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The Marine Observer

A quarterly journal of Maritime Meteorology

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January 1991

THE
MARINE OBSERVER

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

Vol. 61

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

VOL. 61 **No. 311** **JANUARY 1991**

CONTENTS

COVER PHOTOGRAPH: Annular eclipse over the Antarctic Peninsular region on 26 January 1990. Photographed on Dartcom weather satellite receiver on board R.R.S. *Bransfield* by Mr S.J. Mee, Radio Officer. (See page 34.)

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: HMSO

Editorial

The Meteorological Office became an Agency on 2 April 1990 at a ceremony where Mr Michael Neubert, the Under-Secretary of State for Defence Procurement, handed over to me a handsomely bound copy of the *Framework Document* — a document which defines the rules under which the Agency operates. What difference has being an Agency made to my life as the Agency's first Chief Executive?

The main difference which is really a very substantial one is that I now have charge of the Agency's budget — in fact, for the first time the Meteorological Office has a budget of its own together with considerable flexibility to spend it to the best advantage of the Office's programme. Responsibility for this budget is being delegated to the Office's managers so that at all levels of management there is an appreciation of the cost of all parts of the Office's activity and a recognition of the choices which need to be made to achieve more cost effectiveness. This in turn brings a heightened awareness of the best ways of serving the Office's customers.

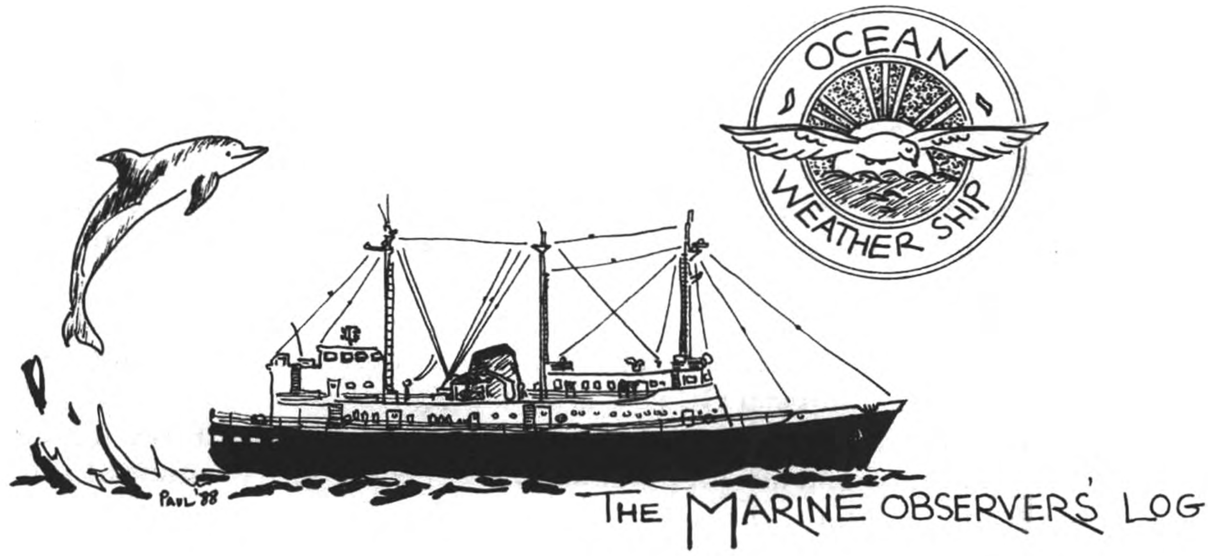
It is sometimes thought that emphasis on cost and on commercial attitudes is bound to bring a depreciation in the quality of service. We find, in fact, that the reverse is the case. Paying customers demand high quality of service, indeed if the quality is inadequate they will take their custom elsewhere. Further, some express fear that the Office's high quality programme of observations or its research will suffer in the new environment. That is not happening either. Again, the reverse is true. Unless regular accurate observations with good coverage are maintained the accuracy of forecasts will deteriorate and customers will find them less useful. Observations from ships are of particular importance because of the need to cover the large ocean regions of the globe for which it is difficult to obtain observations of the required accuracy by any other means. Regarding the need for research, as for any high technology company, the Office's commercial service critically depends on the continuing quality of its products. There is, therefore, a strong motivation for the Office to put in the research and development necessary to ensure that it remains a leader in the field so far as quality is concerned. For a healthy programme research must be directed both to short-term and long-term goals.

A further responsibility I have had during the past year has been the chairmanship of the Scientific Assessment of the Intergovernmental Panel on Climate Change jointly organized by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). I was supported by a small international group of scientists based in Bracknell led by Dr Geoffrey Jenkins. The results of our work have been widely reported and acclaimed by both scientists and politicians. Mrs Thatcher in her speech at the opening of the Hadley Centre in May called it 'an authoritative early warning system: an agreed assessment from some three hundred of the world's leading scientists of what is happening to the world's climate'.

The foundation of the Hadley Centre for Climate Prediction and Research is a major new development for the Office. It means that we are now in the front line not only in the forecasting of weather a few days ahead but in the forecasting of changes in the climate 100 years ahead. Climate prediction relies heavily on numerical models of the climate system, which are rather more elaborate versions of the numerical models of the atmosphere used for weather forecasting.

The Hadley Centre therefore will have a dedicated supercomputer on which to run the climate model; the computer and extra staff for the Centre are being funded by the Department of the Environment. But, as with weather forecasting, models are of no use without observations; the climate models must be tested against observations. Of key importance again are observations of the ocean which can be made both from the surface, and increasingly, from satellites, of sea surface temperature, surface stress, surface topography and ocean colour. The latter measurement is required to ascertain the amount of biological activity in the ocean, a key component of the global carbon cycle. The problem of climate change is clearly firmly on the political as well as the scientific agenda and I feel proud that the Meteorological Office has such a central position on the world stage in this area of activity. I am also grateful for the support of the marine observing community, and my good wishes for 1991 come with the hope of your continuing co-operation for the foreseeable future.

Dr John T. Houghton CBE, D. PHIL., FRS
Chief Executive



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.

PASSAGE OF DEPRESSION

North Sea

m.v. *Shetland Service*. Captain P.C. Dyer. On station, Fulmar oil field. Observers: the Master, Mr I.A. MacDonald, Chief Officer and Mr I.G.C. Ferguson, 2nd Officer.

25/26 January 1990. During this period the vessel experienced the effects of a deep depression some details of which are recorded in the following table.

Date and time (UTC)	Wind Dir'n	Wind Force	Pressure (mb)	Sea (m)	Swell (m)	Cloud (oktas)	Remarks
25th 0000	260°	7	991.3	2	4	4	Cumulonimbus with rain/hail showers.
0400	240°	6	989.0	2	4	4	Pressure falls rapidly.
0600	230°	6	986.8	2	4	4	Pressure gradient increasing.
0730	180°	7	—	—	—	—	
0800–1200	Wind backing and increasing. Sky becoming overcast with low stratus. Rain showers.						
1200	150°	9	967.5	2	4	8	Pressure fall of 12 mb in three hours. Swell confused.
1200–1800	Wind decreasing to force 4, veering. Confused seas/swell of 3.5 m.						
2000	225°	5	952.0	4	4	8	
2100	230°	5	951.5	Confused		8	Good visibility.
2330	280°	10	—	—	—	—	Continuous heavy rain. Vis. 5 n.mile.

26th 0000	285°	11	953.6	3.5	—	8	Continuous heavy rain. Vis. 3 n.mile.
0100	280°	12	960.0	5+	—	8	Wind gusting to 75 knots. Rain and vis. unchanged.
0300	290°	12	965.3	5.5+	—	8	Gusts to 75 knots. Rapid pressure increase.
0600	280°	11	970.5	8	—	8	Intermittent moderate rain.

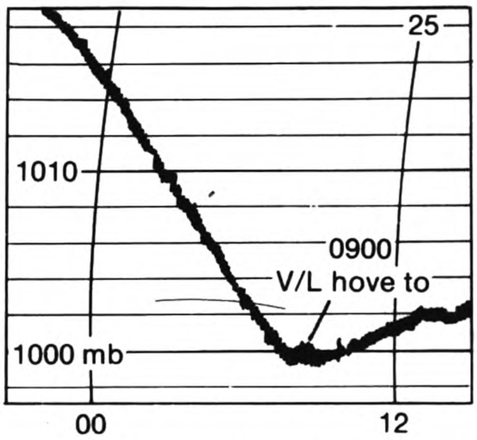
Between 0600 and 0900 the wind remained constant in direction and eased slowly whilst the cloud cover decreased to cumulus and altostratus. The significant wave height was 6.5 m with a maximum of 10 m. At 1200 the wind had eased to force 8 and the pressure had risen to 978.7 mb.

Position of ship: 56° 30′N, 02° 09′E.

Bay of Biscay

m.v. *Methane Princess*. Captain D.C.J. Still. Arzew to Canvey Island. Observers: the Master and ship's company.

25/26 January 1990. Throughout the 25th the pressure had been falling rapidly but steadily and at 0815 UTC the barograph trace levelled out at 999 mb. At this time the wind was W'ly, force 10 and there was a moderate west-north-westerly swell of 5 m. At 0900 the vessel hove to on reduced revs as a weather front passed over and the pressure began to rise. One hour later the wind was SW×W'ly and the pressure, after a slight fall, started to rise steadily.



At 2300 the wind decreased to force 8 while the swell was reduced to 3 m, but at 2330 a squall passed over the ship and winds of force 10 were experienced along with a swell of 5 m; there was heavy rain and hail which drastically reduced the visibility. By 0000 the rain and hail had ceased leaving winds of force 9–10 along with blowing spray and a steady swell of approximately 5 m, but the visibility improved to 10–12 n.mile. The vessel was pitching heavily and rolling moderately in the rough conditions.

On the 26th at 0100 the pressure levelled at 1005 mb and by 0800 the wind had dropped to force 8–9; the swell also decreased and was 3 m high at this time. The vessel was then brought back to a heading of 067° and passage was resumed.

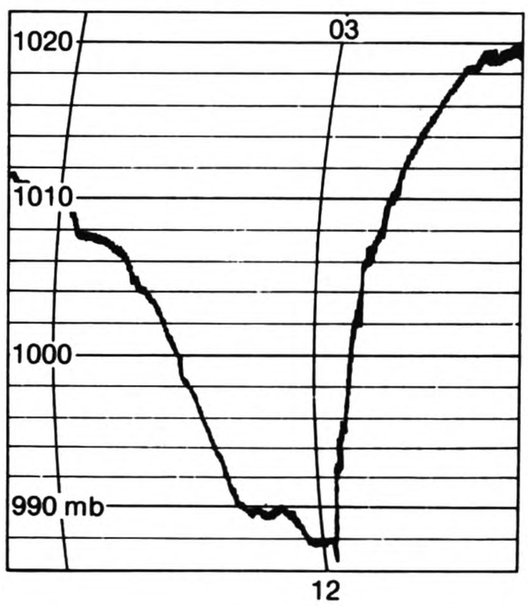
Position of ship at 0900 UTC on the 25th: 47° 04′N, 06° 49′W.

Note. A short article describing the storm of 25/26 January appears on page 30 and a satellite view of the associated cloud formations is shown opposite page 8.

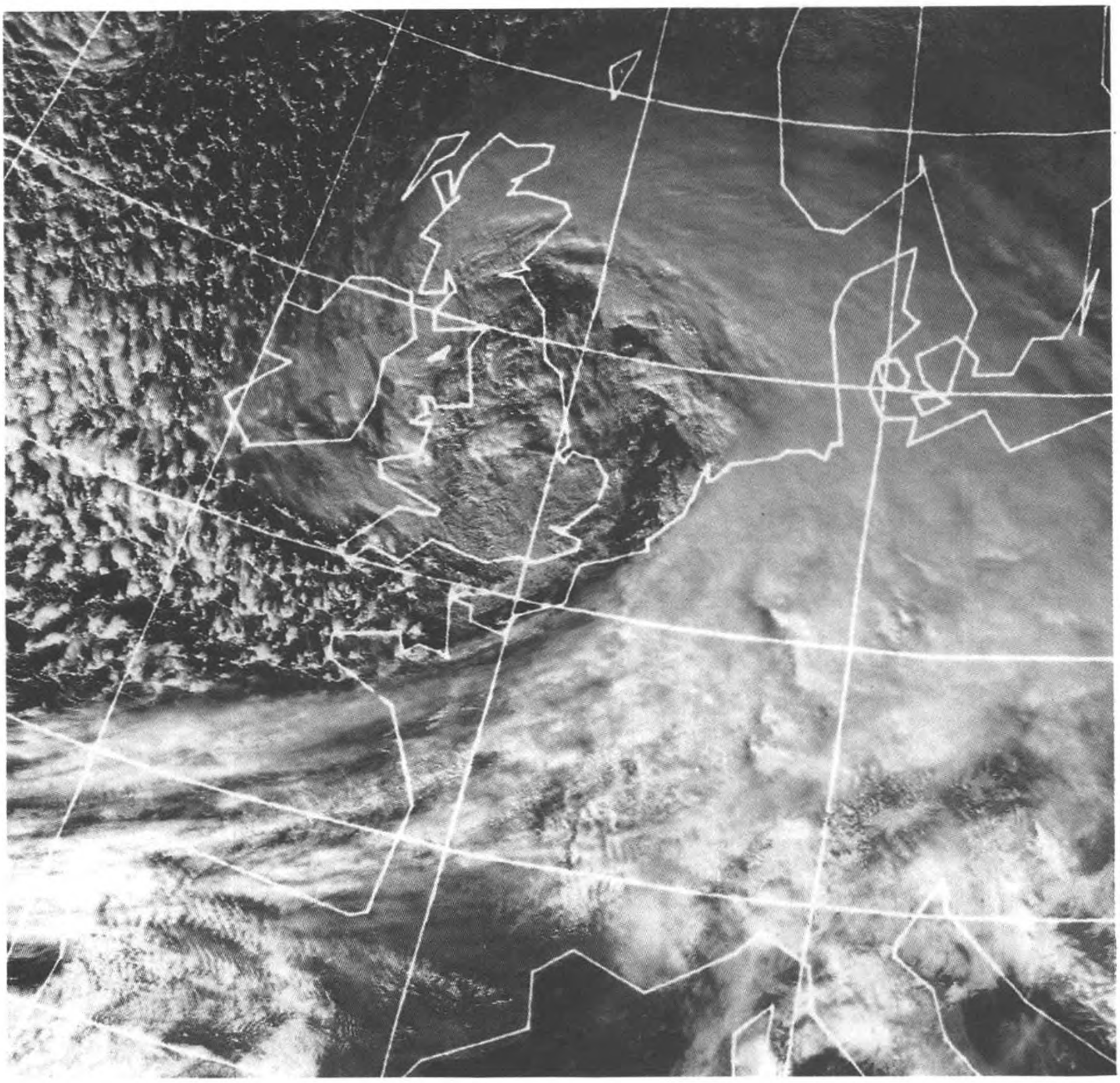
m.v. *Pride of Cherbourg*. Captain W.J.C. Clarke, OBE. Portsmouth to Le Havre. Observers: the Master, Mr J.E. Birdsall, 2nd Officer and ship's company.

3 February 1990. After a week and a half of constant gales and storms, the 0600 shipping forecast seemed little different from previous days. The sea area forecast for the 24 hours from 0500 on the 3rd read: Thames, Dover, Wight. South-westerly 6 to gale 8 becoming cyclonic severe gale 9 for a time. Occasional rain. Moderate or good becoming poor for a time.

The 'cyclonic force 9' confused the observers slightly, not knowing really what was to happen, and a seemingly insignificant low in north-west Biscay, moving north-east on the forecast chart gave them little idea except that more foul weather was afoot. At 1200 the wind was SE'ly, force 7 with a moderate sea and a low, medium length south-westerly swell. The pressure was 991.3 mb and the skies were overcast with rain, see barograph trace. On passing the ship's one hour ETA to Le Havre Port Control, the Second Officer was informed that the wind direction was S'ly, force 7, gusting to force 8–10. A Pilot and tugs would be required.



The Master was dubious about the accuracy of the Le Havre Port Control anemometer, but a Pilot and one tug were ordered to assist turning the vessel round. The ship was maintaining its speed of 19.5 knots in order to arrive on time; the sea was still moderate and the movement very comfortable. By 1300 the pressure had dropped to 986 mb and the wind had veered to SSW'ly, force 8–9. The sky was heavily overcast with line squalls and occasional heavy rain. The sea state was still reasonable with wave heights of about 2 m in the well sheltered Baie de la Seine. As the ship approached the Pilot Station at about 1340 the weather took its cue as the wind veered rapidly (in roughly three or four minutes) from SW'ly to NW'ly, force 10. The Pilot boarded successfully, and as the ship proceeded towards the approach channel, the VHF erupted on the port frequency as several vessels in Le Havre and on the River Seine parted moorings and called for tugs. Consequently, all available tugs rushed to their assistance and the *Pride*



Photograph courtesy of Dundee University

NOAA-11 image of the severe storm of 25/26 January 1990 taken on 25 January at 1324 UTC. (See page 7.)

Burrfish found on board m.v. *British Trent*. (See page 14.)

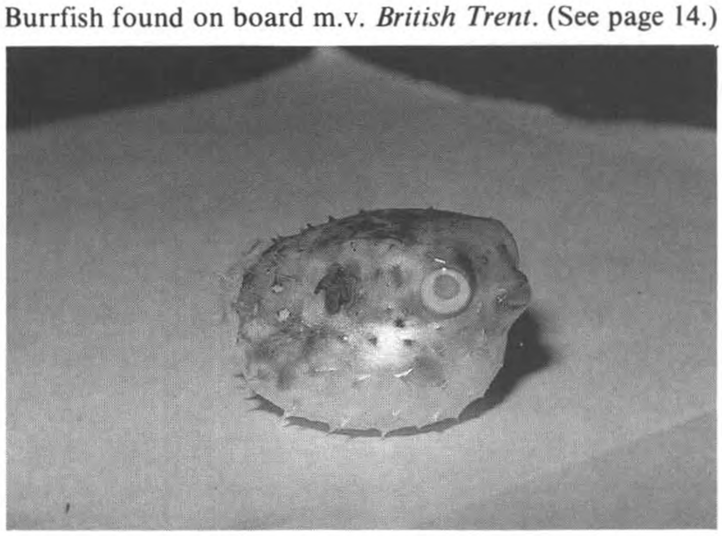


Photo. J.H. Parry

Mr F. Singleton (Divisional Director (Observations), Met. Office) presents a Special Long-service award to Captain P.J.R. Manson. (See page 34.)

Mr F. Singleton presents Captain P.J. Clark with his Special Long-service award. (See page 34.)

Mr F. Singleton presents a Special Long-service award to Captain S.J. Lawrence. (See page 34.)

