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THE MARINE OBSERVER

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VOL. XLIX **No. 264** **APRIL 1979**

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Letters to the Editor, and books for review, should be sent to the Editor, 'The Marine Observer', Meteorological Office, Eastern Road, Bracknell, Berkshire RG12 2UR

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Report of Work for 1978

(MARINE DIVISION OF THE METEOROLOGICAL OFFICE: VOLUNTARY OBSERVING FLEET AND OCEAN WEATHER SHIPS)

1. Voluntary Observing Ships

At the end of the year the British Voluntary Observing Fleet was composed as follows:

(*a*) 489 Selected Ships, including 5 trawlers, which are supplied with a full set of meteorological instruments on loan and which make observations in code every six hours and transmit them to the appropriate coastal radio station wherever their voyages take them.

(*b*) 30 Supplementary Ships, including 5 trawlers, which make less-detailed observations than Selected Ships and are supplied on loan with only a barometer, air thermometer and screen. They use an abbreviated code for their messages.

(*c*) 56 coasting ('Marid') vessels which make sea-surface temperature observations in UK coastal waters and transmit them in a special code by W/T or R/T. When in the North Sea, the coasting ships include in their messages wind, weather and visibility observations.

(*d*) 12 Light-vessels and 1 light-tower which make observations of wind, waves, visibility, air and sea-temperatures; all of these send coded reports by R/T. Reports from the *Royal Sovereign* light-tower and the *Noord Hinder*, *Dowsing* and *Varne* light-vessels are included in the BBC weather bulletins for shipping and all four report barometric pressure, using the precision aneroid. The first two also report barometric tendency.

(*e*) 1 Trawler which makes non-instrumental observations only and transmits them by W/T or R/T, using an abbreviated code, to radio stations in the UK, Canada, Iceland, Norway or USSR depending on the area in which they are fishing.

(*f*) 6 Auxiliary Ships which make and transmit visual observations similar to those made by trawlers, with the addition of pressure and air temperature readings from the ships' own instruments (using the 'Shred' code). These ships do this work only when in areas where shipping is known to be sparse.

The depressed state of the shipping industry has resulted in the withdrawal from service of a number of older vessels from the British Merchant Navy Fleet. The trend throughout shipping has been to replace small conventional tonnage with larger, faster container vessels which spend more time at sea than their predecessors. Therefore, although the strength of the Voluntary Observing Fleet has decreased marginally during the year, the number of observations received has continued to increase. The responsibility for recruiting vessels into the Voluntary Observing Fleet devolves upon the seven Port Meteorological Officers at London, Liverpool, Southampton, Hull, Newcastle, Cardiff and Glasgow and it is a measure of their effectiveness that the strength of the Fleet has been largely maintained despite the recession. Being Master Mariners with considerable experience as voluntary observers at sea, they are also able to contribute significantly to the maintenance of a high standard of observations received from the Voluntary Observing Fleet. Meteorological work at sea in British Merchant Ships has always been carried out on a voluntary basis and it is gratifying to note that the standard of observing throughout the year has, in general, been well maintained.

The British Voluntary Observing Fleet includes ships of many shipping companies and Table 1 shows the variety of trade routes on which they are engaged.

Table 1. Average number of British Selected and Supplementary Ships on main trade routes to and from the UK

Europe	67	West Indies	21
Australasia	37	South America	13
Far East	40	Pacific Coast of North America	9
Persian Gulf	31	Falkland Islands and Antarctic	2
South Africa	23	World-wide 'tramping'	188
West Africa	10	Near and distant-water fishing grounds	10
North Atlantic	60		

The liaison work between the Port Meteorological Office staffs and the various shipping companies has been to their mutual benefit. The installation of distant reading meteorological equipment and automatic weather stations in a number of merchant ships under construction, in order to ease the workload of observing officers, has continued with the whole-hearted support and co-operation of shipowners.

During two typical five-day periods, one in June and one in November, the average daily number of reports from ships received in the Central Forecasting Office at Bracknell from various sources is shown in Table 2.

Table 2. Average daily number of reports received at Bracknell by various sources from ships during 1978

	JUNE	*NOVEMBER*
Direct reception from		
British ships in eastern North Atlantic	137	119
Foreign ships in eastern North Atlantic	90	88
British ships in North Sea	23	25
Foreign ships in North Sea	16	4
Ships in other waters	12	21
Total	278	257
Via other countries		
Ships in eastern North Atlantic	582	501
Ships in western North Atlantic	327	233
Ships in Mediterranean	60	37
Ships in North Sea	89	89
Ships in Arctic Ocean	74	63
Ships in North Pacific	633	749
Ships in other waters	272	287
Total	2037	1959

Once again, acknowledgement must be made to the many Commonwealth and foreign Port Meteorological Officers for their valuable services and assistance in the replacement of defective instruments in UK Selected Ships on protracted voyages and the withdrawal of instruments from British ships which have been sold abroad. The number of British ships ending their sea-going careers in foreign ports has continued to increase and the timely intervention of foreign Port Meteorological Officers has been a great assistance to us.

2. Ocean Weather Ship Activities

The United Kingdom continued to operate two Ocean Weather Ships within the North Atlantic Ocean Station (NAOS) scheme. The ships, *Admiral FitzRoy* and *Admiral Beaufort*, continuously manned station 'Lima' throughout the year with the exception of two 5-day periods when the station was vacated to land incapacitated crew members.

The weather ships make hourly surface and 6-hourly upper-air observations. Reports of floating pollutants for the Intergovernmental Oceanographic Commission/World Meteorological Organization pilot project on marine pollution monitoring together with sea and swell records using the Tucker shipborne wave recorder were continued throughout the year. Sea-water temperature and salinity readings to considerable depths, collection of rain water samples for analysis by the International Atomic Energy Agency, observations of magnetic variation and collection of sea-water samples on passage to and from station for monitoring radio-active content were undertaken at regular intervals.

3. Ship Routeing

A ship-routeing service is provided to advise on North Atlantic and North Pacific passages and to offer advice in regard to the movement of tows. Advice is also given to vessels on passage in other parts of the world on request. For conventional vessels the object of the service is to select the best route for a ship to follow in order to reach its destination in the shortest possible time with the most economical fuel consumption commensurate with the least damage to the ship and cargo. Data are extracted from a vessel's deck logbook in order to determine the vessel's response to various sea wave fields and a ship/wave performance curve is constructed. However, the service has now amassed a considerable amount of ship performance information for various types of vessels and it is frequently possible to construct a wave/speed curve from basic ship size and type data without recourse to the deck logbook. The forecasters of the Central Forecasting Office supply the ship-routeing officers, who are all Master Mariners, with wind and sea predictions up to 72 hours ahead at 12-hourly intervals and this information is used in conjunction with the performance curve to determine the most favourable course for the vessel to follow. Subjective consideration is also given to the loading state of the vessel, to sea-surface currents, navigational hazards such as shoals, ice and areas of fog. Later stages of the voyage are also borne in mind. Communication with the vessel to be routed is usually by telex prior to sailing and via pre-determined coastal radio stations whilst on passage. Routeing advice to tows which do not have too restrictive weather parameters is similar to that provided for conventional ships but allowance is made for the slower speed of the tow and for their reduced manoeuvreability. For tows with limiting weather factors—which may be wave height or period, amount of heel or wind force—the routeing service advises when and where to seek shelter or when to resume passage.

4. Services for Marine Activities

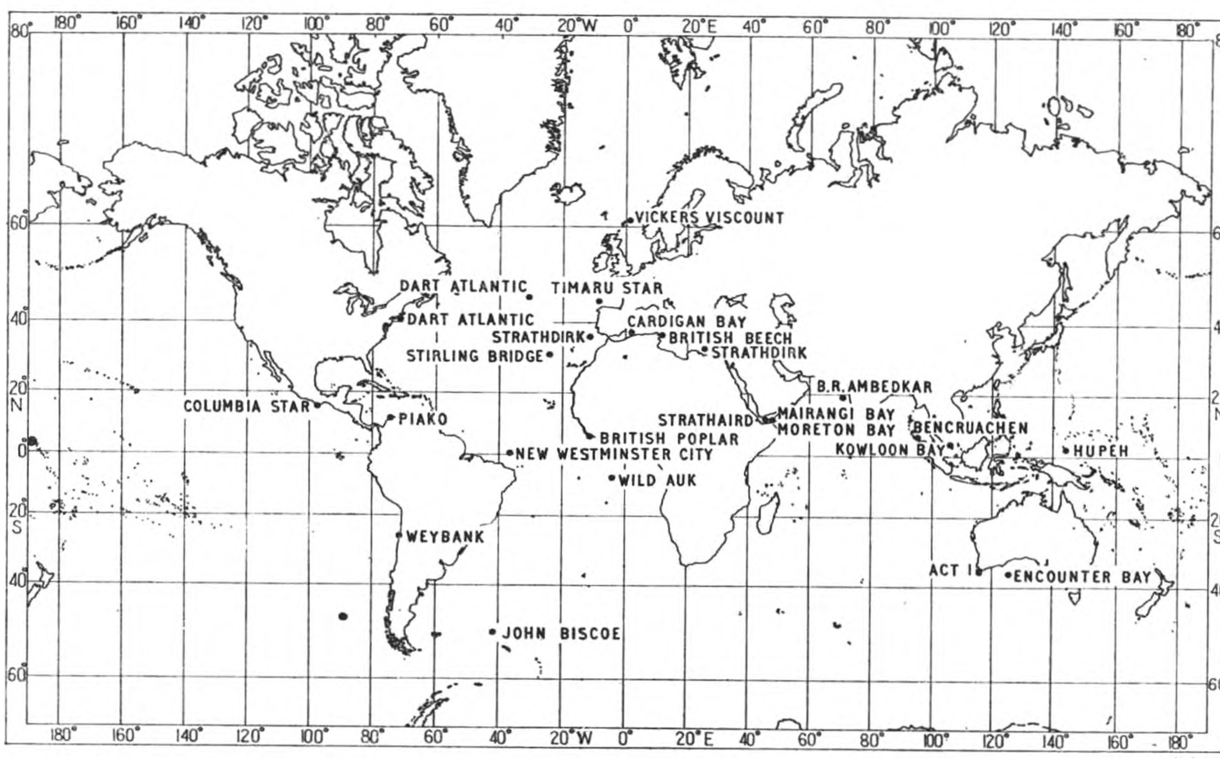
As a result of a survey on marine meteorological services to shipping conducted in 1976 throughout the shipping and fishing industries, the North Atlantic Weather Bulletin for shipping transmitted by Portishead Radio was extended in January to include a new sea forecast area named Trafalgar to the south of area Finisterre. For most of 1978 services to shipping via BBC Radio and Post Office Coastal Radio stations continued as in previous years but in November, when the BBC introduced frequency changes, the coastal Shipping Bulletin was moved from BBC Radio 2 to Radio 4 so that it remained on 200 KHz i.e. 1500 metres long-wave; an advantage that arose from this change was that the program pattern on Radio 4 permits the Shipping Bulletins to be broadcast at the same time every day of the week. The opportunity was also taken to include a forecast for the new sea area Trafalgar in one of the broadcasts daily. The Inshore Waters forecasts remained at the same times as before on BBC Radios 3 and 4, but on the new frequencies for these channels. A growing number of BBC local radio stations also now transmit forecasts designed for local inshore yachtsmen and fishermen.

5. Inquiries

Marine inquiries, principally from shipping interests, solicitors, universities and industrial firms, continue at a high level. The subjects of the inquiries are extremely varied and, this year, have ranged from the weather conditions prevailing at the Battle of Taranto in 1940 to those experienced during and after the recent stranding of the super tanker *Amoco Cadiz*.

6. Awards to Voluntary Observers

As in previous years, 'Excellent' awards in the form of books were made to the shipmasters, principal observing officers and radio officers who were responsible for submitting the 100 best meteorological logbooks for the year. Similar awards were made to masters and officers on the short sea trades for their contribution in making sea-temperature observations and also to skippers and radio officers serving in trawlers with the best records in making and transmitting non-instrumental observations. The books selected for this year's awards were *The University Atlas*, *Cassell's English Dictionary* and *The World Encompassed* by Derek Wilson. Long-service awards in the form of barographs were made to four shipmasters in recognition of their valuable voluntary meteorological observing over many years during their career at sea.



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

THE MARINE OBSERVERS' LOG

April, May, June

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.

HURRICANE 'ALETTA'

Gulf of Tehuantepec

m.v. *Columbia Star*. Captain A. W. Kinghorn. Los Angeles to Le Havre. Observers, the Master, Mr J. Bottwood, Chief Officer, Mr J. Dick, 3rd Officer and Mr G. Bates, A. B.

29 May 1978. Between 0600 and 1315 GMT light variable winds and occasional rain showers were observed. At 1315 the sky became heavily overcast, heavy rain began to fall and lightning was observed but no thunder was heard, the wind was E, force 2–3, the barometric pressure rising rapidly and the temperature falling steadily. The rain ceased abruptly at 1350 and the wind became light variable again. Both sea and swell were, at this time, confused.

At 1400 'white horses' were observed to stretch from horizon to horizon about 2 n. mile ahead of the vessel; a very distinct line of demarkation could be seen separating the two areas of sea.

When the vessel entered the area of rough sea the Master and the 3rd Officer were standing on the bridge-wing. A sudden increase in wind speed sent the 3rd Officer staggering backwards—the warmth of the wind was likened to air from the inside of an oven. At 1405 the wind was E'ly, force 5, the temperature had increased to 25°C and a sharp fall in barometric pressure was observed.

The following are extracts from the vessel's logbook:

1415: Wind E'ly, force 6, temp. 26·5.
1430: Wind E'N, force 7–8, temp. 28·0.
1445: Moderate rain commenced and temperature began to fall again.
1545: Rain ceased, temp. 25·5, wind E'N, force 6–7.
1550: Wind ENE, force 4, temp. 25·0, barometer steady.
Position of ship at 1400: 15° 10'N, 97° 30'W.

Note. On the 29th the *Columbia Star* was on the periphery of a quickly intensifying tropical cyclone. It was identified by satellite on the 30th south of Acapulco as a well-developed system. 'Aletta', as the cyclone was named, meandered north-west and was upgraded to hurricane on the 31st. It weakened when the main centre moved ashore between Acapulco and Manzanillo on the same day and had degenerated by 1 June.

CYCLONE 'ALBY'

Indian Ocean

s.s. *Act I*. Captain C. P. Leighton. Melbourne to Fremantle. Observers, the Master and Mr A. M. Ashton, 3rd Officer.

1 April 1978. The vessel sailed during the evening from Melbourne and, at the time, cyclone Alby was centred off the north-west of Australia. A watchful eye was kept on its movements by way of shore weather reports and the facsimile charts received on board. The storm was slow-moving until 2300 GMT on the 3rd, after which it commenced to move in a south-easterly direction.

At 0900 on the 4th it became apparent that the storm, if it maintained its track and speed, would pass about 40 n. mile to the south-west of Cape Leeuwin; at this time the vessel was 25 n. mile to the south-west of Albany. In order to avoid passing through the centre of the storm and to increase the distance from land, the vessel's course was altered to the south-west.

By 1300 it was observed that the storm's speed of movement had increased such that it would pass close to the vessel. The weather began to deteriorate and speed was reduced at 1325. A little while earlier a line-squall had been observed 20 n. mile ahead and moving quickly towards the vessel.

At 1340, just after the line-squall had passed, the wind increased to storm force, the sea became very rough with a heavy swell and visibility was reduced to nil by foam and spray. The barometer, which had been falling steadily, began to rise quickly. For a period of about 20 minutes after the passage of the squall both radars became unserviceable as the scanner would not rotate due to the high winds.

The following are extracts from the logbook shortly before and after the passage of the squall:

4 April 0800 : Wind ENE, force 5–6, barometer reading 997·5 mb, temp. 21·5°C.
1000 : Wind ENE, force 5–6, barometer reading 991·8 mb, temp. 22·4.
1200 : Wind ENE, force 5–6, barometer reading 984·9 mb, temp. 24·1.
1300 : Wind N'W, force 5–7, barometer reading 981·6 mb, temp. 24·1.
1400 : Wind S'W, force 10–12, barometer reading 981·8 mb, temp. 22·0.
1500 : Wind S'W, force 10–11, barometer reading 991·3 mb, temp. 19·0.
1600 : Wind S'ly, force 9–10, barometer reading 997·8 mb, temp. 18·5.
1700 : Wind SSW, force 8, barometer reading 1002·5 mb, temp. 17·0.

Position of ship at 1200 on the 4th: 35° 24'S, 116° 18'E.

HEAVY SWELL

Mediterranean Sea

m.v. *British Beech*. Captain N. H. Roberts. Ambarli (Turkey) to Port Foxi (Sardinia) Observer, Mr C. S. Renton, 3rd Officer.

15 April 1978. At 1200 GMT the barometric pressure, which had fallen from 1021·0 mb at 0200 on the 13th, steadied at 1006·0 mb and the wind, which had maintained a consistent W'ly direction, began to increase from force 4. Cumulus cloud also began to develop.

By 1800 the wind had increased to force 8 and the vessel was pounding in a heavy westerly swell. The engine speed was reduced at this time to 90 r.p.m.

At 2200 the vessel took a sudden lurch foreward and slammed into the next wave shuddering violently. Engine speed was further reduced to 80 r.p.m. and the vessel was now making only five knots. By 0001 on the 16th the wind had further increased to an estimated force 9 and the skies began to clear; the clouds now were mainly stratocumulus and altocumulus.

At about 0700 the pressure began to rise and the wind had moderated to become NW'ly, force 5. At anchor on the same evening in the Gulf of Cagliari the wind had moderated to force 1 and the pressure was rising rapidly.

A Radio Newsreel report stated that extensive earth tremors were experienced in Sicily and south Italy and it was wondered if these had been the cause of the unusually heavy swell experienced as it was considered to be not typical of Mediterranean weather conditions.

Position of ship at 1200 on the 15th: 37° 48'N, 13° 06'E.

ICEBERG SIGHTING

South Atlantic Ocean

R.R.S. *John Biscoe*. Captain E. M. S. Phelps. South Georgia to Montevideo. Observers, the Master, Mr R. W. Wade, Radio Officer and ship's company.

1 April 1978. An iceberg, which had previously been encountered on 19 March in position 52° 45'S, 42° 20'W and then estimated to measure 32×24 n. mile, was encountered.

On 23 February the British Antarctic Survey ships had been informed by Dr Charles Swithinbank, glaciologist and Head of the Survey's Earth Sciences

Division, of a giant iceberg which he had been following for 11 years. The iceberg measured 27×52 n. mile and was, at that time, observed in position 54° 25′S, 39° 00′W; it was considered to be the largest iceberg ever reported north of 55°S.

On the occasion of the April sighting the vessel steamed 38 n. mile along one face before it was able to resume course. Another face, at right angles to the first, was observed by radar to measure 16 n. mile. Many small icebergs were encountered within a 50-n mile radius of the 'mother'. The net drift since the encounter nearly two weeks earlier was calculated to be 130 n. mile in a NE'N direction.

Buenos Aries, Cape Town and Portishead Radios were informed on both occasions of the encounters.

Position of ship: 51° 10′S, 40° 40′W.

Note. The following are extracts from 'Eleven Year Chronicle of one of the World's most Gigantic Icebergs' by E. Paul McClain of the National Environmental Satellite Service, USA, published in *Mariners Weather Log* and reproduced by kind permission of the Editor.

A comparison of Antarctic charts before and after 1967 (American Geographical Society, 1965 and 1970) reveals that a large portion of the Trolltunga ice tongue at 69° 30′S, 1° 00′W is missing from the more-recent charts. This ice tongue is clearly visible in ESSA satellite images taken in March 1967 and earlier. In satellite data of October 1967 and later most of the Trolltunga tongue is gone, but a large iceberg of the same general size and shape as the missing tongue is visible drifting south-westwards along the coast (Swithinbank *et al,* 1977). This gigantic iceberg, which is called Trolltunga after its origin, became grounded near 77° 00′S, 48° 00′W just off the Filchner ice shelf in 1969 where it was to remain for some five years. To give the reader some feeling for the enormity of this piece of ice, its planimetered area in 1973 was 4650 square kilometres and its weight estimated to be $976 \cdot 5 \times 10^9$ tonnes.

Trolltunga resumed its travel in February 1975, still embedded in the perennial ice pack of the Weddell Sea, and reached a point near the north-east point of the Antarctic Peninsula about two years later. At this time it measured 92×50 kilometres.

By March 1977, Trolltunga was drifting free of the pack ice and heading generally northward. It then accelerated north-eastward to pass just east of the Elephant and Clarence Islands into the open South Atlantic Ocean.

By March 1978, Trolltunga had reached a point just west of South Georgia Island. The iceberg's generally north-eastward track became essentially due east after April 1978 and thereafter a considerable reduction in horizontal area took place. In June 1978 its horizontal dimensions measured from satellite data were 56×23 kilometres. At its past average rate of drift it was estimated that the remnants of Trolltunga could reach a position near 50° 00′S, 00° 00′W by 31 December 1978.

