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# The Marine Observer

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# THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME  
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DIVISION OF THE METEOROLOGICAL OFFICE

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COVER PHOTOGRAPH of a Black-browed Albatross taken by Captain S. Mayl, from R.R.S. *Discovery*. This picture was voted one of two runners-up to the winner of the *Sea Swallow* Photographic Competition for 1986. (See Notices to Marine Observers at the rear of this issue.)  
*Letters to the Editor, and books for review, should be sent to the Editor, The Marine Observer, Meteorological Office, Eastern Road, Bracknell, Berkshire RG12 2UR*

LONDON: HER MAJESTY'S STATIONERY OFFICE



# **Report of Work for 1986**

## **(MARINE DIVISION OF THE METEOROLOGICAL OFFICE)**

### **1. Voluntary Observing Fleet**

The British Voluntary Observing Fleet (VOF) comprised the following units on 31 December 1986:

- (a) 410 Selected Ships.
- (b) 5 Supplementary Ships.
- (c) 51 'Marid' vessels.
- (d) 6 Light-vessels and 1 light-tower.
- (e) 4 Auxiliary Ships.
- (f) 31 Oil Rigs and Platforms.

Each group receives a different level of instrumentation on loan and makes observations for transmission in various ways. Selected Ships and Oil Rigs are equipped to make comprehensive observations every 6 hours, whilst Supplementary Ships have only barometer, air thermometers and screens on loan with which to make recordings in an abridged code. 'Marid' vessels are mainly those on the coastal trades which take sea-surface temperature readings for radio transmission; these data assist in the forecasting of fog, and when in the North Sea, such ships include wind, visibility and weather information in their messages.

Light-vessels and the light-tower observe wind, waves, visibility and temperatures, sending coded reports by R/T, some of them hourly but mainly less frequently. The shipping forecasts broadcast by the BBC include reports from *Channel*, *Dowsing* and *Royal Sovereign*. Auxiliary Ships use the ships' own instruments to provide pressure, air-temperature, wind, weather and visibility and are specially recruited on single voyages proceeding through areas where weather data are sparse.

Automation of light-vessels by Trinity House is now being progressed with the *Varne* being one of the first to be substituted. Pending the installation of an Automatic Weather Station unit, the weather reports previously received from the *Varne* are being supplied from Dover for use in BBC broadcasts.

The total number of observing ships remains depressed below a satisfactory level but, due to continuing offers of co-operation from a broad spectrum of ships the overall numbers show little change, despite the inexorable shrinkage of the U.K. merchant fleet. New recruits will be welcomed and no previous experience is necessary as guidance will be given by Port Meteorological Officers.

The Port Meteorological Offices are maintained at 7 major ports of the United Kingdom and the Officers can attend on ships in any part of the country, including non-observing ships who may call on them for information or advice on aspects associated with the weather or ship routeing. Their addresses and telephone numbers may be found in *Admiralty List of Radio Signals Volume 3*, as well as in *The Marine Observer's Guide* and the October edition of this journal. The Guide is supplied to observing ships and contains details of participating Port Meteorological Officers world-wide from whom equipment and stationery may be obtained on direct request from ships. Overseas assistance is also willingly given to British observing ships by many Port Meteorological Officers around the world.

There is a continuing increase in the number of reports received at Bracknell, as shown in the following table.

**Average daily number of reports received at Bracknell from ships and sea stations and geographical breakdown of total daily number of reports received at Bracknell direct and via the Global Telecommunications System (GTS).**

	1985	1986
Direct reception from:		
British ships ... ..	203	240
Foreign ships ... ..	173	174
Rigs, platforms and buoys ... ..	180	232
	<hr/>	<hr/>
Total ... ..	556	646
	<hr/>	<hr/>
Total number of reports received by geographical locations:		
Eastern North Atlantic ... ..	916	1030
Western North Atlantic ... ..	723	696
Mediterranean ... ..	134	107
North Sea ... ..	479	587
Arctic Ocean ... ..	104	119
North Pacific ... ..	1330	1206
All other seas ... ..	670	675
	<hr/>	<hr/>
Total ... ..	4356	4420
	<hr/>	<hr/>

Improvements in the timely receipt of weather messages by the forecasters continue as the 8 ships already fitted with the Meteorological Observing System for Ships (MOSS) become accustomed to this equipment with VDU format and automatic transmission of the coded message. By ensuring the inclusion of the ship's Call Sign at the beginning of the message, data transmitted by MOSS are received in time to be of maximum use in the synoptic charts. Second generation MOSS sets were being tested at the year's end in preparation for installation on a further 8 ships, set to join the 8 already fitted with the prototype units — *Albright Explorer*, *Dart Americana*, *Dart Atlantica*, *Dart Britain*, *City of Plymouth*, *Manchester Challenge*, *Pacific Crane* and *Pacific Teal*. When in the North Atlantic and east of longitude 30° W, these ships are requested to send observations in coded form every 3 hours whenever possible, thus benefitting the compilers of forecasters even more.

Semi-submersible rigs and oil platforms provide significant North Sea data, and fixed and drifting buoys in the Atlantic and around the U.K. transmit valuable data via Meteosat or the French System Argos to shore receiving stations. The Automated Shipboard Aerological Programme (ASAP) was taken a step further with the installation of a portable upper air sonde unit on the CP Bulkships' *Canmar Ambassador*, this equipment belonging to and being manned by the Finnish Meteorological Institute. The Master of the ship was also presented with a plaque by the Marine Superintendent in recognition of the ship's co-operation in 1984 and 1985 with the ASAP test unit when the ship was named *CP Ambassador*.

**2. Ocean Weather Ship Programme**

Rationalisation of the North Atlantic Ocean Stations (NAOS) agreement took place in January when Ocean Weather Ship *Cumulus* commenced single-manning of station 'Lima' in position 57° 00'N, 20° 00'W. The Netherlands Weather Ship was purchased by the United Kingdom for a token sum of £1 in

December 1985, to be managed for the Meteorological Office by J. Marr & Son of Hull, in succession to the previous NAOS arrangement of alternate manning of *Cumulus* and *Starella*, the latter being released to Marr's.

Apart from a drydocking period in August, *Cumulus* maintained a 35-day operational cycle, of which 27 days were spent on station, 3 days on passage from and to her new home port of Greenock and 1 to 2 days in port for storing and maintenance.

The weather ship made routine hourly surface observations and 6-hourly upper-air soundings. Having automated telex communication with Portishead Radio, 97 per cent of her weather messages were, on average, cleared in good time and her auto-polling facility reduced both wear and tear on the installation and time wastage that was common with the old manual system.

A shipborne wave recorder was used to obtain sea and swell readings and sea-water and salinity samples taken. For the MOD, deep thermal soundings were made with the Expendable Bathythermograph. For the first time, *Cumulus* was fitted to take atmospheric turbidity measurements (to find out the amount of aerosol and thus determine the clarity of the earth's atmosphere).

During the August drydocking period, the ship was visited for a statutory inspection by the representative of the Netherlands Government Vessel Department, who reported to the Met. Office Marine Superintendent that a satisfactory upkeep of the vessel had been maintained. Under the joint agreement, the *Cumulus* will be returned to the Netherlands on termination of the current NAOS contract at the end of 1988 or possibly later. France and the Netherlands having withdrawn from NAOS at the end of 1985, 3 ocean stations remain, manned by the U.K., the U.S.S.R. and Norway.

*Cumulus* experienced rather more heavy weather than usual in the latter part of the year, and near the end of November she returned to her station after proceeding towards home port to stand by a cargo ship in trouble. She escorted a 3770 dwt German owned ship to within 200 miles of the Outer Hebrides where the latter would be within helicopter range, following the development of a 25-degree list after the ship's timber deck cargo broke adrift in treacherous conditions with waves up to 60 feet in height.

### **3. Ship Routeing**

The Metroute service provided advice to a large number of clients on trans-oceanic passages as well as for towage and salvage operations on several occasions. The products used by the team of Master Mariners, all with command experience, were enhanced by new computer software and the latest advance in production of five-day wave field analyses.

Five shipping companies were visited in a review of existing Metroute services, undertaken to identify ways of improving client service. A Metroute development plan was drafted by the Marine Division with the assistance of a marketing services consultant.

Among the contracts obtained was the ship routeing of the Dutch racing yacht *Flyer* from Rotterdam to Fremantle via the Panama Canal and the Galapagos Islands. The owner and skipper is Holland's greatest ocean sailor Cornelius van Rietschoten. Other customers included the entire fleet of the Bangladesh company Aqua Lines, Orient Overseas Container Lines, London, Zim Israel, U.S. Lines, ACL, Alexandra Towage and clients from the U.S.A., Finland, Sweden, Belgium, West Germany, Malaysia, Netherlands and Switzerland.

Charts were prepared by the Sea Ice Officer for suitable sections of the North Atlantic, Barents Sea and the Baltic for weekly issue to clients' requirements. This work was carried out at Cardiff by the Port Meteorological Officer, Bristol Channel, until the appointment took place in December 1986 of a new Sea Ice Officer to be Bracknell based as in the past.

#### **4. Services to Shipping**

The Met. Office continued to provide shipping forecasts, synopses and gale warnings for the shipping and fishing industries via the BBC and British Telecom International's coastal radio stations.

NAVTEX automated telex service continues to be operated satisfactorily and is being progressively introduced in many other countries throughout the world.

Facsimile broadcasts from GFA and GFE were maintained and weather charts for outward bound ships were supplied at some British ports.

Full details of these services were published in a new edition of *Leaflet No. 3* which was redesigned to harmonise with other Met. Office publications.

#### **5. Marine Enquiries and Consultancies**

The specialist marine advisory group provided information for organizations or individuals engaged in weather-sensitive operations, such as the planning or design factors affecting marine operations. Staff were called upon to give expert evidence before the Wreck Commissioners in the enquiry concerning the loss of the barque *Marques*. Litigation, existing or planned, was often the subject of the enquiries, which related to loss of life or personal injury, to structural damage or to breach of contract.

#### **6. Awards to Voluntary Observers**

Four shipmasters were again awarded barographs mounted with specially engraved plates in recognition of consistent weather observing service given voluntarily over a long period of time.

Excellent Awards were presented to 100 Masters, 100 Principle Observing Officers and 100 Radio Officers whose meteorological logbooks had been rated suitably well maintained, taking into account the difficulties encountered in keeping up regular observing. The books presented as awards during the year included a new publication by Frank Lane entitled *The Violent Earth*, cataloguing meteorological disasters from around the globe; *Philip's New World Atlas*, 6th edition; and *Chambers 20th Century Dictionary* with thumb indexing.



## April, May, June

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

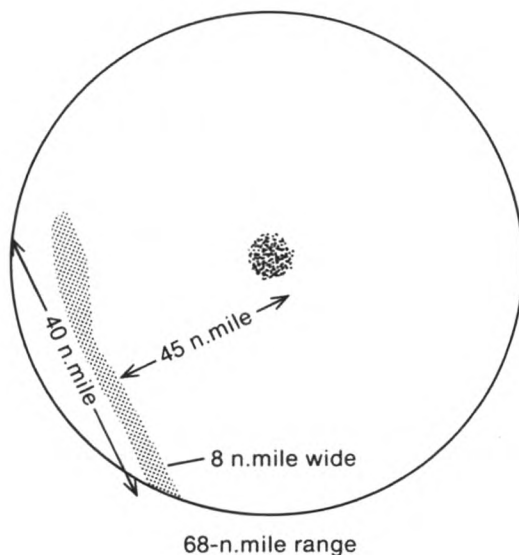
Observing officers are reminded that preserved samples of discoloured water, luminescent water, etc. considerably enhance the value of such an observation. Port Meteorological Officers in the U.K. will supply instructions on how to preserve and pack such samples on request.

### LINE-SQUALL

#### Western South Atlantic

m.v. *Sokoto*. Captain J.P. Wishart. Degrad de Cannes, French Guiana to Rio Grande. Observer: Mr G.J. Andrews, 3rd Officer.

10 May 1986. At 0015 GMT, whilst the vessel was on a course of  $230^\circ$ , lightning first became visible to the west-north-west, although the sky was cloudless and no thunder was heard. Later, with the radar on the 68 n.mile range, a line-squall was detected at a distance of 45 n.mile, lying  $225^\circ / 340^\circ$  and being about 8 n.mile deep. See sketch.

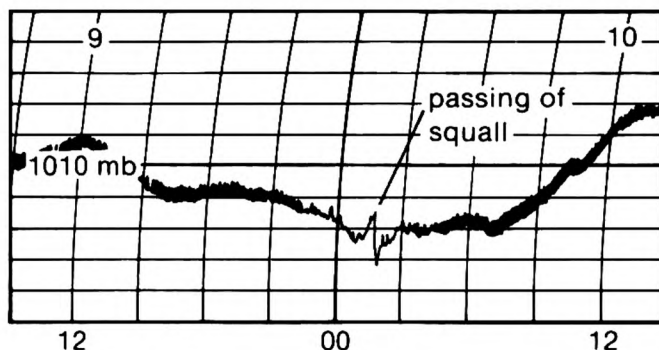




By 0240, the wind had veered to NE'ly and decreased to force 3–4, the rain became moderate, and there was lightning but not thunder; a few minutes later, the rain stopped as the squall passed. Lightning remained visible as bright looms to the north.

The squall took 1½ hours to reach the ship after first being spotted, and left 4 oktas of small cumulonimbus accompanied by stratus in its wake.

Position of ship: 29° 26'S, 47° 59'W.



Then, at 0200, the wind backed to NNE'ly, and increased to force 5, whilst the lightning increased in intensity and formed well-defined forks. Thunder was heard, and it started to rain slightly. At 0221, the wind was continuing to back and increase, being NW'ly, force 7–8, it was raining heavily from 8 oktas of cumulonimbus, and the pressure dropped suddenly by almost 4 mb as shown on the barogram.

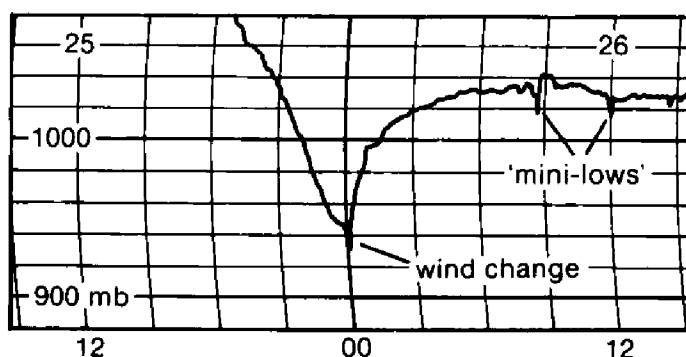
## DEPRESSION

### South Pacific Ocean

m.v. *New Zealand Pacific*. Captain R.C. Jackson. Balboa to Auckland. Observers: the Master, Mr G.C. Grey, 2nd Officer, and most of ship's company.

22–26 June 1986. During the vessel's passage, very variable weather conditions had been experienced. After passing Ile Rapa at 2200 GMT on the 22nd, the wind was SE'ly, force 4; twenty-four hours later, it was NNW'ly, force 8. On the 25th, it was SW'ly, force 7 at 0100, there were light airs at 1100, and at 2359, it was NE'ly, force 7. Sea and swell conditions were in accordance with this situation.

