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THE MARINE OBSERVER

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

VOL. 58 **No. 302** **OCTOBER 1988**

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COVER PHOTOGRAPH of a Bottlenose Dolphin (*Tursiops truncatus*) taken by Mr J.W. Graham, 2nd Officer, m.v. *Gardline Locater* off the Liberian coast on 13 December 1987.

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

LONDON: HER MAJESTY'S STATIONERY OFFICE

Editorial

The events of mid-October 1987, when the English Channel, south-east England and north-west France were subjected to gales of destructive force, continue to be matters for discussion twelve months later, and the lessons learned put to good use by scientists. Meanwhile it has been possible to gather together the numerous accounts from ships, which continue to arrive at the Met Office, on which the storm of 15/16 October last year was experienced, thus redressing the balance with the many published records of devastation on land, and our story is contained in this edition.

One of the lessons learnt from the forecasting experiences of that occasion was the continuing need of reliable and regular observations from ships at sea, including those on the coast whenever this is practicable. Co-operation of all the ships which contribute weather information under the umbrella of the Voluntary Observing Fleet will be as valuable as ever after the implementation of the proposed Executive Agency status for the Met Office announced by the Government last February. Under the proposals designed to improve the way in which the Civil Service carries out its business, there will no change to the Met Office's function, that is to provide an integrated service to serve Defence, Civil Aviation, Public Bodies, Industry, Commerce and the General Public. The proposals are likely to give the Met Office greater autonomy over both its manpower and financial resources, plus the ability to react to circumstances more quickly and benefit from commercial opportunities as they arise to make the best use of the revenue thus generated. The need for the Met Office to provide more revenue earning services has been recognized for some years, and the granting of Executive Agency status presently planned for April 1990, will enable the Office to act more on its own initiative while remaining finally accountable to the Secretary of State for Defence.

In looking ahead to be able to formulate plans for weather watching over the next decade, several significant projects initiated by the World Meteorological Organization are even now receiving our attention. The most comprehensive of those affecting our own region is the Operational World Weather Watch Systems Evaluation–North Atlantic (OWSE–NA), designed to run in 1987 and 1988, with evaluations continuing at least into the following year. The aim of OWSE–NA is an evaluation of the impact of data upon the quality of meteorological advice provided by meteorological services of the 12 participating states bordering the North Atlantic, northern Europe and the Baltic. The data are received from a wide range of surface- and space-based observing systems on and over the North Atlantic and adjacent land areas of North America and Europe, including the Caribbean and other islands. These systems include Ocean Weather Ships, ships equipped with upper-air sounding systems (ASAP), fixed and drifting buoys, land upper air and land surface units, aircraft, satellites, both geostationary and polar orbiting, and not least Voluntary Observing Ships. Being the most numerous in terms of quantity of observations transmitted in real time, the last mentioned group attracts much attention and is considered of prime importance when the six-monthly retrospective reports are compiled. The overall monitoring programme includes the measurement of accuracy of the observations, problems of installation and operation, transmission delays including those occasioned during forwarding of the original ship's weather message, format and coding errors and availability of data. These and many other aspects will be reviewed and it is hoped that any useful assessments will become public knowledge and thus assist the shipboard and other observers to benefit from the project's findings.

A considerable number of observing ships have become involved in additional ancillary exercises, such as the launching of Expendable Bathythermographs in continuance of the 10-year TOGA programme, and by all accounts these special enterprises have stimulated much interest amongst observers on board, being a pleasant departure from the daily routine of observing and navigating. Another such scheme even now being introduced to the all-important North Atlantic region is the Voluntary Special Observing Project North Atlantic (VSOPNA). Up to 10 U.K. ships plying various North Atlantic routes will be invited, with the blessing of their operators, to provide a small amount of additional data appended to the meteorological log records. Designed to run throughout 1989, the project has two objectives, aimed at improving the accuracy of the data received from ships being used to generate the shipping and other marine forecasts which are of such importance to those ships. The first objective is to determine if the location of their weather instruments has an effect on the data which is constant for each location on each ship. Secondly, if a constant error exists, it will be necessary to decide whether the error is large enough to have a significant effect on the accuracy of the data. Port Met Officers are currently visiting suitable ships of the Voluntary Observing Fleet to seek their co-operation in carrying out the projected activities. Only 18 figures, coded in 9 short groups, are involved additionally to the standard ship's code, and these will not require transmission with the radio weather message. We expect to obtain results from this project which will enable us to make even better use of the weather data already provided from ships.

It must be with enormous relief that ships' crews, as well as owners and operators, greeted the signs of an apparent end to the Gulf war. The killing of innocent crew members and damage to non-combatant shipping by both Iran and Iraq has been a terrible trial for all concerned, and it is to be hoped that normality will speedily return to the region, including the resumption of weather message transmission, understandably suspended by most ships when within the confines of that area of hostility. It still remains a dangerous world we live in, recalling the Piper Alpha disaster in the North Sea and the shooting down of the Iranian jumbo jet last July, to mention but two of the accidents with fatal consequences which have occurred over the seas within this year. At least we may be reassured that something is always being done to try and improve the chances of survival, by the introduction of new systems such as the GMDSS and the deployment of new satellites for communication and weather monitoring. Maybe even the coming of a unified Europe in 1992 may enhance the value of safety systems to the greater benefit of all who venture upon the sea in today's diversity of vessels.

J.F.T.H.

October, November, December

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

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

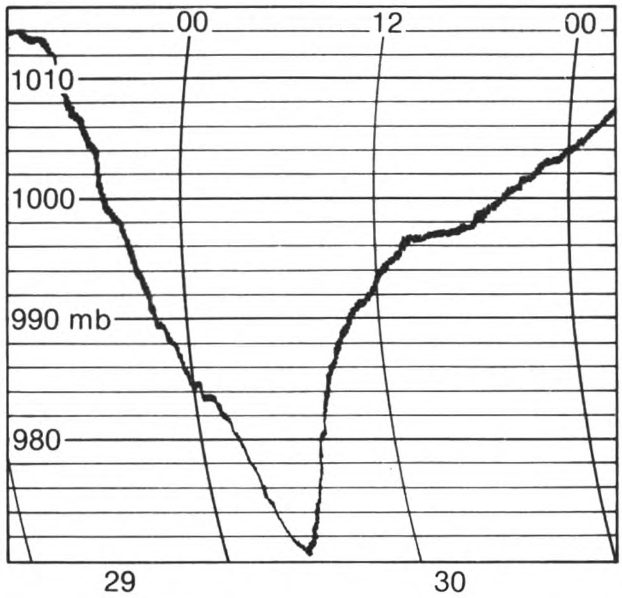
PASSAGE OF DEPRESSIONS

North Atlantic Ocean

m.v. *Hupeh*. Captain J.N. Edwards. Istanbul to Boston, Ma. Observers: the Master and ship's company.

24 and 30 December 1987. On each of these dates the vessel experienced the passage of a deep depression. The following observations were made during the two days, and the barogram shows the pressure changes associated with the depression which passed on the 30th.

Date and time (GMT)		Wind Dir'n	Wind Force	Dry Bulb (°C)	Pressure (mb)	Remarks
24th	0000	S'W	7	18.4	990.5	Overcast with moderate to heavy rain.
	0100	S	8	17.5	986.1	Overcast with moderate rain.
	0200	SSW	7	17.0	982.4	Cloudy.
	0300	S	8	18.0	976.9	Partly cloudy.
	0400	S	9	17.0	970.1	Overcast with moderate rain.
	0500	S	8/9	17.0	962.1	Overcast. At 0500 wind veers to W'S'ly.
	0600	WSW	8	14.0	960.7	Overcast with moderate rain. At 0650 wind veers to NW'N'ly.
	0700	NW'N	9	5.0	967.5	Overcast with moderate rain.
	0800	NW'N	10	5.0	973.0	Overcast with moderate rain.
	1200	NW'N	10	4.0	995.4	Overcast with continuous moderate rain.
30th	0500	SW'S	11	9.0	968.7	Partly cloudy.
	0600	SW'S	11	—	971.3	
	0700	W	11	—	977.0	
	0800	NW	11	—	981.1	
	0900	NW	10	4.0	984.0	Overcast.
	1300	WNW	10	2.0	993.0	Overcast with snow.



At 0445 on the 30th, the ship's course was altered to 215° owing to the vessel rolling violently. Later, the course was adjusted again, the original course being resumed at noon. Wind noise on the bridge was very loud and the sea was white with blowing spray. At times, the cloud cover would break and the moon could be seen. The starboard Stevenson screen was wrecked on its way to one of the lower decks.

Position of ship at 0600 GMT on the 24th: 41° 00'N, 47° 36'W.

Position of ship at 0600 GMT on the 30th: 41° 00'N, 61° 12'W.

Note. Mr R.D. Whyman, of the Marine Climatology Branch, Met. Office, comments:

'Both days were similar with each having a deepening depression curving north-eastwards, and with the centre of each passing not far north of the vessel.

'Both depressions continued to deepen after passing the vessel. The first had a central pressure of 971 mb at 0600 on the 24th (this does not agree with the *Hupeh*'s observations, but there is a lack of observations on the charts consulted), but had deepened to 950 mb by 0000 on the 25th. The second one had a pressure of 968 mb at 0600 on the 30th (in good agreement this time) deepening to 952 mb by 1800 the same day.

'Also interesting is the fall in air temperature with the first depression as the N'ly winds arrived. Temperatures over eastern Canada at the time were very low, −20 °C or less. At this time of year there is a very marked contrast in sea temperatures, being 12–14 at 40° N, but only 1 at 45° N.'

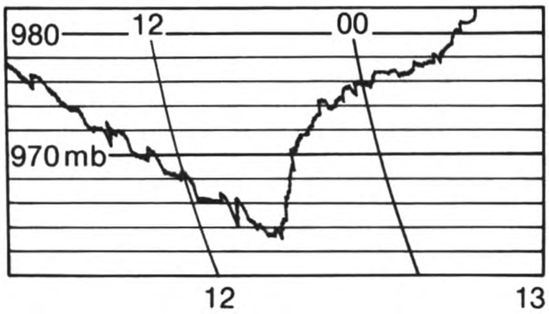
HEAVY WEATHER

Eastern North Atlantic

m.v. *Viking Viscount*. Captain M. Edward. Luce Bay to Stranraer. Observers: the Master, Mr M.L. Bechley, Chief Officer and Mr J.R. Warton, 2nd Officer.

12 November 1987. During the afternoon a vigorous depression moved north-east from the Atlantic Ocean to cross sea area Malin; its central pressure was 961 mb. Having attempted to anchor in Loch Ryan at 0700 GMT, with the wind WSW'ly, force 8, and failed to maintain position, the remainder of the day was spent slow steaming in the vicinity of Loch Ryan and Ailsa Craig to make the ship as comfortable as possible.

Between 0900 and 0930 the wind backed to SW'S'ly, and increased to a mean strength of force 10 by 1200. The wind increased further to a mean of force 11 between 1300 and 1600, at which time the pressure rose sharply, see barogram, and the wind veered to W'ly while decreasing slightly.



The shelter afforded by Ireland meant that no appreciably heavy seas were experienced, apart from a brief period between 1730 and 1815 when a height of 6.5 m was reached.

Position of ship at 1600 GMT: 55° 08'N, 05° 09'W.

LOCAL WINDS

Western South Atlantic

m.v. *Tricula.* Captain M. Ayech. Port Kembla to Rotterdam. Observers: the Master and ship's company.

17–18 December 1987. At 1000 GMT on the 17th the ship was experiencing moderate to heavy continuous rain and a wind of N'ly, force 4–5. At 2230 the rain became torrential, remaining so throughout the night. Visibility was reduced to less than 1 n.mile at times. Lightning was also noted, but no thunder was heard. The screens of both the 10-cm and 3-cm radars were almost completely covered with rain clutter. Between 1000 on the 17th and 0130 on the 18th, the air temperature was 22.0 °C and the wet bulb was 21.5, giving a dew point of 21.2 with a relative humidity of 95 per cent. The sky was completely overcast with stratus and stratus fractus at a height of about 1,500 feet. However, when darkness fell, the cloud type and height was impossible to determine. The barometric pressure had been steady at 1008 mb, and the barograph showed no signs of a diurnal pressure variation.

At 0103 on the 18th the wind backed rapidly over a period of 5 minutes to a SW'ly direction, the wind speed remaining at force 5. There was no apparent change in the pressure, and it was noticed that the visibility seemed to improve. Rain clutter still showed on both radar screens, and the rain was still heavy and continuous but the lightning had stopped.

The wind direction backed again at 0200 to a SSW'ly direction; again there was no change in the wind speed or the other previously observed meteorological variables. The speed at which the wind backed was equally as rapid as the first time. It was noted at 0220 that the direction of the wind had backed again, equally as quickly, to SSE'ly; this time, the speed increased to force 7.

What was interesting with these observations was that there was a rapid change in the wind direction, but little or no change in other meteorological aspects. These observations appear to show an adaptation, owing to the moderating effect of the distance between the ship and the Rio de la Plata, of the local wind, the Pampero.

The vessel had been steering a course of 032° at 12 knots, approximately 300 n.mile off the east coast of Brazil.

Position of ship at 1000 GMT on the 17th: 33° 42′S, 46° 23′W.

Position of ship at 0200 GMT on the 18th: 31° 17′S, 44° 28′W.

Note. Mr R.D. Whyman comments:

'This report is in good agreement with *N.P. No. 5* which states that "between 80 and 100 cold fronts cross Rio de la Plata each year with a sudden change of wind from N to S. The intervals between the troughs vary from 1 to 15 days, and the troughs vary a great deal in intensity and duration. Occasionally the front passes with little evidence other than the wind change'.

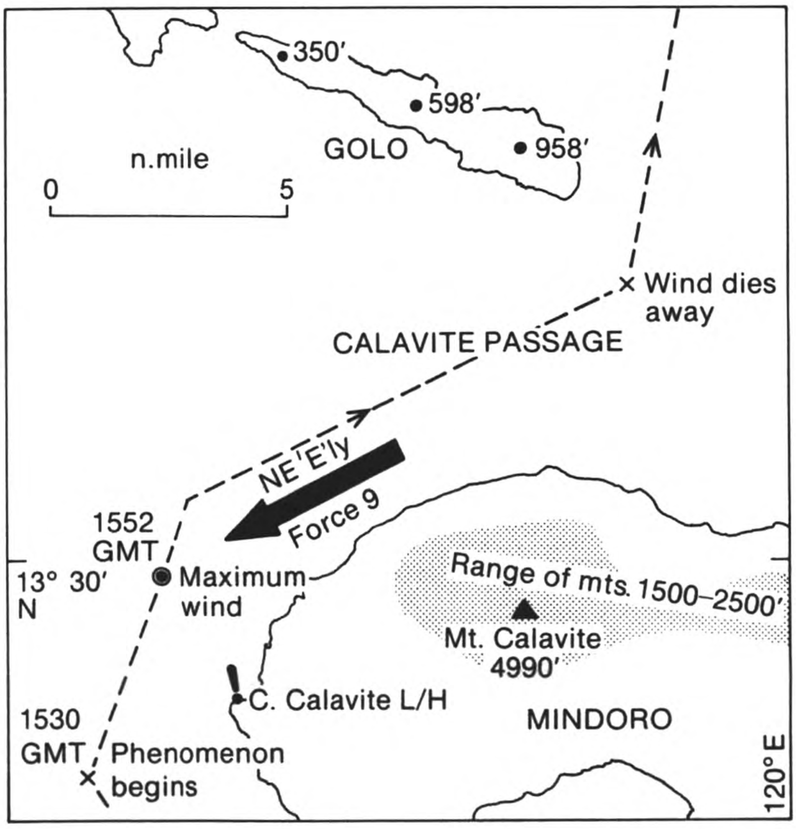
'The circumpolar charts show the northward passage of a cold front across the area at the time.'

South China Sea

m.v. *Asian Jade.* Captain A.R. Savil. Melbourne to Manila. Observers: the Master and ship's company.

2 November 1987. At 1530 GMT as the vessel approached Cape Calavite lighthouse on Mindoro Island and came abeam of it, the wind freshened from NE'ly, force 3 to reach a peak of NE'E'ly, force 9 at 1552. The sea was very rough. As the vessel approached the south-eastern end of Golo Island, the wind died away.

A strong gale force wind had been encountered when passing through Calavite Passage on the previous voyage (21 September at the same time of day, 1530–1600).



The sketch shows the vessel's track on 2 November, together with the area where the strong winds were encountered.

Position of ship: approximately 13° 25′N, 120° 20′E.

Note 1. Mr R.H. Marles, of the Synoptic Climatology Branch, Met. Office comments:

'It is not possible to say with certainty why the phenomenon described should have happened on the two occasions.

'The frequency table for the particular 5° × 5° square which encloses the area, shows that from 1902 to 1980, mean wind speeds of over 34 knots have occurred on only 16 occasions out of 4,991 observations reported in September, and only 18 times out of 5,173 in November. This seems to suggest that the phenomenon was either not reported, or occurs very infrequently.

'The charts for the days in question show the general wind speed and direction for the September event to be very slack but mainly E'ly or NE'ly, while in November it is slightly stronger but still from the same general direction.

'As for the event itself, anomalous wind speeds and directions can occur around islands, especially hilly ones such as these. Upwind of the area is a mass of hills and islands; the occurrence was, therefore, very likely to be a combination of events caused by the relatively light winds being forced between the hills and so increasing, before they in turn are negated by other local and opposite effects.'

