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The Marine Observer

A quarterly journal of Maritime Meteorology

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January 1990

THE
MARINE OBSERVER

A Quarterly Journal of Maritime Meteorology
prepared by the Marine Division of the
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VOL. 60 **No. 307** **JANUARY 1990**

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COVER PHOTOGRAPH: Remainder of the upper parts of a cumulonimbus cloud (cloud type C_{H3}) in the Caribbean Sea during early 1989, taken by Captain J.P. Taylor, Master of m.v. *Eburna.*

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

LONDON: HER MAJESTY'S STATIONERY OFFICE

Editorial

Much water passes under the bridge in the space of two months or so, and trying to compose something new of current interest for readers to enjoy in January, when having to write it in late October, is once again proving troublesome. Scoops are not for quarterly journals and we therefore have to make do with general, long term views as usual.

It is the season of political party conferences as I write and other parties strive to appear greener than the Greens themselves. It is understandable why that colour has been selected to symbolize all that is desirable in the struggle to save and safeguard natural life on Earth. But when it comes to caring for the seas I plump for the colour blue every time. It has little to do with political leanings, but blue is my colour and I often wonder how many seafarers have the same feelings, perhaps induced by spending so much of their lives on the wide blue sea, under azure skies and gazing into the ultramarine depths. Of course the waters can take on many other hues, but the true blue can only be preserved by the caring actions of the mariners who sail upon those seas, and by those who have a vicarious responsibility over the oceans. Some say there should be fewer ships allowed on the seas, powered less by fossil fuels and more by atmosphere-friendly sources; but who has yet heard of unleaded MFO for ships? The blueprint for the long term future of marine propulsion methods seems progressively on course for the increased use of natural elements. The wind for motion, solar power for control mechanisms and aerogenerators for auxiliaries, for instance. The use of modern sail systems, such as the Walker Wingsail, for propelling commercial ships will increase as fossil fuels become more scarce and this move could lead to a lessening of the global warming caused by the greenhouse effect. But whilst it will apparently take a decade to rectify the harmful effects of a single year's discharge of greenhouse gases we continue to pump into the atmosphere, actions to reduce this damage need to be positive and swift. At sea we need to help eliminate pollution by the discharge of persistent oils which will often do harm to such species as the blue whale, the blue-footed booby and the Australian bluefish, not to mention the blue-coloured humans on cold, polluted beaches. The use of environmentally harmless anti-foulings is one of the newer methods to be adopted by paint manufacturers, a move to be commended even if it sounds a contradiction in terms. Judging by the reports received from small craft on trans-ocean passages, the quantity of plastic flotsam on the high seas, even thousands of miles from shore, indicates that the problem of garbage dumped from ships still needs to be strictly controlled. The winds and currents may carry the litter away from somebody's patch, but man's indestructible products will inevitably foul others' shores in time. It seems anomalous that the U.K. disposes of 8 per cent of its hazardous waste by dumping at sea, according to results recently published, whilst other European and American countries do not allow any such pollution around their shores.

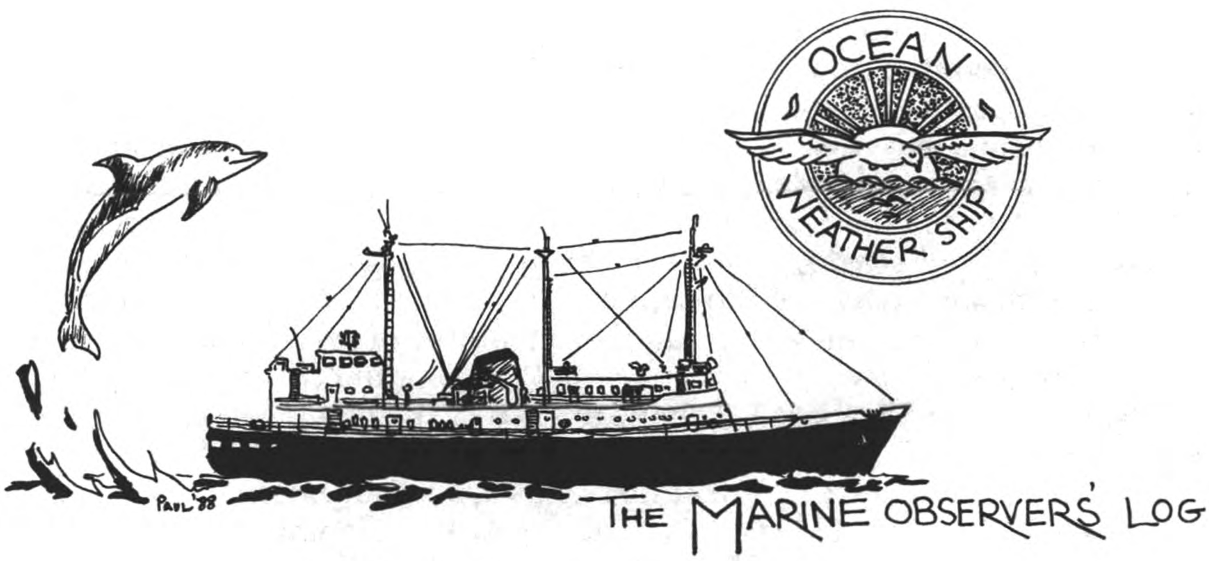
It is all too easy for the individual to deny any responsibility for pollution and long-term harm to his environment, blaming it on others. We must think what each can do, alone and corporately, to help improve Earth's chances of change for the better. The fact that global temperatures show an apparent increase of between only 0.3 and 0.7 °C since the turn of the century leaves scientists wondering whether the observed temperatures can be after all ascribed to changing concentrations of greenhouse gases. The small gap in credibility which gives rise to these doubts can be narrowed by ever greater care in ensuring that accurate temperature readings are taken. This may explain our concern in constantly repeating to shipboard observers the vital importance of taking temperatures and pressures with as much care as possible to the nearest tenth of a unit. This includes the wet-bulb temperature which can only function correctly with clean water and wicks and a free natural air-flow. Proper pressure readings too are essential and sea temperatures taken by rubber bucket are considered the most accurate obtainable. An indication of the methods used gives guidance to scientists who can then gauge accuracy and reliability of ships' data, making use of their findings in their research into global temperature changes. Thus ships' observers are in the vanguard in helping to identify these changes. Projects such as VSOP-NA (Voluntary Special Observing Project-North Atlantic) are designed to take this a stage further and help to determine optimum observing methods on the moving ship platform. The nine U.K. Voluntary Observing Fleet ships and about 30 others actively participating in this useful project are adding greatly to our knowledge by logging the few extra groups requested at every synoptic hour. Overall the record of the standard of observing on U.K. ships, as obtained by programmes monitoring observational accuracy measured against the 'background field', is second to none when compared with other countries' VOF units.

Confirmation of the imminent change of status of the Met. Office to an Executive Agency within the Ministry of Defence from April 1990 came from the Government last October. Director-General for the last six years, Dr John T. Houghton, CBE, D Phil, FRS, will become Chief Executive of the new Agency. The change marks a major landmark in the history of the Met. Office which, however, will continue as the State Meteorological Service but with a new charter to meet the needs of defence, civil aviation, the merchant service and the general public. Staff will continue to be Civil Servants whilst the Directorate will have increased financial responsibilty and more freedom of action.

Although not directly connected with the results of the Government's 'Next Steps' initiative which created the Executive Agency concept, the Weather Ship *Cumulus* has also commenced a new era of operations, following the cessation, at the end of last November, of operations under the auspices of the North Atlantic Ocean Stations Board of WMO. The *Cumulus* now has more flexibility of operational area in the eastern North Atlantic, being no longer confined to Station 'Lima'. She will be deployed near the 20° W meridian but anywhere between latitudes 48° N and 57° N, where she can be of maximum benefit to forecasters in helping to give advance warning to northern European users of approaching weather systems. *Cumulus* besides being used for the collection of weather and oceanographic observations, has liberal spare accommodation. The facilities on board can be utilised by scientific bodies, bird watchers, oceanographers or other interested groups. There is ample scope for considerable investigative or scientific experimentation to be carried out on board.

Many of the issues mentioned above could hopefully lead towards a cleaner, enduring world, especially so far as the true-blue sea is concerned, and perhaps matters will one day improve sufficiently for someone to report a sighting of *Sylvia sialis*, that symbol of hope, the bluebird. Meanwhile, all at Bracknell send good wishes to those on and connected with the seas for clear observing and pollution-free sailing in 1990 and beyond the blue horizon.

J.F.T.H.



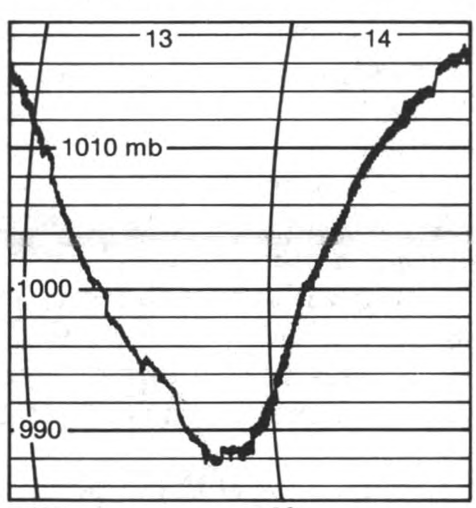
January, February, March

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

DEPRESSION
North Sea

m.v. *Shetland Service*. Captain P.C. Dyer. On station, Fulmar 'A' oil field. Observers: the Master and ship's company.

13–14 February 1989. From about 1200 GMT on the 13th, the vessel experienced the effects of a passing depression. A selection of the frequent observations made is given below, while the barograph trace shows the pressure characteristics. All times are in GMT.



13th 1200: Wind S×W'ly, force 8/9. Low stratus covering the sky. Swell height mainly 3–4 m, but maxima in excess of 5 m.
1400: Wind SW'ly, force 9. Cloud beginning to break up. Swell building slowly.
1800: Wind SW'ly, force 9. Cloud cover 5 oktas stratus. Maximum swell height 7 m.

2000: Wind SW'ly, force 10. Sky clearing. Swell continuing to build, becoming longer.
2100: Wind begins to veer W'ly with a gradual increase in strength.
2245: Fulmar platform reports wind gusting to 86 knots. Sky completely covered by stratus. Visibility affected by blowing spray.
2255: The *Stadive*, on location, reports anchor cable parted and dragging remaining anchors. Wind speed reported as 88 knots, with gusts well in excess of 90 knots.
2300: Wind NW'ly, force 12. Swell confused, maximum height 10 m. Visibility reduced to 0.3 n.mile owing to spray.
14th 0000: Wind NW'ly, force 12, mean wind speed in excess of 60 knots. Permission granted by Fulmar Marine Control for vessel to continue steaming into the wind; vessel unable to turn owing to heavy seas and storm force winds.
0400: Wind NW'ly, force 9/10, slowly abating. Cloud cover decreasing. Swell lengthening and decreasing.
0600: Wind NW'ly, force 9/10. Cloud cover 6 oktas cumulonimbus. Heavy rain showers.
0800: Wind NW'ly, force 8/9. Swell slowly decreasing.
0900: Wind NW'ly, force 8. Vessel arrives back on station, Fulmar oil field.
1200: Wind NW'ly, force 8. Cloud cover 6 oktas cumulus and stratocumulus.

The wind continued to decrease and had backed to W'ly, force 6 by 1600, at which time the swell was lengthening, height 8 m.

Position of ship: 56° 30'N, 02° 06'E.

Note. Mr R.D. Whyman, of the Marine Advisory, Consultancy and Data Services, Met. Office, comments:

'This sequence was associated with a depression which moved eastwards to the north of Shetland during the period. The observers' description of the conditions is in very good agreement with the United Kingdom hourly charts.

'One noticeable feature of this situation was the large fall and rise in pressure associated with the passage of this depression, falls and rises of 10–12 mb in three hours being recorded over large areas.

'The lowest pressure recorded by the *Shetland Service* is in good agreement with the value noted at *Auk Alpha* at the same time.'

North Atlantic Ocean

m.v. *Ironbridge*. Captain P.J. Creber. Port Cartier to Immingham. Observers: the Master, Mr J.R. Holloway, 2nd Officer, Mr N.I. Wiggins, 3rd Officer and ship's company.

11–12 March 1989. Throughout this period the vessel, whilst on a course of 081°, was affected by a deep depression, the early signs of which were detected at about 1000 GMT on the 11th. The following remarks are extracted from the ship's deck logbook, and the barograph trace shows the contours of the depression. All times are in GMT.

11th 1000: Wind SW'ly, force 7. Pressure 1012.9 mb, falling steadily. Air temperature 8.7°C, wet bulb 8.2°. Sky overcast with continuous light to moderate rain. Rough sea with confused, moderate swell. Vessel rolling and pitching moderately, speed unaffected.
1200: Wind SW'y, force 8. Pressure 1012.2 mb, falling steadily. Air temperature 8.9°, wet bulb 8.1°, sea 11.7°. Sky overcast with scattered, heavy rain showers. Sea rough with short period, swell confused and moderate. Vessel rolling and pitching moderately, speed (13.2 knots) unaffected.
1400: Wind SW×S'ly, force 8. Pressure 1009.2 mb, falling more rapidly. Air temperature 9.7°, wet bulb 9.1°. Sky overcast with both stratocumulus and ragged stratus; heavy rain showers. Sea rough with longer period, swell confused and moderate. Vessel pitching and rolling, speed unaffected.
1600: Wind S'ly, force 9. Pressure 1004.6 mb, falling rapidly. Weather conditions

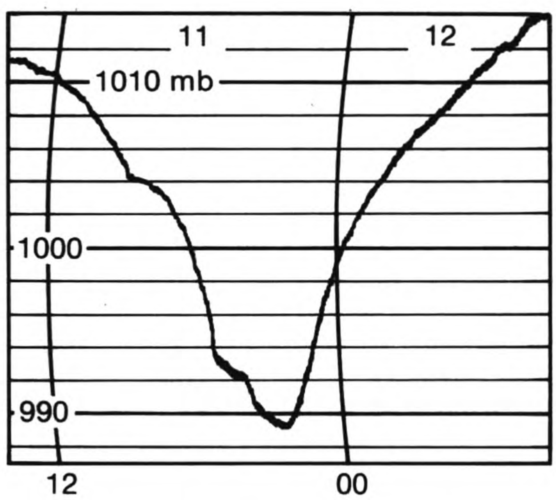
deteriorating rapidly also. Sky overcast with heavy rain showers. Vessel beginning to roll quite heavily to very rough seas on the beam, speed unaffected, spray blowing. Swell still moderate and confused.

1800: Wind S'ly, force 10. Pressure 997.4 mb, falling rapidly. Air temperature 10.2°, wet bulb 10.0°. Sky overcast with continuous heavy rain. Sea very rough and covered in foam. Vessel rolling heavily and shipping heavy spray and light seas all along weather side (starboard), speed virtually unaffected. Swell still moderate and confused.

1900: Wind S'ly, force 10. Pressure 995.2 mb, falling rapidly. Sky overcast with heavy rain. Vessel rolling heavily and shipping heavy spray with light seas as before, speed falling to 12.5 knots. Swell from the south, moderate.

2000–
2140: Wind S'ly, force 10. Weather and sea conditions as for 1900. Pressure reaches its minimum for the ship at 2140 (barometer reads 989.1 mb), whilst the wind veers suddenly to WNW'ly and decreases.

2200: Wind WNW'ly, force 9, gusting to force 10. Pressure 992.3 mb, rising very rapidly. Air temperature 12.5°, wet bulb 12.0°. Sky clearing with moon and stars visible directly overhead. Sea very rough with confused and heavy southerly swell. Vessel shipping seas as before, speed 12.0 knots.



12th 0000: Wind W'ly, force 9. Pressure 1001.5 mb, rising very rapidly. Air temperature 8.0°, wet bulb 6.8°. Sky overcast, blowing spray affecting visibility. Vessel pitching heavily and rolling moderately to very rough seas and a very long and heavy south-westerly swell; shipping heavy spray overall and light seas on both sides in way of No. 1 hatch, speed 11.5 knots.

0200: Wind NW'ly, force 8, occasionally gusting to force 9. Pressure 1006.6 mb, rising more slowly. Air temperature 7.7°, wet bulb 6.1°. Sky overcast with moderate rain showers. Vessel pitching heavily to heavy south-westerly swell accompanied by a second, confused swell, but conditions improving steadily. Speed falls to 11.2 knots owing to ship's movement.

At 0600, the depression was deemed to have passed since the wind had decreased to force 7, the pressure, at 1013.2 mb, was rising steadily and there were very few clouds. The vessel continued to pitch and roll moderately in rough seas and very heavy and confused swells.

Position of ship at 1200 GMT on the 11th: 47° 24′N, 28° 00′W.
Position of ship at 0000 GMT on the 12th: 47° 54′N, 24° 30′W.

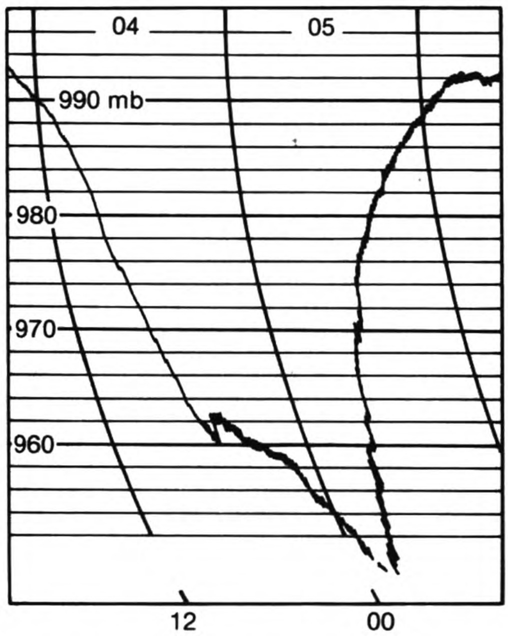
Note. Mr R.D. Whyman comments:

'This was a case of a deepening depression moving rapidly north-east with the centre passing close to and to the north of the *Ironbridge*. The veer of wind to WNW'ly around 2200 was associated with the passage of the cold front.'

m.v. *Abbey*. Captain B. Walmsley. Newport News to Port Talbot. Observers: the Master, Mr R.A. Berry, Chief Officer, Mr K.P. Alcock, 2nd Officer, Mr C.W. Jones, 3rd Officer and ship's company.

4–5 January 1989. Whilst on passage, the vessel experienced the wrath of an extremely deep depression when approximately 350 n.mile to the south of Newfoundland. A weather forecast from Tuckerton Radio indicated that a developing storm (979 mb) was fast approaching the vessel from a south-westerly direction, but it was expected to move up to the north-west and pass well astern of the *Abbey*. However, from observing the winds, and from later weather reports, it was thought that the depression passed very close to the ship. The observations which follow have been condensed from the heavy weather report.

Date and time (GMT)		Wind Dir'n	Wind Force	Course of ship	Pressure (mb)	Remarks
4th	1200	E	10	075°	972.7	Very rough sea and confused swell. Showers.
	1400	S×E	11	075°	960.8	
	1600	S	8	075°	960.4	Rolling and pitching moderately to a very rough sea. Confused swells. Occasional heavy rain. Taking heavy spray over all. Courses to Master's orders from 1630. Dry-bulb temperature 14.9°C.
	1800	S×E	10	TMO	958.0	
	2000	S×E	10	TMO	952.8	Rolling and pitching heavily at times. Shipping heavy seas. Few clouds, moderate visibility. Dry-bulb temperature 15.8°.



Date and time (GMT)		Wind Dir'n	Wind Force	Course of ship	Pressure (mb)	Remarks
5th	0000	SSW	11	TMO	952.4	Vessel hove to. Pitching and rolling heavily to very rough bow seas, taking frequent seas on both sides. Dry-bulb temperature 13.5°. Adjust course to 090° at 0045; increase to sea speed.
	0200	WSW	10	090°	973.8	
	0400	W×S	9	085°	979.4	Pitching and rolling heavily to mountainous following seas, very heavy south-westerly swell. Cloudy but fine.

0600	WSW	9	085°	982.5	
0800	W	8	085°	985.2	Rough following sea, heavy swell. Heavy rain showers, good visibility. Dry-bulb temperature 8.5°.