Barometric pressure had been falling rapidly from 1013 mb at 1600 on the 25th, to reach 997.7 mb at 2330. At 0100 on the 26th, a violent wind shift was experienced, there was no backing or veering, the wind simply started to blow in the opposite direction, changing instantly from NE'ly, force 7, to SW'ly, force 9 (40–45 knots in squalls). An immediate fall in pressure from 997.3 mb to 994.6 mb was recorded (see barogram), with temperatures also falling, from 16.7 °C to 14.6 (air temperature), and from 16.2 to 13.0 (wet bulb). The barogram shows the pressure changes.



By 0100, the wind had steadied at SSW'ly, force 8, with the barometer reading 998.8 mb, and pressure rising rapidly. The cloud cover had reduced to 2 oktas, consisting of stratus, cumulus and stratocumulus. Sea and swell conditions had become rough and confused, while the air temperature was 14.1, and the wet bulb 12.5. The wind had veered to WSW'ly, force 7 by 0230, and remained in this direction for some hours before veering further to NW'ly, force 4-5. Skies were now overcast.

During the evening of the 26th, the vessel experienced two 'mini-lows', at 0830 and 1205. These involved a drop in pressure of about 2 mb below the general pressure level, producing squally conditions without a change in wind direction.

The barogram clearly shows the two systems.

Position of ship at 0100 GMT on 26th: 35° 17'S, 173° 32'W.

## CORPOSANTS

### Mozambique Channel

m.v. *British Respect*. Captain S.R. Montague. Ras Tanura to Rotterdam. Observers: Mr J.E. Perry, Chief Officer and Mr N.T. Lee, 2nd Officer.

13 April 1986. The vessel was steering a south-westerly course about 35 n.mile east of Maputo, when, at 0000 GMT, distant lightning was observed. The wind at this time, was S'E'ly, force 3, and the dry bulb read 25.8 °C, with a relative humidity of 75 per cent.

At 0130, the wind backed to NW'N, increasing to force 4. Forked lightning was clearly visible from a low cumulonimbus cloud which covered three oktas of the sky, and was observed to be coming closer until, at 0200, the vessel entered a moderate thunderstorm. Thunder was audible from between 3 seconds and 20 seconds after the lightning, which was of a yellow-white and blue-white colour.

Prior to entering the thunderstorm, the atmosphere felt 'close', and a distinct buzzing noise could be heard from the ship's whip aerial. On closer investigation, a light-blue haze could be seen around the top of them, extending to about 1 cm down. It was also visible as a series of 'balls' across the maindeck athwartship aerial, between the samson posts. The intensity of the buzzing and the haze increased until a discharge of lightning occurred, then it ceased briefly, reforming

almost immediately until a further discharge. The phenomenon lasted for about 20 minutes, during which time, signals from a satellite which was being tracked were lost by the satellite navigator.

The storm passed directly overhead, and heavy precipitation fell, giving the atmosphere a cool and fresh feeling. Backing further to WSW'ly, the wind increased to force 6; this dropped to force 4 by 0600, when the dry bulb temperature was recorded as 23.5.

Position of ship: 26° 10'S, 34° 24'E.

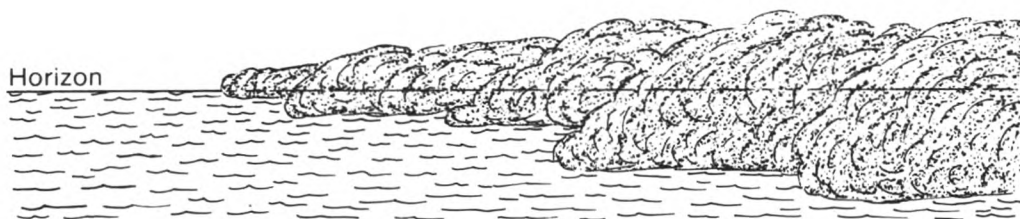
## FOG BANK

### South African Waters

m.v. *Nosira Madeleine*. Captain M.A. Gater. Cape Town to Halmstad. Observers: the Master, and Miss K.E. Powell, 3rd Officer.

21 May 1986. At 0745 GMT a bank of fog could be seen clearly to the north of the vessel as she steamed north-west at 14 knots, the sketch shows its appearance.

The vessel entered the fog bank at 0815, and the wind increased to force 2,



while the air temperature dropped from 18.5 °C to 17.0. The fog was low, reaching between 12 m and 30 m above the sea surface. At the edge of the bank, the fog was very patchy, but well inside it, the visibility was reduced to an average of 0.25 n.mile, being less than 200 m at times.

At all times, the sky could be seen, and altocumulus was noted. When the observers were above the fog bank, a clear, pale rainbow/semi-halo of radius about 40° could be seen close to the ship on the port side.

The fog began to thin and became patchy at 0850, and by 0900, the vessel was well clear of it; the air temperature then began to rise again. Throughout, the sea temperature remained at 18.5, and the sea itself was calm.

Position of ship: 32° 42'S, 17° 12'E.

## DUST

### Eastern North Atlantic

m.v. *Benhope*. Captain T. Fyfe. Rouen to Richards Bay. Observers: the Master, Mr J.H. Clark, Chief Officer and ship's company.

18–21 April 1986. From about 1800 GMT, the vessel encountered an area of dust suspended in the air. From this time, the visibility decreased, until by 0730 on the 19th, it was 0.5 n.mile or less.

The sky was obscured, and during the hours of darkness, only the moon and the brightest, highest stars were visible. The rising sun was not visible until it reached an elevation of about 15°. When shining through the dust, it took on a bright, metallic appearance, like a piece of stainless steel.

At first, the dust was only really apparent on glass (windows and thermometers etc.), but soon, the ship was covered in a thin film of red dust. Throughout, the wind was from the north.

The vessel finally emerged from this area of dust on the 21st at 0300.

Position of ship on the 18th: 21° 00'N, 17° 55'W.

Position of ship on the 21st: 08° 15'N, 16° 38'W.

## CURRENTS

### North Atlantic Ocean

m.v. *Falmouth Bay*. Captain R. Brinkworth. New York to Rotterdam. Observers: the Master and ship's company.

18–23 June 1986. Whilst on passage to the English Channel, appreciable variations in the ship's speed were noticed over a period of several days. Outside forces remained virtually constant i.e., wind direction and force, engine revolutions and draft. We therefore reached the conclusion that inconsistencies in the direction and rate of the Gulf Stream were responsible for the variations in distance run. At one time, the vessel's speed was in excess of 19 knots, and then, less than twenty-four hours later, was only 16.5 knots.

The following information has been extracted from the 'Satellite Fix' logbook.

DATE TIME (GMT)	POSITION	SET	DRIFT	SPEED (KNOTS)
20th 0013	42° 06.2'N, 48° 06.2'W	032	0.8	
0256	42° 29.7'N, 47° 07.8'W	262	0.8	
0539	42° 54.4'N, 46° 09.0'W	148	0.9	18.2 ex 0013
0748	43° 11.3'N, 45° 18.3'W	093	1.1	18.5 ex 0256
1229	43° 51.6'N, 43° 21.9'W	067	2.0	19.9 ex 0748
1318	43° 57.7'N, 43° 02.8'W	079	1.3	
1731	44° 22.6'N, 41° 24.2'W	119	0.4	17.8 ex 1318
1950	44° 38.0'N, 40° 32.2'W	204	0.9	
2011	44° 40.9'N, 40° 23.6'W	204	0.9	17.4 ex 1731
2348	45° 04.9'N, 39° 02.8'W	221	0.1	
21st 0345	45° 27.6'N, 37° 34.5'W	208	2.5	
0422	45° 30.8'N, 37° 20.7'W	155	0.2	16.7 ex 2348
0759	45° 50.4'N, 35° 58.4'W	210	1.6	16.7 ex 0422
1207	46° 14.3'N, 34° 26.7'W	233	1.4	16.5 ex 0759
1638	46° 39.4'N, 32° 41.6'W	275	0.3	17.0 ex 1207

These adverse eddies were surprising and unexpected, and the inconsistencies lasted for several days, although not so marked as the example shown.

Position of ship at 0600 GMT on the 18th: 40° 36'N, 64° 30'W.

*Note.* Mr J. Clarke, of the Ocean Currents Section, Met. Office, comments:

'Although the Gulf Stream is one of the more constant of the world's ocean currents, and, while having a well-defined mean direction and speed, it is also subject to 'meanders' much as a river on a plain, each meander itself containing eddies. In addition, complications occur when a) near its boundaries with other countries, b) when approaching a land mass, c) when approaching or traversing an uneven bottom.

'I have examined data of mean currents over relevant areas of the North Atlantic Ocean, and believe the following are the chief reasons for the current variations experienced by the *Falmouth Bay*:

1. The earlier part of the voyage (west of about 40° W), although lying in a more constant stretch of the Gulf Stream, is only 100 n.mile or so south of the mean limit of the Labrador Current, and it is therefore possible that only a relatively slight further-than-normal southward encroachment of the Labrador Current would bring its boundary with the Gulf Stream into the vicinity of the vessel's course, thus causing the eddies experienced on the first leg.
2. East of about 40° W, the Gulf Stream approaches the North Atlantic Ridge (which lies between about 35° W and 23° W) and then the European continent; thus, the combined effect here would be of b) and c) above.

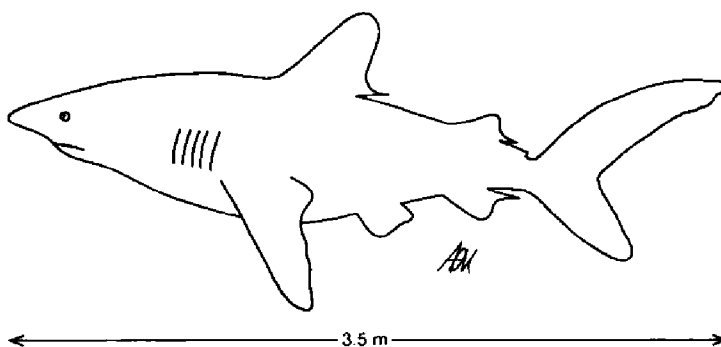
'I hope these comments help to explain this event.'

## SHARK

### North Atlantic Ocean

m.v. *Atlantic Star*. Captain C.S. Kingston. Le Havre to Halifax, N.S. Observers: Mr D.G. Kerslake, Radio Officer and Mr A.P. Macey, Cadet.

17 May 1986. The shark shown in the sketch was sighted at 1000 GMT. It was



about 3.5 m long, and was a light brown colour, with a much lighter underside. There were also distinctive white tips on the fins.

It panned down the port side of the vessel at a distance off of about 3 m, remaining stationary in the water. With reference to text books, the shark was thought to be a White Tip (*Carcharinus longimanus*), although sighted well north of its territorial waters.

Weather conditions at the time of observation were: dry bulb 15.0 °C, sea 16.0, wind W'N'ly, force 4. There was also a north-westerly swell, 1.5 m high.

Position of ship: 41° 30'N, 53° 09'W.

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

'A very large example of the high-oceanic White-tipped Shark, *Carcharinus longimanus*, correctly named by the observers.'



## MARINE LIFE

### Eastern North Atlantic

m.v. *Bora Universal*. Captain H. Jones. Cape Town to Flushing. Observers: Mr R. Kendall, Chief Officer and Mr D.B. Flood, 3rd Officer.

19 May 1986. At 1000 GMT the Chief Officer found a small flying fish on the poop deck. The fish was small, measuring 25 cm in total from tip to top, and was of the two-winged variety. Its colouring was similar to that of a mackerel. Although there was nothing unusual or exciting about the flying fish itself, we noticed a creature inside its open mouth, almost filling it.

It was decided that the fish should be dissected in order to see what the intruder was, and we found that the head of the fish had to be cut in half to get at it, and even then, it had to be prised off the throat and gill area with a sheath knife. Another, smaller specimen was even further inside the fish, but not as far down as the stomach.

We noticed that the reasons for the bigger one being so well attached to the fish, were its fourteen powerful legs, with hooks on their ends. The creature was approximately 3.5 cm long and 1 cm wide, with a square head and tail. Its body was similar to that of a crustacean, with hard segments the full length of the body, all of them varying in size. After being prised off the fish, its legs contracted slightly, to finish under the body.

Was it a crustacean? If so, we thought they were bottom feeders like crabs and lobsters. How would a surface fish obtain one in mid-Atlantic? Or, was it, on looking at the large, curved hooks on the legs, a parasite of some sort? We wondered how big one would grow, as the creature was large in relation to the size of the flying fish.

Last year, whilst on the *Caspian Universal* at Almirante, a similar thing was seen. Then, a Red Snapper was caught when the ship was alongside the berth, but nobody would take the hook out, as a creature about 2 cm across could be seen inside its mouth!

Position of ship: 06° 53'N, 14° 47'W.

*Note.* Dr F. Evans comments:

'The creature was a species of isopod parasite called *Glosobius* (meaning "tongue-living") which inhabits the mouths, gills and sometimes the surrounding skin of flying fish. They grow surprisingly large within the hosts. The report from the observers is very detailed and commendable; the rows of feet are indeed terminated by hooks as with many parasites. The smaller specimen was probably not related to the larger since the young (which are at first carried in a marsupial pouch by the mother) must take off and find other flying fish, or the tribe becomes extinct.

'Beware! isopod parasites of this group will readily bite your hand.

The most familiar relative of this strange creature, and quite closely connected with it, is the common wood-louse or slater (which does not bite, of course).'

## BIOLUMINESCENCE

### North Atlantic Ocean

m.v. *Bora Universal*. Captain H. Jones. Sheerness to Cristobal. Observer: Mr D.B. Flood, 3rd Officer.

31 May 1986. On looking out at 2240 GMT, the bow wave looked as if it had lots of snowflakes in it, as there were thousands of tiny golf-ball sized 'bio-bursts'

which were very bright. Most of them appeared to be moving away from the ship at right-angles, although there were a few which were moving perpendicularly to these i.e., running the length of the ship, but in the same, and opposite directions to it, all at different speeds.

When shining a torch or lamp on them, they seemed to fade, but not vanish. There was no significant sea temperature change except for a slight increase owing to our southerly course, and when, after taking the sea temperature, (19.1 °C), the water was poured onto the deck, there appeared to be hundreds of tiny 'bursts' scuttling to the edges of the wetted area.

Whilst looking out of the window, there were alternate periods when either the port or the starboard bow wave became completely devoid of 'bio-bursts', while the opposite side retained them. There was no apparent reason, but it happened several times to both sides.

This little exhibition went on until 2315, when all the 'bursts' suddenly vanished.

At the time of observation, the wind was NE'ly, force 3, the sky was overcast, and there was a slight sea with a low swell.

Position of ship: 38° 31'N, 29° 59'W.

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

'The description of the movement of the small bursts of light in the bow wave indicates that the sources were very active (nothing passive would have moved in the same direction as the vessel). I can only suggest they were fishes, probably lanternfishes, and that their occasional appearance on one or other side of the bow wave was an indication of small aggregations being disturbed by the close passage of the vessel, rather than by its passage through an aggregation. The organisms in the water bucket were much too small to have been directly involved in the bow wave effect. They were probably dinoflagellates and were swept to the edge of the wetted area, rather than "scuttled". It is a pity none were preserved.'