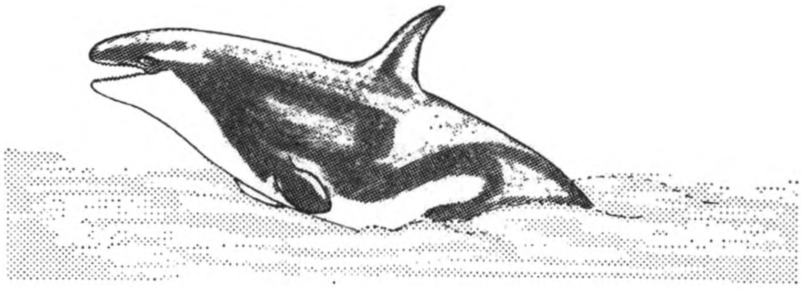
WHALES

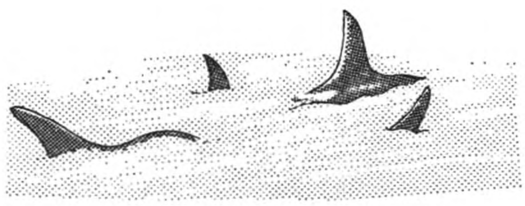
Great Australian Bight

s.s. *Encounter Bay.* Captain G. Barrett. Fremantle to Melbourne. Observers, Mr C. C. Woodward, 2nd Officer, Mr D. R. Lewis, 3rd Officer and Mrs P. Thornally.

20 April 1978. At 0325 GMT the whales shown in the sketch were first observed by their dorsal fins riding out of the waves; the shape was so distinctive that little doubt remained that they were killer whales.

There were eight in the group, six remained close together with the other two trailing behind as outriders. The whales passed about 1½ n. mile from the vessel and it was thought that the group consisted of four adults and two calves. The two





'outriders' were the most active, occasionally leaping clear of the water showing their large fin and rust-coloured saddle behind.

Position of ship: 36° 20S, 125° 09′E.

FISH

Bay of Biscay

m.v. *Timaru Star*. Captain G. Seaye. Sheerness to Cape Town. Observer, Cadet J. Simpson.

12 April 1978. Shortly after 0600 GMT the look-out reported that a fish, see photograph opposite page 69, had 'fallen out of the sky' and had landed on his head. It was thought that a bird had picked the fish out of the water and subsequently let it drop. The upper lip appeared to be missing. The appearance of the fish suggested that it was a deep-water type which had been caught in a trawl and rejected.

Position of ship: 45° 06′N, 8° 00′W.

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

'This is a handsome photograph of a deep-sea hatchet-fish *Argyropelecus affinis*. This fish has a line of light organs on each side of the belly. It spends the day at depths down to 1000 metres and the night in shallower water, sometimes breaking surface during the hours of darkness. The upper lip of this specimen was missing.'

SHARKS

North Pacific Ocean

m.v. *Hupeh*. Captain J. M. Parker. Hong Kong to Lautoka (Fiji). Observer, Mr A. Jackson, 2nd Officer.

12–13 June 1978. Between 2330 and 0230 GMT two sharks were sighted whilst the vessel was stopped carrying out repairs.

The first shark was quite small—about 1½ metres in length, it was observed for only a short time so that no other details were obtained. The second was about 3 metres long, this swam backwards and forwards off the starboard side of the vessel for about an hour. The most prominent features were the long top half of the tail and the long horizontal fins which appeared to have white tips.

Position of ship: 2° 43′N, 144° 00′E.

Note 1. The *Hupeh* is a Hong Kong Selected Ship.
Note 2. Dr F. Evans comments:

'I cannot be certain of this larger shark but it was most likely the white-tipped shark *Carcharinus longimanus*, a tropical high-oceanic shark often seen at the surface. This shark has a white tip to its anterior dorsal fin also.'

JELLY-FISH

Eastern North Atlantic

m.v. *Strathdirk*. Captain B. Penman. Savannah to Malta. Observers, the Master and ship's company.

17 April 1978. At 1130 GMT a large number of dark-blue shell-type objects were observed on the sea surface; they were regular in shape, varied in size between 4 and 10 centimetres and each had a white diagonal sail. Also observed later were small light-brown seed-shaped objects. The shell-type objects were observed throughout the day.

Position of ship: 36° 25′N, 11° 20′W.

Note. Dr F. Evans comments:

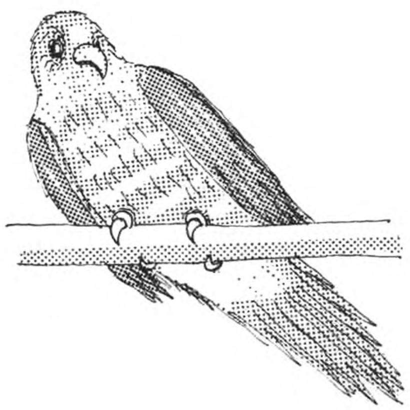
'These were specimens of the oceanic jelly-fish *Velella velella*. Sir Alister Hardy has written, "The old sailors used to call them Jack Sail-by-the-Wind, today I do not suppose the steamship men, travelling fast, even notice them." He was wrong, the sail is part of the float which supports the animal at the surface.'

BIRDS

Gulf of Aden

s.s. *Moreton Bay*. Captain J. H. Hutson. Suez to Fremantle. Observers, the Master and ship's company.

26 June 1978. At 0900 GMT two birds landed on board, see sketches.



The first bird, thought to be a kestrel, was light brown in colour with dark-brown V-shaped feathers on the chest and tail. The wings were much darker in colour and finely feathered. Black hood-type markings were observed on the head.

The second bird was dark grey in colour becoming lighter grey around the head. The beak was long, slightly curved and yellow in colour.

Both birds flew off at sunset.
Position of ship: 12° 15′N, 47° 48′E.

Note. Captain G. S. Tuck, Chairman of the Royal Naval Birdwatching Society, comments:
'I consider the first bird to be a female Kestrel, *Falco tinnunculus* and the second is a white-necked Pacific Heron, *Ardea pacifica*—a typical heron of the swamps and waters of Australia.'

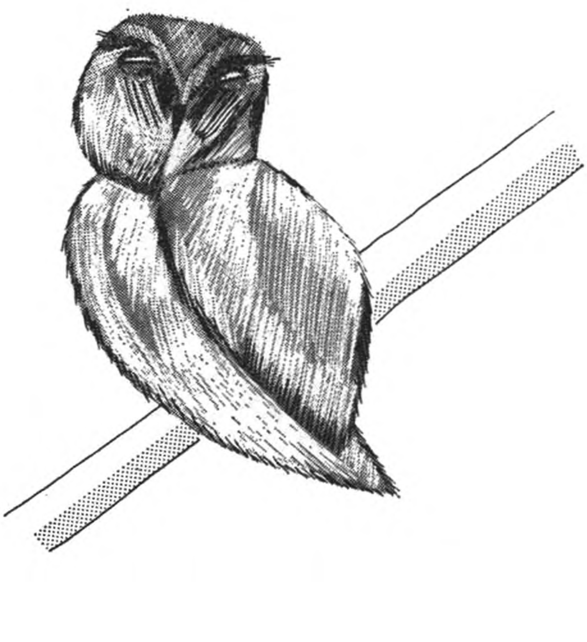
Mediterranean Sea

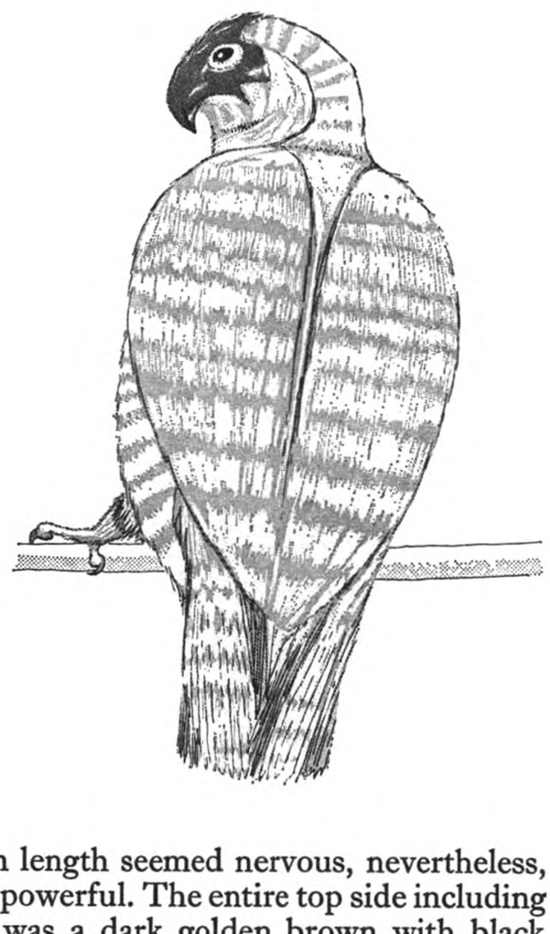
m.v. *Strathdirk*. Captain B. Penman. Malta to Port Said. Observers, Mr M. Ross, 3rd Officer and Cadet A. R. L. Herriott.

23 April 1978. At 0715 GMT an owl, see sketch, was observed sitting on cargo-securing webbing about six metres from the bridge window on the port side.

The bird was 15–20 cm in length, the head was a light-fawn colour with almost white areas around the eyes. The eyes, which were closed most of the time during its stay, were large with stubbly feathers on the lids. The wings were a darker brown with light grey to white streaks on the outer edges, the tail feathers were also dark brown. The underside was almost cream in colour with darker shades towards the rear.

At 0819 the owl, in company with other birds, flew off upon the approach of a falcon, see sketch.





The falcon, which was in excess of 30 cm in length seemed nervous, nevertheless, it gave the impression of being very solid and powerful. The entire top side including the nape of the neck and top of the head was a dark golden brown with black horizontal bars running across. The tail, when folded, was at least three-quarters of the width of the body and of the same colour. The head was a lighter colour, the beak black and there were black edges around the eyes. The under side was a creamy colour with darker horizontal bars running across from wing tip to wing tip. The feathers had a 'downy' appearance.

During the falcon's stay it made a number of short flights and on one occasion, when it was followed through binoculars, it was observed to 'home in' on a small object and devour it—it was thought the object was either a large insect or a small bird. Upon its return to the vessel it 'buzzed' a passing sea-gull before landing on the aftermast.

After a few further flights, sometimes returning quite wet and bedraggled, it finally flew away.

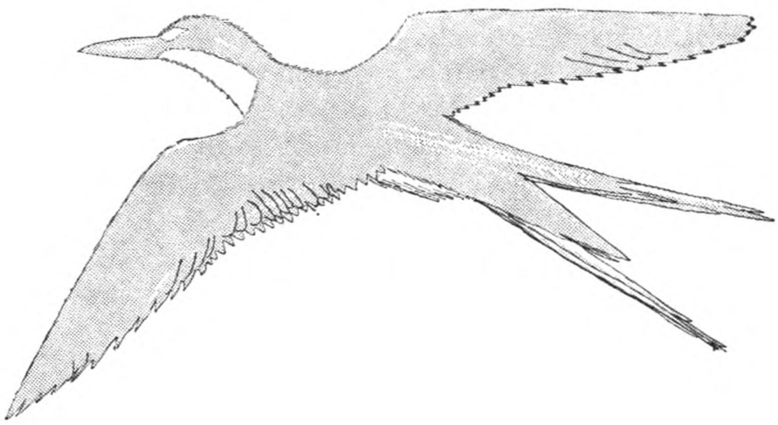
Position of ship: 33° 10′N, 25° 50′E.

Note. Captain Tuck has identified the birds as being Bruce's Scops owl, *Otus brucie* and the Barbary falcon, *Falco peregrinoides.*

South Atlantic Ocean

m.v. *Wild Auk.* Captain J. C. Fulbrook. Sheerness to Cape Town. Observers, the Master and ship's company.

9 May 1978. The bird, shown in the sketch drawn by Mr R. M. Hughes, 3rd Officer, was found dead on the fo'c's'le. The topside was black with white leading edges and the underside white.



Position of ship: 7° 38′s, 4° 30′w.

Note. Captain Tuck comments:
'This is a good sketch of a Sooty Tern, *Sterna fuscata.* It is frequently seen in this area off the west coast of South Africa.'

TERMITES

Liberian waters

m.v. *British Poplar.* Captain A. J. Lockwood. At anchor Monrovia (Liberia) Observer, Mr N. H. Lane, 2nd Officer.

24 April 1978. Shortly after dusk the vessel was invaded by thousands of flying termites. At first the insects flew around the lights then dropped onto the deck where they began to search for a partner, upon finding one they dropped off their wings as though they were no longer required and then mated.

The termites were about 1·5 cm in length with wing-spans of 3–3·5 cm. Their bodies were dark brown on the upper parts and cream coloured underneath.

They were assumed to be termites, as, before joining the vessel, several people had seen a TV documentary on these creatures. Although they were reputed to taste very good, no one actually tried them—not even the locals.

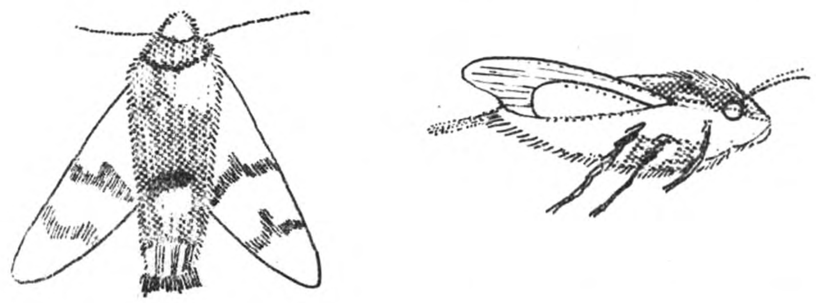
Position of ship: 6° 18′N, 10° 47′W.

HAWK-MOTH

North Atlantic Ocean

m.v. *Stirling Bridge*. Captain P. Boyle. Dunkerque to Tubarão. Observers, the Master and Officers of the watch.

20 April 1978. At 0740 GMT an insect, see sketch, flew into the wheel-house.



The body was 20 mm in length, tail 5 mm, body width 9 mm and wing-span 50 mm. The body was covered in fur. The underside was light grey with white, off white and black sections towards the tail. The upper part was dark brown with a series of patterned sections at the rear. The wings were a lighter brown with dark stripes on the upper part and reddish brown underneath. The head was round with large yellow eyes. The mouth was large and the insect had a divided 'chin' into which a tongue of approximately the same length as the body curled. The legs were covered in long fur, the foremost pair disappearing into the body fur when the insect walked. A pair of long flat black antennae emerged from very slightly above the eyes.

Position of ship: 31° 47′N, 24° 22′W.

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

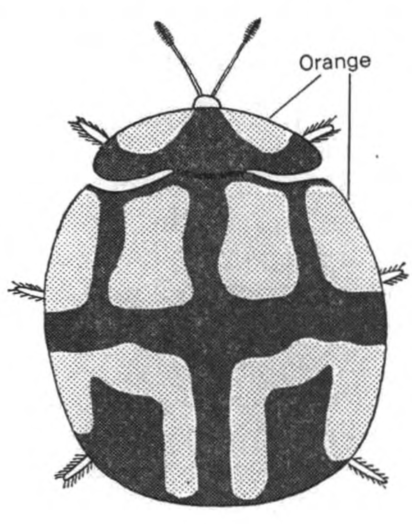
'This is the hummingbird hawk-moth *Macroglossum stellatarum*.'

TORTOISE BEETLE

North Atlantic Ocean

m.v. *New Westminster City*. Captain R. I. Crawford. Montreal to Maceio (Brazil). Observers, the Master and ship's company.

22 May 1978. The insect shown in the sketch was discovered on the main deck;



a most notable characteristic was its extremely tight grip on every kind of surface. The nearest land at the time was Porto de Mueuripe, Brazil, some 210 n. mile distant.

Position of ship: 0° 18′N, 36° 27′W.

Note. Mr R. D. Pope of the Department of Entomology, the British Museum (Natural History), comments:

'This is a tortoise beetle (Chrysomelidae: Cassidinae) called *Poecilaspis angulata* Germ. This species occurs throughout South America. Both adults and larvae are leaf-feeders although the host plant of this species is not known. Adults frequently take flight in warm weather and may be attracted to lights.'

SHIELDBUG

Caribbean Sea

m.v. *Piako*. Captain D. Foreman. Avonmouth to Cristobal. Observers, the Master, Mr M. J. Stopford, Chief Officer and Mr A. R. Woodhouse, 3rd Officer.

28 April 1978. At 1430 GMT an insect was found on board and later passed on to the British Museum for identification purposes.

The insect was 15 mm in length, had six legs and two pairs of wings. It was predominantly dark brown in colour with two distinct spots in an area of lighter brown on the back and a light-brown diamond-shaped marking just back from the head. The abdominal region was a creamy colour and was covered with transparent scales.

Position of ship: 11° 40′N, 74° 18′W.

Note. Mr W. R. Dolling of the Department of Entomology, British Museum (Natural History) comments:

'This is a Shieldbug of the family Scutelleridae; the species is *Augocoris nigripennis* Dallas. This insect is recorded from Venezuela, Trinidad and Brazil.'

LOCUST

Gulf of Aden

m.v. *Mairangi Bay*. Captain L. E. Howell. Suez to Melbourne. Observer, Mr M. Taxis, 3rd Officer.

31 May 1978. A large locust was found on deck and preserved in a mixture of gin and pure water. It was subsequently passed on by the Port Meteorological Officer, London to the Centre for Overseas Pest Research.

Position of ship at 1200 GMT: 12° 18′N, 47° 48′E.

Note. Mr Jeremy Roffey, Head of the Desert Locust Information Section of the Centre for Overseas Pest Research, comments:

'The insect was a tree locust the scientific name of which is *Anacridium melanorhodon arabafrum* Dirsh. It has a wide distribution in the Sahelian and Sudanese vegetation zones of Africa and also extends into south-west Arabia.'

BIOLUMINESCENCE

Eastern South Pacific

m.v. *Weybank*. Captain P. H. Thomas. Coquimbo (Chile) to Antofagasta (Chile). Observer, Mr F. Hunter, Chief Officer.

31 May 1978. At 1000 GMT the bow wave and wake were brilliantly illuminated by bioluminescence. What at first appeared to be a blooming or upwelling effect in large streaks and patches, proved to be the effect caused by shoal after shoal of mackerel or pilchards through which the vessel was steaming. The intensity of the effect varied and depended upon the depth at which the fish were swimming. When the fish were caught in the bow wave they seemed to scatter in fright.

Position of ship: 26° 25′S, 71° 12′W.

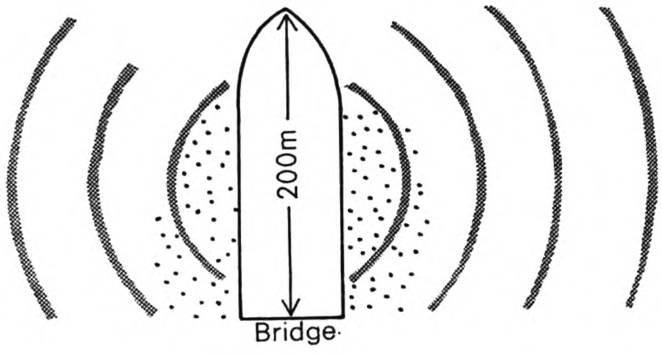
Note. Dr P. J. Herring of the Institute of Oceanographic Sciences, comments:

'This sounds like a particularly spectacular example of fish shoals in an area of large numbers of luminous dinoflagellates. This type of luminous "marker" is being used in some regions to identify and follow fish shoals from low-flying aircraft equipped with low-level light sensors.'

South China Sea

s.s. *Kowloon Bay*. Captain J. Bold. Kobe to Port Kelang. Observers, Mr D. J. Baily, 2nd Officer, Cadet M. Heaps and Mr W. Doran, look-out.

10 May 1978. At 1900 GMT small white patches of pulsating bioluminescence were observed within 30 metres of the vessel on both sides, see sketch. The phenomenon gradually increased in brilliance and regular flashes, two every second, were observed.