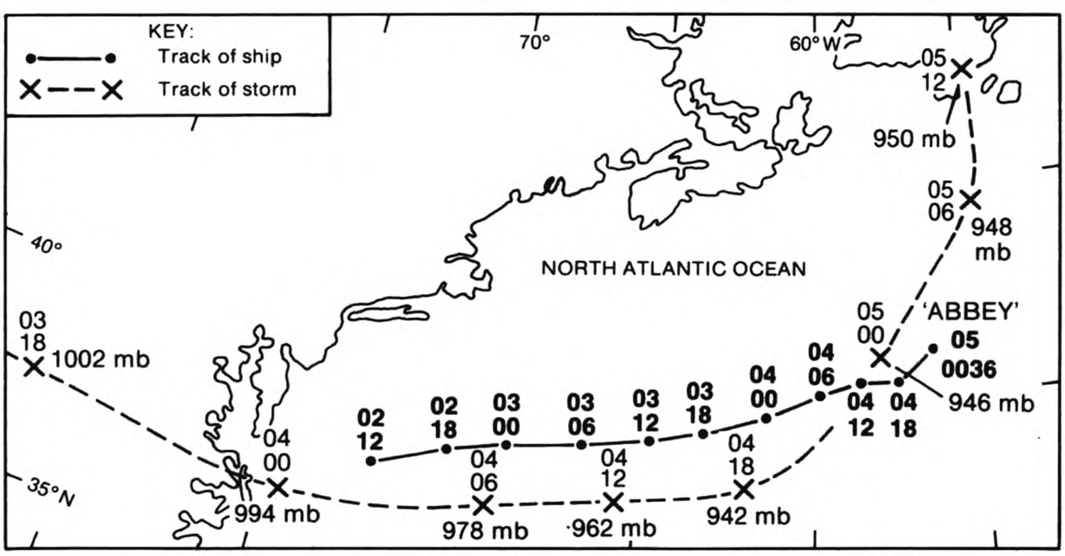
As can be seen from the barograph trace, the pen nib was unable to record the lowest pressure reached at the ship. However, recordings of pressure made with the precision aneroid barometer every fifteen minutes at the height of the storm, gave a minimum reading of 947.9 mb at 0115 on the 5th. During this time, weather observations were transmitted by high-frequency telex every three hours.

Even when hove to, the vessel took on board very heavy seas at regular intervals, resulting in extensive, though mostly minor, damage to fittings on the weather deck. The starboard life-boat and life raft were almost lost as well. During the strongest winds, which were gusting to force 12, the scanner for the DECCA ARPA radar was unable to cope and so was switched off.

Position of ship at 0036 GMT on the 5th: 41° 17′N, 56° 13′W.

Note. Mr R.D. Whyman comments:

'This is another good example of explosive deepening in a depression crossing the eastern seaboard of North America (see *The Marine Observer*, April 1987, pp. 69–72).



'As can be seen from the plotted tracks of the *Abbey* and the depression, the ship was very close to the storm at 0000 GMT on the 5th, and the observed pressure readings agreed well with the central pressure as assessed on the North Atlantic synoptic chart.'

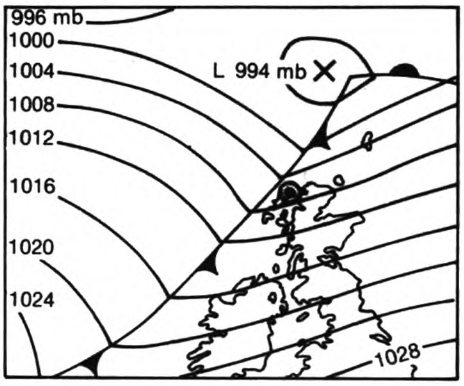
PASSAGE OF FRONT

The Little Minch

f.p.v. *Vigilant*. Captain D.L. Rattray. Patrolling Scottish waters. Observers: the Master, Mr I. McKendrick, 1st Officer, Mr R. Galbraith, Seaman and ship's company.

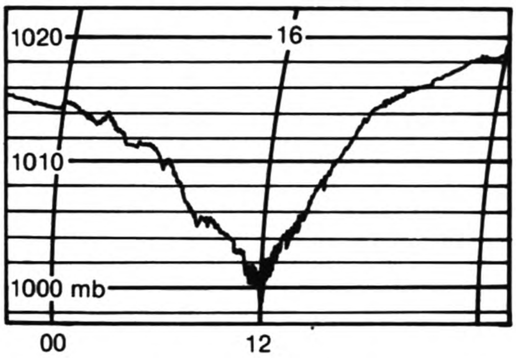
16 January 1989. At 1250 GMT the vessel was battling its way towards the south-south-east in SSW'ly winds estimated to be in excess of 60 knots. There

was torrential rain, and the visibility was reduced to about 0.5 n.mile. The pressure at this point was 1000.1 mb, and the dry-bulb temmperature was 9.1 °C. (See chartlet for synoptic situation and ship's position at 1200.)



◉ Position of ship at 1200 GMT

At 1255, a sudden 'hush' became apparent to those observers on the bridge. This lasted for about 30 seconds, and then the wind started shrieking again, but this time it was W'ly, force 9. The rain suddenly stopped and the visibility improved to at least 5 n.mile. On the radar, the western side of the precipitation, moving north-east, was very clearly defined. The barograph trace shows the sharp rise in pressure which also occurred at this time.



For approximately 10 minutes, the wave tops of the south-south-westerly swell were observed being blown off by the W'ly wind until they gradually realigned with the wind. At 1305 the pressure was 1003.2 mb and the dry-bulb temperature was 6.7°.

Position of ship: 58° 16'N, 06° 01'W.

CETACEA

English Channel

s.t.s. *Lord Nelson*. Captain H.M. Munro. Hamilton to St Helier. Observers: the Master, Mr R.J. Bridge, 2nd Officer and ship's company.

25–26 March 1989. At 1910 GMT on the 25th approximately 10 Common Dolphins were seen accompanying the ship, jumping clear of the water along the starboard side and the starboard bow. They had brown upper parts and white undersides. The ship was sailing at 10.5 knots.

Between 0800 and 0900 the next morning, there were about 40 dolphins jumping clear of the water all around the ship. These were actually heard 'talking' from down below in the ship's saloon. At 1300, approximately 20 dolphins appeared on the port side, then swam under the stern and around the bow for some 20 minutes.

The observers wondered if the fact that the *Lord Nelson* is a large sailing ship may have led to the frequent dolphin visits.

At 1300 the wind was S'ly, force 6, the sea temperature was 10.8 °C and the seas were approximately 2 m with a south-westerly swell of 3 m.

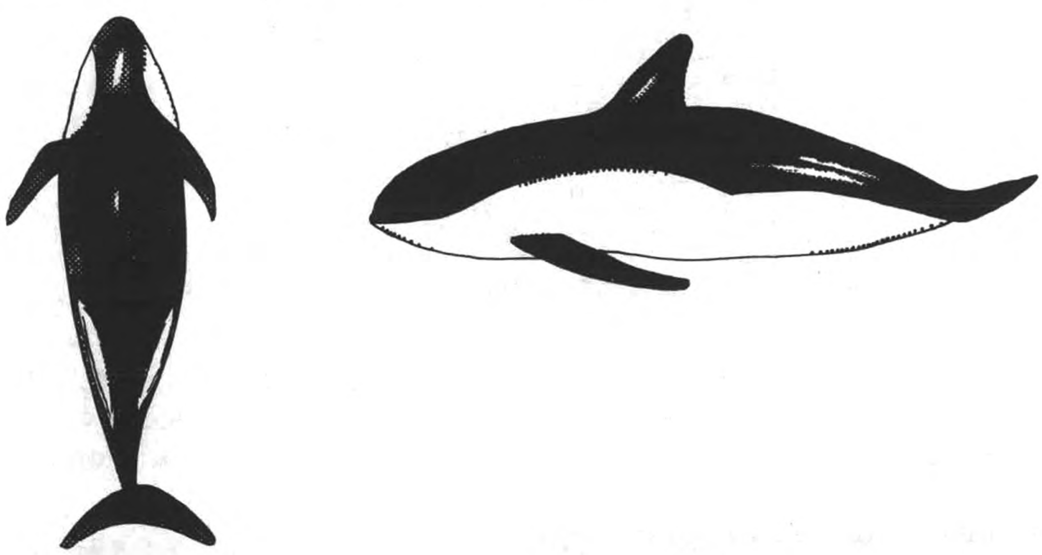
Position of ship on 26 March: 49° 00'N, 06° 13'W.

South Atlantic Ocean

R.R.S. *Charles Darwin*. Captain S.D. Mayl. Falkland Islands patrol zone. Observers: Mr A.R. Louch, 2nd Officer, Mr C.J. Brown, Radio Officer and members of the scientific staff.

22 February 1989. At 1830 GMT a small school of 10–12 black-and-white dolphins was seen playing around the bow for about 10 minutes.

They were approximately 1.5–2.0 m in length, with very distinctive markings, as indicated in the sketch. No noticeable beak was observed, their heads were more like a porpoise's, and each had a long, curved dorsal fin.



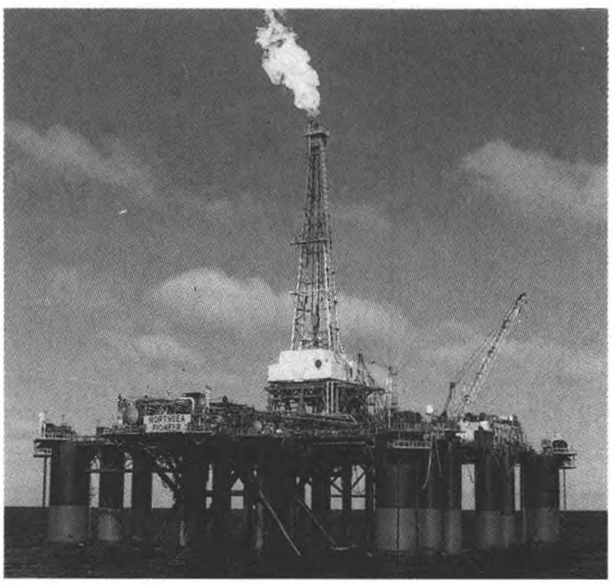
Occasionally leaping high out of the sea, all of them were of a similar size, with no obviously smaller (younger?) ones being seen. Initially, from *The Seafarer's Guide to Marine Life* by Paul Horsman, they were thought to have been Commerson's Dolphins (*C. commersoni*), but the individuals observed had greater amounts of black along their backs. They may have been Cruciger Dolphins (*L. cruciger*), given their size and the ship's position, but the 'dramatic black-and-white' crucifix pattern was not obvious to the observers. Course of ship 290° at 11.0 knots.

Conditions at the time were: dry bulb 1.2 °C, sea 0.3°, wind WNW'ly, force 4, slight sea with occasional bergy bits and growlers.

Position of ship: 59° 16'S, 34° 38'W.

Marcus Taylor Offshore Photography

Niki Photography



Two of the three recent recruits from the United Kingdom oil and gas industry. Top: *Ocean Alliance*. Centre: *North Sea Pioneer*. (See page 37.)

Captain M.J. Godbehear (left) receives his inscribed barograph from Captain G.V. Mackie, Marine Superintendent, at Bracknell on 2 August 1989. (See page 38.)

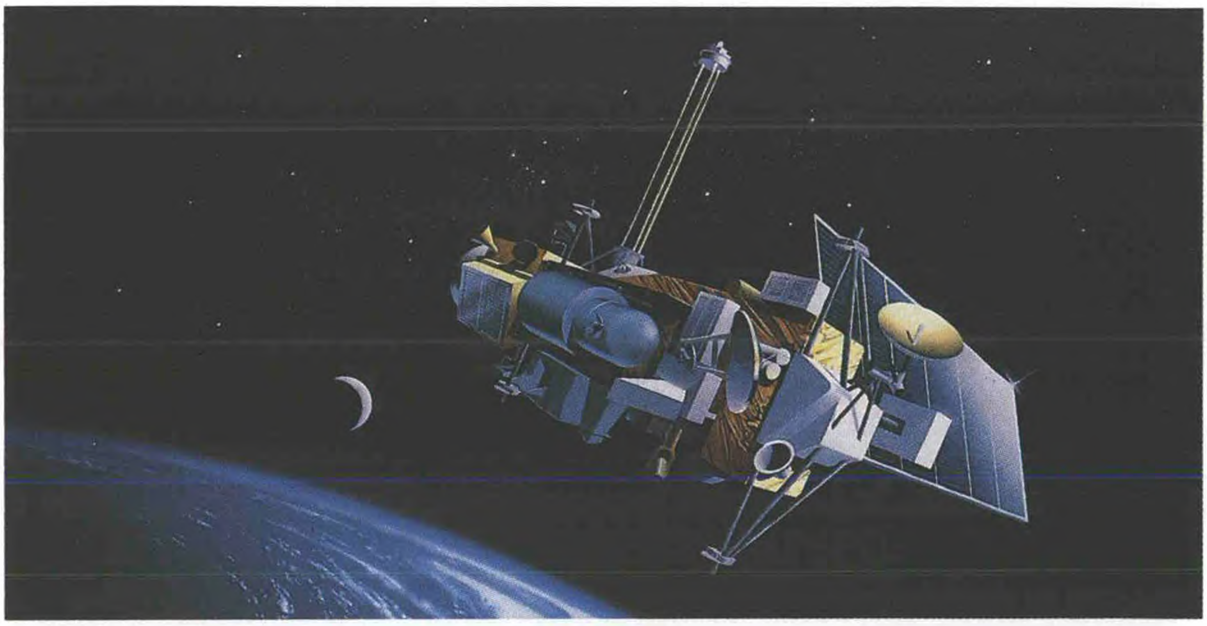
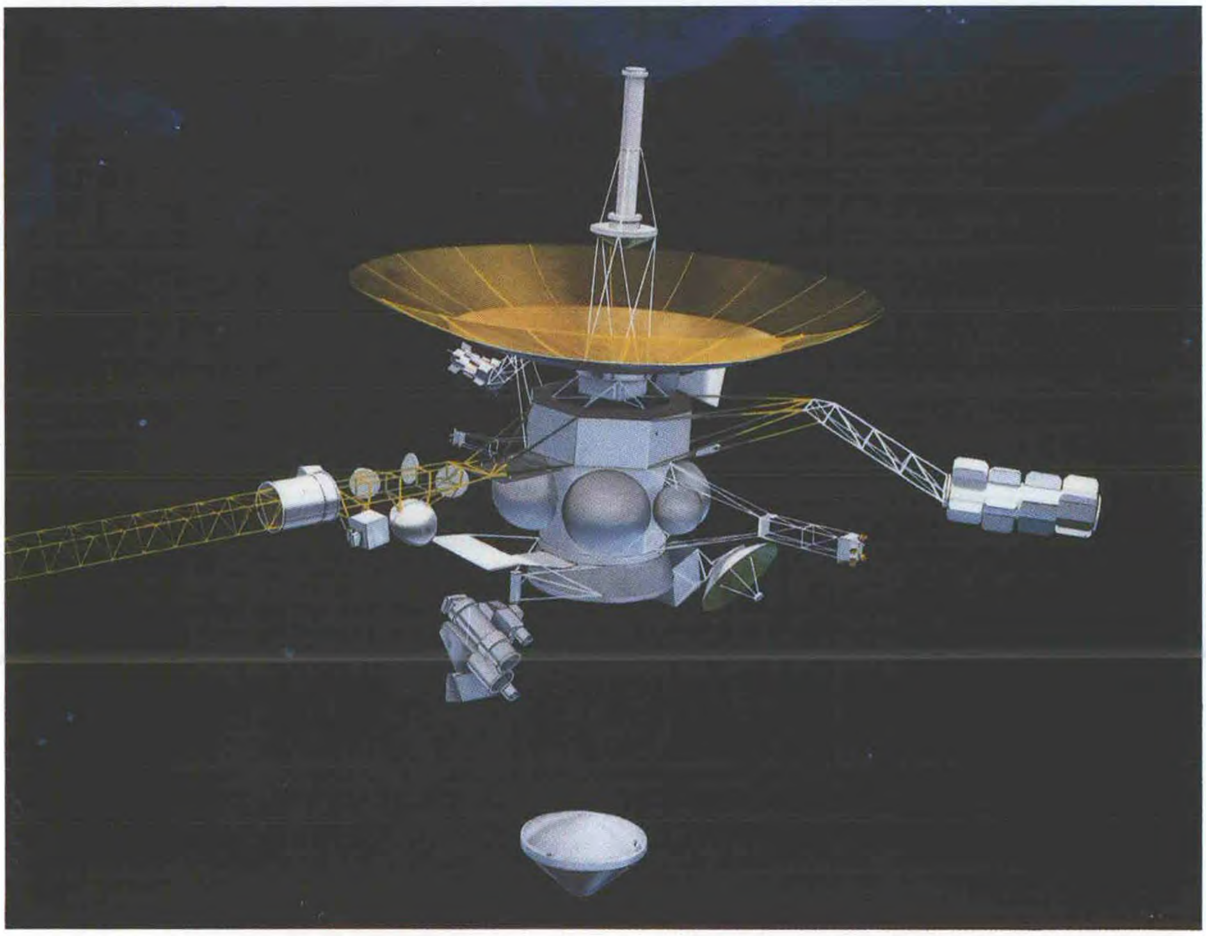


Figure 2. An artist's impression of the Upper Atmosphere Research Satellite in Earth orbit, *circa* October 1991. Many of the scientific instruments can be seen in this view; the ISAMS is the large box on the underside of the spacecraft towards the rear.



Illustrations courtesy of NASA

Figure 3. The Galileo spacecraft, which visits Venus in January 1990 and becomes a satellite of Jupiter in 1995. This painting shows the moment of probe release; it enters Jupiter's atmosphere while the main spacecraft goes into orbit. The small dish collects data from the probe and relays it, via the large antenna, to Earth. Just above the probe, on an articulated scan platform, the optical remote sensing instruments can be seen. The long arm on the left supports the particles and fields experiments and the short one on the right holds the nuclear power source.

FUTURE SATELLITE MISSIONS (See page 32.)

TURTLES

Mediterranean Sea

m.v. *British Trent*. Captain A.R. Wilkinson. Lagos to Cape Passero. Observer: Mr W.M. Perkin, 2nd Officer.

24–27 March 1989. Whilst drifting and awaiting orders, single green (Loggerhead?) turtles were seen on numerous occasions; they were 45–60 cm long. One particular individual seen on the 27th, was accompanied by a small, black fish of about 15 cm in length, which swam over the back of the turtle, leaving its station only when the latter surfaced, then it followed close behind. It reminded the observers of a faithful, eager dog with its master, and was rather like a wrasse in shape. Below the turtle and sometimes behind it was seen a small shoal of 20–30 minute fish, white/silver in colour and less than 25 mm long.

Generally, the turtles observed sculled about, making little headway against the current. As the weather was basically fine and sunny, it was wondered if the turtles could have been warming themselves.

At the time, the dry-bulb temperature was about 15 °C, while the sea was less than 17°.

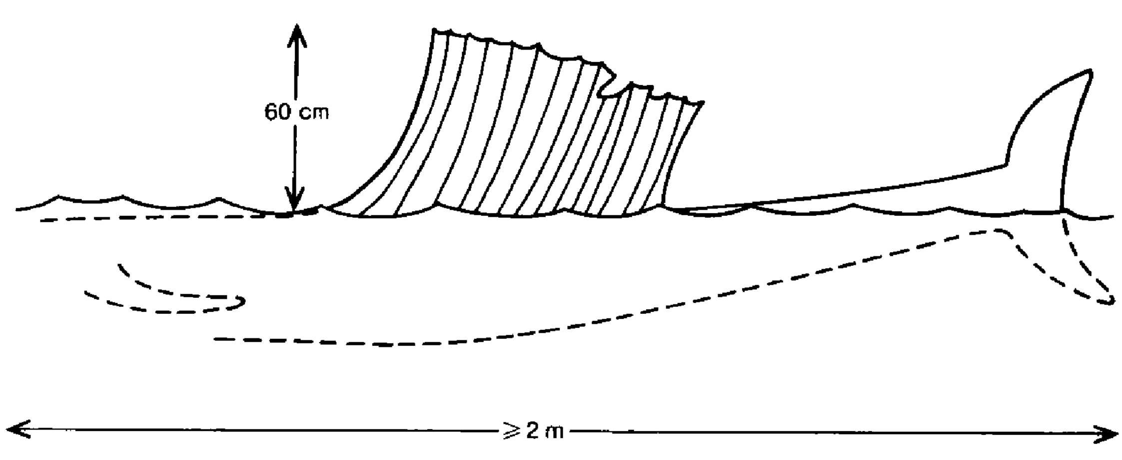
Position of ship: approximately 37° 18′N, 15° 30′E.

FISH

Gulf of Guinea

m.v. *Gardline Locater*. Captain P.C. Hewitt. Ship engaged on survey work. Observers: Mr S. Jones, 2nd Officer and ship's company.

1 March 1989. At 1150 GMT whilst the vessel was running 2-n.mile survey lines (146°/326°) 10 n.mile west-south-west of Forcados offshore terminal, a large, ribbed fin was spotted moving rapidly towards, then along the port side. As shown in the sketch, the fin belonged to a large fish at least 2 m long; the fin or sail itself, was estimated to be about 60 cm high and 1.06 m long, and was black or dark grey in colour. Along the body ran a silver/white stripe from the head to the



tail, and this stripe extended forward, giving the impression of a long, tapered head. The tail-fin was short, curved and of a similar colour to the sail, while the pectoral fins were thin and curved. No details of the head could be seen.

