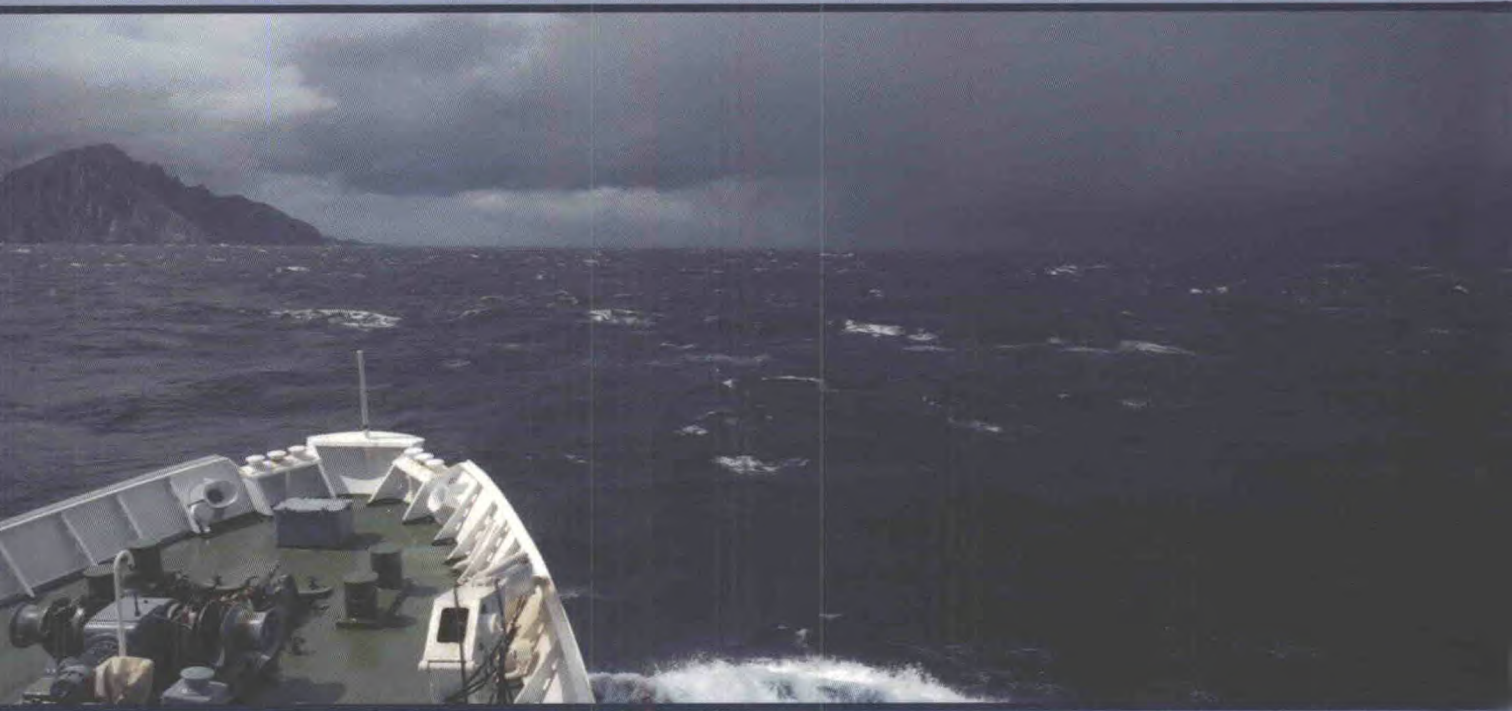


# The Marine Observer



*A quarterly journal*

*January 2000*

Met.O.1027



**The Met.Office**



# THE MARINE OBSERVER

*A quarterly journal prepared by  
The Met. Office Observations–Voluntary (Marine) Branch*

**VOL. 70**

**No. 347**

**JANUARY 2000**

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## **Contents**

	<i>Page</i>
Editorial	2
The Marine Observers' Log — January, February, March	4
Lair of the dragon	19
Some deep-sea dwellers which show bioluminescence	24
Track record turtles	25
Autonomous solar electric research vessels	29
Who's who at HQ?	31
Presentation of special long-service awards for 1997	35
Commander C.E.N. Frankcom OBE, RD, RNR	37
Personalities	38
Postbag	40
Noticeboard	40
Fleet list updates	43

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**LONDON: THE STATIONERY OFFICE**



## **Editorial**

**New year, new century — new millennium! Welcome to the year 2000.**

In meteorological terms, there is unlikely to be a marked difference between the last day of December and the first day of January. Weather, after all, is a sequence of atmospheric interactions complying with physical laws, and one would hardly expect the nature of those interactions to change significantly overnight, simply because a new millennium is dawning (or not, according to many folk, but to attend to that subject would be a digression).

Weather forecasts are made by predicting the behaviour of the atmosphere at specified times in the future; whilst we know pretty much what weather will be experienced in the next 24 hours, or even the next few days, predictions for 'next year' or the 'next century' present a far more formidable task to the forecaster. However, in recent years there have been seasonal and climate predictions daring to look ahead to the middle of 2000 and even beyond. Suddenly, by arriving at this particular 1 January, those forecasts seem to attain an immediacy they did not possess before; suddenly, we are aware that the effects of global warming are not going to happen 'in the next century' but within the next few years, and possibly within our lifetimes. The 'future' is fast becoming 'now'.

Looking back, The Met. Office has come a long way since its humble beginnings in 1854 as a small department within the Board of Trade. The issue of storm warnings for shipping was one of the prime commitments of the Office in its embryonic years, followed by the gradual development of weather forecasts. However, progress would not have been possible and could not continue today without the unceasing supply of high-quality weather observations which now feed ever more complex global atmospheric models and databases. The source of this basic data is the global network of manual and automatic observing stations supported by other WMO programmes such as the internationally co-ordinated Voluntary Ships Observing Programme of which the UK VOF continues to play an essential part.

Considering the fact that water covers about 75 per cent of the Earth's surface, it is not surprising that ships' observations are afforded such importance; while much information can be inferred from satellite measurements, and satellite imagery can give a picture of what is happening over a large area, it takes a ship's surface observation to provide both ground truth and the real-time information required on near surface conditions. The Observations-Voluntary (Marine) branch of The Met. Office undertakes, as its major responsibility, to ensure a supply of high-quality marine data by recruiting merchant ships to the UK VOF and to provide support to their Masters and observing officers through its network of Port Met. Offices.

In the few years preceeding this millennium there have been significant advances both in the ways in which observations are transmitted to Bracknell and in the ways in which forecasts are received on board. Clearly the most significant change has come about with the advent of satellite and automatic terrestrial communication systems required by the Global and Maritime Distress and Safety System (GMDSS) which formally came into force in February 1999. As a consequence, Maritime Safety Information, in the form of meteorological warnings and forecasts, is now readily available to ocean going ships via satellite



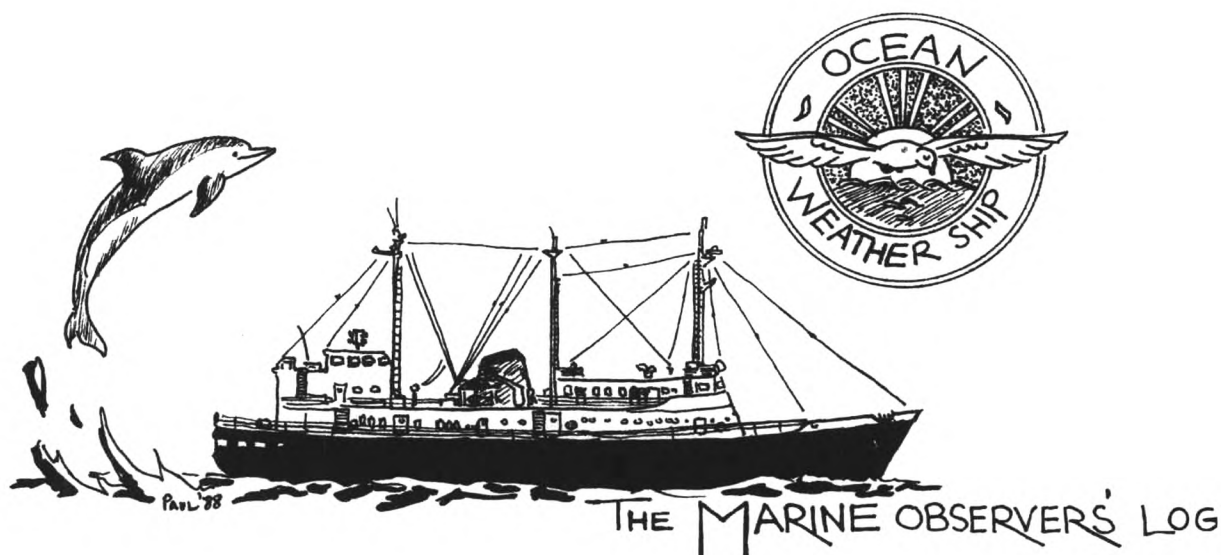
using the international 'SafetyNET' service and for ships operating in coastal areas using the international NAVTEX service.

However, for every change a price must be paid; with the increasing use of satellite communications there has been a corresponding reduction in the demand for terrestrial radio services, and many of the BT coast radio stations through which observers have traditionally received their weather information, and sent their observations, are now in the process of closure. This has inevitably presented problems for ships operating in UK coastal or near continental waters which are not required to be fitted with satellite communication systems, and no longer have a reliable means of transmitting their observations to Bracknell. To those ships concerned, please rest assured that we fully recognise the difficulties and that we are endeavouring to resolve this matter as soon as possible — quality observations are valued no matter by which means they are transmitted.

In recent months the Office has also resumed its involvement in the collection of upper-air profile data from the oceans by installing an Automated Shipboard Aerological Programme (ASAP) system on the observing vessel *CanMar Pride*. The radio-sonde balloon launching system, associated electronics and antennae were installed on board during the first half of 1999, and upper-air soundings successfully commenced in July 1999. Further details about the ASAP operation will feature in a forthcoming edition of this journal.

At the same time as these developments have been unfolding, there have been changes to the marine staff here in Bracknell, and to help you put 'names to faces' we are including a 'rogues gallery' in this millennium edition. One of the aims of the new editorial team overseeing *The Marine Observer* is to introduce a more modern style of presentation whilst maintaining the high standards which have been in existence since the first edition was published back in 1924. We hope therefore, that you will approve of the changes we intend to introduce gradually during the coming year.

It will have been of little significance to observers in the Pacific that tour operators were offering 'Millennium Dawn' holidays to tourists willing to pay to be among the first to see the dawn of the year 2000, perhaps observers in the region drew some satisfaction from the fact that they, at least, were actually being paid to be there, albeit *en route* to a destination not necessarily of their preferred choice. Whatever the circumstances in which you celebrated the millennium, to all observers we extend, on behalf of the Chief Executive and the Board of Directors, our very best wishes for the coming year.



*The Marine Observers' Log* comprises observations of interest and value contributed by weather observers primarily from the UK Voluntary Observing Fleet. Responsibility for each item rests with the contributor although texts may be subject to amendment at the discretion of the Editor.

All temperatures are degrees Celsius unless otherwise stated, and barometric pressure is given in millibars (mb), although the standard international unit is the hectopascal (hPa) which is the numerical equivalent.

## Depression

Baltic Sea

4–5 February 1999

**m.v. *North Pacific*. Captain D.N. Goswami. Wilhelmshaven to Ventspils.**

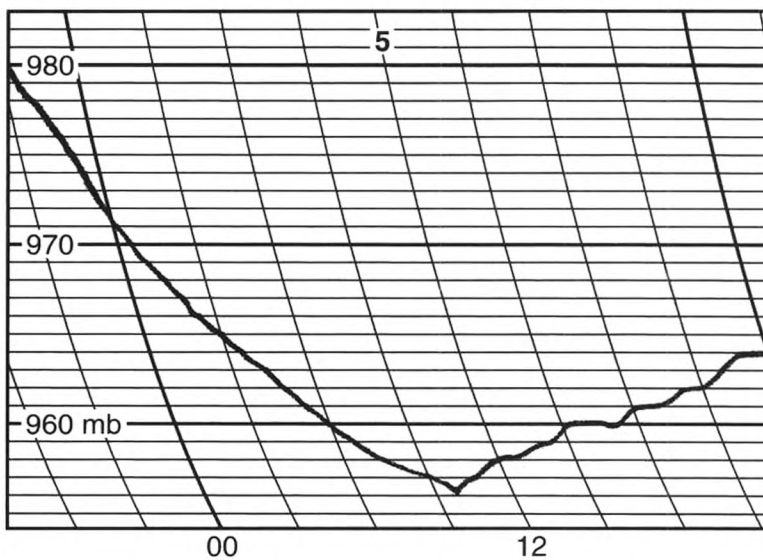
**Observers: the Master, M. Masud Parvez, 3rd Officer and ship's company.**

The vessel was passing through the western Baltic Sea at 1500 UTC on the 4th and forecast charts showed a deep low developing over central Scandinavia and then moving over central Sweden to southern Finland and later Estonia. The pressure fell from 1006 mb to 990 mb and the strong SW'ly wind of force 7 swept away dense local fog as the sky became overcast and the visibility good. The ship's course at this time was 067°, and its position at 1100 had been 54° 25' N, 11° 56' E.

The following observations were made during the passage of the depression, while the chart shows the synoptic situation at 1200 on the 5th.

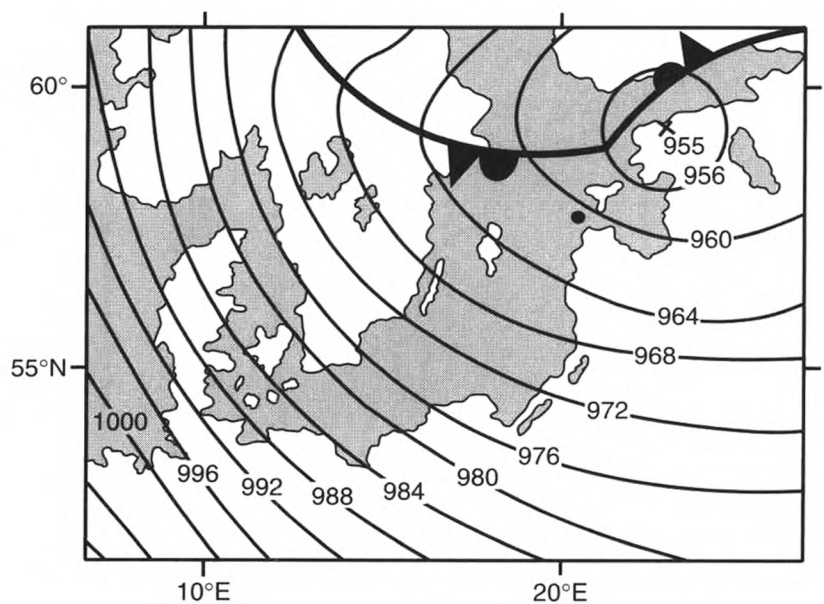
Date and time	Temperature		Pressure (mb)	Wind		Remarks
	Dry bulb	Sea		Dir'n	Force	
4th/1900	5.0°	3.0°	984.0	SW	8	
2300	5.0°	3.0°	976.0	WNW	8	Gusts of wind to 54 knots. Sky partly covered by altostratus. Vessel rolling heavily.