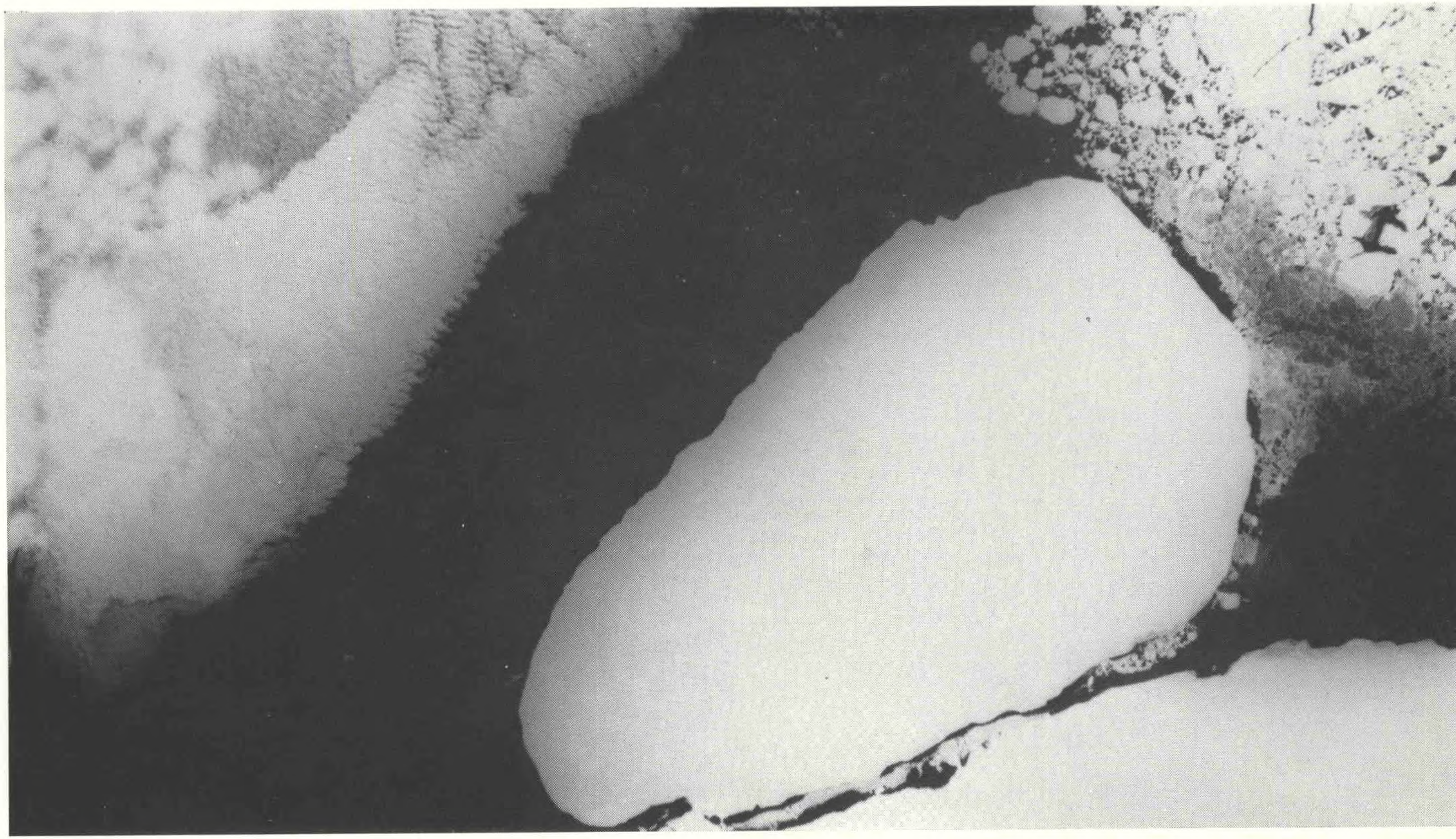
As the brilliance increased bluish-green waves were observed to radiate rapidly outwards from a point on the hull half-way down the foredeck, the rate of the radiation was synchronized with the general pulsation of the bioluminescence. The waves faded about 300 metres from the vessel. The display, which was observed for about 10 minutes, was observed only forward of the beam.

The night was dark and there was no moon. The sky was largely overcast, wind light variable and there was a low swell. The air temp. was 29°C and the sea temp. 31.

Position of ship: 4° 03′N, 105° 55′E.

Note. Dr Herring comments:

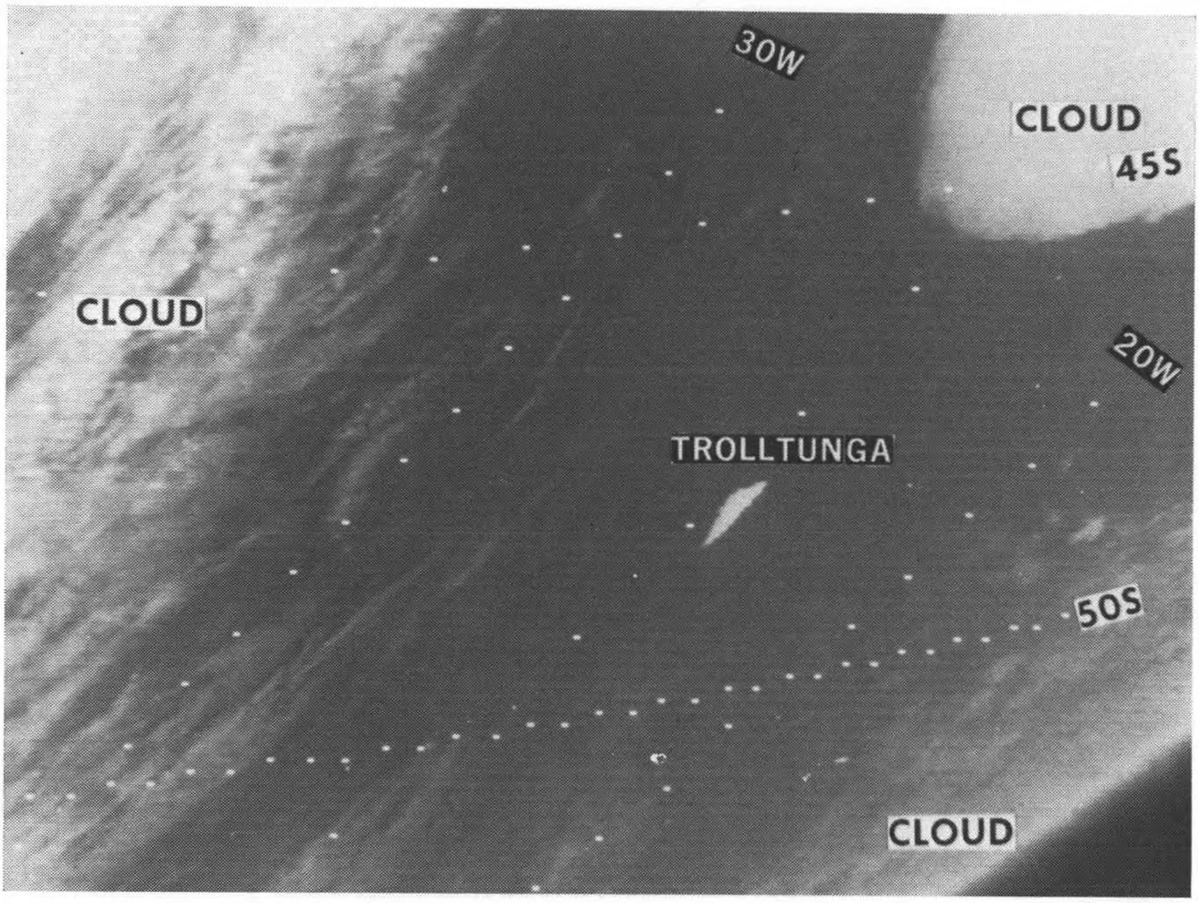
'It seems likely that the luminous organisms in the sea were responding to some regular pulsation within the vessel, presumably from the engines. The radiation of waves of light from the vessel is in keeping with this suggestion. Other examples of this type of response have been reported (e.g., m.v. *Malaita*, *The Marine Observer*, Vol. **31**, 1961, page 184), but they are uncommon.'



Landsat-1 MSS-5 image of the Trolltunga giant iceberg on 11 December 1973 when it was grounded near 77°S, 48°W. Mostly consolidated pack ice appears at top right, a portion of the Filchner Ice Shelf is seen at bottom right and clouds cover the top left of the photograph (*see* page 60)

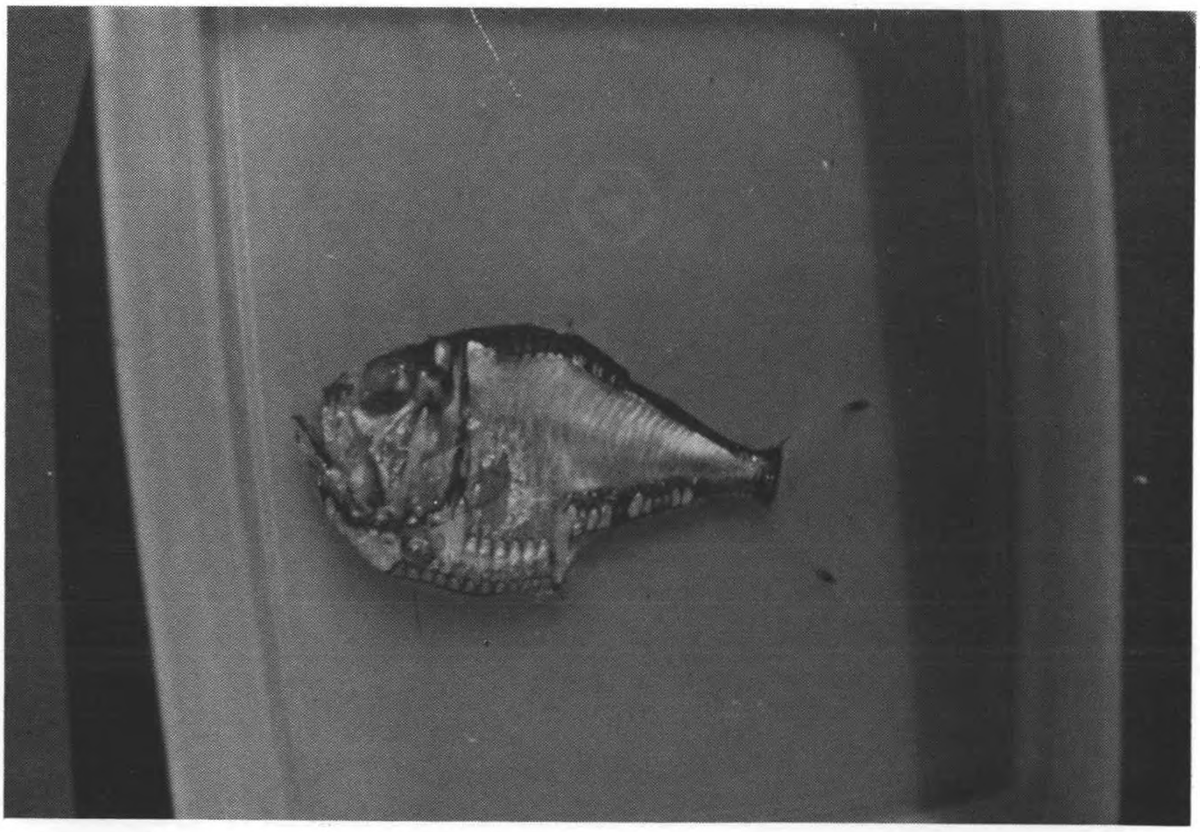
National Oceanic and Atmospheric Administration photograph

B



GOES-2 VISSR-VIS image of the Trolltunga iceberg as it drifted eastwards near 48°S, 25°W (*see* page 60)

National Oceanic and Atmospheric Administration photograph



Deep-sea hatchet-fish found on board m.v. *Timaru Star* (*see* page 62)

Arabian Sea

m.v. *B. R. Ambedkar*. Captain R. D. Sudarshan. Ra's Tannūrah to Bombay Observers, the Master, Mr P. M. Umrigar, 2nd Officer and Cadet G. P. Singh.

8 April 1978. At 1655 GMT numerous streaks of light were observed on the se surface originating from a centre about two n. mile from the vessel; the phenomeno was observed about four points on the starboard bow.

The streaks were greenish in colour and seemed to be moving in an anti-clockwis direction around the centre in an orderly fan-like fashion and at a good rotationa speed. The phenomenon was observed for about 10 minutes.

The same phenomenon was observed again between 1855 and 1900, this time o the port side.

Weather conditions were as follows:

At 1655: barometric pressure 1011·3 mb, dry bulb 26°C, wet bulb 23·5, partl cloudy, good visibility.

At 1855: barometric pressure 1010·1 mb, dry bulb 25, wet bulb 23, partly cloudy good visibility.

Position of ship at 1655: 19° 39′N, 70° 41′E.

Note 1. The *B.R. Abedkar* is an Indian Supplementary ship.
Note 2. Dr Herring comments:

'This is clearly an example of a phosphorescent wheel.'

Gulf of Aden

m.v. *Strathaird*. Captain J. M. Burn. Mogadiscio to Jeddah. Observers, the Master Mr P. N. Hambleton, 2nd Officer, Mr J. C. Etheridge, 3rd Officer and Mr Etheridge.

25 June 1978. When the Aldis lamp was switched on and the light directed ont the water, hundreds of pin-points of bioluminescence were observed; they appeare to have been stimulated by this light as they were not visible when the lamp wa switched off nor by the vessel's navigation and accommodation lights. The colour of the bioluminescence varied from a reddish orange to a bluish white. Whe patches of pin-points were followed by the light from the Aldis lamp, they wer observed to change colour and, on occasions, to do so several times.

A water sample was taken but when shaken, stirred and subjected to stron light, no effects were observed. No effect had been observed when the radar an echo-sounder were switched on.

Weather conditions at the time were: dry bulb 31·6°C, wet bulb 27·5, wind SE'ly force 2, sea rippled.

Position of ship: 12° 21′N, 46° 18′E.

Note. Dr Herring comments:

'The observers saw a school of small fishes, probably lanternfish. The eyes of these fish ar very reflective.'

SOLAR HALO

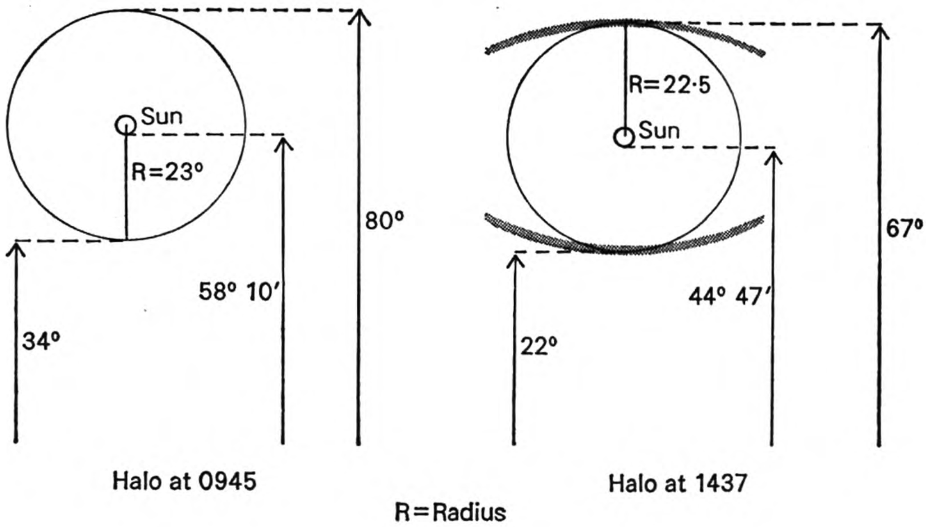
Mediterranean Sea

s.s. *Cardigan Bay*. Captain W. P. Goldie. Port Said to Hamburg. Observers, Mr W Broadbent, 2nd Officer and Cadet W. Kirrane.

22 April 1978. At 0945 GMT a halo was observed around the sun, see sketch.

The halo was observed to have a radius of 23°. The altitude of the lower rim wa 34° and that of the upper rim 80°—both altitudes were measured by sextant. Th sun's altitude was 58° 10′.

The colouration was well developed especially in the north-easterly quadrant where colours of red, yellow, green and blue were clearly seen; only the red and yellow colours were observed throughout the whole 360° of the halo. The halo was observed in this form for only a short period of time after which it took on a generally white appearance, although the colours were observed from time to time especially in the north-easterly quadrant.



The sky was gradually being invaded by a layer of cirrostratus cloud. The dry bulb temp. was 16·9°C and the wet bulb 12·8.

At 1400 the halo became more prominent again and at 1437 upper and lower arcs of contact were observed, see sketch. Note also in the sketch that a cut-off arc was observed to the left of the upper arc. All four colours (red, yellow, green and blue) were clearly visible at the top and bottom of the halo for about 15 minutes.

The altitude of the upper rim was, on this occasion, 67° and that of the lower rim 22°. The sun's altitude was 44° 47′. Temperatures were: dry bulb 18·2 and wet bulb 14·0.

The halo was observed for the last time at 1545.

Position of ship at 0945: 37° 04′N, 2° 26′E.

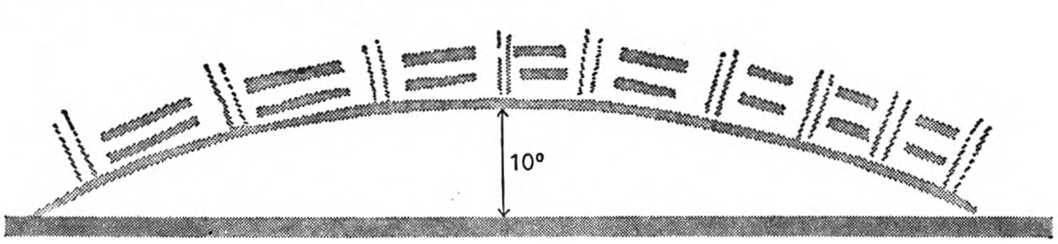
AURORA

Western North Atlantic

m.v. *Dart Atlantic*. Captain C. O. Thomas. Halifax (Canada) to New York. Observers, the Master, Mr S. Thomas, 3rd Officer and ship's company.

2 May 1978. At 0100 GMT a glow on the horizon was first observed. Gradually the glow increased in height above the horizon until by 0130 it had taken on an arc shape, the end bearings were 300° and 060°T and the altitude 10°, see sketch. At that time the glow was quiet with only moderate brightness.

At 0145 the glow became active when about a dozen rays, weak to moderate at first but gradually becoming brighter, were observed; the rays seemed almost stationary with a slight pulsating effect.



At 0150 a bright flaming effect was observed between the vertical rays over the whole length of the arc and to an altitude of 40°. The effect was, however, not observed over the whole arc simultaneously, only a small section at a time and at not very regular intervals—sometimes every 2–3 seconds, then every 10–15 seconds. The flaming effect was observed for about 25 minutes but the rays were still visible until about 0300 when they began to fade, finally disappearing about 0330.

Position of ship: 40° 30′N, 71° 30′W.

Norwegian Sea

m.v. *Vickers Viscount*. Captain A. J. Mellor. Shetland Islands to the North Sea Oil Fields. Observers, Mr P. Hannah, 2nd Officer and Mr R. I-Anshon, Radio Officer.

2 April 1978. At 0000 GMT a brilliant display of aurora was observed. At first it appeared in the form of coronal rays, the altitude of the centre of the display was 80° and that of the lower rays about 30°. By 0230 this effect had faded and a shimmering homogeneous band, bearing south-west at one end and east at the other, was observed; this display was of moderate brightness. The altitude of the band was approximately 10° at the south-west end, 30° at the centre and 20° at the east end.

At 0240 the display took the form of a rayed arc; this appeared directly overhead and stretched from the western to the eastern horizon. A brighter shimmering patch appeared in the arc on an east-south-easterly bearing at an altitude of 60°. At the beginning of the display the aurora was pulsating rapidly, by 0240 this effect had ceased. After about 10 minutes the rayed arc diminished and became a series of vertical rays extending from 50° to 60° of altitude on an easterly bearing.

At 0255 a homogeneous band was again observed, this turned rapidly to a pulsating and shimmering rayed patch.

At 0305 a spectacularly brilliant coronal ray was observed at an altitude of 80° and on a south-easterly bearing. The display appeared as a sudden flare-up, the colour, white at first, turned to an intense iridescent green, purple and yellow. This gradually moved across the zenith and diminished after about five minutes. A few minutes later a bright yellow ray was observed extending from the south-west to the south-east at an altitude of 80°. The ray began to diminish after about two minutes and no further display was observed after 0325.

On the previous day sun-spot activity had been observed whilst checking the sextant's index error.

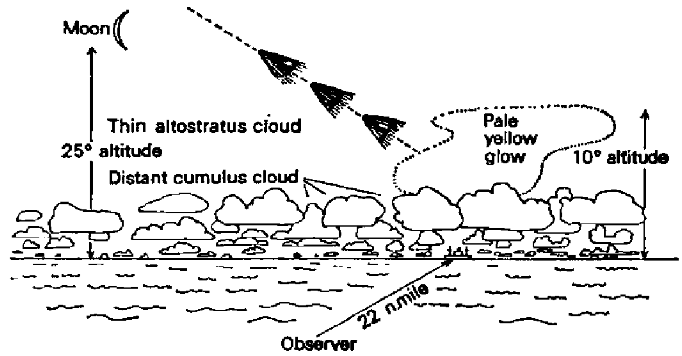
Position of ship: 61° 05′N, 1° 34′E.

UNIDENTIFIED FLYING OBJECTS

North Atlantic Ocean

m.v. *Dart Atlantic*. Captain M. J. Butler. Norfolk (Va) to Southampton. Observers, Mr C. S. Gaukroger, 2nd Officer and Mr P. Bowers, A.B.

11 April 1978. At approximately 2200 GMT three cone-shaped lights as shown in the sketch emerged from a large pale-yellow glow in the sky. The lights appeared to be equally spaced and were travelling at great speed; they were brightest at the apex. Each light was observed for about one minute—the time taken to travel from the yellow glow to a point just above the layer of altostratus cloud—before fading rapidly and disappearing at an altitude just above the moon.



At the same time a vessel was detected by radar on the same bearing as the yellow glow at a range of 22 n. mile. It was at first thought that the lights may have been missiles launched from the vessel—this was, however, later discounted as it would not account for the yellow glow from which the cones of light emerged. Shortly after the cones of light had disappeared the yellow glow began to fade but it was not until half-an-hour later that the glow had disappeared completely.

It may be worth noting that the lights were observed approximately one hour after sunset when there were still traces of red among the clouds above the western horizon.

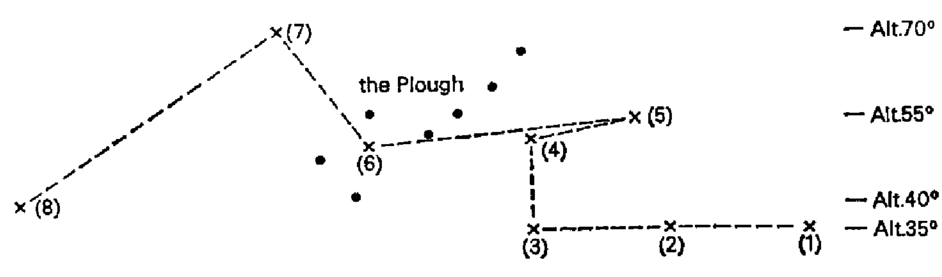
Position of ship: 45° 50′N, 30° 20′W.