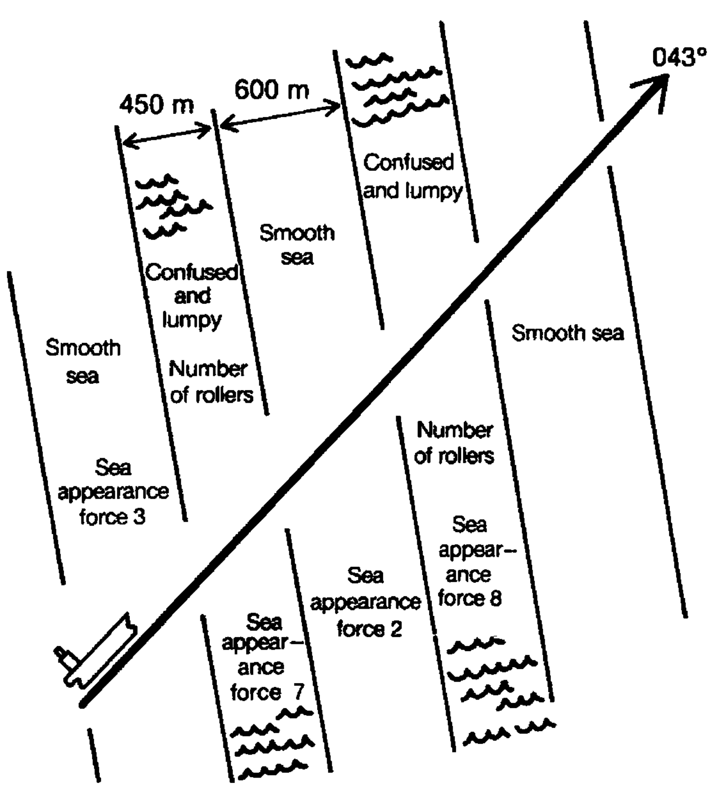
Note 2. The *Asian Jade* is a Hong Kong Selected Ship.

CURRENT RIPS

South China Sea

m.v. *Tokyo Bay*. Captain J.M. Johnston. Jeddah to Busan. Observer: Mr R.A. Kenchington, 1st Officer and Miss W.M. Winter, 2nd Officer.

25 November 1987. At 0100 GMT alternate bands of disturbed and calm sea were observed as shown in the sketch, sometimes being very distinct. They ran from 170° to 350°; the ship's course was 043°.



Photos. by D. Pickup

Above and left: One of the Humpback Whales photographed from m.v. *Botany Bay*. (See page 175.)

Right: Blackpoll Warbler on board m.v. *Atlantic Amity*. (See page 180.)

Photo. by T.B. Harris

Opposite page 173.

Left: Admiral FitzRoy's clock (see page 205).

Below: The *Neptune Sapphire* in tow after encountering the region's freak seas, August 1973. About fifty metres of the bow were broken off the 12,000-ton freighter while on a maiden voyage from a Finnish shipyard to her owners in Singapore. (See page 195.)

Photograph from The Natal Mercury

At the time, the wind was E'N'ly, force 6 and there was a confused swell which was predominantly from the north-east with a period of 8 seconds and height 3.5 m.

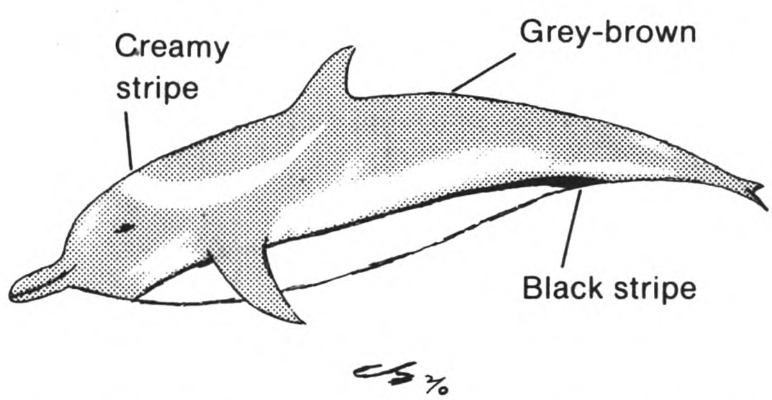
Position of ship 20° 01'N, 119° 38'E.

CETACEA

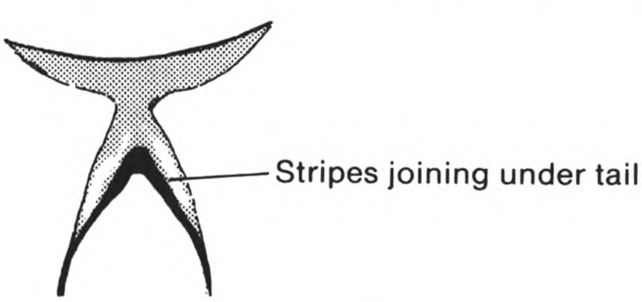
South Atlantic Ocean

m.v. *Nassau Pride*. Captain J.A. Coffin. Tubarao to Kaohsiung. Observer: Mr C.J. Slade, 2nd Officer.

17 October 1987. At 1400 GMT a school of about 15 porpoises, one of which is shown in the sketches, arrived from the north-east, and started swimming about 30–40 m ahead of the ship; they were constantly making short jumps and sometimes abruptly changed direction. This continued for 3½ hours as they drifted from the port to starboard bow and back again. They appeared quite purposeful and may have been chasing fish which were being scattered ahead of the vessel. In colour they were a greyish-brown on top with white undersides, and



all had a very distinct black stripe which ran down the length of each side of the body forming the boundary between brown and white colouration, and then joined under the body, just forward of the tail. There was also a creamy stripe which went from the head towards the dorsal fin, as shown.



Their sizes varied, the largest being about 3 m long, and the smallest about 1.5–2 m long. Estimates were difficult, however, owing to their constant activity and their distance from the bow.

Position of ship: 30° 09'S, 01° 17'W.

Note. Mr D.A. McBrearty, of the Dolphin Survey Project, comments:

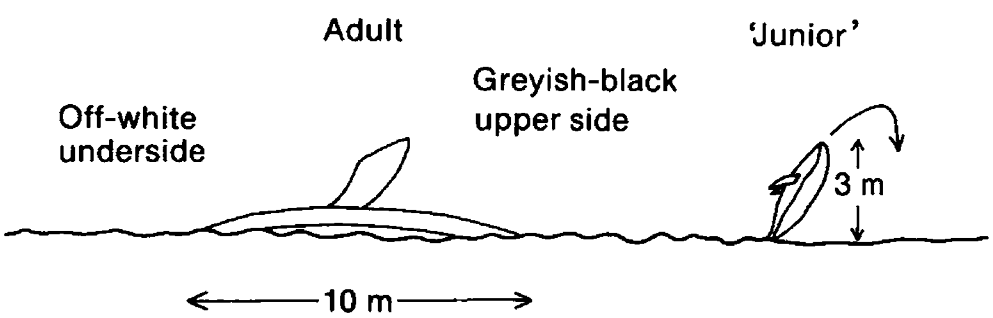
'Not porpoises but dolphins, and judging from the excellent drawings and description they were striped or Euphrosyne Dolphins (*Stenella coeruleoalba*). They are found world wide in tropical, sub-tropical and temperate seas, usually well offshore. Groups or schools of around 20 are most often seen, although aggregations of 100 or more are not uncommon.'

South Atlantic Ocean

m.v. *Equinox*. Captain G.D. Sandercock. Mobile to Richards Bay. Observers: Mr P.A. Lanaghan, 3rd Officer, Mr C.A. Dillon, Radio Officer and Choo Young Hyung, ABB.

25 December 1987. At 1120 GMT a large Killer (?) Whale was sighted heading roughly northwards at a distance of about 1 n.mile from the ship, it had a distinctive white underbelly. The whale did not appear to be making any headway; most of its time was spent raising one fin which appeared to be a greyish-black colour on top and all white underneath. The fin was then slapped down flat on the surface of the water, creating a large wash and sending water up into the air.

After 5 minutes of this behaviour, a much smaller whale with the same distinctive colouring and markings appeared near the larger whale. The 'baby' was continually breaching i.e., forcing itself almost completely out of the water, and then arching its back and slamming back into the sea. The sketches show the postures of the two whales. These activities continued until both whales were out



of sight. Due to their extreme distance from the ship, only a rough estimate of size could be made, but the larger whale showed about 10 m of its body length along the water, while the 'baby' was about 3 m tall when breaching, and was thought to be around a quarter of the size of the adult.

At the time of observation the sea temperature was 22.0 °C, the sky was overcast with rain on the horizon, and there was a slight/moderate sea.

Position of ship: 10° 11'S, 19° 06'W.

Note. Mr D.A. McBrearty comments:

'This is an interesting observation, but I do not believe the whales in question to have been Killer Whales (*O. orca*), in fact I do not think they were toothed whales at all. In my opinion the observers were watching the antics and typical behaviour patterns of a Humpback Whale (*Megaptera novaeangliae*) cow and calf. The long thin forelimbs of the species can be up to one-third of the adult's length and are shown clearly on the observers' drawing of the leaping calf. The dorsal fin of *Megaptera* is a small curved nub situated about two-thirds of the way down the back towards the tail, it is not shown on that same drawing and at the extreme distance could easily have been missed. The drawing of the larger or adult whale shows the animal lying on its side, waving the forelimb, a typical "lounging" posture of this species.'

Tasman Sea

m.v. *Botany Bay.* Captain D.B.C. Morris. Melbourne to Port Botany. Observers: the Master and ship's company.

8 October 1987. At 0030 GMT whilst drifting off Botany Bay, 2 whales which had earlier been sighted spouting at a distance, came close to the ship's side. The whales kept in very close company with each other at all times so mating was suspected. Estimates as to their size varied somewhat, but it was eventually thought they were about 14 m long. Both whales had large flippers and a very small dorsal fin. What could be seen of the undersides was whitish, and was especially clear on the underside of the tail. The head was flat with very distinct lumps on top. (See photographs opposite page 172). At all times the whales remained in the calm water in the lee of the drifting vessel.

Information on board was very limited, and the observers were unable to come to a definite conclusion as to the identity of the whales. However, during the ship's stay in Sydney, an article in a local newspaper confirmed that they were east Australian Humpback Whales.

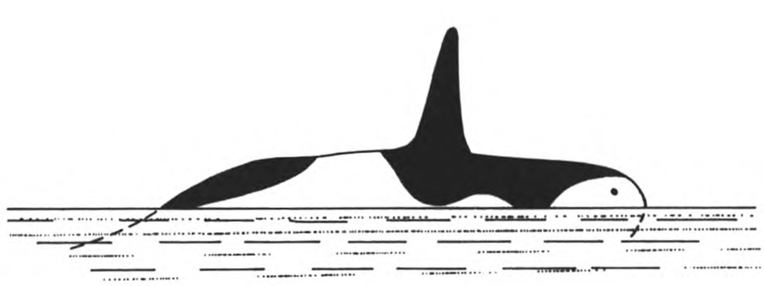
Position of ship: approximately 34° 00'S, 151° 20'E.

Note. Mr D.A. McBrearty comments:

'The photographs do confirm the whales to be Humpbacks (*Megaptera novaeangliae*). Chief recognition characteristics include long forelimbs showing barnacle-encrusted leading edges, a low dorsal fin with a short faring or step in front, a series of fleshy prominences about the size of a cricket ball along the line of the jaw and on the rostrum, and lastly, the whale shows the tail flukes clear of the water when diving.'

m.v. *Discovery Bay.* Captain B.V. Chipperfield. Botany Bay to Auckland. Observer: Mr A.J. Ball, 2nd Officer.

20 October 1987. At 0320 GMT when 8 n.mile north-east of Doubtless Bay, 3 tall, slender fins were observed about 1 n.mile ahead. As the vessel drew closer, the creatures were seen to have the distinctive features of Killer Whales — tall, slender, dark dorsal fins 2.4 m high, rounded heads and dark backs with white markings around the sides of the head and flanks, see sketch. The creatures were



10–12 m long overall, and the largest of them had distinctive markings in that the white flank markings joined behind the dorsal fin, giving a 'saddle' appearance. The Killer Whales did not seem to react to the ship passing within 30 m of them — they remained on or just beneath the surface throughout.

Position of ship: 34° 45'S, 173° 43'E

Note. Mr D.A. McBrearty comments:

'There can be little chance of mistaken identity when confronted by a dorsal fin such as this, there is nothing else like it in the sea. It is, of course, the adult male of the species which has the tall triangular fin, females and young have a shorter and slightly curved fin. Killer Whales (*Orcinus orca*) are relatively common in New Zealand waters, and during the days of whaling in those waters in the nineteenth century, there were many tales of Killer Whales alerting local whalers to the presence of Humpbacks and Right Whales by leaping, tail-slapping and generally harassing the larger whales.'

FISH

Western South Pacific

m.v. *ACT 7*. Captain D. Newlin. Auckland to Wellington. Observers: Mr S. Rathbone, 2nd Officer, Mr P.J. Neve, 3rd Officer and Mr T. Baxter, Radio Officer.

22 December 1987. For a period of about 2 hours when the ship was off East Cape, New Zealand, several Sunfish were sighted swimming and basking near the vessel. Each sighting was of an individual fish i.e., they were never in pairs. At least 10 fish were seen in all. Several days earlier, whilst the ship was drifting off Botany Bay, a large Sunfish had been seen basking near the ship, its body frequently breaking the surface. After about 5 minutes it had swum in under the ship and reappeared shortly afterwards chasing a shoal of mackerel-type fish at great speed away from the vessel. The fish was estimated to be 2.5 m from 'fin to fin' and was about 1 m long.

Position of ship: approximately 37° 42'S, 179° 00'E.

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

'The observation of a Sunfish off Botany Bay is particularly interesting for they are notoriously sluggish, often allowing boats to come right up to them without making any effort to escape. They are known to feed on very small fish and on small crustaceans and jellyfish. I had not known that they could achieve any great speed. This was not a particularly big specimen, by the way; examples 3 m and even 4 m long have been cited.

'Wheeler, in his book *Key to the Fishes of Northern Europe* states that the numerous Sunfish reported lying at the surface apparently basking (hence the name) are simply sick or disabled. However, the present observation suggests otherwise. For myself, I suspect that the appearance of basking is misleading and that like other deep-bodied fish, Sunfish will turn on their sides to alter their field of view, no doubt while watching for food. A further example of a Sunfish basking near the surface appears in *The Marine Observer*, January, 1981.

'Sunfish are usually seen singly or in pairs, but will occasionally form small schools. I am afraid I cannot say why the fish were congregated off the East Cape of New Zealand, but I suspect that food was at the bottom of it.'

JELLYFISH

North Sea

m.v. *Matco Clyde*. Captain D.R. Platt. Flushing to Beryl Oilfield. Observer: Mr A.J. Anderton, 2nd Officer.

24 October 1987. At about 1200 GMT whilst north of Dogger Bank and drifting for a while, a large number of brown-coloured jellyfish were noticed drifting by between 0.6 m and 1.8 m beneath the surface. Their sizes varied

having diameters of 15 cm to possibly 30–45 cm, and the larger specimens had a very long spiderweb-like spread of tentacles extending in some cases up to 1.8–2.4 m.

The smaller jellyfish seemed to be closer to the surface and were able to propel themselves using their own system of 'jet propulsion', whereas the larger ones seemed to drift with no discernible movement.

The sea temperature was 11.0 °C and the sea itself was rippled.

Position of ship: 55° 33′N, 02° 14′E.

Note. Dr F. Evans comments:

'These were examples of the jellyfish *Cyanea capillata*, sometimes called the Lion's Mane Jellyfish; indeed Conan Doyle wrote a Sherlock Holmes short story about such a jellyfish and called it "The Adventure of the Lion's Mane". This story was inspired by the misfortunes of one J.G. Wood, who in 1882 was incapacitated for several days after having been stung by a *Cyanea*. It was an exaggeration of Conan Doyle's, however, to suggest that the sting could be lethal.

'They are unpleasant creatures which can sting long after being landed and are much disliked by fishermen. They are common all over the North Sea and indeed in most northern coastal waters of the world. They grow to about 0.5 m in home waters but up to 2 m in higher latitudes, and are annuals, growing to their largest size in the autumn before breeding and dying.'

BALOLO WORMS

South Pacific Ocean

m.v. *Lairg*. Captain A.W. Kinghorn. Pago Pago to Suva. Observers: the Master, Mr D.B. Waddingham, 2nd Officer, Mr J.S. Latto, 3rd Officer, Mr D.R. Pickler, Radio Officer, Mr P. Hill, Deck Cadet, Mrs Kinghorn and ship's company.

26 November 1987. At 0012 GMT extensive light-brown/dark-brown streaks were observed in the water ahead of the vessel, extending from 4 points to port to 4 points to starboard at a distance of about 5 n.mile. Initially these were thought to be oil; the Master was informed and the course altered to avoid the larger patches in case of contamination to the sea-water intakes. As no sheen was observed in the lighter patches, the vessel was allowed to pass through the larger ones in order to obtain a sample, but this proved impossible owing to the vessel's speed of 16.5 knots.

The streaks were in the direction of the wind, ranging from about 3 m to 30 m in length and from about 60 cm to 4.5 m across. Two large, oval patches were also observed of which parts were a light blue/green colour with broken water around them, looking as if a shoal of fish was feeding on the 'organisms'. All the streaks had the appearance of muddy water when viewed from close range to a depth of around 30 cm. A photograph of the phenomenon appears opposite page 189.

However, the Deck Cadet who was of Fijian origin, identified the phenomenon as 'balolo' which he said was a type of sea worm that made its way to the surface twice a year in November and December. They were harvested by the Fijians in the early morning using very fine-meshed nets, and when deep-fried, were regarded as a delicacy. The streaks of discoloured water were the remains of these worms after they had been killed by the strong sunlight. He also informed the other observers that December was usually the best month for this when large patches of the sea could be covered by the remains of these animals. The vessel finally passed clear of the streaks at 0108.

At the time, weather conditions were: air temperature 30.0 °C, wet bulb 27.2, sea 28.4, pressure 1010.2 mb, wind NE'ly, force 2.

Position of ship at 0012 GMT: 16° 09'S, 177° 18'W.

Note. Dr F. Evans comments:

'This fascinating account of the balolo worm is much enhanced by the interpretation of Mr P. Hill. Without the direct observation of a knowledgeable observer it would have been lengthy and difficult to give an identification, since the sea may be discoloured by many substances. Russell and Yonge, in their fine book *The Seas*, have the following to say about the balolo worm in Samoa: "The balolo worm, *Eunice viridis* can be regarded as a veritable sea calendar. All the year round it lives in holes and crevices among rocks and coral growth on the sea bottom. But true to the very day, each year the worms come to the surface for their wedding dance. This occurs at dawn just for two days in each of the months, October and November (in Samoa; elsewhere the months vary. F.E.), the day before and the day on which the moon is in its last quarter; the worms are most numerous on the second day, when the surface of the ocean appears covered with them.