Date and time	Temperature		Pressure (mb)	Wind		Remarks
	Dry bulb	Sea		Dir'n	Force	
5th/0200	3.0°	3.0°	966.0	W	8	
0600	2.0°	3.0°	960.0	W	8	
1000	3.0°	3.0°	956.0	NNW	8	Minimum pressure reached (see barograph trace). Ventspils closed owing to conditions. Vessel drifting in preference to anchoring. Heavy rolling and pitching.
1400	3.0°	3.0°	959.0	WNW	8	
1800	-1.0°	3.0°	961.0	NNW	7	



Ships barograph trace for 5 February 1999

Synoptic situation at 1200 UTC on the 5th. The approximate position of the North Pacific at 2200 is indicated by '●'



The low moved further towards the south-east and weakened, but the wind continued to veer, becoming NW'ly by 2200 by which time the ship's position was 57° 30' N, 21° 23' E; the temperature fell to -2.0° and rain showers followed by snow showers were experienced but the pressure was rising slowly and the conditions did not worsen.



## Depression

Indian Ocean

5 March 1999

**m.v. *Eagle*. Captain P.J. Chambers. Qua Iboe to Vadinar. Observers: G. Webb, 2nd Officer and M. Littlewood, 3rd Officer.**

The vessel was on a heading of 064° about 50 n mile south of East London in overcast conditions with horizon haze and the visibility at 10 n mile.

The pressure at 0000 UTC was 1010.4 mb and the wind was ENE'ly, force 4. There was a brief increase of 1 mb in 30 minutes noted on the barograph trace before the pressure decreased by 6.2 mb to 1004.2 mb over the next two and a half hours. The wind increased dramatically to force 8 by 0200, with gusts to 45 knots at times but the direction remained constant at ENE'ly. At 0300 the pressure began to rise almost as rapidly as it had fallen and, by 0330, the wind had veered slightly to NNE'ly and dropped to force 4 or 5, becoming steady.

This sudden decrease and increase in pressure tied in nicely with the position of a small depression which was shown off the coast of South Africa on the fax charts received from Pretoria.

During this period the Agulhas Current had also been encountered which affected the ship's speed, reducing it in stages from 14.1 knots to 10.2 knots and which required a course of 058° to be steered in order to make good 064°. Once past East London and moving further away from the coast, the ship's speed began to increase.

Later in the day, at 1200, the vessel was 200 n mile south of Durban but other ships were heard in communication with Durban Port Control on Channels 12 and 16. The possibility that the observers were hearing a much closer remote station for Durban was ruled out when one vessel was heard informing Port Control that he was 4 n mile south of the breakwater. Richards Bay a further 90 n mile north of Durban was also heard very clearly, giving a VHF range of about 300 n mile.

## St Elmo's fire

North Sea

8 February 1999

**m.v. *Repulse Bay*. Captain K. Byrne. Rotterdam to Hamburg. Observers: M. Messenger, 2nd Officer, Mrs Messenger, J. Bevier, Cadet and I. Mills, AB.**

Whilst the vessel was in the German Bight, in position 53° 57' N, 07° 08' E, a classic example of St Elmo's fire was observed at 0230 UTC. A high-pitched buzzing sound was heard on the corner of the bridge wing, and what seemed to be a glow was also present. Observers were able to pick up the static and saw short flame-like 'tufts' of blue and violet appear on the end of their finger-tips, as if the fingers had ignited.

The 'flames' were able to be passed from person to person, and were even placed upon another observer's forehead!

There were no electrical storms in the area but there was a mixture of hail and snow falling at the time. Two of the observers experienced strong electrical shocks from each other, and also electric shocks each time snow landed on their skin — a very peculiar experience! The lights faded after about 30 minutes although the buzzing continued for a while afterwards. Static was heard on the VHF radio throughout.

**m.v. *Tepozteco II*. Captain R. Hernandez. Nagoya to Inchon. Observers: the Master and G. V. Munoz 3rd Officer.**

The vessel was on a course of  $240^{\circ}$  at 14.0 knots in position  $32^{\circ} 17' \text{ N}$ ,  $134^{\circ} 42' \text{ E}$ , with the wind blowing NNW'ly, force 8/9. Suddenly, the visibility began to decrease owing to a kind of steam; in just a few minutes the visibility was down to about 100 m. Upon calling the Master to the bridge, the Third Officer was advised by him to check the temperature both outside and at the sea surface. The dry-bulb temperature was found to be  $6^{\circ}$ , while the sea was  $26.0^{\circ}$ . The Master then explained the effects produced by a cool breeze blowing over a warm sea surface. The sea smoke was left astern at 0135 UTC after a period of about 15 minutes.

*Note.* In instances where cold air passes over a warm water surface, the water vapour escaping into it from the surface is cooled immediately and condenses again in the form of steam. Because the air is usually so much colder than the water surface (typically the air-surface temperature difference is  $10^{\circ}$ , although greater in the above example), the lower layers of the air become unstable allowing shallow convection to take place. Arctic sea smoke, or steam fog as it is also known, often appears as convective swirls of fog which then evaporate into the drier air above at a level of about 10 m. With the wind speed reported by the observers, however, the individual swirls of fog were most likely not recognisable.

**In brief:** On 11 February 1999 a snow shower passed over the *British Harrier* at 1530 UTC whilst in the central Mediterranean. Snow pellets about 50 mm in circumference, followed by sleet and rain, were witnessed by Captain C.R. Shoolbraid, G. Butler, 2nd Officer, K. Abdula and M. Alshamsi, Cadets.

**In brief:** A waterspout was sighted from the *British Resource* on 1 February 1999 at 0830 UTC by A. Short, 2nd Officer and R. Warwick, 3rd Officer. It emerged as a funnel of cloud from beneath a cumulonimbus cloud with a base at about 2,000 feet, and a 'bush' of water was also raised at the sea surface. The two parts of the waterspout then connected and the whole was visible for 30 minutes. At the time the ship was at anchor on Forcados roadstead, the wind was S'ly, force 2 and the sea was smooth.

**m.v. *Waterford*. Captain G. Nicholls. Richards Bay to Tarragona. Observers: the Master and A. Banerjee, 3rd Officer.**

At 2030 UTC the vessel was on a course of  $360^{\circ}$  at 12.5 knots in position  $16^{\circ} 31.5' \text{ N}$ ,  $17^{\circ} 55' \text{ W}$  when a large number of strange echoes were seen on the 3 cm radar but not on the 10 cm radar. The echoes were in a band about 8 n mile broad with the outer edge 21 n mile away while the inner edge was 13 n mile away.

Initially it was assumed that the echoes were of dust as the vessel was about 100 n mile off the coast of Senegal at the time. Since the wind was N'ly, the 'dust cloud' was expected to get closer to the vessel but the echoes remained at a fixed distance, seeming to form a ring around the centre of the PPI. At 2130 the echoes formed a complete ring, of radius 12 n mile, around the centre of the PPI.

Whereas the ring was 8.5 n mile wide ahead of the vessel, it was only a couple of miles wide astern. Targets passing through the echoes were lost but regained once they had passed out of the band. Upon checking through earlier editions of *The Marine Observer*, two references to similar echoes were found; in Volume 68, No. 339 (January, 1998) the *Taunton* observed these echoes in position 11° 30' N, 17° 55' W, and in Volume 69, No. 343 (January 1999) the *Orion Reefer* sighted these echoes in position 24° 47' N, 16° 36.7' W.

Are these echoes caused by dust? If so, why do they remain at a constant distance?

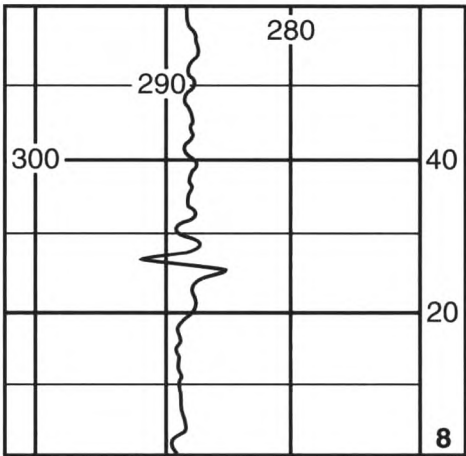
Demarcation

Mediterranean Sea

7 March 1999

**m.v. *Singapore Bay*. Captain P.A. Furneaux. Port Said to Rotterdam.  
Observers: D.J. Harkness, 3rd Officer and M. Mullins, 2nd Officer.**

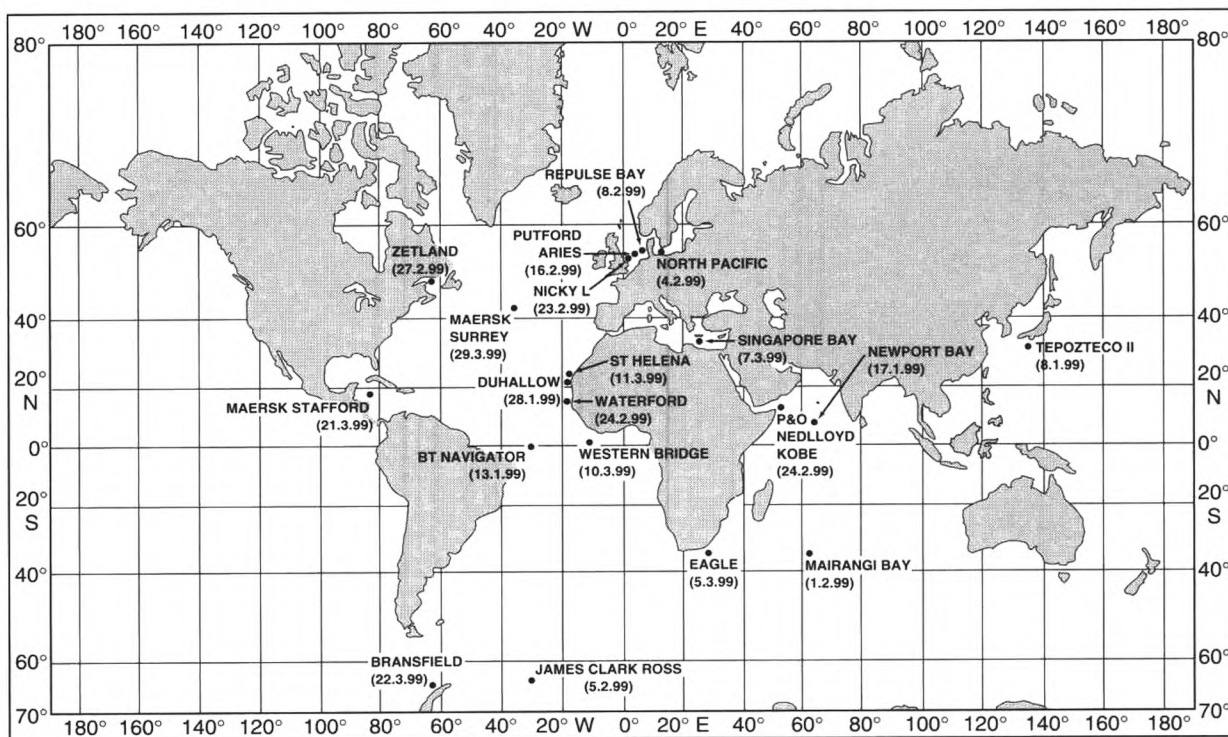
At 0825 UTC the Third Officer noticed a conspicuous line a few miles ahead of the vessel (which was in position 33° 37' N, 25° 02' E), marking a significant difference in the sea surface appearance, and lying WSW to ENE. The line stretched along the whole of the visible horizon. Immediately after crossing the line, the ship's head which had previously been fluctuating one degree either side of 288°, suddenly veered about 4° to port and then about 8° to starboard as the autopilot counteracted the movement, see ship's course recorder chart.



A similar distinct 'wriggle' was observed in the vessel's wake which had been perfectly straight prior to the event. About five minutes elapsed before the ship's head settled and the course steadied to 288° once more. The sea temperature was monitored throughout, remaining constant.

**In brief:** A waterspout was sighted from the *Newport Bay* on 11 March 1999 by D.J. Hinson, 1st Officer. There was a heavy rain shower from a cumulonimbus cloud at the ship, and the waterspout was visible to one side of the rain area. It developed to cover about 60 per cent of the distance from the cloud to the surface (the cloud base was 400–500 feet) and there was agitation and spray at the surface. The ship's position was 05° 31' N, 97° 05' E, and the wind was WNW'ly, force 4 or 5.





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

## Whales and dolphins

Indian Ocean

1 February 1999

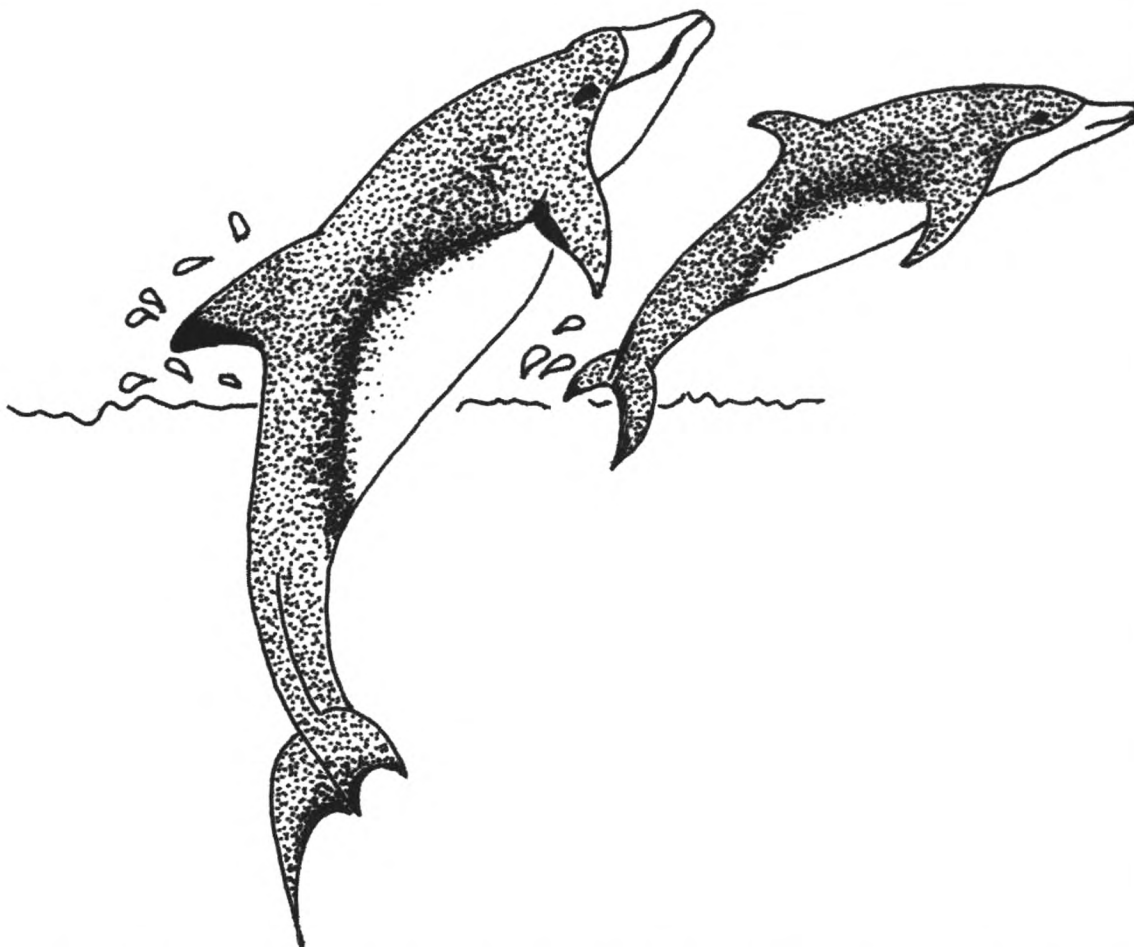
**m.v. Mairangi Bay. Captain D.S. Hughan. Cape Town to Fremantle. Observers: the Master and C. Hall, Chief Officer.**

At 1200 UTC a pod of eight whales or very large dolphins, swimming leisurely eastwards, passed close to the vessel in position  $33^{\circ} 49' S$ ,  $63^{\circ} 19' E$ . After consulting *Sea Guide to Whales of the World* by Lyall Watson, it was thought that they could possibly be Southern Fourtooth whales.

