The Marine Observer

Met Office

A quarterly journal

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Contents

Regulars

Features

Cover photo: Orographic cloud over Kobe.
*By O. Ridyard (*P&O Nedlloyd Kobe*) July 2000.*

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Met.O. 1029

LONDON: THE STATIONERY OFFICE

Editorial

A man must shape himself to a new mark directly the old one goes to ground.

Sir Ernest Shackleton
South (*1919*)

In October 1915 Shackleton began an epic 800-mile journey to lead his companions to safety after his ship the *Endurance* was beset by the harsh forces of the Antarctic ice. His fortitude and resolute spirit, combined with clear-minded leadership, eventually ensured that his entire party was saved.

The Met Office now finds itself on the verge of its own great adventure as it gears up to re-locate to its new home port of Exeter. Whilst this journey has only just begun it will require equally careful planning, clear vision, and a steady hand on the tiller to ensure we safely reach our destination.

There are undeniable benefits to be gained by embarking on this ambitious voyage, not least a reduction in our operating costs which will benefit our customers and help us to expand our business. It will enable us to build upon our past successes and allow us to lay a new course for the future. This is not, however, the first time we have set sail to a new port of destination — the last time was in the early 1960s when the current Bracknell site was first occupied. Taking the form of a gradual migration of staff and services, this latest relocation to Exeter should be complete in early 2003.

Coupled to the process of relocation, the Met Office has recently assumed a new identity to herald its new future. This 're-branding' is part of our new vision and is defined by the updated and dynamic logo which appears on the cover of our journal, and by the revised style of presentation you will find herein. Building on our established reputation for forecasting accuracy, the Met Office now aims to diversify into other related environmental fields such as oceanography and hydrology. Other key themes are increased co-operation in Europe and the exploitation of new technology. For example, exploitation of the potential offered by the internet for the dissemination of products and services is being explored; indeed, one component of the launch of the new identity is our redesigned and improved website, to be found at: http://www.metoffice.gov.uk

The winds of change have already been felt by the marine branch and, as part of the restructuring of the UK Port Met. Officer network, we have said farewell to three of our Assistant Port Met Officers in the course of the last year — Dave Williams and Dave Hampton (assistants at Southampton and Cardiff, respectively) have both moved on to new posts within the Met Office, while Malcolm Taylor retired from his post at Hull in September [see page 50]. We wish them all well for the future and thank them for all their help and efforts on behalf of the UK Voluntary Observing Fleet.

Observers may think that the changes currently taking place within the Met Office will go by largely unnoticed. However, new technologies and the increased access to the internet on board ships will inevitably provide opportunities to improve the way in which we in the marine branch interact with you, the observers. In this respect e-mail is already proving to be an efficient alternative method for observers to send us the 'Additional Observations' they would normally include in the ships' meteorological logbook. Digital images can also be sent by this means (preferably in as high a resolution as possible to enable their best reproduction). The address is: obsmar@meto.gov.uk

Regardless of any of the above mentioned developments, the need for high quality marine observations on which to base our forecasts will continue for many years to come. The role of the UK voluntary fleet is therefore assured and, moreover, its importance is likely to increase with the launch of the new VOS Climate project [see page 24] and the increased involvement of the Met Office in ASAP operations.

When Shackleton penned the words that now head this editorial, he was no doubt recalling how he and his companions were faced with the need to adapt to their unforgiving environment in order to survive. The Met Office is now ready to shape itself to its own 'new mark', setting its sights on the future, embracing innovation and seeking new partnerships in order to broaden the scope of its activities. Its outlook is bright, to the benefit of its existing and potential customers.

On this positive note it only remains to extend to all observers, no matter in which corner of the globe they may find themselves, and to all our readers, our very best wishes for the new year.

The Marine Observer's Log

This section of *The Marine Observer* comprises reports of interest and scientific value contributed by individual observers or as part of a ship's meteorological logbook.

All reports are welcome in the Observations–Voluntary (Marine) branch of the Met Office and, wherever possible, they are forwarded to relevant sources of expertise for comment and analysis. The following list includes many of the normal and some of the more unusual subjects reported from ships at sea — the list is by no means exhaustive, and we always hope for additions:

- tropical storms, hurricanes and typhoons
- depressions and squalls
- waterspouts and funnel clouds
- electrical phenomena and thunderstorms
- dust and sand
- fog and fogbanks
- currents, tide rips, whirlpools and disturbed water; extreme waves
- marked changes in sea temperature
- earthquakes and volcanoes
- birds, bats and insects
- whales, dolphins and other mammals such as seals and manatees
- sea snakes, turtles, fish and other marine life
- bioluminescence, milky seas, phosphorescent wheels
- optical phenomena such as haloes, rainbows, fogbows and coronae; refraction
- crepuscular rays, 'flash' phenomena and noctilucent clouds
- comets, meteors, eclipses
- sunspots, the aurora, satellites and 'UFOs'

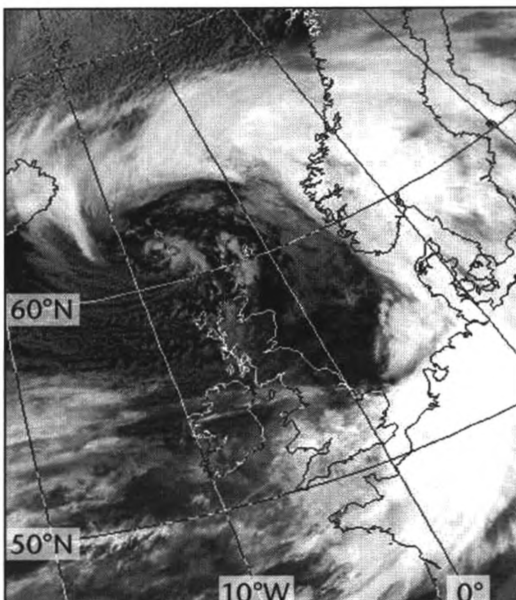
Responsibility for the content of any item offered for publication rests with the contributor, although texts may be subject to amendment at the discretion of the Editor.

All temperatures in this publication are given in degrees Celsius unless otherwise stated, and the barometric pressure is given in millibars (mb) although the standard international unit is the hectopascal (hPa) which is the numerical equivalent. Where mentioned, 'mile' and 'miles' are to be taken as the nautical mile.

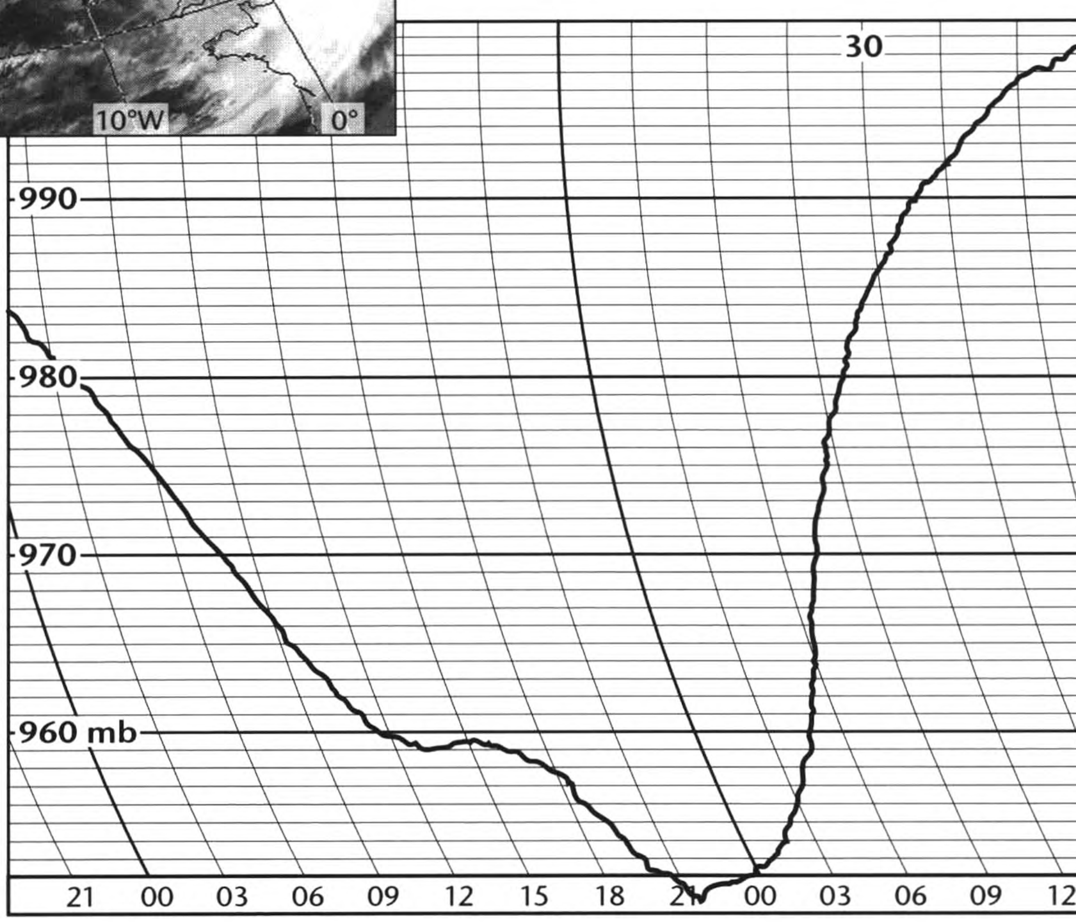
Depression
Skagerrak
29 January 2000

- **m.v. *North Pacific***
- **At Brofjorden, Sweden**
- **Captain P. Sood**
- **Observers: the Master and ship's company**

Whilst the vessel was alongside at Brofjorden discharging crude oil, the effects of a deep depression were felt between 28 January and 30 January 2000. As indicated by the barograph trace, the pressure had decreased steadily since the 28th. By the 30th the wind was SW'ly with gusts reaching a speed of 40 m s^{-1} [78 knots], and then veered to N'ly and NW'ly. During the period of the strongest winds, the vessel was assisted by two tugs in order to stay alongside.



Left: A NOAA satellite image of the storm on 29 January 2000 at 0658 UTC. (Courtesy Satellite Receiving Station, Dundee.)



The pressure fell from 1010 mb to 950 mb over a period of 45 hours and, as the storm passed clear, there was a rise to 998 mb within 24 hours. The vessel's departure was delayed by a day, but no heavy weather damage was sustained.

Editor's note. This storm was also experienced by observers on the *Matco Clyde*, see page 6.

Depression
North Sea
27 January 2000

- **m.v. *Matco Clyde***
- **Between Beryl oil field and Shetland**
- **Captain P.D. Kelly**
- **Observers: Captain Kelly, W.B. Goswell (2nd Officer) and ship's company**

At about 1800 UTC on the 27th the pressure was noted to be falling, and this continued throughout the next day. At 0200 on the 29th, the wind was SW'ly, force 8/9, veering, with a rough sea and a swell of 7 m. By 1200 the pressure had fallen to 948 mb, and the barograph trace 'fell off the scale'; the wind at this time had reached hurricane force driving a very rough sea accompanied by a swell of 10–12 m. Wintry showers were also experienced.

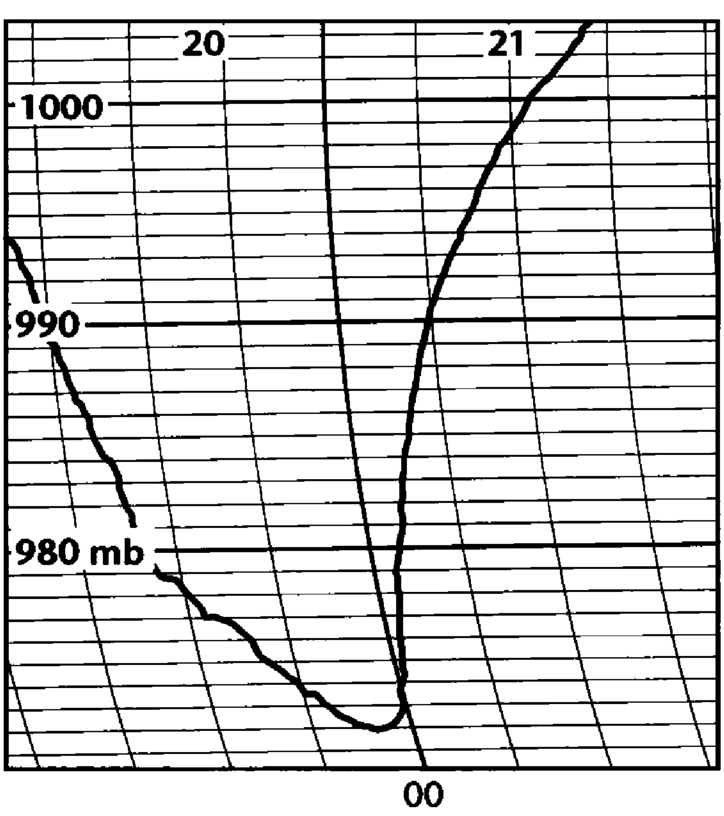
The wind veered throughout the day, ranging in speed between force 8 and force 11 as the pressure rose quickly to reach 995.8 mb by 0400 on the 30th, by which time the speed had moderated to NW'ly, force 7. The ship's position at 1200 on the 29th was 59° 42'N, 00° 48'W.

Editor's note: This storm is also reported by the *North Pacific*, see page 5.

Depression
Indian Ocean
20 January 2000

- **m.v. *Resolution Bay***
- **Cape Town to Fremantle**
- **Captain M.D. Moore**
- **Observers: Captain Moore, C.I. MacLeod (Chief Officer), R.H. Elson (2nd Officer), A. Graham, (3rd Officer) and ship's company**

On 20 January a weather fax was received from the Australian weather bureau showing an area of low pressure in the vicinity of the vessel. At 1500 UTC an Enhanced Group Call report was received which indicated that the low pressure (forecast central pressure of 992 mb) would pass ahead of the vessel's course line.



During the next hour it was observed that the pressure was falling quickly, as indicated by the barograph trace, while at 1600 the wind began to increase to E × N'ly, force 7 with continuous heavy rain. The swell had increased in height but its direction remained unchanged at 2 points on the port bow.

The vessel began to pitch and roll heavily, and spray was being shipped. By 1800, when the ship's position was 44° 00' S, 77° 55' E, the wind had backed to NE'ly and increased to force 9. The pressure continued to fall, having reached 979.3 mb, but the rain had stopped.

At 2200 the pressure reached its lowest point, 973.9 mb, but the wind continued to back to NW'ly and WNW'ly with the strongest gust being estimated at around 45 knots. There were heavy rain showers. The swell had increased to a height of 6 m and was beam-on to the vessel which rolled heavily in the very rough seas.

On the 21st the wind remained W × N'ly, force 8 and the sky was overcast with moderate visibility, and at 1200 the wind began to moderate. The swell remained north-westerly, and at this time the observers thought that the low had now passed astern of the vessel.

The passage to Fremantle was continued and, during the next 24 hours, the wind gradually decreased to W'ly, force 5 before backing to SE'ly. The pressure continued to rise, and the sky cleared while the swell decreased in height although remaining on the port quarter. No storm damage was inflicted either on the ship or the cargo.

Demarcation

Arabian Sea

20 February 2000

- m.v. ***British Ranger***
- **Kharg Island to Jamnagar**
- **Captain D. Lewis**
- **Observer: S. Magalotte (3rd Officer)**

At 0900 UTC, when in position 25° 11.6′ N, 58° 30.4′ E, the vessel passed through a very strong tide rip that was not indicated on radar. A very visible demarcation boundary was observed on the surface of the sea, being light-blue on the side nearest the ship, but a very dark blue on the far side.

The boundary stretched across the entire horizon ahead and, upon crossing it, the autopilot was seen to apply 20° of helm. The wake at this point displayed a pronounced 'zig-zag' effect.

Immediately afterwards, the water surrounding the vessel was noted to be a bright purplish-red colour — possibly a 'red tide' or some other algae. Also observed were long, fibrous, yellow 'streaks' in the water, possibly discolouration by plankton.

The vessel's heading was 108°, and the sea temperature was 24°, while the general weather conditions were hazy with light winds of force 1–2.

Editor's note. A photograph of a 'red tide' appears on page 45.

In brief: On 25 January 2000 an area of disturbed water was observed three miles from the *Barbet Arrow*. It was five miles long and one mile wide, and was orientated along 050° to 230°; the water appeared to be quite rough with breaking waves, and the phenomenon was distinct on radar. The weather in the previous hour had changed, namely in that the wind had veered to E'ly and decreased to force 3. The vessel's heading and speed were 077° at 12.8 knots in position 01° 37′ N, 120° 58′ E.

DID YOU KNOW ...?

Contributions for *The Marine Observer* can now be sent direct to the Editor by:

E-mail to obsmar@meto.gov.uk
or fax to +44 (0) 1344 855921

Dolphins
South Atlantic
15 February 2000

- **m.v. *British Pioneer***
- **Escravos to Vadinar**
- **Captain A. MacLeod**
- **Observers: E. Salmon (2nd Officer) and N. Inman (Cadet)**

At 1205 UTC small breaking waves on top of a swell of 7 m were observed. On closer inspection it was noted that these waves were being caused by dolphins breaking the surface.

With the aid of binoculars at least 500 dolphins could be seen only 2–3 cables from the ship. The observing parties believed them to be of the species *Stenella coeruleoalba*, the Striped Dolphin. The dolphins took no interest whatsoever in the ship, but carried on jumping out of the water for the observers' pleasure.

The ship's position was 23° 38.5′ S, 12° 59.2′ E at the time of the sighting, and the sea temperature was 19°.

Whale
South Atlantic
4 March 2000

- **m.v. *Western Bridge***
- **Port Talbot to Saldanha Bay**
- **Captain I.C. Gravatt**
- **Observers: Captain Gravatt, N. Jerrum (Chief Officer) and W.M.I. Aponsu (3rd Officer)**

At 0746 UTC whilst in position 24° 47.05′ S, 10° 16.4′ E the observers spotted a fairly large white object approximately one mile from the vessel, on the starboard bow. The course was altered so as to pass closer to it, and it was noticed that numerous seabirds (including albatrosses and skuas) were in the vicinity too.