Bay of Bengal

s.s. *Bencruachan.* Captain O. Tucker. Singapore to Colombo. Observers, Mr T. J. Mooney, 4th Officer, Cadet P. Clews and Mr M. Harrison.

28 May 1978. At 1640 GMT an object was sighted flying at an altitude of approximately 35°. It was thought at first to be an aircraft but once the object was on the starboard beam, it was clearly seen to be cylindrical in shape and to be moving across the sky at a greater speed than that of a commercial airliner.

After a few moments the object climbed vertically to an altitude of 50° then proceeded to move in an erratic manner, doubling back on itself on one occasion, and increasing and decreasing in altitude by 30° in a matter of seconds, see sketch.



It was also observed that during these erratic movements the object changed colour from orange to blue to red, the colour change varying with changes in altitude. The whole episode, which lasted for 1 minute 25 seconds, was observed through binoculars. The vessel remained steady throughout the observation so that rolling or pitching could not contribute to any observed change in altitude of the object.

Weather details were: sky cloudless, wind W'ly, force 4, dry bulb temp. 28·2°C, wet bulb 26·0.

Position of ship: 05° 54′N, 95° 30′E.

551.507.2: 551.508.825

The United Kingdom National Data Buoy (DB1)—A Future Source of Meteorological Data?

By M. Bader, H. A. Douglas and M. J. Kerley

Meteorological Office, Bracknell

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Because of its geographical position, the United Kingdom needs extensive meteorological data from the surrounding sea areas. In the past this need has been fulfilled by observations made mainly from merchant ships on passage and from specialized Ocean Weather Ships. However, the need for a greater density of observations, in part to satisfy an increased demand for specialized services, has coincided with the advance of containerization which has reduced the numbers of ships available for such work. As a result alternative ways of gathering the required data have been considered.

A prohibitively expensive method of obtaining additional surface data would be to provide extra Weather Ships; a more realistic alternative would be to use moored buoys fitted with meteorological instrumentation with the data transmitted at regular intervals to a shore station. The buoy and associated instruments must be sufficiently reliable to withstand the severe environment experienced at sea.

Instruments which were intended to satisfy these requirements have been tested on a data-gathering buoy specially designed for research and development. This paper contains a brief description of the project and a description of the meteorological sensors on board. Some results obtained from the first 11 months at sea are presented and discussed.

The data buoy project

In 1971 the Marine Technology Board recognized a potential use for data buoys around the United Kingdom and recommended the undertaking of a design study to provide a data buoy as a platform for developing sensors, telemetry equipment and power supplies. The Government Departments or Agencies who expressed a wish to participate in the project included the Institute of Oceanographic Sciences (IOS), the Department of Trade and Industry, the Ministry of Agriculture, Fisheries and Food (MAFF), the Meteorological Office and the Institute of Coastal Oceanography and Tides.

The design study was successfully completed and early in 1974 the contract for the project was awarded to the Seatek Consortium, comprising Hawker Siddeley Dynamics, EMI (Electronics) Ltd and Green & Silley Weir Ltd. Subsidiary contracts went to Racal Ltd and AERE (Harwell). The Meteorological Office and IOS supplied their own sensors. The total cost of the contract was estimated at £400 000.

The buoy (known as DB1) was launched on the Thames in June 1975 and towed to Lowestoft on the east coast of England, Figure 1, where fitting out was completed and the buoy commissioned in September 1975 (Rusby 1975). It was towed to the mooring position (52° 23·8′N, 1° 48·2′E) at the end of November 1975.

Description of the buoy and the transmission system

The buoy hull is a wave-following discus 7·5 m in diameter and weighing 30 tonnes; it carries a central aluminium mast 7·5 m high, Figure 2. A total of 100 data channels are provided, the majority of which are available for the testing and evaluation of meteorological and oceanographic sensors. The values of the variables

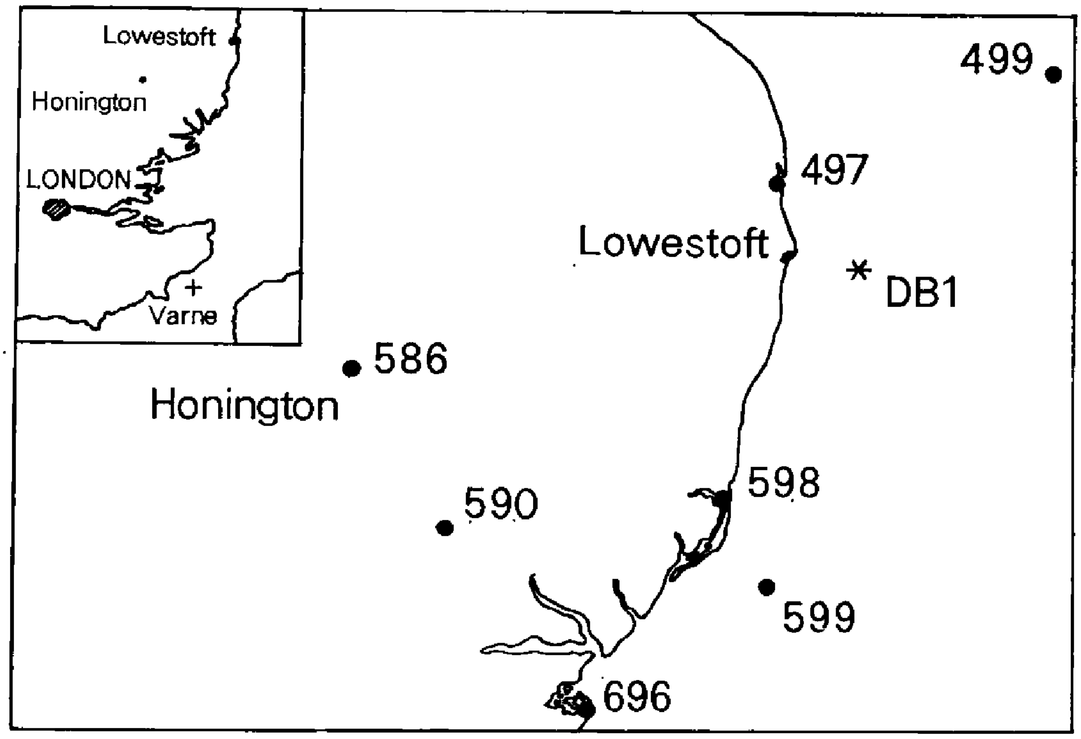

Figure 1. Location of places named in the text and the sites of other stations (identified by their station number) used in obtaining the 'comparison values'

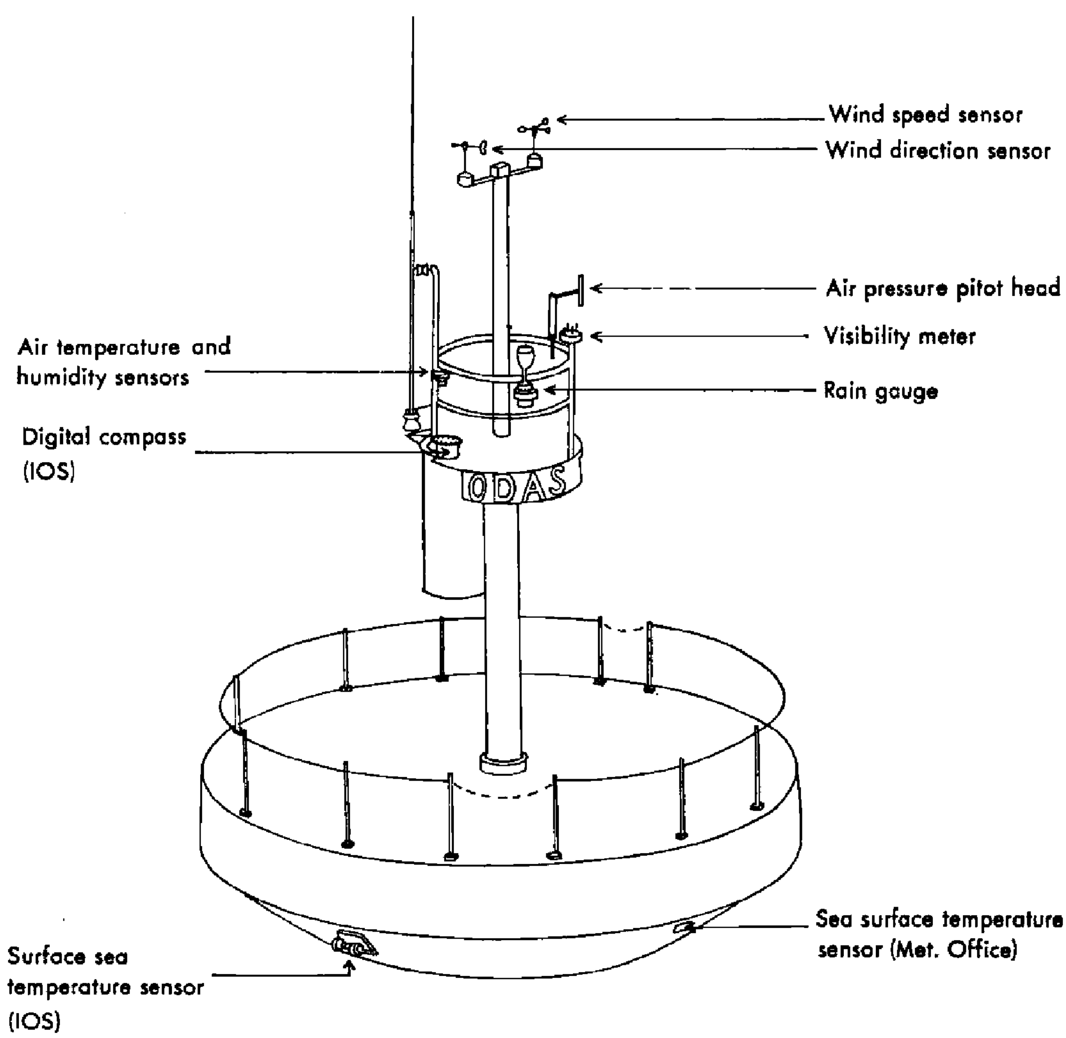

Figure 2. Schematic diagram of DB1 indicating the position of the sensors

measured are converted into a form suitable for transmission, Figure 3, and transmitted hourly by Piccolo (a high frequency (HF) telemetry system) to a shore station sited at Lowestoft. Here the data are fed into a computer where they are processed, stored on magnetic tape and the meteorological information transmitted by landline to the Meteorological Office at Honington in the form of a standard coded meteorological message.

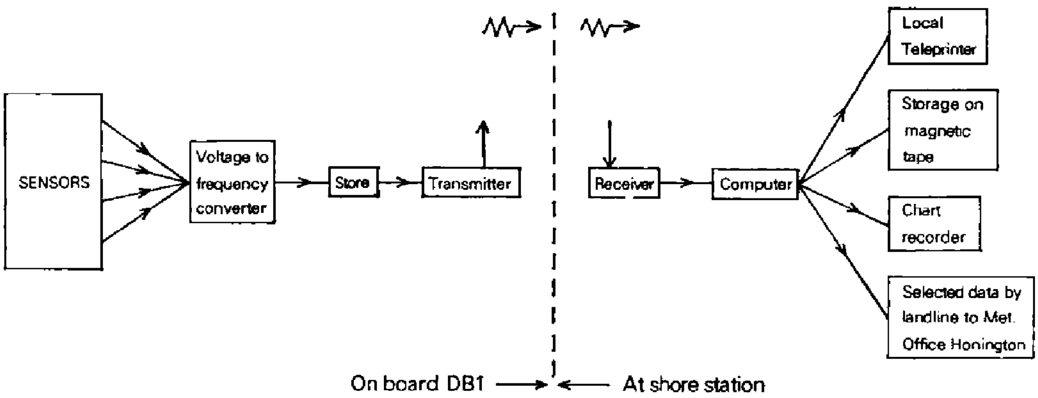

Figure 3. Simplified block diagram of the data collection and transmission system

Meteorological instrumentation

The meteorological instruments fitted on DB1 during the period under consideration measured air and sea temperature, pressure, humidity, cumulative rainfall, visibility, wind speed and wind direction, Figure 2. Any such instrument has to work automatically and provide an electrical output (i.e. a voltage or pulse count) which can be converted to a suitable form for transmission to the shore station. In general the meteorological sensors deployed on DB1 (during 1976) were similar to those in use at automatic land stations, but were specially protected against corrosion from sea spray. The following paragraphs give a brief description of the sensors.

The air temperature is measured by a platinum resistance thermometer in which the electrical resistance of the sensing element is proportional to temperature (within acceptable limits). The element forms part of an electrical bridge network and there is a direct relationship between the temperature and the voltage output. The humidity is measured by a chemical hygrometer (Folland 1973) in which the sensor surface (a layer of sulphonated polystyrene) absorbs and exchanges water vapour with the atmosphere to achieve equilibrium. These changes modify the electrical resistance of the sensor surface which forms part of a second electrical bridge measuring circuit. To protect the surface from atmospheric pollution, a thin cellulose sleeve is mounted on a special holder, Figure 4a. The sleeve acts as a barrier to contaminants such as sea salt but allows moisture to permeate. Both sensors are mounted in a new type of glass-fibre screen, Figure 4b, designed for marine use. The sea-surface temperature sensor is also a platinum resistance thermometer bonded to a copper disc which in turn is bonded to the inside of the buoy hull below the water-line. The adhesive used enables good thermal contact to be made whilst the complete sensor is thermally insulated from the internal ambient air. The conversion to a voltage is achieved in a similar manner to that for air temperature.

Air pressure is measured by an aneroid barometer in which the movement of the pressure-sensing capsule is converted to a voltage by a differential transformer. The capsule is located within the buoy where errors due to buoy motion are at a minimum. The capsule is connected to the outside air by means of an armoured tube fitted with static pressure (pitot) head to reduce the errors caused when a strong wind blows across a vent.

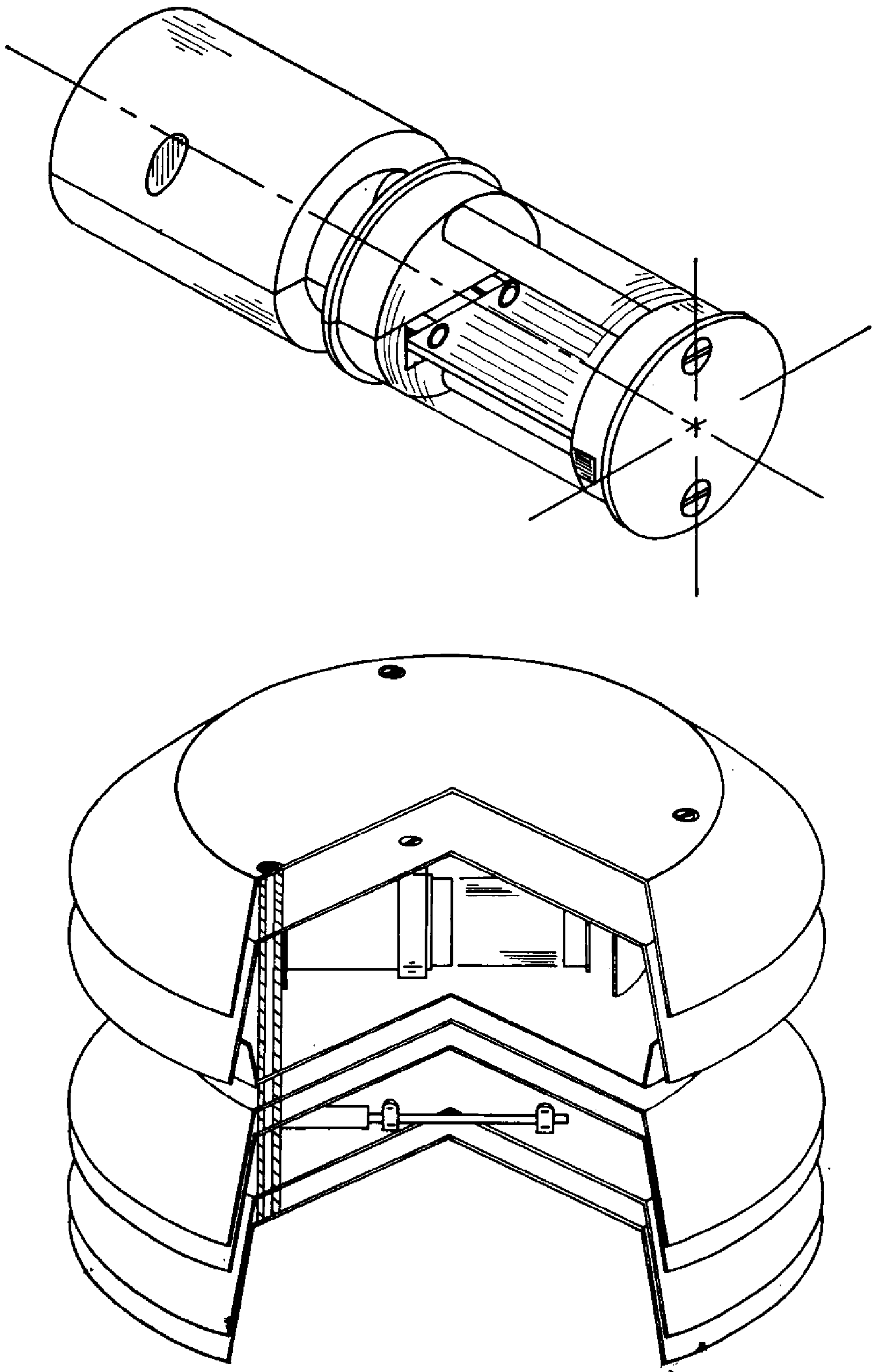

Figure 4. (a) Sketch of the hygrometer element, upper figure, (b) cut-away view of the glass-fibre screen showing the positions of the temperature and humidity elements, lower figure

The wind speed is measured by a cup anemometer and the rate of rotation of the three cups is proportional to the wind speed. The mean wind speed is determined by the number of revolutions of the cup assembly over a given time interval (5 minutes). A wind vane is used to measure the mean wind direction relative to the buoy heading over the same time period. As a buoy can rotate through a 40° arc, the output of the buoy's compass is combined with that of the vane to give a true wind direction.

Visibility is measured by a Plessey Point Visibility Meter (PVM) (Winstanley and Adams 1975). This instrument has previously been tested under most meteorological conditions at an inland site and found to operate successfully in particular conditions. It has been fitted to DB1 to see if it can operate reliably in a marine environment. The instrument utilizes the forward scattering, at a fixed angle, of a light beam directed across a sampling volume of air. Broadly speaking, the better the visibility the lower is the concentration of aerosol in the sampling volume and the lower is the intensity of scattered light. The spikes mounted on top of the instrument, Figure 2, are to discourage seabirds resting on and fouling the instrument.

The raingauge is designed to overcome the problems of a tipping bucket instrument caused by vibration or movement of the buoy. The gauge's funnel leads to a central chamber which slowly fills with water. When the column of water reaches a certain height it touches an electrical probe, the resulting completion of an electrical circuit activates a peristaltic pump (similar to that used in heart and lung machines) which removes fixed volumes of liquid from the chamber until the electrical circuit is broken. The number of times the pump operates gives a measure of the cumulative rainfall.

Assessment of the instruments

Reliability

During the first 11 months aboard DB1 (Dec. 1975–Oct. 1976) no faults were detected in either of the platinum resistance thermometers. There were two faults in the rainguage and one in each of the remaining five instruments, all were electrical in nature except for that of the humidity element which became contaminated by salt soon after installation because the protective sleeve had not been fitted.

Method

The accuracy of the instruments which measured pressure, wind, air temperature and relative humidity was assessed by comparing the recorded values from DB1 with other values simultaneously applicable to the vicinity of DB1, which for the purpose of this paper will be referred to as 'comparison observations'. Unfortunately the original plan for mooring DB1 close to a light-vessel was not executed and so the comparison values for the DB1 area were obtained by staff at London Weather Centre (LWC) interpolating observations from surrounding stations, Figure 1. This interpolation was carried out for all the synoptic hours from the end of March 1976.

For a short period at the end of March 1976, other comparison observations were available every three hours from the MAAF Research Vessel *Clione* stationed close to the buoy as part of a separate experiment. These observations were probably more representative of the DB1 area than those interpolated by LWC. Owing to the large spatial and temporal variations of rainfall and visibility, valid comparison data could not be provided and so the instruments which measured these variables were not assessed quantitatively; they were, however, checked for serviceability. The comparison of the sea-temperature sensor followed a slightly different form and this will be referred to later in the section.

Results of sensor comparisons

(*a*) *General.* The results are presented graphically in Figure 5 and show the weekly means and standard deviation of differences between the results from DB1 and the corresponding comparison values. The two large gaps in the data were due to transmission failures and the three comparison periods will be referred to as phases I, II and III respectively. Some of the more important details are described below.