"Actually it is not the whole worm that joins in the spawning swarm. The hinder portion of the worm becomes specially modified to carry sexual products. On the morning of the great day each worm creeps backwards out of its burrow, and when the modified half is fully protruded it breaks off and wriggles to the surface while the head of the worm shrinks back into its hole. The worms are several inches in length, the males being light brown and ochre in colour and the females greyish indigo and green. At the time of spawning the sea becomes discoloured all around by the countless floating eggs.

"... The worms are eaten either cooked and wrapped up in breadfruit leaves, or quite undressed. When cooked they are said to resemble spinach, and taste and smell not unlike fresh fish's roe".

"... There is also a closely allied form, the Atlantic palolo whose habits are very similar. Their appearance, also linked to the moon, is in June and July".

'This is one of quite a large group of marine animals whose breeding is under the influence of both the season and the moon's phase. The herring is another.'

BIRDS

North Atlantic Ocean

m.v. *Irma M.* Captain R.L. Westwater. Almirante to Antwerp. Observers: the Master and ship's company.

14–15 October 1987. At about 0720 GMT an adult osprey circled the ship and then landed. Several times throughout the day it took off and flew around, but each time on landing, found difficulty in coming to rest anywhere except on the crane wires. The wind at 0800 was W'S'ly, force 7, and it continued to blow from this general direction all day, reaching force 9. The osprey was seen clinging to No. 2 crane topping lift wires at dusk, and the observers were amazed to see it still there at dawn on the 15th. The wind at 0600 was gusting to 65 knots. At about 0730, the bird, with its head hanging low, appeared to be blown off its perch by the wind, and went careering aft seemingly out of control. It was not seen again and was thought either to have landed on the water and taken off once more, or to have drowned.

Position of ship at 0730 GMT on the 15th: 40° 11'N, 27° 56'W.

Note. The relevant weather charts for the above dates have been examined, and it would appear that the osprey, by being displaced in such a manner, probably became the first casualty of the storm which was to cause chaos in the English Channel and over southern areas of the United Kingdom on the night of 15/16 October, an account of which appears on page 187.

m.v. *Lackenby*. Captain F. Stuart. Port Cartier to Immingham. Observers: the Master, Mr A. Tong, Chief Officer, Mr P. Wylie, 2nd Officer, Mr R.J. Inge, 3rd Officer, Mrs Wylie and ship's company.

23–26 October 1987. Whilst the ship was coming through the Strait of Belle Isle, a pair of Snowy Owls were observed on deck. One was very white, whereas the other had light grey in part of its plumage; they were both approximately 76 cm tall with wing-spans of around 1.5 m.

They seemed just to sit on top of the hatches, sheltering from the wind and snow — there were gale force W'ly winds with continual hail and snow falling. After a couple of days, the bo'sun tried to feed them some raw liver, but it was thought that they did not touch it. There were no small birds for them to catch, only seagulls. On 25 October they were looking a bit worse for the wear, looking bedraggled and very tired; they seemed to be just sitting down waiting for food to come to them. The wind was blowing at least 50 knots, so they were being blown around somewhat as the 3rd Officer tried to feed them some raw steak which the Cook had given him. At first, the owls flew away when the Cook and the 3rd Officer approached, but they then settled down on No. 2 hatch cover and some meat was thrown to them, the officers went back down aft and watched.

The owls actually started eating the meat, which was surprising as normally they only like live animals which they have caught themselves. Obviously they were hungry and so they ate it. It must have given them strength because the next day there was no sign of them. They had disappeared, so either they had been blown off the deck and drowned by the seas coming on the deck, or they had found enough strength to fly to land. The nearest land was Greenland approximately 400 n.mile to the north while Canada, where they had come aboard was 900 n.mile away. It was disappointing when the birds left, as it had been hoped that they would stay until the ship reached the Pentland Firth where they could have settled in northern Scotland or somewhere near.

Position of ship: 55° 00'N, 35° 00'W.

m.v. *Melton Challenger*. Captain T. Hunter. Newark to Liverpool. Observer: Mr N.M. Sly, Chief Officer, Mr T. McCreadie, Chief Engineer Officer and Mr D. Johnston, 2nd Engineer Officer.

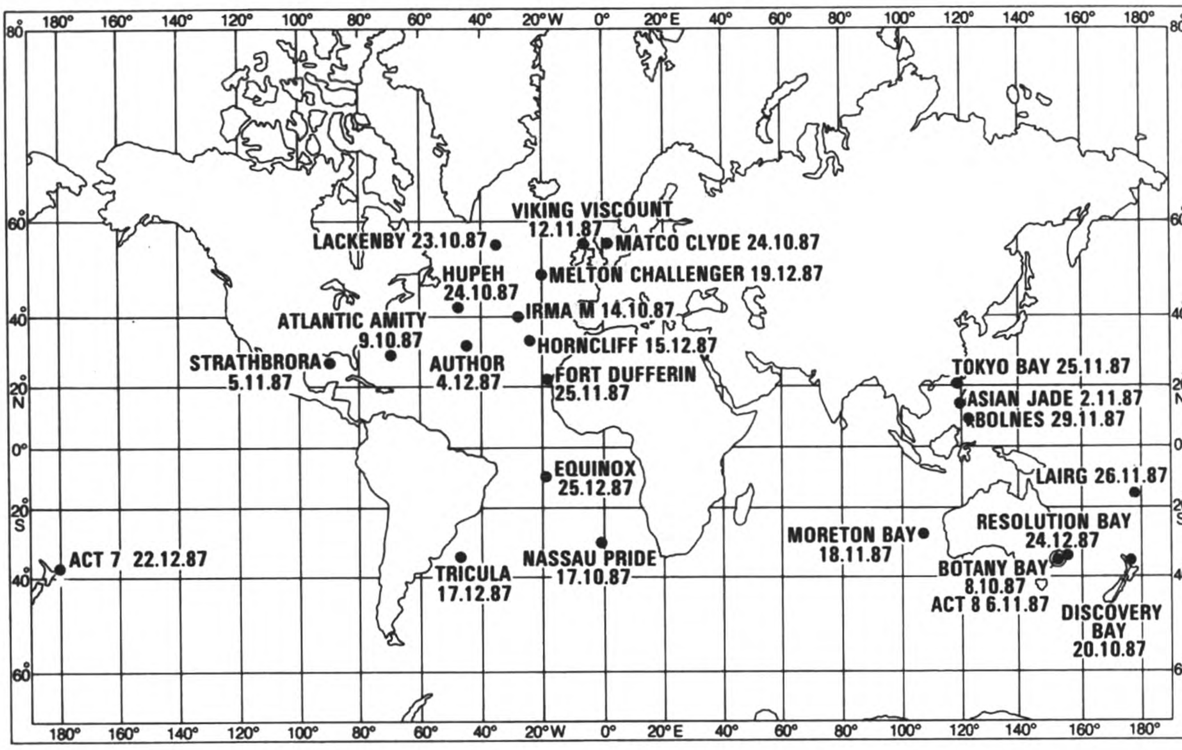
19–21 December 1987. At 0500 GMT a bird was found on the outside accommodation deck, windward side, after having been heard to hit the accommodation and fall to the deck. The unfortunate creature (or fortunate) appeared to be dead tired and was brought inside for some creature comforts, and 'persuaded' to partake of bread and water.

The bird was identified as a storm-petrel, possibly a Madeiran Storm-petrel. Obviously well off the beaten track, quite probably owing to the strong SW'ly winds of the previous 36 hours. After discussions with the ship's ornithologist (Chief Engineer Officer) and consultant veterinary surgeon (Second Engineer Officer), 'Henry' as he came to be known, was put on a diet of bread, sardines and water, and a rigorous training programme.

By the afternoon of the 20th there were definite signs of improvement, and flying lessons were commenced that evening. After a couple of hours Henry was getting the hang of it again; his take-offs were excellent, but the landings left much to be desired. However, it was concluded that there would not be much need for landing, once Henry was on his way.

On the morning of the 21st, Henry had taken to helping himself to food, and was looking longingly out of the port; so, wishing him a Merry Christmas and all the best for 1988, he was taken out, pointed in the right direction for Spain, and allowed to go on his way.

Position of ship: 49° 15'N, 20° 18'W.



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

Western North Atlantic

m.v. *Atlantic Amity*. Captain C. Bunyan. Flotta to Beaumont. Observers: the Master, Mr J. Murray, Chief Officer, Mr T.B. Harris, 3rd Officer and ship's company.

9 October 1987. Whilst the vessel was drifting, a vast flock of small birds congregated around the accommodation when the lights were switched on. A conservative estimate of their number was 600–700, but as the evening progressed, more birds arrived. The majority of them (one of which appears opposite page 172) were thought to be varieties of finches; an average size, taken from those that stunned themselves by flying into the funnel, was 11 cm long and 7 cm in girth. Some had a yellow belly with greenish-brown back and wings, their wings having black streaks on them with a light underside. The heads of both types were green with a white streak above the large eyes.

At the peak of observation it was thought there were more than 1,000 birds present, but unfortunately a large number of them seemed to have a penchant for suicide as their collisions with the accommodation proved fatal. About 40 birds were cleared off the decks the next day.

Position of ship: 29° 42'N, 70° 22'W.

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

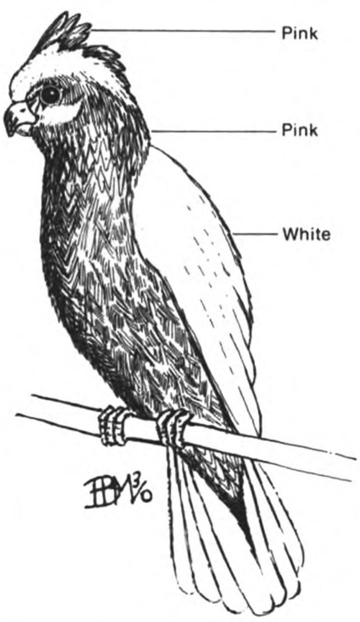
'These birds were obviously part of the autumn migration; I have been lucky enough to see these vast quantities on various occasions. Most of the birds would be American warblers in autumn "fall" plumage, which can be very hard to tell apart as they are mainly greenish-brown with yellow to white bellies, and identification is by less obvious means.

'The photograph looks like a Blackpoll Warbler (*Dendroica striata*), in "fall" plumage. A common bird which breeds over much of Canada and the northern United States, and winters in South America.'

Tasman Sea

m.v. *ACT 8*. Captain L.R. Bell. Melbourne to Botany Bay. Observers: Mr B.P. Murphy, 3rd Officer, Mr C.S. Carver, Radio Officer and ship's company.

6 November 1987. At 2215 GMT whilst the vessel was drifting about 5 n.mile off Botany Bay, 6 birds, one of which is shown in the sketch, flew onto one of the



ship's transmitting aerials. Their wing and tail feathers were white, as were their crowns and also a small patch under each eye. The remainder of their plumage was a pink colour inclusive of a small crest which was visible on only one of the birds.

They did not seem to be disturbed by the ship's crew who were working directly below them. At 2250, after resting and preening, the birds flew off towards land. There were no books on board with which to identify the birds, but presumably they were of the parrot or cockatoo families.

At the time of observation, the dry-bulb temperature was 20 °C, and the wind was NE'ly, force 3.

Position of ship: approximately 34° 00'S, 151° 20'E.

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

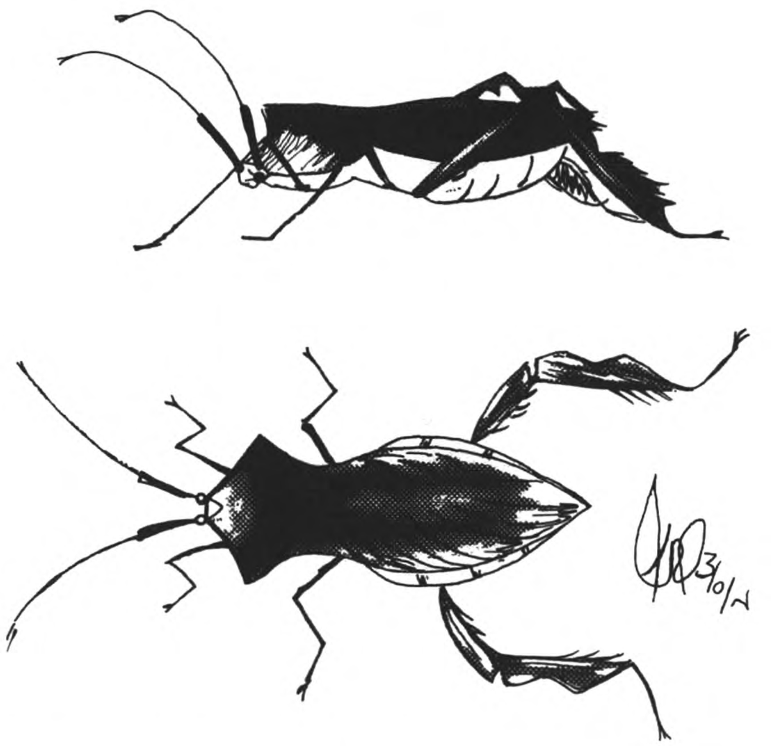
'This is a useful sketch showing I suggest a Pink Cockatoo (*Cacatua leadbeaters*). It is fairly widespread throughout Australia.'

INSECTS

Gulf of Mexico

m.v. *Strathbrora*. Captain B. Cushman. Houston to Savannah. Observers: the Master, Mr J.P. Meade, 3rd Officer, Mr P.W. Ferguson, Radio Officer and Mr D. Saint, Electrician.

5 November 1987. The 'bug' shown in the sketches was found in the wheel-house by the Electrician. Its body was about 4 cm long, the underside was chalky



white and it had two dark grey wings neatly folded across its back. The head of the insect was an unusual shape with a black rim around the top, as shown.

When captured, the bug secreted a clear liquid which gave off a strong almond-type smell. The ship had been in Houston on the 4th.

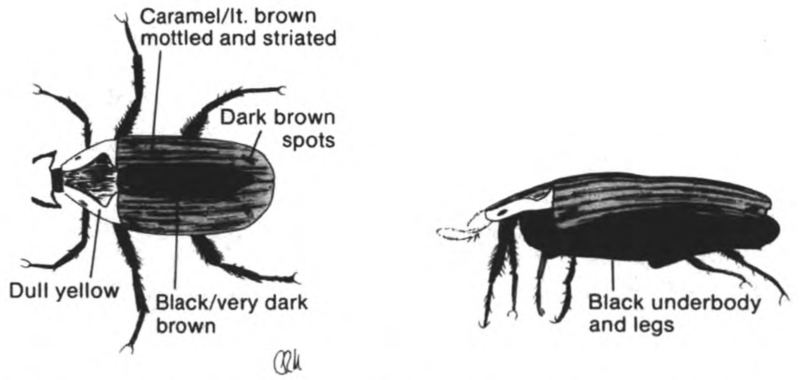
Position of ship at 1800 GMT on the 5th: 26° 54′N, 90° 00′W.

Tasman Sea

m.v. *Resolution Bay*. Captain J.H. Hutson. Sydney to Auckland. Observers: the Master, Mr C.R. Merry, 3rd Officer, Mrs E. Mackenzie, Radio Officer and Mr D. Gymer, SM1.

24 December 1987. On departure from Sydney, a beetle was discovered lurking under the dodger of the starboard bridge wing. This interesting creature was finally caught by Mr Gymer, and 'Albert' was retained for observation.

Of particular note was his camouflage, as shown in the sketches. His abdomen was a caramel/light-brown colour with a black band extending from the thorax to the end of his body. The abdomen had a slight mottled effect, and striations were also noted down both sides. The thorax was mainly black, but it also had dull yellow flanks. The head, underbody and legs were all black, and the underbody itself was segmented from the hind legs to the end of the abdomen.



Albert measured 25 mm long and 12 mm across, and was preserved in formalin solution for 'safe keeping'.

Position of ship: 34° 12′S, 154° 42′E.

BIOLUMINESCENCE

Eastern North Atlantic

m.v. *Fort Dufferin*. Captain P.M. Bell. Cape Town to Le Havre. Observer: Mr H.K. Nagpal, 3rd Officer.

25 November 1987. At about 0045 GMT, bioluminescence in bands was observed between the bow waves and the ship's sides on both sides. The bands were irregular and varied in length from 15–45 cm, and in width from 5–7 cm. Most of the larger bands tended to leave a trail of greenish-blue light which at times widened up to 15 cm and increased the length of the bands to a maximum of about 1 m. This effect was dominant for the first half an hour of the observation, then subsided for about the same time. It increased again at 0140.

Flashing the Aldis lamp on the surface of the water had little effect on its occurrence; just between the bands it appeared that pearls were floating on the surface. The radar in use was a 10-cm band display, and switching it to 'standby' and 'on' again showed no effect.

A few samples of water were taken, and the temperature was noted to have risen by 1 °C in the period since the last main weather observation was made. In each sample, half a dozen fish measuring 2.5 mm in length and 1 mm in diameter were picked up. They had tapered tails and two hairs at the front of the body, perpendicular to it, and each measuring 2 mm. The fish were very light grey/off-white in colour. Along with them were numerous spherical organisms, 0.5 mm in diameter which were suspended in the water. Torchlight on these organisms had no effect on them, but when the water was thrown on the deck it gave the appearance that some pearls, which had been observed on the sea surface, had been thrown down. However, slowly pouring a sample on the deck showed nothing. At 0200 the bioluminescence disappeared completely. The sea temperature at the time was 19.8, and the ship was travelling at 12.5 knots.

Position of ship at 0100 GMT: 22° 37′N, 17° 08′W.