The object was in fact the remains of a dead whale which had been completely stripped of all flesh [sic] hence the white colour. Several long 'tendrils' could be seen on the underside of the carcass, and the water was teeming with fish of various types and sizes, the largest of which was a grey shark about 2.5 m long.

The birds and fish were obviously feeding on the carcass, to such an extent that it was impossible to even try to identify what species the whale had once been. The remains were 5 m long and approximately 3 m deep, and there was a distinct trail of oil on the sea surface leading off to the south.

Editor's note. The sighting of a dead whale is an unhappy occurrence, and fortunately few reports of such are received in our offices. This sighting gives no clue as to the cause of the whale's demise but the report is useful because it clearly illustrates how creatures further down the food chain take advantage of free banquets however large.

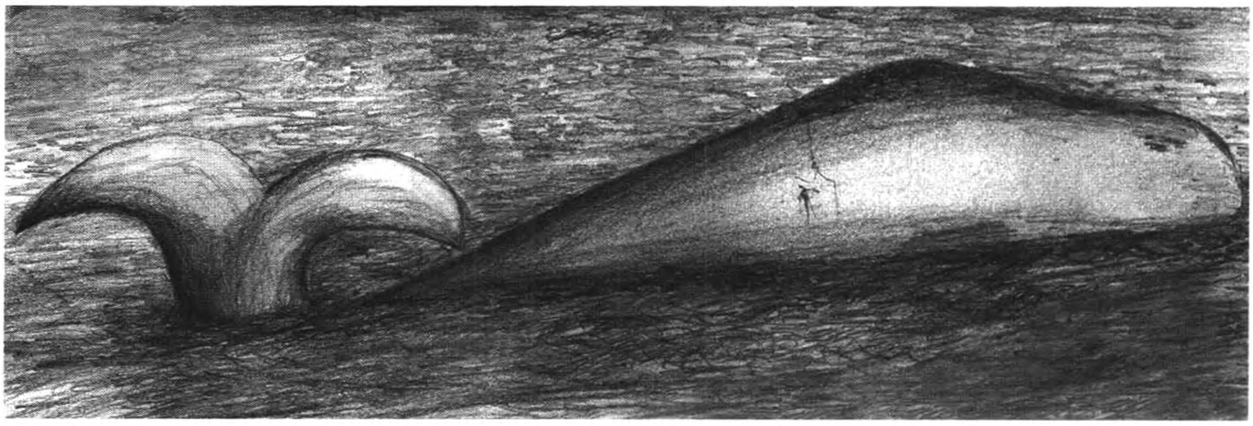
In brief: On 16 February 2000, when the *Peninsular Bay* was in position 22° 40′ N, 60° 45′ E, bioluminescence was observed in the bow wave and extended to about 2 m off the ship's sides. The phenomenon was present between 1400 UTC and 1700, and was also noticed in the bow wave of another ship. The sea was rippled and there was a low swell. The sea temperature was 24.8°.

Whale
Straits of Florida
26 March 2000

- **m.v. *Maersk Sussex***
- **Straits of Florida to Altamira**
- **Captain P.A. Carmichael**
- **Observers: P. McPherson (Cadet), S. Fenton (3rd Officer) and S. Docherty (Cadet)**

While east of Miami, in position 25° 05.9′ N, 79° 56.2′ W, a whale was spotted from the monkey island at 1600 UTC by Mr McPherson.

It was assumed by the other observers that the area would be too busy with traffic for a whale to be present, but to their amazement there was a large light-grey whale following the same course as the ship, 215°, but travelling a little slower than the ship's speed of 14.3 knots. A sketch was made of the whale's general appearance.



The whale was passed at a distance of 10–20 m on the port side but did not seem to be at all bothered. It was noted that the whale carried "lots of barnacles" with it. At the time there was no wind and the sea was calm, both the air and sea temperatures were noted as being 24°.

Whale
Bay of Biscay
30 March 2000

- **m.v. *Thorkil Maersk***
- **Dunkerque to Lisbon**
- **Captain A.G. Groom**
- **Observer: D. O'Donovan (3rd Officer)**

Three whales were sighted off the starboard bow at 0800 UTC, crossing from starboard to port on a heading of about 090° but all three were on a collision course with the vessel (heading 210°). At the last second they all turned to port and passed between 5 m and 15 m down the starboard side, then turned around the stern to resume their course before diving.

The whales were black in colour and were 4–7 m long; their blows appeared at approximately 12-second intervals, each blow being about 1 m high (perhaps less) from the front of the head. The whales had a 'high' forehead, there was a small dorsal fin which made an angle of less than 40° with the back and, when the whales dived their hindquarters were 'bunched up' but the flukes were not raised. No growths or crenellations were noticed on either their heads or bodies.

They were seen again some minutes later well astern (assuming that these were the same three whales). At the time of the sighting, the ship's position was 49° 06′ N, 06° 24′ W.

Editor's note. This report was passed to Kelly MacLeod, of the Natural Resources Institute, University of Greenwich, who said:

"The whales described best fit Sperm Whales (*Physeter macrocephalus*). The estimated length of 4–7 m is small for Sperm Whales although the total length of such animals at sea is difficult to imagine when at least one-third (behind the dorsal fin to the tail) is under water. At 7 m, the animals would be juveniles, and you would expect only to see such young animals in 'nursery groups' containing adult females (12 m long). If we assume the size of these animals is underestimated, the other features describe characteristics of the Sperm Whale — dark colouration, a low bushy blow angled from the front of the head, a square (high) head and small dorsal fin. When the animals dived to avoid the *Thorkil Maersk*, the knuckles along the dorsal ridge of the animal — behind the dorsal hump to the tail fin — were evident (this is what I am assuming is described by the hindquarters were "bunched up").

"Sperm Whales are often just seen 'logging' (resting) at the surface, and are not always aware of oncoming vessel traffic. In busy shipping areas it may be difficult for the whales to judge the direction and distance of a sound source. Another possible explanation is that they are unable to detect the sound of a vessel because the frequency and intensity of the noise caused by the vessel's hull, engines, etc. are outside the hearing frequency range of the whales."

Sea snake and fish

Arabian Sea

29 February 2000

- **m.v. *British Ranger***
- **At anchor**
- **Captain D. Lewis**
- **Observer: J. Hassall (3rd Officer)**

Whilst at anchor in position 22° 49′ N, 68° 01.2′ E at a distance of 40 miles from the coast, a sea snake was sighted on the port side at 0600 UTC.

The snake was between 60 cm and 90 cm long, and was yellow in colour; it stayed at the surface for three or four minutes before diving away. There was also a single large fish about 1.2–1.5 m long present at the same time. It had stripes of vivid pink/purple and white, and remained at the surface for a few minutes after the snake had disappeared, then followed it. Conditions at the time were hazy with light airs and a calm sea.

Seal

North Sea

16 February 2000

- **m.v. *Petro Fife***
- **Kittiwake oil field**
- **Captain A. Hodgson**
- **Observer: D.J. Buckley (2rd Officer)**

During the morning 8–12 watch what was thought to be a Common Seal was observed close to the port bow. It appeared to surface several times, and this attracted a variety of seagulls to the same area of water.

The vessel was moored to the Kittiwake Loading Buoy in position 57° 28.17′ N, 00° 32.91′ E at the time. Weather conditions comprised wintry showers delivered on a NW'ly wind of force 6–7, and the sea was rough with a moderate swell from the north-north-west.

A reminder to observers...

Check pages 155–157 in the October 2000 edition of *The Marine Observer* — you may have won an Excellent Award for observing in 1999 and not yet know it.

Bird
North Atlantic Ocean
7 January 2000

- m.v. *Mark C*
- **Lisbon to La Pallice**
- **Captain J.W. Jackson**
- **Observers: Captain Jackson, and ships company**

The vessel was in the northbound traffic lane off Finisterre at 0800 UTC when a small bird (shown in the photograph on page 44) was found on a side deck during routine cleaning and washing of paint-work.

The bird was soaked and bedraggled, and so it was placed in the care of the cook. It was assumed by the observers that the bird had come on board during the hours of darkness. After resting and drying out, the bird accepted small amounts of fish offered floating in a bowl of water, and it was set free in the evening, after dark.

Having consulted *Sealife: A Complete Guide to the Marine Environment*, the visitor was tentatively identified as a European Storm-Petrel

Bird
Indian Ocean
20 January 2000

- m.v. *Geo Prospector*
- **Cochin to Port Louis**
- **Captain M.N. Baxter**
- **Observers: Captain Baxter, K. Fletcher (Chief Officer) and members of ship's company**

A small flock of seven birds was sighted in the distance on the starboard side at 1345 UTC. The birds then approached to within one cable of the vessel's starboard beam where they were quite clearly identified as Sooty Terns (*Sterna fuscata*), see the Chief Officer's sketch.

The terns were diving into the sea after fish, possibly tuna which were also observed jumping out of the sea. The birds were watched as they swooped upwards before diving straight down, showing great speed and agility, and this behaviour continued until they were lost from sight.

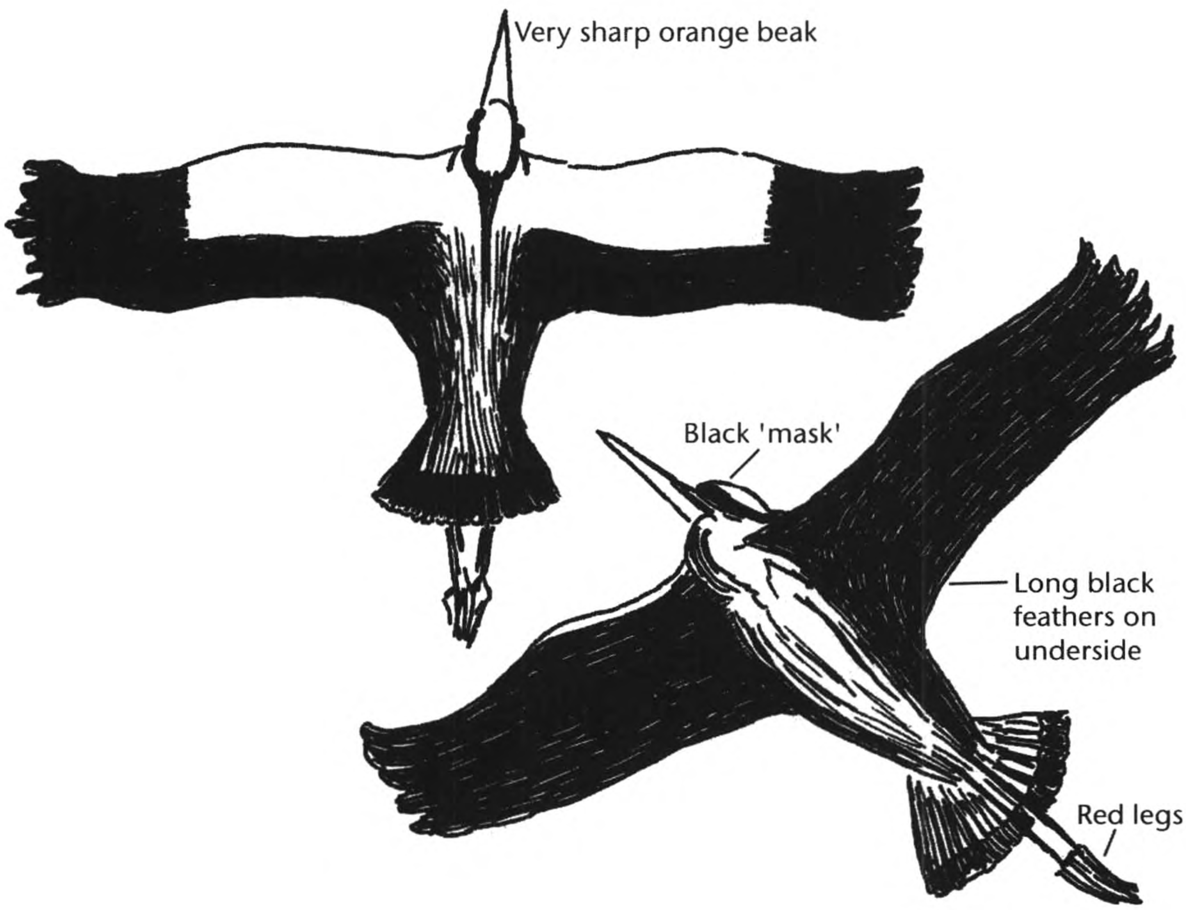
The ship's heading was 203° at 9 knots in position 14° 10′ S, 63° 15′ E. Weather conditions at the time were: dry bulb 29°, wind SE'ly, force 3; the sky was clear and there was a slight sea with a low swell.

Birds
Taiwan Strait
10 March 2000

- m.v. *Jervis Bay*
- **Pusan to Kaohsiung**
- **Captain C.J.A. Hughes**
- **Observers: K. Fuller (3rd Officer) and J. Spencer (1st Officer)**

A group of three large birds accompanied by a smaller one (believed to be a juvenile) landed on top of some containers. Initially, they were suspected to be some sort of heron, and they came aboard when the ship was in position 25° 54′ N, 121° 15.3′ E.

The adult birds stood nearly one metre tall, and had very long necks which had been tucked in during flight, as shown in the sketches. Not being content with the motion of the ship, the birds took off after a short time but continued to fly in the vicinity of the vessel.



There was quite a thick mist which reduced the visibility to four or five miles; even so, it appeared that the juvenile had become separated from the three adults which seemed to carry out a systematic search for the youngster. They were joined in their search by four more adults, but eventually flew away without the juvenile.

Each had a very sharp, orange beak, dark-red legs, and a pale-grey underside whereas their throats were white with two long black feathers adorning them. There was a black 'bandit' mask on their heads, with another long dark feather at the back, like a crest, and yet more long feathers on the breast. The top side of each wing was mostly black, with a broad white rectangular stripe along the leading edge that started at the centre of the back and extended to three-quarters of the wing. The bird that was thought to be a juvenile had been smaller in size and darker in colour.

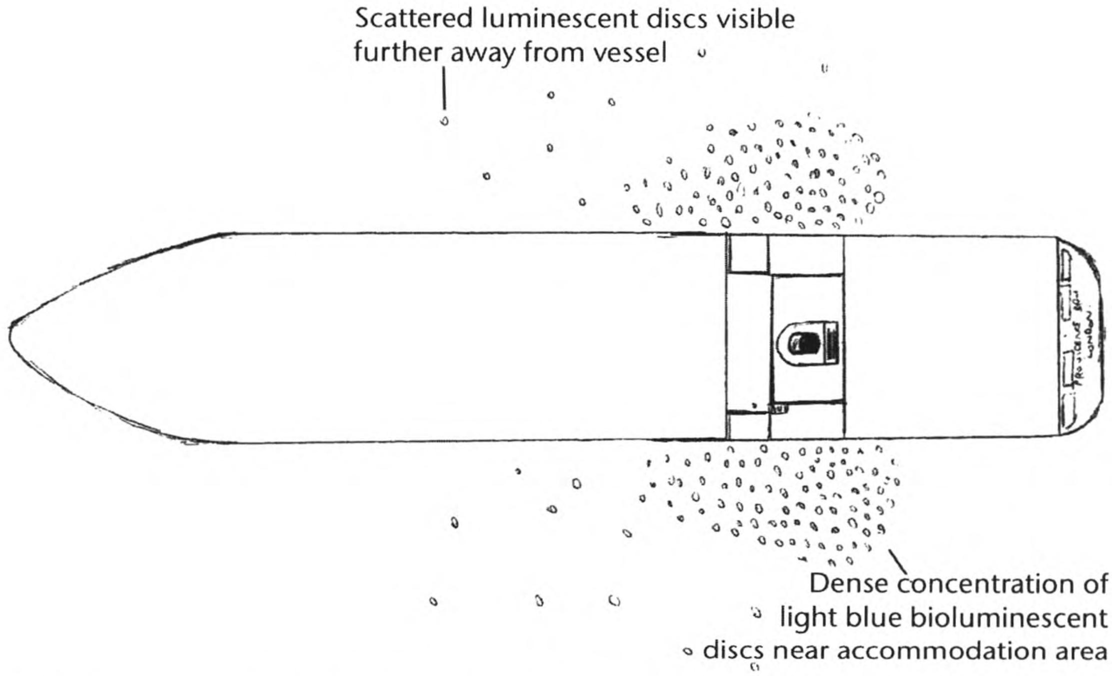
This sort of black-and-white pattern was more reminiscent of European storks than of herons. It was not possible for the observers to get a good look at the tail end of the birds but it was thought that the colour was grey.

Weather conditions at the time were: air temperature 13.3°, wet bulb 13.1°, pressure 1017.1 mb, wind W'ly, force 6. The ship was on a heading of 217° at 23.4 knots, but in spite of this the birds were flying rings around it.

Bioluminescence
Indian Ocean
28 February 2000

- **m.v. *Providence Bay***
- **Singapore to Suez**
- **Captain K. Smith**
- **Observers: C.W. Longmuir (2nd Officer) and M. Cadiao (AB)**

At 1930 UTC bioluminescence was noted; it took the form of light-blue 'discs' with diameters between 30 cm and 60 cm. They appeared to be just below the water surface, and were distributed as indicated in the sketch.



The bioluminescence was more prevalent within the vicinity of the well-lit accommodation area, with only the occasional flash sighted further away. It was speculated that this may have been because the accommodation lights were stimulating the organisms concerned. The phenomenon lasted for about 10 minutes. Although it was not possible to ascertain the cause for sure, it was the observers' opinion that jellyfish were the most likely source of the lights. The ship's position at the time was 11° 13′ N, 54° 41′ E, while the heading and speed were 280° at 22 knots. The sea temperature was 26.5°.

In brief: Whilst in position 55° 11′ S, 64° 25′ E numerous Magellanic Penguins were sighted from the *Resolution Bay* on 26 February 2000; there were at least 15 of them jumping through the waves. After consulting *Seabirds — an identification guide* R.H. Ellison, Second Officer and A. Graham, Third Officer thought that the penguins were juveniles. The penguins continued jumping until lost from view.