### North Sea

m.v. *Malling*. Captain B.J. Pratt. Off Zeebrugge, coasting. Observers: the Master, Mr D. Oliver, 1st Officer and the Belgian Pilot.

16 June 1986. Whilst off Zeebrugge, or, more precisely, by the wreck buoys of the *Mont Louis* between 2245 GMT and 2300 GMT, we had just commented that the conditions were like those of a tropical night, when luminescence was noted in the ship's wash. It was remarked between the observers that this was very unusual, and so as many weather observations as were practicable on a MARID ship were taken.

The sea-water temperature seemed to be abnormally high at 16.0 °C, since all the previous recordings were 11.0 (taken before the ship went into port for several days), but it was thought that even the sudden warm conditions of a heat-wave then being experienced would not have been sufficient to bring the temperature up by five degrees. The water temperature was checked very carefully, and taken again in order to confirm the reading.

Conditions at the time were: dry bulb 18.0, pressure 1014.5 mb, wind and sea calm, no swell. Visibility was 2 n.mile in mist.

Position of ship: 51° 24'N, 01° 54'E.

*Note.* Dr P.J. Herring comments:

'Dinoflagellates are the probable cause. They are often the dominant small organisms in warm surface water, and frequently appear in "blooms" around the British Isles in the summer and early autumn. A persistent patch of unusually warm surface water could have provided ideal conditions for such a "bloom" here.'

### **Eastern North Atlantic**

m.v. *Harold La Borde*. Captain M.M. Reeves. Rotterdam to Point Lisas. Observers: Mr S.N. Harris, Chief Officer, Mr F.P. Wight, 2nd Officer and Mr I.D. Gordon, 3rd Officer.

2-3 June 1986. At 2200 GMT, bow-wave bioluminescence was first noted. Originating in the disturbed water around the bow, it gradually spread until the whole of the ship's hull appeared to glow as it passed through the water. By 2230, the ship's wake was also glowing for a distance of approximately 200 m. The glow became very intense at 2310, and presented a white/green hue. This extra brightness reduced somewhat at 0000 on the 3rd, thereafter gradually diminishing until 0430. No 'flashes' of light were observed.

The following night produced yet more bioluminescence. At 2200, a bow-wave glow was again seen, and the colour was the same as the previous night. However, on this occasion, flashes of light were very common; intensely white, they were visible for an average of seven seconds. By 2245, all traces of this activity had disappeared.

Position of ship at 2200 GMT on the 2nd: 45° 33'N, 13° 38'W.

Position of ship at 2200 GMT on the 3rd: 42° 48'N, 19° 05'W.

### **South Atlantic Ocean**

m.v. *Valdivia*. Captain N.C. Kerr. Gibraltar to Richards Bay. Observers: the Master, Mr A.C. McLundie, Cadet, and Mr I. MacGregor, Cadet.

4 April 1986. Between 1910 GMT and 2130 GMT, whilst the vessel was proceeding south-east at 11.5 knots, large numbers of bright patches of luminescence were seen passing down the ship's sides. Closer observation revealed what appeared to be numerous sausage-shaped jellyfish. Upon switching on the floodlighting, it was seen that the jellyfish numbered thousands, of which only about 20 per cent were luminous.

A large number of these creatures appeared to be near the surface, and by using a small hand net, it proved relatively easy to remove one from the sea for inspection. It was 19 cm long and 5 cm in diameter at its broadest point, and was shaped like a hollow bullet. The outside was covered with rigid spikes, curved towards the hollow ends. The body was composed of semi-rigid jelly, white in colour with a pink fleck.

After a few minutes out of the water, the jelly began to break down into a clear liquid. Following subsequent research, we believe that these bullet-shaped objects were colonies of a tunicate called *Pyrosoma*, as described in *The Marine Observer*, January 1983. The sheer number of the creatures observed (the vessel passed through them for some 23 n.mile, and they must have numbered millions)

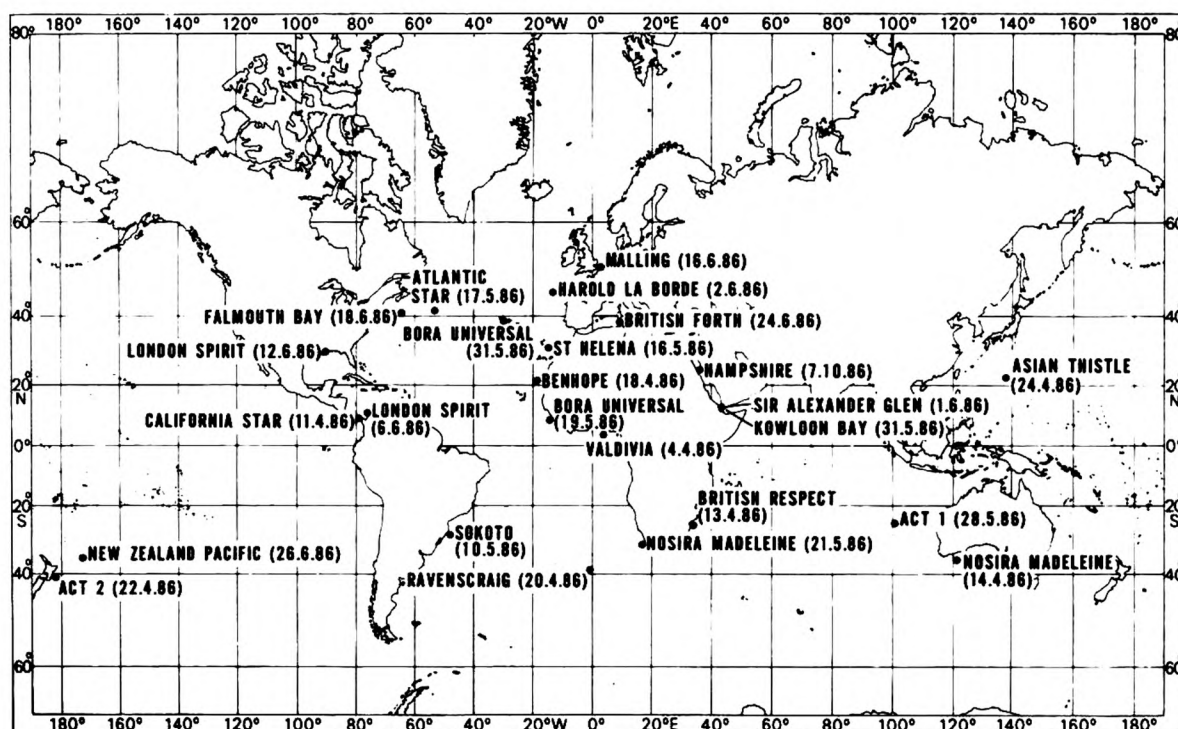
made us feel that this sighting was worth reporting as it indicated a plentiful supply of food in that area. Patches of paler luminescence were also observed during this time where the sea had been disturbed by the passage of the ship. No luminescence was observed after 2130.

Weather conditions were: dry bulb 23.5 °C, sea 24.0, wind SE'ly, force 3, and there was a slight sea with a moderate SE'ly swell.

Position of ship: 17° 24'S, 03° 54'E.

*Note.* Dr. F. Evans comments:

'They were indeed *Pyrosoma*. There is plenty of marine life in the Benguela Current, where the sea is rich in nutrients. The patches of paler luminescence could have been caused by plant plankton on which the *Pyrosoma* would be feeding. The animals are not jellyfish, by the way, but are colonies of creatures related to sea-squirts and salps. They filter food out of the sea and do not sting.'



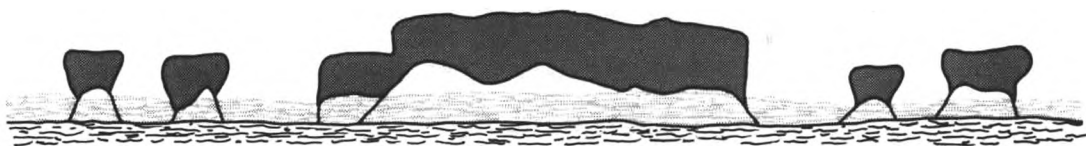
Position of ships whose reports appear in *The Marine Observers' Log*

## ABNORMAL REFRACTION

### Mediterranean Sea

m.v. *British Forth*. Captain R.H. Hall. Santa Panagia Bay to Bec d'Ambes. Observer: Mr M.S. Prestt, 2nd Officer.

24 June 1986. At 1300 GMT, the vessel was approaching the Isles de la Galite from the east, the islands being about 30 n.mile away. The visibility had been about 6 n.mile, and there appeared to be a quantity of sand in the air. The islands seemed about twice their normal size, and were flat-topped. Obviously, they were seen as themselves, plus another image of them which was inverted on top of the real thing, see sketch. A ship some 15 n.mile ahead also presented a similar effect.



This phenomenon lasted for about 45 minutes, and as the vessel approached, it gradually disappeared. At the time of observation, the cloud cover was nil, although sand was present as long streaks just above the horizon.

Weather conditions were: air temperature 25.3 °C, wet bulb 20.2, sea 22.2, wind W'N'ly, force 2.

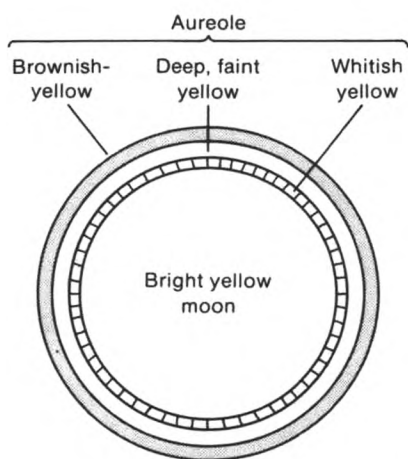
Position of ship: 37° 36'N, 09° 36'E.

## LUNAR ECLIPSE AND AUREOLE

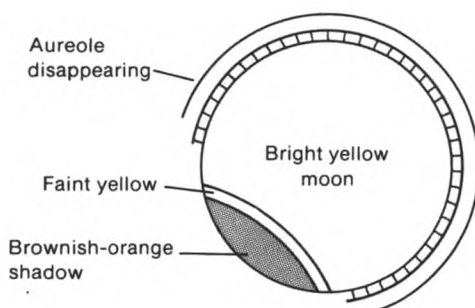
### Coral Sea

m.v. *Asian Thistle*. Captain J.F. Allen. Gladstone to Kakogawa. Observer: Mr Chow Man Wai, 3rd Officer.

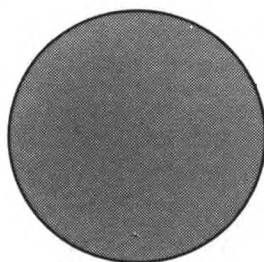
24 April 1986. At 1105 GMT a lunar eclipse commenced. Initially, the moon was surrounded by several rings which were whitish-yellow nearest the disc, becoming brownish-yellow, see sketch (a). As the Earth's shadow invaded the moon, sketch (b), the colour of the moon changed from bright yellow to a



(a)

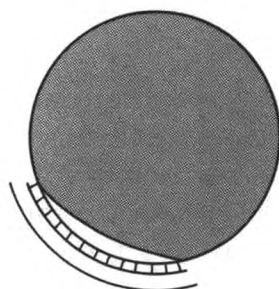


(b)



Moon in total shadow.  
Aureole gone

(c)



Shadow passing.  
Aureole reforming

(d)



brownish-orange. At about 1210, the Earth's shadow had completely shaded the moon, which was then totally brownish-orange. However, the shape of the moon was still clearly visible, sketch (c), and the rings surrounding it had disappeared. About another hour later, the outline of the moon became very faint, and it eventually disappeared from view, together with some dark clouds which also became invisible to the naked eye.

At about 1318, the moon started to regain its brightness as the Earth's shadow passed away from the lower portion of the moon, sketch (d), in a reverse version of the eclipse's first hour, and the aureole surrounding the moon began to reform. The shadow was clear of the moon at 1420, by which time the aureole was again complete.

Position of ship: 22° 20'N, 138° 32'E.

*Note.* The *Asian Thistle* is a Selected Ship of the Hong Kong Voluntary Observing Fleet.

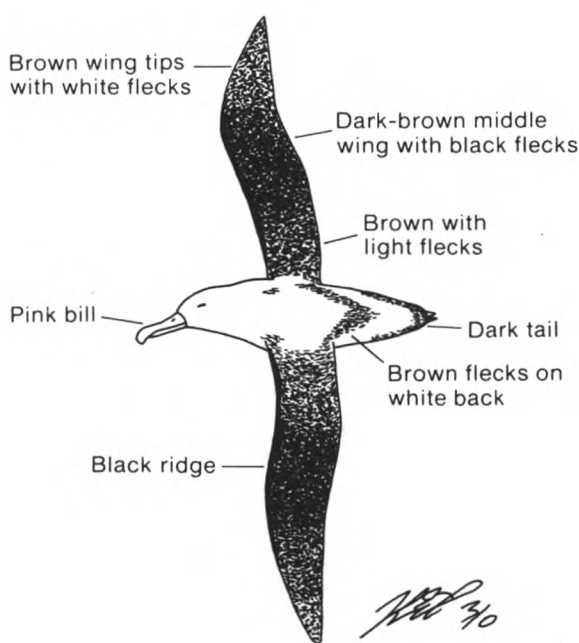
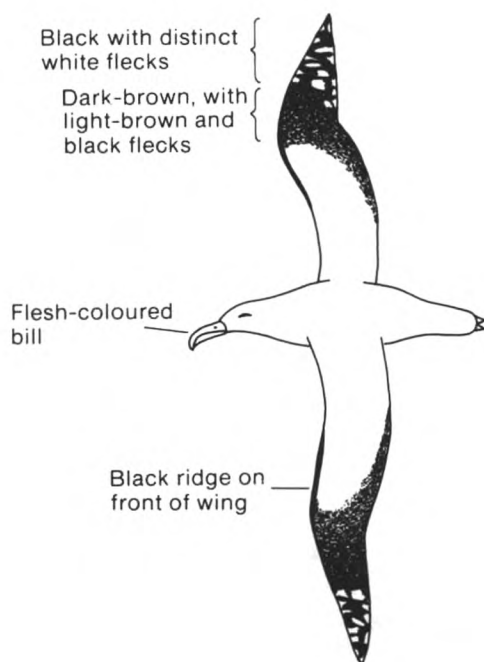
## BIRDS

### Southern Ocean

m.v. *Nosira Madeleine*. Captain M.A. Gater. Khawr Fakkan to Tasmania. Observers: the Master, Mr A.A. Watkins, Chief Officer, Mr A. Lewington, 2nd Officer and Miss K.E. Powell, 3rd Officer.

14–17 April 1986. After making landfall at Cape Leeuwin, and taking up an easterly course across the South Australian Basin, the ship was joined by first one, and then other Wandering Albatrosses. They were identified by their distinctive flesh-coloured bills, and also by reference to *A Field Guide to the Seabirds of Britain and the World* by Tuck and Heinzel.