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

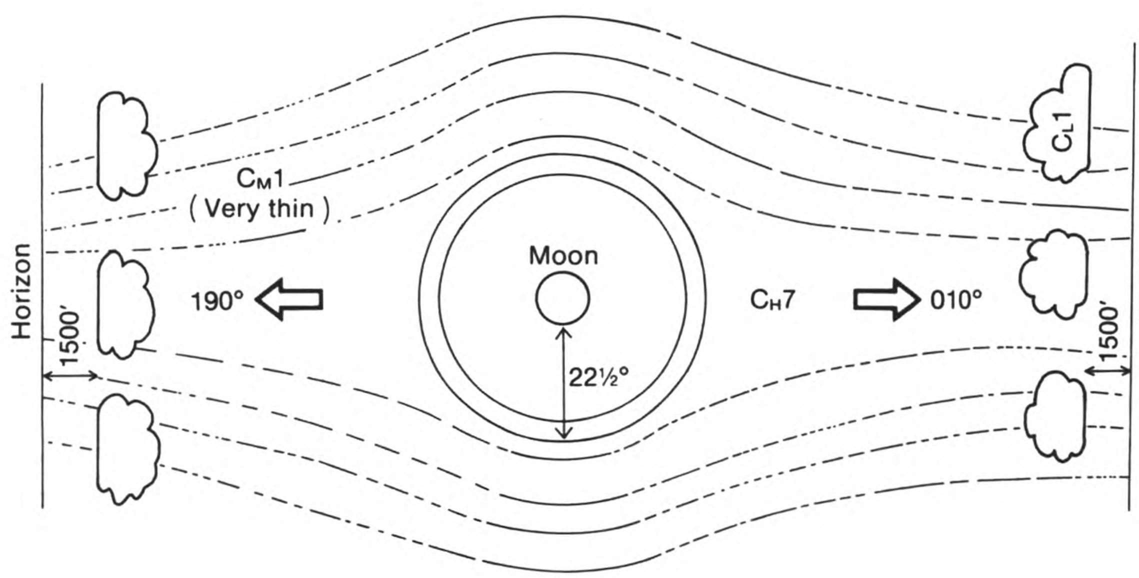
'The description of the "fish" indicates they were small copepod crustaceans as inferred by the observer. Some species of these animals are luminous. The 0.5 mm diameter organisms were almost certainly the colourless dinoflagellate *Noctiluca*, so named (literally "night light") on account of its luminous capabilities. The "bands" observed on the sea surface appear to have been caused by the movement of some larger animal (fish perhaps) disturbed by the bow wave and leaving a short trail of luminescence from the agitated dinoflagellates and copepods. I would have expected the bow wave itself, and the wake to have been brightly luminescent in those circumstances.'

LUNAR HALO

Western North Atlantic

m.v. *Author*. Captain R.H. Jones. Ponce to Felixstowe. Observer: Mr P.R. Walton, 3rd Officer.

4 December 1987. The halo phenomenon shown in the sketch was observed at 0229 GMT. At this time, in the latter part of the evening 8–12 watch, the moon was at its zenith and the phenomenon was most prominent. The moon was full, declination 23° 50′N, and the halo of 22½° had been present all watch.



The additional features started to develop 30 minutes before the moon reached its zenith. Initially, further curves appeared on either side of the halo; by the time the moon was at its highest, these curves extended from one horizon bearing 010° to the other, bearing 190°. This continued for at least an hour, then began deteriorating quite rapidly, leaving just the halo which remained for a couple of hours longer.

Clouds present during the period were small cumulus, very thin altostratus, and a veil of cirrostratus. It must be stressed that the cloud cover was extremely thin, as Orion's belt and Jupiter were clearly visible.

The dry-bulb temperature was 21.4 °C, dew point 19.2, sea 20.0, the pressure was 1020 mb (corrected) and the wind was variable, force 2. Visibility was greater than 11 n.mile.

Position of ship: 31° 54′N, 44° 31′W.

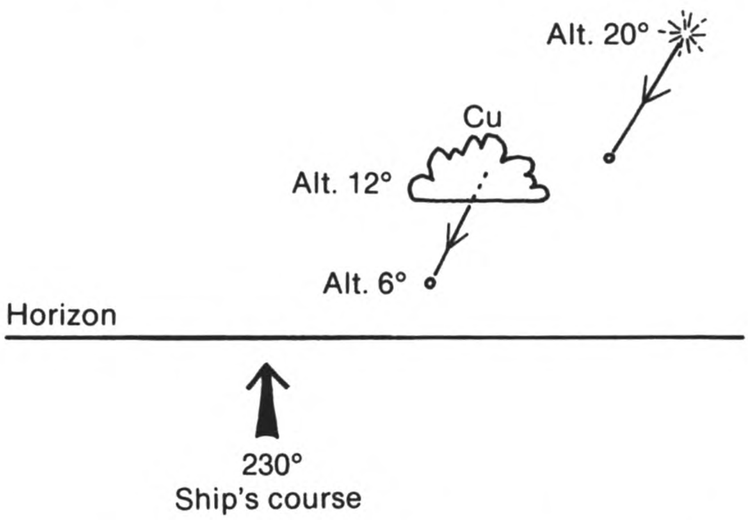
Note. Reference to authoritative works on the subject of haloes and associated phenomena has shown no comparable likeness to the features described in this report, with the exception of the halo itself. It is thought possible, however, that the additional arcs and bands may have been streaks of more dense cirrus cloud associated with a developing depression to the north of the vessel. These may have been illuminated by the moon so as to resemble further halo phenomena, and the effect of perspective would create the appearance of the bands tending to converge towards either horizon, as indicated in the sketch.

METEORS

North Atlantic Ocean

m.v. *Horncliff*. Captain A.J. Chivers. Hamburg to Bahia Moin, Costa Rica. Observers: Mr J.R. Benson, 3rd Officer, Mr R.J. Evans, Radio Officer and Mr P. Allison, SM1A.

15/16 December 1987. Between 2130 GMT and 0130 GMT approximately 25 meteors were observed. At 2330 a meteor was seen to appear from behind a small cumulus cloud. Simultaneously, a second one was noted at a higher altitude and to starboard of the first, see sketch. The second meteor burnt out at the altitude of



the cloud, whilst the first disappeared lower down at approximately 6° altitude. The meteors, visible for about 2 seconds, were dim and left no trail.

The sky was practically cloudless throughout the period, with only small cumulus clouds present occasionally, and the wind was SW'ly, force 6.

Position of ship at 2330 GMT: 33° 51'N, 23° 40'W.

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

'The report of so many meteors suggests that they were Geminids. These are meteors which peak on 14 December, and if their tracks are produced backwards, they appear to radiate from the constellation of Gemini. No indication of direction is reported for the majority of the meteors.

'Regarding the two meteors recorded at 2330 GMT, these are approximately on parallel tracks which, when produced backwards, point to the constellation of Gemini. The Geminids are rich in fireballs and faint meteors.

'The observers should be congratulated on producing a very detailed report. As a suggestion, it would be even more valuable if, in future reports, estimates of the azimuths (or bearings) as well as altitudes could be recorded.'

Indian Ocean

m.v. *Moreton Bay*. Captain D.C. Blackman. Fremantle to Jeddah. Observers: the Master and Mr E. Phillips, Seaman.

18 November 1987. At 0411 GMT, whilst on the bridge wing, the Master's attention was drawn by a white streak across the sky, headed by a brilliant green object. It fell obliquely across the sky, disappearing at an altitude of 15°, bearing 147° from the ship. The duration of flight was less than 1 second, and the trail

was non-persistent. At the time of observation there was clear sky with bright sunlight prevailing, and a band of small/medium cumulus cloud to an altitude of 10° above the horizon.

Later in the day the Master's observation was confirmed by Mr Phillips who visited the bridge to find out 'if it was possible to see shooting stars in the day time'.

Position of ship: 27° 30′S, 108° 29′E.

Note. Mr H. Miles comments:

'This is a very interesting report of a daylight fireball. The short time interval of the passage across the sky indicates that it was the entry into the atmosphere of a natural object and not an artificial satellite. As the sky was clear, the disappearance at an altitude of 15° suggests that the object burned out in the atmosphere. The absence of the report of a sonic boom also suggests that the object could have consisted of cometary material and not of the type which would deposit meteorites. There are, however, many factors which have to be considered before any positive identification can be made.'

FISHING CRAFT

Tanon Straits

m.v. *Bolnes*. Captain R.W.H. Dole. Gladstone to Sangi, Cebu Island. Observers: the Master, Mr N.W. Conquest, 3rd Officer, and members of the ship's company.

29 November 1987. At 2230 GMT as the ship entered the southern end of the Tanon Straits, approximately 20 motorised fishing vessels were observed along with a further 30–40 much smaller, canoe-like craft, all busily engaged in early morning fishing using nets as well as trawls.

The ship then followed the coast on a north-north-easterly heading towards Sangi, keeping 2–3 n.mile off the shore line. During this passage throughout the morning, approximately 25 'unmanned' craft were observed intermittently, drifting south with the current at a rate of up to 1 knot.

These craft, one of which appears opposite page 189, appeared to be about 8 m long, 1.5 m in beam, constructed of wooden spars lashed together, and with an open deck combined with a shelter amidships. There were no signs that these craft had broken loose; various fishermen in close proximity seemed to ignore them. The craft concerned were not towing nets; however, it was noticed that each one had a large identification number located on the roof of the shelter-like structure.

After having consulted the local fishermen in the port of Torledo, the observers were informed that the craft were used to attract fish by providing shade from the sun, such that fishermen could close in on them to make a better catch. Other theories from the ship's company suggested that they would be ideal for the Mother-in-law on a Sunday afternoon. 'Mirror' type sea conditions prevailed at the time of the observations.

Position of ship: 09° 18′N, 123° 24′E.

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The severe storm of 15/16 October 1987 — as viewed by ships of the VOF

By Miss J. Mitchell
(Meteorological Office, Bracknell)

Introduction

The following description of the severe storm which raced across the English Channel on the night of 15/16 October 1987 has been compiled from those first-hand accounts received of the conditions at sea as experienced by observers in the VOF, with additional material from Meteorological Office sources and *Lloyd's List*.

Conditions at sea

During October 15th, what was to be a major weather system in terms of severity was developing west of the Iberian peninsular. The *Celtic Ambassador*, 4,490 dwt, bound for Banjul from Plymouth, encountered the storm at 44° 54'N, 08° 00'W (Figure 1), where at 1800 GMT, the wind was S'ly, in excess of force 12. The visibility 'ranged from virtually zero to at best 1 n.mile, depending upon the intensity of the rain and the amount of spindrift. In this period the seas were mountainous, some waves being well in excess of 20 m'. The *Celtic Mariner*, 1,519 dwt, (Figure 1), also in the same area was headed north-north-east for Humberside, but in the prevailing conditions was making only 9 knots. The storm tracked north-eastwards across Biscay to be in the south-west English Channel at 0000 on the 16th, where, at 48° 00'N, 06° 00'W and in heavy rain, the *Graiglas* (Figure 1) recorded a pressure of 976.5 mb, with W'ly winds of force 10. The ship's freeboard was 10.5 metres, but seas were still being shipped on deck. With mean wind speeds to hurricane force at times, the storm then crossed the Channel and swept up over southern areas of the United Kingdom overnight.

Not surprisingly, it was a night to remember for the numerous ships that found their sailing schedules disrupted by the violent conditions. Among them was the small coaster *Union Mars* (Figure 1), bound from Fowey to Antwerp; she suffered steering failure off the Isle of Wight owing to the heavy seas, but managed to make Portsmouth in safety, attended by two lifeboats. The Sealink ferry *Hengist* (Figure 1) broke from her moorings in wind speeds estimated at 70–100 knots, and ran aground close to Folkestone harbour, suffering severe bottom damage and a hole in her side as she was dashed against rocks during the storm; elsewhere, more ships broke from their moorings causing damage to themselves and others. Ships were hove to, in some cases with maximum power and speed being applied just to maintain steerageway. Sometimes even this proved inadequate; the *Bibi* (a Canadian Selected Ship), hove to 20 n.mile south of Felixstowe (Figure 1), was still being pushed astern after taking such measures in steady winds of 60–70 knots, gusting regularly to over 90 knots, this between 0300 and 0700 on the 16th. The Master also reported that 'between the hours of 0700 and 1100, the vessel steamed at Slow Ahead and remained in the same position. During the afternoon of the 16th, with winds easing to force 8, the vessel was allowed to drift astern, with the engines put Full Ahead every half-hour for a

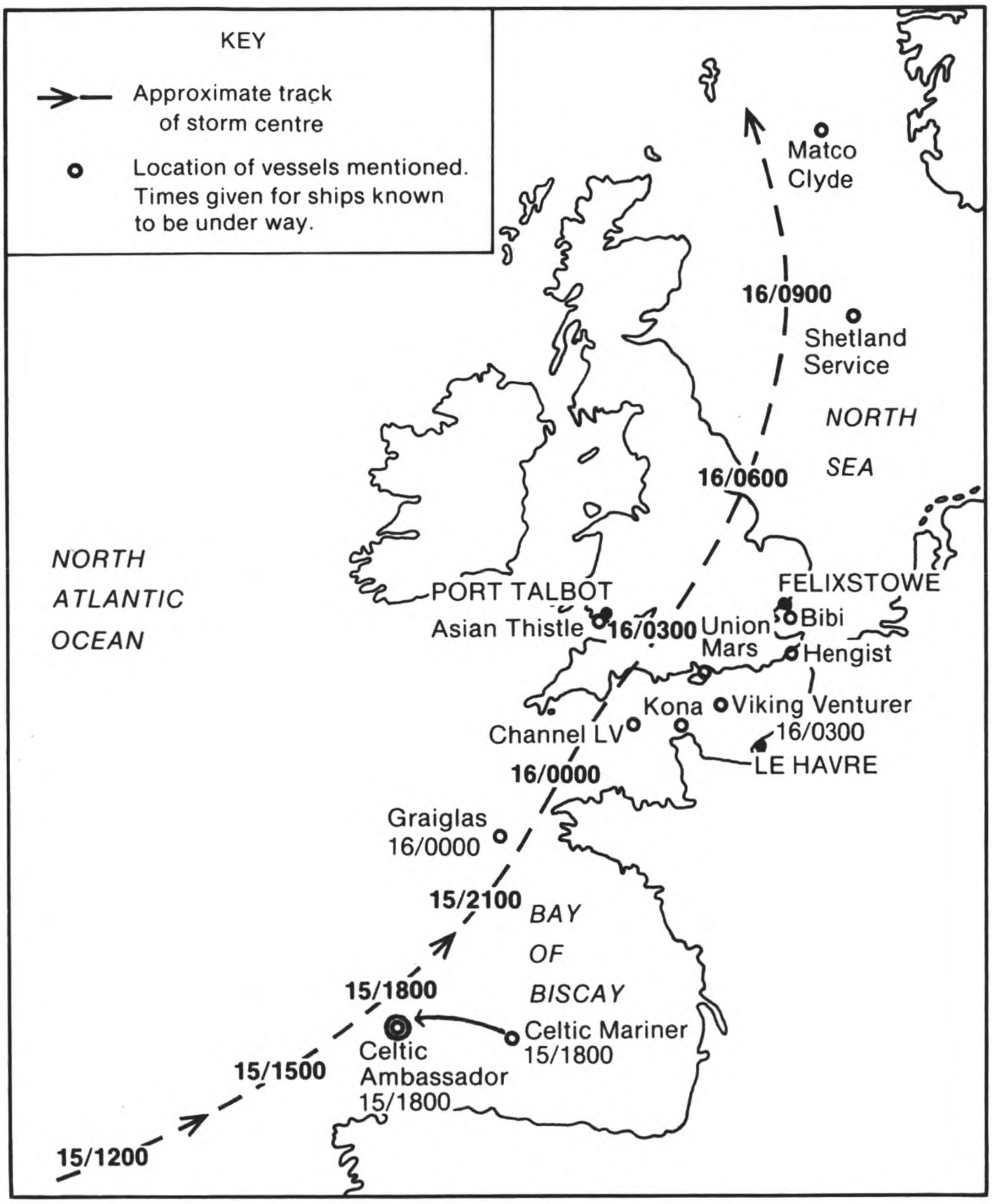

Figure 1. Approximate track of the storm centre, and location of ships mentioned.

few minutes in order to maintain a safe distance off the Galloper and North Falls banks'. The *Bibi*, 22,378 dwt, was finally able to anchor off the Sunk light-float at 1741.

Among other United Kingdom VOF ships affected was the Townsend ferry *Viking Venturer* (Figure 1). Departing Portsmouth at 2336 on the 15th, she was intending to berth at Le Havre at 0700 the next day; however, when about 6 n.mile south-south-east of the Nab Tower at 0100 on the 16th, conditions suddenly deteriorated with a dramatic increase in the S'ly wind, the rushing noise of which brought the Master back to the bridge from the midst of his rounds of the ship. The anemometer 'began to show speeds in excess of 80 knots (80 knots being the maximum deflection of the needle)'. As the seas began to build up, the ship's speed was further reduced to only 5 or 6 knots despite maximum revs/pitch being applied. In calm weather, such settings would have given a speed of about 18 knots.

Presentation of barographs at Bracknell Headquarters on 17 May 1988. Back row, left to right: Mrs D. Dickson; Captain T. Crookall (Marine Superintendent, Blue Star Ship Management Ltd); Dr J.T. Houghton (Director-General, Met. Office); Dr D.N. Axford (Director of Services, Met. Office); Captain D.R.G. Hannah (Marine Superintendent, P. & O. Containers Ltd); Mrs J.D. Thomson. Front row, left to right: Captain D. Dickson (Denholm Ship Management Ltd); Captain D. Barber (Marine Manager, P. & O. Cargo Division); Captain D.M. McPhail, Retd, (Blue Star Ship Management Ltd); Captain J.D. Thomson (P. & O. Containers Ltd). (See page 199.)

Opposite page 189.

Photo. by J.S. Latto

Balolo worms discolouring the sea, as seen from m.v. *Lairg*. (See page 177.)

Photo. by N.W. Conquest

Fishing craft seen from m.v. *Bolnes*. (See page 186)

These severe conditions were not experienced in all areas however. At 0100 on the 16th in Port Talbot, south Wales, north of the storm centre (then located south of Plymouth), the *Asian Thistle* (Figure 1) was discharging her cargo; the pressure was falling steadily as it had done since the morning of the previous day, but the winds were only NW'ly, force 4–5. Needless to say, the Master and the ship's company were thankful to be in that particular location.