They had a general dolphin-like appearance and similar movements but were much larger than any dolphin. Their length was estimated at 8–10 m and they were dark-grey in colour, with a smooth unpronounced forehead and moderate-sized triangular dorsal fin; no unusual marking or colour variation was noted. The whales or dolphins had no fear of the vessel passing close by.

**In brief:** A lunar halo was observed from the *Pacific Sandpiper* on 1 March by J.P. Gaskin, 2nd Officer and M. Booth, 3rd Officer. Bluish-white in colour, its radius was about  $22^{\circ}$  and it was visible around the near full moon for about four hours.

**In brief:** During a thunderstorm on 11 March 1999 the VHF aerial of the *British Ranger* was heard 'fizzing'. Upon closer inspection, J. Stone, 2nd Officer and A. Lincoln, 3rd Officer could see a blue glow at the tip of the aerial, there was also a smaller glow about 15 cm from the top on the forward side of the antennae.



m.v. *Western bridge*. 10 March 1999. About 24 dolphins were sighted at 1125 UTC by Captain I.C. Gravatt and 3rd Officer M.A.G.S. Anthony. At the time the ship was in position 01° 00' N, 10° 29.9' W on passage between Port Talbot and Saldanha Bay; the sea was calm and there was a low swell at the time of observation.

*Sketch by M.A.G.S. Anthony*

## **Sperm whale and dolphins      Gulf of Aden      24 February 1999**

**m.v. *P&O Nedlloyd Kobe*. Captain J.L. Peterson. Suez to Singapore. Observer: L. Rainford, 2nd Officer.**

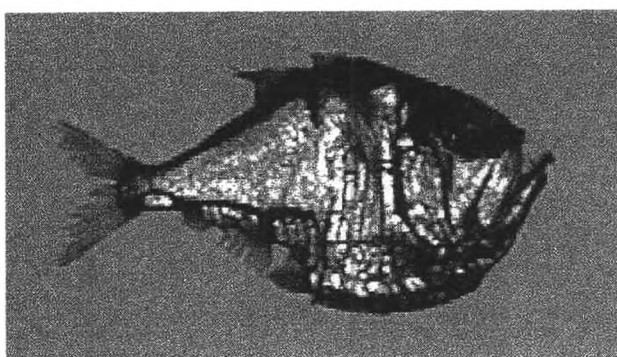
At the eastern end of the Gulf of Aden, in position 12° 09' N, 50° 44' E, a single sperm whale was sighted at 1140 UTC resting on the surface. It was estimated to be about 15 m long, and was identified by its square-shaped dorsal fin and forward projecting blow; the left-sided blowhole was clearly seen as the whale passed about 100 m from the vessel.

At the same time, about 500 m away, was a large school of dolphins; these were dark-grey in colour and appeared very slender. Several individuals were highly acrobatic, throwing their whole bodies out of the sea, doing back-flips and spinning around. They were thought to be long-nosed spinner dolphins owing to their appearance and behaviour.

**m.v. Maersk Surrey. Captain S.J. Cresswell. Terneuzen to New Orleans. Observers: the Master, S. Gallaway, Chief Officer and members of ship's company.**

Another day in paradise! Two swells present, the larger was barrelling in from the north-west causing moderate to heavy rolling and the other was romping in from the west causing us to pitch in an equally energetic manner. The relative wind was whipping the odd bit of spray across the decks and we'd been subject to the attention of one or three squalls during the night. As seafarers, we call it Constant Rolling And Pitching type weather but the shorter acronym sums it up much better!

I was having a mooch around the deck and, when I got to the poop, I came across this small fish. Whilst swimming through the Sea of Life it had passed through the Ugly Reef at a fair old lick and it looked as if it had hit every coral outcrop on the way through — well, its mother must have loved it! Whilst not still alive it must have been reasonably fresh as it still had that suppleness to the body, and the eyes were still pretty clear. Said fish removed to Ship's Office where digital camera fired up and snapshot taken.



We can only surmise that this poor unfortunate was swimming close to the sea surface when it was untimely ripped from its watery abode and unceremoniously dumped on deck by the strong winds we had been having. The reproduced digital image hardly does it justice but at least it gives an overall impression of how Mr Ugly looked before one of the cadets popped him on a piece of toast in the mistaken belief that it was a sardine!

*Note.* This fish, a hatchetfish, has been reported in the past, the most recent examples coming from the *Amethyst* on 22 December 1996. In the October 1997 edition of *The Marine Observer*, Dr Frank Evans, of the Dove Marine Laboratory gives a detailed comment on that observation, and says that although these fish can be washed aboard they can also be dropped on deck by seabirds failing to hold their catch.

Hatchetfish are also bioluminescent, and further reading about bioluminescence can be found in the article 'Lair of the dragon', on page 19 of this edition.

**In brief:** A single sperm whale was spotted about 100 m ahead of the *British Hawk* on 10 January 1999, in position 02° 10.3' N, 16° 15.4' W. It was about 15 m long and crossed the bow as it headed north-west. A further two or three sperm whales were seen at about a mile on the starboard beam.



## **Sharks**

**Equatorial Atlantic**

**13 January 1999**

**m.v. *BT Navigator*. Captain M.J. Bromwich. South West Pass, Mississippi to Cape Town. Observer: S. Srivastava, Cadet.**

In calm conditions with partly cloudy skies, 30–40 sharks were observed at distance of about a mile on the ship's port side between 1915 UTC and 1925. They were dark-grey in colour, only their dorsal fins being visible, and their direction of movement initially was opposite to the ship's course of 131°. However, after passing the vessel they turned around and started moving along the ship's course, and were seen for about 10 minutes before becoming apparently stationary and disappearing from sight. They were sighted right on the equator, the ship having 'crossed the line' at about 31° W at 1920.

## **Bioluminescence**

**Eastern North Atlantic**

**28 January 1999**

**m.v. *Duhallow*. Captain M.J. Walker. Richards Bay to Ensted. Observers: the Master and Sudip Nag, Extra 2nd Officer.**

Whilst off Mauretania on a course of 360° at 13.5 knots, a huge area of bioluminescence was encountered at 2040 UTC. The wind was NW'ly, force 4, the weather good, and the sky extremely clear when, suddenly, the sea was noticed to be very bright — all over — for a distance of about one mile. The water along the ship's sides was glowing with a very bright light, while the wake was also very bright, being visible for more than 1.5 n mile. The water appeared 'milky' and smelled like fish.

The vessel passed through this area and then met another one of lesser density, and a sample of water was collected. The sample contained microscopic organisms which, taken in their container to the darkness of the bridge chart room, emitted a green light when disturbed. Unfortunately, the sample could not be landed in Ensted, and the vessel then visited Norfolk (USA) before arriving in Dunkerque where it was finally landed. By that time, the organisms were no longer emitting light but they could still be seen with the use of appropriate instruments.

## **Bioluminescence**

**Arabian Sea**

**17 January 1999**

**m.v. *Newport Bay*. Captain R.B. Gurney. Singapore to Suez. Observers: S. Foster, 3rd Officer and M. Hands, 1st Officer.**

Whilst handing over the watch, a large section of water approximately 0.5 n mile away on the port bow was seen to flicker, intermittently at first. As the vessel approached the area, in position 09° 54.6' N, 63° 07.7' E, the sea became awash with flickering bioluminescence covering an area about half a mile square, and the vessel passed within 5 cables of it.

Interrupting the hand-over, the Third Officer rushed to the bridge and was astonished by the demonstration of light beating away to an unseen stimulus. Within minutes the flickering had disappeared as quickly as it had formed, leaving just a slight glow in the wake.

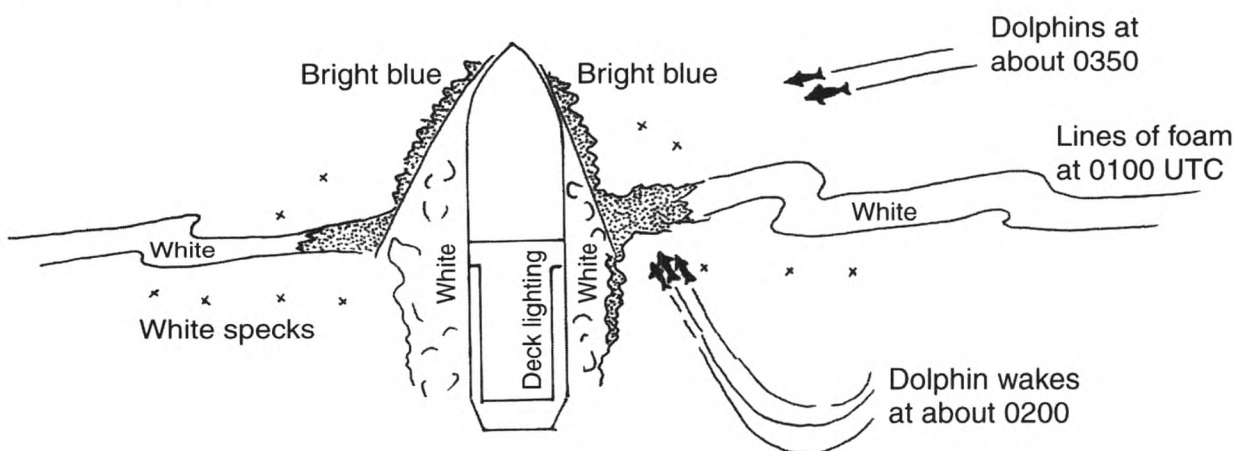
R.M.S. *St Helena*. Captain D.N.R. Roberts. United Kingdom to Cape Town.  
Observers: N. Mogg, 2nd Officer and C. Thomas, DHU.

At 0100 UTC when 30 n mile off Cape Corveiro on the Saharan coast, crossing a charted depth of 150 m, bioluminescence was first noted in the turbulent water down the ship's sides and in the bow wave, all of which was glowing white. The vessel passed through several lines of foam which lay across its course (190° at 15.5 knots), and these could be seen as lines of white light from about 2 cables off.

As the lines of foam were crossed, the edges of the bow wave lit up in a very bright blue colour which was visible down the ship's entire length, even abreast with the passenger accommodation abaft the bridge where the glare from fluorescent strip lights usually outshines bioluminescence. Specks of light beyond the bow wave were sometimes seen up to 100 m from the ship, perhaps caused by fish or squid.

At about 0200 three dolphins leaving luminous wakes approached the ship from astern; when close to the bow wave they could be seen clearly beneath the surface. Fuzzy white patches, roughly triangular in shape were seen below the surface at 0330; these were thought to be shoals of fish.

Twenty minutes later a shoal of fish was clearly seen close to the ship; individual fish were visible in a greenish light while a fishy smell was evident. More dolphins approaching on the starboard bow were also sighted at this time. A shoal of fish holding a circular shape whilst actually rotating was seen passing down the ship's starboard side at 0400. The sketch indicates what was seen at various times.



The night was at first cloudless and very dark with stars visible down to altitudes of about 5°, and ships' masthead lights being seen as they came over the horizon about 16 n mile distant. The moon rose on the port side during the period, and the display of bioluminescence was brightest before this although still visible afterwards.

With the wind at NW'ly, force 2, the sea was smooth and there was a negligible swell; the sea temperature at 2000 on the 10th had been 19.0°, dropping to 18.3° at midnight, to become 17.3° by 0300 on the 11th.

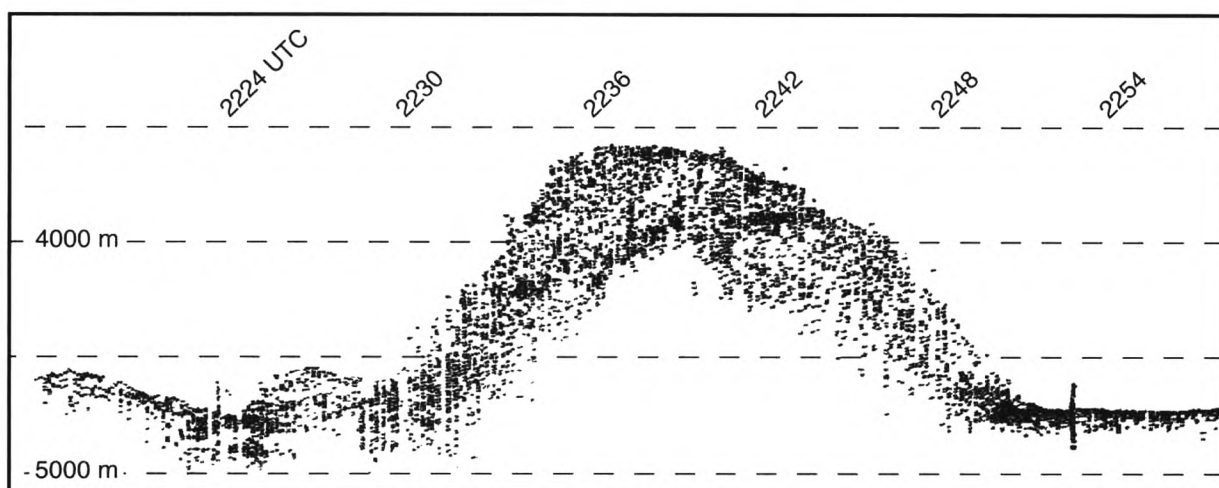
## Discoloured water

Weddell Sea

5 February 1999

**R.R.S. *James Clark Ross*. Captain C.R. Elliot. Engaged in scientific work. Observers: R. Patterson, 1st Officer, Dr R. Livermore, Principal Scientist and members of ship's company.**

Patches of discoloured water were seen around the ship for a period of about one hour, commencing at approximately 2200 UTC; the diagram represents the echo trace recorded during that time as the ship travelled on a heading of 315° at 12.5 knots.