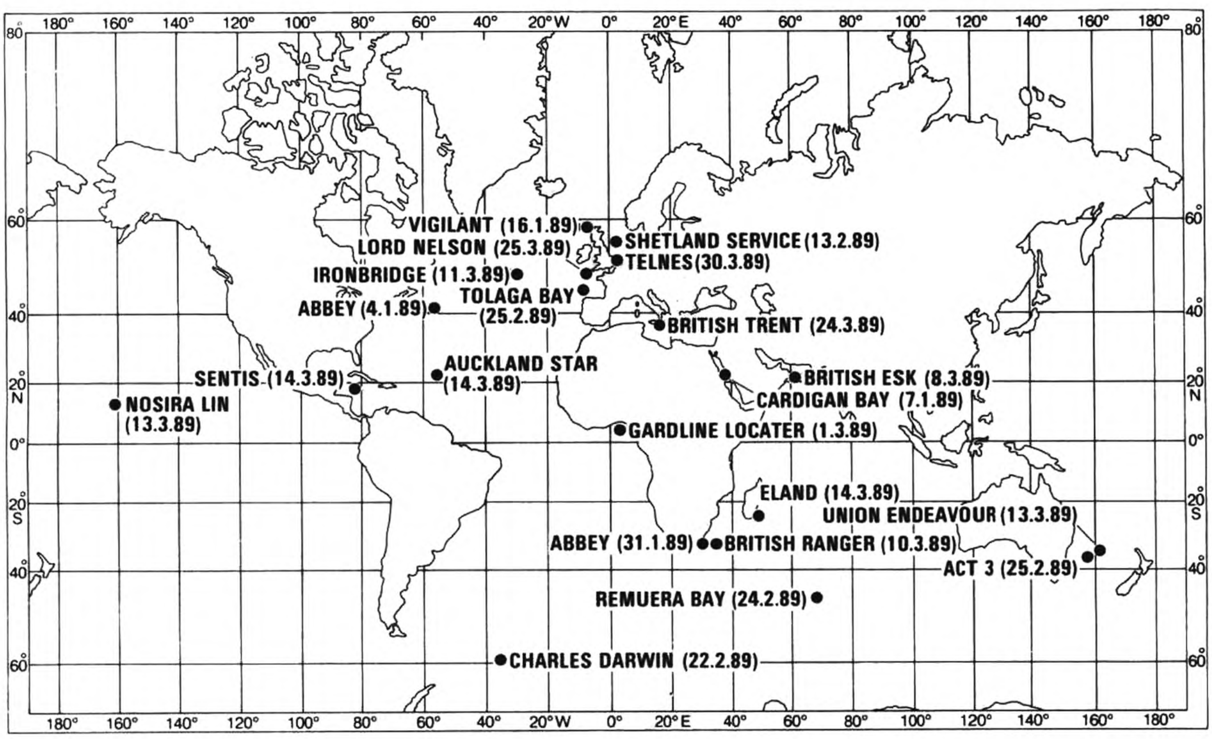
The fish appeared to be very interested in the gear being towed astern, but soon made off. It was variously described by those on board as a sailfish, marlin or swordfish. It was seen again in the same location at 1500, but this time it shied away on the vessel's approach and dived immediately.

At the time of the first observation the wind was SW'ly, force 4, the sea temperature was 29 °C and the sea state was choppy with a short south-westerly swell of 1.5 m.

Position of ship: 05° 06'N, 05° 00'E.

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

'From the extent of the dorsal fin shown in the sketch, this was not a marlin or swordfish but a sailfish (*Istiophorus*). Two metres is a good average size, but they do grow to more than 3.5 m. The food consists of schooling fish and squid living near the surface. Wheeler (*Key to the Fishes of Northern Europe*) says the sailfish is a tropical fish found world wide at the edge of coastal waters and also in the open sea. It is strongly migratory.'



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

SHARKS

South African Waters

m.v. *Abbey*. Captain B. Walmsley. Taranto to Richards Bay. Observers: the Master and ship's company.

31 January 1989. When the vessel was stopped and drifting for Engine Room purposes between 0730 GMT and 0830 GMT, two hammerhead sharks were observed. Initially, the dorsal fin of one was seen approximately 60 m off the port quarter (lee side). The shark swam towards the vessel until it reached a distance off the hull of 2–3 m in the region of the engine room discharges. It stayed briefly

before proceeding back to its initial position. The second shark was observed swimming towards the stern, and then maintained a distance from it of about 3 m, but once again, the stay was brief. Both sharks were seen together at the initial position prior to the vessel getting under way again; each one was reckoned to be 2.4–3.0 m long.

Conditions at the time were: air temperature 23.9 °C, wet bulb 19.0°, sea 24.3°, wind SW'ly, force 7.

Position of ship: 32° 12'S, 30° 06'E.

Note. Dr F. Evans comments:

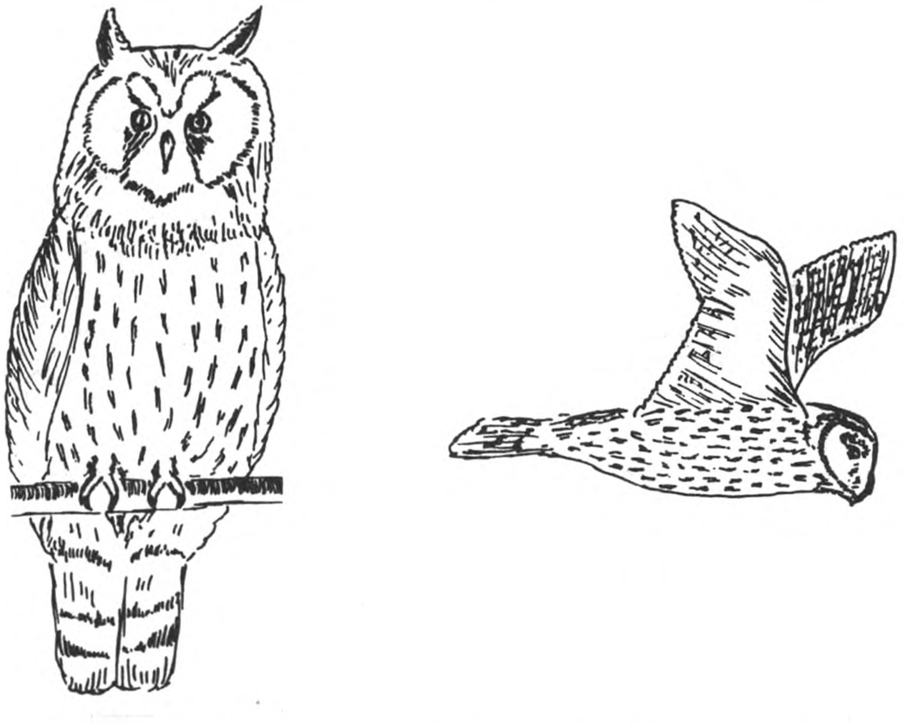
'I am grateful for this report of a pair of hammerhead sharks. It is not possible to say from the account which species they were, but may I recommend to the observers a book published in South Africa, called *A Guide to the Common Sea Fishes of Southern Africa* by R. van der Elst. This gives an outline of the head shape of the three hammerheads found on that coast, as well as much other information on the local sea fish. By the way, most hammerheads off South Africa are juveniles less than 2 m long, which these, at around 3 m, obviously were not.'

BIRDS

North Sea

m.v. *Telnes*. Captain J.A. Wilson. United Kingdom coastal passage. Observers: the Master, Mr D.J. Ayling, 2nd Officer, Mr C.A. Jennings, Radio Officer, Mrs Wilson, and the Pilot.

30 March 1989. At 0700 GMT when off Foulness Island, a large bird was observed to circle the vessel before settling on the port side of the fo'c'sle. On closer inspection, it was identified as a mature Long-eared Owl, see sketch. The



bird was generally off-white in colour with mottled brown markings on its back and wings, whereas its chest was more creamy with dark streaks.

It settled in the shade on a railing and attempts were made to approach it with a view to taking a photograph, but it took flight when approached to within 5–6 m (although the Master's wife accidentally got within 2 m of it on one occasion before it flew off). The owl flew aft and followed the ship and despite the large number of Common Gulls in the vicinity, it was not pestered by them, seeming to be unconcerned with their presence. It finally settled back on the port side of the fo'c'sle and on the same railing as before where there was still some shade, and it was left in peace.

Position of ship: 52° 12′N, 01° 50′E.

Note. Commander M.B. Casement, former Chairman of the Royal Naval Birdwatching Society, comments:

'This is an excellent sketch which confirms the observers' identification of the bird as a Long-eared Owl (*Asio otus*).'

Southern Ocean

m.v. *Remuera Bay*. Captain R.J. Bland. Cape Town to Melbourne. Observers: the Master, Mr C.K. Urwin, 2nd Officer and ship's company.

24–25 February 1989. At about 0600 GMT four penguins were clearly seen approximately 30 m from the ship. They were believed to have been Macaroni Penguins as yellow could be readily seen above the eye from the forehead to the side of the neck. No crest was seen. At the time, the ship was 160 n.mile east-north-east of Îles Crozet, this being the nearest land.

On the following day between 0400 and 0900, approximately 160 penguins were seen. They were in 12 groups (flocks?) numbering from 4–20 individuals. Of those close enough to the ship for details to be noted, none had any colouring other than black and white, and again, no crests were seen. These penguins were jumping out of the sea in similar fashion to dolphins. It was thought that these birds were probably Gentoo Penguins.

The ship was on a course of 090°, and at 0900, was 150 n.mile north-west of the northernmost island of the Kerguelen group.

Weather conditions on the 25th were: dry bulb 9.1 °C, sea 9.9°, pressure 1036 mb, wind light and variable, clear sky, rippled seas.

Position of ship at 0600 GMT on the 25th: 46° 18′S, 69° 42′E.

Note. Captain P. Chilman, of the Royal Naval Birdwatching Society, comments:

'The first birds observed could indeed have been Macaroni Penguins (*Eudyptes chrysolophus*) as suggested, but they could also have been Rockhopper Penguins (*Eudyptes chrysocome*). Both have yellow on the head and both breed on the Crozet Islands, but without further details, I cannot be of more help.

'I agree that the second observation was most likely to have been of Gentoo Penguins (*Pygoscelis papua*) which breed on Kerguelen and other islands in the area.'

BIOLUMINESCENCE

Indian Ocean

s.s. *British Ranger*. Captain J.C.E. Bovaird. Port Gentil, Gabon to Kaohsiung. Observers: Mr D.J. Lavery, 3rd Officer and Mr K. Guy, S3.

10 March 1989. At about 1900 GMT bright flashes of light were observed passing down the ship's side in the bow wave, which at the time, was giving off a permanent, dull bioluminescent glow. The bright flashes were sometimes extremely bright, like a torch being flashed up from the sea surface. Occasionally, the duration of a flash would be up to 30 seconds, but at other times, less than 1 second. They varied in brightness, and closer inspection from a lower deck revealed many more flashes of weaker intensity that were not visible from the bridge. Although the dull glow in the bow wave was constant, the number of flashes at any one time varied, appearing in phases. Sometimes there would be one every 5–10 seconds, whereas the source of light would seem to be all over the place on other occasions.

The bursts of light did not appear to be moving, and sometimes appeared to be up to 20 cm across. There did not seem to be any 'wheel' effect, and the flashing persisted for about two hours. No difference was noted when a beam of light was shone on the sea surface.

Position of ship: 32° 30'S, 34° 48'E.

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

'This is a very clear description of the variety that is commonly observed in the luminous flashes in the bow wave. There are many organisms that can be responsible, but different kinds of jellyfish are the most frequent causes. The patchiness with which most marine animals are distributed produces the variation in flash frequency that is noted; the dull glow is usually produced by much smaller organisms, such as dinoflagellates; the size of a light source is to some extent determined by its depth, and the duration of the flash depends on the kind of animal producing it. Most animals produce either long pulses or short flashes, not usually both.'

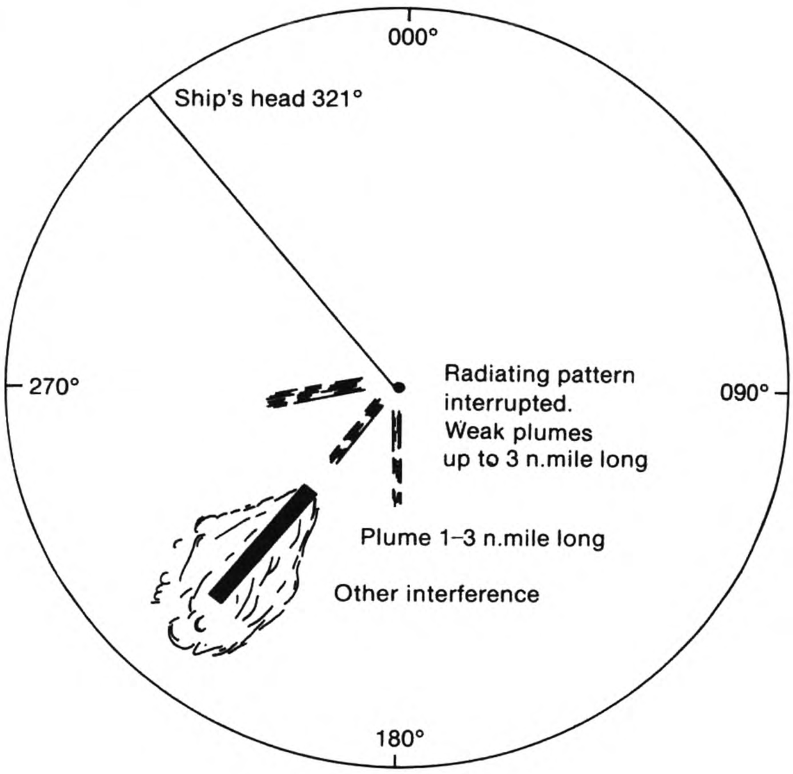
RADAR INTERFERENCE

Arabian Sea

m.v. *British Esk*. Captain P.F. St Lawrence. Vishakapatnam to Bahrain. Observers: Mr I.C. Massey, Chief Officer and members of ship's company.

8/9 March 1989. During the night a particularly strong and distinct patch of radar interference was noted by all observing officers. The sketch shows the phenomenon as seen on the 12-n.mile range of the 3-cm radar. The racon type mark varied in length from 1–3 n.mile at a nearest range of 5–10 n.mile. The effect was minimal on the 10-cm radar.

The bearing of the mark remained fairly constant at about 20° abaft the port beam or about 230°. Of particular note was that around 1600 GMT to 1700 GMT (about 2 hours after sunset), when the mark on the radar was very distinct, the satellite communication system suffered a loss in signal strength sufficient to prevent transmission or reception, the bearing of the satellite being almost due south of the vessel. It was thought at the time that the signal mast had become aligned between the aerial and the satellite, but alteration of the ship's head to port or starboard did not cure the low signal strength (it normally does if the alignment of mast/aerial/satellite is true). The ship's position at this time was over the Murray Ridge in the north-west Arabian Sea.



12-n.mile range. 1600 GMT

Of note, although this may have been of coincidence only, was that the vessel was passing through patches of bioluminescence at the time, mostly only bright enough to show up in the breaking waves of the ship's wake, but during the period of low signal strength, the whole area of white, foamy water along the ship's side frequently shone a bright, greenish-white colour.

During the period of the observation, weather conditions were fine and clear, the sky was almost cloudless and the sea virtually calm.

Position of ship: 21° 40′N, 61° 47′E.

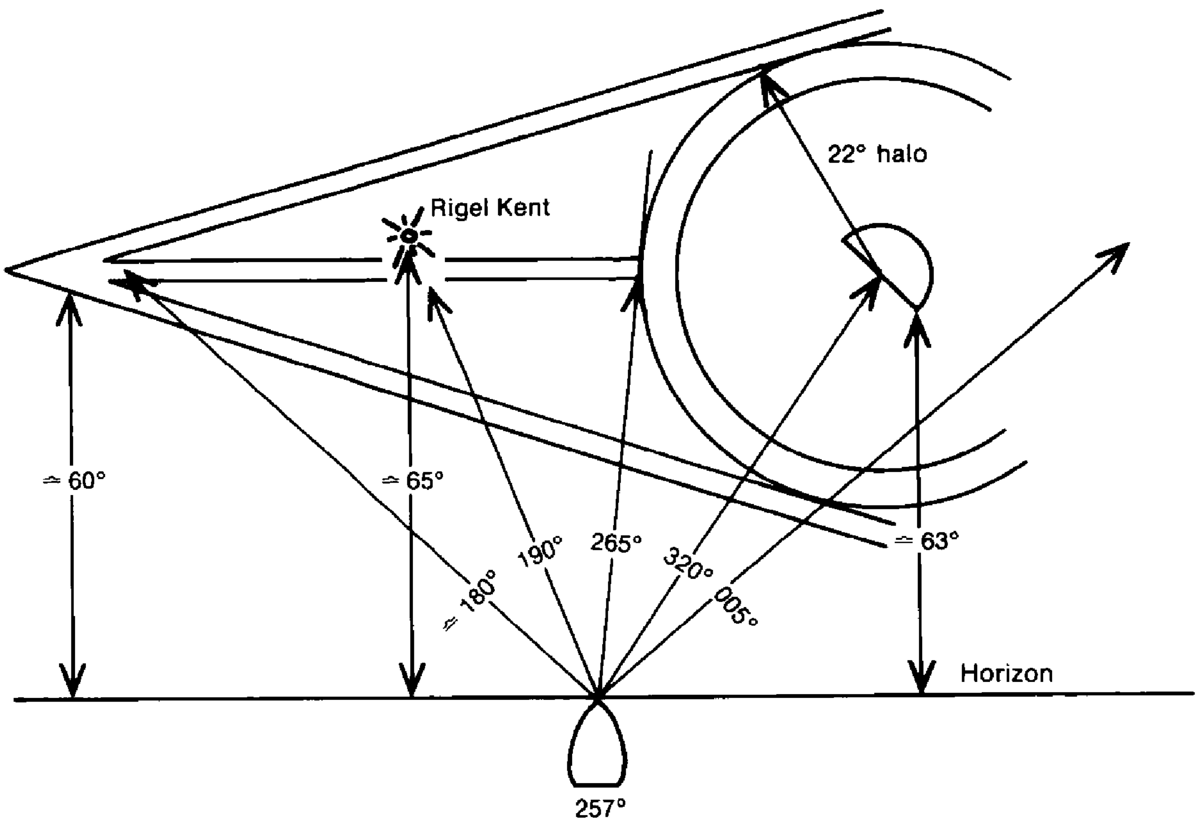
HALO COMPLEX

Tasman Sea

m.v. *ACT 3.* Captain E.L. Jackson. Balboa to Melbourne. Observers: Mr D.W. Lax, Chief Officer and Mr A. Shreh, AB.

25 February 1989. Between 1812 GMT and 1830 GMT a lunar halo of radius 22° was observed. The ring was complete throughout the period, only fading as dawn broke and the layer of cirrostratus in which it was formed started to thicken.

The sketch shows the effect seen between 1814 and 1818. Three converging bands were observed to emanate from the southern edge of the halo. These were very distinct and of the same intensity as the halo, and during this time, no other bands of cirrostratus were discernible.



1815 GMT

Weather conditions were: air temperature 19.4 °C, wet bulb 17.0°, pressure 1024.9 mb, light airs, cloud cover 6 oktas cirrostratus.

Position of ship: 36° 56′S, 158° 03′E.

Note 1. Dr R. White, of the Institute for Research in Meteorological Optics, comments:

'The 22° halo is standard and requires no particular comment. The horizontal band of the three shown is probably part of a paraselenic circle (the lunar equivalent of a parhelic circle); no paraselenae (mock moons) are to be expected at such a high lunar elevation. The two remaining bands are interesting. It is possible that they are parts of one of the numerous kinds of anthelic arcs, most probably that kind produced mainly by refraction through the 60° angles (combined with an odd number of internal reflections at hexagonal end faces) of hexagonal columnar crystals with their long axes horizontal, and free rotation (or random distribution) about these axes.'

Note 2. The *ACT 3* is a Selected Ship of the New Zealand Voluntary Observing Fleet.

AURORA BOREALIS

North Atlantic Ocean

m.v. *Auckland Star*. Captain W.J.G. Jones. Gibraltar to Puerto Limon. Observers: the Master, Mr N.M. Bennett, 3rd Officer, Mr R.C. Knott, Radio Officer, Mr A. Howes, SM1A, and ship's company.

13/14 March 1989. Between the hours of 2330 GMT and 0245 GMT a distinct, semicircular colouration of the northern night sky was observed. The phenomenon was first noticed at the handing over of the watch at 2000 GMT, when a reddish glow to the sky became more apparent to the observers as their eyes adjusted to the darkness. At first, no explanation could be found for the phenomenon, surely the ship was too far south at only 22° N to see the northern lights?

The red glow reached its maximum intensity at approximately 0130 when it was seen to extend across the sky, bearing 250° at its westernmost extremity, to 040° at its easternmost limit. Its brightest portion seemed to consist of a deep-red patch bearing 330°, although at times, other areas seemed more prominent. The maximum elevation was 35° from the horizon, but an area of 'normal' coloured sky was noted between the horizon and the base of a small cumulus cloud, elevation about 5°. In addition, there were faint cream/white, multiple and very nearly parallel streaks which formed a ray structure arcing through the discoloured area to the vertical, and extended from behind the cloud to approximately 40° elevation. These rays were most prominent at a bearing of 330°. By 0315 GMT the phenomenon had all but faded away, leaving clear, moonlit skies.