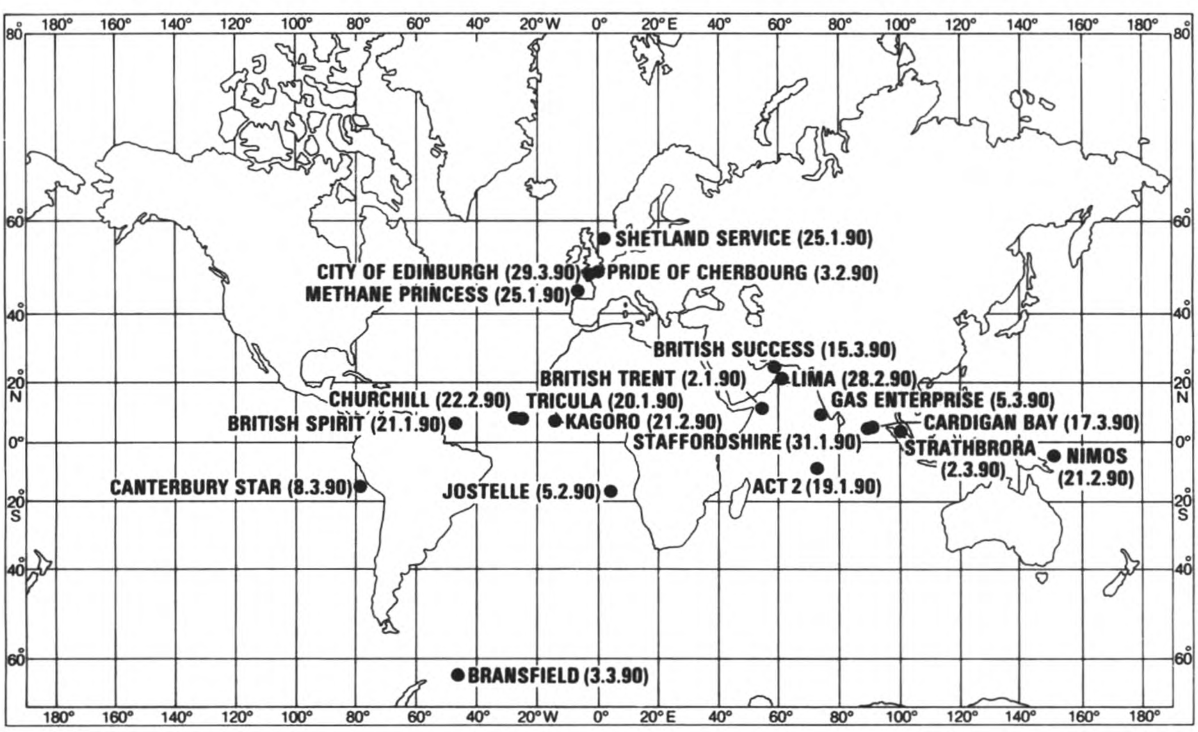
Captain G.V. Mackie (Branch Director Observations (Marine) and Marine Superintendent) presents a Special Long-service award to Captain C.O. Thomas (Bibby Bros Management Ltd) at Bracknell on 4 September 1990. (See page 34.)

of Cherbourg was forced to abort its approach, turn around into wind and heave to. The force of the wind and the angle of heel owing to turning at 12 knots caused a 15°–20° heel to starboard, even with stabilizers rigged.

At 1400 Le Havre Port Control reported that the wind speed was 70 knots gusting to 85 knots from the north-west. The vessel was hove to at 2.5 knots, heading north-west and its anemometer needle had disappeared off the end of the 80-knot range. All thought of entry was abandoned as the vessel sat comfortably 4 n.mile west of the French coast, but the sea was increasing rapidly. The wave height was about 4–5 m and the waves were very close together, their peaks disappearing in a low shroud of spray. In this position the ship awaited an improvement in harbour conditions, pitching heavily in rough seas and taking spray over the bridge front.

The port was clear to enter by around 1630 and the vessel eventually berthed one hour later by which time the wind was WSW'ly, force 4–5 and the pressure was 1017 mb. By the time the vessel sailed again at 1850 the pressure was 32 mb higher than five hours previously.

Position of ship: 49° 30'N, 00° 01'W.



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

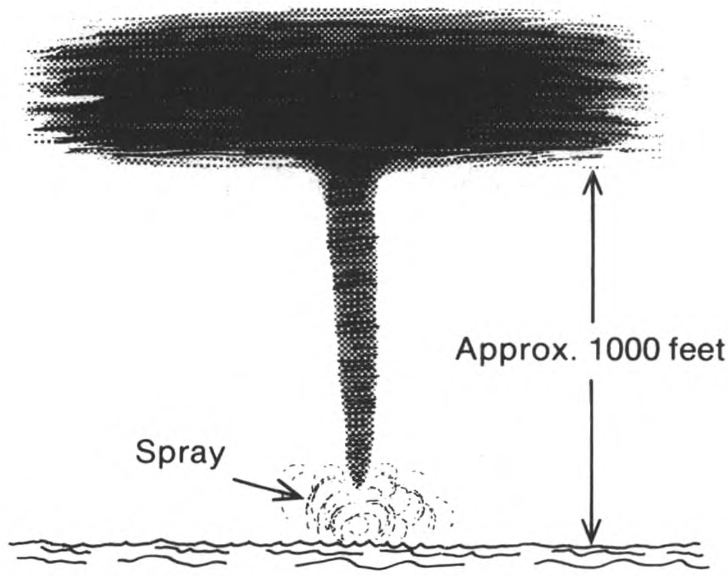
WATERSPOUTS

Strait of Malacca

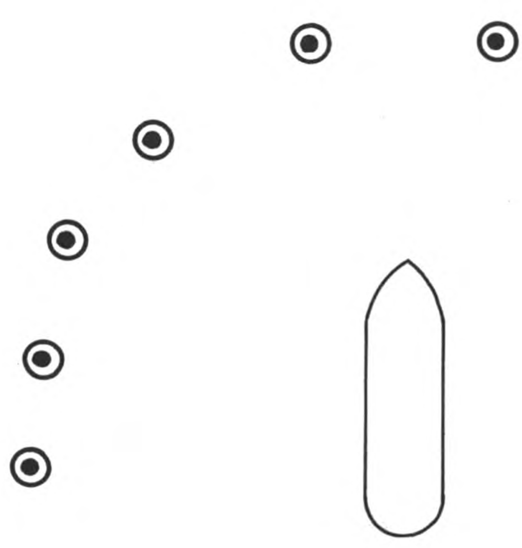
m.v. *Strathbrora*. Captain B. Cushman. Dubai to Singapore. Observers: the Master, Mr N.R. Hart, 2nd Officer and Mr S. Seafield, SM1.

2 March 1990. Whilst on a course of 129° the vessel was passing through an area of slight horizon haze with 3 oktas of cumulus and cirrus cloud cover. At 0140 UTC a bank of cumulonimbus with anvil was seen to the south of the vessel

and at 0145 a waterspout was observed at a distance of about 8 n.mile; it stretched from the base of the cloud down to the sea surface. Six waterspouts were visible simultaneously at 0200 (see sketch) four of which had bends in them.



0145 UTC



0200 UTC

At 0220 whilst the ship was passing through heavy rain showers at the latter end of the cloud, one waterspout was seen to pass approximately 5 cables off the starboard side. The area from the sea surface up to about 15 m was of clear appearance with spray whereas from 15 m to the base of the cloud the spout was a uniform grey colour and vertical. Its base was roughly 30 m in diameter and the sea surface in this area was more agitated than elsewhere with the wind blowing in a clockwise direction. By 0230 the waterspouts had dispersed.

Weather conditions at the time were: air temperature 29.0 °C, wet bulb 26.2°, sea 28.5° rising to 33.0° during the passing of the spouts, wind SSW'ly, force 3.

Position of ship at 0145 UTC: 03° 44′N, 99° 54′E.

Note. Mr M. Rowe, of the Tornado and Storm Research Organisation, comments:

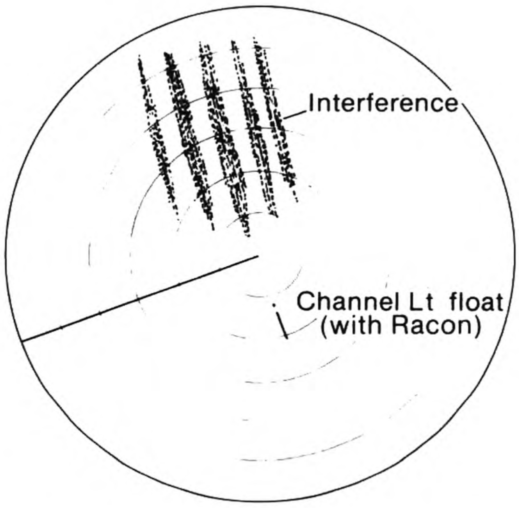
'This is a good account of a multiple waterspout sighting; it is not uncommon to see more than one waterspout, but six at once is fairly unusual. It is encouraging to find an increasing number of observers giving the direction of rotation of the spout. In theory, this should be anti-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere, but there are a number of reports of spouts rotating in the "wrong" direction, and more data on the subject are needed.'

RADAR ECHOES

English Channel

m.v. *City of Edinburgh*. Captain H.G. Gray. Southampton to Port Said. Observers: the Master, Mr P.D. Brooks, Chief Officer and Mr R.G.C. Noble, 2nd Officer.

29 March 1990. At 0900 UTC while passing to the north of the Channel light float, interference was noted on both the 3-cm and 10-cm radar screens. This took the form of 5 parallel bands, each measuring approximately 20 n.mile long by 1.5 n.mile wide, with a spacing between them of 1.5 n.mile, see sketch.



24-n.mile range

Appearing to be stationary relative to the light float, the interference was similar to that which might be experienced, for example, in the Red Sea owing to sand in the atmosphere, but at the time of the observation there was no indication of haze with the horizontal visibility at 12 n.mile.

The sea surface was inspected for anything that might suggest the presence of tide rips, but the sea appeared calm with no disturbances. Weather conditions were: air temperature 12.6 °C, wet bulb 11.0°, sea 7.0°, pressure 1035.2 mb, wind NE'ly, force 2. There was a low westerly swell.

Position of ship: 49° 59'N, 02° 56'W.

CETACEA

North Atlantic Ocean

m.v. *Churchill.* Captain J.F. Rowe. Tilbury to Rio de Janeiro. Observers: Mr S. Rathbone, 2nd Officer, Mr R.E. Tucker, Radio Officer and Mr D. Pullen, Bosun.

22 February 1990. At approximately 1200 UTC whilst the vessel was stopped and drifting for ETA purposes a school of six to eight whales was sighted astern of the ship. They had the distinctive square head of the pilot whale family, were about 5 m in length and black in colour with a large, curved fin. Swimming slowly across the stern they dived shallowly, and when they had crossed, they all dived together and were not seen again; the tail flukes were not raised upon sounding. Their identification as Shortfin Pilot Whales was confirmed after reference to *The Seafarer's Guide to Marine Life* by Paul Horsman.

About 30 minutes later the surface to port of the vessel came alive with dolphins; there were hundreds of them. They were approximately 2 m long and dark grey with lighter grey undersides; they had beaks and medium-size dorsal fins. On consulting the above guide, it was decided that these were Common Dolphins. Lazing about on the surface in pairs or groups of three or four, they occasionally rolled over on their backs or went speeding off for about 20 m before surfing to a stop again. A white object then caught the observers' attention and binoculars were trained on its last noted position, then an all-white dolphin was momentarily glimpsed. It was seen only briefly so no precise details could be recorded except that it was of a similar size to the rest of the dolphins and was very lightly speckled with grey. It was thought that this could have been an albino.

The dolphins were about the vessel for most of the afternoon, but when the vessel resumed passage they remained where they were in the slight sea and long, low swell.

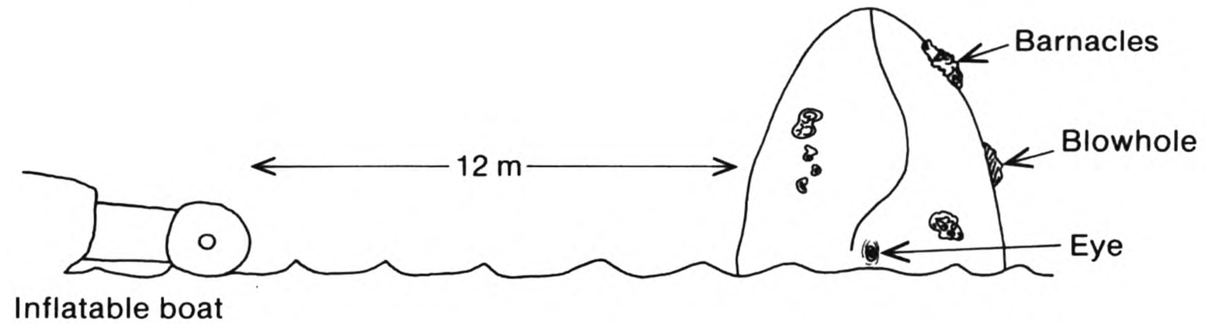
Position of ship: 08° 44'N, 26° 55'W.

Scotia Sea

R.R.S. *Bransfield.* Captain M.J. Cole. At anchor near Signy Island, South Orkney Islands. Observers: the Master, Mr G.T. Hobbs, 2nd Officer, Mr R. Jackson, 3rd Officer and members of ship's company.

3 March 1990. At about 1230 UTC a whale's blow was observed approximately 1.0–1.5 n.mile to starboard. To the observers on the bridge this was obviously a larger whale than they had recently been seeing, Minke whales being frequently observed up to this time. It was decided to launch the vessel's inflatable to investigate and have a closer look. The boat was launched with four crew and set off in pursuit of the whale. When in the approximate position of the last sighting, as guided by the observers on the bridge, the engine was cut. Several minutes passed before a blow was heard from behind, and on turning around, the observers in the inflatable sighted the whale about 55 m away.

It was immediately noticed by all that the width and size of the head took up a large proportion of the body length which was estimated to be 15 m. The colour of the whale was dark-grey/black and it did not have a dorsal fin or any ridges along its back; the blow was quite distinctive, being a 'V' shape. It then dived several times showing its flukes which were uniformly black all over. At one stage the whale surfaced head uppermost and the head came clear of the water; its mouth was curved and its eye was set back from the bottom of the jaw, see sketch, and there were also several clusters of barnacles around the head.



The whale appeared to be quite timid, not allowing the inflatable closer than about 9 m and would dive then re-surface several minutes later about 45 m away every time the outboard engine was started; it moved very slowly on the surface. After consulting *Whales of the World* by Lyall Watson, the whale was identified as a Great Right Whale.

Weather conditions were: dry bulb 0.2 °C, sea 0.6°, wind N'ly, force 3–5. Cloud cover was 8 oktas of stratocumulus. Many icebergs with bergy bits and growlers were also present but no sea ice.

Position of ship: 60° 42'S, 45° 36'W.

FISH

North Atlantic Ocean

m.v *Kagoro*. Captain E.D. Somes. Le Havre to Abidjan. Observers: the Master and Mr A. Dzator, 2nd Officer.

21 February 1990. Between 1300 and 1315 UTC the vessel passed through a group of manta rays, a total of 17 being counted from the port bridge wing during the period. They varied in size from 2–3 m up to 5–6 m although it was rather difficult to estimate accurately from a height of 28 m.

Some were a few metres below the surface but most had their wing tips touching the surface although none were seen to jump. The mantas had brown backs with horned fronts and grey areas on each side aft of the horns. Their undersides were vivid white and gleamed like phosphorous as they wheeled about. At 1345 one lone ray was passed, it was much larger than the rest but had the same colouring. It swam just below the surface and was visible at a good distance.

Position of ship: 07° 58'N, 14° 12'W.

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

'Seventeen mantas! What a remarkable sighting of so many big fish. I have no record of such a large congregation and am not sure what business they were about. Mantas are related to bottom living skate but have given up this habit to live in the thickness of the sea, often approaching the surface. They are harmless plankton feeders, but will take a fish hook and then become a violent and dangerous quarry. Since plankton is widespread and diffuse it may be that the mantas were not congregated to feed but for some other purpose, most likely reproduction. Unlike in bony fish, the sex products are not shed into the sea but copulation takes place, the young develop internally and are born alive.'

Indian Ocean

m.v. *British Trent*. Captain J.Y. MacAlpine. Visakhapatnam to Suez. Observers: the Master, Mr K. Patterson, 2nd Officer and Mr J.H. Parry, Chief Engineer Officer.

2 January 1990. The fish shown in the photograph opposite page 8 was discovered on deck by the Master after it had presumably been washed on board whilst the vessel was shipping slight seas.

Metallic silver in colour, it measured 70 mm from mouth to tail and was 50 mm deep while its width was 20 mm. The fish had a bloated appearance and was studded with rows of short spines which were about 3 mm tall.

Position of ship: 11° 10′N, 54° 52′E.

Note. Dr F. Evans comments:

'There are a great many species of tropical puffer fish and tobies, perhaps around 130. They mostly live not far from land and some are freshwater fish. A few are edible, but puffer flesh tends generally to be toxic. So, while most are too small to be considered for the pot, they should not be fed to the ship's cat either. Puffers, when alarmed, inflate themselves when in water by gulping water and when in air by gulping air.

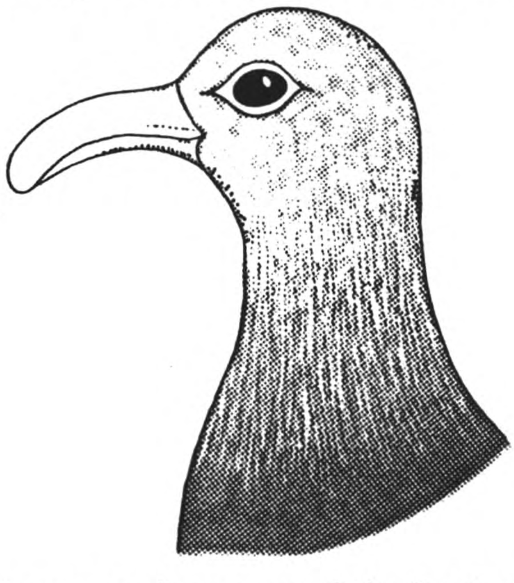
'After rumination and consultation I have concluded that this particular puffer species is the small Burrfish (*Chilomycterus reticulatus*) whose range is given as "Indo-Pacific".'

BIRD

Bismarck Sea

m.v. *Nimos*. Captain C.C. Macdonald. Kimbe, New Britain to Kavieng, New Ireland. Observer: Mr G.A. Hadley, 3rd Officer.