The patches of water were about 50 m by 50 m in size, dark-green in colour, and were encountered between 63° 32.7' S, 31° 10.5' W and 63° 24.8' S, 31° 30.8' W. There were several species of birds in the area but none were seen feeding from the discoloured water, and no whales were sighted in the vicinity either. This may suggest that the discolouration was not caused by plankton or krill. No sea-water sample was obtained from these areas.

## Halo

North Sea

23 February 1999

**m.v. *Nicky L*. Captain C.R. Profit. Rotterdam to Invergordon. Observer: the Master.**

A large, well-defined halo was sighted around the moon at 2115 UTC when the ship was at 52° 26.4' N, 03° 01.4' E. Its diameter was estimated to be about 24 times the diameter of the moon, and had a band width of about twice the moon's diameter. The halo persisted for two or three hours, and was the largest and most clearly-defined one that Captain Profit had seen in over 40 years at sea.

*Note.* As observers are aware, halo phenomena are seen only in clouds of the cirrus family, with cirrostratus providing the best examples of complete haloes owing to its veil-like structure which often covers large areas of the sky. The halo most commonly reported by observers is that showing a radius of 22°, frequently seen in its entirety around the sun or moon; other forms having greater or lesser radii can also appear, but these are not reported so often. The above example may be an observation of the '46-degree' halo; arcs of this halo sometimes appear as part of a display of multiple halo phenomena but it is not often seen in its entirety owing to its size and the large area of sky which needs to be covered by cirrus clouds containing ice crystals of the correct size and orientation for its formation.



## Meteor

Caribbean Sea

21 March 1999

**m.v. *Maersk Stafford*. Captain R.M. Banton. Cristobal to South West Pass, Mississippi. Observers: R. Pierce, 3rd Officer and L. Carbonilla, Watchman.**

At about 0400 UTC a bright light bearing  $260^{\circ}$  was spotted rising on the horizon, the ship's heading being  $315^{\circ}$  in position  $19^{\circ} 24.2' \text{ N}$ ,  $83^{\circ} 07.8' \text{ W}$ . Upon closer inspection of the object, a bright 'phosphor-burning' white light was seen extending behind it. Initially, it was assumed that the object was a meteor or 'shooting star' entering the atmosphere and burning up. However, the object moved at a uniform speed and direction, maintaining an approximate altitude of  $25^{\circ}$  from the horizon, and this bright trail continued; it was only a small, localised trail astern of the object, as if from the burning of rocket engines.

The observation lasted for about 45 seconds, as the object passed from one horizon to the other before dipping out of sight. It was far too bright to be a satellite but moved too slowly to be a shooting star.

The Third Officer felt that the trail resulted from the object entering or leaving the atmosphere and, owing to the area through which the ship was passing, proposed that it was a space shuttle as its approximate heading was towards the Florida peninsular where space operations are not uncommon.

Whilst viewing the object, the Third Officer reckoned it was definitely a space shuttle, while the watchman was certain that it was a 'UFO' — who knows?

## Meteor

South Atlantic Ocean

22 March 1999

**R.R.S. *Bransfield*. Captain J.B. Marshall. Scientific work around Antarctic Peninsular. Observers: P. Heslop, 3rd Officer, I. Heffernan, 4th Officer and P. Clark, AB.**

It was a calm, dark night with traces of low cumulus cloud and occasional well-defined banks of shallow fog; nevertheless, many stars were brightly visible as the vessel, in position  $64^{\circ} 05' \text{ S}$ ,  $61^{\circ} 50' \text{ W}$ , made its way between dive sites at 'The Waifs' group and Livingston Island.

At 0030 UTC, shortly after arriving on the bridge for handing over the watch, all three observers were momentarily stunned as the eastern half of the sky (on the starboard side) lit up in a single uniform flash of very bright greenish-white light lasting no more than 3 seconds. During this time the snow and ice-covered peaks of the mountains on the Christiana Islands, about 12 n mile away on the starboard bow, were clearly visible, as well as what appeared to be thin ribbons of altostratus on the horizon ahead. The light appeared to emanate from abaft the starboard beam.

This brief experience was simultaneously spectacular and somewhat unnerving; none of the observers could recall ever having witnessed anything remotely similar before, certainly nothing involving conventional pyrotechnics, anyway. When considering the possible source of the light, it was noted that there was only one research station in the vicinity, namely the Argentine 'Primavera' Base, in Cierva Cove some 22 n mile to the east, but its operational status could not be confirmed.

Later, having been advised by Jon Shanklin (British Antarctic Survey, Cambridge) that stellar configuration can be useful in locating or tracing meteoroid/bolide events (his initial explanation of the cause of the flash), the Third Officer recalled that Mars was conspicuously bright, bearing 030° at altitude 30° at, or just after, the time of the flash, while the constellation of Scorpius dominated the celestial dome just above the horizon on the starboard beam. If it was possible to ascribe any directional sense to the flash, given the speed at which it occurred, the Third Officer considered that the flash appeared to radiate from somewhere astern of the vessel, and travelled ahead of it. This would have given it an approximate axis of 020°/200°. The light from the flash was not thought to have extended higher than about 10°–15° above the horizon. No sound was heard at the time, and nothing was noticed over the following few minutes.

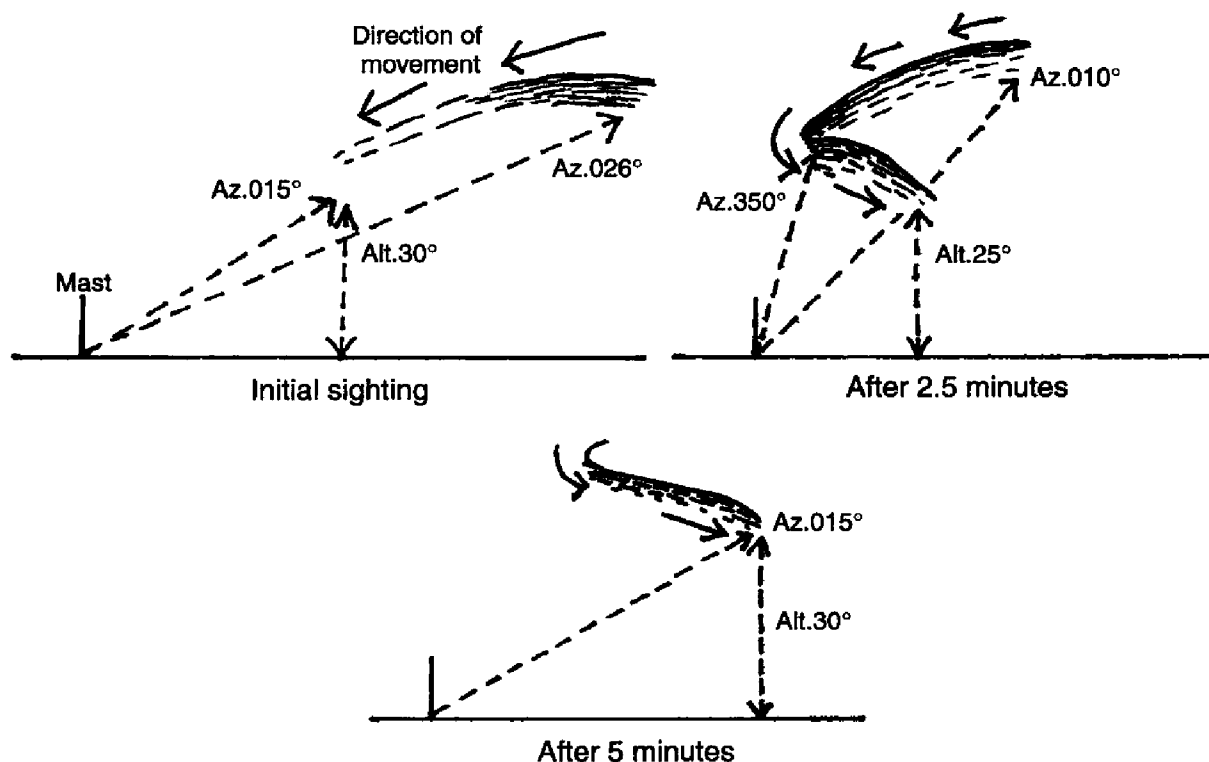
## Aurora borealis

Gulf of St Lawrence

27/28 February 1999

**m.v. *Zetland*. Captain J.A. Smeeton. Rotterdam to Port Cartier. Observers: R. Sarma, 3rd Officer and A. Pacheco, Quartermaster.**

At 0145 UTC a dull off-white homogeneous band was sighted for about five minutes when the ship was in position 49° 12' N, 63° 29' W. It changed shape after a couple of minutes, and again after five minutes, the glow pulsating continuously. The effects seen are indicated in the sketches.



The band seemed to move in a snake-like manner. Nothing unusual was detected on radar, and there was no interference or static on the ship's VHF.

*Note.* Ron Livesey, Director of the Aurora Section of the British Astronomical Association, said, "The Gulf of St Lawrence is a favourite location from which ships observe the aurora. On this occasion there was no major solar or geomagnetic activity but as records show over the years, auroral effects

may be seen when conditions are relatively quiet. A quiet glow was reported by a scientist on the R.R.S. *Bransfield* at 53° 47' S, 37° 09' W on 26/27 February, while observers in Scotland recorded quiet arcs and active rayed bands on 28 February/1 March as the Earth was impacted by a disturbance in the wind particle stream coming from the sun."

**In brief:** When the *Geo Prospector* was stopped and drifting at 04° 26' N, 04° 02' W on 18 February 1999, crew members snorkelling noted vast amounts of plankton and larger organisms ranging in size from 1 mm to 15 cm, these having been present for a couple of days. There were all shapes and sizes, including many 'jellyfish-like' creatures. The sea temperature was 29.0° and the depth of water was 2,700 m.

**In brief:** Whilst the *Petro Fife* was loading offshore at the Kittiwake oil field in the North Sea on 31 January 1999, a seal was observed during clean ballast operations, diving and resurfacing in the area of the overboard discharge. It was about 1.5 m long, grey, with a white underbelly and mottled patches. After about 10 minutes the seal dived and was not seen again.

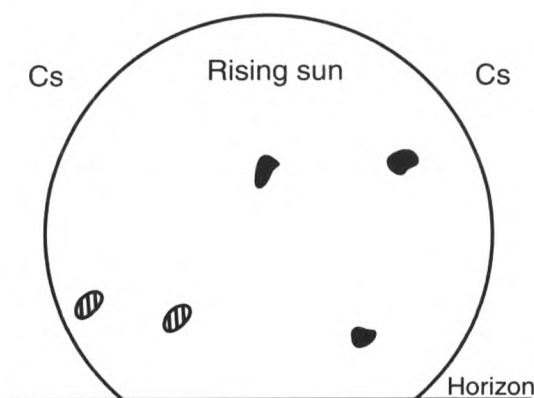
## Sunspots

North Sea

16 February 1999

**m.v. Putford Aries. Captain R.A. Stockley. Offshore support duties. Observers: the Master, P.G. McCardle, Chief Officer and K. Bennington, SG1.**

The dawn horizon was covered by thin cirrostratus; as the sun rose through it several sunspots were revealed, as shown in the sketch. Three very dark spots were clearly visible, with two lighter ones.



These were visible as the sun broke the horizon and before the sun became too bright for them to be observed by the naked eye. (Precautions were taken when viewing the sun.) The ship's position was 53° 31.7' N, 01° 07.1' E.

*Note.* In connection with things heliological, we have received three other observations. The first, of "two rather small sunspots" on 13 February 1999, came from M.P. Littlewood 3rd Officer on the *Eagle*, while S. Woodward 2nd Officer and most of the ship's company on the *British Success* noted a partial eclipse giving about 90 per cent coverage on 16 February at 0730 UTC when the vessel's position was 27° 54' S, 113° 04' E. The third report came from the *Maersk Suffolk*, and featured an annular eclipse visible in 14° 15' S, 154° 36' E commencing at 0811 (nearing local sunset).

**In brief:** Between 0200 UTC and 0215 on 11 March 1999 many dolphins were observed on the port side of the *Shenzhen Bay*, in position 05° 44.2' N, 81° 41.1' E. There were at least 100 but they appeared strangely stationary in the water, apparently completely disinterested in the vessel passing about 80 m away at the closest point. Unfortunately the observers S.W. Capes, 2nd Officer, T.B. Leyland, 3rd Officer and A. Norwood, SM1 were unable to identify the species.

## Postscripts

Where circumstances conspire to prevent the inclusion of expert comment and analysis alongside observers' reports we will print those comments at the earliest opportunity, referring readers to the original item.

### Marine bioluminescence

Comments received from Dr Peter Herring, of the Southampton Oceanography Centre:

April 1999, page 63, *Oriental Bay*. "A very brilliant example of a dinoflagellate bloom (these often occur in regions of high productivity — where fish are also to be found). The fishing fleet must have been a spectacular sight in these conditions."

April 1999, page 64, *Newport Bay*. "The bow wave light was probably dinoflagellates, and I expect that the glittering lights were the flashes produced by other animals (fish?) amidst them."

April 1999, page 65, *Cotswold*. "This sounds like mixed plankton bioluminescence with the flashes coming from somewhat larger organisms than dinoflagellates."

July 1999, page 106, *Botany Bay*. "This is a classical account of upwelling or erupting bioluminescence, as the observers recognise. I would attribute it to shoals of fish (or, less likely, squid) coming up to the surface through a dinoflagellate bloom and then spreading out at the surface. The effect of the Aldis lamp would perhaps have been to alarm animals beneath the surface and as they fled they would make a glowing track 'exploding' if they then came up to the surface. I have witnessed a similar occurrence (in which the fish could clearly be seen) in the Strait of Hormuz which the 2nd Mate memorably described as like an atomic mushroom cloud hitting a window!"

July 1999, page 107, *Maersk Surrey*. "These were dinoflagellates again, with the apparent colour change from greenish to electric-blue indicating an increased brightness rather than a change in the source of the light."

July 1999, page 108, *P&O Nedlloyd Liverpool*. "Both reports indicate patches of luminous dinoflagellates, with the greatest densities in the second case. The absence of flashes in the water sample is slightly surprising but it might have missed a high enough density in the patchy conditions. Radars and lights have no direct effect on these organisms."