So what had the observers encountered? On referring to the *Marine Observer's Handbook*, it was found that they had in fact witnessed the aurora borealis, and any lingering doubts were dispelled the following morning when the Radio Officer remarked that the BBC World Service had reported the northern lights seen as far south as Southampton in the United Kingdom, and all across North America. The observers congratulated themselves on perhaps being those in the most southerly latitudes.

Position of ship: 21° 34'N, 54° 00'W.

Caribbean Sea

m.v *Sentis*. Captain R.G. Savage. La Salinas to New Orleans. Observers: Mr T. Luke, 3rd Officer and members of ship's company.

13/14 March 1989. At 0100 GMT a light phenomenon was observed in the sky to the north-east of the ship's position which was 60 n.mile south-west of Grand Cayman Island. A red glow was noted with faint, white stripes stretching up and down through it. The glow extended across the sky from approximately 320° to 050°, at an altitude of 25°, while the white colour appeared to be pulsating.

The phenomenon lasted for about two hours, dissipating at 0300. Several other ships in the area confirmed the sighting, and Grand Cayman Radio observed the light offshore to the north of the island. The following morning Grand Cayman Radio reported that the light was due to freak atmospheric conditions, with dust particles reflecting the light. The observation was nevertheless thought worthy of note.

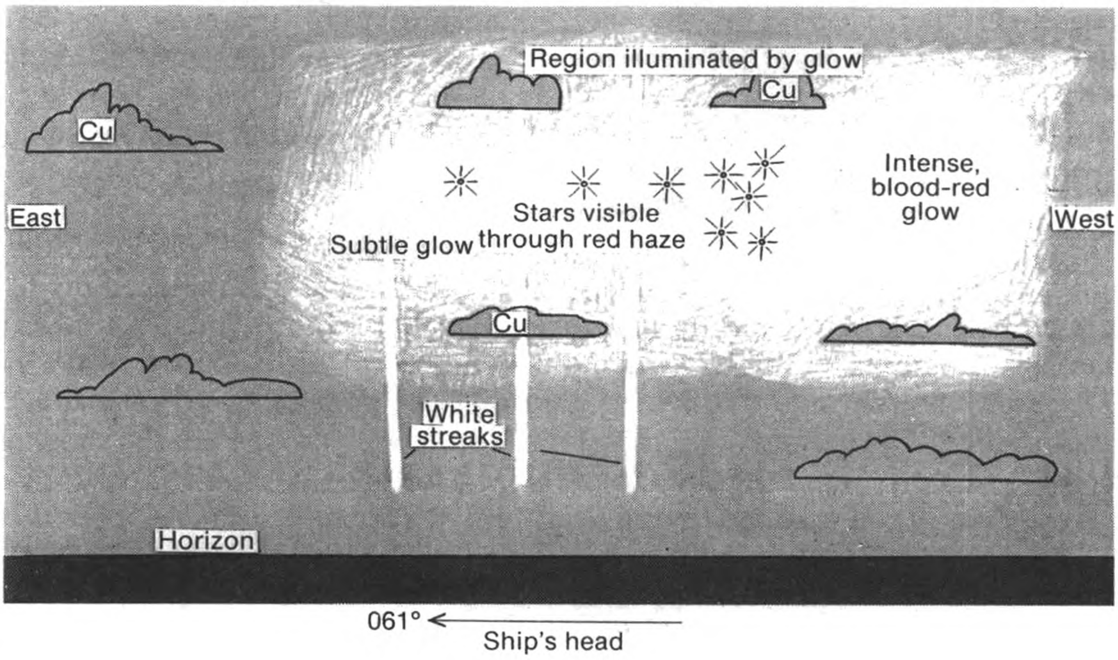
Position of ship: 18° 29'N, 81° 15'W.

AURORA AUSTRALIS

Indian Ocean

m.t. *Eland*. Captain R.R. Walker. Durban to Reunion. Observers: Mr E. Mpungose, 2nd Officer, Mr D. Willers, Cadet and Mr P. Gillan, Junior Electrician.

13/14 March 1989. At 2130 GMT the following phenomenon was observed in the southern skies at an azimuth of 120° to 230°. See sketch.



The colour of the sky was 'fire' red, as if the sun was going to rise from that direction; the intensity increased towards the west. The altitude of the aurora was initially about 15° above the horizon, but after an hour, this began to lower. White streaks were observed rising vertically from the horizon, and numbered six in all, at intervals of 10° azimuth.

Stars were observed through the red colouring, although they were less distinct where it was more intense. The colouring gradually dissipated until about 0100 when it was right astern of the vessel.

Position of ship: 24° 08'S, 49° 10'E.

Note. The *Eland* is an observer with the South African Voluntary Observing Fleet.

Tasman Sea

m.v. *Union Endeavour*. Captain E.M. Hector-Taylor. Auckland to Sydney. Observers: the Master, Mr G.P. Dutch, Chief Officer, Mr M. Sutton, 2nd Officer, Mr P.G. Hines, 3rd Officer, Mr C. Hague, Radio Officer and Messrs B. Elliott, S. Robertson and A. Ayers, AB.

13/14 March 1989. At 1145 GMT a spectacular, bright-orange glow appeared in the southern quadrant. It was spectacular owing to its brightness and the fact that it appeared in the space of about 30 seconds.

At first, it was thought it could have been a distress flare of some kind, but after a period of three or four minutes, the colour of the area concerned changed slowly to a very deep, rich, blood-red hue; it then dawned on the observers that they were looking at the best show of the southern lights that any of them had ever seen.

The red colour lasted for approximately 45–50 minutes, being of such brightness that Achenar (magnitude 0.6) was unobservable. During this time, bright 'crepuscular' rays of white and deep red appeared in all different arcs, but radiating from about 190°, having the apearance and brightness of searchlights.

Also in this period, and in the same quadrant, very luminous lime-green meteorites were seen, but they were not like ordinary ones. These were slow, and took 3–4 seconds to pass from an altitude of 70° to 80° to the horizon or just above it. Approximately 15 of these were seen, of which four could easily have been mistaken for green distress flares.

The redness in the sky slowly dissolved into a tinge of its former colour, then broke up and became patchy in places, with these patches sometimes brightening again. At 1230, the red colour dissipated even further and was replaced by just a white glow, similar to the loom of a large city over the horizon. At times this varied abruptly as if a dimmer switch was being turned up and down rapidly.

This continued throughout the night until about 1700 when a final display of rays of moderate brightness radiating from about 160° completed the show. All observers were in awe of the sight, and the Master, who had sailed these waters for more than 30 years, stated that this sighting was the best he had ever seen. The following night, all watched for a repeat performance, but as Mother Nature decided, nothing eventuated.

Position of ship: 34° 40′S, 161° 00′E.

Note 1. The *Union Endeavour* is a Selected Ship of the New Zealand Voluntary Observing Fleet.

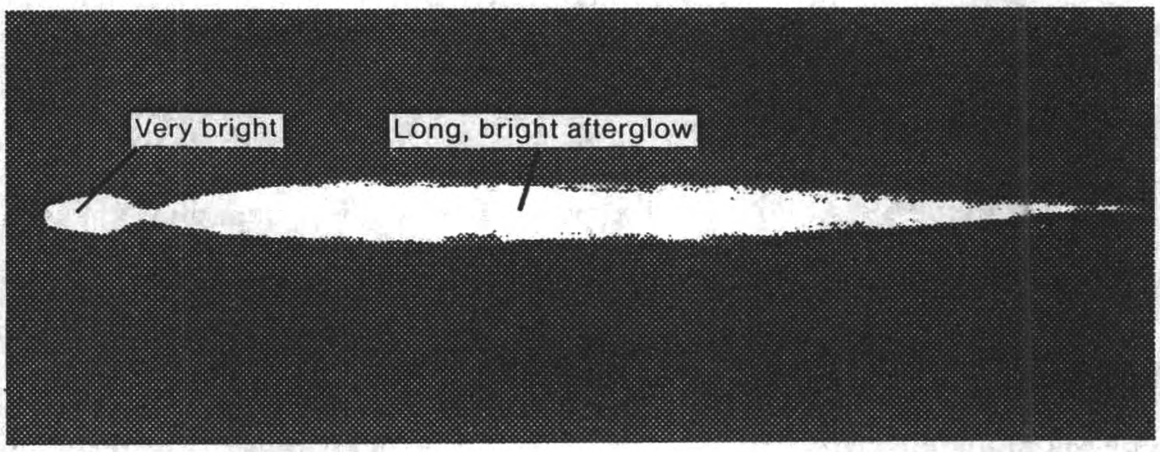
Note 2. Many observers aboard ships in both the Northern and Southern Hemispheres were fortunate enough to see this display, a further account of which appears on page 40 of this edition.

SATELLITE RE-ENTRY

Red Sea

m.v. *Cardigan Bay*. Captain P.J. Clark. Singapore to Suez. Observers: the Master and Mr K.W.S. Macmillan, 1st Officer.

7 January 1989. At 1600 GMT a very bright object was sighted in the sky, see sketch. It had a strong, long tail and bore 290° from the ship at an altitude of about 8°. Moving south at a rapid pace, it disappeared behind cloud (cumulus at



2500 feet) bearing 210° from the ship, having maintained its apparent altitude throughout, and taking approximately 12 seconds to travel the observed distance. A short section of trail, about 4°, remained visible as a thin, white cloud similar to a contrail.

It was much faster than any aircraft, even military, and the fact that it maintained its apparent altitude would seem to rule out a meteorite.
Position of ship: 21° 45′N, 37° 55′E.

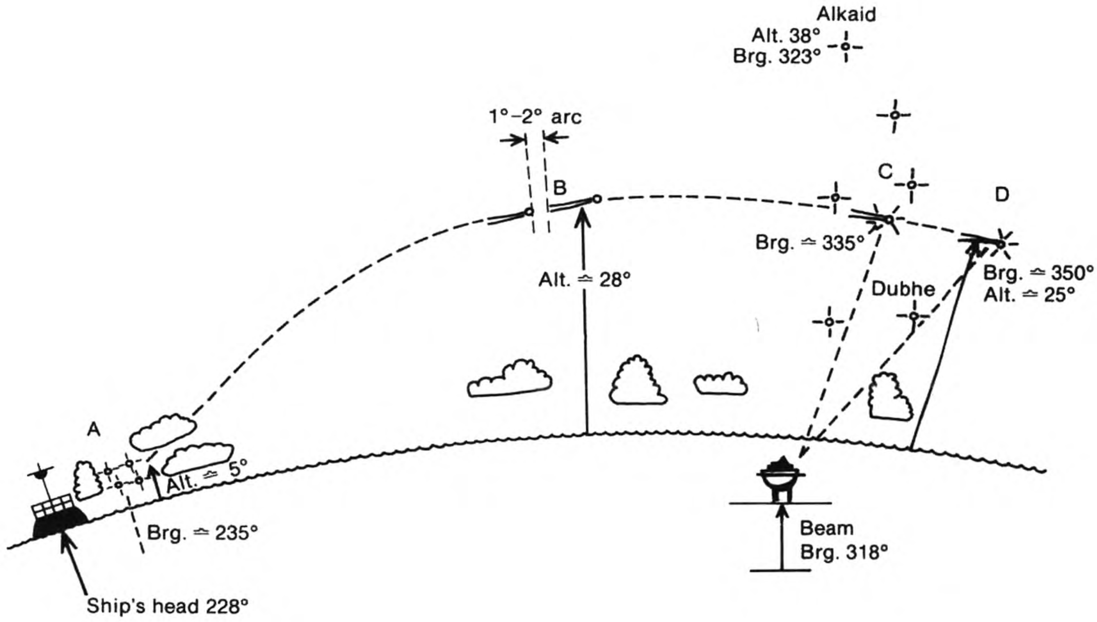
UNIDENTIFIED LIGHTS

North Pacific Ocean

m.v. *Nosira Lin.* Captain I. Woodier. Coos Bay to Brisbane. Observers: Mr P.M. Bailey, Chief Officer and Mr A. Calaguas, AB.

13 March 1989. At about 1632 GMT a group of at least six very bright lights of a basically orange/white colour was seen, bearing 235°. The lights dimmed momentarily, then reappeared equally as bright but in different positions. Then, the tail of an object was seen heading away from the group. On first glance, the initial assumption was that the phenomenon was flares or a group of aircraft lights or something else. See point A on the sketch.

Following this, two very bright objects were seen heading across the sky, close together. Each had a distinct, solid head followed by a very white tail, and the two bodies were separated by about 1° of arc. See point B. When the second object reached a bearing of 335° (point C), there was a sudden, very bright green/blue flash from its head and the whole thing disappeared, its tail also fading quickly.



At a bearing of 350° (point D), a similar ending befell the leading object, which, through binoculars, appeared to disintegrate with small pieces falling away after the flash. No real check on the duration of flight was made, but it was thought to be in the region of 15–20 seconds.

Weather conditions were: air temperature 24.5 °C, wet bulb 22.5, pressure 1016.4 mb, wind NE×E'ly, force 5. Cloud cover was 1–2 oktas small cumulus near the horizon.

Position of ship: 14° 23′N, 161° 01′W.

Note. Mr H. Miles, Director of the Artificial Satellite Section, British Astronomical Association, comments:

'There is every indication that the phenomena seen were connected with the decay of a satellite or associated material. The most likely object was Cosmos 1813's engine, and the lights seen were the final part of the trajectory before the burn-up was complete.'

SEARCH AND RESCUE

Bay of Biscay

m.v. *Tolaga Bay*. Commodore R.P. Royan. Southampton to Port Said. Observers: the Master, Mr D.J. Baily, Chief Officer, Mr M.P. Murrison, 2nd Officer, Mr S.N. Horne, 2nd Officer, Mrs E. Mackenzie, Radio Officer and Mr A. Montgomery, Cadet.

25–26 February 1989. At 0530 GMT the wind veered from SE'ly, force 6 and increased to WNW'ly, force 8 while the pressure started to rise steadily from 957 mb, having previously been falling steadily for the past six hours. The visibility deteriorated to less than 3 n.mile as frequent, heavy rain showers passed over the vessel. The wind remained NW'ly throughout the day, increasing to force 10 by 1800; at this time, the vessel was rolling and pitching heavily to very high 10 m seas and shipping water over all.

At 1952 the vessel received a distress message from m.v. *Anna Leonhardt* which was reported to be abandoning ship having taken water in No. 2 hold with a severe list.

The *Tolaga Bay* arrived at the distress position at 2112 and commenced a search of the area, the wind having increased to force 12, with phenomenal seas of 12–14 m. The life-boats and debris were sighted at 2126 and the vessel manoeuvred to enable the recovery of any survivors. During this operation two crew members of the *Tolaga Bay* were washed overboard from the shell doors, but were fortunately wearing safety harnesses and were safely recovered.

At 2350, having been joined in the search by a French Maritime Patrol aircraft, the search was postponed until daylight owing to the particularly high winds and seas which had severely hampered the rescue operation. The winds and seas gradually moderated throughout the 26th but no survivors were recovered. The search was eventually called off and the *Tolaga Bay* resumed her passage.

Position of ship at 2112 GMT: 45° 22′N, 08° 11′W.

551.578.4:551.574.42:551.555.6:551.553.11(261.26+420):629.12

Land-breezes, snowfalls, and cold air convergence near coastlines in southern Britain, 11–13 January 1987

By W.S. Pike
(Royal Meteorological Society)

Heavy, localised snowfalls occurred along pronounced lines which formed near some coasts during an exceptionally cold, easterly outbreak of polar continental air throughout the period of 11–13 January 1987. This article discusses land-breezes and aspects of (a) differential surface friction over land and sea, and (b) strong surface temperature gradients at coastlines, with reference to satellite and radar data.

In one such snowfall, light to moderate ice accretion due to 'pack snow' and freezing spray began on m.v. *Shell Explorer* where sea-surface temperatures were near +10 °C off south-west Cornwall, and persisted for some 24 hours in the English Channel whilst the vessel was on passage to Jersey (Kain[11]).

The easterly outbreak of 11–13 January 1987 brought an exceptionally cold, polar continental air mass westwards over Scandinavian, near-continental, and southern British waters. The 'forecaster's measure' of 1000–500 mb thickness height fell to 497 decametres (dam) at Hemsby, Norfolk, at 1200 GMT on the 12th (only having been equalled there once, 31 years previously, on February 1, 1956) and to 502 dam at Camborne, Cornwall, by 0000 on the 13th (a record low value in 50 years of upper-air radiosonde measurements in south-west Britain), demonstrating how this particular pool of coldest air had moved westwards, albeit warming slightly with time, over southern England and Wales, bringing unusually severe conditions.

As it moved out over the relatively warm waters of the North Sea and English Channel, the very cold air mass became extremely unstable and scattered shower clouds soon formed. Heavier snow showers tended to develop along boundary lines between clear air over land and showery air over the sea, and lines of dwarf cumulonimbus with relatively low bases and tops were clear evidence of convergence between low-level airflows from over land and over the sea.

Figure 1 shows surface synoptic charts for 12–13 January 1987, with heavy dashes representing several of these 'convergence lines' which were developing westwards, and whose positioning can be approximated to within a few nautical miles by careful study of Figure 2, which shows various temperatures as 'false colour' computer interpretations. These are based on satellite pictures from the geostationary METEOSAT's infra-red (IR) radiometer, with each picture made up of small, square pixels representing 10 km × 10 km of average temperature, whether from cloud top, sea surface or land.

A persistent and notable feature of Figure 1 is the marked offshore 'troughing' of the isobars over the relatively warm southern North Sea and the English Channel. This quasi-stationary development may be regarded as a winter-time marine effect similar to the summer thermal depression ('heat low') which forms inland, often over the warmest ground. With regard to differential surface friction, this offshore trough had the important effect of backing the pressure gradient over the coast, where the onshore wind could make a more shallow angle of incidence with the coastline than would otherwise have been the case.

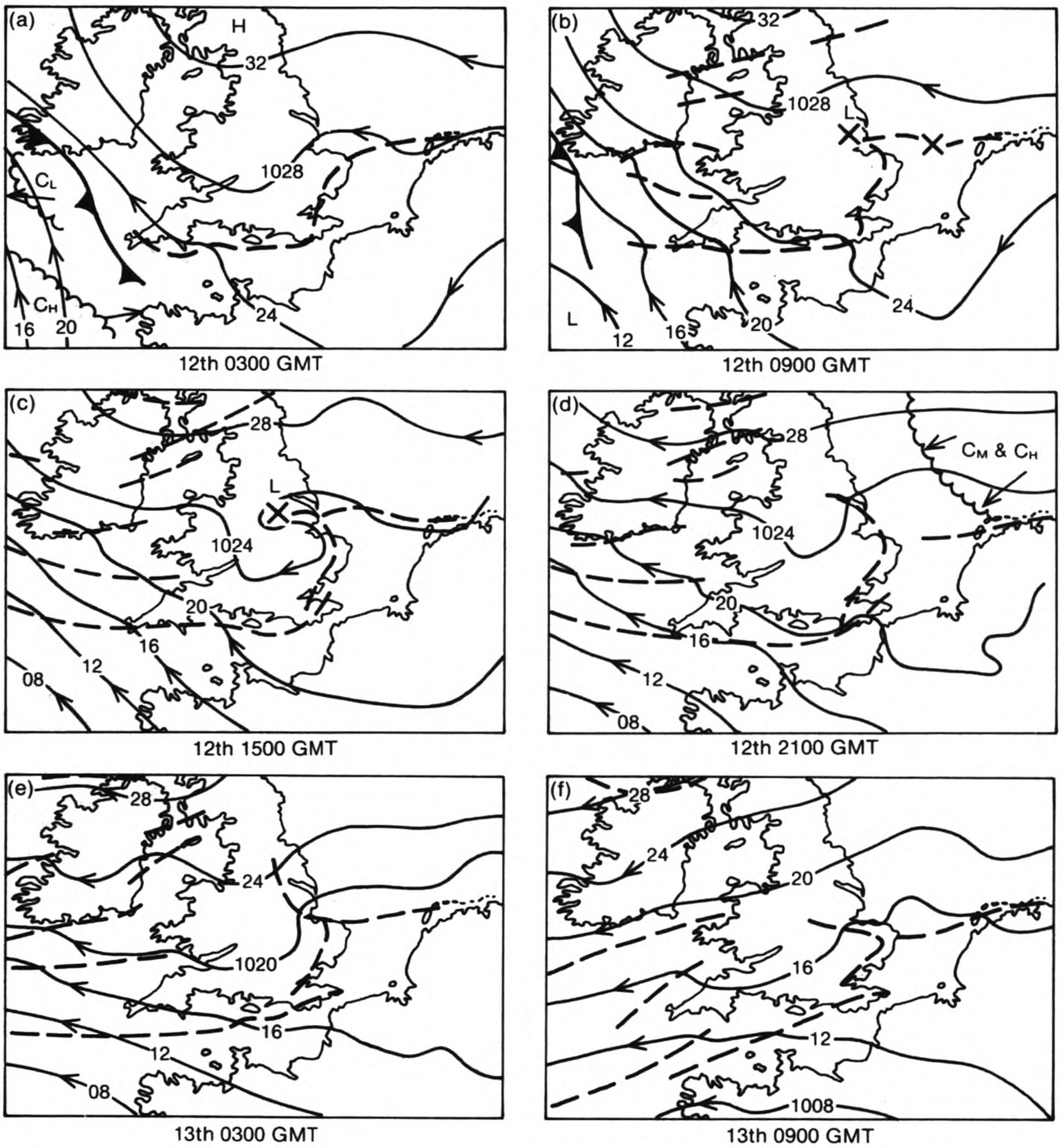


Figure 1. Surface synoptic charts at 6-hourly intervals from 03 GMT on 12 January 1987 to 0900 GMT on 13 January 1987. Isobars drawn at 4 mb intervals.