From bill to tail, their lengths measured from 1–1.5 m, whilst their wing-spans were around three times as long, averaging about 3 m. Markings varied from all brown upper wings with dark tails and flecked backs, to markings restricted to the ends of the wings only, as shown in the sketches.



Each bird had its own individuality, no two birds were the same; a couple of them had white 'windows' on the upper wing, near the back, and some had more distinct white markings at the tips of the wings. Only one bird had a completely white body; they were all obviously at different stages of maturity.

The albatrosses were following the ship on the 'scrounge'. Sometimes they would glide across the stern of the ship, sometimes alongside (usually on the windward side), and occasionally across the bow. Most of the time, they were within 5 m of the sea surface, and very rarely flew above the mast head (35 m). At times, two or three of the birds would trail behind and disappear from view, only to return a while later.

While gliding, the postures of the birds changed (see sketches) from an arched back, with head and tail pointing down, and wings nearly flat, to flat back with the head up, and wings pointing slightly downwards, depending on how fast the birds were moving. When coming to rest on the water to inspect some scraps



Fast glide



Slow glide



Stopping to land on the water

*W. J. 30*

thrown overboard, the legs were brought forward, bringing the body down, the tail was fanned out, and the wings scooped around in front of the body, as though trying to catch the wind. Upon landing, the wings were folded in. The maximum number of albatrosses around the ship at any one time was eight.

Position of ship at 1800 GMT on the 14th: 36° 06'S, 121° 48'E.

*Note.* Captain A.S. Young, of the Royal Naval Birdwatching Society, comments:

'Certainly Wandering Albatrosses (*Diomedea exulans*) as you so rightly deduced in various stages of immaturity to full adulthood, which for these large birds, takes some 6-7 years. The pink bill is very diagnostic, and is the main difference from the adult Royal Albatross (*D. epomophora*), which otherwise is very similar. Also, the white "mask" of the juvenile is unmistakable.

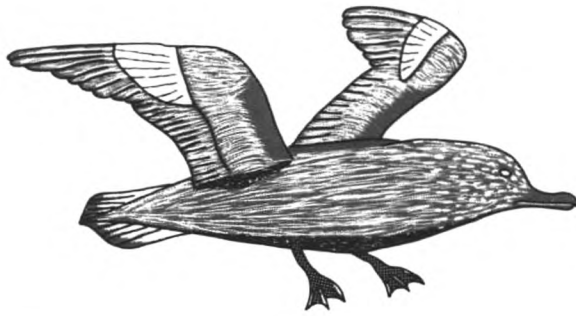
'Your comments upon the flight patterns are interesting; these birds are of course masters of the use of air currents which occur alongside a ship, giving ideal opportunities to a budding photographic enthusiast. However, here we have an exceptional set of sketches that would do justice to any work of reference — I think we must find a place for them in a future issue of our journal *The Sea Swallow*.'

## South Atlantic Ocean

m.v. *Ravenscraig*. Captain F. Stuart. Sepetiba Bay to Singapore. Observers: the Master, Mr C. Devey, 2nd Officer and Mr D.J. Vickery, 3rd Officer.

20 April 1986. Two days after passing 25 n.mile north of Tristan da Cunha, albatrosses of the 'wandering' and 'sooty' varieties were still very much in evidence, up to eight of them keeping station with the vessel. On the closest approach to the islands, over twenty of the two (possibly three) varieties were counted, along with several smaller birds which were tentatively identified as White-chinned Petrels. Positive identification could not be established as they would not come close to the ship, unlike the Wandering and Sooty Albatrosses which seemed content to play their version of 'chicken' with the wheel-house windows. Making identification of species was very easy, whilst consulting *A Field Guide to the Seabirds of Britain and the World* by Tuck and Heinzel.

A stranger was then noted amongst our escort, being a good deal smaller, with a totally different wing shape and size, and also movement. It was dark brown in colour with white markings on its upper and lower wings, as shown in the sketch.



At first, it was thought to be a petrel, but when our visitor came closer, the shape of the beak was seen to be totally wrong, and no petrel could be found which fitted the basic colouration.

After spending several minutes in the attempt, the bird made a successful landing on No. 1 hatch, and in doing so, displayed large, black, webbed feet. He was then studied at leisure, and the bill seemed to be hooked, and black in colour. On consulting our field guide, we found we had a Southern Skua — the illustration could have been taken from 'our' bird.

About five minutes later, after hopping around, the skua took off, flew for several minutes with one of the adolescent albatrosses, and then disappeared. It reappeared half an hour later, attempting to land on No. 2 hatch, but failing, and then flew off westwards.

Position of ship: 38° 48'S, 01° 07'W.

*Note.* Captain A.S. Young comments:

'Wandering Albatrosses (*Diomedea exulans*) and Sooty Albatrosses (*Phoebastria fusca*) amongst others, should be met within this area in reasonable numbers. The Sooty Albatrosses still breed on these islands, whereas there is now some doubt about the former. White-chinned Petrels (*Procellaria aequinoctialis*) are also fairly common birds of the Southern Ocean, with the diagnostic white chin (variable in sub-species) and largish, yellow/straw bill. The Southern or Antarctic Skua (*Catharacta antarctica*), the southern counterpart of the northern Great Skua or Bonxie (*Ciskua*) is a large, dark, piratical character — thanks for the useful diagrammatic sketch.'

## BAT

### Caribbean Sea

m.v. *London Spirit*. Captain R.B. Tarbuck. At Covenas, Colombia. Observers: Mr M.C. Littlewood, Extra Chief Officer, and members of the ship's company.

6 June 1986. While loading crude oil at the single buoy mooring at Covenas on the night of the 5th/6th, there was a very violent thunderstorm which originated over the hills ashore, but was then blown across the ship by an offshore wind at about 8–10 knots. During the storm, which lasted for about 5½ hours, frequent lightning and heavy rain was accompanied by heavy squalls.

In the morning, when the rain had abated, a small bat was found in one of the upper deck scuppers. At first, it was thought to be dead, as it was soaking wet and showed no signs of life, but when picked up, it was found to be breathing and was just warm to the touch.

It was dried off as well as possible with paper towels, and was then measured. From head to tip of tail, the length over all was 13 cm, and tail was 3 cm long, the widest part of the body was 3.5 cm across, and the length of a folded wing was 6 m. The bat was dark grey, with the outer ends of the fur on its body being dark brown. The skin forming the webs on the hind legs, tail and wings, and also that on the ears was a very dark brown, nearly black. Its ears were medium-size, and the nose was flat, rather like the snout of a pig.

After a photo-call, the result of which is shown opposite page 68, the bat was placed outside in a warm and sheltered spot, where it rested for several hours before flying off in mid-afternoon.

Position of ship: 10° 06'N, 76° 12'W.

*Note.* Mr J.E. Hill, of the Mammal Section, British Museum (Natural History), comments:

'The bat described and photographed is a member of the family Molossidæ or free-tailed bats, widespread in South America, and characterized by the usually fleshy ears and lips, and by the protruding tail. It is difficult to provide a definite identification, but its appearance, size, and the description of its fur and colour suggest that it might be an example of the Big free-tailed Bat *Tadarida macrotis* which occurs from British Columbia south to Uruguay and Paraguay. It is primarily an inhabitant of rugged, rocky country. It is quite possible that any species of bat would be disorientated by a severe electrical storm and blown offshore, perhaps from some distance — bats are not infrequently found on board ships, even at some considerable distance from the nearest coast.'

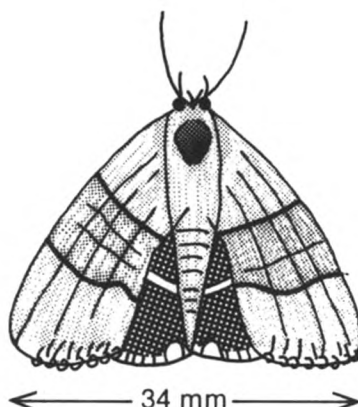
## MOTHS

### Red Sea

m.v. *Sir Alexander Glen*. Captain D. Willey. Sirri Island to Suez Bay. Observers: the Master the ship's company.

1 June 1986. At about 0600 GMT while the vessel was passing through the Bab al Mandeb Strait, several thousand moths of the same species settled on board. The most noteworthy feature was their sheer numbers, they alighted on the decks, accommodation and hatches, only to rise up again when disturbed.

The moths themselves were small (as shown in the sketch which is drawn life-size), predominantly grey in colour, with black and white markings on the wings, and with an orange spot on the body behind the head. Whilst on board, many fell prey to a pair of jackdaws which had also joined the ship.



The majority of moths left the ship during the night, probably in the vicinity of the Zubair Islands, leaving behind the dead and just a few stragglers.

Weather conditions at the time were: dry bulb 32.2 °C, pressure 1007.7 mb, wind SE'ly, force 4-5.

Position of ship: 12° 37'N, 43° 23'E.

*Note 1.* Large numbers of moths were encountered in the same area by the *Kowloon Bay* during the night of 30/31 May, two of them were forwarded for identification to the British Museum.

*Note 2.* Mr M.R. Honey, of the Department of Entomology, British Museum (Natural History), comments:

'The moths which landed on both the ships were *Achaea catella* Guenee, a species known in parts of Africa as the Banded Achaea (Lepidoptera, Noctuidae, Catocalinae).

'This species is generally distributed throughout the Ethiopian region, (Africa, Saudi Arabia etc.), and from the notes made by the observers, it would also appear to be a migratory species (one of many in this group of moths). Obviously, there was a considerable migration during this time.'

## INSECTS

### Gulf of Mexico

m.v. *London Spirit*. Captain R.B. Tarbuck. At Baton Rouge. Observers: Mr M.C. Littlewood, Extra Chief Officer and all observing officers.

12 June 1986. After discharging at Baton Rouge, a large number of unusual insects, one of which is shown opposite page 68, was found on board.

According to the River Pilot, they were known as 'stink bugs' by local people, because of the smell emitted when crushed. However, when this was tried on board, there was no smell, perhaps they had not eaten for several days.

The body was generally a light brown/grey, the head and body together measuring 32 mm. Its antennae were a light reddish-brown, as were the outer areas of its legs, while the legs themselves measured 23 mm, and ended with twin



black hooks. The proboscis was 6 mm long, being the same length as the head, and appeared to be made of two sections which ended in a black, pointed section. A row of short, black spikes topped the mantle of the thorax, and it was these which first attracted the observers' attention.

Position of ship: 30° 27'N, 91° 11'W.

*Note.* The Department of Entomology, British Museum (Natural History), has identified the insect as *Arilus cristatus* (Hemiptera, Reduviidae).

Not all bugs are 'stink bugs', and predatory families such as Reduviidae do not have this defence which many of the phytophagous families do.

## Red Sea

m.v. *Hampshire*. Captain P.S. Bytheway. Tampa to Yanbu. Observers: Mr D. Cramer, 2nd Officer and Mr Ma Kat Lee, Lookout.

7–10 June 1986. Whilst drifting off Yanbu, the vessel was infested with thousands of locusts. Some, which were white with brown spots, were by far the largest, making a very audible 'whirrr' when taking off. The smaller, brown ones were mainly 'jumpers' and tended to make various grasshopper-like clicks, though not continuously. Bearing in mind the strong NW'ly winds, it was thought that they had been blown across from Egypt. Most of them died within a few days, and then the more hardy showed a cannibalistic nature, eating the bodies of the dead.

When the vessel was at anchor off Yanbu on the 10th, it became infested with crickets ('Just when you thought it was safe to go out on deck — Locust II, the crickets!'). At night, the crickets cleared up the rest of the locusts, and then started on themselves. They tended to drive the bridge staff mad, as they found their way behind the main consols, and even inside the echo sounder, which magnified their chirruping. Of the two types noted, brown-winged and black-winged, the ones with brown wings were by far the noisiest. The Lookout said that the crickets could be sold for \$2.00 U.S. in Hong Kong, as they are regarded as good luck tokens, and they keep the bugs down. This explained why some of the crew started collecting them for their accommodation, and why I foraged the bridge at night, with a torch, and armed with a tin of Sure Shot.

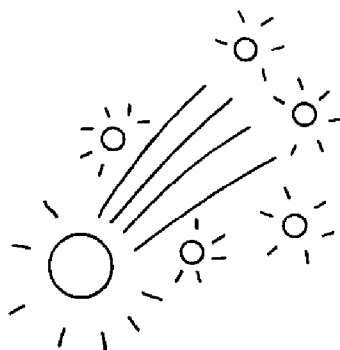
Position of ship: 24° 00'N, 36° 30'E.

## METEORS

### Caribbean Sea

m.v. *California Star*. Captain H.K. Dyer. Lazaro Cardenas to Balboa. Observers: Mr G.A. Hoe-Richardson, 3rd Officer and Mr L. Patten, Lookout.

11 April 1986. At 0130 GMT whilst on a course of 019° approaching Balboa anchorage, a large, bright-green 'fireball' was sighted almost dead ahead. It was sighted at an altitude of about 40°, and 'disappeared' at an altitude of about 5°, seeming to almost reach the sea surface. During its descent, smaller flashes of light were seen to be breaking away from it, as shown in the sketch, perhaps resembling a 'rocket', common at firework displays.



The display lasted for probably only a second, but because of its brightness, an image remained on the eye for some seconds afterwards.

At the time, the wind was SSW'ly, force 3-4, and there were 7 oktas of stratocumulus.

Position of ship: 08° 40'N, 79° 30'W.

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

'This was a fairly bright fireball, although no information is given about its brightness, except to say that it was a large, green light. It was a natural object entering the atmosphere, and it obviously consisted of a very friable material because of the fragments which were continually breaking away from the main mass.'

### North Atlantic Ocean

R.M.S. *St Helena*. Captain R.H. Wyatt. Avonmouth to Tenerife. Observers: Mr M. Bray, 3rd Officer, Mr R.A. Wilson, Radio Officer and several passengers.

16 May 1986. The vessel was proceeding on a southerly course in a position some 90 n.mile to the east of Madeira, when, at 2112 GMT, the following phenomenon was observed.

It was an almost perfect evening, with few clouds, a new moon, and a light SW'ly wind which rippled the sea, when suddenly, the area surrounding the ship was lit up by the first of three pulses of bright light — the third being of sufficient intensity as to illuminate the vessel and the horizon as if it were daylight. It was thought by the Radio Officer and Third Officer, who were on the bridge, that this light originated from a source which was either above the vessel or behind it. The total duration of the event was about four seconds, and no other phenomenon accompanied it.

Afterwards, the evening returned to normal, and the following morning, several passengers reported seeing the glow through their cabin portholes.

Weather conditions at the time of observation were: air temperature 18.0 °C, wet bulb 16.2, sea 19.0, pressure 1017.8 mb, wind SW'ly, force 1-2.

Position of ship: 31° 55'N, 14° 57'W.

*Note.* Mr H. Miles comments:

'Because of the short duration of the flight, it is most likely that the phenomenon seen were caused by the entry into the atmosphere of a natural body which broke up in the upper atmosphere to produce three objects travelling on parallel paths, the last object being the main mass. It is thought that the material consisted of stony matter which was quite friable. There is no evidence of any space debris entering the atmosphere at that time.'