## **Lair of the dragon \***

By Stephanie Pain

*You need special eyes if you're going to get the most out of life in the deep ocean.*

*Stephanie Pain heads for the twilight zone*

Deep in the dark depths of the ocean, there are dragons. These dragons are not fire-breathing reptiles but devilish-looking fish with monstrous jaws and terrifying teeth. And their fire is a beam of red light that shines from a lamp beneath each eye. Like military sniperscopes, the dragon's red searchlights allow it to see without being seen, except by other dragons with eyes equipped to pick out their secret signals.

Dragonlight is the only known example of red bioluminescence in the oceans, and dragonfish the only creatures with eyes able to see it. The red light allows them to hunt unseen and find prospective mates without alerting their own enemies. More than that, dragonlight provides unequivocal evidence that bioluminescence is the driving force behind the evolution of vision in the deep sea.

Most bioluminescence is not red but blue-green. The colour varies a little, but not much, because water is more transparent to these wavelengths than any other. But just as blue bioluminescence transmits well through the ocean, so do blue wavelengths from the sunlight filtering down from the surface.

The apparent match between the wavelengths of light that reach down a few hundred metres and the sensitivity of the visual pigments in a fish's eye is held up as a textbook example of how vision evolves to suit the light in an animal's environment.

But there's a problem with that idea. There are thousands of species of fish that live well beyond the reach of any sunlight, and these too have well developed eyes with photoreceptors tuned to detect blue light. "In the clearest ocean at noon on the brightest tropical day, visually useful sunlight penetrates to a maximum of 1000 metres — but the average depth of the ocean is 4000 metres," says Julian Partridge, a biologist at the University of Bristol. For the creatures living at these depths, the only source of light is other animals. "Downwelling light is of no interest to these animals at all," says Partridge.

After painstaking examination of the eyes of almost 200 species of deep-sea fish, Partridge and his colleague Ron Douglas from the Applied Vision Research Centre at City University in London now have convincing evidence that while these eyes are designed to detect blue light, that light doesn't come from the Sun but from other animals. "Sunlight may fuel life in the deep sea but when it comes to vision, bioluminescence is the driving force," says Partridge.

Bioluminescence is everywhere in the ocean, from the surface to the deepest trenches. Around 80 per cent of marine organisms emit light, from microscopic plants in the plankton to gelatinous invertebrates such as *Atolla*, a jellyfish that flashes and pulses like a Catherine wheel. There are angler fish with luminous

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lures to attract prey, lantern fish with headlamps that shine at intervals through the gloom, and the fearsome dragons. Most make their own light; a few depend on symbiotic bacteria to do it for them.

The ability to make light in a dark world has such huge advantages that it has evolved perhaps as many as thirty times, says Edie Widder, an expert on bioluminescence at Harbor Branch Oceanographic Institution in Florida. "In the open ocean, bioluminescence seems to be the rule rather than the exception," she says.

Bioluminescence serves many purposes: to attract a mate, seek out or lure prey closer, or frighten off potential attackers. A bright flash of light can blind an approaching predator used to dim light, perhaps for long enough to make a getaway. Some animals use their lights in a last-ditch effort to shake off their attackers by attracting the attention of their enemy's enemies. "A flash of light in the ocean is a big deal and all eyes are drawn to it," says Widder. Lights can also confuse would-be predators. "If the prospective prey has the right arrangement of lights, a predator can't work out which end is front and which is back— or which direction it is likely to move in," says Partridge.

Even in the twilight zone, dimly lit by the last vestiges of sunlight, bioluminescence comes in handy. An animal looking upwards will see the shadowy silhouettes of creatures moving overhead against the dim light above. Some fish and squid make themselves invisible by counterillumination, giving out light of matching intensity from photophores along their bellies.

Researchers visiting the deep ocean in submersibles are likely to be treated to an astonishing underwater firework display. But this is not the normal state of affairs: the show is triggered by the movement of the sub, which sets off a profusion of alarms and warnings. "If you go down and sit with the lights off without moving, there is no background light," says Peter Herring of the Southampton Oceanography Centre. "Things only emit light when something does something, when there is an interaction between organisms." But just one interaction — a fish blundering into another, for instance — can set off a chain of flashes and twinkles.

For a fish on the lookout for food, the giveaway flash is likely to be small and far off, a "point of light in an otherwise dark world", says Partridge. So most deep-sea fish have large eyes to gather as much of that light as possible. The crucial feature for capturing photons is the size of the pupil, and for some fish the only way to enlarge the pupil without making the eyes too big to fit in the head is to do away with the outer parts of the eyeball and have tubular eyes.

### **Making the most of it**

The retina is also well equipped to make the most of what little light there is. Unlike the human retina, which has two types of photoreceptor cell — cones for daylight vision and rods for night vision — the retinas of most deep-sea fish have only rods. To increase their sensitivity, the outer part of the rod is up to five times as long as it is in a human rod. A few fish have banks of rods three or four deep. Each rod is densely packed with light-absorbing pigment molecules, sensitive to a very narrow range of wavelengths. And it is these visual pigments that provide the best evidence that fish eyes are designed to see bioluminescence.

Visual pigments are coloured compounds found in high concentrations in the light receptors of the eye: it is their job to absorb light, the first fundamental step in vision. All visual pigments consist of two parts, the chromophore, which absorbs the light, and a protein called an opsin. In most fish the chromophore is a derivative of vitamin A<sub>1</sub> called retinal. On its own, retinal absorbs in the ultraviolet region, but when attached to the protein it is retuned to absorb light of a different wavelength. "By changing the amino acid sequence of the protein you can shift the sensitivity of a visual pigment virtually anywhere from UV to far red," Partridge says. He and Douglas have investigated 195 visual pigments from 175 species of deep-sea fish, testing which wavelengths they are most sensitive to. And they say the variation is far too great to be explained by the need to detect the last glimmers of sunlight.

As sunlight passes through seawater, very short and very long wavelengths are lost, filtered out by particles and chemicals dissolved in the water. Eventually, all that remains is a narrow band of radiation between 470 and 480 nanometres — a flat, monochromatic blue. If eyes were adapted to see this dim downwelling light then they should all be most sensitive to these wavelengths. "The match is good," says Partridge, "but not that good." The visual pigments they found had peak sensitivities spanning a much broader section of the spectrum than this — most of them falling in the region between 468 nanometres to 494 nanometres.

### **Faraway flashes**

Partridge believes this diversity arises because each fish's visual pigment is tuned to detect the wavelengths of bioluminescence that reach its eye. And that wavelength varies, depending on how far the fish can see. A typical flash of bioluminescence starts off blue-green, but as it travels through the water the green wavelengths are lost along the way, making it appear progressively bluer. How far away a fish can see a faint flash depends on the size of its pupils and the sensitivity of its rods. A far-sighted fish with a big eye and extra-long rods will need to detect shorter, bluer wavelengths than a smaller-eyed fish that can see only a short distance.

So Partridge looked at the sizes of the eyes in as many deep-sea fish as he could, and estimated how far this would allow each species to see. He then calculated the wavelengths each fish ought to detect. The figures fitted almost perfectly with the range of sensitivities of the visual pigments that he and Douglas had found. "The match between bioluminescence and these visual pigments is a good indication that the pigments have evolved to see bioluminescence," agrees Herring.

This link also explains another puzzle. Many fish in the twilight zone wear yellow sunglasses — pigmented lenses at the front of the eye. Yellow lenses filter out about 80 per cent of the blue light that reaches the eye, which would be a real handicap if the animal needed to detect faint downwelling sunlight. "These filters remove photons when you would think the animals should try to capture as many as possible," says Douglas. "But there are more than ten different yellow pigments with completely unrelated biochemistry, which indicates that the trait has evolved many times. So it must be important."

And so it is, if bioluminescence is the most important light in your life. Yellow

lenses increase the contrast between blue-green bioluminescence and the blue background illumination in the twilight zone. Douglas and Partridge tried this themselves, looking out of a sub window through a piece of yellow acetate. “You see bioluminescent things floating by,” says Partridge. “Their light stands out. It’s brighter than the background light and a slightly different colour.”

Yellow lenses also help predators to break the camouflage of counterilluminated prey. Bioluminescence that is intended to make prey blend into the background makes it stand out instead. This ability would be useful only in the twilight zone, and sure enough you don’t find yellow lenses in fish that live deeper than 1000 metres. “This supports the idea that their eyes are designed to pick out bioluminescence,” says Douglas.

If any extra evidence were needed that deep-sea eyes have evolved to see living light, then the dragonfish provide it. Their red-sensitive eyes are designed to see a very specific type of bioluminescence — their own.

Dragonfish have two sets of light organs on their heads. A pair of photophores just behind the eye emit blue-green light, like other fish. A second light organ beneath the eye emits light in the red part of the spectrum, which is invisible to other fish. The human eye can just about make out a dim, red glow from two of the dragons, *Aristostomias* and *Pachystomias*. The third dragonfish, *Malacosteus niger*, emits light that is so far into the red — around 700 nanometres — that it is detectable only with an image intensifier or on video.

Producing red light is simple: a red filter fitted over a normal light organ produces a red beam. But dragons have had to go to much greater lengths to ensure they can see their own light — and have come up with two separate mechanisms for doing so. *Aristostomias* and *Pachystomias* have a pair of visual pigments that absorb blue-green wavelengths, plus a third pigment that is most sensitive to wavelengths around 590 nanometres. This would allow the fish to detect some red light but not very efficiently. Douglas is convinced there is a fourth pigment that provides even better red vision. “In theory it would be most sensitive to light around 650 nanometres — but we haven’t found it yet,” he says.

The third dragon, *Malacosteus niger*, has only the two blue and green-sensitive visual pigments. But it also has a “photosensitiser” that somehow makes those pigments respond to wavelengths of around 700 nanometres. With the help of researchers at the University of Helsinki and University College London, Douglas and Partridge have worked out that the photosensitiser is a type of chlorophyll most like that found in certain marine bacteria. “This was pretty exciting,” says Douglas. Not only was this the first time a photosensitiser had been found to be involved in vertebrate vision, it is also the first time anyone has ever found a use for chlorophyll in an animal. The researchers still do not know how chlorophyll activates the dragon’s visual pigments. Nor do they know how it comes to be in a fish’s rods. But the most likely source is the diet — in which case the benefits of red bioluminescence have driven *Malacosteus* to radically change its eating habits to provide the ingredients for red vision.

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Note. See page 24 for some deep-sea dwellers which show bioluminescence. (Courtesy of the Southampton Oceanography Centre).

*Malacosteus* looks like a top predator. “They have damn great teeth for impaling fish,” says Douglas. Yet, according to Tracey Sutton, a biologist at the University of South Florida in St Petersburg, this terrifying dragon eats mostly copepods, small crustaceans. Copepods eat smaller copepods and protozoans, which in turn could be eating the bacteria that look the most likely source of the chlorophyll.

If *Malacosteus* does acquire chlorophyll this way, then it has had to work hard for its red vision, overcoming huge anatomical obstacles to get the food it needs. The dragon doesn’t have gill rakers for straining plankton, and worse still its mouth doesn’t have a floor to it: any copepods it snaps up should drop straight out again. They obviously don’t, because all the specimens Sutton has examined have copepods in their stomachs. So the dragons must have developed some special way of swallowing.

If *Malacosteus* has altered such a fundamental part of its life to see red then there must be a compelling reason for it. A private channel of communication is clearly well worth having. “They have a big red searchlight to illuminate prey — without the prey knowing,” says Douglas. “And they can talk to each other by flashing lights. If only potential mates can see them they are immune from predation.”

Unfortunately, no one has seen *Malacosteus* in action in the wild. And even if they had, they would not be able to pick out the red light. Herring and Widder have caught one live fish, and captured its last words on video. “We shone a red torch at it and it flashed back,” says Herring. “But it didn’t know what we were saying — and we didn’t know what it said.”

**Further reading:**

Dragon fish see using chlorophyll, by R.H. Douglas and others, in *Nature*, **393**, p. 424 (1998)

The eyes of deep-sea fish. I: Lens pigmentation, tapeta and visual pigments, by R.H. Douglas, J.C. Partridge and N.J. Marshall, *Progress in Retinal and Eye Research*, **17**, p. 597 (1998)



## Some deep-sea dwellers which show bioluminescence

(See page 19 for more about bioluminescence)



P.J. Herring/SOC

Left: Anglerfish (*Melanocetus*)

Below: Firefly squid (*Watasenia*)



Y. Kito/P.J. Herring



P.J. Herring

Left: *Aristostomias scintillans*  
(length approximately 22 cm)

Below: *Pachystomias microdon*  
(length approximately 21 cm)



P.J. Herring



P.J. Herring



P.J. Herring

*Malacosteus niger* (length approximately 30 cm)

### Acknowledgement

We are grateful to the Southampton Oceanography Centre for these pictures.



## Track record turtles \*

By Graeme Hays

(School of Biological Sciences University of Wales Swansea)

*How do turtles find their way? Satellite tracking technology is revealing how turtles navigate across the Atlantic Ocean.*

What do we know about marine turtles in their natural habitats? On the one hand, it is relatively easy to observe them on the beaches where they nest. So we know a lot about body size, clutch and egg size, nesting behaviour, hatchling success and how often they nest. On the other hand, studies of turtles at sea are far more difficult to do and have generally been limited to sporadic observations of their behaviour and fragmentary evidence of their movements from studies where marked turtles have been recaptured.

These mark-recapture studies have provided tantalising glimpses of the exceptionally long distances that turtles may move. For example, green turtles (*Chelonia mydas*) tagged while nesting on Ascension Island in the middle of the Atlantic, have been recaptured on feeding grounds along the South American coast.



G. Hays

A green turtle on Ascension Island rests after laying her eggs.

The ability of this population to shuttle between their Ascension Island nesting beaches and South American feeding grounds represents one of the most remarkable feats of animal navigation. The island is so small (about 10 km across) and the distance from South America is so large (the minimum crossing distance being about 2,200 km). Yet despite its small size and isolation, Ascension Island is one of the most important nesting grounds for green turtles, with 5,000–10,000 turtles arriving at the island each December for the seven-month nesting season.