21 February 1990. At 2300 UTC while approaching Willaumez Peninsula, New Britain, the bird shown in the sketch was observed resting on the vessel's gantry crane approximately 12 m away. It was about the size of a domestic



pigeon and was a sooty-grey colour around the head and neck, with a much darker body, possibly dark grey or dark green as it appeared to have a metallic sheen. The breast was paler, possibly white while the eyes had a very pronounced spectacle, also white in colour. The bird's eyes were large and black whereas the beak was grey, sickle-shaped and was as long as the head was deep. As the bird rested with its legs close underneath no description of these could be taken. It was not seen to alight but was observed on board for about one hour.

At the time of the observation the wind was SE'ly, force 1.

Position of ship: 04° 56'S, 149° 50'E.

Note 1. Commander M.B. Casement, of the Royal Naval Birdwatching Society was unable to positively identify the bird, so forwarded the report to his colleague, Captain N. Cheshire, in Australia, for further comment. Captain Cheshire concluded that the most likely identification was the Grey Imperial Pigeon, also known as the Island Imperial Pigeon (*Ducula pistrinaria*).

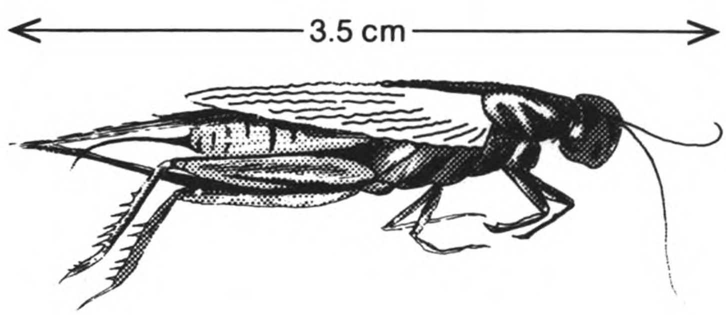
Note 2. The *Nimos* is a Selected Ship of the Australian Voluntary Observing Fleet.

INSECTS

South Atlantic Ocean

m.v. *Jostelle.* Captain B.G. Longley. Saldanha Bay to Koper. Observers: Mr J. Barrett, 2nd Officer and Mr P. Birt, Radio Officer.

5 February 1990. At 0600 UTC whilst the vessel was proceeding between Saldanha Bay and the Archipelago dos Bijagos, the insect shown in the sketch was discovered on the deck in the Radio Room. When attempts were made to capture it, it took off and flew around just above the deck. However, it was eventually caught and the following observations made.



Its body was 35 mm long, breadth 7 mm, wing-span 37 mm and the antennae measured 20 mm. Except for two small rust-coloured patches at the top of the legs, its body and head were entirely black. The wings consisted of one small, black upper wing on each side plus a transparent, larger, lower wing. The black upper wings may have been simply protective cover for the more fragile lower ones.

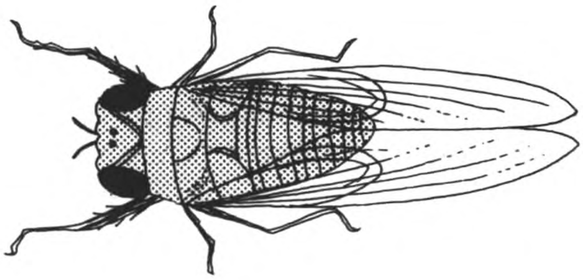
As the vessel was some 360 n.mile off the Namibian coast, it seemed possible that the insect may have boarded the vessel at Saldanha Bay.

Position of ship: 18° 30'S, 05° 12'E.

Indian Ocean

m.v. *Cardigan Bay*. Captain A.J. Leslie. Singapore to Jeddah. Observers: the Master, Mr K.W. Smith, Chief Officer, Mr C.D. Levesley, 2nd Officer, Mr B.G. Ball, 3rd Officer and ship's company.

17 March 1990. At 0300 UTC the insect shown in the sketch was discovered in a shady corner of the bridge console, the ship having rounded the north-west



coast of Sumatra a few hours earlier. It was about 6 cm long and 1.5 cm wide, with a black body which had a diagonal row of light-brown spots on each side. There was also light-brown colouring on its upper legs. The insect possessed two pairs of clear wings, the second pair being under the first and much smaller.

Although its appearance was quite aggressive, it was decidedly lethargic and offered little resistance when handled.

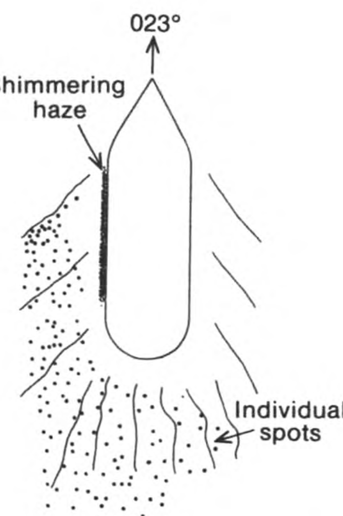
Position of ship: 05° 55′N, 91° 58′E.

BIOLUMINESCENCE

North Atlantic Ocean

m.v. *Tricula*. Captain R.G. Savage. Tubarao to Gijon. Observer: Mr J.G. Legg, 2nd Officer.

20 January 1990. At approximately 0210 UTC the vessel passed through several patches of very different bioluminescence. As shown in the sketch, alongside the port side of the ship's hull was observed a bright, greenish-white



shimmering haze, giving the effect of the hull being lit from underneath by under-water lighting. At the same time in the broken water of the wake approximately 6–15 m from the ship's side, hundreds of small, bright individual greenish-white 'spots' were observed. This gave the impression of lights bobbing around on the sea surface and stretched aft for about 45–90 m, giving off a faint glow and turning the propeller wash into a confused and jumbled mass of bobbing, twinkling lights. This lasted 10–15 minutes before the sea became dark again and the bioluminescence disappeared.

Weather conditions were: air temperature 23.5 °C, wet bulb 23.0°, sea 25.0°, wind NNE'ly, force 4. The sky was overcast with haze and there was a moderate sea with low swell.

Position of ship: 10° 08'N, 24° 55'W.

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

'This is an unusual report in so far as the luminescence round the hull is usually a steady glow rather than a shimmering light. I believe this can be attributed to the vessel encountering a large patch of either comb-jellies or siphonophores. These jellies flash very brightly and very briefly, and readily disintegrate into many flashing fragments when in extreme turbulence. The mass of short, bright flashes as the animals encountered the turbulence around the hull would produce a shimmering appearance as described, while the individual animals (or segments) would account for the bright spots observed away from the hull. The propeller wash contained both elements, aptly described in the report.'

Arabian Sea

s.s. *Lima*. Captain A.D. Straight. Aruba to Mina-al-Fahal. Observers: Mr A.F. Devanney, Chief Officer and Mr R. Gansena, Fitter.

28 February–1 March 1990. During the evening the observers were on deck adjusting the ballast for arrival at the landing port when the Chief Officer noticed what appeared to be diffuse lighting on the sea. On going to the ship's side rail for closer inspection it appeared as if there were floodlights underneath the hull, and the whole ship's length was bathed in the glow from them. On the bow wave wavelets there was very bright luminosity of a fluorescent green colour (almost a white green) as the wavelets broke and this effect stretched far astern. Crossing the deck to see if there was a similar effect on the other side he was not disappointed, and on going forward to see what was visible over the bow, the Chief Officer could hardly believe the sight that greeted him. Sure enough, there was the diffuse light like a 'back glow' and much bioluminescence in the bow wave, but what made it breathtaking were dolphins which were swimming ahead of the ship. They were just breaking the surface, darting from side to side and criss-crossing one another's path. Their snouts were like arrowheads of luminescence which continued down the length of their bodies to meet the bow wave. As they swam across one another the trails appeared to be alive and fluid.

The Chief Officer was spellbound; five or six dolphins were putting on the show, and he stood enchanted, watching them for more than 20 minutes before tearing himself away and back to the task in hand. However, it was impossible not to stray forward again at intervals to see if all was as it had been, and much to his delight, it was.

By the early hours of 1 March there were only two or three dolphins remaining but everything else was still the same; it was if they had been giving a private performance and there were just the curtain calls to come. It was a most enjoyable interlude in a long night.

Position of ship: 20° 35'N, 60° 15'E.

Note. Dr P.J. Herring comments:

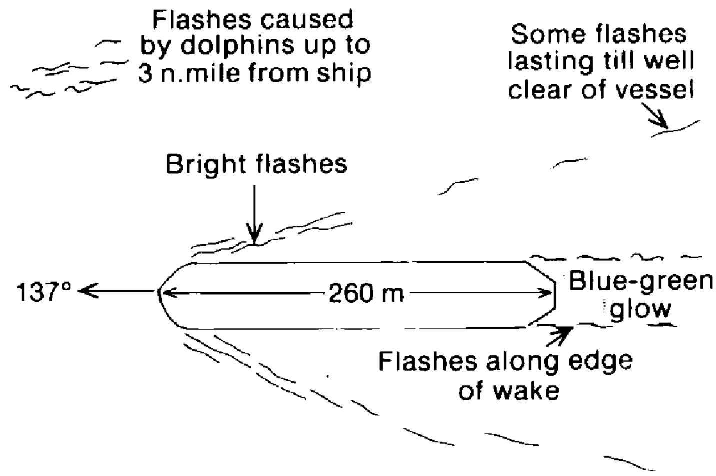
'This is a fascinating account of one of the most glorious sights involving bioluminescence. The trails produced by dolphins ahead of the bow in such circumstances are an amazing sight and anyone who has seen them feels privileged. I was lucky enough to see a similar scene in the Mediterranean many years ago, but still remember it vividly.

'The diffuse lighting does not seem to be a manifestation of the "milky sea" phenomenon, but rather an intense local luminescence produced by a bloom of dinoflagellates, or similar small organisms, in the surface waters. These produced an intense light over the whole surface of the hull which was reflected back out into the water as a diffuse light. The Arabian Sea is an area noted for such locally intense phenomena.'

Gulf of Oman

m.v. *British Success*. Captain A.R. Wilkinson. Jebel Dhanna to Kwinana. Observers: Mr J. Cook, 2nd Officer and Mr A.B. Sedge, 3rd Officer.

15 March 1990. Between 1500 and 1800 UTC large numbers of flashing lights could be seen in the bow wave of the vessel, see sketch. These flashes were seen to last for reasonably long periods of time, with some of the brightly illuminated areas of water not fading away until well past the stern. More flashes were observed at the edges of the ship's wake while the wake itself was illuminated with a blue-green glow.



Patches of flashing light could be seen up to about 3 n.mile from the ship. On closer examination these were found to be caused by schools of dolphins breaking the sea surface.

Position of ship at 1800 UTC: 23° 12′N, 59° 36′E.

Note. Dr P.J. Herring comments:

'The flashes in the bow wave and wake were probably produced by luminous jellies, many of which are capable of producing very bright flashes when disturbed by the bow wave or the local activities of dolphins. The glow in the wake was probably more a consequence of additional smaller organisms, such as dinoflagellates or ostracod crustaceans, which were also present in the water. The visibility of the dolphins at up to 3 n.mile is quite remarkable and demonstrates how bright the luminescence must have been.'

DISCOLOURED WATER

Indian Ocean

m.v. *Gas Enterprise*. Captain E. Thorp. Arabian Gulf to Ulsan. Observer: Mr P. Hebden, Chief Officer.

5 March 1990. At 1200 UTC the ship was passing through a large area where the sea surface was covered with some form of scum. The colour of it was a sort of

reddish-brown and it was also very lightweight, almost like a dust resting on the surface. Below the surface down to a depth of about 2 m, many pieces of more solid debris could be seen. These were fawn/cream in colour and seemed almost fibrous, like a very fine weed in strands. Attempts to obtain a sample of the 'weed' proved unsuccessful. One curious effect of the scum was that there were no wind waves near it despite there being a definite breeze; the effect was similar to the sea being covered with a light oil. In fact, the only place where wind waves appeared was in the ship's wake some distance astern, that is, the reverse of normal where a 'calming' effect is usually noticed, while wind waves could be seen towards the Indian coast at a distance of approximately 3 n.mile. The surface scum was streaked in the direction of the wind.

At the time of this phenomenon the ship's track was parallel to the Indian coast at a distance of 40–50 n.mile and the depth of water varied between 100 and 200 m. The area covered by the debris seemed too large to be any form of marine pollution. At 1230 the amount of debris lessened and the wind waves returned 'filling in' from the direction of the coast, while the depth of water increased to more than 200 m.

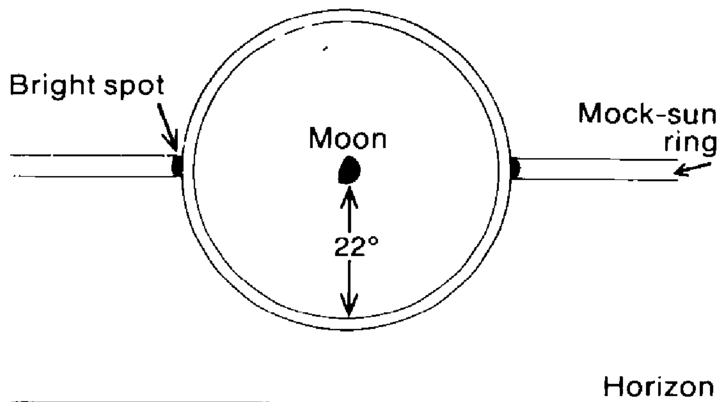
Position of ship: 10° 42'N, 75° 16'E.

HALO

South Pacific Ocean

m.v. *Canterbury Star*. Captain C. Jackson. Panama to Valparaiso. Observers: Mr M.W. Speers, 3rd Officer and Mr S. McKeown, Lookout.

8 March 1990. At 0100 UTC when the moon was at an altitude of about 55° the halo shown in the sketch was clearly seen and was accompanied by a 'mock sun'



ring running from outside the halo while parallel to the horizon. The sky was lightly overcast at the time and so it was difficult to see the extent of this ring.

Position of ship: 13° 12'S, 78° 57'W.

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

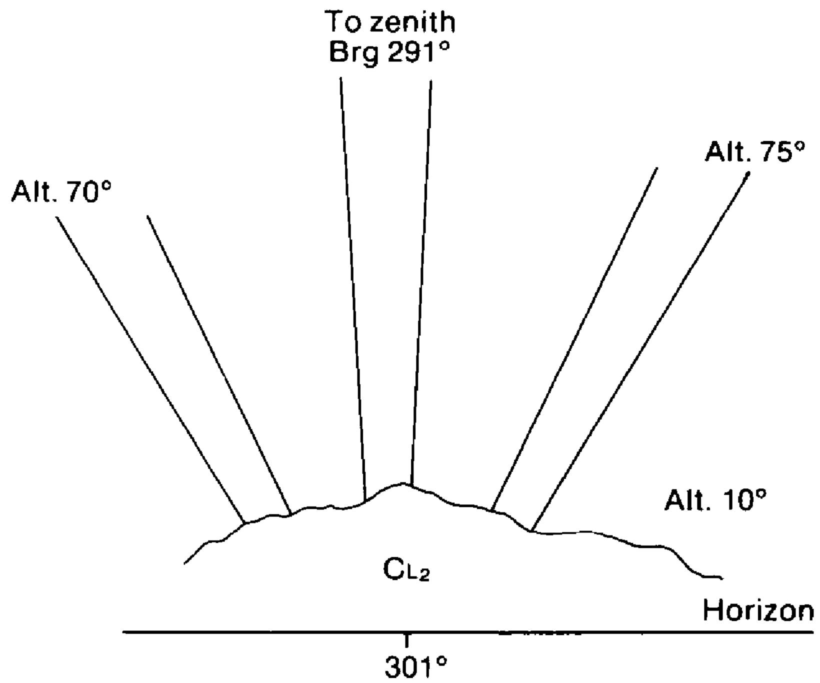
'This is a fairly standard observation as the observers recognise they have a 22° halo. The brighter spots seen at either side were the paraselenae or mock moons; the fragments of the "mock sun ring" or paraselenic circle which was seen would perhaps be better described as the "tails" of the paraselenae.'

ANTI-CREPUSCULAR RAYS

Indian Ocean

m.v. *ACT 2*. Captain M. Thwaite. Fremantle to Jeddah. Observer: Mr D.W. Lax, Chief Officer.

19 January 1990. At 0052 UTC three quite distinct anti-crepuscular rays were observed on the western horizon whilst the ship was on a course of 301°. These rays were as shown in the sketch and were coloured a delicate pink/orange. Their width was one finger's width at arm's length with a gap of two fingers' width between them to starboard and two and one-half widths to port.



The area between the rays appeared a more intense blue than the sky outside them. The central ray reached the zenith while the remainder were shorter. At 0056 the side rays disappeared whereas the central one extended to cover an arc of about 130° from the horizon through the zenith and then astern of the vessel. This ray remained visible till 0130, although somewhat diminished in brightness, until obscured by cloud. Astern of the vessel there were large cumulus clouds and also some cumulonimbus.

Position of ship: 08° 10′S, 73° 34′E.

METEORS

Indian Ocean

m.v. *Staffordshire*. Captain C.O. Thomas. Juaymah to Singapore. Observer: Mr W.J. Clear, 3rd Officer.

31 January 1990. At 1520 UTC while on a course of 089° and taking a compass error using Polaris overhead the ship a meteor fell from behind some small cumulus clouds, making an angle with the horizon of about 60°. It turned a

bright, yellow-white colour and was on a bearing of approximately 305°. Until 1533 a whole series of bright lights fell in the same region at intervals of 10 to 15 seconds, with 25–30 falling in total. Each one was of the size of a large star, they were visible for 2–3 seconds and left a small trail. The sky was covered by about 4 oktas of cloud, the wind was NE'ly and the visibility was good.

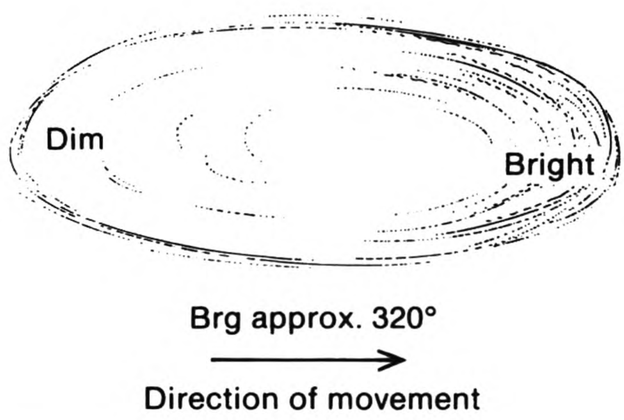
Position of ship: 05° 54'N, 89° 39'E.

UNIDENTIFIED LIGHT

North Atlantic Ocean

m.v. *British Spirit*. Captain M.T. Gordon. Blang Lancang to Guayanilla. Observers: Mr M.C. Rattue, 3rd Officer, Mr P. Brennan, 3rd Engineer Officer and Mr E. Tattao, Watchkeeper.

21 January 1990. In the night sky at 1945 UTC at an approximate altitude of 30°–35° there appeared a visibly growing phenomenon roughly conforming to the shape shown in the sketch. It seemed brighter towards its north-eastern end.