Coastal zones are particularly subject to frictional convergence of low-level airflows due to the roughness difference between land and water surfaces. Without thermodynamic effects, frictional convergence in itself leads to upward air motion, and is found to have a maximum when strong onshore wind makes a shallow angle (between 15° and 35° clockwise) with the coastline (Roeloffzen *et al*[2]). With a strengthening east-south-easterly pressure gradient (Figure 1(a) and (b)), much of the heavy overnight snow experienced by m.v. *Shell Explorer* and land stations in south-west Cornwall was partly maintained in a limited belt by frictional convergence of airflows at the south coast.

During the 12th, there was a sharp dividing line to snowfall accumulating in Cornwall; none occurred north of a line from St Austell to Perranporth, whereas

Penzance measured 39 cm, Culdrose and Falmouth 30 cm, and Gwennap Head 15 cm of snow lying. Figure 3 shows 2-km radar precipitation data from Camborne during the daylight hours of 12 January 1987, speckled areas indicate light snow occurring, with black areas representing moderate to heavy snowfall.

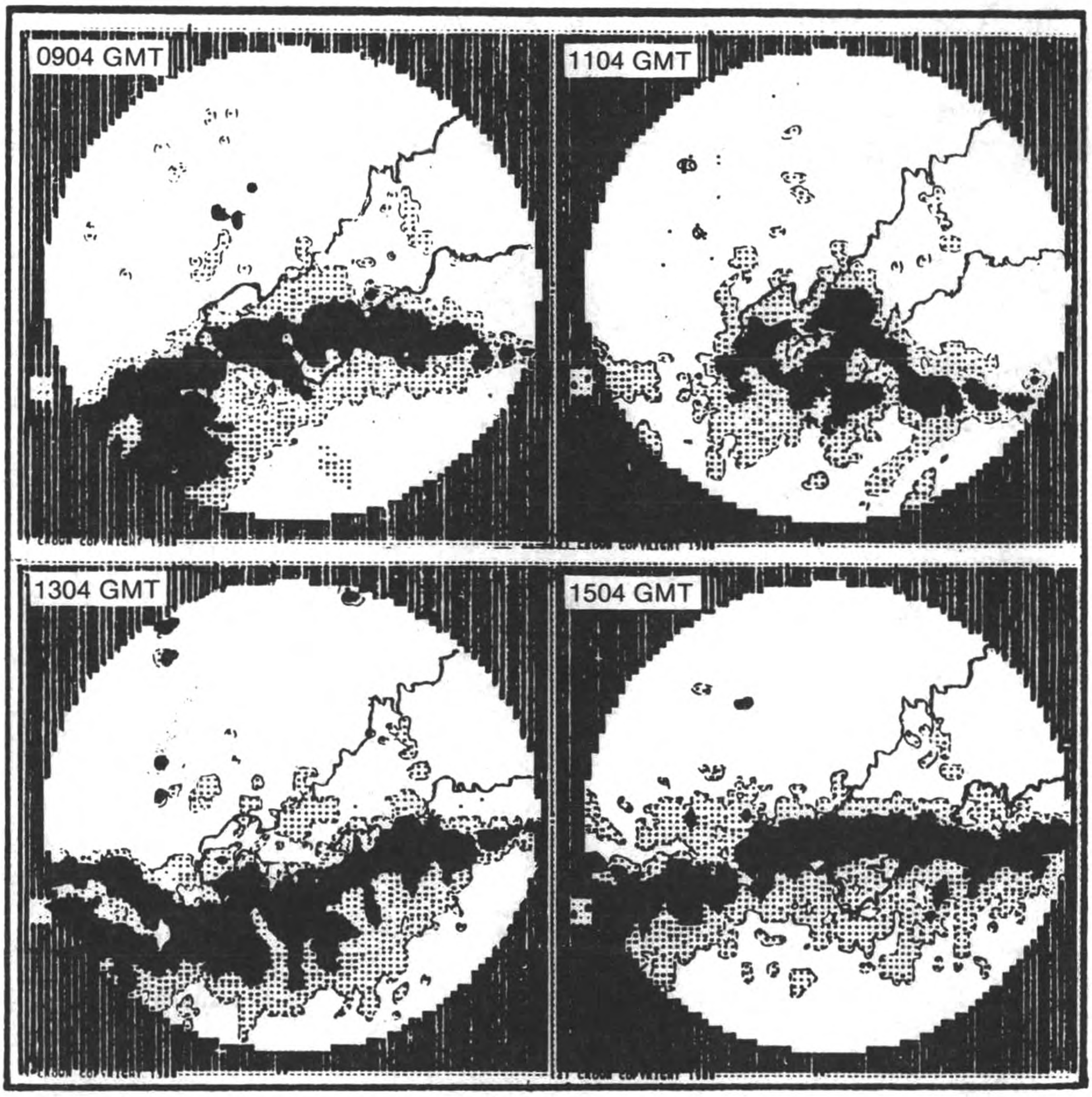
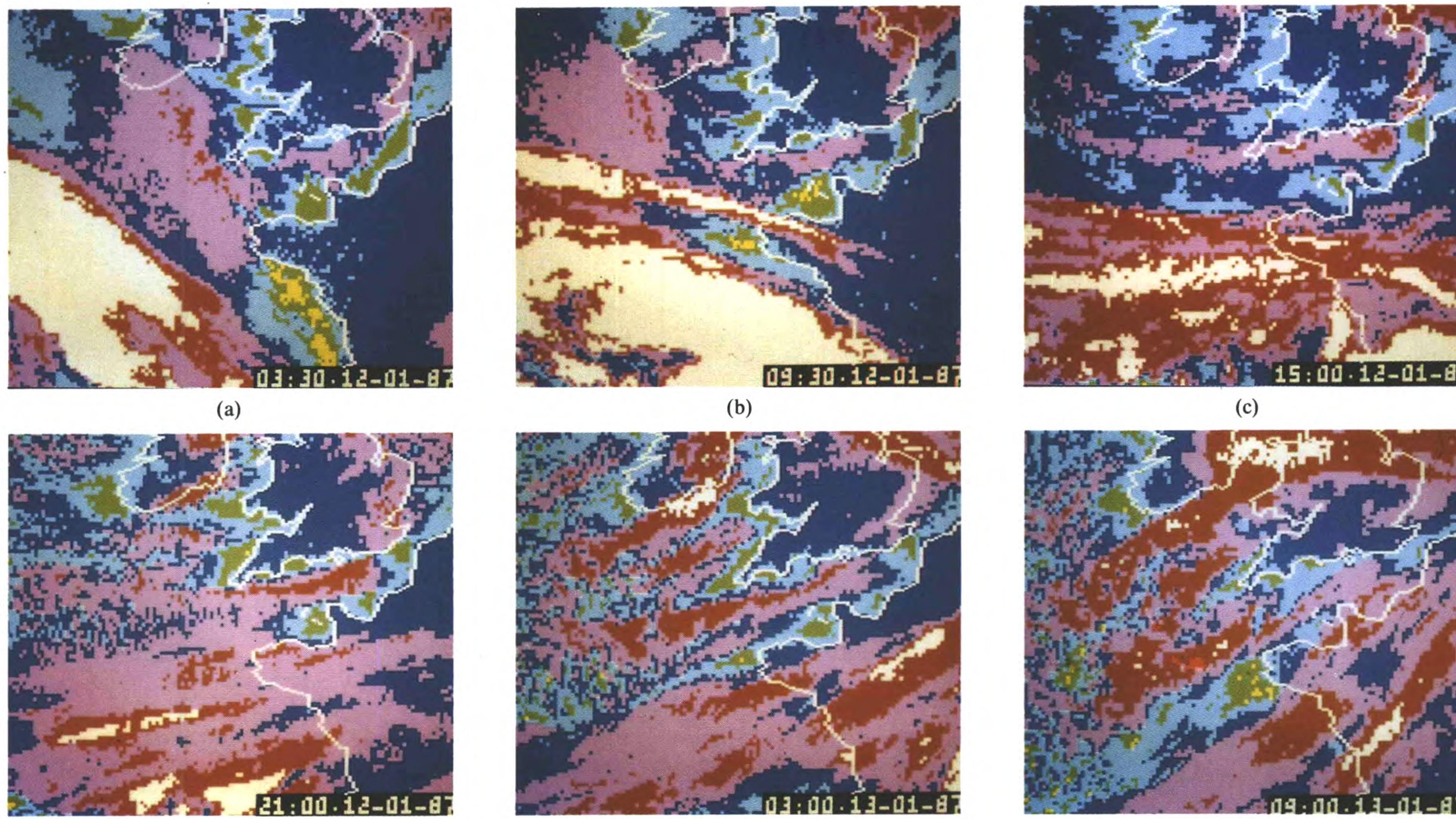


Figure 3. Camborne 2 km radar precipitation data at 2-hour intervals during daylight hours of 12 January 1987. Key: Speckles = light snowfall, <0.5 mm hr^{-1} rainfall equivalent; black = moderate to heavy snow, rate >0.5 mm hr^{-1}. South-west Cornish coastline is outlined.

The snow belt tends to break up during daylight, and individual cells of heavier snow move at approximately 12–16 knots westwards along the belt which itself moves very little to the north or south. The sharp northern edge of the snow belt, both early and late in the day, indicates that thermodynamic land-breeze involvement is helping to maintain its position and activity. Figure 2(c) reveals that cloud associated with this English Channel coastal convergence line extended some 250 n.mile from east to west by 1500 on the 12th.

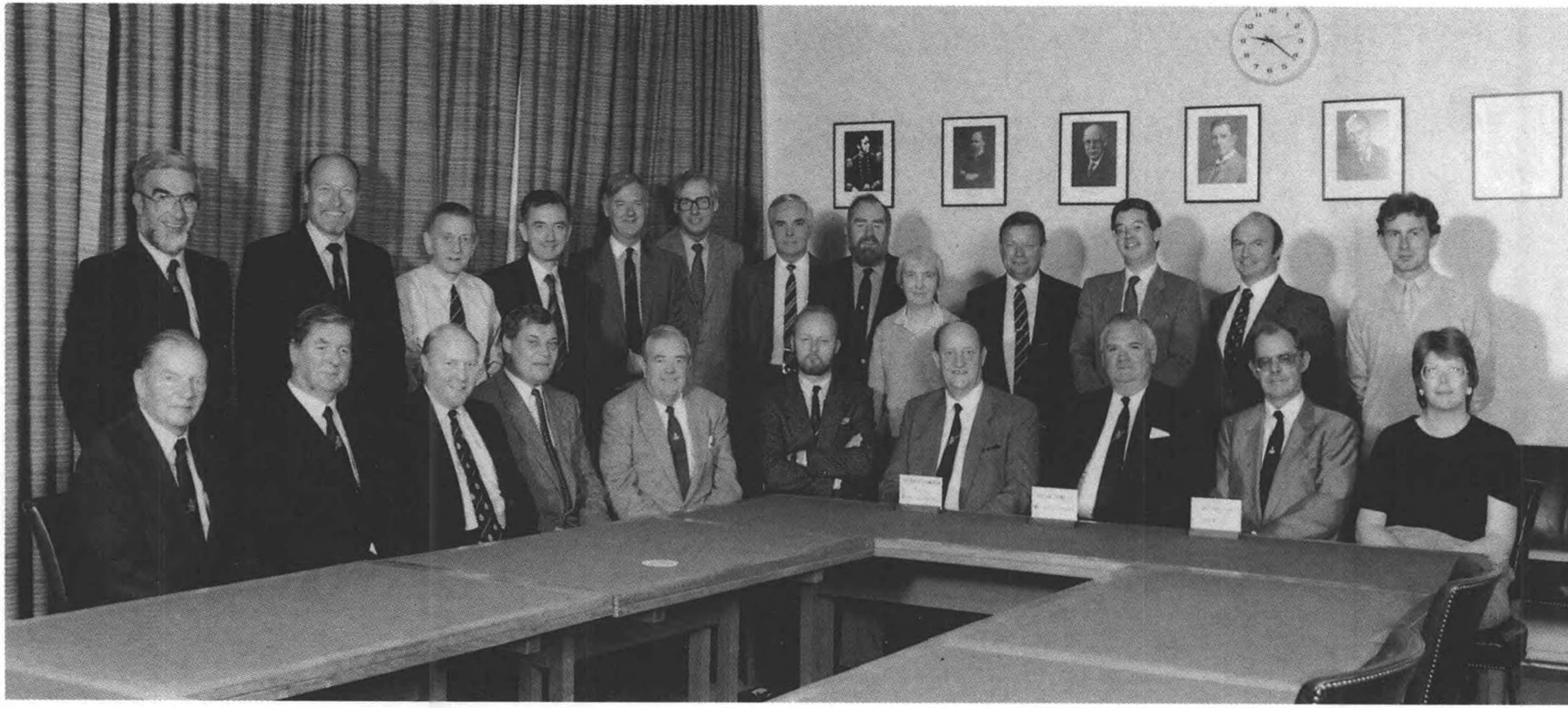


(a) (b) (c)

(d) (e) (f)

Figure 2. METEOSAT infra-red satellite pictures at approximately 6-hourly intervals comparable with Figure 1. False-colour key: white = below −40 °C; red = −40 °C to −30 °C; pink = −30 °C to −20 °C; blue = −20 °C to −10 °C, cyan = −10 °C to −0 °C; green = +0 °C to +10 °C; yellow = above +10 °C.

Opposite page 28



Port Met. Officers Conference, 19 September 1989
Seated, left to right: Captain M.L.McN. Coombs, Headquarters; Captain C.A.S. Borthwick, METROUTE; Captain S.M. Norwell, Scotland and Northern Ireland; Captain G. Hindmarch, E England; Captain A. Britain, NW England and Ocean Weather Ship Officer; Dr E. De Dycker, Brussels; Captain R.C. Cameron, Deputy Marine Superintendent; Captain G.V. Mackie, Marine Superintendent; Mr F. Singleton, Deputy Director, Observational Services; Miss J. Mitchell, Publications (Secretary). Standing: Mr P. Schnitker, Rotterdam; Mr J. Guehne, Hamburg; Captain J.F.T. Houghton, Headquarters; Captain D.J. Hewitt, METROUTE; Captain J.A. Williamson, METROUTE; Captain D.H. Rutherford, NE England; Captain D.R. McWhan, SW England; Captain A.F. Ashton, Bristol Channel; Miss J.G. Caudrelier, Scientific Officer, Instruments; Captain C.R. Downes, SE England; Mr J.S. Hopkins, Head of Marine Advisory Services; Captain A.P. Maytham, METROUTE; Mr J.P. Starkey, Marine Advisory Services (Secretary). (See page 38).

Land-breezes were for many years merely associated with radiation cooling on summer nights over land. Grecian mariners would use them nocturnally as part of a well-known diurnal cycle where the sea-breeze which blew inland by day was replaced by an offshore land-breeze at night, Neumann[3]. American radar studies over the past two decades have revealed the hitherto unsuspected strength of winter-time land-breezes which, unaided, sometimes pushed 15–20 n.mile out to sea, headed by a 'land-breeze cold front' and 'shoreline-parallel snow band' on a sub-synoptic, 'mesoscale'. Recent case-studies particularly involve Lake Michigan in cold outbreaks of Arctic air (Passarelli and Braham[4], Schoenberger[5]).

The two basic conditions for maximum land-breeze involvement are (a) moderate onshore winds with stagnating, cold air acting as a 'quasi-orographic' hill over land where (b) clear skies are necessary to maintain maximum radiation and, therefore, coldest surface temperatures. These conditions were met throughout a 66-hour period in southern East Anglia over 11–13 January where cloud and precipitation were largely held up along the east Suffolk to Essex coastline (Figure 2 (a) to (f)). During that period, 60 cm of snow fell in the Gillingham / Sittingbourne area of north-west coastal Kent owing to land-breeze induced oscillations of this East Anglian convergence line. Three such oscillations (out to sea and back inland again) were indicated by surface wind changes at Walton-on-the-Naze Coastguard Station over 11–12 January, each movement accompanied by snowfall. Places 40 km to the north-west and south-east of the snowbelt (i.e., Stansted and Manston aerodromes) reported only 3 cm lying snow at 0900 on the 13th. Meanwhile, there was turmoil around the Thames Estuary, where the Isle of Sheppey had become cut off and supplies had to be brought in by sea, helicopter, or by the Army on skis.

Heavy snow accumulating at the rate of 5 cm hr^{-1} affected north-west coastal Kent during the evening of the 11th, and with this air travelling south-westwards, it is quite conceivable that Captain Kain and the *Shell Explorer* encountered similar heavy snowfalls while rounding south-west Cornwall some 10 hours later when the dry-bulb temperature (by extrapolation from the ship's observations in Figure 4) was just falling below −1 °C. Sea-water spray in the area normally has a salinity of 35–36 $^{\circ}/_{oo}$[6], and would typically begin to freeze at an air temperature of −1.9°; however, the heavy snowfall, in melting, would provide pure water to reduce this salinity and thus would raise the temperature at which a

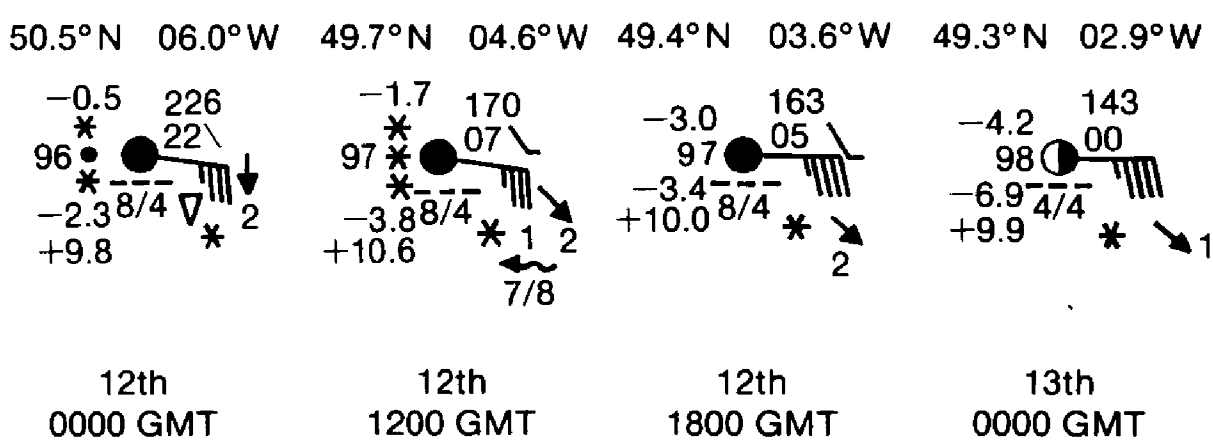


Figure 4. Station plots for m.v. *Shell Explorer* in additions to observations already made[10] over 12-13 January 1987. Remarks at 1200 GMT on the 12th: 'Spray turning to ice on contact with steel and glass', to which was added at 0000 GMT on the 13th: 'Unheated wheel-house windows, 0.5. cm of ice'.

mixture of snowflakes and sea spray will freeze, especially on the cold superstructure of a vessel of 1,586 tons gross, raised some distance from the sea surface, and beating into a gale of force 8.

When the Master noted snowfall freezing to the unheated wheel-house windows of the *Shell Explorer* at 0700 on the 12th, radar reports from Camborne indicated that the vessel had just passed through the heaviest snow associated with the coastal convergence line. Because repeated washing by flying spray was failing to clear the adhering snowflakes, these were already imprisoned by a thin layer of ice, and the phenomenon of 'pack snow' may be identified as having commenced.

This type of icing has been more usually associated with the dangerous fishing waters off north-west Iceland (personal communication with Mr D.J. George, Trawler Support Meteorologist in the 1970s) in the slight to moderate snowfalls which occur in north-easterly gales giving blizzard conditions there. It is elsewhere defined by the *Handbook of Aviation Meteorology*(7) that 'in clouds of liquid droplets where temperatures are below 0 °C, ice crystals may be present. These tend to stick if they strike (wet surfaces) and become frozen along with the cloud drops (spray) to give formation of rough, cloudy ice. If snowflakes are present they are similarly imprisoned within the ice as it forms, producing an opaque deposit with the appearance of tightly packed snow which is called pack snow.'