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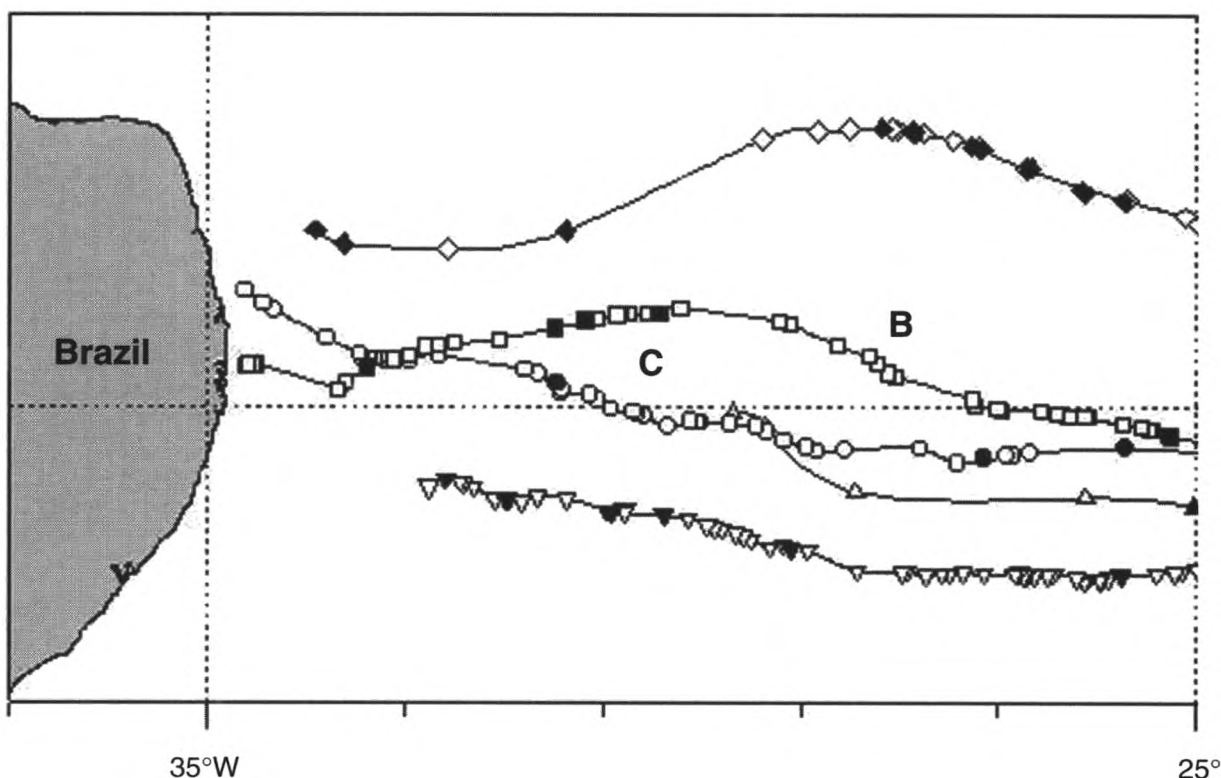


Figure 1 (above and opposite). Migratory routes of the turtles B–F as they left Ascension Island for their postnesting migration towards Brazil. Filled symbols represent fixes of the three most accurate classes (typically within 1 km of the true location), while open symbols represent the less accurate fixes. Only fixes considered valid are plotted in the figure. The chart is constructed on equatorial Mercator's projection. (See Luschi P, Hays G.C., Del Seppia, C., Marsh R., Papi, F. (1998). *Proceedings of the Royal Society*, **265**, pp. 2279–2284.)

### Navigation signals

The remoteness of Ascension has led to a long-standing interest in how turtles navigate during their trans-Atlantic crossing. Back in the 1960s it was suggested that turtles might locate Ascension by smelling an odour plume downstream from the island in the westward-flowing South Atlantic Equatorial Current. According to this hypothesis, turtles would depart from South America and swim eastwards until they crossed the odour plume, at which point they would turn and follow the plume back to its source — Ascension Island — in the same way that salmon can locate their home river by its characteristic smell.

More recently it has been suggested that turtles can use the Earth's magnetic field as a 'map' with which to navigate. According to this hypothesis, turtles can tell exactly where they are in the South Atlantic by using two properties of the Earth's magnetic field — the magnetic inclination and the magnetic intensity. Knowing where they are, they can then set the appropriate course to and from Ascension.

There is, of course, a limit to how much we can find out from laboratory observations and theoretical considerations. To discover which navigational mechanisms are actually being used, we must first track the turtles as they migrate, to identify which routes they follow. Then we need to manipulate the navigational cues that are available and see how this affects the behaviour of the turtles.

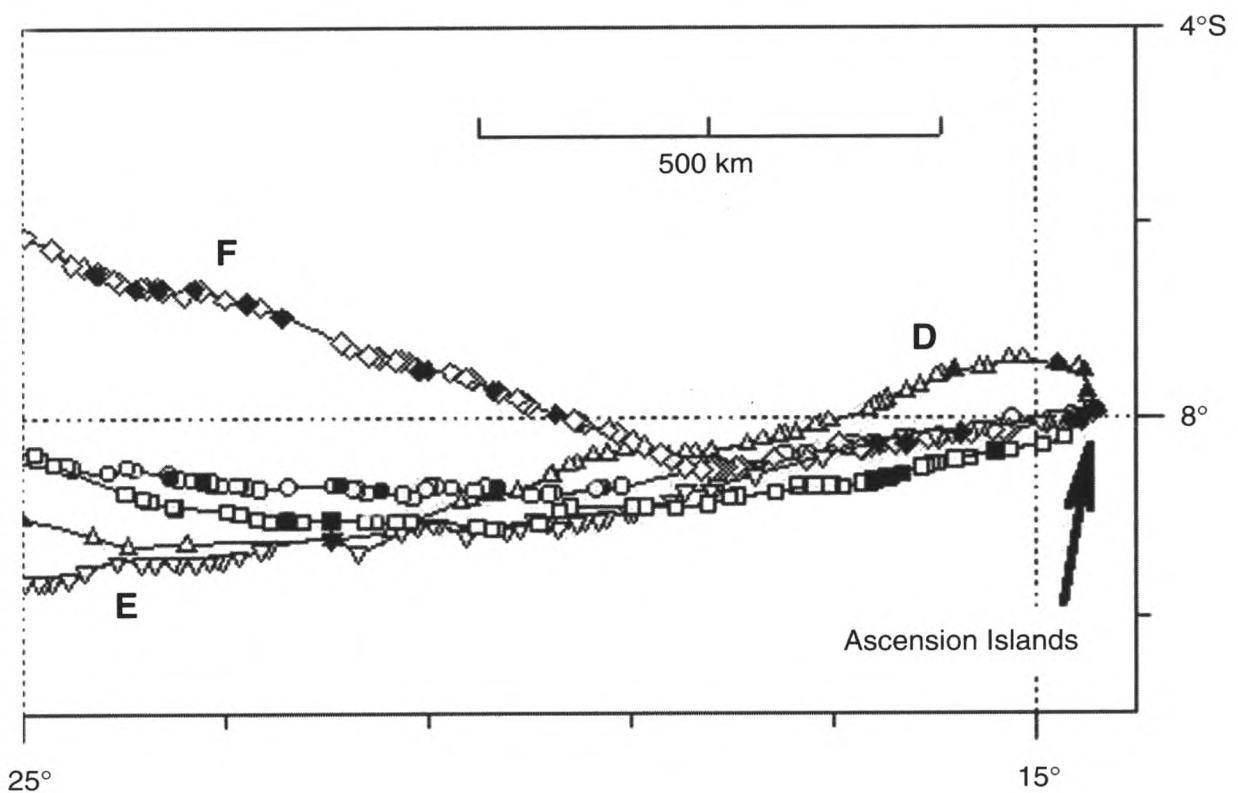


Figure 1.

We have now succeeded in the first of these objectives: tracking turtles as they migrate. Up until recently, this type of work was simply impossible because there was no way of recording the turtles' movements during the migration. But satellite tracking technology has now come of age as a powerful technique to record the movements of long-distance migrants.

The satellite tracking system involves a collaboration between the US and French space agencies. Satellite transmitters send radio signals to either of two NASA/NOAA polar-orbiting satellites. On board these satellites, an instrument developed by the French space agency picks up the radio signals and relays them to a ground receiving station in Toulouse where the signals are analysed and the location of the transmitter determined. This system gives global coverage, so no matter where an animal moves on the planet it can be located.

With partial support from a NERC Small Research Grant and in collaboration with Professor Floriano Papi and Dr Paolo Luschi of the University of Pisa (Italy), I have recently set out to use this satellite tracking technology to identify the migration routes of Ascension Island turtles. In 1997 we travelled to Ascension and attached transmitters to females at the end of the nesting season.

Spectacular results were obtained from the project. As the turtles migrated, we were able to find their location up to five times a day, allowing their movements to be accurately charted. (See Figure 1.) Initially all the turtles headed west-south-west as they left Ascension with a speed of around 2.5 km per hour. Then the turtles made distinct turns to the north before eventually converging on the east-most part of Brazil.





G. Hays

A female turtle returning to the sea carrying a satellite transmitter which allows her subsequent movements to be charted. The huge size of these turtles (up to 250 kg) makes them amenable to satellite tracking since the size of the transmitter is of little convenience.

What is remarkable is that during the first few hundred kilometres, all the turtles followed very similar routes as they migrated. It seems that there is a narrow migration corridor across the Atlantic — almost like a turtle motorway — that they follow to complete their journey as quickly as possible. The departure direction of the turtles from Ascension corresponds exactly with the direction of the prevailing South Atlantic Equatorial Current, suggesting that the current is crucially involved in their migration — possibly because an odour plume in the current provides navigational information — or because swimming with the current minimises the energetic cost of getting back to Brazil.

Having successfully identified the routes that turtles follow, the next step in this work is to identify the signposts that the turtles use to find the location of the migration corridor.

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# Autonomous solar electric research vessels

By Peter Thomas

(Central Institute of Technology Department of Software and Electronic Engineering  
Wellington New Zealand)

## Introduction

Satellite weather forecasting gives good information when it is backed by hard data from the oceans. Up until now much of this data from the oceans has been obtained from drifter buoys, moored buoys or ships in transit.

The average depth of the oceans is about two miles, so if moored buoys were to be used in blue water, they might need to support about two miles of chain which means the buoys would need to be big to support that weight, and a big buoy would require a heavy chain to hold it. The result is often too expensive for some users to consider in waters off the continental shelf.

Drifter buoys offer a low-cost solution. They can be deployed by ship or aircraft; however, by their nature they drift away from a place of interest to a place of non-interest and have to be replaced. Often the buoy is lost.

## The *Goodwill* project

The solar electric vessel [*Goodwill*, Figure 1] developed at the Central Institute of Technology in New Zealand offers a solution for remote areas of the ocean not frequented by ships.



P. Thomas

Figure1. The solar electric vessel *Goodwill* prototype

The surface vessel is unmanned and is totally solar powered. It is self righting in all conditions, and can be programmed to leave its home port under its own power and proceed to its station which could be thousands of nautical miles away. It has a cruising speed of about 4 knots, so will cover about 100 n mile per day. Surplus solar energy obtained during daylight hours is stored in sealed deep cycle lead acid batteries for use at night. The quantity of solar energy arriving varies from day to day because of changing seasons, changing latitudes, and daily weather variations. The vessel therefore carries a self-learning energy management system which will adjust shaft speed as required to match the incoming daily solar energy the vessel is receiving.

## Management

Once at its destination, the vessel can maintain station. The rudder [in normal operating conditions] is rather like a book turning about its spine, but when the vessel is required to maintain station the rudder opens up (like a book) and works as a drogue to slow down drift due to wind. When the vessel has drifted, say, 0.5 n mile, the rudder closes and the boat motors back to its waypoint. Once there, its electrical propulsion is turned off [the vessel drifts once more] and the drogue operates again. By this method the vessel can maintain station for as long as required.

It gathers data and transmits this back using satellite communication systems. With the recent development of low earth orbit satellite systems with world-wide coverage, it is now possible for a shore-based command and control centre to direct the operations of a number of vessels. This may involve moving them to new locations, instructing them what data to gather or telling them to return to their home port for a refit. The position of each vessel is displayed on computer at the command and control centre. The vessel will then gather the data it is instructed to collect, and transmit this information back to shore.

## Applications

Other applications for the vessel require different transducers. One application is the continuous monitoring of shell fisheries. As an example, the vessel could do a continuous grid search of an area, looking for nutrients and toxins. The instruments used for this application would measure salinity, temperature, depth, turbidity and currents. In this way the health and production rate of the fishery may be constantly monitored.

Another application is the monitoring of extreme weather conditions to assess the viability of offshore rigs. In this application, wave height and direction, wind speed and direction, ocean current and direction would be important parameters.

The vessels are small enough to be lost in sea clutter on radar if radar-reflecting surfaces are removed from them. Fitted with security cameras, and guided from their position off shore onto their target by the use of a shore-based radar system, they can send video pictures (time, place and date-stamped) of such things as illegal fishing operations or illegal dumping operations. If manned vessels or aircraft are used for this application, the offending vessel can see the approaching ship or aircraft on their own radar, temporarily stop their illegal operation and, when questioned, are just 'in innocent passage'.

Further applications may include electronically assessing fish stocks, collecting and returning with water samples from predetermined places, or collecting water samples and carrying out simple analysis at sea before transmitting the results back.

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*Note.* At the time of this article going to press, in the autumn of 1999, the *Goodwill* is still at the prototype stage and has yet to be tested on a sea voyage of any rigour or duration. However, we understand that The Meteorological Service of New Zealand Ltd has offered buoy sensors and the expertise of their personnel to CIT, if required, to assist in sea trials. Exactly what the future holds for the *Goodwill* project and its possible applications is, as yet, unknown.



## Who's who at HQ?

In the course of their normal operations, ships' Masters and observing officers may already be acquainted with some or all of the UK Port Met. Officers. However, we thought it time that the whole story was told, and that the anonymous faces of the rest of the team at Observations–Voluntary (Marine), based at the Bracknell headquarters, should make an appearance. So, for your information, we are:

### Margaret Atkins — Head Observations–Voluntary



Margaret joined The Met. Office in 1966, bringing an honours degree in Mathematics from the University of Nottingham. Following a year's training in meteorology and gaining experience at forecast offices around the country, the first 10 years of her career were spent in research into numerical weather prediction. At that time the Meteorological Office's first computer model was being developed and Margaret's responsibility was to determine the initial state of the model from the available meteorological observations. When forecasting for the UK it was, and still is, particularly important to get the analysis for the North Atlantic correct, and ships' observations were essential to this work.

In 1977, Margaret moved to the operational side of the Office and, for eight years, worked with the operational numerical weather prediction system. During this time she became involved with monitoring the quality of observations, and developed a system that has led to significant improvements in the quality of ship observations through the identification of problems with observing equipment or practices.

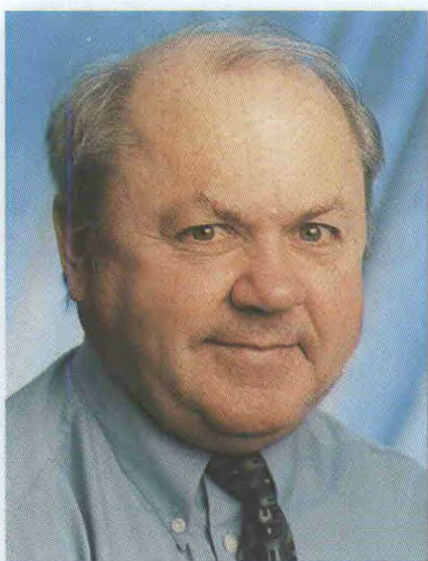
Margaret then began a 10-year association with the International Branch in 1985, first as deputy and then as Head from 1990. This work required frequent attendance at WMO meetings as well as participation in the Voluntary Co-operation Programme whereby meteorological equipment is provided to developing countries in order to maintain and improve the World Weather Watch on which all National Meteorological Services depend.