Over land, most areas affected experienced their strongest winds between 0200 and 0600. This was also true for the *Viking Venturer* in the Channel. At 0300 the ferry recorded what was to be her lowest pressure reading, 963.6 mb, the wind at the time being in excess of force 12. At this point the ship was still only about one-third of the way across to Le Havre, but the course required for the port had become of secondary importance to the need to maintain steerageway, and this was achieved by keeping the wind 2 or 3 points on the starboard bow. The general movement of the ship was one of rolling moderately and pitching heavily at times, shipping water over fo'c'sle and decks. Earlier, the 10-cm radar had been switched off as the aerial could no longer rotate against the wind, and although the smaller aerial of the 3-cm set still turned, the screen was so covered by sea clutter that its use was considerably restricted.

The extremely high wind speeds were maintained throughout the early hours of the 16th; at 0400 the Channel light-vessel, south of the centre (now in the Severn Estuary) recorded W'ly winds of 70 knots. The *Viking Venturer* at 0500 noted that 'the wind was SW'ly, force 12–13, but the pressure was rising very rapidly, reading 974.8 mb, and the vessel was still shipping water over the fo'c'sle and spraying over all. By 0600 the wind had veered to SW'W'ly but showed no sign of decreasing, the pressure was 982.2 mb'.

After the cold front associated with the storm had passed, a quite spectacular rise in pressure of about 20 mb in 3 hours was registered by the ship's barograph. The rise was so phenomenal that the Master remarked that the change in pressure caused his ears to 'pop'. Figures 2(a) and 2(b) show similar rises as noted by the *Graiglas* and also the *Kona* which was some 20 n.mile north of Cherbourg. When at 0800, the wind moderated to storm force 10, the *Viking Venturer* was able to make her way to Le Havre where, after the wild night, she eventually berthed at 1033 on the 16th.

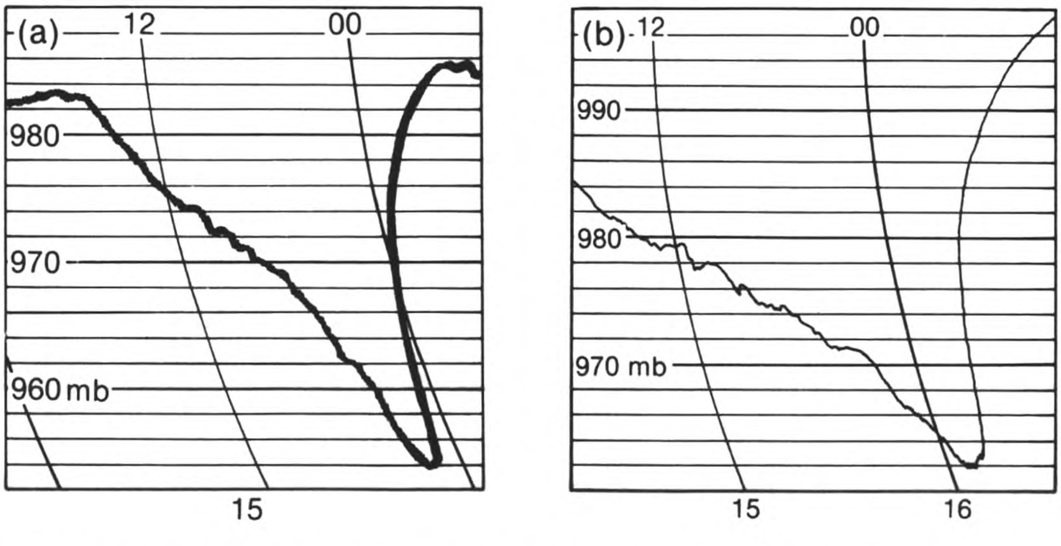

Figure 2(a), 2(b). **Barograms from the *Graiglas* and the *Kona*, showing the dramatic rise in pressure following the passage of the cold front.**

The storm centre itself continued north-east over land, and then moved into the North Sea, crossing the English coast near 54° N. While shipping in the Channel and adjacent areas was recovering, those ships in the North Sea were about to have their share of the event, although by this time, conditions were moderating a little. Nevertheless, the barometer on board the support ship *Shetland Service* (Figure 1), on station at the Fulmar Oilfield registered a pressure of 963.5 mb at 1200, whilst the *Matco Clyde* (Figure 1) loading from the Beryl Oilfield, noted deteriorating conditions as the cloud cover increased and the wind veered, gaining in strength at the same time. At 0800, the wind was E'N'ly, force 6 and the pressure was 966.5 mb; at 1200 it was SE'ly, force 8, and at 1600 it was S'ly, force 8 whilst the pressure had reached its lowest reading of 958.2 mb. At this time the sky was overcast, there was heavy rain and poor visibility. Between 1600 and 0000 on the 17th, the wind continued to veer and increase, with the maximum of SW'S'ly, force 12 being recorded at 1800. The vessel was unable to continue south by 0000, so steerageway was just maintained until 0400 when the weather started to improve.

Detailed surface analyses*

The detailed surface analyses (Figure 3) over southern Britain and the English Channel show that, as the storm approached the English coast, two separate

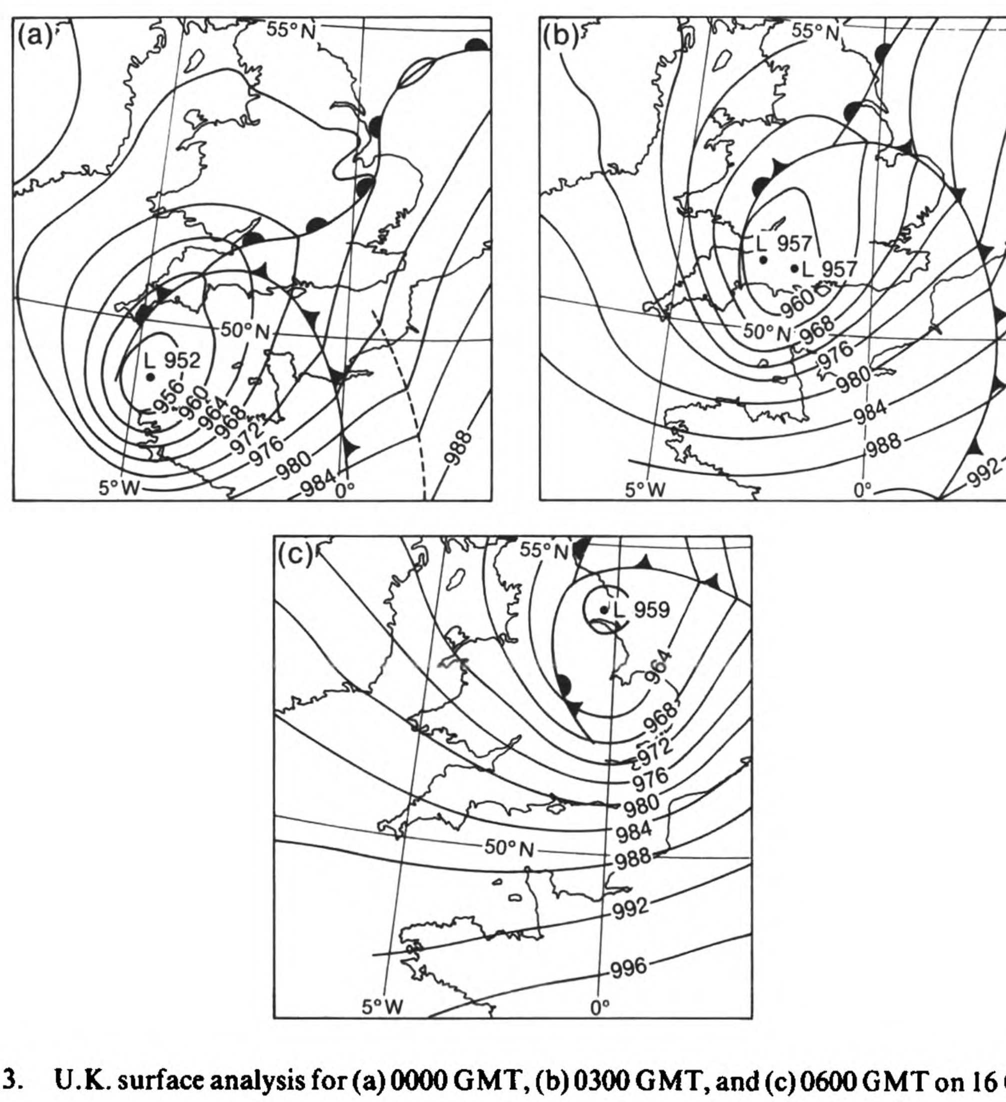

Figure 3. U.K. surface analysis for (a) 0000 GMT, (b) 0300 GMT, and (c) 0600 GMT on 16 October 1987.

centres became apparent with relatively light winds in the vicinity of these centres and to the north of them. The very strong winds lay in a belt through the eastern, southern and western quarters, the highest and most damaging gusts being experienced around 0500 GMT some 200 miles or so to the south-east of the centre. The crux of the forecasting problem was the prediction of the location and severity of this belt of very strong winds and that problem had exercised the forecasters' minds from Sunday 11 October onwards.

Conclusions*

A detailed 'after the event' appraisal of all the data and satellite imagery indicates that several discrete low centres ran rapidly north-east over Biscay before the arrival of the final low which was associated with the major storm development. Tracking of the centre depicted on the CFO operational analyses (Figure 4), suggests slow north-eastward transference of the low across southern Biscay up to 1800 GMT on 15 October, followed by a rapid acceleration towards the United Kingdom. In reality it was different low centres which were being followed and this explains the inconsistent movement. In contrast the deduced track and depth of the developing low centre present a very coherent pattern (Figure 4), the chart revealing relatively steady deepening of the centre as it tracked from west of Iberia to the western English Channel. However, it must be

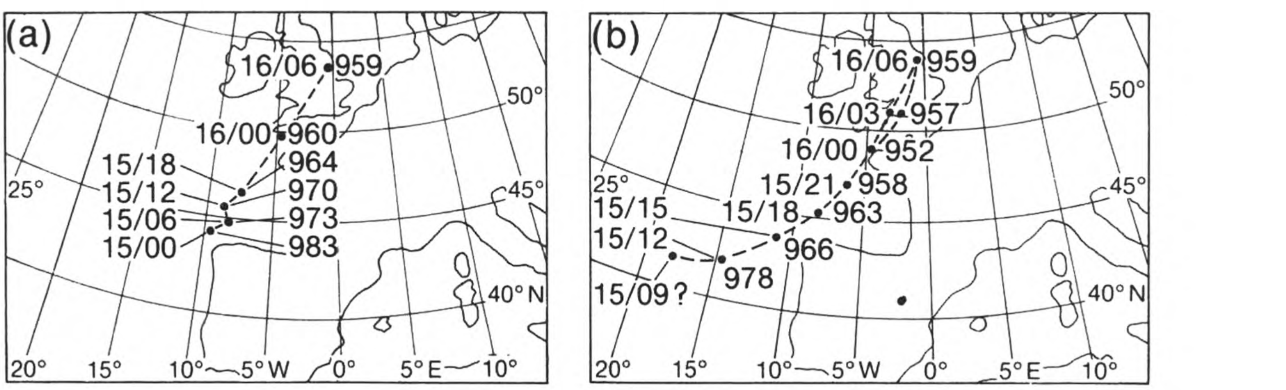

Figure 4(a), 4(b). Operational analysis and finalized analysis of the storm track.

recognised that, even now, some doubt still exists concerning the precise details of the analyses, depending as they do on subjective interpretation of the satellite imagery and the assessment of the reliability of the various ship reports.

Postscript

Perhaps now the storm is fast becoming history, for twelve months have passed quickly since the event. However, to the Masters and ships' companies who were actually at sea at the time, memories are maybe revived whenever similar conditions occur in other sea areas of the world, and no doubt what has already been labelled the 'Great Storm' will, like the English winters of 1947 and 1963 and the summer of 1976, become a yardstick by which other events will be measured.

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* Reproduced from *Meteorological Magazine*, **117**, April 1988, by permission of the Editor.

Giant Wave — Anomalous Seas of the Agulhas Current*

By Eckart H. Schumann

The waves were much too big. In an endless stream they struck at the heaving, pitching freighter. Occasionally there would be some respite, a temporary lull, but then the inevitable up, down, up, down motion increased again. Several times the whole ship shuddered as a particularly huge wave crashed against her unexpectedly.

On the bridge the captain stared out at the turmoil of wind, waves and foam surrounding his ship. Anxiously he considered the responsibilities and decisions facing him. His first concern was for his ship, but he had weathered many storms like this before without damage. He slowed the vessel even more than was recommended and he could do no more. Any delay was costly. A stoppage would be prohibitive.

But his thoughts kept returning to the stories and reports he had heard about these waters off the southeast coast of southern Africa: the so-called 'freak waves' that could break a ship in two, and the holes in the sea that ships fell into before being swallowed by a following mountain of water.

He could not understand the size and steepness of the waves into which his ship was ploughing. After all, the southwesterly wind was only just over gale force, and the 10,000 ton freighter should be able to withstand it easily. Yet, there was something ominous and relentless in the curling wave tips that kept rushing at the struggling ship, like fingers wanting to pull her down.

With another lull in the waves, a sick seaman on a bunk below, swallowed, grateful for the temporary relief. The captain continued to stare out at the sea, waiting for the next group of big waves he knew would come. The pitching increased, but something seemed different; the size and steepness of this series of waves were greater than anything that had preceded it. The ship struggled up one wave, only to be faced by an even larger succeeding one. The bow dug into the roaring foam, then was lifted right up to the crest. Here it hung as the wave slid down the length of the ship. As it came down to meet the next onslaught, the captain stared in disbelief: behind those two enormous waves was a still bigger one, and the ship, now in a downward attitude, was heading straight for the guts of that wall of water. The alarm bells rang even as a deluge of water buried the bow, crashing right up to the bridge.

This story, with variations, is one that has been played out, not infrequently, off the southeast coast of Africa. The approaching wave steepness can be such that it appears as though a hole has formed in the water ahead, into which the hapless ship plunges. The bow ploughs into the onrushing wall of water, which floods the foredeck. The weight of water on a ship's bow, plus the buoyancy potential in the forepeak, result in tremendous strain on both the deck and internal members. The bow itself may split open, or on occasion even the back of a ship can break.

In view of the enormous tonnage of ships that round the Cape of Good Hope every year, southern Africa is of particular interest to world shipping, and giant waves there have become a feared phenomenon. What is especially disturbing is that they occur in situations in which mariners would not normally expect them.

The strength of the current running along this shore was first noted by William Bourne (c.1574), who said of the course taken by ships sailing eastward that they 'standeth South ouer toward the land that lyeth to the Antarticke Polewards, and the cause thereof, is by the means of the great Current, that is at *Cape bone sperance* continually running from the East unto the West ...' It was a different story on their return homeward, when 'they will have all the helpe that they may with the Current.'

This 'great current' is now known as the 'Agulhas', and with others, such as the Gulf Stream and Kuro Shio, forms the major western boundary currents of the oceans. Flowing poleward, these currents are an important part of the ocean

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* Dr E.H. Schumann's article appeared originally in the South African Journal, *Oceans*, July 1980.

basin circulations: the present estimate of the flow of the Agulhas Current is about 80 million tons of water per second, with usual speeds between one and two metres per second.

Early mariners fully appreciated such a strong current: they attempted to avoid it when sailing against the stream, but took advantage of it when they journeyed in the opposite direction. The same practice, considerably refined, holds true today.

Six years ago Professor J.K. Mallory of the University of Cape Town analysed the recorded conditions that had prevailed each time when a number of ships were damaged by waves. He found that in all eleven cases the dominant waves were from the southwest, while on all but one occasion the ship that was damaged was steaming southwest *with* the Agulhas Current (see *The Marine Observer*, January 1984, pp. 29–38). In addition the weather patterns appeared to play a part, in that the most dangerous periods occurred when cells of low pressure were moving along the coast in a northeasterly direction. These coastal lows are a regular feature of the area, and it often happens that during their passage the wind can change from near northeasterly gale to a southwesterly one in a matter of hours. The wind then reinforces the existing waves by generating a short-period choppy sea which acts directly against the Agulhas Current (see Figure 1).

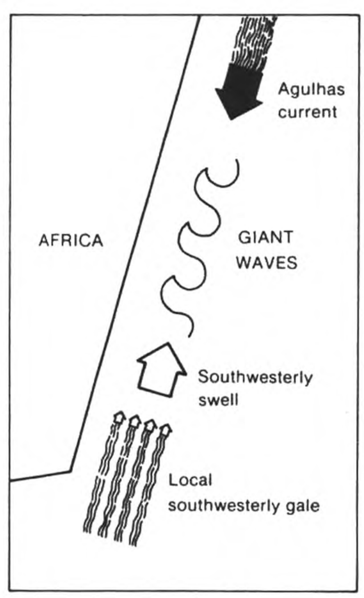

Figure 1. Big swells coming from a southwesterly direction and accompanied by storm force winds move into the opposing Agulhas Current off southeast Africa to generate devastatingly giant waves.

In itself, such a situation should not present any great danger, since both currents and gales are common in all oceans. The difference here is the combination of their strength, and the extent to which they interact. It is a subtle phenomenon, but mariners early on began to notice it. In a 1773 guide to the area, W. Nichelsen states that the interaction between the current and a south-west gale 'makes monstrous high seas'.

A similar interaction between waves and a current is readily observable at the mouth of a river flowing into the sea. Specifically one can observe the wave steepness, that is, the ratio of wave height to wave length. In addition to the expected reduction of wave speed in the opposing current, the wave graduation can increase dramatically.

Many waves, in fact, break because of their extreme steepness. The mechanism involved is not only a 'squeezing up' of the wave profile (or elongation when waves and current are moving in the same direction), but also an actual transfer of energy between the current and the waves. The extent of the transfer depends upon the current's strength and the wave period (the time taken between two successive crests to pass a given point). In a given opposing current, a shorter-period wave will increase in height more than a longer-period wave; if the strength of the opposing current is increased the wave height will also increase.

It is primarily the wave steepness that concerns a ship, for a long swell is much easier to ride out than a short chop, even though the height of the swell may be greater. Experimental evidence shows that in an opposing two-meter-per-second current, the steepness of a ten-second period wave will double. A five-second period wave will already have broken, while the steepness of a fifteen-second wave will increase by 50 per cent.