Meteor
North Pacific
19 February 2000

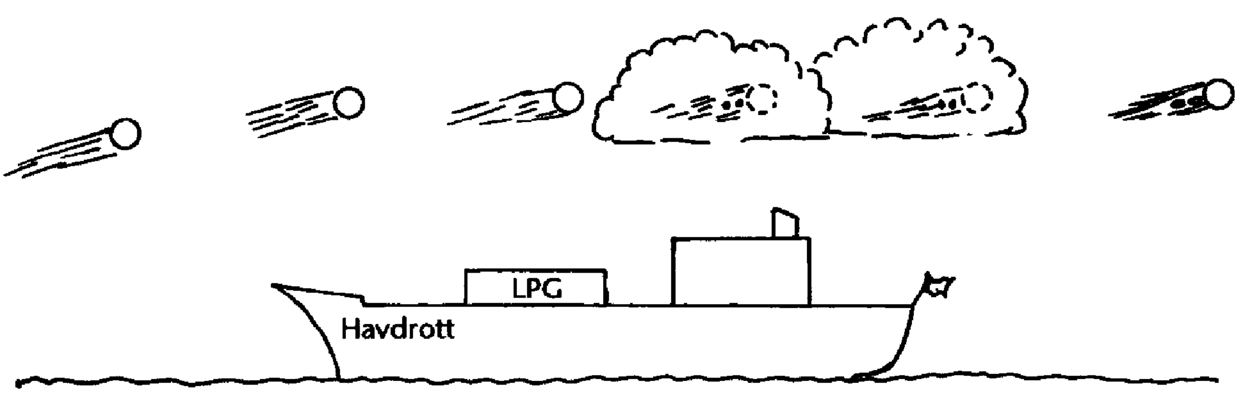
- **R.M.S. *Queen Elizabeth 2***
- **Zihuatanejo to Los Angeles**
- **Captain R.W. Warwick**
- **Observers: P. White (1st Officer), O. Ghoshroy (2nd Officer) and members of ship's company**

A large meteor was sighted at 0220 UTC as it entered the atmosphere in a bright white plume accompanied by a slightly offset, green, ionised trail. The meteor disintegrated with a visible shock-wave, and the green glow from the trail persisted for approximately 10 minutes after 'burn out'. The ship's position at the time was 30° 25′ N, 116° 53′ W.

Fireball
North Atlantic
8 January 2000

- **m.v. *Havdrott***
- **Panama to Puerto Jose**
- **Captain R. Tanguy**
- **Observer: M.A. Pagente (3nd Officer) and D. Dantos (AB)**

At 0945 UTC, when north of Isla la Turtuga a very bright fireball or meteor showing very bright multiple colours was sighted on the bow. It was travelling from west to east and had a long tail with two smaller balls following behind. The sketch indicates what was seen.



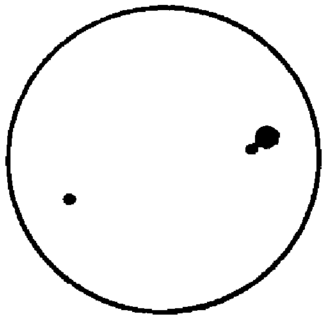
The object was in view for 20–30 seconds before disappearing in dark clouds for a few more seconds; it then reappeared and continued until lost from sight. The ship's heading was 320° at 15.5 knots in position 11° 10′ N, 65° 13.4′ W.

In brief: On 24 February 2000 the *C.S. Nexus* was engaged in cable-laying operations in position 33° 46.2′ N, 139° 26.4′ E when a waterspout was sighted at 2220 UTC. It was about 2.5 miles from the ship, tracking in a westerly direction, reaching sea level and coming to within 100 m of the vessel. The wind became erratic and the passage of the spout was marked with a shower of hail. A second spout was seen later in the day; it did not pass close to the vessel but was equally impressive. The activity on each occasion lasted about 20 minutes.

Sunspots
South China Sea
15 March 2000

- m.v. Grafton
- **Ponta da Madeira to Kaohsiung**
- **Captain A.M. Diesh**
- **Observer: I. Pinto (2nd Officer)**

At 0432 UTC sunspots were observed in the course of obtaining the noon sight. Three were detected, as shown in the sketch. The sky was covered with thin cirrostratus clouds, and the sun was observed on the horizon through the sextant; the spots were clear. The ship's position at the time was 17° 12′ N, 116° 35′ E.



The observer was unsure whether this was a usual or regular occurrence, but his attention was drawn to a report of sunspot activity in the July 1998 edition of *The Marine Observer* (a report from the *British Resource*, page 107). In the 'Editor's note' it was suggested that direct viewing of the sun, or (through) binoculars causes harm to the eyes, and instead to focus the sun on to a piece of paper, through binoculars. This sounded like a rather tedious process, and the observer felt that observing the sun on the horizon, using a sextant and appropriate filters, was more practical. Besides, it was felt that the sun would look bigger and true to life provided that no harm was done to the eyes.

Editor's note. Mr Pinto's comments are appreciated and understood. In the edition of *The Marine Observer* referred to, we sought only to remind observers that viewing the sun with the naked eye is not recommended, and that binoculars should be used only in the manner described above.

No doubt modern sextant filters are acceptable but it is important to remember that screening properties for both visible light and the infrared and ultraviolet wavelengths need to be considered when using filters of any description.

Volcano
South Pacific
18 February 2000

- m.v. *Arunbank*
- **Suva to Santo (Vanuatu)**
- **Captain E. Pallister**
- **Observer: S.J. Wallace (3nd Officer)**

Pronounced volcanic activity was noted at 0830 UTC; lava and smoke was clearly visible until 1000. An hour later, in position 16° 10.1′ S, 168° 36.5′ E, volcanic activity was again clearly visible. Magma, which included fire (lava) balls, was seen shooting into the air and also descending down the side of the volcano to the left and right. A large dark patch in the centre was taken to be the crater.

The vessel's heading was 286° at 12 knots, and a visual bearing (218°) indicated that the activity was on the island of Lopévi, but nothing was indicated on either *Admiralty Chart 1570 Pacific Islands Pilot, Volume II.*

In brief: A waterspout was sighted at 1400 UTC on 12 February 2000 by Second Officer G. McCracken on the *British Valour*. The sky cover was 7 oktas of cumulonimbus, and there were heavy rain showers scattered around the vessel's position (37° 41.3′ N, 06° 41.6′ E). The waterspout reached three-quarters of the way to the surface, and was estimated to be about 100 m in diameter. The direction of rotation was not noted.

In brief: On 20 March 2000. An unidentified shark was sighted from the *Arunbank* in position 06° 12.9′ S, 119° 24.7′ E by Third Officer S.J. Wallace. It was 3–3.5 m long, and its fin could be clearly seen cutting the surface along the port side. The shark swam close under the bridge and then passed astern.

... and finally

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.

Waterspout reported from m.v. *Erradale*. October 2000. Page 160.

Mike Rowe, of the Tornado and Storm Research Organisation, said:

"This is a fascinating observation. The fact that rotation was noted shows that a vortex was present, and the event can therefore be called a waterspout, even though there was no visible funnel. The lack of a visible funnel may have been because the relative humidity was too low to allow moisture condensation in the vortex, especially if pressure was barely reduced within the vortex.

"There is a likelihood that some waterspouts are more like the marine equivalent of a dust devil or land devil than the marine equivalent of a tornado. This may have been the case here."

Waterspout reported from m.v. *Providence Bay*. October 2000. Page 161.

Mike Rowe said:

"This is an interesting description, accompanied by an excellent and informative sketch. The translucent centre and darker edges have been observed frequently, though there are also reports of spouts in which the centre was darker!

"The agitated sea surface shows that the spout did touch down, even though the bottom 50 m of the funnel were invisible."

Waves *beneath* the sea*

By Bruce Parker, National Ocean Service, NOAA

On August 29, 1893, two months into its voyage to the North Pole, the Norwegian ship *Fram* was steaming in calm weather through open waters north of Taimur Island, Siberia, when it came almost to a dead stop. The ship's engine had been going at full pressure, moving her at 5 knots, when the speed suddenly dropped to 1 knot, and stayed that way. The ship's progress was greatly slowed, and Dr Fridtjof Nansen, the leader of the expedition, wrote in his journal, "It was such slow work that I thought I would row ahead to shoot a seal."

The *Fram* had encountered what Norwegian seamen called "dödvand" or "*dead water*". This strange phenomenon caused a ship to lose her speed and to refuse to answer her helm. The only clue to its cause was that dead water always occurred at locations where the sea was covered with fresh or brackish water. And this was indeed the case in the sound north of Taimur Island, where the ice cover had been melting rapidly. August 30th brought more slow going. Nansen wrote: "We could hardly get on at all for the dead water, and we swept the whole sea along with us." "We made loops in our course, turned sometimes right round, tried all sorts of antics to get clear of it, but to very little purpose. The moment the engine stopped, it seemed as if the ship was sucked back."

The *Fram* encountered dead water on several other occasions during its voyage. In November 1898, two years after his expedition's end, Nansen sent a letter to Professor Vilhelm Bjerknes, an old classmate, asking for his opinion as to the cause of this phenomenon. Bjerknes hypothesised correctly that, when there is a layer of fresh water on top of saltwater, a moving ship will not only generate visible waves at the boundary between water and air, but will also generate invisible waves beneath the sea along the boundary between the freshwater layer and the saltwater layer below it. The energy that normally would have propelled the ship forward was instead going into generating these "*internal waves*", with the result that the ship hardly moved at all (see Figure 1).

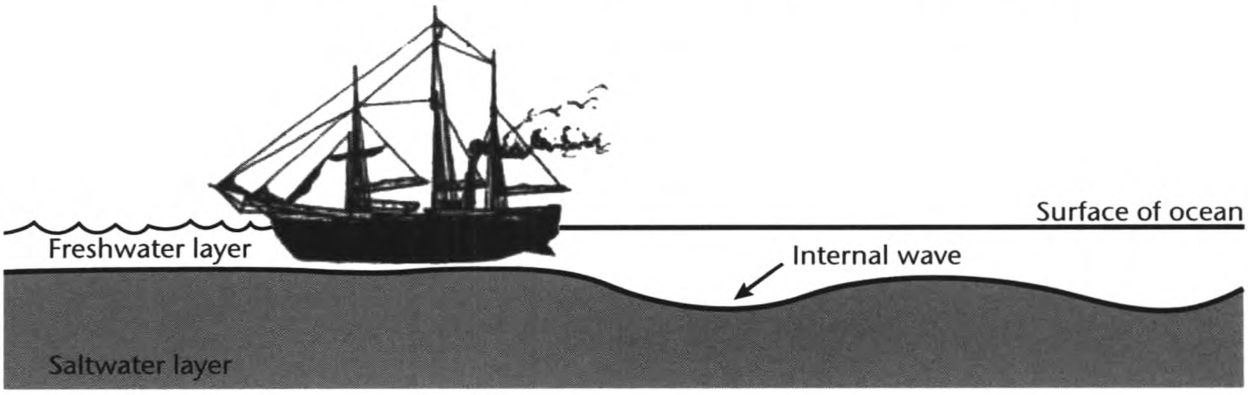


Figure 1. A model of the Norwegian ship Fram *generating an internal wave at the interface between an upper layer of freshwater and a lower layer of saltwater.*

Bjerknes then turned the problem over to his student Vagn Walfrid Ekman, who proceeded to confirm Bjerknes' theory with mathematics and with experiments. In these experiments he used a glass tank containing a freshwater layer on top of a salt-water layer that had been dyed a dark colour to make the interface clearer. Ekman pulled a model boat along the surface and was able to generate clearly observable internal waves propagating along the interface between the two water layers.

Reproduced from* Mariners Weather Log, **43, *11–17.*

This was the first demonstration and explanation of internal waves in the ocean. Internal waves, however, had been observed earlier in a totally different setting. Benjamin Franklin may have been the first to write about them, in a letter dated December 1, 1763, while he was in Madeira, Spain. He had made what he referred to as an Italian lamp, by filling the bottom third of a glass tumbler with water, and the next third with oil. He noticed times when the surface of the oil (with air above it) was motionless, but the surface of the water under the oil could be "in great commotion, rising and falling in irregular waves". He repeated this experiment many times when he returned to America. Today one often sees toys where a layer of blue-dyed water is covered by a layer of clear oil to make the waves along the interface look like waves at sea. These waves, however, look like they're moving in slow motion, and they become larger and break more easily than would water waves covered with a layer of air. (As we shall see, this is due to the small difference in the densities of water and oil, which is much smaller than the difference in the densities of water and air).

When one looks at the details of the wave motion along the interface between two liquids (whether water and oil or saltwater and freshwater) there are many similarities with the wave motion along the surface of the ocean. When the two layers are motionless, with the lighter fluid resting on the heavier one, and the interface is a horizontal straight line, the entire system is in equilibrium. At every point the weight of the fluid is exactly balanced by the pressure exerted on it by neighbouring fluid. If something disturbs the interface, for example by pushing the interface up at some point, heavier water from the lower layer will be moved higher up in the water column into a layer of lighter water. Gravity will then pull the heavier water back down. Without any appreciable friction to stop this downward movement the inertia of the heavier water will keep it moving downward, overshooting its original at-rest equilibrium position and moving deeper than it originally was. The lighter water in the top layer follows after, flowing down into the depression. This lighter water moves downward in the water column into a layer of heavier water. The buoyancy of the lighter water (being surrounded now by heavier water) eventually starts it moving upward again. This oscillation of the interface between the two layers also moves horizontally, because the individual water particles do not just move up and down; they also move to the left and right. In fact, water particles in both layers trace out circular orbits (rotating in opposite directions on opposite sides of the interface). Energy is transferred horizontally to surrounding water particles, and so the wave (i.e., the shape of the distorted interface) propagates along the interface (see Figure 2).

Due to the small density difference between the two water layers, the gravitational restoring force is reduced, and is much smaller than the restoring force for waves on the ocean's surface. The heavier water particles raised up in the crest of an internal wave are not that much heavier than the surrounding water, so it takes longer for these water particles to slow up and start falling again. Likewise, lighter water particles lowered into the trough of an internal wave are not that much lighter than surrounding water. They are, therefore, only slightly buoyant and so they also take longer to slow up and then to start moving upward. This makes for larger wave heights (they move farther up and down before slowing down) and for slower propagating wave forms (it takes longer for the restoring force to return water particles to their average position). Internal wave periods vary from 10 minutes to several hours, compared with several seconds to minutes for surface waves. Internal waves can reach heights of several hundred feet in the ocean, much larger than their surface wave counterparts.

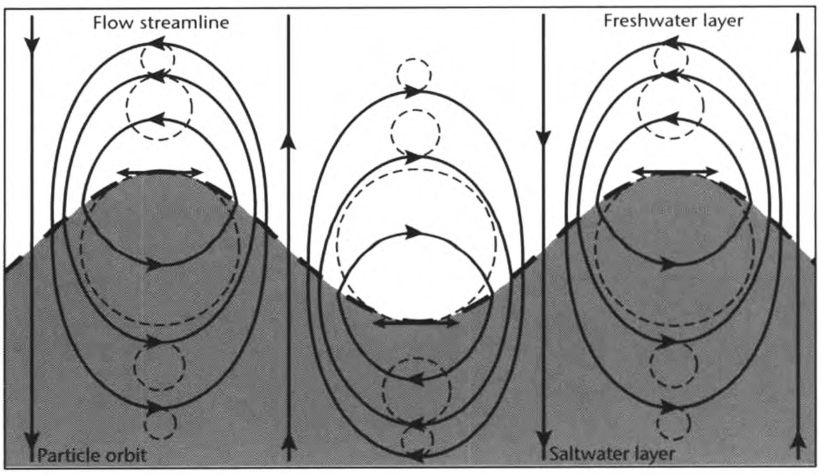


Figure 2. An idealised internal wave propagating along the interface between a layer of freshwater and a lower layer of saltwater. The streamlines show the direction of flow for a particular moment in time. the particle orbits are the motion of specific water particles over one complete cycle of the internal wave as it propagates from left to right.

For a ship to be caught in dead water, first, its draft must be close to the thickness of the fresh water surface layer, so it can generate an internal wave, and second, it must be travelling at the same speed (or slower) than the speed of propagation of the internal wave created. The speed of the internal wave is determined by the density difference between the two layers, and by the thickness of the layers. The drag on the ship reaches a maximum when the ship's speed is very close to the internal wave speed. If the ship has enough power to go faster than the speed of the internal wave (usually speeds greater than 5 knots will be enough), it can break away from the dead water. Dead water is thus less of a problem today with the power of modern ships. However, there have been cases where a ship has slowed down and then suddenly come to a dead stop (sometimes with extreme vibrations). In such cases, the initial reaction is usually that the ship has run aground. In some instances ships have even been dry-docked to assess the damage from the 'grounding', only to find that there was none.

Back when ships had less power than today, incidents of dead water were reported at many locations around the world where there was a fresh or brackish water layer on top of a saltwater layer. Dead water was especially common in the fjords of Scandinavia. A fjord is a hollowed-out glacial valley with a sill at the ocean end. Cold dense saltwater fills the bottom of the fjord to the depth of the sill. The surface water is lighter due to the freshwater from streams running into the fjord. The sill at the entrance tends to act like a filter, keeping a major portion of the energy in the ocean from getting into the fjord, so that there is little vertical mixing and the two layers are maintained. Thus, a fjord is an ideal location for the generation of internal waves. Dead water was less common in rivers because, even with strong runoff, the water column can be well mixed from top to bottom if the currents are strong enough (especially if there are strong tidal currents). When dead water was reported in rivers (with slow currents), it occurred at different locations at different times of the year because of differing amounts of runoff, since the thickness of the upper layer had to be comparable to the ship draft. Dead water occurred upriver during dry seasons, and outside the river entrance in the sea during periods of heavy runoff. Dead water also tended to be more prevalent during sea breezes and flood tides (which helped maintain the thickness of the freshwater surface layer).

Internal waves are not limited to rivers and fjords where fresh water flows out over saltwater. Most internal waves, in fact, occur offshore and in the open ocean, but there the density differences are primarily due to differences in water temperature. The upper layer is lighter because the water is warmer than in the lower layer. Heat from the sun warms the surface waters of the ocean, and the heat slowly propagates downward into the ocean depths. The action of surface waves often mixes the water to a particular depth, so that the entire upper layer is the same warmer temperature.