In 1995 she became Head of Observations–Plans and Requirements. Here, her responsibilities included the establishment of internal user requirements for observations, and the quality control and archiving of climate data, including ships' logbooks data.

Margaret moved to her present position as Head of Observations–Voluntary in May 1999, and her responsibilities extend not only to ensuring the quality of marine observations, but also those received from land-based stations. As Head of the branch, Margaret also heads *The Marine Observer* editorial team.



## **Edward (Eddie) O'Sullivan — Marine Observations Manager**



Hailing from Bantry Bay, County Cork, Eddie commenced his seagoing career in 1961 as a boy on board the Royal Mail Lines' vessel, *Brittany* which operated the company's UK/NW Europe–Brazil, general cargo service.

Thereafter followed several years progressing through the ranks on various types of passenger and cargo vessels engaged in the traditional Southern Hemisphere trade routes before he decided to stay closer to home and work on small vessels operating on the UK/Scandinavia/Continental trades, until 1966. By this time a career decision had to be made which resulted in him becoming one of 'King Ted's' boys and obtaining a coastal Mates Certificate, the first step towards a boyhood ambition. Several more years on coastal vessels followed before obtaining his 2nd Mates Certificate in 1969.

The oceangoing work beckoned once more and Eddie joined Fyffes Lines early in 1970, transferring to Whitco Marine Services (which later became Salen UK) in 1973. Obtaining his Master's Certificate in 1978, he was promoted to command his first ship in 1983, before finally calling it a day in 1988 and joining MetROUTE, The Met. Office's ship routing team.

He has since been the UK Port Met. Officer for East England, based in Hull, and also the Port Met. Officer for South-east England, based in Grays, but in 1995 he 'emigrated' back to Bracknell Headquarters to take up the post of Nautical Officer, and later became Deputy Marine Superintendent of the Observations (Marine) branch. Following extensive reorganisation within The Met. Office during 1998 and 1999, the branch emerged as Observations–Voluntary (Marine) part of the newly-formed Technical Division, and Eddie O'Sullivan was appointed to his current post of Marine Observations Manager.

## **Sarah North — Nautical Officer and Deputy Editor of *The Marine Observer***



On leaving school Sarah joined the merchant navy as a navigating officer working on a wide range of ship types including oil and chemical tankers, bulk carriers and gas carriers trading world wide. After almost 10 years at sea working for BP Tanker Co. Ltd, and later for Silver Line Ltd, she eventually attained a Master Mariners FG (written) certificate.

At this point she decided that it was time to come ashore and, in 1984, joined the Chamber of Shipping based in London. During her six years at the Chamber she acted as secretary to several committees overseeing the technical interests of both International and UK shipping companies. The work also focused on offshore technical issues relating to supply ship and mobile drilling unit operations, and often required her to attend

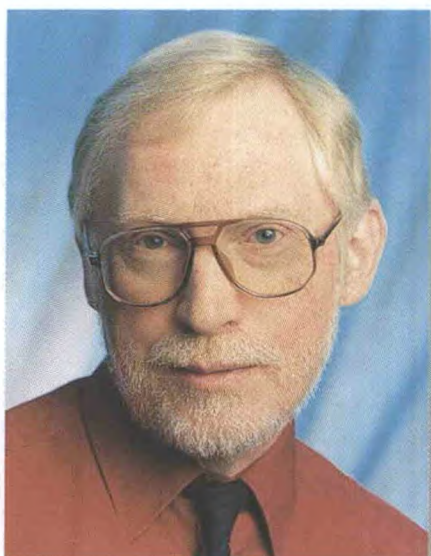


meetings of the International Maritime Organisation, and UK Government Departments.

She subsequently joined Lloyds Register of Shipping in 1991 as a Senior Statutory Examiner where she was responsible for the statutory approval of ships' life-saving, fire-protection and stability arrangements for compliance with international and national requirements.

Sarah joined The Met. Office in December 1998 as a Nautical Officer where she assists in the co-ordination of the UK VOF, and also supervises the publication of relevant marine literature originating in the branch. As Deputy Editor of *The Marine Observer*, Sarah hopes to introduce an updated style of presentation to the journal, whilst at the same time maintaining its long established high standards.

### **Geoff Allen — Technical liaison**



Spending the greater part of his Met. Office career on ships of the UK Ocean Weather Service, Geoff left the wide open spaces of the North Atlantic in 1982 and 'came ashore' to Bracknell-based work. When the UK Automated Shipboard Aerological Programme (ASAP) first began operations in 1987 he was one of three weather ship personnel rostered to operate the systems carried on board the *Manchester Challenge* and the *CanMar Europe* whilst on UK to Montreal return voyages. He also helped train those who would replace the three operators, and last year undertook the inaugural voyage when ASAP operations were revived, on board the *CanMar Pride*.

Geoff's main preoccupations at Bracknell are liaising with the UK Port Met. Officers on matters of equipment, coding and stationery for the UK VOF; maintaining a database of UK VOF ships for national and international use; he also manages the distribution of *The Marine Observer* to VOF ships.

### **Jan Freeman — Sub editor of *The Marine Observer***



Jan was born in Chichester but grew up in Newbury. She joined The Met. Office in 1971, her first posting being to what was then the Special Investigations branch before joining the Marine Division the following year where she was part of the small quality-control team making manual corrections to ships' logbook data and applying quality control indicators prior to further processing of the data. When computerised error detection was introduced in the late 1970s, the work then entailed checking the output against the original logbook data and eventually running programs to archive marine data to the Main Marine Databank.

In 1975, she was asked to deputise for the sub editor as a temporary measure, subsequently finding herself in



the post for a year before returning to quality control. However, she remained responsible for 'feeding' the contents of the logbook Additional Remarks pages to a succession of editorial staff up until 1982 when she was detached to work at London Weather Centre. Upon returning to 'base' in March 1983, more quality control of marine data followed, but in 1985, after promotion, she took up the sub editor post full-time and has been reading every single ship report of marine flora, fauna and meteorological happenings ever since. In addition to working on the journal, Jan manages the allocation and distribution of the annual Excellent Awards. Jan says she joined the Office as a stop-gap until she found a "proper" job — 29 years later she is still trying to work out what went wrong! She lives in Somerset, working mainly from home and, when not hunched over her keyboard, enjoys gardening, walking with her husband and their dog, and bird-watching.

### **Michelle Ayres — Administration and officers' records**



Michelle is a team member who can safely lay claim to handling every logbook arriving at Bracknell. Not content with updating the branch databases with the details of each book, then sending out the acknowledgment cards, she also prepares each one for its journey through various sections of The Met. Office. When the books return to her from their travels, which includes their assessment, Michelle then updates the observing records of every officer named in them. The results of this never-ending task are very important, for the records accumulated over the years form the basis for the short-lists of names needed to identify those Masters who eventually become eligible for special long-service awards.

During the past 12 years, in which Michelle has also helped manage the 'Admin' department, answered the phone, greeted guests, and packed 'Excellent' Award books for despatch, she estimates that approximately 9,000 logbooks have passed through her hands — and she says she would like that number converted to cash!

Also located at Bracknell on a part-time basis, are Martin Stubbs and Jenny Mynott. Martin has returned to the Office from retirement to revise *Meteorology for Mariners*, a part-time task that is expected to occupy him for about a year. Since there is considerable change in the dissemination of forecasts to the mariner at this time, his background (having retired in 1995 as Head of the Central Forecasting Office) has enabled him to take an active co-ordination role in connection with the preparation and dissemination of forecasts to the marine community.

Jenny is the newest recruit to the team, having joined the branch in November 1999. Dealing with branch administration, she brings wide-ranging experience from outside the Office, which includes having managed a business centre. When away from her desk she lists Feng Shui among her interests.

## Presentation of special long-service awards for 1997

On 4 October 1999, The Met. Office was pleased to welcome three ship masters to Bracknell to receive specially inscribed marine barographs in acknowledgment of long-standing contributions made to voluntary weather observing at sea. These awards were first made in 1947, and have been an annual event ever since.

On this occasion, all three recipients hailed from a single company, namely P&O Nedlloyd Ltd. The fourth Master nominated to receive a long-service award, Captain K.S. Hardy (also of P&O Nedlloyd Ltd), was unable to attend owing to an unfavourable duty roster, but he will receive his award at a later date. The Fleet Personnel Manager of P&O Nedlloyd Ltd, Bob James, had also hoped to attend but was called away at the last minute.

In the Reading Room of the National Meteorological Archive, Captains P.D. Davies, J.G.W. Dixon and J.W. Welch (now retired), accompanied by their wives, were first welcomed by Margaret Atkins (Head of Observations–Voluntary) and Eddie O’Sullivan (Marine Observations Manager), and then met Peter Ewins the Chief Executive of The Met. Office, Jim Caughey, the Technical Director, and Peter Francis, Head of the Observations–Plans and Requirements branch.

In a short speech, the Chief Executive thanked the three recipients wholeheartedly for their work, and then briefly described the criteria used to identify nominees for long-service awards, namely a minimum of 18 years observing service including the submission of at least one logbook during the year in question. He emphasised that alterations made in 1980 to the identification ‘formula’ placed more significance on the quality of weather observations received by The Met. Office, whereas when the awards were first introduced, quantity was very highly rated. Margaret Atkins then read the citations before the Chief Executive made the presentations (see page 36).

Captain Peter D. Davies, currently serving on container ships operating between Europe and the Far East, sent his first logbook from the *Chindwara* in 1966. Up until 1997, in 28 observing years the Office had received a further 61 logbooks of which 22 were assessed as ‘Excellent’. Captain Jonathan G.W. Dixon, also serving on ships on the above route, sent his first logbook from the *Glenglyde* in 1970. Of the 62 logbooks received during the following 25 observing years, 30 were assessed as ‘Excellent’. Captain Joseph W. Welch, recently retired, submitted his first logbook from the *Stratheden* in 1962. He submitted 62 logbooks of which 23 were assessed as ‘Excellent’.

After the presentations, the party of guests were able to examine some of the first logbooks containing observations made by the Masters in their earlier days as Principal Observing Officers, and other items of interest arranged for the occasion by Ian MacGregor, the manager of The Met. Office Archive Services and his staff. The three barograph recipients were amused to spot errors in their early observations, and there was great interest in the use of manual quality control techniques for logbook data made evident by the copious amount of red pencil entries apparent throughout the books. The guests were then taken to lunch and, to round off the afternoon, they were given a guided visit to the National Meteorological Centre and other areas of interest.



# Presentation of special long-service awards for 1997



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Left: The Chief Executive of The Met. Office, Peter Ewins presents a long-service award to Captain P.D. Davies at Bracknell on October 1999.

Below: Captain J.G.W. Dixon receives his long service award.



Crown copyright

Right: Captain J.W Welch receives his long-service award.  
(See page 35.)



Crown copyright

## Presentation of special long-service awards for 1997



Crown copyright

The three shipmasters who received special long-service awards at Bracknell on 4 October 1999.

Standing, left to right: Captain John G.W. Dixon,      Seated, left to right: Marie Dixon,  
Captain Peter D. Davies,      Elizabeth Davies,  
Captain Joseph (Joe) Welch.      Joan Welch. (See page 35.)



## **Commander C.E.N. Frankcom, OBE, RD, RNR**

Commander C.E.N. Frankcom, OBE, RD, RNR died on 17 August 1999, aged 96. He had retired from the post of Marine Superintendent of the Meteorological Office on 27 June 1969, having given the greater part of his working life either directly to the sea, or else ashore in support of those at the 'front line' of voluntary weather observing and merchant shipping in general.

Charles Edward Nowell Frankcom was born at North Wraxall, Wiltshire, in July 1903. After two years' training in H.M.S. *Conway* between 1918 and 1920, followed by eight months' naval training as an R.N.R. midshipman aboard the aircraft carrier H.M.S. *Argus*, he commenced his apprenticeship with Royal Mail Lines in 1921.

In 1924 he obtained his 2nd Mate's certificate and returned to Royal Mail Lines as a junior officer, serving in both cargo and passenger ships of this company. Having obtained his Extra Master's certificate in 1930 he was naturally anxious to obtain early command. To achieve this he resigned from Royal Mail Lines to join the Bristol City Line as Chief Officer, and the following year was promoted Master.

In 1936, after a further period of naval training in submarines, he joined the Board of Trade as a Nautical Surveyor and Examiner of Masters and Mates. His first appointment in that service was at Liverpool, and the following year he was transferred to the Central Board of Examiners in London. In January 1939 he was appointed Marine Superintendent of the Meteorological Office and also took over as Editor of *The Marine Observer*.

Shortly after the declaration of hostilities that year the Marine Branch, as it was then called, moved to Stonehouse in Gloucestershire where the main task was the preparation of climatic atlases derived from data recorded by ships' voluntary observers over a period of about 100 years. There was an urgent need for these atlases at that time, for use in naval operations, and any information was of value even if it originated in private observations made before the first official meteorological service was set up in the 1850s.

In November 1940 he volunteered for service at sea in the Royal Navy and was appointed Commodore of coastal convoys on the Southend-Methil-Loch Ewe-Oban route. For this service he was awarded the OBE. Early in 1943 he was transferred, at his own request, to combined operations and took part in the North Africa, Sicily, Reggio and Anzio landings. He was later appointed Naval Officer-in-Charge at Piombino (Italy) and opened up the ports at Patras, Gruz (later to become Dubrovnik) and Split, and was employed on special duties in Corfu.

After demobilization in September 1945, Commander Frankcom rejoined the Meteorological Office as Marine Superintendent where his first task was to reorganize the voluntary observing fleet, which had ceased to function in September 1939. He was responsible for the planning and conversion of four 'Flower' class corvettes to ocean weather ships in 1947, and the planning and conversion of the four 'Castle' class frigates which replaced the 'Flower' class vessels as ocean weather ships between 1958 and 1961. The operation of these ships had been one of his duties since the Ocean Weather Service began in 1947.

As Marine Superintendent he represented the UK Meteorological Office at World Meteorological Organization (WMO) conferences, and was a member of the Commission for Maritime Meteorology (CMM) of the World Meteorological Organization (WMO) commencing in 1939, and serving as President of CMM from 1946 to 1956. He attended the inaugural meeting of the Inter-Governmental Maritime Consultative Organisation (IMCO) at Geneva in 1948, and later chaired an operational Working Group of the Commission and represented the WMO at various meetings of the Maritime Safety Committee of IMCO. He also represented WMO and was an adviser to the British delegation at the Safety of Life at Sea Conference in 1948 and 1960, and was a British delegate at the International Load Line Convention in 1966. He was also a member of the British delegation at all the international weather ship conferences and, between 1954 and 1969, was Chairman of the Advisory Committee of European Operating States on North Atlantic Ocean Stations. From 1963 until 1968 he was Chairman of a sub-committee of the British Standards Institution charged with the preparation of a booklet on climatic hazards in the transport and storage of goods (including cargoes in ships' holds). He was a Liveryman of the Honourable Company of Master Mariners, a Fellow of The Institute of Navigation, a member of the Challenger Society and the Society for Underwater Technology, and a Freeman of the City of London.