The problem is compounded by the motion of a ship in a wave field, where, depending on the ship's speed and direction, an apparent change in wavelength also occurs. If the ship is moving against a wave group, the wavelength will apparently decrease because the ship itself steams part of the distance between consecutive wave crests. Consequently, the wave steepness as observed from the ship increases, with the opposite happening if the ships and waves are moving in the same direction. For example, in the case of a ten-second period wave, if a ship is steaming at twenty knots with a two-meter-per-second current into the wave field, the wave steepness will be increased about three times.

Two more complications should be considered, neither of which can be handled quantitatively at this stage. First there is a possible concentration of the wave field in the body of the current, and second, the random nature of the sea surface itself. The surface consists of a number of wave trains, or sets, at various stages of growth, with different periods and coming from different directions. Wave trains propagate for thousands of kilometres across the ocean, interact with other waves and are modified by local weather conditions.

The simplest of all possible wave interactions is the superposition of height. Superposition of different wave trains produces groups of high waves separated by calmer periods. The middle wave of such a group will be the highest, and maritime folklore abounds with pronouncements that in a particular region it is the third, fifth or seventh wave in a set that presents the greatest danger. There is probably much truth in these statements; certainly the wave climate in any area will depend heavily on the local conditions.

In the vast areas of the Southern Ocean, the region in the 'roaring forties' is often described as a vast weather factory. Strong winds can blow for days over endless stretches of ocean, generating what is known as 'a fully developed sea'. The resulting waves depend, among other factors, upon the strength of the wind, its duration, and the 'fetch', or distance over which it blows. Initially, shorter-period waves are generated, but with time it is the waves with longer periods that are the highest. Off the Cape, occasionally there are waves with periods as long as twenty seconds, but in the Agulhas Current the dominant periods range from about ten to fifteen seconds.

The dangerous waves are, then, those with big swells propagating from a southerly or southwesterly direction around southern Africa, and moving into the Agulhas Current. The southwesterly winds associated with the fierce storms along the coast will abet the swells, increasing their height and producing an additional short chop which causes breaking at their crests. We know from the comments of unfortunate mariners and passengers that these waves are much greater than those experienced on other voyages. In October of 1970, Captain Wilhelm Schroder was taking the *Stephaniturm*, a 499-ton German-built supply vessel, on her maiden voyage from Europe to Malagasy. In Cape Town Schroder was quoted as saying, 'My ship can sail with absolute impunity in any of the seas between Alaska and Singapore.' Yet, one week later he was one of the five among his crew lucky enough to be rescued after his ship capsized in raging seas near Durban. The wind at the time was about force eight or nine — not exceptional — however he said that he had 'never seen such high seas'. The chagrined skipper had just learned that keeping to a schedule can quickly become the least of a captain's problems. [For an example of the severe damage which can be caused by these extreme seas, see photograph of the *Neptune Sapphire* opposite page 173.]

El Niño — A historical background*

By Roberto Jimenez
(Instituto Nacional de Pesca, Ecuador)

Archaeological excavations and discoveries along the north-west coast of South America from Esmeraldas in northern Ecuador to the south of Peru provide evidence that certain villages were mysteriously abandoned by their inhabitants many centuries ago. Some archaeologists believe that this abandonment was associated with marked climatic fluctuations similar to others recorded in history, several of which were related to the phenomenon known as El Niño.

When the Spaniards in their frail sailing vessels began to explore what was then called the Southern Sea (later to become the Pacific Ocean), the indigenes told them that the winds sometimes blew from the coast to the sea and at other times in the reverse direction; they were also warned that at certain times of the year the winds were so weak that navigation became impossible. The intrepid conquistadores soon confirmed the truth of this, and arranged their voyages to fit in with the period of favourable winds.

The colony's chronicler, Pedro Cieza de León, made detailed observations and descriptions of the South American coast, and it is to him that we owe our knowledge of the early sea routes. From his descriptions we can see that the usual sea routes always kept close to the coast, navigation being based on sighting landmarks, and with many shipwrecks as the result.

* Reproduced from WMO Bulletin, July 1987, by kind permission of the Editor. Originally published by permission of *El Universo*, Guayaquil.

The first significant historical reference to the system of sea currents and winds dates from a journey made by Father Tomás de Berlanga, Bishop of Castilla de Oro, who had been commissioned by royal decree of Carlos V to visit and report on the Spanish colonies. Either ignorant of the facts mentioned above or disregarding their importance, Tomás de Berlanga sailed from Panama on 23 February 1535. After eight days' sailing southwards the winds dropped entirely and the current carried the ship westwards, and on 10 March eventually brought it to the coasts of an island in a latitude about 30 minutes south of the Equator. It was thus quite by chance that Father Tomás discovered the Galapagos Islands, now a province of the Republic of Ecuador.

Over the centuries that followed, it became generally known that from April or May the prevailing winds blew seawards from the coasts of Ecuador or Peru, but towards the end of the year they stopped or actually changed direction. In addition to this atmospheric sequence, it was noted that around December or January the north-western coast of South America was washed by warm currents. Since this phenomenon coincided with Christmas, it was called El Niño, which means 'The (Christ) Child'.

Perhaps it was Jerónimo Benzoni in an account of a voyage to Ecuador between 1547 and 1550 who first mentioned one of the worst floods to affect that country. In his description of the Ecuadorian coast and the Gulf of Guayaquil he reported that in the year 1546, due to excessive rainfall, the River Guayas swelled so much that it not only caused damage but flooded a large part of the surrounding country, including the town of Guayaquil. The Spaniards thereupon moved about 20 miles further downstream and rebuilt the town on higher ground, but still close to the river. In an interesting account of the dry and rainy seasons in this area, Benzoni observed that in the province of Guayaquil winter began in November and lasted until the end of April; spring began in May and summer ended in October. Along the entire coast south of Tumbuz it was possible for the plains to have no rainfall at all for three or four years. So at least from the 1550s it must have been known that in some years there could be torrential rain and in other years severe drought.

Comparisons of the South American rainy season were made with periods of drought in other parts of the world. Tomás López Medel, a high court judge in Nueva Granada, referred to them in this *Tratado de los tres elementos* (Treatise on the Three Elements), particularly when dealing with the seas and the hydrography of the West Indies, and in a description of a voyage made to that area between 1558 and 1559. He gave remarkable descriptions of some aspects of the climate such as the rainy season, hinting at the knowledge widespread among the early Spanish colonists that in the years when there was a lot of rain and plenty of water in the West Indies, other regions had little rainfall and water shortages; conversely when it was very rainy elsewhere the Indies had water shortages.

López Medel also wrote interesting accounts of hurricanes and severe storms on land and at sea, and gave detailed descriptions of marine fauna of the tropical Pacific Ocean such as sea-bream and flying fish.

Thus two phenomena have been identified since ancient times: one atmospheric, relating to changes in wind direction and force; the other oceanic, relating to an increase in sea temperature from December into the first few months of each year. The irregular occurrence of years with heavy rainfall, without any detectable periodicity, has also been recognized for centuries.

There are numerous references to events associated with El Niño by the colonial chroniclers, who mention years of aberrant climate with torrential precipitation and overflowing rivers causing serious damage along the coast. Parallel with this was the anomalous 'tropicalizing' of the sea that disturbed the ecology to a catastrophic extent.

Subsequent major scientific expeditions to America by the Spaniards over four centuries focused on the study of continental fauna, flora and minerals, but showed little interest in oceanic research.

Only recently have the oceanographic conditions associated with El Niño been recorded with greater accuracy. Robert C. Murphy, who was in Peru and Ecuador from December 1924 to March 1925, referred to El Niño as a 'warm cross-current' appearing annually around Christmas-time, but assuming greater significance over longer periods of time. He considered the 1925 El Niño to have been the strongest since 1891. He also showed that among the effects of the 'warm cross-current' were the disappearance of plankton; fewer fish; the invasion of coastal waters by tropical fauna; the death or emigration of sea birds and unusual quantities of rain.

Charles W. Beebe also carried out zoological and oceanographic studies from the RV *Arcturus* in March and April 1925 in the region comprising Panama, Galapagos and Cocos. He observed a remarkable phenomenon, namely a very strong convergence between Panama and Galapagos; a frontal zone where all the thousands of floating objects carried by the current accumulated against a barrier of water, showing that the convergence ran NE–SW. Other characteristics of the front were the strong currents and numerous pelagic species (such as fish, sea mammals and birds) which fed on the organisms concentrated along the front. Beebe related this feature to the inexplicable absence of the Humboldt current as in the area south of the Galapagos Islands where he had found tropical marine fauna and relatively high sea temperatures.

In recent years, marine science research conducted by Ecuadorian institutions has shown the important role played by this equatorial front as regards plankton fertility and the associated level of fish stocks. The remarkable variability of oceanographic conditions in the Ecuadorian sea area connected with the equatorial front and equatorial and coastal upwelling contribute to high plankton fertility and concomitant high populations of fish and crustacea, which have permitted the growth of a fishing industry recognized as one of the largest and most dynamic in the country.

At the same time there are the anomalous marine conditions associated with El Niño, the most recent occurrence of which (1982/83) dramatically altered the distribution and population patterns of fish, crustacea and almost all living organisms in the marine ecosystem, and lowered the sea's fertility by one fifth, with serious repercussions. Catches of pelagic fish were reduced, whilst floods along the entire Ecuadorian coastal region adversely affected agricultural production and the road network.

The phenomenon in one way or another has affected, and will periodically continue to affect, the whole of Ecuador and the eastern Pacific, which is why we must make still greater efforts to understand its full significance.

Yacht Attack by Killer Whales

By D.A. McBrearty
(University of Cambridge)

On 13 June 1988 the British yacht *Hyccup*, sailing in the Single-handed Transatlantic Race, reported attack by killler whales in position 48° 54'N, 28° 45'W. The yacht was rammed, holed and sunk by the whales but the yachtsman was rescued.

The picture the average person has of cetaceans, indeed of many different animal species, is formed by popular books and articles, by TV and by seeing captive specimens in marine zoos. Many marine zoos keep killer whales and they are indeed a great attraction. It is in the interest of these marine zoos to promote the idea that these whales are no different from any other happy-go-lucky, fun loving dolphin; they are just bigger. Why else do trainers jump in the pool with them, ride around on their backs, put their head in the whales' jaws etc. It is purely entertainment; it is certainly not educational. Killer whales in the open ocean are living free and wild; they build and maintain a very complex social relationship of their own choosing. They do not behave like circus animals. Killer whales held in marine zoos are mainly pre-pubescent, held singly or in female pairs but in most instances are without an adult male. In these circumstances their scope for forming any kind of social group is very limited and therefore the resultant behaviour patterns are different from those of free ranging whales.

I can find no information on the killer whale/yacht encounter other than the story of the attack reported in the press and on local radio with the accent on the whale attack and result, nothing on any other circumstances. A number of important questions arise regarding both the yacht and the pod of whales which need to be answered before any useful judgement of events can be made. Taking the yacht first, what size was it; was the electrical equipment such as radio or echo sounder operating at the time; what was the colour of the yacht hull and underwater surface; how did the yacht approach the pod of whales; did the yacht attempt any avoiding action on first encounter or did it simply sail through on an uninterrupted course? And now the whales: how many whales; it is fairly easy to differentiate between male, female and young killer whales, so what was the composition of the pod; which whales actually carried out the attack, was it a single male, more than one male, or were any females involved; after the final attack on the vessel, did the whales show any interest at all in the liferaft?

In the light of this unfortunate occurrence, and similar related instances, I do believe that all yachtsmen should consider the circumstances under which they approach any free ranging cetacean large or small. Remember they are in their own element, they have their own signals and behaviour patterns of 'language' that is fully understood by them but hardly at all by us. They will be fiercely protective of their own 'family group', especially of any young that are present. If any interloper keeps coming on after it has been signalled to keep away, that intruder will be regarded as a threat and a danger to the composition and stability of that particular pod. Such an event will provoke a reaction to meet the challenge. A male killer whale can grow to 9 m, weigh in excess of 8 tons and swim in short bursts at over 20 knots; an average 10 m GRP yacht in those circumstances is somewhat at a disadvantage. That is not to say that all small boats are in imminent danger at each and every encounter with cetaceans. I would however, advise caution and awareness and further suggest that a yachtsman should let the whales come to him, do not follow them and never try to sail into a pod which is apparently resting on the surface. He should always be prepared to move away from a pod, especially if he notices one member detaching itself from the main group.

PRESENTATION OF BAROGRAPHS

As foreshadowed in the April 1988 edition of this journal, four shipmasters were presented by the Director-General with long-service award barographs, at Bracknell on 17 May 1988.

Three recipients were able to be present in person to receive their inscribed barographs: Captain D. Dickson, Denholm Ship Management Ltd, Captain D. McPhail, retired from Blue Star Ship Management Ltd, and Captain J.D. Thomson, P. & O. Containers Ltd. The barograph for Captain J.O. Spence, P. & O. Ship Management Ltd, was accepted on his behalf whilst he was at sea, by Captain D. Barber, Marine Manager of P. & O. Cargo Division. See photograph opposite page 188.

The presentation was made in the Reading Room of the Meteorological Office Archives at Eastern Road, a departure from normal practice made necessary by the maintenance work being undertaken to the structure of the Headquarters building at the time. However, the venue proved popular with the guests, including Mrs Dickson and Mrs Thomson and other Shipping Company officials, and with members of the Directorate and staff of the Met. Office who had gathered to witness the occasion. The staff of the archives had provided an extraordinary array of weather records, photographs and other memorabilia from the past to interest the visitors, and following the ceremony they were entertained to lunch by the senior staff before undertaking a short tour of the more interesting parts of the Headquarters building.

It was forty years ago, in 1948, that the Director of the Met. Office, Sir Nelson Johnson, KCB, D.Sc, introduced the barograph awards in recognition of the best in marine observing by shipmasters who had co-operated in this work for many years. During Sir Nelson's time as Director, which post he held from 1938 to 1953, the presentations were often made aboard the Master's own ship in a U.K. port, or on board H.Q.S. *Wellington*, either by the Director or by the Marine Superintendent of the day, Commander C.E.N. Frankcom. As a result of changes in shipping company structures over the years, many of the shipmasters have transferred to new corporate bodies, and it is interesting to reflect on the numbers of barograph awards that have been presented against the company in which the officer received his formative early training. The companies and numbers of barograph awards are as follows: New Zealand Shipping Co and Federal — 45, Manchester Liners — 16, Cunard — 10, Port Line —10, Shaw Savill — 10, Canadian Pacific — 8, Bibby Line — 6, Clan Line — 5, Royal Mail — 5, Anchor, Blue Star, Bristol City, Ellerman, Head, P. & O., Union Castle — 3 each, Alfred Holt, Bank Line, Booths, Brocklebanks, Cairn, Donaldson, Furness Withy, Hain-Nourse, Hogarth, Pacific SN — 2 each, Bolton, Everard, Scottish Shire, Silver Line and Steamship Eros Ltd — 1 each. These records are extracted from past editions of *The Marine Observer* and there may be a few omissions. Although the number of meteorological logbooks attained by the shipmasters by the time of their barograph awards is usually in the region of 40 or 50, the record number must surely be that of Captain J.V. Locke of Cunard Steamship who amassed 123 logs between 1924 and 1952, 76 of these logs being assessed as 'Excellent'. The North Atlantic service occasionally has its advantages.

AURORA NOTES OCTOBER TO DECEMBER 1987

By R.J. Livesey

(Director of the Aurora Section, British Astronomical Association)

The observations received from ships during the period are summarized in Table 1. A review of important auroral activity observed by land and by sea is given in Table 2.

Table 1 — Marine Aurora Observations October to December 1987

Date	Ship	Geographic Position	Time (GMT)	Forms in Sequence
3/4 Oct.	*Baltic Eagle*	58° 08'N, 20° 17'E	1842–1904	aRR, G
3/4	*Montarik*	71° 00'N, 11° 45'E	1915–1950	mRR, aCRR, HB, G
3/4	*Speciality*	65° 04'N, 07° 54'E	1935	p_3HB
20/21	*Cumulus*	56° 52'N, 20° 08'W	2045–0305	qN, qPN
24/25	*Cumulus*	57° 07'N, 19° 48'W	2340–0445	qN, qR_2R, qN
27/28	*Cumulus*	57° 05'N, 19° 35'W	2245–2330	qN
27/28	*Iberita*	51° 47'N, 53° 20'W	0410–0700	N
28/29	*Speciality*	63° 29'N, 07° 10'E	1930–1950	G, mRB, p_3RB, G, ½ sky
28/29	*Cumulus*	57° 04'N, 19° 35'W	0005–0545	qN
2/3 Nov.	*Montarik*	65° 58'N, 05° 22'E	1946–2024	mRR, amRR, HB, aRB, p_3RR, ½ sky
12/13	*Esso Demetia*	60° 12'N, 15° 28'W	2215	RA, HA, HB
13/14	*Esso Demetia*	61° 09'N, 24° 52'W	2300–2330	RA
18/19	*Montarik*	66° 38'N, 11° 46'E	1921	mRR
23/24	*Cumulus*	56° 53'N, 20° 02'W	0450	qN
27/28	*Montarik*	70° 51'N, 06° 02'E	1737–2055	HB
21/22	*Hermod*	60° 00'N, 23° 21'W	0045–0330	HA, RR, RB, pRB, m_3RR, p_2RR

KEY: a = active, m = multiple, m_3 = 3 forms, p_2 = flickering, p_3 = horizontal streaming, q = quiet, C = coronal ray structure, G = glow, HA = homogeneous arc, HB = homogeneous band, N = unspecified form, RB = rayed band, RR = ray structure, R_2R = medium length rays.

The first half of 1987 comprised a period of minimum disturbance to the Earth's magnetic field and hence a minimum of aurorae visible in mid latitudes. Fresh activity associated with the development of the new sunspot cycle appeared in July, and the aurorae seen in this period appeared to be a continuation of this activity.