The approximate bearing of the light was 320° and it was sufficiently luminous so as to appear in sharp white contrast with the clear, starry background. It remained observable for a few minutes, turning from white to amber and finally to a dull red before it disappeared. From the beginning of the observation to its eventual conclusion five minutes later, the phenomenon appeared to change its bearing through 10° from port to starboard but did not appear to alter in altitude.

Position of ship: 06° 45'N, 48° 23'W.

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

'It is most likely that this observation was associated with the launch of a satellite, SPOT 2 (Ariane 4–07), from Korou in French Guiana.'

551.593.63

Rare vertically elliptical haloes *

By J. Hakumäki† and M. Pekkola††
(†Kuopio and ††Helsinki, Finland)

In December 1987 two Finnish amateur astronomers observed and photographed a peculiar vertically elliptical ring surrounding the moon. A literature study carried out soon after this first observation brought to light ten reported historical cases of this type of rare halo phenomenon. It was found out that the existence of these elliptical haloes has been uncertain due to the lack of photographic evidence. One indication of this is that none of the major modern works on haloes mention such phenomena. During 1988 three more elliptical haloes were seen by the Finnish halo observing network. Observations and photographs taken of these phenomena seem to indicate that at least two types of elliptical halo exist. The smaller one was first reported by a U.S. astronomer Frank Schlesinger in 1908 and its vertical axis has in all four possible cases been about 7°. No name has been suggested for this halo. The larger one seems to have a vertical axis of about 10° and it has been called as the 'halo of Hissink' by Dutch halo observers. Outside The Netherlands this rare halo has received little attention.

Historical reports on elliptical haloes

The only common and theoretically well explained elliptical halo is formed when the upper and lower tangential arcs of a 22° halo join together as the circumscribed halo, which is horizontally elliptical. The majority of articles and books written on haloes do not mention any other elliptical haloes. A few historical observations report vertically elliptical haloes. Details from these reports are summarized in Tables 1, 2 and 3. Tables 1 and 2 include the ellipses recently seen by the Finnish and Dutch halo observing networks and earlier phenomena of about the same size. These observations are briefly discussed in the following sections.

The first reported observation of an elliptical halo was made by C.M. Broomall in Media, Pennsylvania, on 23 March 1901. Broomall's (1901) letter to *Science* asked for an explanation from the readers of the journal. At that time nobody tried to answer Broomall's question and seventy years later W.R. Corliss (1984) was perhaps the only one to quote his observation in the Sourcebook Project collection of uncertain rare anomalies.

In the second observation by Hissink, 28 June 1901, (Figure 1) accurate measurements were made with an octant. These gave a vertical axis of about 10.5° and a horizontal one of about 7.5°. This observation was noted by two Dutch scholars, Minnaert (1954) and Visser (1957, 1960). The latter referred to

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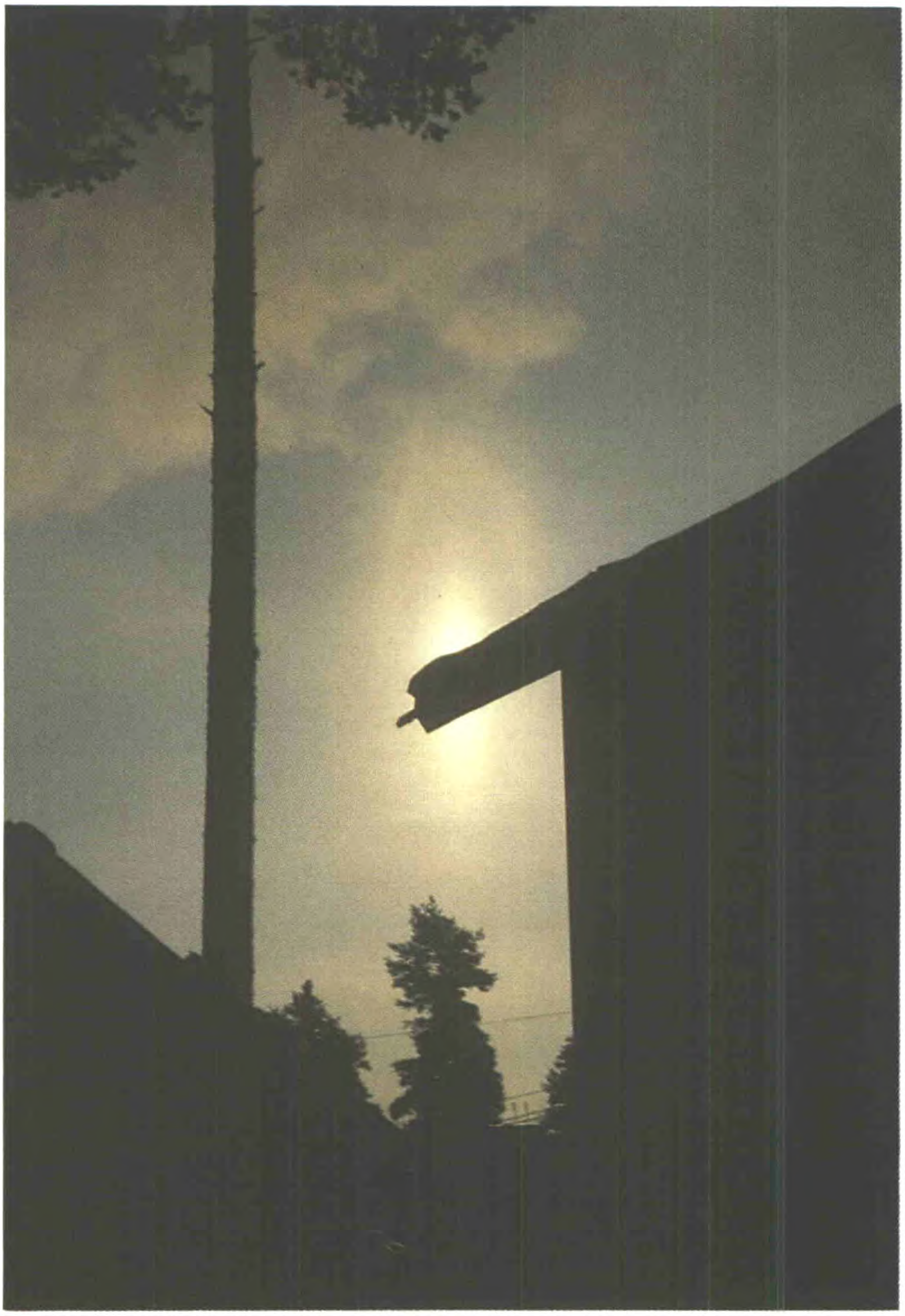
Presentation of barographs at Bracknell Headquarters on 31 July 1990. Standing, left to right: Mr F. Singleton (Divisional Director (Observations), Met. Office); Captain P.J.R. Manson (P.& O. Containers Ltd); Captain P.J. Clark (P. & O. Containers Ltd); Captain S.J. Lawrence (British Antarctic Survey); Mr W.M. Sievwright (Establishment Officer, British Antarctic Survey); Captain S.E. Bligh (Fleet Operations Manager, P. & O. Containers Ltd). Seated, left to right: Mrs Manson; Mrs Clark; Mrs Lawrence. (See page 34.)



Photograph by J. Hakumäki

The halo of Hissink in Kuopio, Finland on 18 February 1988 between 1030 and 1045 GMT. (See page 22.)

Table 1 — Observations of the 'halo of Hissink'

Date	Time (GMT)	Duration	Source	Altitude	Vert. diam.	Horiz. diam.	Colour	Place	Observer
25.02.1901	?	>15 min	Moon	?	9°	6°	?	Media, Pa, U.S.A	C.M. Broomall
28.06.1901	1335–1355	20 min	Sun	47° 50′	10.5°	7.5°	red, white	Zutphen, NL	Hissink
26.01.1977	1930–	'short'	Moon	41°	10°	4°	?	Leiden, NL	K. Neve
18.02.1988	1030–1050	<40 min	Sun	14.5°	10.7°	3.3	orange, white	Kuopio, SF	J. Hakumäki
23.04.1988	2106–2110	4 min	Moon	30°	9.7–12°	5.4–6.5°	white	Espoo, SF	T. Kinnunen

Table 2 — Observations of the small elliptical halo

Date	Time (GMT)	Duration	Source	Altitude	Vert. diam.	Horiz. diam.	Colour	Place	Observer
26.01.1908	0925, 0931	1 min	Moon	36–37°	7°	3–3.5°	white	Pittsburgh, U.S.A.	F. Schlesinger
02.12.1908	0100–0200	1 hour	Moon	42–38°	7°	4°	white?	Pittsburgh, U.S.A.	Jordan & Baker
07.12.1987	1950–2012	>22 min	Moon	35–37°	7–7.5°	4–5°	white	Espoo, SF	E.& T. Kinnunen
07.01.1988	2125–	>1 hour	Moon	24.5°	6–7°	2–3°	white	Ylitornio, NF	J. Kallijärvi

Table 3 — Observations of some elliptical haloes

Date	Time (GMT)	Duration	Source	Vert. diam.	Horiz. diam.	Colour	Place	Observer
18.03.1918	1930–	'consid. time'	Moon	46.6°	42.8°	?	Craigness, Surrey, G.B.	J.B. Dale
14.12.1926	2300–2330	>30 min	Moon	?	?	red-blue	Near Vita, Man., CAN	G.P. Morse
15.04.1943	1200	<2.5 hours	Sun	46°	40°	'silvery'	Near Chiemsee, D	W. Maier
08.07 1958	1200–1230	>30 min	Sun	40°	30°	?	45° 45′N, 45° 40′W	R.E.W. Butcher
08.03.1963	0010–	>30 min	Moon	48°	40°	?	07° 18′S, 12° 36′E	T.D. Willey

an earlier work by Bravais (1847) in explaining Hissink's ellipse with a special type of pyramidal ice crystal (Figure 2). According to Visser, refraction in this crystal gives this halo a vertical axis of 10° 31′ and a horizontal one of 7° 30′ at a source elevation of 47° 50′.

On the morning of 26 January 1908 Prof. F. Schlesinger was making observations with the Keeler reflector at Allegheny Observatory when he noticed a curious lunar halo (Schlesinger 1913). His paper described in detail two observations of a small elliptical halo, for Schlesinger had requested the staff of the observatory to look for such a phenomenon; ten months after the first sighting Prof. Jordan and Dr Baker did succeed in seeing it again. Both observations gave vertical axes of 7°. The article was followed by a comment by the editor of *Nature*, suggesting the halo was nothing else but 'Hall's halo', a halo ring of about 8–9° radius mentioned and explained by Pernter and Exner (1922). This is not surprising because these authors represented some smaller rings and Hissink's ellipse, incorrectly, as the same phenomenon.

Modern observations

The last known sighting of an elliptical halo before the Finnish observations was made on 26 January, 1977 in Leiden, The Netherlands by K. Neve (Figure 3). Neve described his observation as follows: 'On 26 January I observed an, at first sight, strange halo. This occurred at about half past eight in the evening. The weather was fair. Altocumulus clouds moved by frequently. At about the above mentioned time a small field of cirrocumulus and cirrus moved just before the moon. In this I saw a clear oval shape of a ring which fairly contrasted against the dark sky. The lunar elevation amounted to 41°. The horizontal diameter was 4°; the vertical diameter was 10°. Because of the small cloud field the halo persisted only for a short time. Almost certainly I have seen the halo of Hissink.' (Translation from the original observation by P-P. Hattinga Verschure.)

On 7 December, 1987, Esa and Timo Kinnunen observed a small elliptical halo in Espoo, Finland (see Figure 4). It was also seen by Markku Nousiainen in Espoo. Again the halo was formed around the moon and the observers first thought it to be a strange corona as there was slight snowfall and low clouds present. After a while it began to look as if the phenomenon was well above the lower clouds, and when also a pillar could be observed it was confirmed as a halo. The halo and the pillar seemed to form an elliptical disk of nearly uniform brightness. In the final report the ring was said to be caused by 'ice fog?'. Measurements on photographs of the ellipse, in which the size of the moon was used as a scale, gave 7–7.5° for the vertical and 4–5° for the horizontal axes.

These results unveiled a totally new situation. Based on crude measurements made during the observation, the ring was first thought to be the halo of Hissink. Later, after literature study, it became evident that the phenomenon might well be the smaller, apparently rare ellipse observed twice by Schlesinger and his colleagues in 1908.

The fourth and last observation of the small elliptical halo was reported a month later, on 7 January, 1988, in Ylitornio, northern Finland. Observer, Jukka Kallijärvi, is not a member of the Finnish halo observing network and therefore neither measurements nor photographs of the halo are available. However, according to the observer the size of the moon in his drawing is fairly accurate. The approximate, somewhat uncertain axes of the halo shown in Table 2 are therefore based only on Kallijärvi's drawing (Figure 5).

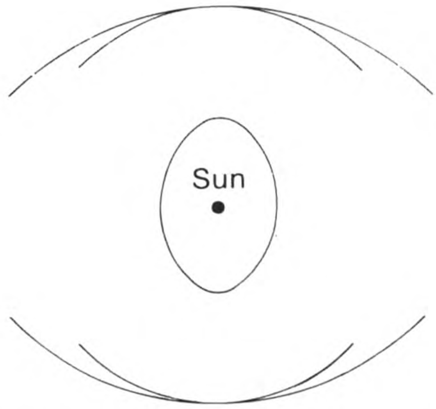


Figure 1. A halo display including an elliptical halo seen by Hissink on 28 June 1901 at 1335–55 GMT, in Zutphen, The Netherlands. Note that the ellipse was drawn (KNMI 1902) twice as large as it should have been according to the original measurements by Hissink.

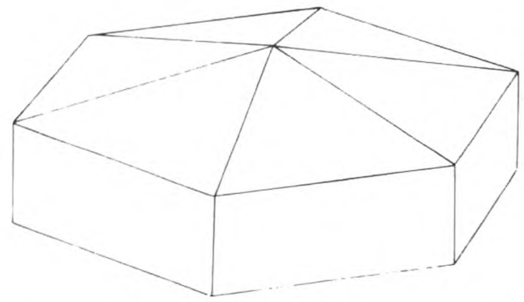


Figure 2. According to the proposed theory (Bravais 1847 and Visser 1957) the halo of Hissink is caused by a crystal of this type. The top and bottom faces of the crystal form an angle of 80° with the main vertical axis of the crystal (The Hauy principle n:m=4:1).

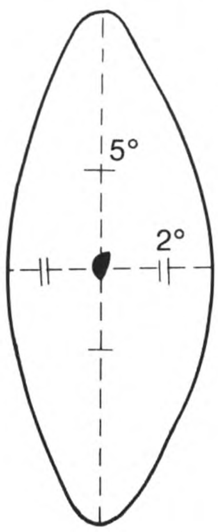
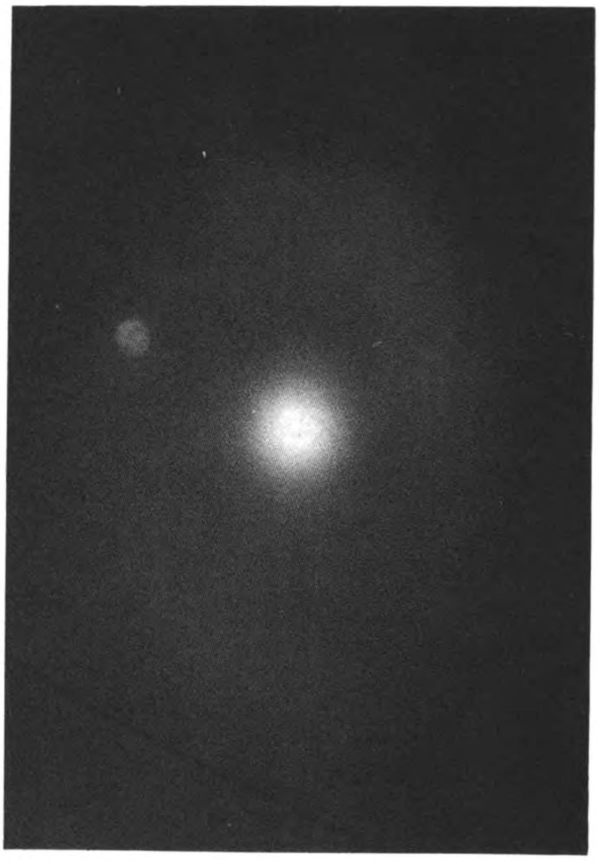


Figure 3. Original drawing of the halo of Hissink on 26 January 1977 at 1930 GMT, in Leiden, The Netherlands by K. Neve.



Photograph by Esa Kinnunen

Figure 4. An elliptical halo of about 7° vertical axis over Espoo, Finland, 7 December 1987, at 1811 GMT. The ghost image of the moon on the left side is caused within the lens. Authors are not aware of any earlier photographs of this elliptical ring or of the halo of Hissink. Photographs of the ellipse of 7 December were first published in April 1988 (Pekkola, 1988).

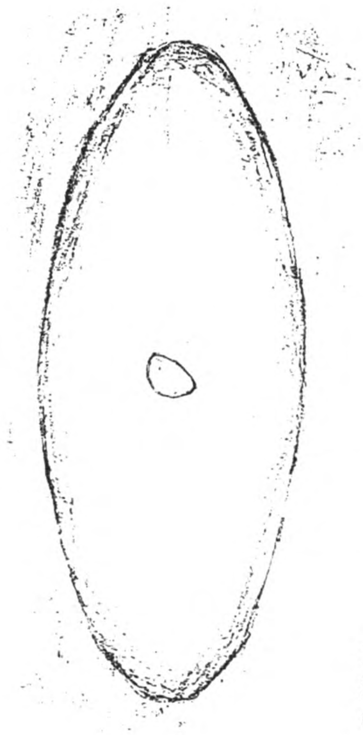


Figure 5. A drawing by Jukka Kallijärvi of the elliptical halo of Schlesinger in Ylitornio, Finland, on 7 January, 1988 at 2125 GMT.