When Commander Frankcom retired in 1969, the age of the 'Gentleman sailor' was almost over and a heady new era of advances in meteorological and communication services for the benefit of shipping was in its infancy; ship routing was being developed (the UK Met. Office had very recently launched its own service, MetROUTE), geostationary meteorological satellites were being planned, while GMDSS and NAVTEX were ideas as yet lacking substance. He kept in touch with The Met. Office in retirement, and staff in the Observations-Marine offices frequently discussed a variety of marine-related topics with him.

The Met. Office has lost a part of its maritime history; and the marine community one of its best supporters.

## Personalities

**RETIREMENT** — It is not often that we hear of the retirement of Radio Officers for they seem to be among the unsung heroes of observing, but we learn that Radio Officer Tony Fell retired in August 1999 after a long career brought to a premature end by redundancy following the formation of BP Amoco.

Born in Plymouth in January 1940, he attended Colwyn Bay Wireless College between 1955 and 1958, going to sea as Radio Officer with Siemans Bros in August 1958. That year his name first appeared in a met logbook, from Clan Line Ltd's *Clan Forbes* and, until 1964, he worked for Siemans Bros on other Clan Line vessels as well as those of the Sugar Line Ltd and Furness Lines. He then joined Marconi Marine in 1965, and in the period to 1983 worked in vessels of Furness Withy Ltd, Stephenson Clarke Ltd, British & Commonwealth Shipping Ltd and Bibby Line Ltd. For the following seven years to 1990, he was with Denholm UK Ltd, and then switched to the North Sea offshore industry where he

worked for several companies before being employed by BP Exploration as a Radio Officer on the Montrose 'A' platform in 1995, remaining there until redundancy overtook him four years later. He was nominated to receive an Excellent Award in 1965, 1968 and 1980.

During his career he served on the Executive Committee of the Radio & Electronic Officers Union between 1965 and 1985, and was elected as its Chairman in 1975 and Vice Chairman the following year. Currently, he also has many contacts within the merchant navy and will be well known to many VOF observers, having served on the National Radio & Electronics Committee of NUMAST since 1985 and having been a member of the NUMAST Council since 1997.

The loss of Radio Officers from offshore installations deprives The Met. Office of a reliable source of weather observations. Indeed, from January 1997 when Tony Fell was one of the first to test the TurboS and TurboWin programmes (and when analysis of the returns from Turbo software began), he sent no fewer than 1,045 observations in the period to August 1999.

In retirement Tony hopes to continue his seafaring links through NUMAST and to become an advisor with CAB. We wish him well for the future as we do for Radio Officers elsewhere who find themselves having to deal with redundancy.

**RETIREMENT** — We have learned that Chief Officer David MacIntosh retired in July 1999 after more than 30 years at sea. Those who are able to say that they have spent their entire careers in the employment of a single company are becoming few in number but David was one of them, having been with Esso Petroleum Ltd (latterly Standard Marine Services Ltd) throughout.

The Met. Office received David's first weather observations in 1970, in a logbook from the *Esso Hampshire*, where he was Second Officer; the logbook almost achieving the 'Excellent' assessment. Similar markings then came from the *Esso Cambria* and *Esso Mercia* over the next three years, and David helped score an 'Excellent', finally, in 1978 from the *Esso Warwickshire*. He gained an Excellent Award for his efforts that year, and again two years later, from the same ship. Between 1982 and 1996, in which year David was promoted Chief Officer, he worked in *Esso Aberdeen* (later renamed *Petro Aberdeen* when the operators became Standard Marine Services Ltd) but his last two books came from the *Petro Tyne* and *Petro Fife*.

At the time of going to press with this edition, David's final contributions have yet to be assessed but we would not be surprised to find that his usual high standard of work has been maintained. Although David has not always found himself assigned to 'reporting ships' during his career, we thank him nevertheless for his interest and enthusiasm over the years and wish him a very happy retirement.

## Postbag

### Flash phenomena at sunrise

Further to R.J. Livesey's letter about multiple green flashes [*The Marine Observer*, April 1999, p. 93], in 1976 while aboard the brigantine *Phoenix* (Captain M.L.M. Smith) I noted a green flash during a magnificent sunset on 8 June which I logged as "very noticeable and almost blue just before the end". I therefore determined to try and observe one at sunrise but it was not until 11 June that I succeeded.

Being in a small vessel in calm weather but with a very long swell, I was rewarded with a double flash due to the combined heave and pitch of the vessel in 28° 33' N, 52° 01' W. It takes considerably more concentration to see a flash at sunrise since there is no warning of the exact moment when it will occur — one glance elsewhere can be disastrous!

From Brian Rice, Horsham, West Sussex.

## Noticeboard

### 'The Big Number' — new phone numbers for Cardiff and Southampton PMOs

As has been widely publicised by BT and the media, several new UK area codes are in the process of being introduced, and will become fully operational on 22 April. The following information summarises the changes as they affect the UK Port Met. Offices in Cardiff and Southampton:

#### Cardiff

	<i>Old</i>	<i>New</i>	<i>New no. in use</i>	<i>Old number ceases</i>
<i>Telephone</i>	01222 221423	<b>029 2022 1423</b>	As of 1 June 1999	5 August 2000
<i>Fax</i>	01222 225295	<b>029 2022 5295</b>	As of 1 June 1999	5 August 2000

When dialling from outside the UK:

The new telephone number will be **+44 29 2022 1423**, and the new fax number will be **+44 29 2022 5295**.

#### Southampton

	<i>Old</i>	<i>New</i>	<i>New no. in use</i>	<i>Old number ceases</i>
<i>Telephone</i>	01703 220632	<b>023 8022 0632</b>	As of 1 June 1999	2 September 2000
<i>Fax</i>	01703 337341	<b>023 8033 7341</b>	As of 1 June 1999	2 September 2000

When dialling from outside the UK:

The new telephone number will be **+44 23 8022 0632**, and the new fax number will be **+44 23 8033 7341**.

There is a Freephone Helpline to deal with any queries relating to The Big Number changes: 0808 224 2000.

## **‘Norwegian Sea and Denmark Strait’ sea area split into three new areas**

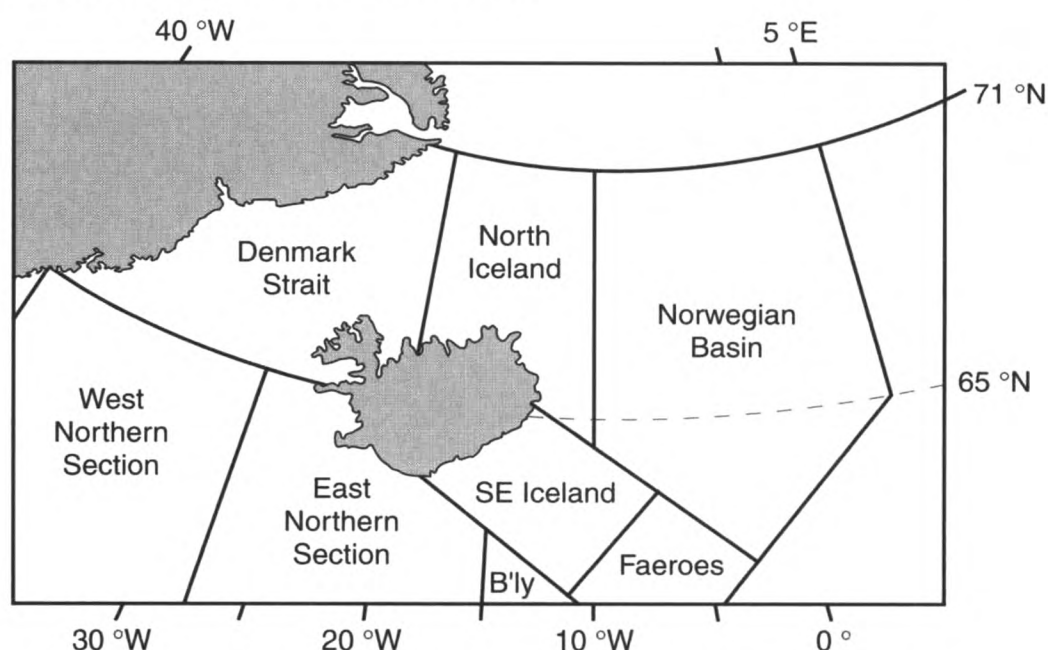
Most observers will, by now, be aware of amendments which came into force on 31 October 1999, concerning the creation of three separate forecast areas from that originally called ‘Norwegian Sea and Denmark Strait’, as termed in the North Atlantic Bulletin and in the SafetyNET for broadcasts for METAREA I.

The borders of these new forecast areas are shown on the map below, and are once more confirmed as:

Denmark Strait — 40° W to 20° W.

North Iceland — 20° W to 10° W.

Norwegian Basin — 10° W to 5° E.



The northern and southern boundaries are the same as the area replaced. Details of the above changes were appended to North Atlantic Bulletin broadcasts and GMDSS texts until mid-November 1999, and were also promulgated in *Admiralty Notices to Mariners*, weekly edition No.39.

### ***State of SEA booklet***

Owing to increasing demand, the *State of SEA booklet* was recently reprinted as a temporary measure pending the production of a new edition of this useful publication. Although this latest reprint of the booklet was in colour for the first time, the original photographs used for the illustrations, although still representative, have now physically aged to such an extent that they can no longer be considered for use in future editions.

Consequently we need to compile a replacement set of illustrations, and invite UK VOF observers to help by sending in colour photographs or slides of seas in all conditions. All contributions will be acknowledged, and there will be a prize for the photographers of all pictures selected for use in the new edition of the booklet.



Most film formats will be acceptable, including digital, but we will be unable to accept 'polaroid' types. Any UK Port Met. Officer will be pleased to forward your photographs (closing date for receipt is 31 July), but they can also be sent direct to:

The Met. Office (OVM) Scott Building Eastern Road Bracknell Berkshire  
RG12 2PW UK

If preferred, digital images may also be emailed direct to our offices at:  
obsmar@meto.gov.uk

The following information should be included with your contributions (please do not write on the back of photographs):

Ship name	Estimated wind speed and direction
Observer's name and contact address	Estimated wind wave height
Date, time and position of ship	Details of any swell(s) present

## **'ASAP' returns to the UK VOF**

After a break of nearly 10 years the UK Automated Shipboard Aerological Programme (ASAP) has been revived. Following land-based trials early in 1999, the *CanMar Pride* made the first operational voyage on a return run from the UK to Montreal in July. Observing officers launched balloon-borne upper-air equipment under the guidance of staff from Observations-Voluntary (Marine). A feature about the ASAP will appear in *The Marine Observer* soon.

## **'Excellent' Awards — 1998**

At the time of going to press 184 awards for 1998 have been processed, and we look forward to hearing from more nominees if they have *not* already contacted us. We would like to remind all observing officers that the names of the nominees for Excellent Awards appeared in the October 1999 edition of *The Marine Observer*; please check these lists and bring them to the attention of any colleagues who may have been named but who may be unaware that an award awaits them.

Sadly, we have so far been unable to make initial contact with several observers, their letters of notification having been returned to our offices, and we need to locate the following:

**Captains:** A.K. Rangi J.A. Smeeton

**Observing Officers:** J. Aquilino E. Almeida J. Almeida R. Aurora  
V. Ballesteros A.T. Buchan A.J. Clarke J.D. Crasto P.D. Dewan P.D. Dhule  
N. Kumar D.B. Lemon F.B. Longanilla K.M. Mathews J.Pearson F.F. Mercado  
M. Shahadah R. Sim J.R.T. Svalle J. Virgilio

If the above-named would like to contact us direct or through any UK Port Met. Officer, we will be delighted to process their awards.

Please remember that there is now a deadline of 30 April 2000 by which date we should be in receipt of claims for 1998 awards. Claims dated or received after this deadline will be honoured by a certificate rather than a book. The names of all officers who have not yet claimed will be published in the April edition of this journal.

## **Fleet list updates**

Ships recently recruited to or withdrawn from voluntary weather observing.

### **Australia**

#### **Selected**

Recruited: *Alnilam Botany Tradewind Capitaine Tasman Fanal Merchant Forum Tonga Northwest Swift P&O Nedlloyd Otago Thor Kirsten*

Withdrawn: *Australian Enterprise Brigit Maersk El Cordero Highland Chief Iron Curtis Iron Flinders Iron Newcastle Klang Reefer NOL Amber Papuan Chief Provider Rig Seismic Swan Reefer Tasman Chief Tradewind Express*

### **India**

#### **Selected**

Recruited: *Kanpur Patilputra*

#### **Supplementary**

Recruited: *Abdul Kalam Azad Aditya Vikram Arcadia Progress Chettinad Glory Guru Gobind Singh Jag Palak Jag Vikram Maharaja Agrasen Nirmal Bhushan Prabhu Jivesh Sampurna Swarajya Suvarna Swarajya Viswa Doot*

Withdrawn: *APJ Priti Chennai Ookkam Chennai Perumai Jag Vasant Log Vikas Maratha Prudence Patilputra Prabhu Gopal*

### **New Zealand**

#### **Selected**

Recruited: *Kakariki Kiwi Breeze*

Withdrawn: *Direct Kea Maersk Belawan Maersk Barcelona*

#### **Supplementary**

Recruited: *Aratere*

Withdrawn: *Aratika*

### **United Kingdom**

#### **Selected**

Recruited: *Atlixco City of Rome CMBT Asia CMBT Europe Comanche Drin Eastern Express Enchanter Ernst Oldendorff Federal St Laurent Ivory Dawn Macoma Maersk Baffin Maersk Humber Naparima Nariva Ocean Spirit of Moray Pacific Breeze Plover Arrow Royal Viking Sun Shun Kim Stolt Kittiwake*

Withdrawn: *Al Shamiah Arctic Spirit Asia Star Astrid Blue Flame I Botany Bay Bransfield C.S. Iris Cap Blanco Cast Bear Cast Lynx Equinox Esplanade Francis Drake Greater Manchester Challenge Helene Maersk Island Princess Jahre Spirit Jahre Spray Koningin Beatrix Kumasi Lampas Mbashi Merchant Principal Mineral Prosperity Nerfertiti Nicky L Northern Light Rothnie Sachem Seki Cedar Seki Pine Skauborg Sunny Clipper Toisa Widgeon Uisge Gorm*





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ISSN 0025-3251