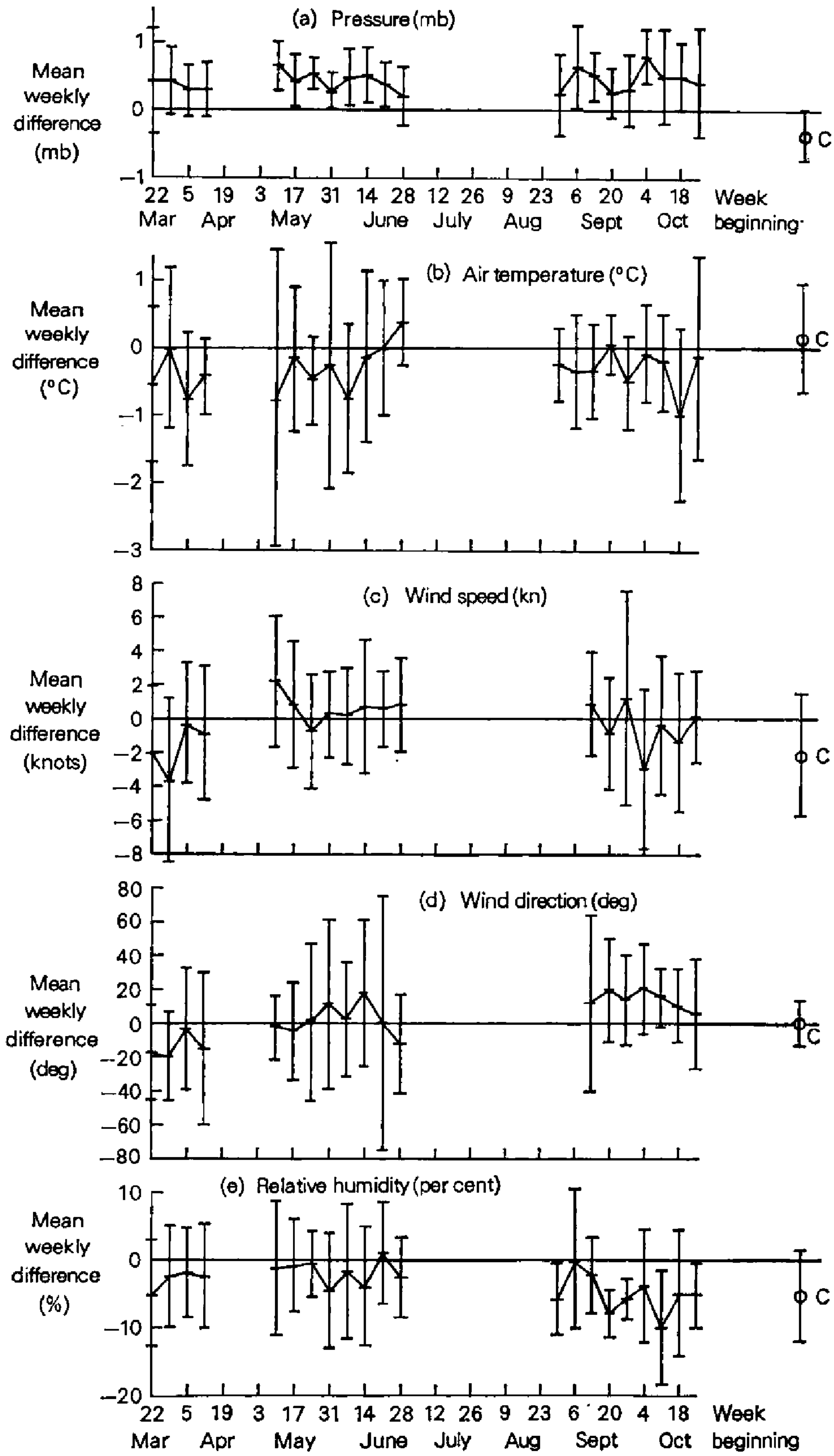

Figure 5. Graphs showing the weekly means and standard deviation of differences of (a) pressure, (b) air temperature, (c) wind speed, (d) wind direction and (e) relative humidity. The values marked ØC indicate the corresponding values for the comparisons made from the MAFF *R. V. Clione*

(*b*) *Pressure.* During all three periods the weekly mean pressure on DB1 was about 0·5 mb higher than the comparison value. The corresponding standard deviations were between 0·5 and 1·0 mb. Similar magnitudes were obtained when using *Clione* data as the comparison, but note the change in sign for the mean difference. This indicates that one or both of the pressure sensors (DB1 or *Clione*) may not have been as accurately calibrated as is possible.

(*c*) *Air temperature.* The weekly mean air temperature measured aboard DB1 was generally up to 1 deg. C lower than the comparison value with standard deviations typically ranging from 0·5 to 2·0 deg. C. The comparison with *Clione* was much closer, indicating a possible error in the comparison data provided by LWC.

(*d*) *Wind speed.* The mean differences were typically within ± 2 knots of the comparison value with standard deviations of 3–4 knots.

(*e*) *Wind direction.* The weekly mean differences using the comparison data from LWC varied between $\pm$ 20° with standard deviations as large as 70°. Very much better agreement was obtained using *Clione* data. The large differences and standard deviations based on the LWC data probably emphasize the difficulty in allowing precisely for short-term local effects. Some of the large deviations during phase II were due to a fault which developed in the sensor during that period. Observations for occasions when the wind speed was less than five knots were excluded from the above calculations.

(*f*) *Relative humidity* (*RH*). The weekly mean value of RH was consistently lower than either comparison source by up to 10 per cent, but the lack of a good comparison value for this variable must be borne in mind.

(*g*) *Sea-surface temperature.* The measurement required is that representative of the topmost metre of the surface, not the 'skin temperature', and most meteorologists assume that this variable changes only slowly, certainly under light wind conditions, and indeed LWC's estimate of the sea-surface temperature gave constant values over long (more than 24 hour) periods. However, the sea-surface temperature measured on DB1 varied significantly from hour to hour and appeared to be in phase with the tide, Figure 6. This behaviour was supported by a second instrument mounted in the buoy by IOS for its own trials. The standard deviation of the differences in sea temperature measured by these two instruments (over a 9-day period in June) was 0·11 deg. C. The mean difference was due to a fault in an electronic board

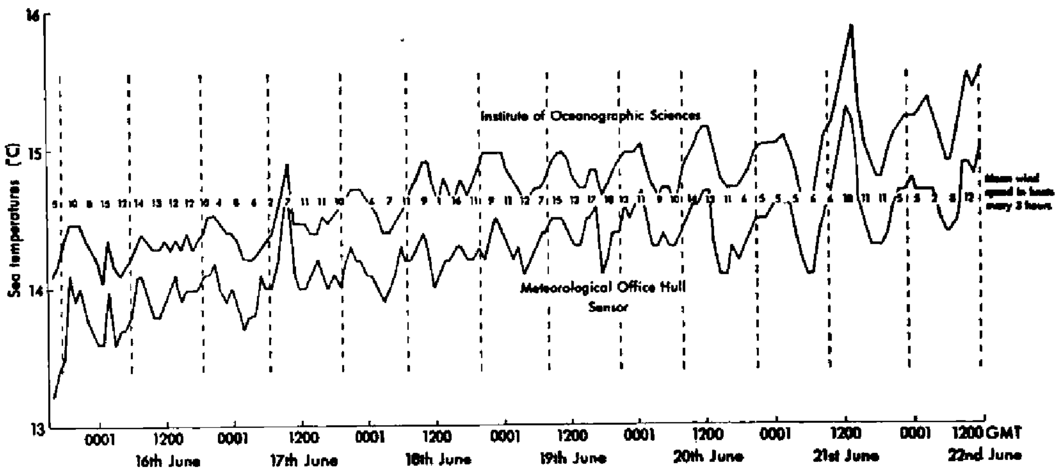

Figure 6. Graph of the hourly values of sea-surface temperature over seven days in June 1976 from two independent sensors. The vertical lines indicate the times of low tide, and the correlation between the temperature variations and the tidal flow can be observed

which had the effect of reducing the temperature measured by the Meteorological Office instrument by 0·55 deg. c. It can be seen that the temperatures were generally higher at low tide perhaps because warmer water from the shallower sea nearer the coast moved toward DB1's position. The amplitude of the fluctuations was occasionally as high as 1 deg. c (within a single tidal sequence) both in summer and winter with the larger amplitudes usually associated with periods of calmer seas. This tidal variation could, perhaps, affect the onset or position of fog or low stratus over the sea.

Discussion of results

The results indicate that the measurements on DB1 are similar to the comparison values for pressure and sea-temperatures. For the other variable the mean differences and standard deviations were sometimes very large. It should be emphasized that the comparison values were difficult to estimate especially when meso-scale atmospheric phenomena (e.g. sea breezes) were present. This was confirmed in a separate experiment in which an estimate of the values at the *Varne* light vessel, Figure 1, obtained by interpolation from neighbouring stations were compared with the actual observations for the last week in October. The results, Table 1, show that the mean differences and standard deviations are of similar magnitude to those in Figure 5. It seems reasonable to conclude that the instruments on DB1 are almost certainly more accurate than Figure 5 implies.

Table 1. Mean differences and standard deviations of the differences between estimated and actual values for some meteorological variables at Varne light vessel during one week in October 1976. Wind direction observations for occasions of wind speeds less than five knots were omitted from the calculations

Variable	No. of Obs.	Mean Differences (Estimated-Actual)	Standard Deviation of the Differences
Pressure (mb)	29	−0·2	0·4
Air temp. (°c)	27	+0·7	1·3
Wind speed (knots)	29	−0·7	3·4
Wind direction (dgs) ..	25	+15	22

Conclusions

DB1 has proved to be a very useful facility to test meteorological instruments intended for use on buoys. The experiment demonstrated that the sensors are able to withstand a marine environment and additionally, an indication of the accuracy which these sensors can achieve, has been obtained. However, it must be appreciated that the comparison values of some of the variables were not always representative of the DB1 area and thus the instruments are considered to have performed better than reference to Figure 5 will imply. In the future it is hoped to test sensors mounted on a buoy against calibrated instruments mounted on a nearby stable platform. A trial of this nature will help to clarify the accuracy of the meteorological data from such sources.

Acknowledgements

The authors wish to thank all colleagues who have been involved in this project.

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The International Dolphin Watch

By Elaine Orr
(International Dolphin Watch Projects Officer)

The sight of dolphins cruising effortlessly along in the bow-wave of a ship or performing an aquatic ballet for their own enjoyment has always been a welcome sight to mariners. It is said that the presence of a dolphin bestows good fortune upon both the vessel and the crew. Many stories, with varying degrees of plausibility, are told of the dolphin as companion, escort or rescuer. Yet apart from folklore and sailors' stories surprisingly little is known of these keen-witted and benevolent mammals; even basic information about their numbers and distribution is unknown. One reason for this state of affairs is that the dolphin was not exploited as a natural resource like the larger whales during the nineteenth century. Until recently the only animals to have received much attention from man have been those that have been hunted or domesticated. In the case of the former it is essential to know the movements and habits of one's quarry otherwise hunting is a very haphazard business indeed. The dolphin, with only 2½ centimetres of blubber, was small fry compared to the great whales and was generally ignored; only recently have the pressures of commercial fishing become a threat to the dolphin in some parts of the world. Positive reliable information is so scarce that fears that the dolphin population is declining can neither be refuted nor confirmed. For as long as this state of affairs continues the dolphin population could dwindle to a dangerously low level and very few people would be aware of their demise.

It has been noted that people along the Yorkshire coast regularly used to see schools of porpoises—now they see very few. In Wales the fishermen in the Menai Straits have reported that between 1953 and 1963 the numbers of dolphins they saw declined and since 1963 they have not seen any dolphins at all in the area. What has happened to the dolphins out in the oceans is a mystery and before that mystery becomes a tragedy reliable information must be obtained so that scientists can assess the situation and take action to conserve the dolphin should such measures be considered necessary.

Although there are so many questions about the dolphin which remain unanswered there are other questions which have been answered by observing dolphins in captivity and by the close study of carcasses which have been washed up on the beaches. It is known that the dolphin was once a land mammal and that at some time in the remote past man and dolphin had a common ancestor, but since that time the dolphin has become adapted to its watery environment. In the process of evolution the hind limbs were lost and the fore limbs were greatly modified, the result of these, and many other subtle changes is the graceful, but powerful, animal that we see today. Despite these radical changes the dolphin has retained many of its mammalian characteristics. It is warm blooded, unlike a fish, and it is able to maintain its body temperature because it has a thick layer of blubber beneath the skin. The skin too has special properties that reduces drag in locomotion. It has long been recognized that if submarine hulls could be constructed with the same properties it would represent a considerable advance in marine technology.

The dolphin is air-breathing but has the capacity to dive deeply and remain below the surface for comparatively long periods without suffering the same adverse effects as human divers. Changes in the respiratory and circulatory systems reduce the heart rate as the dolphin dives and ensures that a sufficient supply of blood reaches the brain. The dolphin does not suffer from that dread of human divers—the 'bends'.

The dolphin's remarkable turn of speed, up to thirty knots, is produced by the powerful horizontal tail flukes, the flippers being used only for steering and balance.

With the energy and speed that the dolphin can muster it is free to follow the warm currents and fish stocks to any part of the ocean. To assist it in its travels it is equipped with a natural sonar system of considerable complexity. The dolphin lives in a world of sound. It hears its way around and can discriminate with great accuracy between objects of different sizes, shapes and densities. It is known that dolphins are reluctant to approach a vessel using an echo sounder because the high frequencies emitted are detectable and unpleasant.

The fact that the dolphin has a large brain has been recognized for some time but scientists do not agree about the implications of this. Much more research will have to be done to establish how the dolphin uses its brain and why it requires such a large one, before definitive statements can be made about dolphin intelligence. Many people who have worked with dolphins in captivity or who have come close to them in their natural environment feel that there is much that mankind can learn from these masters of the seas.

There is always confusion about when dolphins are really dolphins and when they are porpoises, not to mention that the killer whale for example is also called a dolphin; the difficulty has arisen because the classification of the various species of dolphin is very complicated. All the whales and dolphins belong to the order Cetacea and the dolphins are toothed whales (Odontocetti) not baleen whales (Mysticeti). Most Americans call dolphins porpoises but in Britain only the smallest member of the dolphin family, the common porpoise, bears this name. Despite the many different names and physical characteristics the various members of the dolphin family are quite closely related.

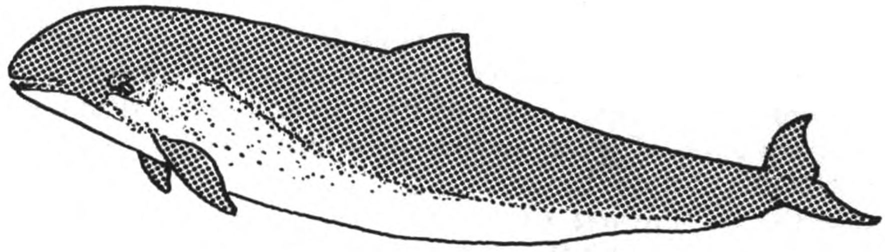
While scientific knowledge has been growing in some areas of dolphin study other areas have remained almost at a standstill. The need for data on the dolphin population and its distribution has become increasingly urgent and the response to this situation of ignorance is that the Dolphin Survey Project has been initiated. The Project is the work of Dr Horace Dobbs, director of International Dolphin Watch and it is being undertaken in co-operation with Professor Richard Harrison of the Department of Anatomy at the University of Cambridge. Professor Harrison is one of the leading authorities on marine mammals.

A census of the world's dolphin population would seem to be almost impossible but the organisers of the survey are convinced that reliable information will be forthcoming. Information will be collected in the same way that ornithologists have collected vital information on the habits and migratory patterns of birds. Dolphin spotters from all walks of life are being encouraged to record sightings of dolphins. Volunteers include British Sub-Aqua Club divers, lighthouse keepers and a multitude of seafarers.

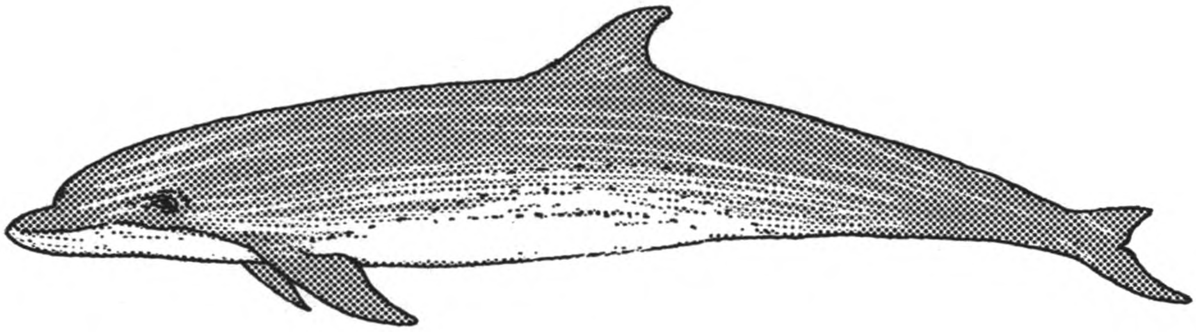
Arrangements have been made for all dolphin sightings recorded in logbooks submitted to the Meteorological Office to be forwarded to the Dolphin Survey Project. Such reports will come from every corner of the globe and would make a very valuable contribution to the survey. As data is so scarce all reports, however brief, will be useful. The information that is needed, in addition to the date, time and location, is the number of dolphins seen together with an estimate of their size. Ideally an indication of the species should be included but this can be a very difficult task. To help observers in home waters a chart illustrating the twelve species of dolphin commonly seen around the British coast has been produced and this is available on request. In time charts will be available for other areas of the world. Some dolphins have been seen so rarely that good sketches are unavailable.

The value of any recorded sighting will be enhanced if details of the dolphins' behaviour are included. Notes on whether there were juveniles present and if the dolphins were in family units, the direction in which they were travelling and their speed, whether they were playing and jumping or associating with ships all help to complete the picture.

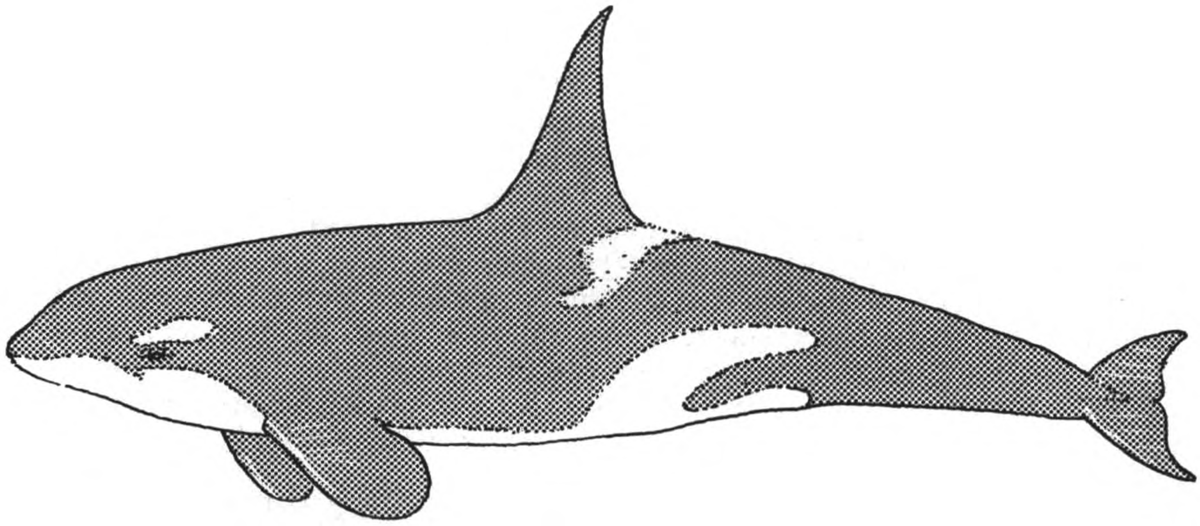
All the data will be collated and analysed at the University of Cambridge and the