This produced the 7 cm of granular ice which, together with 'quantities' of smooth (spray) ice, were encountered on the fo'c'sle head and catwalk on arrival at Jersey. Had this occurred on a smaller vessel, ice accretion at the rate of 7–14 cm in a 24-hour period would have been defined as 'severe' by Dr Mertens(8). However, a more recent study by Overland *et al*(9) suggests new definitions of *hourly* icing rates as 'light', 'moderate' or 'heavy', with 'moderate icing' being defined as accretion rates of between 0.7 cm and 2 cm per hour. If this is applied to the *Shell Explorer*, the pack snow accretion may be described as 'light to moderate' and the later, spray icing as only 'slight'. Nevertheless, the incidence of icing occurring with the sea temperature near or above 10° (as happened off south Cornwall on the 12th) is very rarely reported, and the author would like to hear if any other vessels experienced similar conditions, especially in the various channels or coastal waters around southern England during this exceptionally cold outbreak.

Figures 1 and 2 show the convergence zones, and therefore, indicate where trouble from pack snow icing was likely to have been encountered. The first convergence line appeared to form westwards from Terschelling soon after 1800 on the 10th, and propagated heavy showers of snow across the southern North Sea. This activity was at first deflected southwards along the East Anglian coast, which meant much snow in the Thames Estuary early and particularly later (after 1400) on the 11th, when convergence line activity had extended into the English Channel also. These conditions were persisting at 0300 on the 12th, and another line of heavy snow showers, formed by convergence off southern Norway, had reached Northumberland. The red speckles in Figure 2(a), appearing over the Thames Estuary, indicate that cloud tops (isolated cells) had reached 12,000 feet (corresponding with −30° on the Hemsby radiosonde ascent) where, before 0200, tops had been lower since the very cold air had been shallower. Figure 2(a) to (c) also shows an upper cloud 'shield' moving eastwards into France and later, beginning to break up as the surface pressure gradient continued to back.

Brugge[10] has already remarked on the cold daytime temperatures experienced on the 12th in southern England and South Wales. A temperature of −9° at Southend was a typical extreme maximum, and the sea (albeit shallow) froze there where a persistent land-breeze was draining cold air from over East Anglia. By 1500 on the 12th, a small depression had formed on the westward extremity of the Wadden Islands convergence line, and this depression (by then over Lincolnshire and Humberside) helped push the land-breeze cold front, with a temperature discontinuity of 2° across it, some 25 n.mile north-east of the Wash, the front having cleared the Inner Dowsing Lighthouse by 1500, but never quite reaching the *Dowsing* light vessel.

A backing gradient and the arrival of deeper cold air, combined to produce more definite convergence lines in the Irish Sea, especially when land-breezes were added to the general synoptic-scale airflow. In addition to the coastal convergence associated with southern Eire, the Isle of Man, and the Mull of Kintyre, a line of cloud and showers formed in the Bristol Channel well away from land, and this appears due to convergence of the NE'ly land-breeze over south Wales with the over-sea-surface, low-level ESE'ly prevailing wind. Land-breeze convergence induced a similar line to form downwind of Galway Bay by 2100 on the 12th when slight backing of the synoptic gradient caused the English Channel snow belt to move out to sea away from Cornwall. This process of a backing gradient continued as a depression moved eastwards over France, and the effect on the orientation of the various convergence lines can be seen in Figure 2(d) to (f). Upper cloud has spread from the east to overwhelm land-breeze effects north of the Wash as the north-easterly gradient has strengthened. Increasing winds whipped coastal snowfalls into huge drifts and made level depth measurements impossible, but 56 cm was recorded on West Terschelling, and 65 cm near Sittingbourne, as maxima on the 13th.

As soon as coastal land becomes snow-covered and skies clear inland, it may be suspected with reason that land-breezes are being added to the general synoptic airflow, especially near coastlines exposed at a shallow (15–35° clockwise) angle to onshore winds. Snow-covered ground beneath clear skies produces the coldest surface temperatures and therefore, a maximum thermal gradient with the warmer sea surface. In this situation, convergence lines may soon develop into coastal fronts if the conditions persist for long enough, due also to frictional and stability differences between airflows over sea and over land.

Acknowledgements

Particular gratitude to Geoffrey Monk, Meteorological Office, Bracknell, who kindly supplied satellite and radar data. Also to John George, now retired, formerly ship's meteorologist on board m.v. *Othello* and m.v. *Miranda* during the 1972–73 winter trawler support operations off north-west Iceland, and who offered helpful advice. Synoptic charts in Figure 1 have been based on the Bracknell Central Forecasting Office analyses of British Isles hourly charts, held in the National Meteorological Archives, Bracknell, where thanks are due to Mick Wood and June Broad who supplied the *Shell Explorer*'s meteorological logbook for Figure 4. Also in appreciation of Dr Wim Van den Berg for personal correspondence.

REFERENCES

1. Kain, Capt. D.G. (1988) Ice Accretion. *The Marine Observer*, **58**, 299, p. 13 and cover photograph.
2. Roeloffzen, J.C., Van den Berg, W.D., and Oerlemans, J. (1986) Frictional convergence at coastlines. *Tellus*, **38A**, pp. 397–411.
3. Neumann, J. (1973) The sea and land breezes in classical Greek literature. *Bull. Amer. Met. Soc.*, **54**, pp. 5–8.
4. Passarelli Jr., R.E., Braham Jr., R.R. (1981) The role of the winter land breeze in the formation of Great Lake snow storms. *Bull. Amer. Met. Soc.*, **62**, pp. 482–491.
5. Schoenberger, L.M. (1984) Doppler Radar Observation of a Land Breeze Cold Front. *Monthly Weather Review*, **112**, pp. 2455–2464.
6. Times Books, London (1983) *Atlas of The Oceans*, p. 66.
7. HMSO London (1971) for Meteorological Office, *Handbook of Aviation Meteorology*, p. 115.
8. Mertens, H.O. (1968) Icing on fishing vessels due to spray. *The Marine Observer*, **38**, 221, pp. 128–130.
9. Overland, J.E., Pease, C.H., Preisendorfer, R.W., and Comiskey, A.L. (1986) Prediction of Vessel Icing. *J. of Climate and Applied Met.*, **25**, pp. 1793–1806.
10. Brugge, R. (1987) Low daytime temperatures over England and Wales on 12 January 1987. *Weather*, **42**, pp. 146–152.

Future satellite missions+

By F.W. Taylor* and J.R. Eyre**

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Earth satellites have become well established as a means of gathering meteorological data, whether for routine surveillance of the atmosphere as an aid to forecasters, or as a research tool for tackling basic problems in the understanding of weather and climate. In the 1990s, a large number of innovative instruments will be launched on new generations of larger and more sophisticated satellites, including deep-space probes to some of the other planets of our solar system. This article examines the improvements we may expect to see in the methods and technology of remote sensing from satellites between now and the end of the century, and what it will mean for our understanding of atmospheres in general, and our own in particular.

Weather satellites

Observation of the weather was one of the earliest uses for Earth-orbiting satellites, nearly 30 years ago. The experimental satellite TIROS-1 was launched in 1969 carrying cameras for imaging cloud systems, and it was the start of a rapid chain of development. The first truly operational satellite was ESSA-1 in 1966. In 1970, NOAA-1 contained further improvements including infra-red imaging instruments which made night-time coverage possible, and in 1972 NOAA-2 carried an infra-red radiometer for operational sounding of the vertical temperature structure of the atmosphere.

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[Figure 2 and Figure 3 of this article appear opposite page 13.]

Further improvements and the addition of a microwave sounder were included in TIROS-N, launched in 1978 as the first of the operational series of TIROS-N/NOAA satellites which are still with us today. The current operational pair, NOAA-10 and NOAA-11, are the sixth and seventh of the series. Their principal instruments are the Advanced Very High Resolution Radiometer (AVHRR) and the TIROS Operational Vertical Sounder (TOVS). AVHRR is a visible and infra-red imager with a horizontal resolution of about 1 km, principally for imaging clouds and monitoring sea surface temperature but also providing data for a wide range of meteorological, climatological and environmental applications. TOVS is a group of three radiometers, infra-red and microwave, sensitive to the vertical temperature structure of the troposphere and stratosphere and also to the tropospheric water vapour profile. Global monitoring of these variables plays a major role in numerical weather prediction. These satellites also include radiometers for monitoring ozone and a data collection system (DCS) which relays meteorological data from platforms on the ground, usually in remote sites.

The first geostationary weather satellite was the USA's GOES-1 launched in 1975. This was followed in 1977 by Europe's METEOSAT and the Japanese GMS or 'Himawari'. Each of these satellites was the first of a series which has continued to the present. They carry visible and infra-red imaging radiometers and act as a co-ordinated international system, stationed around the equator and giving complete coverage to about 60 degrees latitude.

Progress in the last decade has included the start of the Indian geostationary series INSAT, the inclusion of a vertical sounding component (VAS) on the GOES series, and improvements in the USA's parallel series of polar-orbiting military weather satellites (DMPS), including an advanced multi-channel microwave imager (SSM/I).

The first important initiative of the 1990's will be the launch of the European satellite ERS-1 in 1990. This is principally an ocean applications satellite dominated by active microwave instruments, including a synthetic aperture radar and an altimeter. Of primary interest to meteorologists will be information from the microwave scatterometer and the Along-Track Scanning Radiometer (ATSR). The scatterometer will sense the roughening of the sea surface by wind stress, from which surface wind speed and direction can be inferred, for a number of applications including weather forecasting. This will be the first opportunity to study and apply such data since a similar research instrument flew on SEASAT in 1978. ATSR is an infra-red radiometer specifically designed to measure sea surface temperature. Although its daily coverage will be less than that of an AVHRR (because of a narrower side-scan), its accuracy should be higher — a particular concern when monitoring sea surface temperature for applications in climate research.

The first major change in the polar series will arise with NOAA-K, scheduled for launch in 1993, when the combination of vertical sounding instruments will be upgraded. The Advanced Microwave Sounding Unit (AMSU) will be introduced, to measure radiation at 20 frequencies between 20 and 190 GHz with considerably improved horizontal resolution compared with its predecessor (MSU). In combination with the existing infra-red sounder (HIRS), it will improve the monitoring of atmospheric temperature and humidity profiles, particularly in cloudy areas. In the late 1990s further changes are planned: the AVHRR imager and the HIRS sounder will be replaced by the Advanced

Medium Resolution Imaging Radiometer (AMRIR). This will take over the visible/infra-red imaging role of AVHRR, providing somewhat improved horizontal resolution, despite its name. It will also make infra-red soundings at key wavelengths and at much higher horizontal resolution than previously available for sounding.

Some of the polar platforms (see below) will carry full complements of instruments for operational weather monitoring. This will probably include (initially) AMRIR, AMSU and DCS, and possibly other instruments such as a scatterometer, a microwave imager and an ozone sounder. In this way the capabilities of the current NOAA series will be continued and enhanced.

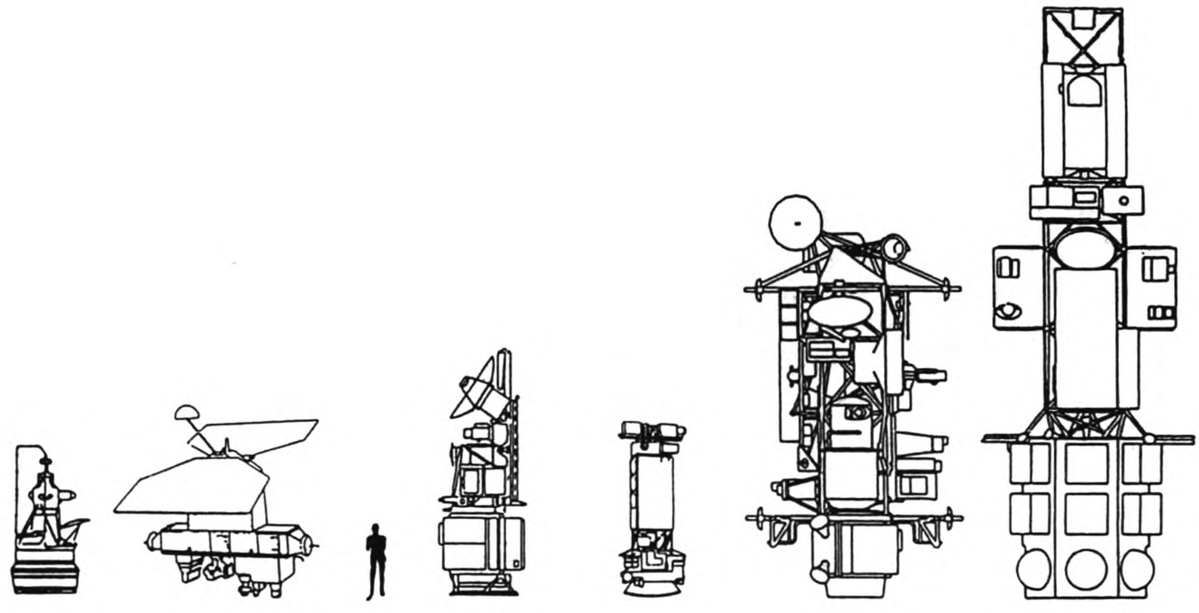
Changes are also awaited in geostationary monitoring. In the early 1990s the GOES system will be enhanced in terms of both its imaging and sounding capabilities. Plans for the second generation of METEOSAT are not imminent. From about 1997, a new satellite series will begin, carrying a greatly enhanced visible/infra-red imaging radiometer measuring at about 10 different wavelengths and with improved resolution in both space and time. The inclusion of infra-red and microwave sounding capabilities is also being considered.

All these advances in satellite technology will be accompanied by increases in the volume and complexity of the data. We have yet to come to terms with the information from existing systems, and so it is clear that one of the greatest challenges in the 1990s will be in the processing, interpretation and application of the great wealth of data which these systems will provide.

Research satellites

The atmospheric research community was served for nearly twenty years by a string of NIMBUS satellites, the last, NIMBUS-7, being launched in October 1978. A long gap followed, to be filled at last by the large and sophisticated Upper Atmosphere Research Satellite (UARS) in 1990 or 1991. After a hopefully somewhat shorter gap of about five years, UARS itself will be supplanted by the various polar platforms to be provided by the USA, Europe and Japan. These will be large polar satellites (up to three tonnes payload) to carry remote sensing instruments catering for the observational needs of a wide range of disciplines. Those dedicated to Earth observations are given the generic name Earth Observing System (EOS) in the USA. The first is expected to be launched around 1996; the selection for the scientific payloads of the first two has just been announced at the time of writing, which gives us a good idea of its expected very advanced capability.

The difference in size between NIMBUS-7 and UARS is striking (Figure 1); EOS, although not designed in detail yet, is expected to be even larger. With the increase in size comes a great growth in complexity and sophistication. UARS is a 10 m long, 7 tonne spacecraft, with a scientific payload of 2.5 tonnes, made up of ten large sensors (Figure 2). These include advanced developments of instruments which have flown before, such as the Improved Stratospheric and Mesospheric Sounder (ISAMS), which uses pressure modulators and specially developed closed-cycle coolers to measure temperature, nitrogen oxides, water vapour and associated species like methane and carbon monoxide with more accuracy, more detail and wider global coverage than ever before. Others break entirely new ground, such as the Microwave Limb Sounder, which uses a very large antenna to obtain the narrow beam required to resolve the Earth's atmosphere in thin layers at the limb. The Cryogenic Etalon Limb Spectrometer



NIMBUS-7	ERBS	LANDSAT	ATN	UARS	Eos-CONCEPT
1,021 KG	2,225 KG	1,727 KG	1,909 KG	6,736 KG	12,210 KG
1.6 M DIAMETER	1.6 M DIAMETER	2.2 M DIAMETER	1.9 M DIAMETER	4.3 M DIAMETER	4.3 M DIAMETER
3.6 M HIGH	3.8 M HIGH	5.6 M HIGH	4.2 M HIGH	9.8 M HIGH	12 M HIGH
303 KG PAYLOAD	100 KG PAYLOAD	318 KG PAYLOAD	361 KG PAYLOAD	2,283 KG PAYLOAD	3,500 KG PAYLOAD
(1978)	(1984)	(1984)	(1992–1995)	(EARLY 1990S)	(1995–2000)

Figure 1. This diagram compares the size and mass of some recent and some forthcoming Earth satellites. Note particularly the contrast between NIMBUS-7, the last of the old generation of atmospheric research satellites, and UARS, the first of the new.

uses a huge tank of cryogen to cool a complete infra-red spectrometer, which measures freons and other gases. The Halogen Occultation Experiment measures profiles of chlorine and fluorine containing species like HCl and HF. HRDI and WINDII are acronyms for instruments which use very high resolution spectroscopy to measure winds by their effects on the Doppler shifting of spectral lines. Other experiments monitor the activity of the Sun and its input into the atmosphere, including energetic particles as well as radiation. The whole system is supported by a particularly comprehensive, centralized data handling facility and teams of theoretical investigators in addition to those already associated with the provision of instruments.

EOS goes a giant step further forward. Conceived as the most complete assault imaginable on environmental problems, it carries a number of further advances on even the exotic UARS instruments. Its wind sensor, for example, uses novel electro-optical frequency shifters to obtain middle-atmosphere winds by a reliable and sensitive null method. Its temperature sensor uses very fast three-dimensional scanning of the atmosphere to reveal the detailed structure of wave and eddy phenomena which control the dynamics of the middle atmosphere. It has two cryogenic spectrometers, both high-resolution Michelson interferometers similar to high-quality laboratory instruments, but cooled to make them sensitive to the emission from trace gases in the troposphere and stratosphere. In this way, all latitudes can be observed, night or day.

The research programmes for the polar platforms cover a wide range of environmental sciences, but they include some advanced sensors which have the potential to become part of the following generation of operational weather-monitoring instruments and, even as research instruments, may provide useful inputs to operational systems. Of these, two of the most exciting for weather monitoring are the Laser Atmospheric Wind Sounder (LAWS) and the Atmospheric Infra-Red Sounder (AIRS). LAWS will monitor atmospheric wind profiles by measuring the Doppler shift of laser pulses back-scattered by the atmosphere. This will mark a considerable advance on current satellite techniques for monitoring tropospheric winds, which are restricted to the tracking of clouds using sequences of images from geostationary satellites. AIRS will mark a further development in monitoring vertical temperature structure. Compared with current instruments, it will achieve a considerable increase in vertical resolution by making measurements of much higher spectral resolution, and thus it will come closer to meeting the demanding requirements of numerical weather prediction systems for observations of this type.

Planetary missions

This year will see the launch of the first new US planetary missions for over a decade. By the time this issue of *Weather* is being read, *Magellan* should be well on its way to Venus, in October, *Galileo* blasts off for Jupiter (Figure 3). The Venus mission, alas, is to concentrate on radar mapping of the planet's surface, in a search for plate tectonics and other fundamental geological indications, ignoring for once the planet's fascinating atmosphere. *Galileo*, however, will plumb Jupiter's vast gaseous envelope with an entry probe and a full complement of instruments for remote sensing from orbit. Before becoming the first artificial satellite of the giant outer planet, *Galileo* will also visit Venus for a velocity-enhanced fly-by. Its instruments will partially make up for *Magellan*'s myopia with a comprehensive, if brief, survey of the atmosphere of Venus with instruments more advanced than any which have been there before. Of special interest is the Near Infra-red Mapping Spectrometer, which will map the deep cloud structure using the recently-discovered short-wave thermal emission from the lower atmosphere. At Jupiter, this instrument and its companion ultraviolet spectrometer, far-infra-red radiometer and television camera will map the complex and inhomogeneous cloud structure on Jupiter and attempt to unravel the dynamical mysteries epitomized by the vast coloured bands, and the Great Red Spot and other giant eddies.

The Soviet planetary programme is now concentrated on the exploration of Mars, with balloons deployed in the Martian atmosphere, rovers on the surface, and geological and atmospheric samples returned to Earth, all on the near-term agenda. The current mission to the moon Phobos will be followed in 1994 by Mars orbiters and balloons, with an unmanned landing in 1996 currently planned.

The USA has a mission to the Red Planet, *Mars Observer*, at an advanced stage of development for a 1992 launch. This is a polar orbiter, from which temperature, water vapour, dust and energy budget will be measured with high spatial resolution over a period of at least one Martian year. The US successors to *Mars Observer* include another scientific satellite, *Mars Aeronomy Observer*, and an ambitious *Mars Rover-Sample Return* programme. The latter is likely to lag the Soviet equivalent by many years on current planning, however. Scientific interest in this very Earth-like planet, plus political concern as to whose cosmonauts will be first to walk on the surface, has fuelled talk of a truly international programme of Mars exploration which may also involve Europe and Japan.

A look well into the future reveals Europe's first planetary mission. Named *Cassini* after the French/Italian astronomer who discovered the prominent gap in Saturn's rings, the entry probe is designed to land on Saturn's large moon Titan, which has an atmosphere thicker than the Earth's. After delivering the probe, the orbiter will continue to orbit Saturn for two years, and will carry a complement (not yet selected) of remote-sensing instruments, probably to include a radar to map Titan's surface through its dense cloud cover. Somewhat paradoxically, the currently preferred model for Titan's surface is a smooth ocean of liquid hydrocarbons, an exciting scenario if a somewhat dull radar target.