## **Indian Ocean**

m.v. *ACT 1*. Captain W.A. Davidson. Fremantle to Jeddah. Observers: Mr S.H. Hollingworth, Radio Officer, Mr D.J. Massey, Cadet and Mr A. Williams, Seaman.

28 May 1986. At 1450 GMT high meteorite activity was observed. Large meteorites were seen about 2–6 miles due south of the vessel. Several bright meteorites and numerous small ones were observed in the same general direction over a period of three to five minutes.

The approximate average altitude of 'burn out' was about 2550 feet.

Position of ship: 25° 12'S, 101° 16'E.

*Note.* Mr H. Miles comments: 'This is a very interesting and important observation. It does not correspond with any known meteor stream, but several recent burst of meteor activity have been reported, especially from locations in the Southern Hemisphere. Before this activity can be recognised as definitely being associated with a new meteor stream, it is necessary to watch for activity around this date during the next few years and to have observations from as many positions as possible.'

Commenting on meteors, fireballs and space debris in general he said:

'It is virtually impossible to estimate accurately a distance or height in the atmosphere except when the size of the object is known. Estimating the range or height of an aircraft can be carried out quite accurately, but when an object is 50–100 km, or even more, above the Earth's surface, the eye registers the range purely on the brightness of the object. It is purely an optical illusion. Objects need not necessarily be in the atmosphere. As an example, Venus is often quoted as being a few hundred yards away when it is actually more than 50 million km distance! Meteors, fireballs and re-entering space debris will, in most cases, be within 50–150 km above the Earth's surface as they cross the sky. Some of the larger particles may still be visible until they have descended as low as 10–15 km, but a single observer would not be able to estimate this.

'The dimensions of the light as it crosses the sky bears little relation to the size of the object itself. Much of the size of the light observed comes from the air molecules surrounding the object, and being dragged along with it.'

## **FLASHING LIGHT**

### **South Pacific Ocean**

m.v. *ACT 2*. Captain R. Jenkins. Wellington to Balboa. Observers: Mr L.P. Kirby, 3rd Officer and Mr M. McKinnon, A.B.

22 April 1986. Between 1200 GMT and 1330 GMT, continual flashes of light were observed on the horizon, these were clear, pin-point flashes somewhat like a beacon or lighthouse, only they were at totally infrequent intervals, and were out to sea, about 100 n.mile from the nearest land.

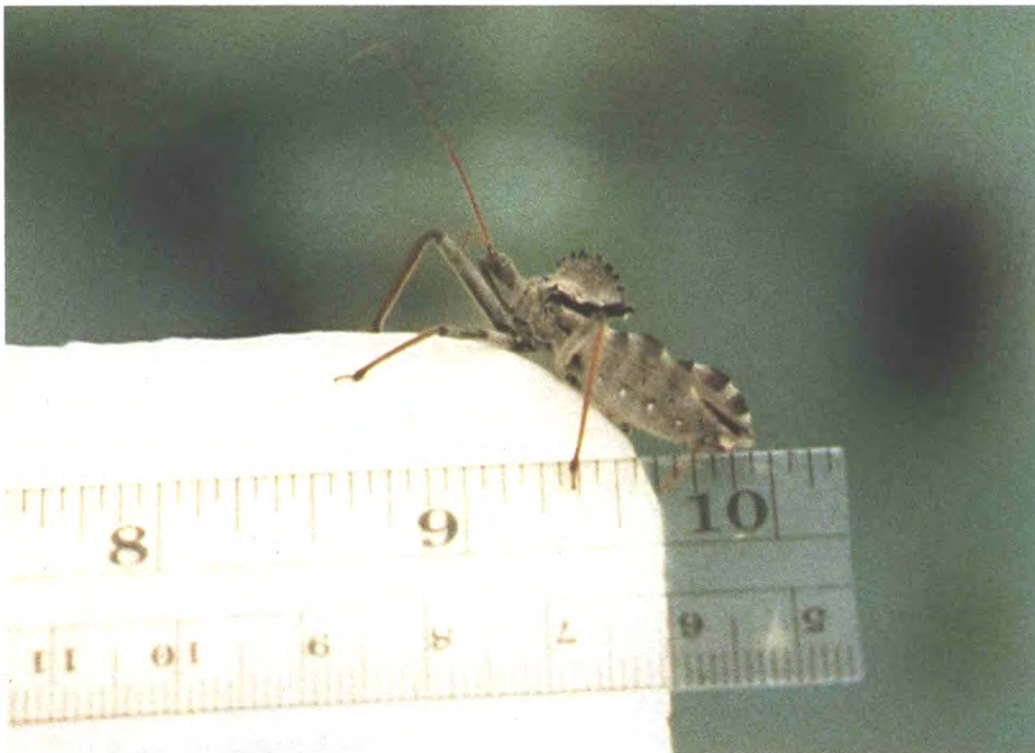
The flashes were occurring singly, but at various heights, from immediately on the horizon, to 3°–4° above it, and at no time did the compass bearing change more than about 20°.

Also observed over the same period of time and in similar positions on the horizon, was sheet lightning. It is believed that the phenomenon was some form of ball lightning, as at no time during the long period of observation was any object observed visually or by radar, which could have been producing such flashes.

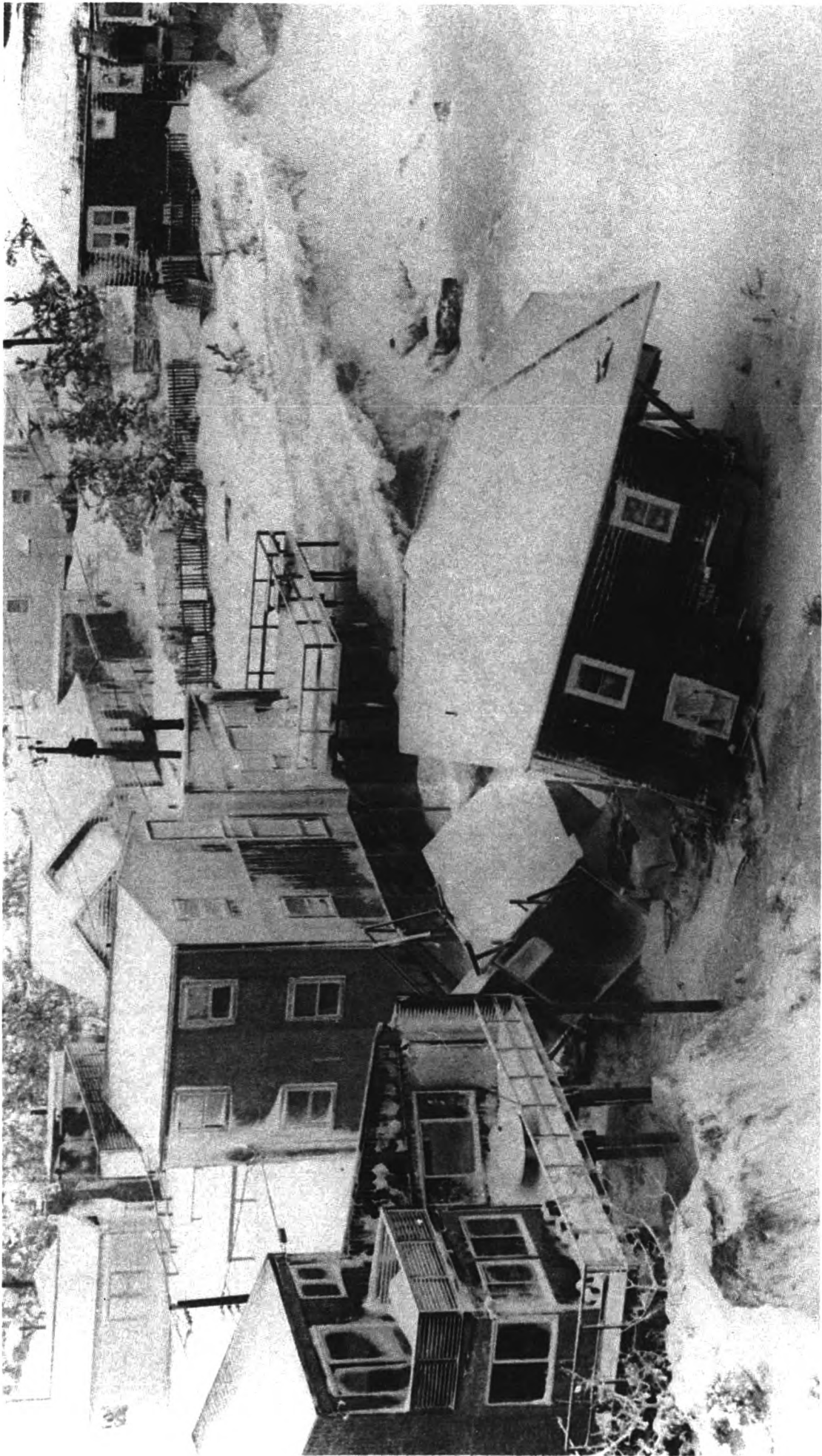
Position of ship: 40° 50'S, 178° 25'E.



Bat found on board m.v. *London Spirit* (see page 64).



Insect pictured aboard m.v. *London Spirit* (see page 65).



Photograph by courtesy of NOAA

The devastating results of a nor'easter on coastal areas. NOAA researchers are making special studies to learn more about the birth, formation and life cycle of such storms.



## On the Coattails of a Nor'easter\*

By D.E. WITTEN

(National Oceanic and Atmospheric Administration)

One minute its a low pressure system off the coast of Cape Hatteras. Twelve hours later its a powerful winter storm, driving north and eastward along the Nation's east coast.

The storm contains narrow bands of rain, freezing rain and intense snow. A deviation of 10 degrees in its forward track can mean the difference between a minor inconvenience or a significant disruption for a major east coast city, costing lives and millions of dollars in damage and lost productivity.

This is the infamous 'Hatteras Low', which is known as a nor'easter if it drives far enough to the north and east. Regardless of what it is called, it is difficult to forecast. Like a bomb, it can explode into existence, follow an erratic path, and change in forward motion as if directed by some devilish hand.

Researchers and forecasters will join forces this winter from mid-January to mid-March [1986] to focus special observations on the birthplace of the 'Hatteras Low'. Their goal is to learn more about the birth, formation and life cycle of such storms. The improved short range forecasts of coastal storms, expected to result eventually from this project will benefit the coastal communities and maritime enterprises subjected to the fury and vagaries of these storms. (See photograph opposite page 69.)

This unique project is called Genesis of Atlantic Lows Experiment. It involves forecasts and researchers from the National Oceanic and Atmospheric Administration, the National Science Foundation, the National Center for Atmospheric Research, the National Aeronautics and Space Administration, the Office of Naval Research, and a number of universities, including North Carolina State University.

GALE project director is Dr Richard Dirks of the National Science Foundation. He said that the primary objectives of this multi-million dollar project are to record and describe in detail the evolution of east coast winter storms, and to gain a better understanding of the large and small scale features which evolve during the storm's formation and development. Another objective of the GALE project is to develop and test improved models for better simulation and prediction of east coast winter weather accompanying the 'Hatteras Low'.

A low pressure system generally is associated with foul weather, and it can intensify into a major storm, given certain conditions. It begins with a body of warm air, which rises because it is more buoyant than surrounding, cooler air. The atmospheric pressure in the center is reduced, hence the name 'low pressure system'. Surrounding air is pulled into the center to replace the rising air, which condenses at higher, cooler altitudes to form clouds and eventually snowflakes or rain. In cooling, the warm air releases energy to fuel the storm. High level winds blowing across the top of the storm contribute to its development much like wind blowing over a chimney helps a fire burn faster.

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\* Reproduced from *NOAA Journal*, 16, 1986 by kind permission of the Public Affairs Officer, NOAA/National Weather Service.

Dirks described a classic situation which reveals just how little is known about the genesis of the 'Hatteras Low': 'If you look at the weather maps, you can trace a storm travelling across the United States. Ultimately you can track it up the west side of the Appalachian Mountains where it dies. About the same time, you see a new low pressure center emerge over the Cape Hatteras area.'

Just what is it that causes the new low pressure center to form off the coast of Cape Hatteras and to intensify overnight into a major storm? And equally important, what triggers and contributes to the development of the storm's various small scale features such as snowbands, rainbands and others?

Project GALE researchers hope to answer these and other questions, at least in part.

The boundary layer where the atmosphere meets the sea is of particular interest to the GALE Project researchers. One feature they want to examine is the zone where a shallow pool of cool air along the Appalachians meets a layer of warm, moist air produced over the coastal water by heat from the ocean.

'We think that ocean heat, particularly that from the warm Gulf Stream, is an important factor in the generation of coastal winter storms,' Dirks said.

Dr Ronald Lavoie of the National Weather Service's Office of Meteorology serves as the co-ordinator for NOAA activities in the GALE Project. He noted that the numerous observations recorded during the two-month GALE experiment will allow the researchers to examine how upper atmospheric conditions contribute to the intensity of a building, coastal winter storm.

Forecasters know that the energy from storm activity at the surface is derived in part from the circulation of the upper level winds. They also know that the path of storms is steered to some extent by these winds.

'One thing we want to determine is the combination of ingredients from both the lower and upper levels of the atmosphere, which contribute to the rapid development of these storms,' Lavoie said.

The observational network to be utilized for the GALE Project will provide the most intensive look at the atmospheric structure of our east coast storms. It includes the basic NOAA weather observations system augmented by state-of-the-art systems contributed by a host of organizations involved in the GALE Project.

During pre-storm and storm conditions, upper air disturbances will be detected and tracked eastward by balloon-lofted radiosondes launched every three hours from forty National Weather Service sites. Normally, these stations collect upper air observations twice daily.

Once an atmospheric disturbance reaches the Appalachians, it will be observed by upper air and surface stations, ground radar, research aircraft and ships, offshore buoys and satellites. The use of aircraft, ships and buoys will provide an extension of observational capabilities to several hundred miles at sea where few observations are normally available.

Researchers from NOAA's Environmental Research Laboratories will compare the characteristics of the precipitation bands in the observed coastal winter storms with those in hurricanes. Information critical to their task will be collected by Citation and P-3 research aircraft, both operated by the NOAA Office of Aircraft Operations. This data also will be of value to GALE Project researchers studying other aspects of coastal winter storms.

'Essentially, we are trying to use our aircraft techniques to gain insight into coastal winter storms and contrast this with the structure of hurricanes about

which we have learned a great deal using the research aircraft,' said Dr Robert Burpee of ERL's Atlantic Oceanographic and Meteorological Laboratories in Miami.

The Weather Service's National Meteorological Center in Camp Springs, Md., will support the GALE Project by providing forecast guidance based on current observations which are computer-processed with numerical models of the atmosphere.

Although numerical models constitute a major input to the forecasts and warnings prepared by the National Weather Service, they still cannot simulate a coastal winter storm's small scale feature such as the precipitation bands associated with heavy snowfall.

'The main limitation we now face in this area is the lack of sufficient observations, particularly over the coastal waters,' said Harlan Saylor, Chief of the Forecast Division at the National Meteorological Center.