Table 2 — Activity reported October to December 1987

DATE (NIGHT)	LOCATION AND NUMBER OF OBSERVERS	GEOMAGNETIC LATITUDE LOWEST	HIGHEST	AT STORM PEAK	MAXIMUM STORM ACTIVITY CODE*	TIME (GMT)
1/2 Oct.	Alberta, Finland (4)	60	64	61	5	2210–0430
3/4	Norway, Finland, Campbell Is.(8)	57	70	70	6	1842–1200
11/12	Finland (2)	57	61	61	6	1948–2115
14/15	Scotland, Finland, Alberta, Campbell Is. (7)	57	62	59	5	1420–0505
22/23	Alberta, Labrador, Scotland (5)	61	64	61	5	2335–0830
24/25	Alberta, Scotland, 'Lima' (4)	58	64	58	5	1930–0500
26/27	Alberta, Finland (2)	58	64	64	6	0400–0700
27/28	Canada, 'Lima', Ireland, Scotland, Finland, New Zealand (10)	51	63	58	5	2245–1000
28/29	'Lima', Scotland, Finland (9)	60	64	64	6	1745–0545
2/3 Nov.	Norwegian Sea, Scotland, Finland (4)	58	66	66	6	1946–0015
3/4	Alberta, Finland (10)	57	64	57	7	1700–2350
9/10	Alberta, Orkney, Finland (3)	61	64	64	6	2200–0700
12/13	Atlantic, Orkney, Finland (3)	61	65	62	5	2215–0100
22/23	New Zealand (3)	51	51	51	4	1000–1200
23/24	'Lima', Scotland (5)	59	63	62	5	1830–0050
26/27	Alberta, Scotland, Finland (4)	61	64	64	7	2200–0600
10/11 Dec.	Alberta, Scotland, Finland (3)	62	64	62	5	1950–0100
14/15	Alberta, Finland (3)	60	64	64	6	2200–0400
16/17	Finland, New Zealand (6)	50	61	58	5	1330–0212
21/22	Atlantic, Scotland, Finland (6)	57	61	57	5	1747–0330

*Storm Activity Code: 1 = Glow or unspecified form, 2 = Homogeneous arc, 3 = Rayed arc, 4 = Ray bundles, 5 = Active, pulsating or flaming forms, 6 = Corona or half sky, 7 = All sky storm.

Notes. (i) No distinction has been made between north and south geomagnetic latitudes.
(ii) Auroral activity was reported by 1 or more observers on 58 nights of which the above represent the most active apparitions.

In Figure 1 is shown the frequency relative to geomagnetic latitudes with which auroral light could have been seen during 1987 in the Atlantic area. The graph is derived from observations made in Canada, north-west Europe and ships at sea. High latitudes are omitted owing to a lack of observers sufficient to make reliable calculations. The curve is calculated on the basis that if the aurora is seen at any geomagnetic latitude on any night, then it will have been possible to see it at any other latitude northwards to the auroral zone, given of course, adequate breaks in the cloud.

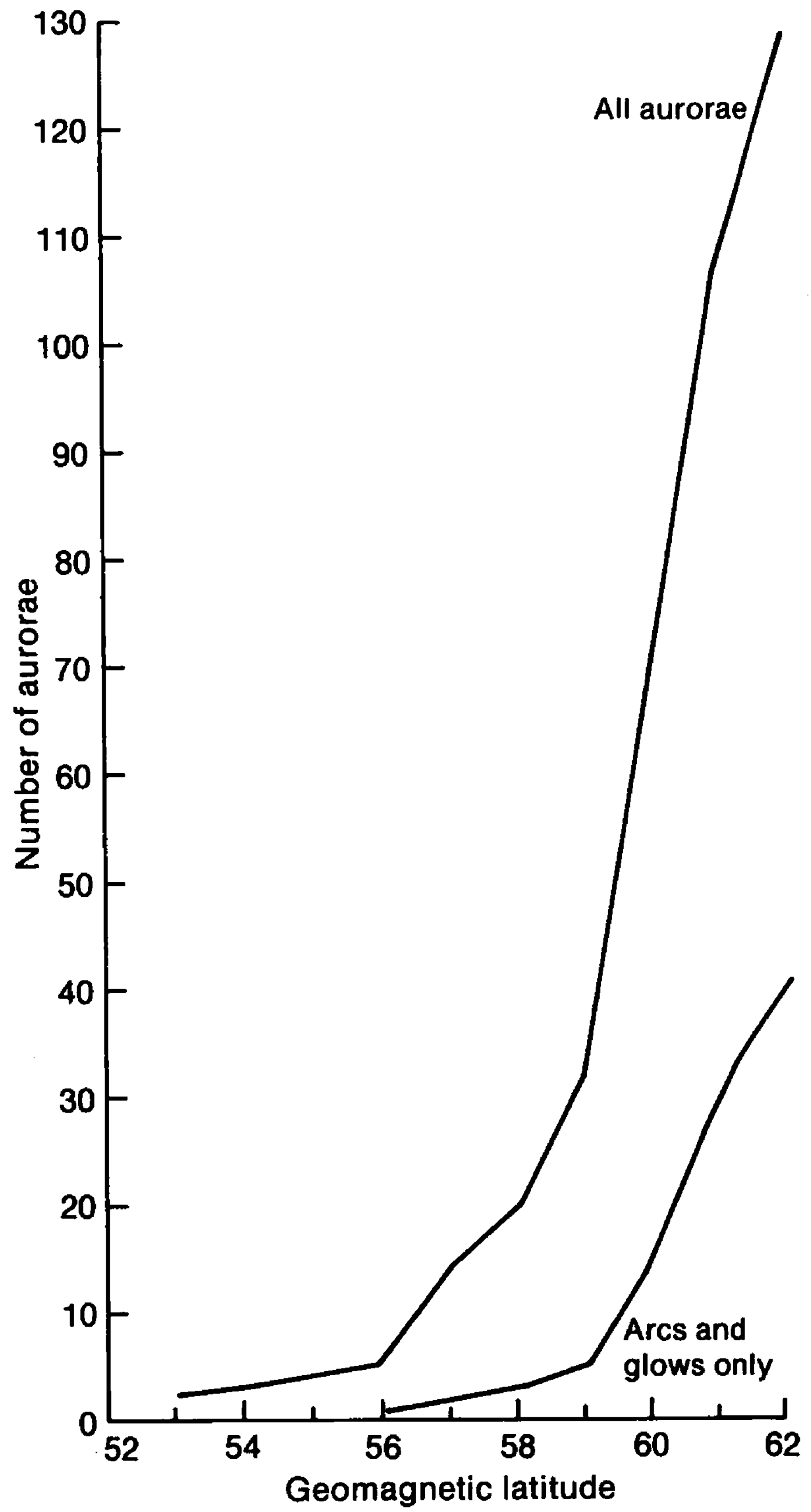

Figure 1. Frequency with which aurora was visible at given geomagnetic latitudes in Atlantic area, 1987.

A second calculation has been carried out and produced in Figure 1 to show the frequency for aurorae where only glows and quiet homogeneous arcs were seen. It is obvious that the quiet aurorae do not penetrate so far south as the active aurorae, into mid latitudes.

In Figure 2 is shown the annual frequency of auroral visibility with respect to the geomagnetic latitudes of 57, 58 and 59 degrees north, which, in the United Kingdom, correspond roughly to the latitudes of Liverpool, Carlisle and Edinburgh respectively. The data are reported with respect to time. For comparison, in Figure 3, the annual frequency of all quiet aurorae reported is shown with respect to time.

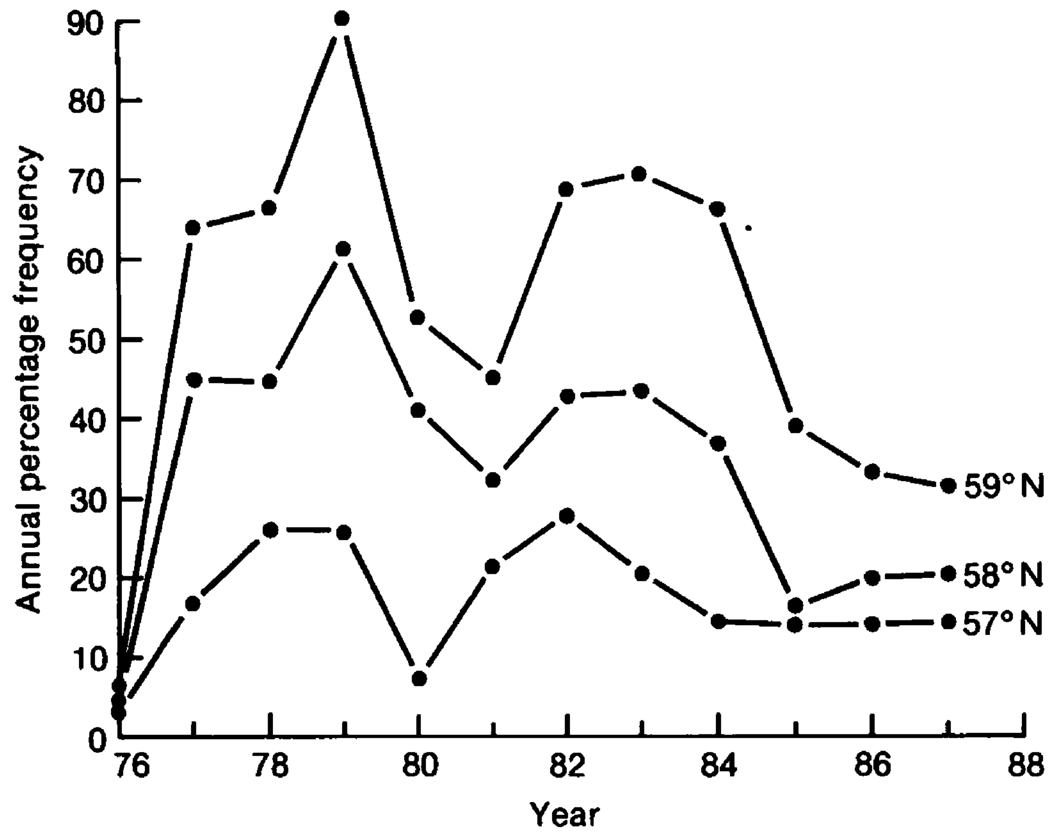

Figure 2. Frequency of all aurorae with geomagnetic latitude 57° N–59° N, 1976–88.

Because auroral observing and any statistical investigation deriving from the data collected is highly affected by the distribution and availability of observers together with the state of the sky, one has to be very careful as to how the information may be interpreted if false conclusions are to be avoided. For example, is the higher frequency of aurorae in 1987 with respect to the level in 1976 as shown in Figure 3 real, or is it the result of an increased number of keen and dedicated observers in the meteorological offices at the airports in Wick, Sumburgh and Kirkwall? The double peak of activity in the last sunspot cycle seen in both Figures 2 and 3 have a different time distribution especially with regard to the minimum in between. The very low frequency of aurorae shown in 1976 in Figure 2 is known to be due to the lack of an adequate, organized group of land observers at that time.

To examine observing conditions upon the detection of auroral light, the auroral frequency reported at Ocean Weather Station 'Lima' by the various

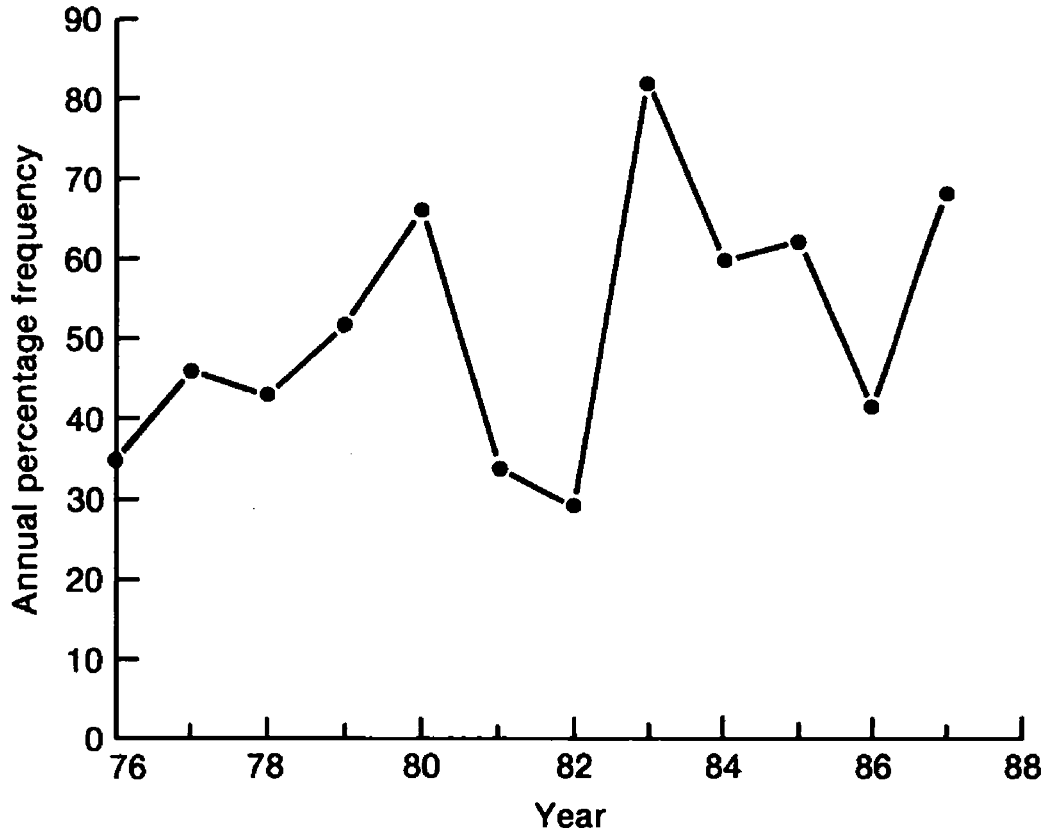

Figure 3. Frequency of quiet aurorae (glows and homogeneous arcs) at all latitudes, 1976–88.

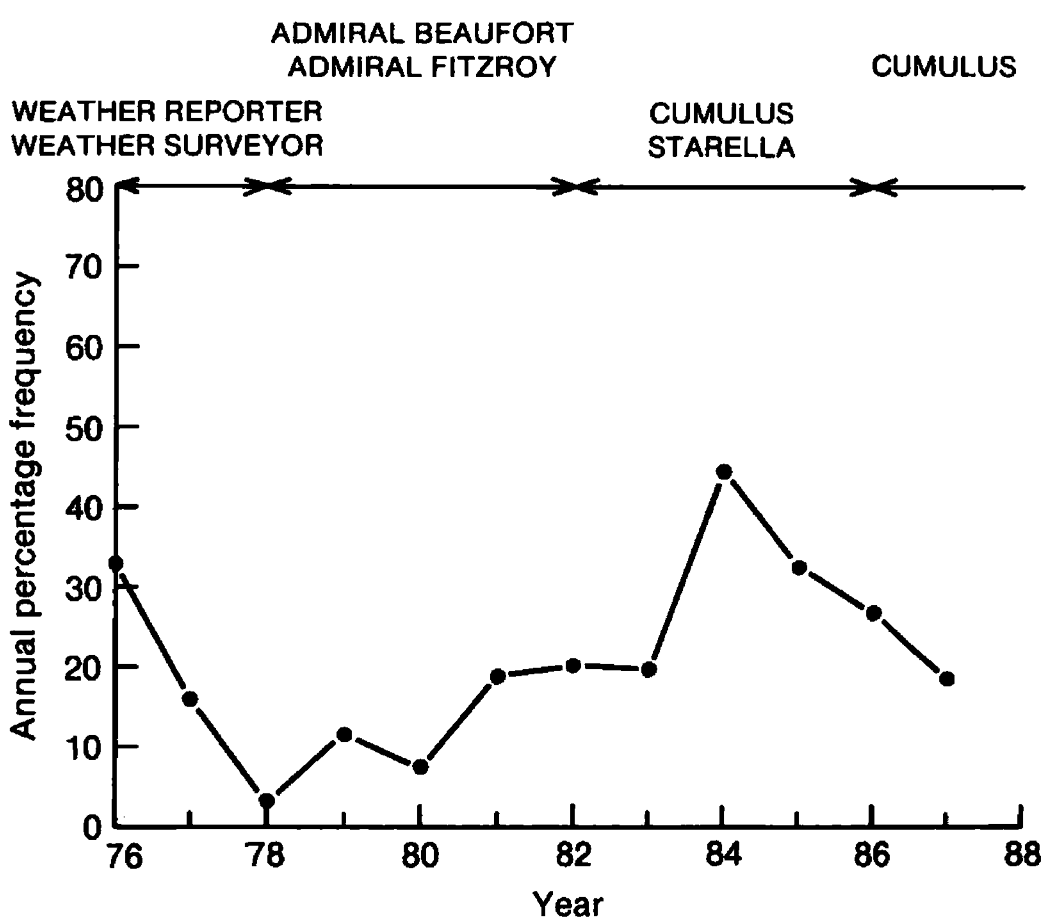

Figure 4. Frequency of aurorae at Station 'Lima', 1976–88.

weatherships operating there from time to time, has been plotted in Figure 4. It will be noted that whereas the secondary peak in auroral activity in sunspot cycle twenty-one has been detected, the first peak is wholly absent from the record. There is evidence to suggest that perhaps the observing conditions on the *Admiral Beaufort* and the *Admiral FitzRoy* were different from those on the *Cumulus* and the *Starella*, not least in the way the deck lighting was used. It will be very interesting to see what the frequency of aurorae will be in the next year or so during the active period of the current sunspot cycle development.

From *The Marine Observer* 40 Years Ago

During the war the Meteorological Office received an interesting memento of its first Director, Admiral FitzRoy (1855–1865), in the form of a clock which was presented to Admiral FitzRoy by the Minister of Marine and Colonies of France.

On his appointment as Director, one of Admiral FitzRoy's first steps was to organise a system of storm warnings for ships. In doing this he was taking advantage of the recently introduced electric telegraph, prior to which such a system of warnings was, of course, impossible. Admiral FitzRoy decided to share the advantage of his warning system with the French, and he made arrangements for the warnings to be telegraphed to Paris, whence they were distributed for the benefit of the French Navy, merchant navy and fishing fleets. It was in recognition of the services thus rendered that the French Government presented Admiral FitzRoy with the clock which forms the subject of this note.

The clock is a beautiful specimen of the travelling clocks of that period, and its general appearance can be seen from the photograph opposite page 173.* The movement is contained in a gilt case standing 7½ in. high, with bevelled glass panels forming the sides, and bearing richly chased steel figures on the corner columns. In addition to the ordinary dial, the clock has subsidiary dials showing the day of the week, day of the month and the year. It also has an alarm and repeater mechanism which strikes the last hour and quarter on pressing a stud on the top of the clock case.