Conclusion

Satellites and space probes are quite obviously not only here to stay, but are getting larger and more sophisticated at a great rate. In little more than twenty years, satellites such as NIMBUS have gone from being technological miracles to museum pieces. The much larger systems which replace them, such as UARS, will become obsolete in their turn, even before the end of the next decade, replaced by the re-usable polar platforms and the manned space station. But *en route*, there is every reason to expect that they and their planetary equivalents will revolutionise the way we think about the atmosphere, improve forecasting, and hopefully point the way out of some of the serious environmental problems which may be looming.

Three new recruits from the United Kingdom oil and gas industry

By I. Hendry
(Offshore Weather Observing Practices Adviser, Aberdeen)

There are now 28 platforms and 16 oil rigs working in U.K. waters and sending routine weather reports to the Met. Office. The majority of observations received are made in the International Ships' Code.

The Marine Division would like to welcome into the Voluntary Observing Fleet three new members who were recruited during May 1989. They are the *Sonat Rather* (Sonat Offshore Ltd), the *Ocean Alliance* (Ben-Odeco Ltd), and the *North Sea Pioneer* (Hamilton Brothers Oil & Gas Ltd). See photographs opposite page 12.

At first glance, it might be fair to expect that the total number of installations would provide a dense network of observations adjacent to the U.K. every six hours, particularly when neighbouring countries like Norway, Denmark and The Netherlands also input reports from their own offshore oil and gas industry, but this is not necessarily the case.

Of the 16 rigs mentioned previously, it would be unusual to find all of them working simultaneously, although utilisation of drilling rigs has improved considerably recently. Quite often it is just not possible for some reports to be made and/or transmitted on time. The 0600 GMT report, for example, is often late because this coincides with probably the busiest period of a Radio Operator's day. The 0000 report is another which is often missed, not because of any failing on the part of the observer, but because only one individual may have been allocated the task on board the platform and it would be unreasonable for the Met. Office to expect him to provide us with 24-hour coverage.

Ballast Control Room Operators (CROs) on semi-submersible rigs, and Radio Operators (ROs) on production platforms are the two foremost occupations which have been burdened with weather recording duties. Fortunately, from the Met. Office point of view, the majority of personnel employed in these professions have a marine background; thus, weather observing, if it does not come naturally, at least does not present them with too many difficulties.

However, weather observing is not the exclusive domain of CROs or ROs, and it would be unfair not to mention other officers. On some platforms, for instance, up to three reports a day are compiled by the Logistics Supervisor. These gentlemen have many and varied responsibilities, and it is to their credit that they manage to find the time to carry out an additional task for the Met. Office.

All offshore workers travel to and from their place of work by helicopter. Some parts of the North Sea are quite heavily populated by platforms and this means that some of them have an Air Traffic Control responsibility for their area. The Controllers on these installations kindly provide us with detailed weather reports, particularly of cloud amount, type and heights, every two hours when flying is taking place.

To all our observers on the oil and gas platforms and rigs in U.K. waters, thank you for your continued co-operation, and to the CROs and ROs on the *Sonat Rather, Ocean Alliance* and *North Sea Pioneer*, welcome again to the U.K. VOF.

PRESENTATION OF BAROGRAPH

Captain M.J. Godbehear and his wife were invited to the Eastern Road offices the Marine Division of the Met. Office at Bracknell on 2 August 1989 for Captain Godbehear to receive his inscribed barograph. He had been unable to attend the general presentations made by the Director-General in May, but being on leave from the P. & O. Containers m.v *Tokyo Bay*, he was able to receive his long service award from Captain G.V. Mackie, Marine Superintendent (see photograph opposite page 12). After lunch, a tour of the National Meteorological Archives in Eastern Road was made, when the visitors were able to see some of the countless historical records held in the building, which is open members of the General Public as part of the Records Office.

Port Meteorological Officers' Conference

On 19 September 1989, the seventh Port Meteorological Officers' Conference was held at the Bracknell Headquarters of the Met. Office. As for the previous conference in 1987, representatives of the port meteorological services of Belgium, France, Germany and The Netherlands were invited to attend, with only France being unable to on this occasion, see photograph opposite page 29.

The discussions, chaired by Captain G.V. Mackie, Marine Superintendent, proved varied and fruitful, covering a range of topics from the quality control of data from the ongoing schemes of the Ocean Weather Systems Evaluation

— North Atlantic (OWSE-NA) and the Voluntary Special Observing Project (VSOP), to the reception of weather data on board ship and the transmission of MARID messages. (See Notices to Marine Observers on page 49 of this issue.)

Mr F. Singleton, Deputy Director, Observational Services, drew particular attention to the OWSE-NA project and stressed the continuing importance within it of ship observations. He reminded those present that this objective analysis of North Atlantic data would identify the best combination of observations from all types available, which will be the most beneficial to forecasters. Analysis of OWSE-NA data has shown that 85 per cent of data are of a similar quality to weathership observations. Of the remainder, there are likely to be some ships contributing small, but consistent errors in some element of their observations. These ships can be identified, so a Port Meteorological Officer can contact them as convenient, and advise on the problem area. Further automatic checks are made on the pressure element of observations from U.K. VOF ships against a background field of pressure data; again, spurious readings can easily be singled out for attention. It was clear from discussion and the presentations given by invited speakers on these particular aspects of marine data, that a ship's observations are of great value to the office, and that all the analytical attention paid to them is intended only to achieve a high level of consistency.

Several 'user problems' were addressed during the course of the conference; these included the quality of Bracknell's GFE facsimile transmissions and the difficulties some ships, especially those on U.K. coastal passages, were experiencing when trying either to transmit their weather observations or receive coastal forecasts, both tasks involving the use of the British Telecom DOC system. All the points raised, however, have received or are receiving attention.

The operation of the U.K. weathership *Cumulus* was reviewed as the Chairman described how the NAOS Agreement, under which *Cumulus* operated, was to terminate in November last. Subsequently, the ship has been retained in service for the U.K., but in a new operational area along 20° W, bounded by 57–48° N. The *Cumulus* will, whenever practicable, be directed towards meteorological 'hot spots' according to the wishes of the Marine Superintendent, in consultation with forecasters; and, having greater mobility than hitherto, it may well be spotted by more ships on passage than was the case when it was based at station 'Lima' in 57° N, 20° W.

The merits and performance of METROUTE, the ship routeing section of the Met. Office, were also thoroughly aired, and there was favorable feedback from those companies already using the service. Automation of the team's systems, when completed, will further increase its routeing capacity, and the five Master Mariners (supported by Senior Forecasters' briefings) who comprise the brainpower behind METROUTE, anticipate channelling their considerable, professional skills towards an expanding market in the near future.

There was also encouraging news from the Belgian representative, Dr E. de Dycker, who said that port meteorological services for his country were to be reinstated at Antwerp and Zeebrugge, possibly by March this year; additionally, Oostende Radio was accepting weather observations from ships.

In closing the conference, the Chairman again invited Port Meteorological Officers from overseas to attend the next meeting, to be held after an interval of about two years, and hoped that other countries with VOF interests, such as France and Norway, would also send representatives.

AURORA NOTES JANUARY TO MARCH 1989

By R.J. Livesey
(Director of the Aurora Section, British Astronomical Association)

As usual, the observations from mariners made during the period are summarized in Table 1. A summary of all observations made by land and by sea is given in Table 2.

Table 1 — Marine Aurora Observations January to March 1989

Date	Ship	Geographic Position	Time (GMT)	Forms in Sequence
4/5 Jan.	*Norna*	58° 15′N, 06° 05′W	0420–0510	G.RA.P.arr.G. Max. alt. 20°
5/6	*Cumulus*	57° 20′N, 20° 00′W	2350–0100	aRB
6/7	*Norna*	59° 50′N, 04° 50′W	1800–1830	qHA
8/9	*Cumulus*	57° 05′N, 20° 12′W	2015–0000	qG
10/11	*Cumulus*	56° 52′N, 20° 19′W	0150–0200	qN
11/12	*Cumulus*	56° 59′N, 20° 13′W	0018–0540	RR.pN
31 Jan./ 01 Feb.	*Cumulus*	57° 00′N, 20° 00′W	2221–0328	qHB.qN.qHB
2/3 Feb.	*Lackenby*	62° 18′N, 04° 11′E	0310	N.pN.All sky.
9/10	*Cumulus*	57° 00′N, 20° 00′W	2320–0150	qHN
11/12	*Cumulus*	57° 00′N, 20° 00′W	0125–0221	qN
12/13	*Esso Fife*	61° 01′N, 01° 26′E	1845	HB.RA.RR. Max. alt. 40°
16/17	*Nivosa*	35° 08′S, 116° 24′E	1807–1813	aRR.RA. Max. alt. 35°
28 Feb./ 01 Mar.	*Cumulus*	57° 00′N, 20° 00′W	0200–0500	G
2/3	*Cumulus*	57° 00′N, 20° 00′W	0000–0530	qN
3/4	*Remuera Bay*	42° 00′S, 135° 00′E	1200–1600	RR.RA.G. Max. alt. 70°
3/4	*Cumulus*	57° 00′N, 20° 00′W	2330–0040	qN
5/6	*Cumulus*	57° 00′N, 20° 00′W	0000	qN
6/7	*Cumulus*	57° 00′N, 20° 00′W	0000–0330	qN
7/8	*Cumulus*	57° 00′N, 20° 00′W	0400	qN
8/9	*Cumulus*	57° 00′N, 20° 00′W	2300–0500	qN
8/9	*Vigilant*	57° 36′N, 06° 12′W	1500–0330	RA
9/10	*Mairangi Bay*	43° 10′S, 173° 42′E	0905–0936	G.aRB.pRR.P. Max. alt. 85°
9/10	*Cumulus*	57° 00′N, 20° 00′W	2300–0500	qN
11/12	*Cumulus*	57° 00′N, 20° 00′W	0000–0200	qN
12/13	*Atlantic King*	48° 00′N, 61° 00′W	0045–0530	RV.CRR. Max. alt. 75°
13/14	*City of Manchester*	39° 54′N, 09° 52′W	2142–2330	HA.G.aRR.G.RR. Deep red
13/14	*Sentis*	18° 25′N, 81° 16′W	0100–0300	G.RR. Max. alt. 25°
13/14	*Scottish Star*	22° 34′N, 24° 29′W	0110–0225	G.RR+G.G. Max. alt. 70°
13/14	*John Biscoe*	53° 03′S, 57° 54′W	2345–0230	G.CRR.P. All sky.
13/14	*Eland*	24° 08′S, 49° 10′E	0330–0400	G.RR. Intense red.
13/14	*Union Endeavour*	34° 34′S, 161° 00′E	1145–1700	G.RR.RA.G.RR. Blood-red. Meteorites.

Table 1 *(contd)*

Date	Ship	Geographic Position	Time (GMT)	Forms in Sequence
13/14	.. *Lampas*	34° 30′S, 25° 52′E	2145	G.mHB. White + red. Half sky.
13/14	.. *Bluestream*	22° 28′N, 62° 39′W	0120–0255	G.RR.G.RR.G. RR. Plum-red. Max. alt. 30°
13/14	.. *Snowdon*	26° 20′S, 101° 41′E	2145–2245	RR.RA. Max. alt. 30°
13/14	.. *Auckland Star*	21° 34′N, 54° 00′W	2330–0245	G.mRR. Red + white. Max. alt. 40°
13/14	.. *City of Edinburgh*	45° 14′N, 09° 57′W	0138–0230	G.mG.RR. All colours. Max. alt. 50°
13/14	.. *Fleetwave*	23° 36′N, 67° 00′W	0100–0200	RA. Pink.
13/14	.. *Luminetta*	31° 15′S, 30° 06′E	0130–0240	G.mHA.RR. Red glow. Max. alt. 60°
13/14	.. *Remuera Bay*	39° 30′S, 168° 30′E	0850–1000	G. All sky.
13/14	.. ?	42° 00′S, 90° 01′E	1850–1945	G.HA.RA.mRR. p_2RR.HG. Max. alt. 65°
13/14	.. *Selectivity*	51° 42′N, 02° 36′E	2130–2215	G.RR.HA.mp. Red arc. Half sky.
13/14	.. *Resolution Bay*	42° 00′S, 77° 53′E	1730–1830	mRR.G.RR. Red glow. Half sky.
13/14	.. *ACT 7*	Zeebrugge	2130	HA.RR. Red + green. Max. alt. 30°
13/14	.. *British Ranger*	26° 00′S, 53° 30′E	2100–0200	G.p_3m_3RR.mR. Red glow. Max. alt. 70°
13/14	.. *Direct Kea*	34° 00′S, 159° 30′E	1700	mRR. Sydney VHF heard at 400 n.mile. Max. alt. 70°
13/14	.. *English Star*	33° 21′N, 29° 31′W	2200–0200	G.RR. Red glow.
13/14	.. *London Spirit*	19° 26′N, 61° 44′W	0100–0230	G.mRR. Red glow. S/W blackout. Max. alt. 55°
13/14	.. *Scamper Universal*	24° 42′N, 46° 48′W	0130–0210	G. Red.
13/14	.. *Maersk Commander*	30° 40′N, 65° 44′W	0105–0210	G.m_2p.mHA. CRRmp. Red glow. All sky.
14/15	.. *Cumulus*	57° 00′N, 20° 00′W	2220–0500	Cap_2RR. ap_2RR.G.
16/17	.. *Resolution Bay*	42° 00′S, 111° 00′E	1600–1630	G.RA.aRA.mRR.
24/25	.. *Cumulus*	57° 00′N, 20° 00′W	2125–2135	N.HA.
31 Mar./01 Apr.	.. *Cumulus*	56° 45′N, 17° 52′W	0000–0200	N
31/01	.. *Baltic Link*	54° 31′N, 00° 30′W	0130–0315	G.mRR.p_4RR.G.

KEY: a = active, m = multiple, m_2,m_3 = 2 or 3 forms, p = pulsating, p_2 = flaming upwards, p_3 = flickering, p_4 = horizontal streaming, q = quiet, B = band, C = coronal ray structure, G = glow, H = homogeneous, HA = homogeneous arc, HB = homogeneous band, N = unspecified form, P = patch, RA = rayed arc, RB = rayed band, RR = ray structure, RV = rayed veil.

Table 2 — Auroral reports received January to March 1989

Date	Time (GMT)	Number of Observers	European Min. Geomagnetic Latitude	Location and Activity of Aurorae*
3/4 Jan.	2210	2	60	Scotland (1), Finland (2)
4/5	2245–0510	6	56	North Dakota (5), Scotland (5)
5/6	1755–0440	8	60	'Lima' (5), Scotland (5), Finland (4) England (4)
6/7	1800–1830	1	62	Scotland (2)
8/9	1839–0000	3	61	'Lima' (1),Scotland (5)
9/10	2200–0100	1	61	Wick (1)
10/11	0150–0200	1	63	'Lima' (1)
11/12	1600–0550	16	60	North Dakota (5), 'Lima' (5), Scotland (5), Finland (5)
12/13	2200–0448	2	61	North Scotland (1)
13/14	2155–0155	2	61	North Scotland (5)
15/16	1957–0150	9	57	Scotland (5), Finland (5)
16/17	1850–0056	12	57	Scotland (5), Finland (5)
17/18	2300	2	61	North Dakota (5), Orkney (5)
20/21	—	2	60	Finland (4)
21/22	2150	1	61	Wick (5)
27/28	—	1	—	North Dakota (4)
28/29	—	2	60	Finland (4)
29/30	—	1	—	North Dakota
30/31	1850–0047	2	60	North Scotland (4)
30 Jan./ 01 Feb.	1828–2240	10	60	North Scotland (5)
1/2	1840–0448	15	59	North Dakota (5), Scotland (5)
2/3	1954–0441	14	57	North Dakota (4), Winnipeg (4), Scotland (5), Eire (1)
3/4	2035–2300	7	57	North Dakota (4), Scotland (5), Finland (4)
4/5	2050–2347	3	61	North Dakota (1), North Scotland (1)
5/6	0150	4	57	RAF Kinloss (1), Finland (4)
6/7	—	2	61	North Dakota (1), Finland (4)
7/8	1930	5	60	Scotland (2), Finland (4)
8/9	0100–0200	2	61	North Dakota (4), Scotland (2)
9/10	2320–0150	4	61	North Dakota (4), 'Lima' (1), Scotland (2), Finland (5)
11/12	2000–0221	6	60	North Dakota (4), 'Lima' (1), Scotland (2), Finland (4)
12/13	1845	1	62	Norwegian Sea (4)
15/16	1954–0000	4	59	Scotland (4)
16/17	1807–2030	3	60	Scotland (4), Finland (4), Indian Ocean (5)
20/21	—	2	59	Winnipeg (1), Finland (3)
28 Feb./ 01 Mar.	0200–0500	1	63	'Lima' (1)
1/2	0050	1	61	Wick (1)
2/3	0000–0530	2	63	Winnipeg (5), 'Lima' (1)
3/4	1200–0400	4	60	'Lima' (1), Scotland (1), Gt Aust. Bight (4)
4/5	0340	1	61	Kirkwall (2)
5/6	0000	1	63	'Lima' (1)

Table 2 (*contd*)

Date	Time (GMT)	Number of Observers	European Min. Geomagnetic Latitude	Location and Activity of Aurorae*
6/7	2355–0330	4	61	'Lima' (1), North Scotland (3), Finland (4)
7/8	0400	1	63	'Lima' (1)
8/9	1950–0510	14	59	U.S.A. (5), 'Lima' (1), Scotland (6)
9/10	2100–0936	7	59	'Lima' (1), Scotland (5), Tasman Sea (5)
10/11	2340–0132	1	61	Kirkwall (5)
11/12	2000–0221	6	59	North Dakota (4), 'Lima' (1), Scotland (2), Finland (4)
12/13	0120–0530	5	57	Newfoundland (6), Eire (1), Kirkwall (2), Finland (4), Tasman Sea (7)
13/14	1145–1000	112	27	World-wide event
14/15	1915–0500	10	56	Winnipeg (6), 'Lima' (6), Scotland (7), Denmark (4)
16/17	1600–0440	6	59	Winnipeg (6), Scotland (5), Finland (3), Southern Ocean (5)
20/21	0240	1	61	Kirkwall (4)
22/23	2025–0248	3	61	North Scotland (6), Lappland (4)
23/24	—	1	—	Lappland (1)
24/25	2045–0030	2	62	'Lima' (2), Shetland (1)
25/26	2050	4	61	Orkney (5), Shetland (1), Finland (6)
26/27	2149–2345	2	61	Kirkwall (5), Shetland (3)
27/28	2140–2300	4	57	Finland (4)
28/29	2100–0315	7	57	Scotland (5), Finland (3)
29/30	1845–0400	5	57	Scotland (6), Finland (5)
30/31	2050–0350	14	57	North Dakota (5), Winnipeg (6), Scotland (5), Finland (6)
31 Mar./ 01 Apr.	1928–0200	14	57	Scotland (2), Finland (7)

*Storm activity code: 1 = glow or patch, 2 = homogeneous arc or band, 3 = rayed arc or band, 4 = ray bundles, 5 = active moving or flaming storm, 6 = coronal or half sky, 7 = all-sky storm.

These observations come from members of the British Astronomical Association, the Ursa Astronomical Association of Finland, British meteorological stations, O.W.S. *Cumulus*, ships of the U.K. VOF and individual correspondents in the Caribbean, U.S.A., Canada, Denmark, France, Norway and Australia. The coverage of the aurora is not globally even, as might be so from artificial, Earth satellites, but nevertheless, all are to be congratulated for their efforts in affording us a picture of what has been happening. At the time of writing, more than 380 observations have been received for this period, equivalent to the annual 'score' of on some years. This emphasizes that the aurora has been very active; but the great aurora of 13/14 March set up a score of more than 105 observations on its own. Well done everybody.

The Institute de Physique du Globe de Paris has monitored the Earth's magnetic field at two antipodal observatories since 1868, describing the disturbances in terms of an index *aa* calculated for each 12-hour interval. On this scale, the night of 13/14 March came fourth largest in the list of magnetic storms for the 121-year period, as follows:

YEAR	DATE	*aa* INDEX
1909	September 25	546
1941	September 18	477
1960	November 13	462
1989	March 13	62

During the storm, the British Geological Survey Geomagnetic Observatory at Lerwick reported a gross horizontal magnetic field deviation of eight degrees. At Eskdalemuir Observatory near Carlisle it was six and one-half degrees, and at Hartland Observatory it was three degrees. The electrical fields induced at ground level were such that in Canada, transmission line systems were overloaded and large areas of Quebec Hydro supply were blacked out as circuit breakers came out. There are reports of oil well 'down the hole' magnetic navigation systems having been affected, and the flight of a Concorde aircraft is thought to have been diverted to a more southerly route to avoid the incoming particle radiation at high altitudes and latitudes.

In Figure 1 are plotted the locations of ships which observed the aurora of March 13/14. The first report scrutinized was that made on the *Sentis* while off Grand Cayman Island, recording red glows and rays. The local radio station put out a message that the peculiar lights in the sky were due to unusual atmospheric effects. The *Sentis*' observation was amply confirmed by other ships in similar latitudes, by an amateur astronomer and by the United States Weather Service. In Europe, the aurora penetrated down to Italy, while in the Southern Hemisphere it was widely seen in Australia and South Africa.