In this case there is a sudden change in temperature as one crosses the interface between this warm upper layer and the cooler layer below. This interface is called a *thermocline* (the interface between fresher water and saltier water is called a *halocline*). It is along the thermocline that internal waves in the ocean propagate. When water density increases with depth (due to decreasing temperature or to increasing salinity) the water is said to be 'stratified'. Wherever water is stratified, internal waves are possible.

Because the density difference between an upper warm layer and a lower cool layer in the ocean is smaller than that between freshwater and saltwater layers, and because the thickness of these layers is larger, the amplitudes of the internal waves in the ocean can be much larger than those in fjords and rivers. Ocean internal waves are often 160 feet high, but have been measured at heights of 600 feet. These internal waves also produce currents (see below) that can reach speeds of 6 knots. The largest internal waves tend to occur where the thermocline is deep and where the local generation mechanisms are energetic enough (places like the Strait of Gibraltar, where current speeds are increased by the sudden narrow width of the strait).

When two fluid layers are close in density it does not take much of a disturbance to move water vertically and to generate an internal wave. As we have seen, this disturbance can be a moving ship, but it can also be a change in wind stress or pressure at the ocean surface. When stratified water flows over a bump in the river bottom (or over on ocean ridge or shelf break, or over any irregular underwater topography) the fluid particles will be displaced vertically upward. Being heavier than their surroundings, those water particles are acted upon by gravity to move them downward again, thus starting the internal wave (see Figure 3).

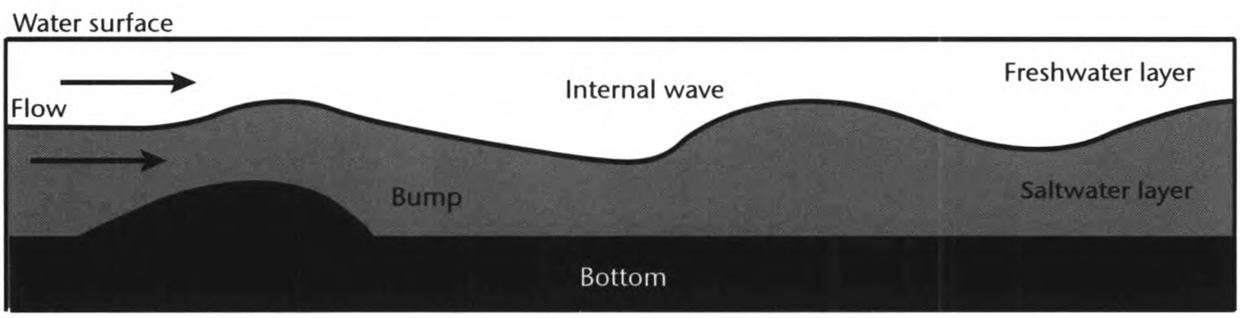


Figure 3. Internal wave generated by two-layered flow over a topographic feature on the bottom.

The internal waves that result can vary significantly, having periods from a few minutes to many days. *Internal tidal waves*, with the thermocline or halocline moving up and down at tidal frequencies, are probably the most common variety. An earthquake can produce *internal tsunamis* at the same time that it is producing the much faster and more destructive tsunami on the ocean's surface.

Sudden disturbances can generate *'solitary' internal waves*. A solitary wave (also called a *soliton*) is a single peak or trough that moves along the thermocline. Such waves can maintain their shape as they travel for hundreds of miles. Disturbances at a shelf break or in a strait can produce packets of solitons, which always travel with the tallest soliton at the front of the packet. A typical situation is that strong tidal currents oscillate stratified water over continental shelf topography or through a small strait, which generates long internal tidal waves, which become unstable as they propagate onto the sloping shelf (much like a wave breaking on a beach). This breaking of the internal tidal wave generates packets of solitons with even larger heights and stronger currents. For example, packets of solitons have been observed in oil fields in the northern South

China Sea that were generated 350 miles to the east, and two to four days earlier, by tidal forcing at the shallow sill in the Luzon Strait (halfway between Taiwan and the Philippines). These waves had travelled at speeds of 4 to 8 knots and had been refracted around an island creating a complex interference pattern of wave fronts. Packets of solitons are very common in this area, observable throughout the year. During some months these packets arrive every 12 hours. These waves can be 165 feet high and accompanied by currents on the order of 3 knots or higher.

Although internal waves beneath the surface of the water are not directly visible, they do have an effect on the water's surface that is clearly observable. Figure 4 illustrates the circulation pattern produced by propagating internal waves.

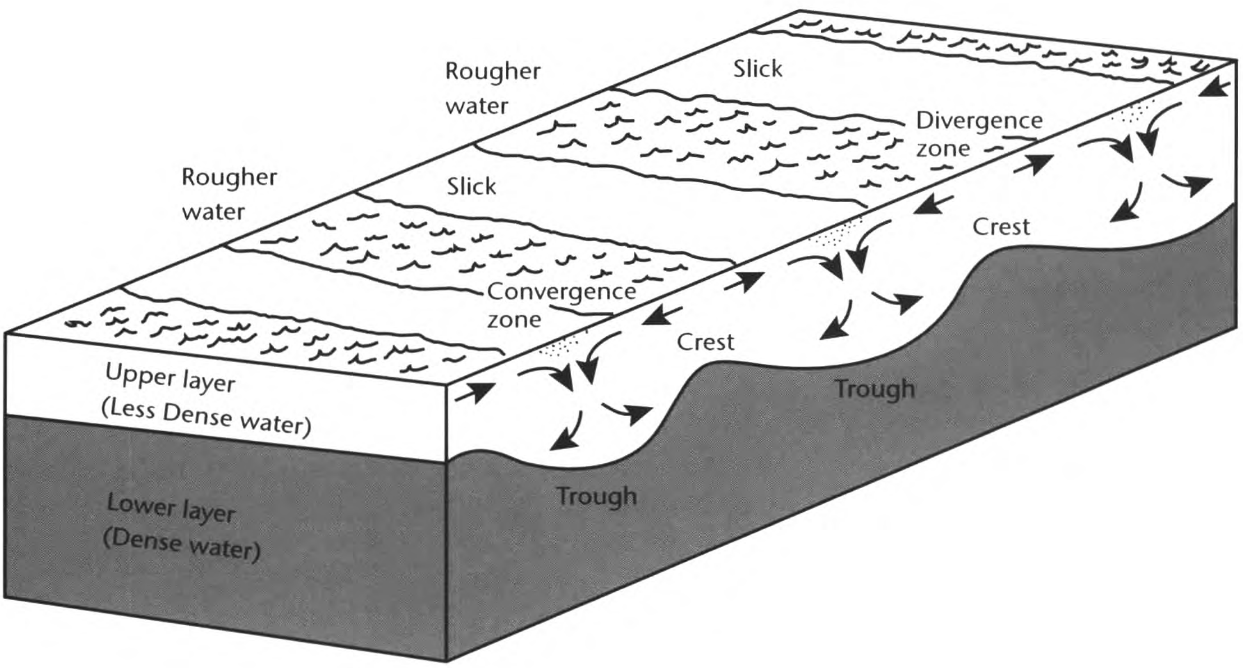


Figure 4. The circulation pattern produced by a propagating internal wave. At the water's surface, long slicks of smooth water alternate with bands of rougher water. Surface debris tends to collect in the convergence zones over the troughs of the internal wave, as does plankton.

Water in the upper layer moves down toward the trough of the internal wave as the interface moves deeper, and water in the upper layer over the crest is pushed aside as the crest of the internal wave moves upward. At the ocean's surface, therefore, the motion of the surface water is away from the crests and toward the troughs; the water tends to converge over the troughs and diverge over the crests. This causes any floating surface debris to collect over the troughs. This debris dampens the small surface ripples, making the surface smooth and glassy. The result is long parallel *slicks* of smooth water on the ocean surface, alternating with long rows of rougher water.

Such patterns were observable by Nansen and many others who described the surface waters during incidents of dead water. Nansen's comment that "we swept the whole sea along with us" was a typical description of dead water and was a reference to the smooth slick area (over the unseen trough of the internal wave just behind and below the stern of the ship) that moved with the ship. His comment that "The moment the engine stopped, it seemed as if the ship was sucked back," was a reaction to the slick area (and succeeding surface pattern) moving past the ship as the internal wave below propagated forward leaving the ship behind. For the larger internal waves offshore and in the open ocean, the parallel rows of smooth slicks and rougher water can each be

60 miles long. The difference in the surface roughness can be seen from satellites with Synthetic Aperture Radar (SAR) or with ordinary photography (if the sun is at the right angle). With packets of internal solitons, each soliton is preceded by a very long band of rough water (called 'rips') and followed by an equally long band of calm water.

Most of the interest in internal waves today is not because of dead water, but because of the damage that the large internal waves in the ocean can do, especially to oil drilling operations. Large amplitude internal waves (especially packets of internal solitons), with their associated strong currents, can create enormous bending movements in offshore structures, and have been reported to displace oil platforms hundreds of feet in the horizontal as well as tens of feet in the vertical direction. Drillships appear to be especially susceptible to the effect of internal waves. Self-propelled and designed to drill for oil in water over 7,000 feet deep, they use dynamic positioning and propulsion to maintain a constant position while drilling. Studies in the Andaman Sea (west of Burma) have shown increases in mooring line tensions that correlate directly with independently measured packets of 200-foot high internal solitons propagating past the drillship. Internal waves are capable of causing large integrated forces on vertical elements such as risers and tethers. Because of the real possibility of riser failure or other problems, internal soliton prediction systems have been developed.

Internal waves have also been cited as the possible cause for a few unexplained submarine losses. Perhaps the most famous was the loss of the USS *Thresher* on April 10, 1963, in the Gulf of Maine. The most probable cause of the tragedy was determined by the Navy to be a leak in an engine room seawater system which shorted electrical circuits causing a loss of propulsion power. At some point she sank below her crush depth and then plunged to the bottom. Two days before, however, a large storm crossed the Gulf of Maine creating a subsurface eddy and (it was speculated) possibly a 300-foot high internal wave. A submarine travelling through an internal wave could very quickly cross from dense to less dense water and suddenly become heavier and start to sink. Without prompt pumping of ballast overboard and enough propulsion power to propel it toward the surface, the submarine could continue to head deeper. Whether an internal wave played a role in the *Thresher* tragedy will never be known, but internal waves are certainly important in submarine operations. They can affect sound transmission and a submarine can trim its buoyancy so that it can 'rest' on a density layer, move slowly, and remain undetected by surface craft. Internal waves observed with satellite Synthetic Aperture Radar (SAR) may also be used to locate moving ships, by analysing patterns at the surface produced by the internal waves generated by the ship.

Internal waves also have a variety of as yet not fully appreciated effects. The slicks above the troughs have been shown to be associated with higher concentrations of plankton. This has been seen not just at the surface, but throughout the water column over the troughs. Porpoises have been observed feeding in these surface slicks. The porpoises also ride internal waves, much as a surfer rides a wave on the surface of the ocean. Porpoises learn to tilt themselves at a slope that matches the slope of the internal waves, so that in effect they're on a perpetual downhill ride.

We have only talked about internal waves travelling horizontally along an interface between two layers of water, such as a thermocline. However, water temperature can become cooler with depth in a smooth continuous manner, rather than in a sudden change when crossing a thermocline. In such cases, internal waves are no longer restricted to travelling horizontally. Although the largest still travel horizontally, some also travel vertically. Thus, internal waves can travel to all depths of the ocean if the stratification is right. They are, therefore, an important mechanism for transporting energy from the ocean's surface to the ocean bottom. If vertical propagation is impeded by the bottom or a sudden change in stratification at some depth, these internal waves can also be reflected.

Internal waves also occur in the atmosphere, travelling on the interface between warm and cold air. They can produce patterns of cloud organised into bands, with the clouds over the crests of the internal wave. They are often found downwind of mountain ranges, the so-called lee waves in which sailplane pilots soar to great heights.

In the report that Ekman wrote describing his experiments and his mathematical treatment of internal waves, he also provided a section of collected historical anecdotes about occurrences of dead water recorded as far back as the Roman Empire. Since dead water would very suddenly hold back a ship, as if by a mysterious force, it was attributed to a whole host of causes. Seamen blamed it on the gods or other supernatural forces, on magnetic rocks, and on molluscs that suddenly grew on the ship's hull. They also imagined very large remora fish (the normal size remora attach themselves to sharks and other fish) that could attach onto the hull of a ship and hold it in place even during a strong wind. The slick that follows a ship in dead water led some mariners to believe that something had made the water stick to the vessel and the ship had to drag it along, thus greatly reducing its speed.

Over the years mariners have tried a variety of ways to escape dead water, including shearing off course, running the whole crew forward and aft on the deck, scooping up quantities of water on deck, pouring oil on the water ahead of the ship, working the rudder rapidly, firing guns into the water, and hitting the water with oars. Tugboats with a vessel in tow were usually more successful in escaping. Typically the vessel they towed had a deeper draft and was the vessel actually caught in the dead water. When this happened one course of action was to shorten the rope between the tugboat and the towed vessel as much as possible. Unknowing to the tug captain, this allowed the tug's propeller to mix the water around the vessel being pulled, destroying the interface on which the internal wave travelled.

Of all the stories collected by Ekman, to which he attributed a role to internal waves, the most famous was the Battle of Actium, the naval battle on September 2, 31 BC, where the fleets of Marc Antony and Cleopatra were defeated by Octavian. Ekman cites an account by Pliny the Naturalist, who said that during that sea battle a remora fish grabbed onto Antony's ship and held it so fast that he was obliged to board another vessel. Although it will never be known for sure, Ekman's guess that an internal wave was involved may be correct. The Battle of Actium took place on the Adriatic Sea along the coast of Dalmatia (near where Croatia is today). The Adriatic Sea receives large amounts of freshwater river runoff. Antony's fleet was trapped close to shore by Octavian's fleet. Octavian had lighter shallower-draft vessels, whereas Antony's vessels were heavy deeper-draft Roman warships equipped with stone throwing catapults. Historians have mentioned how the lighter ships of Octavian were more maneuverable. But if on that day there was a layer of brackish water on the surface, Antony's deeper draft vessels would have been more likely to be captured by dead water, and Pliny's description of Antony's vessel being held fast may have been accurate. The battle ultimately ended when Cleopatra decided to flee with her 60 ships and Antony abandoned his legions and chased after her. It was a sea battle that changed history, and it is possible that internal waves may have played a role in Octavian's victory, which led to his subsequent crowning as Rome's first emperor, Augustus.

Bruce Parker is the Chief of the Coast Survey Development Laboratory, National Ocean Service, National Oceanic Atmospheric Administration (NOAA).

The VOS Climate project

The second planning meeting for the VOS Climate Project was held at the National Climate Data Center (NCDC) in Asheville, North Carolina, from 30 October to 1 November 2000, and was chaired by Captain Gordon V. Mackie (a former Marine Superintendent at the Met Office). Delegates from nine countries attended the meeting: Australia, Canada, France, Germany, India, Poland, Japan, the United Kingdom and United States.

A healthy exchange of views and ideas took place at the meeting, which ultimately had a successful outcome with an ambitious program for the next phase of the project being agreed. All the delegates present at the meeting undertook to recruit ships from their voluntary fleets and it is anticipated that there should be no problem in achieving the target of 200 project ships.

The Met Office is endeavouring to contribute approximately 30 UK Voluntary Observing Ships; emphasis will be given to those ships which routinely return to the UK, have a good observing record, and which preferably utilise TurboWin software for coding their observations. Efforts will also be made to provide a wide range of vessels operating both world-wide and on near continental voyages, with some research vessels providing observations in data sparse areas. Subject to a number of outstanding matters being resolved it is anticipated that initial recruitment will commence in Spring 2001.

The use of the TurboWin program will greatly simplify collection of the additional delayed mode data that will be required by the project. Participating ships not provided with programs such as TurboWin will, however, need to be provided with addenda to their meteorological logbooks to incorporate the additional codes.

A dedicated project web-site is being developed by the NCDC and should become fully operational by April 2001. It will contain downloadable instrumentation data; monitoring data; ship status data; project support information; and observation data.

Left: The NCDC, Asheville, N.C.

A newsletter containing information, reports, and statistics on participating ships, together with information drawn from the Port Met. Officers and project participants will be published periodically. The first edition is already planned for July 2001. Promotional literature is also being prepared, and a project logo is being designed for inclusion on a plaque which will be presented to participating ships.

Routine inspection forms are also being prepared for Port Met Officers to complete when visiting project ships, and it is planned that such inspections should normally be made on a quarterly basis at least.

As previously reported [*The Marine Observer*, July 2000, 131] the Met Office will act as the Real-time Monitoring Centre for the project. In this capacity we aim to monitor six observed variables for each of the project ships: pressure, wind speed, wind direction, air temperature, relative humidity and sea temperature. Such monitoring will take place primarily on a monthly basis and the results forwarded to the NCDC who will be acting as the Data Assembly Centre for the project. The variables for each observation received from a project ship will be co-located with the model field values (four times a day) and the resultant data sets transmitted to the Data Assembly Centre.

A further meeting to progress the project is tentatively planned to take place at the WMO Headquarters in Geneva in November 2001, when it is hoped that sufficient data will be available to review the initial project results.

Editor's note. A detailed article outlining the aims of the VOS Climate project and providing further information on how it will be organised will appear in the April 2001 edition of The Marine Observer.

Portishead Radio — the end of an era

Introduction

On 30 April 2000, all maritime and aeronautical services (radiotelegraph, radiotelex and radiotelephone) operated by Portishead Radio were withdrawn at noon, and the station closed. This article outlines the history and development of Portishead Radio.

The early days

In May 1897 Marconi ran early experiments with radio transmissions between Lavernock Point near Cardiff and Brean Down in Somerset, a distance of eight miles. Three years later in 1900 he set up radio stations at Poldhu in south-west Cornwall and a coast station five miles away at Bass Point on The Lizard peninsula.

These experiments culminated on 12 December 1901 when the first 'historic' transatlantic transmission from Poldhu was received in St. John's, Newfoundland, over 4,000 miles distant. This transmission marked the start of long-range communications.