Opposite page 25

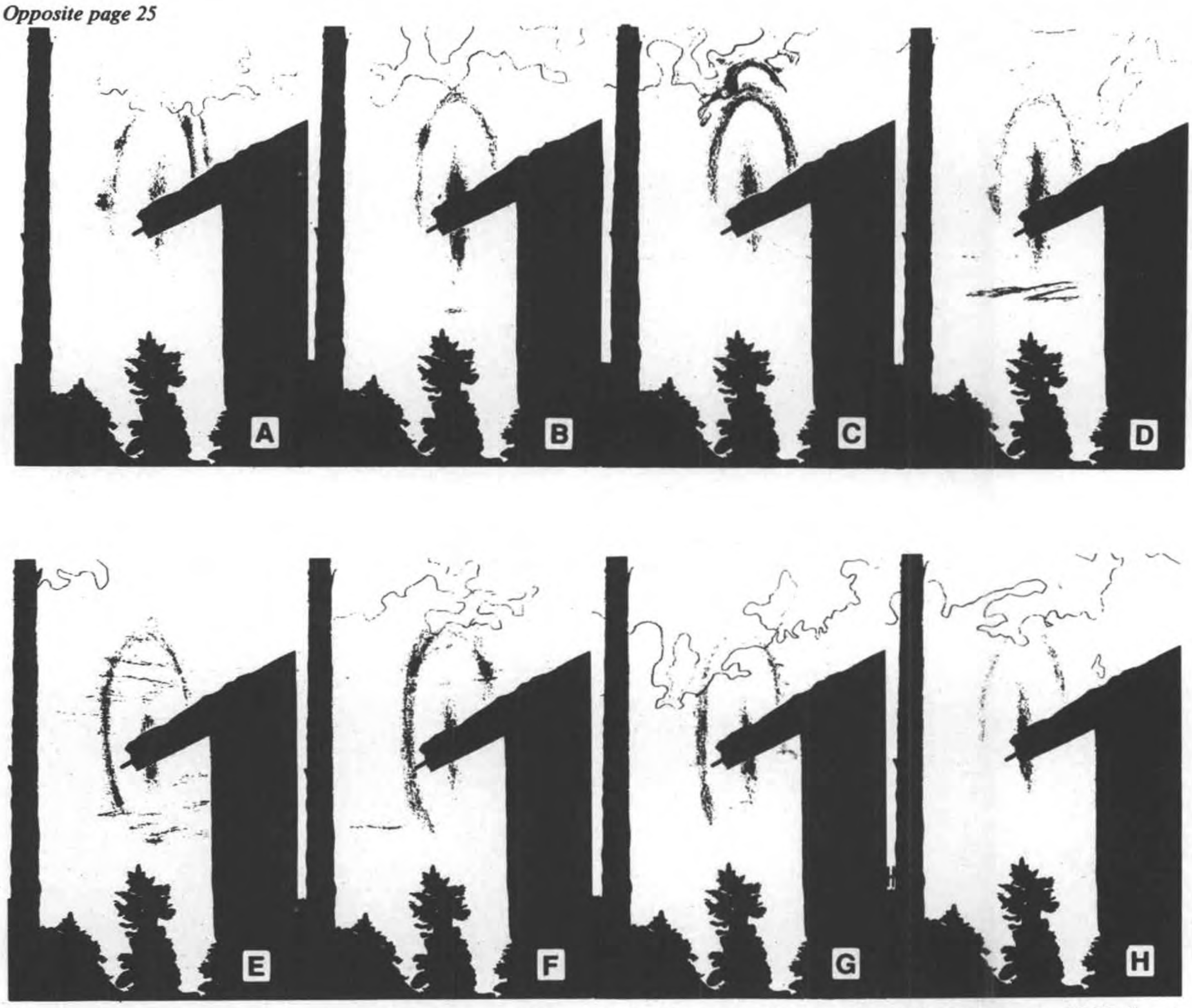
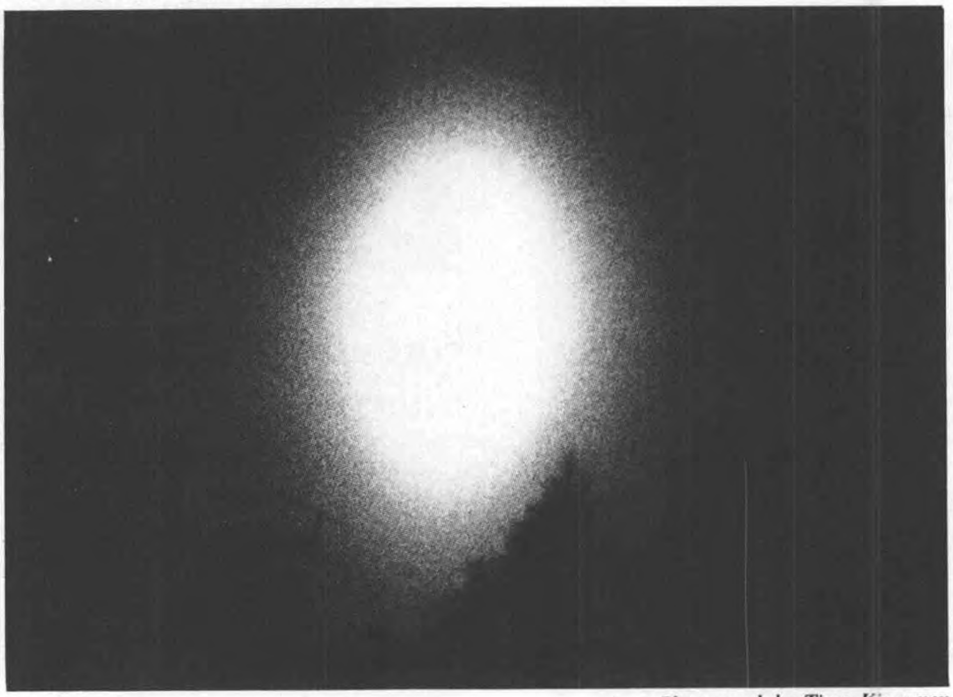


Figure 6. The development of the halo of Hissink in Kuopio, Finland on 18 February 1988 from 1030 to 1045 GMT. The drawings (A–H) are based on photographs taken at intervals of approximately two minutes. Thin lines represent areas of smoke. (Drawings by Juhana Hakumäki). See also the photograph opposite page 20.



Photograph by Timo Kinnunen

Figure 7. The halo of Hissink as it appeared around the moon in Espoo, 24 April 1988, at 2110 GMT. The halo ring itself is located on the border of the elliptical glare.

The third observation of the larger elliptical halo was made by the Finnish network on 18 February 1988 in Kuopio, Finland, by Juhana Hakumäki (see Figure 6). The surface temperature was around −15 °C and dense ice-fog was present forming a flat, twinkling field against the ground. At half past noon, an elliptical halo suddenly appeared. To quote Hakumäki, 'Having waited anxiously for such a halo to appear it was indeed a breath-taking event. It seemed to grow from the sides upwards until it formed a firm, solid, elliptical arch above the sun, nearly as bright as the pillar'. The halo was fully developed for only a couple of minutes during its 20-minute appearance. Before it vanished, the author managed to alert another observer of the network, Timo Nousiainen, also to witness the event. Photographs of the phenomenon were measured and the axes of the halo were about 10.7° vertically and 3.3° horizontally. Although the horizontal dimension is half as small, the vertical value coincides remarkably with that of Hissink's (10.5°).

The most recent observation was made during the night between 23 and 24 April 1988 in the neighbouring cities of Helsinki and Espoo in Finland. Most of the time the phenomenon was merely a hazy elliptical field of light around the moon without a clear halo-like border. it was seen and described as such by Markus Hotakainen (Espoo), Timo Kinnunen (Espoo), Veikko Mäkelä (Helsinki), and Marko Pekkola (Helsinki). Soon after midnight this type of appearance changed only for four minutes when the ellipse itself appeared and was observed by Kinnunen (see Figure 7). Results from his photographs are presented in Table 1. Again there was uncertainty about the origin of the halo. It was reported as originating from either ice-fog or cirrostratus or both.

Observations of related phenomena

In almost all of the Finnish observations (the only exception being Kallijärvi's) a short pillar has accompanied these haloes. It is reasonable to suspect this pillar is also formed by the same crystals as the ellipse itself, since the lack of usual haloes also indicates the lack of usual ice crystals.

A few hours before the fourth Finnish observation of 23 April, an interesting phenomenon was seen in Turku (160 km west from Espoo). A single brightening about 6.5° below the sun was observed by Pekka Parviainen. This brightening was visible for about 10 minutes. The angular distance of 6.5° is not far from the suspected vertical semiaxis of the halo of Hissink, and because of the date and time of this observation it is easy to suspect this phenomenon is somehow related to elliptical haloes.

In the first photograph of the halo of Hissink in Kuopio (18.2.1988), there is also a faint trace of a possible halo outside the halo of Hissink (see Figure 6(a)). The angular distance of this feature from the sun was measured to be about 0.5° greater than that of the actual halo. This is, however, a most uncertain phenomenon, since industrial smoke could have caused this form and it is not visible in the following photographs.

Elliptical haloes of 7–11° vertical axes are not the only vertically elliptical haloes that have been reported. Table 3 represents details of larger ellipses. To our knowledge, none of these have yet been photographed and so their existence remains uncertain.

Summary of observations

On all occasions, elliptical haloes have been observed without any other halo components except a short pillar. Once, the 22° halo and the circumscribed halo were also seen (see Figure 2), but these were reported being visible in another cloud type than the ellipse itself. Solitary appearances seem to favour Visser's hypothesis that at least the halo of Hissink is produced by its own type of crystal.

The most striking feature in the observations is the clear majority (7 out of 9) of ellipses seen around the moon. One explanation to this is the dazzling brightness in the vicinity of the sun, which easily hides a halo of small size. As the moon is a more subtle source of light, a reasonably well developed ellipse of medium brightness is easier to see.

Another reason might be that more observers are around at night. Observatories and amateur astronomers conduct their observations at night and a curiosity appearing around the moon is therefore more likely to be noticed.

A third explanation is possible, and that is nocturnal temperatures. Perhaps the crystals causing these haloes require special temperatures to form and these conditions could only be met at night? Seven out of the nine observations have been made during wintertime.

Differences between the dimensions of haloes in Figures 4 and 6 are obvious. Therefore, it seems that at least two elliptical haloes of different size exist in nature.

The investigation of whether or not the theory presented by Bravais and Visser for the larger one is correct would be welcome. The smaller one has no theory. The exact behaviour of these haloes with different altitudes of the sun and moon is not known. Table 1, however, shows that the horizontal axis and altitude might correlate.

Furthermore, are these phenomena related to Bottlinger's rings? These elliptical rings are sometimes seen around the sub-sun but have not been adequately explained. There is a startling resemblance both in size and appearance between the small ellipse and a photograph of Bottlinger's ring in Scorer's *Clouds of the World* (Scorer, 1972; see also Greenler 1980).

Nomenclature questions

The smaller elliptical halo has yet no name. As Greenler (1980) has suggested, hard-to-remember observer names that have nothing to do with the physical appearance of the actual phenomena should be avoided. This applies especially to haloes of abnormal radii, which should rather be identified by their radius. We agree with this. There are, nevertheless, more difficult cases in which nomenclature after observers would be preferable. Examples of these are the different anthelic arcs (where Greenler himself introduced names of theoreticians to be used) and elliptical haloes. We find 'the halo of Schlesinger' better than any variation of the theme 'an elliptical halo with a vertical axis of about 7 degrees'. After all, amateur halo observers should not be totally deprived of the opportunity that has inspired so many comet observers.

Sourcebook Project anomalies

Experience in dealing with amateur observations gives no delusions on the accuracy of these reports. It is easy to agree with White (1981) that most of the claimed halo anomalies included in Sourcebook Project (Corliss 1977, 1984) probably result from either mistakes in observing or inaccuracy in representation of these sightings. However, as observations of elliptical haloes have now shown, this is not the case with all of them.

Acknowledgements

The authors wish to thank Markus Hotakainen, Timo Kinnunen and Veikko Mäkelä for helpful assistance. Especially we are in gratitude towards the leader of the Dutch network, Peter-Paul Hattinga Verschure (Deventer, The Netherlands) for assisting on Dutch observations.

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Last days of the *Dowsing* light vessel

By T.J. Boult

(Navigating Officer, NERC)

In April 1989, Mr Boult spent two weeks on the *Dowsing* light vessel to experience and record the life of the five lightsmen, prior to complete automation of the Trinity House light vessel service. This was made possible by the generous support of Trinity House, Northern Arts and The *Cutty Sark* Society.

'Sheer dedication,' I said admiringly to Alf. Dripping wet, with hair dishevelled by a mean wind, he plunged back into the lookout shelter of the *Dowsing* light vessel, reverently clutching the hand-held anemometer.

'Stupidity more like,' he replied with a laugh.

As one of the last manned light vessel stations in service and nearing the date of its automation, the time-honoured tradition of carrying out visual weather observations continued. As a coastal station for the shipping forecast, observations on the *Dowsing* offered the thrill of anonymous fame for the lightsmen. Fifteen times each day, an airy ascent to the monkey island was made, as part of the ritual. Lovingly lifted out of its wooden box, the anemometer was borne aloft and brandished at arms length, to the wind's eye. (Figures 1(a) and 1(b).) Inspection of the compass binnacle yielded its direction.

On a balmy summer day, the eye might linger to assess the sky, to look absently at a passing ship, or more critically at the washing hung on an improvised line across the foredeck. During restricted visibility, it became a race against the stomach churning, ear shattering thunder of the fog signal. As scant insurance, ear defenders were worn. More reliance was placed on nimble feet and in judging sixty seconds of silence.

Every minute would come the two deep, slightly wavering blasts, each of three seconds duration, ending in the depressive grunt characteristic of a diaphone. In the relative silences in between, the muffled roar of the air compressors took over, working hard to keep up the pressure for the mighty voice to continue to speak its warning message to the unseen outside world. Below decks the hollow spaces became perfect sounding boxes. The din reverberated throughout the vessel and dominated the lives of the lightsmen. As a conversation stopper it was superlative, a trial for their patience and fortitude. It can go on for days, until the longed-for time when you are touched by the real silence that announces clear weather, evaporating the blanket of subtle gloom and tension that envelops all who find themselves in a fog at sea.

Lavish celebration would call for a cup of tea, water tapped from the kettle which simmered constantly on the calor stove, company for the galvanised bucket, in which dishcloths were boiled to whiteness. In the ample space below decks, all was kept immaculate by the touch of caring hands.

The fascinating fortnight I spent on *Dowsing* passed with a sense of sadness at witnessing the end of an era. From June [1989] no manned light vessels would remain in Trinity House service. The human element seemed all important, a comfort to a navigator who has often passed these friendly sentinels. It was the common lot to share a near timeless world, silent except for the sound of wind and waves, and the ever present purr of an engine aboard a vessel which was powerless to go anywhere.

Tethered to the sea-bed by an oversized anchor and single main cable, the *Dowsing* would often swing to the conflicting dictates of wind and tide. At each bow was strapped a spare anchor, with attendant cable, as insurance against the excesses of the weather. More cable was veered in advance of gales. In big seas 140 fathoms of cable would routinely be set. In calmer conditions the cable would be shortened. As was predicted; 'the Sabbath will be observed.' Early one Sunday morning an unholy mechanical roar shattered the silence. The air compressors now worked flat out to power the windlass, as it hauled in its hefty load to a mere 75 fathoms. In the chain locker below, Vic strained to flake the huge cable manually, as it clanked into its cavernous hold. Adjacent to the lockers were two huge bunkers, able to hold 18 tons of anthracite. *Dowsing* was heated throughout by coal, periodically replenished by support ship, bags slung aboard, together with gas bottles, as vital ingredients for those who, for the last time, lived and worked aboard to keep the light lit and turning.

In its lofty glazed tower, the optic revolved relentlessly, faithful to its characteristic of two flashes every ten seconds, potentially visible for 26 miles in clear conditions. Its four pairs of bulbs and reflectors radiated four separate beams, silent rotor blades of light. They dipped to illumine the sea, then to scan the air, its level-seeking gimbals unable quite to counter the heady motion from a rolling swell. The lights of gas rigs glowed on the horizon. A ship passing nearby was scrutinized in the sweeping searchlight beams, as it forged its deep-laden and spray-washed passage into the seas. They played tricks with the eye, plucking white wave crests out of gloomy obscurity, or catching the spectre of a fulmar's outstretched and ghostly form, in its stiff-winged flight. Beneath its high pedestal the light cast multiple, ever-dancing shadows on the vessel, a flickering aurora to entertain the watchkeeper.

In the small hours, Radio 4 would strike up *Sailing by*, softly infusing into the dark panorama encompassing the lookout shelter and its solitary occupant. Ears became alert with boyish anticipation, as the shipping forecast chanted out its message. As *Dowsing* was given a national airing, there would come a quiet satisfaction, acknowledgement that we were not entirely forgotten.

Beneath the watchmen's feet, in the radio room, the barograph drum rotated in its weekly motion, the aneroid barometer breathed silently, brooded over by a wall chart of Eastern Bloc naval craft. (Figure 2.) Soon it would be time not only to send the next weather obs. to Humber Coastguard, but to respond to the inner air of expectancy which, at fortnightly intervals, had pervaded this vessel on its station for the previous four years; a partial crew change.

A definite air of anticipation wafted its way around the vessel. The usual feelings for the crew of home-going were spiced with the complexities that it may be for the final time. The outward mood seemed buoyant, a domestic version of 'the Channels'. With vigorous and excessive tremulo the crew were in fine voice, as they sang whilst doing their chores. As Alf pointed out, 'madness has struck the ship'.

The weather was agonizingly borderline, not allowing the certainty of a relief. The vessel's rise and fall, and the wind strength, were relayed with perhaps a mean accuracy, to the lighthouse keeper at Cromer, acting middleman on the VHF. A decision made, the helicopter flew from its holding pad in front of the Norfolk lighthouse. Bearing its loud technology, it landed as a gale of wind. In minutes of wordless and frantic activity beneath noisy whirring rotors, the relief was made.

Anonymous waving hands gestured farewells with an urgent poignancy, recognition that the 150-year-old service of manned light vessels was coming to an end. The best view of a ship is often as seen through the back window of a taxi. Yet on that occasion I too craned my neck from the back seat of the helicopter, to keep the little red ship in sight.

On the firm ground at Cromer, the short grass seemed a lush green, the blossoming gorse with its elusive scent a vivid yellow. Refuelled, with a final roar against the jostling wind, the helicopter flew northwards, to its home base in Lincolnshire.

Normality resumed. Far out over the horizon a different normality would be settling for the very last time.

Today, 14 automatic light vessels continue the functions of their predecessors, their spaces filled with the quiet sounds of lifeless and unsleeping technology. The *Smith's Knoll* and *Channel* light vessels are additionally designated Automatic Weather Stations. Aboard each are duplicated suites of sensors. These measure wind speed and direction, air and sea temperature, pressure, visibility, wave height and period. Converted into digital data, these are transmitted at predetermined times to a ground station, via geostationary satellite.

Refuelling and routine maintenance bring visitors every three months aboard a support ship. To attend a 'casualty' light vessel, the helicopter continues its own role, a modern tradition in itself, ousting as it did the former reliefs by sea. As in those days, such airborne visits may not be without hazard. Roosting gulls and migrants can offer a nauseous and slippery surprise to a helicopter touching down on the tiny helipad. Without the disuasion of human occupancy, these solid and welcoming beacons become ready platforms for birds.

They at least will continue to face into the wind's eye, act as living sentinels and echo their raucous laughter in defiance at the transitory, automated silence.