'We will take this opportunity to determine the value of the intense GALE Project observations to the development of new, more detailed numerical models for improved forecasts and warnings of coastal winter storms,' he added.

The center of operations for the GALE Project will be located at the National Weather Service Forecast Office in Raleigh, N.C. Bob Muller, Meteorologist-in-Charge of this office, said that special forecasts will be prepared for the deployment of the research aircraft and ships, which need lead time in order to be on station when a storm develops off shore. GALE Project scientists working in the forecast office will direct the operations of the aircraft and ships when they are on station in a developing storm.

Winter storms born off the coast of Cape Hatteras typically intensify as they move to the north and east, posing dangers to the Canadian Maritime Provinces. Hence, Canadian researchers will conduct a companion experiment to GALE to monitor the later stages of coastal storms as they move into Canada's area of forecasting responsibility. It is called the Canadian Atlantic Storm Project (CASP).

'This country is particularly interested in the small scale features of winter storms because they produce the most violent conditions,' said Dr Herb Kruger, of Canada's Atmospheric Environmental Services, headquartered in Ottawa. Kruger is temporarily stationed at the Bedford Institute of Oceanography in Dartmouth, Nova Scotia, to coordinate CASP meteorological services with Canadian oceanographers.

'We do fairly well on forecasting the large scale features of these storms because our numerical models focus on them. But advances in observing techniques and systems in recent years now allow us to gain a better understanding about small scale features so that we can improve our models and forecasts,' Kruger added.

As in the past, any coastal winter storms developing this year will challenge the forecasting services of the United States and Canada as they pose hazards to the major coastal settlements in both countries. But the 'good news' is that any such storms will be under the close scrutiny of a variety of atmospheric and oceanographic researchers whose efforts just might unlock some secrets invaluable to forecasters in both countries concerned with winter coastal storms next year and beyond.

*Note.* During the project, which ended on 15 March 1986, scientists measured atmospheric and oceanic temperatures, wind velocities and direction, moisture content and precipitation.

#### **Some early results**

Scientists have learned that atmospheric processes on much smaller scales than normally are measured, play critical roles in the explosive growth of East Coast winter storms. Among these processes are the heat exchange between the atmosphere and a narrow core of the Gulf Stream which spawns almost daily intense precipitation and thunderstorms off Cape Hatteras.

Dr Joachim P. Kuettner, associate director of the GALE Project, said scientists also examined for the first time in great detail, the role of the Appalachian Mountains in spawning East Coast storms.

'GALE scientists measured the effects on weather, of the Appalachian Mountains with a network of 50 surface stations that sent their data via satellite to the mission center,' he said. 'These stations were augmented by a dense network of balloon launching sites. This enabled us to get measurements in much finer detail than was previously possible.'

'Our scientists also recorded for the first time, temperature differences as large as 50 degrees Fahrenheit between the warm sea surface and the cold air flowing over the core of the Gulf Stream. The cold air flowing over the warm water causes the water to evaporate and rise rapidly and form dense clouds very quickly. The temperature differences were measured by aircraft flying as low as 100 feet over the surface of the ocean.'

Scientists think the Appalachians trap cold air coming down from Canada, forcing warm, humid air from the Atlantic to flow over this 'cold dome'. This causes precipitation in the form of rain or snow, depending on the temperature at the time. These local processes must coincide precisely in timing with large-scale disturbances.

The large data set that was gathered during the GALE Project will be analysed at the various universities and government laboratories over a period of two to five years.

# Noctilucent Clouds

By R.J. LIVESEY

(Director of the Aurora Section of the British Astronomical Association)

These impressive luminous clouds appear at mid-latitudes from 50 degrees to 65 degrees north and south between May and August, with the peak frequency around the first week in July. Parallax photography shows them to lie at a height of between 80 and 85 kilometres above the Earth's surface. Current statistics suggest that they may be more frequently visible at sunspot minimum than at sunspot maximum, and are more likely to occur when the Earth's magnetic field is quiet and not disturbed by activity from the sun in the interplanetary particle streams. It is also thought that moisture is converted upwards by air rising into the mesosphere above the polar regions, and cools thereby allowing the moisture to crystallise and flow equatorwards at this very high altitude. This pattern of events may be interrupted by heating of the layer in which the clouds form, by the injection of auroral particles during times of magnetic storms. This might account for the absence of clouds in solar active periods, although there are records of aurora and noctilucent clouds appearing at the same time.

The clouds are extremely thin, and appear to be made of tiny ice crystals. They are visible due to the rays of the sun below the observer's horizon striking the particles and being reflected back into the Earth's shadow area. When seen 'edge on' the clouds are brilliant, but when overhead, the observer is looking through the thinnest dimension of the cloud, which is faint and difficult to see.

Clouds may appear as structureless veils (Figure 1), which might be mistaken for aurora by inexperienced observers. They may take the form of a series of bands (Figure 2), sometimes parallel, sometimes crossing each other. Waves, called billows may be seen (Figure 3), a characteristic form resembling herringbone, or ripples on a wet, sandy beach. Whirls comprise large-scale, looped or twisted structures (Figure 4). All forms may appear on the same night.

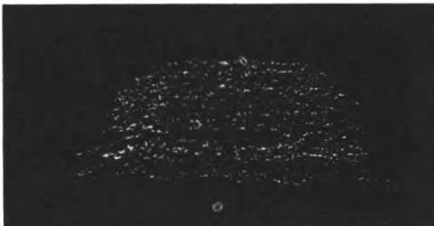


Figure 1. Veil

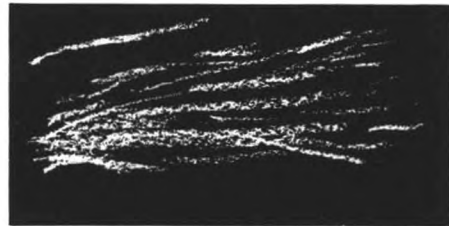


Figure 2. Bands

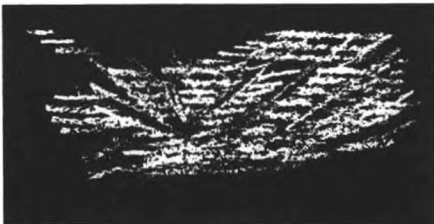


Figure 3. Waves or Billows



Figure 4. Whirls

A particularly bright example of the noctilucent clouds appeared on the night of 23/24 July 1986, and was well seen all over Scotland and elsewhere. Forms may change shape and position during the course of an apparition, and so give information on the direction and movement of wind currents in the upper atmosphere where the pressure is one ten thousandth of that at sea level, and the temperature is  $-130$  degrees Celsius. There is also the possibility of atmospheric waves rippling through the clouds.

Obviously, there is considerable interest in such intriguing clouds, which are often bluish in colour, or white and sometimes golden near to the horizon, shining in the sky while the lower tropospheric clouds show up dark against them. Observers should report the date, time (GMT) and place at which they are seen, using the 'double date' to define the night involved i.e., 23/24 July. The types of cloud should be recorded together with the azimuth bearings of the extremities, and the altitudes of the upper borders. Brightness may be defined as 'faint', 'bright' or 'intensely bright'. A sketch would be helpful. Observations are best made on the hour and at fifteen-minute intervals; a note on sky and cloud conditions should also be included. It will be extremely important to report if aurora and noctilucent clouds are seen together, as this information is of great interest to research workers.

### **LONG ASSOCIATION WITH SHIPOWNERS — ELLERMAN LINES**

Ellerman Lines is one of the great names in British shipping, as shown by the fame of its *City* ships which still ply the world's oceans 85 years after the shipping company's foundation by a truly great entrepreneur of the late nineteenth and early twentieth century. In this year's short account of the Met. Office's connection with the great shipping companies, an attempt is made, in a limited space, to do justice to a very full story of enterprise.

Shortly before 1850, a young German, Johann Herman Ellerman, came from Hamburg to settle in Hull. His son John Reeves Ellerman, was born at the family home at 100 Anlaby Road, Hull, in 1862 and, as he was only seven when his father died, his mother took the family to live in Caen, Normandy, where several years of living there had a profound effect upon him, leaving him with traces of the French way of life throughout his existence.

He returned to England as a qualified accountant, already with some reputation as a consequence of his outstanding examination result, and at the age of twenty-four, Ellerman opened his own accountant's office at 10 Moorgate Street, London. He was not to move far from this site, for it was across the street at number 21 that he later established Ellerman House, his financial headquarters and, until the mid-1970s, the registered offices of Ellerman Lines.

In 1892 Ellerman, in concert with Christopher Furness who was later to found Furness Withy & Company, and Henry O'Hagan, acquired F. Leyland & Company, a shipping firm whose founder had previously bought control of Bibby Line from James Bibby. At the age of 29 or 30 he took over as chairman and managing director of this fleet of 23 ships consisting mainly of 'veritable old crocks' and, notwithstanding numerous forecasts of disaster, led the company to



outstanding success. Moreover, this was to prove to be only the beginning and by comparison with Ellerman's subsequent achievements, a modest one. The Leyland fleet grew as entry was made into trades including Liverpool to New York, London to St Lawrence and Boston, and Antwerp to the St Lawrence, all with remarkable success.

The ships were named *Lancastrian*, *Venetian*, *Persian* and the like, and the first one of the Leyland fleet ever to make weather observations for the Met. Office did so more than thirty years before John Ellerman came on the scene. She was the *Arabian* of 2,072 gross tons, Liverpool, and a weather log for a voyage made between October 1860 and September 1861 was received at the Met. Office in October 1861, only 7 years after formal ship observations had been started.

To exploit developing trade, Ellerman bought and sold ships and shipping companies many times in the following years. He acquired the West India and Pacific Steamship Company, with 21 ships amounting to 95,983 gross tons, in 1900, then in the next year he sold the Leyland fleet to the Great American financier, J. Pierpoint Morgan, but purchased back 20 of the older ships. He established his own service to Portugal and the Mediterranean with these, and followed this in June 1901 by buying the eight ships of the fleet owned by Nicholas Papayanni, thus obtaining the trade and fleet expansion he sought.

By this time there was admiration for Ellerman in the city of London and this feeling was enhanced when he formed his ships into a company named the London, Liverpool and Ocean Shipping Company Ltd, though he still retained personal ownership of the Papayanni Line. In September of the same year he bought the City Line of Glasgow from George Smith and the Hall Line from Robert Alexander, whose failing health and lack of sons to carry on this business had brought him to look out for a prospective buyer. The City Line purchase added to the Ellerman fleet 15 ships of 63,543 tons, and the Hall Line 11 ships of 41,636 tons gross.

George Smith Senior had founded the City Line in 1840, and it was in July 1857 that the first known records from one of his ships was received at the Met. Office, the *City of Benares* on a voyage from Glasgow to Calcutta and return between November 1856 and the summer of 1857. In common with countless City Line ships since then, the name recurred several times during successive decades, and the last *City of Benares* was to suffer the fate of being torpedoed in the North Atlantic on 17 September 1940. She was a troop transport carrying a total of 406 souls of board, of which 215 were crew and convoy staff and the remainder children, their escorts and some passengers, when she set sail from the River Mersey on Friday 13 September. Tragically it is recorded that only seven of the children survived and 258 of those aboard her perished. Surviving passengers wrote their appreciation and tributes to the conduct of the whole ship's company and their selfless devotion to duty, but in almost every case a tribute was reserved for the calmness and courage of the children.

In January 1902 came the formation of Ellerman Lines Limited from the owner's existing shipping interests and, when the 9 ships of Westcott and Laurence were added to the fleet to absorb some of the competition existing in the Mediterranean trade, Ellerman was described as the sensation of the shipping world. At the age of 40 he had achieved more than most men of similar years and he continued driving fast, having the reins of six companies in his grasp. The speed with which his deals were prepared and concluded was exceptional. The City Line had cost approximately £1,000,000 and the Hall Line £434,000.

Ellerman's ability as a shipowner took no time at all to shine through in his new trades and demonstrated the shrewdness of his purchases.

Regular sailings to South Africa were started as a result of making the ships available to carry supplies for the Boer War on behalf of the British government. Then in 1903 a South American venture was begun with a sailing from Glasgow to the River Plate by the *Wistow Hall*. This proved to be less successful at first, but in 1908 Ellerman had already accepted the need for ships to be adapted to carry cattle and he had talks with Swifts in Chicago with a view to fitting ships with refrigeration. In October 1904 he had introduced a new funnel colouring to his ships to replace the various original colours of the constituent companies; he thus gained the approval of the Alexandra Towing Company at Liverpool, where he had admired their tugs' funnel livery, to copy their colours of light buff surmounted by a black top with an intervening narrow band of white. In addition to being neat, the combination looked serviceable, and that meant economic. At the same juncture it became a regulation that, over any existing house-flag, all ships would in future fly a blue pennant with the letters **JRE** in white, an identity which Ellermans have since made known in world ports.

Ellerman remained, throughout his business life, a financier at heart, and although the very large shipping concerns made increased claims on his time this did not prevent him from venturing into the field of breweries, investment trusts and collieries, to name but a few of the industries he financed.

The year 1905 proved to be one of change with a new Indian service started, not without its problems, soon to be followed by lines opened to the Far East, the Persian Gulf and South Africa; meanwhile the shipowner became a Baronet in the name of Sir John Reeves Ellerman. He purchased the Bucknall Steamship Company in 1908 and his trading area soon extended to East Africa.

Ellerman lost more than 50 ships in World War I, as well as 49 lost by Wilson Line, but although serious, the blow was by no means fatal, as he had entered the newspaper and property world in the intervening years and his excellence as financier and money-maker brought him great profits. Trade liaisons and expansions continued in the post-war years, and when Sir John Ellerman died of a second stroke in 1933 his fortune was estimated to be between £37,000,000 and £40,000,000, a huge sum at that time.

The death of the head of any large industrial concern inevitably creates serious problems of succession, and the single heir faced the task of appointing a new chairman, as he was only 23 and it would have been commercially unsound to place the full burden of control on the young shoulders of John Reeves Ellerman junior. He married in the same year and his interests remained more with visiting the theatre and the study of natural history, but the shipping side continued to prosper despite the years of the Depression. Ellerman and Papayanni Lines Ltd was formed, bringing an organised Mediterranean service, including an agreement concerning the carriage of Alexandria cotton. Various other new services were introduced to the Far East and India, though recovery from the slump had not reached an entirely satisfactory stage when war came again. One of the most adventurous episodes during the war years was the creation of a fleet of five motor gunboats, to be manned by Wilson Line personnel, to sail to Sweden through German held waters and bring back ball bearings, supplies of which were vitally needed following the bombing of English factories which had previously supplied these for the war effort. This daring scheme, involving secret runs from Hull to Lysekil, north of Gothenburg, succeeded beyond expectation,

suffering only one major casualty during the whole of the war. All the captains and chief officers involved in the missions were decorated for their courage.

Besides running his shipping lines, it became apparent after World War II that the second Ellerman was a philanthropist, a supporter of the blind and disabled and he had the gift of always making friends with the people concerned when working amongst them. He now spent much of his time in South Africa, where he had first been to recuperate from a serious illness in 1948.