The glass plate which forms the top of the case is engraved with the following inscription:

'Offert par le Ministre de la Marine et des Colonies au Vice-Admiral Robert FitzRoy, Esq., *Chief of the Meteorological Department of the Board of Trade*, pour services rendus à la Marine Imperiale, 1864.'

This beautiful and historic clock was bequeathed to the Meteorological Office by a daughter of the Admiral, Miss Laura FitzRoy, who died in 1943. It forms a treasured memento of a great man, who was not only the first Director of the Meteorological Office, but whose energy was in large measure responsible for its formation.

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* The clock is still in working condition in 1988 and resides in the office of the present Director-General, Dr J.T. Houghton, CBE, FRS.

LETTERS TO THE EDITOR

From Mr William J. Stoker, Principal Observing Officer of the *Flinders Bay*, P. & O. Containers Ltd.

'*Flinders Bay* and the Merchant Ship XBT Programme.

'Once every six hours whilst at sea, almost without fail, the meteorological conditions are carefully noted by the O.O.W. and suitably recorded with any relevant comments in the meteorological logbook. Sometimes this task can be slightly mundane, especially when weather conditions do not appreciably change and i_x is repeatedly coded 2 and ww, W_1W_2 as 0200 or similar.

'However, here on *Flinders Bay* things are somewhat more exciting when it comes to observing time between Cape Gardafui and latitude 20° S whilst *en route* from Europe to Australasia and back, for in July of 1986 *Flinders Bay* became one of eleven ships to be engaged in the Commonwealth Scientific Industrial Research Organization (CSIRO) Merchant Ship XBT Programme.

'XBT is short for eXpendable Bathy Thermograph, or as we tend to call it, a "bomb". It is a sea temperature sensing and recording unit used to find the temperature from the sea surface down to a depth of four hundred and fifty metres. Once every six hours, at the observing time and whilst the ship is in the "drop zone", one of these units is dropped from the bridge wing by means of a launcher. I hasten to add that there are no bangs or flashes accompanied with this ritual and that it is, unfortunately, only a gravity drop. Once the "bomb" hits the water it will begin to transmit the temperatures back to the ship via a very fine copper wire which is housed in the tail and on a reel inside the XBT canister which in turn is affixed to the launcher unit. The information is then fed via a cable to a wheelhouse computer where it is stored on tape. Once all wire has been payed out it breaks away from the end of the launcher, the drop is completed and hence the reason why the unit is expendable. Apart from the information being stored on tape the computer will also give a printout of temperature versus depth in graphical form and from this we can usually tell if the drop has been successful. The sea-surface temperature is also printed, an addition to the system made at our request the previous voyage.

'There are no costs to the ship for this operation. The XBT units and all associated equipment are supplied by the CSIRO of Hobart, Tasmania. The cost of one XBT unit is in the region of $80 U.S. and each passage through the area, north- and southbound, uses thirty units each, making it quite an expensive business.

'The operation is part of the Tropical Ocean and Global Atmosphere (TOGA) programme which is a ten-year study started in January 1985. It is a worldwide scientific project to study the El Niño phenomenon. To explain El Niño fully is not easy, but basically it is a weakening of the trade winds in the tropics which in turn affects the levels of the oceans and thus the distribution of warm sea water within them.

'The last El Niño occurred in 1982/83 and was the worst on record; many people will remember the Royal visit to Australia when they had the severe drought and extremely bad bush fires. A less obvious effect of the '82/83 El Niño was that off the west coast of South America when the fishing industry nearly collapsed, in Colombia the rainfall was double that usually expected and in Guayaquil, Ecuador in June 1983, the rainfall was thirty times more than the average. In the United States the west coast was battered by severe storms, whilst the drought in Ethiopia intensified and spread southwards, severely affecting

Tanzania, Uganda and Zimbabwe; in the summer of 1982 India experienced a very mild monsoon with rainfall down by fifteen per cent.

'As can be seen, the effects of El Niño are global, climatologically and economically. TOGA is therefore an attempt to find a cycle of El Niño such that in years to come it may be predicted and countries will therefore be able to prepare for its effects. Incidentally, it may be predicted by a one degree Celsius rise of sea temperature in the Indian Ocean and shows why the CSIRO has our ship as part of the programme.

'All of us on *Flinders Bay* find the work we are doing for the CSIRO and for the TOGA programme most gratifying, especially when the scientists in Hobart show their pleasure at our performance and are enthusiastic about the merchant ship involvement in this project.'

Personalities

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

RETIREMENT — CAPTAIN J.M. BRACKENRIDGE took early retirement in March 1988 due to his wife's disability and sent us the following details of his interesting sea career.

John Michael Brackenridge was born in Dumfries in July 1928 and educated at The High School of Glasgow followed by a year at Gresham House School, Kilmarnock. Twelve months pre-sea training were taken at the Royal Technical College, Glasgow, School of Navigation. His first voyage was on *Empire Abbey* of Elders and Fyffes, as an apprentice whose indentures precluded him from 'entering alehouses and taverns, or houses of ill repute, except on company business'. In return for a £10 surety, the company undertook to provide him with bread and ale, and also, although unwritten, to teach him 'the facts of life, the utter desolation of the empty bottle — also navigation and seamanship'.

On obtaining his Second Mates Certificate, Mike Brackenridge joined Canadian Pacific as Fifth Officer of *Empress of Australia*, where he met his wife-to-be. After a short spell on *Empress of France*, from which ship he sent us the first of 40 meteorological logbooks in December 1949, he transferred to Clan Line and gained steady promotion until becoming Staff Captain of *Windsor Castle* in 1969, following the merger of Clan Line and Union Castle. His first command was *Clan Maclean* in 1973 and he went on to serve in numerous Cayzer Irvine ships, including *Nina Bowater* on which ship the Met. Office provided him with ship routeing service on the North Atlantic.

Captain Brackenridge moved to Overseas Containers Ltd in 1982, having as his command for his last two years at sea, the *Liverpool Bay*. In 20 observing years his 40 logs included 12 assessed as 'Excellent' and he received Excellent Awards in 1956 and 1976 for his co-operation. Following his retirement on 31 March 1988 he attended a special presentation in June at P. & O.C.L. Headquarters in the City of London, together with two other recently retired

Masters of the company, Captain Dinnie whose career details follow, and Captain J.M. Johnston, who recently moved to Australia where he has taken up flying with a view to earning his 'wings'.

Having married his girl friend stenographer of nearly forty years ago, Captain Brackenridge says that his elder daughter is married with four children but that his twin son and daughter, now in their thirties, are still available. He hopes that the above record might stimulate old memories and be of nostalgic value for any who remember Elders and Fyffes, CP or Clan Line days, and we wish him and his family a happy and successful retirement.

RETIREMENT — CAPTAIN R. DINNIE, joint Master of *Liverpool Bay* with Captain Mike Brackenridge, retired on 28 June 1988 on reaching his sixtieth year.

Ramsay Dinnie was educated at Arbroath High School and went from there to join his first ship as an Apprentice in Alfred Holt & Co, the *Antilochus*, in August 1945, continuing to serve with Blue Funnel Line at the time of obtaining his Master's Certificate in 1955 and on promotion to Master in 1970 when his first command was *Elpenor*. When the container ship service was transferred from Ocean Fleets to OCL management, Captain Dinnie moved across with it, taking command of the *Tokyo Bay*.

Captain Dinnie served in a number of ships co-opted into the Voluntary Observing Fleets of Commonwealth countries, and he also contributed towards 29 meteorological logbooks received at Bracknell, 18 of these being marked 'Excellent'. He received 5 Excellent Awards in recognition of his dedication to weather observing.

In 1953 he was commissioned into the RNR as Sub-Lieutenant, promoted Captain in 1978 and appointed Naval Reserve ADC to the Queen for 1982.

Captain Dinnie is married with one son and one daughter and we send him good wishes and success in his retirement plans to go ski-ing in winter, golfing when available and gardening as required.

J.F.T.H.

Book Reviews

Olsen's Fisherman's Nautical Almanack, published by E.T.W. Dennis and Sons Ltd, Printing House Square, Melrose Street, Scarborough YO12 7SJ. 124 mm × 179 mm, 703 pp., *illus*. Price: £14.00.

The 112th edition of the only almanac published solely for the fishing industry is presented in its usual form but updated in certain respects. Details of changes in the examinations for Certificates of Competency, territorial waters and warnings about suspended oil well heads, as well as the fact that many fog signals are to be discontinued, are included.

The almanac(k) contains most of the information that could become useful to fishermen in United Kingdom waters: this includes the various parliamentary Acts, Merchant Shipping Acts and important M Notices relating to the fishing industry, and a full index of current M notices. There are tide tables for U.K. and north European waters, full lists of fishing ports of registration and British fishing vessels, and of appropriate radio services. All these sections have obviously been assiduously updated, but unfortunately this cannot be said for certain sections of the publication. The tidal stream charts are of such antiquity that they contain an indication only of magnetic north, and refer to a peninsula on the west coast of Scotland as the Mull of Cantyre; modern versions of these tidal stream atlases are freely available from the Hydrographic Office. The Beaufort Scale of wind force on page 361 is many years out of date and some other weather facts mentioned have been superseded. The publishers have been advised and promised a regular update on weather information for fishermen. They might even wish to change the reference in the shipping forecast areas to 'German Bite'! This is no misprint as it appears in that form several times.

It is difficult to understand how they have been allowed to produce a conversion table headed 'Knots into Miles' for so long, when any seaman knows that what they are talking about is Nautical Miles to Statute Miles, surely? For regular users of this pocket-sized publication it is probably easy to find your way to the required section, but after ploughing through more than twenty pages of advertisements we eventually found the index, marked 'Contents' and after another ten pages came across the title page. However, not there but only on the hard cover did we find a brief, incomplete publisher's address, although within the editor does invite readers' requests.

Overall this is undoubtedly a very well used almanac and must be considered good value by its followers, but the publishers might be advised to take a leaf from the equivalent annual produced by the Scottish Fishermen's Federation.

J.F.T.H.

Meteorology for Seafarers by Lieutenant-Commander R.M. Frampton and P.A. Uttridge. 210 mm × 305 mm, xviii + 137 pp., *illus.* Brown, Son & Ferguson Ltd, 4–10 Darnley Street, Glasgow G41 2SD. Price: £27.50.

The authors undertook the difficult task of revising the well-known work *Meteorology for Seamen* soon after the death in 1982 of its respected author, Commander C.R. Burgess, formerly of the Meteorological Office and The Marine Society. It was therefore appropriate that the Met Office Marine Division should be called upon to provide some assistance in supplying updated material to the General Secretary of The Marine Society and his co-authoress, and it is our privilege to be able to review the splendid result of their efforts over several years.

The text, illustrations and appearance have undergone a marvellous transformation from Burgess' original in standard navy blue cloth, reflecting the advances made both in the science and the presentation of books since the first edition appeared in 1950. The result is a larger volume with many contemporary diagrams and coloured photographs, ensuring it should achieve its aim of providing information needed for professional seafarers aspiring to First Class Certificates of Competency, at the same time encouraging seafarers to investigate and understand more clearly the forces of nature which affect his or her daily life. It is clear that the authors have gone to much trouble to ensure the use of good quality and up-to-date material throughout, and the 11 chapters and 3 appendices cover the subjects of the atmosphere, pressure, temperature, water vapour, clouds and wind. There are also sections dealing with global circulation, world meteorological services and forecasting sources. It is probably this attempt to include as broad a range as possible, as well as the large number of coloured illustrations, that has contributed to the book's relatively high retail price considering its potential usage when compared with other texts studied by seafarers. This may place the book more in the category of an institutional or ship's library item, but individuals would certainly benefit greatly from obtaining a copy early on in their careers for maximum benefit.

The illustrations are clear and mainly well placed with respect to relevant text and there is a generally uncluttered presentation throughout. The book treads the path between very simple explanations and the very complex, covering almost the same ground as the best known Met Office publication in this field, but with improved art work. In the attempts to provide a full set of coloured photographs of sea state, it was inevitable that they would be obtained from a variety of ships under differing conditions of aspect, height and light; this has lead to some difference of opinion as to whether the photographs are true likenesses of the given sea states as shown by Beaufort wind force. They are nevertheless an excellent set of guidelines for the student and practising weather observer.

The book presents meteorology, for seafarers, in a generally interesting way without being over simplified since adequate basic information is provided by the radio, television and the more elementary textbooks. The size of the book is a good compromise — perhaps a little large for ease of handling but this allows for the larger plates when required.

J.F.T.H.

Armada by Peter Padfield. 235 mm × 305 mm, 208 pp., *illus.* Victor Gollancz Ltd, 14 Henrietta Street, London WC2E 8QJ. Price: £14.95.

After the closing of the superbly staged Armada exhibition at the National Maritime Museum, Greenwich, time to read all about the historical events being celebrated 400 years after. Peter Padfield's book covers all the necessary ground in well researched detail, including the grand imperial strategy of Philip II of Spain and the strategy and personality of Elizabeth I of England. This lengthy book is very easy to read throughout, making it a suitable addition to the bookshelf of both serious followers of history and those curious to discover what the Armada was really all about. The overall view of the campaign has been carefully put together by a man whose seafaring experience includes service as 'Master Gunner' aboard the replica pilgrim barque *Mayflower II*, from England to Plymouth, Mass., in 1957, following many years as a navigating officer with P. & O. By coincidence perhaps, the author has since become a leading naval historian, specializing in works on naval gunnery and biographies of gunnery officers.

In *Armada*, Mr Padfield treats of the whole campaign whilst reserving one chapter for the guns and gunners, but provides as much space for shipbuilding craft, the difficulties of steering and battle progress plans of a most comprehensive nature. A particularly attractive feature are the colour paintings specially commissioned and carried out by Lionel Willis of the National

Maritime Museum, showing fine detail of construction and layout of typical ships both English and Spanish. Many gaps in historical records are attractively filled with conjecture and lengthy discussion, often leaving the reader to make the final decision as to what actually occurred, particularly as to whether the launch of the fire ships against the Armada off Calais was the turning point in the campaign.

This wide ranging study of all the events which undoubtedly changed some of the directions of history in the Tudor age is first class value at the asking price.

J.F.T.H.

Notices to Marine Observers

SHIPS' WEATHER REPORTS SENT BY INMARSAT VIA GOONHILLY

For the information of shipboard weather observers and radio officers, the following is an update on transmission format for ships fitted with Inmarsat and sending weather messages to Bracknell via Goonhilly (02), using the two-digit code 41+.

ZCZC
RR Obs
. *[full stop to be included]*

RE: Call sign
Call sign/ten-figure code groups/=

Following this format will enable observations to be handled by Bracknell's automatic message switching system with the minimum of delay.

HINTS ON CODING WEATHER REPORTS

Visibility code in restricted weather conditions

Cases occur in ships' meteorological logbooks where VV, horizontal visibility, is incompatible with ww, present weather, in conditions where fog is present. Accurate visibility measurements are difficult to obtain at sea but when fog is deemed to be present, with visibility less than 1,000 metres (0.5 n.mile), ww will be coded between 41 and 49; under these conditions VV will be coded between 90 and 93. Only the decade 90–99 should be used for indicating the visibility in ship code.

Order of figures in past weather code

When coding W_1W_2, observers are reminded that the highest code figure comes first, regardless of the chronological order of events regarding past weather.

THE MARINE SOCIETY NAMES ITS TENTH TRAINING SHIP

The former H.M.S. *Echo* was re-named *Earl of Romney* at Tower Pier, London, on 28 June 19088, to join her sister-ship *Jonas Hanway* and to become the tenth training ship and second seagoing vessel operated by The Marine Society.

H.M.S. *Echo* was built by J.S. White and Company of Cowes and commissioned in 1958 as an inshore survey vessel. She has been re-named *Earl of Romney* to commemorate the first President of the Society, and his successors to the title, all of whom have been Presidents, Vice Presidents and members of the Council.

In common with *Jonas Hanway, Earl of Romney* is fitted with a full range of the newest navigational and meteorological instruments, lecture room and workshops and equipment necessary for general seamanship and survival training. There are six officers/instructors and she can carry 12 trainees, young people who wish to become seafarers or experience life at sea.

The two training ships are normally based off the National Sea Training College, Gravesend, from whence they make training voyages mainly to U.K. coastal locations based either on the working week or on weekends.

The Marine Society was founded in 1756 to encourage men and boys to join the Royal Navy at the start of the Seven Years War, and went on to provide pre-sea training for more than 70,000 boys up to 1940. The Society is best known for its excellent work in providing seafarers with libraries, further education through its College of the Sea and its operation of the Ship Adoption scheme. The latter links schools and seafarers and the Society welcomes anyone at sea who would like to co-operate by forming a personal link with a school.

Further details can be obtained from the General Secretary, The Marine Society, 202 Lambeth Road, London SE1 7JW. Telephone (01) 261 9535.

THE ROYAL INSTITUTE OF NAVIGATION CONFERENCES ORIENTATION AND NAVIGATION: BIRDS, BEASTS AND HUMANS — RIN 89

The RIN 89 Conference will be held at Cardiff from 6 to 8 April 1989. This conference is organised by the Royal Institute of Navigation in association with the Institute's Bristol Channel Branch, and will be held at the University of Wales Institute of Science and Technology. The programme will primarily be concerned with orientation capabilities of birds and animals, including the capabilities of human beings operating without instruments.

SATELLITE NAVIGATION — SATNAV 89

The 1989 International Conference of the Royal Institute of Navigation will be held at Queen Elizabeth II Conference Centre, Westminster, London, from 17 to 19 October 1989. This conference will address current and future aspects of satellite navigation at the very time that such systems will be starting to have a profound impact on almost every facet of navigation. It will embrace all navigation satellite systems, description and demonstration of user products, requirements of all categories of users and legal and general questions of concern to sea, air and land communities, both civil and military.

Abstracts of papers (c. 500 words) are invited on topics within the overall theme of the conference and should be submitted by 31 January 1989.

Further details can be obtained from Rear Admiral R.M. Burgoyne, CB, Director, The Royal Institute of Navigation, at The Royal Geographical Society, 1 Kensington Gore, London SW7 2AT. Telephone (01) 589 5021. Non members are welcome to attend these and other regular Institute meetings.

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