The severe depression of 25/26 January 1990

By R.D. Whyman

(Marine Advisory and Consultancy Service, Met. Office)

Depressions often occur in groups, typically of two to five, separated by a ridge of high pressure or by a rapidly moving cold anticyclone. As one depression matures and decays, another develops from a wave on the cold front and this process is repeated until cold air is advected through into low latitudes so ending the sequence.

The track, speed of movement and development of a wave depression is determined by the upper air flow. Usually, a westerly jet stream extends across the North Atlantic towards Europe and the wave depression is steered quickly east while slowly moving from the warm to the cold side of the jet axis. The sequence of events towards the end of January 1990 followed this pattern.

The depression which brought bad weather to northern Europe during 25 and 26 January 1990 began around midday on 23 January as an innocuous-looking wave on a cold front in the North Atlantic, some 400 n.mile south-east of Nova Scotia. Over the next 48 hours the wave moved quickly north-east at 50 knots, deepening by 59 mb in the process, from 1012 mb to 953 mb by 1200 UTC on the 25th, at which time it was centred near Carlisle (Figure 1). After this, the depression continued to move in a generally north-easterly direction at 25 knots, attaining its lowest pressure of 948 mb around 1800 on the 25th and filling slowly thereafter. The depression remained an identifiable feature until 29 January by which time it was centred in the Barents Sea off Novaya Zemlya.

The strongest winds which were recorded during the passage of the storm occurred on the western and southern flanks of the depression with the passage of the occluded front. This is apparent from the spacing of the isobars in Figure 1, while Figure 2 shows the maximum gust speeds recorded at locations in Great Britain and Northern Ireland. As would be expected from the track of the depression, the highest values occurred over England and Wales with 90 knots (104 m.p.h.) or higher being reported over a few exposed hills and coasts. The *Methane Princess*, in Biscay, reported W'ly winds of storm force 10 with a 5-metre swell while the *Liverpool Star*, approaching the English Channel from the west, reported violent WSW'ly winds of storm force 11. Figure 3 is an

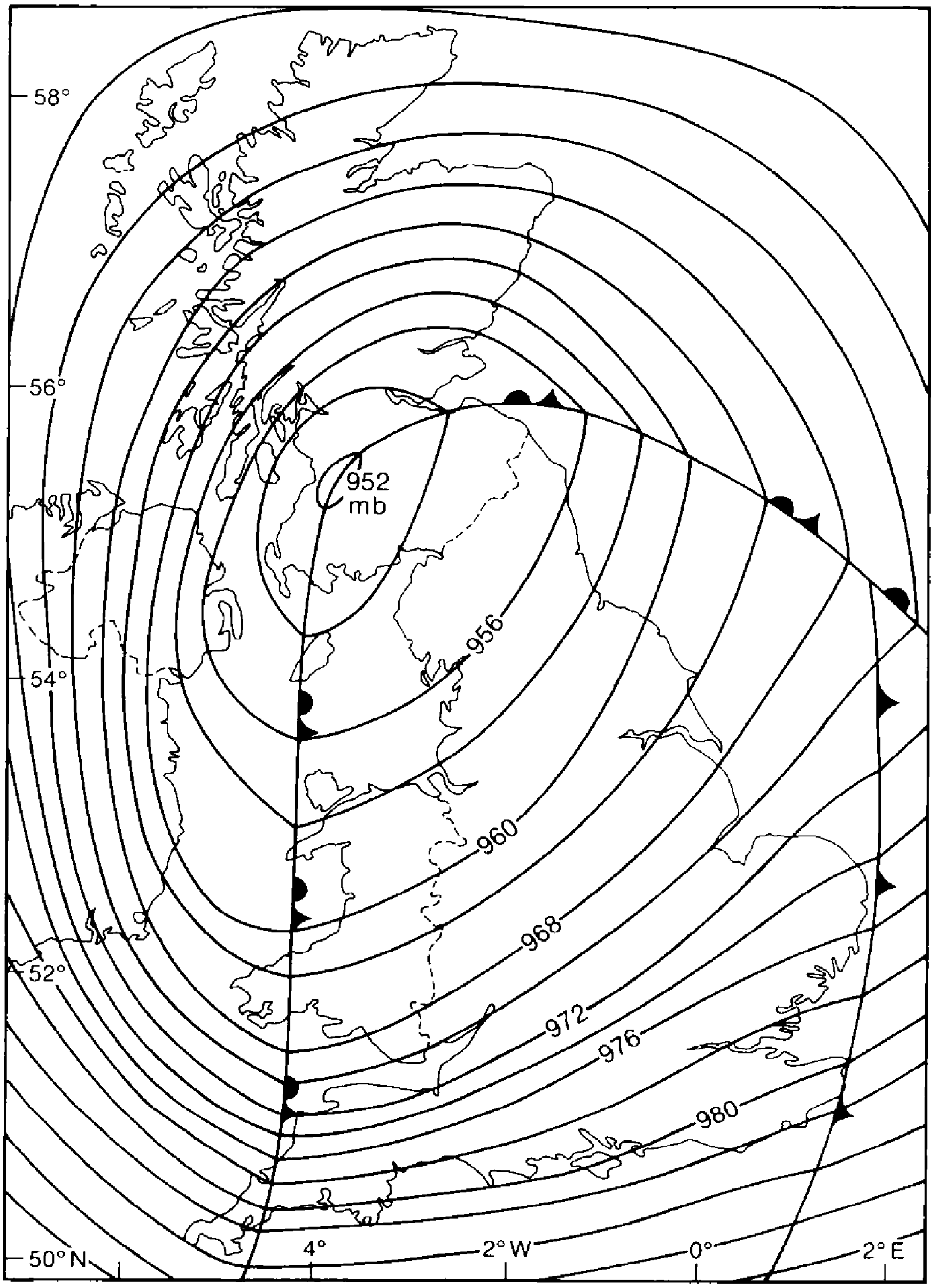

Figure 1. Synoptic situation at 1200 UTC on 25 January 1990 (redrawn from Central Forecasting Office chart of the British Isles).

analysis produced by the Met. Office wave model which shows the winds and resultant waves around the British Isles at 0000 on 26 January. Winds are still of gale force to the west of Ireland and in the south-west approaches, but the strongest winds are in the southern North Sea with an area of winds of 50 knots and above. At this time, the *Shetland Service* reported W'ly winds of 65 knots gusting to 75 knots. Almost coincident with the area of strongest winds is the 9-metre wave contour although the highest waves are off south-west Ireland where there is a 10-metre contour. The waves are higher here because the strong

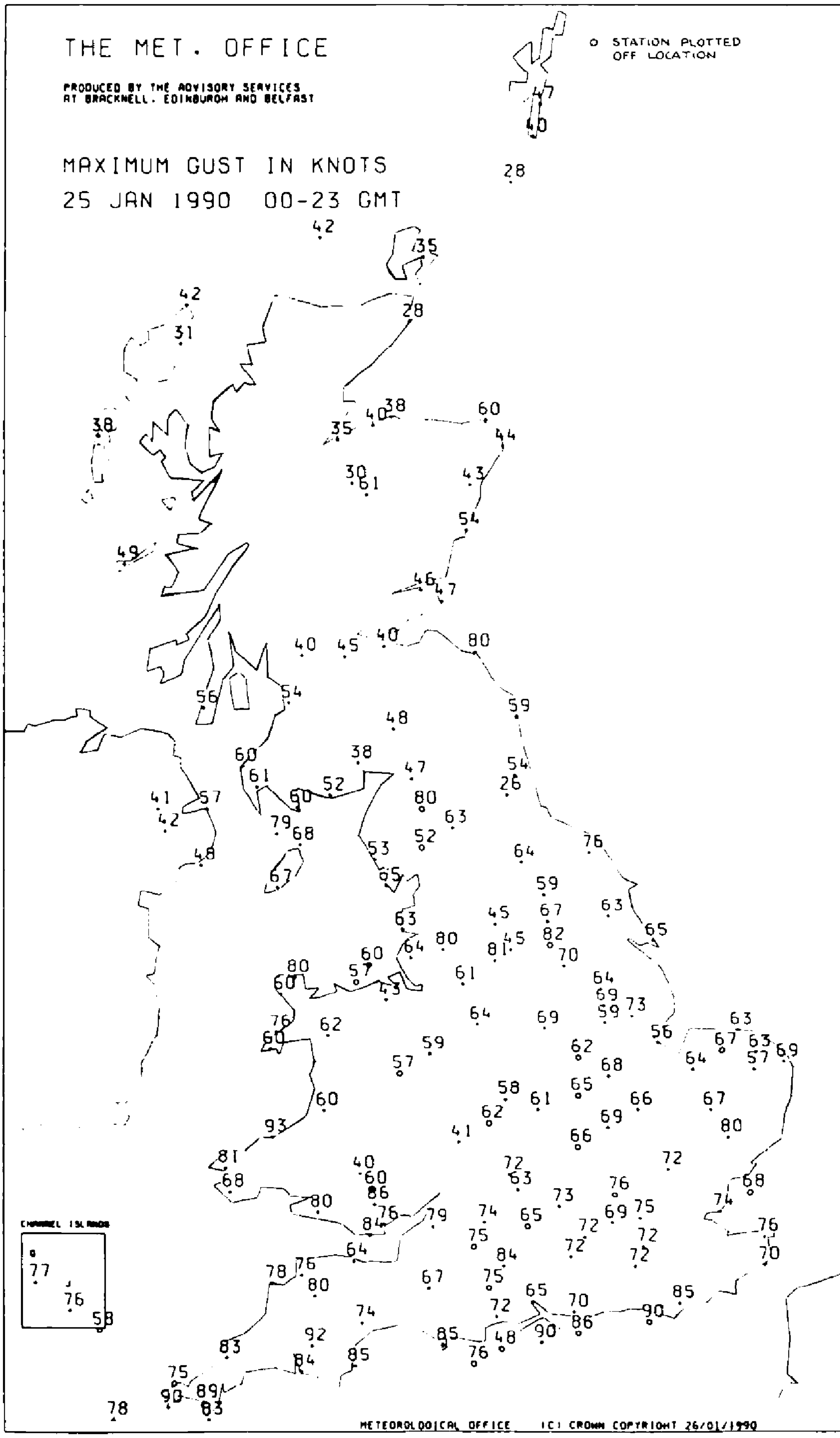

Figure 2. Chart showing maximum gusts recorded on 25 January 1990.

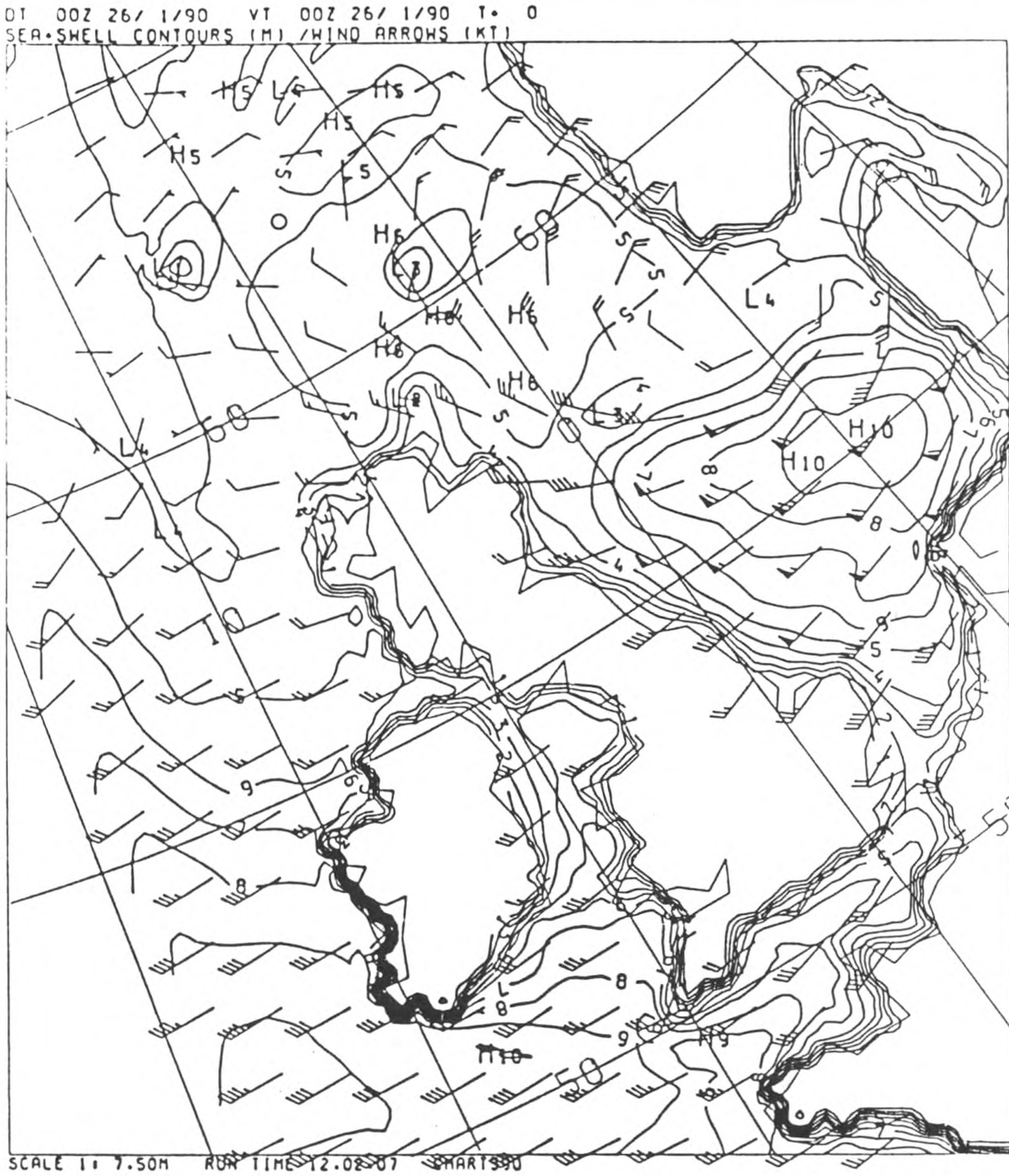

Figure 3. Winds and resultant wave height contours for 0000 UTC on 26 January 1990.

KEY: = 10 knots = 35 knots = 50 knots

winds blowing over a much longer fetch enable higher waves to develop. The highest waves around the British Isles associated with this storm occurred at 1200 on the 25th when the computer analysis gave a 12-metre contour at the western end of the English Channel.

In its wake the storm left a trail of death and destruction both on land and at sea. Newspaper reports put the death toll over northern Europe at 97, with nearly half of these, 47, occurring in Britain. Road, rail and ferry services were disrupted and many trees were blown down, the estimate in Britain alone being 3 million; power lines were brought down both at home and abroad. One casualty was British Telecom's marine radio station at Lands End where the emergency generator also failed, and for a time, a French radio station transmitted the radio messages and navigation warnings. Parts of Hereford and Worcester were flooded when the River Severn rose by 3.5 m while in West Germany the authorities evacuated one coastal village threatened by floods from a broken dyke and parts of the port area of Hamburg were flooded.

The satellite photograph opposite page 7 shows the situation at 1324 on 25 January. The swirl of cloud associated with the fronts is easily identified while the broken area of cloud to the south and west of Ireland is an area of showers, some heavy, moving towards Britain.

Bransfield 'sees' eclipse through snow storm

Last year Radio Officer M.J. Mee of R.R.S. *Bransfield* was involved in the installation of a prototype British Aerospace 'Dartcom' weather satellite receiver on board, from which the cover photograph was taken. It clearly shows the annular eclipse of the sun, taken at 1927 UTC on 26 January 1990, whilst the British Antarctic Survey vessel was in position 76° 14'S, 29° 34'W.

Mr Mee says that, although the ship was almost directly in the path of the eclipse, unfortunately very little of the effect was visible as the vessel was experiencing heavy snowfall, through which cloud base and type could not be determined owing to reduced visibility. However, the timing of the NOAA satellite pass enabled him to capture the moment with this clear image.

The Antarctic Peninsula is seen left of centre, with the Ronne Ice Shelf and its associated polynya leading diagonally down and to the right from the base of the Peninsula. The area of darkness as seen from the satellite is generally over the south-eastern part of the Weddell Sea, apparently centred at that time over the Vahsell Bay/Gould Bay area (78° S, 35° W), or off the Filchner Ice Front, as it is sometimes called. North lies a little left of the top right corner of the frame, and the shadow was moving roughly north-easterly at the time the picture was taken.

SPECIAL LONG-SERVICE AWARDS

In the unavoidable absence of the Chief Executive, this year's long-service award ceremony was conducted by the Divisional Director (Observations), Mr Frank Singleton, at the National Meteorological Archives in Eastern Road, Bracknell, on 31 July 1990.

As foreshadowed in last April's issue, the following three shipmasters were presented with barographs in recognition of their outstanding contributions to the cause of marine observing: Captain P.J. Clark, MNI, P. & O. Containers Ltd, Captain S.J. Lawrence, MNI, FRGS, British Antarctic Survey and Captain P.J.R. Manson, MNI, P. & O. Containers Ltd.

In addition to other members of the Directorate and Met. Office staff, also invited to the reception were the wives of the three nominees and officials from the shipping companies represented. Before making the barograph presentations, Mr Singleton made a short informal address, as follows:

'This occasion is our way of thanking all those who make the observations that we receive from ships at sea. The connection between the Met. Office and the merchant service goes back many years: in 1854, when Captain FitzRoy, as he then was, formed the Met. Office, his brief was to provide advice to the Royal Navy and the Merchant Navy, and that advice was based very largely on observations obtained from ships. And so began the recording of observations in logbooks. Nowadays we use the data you provide in two ways. The data that you provide by radio are used for our real-time forecasting, and they are a very valuable source of data: do not assume that, because we have satellites, everything is done by satellite, although that may be the impression often given. To do our forecasting, to feed our big weather prediction models, using our large computers, we need numbers. We need pressure values, winds and temperatures and we need the whole range of data from land and from sea, and from levels above ground as well. From the observations over the sea that you provide, accurate values of pressure and wind are invaluable information.

'The second use of the data is of those which come in through your completed logbooks. These data are keyed onto our computer data banks, and have been keyed for the earliest records for which we have data. We therefore now have a world-wide marine archive, comprising some 70 million observations on computer database. These are not all from U.K. ships, of course: we exchange real-time data with other countries and we exchange databases as well. These data are used for such things as design and planning work: if somebody wants to design an oil rig or plan an oil operation, they have these data available for basic information. And of course climate change is the burning question that we are all concerned with; is the climate changing? Meteorological observations are often very difficult to interpret because instrumental techniques change. The design of thermometers at the basic level has changed, the buckets that used to be used to bring up the sea water to take the sea temperature changed, and such changes cause anomalies in the data. But over the land it is far worse; over the land you have not only the instrumental changes, you also have such effects as change of land use, afforestation, deforestation and urbanisation, making it very difficult to detect whether there is a real change occurring. Over the seas you do not have forests and there are only the instrumental effects to worry about, and this we can do; thus the data collected from ships since the 1850s, and earlier, are used to help us try to determine if the climate change is taking place.