A few years after the war there came a return to steam, as the motor ship had been relegated to a back seat after an initial popularity. Ten ships of the *City of Oxford* class were built, all with steam turbines, followed by four during 1950–51 with similar engines. These were of 7,500 gross tons, built by John Brown of Clydebank and Swan Hunter on the Tyne. Rebuilding proceeded apace and by the early 1950s, Ellerman's total fleet, including Wilson Line, numbered 129 ships and represented a great effort at recovery from war damages and losses. Although the casualty price had been high, the fleet had played an important role in the evacuation of troops from France in the critical days of 1940 and had continued to operate as transports, munition and supply ships, in every operational zone of the war. The first *City* ship to be sunk had been the *City of Mandalay* on 17 October 1939, four days after leaving Gibraltar on her voyage homeward to the United Kingdom. The final loss was the *City of Adelaide*, sunk in the Indian Ocean on 30 March 1944 when homeward bound from Karachi.

The company's fortunes see-sawed up and down in the two decades after the war, but it always seemed as though there were plenty of *City* ships on the sea and in ports in most parts of the world. Their names were taken from British cities as well as others from many countries of the globe and the majority of them took part in voluntary observing at one time or another. One such was the *City of London*, built in 1970 by Charles Connell of Glasgow. (See photograph opposite page 81). Containerisation took off in 1966, and it was about this time that Dennis F. Martin-Jenkins became Chairman of Ellermans. It was a difficult period but also a time of opportunity and so it was that Ellermans were persuaded to enter the trade between Australia and the Far East in association with two of their partners in A.C.T., Associated Container Transportation.

By 1971, Ellerman's results from both conventional shipping and the new containerised services remained unsatisfactory, and Ellerman even offered to back the company with £7,000,000 of his own cash if it was needed. In the event, it was not, and the Ellermans commitment to a 20 per cent share of three very expensive container ships resulted in the building of the *City of Edinburgh* at the Hamburg yard of Howaldtswerke-Deutsche Werft. A new refrigerated container service across the Pacific from Australia to North America was introduced in 1971. Company reorganisation followed in the next year, resulting in an amalgamation of all the lines, which up to then had operated as separate entities, into a single shipping division with head office in London. Ellermans Travel and Leisure was formed as another division, taking over all travel and leisure interests of the group.

On 17 July 1973, shortly after returning from a holiday in southern France, Sir John Ellerman II had a fatal heart attack. At his own wish he was cremated. His school and lifelong friend Dennis Martin-Jenkins paid tribute to his long devotion to the cause of the deprived, blind and disabled, both in Britain and in South Africa, and the high principles to which his life had been dedicated. Trading results for the newly restructured Ellermans one year after were good,

and in 1974 even better. The Ellerman aura was perhaps discernible even though the last one had departed.

In more recent years the fortunes and the ownership of the company have seen several changes. Most recently there has been a management buy-out with the backing of a number of well-known and highly respected City institutions, ensuring that Ellerman Lines remains one of the largest independent British shipping companies with a world-wide spread of interests. To South Africa there is the Ellerman Harrison Container Line operating two services between northern Europe and southern Africa employing the m.v. *ACT8*, formerly the *City of Durban*, a container ship with a capacity of 2,450 TEUs. This ship has provided excellent observing service to the Met. Office, having started this work in 1978.

The *City of Liverpool* is one of four ships providing a regular service for the Beacon consortium to and from the Red Sea and east and central Africa, and there is also a Joint Container Service from Tilbury to Jedah and the Arabian Gulf. Regular sailings to the Mediterranean from British ports and northern Europe provide good transit times to many inland cities of Europe. One of the Ellerman ships employed on this service is the *City of Plymouth*, a 1,599 gross ton refrigerated cargo ship which undertook weather observing from the time of her maiden voyage in 1978. From August 1984 this ship's good record was further enhanced by the installation of MOSS equipment for data entry on VDU and automatic transmission of the weather message via Darmstadt to Bracknell.

Operating between the U.K. and northwest Europe to the Far East is the container ship *City of Edinburgh* as a member of the TRIO group of companies, within which she is owned by Ben Line Containers, (Ellerman and Ben Line Steamers jointly). This ship has a continuous record of voluntary observing since 1973 and has provided many excellent and interesting meteorological logbooks. (See photograph opposite page 00).

One of the most celebrated sailing warriors of George Smith's City Line in the days before Ellerman's take-over in 1901 was the *City of Hankow*. She was built by Alexander Stephen in 1869, and in November 1874 she began her famous race with *Cutty Sark* and *Thomas Stephens*, two ocean greyhounds. The *Cutty Sark* left Gravesend on 14 November, followed on 17 November by the *City of Hankow*, *Thomas Stephens* leaving the following day. Eventually, when 70 days out from the Lizard, the *City of Hankow* arrived at Hobson's Bay and the *Thomas Stephens* arrived on the day following — identical times resulting in a remarkable dead heat. The *Cutty Sark*, being bound for Sydney, arrived there in 73 days. This was a zenith for sailing ships and their masters. Although it would appear that no weather logs for these three ships are held for posterity in our archives, there are some for the *City of Hankow*'s sister-ship, *City of Perth*. She was regarded by her builders, Charles Connell of Glasgow, as one of the most beautiful sailing ships afloat, and she proved she was one of the fastest. She was also running between England and Melbourne in 1874, as shown by the perfectly kept meteorological log maintained by Captain Alexander Becket for 9 months.

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We wish to acknowledge the helpful assistance provided in preparing this article by Mr Noël Kent, Ellermans' Publicity Manager, and Mr John R. Stark, retired Director of the London & Hull Insurance Company, former insurers to the Ellerman Lines.

## SPECIAL LONG-SERVICE AWARDS

Suitably inscribed barographs are even now awaiting presentation to four deserving shipmasters, in recognition of their consistent service to the Met. Office over many years up to 31 December 1985.

The Director-General is pleased to announce the awards to the following:

1. CAPTAIN A.J. PALMER, Overseas Containers Ltd., who commenced weather observing on Alfred Holt's *Diomed* in 1952 and has sent 45 meteorological logbooks spread over 21 observing years.
2. CAPTAIN J.K. COOPER, Cunard Shipping Services Ltd., with 25 observing years to his credit during which he submitted 59 logs, the first of which he sent from the *Mahalla* (Brocklebank) in 1950.
3. CAPTAIN G.C. BARRETT, Overseas Containers Ltd., whose 49 logbooks were compiled during 23 separate years in which observing was undertaken. His first log came to the Met. Office from the P. & O. liner *Strathmore* in 1948.
4. CAPTAIN F.R.N. BEST, Northern Marine Management Ltd., sent in his first log from the *Roonagh Head* (Head line) in 1953. Since then he has been involved with weather observing in 30 years, co-operating in the creation of 59 logbooks in total.

Meteorological records must have been submitted by shipmasters in a minimum of 18 years, including the year in question, in order to qualify for the award. The scheme was introduced in 1948 by Sir Nelson Johnson, the Director of the Meteorological Office at that time, and has since been perpetuated annually.

J.F.T.H.

## AURORA NOTES APRIL TO JUNE 1986

By R.J. LIVESEY

(Director of the Aurora Section of the British Astronomical Association)

In Table No. 1 are summarised the auroral observations made by Voluntary Observers for the above period, and which are very much appreciated. In recognition of your work, examples of observations, together with a representative sample of photographs depicting ships contributing to the aurora work, were displayed at the Exhibition Meeting of the British Astronomical Association in London on 17 May 1986 at Hawkstone Hall. We were pleased to note that representatives of the Met. Office visited the exhibition, and made complimentary remarks on the work that was being done.

In Table No. 2 are listed the auroral events reported for the period. After the considerable activity in the first quarter of the year, this period remained relatively quiet. Although in areas affected by summer twilight, May to August is the 'closed season' for aurorae (particularly in the North American continent for mid-latitude events), it is 'open season' for noctilucent clouds (NLC) in the Northern Hemisphere. Dr David Gavine reports a very active year for these clouds, which are visible in the geographic latitudes 50 degrees to 65 degrees.

**Table 1 — Marine Aurora Observations April to June 1986**

DATE	SHIP	GEOGRAPHIC POSITION	TIME (GMT)	FORMS IN SEQUENCE
3 Apr. ..	<i>Cumulus</i> .. ..	57° 04'N, 20° 08'W	0345	qN
3 ..	<i>Jura</i> .. ..	57° 20'N, 14° 30'W	0200–0230	HA, RA, fRA
2/3 May ..	<i>Baltic Eagle</i> .. ..	59° 44'N, 21° 20'E	2125–0030	m <sub>2</sub> RB, RG, HA
3 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	0015–0050	qN
3 ..	<i>Baltic Eagle</i> .. ..	60° 06'N, 21° 40'E	2326	RA
3/4 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	2345–0140	qN
7 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	0240	qN
12 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	0225–0300	qN
14 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	0250	qN
15 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	0250	qN
16 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	0245	qN
19 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	0245–0345	qN
19/20 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	2345–0300	qN
25 ..	<i>Cumulus</i> .. ..	57° 00'N, 20° 00'W	0215	qN
28 Jun. ..	<i>Dahlia</i> .. ..	45° 15'N, 55° 20'W	0200	RA

KEY: f = fragmentary, m<sub>2</sub> = multiple (2 forms), q = quiet, A = arc, B = band, G = glow, H = homogeneous, N = aurora of unspecified form, R = rayed,

**Table 2 — Auroral Activity reported April to June 1986 (excluding isolated and doubtful events).**

DATE (NIGHT)	LOCATION AND NUMBERS OF OBSERVERS	LOWEST	HIGHEST	AT STORM PEAK	MAXIMUM STORM ACTIVITY CODE*	TIME (GMT)
3 Apr.	'Lima', Atlantic (2)	62	63	62	3	0200–0345
10	Alberta (1)	64	—	64	6	
13	Alberta (1)	64	—	64	7	0615–0730
2/3 May	Manitoba, 'Lima', Scandinavia, New Zealand (5)	56	63	59	6	2045–1000
3/4	'Lima' (2)	58	63	58	3	2326–0140
6/7	'Lima', Orkney, Finland, New Zealand (4)	56	63	57	5	1200–0240
24	Alberta (1)	64	—	64	5	0400
30	Alberta (1)	64	—	64	6	0700–1000
31	Alberta (1)			64	6	0700
28 Jun.	Newfoundland (1)	56	—	56	3	0200

\*Storm Activity Code: 3 = Rayed arc or band, 5 = Active, moving forms, 6 = Coronal structure, 7 = All sky storm.

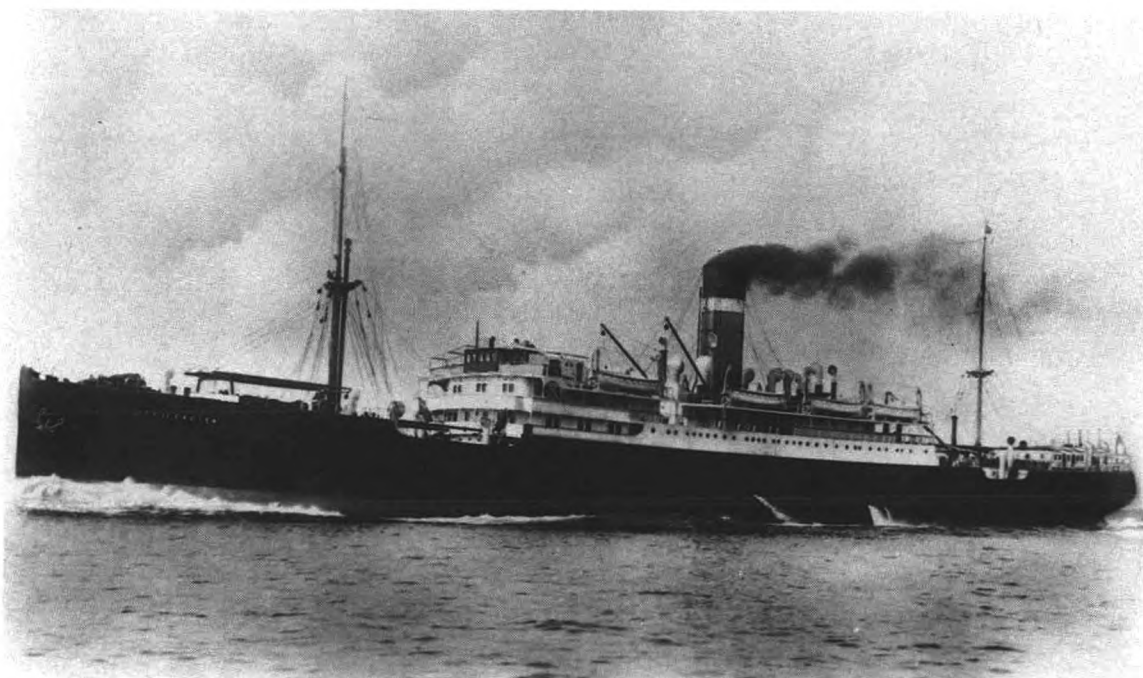
There is a theory that these clouds are more likely to form when the sun's activity is quiet, and the magnetic field of the Earth likewise. It is because NLC is a high-latitude phenomenon not unrelated to auroral and magnetic studies, that the BAA Aurora Section takes an interest in this subject. Marine observations of this phenomenon would be very welcome, but, as mentioned above, they are related to specific latitudes and times of the year. To those in the Southern Hemisphere of course, visibility would be related to their own summer period of November to February.





Photo by FotoFlite

m.v. *City of Edinburgh* (1973), 58 284 tons gross. (See page 78.)



*Photo by courtesy of Ellerman Lines plc*  
s.s. *City of Exeter* (1914), 9 447 tons gross.



*Photo by Terence J. McNalty, Cape Town*  
m.v. *City of London* (1970), 8 434 tons gross. (See page 77.)

VESSELS OF ELLERMAN LINES LIMITED (See page 74)

In the editorial notes to the October 1986 edition of this journal, reference was made to the advances in the automation of meteorological instrumentation. This trend is mirrored in the scientific investigation of the aurora and its allied terrestrial phenomena. The aurora has been effectively monitored from above the Earth's atmosphere, cloud free, by artificial earth satellites such as the NASA/GSFC spacecraft Dynamics Explorers 1 and 2. The University of Iowa's auroral imaging equipment on board has enabled true colour and ultraviolet studies to be made together with that of the spatial extent of the aurora. The NOAA satellite GOES-5 provides continuous monitoring of proton and electron densities in outer space together with magnetic field components.

In the U.K., the magnetic observatories at Lerwick, Eskdalemuir and Hartland, have seen the phasing out of mechanical instrumentation to be replaced with electronic systems talking to a central computer in Edinburgh, untouched by human hand. Data analysis takes place in the computer, and gone are the days when a human observer had to sit continuously with his instrument, make laboriously repetitive measurements, and then, having plotted the data, equally laborious calculations of the three-hourly magnetic index.

Where then, in all this plethora of modern technology of rockets, radar and computers, is there a place for the visual observer on a cold night, hanging over the bridge rail, looking at the aurora?