It is interesting to note that weather played a significant part in all these events. As kite aerials were used, wind speed and direction were particularly important (especially considering the size of kite and the weight of the wire attached). In St. John's several attempts with balloons had failed owing to the balloons being blown away. Additionally the aerials at Poldhu (some 300 ft high) were blown down during gales in September 1901, as were those at Cape Cod (the original planned reception site).

On Monday 18 April 1910 the Bass Point station, GLD, (standing for LizarD Radio and later to be known as Land's End Radio, following relocation) received the first SOS by a coast station when the *Minnehaha*, of the Atlantic Transport Company, went aground in thick fog on Bryher, one of the Isles of Scilly. Ironically, the signals were hampered by the Poldhu commercial station, which was sending out its news and weather transmission!

Long-range wireless experiments continued at Poldhu and Caernarvon and, in June 1922, using a valve transmitter, Marconi established two-way communication between Poldhu and the Cape Verde Islands, reporting extremely good signals at a distance of 2,500 miles. Later he found signals between Beirut and Poldhu held up just as well during daylight hours. Experiments continued with contacts with South America, South Africa and, eventually, Australia.

The origins of Portishead Radio

Even while the early experiments were going on, the Marconi Wireless Telegraph Company and the General Post Office (GPO) set up a long-wave station in Devizes, Wiltshire, in 1920 using the call sign GKT. It was designed to provide two-way communication in the 110–160 kilohertz band at ranges up to 2,000 miles. Another station, using longer wave-lengths and higher masts, was built at Rugby to provide one-way communication with ships.

The GKT service proved extremely popular and, in 1924, the GPO constructed a second transmitter at Devizes to cope with the increased demand, but it proved to be inadequate and was closed the following year. Its functions were taken over by a new receiving station at Highbridge, near Burnham-on-Sea in Somerset, coincidentally some five miles from Brean Down. This system concentrated chiefly on the passenger-liner trade in the Atlantic. By 1926 it had been established that world-wide communication could take place, thanks to experiments with short-wave and it became necessary to construct a new transmitting station; its location was to be Portishead, near Bristol. Thus, Portishead Radio came into being in 1927. It is worth noting, however, that a radio station is often named after its transmitting site rather than where the operators are located.

The pre-war years

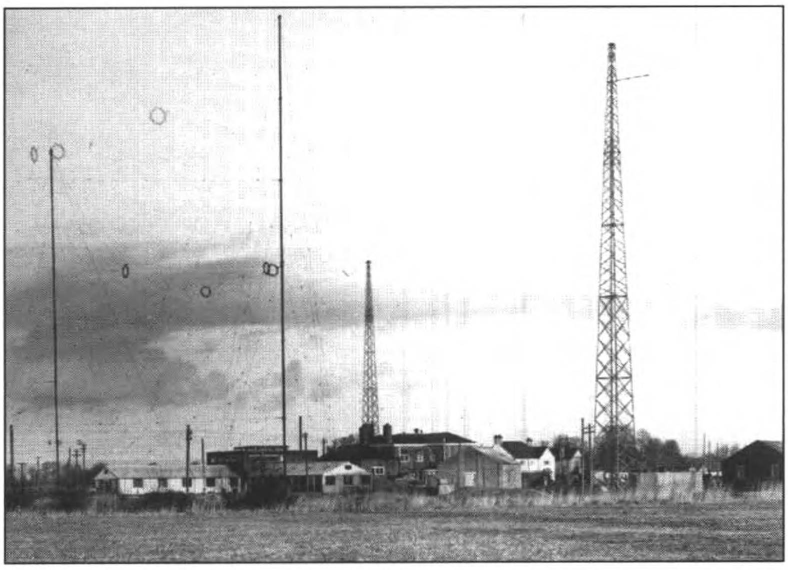
In 1929 a short-wave transmitter was added to the three long-wave (medium distance) transmitters at Portishead. During the 1930s the long-wave (short range) traffic moved to the Coast Stations which were located at North Foreland, Niton, Land's End, Fishguard, Seaforth, Grimsby, Portpatrick, Wick, Valentia and Malin Head. By 1936 there were four short-wave transmitters at Portishead with a staff of 60 radio officers handling over three million words a year.

It was also at this time that civil aircraft started to use the service. Flying-boats were known to relay traffic from South America and India where there were no long-distance communication facilities.

Changes during and after World War II

By 1939 Portishead Radio had 15 receivers and 16 transmitters in use, and handled 3.5 million paid words of radiotelegrams. The war years saw a change to the way of operation of Portishead Radio — commercial working ceased. Traffic was restricted to operational messages; these were sent several times but without acknowledgement. The art of Direction Finding had been refined to such an extent that the location of one ship could give away the location of a whole convoy. News such as the North Africa landings and the sinking of the *Scharnhorst*, distress calls and enemy reports ensured that operators were kept busy. The station was also used for limited broadcast news and regular weather reports and forecasts.

Peacetime brought a return to commercial traffic and a vastly increased demand — particularly for Morse. In 1946 the 'area scheme' to enable British and Colonial ships to relay signals through naval stations was started. Under the scheme radio stations in the British Commonwealth agreed to participate in a world-wide link-up with each station responsible for working with ships in its own area, and with the Royal Navy providing a link between land stations. Portishead and Halifax covered the North Atlantic; Cape Town served the South Atlantic and south-west Indian Ocean; Bombay and Calcutta covered the Indian Ocean; Sydney the south-west Indian and south-east Pacific oceans; Singapore and Hong Kong the north-east Pacific while Wellington covered the South Pacific Ocean, and Vancouver the north-west Pacific.



Highbridge receiving station in 1945

Area 1, assigned to Portishead, was split into three sub-areas — 1A, 1B and 1C — each with its own sending and receiving frequencies. Weather information could be sent pertaining to the particular area thus shortening the broadcast and making it more relevant. Area 1C, which covered the mid-Atlantic 'hurricane belt' would issue details of hurricanes and their tracks during the season. The full script was sent at specific times and frequencies. The other Area stations would also send forecasts covering their own parts of the world.

The area scheme ran until 1972 during which time Portishead Radio acted as co-ordinator, maintaining a vast file index on the movements of all British ships, so that messages for them could be routed to the appropriate station. The introduction of the area scheme and the increased use of radio communications increased the workload at Portishead dramatically. As a result two new operating rooms with 32 operating positions, central control rooms with steel plotting map measuring 36 ft [11 m] by 16 feet [4.8 m], plus a broadcasting and landline room were built in 1948. The station kept track of ships and aircraft with a card file and using the magnetic map.

Landline telex

The early 1950s saw the introduction of landline telex, which enabled customers to send to and receive messages directly from Portishead. Previously, messages to ships had passed by way of local Post Offices to the coastal stations, while other countries were accessible through the London Central Telegraph Office (CTO). The introduction at Portishead of teleprinters working directly into the CTO (through which all messages were routed) made it possible to speed up communications between the ship at sea and the sender/receiver on land. This method was especially for sending and receiving weather information, and did not entail the need to translate the information from and to the Morse code. Heavy users installed their own landlines to the station.

Radiotelegraphy was reaching its peak during the 1960s and, in 1965, there were 86 radio officers handling over 11 million words of traffic a year and communicating with over 1,000 ships every day.

Communications techniques developed further until, in 1968, Portishead achieved a 'first' when it introduced radio-telex transmissions of the *Daily Telegraph* to the R.M.S. *Queen Elizabeth 2*.

Further developments following the area scheme

Following the end of the area scheme in 1972, the volume of traffic started to expand as oil and gas platforms, deep water fishing and 'round the world' yacht races all used the service. By 1974 traffic levels had reached over 20 million words per year handled by 154 radio officers. This was the zenith of the maritime Morse service.

A proportion of the traffic received at Portishead radio would be OBS messages sent from ships and other observing vessels. These would be passed on to the [then] Meteorological Office at Bracknell. In return, Portishead would receive the forecasts and synopsis from the Meteorological Office, and they would be broadcast using radiotelegraphy — in the early days — while radio teletype and radiotelephony were used later. It was well known on board ship that the forecasts were received at 0930 GMT and 2130 GMT and the synopsis at 1130 GMT.

The increased workload and the manual telex service as well as the steadily increasing use of radiotelephony created the need for purpose-built accommodation, and this was under construction in 1979. In the meantime the Portishead transmitting site had been closed in 1978 and the main transmitters relocated to Rugby with subsidiary sites at Leafield and Ongar. The name of Portishead was retained, as it was so well-known that a change would only cause confusion.

The receiving aerials at Highbridge were also taken down at this time, to be replaced by the remote receiving site at Somerton some 15 miles away. Remotely controlled rhombic aerials and receivers were installed; those aerials can still be seen from the train today (June 2000). There were times when radio officers would be taken by bus to Somerton and it was used as an auxiliary operations centre.

A 'state-of-the-art' station opened at Highbridge in 1984 with radiotelephone and radiotelegraphy consoles plus automatic radiotelex. Satellite communications had little early impact, but by the end of the decade they had started to make serious inroads into the Portishead traffic figures.

Portishead Radio was not confined to offering a maritime service, and 1985 saw the opening of a more formal aircraft service. The full name of the company running the station was BT Maritime and Aeronautical Services, and BT continues to run a service for aircraft using 'aero frequencies'. There are still parts of the world where normal landline links are poor or non-existent and where the notion of satellites is incredible. Until its closure, Portishead ran a 'Gateway' service for relief agencies, embassies, military units and industry. Satellite images from Meteosat and the GOES system have changed weather forecasting and this service enabled information to be passed to those requiring it in remote areas.

Portishead in decline

By the mid-1990s new technology had had a significant effect on traffic figures; only 100 ships a day were using the Morse service, and staff numbers fell to 50. The gradual introduction of satellite communications required by the Global Maritime Distress and Safety System (GMDSS) accelerated the decline throughout the 1990s, to the point where the station became an uneconomic proposition. Throughout the world long-distance radio stations were closing down, although Portishead was reprieved until after January 2000 to provide a back-up system should the 'millennium bug' affect satellite performance.

At the end of March 2000, following a report by the industry regulator OFTEL it was announced that Portishead Radio would close down at noon on 30 April. On the same date all short-range VHF coast stations closed for service, followed by closure of the medium-range MF radiotelephony stations at Stonehaven and Land's End on 30 June 2000.

Other BT coast radio stations, all of which had traditionally received OBS messages from voluntary observing ships were also closed to this service, including: Anglesey, Humber, Ilfracombe, Land's End, Malin Head, North Foreland, Oban, Seaforth, Wick and many more.

One hundred years of terrestrial maritime radio history has therefore come to an end. It demonstrates the speed of modern living when one considers that a method of communication, which had such a profound influence on the dissemination of weather forecasts, can come and go within a single life-time.

Portishead Radio played a significant role in the lives of seafarers and for the maritime community as a whole — from the most majestic liner to the tramp steamer, from lone 'round the world sailors' to oil rigs, lighthouses, deep-sea fishermen, tugs and lifeboats. All who were in contact with Portishead, and the other coast radio stations that have now closed, bid them a fond "farewell".

Acknowledgement

Our thanks go to David Barlow, of the Radio Officers Association, who provided much of the material for this article. Other sources of information were *The Marine Observer*, 1979, p 36–38, and *The Story of Portishead Radio, Long-range maritime radio-communications 1920–1995*, published by BT Telecommunications plc, 1995.

Editor's note. On 1 July 1999, the Maritime and Coastguard Agency (MCA) assumed the responsibility for providing the Maritime Safety Information (MSI) previously provided by BT. MSI comprises navigational meteorological and ice warnings, meteorological forecasts and other safety-related messages.

As a consequence, meteorological forecasts and warnings are now broadcast on VHF and MF SSB channels from the Coastguard Maritime Rescue Co-ordination Centres (MRCCs) and the Sub-Centres (MRSCs). However, with the introduction of the GMDSS, the primary means for issuing such forecasts and warnings is considered to be by NAVTEX and SafetyNET™ broadcasts. Full details appear in the *Admiralty Lists of Radio Signals*, Volumes 3(1) and 5, and in associated *Notices to Mariners*.

The aurora event of 6/7 April 2000

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

On 4 April 2000 a coronal mass ejection (CME) was observed by solar monitoring spacecraft to leave the sun. At 1600 UTC on 6 April the US Advanced Composition Explorer spacecraft recorded that the solar wind velocity suddenly rose from 370 to 600 km s^{-1}. At about 1640 our own magnetic observers recorded a magnetic storm sudden commencement thereby indicating that the shock wave from the CME had impacted and compressed the Earth's magnetic field. Thereafter, a magnetic storm developed accompanied by an extensive aurora which our own ground-based observers, and the spacecraft, indicated was overhead at some time in northern France. American internet reports, monitored by Mike Boschat at Halifax (Nova Scotia), showed that aurora was visible at least down to Melrose, New Mexico (34° 36′ N, 103° 39′ W) and possibly down to mid-Florida.

British [land-based] observers detected aurora from at least 2000 to 0130. In odd locations cloud interfered with, or prevented visual observations, but in general the aurora was detected from the Orkney Islands to the English Channel coast. Observations described glows, curtains, ray structures, coronas and bands which were often at the zenith. One set of overhead bands included a twisted 'S-like' structure. There were periods of activity, flaming and flickering, but some observers commented that it was a quiet aurora. There were periods of all-sky activity. In the south of England the aurora extended up to and beyond the zenith, leaving a dark unlit section to the south.

Some observers said that at times some red auroral glows almost resembled illuminated haze. An airline pilot, flying from France to England at 30,000 feet, reported that the aurora seemed to be below him. Since the aurora could not possibly occur at such a low altitude, it must be assumed that what the pilot saw was auroral light being reflected or scattered by ice crystals or water droplets in clouds over which he was flying. This may be similar to the Tigom effect (first reported by the 'Tira' and 'Gom' platforms in the North Sea) whereby ice crystals at altitude have been known to reflect light from refinery and gas platform flare stacks, in such cases to give the effect of spurious aurorae.

A consensus of observers suggests that the peak of auroral activity took place between 2315 and 2330 on 6 April. There was a subsidiary peak at about 2058, while other peaks and lulls were noted by individual observers. Red appears to have been a predominant colour, but auroral green and blue were also detected. White and yellow were also common but these are formed by proportionate mixing of the primary aurora colours of red, green and blue. Blue is associated with intense auroral activity owing to reactions with ionised molecular nitrogen. Blue mixed with red can give a purple hue. Blue and purple are usually most noticeable at high altitudes of the aurora, particularly if above the Earth's shadow and sunlit, when solar radiation enhances the light-producing process, associated with ionised nitrogen bands.

This aurora was a major event although not as great as that of 13/14 March 1989. During that 'Great aurora' mariners' observations were extremely useful, allowing the BAA to determine its southernmost extent. Similarly, marine sightings determined the northern migration of the aurora australis at Madagascar.

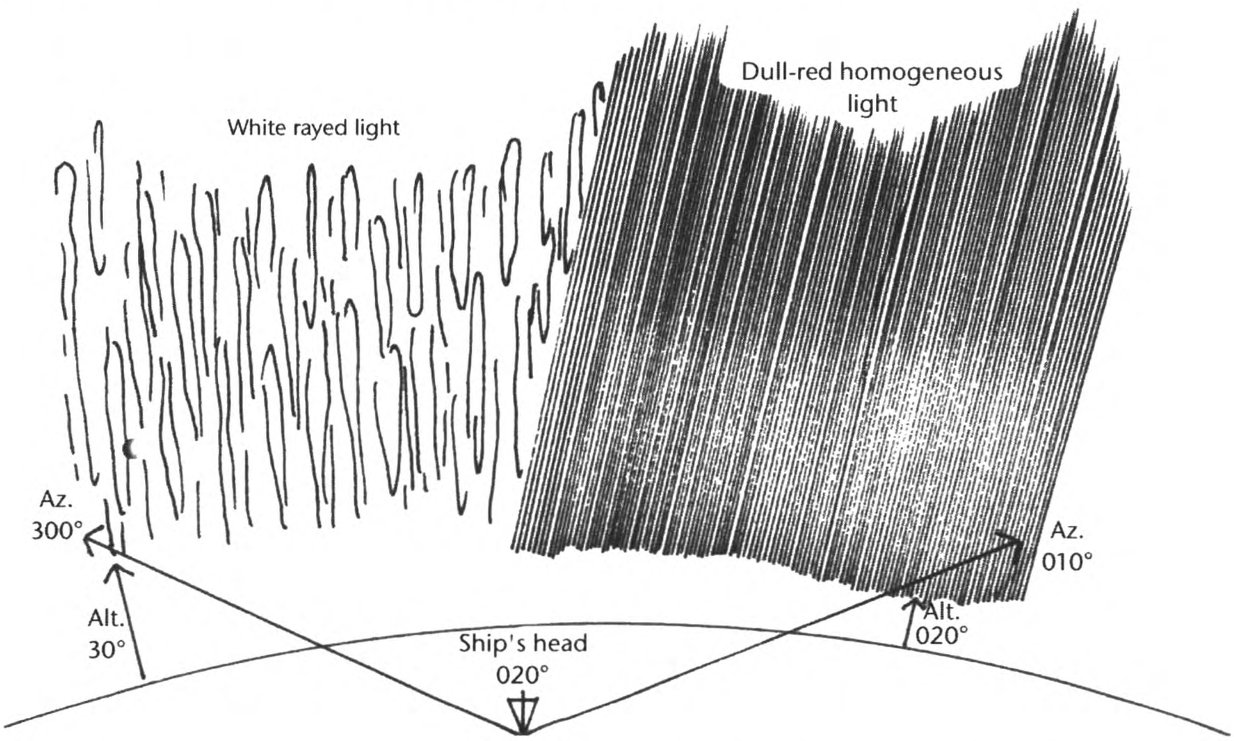
Although American satellites chart the position of auroral activity, it is still useful to determine its visibility on the ground or at sea for comparison with auroral records going back hundreds of years to pre-Christian times.

Postscript by the Editor

To date, the reports that follow have been received of this aurora, from the *Activity*, the *Dallington* and the *Singapore Bay*, and these have been forwarded to the British Astronomical Association for their records. Any further accounts will be included in the April edition of *The Marine Observer*.