'All this is background information as to why observations from ships remain so important to us in the Met. Office, and why we take so much trouble to obtain the best possible observations. I am therefore very proud to say that the U.K. Voluntary Observing Fleet (VOF) is a world leader in the standard of observing. We have a very good fleet providing first class data, and the Marine Superintendent and his staff spend much time and effort in liaising with ships, boarding those ships and discussing with Masters and reporting officers how it should best be carried out, which data are most useful and feeding back any helpful information.

'This presentation is therefore part of this exercise: these ceremonies were begun in 1948 and the idea is to choose each year four Masters who have good long weather reporting track records, and to honour them with these barographs, showing our thanks for what they have done. I hope that, whilst you see it as thanks to these gentlemen in particular, you may also see it as thanks to the VOF as a whole. You are here as representatives of the VOF, the observers at sea, and these awards are our thanks to you in particular and to the VOF as a body.'

Mr Singleton then made the formal presentations of barographs to the three Masters present, after which the visitors were able to inspect the historical documents placed on display in the Archives. After being entertained to lunch the visitors were conducted around the Central Forecasting Office including the Metroute ship routeing section, and other places of interest at Headquarters.

Captain C.O. Thomas returned on leave from his command, m.v. *Staffordshire* of Bibby Bros Management Ltd, just a fortnight too late for the main ceremony, and so was presented with his barograph by the Marine Superintendent, Captain Gordon Mackie, at the latter's office in Bracknell on 4 September. (See photographs opposite pages 9 and 21).

AURORA NOTES JANUARY TO MARCH 1990

By R.J. Livesey

(Director of the Aurora Section, British Astronomical Association)

In Table 1 are listed the observations of the aurora made by mariners during the period. In all, some 246 reports have been received covering 57 nights in which the auroral forms were seen somewhere in north-west Europe, the North Atlantic or at specified places in North America.

Table 1 — Marine Aurora Observations January to March 1990

Date	Ship	Geographic Position	Time (UTC)	Forms in Sequence
5/6 Jan.	*Cumulus*	56° 58'N, 19° 25'W	0428	qn
20/21	*Canmar Europe*	48° 30'N, 69° 00'W	0600–0730	qmHR, qmHR₂fR, qpmHR₂R, pRR
24/25	*Cumulus*	57° 10'N, 20° 24'W	0050–0150	qN
28/29	*Sulisker*	60° 00'N, 00° 02'W	0000–0052	RA, HA, RA, HA
29/30	*Cumulus*	57° 10'N, 20° 10'W	0050	qN
16/17 Feb.	*ACT 7*	47° 22'S, 114° 43'E	1415	mRR, m_3V
18/19	*Sulisker*	60° 32'N, 00° 57'W	2100–2220	HA, RA, HA, G, RA, G, P, G
18/19	*Cumulus*	56° 34'N, 16° 00'W	0145–0242	qH
19/20	*Cumulus*	56° 53'N, 19° 12'W	0240	qN
20/21	*Sulisker*	58° 41'N, 02° 26'W	1920–1945	HA, RA, RB, RR
20/21	*Cumulus*	57° 06'N, 20° 06'W	2150–2235	qN
22/23	*Cumulus*	57° 00'N, 20° 00'W	2236–0037	qN
23/24	*Cumulus*	57° 06'N, 20° 45'W	2340–0240	qN
24/25	*Sulisker*	59° 20'N, 00° 04'W	2230–2351	HA, G
24/25	*Cumulus*	57° 08'N, 20° 34'W	0140	qN
27/28	*Cumulus*	57° 02'N, 20° 23'W	0230–0340	qN

Table 1 *(contd)*

DATE	SHIP	GEOGRAPHIC POSITION	TIME (UTC)	FORMS IN SEQUENCE
13/14 Mar. ..	*Cumulus*	56° 56′N, 20° 08′W	2230–0035	qN, m_2p_2R
14/15 ..	*Cumulus*	57° 00′N, 20° 00′W	2220–0020	qN
15/16 ..	*Cumulus*	57° 07′N, 20° 15′W	2340	qN
18/19 ..	*Cumulus*	55° 57′N, 11° 11′W	0035–0140	qN
25/26 ..	*Sulisker*	60° 24′N, 01° 00′W	1930–2000	G, RR, G, RR
25/26 ..	*Cumulus*	56° 50′N, 18° 34′W	0435	qN
27/28 ..	*Vigilant*	57° 44′N, 06° 54′W	0255–0405	mRR
29/30 ..	*Canmar Europe*	49° 00′N, 62° 30′W	0500–0850	pG, p_2RR, p_2RV, G, p_2m_3G, p_2RR

KEY: a = active, f = fragmentary, m,m_2,m_3 = multiple (1,2, or 3 forms), p = pulsating, p_2 = flickering, A = arc, G = glow, HA = homogeneous arc, N = unspecified form, q = quiet, R = ray, RA = rayed arc, RB = Rayed band, RR = ray structure, RV = rayed veil, R_2 = medium ray, R_2R = medium rays, V = veil.

It is a reflection of the changing pattern of the Merchant Navy that the 24 marine observations reported were made by only five ships while the extent of auroral activity was self evident. After an apparent peak in both the sunspot cycle and the auroral cycle in the first half of 1989, followed by a diminution of activity, there has been an upsurge in both again during 1990. If previous experience repeats itself there may well be a second auroral peak of activity yet to come as the sunspots finally decline, with a higher probability of quieter aurorae in the higher magnetic latitudes.

In Table 2 are given the distributions of auroral nights and observing reports for the three months. Note how the activity is higher in March, closer to the spring equinox. It can be shown that there is a higher probability of seeing aurorae at the equinoxes rather than at the solstices. This is due to the configuration of the sun's magnetic axis relative to that of the Earth at these times. Some sun-earth phenomena do not have an equinoctial preference.

Table 2 — Distribution of auroral nights and reports, January to March 1990

	JANUARY	FEBRUARY	MARCH
Reported aurora nights	16	19	22
Nightly reports received	43	90	113

For the period 1976 to 1989 inclusive, the sum of all activities reported has been calculated for each month and the results are shown in Figure 1. The summer gap in the aurorae is due in part to the twilight that affects observing in north-west Europe but not the American sub-auroral zone along the U.S.–Canadian border. The higher latitude aurorae do not show such a marked peaking at the equinoxes. The aurorae referred to are, of course, the storm aurorae when the auroral oval expands equatorwards.

Another point of interest worth mentioning is the statistic that an aurora is more likely to be seen at local magnetic midnight when the sun, the magnetic pole and the observer are all in the same straight line. In the United Kingdom this is at approximately 2200 UTC. To illustrate the point, 95 auroral storms were

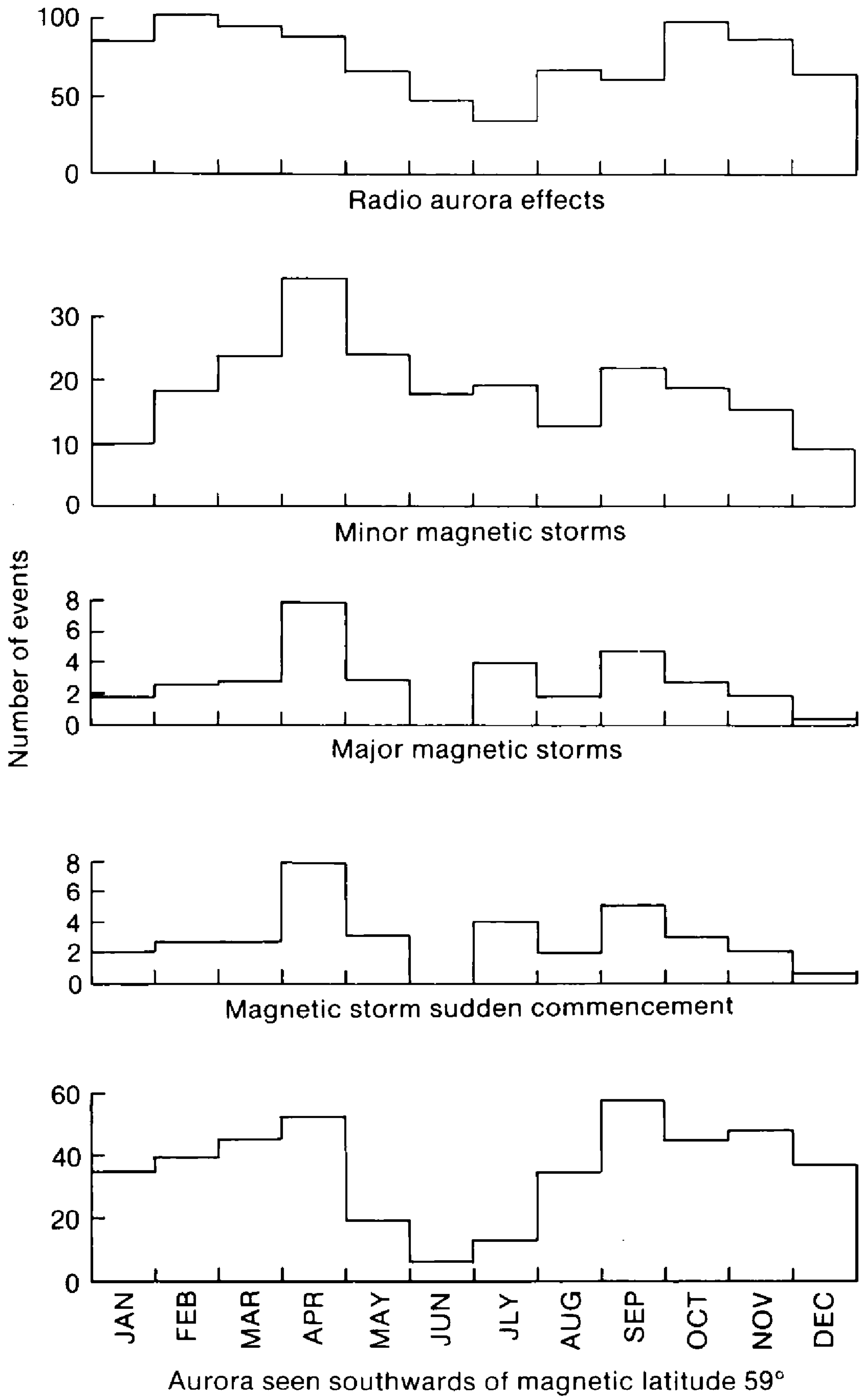

Figure 1. The equinox effect. Sum of events reported 1976 to 1989 inclusive

examined and the times of their peak activity recorded. In Figure 2 the result is clearly seen. Magnetic midnight is when the expanded auroral oval should come nearest to the observer, given that the storm is correctly synchronised with the observer's position.

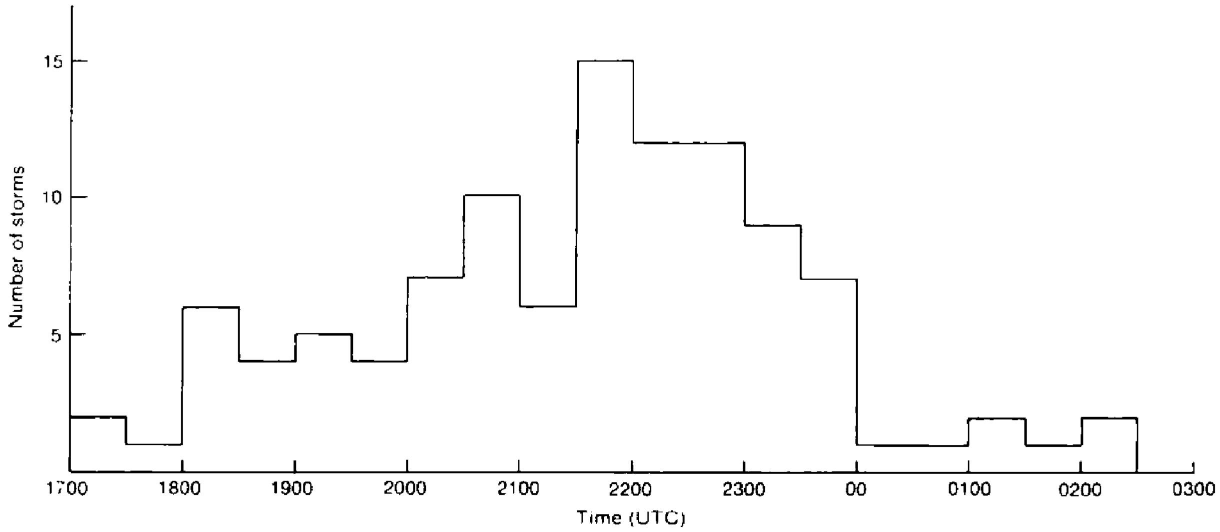

Figure 2. Time of peak activity of 95 typical auroral storms over the United Kingdom.

Although experienced professional and amateur auroral observers use the international aurora code in their reports, a good sketch and a good verbal description are both very welcome, even if the observation is converted back into aurora code in the office, for analytical purposes. The quality of the aurora entries in meteorological logbooks has long been admired and some of the drawings have real artistic merit. The year 1990 was the centenary of the founding of the British Astronomical Association and among the celebrations was a weekend conference at the University of Dundee. In the Aurora Section's contribution, we were pleased to give credit to the work of the marine observers and to project samples of marine log entries before the audience to illustrate this contribution.

During this period of high auroral activity many photographs have been received. Sometimes they show up much more clearly the colours that may be but vaguely seen by the human eye, especially when the aurora is faint. If two lights of equal brilliance, one red and one white, are reduced in illumination by an equal amount, the red light, to the human eye, will become fainter than the white light with increasing effect as both are reduced by a series of equal steps. This is known as the purkinje effect, familiar to astronomers measuring the brightness of stars by old fashioned, naked eye methods. With respect to colour vision as, for example, when a green aurora becomes fainter, colour vision is lost and the aurora will appear white.

Type 'a' aurora colour consists of high altitude red bands and rays existing above the green type 'c' aurora of the normally seen rays and arcs, the bottom of the latter sometimes being fringed with red of the type 'b' colour. Type 'd' colour consists of red aurora at considerable heights and is associated with displays in lower latitudes. Type 'e' colour comprises alternately or irregularly distributed red and green colours along the length of an aurora, often associated with flickering in rayed bands. Type 'f' colour is blue, commonly dominant after very active displays; mixing with red makes it look purple. Blue or purple is seen in the upper regions of the aurora, and if lying in sunlight above the Earth's shadow, can be enhanced by interaction. White and yellow aurorae can be due to appropriate mixtures of green, red and blue from the other colour types. All types have been detected in recent photographs.

It is accepted that ships do not provide good platforms for photography, but good photographs have been submitted by mariners in the past, and more recently photographs of reasonable quality have been taken by passengers in aircraft overflying eastern Canada *en route* to the United Kingdom. Fujichrome is becoming a popular film for auroral work with exposures from 10 to 30 seconds depending on the brightness of the display. Film speeds of ASA 200 and 400 are quite common, though ASA 1000 has been used and offers the advantage of shorter exposure times. It would be worthwhile to experiment whenever an auroral storm develops, especially if the observer's vessel is at anchor or tied up to a quay in calm waters.

The aurora season is still with us, and if experience repeats itself, there should be a good number of apparitions, especially in the higher latitudes, during the declining years of the sunspot cycle. Good sailing and good viewing.

LETTERS TO THE EDITOR

Crop Circles — The 'Eriboll Effect'

In the *Sunday Express* of 24 June 1990 there was an article about the crop circles being due to whirlygig winds. That is almost certainly correct from a life-time of experience.

These effects are of two sorts, those that come down from clouds above, and those that are generated from heating of the ground. In the Malacca Strait our ship was hit by a 50-yard wide waterspout (down from a cloud) which split two of the ship's awnings. Off the coast of Brighton on a fairly calm day, I have seen a bank of cumulus cloud generate a total of 21 waterspouts in an hour, only a few of which appeared to reach down to the sea, although their whirling circular winds probably did. Taxiing to take off from Nicosia Airport on a hot afternoon we dodged three 'dust devils' about 5–10 yards wide and 30–40 feet high. I have seen the same at the airports of Darwin and Brisbane, caused by ground heating.

At model aircraft competitions, it is common for teams of half-a-dozen youngsters to run round in a circle and generate such a whirling 'devil' to provide lift under a 6-foot glider about 10 to 20 feet above the ground, as the time remaining airborne is what counts. The rudders of such gliders are permanently set hard over so that they circle over the hot tarmac of the airfield, rather than disappear on a straight course to neighbouring fields.

But my best story concerns Loch Eriboll near Cape Wrath in the north of Scotland. The loch, half a mile wide and five miles long, is open to the north, and frequently in World War II we would shelter there in H.M.S. *Scott*, a frigate-sized warship. On one occasion with a south-west gale, force 11, we anchored at the southern end of the loch, in 18 fathoms sand, not the best holding ground, with both anchors down and all ten shackles (250 yards) of cable on each.

In laying out anchors by going astern, one inevitably goes broadside on to the wind. And that time with the south-wester blowing over the 2000-ft mountains,

Figure 1(a). View from the lookout shelter of *Dowsing* light vessel in rough weather.

Figure 1(b). Lightsman John Hendrick using anemometer on monkey island. Ear defenders are worn as protection against the fog signal.

Photos. by T.J. Boult

LAST DAYS OF THE *DOWSING* LIGHT VESSEL (See page 27.)

Opposite page 41

Photo. by T.J. Boult

Figure 2. Part of the radio room on the *Dowsing* light vessel. (See page 27.)

the anchors never held. And the capstan was not powerful enough to weigh one anchor at a time against the drag through the sand. Meanwhile, due to circular 'spray devils' more than the 40 feet height of the bridge, covering the whole loch, we could only see a little way beyond the ship, and not really enough safe room to steam around to head into the wind to pick up the anchors.

On other occasions in gales in Loch Eriboll I have watched the barograph dip 10 mb below normal, as the gale, coming over the mountains, sucks a partial vacuum out of the loch, and then breaks down with the whirling wind seen coming down the grass of the mountainside, as the barograph then shoots 10 mb above normal. I dubbed it the 'Eriboll Effect'. It happens the same way in the mountainous fjords of Scandanavia, New Zealand and Iceland. Eriboll is an ancient Scandanavian name for the Devil's Bowl. The Norse pirates also met the circular 'spray devils'. So the crop circles are undoubtedly due to such whirling circular winds, some large, some small.

