charm and enthusiasm and may be commended to anyone with an interest in the northern seas and seafaring custom at the beginning of the nineteenth century.

Anita McConnell
Science Museum

Personalities

RETIREMENT—CAPTAIN E. DUNN retired on 6 June 1980 after serving 47 years at sea.

Ernest Dunn was educated in South Shields and immediately after leaving school in December 1932 was apprenticed to the Ropner Shipping Company of West Hartlepool. The day after leaving school he sailed from Tyne Dock on board the *Hindpool.*

With the exception of a short period during the war years, when Ropners lost a large number of ships, he remained with that Company for the whole of his career. Captain Dunn obtained his Master's Certificate in 1944 and was promoted to command the s.s. *Bellerby* in March 1955. His last command was m.v. *Lackenby* which he left early this year due to the ill-health of his wife. Unfortunately, whilst leaving the ship at an anchorage off Lundy Island, his right leg was crushed between the ship and the pilot launch which was to take him ashore. We understand that Captain Dunn is now well on the way to recovery.

Captain Dunn sent us his first meteorological logbook from the *Swinby* in 1948 and since then we have received a further 30 logbooks bearing his name of which 8 were classed as excellent. He received an Excellent Award from this Office in 1957, a Certificate from the US Meteorological Office in 1964 and an Excellent Award from the Canadian Meteorological Office in 1970.

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

RETIREMENT—MR J. C. KANE, Radio Officer retired on medical grounds from Marconi International Marine Company on 18 March 1980 after 41 years at sea.

Joseph Cowan Kane was born in March 1919 and joined Marconi in February 1939. During the war years Mr Kane served on board 3 ships which were sunk by enemy action—the *Ainderby* and *Empire Gemsbuck* in 1941 and the *Kelvinbank* in 1943. He escaped injury on all 3 occasions.

Between 1955 and 1961 Mr Kane served continuously in vessels owned by Manchester Liners. He completed his last voyage in the *Deseado* in February 1980.

We received the first meteorological logbook bearing Mr Kane's name from the *Ficus* in 1947. Since then he has sent us a further 20 logbooks of which 14 were classed as excellent.

We wish him a long and happy retirement.

Notices to Marine Observers

NEW METEOROLOGICAL CODE TO BE INTRODUCED IN 1982

A new Ships' Meteorological Code is to be introduced in January 1982. A short article giving brief details of the new Code will appear in the next January edition of this journal. Distribution of the revised publications and forms to the Voluntary Observing Fleet to cater for the new Code will commence early in the new year.

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

Headquarters.—Captain G. A. White, Marine Superintendent, Meteorological Office (Met. O. la), Eastern Road, Bracknell, Berks. RG12 2UR (Telephone: 0344 20242, Ext. 2456)
Captain G. V. Mackie, Deputy Marine Superintendent. (Telephone: 0344 20242, Ext. 2543)
Mr J. D. Brown, Nautical Officer. (Telephone: 0344 20242, Ext. 2461)
Captain C. R. Downes, Nautical Officer. (Telephone: 0344 20242, Ext. 2738)
Mersey.—Mr W. G. Cullen, Master Mariner, Port Meteorological Officer, Room 218, Royal Liver Building, Liverpool L3 1HU. (Telephone: 051–236 6565)
Thames.—Captain R. C. Cameron, Port Meteorological Officer, Movement Control Building, South Side, Victoria Dock, London E16 1AS. (Telephone: 01–476 3931)
Bristol Channel.—Captain J. H. Jones, Port Meteorological Officer, 33, The Hayes, Cardiff CF1 6NU (Telephone: 0222 21423)
Humber.—Captain J. Bentley, Port Meteorological Officer, c/o Dept. of Trade, Posterngate, Hull HU1 2JN. (Telephone: 0482 223066, Ext. 26)
Clyde.—Captain S. M. Norwell, Port Meteorological Officer, 118, Waterloo Street, Glasgow G2 7DN (Telephone: 041–248 4379)
Forth.—All enquiries to Glasgow above.
Southampton.—Captain D. R. McWhan, Port Meteorological Officer, Southampton Weather Centre, 160 High Street below Bar, Southampton SO1 0BT. (Telephone: 0703 20632)
Tyne.—Captain D. H. Rutherford, Port Meteorological Officer, 1–2 Osborne Road, Newcastle upon Tyne NE2 2AA. (Telephone: 0632 811616)
Ship Routeing Service. (Telephone: 0344 20242 Ext. 2577)
Captain A. Phillips, Nautical Officer.
Captain P. B. Hall, Nautical Officer.
Captain C. A. S. Borthwick, Nautical Officer.

Editor's Note. We apologise for the different type face used in the July (Vol. L. No. 269) edition. This was due to circumstances beyond our control.

INDEX TO VOLUME L, 1980

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

Printed in Scotland by Her Majesty's Stationery Office at HMSO Press, Edinburgh
Dd 0698267 K18 10/80 (17472)

ISBN 0 11 722072 8
ISSN 0025-3251