■ **m.v. *Activity*.** Observers: B. Murnin (2nd Officer) and D. Beaumont (Watchkeeper)

"6/7 April 2000. The vessel, whilst en route from Guernsey to Stanlow, was in position 53° 00′ N, 05° 00′ W, south-west of Anglesey on a course of 020° at 2315 UTC. At this time a dull-red homogeneous band was sighted in the sky to the east, and extended to the north at an elevation of approx. 20°. The sketch indicates what was seen.



"From the north, a white rayed band of light was observed extending to the west-north-west at an elevation of approx. 30°. The glow pulsated slowly for approx. 20 minutes before fading away. The bands of light reappeared intermittently over the proceeding hour. During the period of observation no interference was detected to VHF, radios or radar. The cloud cover was 3 oktas of high cirrostratus."

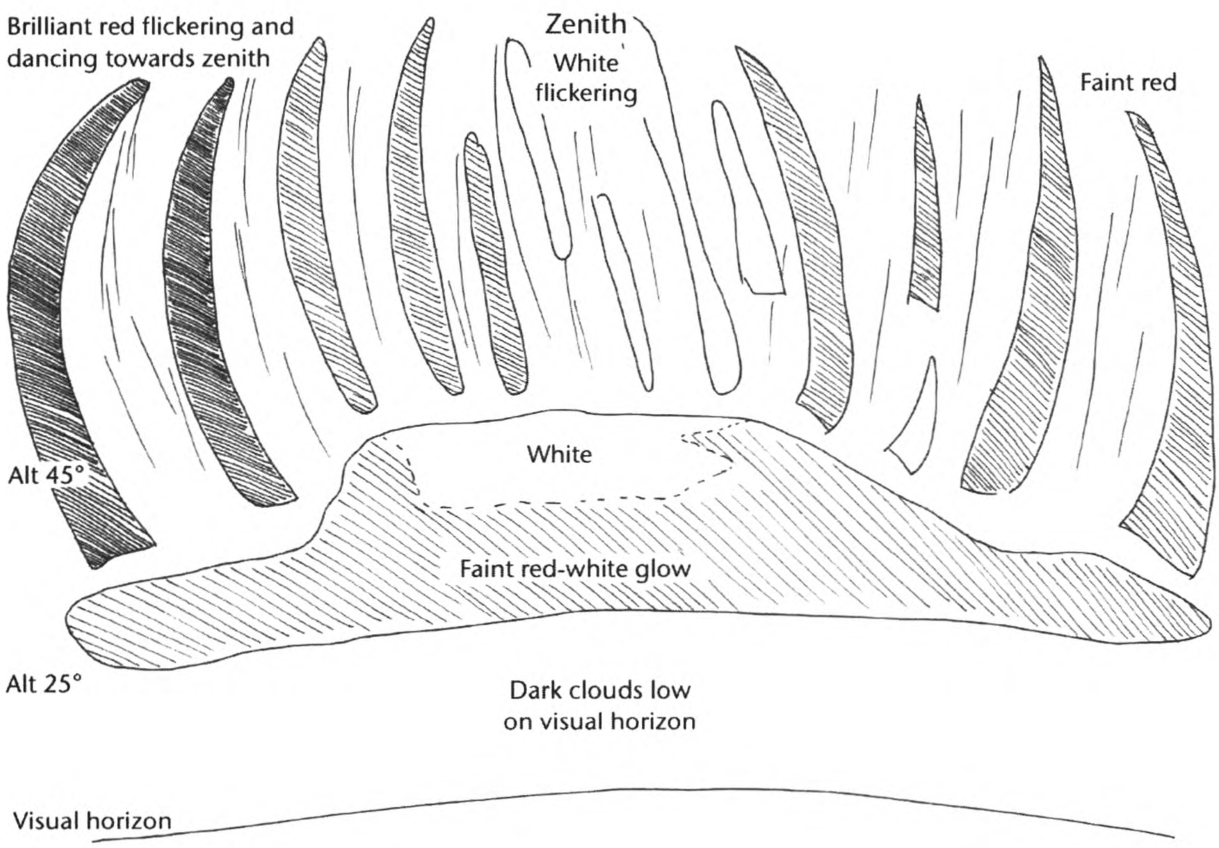
■ **m.v. *Dallington*.** Observers: Captain C. Grahame and P. Johnson

"At 2000 whilst north-west of Hanstholm on the Danish coast, a rayed arc was observed covering the northern sky from the eastern horizon to the western horizon; at times brilliant red areas showed among the white bands. The arc was changing rapidly during the observation, with the red colour fading and then reappearing. From 2100 onwards further brilliant aurorae were observed; a particularly spectacular observation was centred on Polaris, approximately, where there was a brilliant red and white corona with lines emanating from the centre. The white lines were changing from brilliant red to pale green. The display finally faded prior to sunrise at about 0400 (on 7 April)."

■ **m.v. *Singapore Bay*.** Observers: S. Foster (3rd Officer) and C. Agner (AB)

"The aurora was first observed at 0000 UTC on 7 April in the form of a red glowing patch that covered a large section of the night sky, from 300° to 070°. There were dark clouds low on the visual horizon, and the aurora appeared above these, at an altitude of approximately 25° then extending almost to the zenith. Stars were visible through it. The patch was red in colour, being brightest towards the lower edge, then fading in both colour and brightness towards the zenith.

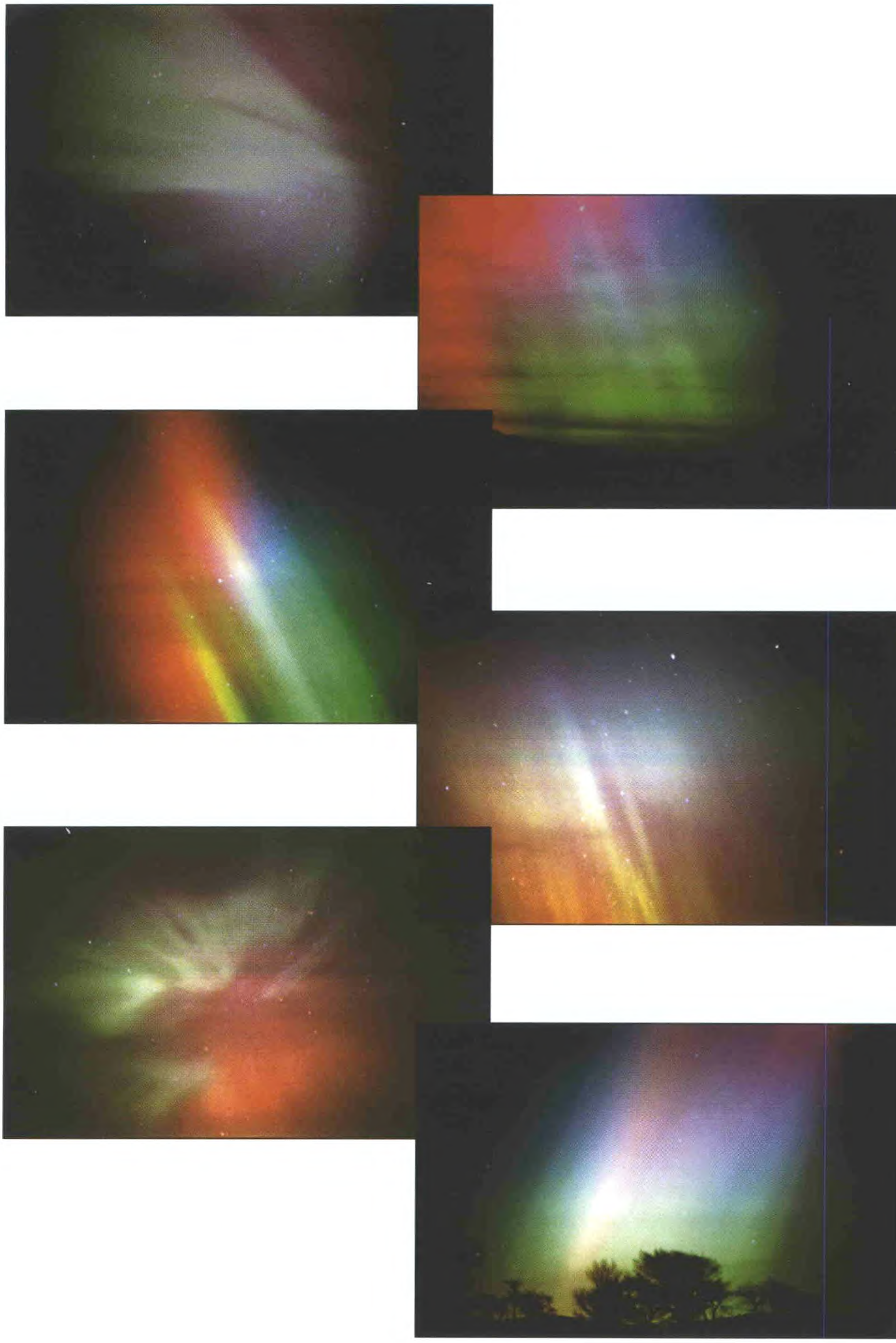
"During the period of observation (approximately 50 minutes) the aurora changed shapes and colours several times, being at its peak at 0040 at which time it was red and white, with patches and rays covering a large portion of the sky. All red and white rays were flickering or dancing across the starlit skies as they raced towards the zenith. During the display, the lowest edge remained at about 25° above the horizon while the highest rays reached the zenith. The sketch shows the display at 0040.



"Later information revealed that the aurora had been sighted in Europe and the United States, with NASA declaring it a Class 4[*] event. The cause of the aurora was a coronal mass ejection dated 4 April which resulted in this outstanding display. At the time of the event, the ship was on a heading of 278° at 22.5 knots in position 40° 11.6′ N, 36° 16′ W."

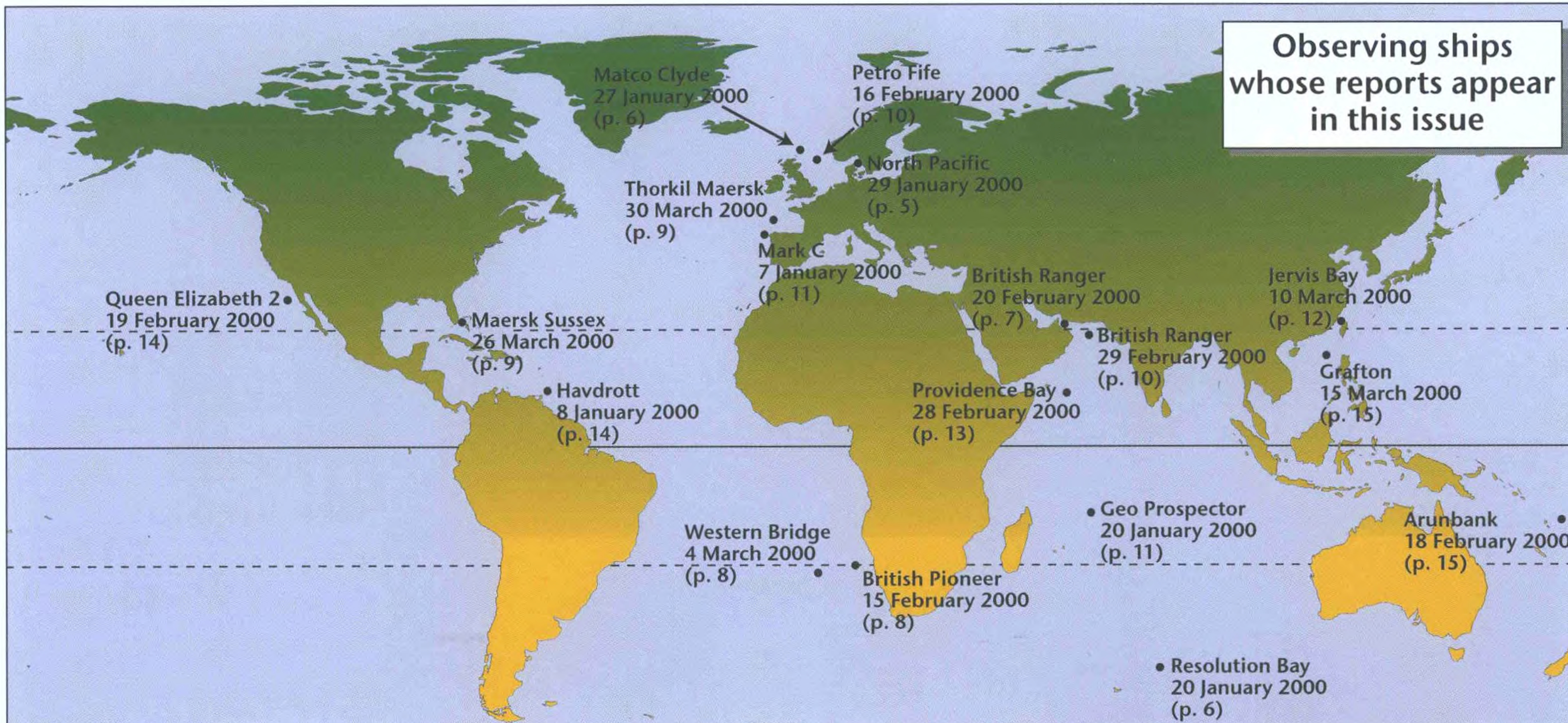
The aurora, whether occurring in the northern or southern hemisphere, is always of interest to the British Astronomical Association, and we look forward to offering that organisation more observers' reports in the future.

[*] NOAA Space Weather Scales. On the NOAA scale for Geomagnetic Storms, level G4 is a Severe storm. (The scale ends at level G5, this being an Extreme storm.) More information about NOAA Space Weather Scales can be found at: www.sec.noaa.gov/NOAAscales/index.html



These photographs of the aurora of 6/7 April were taken between 1130 UTC and 1245 from Muirshield Country Park, Lochwinoch in Scotland, by Ian Law, an amateur astronomer. For more information readers are invited to contact him by email at: I.Law@compaq.com

Observing ships whose reports appear in this issue



Also in this issue

	Page		Page		Page		Page		Page
Activity	31	C.S. Nexus	14	Erradale	16	Northern Producer	42	Providence Bay	16
Arunbank	16	CanMar Pride	41	Mark C	44	Northern Venture	45	Resolution Bay	13
Barbet Arrow	7	Chilham Castle	45	Matco Thames	42	Peninsular Bay	8	Sedco 706	44
British Valour	16	Dallington	31	New Zealand Pacific	43	Pride of Hampshire	46	Singapore bay	32

Editor's note. The sight of a great albatross cruising and gliding effortlessly over the sea surface on a 3-m wing-span, making use of the air currents above the waves to do so, is a memorable occasion; and the smaller species of this bird are no less spectacular in their movements.

However, we have noticed that the numbers of ship reports of albatrosses of any description have decreased in recent months; indeed, some observers themselves have remarked that fewer birds are being seen, for reasons unknown. But one reason for this decline has come to light, and the following article may go some way to explain to readers what is happening.

Saving the albatross *

By Prof. John Croxall

(British Antarctic Survey scientist and Chairman of the Royal Society for the Protection of Birds)

I joined the ranks of the immortals (to paraphrase the great marine naturalist, Robert Cushman Murphy), in 1976 when I first saw *the* albatross — that most fabled and majestic of seabirds, the wandering albatross. I was on my way to South Georgia to establish a British Antarctic Survey research programme on seabirds and seals. This quintessential seabird gliding across wild polar seas is an image that will remain forever. Which is probably just as well, as more than a third of the world's population has since disappeared. I have spent much time trying to discover why and helping to devise solutions to the problems.

G. Robertson

In 1976 I was doubly privileged to see these marvellous birds at sea and to work amongst them on the breeding grounds. The field station on Bird Island was home for many summers. I shared the island with 100,000 fur seals and a million seabirds, with 200,000 penguins and 10,000 albatrosses of four species.

My mentor was Peter Prince, whose untimely death in 1998 deprived seabird ecology of an exceptional field practitioner and seabirds one of their staunchest defenders. He was studying grey-headed and black-browed albatrosses, so I studied the wanderers.

The largest seabirds, wandering albatrosses have one of the lowest reproductive rates (therefore greatest vulnerabilities) amongst birds. They lay but a single egg every second year, take 10–12 years to reach breeding age and spend their first 3–5 years of life at sea. They *should* then live another 30 years or so, circumnavigating the southern oceans, feeding mostly on fish and squid.

It is inspiring to work with these birds whose average age is greater than one's own and, later, to see birds you ringed as chicks return to breed; to ring *their* offspring and to see these return, too, to form their own lifelong pair bonds.

* Reproduced from *Birds* (the magazine of the Royal Society for the Protection of Birds), Autumn 2000, 57–60, by kind permission of the Editor.

Alas, nowadays pair bonds and lives are too short by half. We soon saw that wandering albatross populations had decreased since the 1960s through problems at sea, not on land. Ring recoveries indicated a worrying number killed through interactions with fishing vessels.

There is a long history of interaction between albatrosses and humans intent on commercial gain, always to the detriment of the albatrosses. Even in the remote vastness of the southern ocean early seafarers and sealers killed many for food, recreation and souvenirs (tobacco pouches from feet, pipes from wing bones). Populations at Easter Island and Tristan da Cunha were exterminated, or nearly so. Feather hunters slaughtered tens of thousands, bringing the short-tailed albatross to the brink of extinction (there are still only 1,000 pairs). In the 1950s more than 50,000 Laysan and black-footed albatrosses were killed to reduce air strikes in Hawaii. As such land-based carnages ceased, numbers recovered. But new threats at sea began to take their toll.

From 1950 some 30 years of gill-net fishing killed at least *half a million* seabirds *every year*. While only 1% were albatrosses, losses of 5,000 a year were barely sustainable. As gill-nets were banned, drift-net fishing began. It took another decade to achieve a global ban on drift-net fishing in 1993. Yet *in 1990 alone* it was estimated to have killed more than 4,000 black-footed (2.5% of the world total) and 17,500 Laysan albatrosses (1.5% of the world population).

Against this, our problems at South Georgia may have seemed just a minor local difficulty! Knowledge of our declines, however, prompted investigations elsewhere; soon we heard of other declining populations of albatrosses.