As a postcript, I have dragged more anchors, more miles, in more parts of the world than anyone else in the past one hundred years, and perhaps will do in the next hundred. The manuals are mostly wrong, e.g. one anchor close underfoot to stop yawing broadside on to the wind only works in 5 fathoms mud. The best effort was in a *Bay* class frigate, H.M.S. *Lachlan*; one night in the Fouveaux Strait of southern New Zealand, in the Roaring Forties, with both anchors and all chain down in eight fathoms gravel, we dragged safely enough for 11 miles. The other merchant ship, anchored to shelter close under the 2000-ft mountain of Stewart Island, dragged with the 'Eriboll Effect' and was very unpopular when she broke the telephone cable to the island.

Commander J.M. Sharpey-Schafer, RN, Haywards Heath.

Personalities

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

RETIREMENT — CAPTAIN D.V. HARRADINE, RD, RNR, retired from P. & O. Containers Ltd in the 44th year of his service on the seas.

After cadet training at Sir John Cass College in London, David Victor Harradine was apprenticed to the British India Steam Navigation Company in December 1946 and joined his first ship, *Dumra*, in London the following month. He passed for Second Mate in 1950 and served in the B.I. eastern trades and home line services, including some years in the company's cadet ships, notably *Chindwara* from which we received his first met. logbook in March 1955, when he was Second Officer. He obtained his Master's Certificate in March 1957 and about this time was appointed the first Chief Officer of the MOT Landing Ship *Sir Galahad*.

After a period as Staff Commander of the *Uganda*, David Harradine took his first command, the *Chantala* in June 1970. In 1982 he was in command of the *Strathconon* which transferred into Overseas Containers Ltd and he joined the

Resolution Bay in 1983, staying in that ship until his retirement on 9 October 1990. Out of a total 28 met. logs presented, 19 were classed as Excellent, and he received Excellent Awards on ten occasions.

Captain Harradine tells us that, as a Commander RNR, he is one of the very few officers holding two bars to his Reserve Decoration. He has been a Surveying specialist and nowadays is connected with navigation warning systems. Thanks are due to him for this interesting information and our good wishes are sent for success and happiness in retirement.

RETIREMENT — MR J.R. COWAN spent 15 years at sea as a Radio Officer before coming ashore in late 1989, when he thought that automation appeared to be smothering the real role of the Radio Officer.

John Russell Cowan was born in 1953, trained at Barking College of Technology and obtained his MRGC in July 1973, followed closely by his Radar Maintenance Certificate the following year. After joining the Marconi Company he was appointed to Shell Tankers' *Donax* as his first ship. He then sailed as Radio Officer in ships of many deep sea, coasting and dredging companies and the first log containing his name was received from the *City of Ottawa* in April 1975. On being made redundant by Marconi in 1983 he transferred to STC Marine where he was appointed to Blue Star ships in the main, but had experience on several other companies' ships also.

In his relatively short sea career John Cowan managed to send us 18 logs containing his name, ten of these being marked as Excellent, and he received Excellent Awards for his efforts in 1984, 1985, 1987 and 1989. His father, Donald Cowan, was also a Radio Officer in the Merchant Navy between 1942 and 1949.

John Cowan reports that his most memorable experience at sea occurred when he was serving aboard the *Columbia Star*. While *en route* from Muscat to Dubai in July 1986 his ship was boarded from an Iranian warship, though not before he had sent a warning telex to Dubai agents. He did not stop to argue with two unshaven Iranians armed with sub-machine guns when they appeared and ordered him to shut down power and leave the radio room. After two hours of searching some of the containers and satisfying themselves that the ship was carrying sultanas and not gun-running for Iraq, the Iranians left and allowed the ship to proceed.

Our thanks to Mr Cowan for his radio co-operation over the years, and we wish him well in his planned marriage and future employment ashore.

RETIREMENT — MR P.Y. WRIGHT retired last March after 43 years serving as Radio Officer, mainly on ships of the Brocklebank and Cunard companies.

Peter Yorke Wright was born in Wallasey in 1928 and educated in Calday, Wirral and Llansantffraid, Powys. After training at Liverpool Radio College in 1946 he obtained his PMG 2nd Class in 1947. The *Martand* of Brocklebanks was his first ship, joined in June 1947 at Birkenhead; during his time with that company he received his 1st Class Certificate in March 1952. His name first appeared in a meteorological logbook from the *Mahout* in June 1953 and he transferred to Cunard ships in 1965, with a period on the *Carmania* ending in 1971.

Peter Wright explains the reasons behind two periods of several years when we lost touch with him: between 1955 and 1957 he worked on the communications aspects of the Defence Early Warning line in the Canadian Arctic. During the construction phase he was living for quite a long time in a tent with snow-block insulation and efficient heaters. From 1971 to 1988 he was attached mainly to Cunard passenger ships on Caribbean cruising, including two maiden voyages of ships built in La Spezia, *Cunard Adventurer* in 1971 and *Cunard Princess* in 1977, where he remained as Radio Officer for 8 years. After 3 years on the *Queen Elizabeth 2* he reappeared in a log from the *ACT 2* in January 1989. His co-operation with radio transmission of the weather messages was recorded in 26 logs in all, and he received an Excellent Award in 1989.

We thank Peter Wright for his interesting family information and wish him happiness in retirement with his wife in the Wirral home area, their three married sons and one-year-old granddaughter and his hobbies of DIY and gardening.

J.F.T.H.

Book Reviews

Whales, Dolphins and Porpoises, An illustrated encyclopedic survey by international experts. 317 mm × 247 mm, 240 pp., *illus*. Merehurst Press, Ferry House, 51–57 Lacy Road, Putney, London SW15 1PR. Price: £19.95.

When they see pictures of whales or dolphins or porpoises swimming, breaching or stranded, how many readers have to be reminded that these remarkable creatures are mammals, sharing the same basic characteristics and senses as, for example, mice, elephants and people. Their obvious difference is that they are superbly adapted to a marine life; but how did they evolve from land-based ancestors, and how do they live and behave at sea?

Answers to these questions and many more are given in this marvellously illustrated book containing stunning photographs of cetaceans at sea. Fourteen of the world's experts on these mammals have contributed their knowledge to its pages making it a fascinating insight into a realm which the majority of readers will never see first-hand. As an encyclopedic survey, facts abound in the book's three major sections: Whales of the World, the World of the Whale and Whales and People, and there is a comprehensive index covering subjects such as evolution, anatomy, food, social behaviour, migration, reproduction and strandings.

The book should not be regarded as a field guide to species, but it does contain a section in which many species are illustrated and described in field-guide form in addition to a full listing of all living species as classified at present.

The range of photographic illustrations is remarkable and shows more facets of life-style and behaviour than just 'whale breaching' or 'whale sounding'; cetaceans doing things like feeding, spy-hopping and meeting whale watchers are shown. If the range is remarkable, then the quality of photographs is outstanding both in subject and execution. The cetacean's power, gentleness, exuberance and sometimes aggression are well conveyed in colour pictures taken in world-wide locations, although it is a pity that we are not told exactly where for many of them.

As the text has largely been formed from the knowledge and original research of the contributors (who are too numerous to mention individually, but whose backgrounds and specialisms are given in the book) there is no bibliography as such, but a list of titles which would be of value to the whale enthusiast is included. Throughout the book, the language is broadly non-technical, and it is written so that its facts can be readily appreciated by all readers, except perhaps the very young; but then, there are the pictures for those who cannot take in all of the text. There are also some scenes of whale hunting and subsequent processing of the carcass — step forward all those who, having read this book, could then give a child a valid reason for the continued exploitation of cetaceans.

Fairly expensive this book may be, but *Whales, Dolphins and Porpoises* would complement any library or bookshelf.

J.M.

Chronological List of Antarctic Expeditions and Related Historical Events by Robert K. Headland. Published by Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU. 255 mm × 180 mm, 730 pp., *illus*. Price: £65.00.

This is another of the titles sent to us for review, in the series of publications known as *Studies in Polar Research*, reflecting the growth of research activity in and about the polar regions. However, this is no ordinary title, as its compilation took six years; thus the computer technology used was somewhat outdated before publication. The text was prepared with a commercial word processing program having the advantage that an index could be generated automatically. The index is essential for effective reference amongst the 3342 entries which include details of about 2800 expeditions.

At first sight the title and length of this publication might easily deter anyone with merely a passing interest from considering purchase of a copy. However, a study of the 'related historical events' can be suitably rewarding in itself, providing a miniature history of marine exploration and discovery, with a third of the chronological list being devoted to events mainly occurring before man set foot on the Antarctic mainland. Thus it is possible to use this book as a handy reference and source of interest in sea exploration from the Phoenician expedition of c.700 B.C. to the visit of H.M.S. *Archer* to the Auckland Islands in July 1901, all before Scott's first extensive exploration on land in Antarctica from 1901 to 1904.

The list is preceded by five explanatory chapters which give ample information on the objects and structure of the book, observations about legislation, treaties, industries and national operations and other useful information. The list itself is compiled from an enormous variety of sources, with advice and assistance received from many persons and organizations worldwide. All are referenced where practicable and the author, based at Scott Polar Research Institute, Cambridge, is keen enough to request advice on errors and omissions detected, as well as records of later expeditions.

The chronological entries are as comprehensive as one could wish: there are two basic forms, expeditions and events. Expeditions are introduced by their years, nationality and purpose. This is followed by the names of the leader, captain and other officials. Brief details are given of locations, operations, occurrences, discoveries, inventions, formation of institutes and other matters that have influenced the history of the far south. Maps and photographs are provided but the author has found it impractical to include a general one of the Antarctic on a large scale. This means that readers have to provide themselves with their own maps of the continent and particular regions. In a book so large and extensive in its coverage of the history of the continent, this seems an unfortunate omission. More photographs and prints than the thirty or so plates included would have made the publication less dry to the general user, but it is probably unique in its complete record of Antarctic exploration history. The original list compiled by Dr B.B. Roberts in 1945 for the Research Department of the Foreign Office, London, became available as part of the second edition of the *Antarctic Pilot* in 1948. This new work is largely a revision and update on Dr Roberts' continuing work on the subject, up to the time of his death in 1978. There are now at least six times the number of entries as had the previous edition.

J.F.T.H.

Notices to Marine Observers

APPOINTMENT OF NAUTICAL OFFICER TO THE MARINE BRANCH OF THE MET. OFFICE

Captain John Pinteau has been appointed to the vacant post in METROUTE, the ship routeing section of the Marine Branch in the Met. Office. He received pre-sea training at King Edward VII Nautical College in 1963 and served his apprenticeship with Shaw Savill and Albion . After gaining his Second Mate's Certificate he joined Buries Markes Ltd, serving mainly in chemical tankers and bulk carriers from which he sent us various meteorological logbooks. He obtained his Master's Certificate in 1978 and was first appointed to command in 1980.

INMARSAT NEWS

Notification has been received from Greece that the Inmarsat Coast Earth Station *Thermopylae* (CES code 05) now accepts ships' weather reports free of charge, only from ships operating within the Mediterranean and Black Seas. Reports are routed by automatic service code (41) to the Hellenic National Meteorological Service, which requests that transmission be strictly limited to ship code format and maximum duration of one minute.

NEW TRAINING ROLE FOR O.W.S. *CUMULUS*

An international training venture based on Ocean Weather Ship *Cumulus* was launched last July, when Marine Superintendent and Branch Director Captain Gordon Mackie announced that the contract for managing the vessel for the next two years had been awarded to J. Marr Limited, following the Hull company's eight years of similar success in the weather ship management.

Oceanscan Master Service Limited, an associate company of J. Marr Ltd, describes the new training scheme for ocean resource professionals as a unique opportunity for hundreds of students to undertake two week courses on board *Cumulus*. Trainee observers, offshore engineers and service professionals will receive a taste of life and work on an ocean going survey ship, at the same time attending courses of lectures and practicals from top ocean scientists and experienced ship's officers. *Cumulus* is ideally suited to this role, having ample excellent spare accommodation and operating on ocean station 'Lima', west of Scotland in the North Atlantic.

The training scheme is part of the Met. Office policy to maximise use of its resources and enhance income to reduce the cost of weather ship operations and hence of its whole organization.

Dr Tony Rees, a senior scientist and director of Oceanscan Master Service, underlines the significance of the scheme as collaboration between private and public sectors. The nucleus of the scientific and engineering staff of the company is made up of former members of the Institute of Oceanographic Sciences, Britain's premier deep ocean research body, and the expertise of the J. Marr group of companies extends to a fleet of ships in research and survey ships worldwide, combined with its century's experience of deep water fishing.

WMO HANDBOOK ON MARINE METEOROLOGICAL SERVICES

The Secretary General of the World Meteorological Organization, Mr G.O.P. Obasi, wishes to bring to the attention of marine users the availability of the new WMO *Handbook on Marine Meteorological Services*, code No. WMO/TD–No.348.

In 1988 the president of the Committee for Marine Meteorology agreed on the need for the preparation and distribution of a handbook which would give, in concise, easily readable format, basic information on the availability and scope of marine meteorological services on a global basis. The Handbook, available only in English, was published in the middle of last year and will be updated by regular supplements. More detailed information on basic marine meteorological services is contained in WMO Publication No.9, Volume D–Information for Shipping. However, this publication is not readily available to marine users.

The Handbook briefly summarizes routine services for each country, in alphabetical order, including marine bulletin area coverage, time, validity and reception details of marine bulletins and specialized services such as ship routeing, offshore, marine pollution and deep sea fishing forecast services.

Copies of the Handbook can be obtained, free-of-charge, from WMO, Ocean Affairs Division, World Weather Watch Department, Case postale 2300, 1211 Geneva 2, Switzerland. To facilitate distribution and upkeep of the mailing list, consolidated requests are preferred.

Fleet Lists

GREAT BRITAIN

Updated information regarding the list published in the July 1990 edition of *The Marine Observer*. Amendments for this list are required by 30 September. Information for the main listing in July is required by 31 March.

Name of Vessel	Date of Recruitment	Master	Observing Officers	Senior Radio Officer	Owner/Manager
Arctic Ranger	5.1.90	A.W. Walker	A.L. Jennings	J.D. Lester	Boyd Line Ltd
Baltic Ferry	23.5.90	J.M. Gower	A.M. Smith, I. Morrison, W. Langton, T. Hammond	P. Taylor	P. & O. European Ferries Ltd
Baltic Tern	10.4.90	D.R. Cripps	M. Kearney, R. Baker	—	Andrew Weir Shipping Ltd
Barra Head	23.3.90	R. Phillips	J. Ashley	—	Jebsens Ship Management Ltd
Blue Flame I	23.5.90	F. Powdrill	B. Grint, H. Blake	—	Boston Putford Ltd
CMB Mallet	28.8.90	M.I.C. Kempston	D.R. Trivedi, R. D'Souza, S. Bakshi	M.J. Kailobad	CMB M.B. S.A.
Coppename	29.7.90	D. Robinson	L. Vaz, C. Eyre	S. Sundararaman	Wallem Shipmanagement (I.O.M.) Ltd
Dana Anglia	18.6.90	J. Jensen	D. Westergard, O.S. Andersen	H. Nedergaard	DFDS Ltd
Dawn Shore	24.7.90	S. McClane	W. Smith	—	Boston Putford Ltd
Esso Tyne	31.7.90	K.J. Lightbody	T. Lester, N. Fineman, J. Holmes	I. Wilson	Esso Petroleum Co. Ltd
Felicity	20.3.90	M.R. Brown	D.R.P. Williams, C.M. Lawton	W.R. Jackman	Sealink British Ferries
Greater Manchester Challenge	18.5.90	L. Parker			Ocean Youth Club
Lady of Mann	24.5.90	—. Bridson	O.K. Buckle, P. White	—	Isle of Man Steam Packet Ltd
Jahre Spray	26.7.90	L.A. Lobo	S.A. Hasan, M. Tirkey, M.K. Singh	P.S. Phanse	
Kommandor Sub Sea	12.6.90	I.E. Grant			Hays Ship Ltd
Lowland Lancer	22.8.90	R.C. Osola	M.R. Pickles, S.R. Whalley, M. Bulteel, E.J. Tyler	D. Kelly	Lowline Ltd
Mamora	12.9.90	P. Tomaszewski	L. Wasilewski, J. Chachulski	—	Britamar Shipping
Merchant Princess	3.8.90	R.W. Cotter	K. Sandeep, I. Joel, S. Davinder	C. Ranchmod	V-Ships (U.K.) Ltd
Monas Queen	23.5.90	—. Kinley	T. Harrison, N. Rainford, K. Buckle	P. Davis	Isle of Man Steam Packet Ltd
Natal	10.4.90	G.K. Thomson	F.S. Lobaton, J.R. Acquah, H.Y. Atuwo	R.A. Cruz	Acomarit (U.K.) Ltd

Orient Express	28.5.90	M.R. Rutter		S. Ellrithy	Europe Cruise Line Ltd
Risnes	17.5.90	D. Johnstone	A. Eldeen, J. Bennetts	W. Quinn	Jebsens Ship Management Ltd
Seillean	24.4.90	R. McVey			B.P. Shipping (SWOPS)
Shamrock Rio	29.3.90				V-Ships (U.K.) Ltd
Shamrock Rotterdam	28.5.90				V-Ships (U.K.) Ltd
Tor Scandinavia	15.6.90	H. Zachariassen	H.O. Frederiksen, K. Jeppesen, B. Poulsen	—	DFDS Ltd
Trinity Explorer	17.5.90	G.R. Hall	L. Moon, C. Davidson	A. Saunders	Trinity House Ltd
Ullswater	—.6.90				P. & O. Deep Sea Cargo Division
Wiltshire	4.6.90	N. Stevens	R. Oliver, T. Sinclair. C.I. Walmsley	B. Foley	Bibby Line Ltd

The following Selected Ships have been deleted:
Adelaide Express, Atlantic Amity, Benhope, Bering, Celtic Ambassador, Celtic Mariner, Esso Tees, Fremantle Express, Frio Chile, Harefield, Havprins, Jasmine B, Lancasterbrook, Larkfield, Petersfield, Princefield, Rhone, Salmonpool, Scamper Universal, Thorshavn, Westfield.

BRITISH COMMONWEALTH

AUSTRALIA (Information dated 20.9.90)

The following Selected Ships have been recruited since the list published in the July 1990 edition of this journal:

Aurora Australis, Coral Chief, Fairstar, Highland Chief, Iron Baron, Iron Shortland, Island Seaway, Karina Bonita, Kelvin, Maria Bonita, Southern Surveyor.

The following Selected Ships have been deleted:

Al Yasrah, Australian Prospector, Cape Don, Eigigu, El Redil, Koolinda, Nordvind, Papuan Chief, Pilbara, Troubridge.

The following Supplementary Ships have been deleted:

Iron Shortland, Neptune Seginus.

NEW ZEALAND (Information dated 1.8.90)

The following Selected Ships have been recruited since the list published in the July 1990 edition of this journal:

Capitaine Tasman, Forum Papua New Guinea, Pioneer Tween, World Spring.

The following Selected Ships have been deleted:

Daniel Solander, Westport.

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