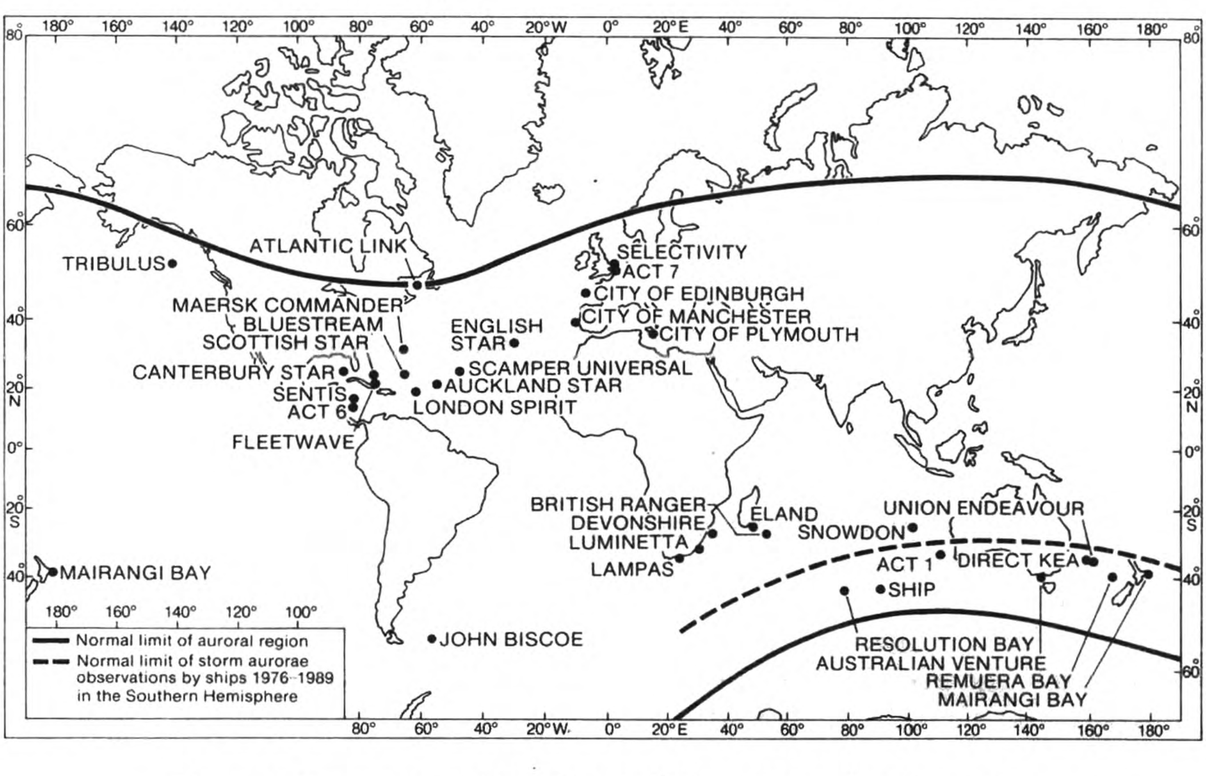


Figure 1. The aurora of 13/14 March 1989 — observations from ships.

Many observers reported all auroral colours of red, green, yellow, white and blue. In Wales, blue bottoms to some rays were reported, implying very high-energy electrons penetrating deeply into the atmosphere. On the other hand, skilled observers noted that generally, the aurora although structured, was not sharp and bright as have been some of the aurorae observed since and which did not penetrate so far to the equatorial side. Another feature of aurorae in the last few months has been the amount of high level low-energy particle red aurorae, which have featured in drawings and photographs that we have received.

Figure 1 shows clearly how the storm of 13/14 March spread equatorwards from the normal limit of the aurora zone. The aurora borealis swept over land masses from which it could readily be seen. On the other hand, the aurora australis passed mainly over ocean waters, so that it is from ships that the spread of the aurora became apparent. The first recorded observation of the aurora australis by a European came from Captain James Cook just before sunspot minimum in 1775. Cook's ship the *Resolution* (462 tons), had parted company from her consort, the *Adventure* (336 tons), on 8 February in a gale accompanied by fog, and found herself under the southern auroral zone when skies cleared. Perhaps modern observers might wish to know how Cook recorded his observations in his diary:

> Between midnight and three o'clock in the morning lights were seen in the heavens similar to those in the Northern Hemisphere known by the name of aurora borealis, or Northern Lights; but I never heard of the Aurora Australis being seen before. The officer of the watch observed that it sometimes broke out in spiral rays and in a circular form; then its light was very strong and its appearance beautiful. He could not perceive it had any particular direction for it appeared at various times in different parts of the heavens and diffused its light throughout the whole atmosphere.

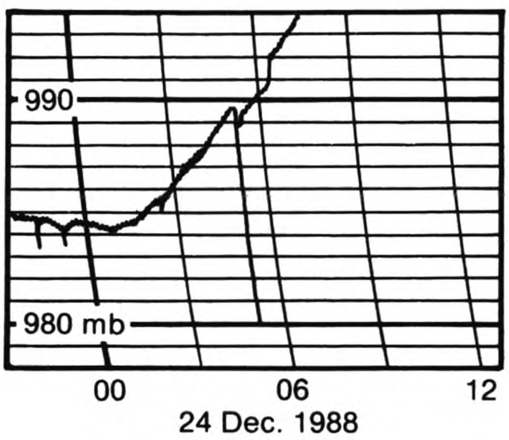
There are indications that solar activity will continue in the months to come and that we may expect further outbreaks of the aurora, although whether or not they will come up to the intensity of the recent big storm remains to be seen. As I say to all observers, for further details, 'Watch this space!'.

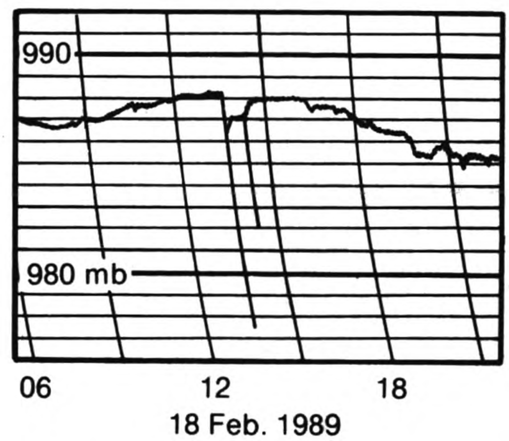
LETTERS TO THE EDITOR

A sharp intake of breath?

On 18 February 1989 at about 1400 GMT the Met. Office barograph (Mk II model, Met 1191) on the *Clyde 'A'* platform behaved in an unexplained way. The pen took a downward excursion of about 10.5 mb followed 45 minutes later by a smaller excursion of 5 mb. No obvious phenomenon on the platform at the time could have caused this to happen. I enclose a photocopy of the trace. The phenomenon previously occurred on 24 December 1988 at approximately 0500 — coincidentally, at about the time the storage tanker on the Fulmar oil field broke loose in bad weather and caused a full alert which could have been disastrous if the ship had collided with *Clyde*!

A waggish comment from the Met. Office at Dyce suggested that the phenomenon was caused by the sharp intake of breath aboard the platform at the time of the emergency. In view of the relatively quiet afternoon on which the second occurrence happened, this theory is now disproved. The only excitements of the afternoon were the rugby internationals on the radio!





Seriously, the barograph itself seems to be in good working order. The air-conditioning/pressurisation of the accommodation module here does not, and I believe, cannot vary the pressure by such a degree; in fact, we experience atmospheric pressure continuously in view of the constant use of the module doors. In any case, any deviation from the norm would be in an upward direction, so that on its own bowls out the air-conditioning/ventilation theory. Over to you!

F.M. Kennedy, Logistics Supervisor, *Clyde 'A'* platform.

Filipino fishing practices

As you know, I have Filipino officers carrying out weather observing on my command, m.v. *Santa Marta*, and I am trying to raise their level of interest in matters meteorological — perhaps a letter in *The Marine Observer* would help!

One of my officers has pointed out that the item in the Marine Observers' Log section in the October 1988 edition, page 186, refers to a common fishing practice followed by himself when he lived as a boy in the adjacent fishing village. Beneath the craft is suspended a rope with a sinker on which are attached at intervals bundles of palm leaves. The leaves provide shelter for the fish and induce them to 'rest'. The fishermen allow the rafts to drift towards land and at a convenient time and location they tow the raft and suspended fish traps to shore where the lines with palm bundles are raised and the fish, now homeless, are caught with ring nets.

I managed to obtain a copy of Gerald Tuck's *Guide to Seabirds on the Ocean Routes* when on leave last time. However, I have not been able to get a copy of the associated *Field Guide to Seabirds*. It may be of help to others as well as myself if you could publish a 'guide' to 'guides'.

Captain D.S. Ritchie, Master, m.v. *Santa Marta*.

Thanks to Captain Ritchie, first for the meteorological logbook enclosed with his letter, showing that his experience and training of his officers was bearing fruit in the field of observations, and secondly for sharing with us his new found knowledge imparted by his Filipinos. Let us have more of your letters about ethnic seafaring practices that we can publish for the benefit of readers. I am afraid we are unable to be of help as marine librarians, as we only obtain books for review by application to publishers, spotting titles in other publications or when mentioned by readers such as Captain Ritchie. We can only suggest contacting the publishers of the book in hand. If readers would like to suggest titles for review we would be pleased to try and obtain the books in question.

Personalities

(Readers are invited to notify the Editor of observing officers retiring from the Navigating and Radio Departments.)

OBITUARY — CAPTAIN M.J. CARTER died unexpectedly, at the age of 50, on 17 August 1989 when in command of a Kuwait Oil Tanker Company vessel. Michael Carter was born in Catford in April 1939 and educated at Rutlish Grammar School. He was a cadet on H.M.S. *Worcester* from 1954 to 1956 and joined the P. & O.S.N. Company as a Navigating Cadet in 1956. He transferred to the Hain Nourse Company for several years, to return to the P. & O. fold on the merger of the two companies. He obtained his Master's Certificate in 1967 and took command of his first ship, m.v. *Grafton*, in February 1978.

The writer had the pleasure of sailing with Mike Carter in P. & O. and is surprised to find that he has no records of observing on that company's ships other than one logbook from s.s. *Oronsay*, received at the Met. Office in June 1970. However, a total of 33 logs were compiled in 15 observing years, 3 of these logs being classed as Excellent.

Our deepest sympathy is extended to his widow Kate and daughters Rosemary and Ruth at their tragic loss.

RETIREMENT — CAPTAIN C.M.SANDY recently advised that he was unfortunately made redundant with the sale of *Barber Hector* in 1989 and had since decided to take premature retirement from active sea-going.

Colin Sandy was born in September 1931 and underwent pre-sea training on H.M.S. *Conway* for two years from 1946. He was indentured as Apprentice to Alfred Holt & Co. in 1948, and his first voyage to sea was in the coal burner s.s. *Neleus*, built in 1911. He obtained his Master's Certificate in April 1957 and was promoted to command of m.v. *Ascanius* on the Far East liner trade in September 1973. He commanded in most classes of Ocean vessel including the OCL Far East *Bay* class container ships. He was Master of m.v. *Barber Perseus* when intercepted and stopped by Iranian naval vessels south of Hormuz Straits on 12 January 1986. Having therefore served in Blue Funnel and Ocean managed ships throughout his career, except for 18 months under Manx Ship Management, Captain Sandy's final command was the 32,000 dwt Ro/Ro vessel *Barber Hector.*

His first log came from m.v. *Cardiganshire* in January 1964 and reminded him recently that basic weather reporting procedures had changed very little over the intervening years. During his 11 observing years Captain Sandy provided 25 meteorological logbooks and 11 of these were classed as Excellent; he received Excellent Awards in 1980 and 1981, doubtless because, as he says, he always found correspondence from the Meteorological Office to be very appreciative of the efforts made by officers in maintaining weather reports, and acknowledgements of logbooks to be courteous and encouraging. When his association with *Barber Hector* came to end almost three years after bringing the ship out from the builders he did his best to persuade the new Swedish Master to retain the observing equipment and continue reporting.

Captain Sandy joined the Royal Naval Reserve in June 1953, maintaining periodic training throughout his career, being promoted Captain in December

1974 and latterly specializing in Amphibious Warfare. He was appointed aide-de-camp to Her Majesty the Queen in 1979.

Captain Sandy retired on 22 February 1989 and we send him thanks and good wishes in his retirement aims of maintaining contact and interest in seafaring through membership of the Honourable Company of Master Mariners, the Nautical Institute and Royal Naval Reserve, and following his other interests of hill-walking, gardening and d-i-y.

Book Reviews

Penguins by John Sparks and Tony Soper. 216 mm × 152 mm, 246 pp., *illus.* David & Charles Publishers plc, Brunel House, Newton Abbot, Devon. Price: £12.95.

Having probably been first seen by Polynesian navigators in the fifth century, most of what was known about penguins came from incidental records and observations made at the rookeries by early explorers. The knowledge was continually expanded and revised over the years, culminating in the detailed reports produced by researchers and scientists of the nineteenth and twentieth centuries.

When this book was first published in 1967, penguins still held many secrets about their lives and behaviour; but with advances being made in the fields of research technology and monitoring methods, there are now far fewer mysteries left to be unravelled, and this, the 1987 edition of *Penguins*, has been partly re-written to include recently gained information. Without a copy of the original edition to hand, it is impossible to tell exactly what is new material, although the 'penguin buff' will readily recognise updated information. For the rest of us who would perhaps be seeking a general picture of the world of penguins and the sixteen (or seventeen, or eighteen, no one is sure even now) species of these upright and naturally humorous characters, then *Penguins* is a fine springboard to increased knowledge.

Liberally illustrated with photographs and also excellent drawings (by Robert Gillmor), *Penguins* presents its myriad of facts simply and in an amiably informative style. With its species notes and distribution map, it would be a useful addition to a ship's library; after all, observations of penguin distribution at sea are as important as those made at the rookeries.

If there should be one complaint, perhaps it would be that even with a subject as inoffensive as penguins, the book, to be complete, needs to contain accounts of the commercial exploitation of the birds, their rookeries and their food source — but then that is hardly the fault of the authors.

J.M.

Notices to Marine Observers

CORRECTION TO SHIPS' CODE BOOK

The following corrections should be made to all copies of the new (1988) edition of Met.0.509, *Ship's Code and Decode Book*, held:

Page 8, Section 3, Table 1, i_w, Wind speed indicator.
For figure 2, wind speed estimated in knots, read 3.
For figure 3, wind speed from anemometer in knots, read 4.

Shipboard observers are reminded that for coded observations, the wind speed should continue to be estimated by the sea state.

Reports from MARID ships

Ships reporting in MARID code (coastal sea temperature reports) are asked to ensure that their messages commence with the call sign and continue with the word MARID before the coded groups. The inclusion of the word MARID is essential to ensure computer identification of these reports.

Reports from MARID ships play an important part in the compilation of the daily isotherm chart, which in turn is a vital element in the forecasting of fog in coastal areas and the North Sea. Observers on ships which have agreed to provide these MARID reports are requested to continue compiling and sending them whenever opportunity permits.

AVOIDANCE OF TROPICAL STORMS — REVISION OF ADVICE TO SHIPMASTERS

As a result of the Department of Transport report into the loss of m.v. *Derbyshire*, the advice given under the avoidance of tropical storms in the forthcoming edition of the *Mariners Handbook* has been revised. At the next reprint, the advice given in Met.0.895, *Meteorology for Mariners*, in the chapter on Tropical Storms, will be similarly revised.

The amendments take account of the Court of Inquiry's recommendation with respect to minimum passing distance from the storm centre, increased from 75 to 80 miles, and will increase the safe distance from 200 to 250 miles.

Fleet Lists

GREAT BRITAIN

Amendments to the list published in the July 1989 edition of *The Marine Observer*. Information regarding these corrections is required by 30 September each year. Information for the July lists is required by 31 March each year.

Name of Vessel	Date of Recruitment	Master	Observing Officers	Senior Radio Officer	Owner/Manager
Antwerpen	10.9.89	J.F. Stokart	S. Laloux, F. Driesen, G. Somers	A. Renard	Antwerp Bulk Carriers N.V.
Astrid	7.4.89	M.C. Kichenside			Astrid Trust
Brussel	20.4.89	R. Marquestiau	M. Defer, P. Van Deuren, P. Corveleyn	H. Stevens	Antwerp Bulk Carriers N.V.
CMB Memling	2.5.89	G. Lierman	P. Roderbourg, P. Legron, W. Verbist	I.De Cauwer	CMB N.V. S.A.
Cheshire	11.5.89				Bibby Line Ltd
Cornelius Verolme	6.5.89	A. Van Hees	F. Stouffs, C. Van Havre, P. Wauters	A. Antoine	Sea Lanes N.V.
De Loris	12.6.89	W. De. Floor	D. Peters, M. Haest, R. Gentilezo	M. Neufcour	Antwerp Bulk Carriers N.V.
Ellen Hudig	23.3.89	J.C. Massart	J.P. Van Meir, J. Walbraeve, Y. Verspreet	B. McGeehan	A.B.C. Container Line
Garth	-.7.89	C.M. Berkley	B. Bantista, M. De Felipe, F.J. Nichol	S.T. Ilkov	Graig Shipping plc
Greenfield	29.3.89	B. Yelland	M.M. Alam, G.C. Grey, J.H. Clamp	W. Hughes	Frigomaris Shipping GMBH
Helen	10.4.89	J. Micails	A. Dubetz, P. Degraeve, G. Somers	M. Limpens	Antwerp Bulk Carriers N.V.
Iris	30.8.89	A.J. Chalmers	A. Reader, S.I. Lewin, K. Brooks	J. Vaughan	British Telecom (Marine) Ltd
Jarikaba	14.3.89	G.P.D. Coleridge	B.P. Tapa, W.J. Harwood, R.R. Kamat	K. Jayaprakash	E. & F. Ship Management Ltd
Lanka Amila	29.7.89	J.R. Olarte	R.M. Librando, O.S. Materiales, R.P. Bandeleon	M.D. Ferrier	Jebsens Ship Management Ltd
Lord Of The Isle	18.5.89	K. Gunn	R. Sneeden, M. Scott, C. MacCurdy, J. Robertson		Caledonian MacBrayne Ltd

Maersk Captain	1.3.89	N. Vause	R. Cuchoo, D. Yorke, K. Earl	S. Walsh	Maersk Co. Ltd
Northella	5.4.89	I.M. Maden	D.A. Sheriden, G. Petty		J. Marr & Son Ltd
Oriental Bay	8.8.89	J.D. Thomson	P. Trafford, C.K. Urwin, D. Batchelor	T. Smith	P. & O. Containers Ltd
Pytchley	20.9.89	P.J. Wild	N.B. Solanki, R.M. Bromilow, R.K. Brivastava	D. Sequeira	P. & O. Ship Management Ltd
Rhone	17.8.89	G.S. Szule	A.J. Hulse, J. Mackenzie, M.S. Brocklesby	V. Thavlingham	Buries Markes (Ship Management) Ltd
St Brendan	7.6.89	N.R. Brown	N.P. Lewis, A. Mackin, P.M. John, J.D. Watson	W.B. Jackman	Sealink British Ferries Ltd
Satucket	25.7.89	M. Cadman	M. Jones, H. Murray, L. Brooker	R.E. McMahon	Mobil Shipping Co. Ltd
Sir Eric Sharp	15.3.89	A.A. Porter	M. Farn, P. Swan	M. Wilson	Cable & Wireless plc
Swan Bay	5.6.89	B. Strom	G. Jaro, D. Manguardia, L.G. Callebro	G. Baron	Swan Shipping Ltd
Ulan Trader	14.9.89	K.S. Sharma	N.R. Pradham, B.H. Dias, A.R. Dias	G. Chattopadmyay	B.C.P. Ship Management Ltd

The following Selected Ships have been deleted:

A.E.S., Al Arous, Albright Pioneer, Atlantic Confidence, B.P. Harrier, Benhope, Benlomond, Binsnes, Bolnes, British Security, British Trident, Canada's Tomorrow, Chelsfield, Dawpool, Eulima, Eulota, Fort Assiniboine, Fort Garry, Fort Rouge, Fort Steele, Fort Toronto, Hampshire, La Chacra, Lakenes, Maeterlinch, Melampus, Memnon, Menelaus, Merchant Purpose, Nassau Pride, Nosira Lin, Nosira Sharon, R.A. Emerson, Rubens, Victoria Peak, Victus.

BRITISH COMMONWEALTH

AUSTRALIA (Information dated 25.8.89)

The following Selected Ships have been recruited since the list published in the July 1989 edition of this journal:

Al Rhyyan I, Anro Melbourne, C.Y. O'Connor.

The following Selected Ships have been deleted:

Australian Escort, Australian Purpose, B.P. Enterprise, El Borrego, Irene Greenwood, Soela.

NEW ZEALAND (Information dated 1.9.89)

The following Selected Ships have been recruited since the list published in the July 1989 edition of this journal:

Cotswold Prince, Forum New Zealand II, New Zealand Pacific.

The following Selected Ships have been deleted:

Fijian, Greenfield, Jebsen Tauranga.

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