J. Croxall

Wandering albatrosses displaying

We tracked wanderers using transmitters to send signals to orbiting satellites. We confirmed the long distance migration of South Georgia birds to Australia and marvelled at the speed of transit: six days to cross the Indian Ocean. To our amazement, even when rearing chicks on Bird Island, our wanderers commuted to and from the coastal shelf of South America, as far as southern Brazil — where recoveries of birds killed during fishing came from.

South American colleagues identified the fisheries as those catching tuna with longlines. This involves tens of thousands of hooks baited with squid and fish — albatross food — on thousands of metres of line. Before the line sinks, seabirds try to eat the bait, may get caught on the hooks, and drown.

Coincidentally, an Australian, Nigel Brothers, was working as an observer on vessels in Australian waters. Albatrosses, including wanderers from South Georgia, were regularly killed. The chance of a bird being killed was less than 1 in 1,000: but with 30–40 million hooks set to catch tuna, probably 30–40,000 albatrosses were killed each year. This had been going on for a decade or more: now we could explain the declines.


J. Croxall

Black-browed albatross chick

Many species of albatrosses and petrels were affected. Much effort was spent in finding ways to reduce the bird 'bycatch'. A major problem was to ensure that any such methods were actually *used* by fishermen, even though every bait removed by a bird potentially means the loss of a fish, costing the industry millions of dollars.

We identified some solutions, pending changes to design vessels to release longlines under water, out of reach of seabirds. Setting lines at night reduces albatross deaths, but many nocturnal petrels are killed. Long streamers on poles frighten birds away, but must be used correctly. Heavier weights sink lines faster, reducing the danger period for birds.

Just as there was a prospect that these measures might reduce the catch of birds in tuna fisheries, longlining became preferred in a whole range of new fisheries: for swordfish in the Pacific, hake around South Africa, toothfish around Patagonia and sub-Antarctic islands.

Suddenly, albatrosses and many other seabirds were seriously at risk: still no fishery had taken the lead in adopting protective measures. Fortunately, this was taken seriously by the management authorities for the southern ocean: The Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR). With colleagues in Australia, New Zealand, South Georgia and France, and support from the Scientific Committee of CCAMLR, I persuaded its Commission to protect seabirds, especially albatrosses, from longlining throughout the southern ocean.

Night setting, use of streamers and line weighting are compulsory. Offal discharges during fishing is prohibited. There is a closed season at the time when albatrosses are most vulnerable. CCAMLR also requires observers aboard each vessel to ensure that such provisions are adhered to. So CCAMLR has reduced seabird catches by 90% in recent years.

Unfortunately, no sooner had this good example begun to spread than *pirate* fishing started in a big way, particularly for Patagonian toothfish, known as 'white gold' because of its high value. Despite vessels being impounded or sunk, million dollar fines and gear confiscation, pirate fishermen operating under flags of convenience to conceal ownerships and financial interests, in which Spain has a leading role, still have a lucrative business. It accounts in the southern ocean for *50–100,000 seabirds annually*, including 10–20,000 albatrosses: losses that are totally unsustainable.

It is no surprise that at Bird Island we now see big decreases in breeding black-browed (1,500 from 22,000) and grey-headed albatrosses (losing 500 a year from 20,000) as well as wanderers (45 a year from 4,000). Very few young black-browed and grey-headeds survive to breed. Once, 1,000 pairs would fledge 500 young of which 200 survived to breed: now, only about 20 youngsters make it.

Having spent the best part of 25 years working with albatrosses and seeing the prospects of these wonderful birds decline, I find it ironic that many populations may be saved from extinction only because fish caught by longliners will become commercially extinct.

It is, then, very exciting for me to see BirdLife International, with the full support of its UK partner the RSPB, embarking on a major campaign to 'Save the Albatross'.

Its main aims include:

- all relevant countries to adopt action plans to reduce the catch of seabirds by longliners
- an international agreement to protect southern hemisphere albatrosses and petrels under the Bonn Convention of Migratory Species
- elimination of illegal, unlicensed and unregulated pirate longline fishing by international trade and related agreements
- adoption of precautionary ecosysytem approaches by agencies regulating high seas fishing

If we fail, this will not just prejudice the survival of magnificent albatrosses — truly the spirits of the seas. We will have failed to work internationally to safeguard the world's greatest global commons — the oceans. The fate of albatrosses is inextricably linked with the future of the world ocean.

If we fail its most potent symbol, the albatross, we will ultimately fail to save the seas on which albatrosses — and we — depend.

UK observers' sightings of cetaceans, 1999–2000

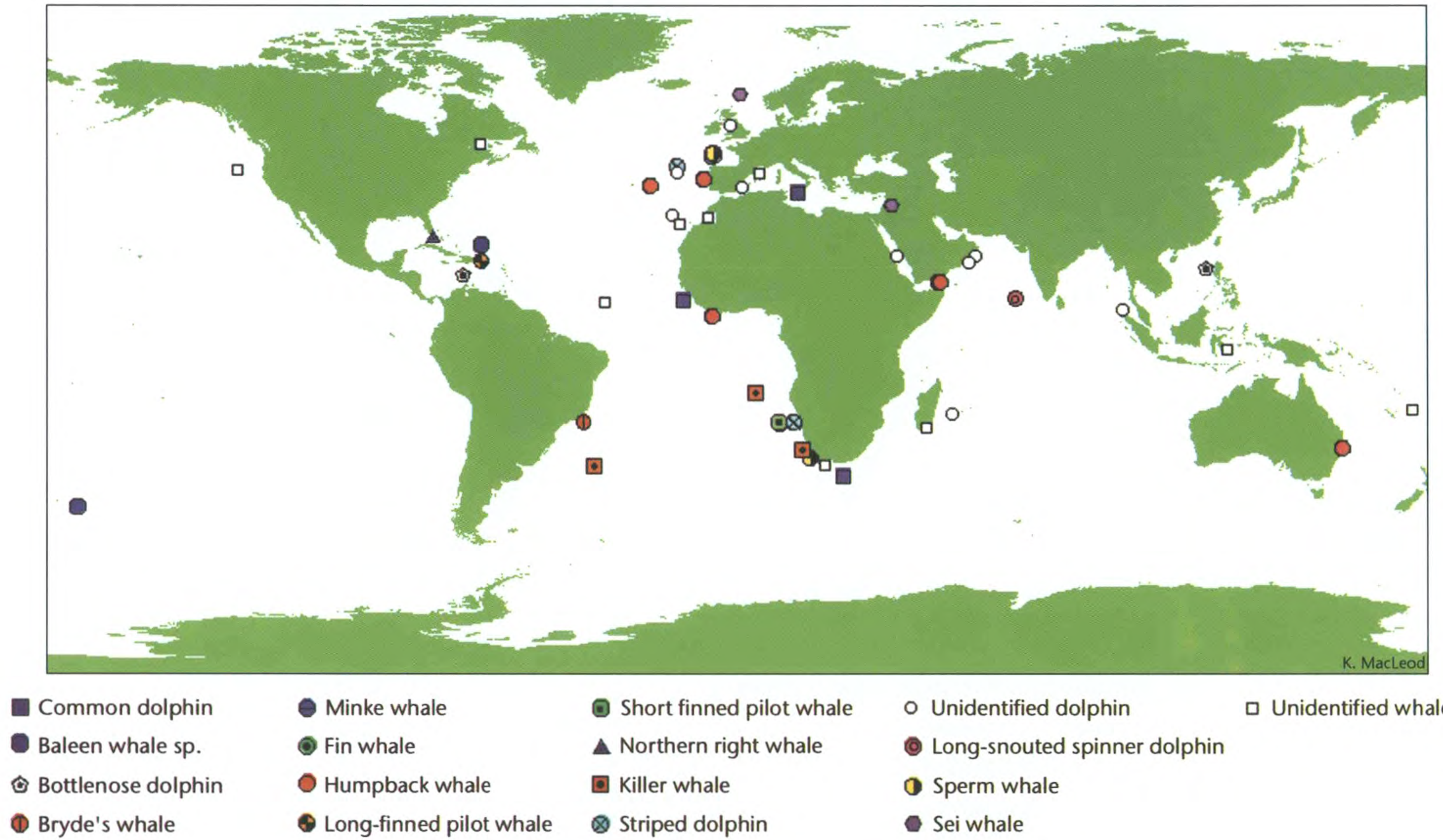
Identifying cetaceans at sea can be tricky at the best of times, and is made no easier when they offer only glimpses of themselves. The 'characteristic features' given for a particular species in field guides should make this a more straightforward task for observers, but even so, cetaceans do not always behave or look exactly as they do in books. The plots on the map opposite, by Kelly MacLeod (Natural Resources Institute, University of Greenwich), mainly represent the species that could be positively identified from observers' sightings made between October 1999 and October 2000. Species are shown as 'unidentified' when essential, confirmatory details were not available.

Therefore, when observing cetaceans, making a rough sketch will help, and noting some or all of the following features, if possible, may aid later identification:

Whales: the estimated length of the visible part of the back; presence of a dorsal fin; the size, shape and position of the dorsal fin; the height, shape and timing of the 'blow'; how the whale dives, and whether the flukes are displayed; the shape and colour of the flukes and fins; overall colour; general behaviour.

Dolphins: the estimated length; size and shape of the dorsal fin; whether there is a pronounced 'melon' (forehead); colour, or patterns of colour; presence of a dorsal fin; length of beak; general behaviour.

Cetacean observations recorded by UK Voluntary Observing Ships. October 1999 to October 2000



ASAP Panel meeting

The Met Office section the twelfth session of the Automated Shipboard Aerological Programme Panel (ASAPP) from 27 to 29 September 2000 at the Met Office College. It was the first meeting of the panel, held under the auspices of the newly formed Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), and delegates from all the major National Meteorological Services involved in ASAP operations were present.

E.J. O'Sullivan

The meeting afforded delegates the opportunity to report on the relative merits and performance of their national ASAP systems and to consider new technical developments. Representatives from the marine section of the Met Office gave a detailed presentation on the new UK ASAP system installed on the container ship *CanMar Pride* (shown left), which operates between Europe and Canada. [A detailed article on the UK involvement in ASAP operations and on the new system onboard *CanMar Pride* appeared in the July edition of *The Marine Observer*, 108–113]. It was reported that the new system was now operating satisfactorily with a total of 116 radiosondes launched successfully for the period January to August 2000, and an average terminal sounding height in excess of 25 kilometres being reached. Some GPS wind-finding problems had however been experienced, especially above the tropopause. Similar operational reports on the status of the ASAP systems on ships recruited by Denmark, France, Germany, Iceland/Sweden, Japan and the USA were also presented by national representatives.

S.R. Key

The Chairman, Dr Klaus Hedegaard also gave a report on the Eumetnet* ASAP Programme (E-ASAP) for which he is Project Manager. He explained that the programme called for the establishment of one ASAP system on a route within the Mediterranean, and another on a route between the English Channel and the south-eastern seaboard of North America. Host ships for both routes had now been identified and 10-ft [3-m] launch containers, similar to that used for the UK ASAP system, were now being manufactured. The launch container installed on the *CanMar Pride* is shown above.

Among the new initiatives being progressed at the meeting were plans for a new World-wide Recurring ASAP Project (WRAP). A potential line and ships were identified for this new global ASAP project and the USA delegate kindly offered to provide, on loan, a complete launcher and sounder system.

*EUMETNET is a network grouping 18 European National Meteorological Services

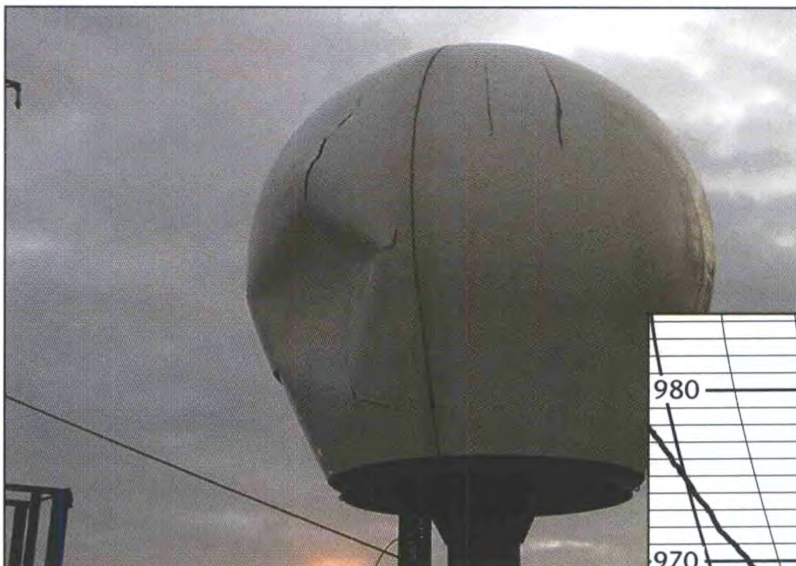
Given its importance for operational meteorology and global climate studies it was agreed that this project should be given high priority. However it was recognised that a number of major issues remained to be addressed, notably concerning the installation of the sounder system, crew training, funding of consumables and ship recruitment. A feasibility study was therefore launched to resolve these matters. The study will be undertaken by Captain Gordon Mackie (who is well known to marine staff, having been a former Marine Superintendent at the Met Office between 1983 and 1995), and it is anticipated that the new system will be installed on a UK-recruited voluntary observing ship [further details will be reported to readers as the project unfolds].

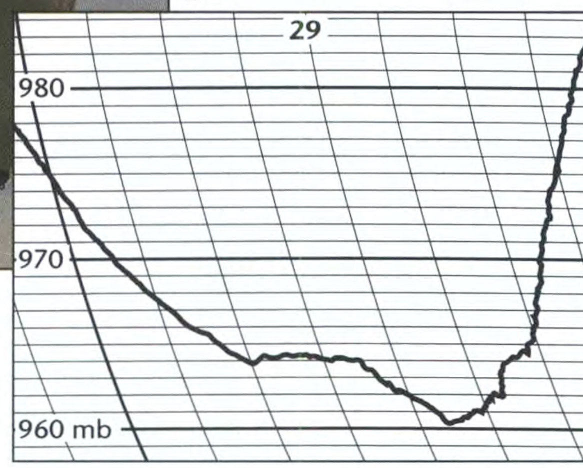
S.C. North

The Panel was pleased to note a report from the representative from ECMWF (European Centre for Medium-range weather Forecasts) that the quality of data from ASAP systems continued to be comparable, or superior to, that of land upper-air stations with respect to forecast model fields.

The large number of representatives present at the meeting (shown above, with the Chairman at centre front) indicated the continued importance of ASAP operations not only to numerical weather prediction and operational meteorology, but also to global climate studies and to the provision of essential ground truth data for satellite soundings.

Scene at sea





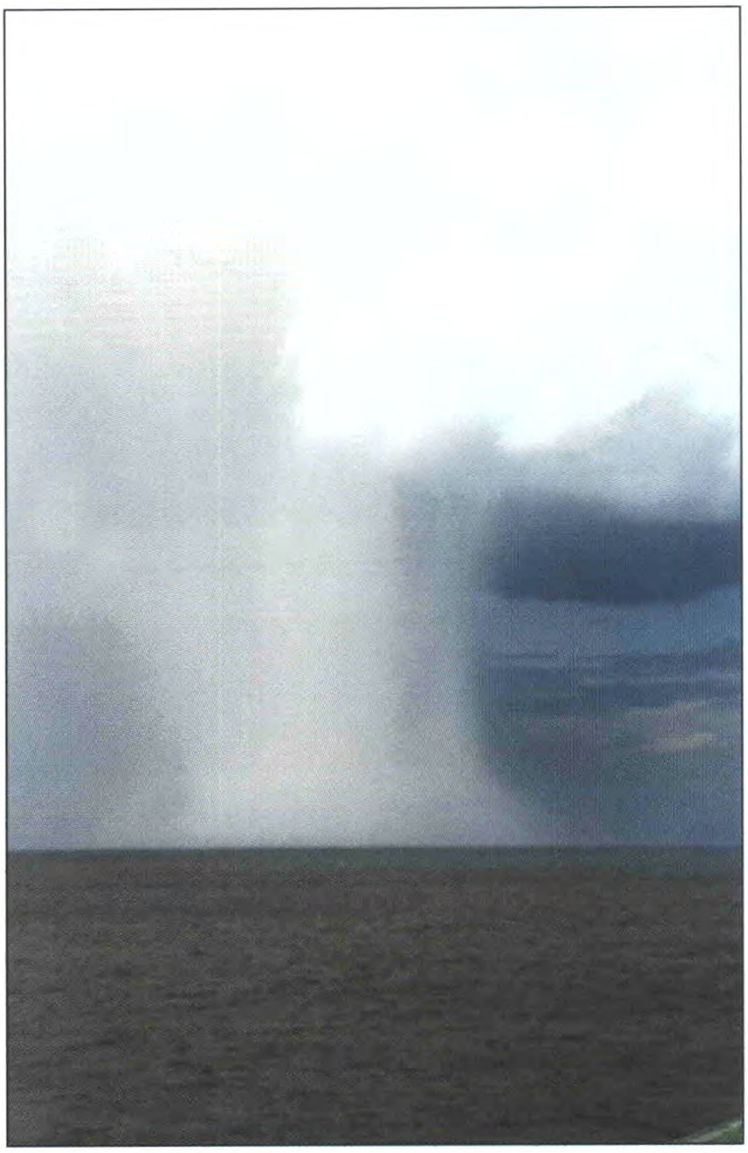
Wind damage on the *Northern Producer*, caused by an intense depression on 29 January 2000. The anemometer (scale 0–100 kt) was at maximum for considerable periods between 1300–1630 UTC and the sea state was comparable to force 12 or greater. The windward face of the satellite dome suffered the above damage. The observers were M.J. Nugent (Barge Officer), P. McKluskey (Production Control Room Operator) and M. MacLeod (OIM).

Position of ship: 58° 18′ N, 00° 26′ E.

[See also pages 5 and 6 of this edition for other reports of this storm.]

Heavy weather affecting the *Matco Thames* in the North Sea on 3 December 1999 at 1430 UTC, during the passage of a deep depression. At the time, the vessel was en route from the Beryl oil field to Le Havre, and was in position 56° 38′N, 02° 41′E. (This storm was one of those featured in the article ‘December 1999 — observers’ records of severe weather’ published in the October 2000 edition of *The Marine Observer*, page 193.)