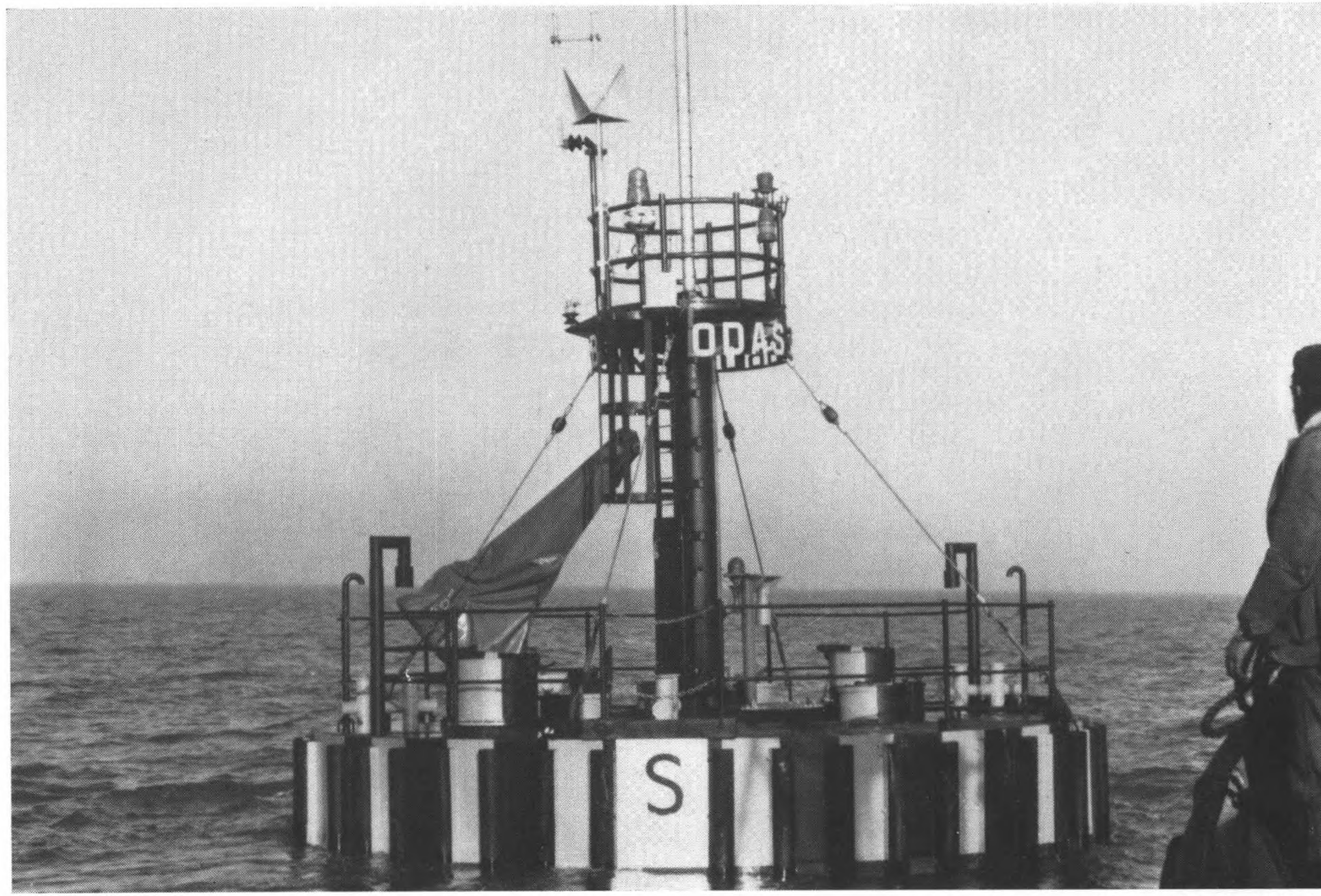
Common porpoise. Up to 2 metres. Tubby, rounded head without beak. Triangular fin at middle of back. Colour black on back, white or cream on belly with varying amounts of grey on sides



Bottlenosed dolphin. Up to 4 metres. Short snout, recurved dorsal fin at middle of back. Not directly pigmented. Dark grey back, white belly

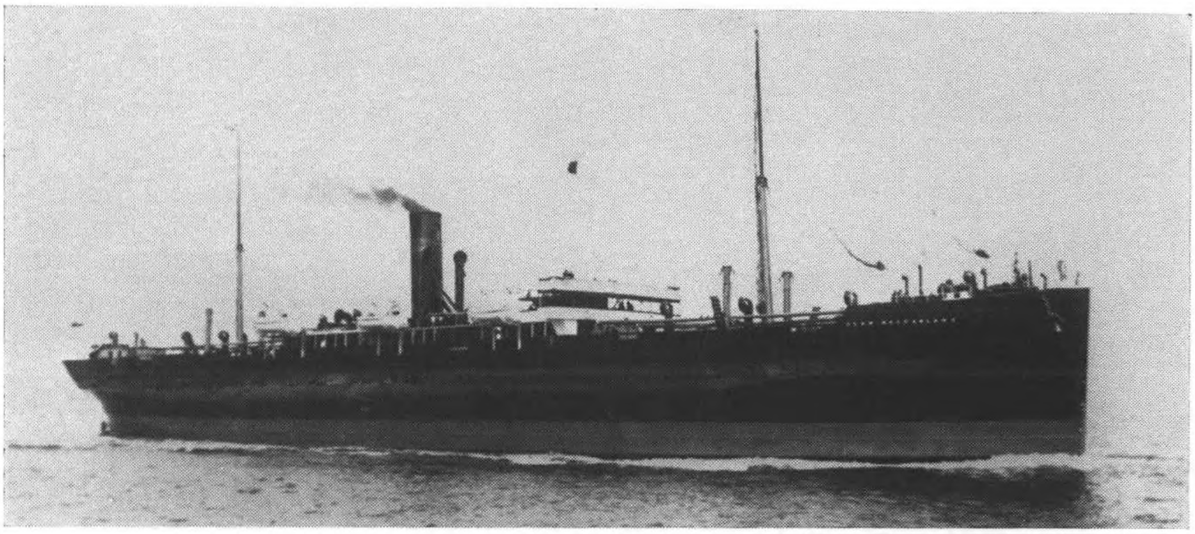


Killer whale. To 10 metres. No definite beak, snout low and rounded. Robust. Dorsal fin at middle of back, recurved in young and female, tall and triangular in adult male. Flippers rounded. Conspicuous powerful teeth. Distinctive black and white pigmentation pattern, white lens-shaped patch behind eye. Grey saddle behind dorsal fin



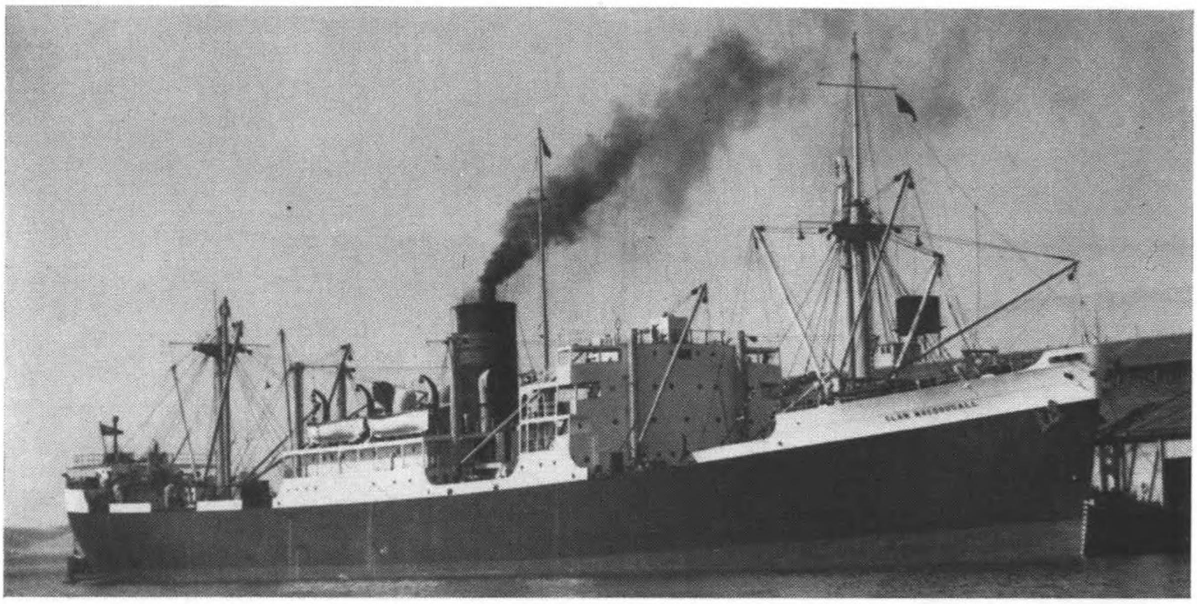
Photograph by M. J. Kerley

The United Kingdom National Data Buoy (DB1) (*see* page 73)



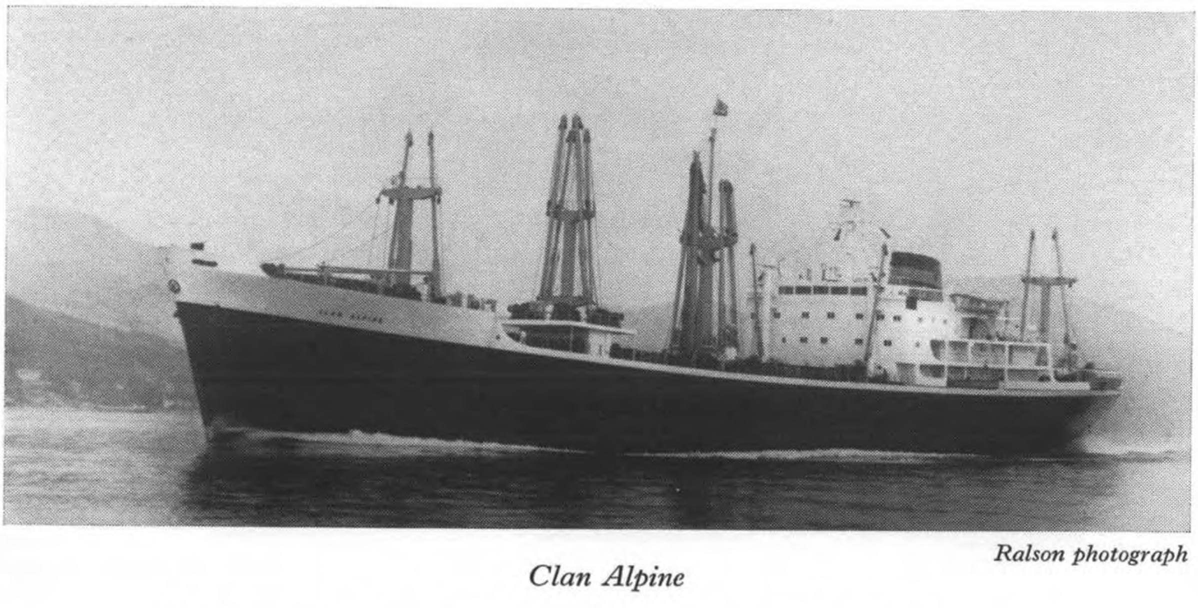
Photograph by Nautical Photo Agency

Clan Macfarlane



Photograph by J. J. N. Barnett

Clan Macdougall



Ralson photograph

Clan Alpine

VESSELS OF CLAN LINE STEAMERS LIMITED

(*see* page 89)

results will form a base line from which future changes can be measured. The facts and figures that emerge will also be used to gauge the effectiveness of any conservation measures that are introduced. The dolphin is part of the marine food chain and has its place in the delicate balance of the marine environment. Man draws a rich harvest from the sea but also deposits his waste there. If damage is being done in ignorance this will probably be revealed by the state of the dolphin population.

It is hoped that marine observers will watch the oceans with renewed interest and record their observations for the benefit of the Dolphin Survey Project.

Illustrated dolphin charts are available from:

International Dolphin Watch, Parklands, North Ferriby, Humberside, HU14 3ET. Price 40p (inc. p. & p. in the UK), 60p (inc. p. & p. overseas).

Bulk orders for the dolphin chart are welcome.

A Dolphin Spotters Handbook will be available shortly. Details will be sent on request.

AURORA NOTES APRIL–JUNE 1978

By R. J. Livesey

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

Aurora observations received from ships for the period April–June 1978 are listed in the accompanying table. The contribution of marine observers to the confirmation of auroral activity, especially when cloud interferes with the work of other observers, is gratefully acknowledged.

The dates shown in the table refer to the evenings of the event nights. The nights of 10–14 April provided auroral activity widely observed in the United Kingdom as did the nights of 1–2 and 11–12 May. The marine observations of 30 April–1 May and 22–23 May coincided with radio auroral generated echoes in the E layer of the ionosphere. That of 11–12 May correlated with both radio and visual events noted in Scotland.

In the period under review a most interesting auroral storm took place and was well observed. David Gavine analysed the incoming data on behalf of the British Astronomical Association and the following is a summary of events.

Flare activity was reported on the sun on the afternoon of 30 April and radio echoes were detected in Scotland from the E layer; at the same time signals from an earth satellite above the Barents Sea were obscured. Active rays were seen by the *Rubens* on Lake Superior and land-based North American observers on the morning of 1 May. At midday on 1 May a magnetic storm, coupled with radio echoes, was detected at Aberdeen. On the same evening Lerwick reported a magnetic storm and further radio echoes were widely reported in the United Kingdom. In spite of some cloud in the southern sectors, major visual auroral activity was observed through the night of 1–2 May—the best of the event was seen in the Scottish Highlands, the Shetland Islands and Norway. The closing stages of the storm were observed by the *Lord Mount Stephen*, the *Vickers Viscount* and the *Dart Atlantic*.

Figures 1 and 2 show the location above the earth's surface of the auroral arcs and patches at different times on the night of 1–2 May. At 2200–2217 GMT white pulsating rays from multiple bands extended up and beyond the zenith to form coronae between Fort Augustus and Stavanger. Flaming came and went several times. Homogeneous bands broke into multiple fragmentary rays, fading and reforming, flaming to the zenith. At 2325 the sky was a confused mass of drifting rays and

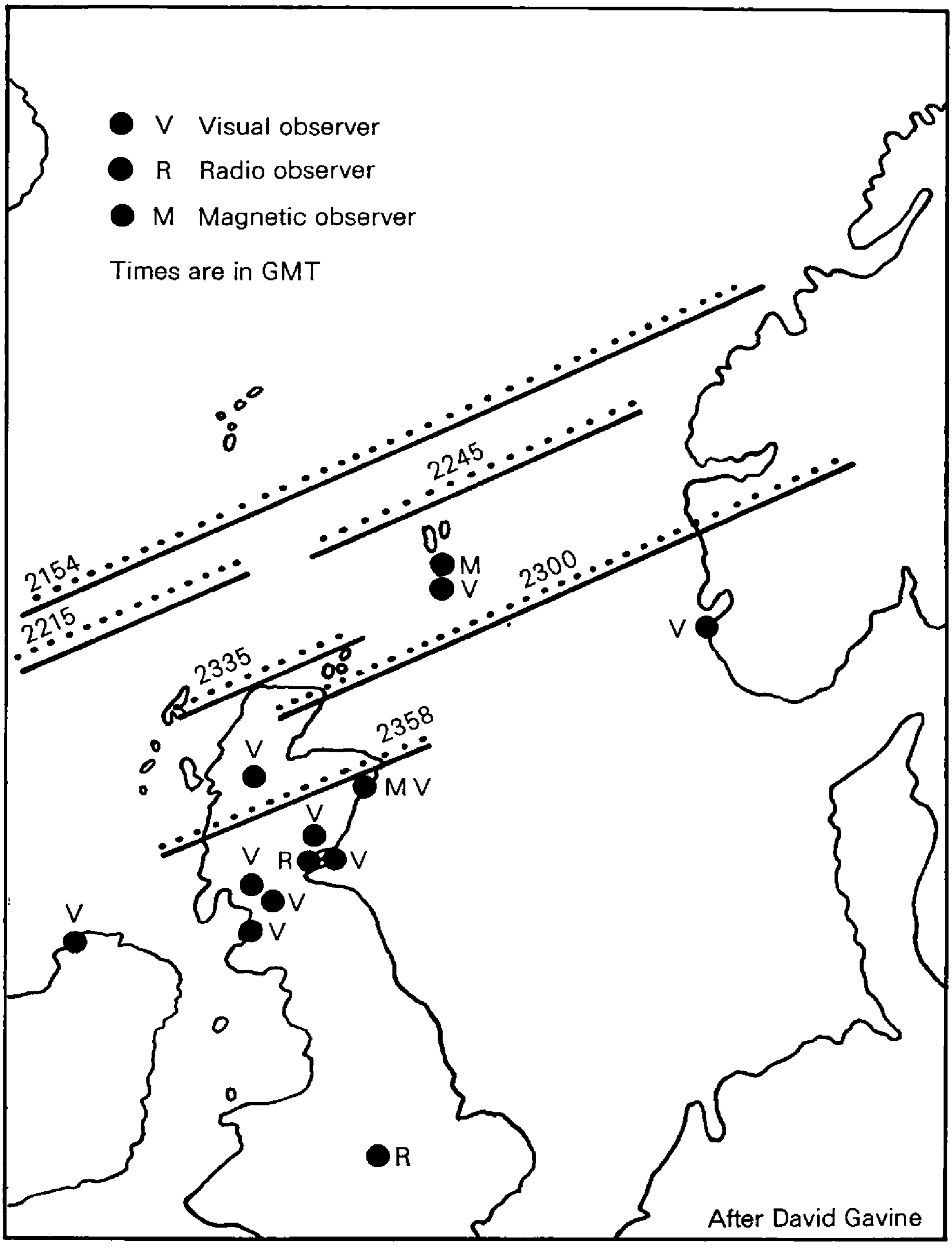


Figure 1. Location of auroral arcs 1800–2400 1 May 1978

surfaces. At 2335 Fort Augustus reported a vivid green band sweeping north-east to north-west, bright enough to read by, rippling along the lower border, followed by a striated coronal band flaming to the zenith. Thereafter, until dawn when the display finished, there were rayed bands and diffuse surfaces. To the west of the Atlantic active rayed aurora was observed until 0900 across North America and as far south as Baltimore.

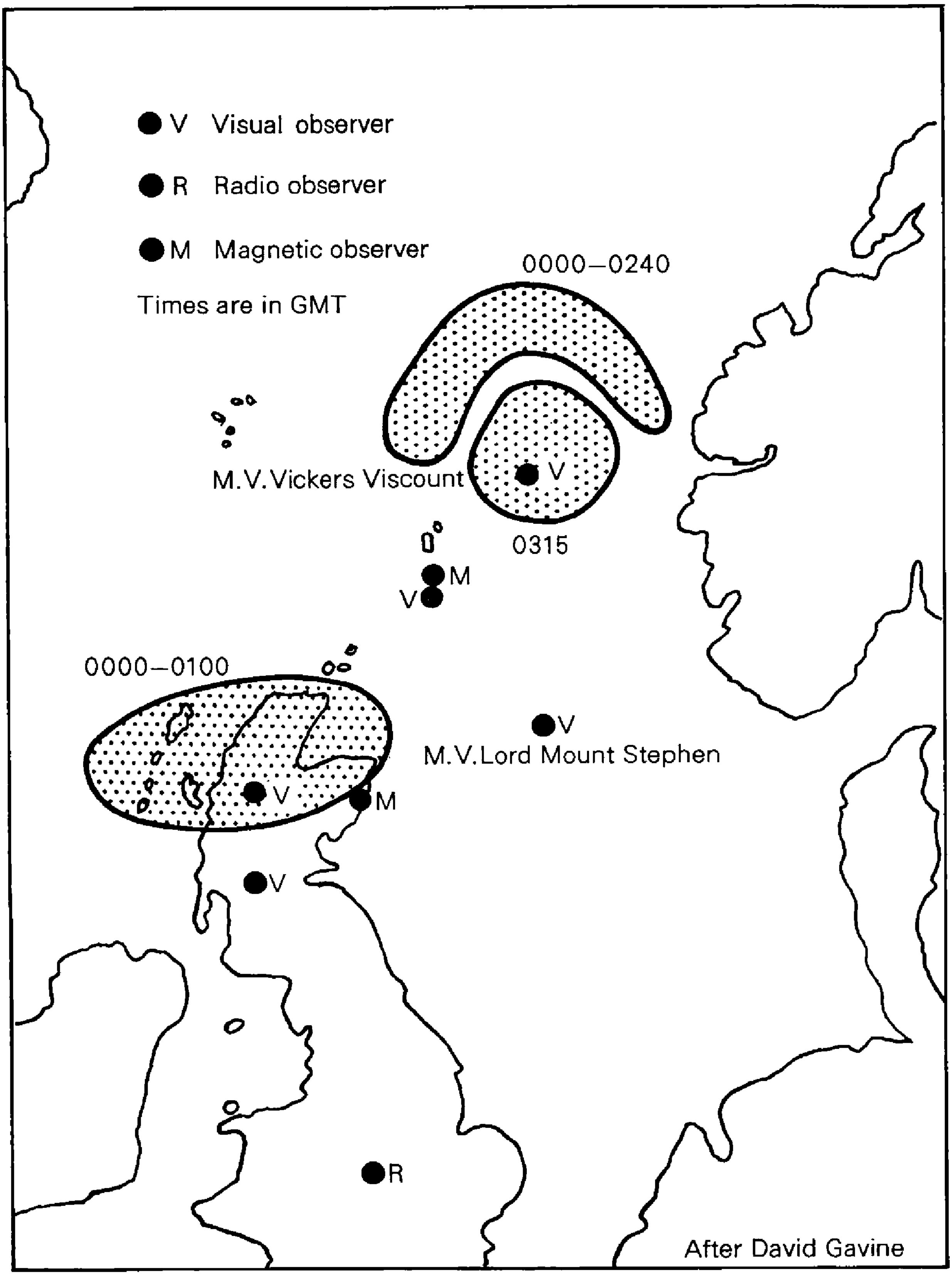
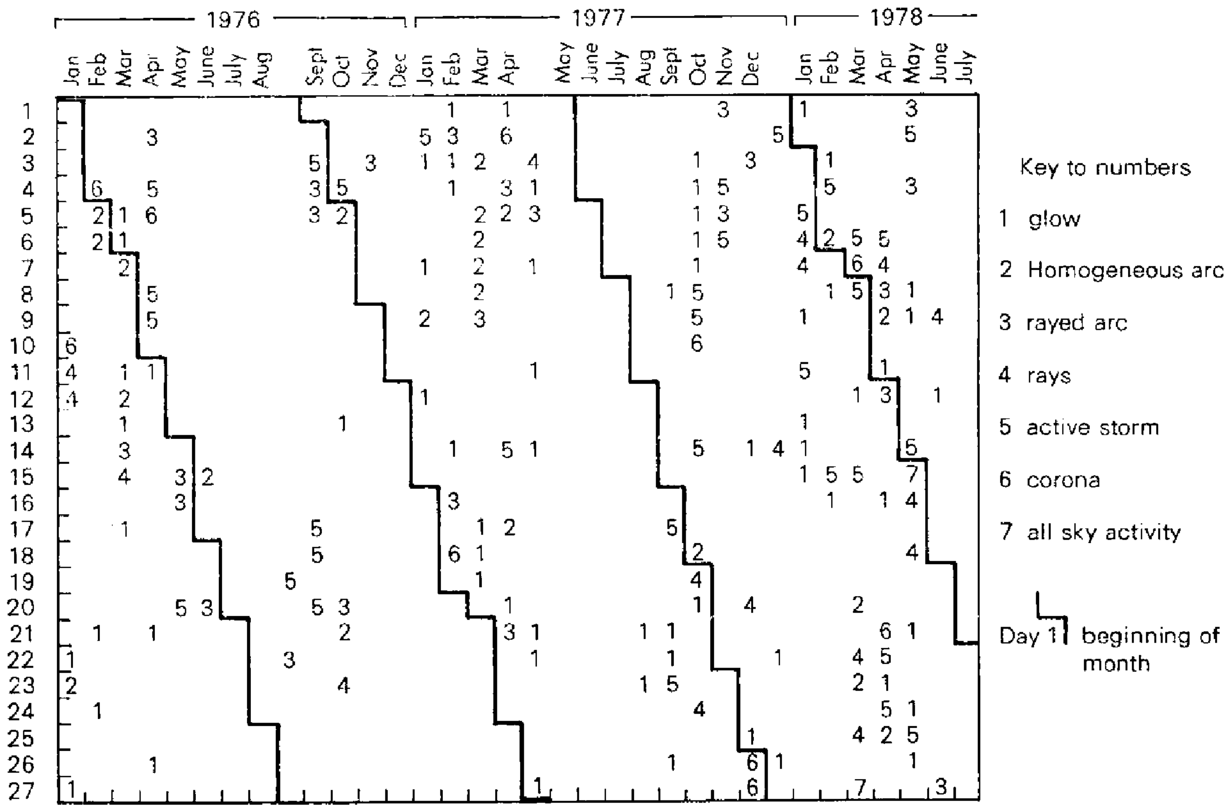


Figure 2. Location of auroral patches 0000–0315 2 May 1978

On 2–3 and 3–4 May radio, visual and magnetic activity were reported from Scotland, England, Western Australia, Tasmania and the United States but few details are available due to bad visibility and lack of recorded detail. The *Wild Cormorant* observed a visual storm in the southern hemisphere on 4 May which correlated with this activity. Further information, it is hoped, may still come to hand from overseas sources.