First show me a computer that can measure beauty or register the emotion of awe at observing a natural phenomenon, and convey these emotions to the human observer. We observe because we enjoy doing it, and have an interest in what is going on around us.

Readers will be interested to know that copies of all marine meteorological log entries relating to the aurora reported in the years 1976 to 1985 inclusive, have now been deposited in Aberdeen University for safe-keeping, together with all other original observational data received by the British Astronomical Association during the same period. This archive extends the collection of original observational data belonging to the Balfour Stewart Auroral Laboratory of Edinburgh University, presently held at Aberdeen University. Again, we have to express grateful thanks to all who have contributed to these records.

Readers may already know that the planet Jupiter possesses a very strong magnetic field with the magnetic axis at some 11 degrees or so from the spin axis. Space vehicles have detected auroral conditions in the Jovian atmosphere. After a journey of 8½ years, the Voyager 2 spacecraft reached the planet Uranus and discovered a magnetic field with an axis of some 55 degrees from the rotational axis. Navigation with a magnetic compass would be an interesting exercise on that planet. However, auroral activity was found to be taking place on the dark side of the planet. Thus, Earth is not the only place where aurorae are to be found.

## LETTERS TO THE EDITOR

From Captain J.B. Caley, whose retirement from Cayzer Irvine Shipping is announced elsewhere in this edition.

'As you are aware, my final command, *Scottish Eagle*, was the last ship in the once considerable fleet of the Cayzer Irvine Group and subsequent to her sale to foreign buyers my crew and I find ourselves redundant. The prospect of a further command under the U.K. flag is non-existent and rather than seek employment abroad I have decided to retire.

'I would like to take this opportunity to send best wishes to the Marine Division at the Met. Office with which it has been my pleasure to work over the years. I recall in particular the time that I spent in command of Bowater ships crossing the North Atlantic; during this time I had regular contact with your Ship Routeing staff when Captain Mackie (now Marine Superintendent) was prominent amongst them.

'The state of our once great industry is a tragic one, and I therefore count myself lucky to have had over 39 years with Cayzer Irvine and thus earned a reasonable pension. Many of my friends and colleagues are less fortunate.'

From Mr A. Stangroom, Third Officer, m.v. *Willowbank*, Bank Line Ltd.

'I would like to echo the call made by Mr Butler in the April 1986 edition of *The Marine Observer* that copies of letters of acknowledgement (to Masters) be sent to Principal Observing Officers. This feedback, including replies to additional remarks, would be greatly appreciated and would generate further interest. I feel that for the effort put in we must at least be worth the price of a stamp.'

We would like to think that most Principal Observing Officers were as fully interested in the subject of observing and reporting in the additional remarks section as yourself, and were under the impression that most Masters were in the habit of passing on the contents of our letters to the ships' staff involved. We certainly feel that the effort you put into this work is worth much more than the price of a postage stamp, as you say, and the contribution made towards the meteorological disciplines is considerable.

In response to the suggestion of yourself and a few others, we have decided to include an extra copy of the letter to Masters for passing on to POOs and those concerned. (Commenced in November 1986.)

To do more than this is not possible at this time. Each of the 1200 or so meteorological logs we receive annually, in addition to about 150 from oil rigs and platforms, is firstly acknowledged by postcard, and several weeks later the logs are assessed and the full letter of acknowledgement written to the ship. At the time of writing these letters, there may be several logs from one ship available for review, and in these logs sometimes up to six Principal Observing Officers may be addressed in one letter, with about three being the average involved. A total of about 675 letters to Masters are sent out each year, as well as those to platforms, and the dictating, signing and mailing of additional letters to all POOs would clearly not be very productive. In addition, the majority of these Officers may have left their ships by the time we write to them, and tracing them via their companies is difficult enough, but attempting to send to home addresses is something we could not consider. Even with the additional copy we have decided to include, we have to consider whether ship owners will accept the extra cost of forwarding that may be incurred.

Many thanks for your obvious interest in bringing these points to our attention, and we hope that we will continue to have your excellent cooperation in the future.

From Mr G. Mead, Third Officer, m.v. *Encounter Bay*, Overseas Containers Ltd.

'During a recent visit to Australia the vessel was fitted with an ocean temperature measuring system by the meteorological division of the CSIRO.



'The system was fitted to collect information on tropical ocean currents and sub-surface temperatures in the Indian Ocean between latitude 20° S and 12° N. This is part of the ten year TOGA project to try and establish whether there is any relationship between the Pacific El Niño phenomenon and ocean temperature variations in the Indian Ocean.

'The relevant equipment consists of the following:

1. Expendable Temperature Probe (XBT)

This consists of a bomb-shaped probe which has a temperature sensor in the nose and a wire spool with approximately 600 m of copper wire housed in a black plastic container.

2. Hand-held Launcher

This is to provide a support from which the probe is launched and which connects the XBT electronically with the recorder and computer.

3. Recorder Interface

This connects the probe via the launcher to the Commodore computer. It receives, digitizes and transmits the temperature data to the computer for display and storage.

4. Commodore Pet Computer

A BASIC computer used for storage and display details.

5. Commodore Tape Drive

Used for loading programmes and storing data files from computer.

The probes are dropped on the synoptic hours within the limits mentioned above. Once they hit the water they commence transmitting the temperature to the computer. The computer then produces a graph of temperature against depth. The transmissions cease at a depth of 462 m. This is recorded on the tape so that it can be researched ashore. The computer also calculates the points on the curve as its shape changes and these are recorded on log sheets by ship's staff.'

All ships observing for the Met. Office are invited to notify us when they are participating in special projects such as the one detailed here; besides the interest to readers, the Office has a commitment to notify the WMO about such co-operative ventures.

## Personalities

**RETIREMENT** — CAPTAIN J.B. CALEY retired from the sea on 1 July 1986 after serving the whole of his 40-year career with Cayzer, Irvine & Company.

John Barry Caley was born on 27 December 1929 and received his education at Arnold School, Blackpool followed by 2 years at H.M.S. Conway. He joined Clan Line Steamers in January 1947, his first ship being *Ocean Viceroy*.

Captain Caley gained his Master's Certificate in September 1955 and it was 3 years later when he first sent us a meteorological logbook, from the *Clan Chattan*. He was promoted to command on the *Gladys Bowater* in December 1970 and went on to command other Bowater ships, Clan Line cargo liners, bulk carriers and finally tankers.

He contributed a total of 42 logs to the Met. Office, 15 of these being assessed as Excellent. For his efforts he received Excellent Awards in 1974, 1975, 1976, 1977, 1982 and 1983.

Cayzer Irvine's ship *Scottish Eagle* played a leading role in the last few years of Captain Caley's life at sea; he stood by the ship during building, took her on her maiden voyage and commanded her for most of the intervening years before

making delivery to new owners when she became the last ship to be sold from the Cayzer Irvine fleet. He spent a considerable time in the South Atlantic, principally in the Falkland Islands, where *Scottish Eagle* was stationed on MOD charter.

Captain Caley met his wife when he was Chief Officer of the *Pretoria Castle* and she a passenger, and they have a son and a daughter at University. We wish him well, both in retirement, and for the challenge of a history degree course at his local Polytechnic upon which he has embarked, whilst fell walking and gardening are his relaxations.

**RETIREMENT —** CAPTAIN A.R. WHYTE took early retirement in December 1985 for reasons of health and strongly recommends retirement to all who may be able to contemplate it.

Alan Whyte was born in June 1929, educated at Waterloo Grammar School and received his pre-sea training during the war years at Captain Danny Roberts' Nautical School in Dale Street, Liverpool. He sailed on his first voyage as Cadet with Ellerman Papayanni Lines aboard s.s. *Samtorch* in June 1946, leaving Birkenhead on this war-built liberty ship.

After obtaining his Master's Certificate in 1956, Captain Whyte transferred to Canadian Pacific Lines where he was appointed to the *Empress of France*, from which ship he treated us to the first of 35 meteorological logbooks in October 1960. He served as Chief Officer aboard the North Atlantic *Beaver* class ships as well as in all ranks aboard the *Empress*, liners, latterly as Staff Commander aboard the *Empress of England* in 1966.

In 1966 he was promoted to command on the *Beaverelm*, running from Liverpool to the Great Lakes, and in later years commanded all classes of CP vessels, from small general cargo ships to the 252,970 dwt *Port Hawkesbury* class tankers, including container and bulk carriers.

Captain Whyte is clearly enjoying a leisurely retired life in his villa in Teneriffe and when in the U.K. he is an active member of the local bowls club and a keen supporter of Everton Football Club. This sounds like an ideal recipe for active retirement, in which we wish him well.

**OBITUARY —** CAPTAIN T.P. BARR died on 16 May 1986 at the age of 62.

Thomas Pollock Barr was born in July 1923 and educated at George Heriots School, Edinburgh, before becoming a Ben Line Cadet in September 1940. He obtained his Master's Certificate at the end of 1949 and was promoted to command on 23 August 1957. His first ship as Master was the *Bennevis* and it was from that ship that Captain Barr contributed 4 Excellent meteorological logbooks in the following twelve months, going on to compile a total of 10 logs marked as Excellent out of a total of 29 logs before his retirement on 31 October 1982. His first log came to the Met. Office from the *Benledi* in 1948, and he received Excellent Awards in 1974 and 1975.

We were fortunate to have the benefit of Captain Barr's co-operation in matters meteorological for such a long period, and send our sympathies to his bereaved relatives and friends.



## Book Review

*A Century of North Sea Passenger Steamers* by Ambrose Greenway. 240 mm × 175 mm, 144 pp., illus. Ian Allan Ltd., Coombelands House, Coombelands Lane, Addlestone, Weybridge, Surrey KT15 1HY. Price: £11.95.

At a time when ever larger passenger ferries are under construction for North Sea operation, it seems appropriate to publish a record of the long and complex history of shipping in the area. Mr Greenway charts the history of the North Sea passenger trade through the operating companies and their ships, and his expert examination is accompanied by many rare and revealing illustrations, all in monochrome with the exception of the two photographs on the book jacket front.

Twenty-five separate companies are dealt with in order, including such well-known names as General Steam Navigation, Wilson Line, DFDS, Swedish Lloyd, Fred Olsen and Bergen Line to name but a few. During the early part of the nineteenth century many new shipping companies came into being, and over the succeeding years some of these started up regular services linking the major sea ports bordering the North Sea. As there was no other means of travelling abroad, these services began to attract the attention of passengers and an initial trickle became a steady flow, subsequently embracing an interest in tourism as well.

The author was overwhelmed with information of the kind needed to compile this book and in order to include as many illustrations as possible he was obliged to condense the histories of the foreign-owned vessels listed. The photographs are varied and of much interest and the author has done well to be able to provide such a good selection of ships of differing types and ages. For readers who may be expecting a good deal of historical information on the companies this book will be a disappointment, but there is an attempt to provide potted histories in each chapter, including former names of shipping companies.

The 'century' appears to begin in 1878, as the earliest ship given the full descriptive treatment is the *Princess of Wales*, built on Clydeside for the Great Eastern Railway Company for the Harwich to Rotterdam service. Many of the ships described were built in the late nineteenth and early twentieth centuries, details of length, breadth and depth being given as well as gross tonnage, machinery and speed characteristics, in addition to brief historical and technical descriptions.

One confusing aspect of the book is that the ships of each company which are catalogued are not always presented in chronological order of date of build, and looking for a ship of a particular era or period becomes difficult. However, as the photographs are so well laid out and of good quality the overall impression of the book is favourable and persuades one to read on.

J.F.T.H.

## **Notices to Marine Observers**

### **APPOINTMENT TO THE NAUTICAL STAFF OF THE MARINE DIVISION AT BRACKNELL**

Captain J.A. Williamson has been appointed to the Marine Division of the Met. Office and posted to the Ship Routeing Service at Headquarters in Bracknell for duties as Sea Ice Officer.

Jim Williamson joined Manchester Liners Ltd in 1951 as Apprentice and gained his Second Mate's Certificate in 1955. Apart from the 2 years 1957–1959, when he was with Atlantic Steam Navigation Company Ltd (Transport Ferry Service), he served all his time at sea with Manchester Liners, obtaining his Master's Certificate in 1961 and being appointed to command in 1974. Four years later he took up a shore appointment as the company Container Terminal Superintendent at Manchester and Liverpool, a post he held until shortly before taking up his present position in November 1986. He completed his first meteorological logbook on the *Manchester Shipper* in November 1954 and sent in 28 further logs before coming ashore.

### **NEW RECRUIT TO THE VOLUNTARY OBSERVING FLEET**

*t.s. Jonas Hanway* — The Marine Superintendent attended the re-naming ceremony of The Marine Society training ship *Jonas Hanway* at Tower Pier, London, on 10 December 1986. Formerly H.M.S. *Egeria*, she is on loan to The Marine Society from the Ministry of Defence; during her refit by Philip and Son at Dartmouth to operate as a training vessel for the Merchant Navy and other maritime organisations, she was recruited into the VOF as a Selected Ship by the Port Meteorological Officer for SW England, at the request of the Master, Captain Sir David R. Clayton.

The ship was renamed *Jonas Hanway* to commemorate the founder of The Marine Society and one of the greatest philanthropists of the eighteenth century. The Society, founded in 1756 to encourage men and boys to join the Royal Navy at the start of the Seven Years War, commissioned the first pre-sea training ship in the world in 1786, a 350-ton sloop renamed *The Marine Society* and moored off Deptford on the River Thames. *Jonas Hanway* is the ninth ship commissioned by the Society but only its first fully sea-going vessel to provide sea training for those who are or wish to become professional seafarers.

### **THE SEA SWALLOW PHOTOGRAPHIC COMPETITION 1986**

The Royal Naval Birdwatching Society (RNBWS) announced the results of its first annual competition for bird photography at its Annual General Meeting on 5 December 1986.

The competition judging panel comprised Captain M.G.T. Harris, Commander M.B. Casement (Chairman, RNBWS) and Lieutenant Commander M.S.G. Lay (Fleet Photographic Officer). Twenty-one entries were received from both R.N. and M.N. personnel and the overall standard of entry was very high; it was an

extremely difficult task to reduce entries to a short list from the wealth and variety of subjects submitted. After much discussion the judges were unanimous in their verdict and also recommended that a competition be run again on similar lines in 1987, with the additional proviso that all entries be accompanied by dates, geographic positions and identification of species, if known. Entries should reach the Chairman by September.

#### COMPETITION RESULTS

WINNER — Leading Seaman David Martin (H.M. Submarine *Opportune*)  
— Cattle Egret

RUNNERS UP — Captain Sam Mayl (Master, R.R.S. *Discovery*) — Black-browed Albatross

Leading Airman Tim Hall (Fleet Photographic Unit) — Southern Skuas at nest (b & w)

HIGHLY COMMENDED — Captain J. Gurton (Master, *La Pampa*) — Osprey

Chief Petty Officer C.A.R. Bailey (H.M.S. *Sirius*) Light-mantled Sooty Albatross

Captain Sam Mayl (R.R.S. *Discovery*) — Kittiwake

Commander A.W. Wainwright (R.N.) — King Penguins

Chief Petty Officer G. Benner (H.M.S. *Amazon*) — Black-browed Albatrosses at nest

J.F.T.H.









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