Scene at sea



G. van Regemorter

A short-lived heavy shower of three minutes duration photographed from the *New Zealand Pacific* on 4 January 2000.

The vessel was on passage from Melbourne to Port Botany, and was on a heading of 017° on the latitude of Jervis Bay at the time. The wind was N'ly, force 4 or 5, the pressure was 1002.3 mb and there were scattered showers with good visibility between them.

[The *New Zealand Pacific* is a member of the New Zealand voluntary observing fleet.]

Scene at sea

A. Melrose

Conditions in the North Sea on 3 January 2000 during the passage of a deep depression.

The picture was taken from the *Sedco 706* in position 60° 37′ N, 01° 39′ E, looking due south.

The wind was S'ly at first, becoming W'ly during the day, with speeds of 80 kt or more.

anon.

anon.

A petrel on board the *Mark C* on 7 January 2000, whilst the vessel was in northbound traffic off Finisterre.

[See page 11.]

Scene at sea

P.J. Ward

Discoloured water photographed from the *Chilham Castle* on 3 January 2000 by Captain P.J. Ward. The water was deep-red and stretched for at least 10–15 miles. The ship's position was 24° 11′ N, 58° 06′ E.

I.C. Oke

I.C. Oke

Two views of a Yellow-billed Cuckoo (*Coccyzus americanus*). Photographed by I.C. Oke on the *Northern Venture* (a non-observing vessel). The ship's position was 21° 24′ N, 47° 23′ W, at 1400 UTC on 28 September 1999.

Commander M.B. Casement, OBE, of the Royal Naval Birdwatching Society, said that "this species is a common breeding species throughout the US south of the Missouri and Ohio rivers, which migrates through to the Caribbean to winter in Argentina. The species has previously been recorded on autumn migration, aboard ships in the western Atlantic, but this observation (700 miles east-north-east of the Lesser Antilles) is unusually far offshore. This species does occasionally turn up as a vagrant to Europe (e.g. Isles of Scilly), and I suspect ship assistance accounts for some of these records".

The *Pride of Hampshire* revisited

By Martin W. Stubbs

During the voyage back from Cherbourg on the evening of Saturday, 16 September 2000, after a few days holiday in France, I paid a visit to the bridge on P&O European Ferries' *Pride of Hampshire*. As Second Officer Susan Harland welcomed me I felt that I was on familiar ground as it had been just over eight years since I had accompanied several of the forecasters from the Met Office at Bracknell on a familiarisation trip to Le Havre and back. Memories of the evening of Wednesday, 29 April 1992 were very vivid in my mind as I recalled three of the forecasters being invited by Mr Ray, the then Second Officer, to compile the 1800 UTC observation.

At just a couple of minutes past 1800 on 29 April 1992 the tables were turned and the forecasters were giving considerable thought to the coding of the 1800 observation on the *Pride of Hampshire* homeward bound from Le Havre. Minds were very concentrated and sounds of "... code figure seven for the medium cloud perhaps, or maybe it could be three ..." could be heard as the forecasters consulted the 'Cloud Sheet'. It was quite thought provoking to realise that a similar task was being carried out by the Officer-on-Watch on voluntary observing ships throughout the world, but that evening it was only on board the *Pride of Hampshire* that the task was being carried out by forecasters who normally would be assessing the observations on charts at Bracknell when preparing the forecasts for shipping, and making decisions in connection with the issue of warnings of gales or storms.

It was thanks to Captain Mike Bechley, duty Master of the *Pride of Hampshire*, to P&O European Ferries (Portsmouth) Ltd and to Captain Gordon Mackie, the then Marine Superintendent at Bracknell, that the idea of sending the forecasters to sea for a day was hatched. In all, three groups went between April and August 1992. All were either Chief Forecasters at Bracknell with overall responsibility for the issue of forecasts and warnings for shipping and the general public, or forecasters on the Shipping Bench who had the responsibility of actually drafting the Shipping Forecasts and initiating gale and storm warnings. Many had no sea experience yet were fully involved with the interpretation of observations from ships and drafting forecasts that would be issued via NAVTEX, the Inmarsat SafetyNET™ service, the then BT Coast Stations, Portishead Radio, and the BBC Radio 4 transmitters.

Permission was granted by Captain Bechley for me to install my radio-fax/radio-telex receiving equipment and utilise the ship's radio receiver during the voyage. This provided all concerned with a constant flow of radio-fax charts and data from Bracknell, Hamburg and Northwood allowing for considerable meteorological discussion during the voyage. It also allowed the forecasters the opportunity to explain how they used the highly sophisticated computer-generated forecasts of the atmospheric pressure field when drafting the forecasts and how important the individual observations were in the whole process.

The same holds true today as it did in April 1992, that is, despite sophisticated mathematical techniques, the basis of a good forecast is a good analysis of the state of the atmosphere at the start of the forecast process — and a good analysis depends on good observations. Although observations are generally plentiful over land, each marine observation is like gold-dust to the forecasters attempting to analyse the atmosphere over the oceans. If the analysis has errors then those errors grow in the forecast.

The forecasters had much to learn. During the course of that day we not only came to an appreciation of the importance of providing a good forecast, but came to realise that the forecasts could influence many different types of operation. We were told of the importance of not being too generous in the provision of wide limits in the expected strength of the wind. It came as some surprise to hear that for certain operations a forecast band of two forces on the Beaufort Scale could be too coarse. For example, even with relatively light winds the carriage of horses could call for the use of stabilisers which in turn reduce the speed of the vessel, this having a knock-on effect on the arrival time at the destination. The cancellation of gale warnings was mentioned too — a frequent criticism was that gale warnings are not cancelled soon enough. However, on this occasion a warning of an easterly gale in sea area Wight had been taken down the evening before (by the author of this article!). Captain Bechley pointed out that the *Pride of Hampshire* had in fact experienced an easterly gale just off the French coast several hours after the gale warning had been taken down. Admittedly this was a local effect near the coast but it did bring home to the forecasters to err on the cautious side when cancelling warnings.

The 1800 observation on 29 April 1992 was finally completed by the team of forecasters; Second Officer Mr Ray then called Niton Radio on the VHF and passed the coded observation for onward transmission to Bracknell at 1811. A subsequent check the next day at the Met Office indicated that the observation was logged as being received in the Bracknell data bank just two minutes later at 1813.

Sadly, on my visit to the bridge in September 2000 an observation for 1800 was not passed to Niton Radio because there is no longer a Niton Radio to receive it and pass it on to the forecasters at Bracknell. We do still get the occasional observations from the *Pride of Hampshire* and other vessels in coastal waters (these being telephoned directly to the Met Office), but since the closure of the BT network of coast radio stations there are currently no facilities for ships in UK coastal waters to pass observations to Bracknell (and thence into the international Global Telecommunication System of the World Meteorological Organization) via MF or VHF facilities. This has left a serious gap in the availability of observations from coastal waters. Facilities are in place for ships equipped with Inmarsat equipment to send their observations to Bracknell, however, so that vital data from the oceans remain available.

However, I still felt that a strong link existed between the *Pride of Hampshire* and the Met Office at Bracknell since those involved with the safe passage of travellers across the Channel still depended very much on the forecasts received. Also every time the call sign GUPM appeared on the charts in the Met Office at Bracknell the forecasters who had made the trip were reminded of their day out on the *Pride of Hampshire* and of the importance of the task that they were employed on.

It is gratifying to know that there are still several forecasters at Bracknell who benefitted from those familiarisation voyages in 1992.

Revised output of forecasts and warnings via NAVTEX

By Martin W. Stubbs

Following the inauguration of the full NAVTEX service from Malin Head and Valentia in the Republic of Ireland, the western limit of the provision of Marine Safety Information (MSI) via NAVTEX by the United Kingdom and the Republic of Ireland has been extended from 15° W to 20° W.

With each NAVTEX broadcast limited to 10 minutes per four hours it has become increasingly necessary to rationalise the content of the broadcasts. Accordingly, to prevent over-running of slot times, a major revision of the output of forecasts and warnings is expected to be implemented in the first quarter of 2001. Full details will be promulgated in *Admiralty Notices to Mariners*.

In brief, the areas for which forecasts will be available from the UK NAVTEX stations will be rationalised so that there is less overlapping among them. Cullercoats [G] will no longer include forecasts for the eastern part of the North Sea since these areas are adequately covered in the broadcasts from Rögaland [L] in Norway. It has been agreed with the Irish Marine Emergency Service in Dublin that Malin Head [Q] and Valentia [W] shall include the relevant sea area forecasts from the Met Office in their transmissions thus taking some of the load off Niton [S] and Portpatrick [O]. The two Irish stations are also transmitting the relevant areas of the High Seas forecast issued by the Met Office (the East Central Section and the East Northern Section).

When these changes are implemented it is important that the NAVTEX receiver is programmed to receive the appropriate stations. For example, a vessel on passage from the English Channel to the Irish Sea should programme the receiver to receive at least Niton [S] and Portpatrick [O], while a vessel on passage from the Channel to the south of Ireland should ensure reception of Niton [S] and Valentia [W].

The Maritime and Coastguard Agency (MCA) have arranged with the Met Office for all routine forecasts via the UK NAVTEX stations to include a 24-hour outlook — this is mainly to signpost hazards such as gales or extensive sea fog. The MCA have also commissioned an Extended Outlook highlighting expected hazards for a further two or three days. This bulletin is available via the three UK NAVTEX transmitters (Niton at 2300 UTC, Cullercoats at 0100 and Portpatrick at 0220).

The extended outlooks are for *all* the UK shipping areas: that from Cullercoats is essentially for all the North Sea areas; from Niton for the English Channel and the South-west Approaches; and from Portpatrick for the Western and North-west approaches, also Irish Sea, Lundy and Fastnet. Full details will be published in the *Admiralty List of Radio Signals* Vols 3(1) and 5 and *Small Craft* editions, updated by *Admiralty Notices to Mariners*.

Book review

Origins — the evolution of continents, oceans and life by Ron Redfern. 295 mm × 265 mm, illus. pp. 360. Published by Cassell & Co Wellington House 125 Strand London WC2 OBB. ISBN: 0 304 35403 1. Price: £35.00.

This is a big, physically weighty volume with an impressive jacket designed in 'morph' style that dares the reader not to lift the cover.

The author's aim is to take the non-specialist reader on a 700-million year journey through the history of the earth in terms of its origin and the development of its land masses, oceans and early life forms. The emphasis centres on what today is called the North Atlantic Ocean, its adjoining sea areas, and the land masses associated with them. It is a massive undertaking, but Redfern seems to have pulled it off.

Ron Redfern had been a research and development consultant in the food and pharmaceutical industries for many years, during which time an interest in photography developed, and it might be thought that such a career would not be the basis from which to launch a new one as a science writer, but from the mid-70s onwards, he did exactly that. Quite how he went about it is not explained, but the facts that two of his previous works have been best-sellers, and that he has received an award in the United States for his contribution to the public understanding of science, surely indicate that he succeeded.

A précis of each of the 12 chapters appear in the Contents, while 90 photographic essays with explanatory text comprise the chapters themselves. In addition, there is a running text throughout each chapter which will enlighten those readers wanting a much more detailed discussion. In fact, the overall construction is very similar to that found on CD-based publications — the reader will frequently be redirected, cross-referenced and linked to other parts of the work.

The author's own superb photography lies at the heart of this book, and he has ensured that not only are his pictures a delight to the eye, but they also depict the features he wishes the reader to appreciate. This skill, allied with his flair for presenting a labyrinth of information in a digestible form, have come together in this spectacular book, which is the culmination of 10 years of research that included a three-year photographic programme encompassing locations from the high Arctic to the Caribbean and the Canary Islands.

Apart from the stunning photographic content, the visual impact of this book is further enhanced by the addition of full-colour graphics, maps and icons; the reader may clarify the text where necessary by referring to the comprehensive glossary, while the number of acknowledgements to those with whom the author consulted during the writing of this book indicate just how much research has gone into it.

Readable on two levels, depending on the reader's choice of indulging in either a leisurely browse or a more thoughtful examination, *Origins* provides both a visual feast and a mountain of information for anyone with even a passing interest in the forces that have brought the earth's land masses and oceans to their present forms.

A couple of minor flaws in production were picked up, about which it would be churlish to devote too many words. Briefly, there is a small inconsistency between the diagram and accompanying text of Essay 2 in Chapter 1, while in the index, the headings of the last four pages still read 'Running head'. The likelihood of these points, or anything similar, detracting from the overall enjoyment of the book is minimal, and no doubt they will be addressed ahead of future reprints.

Jan Freeman

Noticeboard

Retirement — Malcolm Taylor, the assistant to the Port Met. Officer at Hull, retired on 22 September 2000.

Malcolm Taylor (centre) receiving a farewell gift from Eddie O'Sullivan (Manager, Marine Observations, the Met Office); John Steel (Port Met. Officer for East England) is on the left.

Malcolm was born in Sheffield in 1940 but soon moved to Cleethorpes in Lincolnshire where he grew up, attending local schools. In 1957, after pre-sea training at T.S. *Vindicatrix*, Sharpness, he went to sea for a few years, mainly with BP Tanker Co. Ltd although he also served on Esso's *Methane Pioneer* (the first vessel to carry liquid methane on the high seas).

Coming ashore he spent the next 10 years working as an analytical chemist before joining the then Meteorological Office, in 1969, as an observer trainee at RAF Manby. This was followed by 10 years of observing at RAF Binbrook, before being posted to the Port Met Office at Hull in 1980, where he spent the rest of his career assisting the various occupants of the Port Met. Officer position.

After a busy few weeks, with OU exams occupying much of his time, Malcolm says he is slowly settling into retirement, and is putting to good use the binoculars he received as part of his presentation. We wish him all the best for the future.

Port Met Office — North-west England — change of address

The Port Met Office for north-west England has been relocated with effect from 26 October 2000, and the new address is:

Met Office 8 Tower Quays Tower Road Birkenhead CH41 1BP

Tel: +44 (0)151 6490541 Fax: +44 (0)151 6490547
E-mail: pmoliverpool@meto.gov.uk

Fleet list updates

(Latest listings and amendments)

Australia (Information dated 7 September 2000)

Name of vessel

Selected Ships:

Aburri
Al Khaleej
Al Kuwait
Al Messilah
Alltrans
Alnilam
Aotearoa Chief
Arafura
Ariake
Aurora Australis
Australian Endeavour
Australian Pride
Bader III
Boral Gas
Botany Tradewind
Cape Grafton
Cape Howe
Cape Jervis
Cape York
Capitaine Cook
Capitaine Fearn
Capitaine Tasman
Challis Venture
Coral Chief
Danny F II
Duyfken
El Cordero
Endeavour River
Fair Princess
Fanal Mariner
Fanal Merchant

Selected Ships:

Farid F
Fitzroy River
Forum Tonga
Franklin
Fua Kavenga
Goonyella Trader
Iron Carpentaria
Iron Chieftain
Iron Kembla
Iron Monarch
Iron Sturt
Iron Whyalla
Iron Yandi
Kimberley
Kokopo Chief
Kowulka
Leeuwin
Lillo
Lindesay Clark
Maersk Aberdeen
Maersk Algeciras
Maersk Oceania
Maersk Tacoma
Mawashi Al Gassem
Mosdeep
MSC New Zealand
Nivosa
Northwest Sanderling
Northwest Sandpiper
Northwest Seaeagle
Northwest Shearwater

Selected Ships:

Northwest Snipe
Northwest Stormpetrel
Northwest Swift
Norwegian Star
NYK Providence
Ormiston
P&O Nedlloyd Piraeus
P&O Nedlloyd Taranaki
Pacific Gas
Pacific Triangle
Pathfinder II
Pioneer
Portland
Provider
River Boyne
River Embley
Saraji Trader
Seakap
Sitka
Southern Moana II
Southern Surveyor
Spirit of Tasmania
Swan River Bridge
Wauri
Young Endeavour

Supplementary Ships:

Botany Treasure
One And All
Pacific Sentinel

Auxiliary Ships:

Australia has one Auxiliary Ship currently reporting.

(Amendments to the listings in the July 2000 edition)

India

Selected
Withdrawn: *State of Gujurat*

Supplementary
Recruited: *Gem of Tuticorin, Goa, Jag Praja, Swaraj Dweep*

Withdrawn: *Chennai Ookkam, Chennai Perumai, Continental Rose, Jiyamvada, State of Haryana*

New Zealand

Selected
Recruited: *Columbus Queensland, Maasmond, Nele Maersk*

Withdrawn: *Ariake, Columbia Star, Challenger, Italian Reefer, Karamea, Spirit of Freedom, Tasman Navigator*

United Kingdom

Selected
Recruited: *Astrid Schulte, Aurora, British Hunter, British Progress, British Purpose, British Strength, Constantia, Dove Arrow, Eclipse, Gisela Oldendorff, Gosport Maersk, Graceous, Grasmere Maersk, Grebe Arrow, Hamane Spirit, Maersk Dee, Maersk Rapier, May Oldendorff, Meynell, P&O Nedlloyd Drake, P&O Nedlloyd Genoa, P&O Nedlloyd Hudson, Rutland, Sabina, Safmarine Nomzi, Saga Wave, Sponsalis, Tenacious, Toisa Perseus, Transporter, Wren Arrow*

Withdrawn: *Aurora, BUE Skye, Challenger, Chilham Castle, Columbus, Comanche, Eburna, Ervilia, European Trader, Mary C, Mineral Europe, Mineral Venture, MSC Clorinda, Pacific Breeze, Putford Achilles, BT Nautilus, BT Nestor, Northella, Spear, Texas, Tamamonta, Torben Spirit, Yeoman Brook*

Marid
Recruited: *Arduity*

Withdrawn: *Northern Star, Ocean Defender, Spheroid, Superferry*

Fixed and mobile installations
Withdrawn: *Transocean Explorer*

Auxiliary
Recruited: *Alam Baru, Arklow Vale, Jupiter Diamond, Meridian Ace, Safflower, Stena Shipper, Takamine, Vectis Isle, Venus Diamond*

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