The above example shows what can be done by investigators with the co-operation of widely spaced visual land and marine observers, radio and magnetic observers, to build up an overall picture of a given event for which a full minute by minute account can be constructed and recorded in suitable code for use by future investigators. Although the scientific research must inevitably revolve nowadays around the use of space vehicles and other specialist apparatus in order to further the elucidation of the mechanism of the aurora, there is still scope for the volunteer observer to assist in keeping records of the long-term overall statistics of auroral frequency and intensity.

The dates of important auroral nights together with the maximum observed activity reported have been plotted on 27-day sequences corresponding with the rotation of the sun for the period 1 January 1976 to 30 June 1978, see diagram. Consecutive dates are read vertically so that consecutive horizontal or near horizontal entries relate to recurring auroral conditions due to disturbed conditions on the sun which are rotating every 27 days or so. It will be noted that in general aurorae bunch together on the diagram thus identifying discrete sources of the electrified particles which, when shot out of the sun, affect the earth's magnetic field to cause the aurora.



Maximum reported strength of visual auroral storms plotted to 27-day sequences related to sun's rotation to show recurrence of storms

Date 1978	Ship	Geographic Position		Time (GMT)	Forms
10 April	*Atlantic Causeway*	43° 12′N	52° 00′W	0230–0245	RA
11	*Miranda*	70° 36′N	21° 30′E	2130–2330	C, RB, G
17	*Zealandic*	46° 18′S	159° 10′E	0945–0947	RB, G, Ry
18	*Zealandic*	44° 19′S	143° 03′E	1145–1213	PuRB
20	*Spanish Wasa*	46° 40′N	57° 40′W	0100–0200	G, PuRy, RG
30	*Rubens*	47° 28′N	86° 25′W	0030–0334	Ry, A, PuRA, A, RA
1 May	*Lord Mount Stephen*	57° 28′N	01° 22′E	0153–0217	RB, Ry, P
1	*Vickers Viscount*	61° 05′N	01° 34′E	0000–0325	PuRy, B, RA, C, P, Ry
2	*Dart Atlantic*	40° 30′N	71° 30′W	0100–0330	G, HA, RA, PuRA
4	*Wild Cormorant*	71° 12′S	173° 16′E	0645–0655	G, Ry
11	*New Westminster City*	49° 15′N	66° 30′W	0230–0700	HA, AmB, Ry, P
22	*Pacific Wasa*	50° 07′N	66° 32′W	0315	HA, AmB

KEY: A = arc, Am = actively moving, B = band, C = corona, G = glow, H = homogeneous, P = patch, Pu = pulsating, R = rayed, Ry = ray.

Marine Aurora Observations April–June 1978

LONG ASSOCIATION WITH SHIPOWNERS—CLAN LINE STEAMERS LIMITED

There could be no more appropriate choice for our annual 'Long Association' article than Clan Line Steamers Limited which celebrated the centenary of the founding of the Company in October 1978. The following is our small tribute to a famous shipping line which has made such a large contribution to the work of the Meteorological Office since our first association with them, through the *Clan Cameron*, in 1889.

Clan Line owes its origin and development to the foresight and enterprise of the founder, Charles William Cayzer, whose achievements have been successfully followed up by subsequent generations of the family. There are still five direct descendants of the founder engaged in the management of the Company today.

Charles William Cayzer entered the shipping world in 1861 at the age of 18 when he joined William Nicol & Co. of Bombay, agents for the British India Line. Returning to England in 1876 he was given a managerial appointment with the firm which acted as British India's London agent. The driving ambition of Charles Cayzer soon caused him to look further afield and he determined to move to Liverpool to start up in business for himself; his aim was to provide a steamship service direct to Bombay using the ports of Liverpool and Glasgow.

The formation of Clan Line was assured when Alexander Stephen, who owned a well-equipped shipyard on the Clyde, became involved in the venture in December 1877. Shipbuilding was at a low ebb at this time and Stephen, being favourably impressed by Charles Cayzer, was convinced that his ideas held the merits of a sound business venture. Suitable terms were arranged for the payments of the ships and Charles Cayzer returned to Liverpool to induce some of his friends to take up shares in the vessels.

Charles Cayzer retained an office in Liverpool but deemed it wiser to move his headquarters to Glasgow. His friend Captain Alexander Irvine, a British India Line shipmaster he had known in Bombay, was chosen as his Liverpool partner and although Irvine died less than a year later the name of the firm was never changed and remains Cayzer Irvine & Company to this day.

The *Clan Alpine*, the first of the Company's ships, underwent official trials in October 1878 and by the following April another five ships were in service. It soon became known in shipping circles that Clan Line ships were proving a good investment and three successful Scottish business men, who invested several hundred thousand pounds to finance a further fleet of steamers, were brought in. The new ships were all to have the 'Clan' names but as the partnership was financially separate from the one originated by Charles Cayzer, it was named Clan Line Association Steamers but remained under the management of Cayzer Irvine.

Despite the antagonism between the Union Line and the Castle Line, Clan ships began a service to South African ports and by 1882 were also trading to Calcutta, Madras and Colombo. Four years after the launching of the *Clan Alpine* Charles Cayzer was managing 25 ships and profitably operating on three trade routes. By 1893 the Clan and Union Lines had commenced a joint service between the United States and South Africa.

The *Clan Cameron* was the first ship of the fleet to be recruited and equipped as a weather observing ship in 1889. She was an iron steamer of 1585 net registered tons commanded by Captain Harry Sibery RNR, who kept the meteorological logbook himself and was assisted with the observations by Robert Stirling the 2nd Officer.

The first meteorological logbook from the *Clan Cameron* covers a voyage from Liverpool to India via Cape ports commencing 21 March 1889 and ending 25 July 1899 at Suez when observations ceased due to lack of further logbook space. The meteorological instruments consisted of one mercury barometer, three air thermometers and two hydrometers. Observations were made every two hours and specific gravities read at noon each day. Captain Sibery had his own screen built to house the dry- and wet-bulb thermometers, distilled water in the wet-bulb reservoir was changed every morning. Although no pages for 'Additional Remarks' were included in those days a remarks column was and this was fully utilized for reporting comments similar to those made in present day logbooks. In addition to remarks on wind shifts and precipitation times, comments were made on meteors, marine life, luminescence and sea birds et cetera in much the same way as they are today. Observations were continued whilst at anchor or on passage through the Suez Canal and even when moored alongside in the various ports. The whole book is written in copperplate handwriting which is as legible today as when it was written 90 years ago.

Captain Sibery's voyage appears to have been rather a routine one with no excesses of weather or unusual occurrences to delay his ship. The speed of *Clan Cameron* is not known to us but considering the large number of ports *en route* the voyage appears to have been completed with alacrity in just over four months.

Following the recruitment of the *Clan Cameron* as a weather observer the *Clan Alpine* was recruited in the same year followed by *Clan Murray*, *Clan Urquhart*, *Clan Grant*, *Clan Maclachlan* and many others. At the outbreak of World War I Clan Line had a fleet of 56 ships and although by 1918 the Company had lost 28 vessels, these had all been replaced throughout the war years by more-modern ships.

Charles Cayzer had been knighted during the reign of Queen Victoria and in 1904 was created a baronet by King Edward VII. He died in 1916 and the Chairmanship of the Company was taken over by his son Lieutenant Commander August Cayzer. At this time the headquarters of the Company was transferred from Glasgow to London.

In 1918 the Company expanded their interests by acquiring the Scottish Shire Line as well as the Houston Line thereby adding to their activities in the Australian, United States, South American and South African trades. In addition, in order to exercise more control over the building of their ships, Clan Line bought the Greenock Dockyard Company.

During the slump of the 1920s and 30s which spelt doom for many shipowners, it says much for the Clan Line that throughout this period they were one of the few British lines to keep their vessels constantly employed. As the economic situation improved Clan Line embarked on a fresh building program of fast modern vessels, some refrigerated and all purpose built to suit the Company's various trades. At the onset of the World War II in 1939 the Company's expansion was again checked and during this conflict 36 ships were lost through direct enemy action resulting in the loss of 641 lives. After the war all new vessels were fitted with the latest equipment for the speedy and efficient handling of cargo and to uphold the Clan Line tradition of catering for awkward bulky packages.

In 1956 Clan Line and Union-Castle Mail Steamship Company merged their interests under the title of The British and Commonwealth Shipping Company. The two great shipping lines, rivals and colleagues since the day Charles Cayzer had first entered the South African trade in 1881, were now set on a course of co-operation and mutual benefit.

Without the creation of the Clan Line 100 year ago there would have been no British and Commonwealth Company flourishing today under the banner of the descendants of Sir Charles Cayzer, Baronet of Gartmore.

The three photographs opposite page 85 show:

(1) *Clan Macfarlane* 4823 gross tons, built 1898. She was torpedoed and sunk by a U-boat in 1915.
(2) *Clan Macdougall* 9710 gross tons, built 1944. Sold 1971 to Cypriot buyers.
(3) *Clan Alpine* 8713 gross tons, built 1967 and still in service—the most recent Clan Line ship to be built.

At the time of the centenary the British and Commonwealth Shipping Company had 13 Clan Line ships, 5 King Line bulk carriers and 4 Union-Castle refrigerated cargo ships. The Company also has interests in two large fast modern container ships of the Overseas Container Limited consortium. All of the above-mentioned ships are members of the Meteorological Office Voluntary Observing Fleet.

Since the early 1960s the Company has diversified considerably and now has interests in air transport, hotels and travel, investment management and marine and aviation insurance.

The contribution which Clan Line and their associates have made to the Meteorological Office over the years is of inestimable value and our grateful thanks go, without reservation, to all serving masters and officers as well as to all those who have served in the past.

We wish the Company every success in all their business ventures in the future.

J. D. B.

ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM OCTOBER TO DECEMBER 1978

The charts on pages 93 to 95 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).

October

Pressure was lower than average from north-west Russia to north-east Canada. With the resulting anomaly for northerly winds over north-east Canada the unusually cold weather of the recent months persisted there. Ice developed well ahead of normal over Foxe Basin, Hudson Strait, the northern part of Hudson Bay and also Baffin Bay. Over the Greenland and Barents Seas, where there were only small anomalies of temperature, local excesses and deficits of ice more or less balanced. Over the Kara Sea, after the unusually severe ice conditions of August and September, thick second-year ice persisted much further south than normal, blocking the Karskie Strait.

November

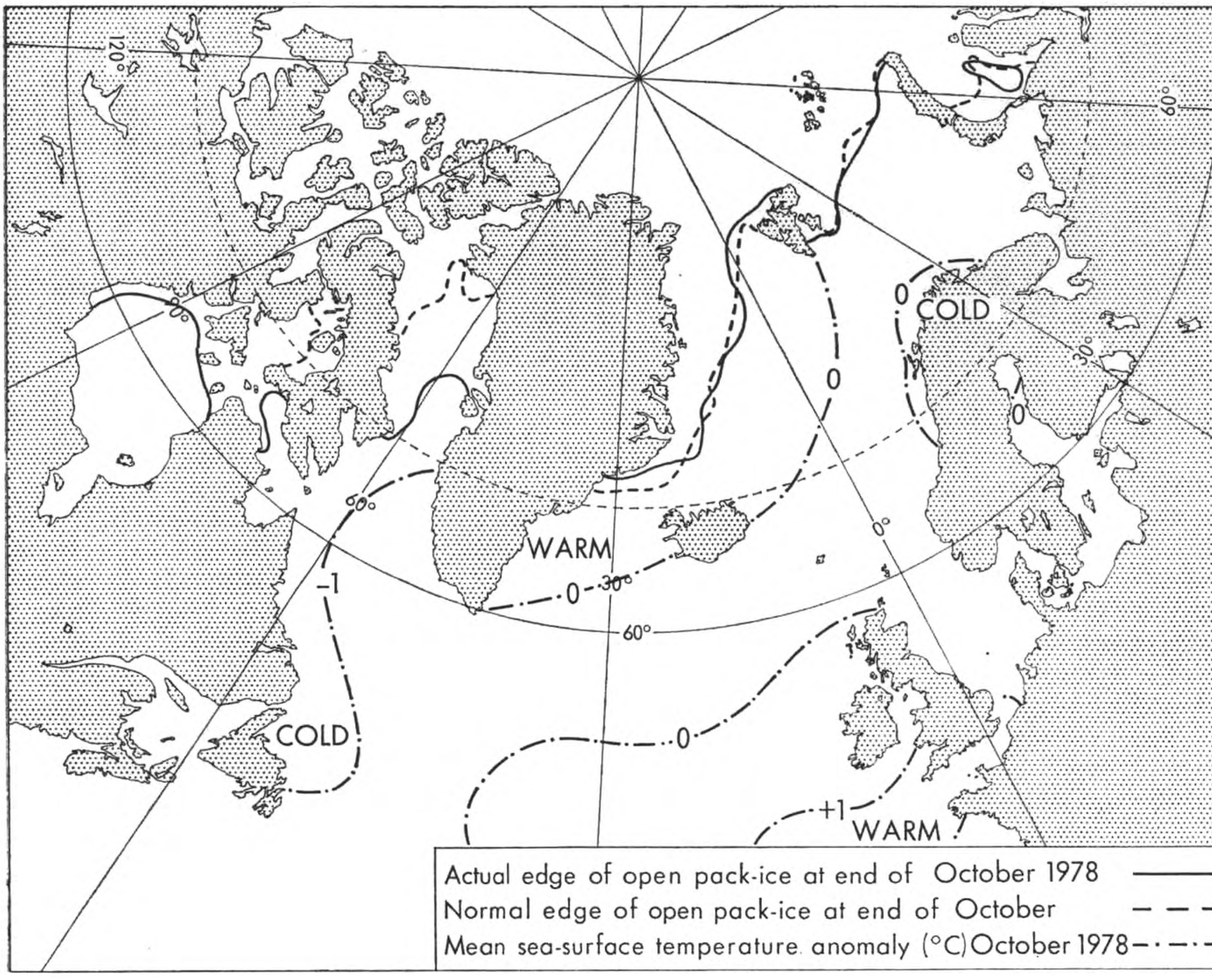
The pressure anomalies were broadly similar to those of October. Temperatures remained below normal over north-east Canada and Baffin Bay. The freezing of Hudson Bay was completed earlier than normal and ice extended along the coast of Labrador much further south than is normal by the end of November. Despite low air temperatures there was some deficit of ice east of Greenland where sea temperatures remained rather above normal. Ice moved south ahead of normal in the Barents Sea where there was some anomaly for northerly winds.

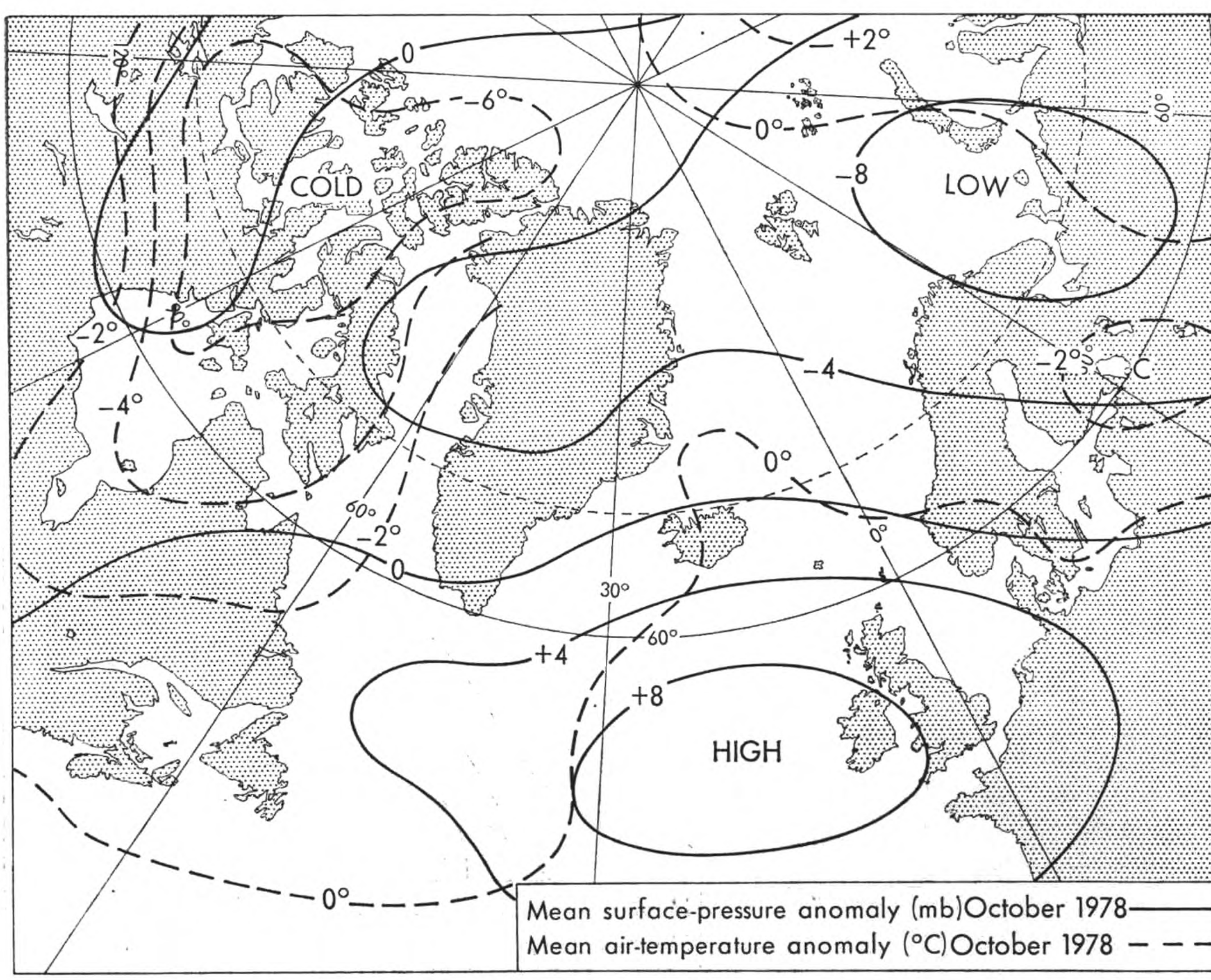
December

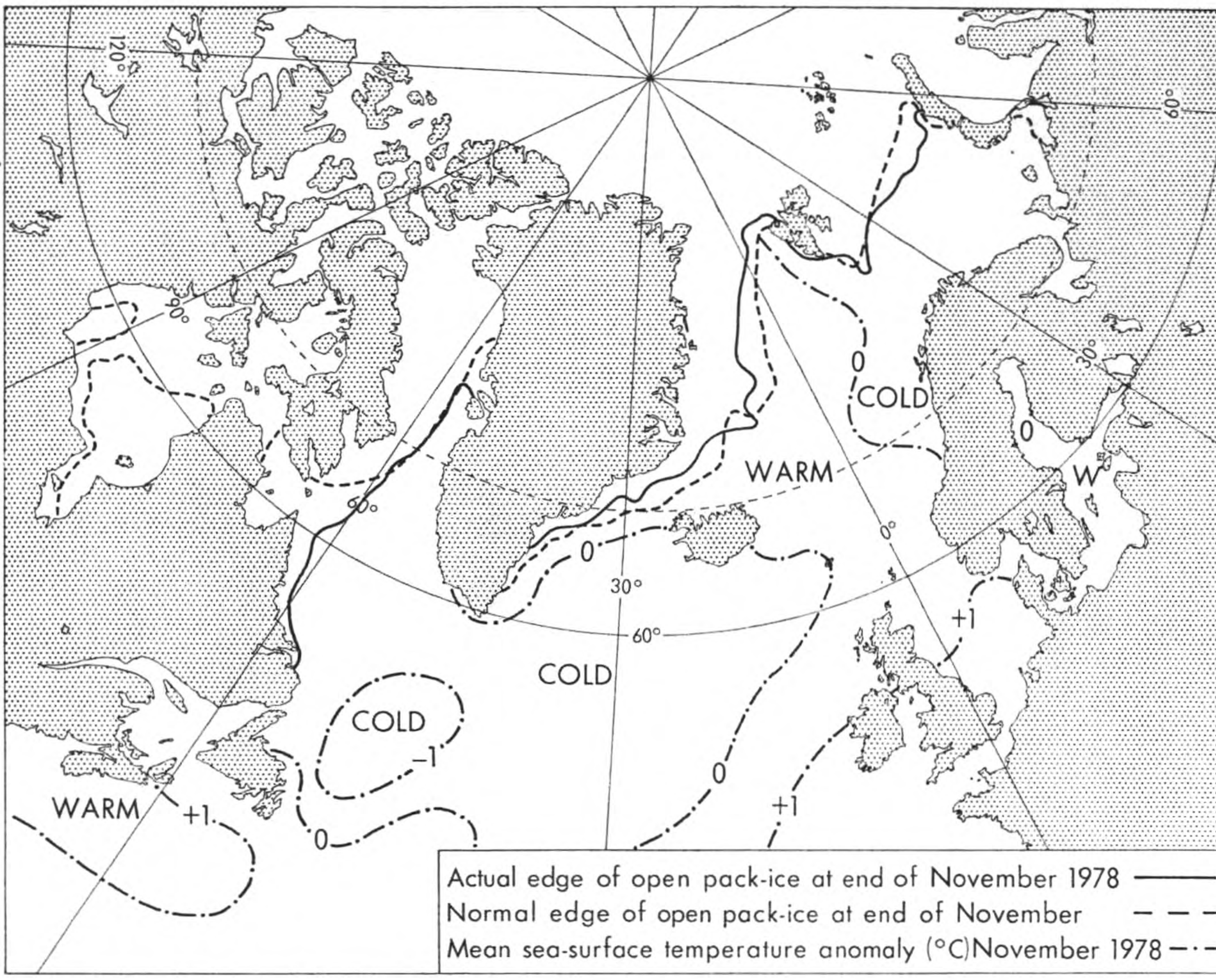
Anomalies of pressure and temperature were largely reversals of those during the previous two months. Notably, high pressure became predominant in the Atlantic sector of the Arctic instead of low pressure. Air temperatures rose well above normal over much of north-east Canada and Baffin Bay after the persistent cold of previous months. Extension of the ice southwards along the coast of Labrador was halted and deficits appeared over Baffin Bay. However, air temperatures were lower than normal over the Barents, Kara and Baltic Seas with anomalies for northerly winds; ice developed rapidly in these areas to give considerable excesses by the end of December.

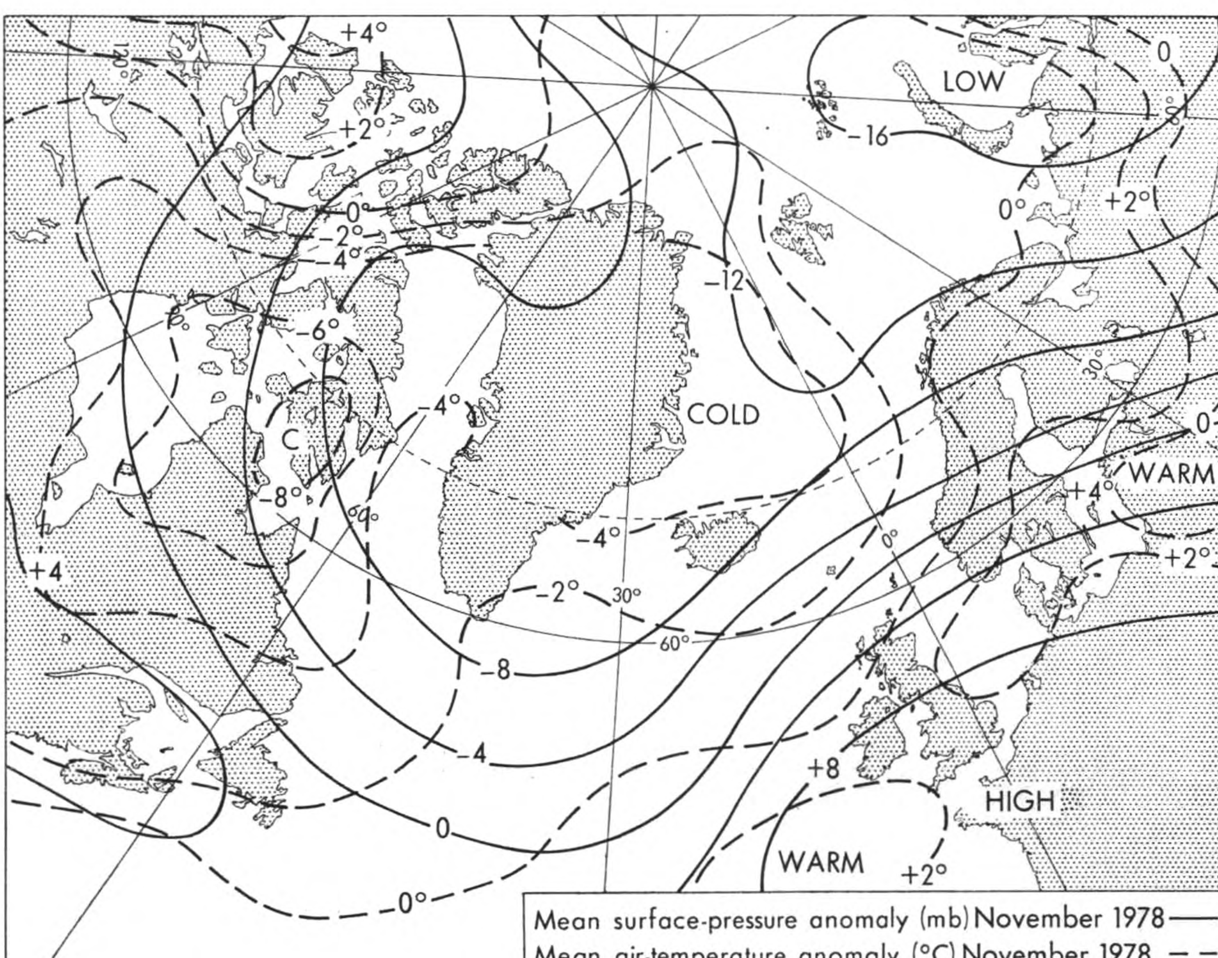
References

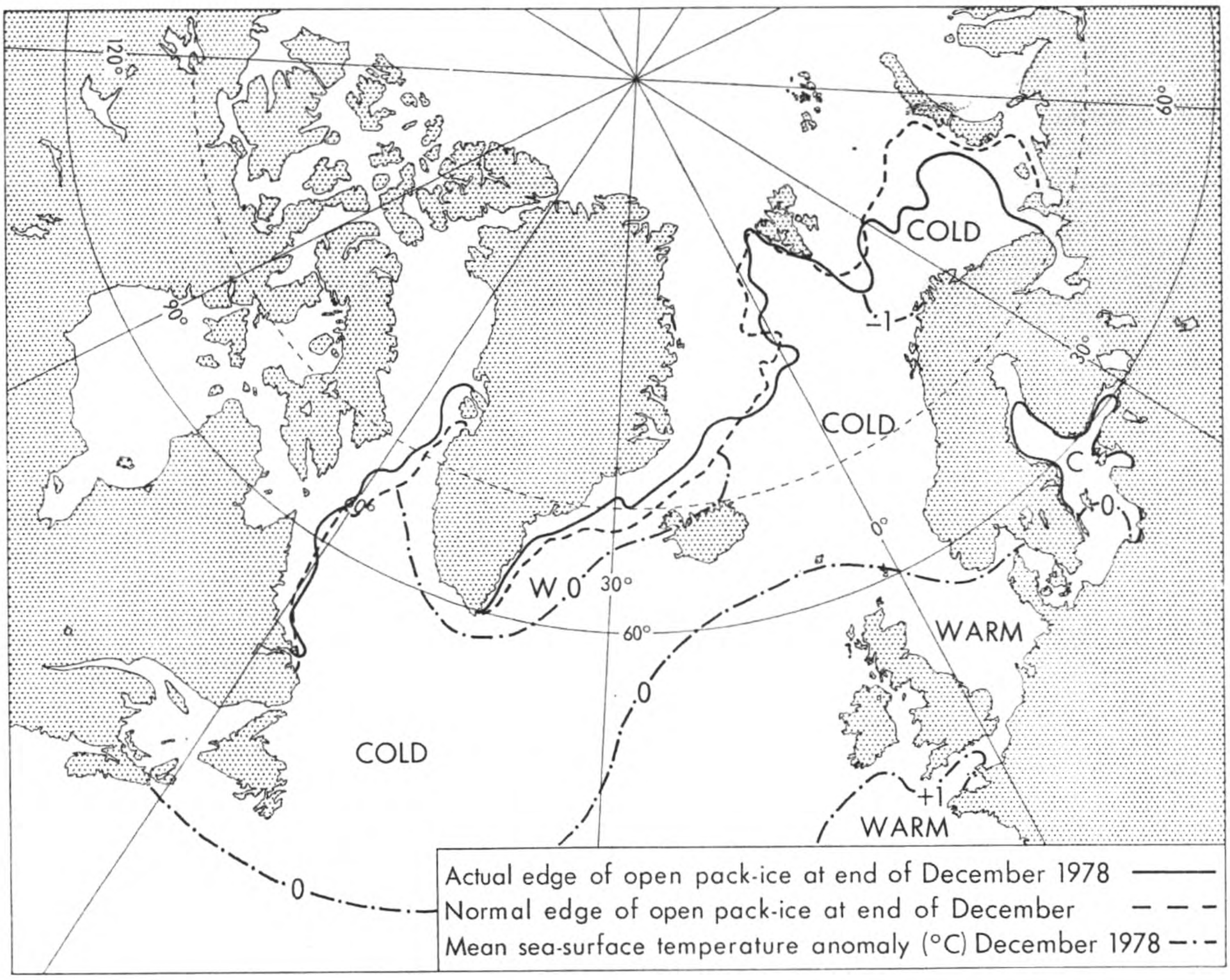
Meteorological Office, London	1966	Monthly meteorological charts and sea surface current charts of the Greenland and Barents Seas.
	—	Sea ice normals (unpublished) and various publications.
US Department of Commerce Weather Bureau, Washington, DC	1965	World weather records, 1951–60. North America.
US Naval Oceanographic Office, Washington, DC	1967	Oceanographic atlas of the North Atlantic Ocean, Section II: Physical properties.


COLD
WARM
COLD
COLD
WARM
0
-1
+1
60°
30°
Actual edge of open pack-ice at end of October 1978
Normal edge of open pack-ice at end of October
Mean sea-surface temperature anomaly (°C) October 1978

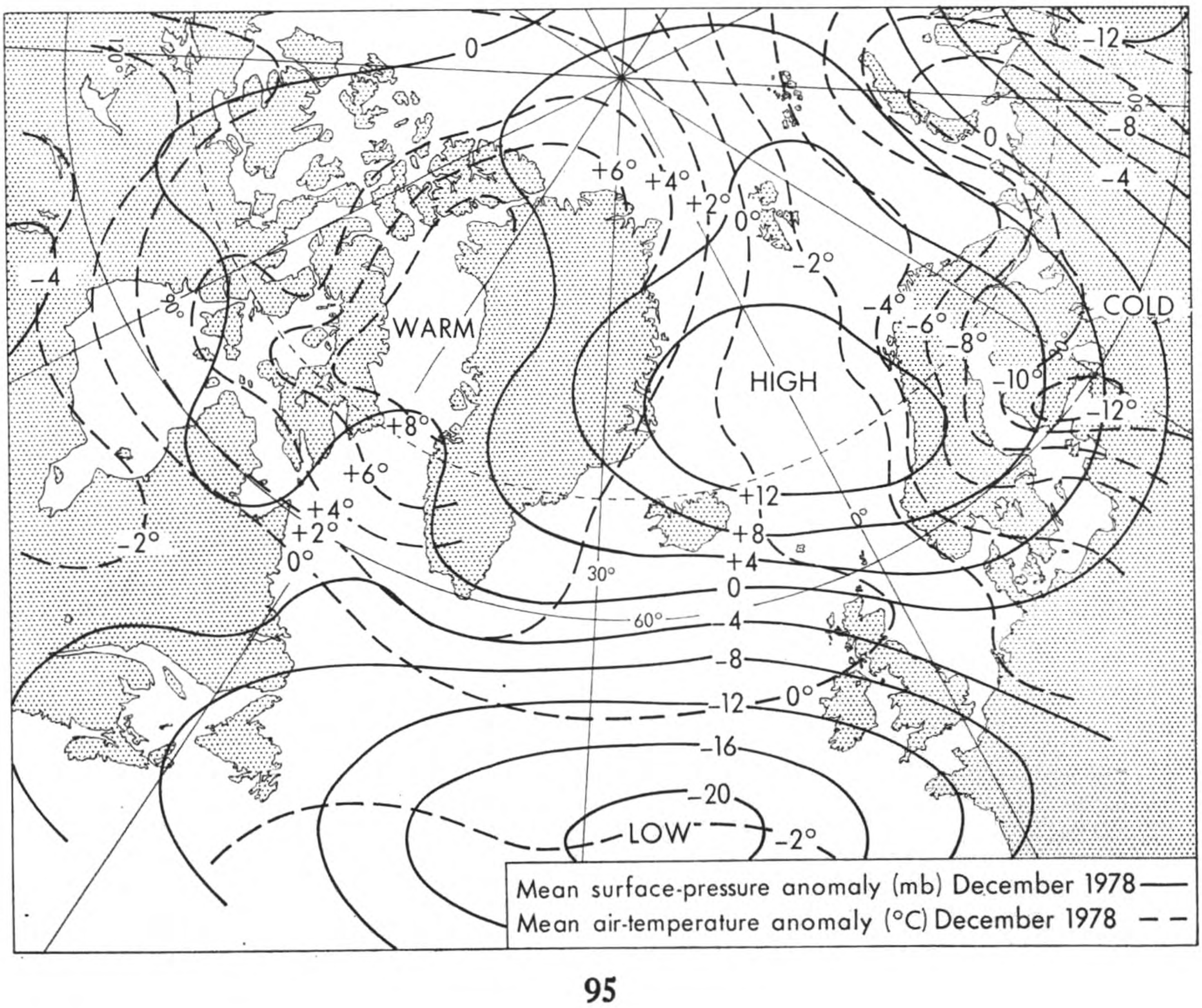

COLD
LOW
HIGH
0
-6°
+2°
0°
-8
-2°
-4°
-4
-2°
0°
-2°
0
+4
+8
0°
60°
30°
Mean surface-pressure anomaly (mb) October 1978
Mean air-temperature anomaly (°C) October 1978


COLD
WARM
COLD
W
COLD
COLD
-1
0
0
+1
+1
WARM
+1
0
Actual edge of open pack-ice at end of November 1978
Normal edge of open pack-ice at end of November
Mean sea-surface temperature anomaly (°C)November 1978


+4°
+2°
LOW
-16
0
0°
+2°
-2°
-4°
-12
-6°
-4°
COLD
C
-8°
WARM
+4°
+2°
+4
-4°
-2°
-8
-4
0
+8
HIGH
WARM
+2°
0°
Mean surface-pressure anomaly (mb) November 1978
Mean air-temperature anomaly (°C) November 1978



COLD
COLD
C
COLD
W
WARM
WARM
Actual edge of open pack-ice at end of December 1978
Normal edge of open pack-ice at end of December
Mean sea-surface temperature anomaly (°C) December 1978



WARM
HIGH
COLD
LOW
Mean surface-pressure anomaly (mb) December 1978
Mean air-temperature anomaly (°C) December 1978

Baltic Ice Summary: October–December 1978

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

No ice was reported at any of the stations in October.

Station	November									December								
	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
Lenigrad	0	0	0	0	0	0	0	0	13	3	31	29	16	11	13	16	0	447
Pyarnu	0	0	0	0	0	0	0	0	—	3	31	29	20	1	5	7	14	—
Viborg	0	0	0	0	0	0	0	0	—	3	31	29	27	1	10	19	0	—
Klaipeda	0	0	0	0	0	0	0	0	—	7	31	23	0	6	14	0	0	—
Helsinki	0	0	0	0	0	0	0	0	27	11	31	19	12	0	16	0	0	398
Mantyluoto	0	0	0	0	0	0	0	0	—	21	31	10	0	0	8	0	0	—
Vaasa	0	0	0	0	0	0	0	0	55	2	31	25	21	0	20	1	0	427
Oulou	0	0	0	0	0	0	0	0	—	1	31	31	31	0	9	22	0	—
Roytaa	0	0	0	0	0	0	0	0	—	1	31	31	3	25	9	22	0	—
Lulea	28	30	3	3	0	3	0	0	124	1	31	31	31	0	3	28	0	640
Skelleftea	0	0	0	0	0	0	0	0	—	4	31	28	26	4	6	25	0	—
Bredskar	0	0	0	0	0	0	0	0	—	6	31	25	7	0	17	4	0	—
Sundsvall	0	0	0	0	0	0	0	0	—	5	31	27	23	0	27	0	0	—
Stockholm	0	0	0	0	0	0	0	0	14	27	31	5	0	0	5	0	0	190
Turku	0	0	0	0	0	0	0	0	22	15	31	17	4	0	10	0	0	356
Tallin	0	0	0	0	0	0	0	0	—	29	31	3	0	0	2	0	0	—
Riga	0	0	0	0	0	0	0	0	0	19	31	13	7	0	9	0	0	302
Ventspils	0	0	0	0	0	0	0	0	—	24	31	7	0	0	3	0	0	—
Emden	0	0	0	0	0	0	0	0	—	31	31	1	0	0	0	0	0	—

CODE:

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

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

Personalities

RETIREMENT.—CAPTAIN G. A. GIBBONS retired in December 1978 after serving 45 years at sea of which 23 were spent in command.

Gordon Arthur Gibbons was born in Felixstowe, Suffolk, in August 1917 and joined Clan Line Steamers as Apprentice in August 1933. He remained with Clan Line until April 1939 when he joined Royal Mail Lines as Junior 4th Officer of the *Highland Brigade*. He served in Royal Mail Lines' cargo ships, troop-ships and passenger ships in all ranks until he was appointed Master of the *Lombardy* in July 1955. Throughout the war Captain Gibbons experienced various convoy battles but came through them all unscathed.

In 1962 he was appointed to command of Royal Mail Lines' passenger ship *Aragon* and thereafter commanded the *Andes* and the *Arlanza*. When the *Arlanza* was transferred to Shaw Savill Line in 1969, Captain Gibbons joined Container Fleets Limited and, before his recent retirement, served in command of all six Overseas Container Limited 'Bay' class container ships on the Europe/Australasia service.

Captain Gibbons sent us his first meteorological logbook from the *Highland Brigade* in 1939. Since then we have received a further 47 logbooks bearing his name. He received Excellent Awards in 1963 and 1973.

We wish him a long, healthy and happy retirement.

RETIREMENT.—CAPTAIN F. M. DICKENSON retired at the end of February after serving over 43 years at sea.

Captain Dickenson was educated at Coatham School in Redcar, Yorkshire and, in December 1935, was apprenticed to the West Hartlepool Navigation Company and appointed to the *Clumberhall*.

He obtained his Master's Certificate in August 1944 and, shortly after, joined Canadian Pacific Steamships Limited where he remained for the next two years. He saw war service both in the Atlantic and Mediterranean but was fortunate never to get his feet wet nor having to take to the boats.

Captain Dickenson transferred to Royal Mail Lines in 1946 and served in the passenger ships *Princess Kathleen* and *Highland Princess* which were then engaged in trooping. In May 1963 he was promoted to Master and appointed to command m.v. *Pampas* of Royal Mail Lines. Later he commanded ships of the Pacific Steam Navigation Company, the Prince Line and Shaw Savill Line. During the period 1974–76 he commanded the passenger liners *Northern Star* and *Ocean Monarch*.

Captain Dickenson sent us his first meteorological logbook from the *Highland Princess* in 1947. Since then we have received a further 29 logbooks bearing his name.

We wish him a long and happy retirement.

Notice to Marine Observers

MARINE METEOROLOGICAL OFFICE AT DOHA, STATE OF QATAR

A Port Meteorological Office facility is now available at the Marine Meteorological Office at Doha Port. The Office is located on Jetty Road, close to the main berths, and the following services are available:

1. Checking of barometers, barographs and thermometers.
2. Local Marine Environment Advisory Service.
3. Forecast service for the Gulf area—supported by a 24-hour forecast centre.

The Port Meteorological Officer, Mr C. C. E. Jackson, will be pleased to assist in any way possible and can be contacted at the Office (Telephone: 324556) or at home (Telephone: 23962). The telex number is 4689 (DPT MET).

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