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The Met.Office

The Marine Observer

A quarterly journal of Maritime Meteorology

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January 1995

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prepared by the Marine Divison of the
Meteorological Office

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

VOL. 65 **No. 327** **JANUARY 1995**

CONTENTS

COVER PHOTOGRAPH: The remains of Krakata (previously named Krakatoa) volcano with the new volcanic centre of Anakrakata puffing gently in the evening light, taken on 29 March 1994 by Mr N.J. Blacker, 2nd Officer on the *Hermod*.

Letters to the Editor, and books for review should be addressed to the Editor, *The Marine Observer*, Met. Office (OM), Scott Building, Eastern Road, Bracknell, Berks RG12 2PW.

LONDON: HMSO

Editorial

It is appropriate that in this, the year of the 140th anniversary of the setting up of the Meteorological Office under the leadership of Admiral FitzRoy, I should send a special message to those who, over so many years, have contributed to the work of the Meteorological Office by voluntary observation at sea.

The Meteorological Office was founded because of the need for a storm-warning system for mariners, and its first Director was a sailor. Today, as ever, we are acutely conscious of the debt the science of meteorology owes to those who "go down to the sea in ships", and I am proud to be part of the great tradition which links the Meteorological Office with the Merchant Navy. On behalf of all in the Office I send to our marine observing colleagues greetings and thanks for all that has been done by voluntary observers in our ships during the past 140 years and express the hope that this bond may continue to flourish in the years to come.

> *'The wind goeth toward the south and turneth about unto the north. It whirleth about continually and the wind returneth again according to his circuits'.*

This is the inscription on the footstone on the grave of Admiral FitzRoy in the churchyard of All Saints, Upper Norwood, London.

Early in the year 1855 a small office with a staff of four people, under the direction of Admiral Robert FitzRoy, F.R.S., was set up under the Board of Trade in London for the purpose of collecting meteorological observations from British ships at sea, the eventual object being to compile meteorological atlases and provide other statistical information about the weather and surface currents of the oceans, for the benefit of shipping. Thus was born the Meteorological Office, and FitzRoy, who was given the title of "Meteorological Statist", was in effect the first Director of the Meteorological Office.

One hundred and forty years have passed and the January, 1995, edition of *The Marine Observer* thus marks a milestone in the history of the Meteorological Office. Under the present Directorship of Prof. J. Hunt, F.R.S., the staff now number 2417, and the information and advice provided by the Office is utilised in a multiplicity of businesses (shipping, aviation, agriculture, the leisure industry) as well as by the general public.

This occasion provides a suitable opportunity for looking back over the years to see what the Meteorological Office has accomplished. It was also 140 years ago that 'agents' were appointed at the principal ports and instruments were supplied on loan to "a limited number of very carefully selected ships". In this way the U.K. VOF and the Port Met Officer Networks were established.

It was fitting that in this maritime nation the history of the Meteorological Office should be linked so closely with the sea. Organised meteorology in this country owes its origin to merchant shipping, and the first Director of the Office was, appropriately enough, a distinguished seaman. These facts are not surprising when one considers how important knowledge about winds, weather and currents in all oceans was and still is to those at sea, and when one considers that the very existence of our island population depended then, as it still does, upon our merchant shipping.

The Marine Branch of the Meteorological Office, which in the earlier days virtually comprised the entire Office, is now only one link in the chain of branches of which the modern Office is made up. The Meteorological Office at present has branches dealing also with general forecasting, communications, services for Army, R.A.F. and Civil Aviation, British and world climatology, land surface and upper-air observations, general research, development and provisioning of instruments, training and administration, and a complete division devoted to our commercial activities: from this one can form some impression as to how the scope of meteorology has extended.

Throughout these 140 years the control of Maritime Meteorology in this Office has been in the hands of a seaman, as the following list shows:

Admiral FitzRoy	1855–1865
Captain Toynbee	1865–1888
Lieutenant Baillie, R.N.	1888–1899
Captain Hepworth, R.N.R.	1899–1919
Captain Brooke Smith, R.N.R.	1919–1938
Commander C.E.N. Frankcom, R.N.R.	1938–1969
Captain G. A. White	1969–1982
Captain G. V. Mackie	1982 to the present

Since Admiral FitzRoy the Directors of the Meteorological Office have been:

Mr Scott (under the title of Secretary),	1865–1900
Sir Napier Shaw	1899–1919
Sir George Simpson	1919–1938
Sir Nelson Johnson	1938–1953
Dr O. G. Sutton	1953–1965
Sir John Mason	1965–1983
Sir John Houghton	1983–1990
(Title changed to Chief Executive on 2 April 1990 when the Office became an Executive Agency within the Ministry of Defence.)	
Prof. J. Hunt	1990 to the present

The Marine Branch has consistently maintained contact with the shipping industry by means of personal visits of the Port Meteorological Officers and by correspondence, and has also been responsible for all aspects of maritime meteorology except forecasting. No matter how far mankind advances scientifically and technically there will always be a need for synoptic and climatological information concerning the meteorology of the oceans, not only for the benefit of mariners and those connected with the shipping industry but also in connection with the meteorological needs of the defence industry, monitoring of global climate change and innumerable other activities.

During these 140 years something like 24,000,000 observations have been received in this Office from voluntary observers aboard British VOF ships trading in all parts of the world. Thanks to wise planning in the early days, all the instrumental observations are comparable because they have consistently been made with officially tested instruments. The non-instrumental observations such as MARID are equally important.

There is thus a mass of reliable information available which provides the basis for day to day, month to month and year to year scientific study of the weather in all the oceans. But although 24,000,000 observations look a lot on paper, they have proved by no means sufficient for the detailed climatological study of some areas, which is hardly surprising when one considers the vast expanse of the oceans and the fact that the observations cover the period of 140 years, with gaps in the war years of 1914–18 and 1939–45.

Considering that the VOF strength world-wide is approximately 7400 ships, out of a total global merchant fleet of about 26,000 vessels over 1600 gross tons, this does not provide a very good network when spread all over the oceans, particularly since ships normally keep to the established trade routes. Nevertheless, this library of observations has enabled the Meteorological Office to study the climatology and currents of the oceans in some detail and it has proved of considerable value for numerous scientific investigations.

As the years have gone by so has the application of meteorology to various activities extended. Admiral FitzRoy introduced the visual storm warning system for shipping in 1861, and coined the word "forecasting" when he began to issue the first weather bulletins in the daily newspapers for the information of those interested in the operation of ships and for the general public. These bulletins were of necessity very limited in scope, as he had to depend entirely on telegraphic reports from land for drawing his maps, and there was then no means of passing on the information to shipping out of sight of land. It was the arrival of radio which provided meteorologists with an instantaneous and extensive picture of the weather at a stated time both at sea and ashore, and enabled them to issue comprehensive and up-to-date weather forecasts at frequent intervals for ships at sea, for aircraft in flight and for all the various interests ashore.

There is no doubt that the meteorological needs of the aviation industry increased the scope and activities of the Meteorological Office enormously. As the atmosphere is the medium in which aircraft operate, this is perfectly natural just as it was natural for the formation of the Office in 1855 to be due to the needs of another and older form of transport — shipping. In 1855 there were no reliable world-wide statistics of weather at sea, and such information was urgently needed for the safe and economic operation of sailing ships.

We do now have a fairly accurate statistical picture of ocean climatology but there are still big gaps in our knowledge. The technical advances in the shipping industry have not lessened the mariners' need for accurate advice about present and future weather; we only need to think of recent storm disasters at sea to realise this. But the aviators' need for frequent and up-to-date meteorological information both on the surface and in the upper air is even more vital — in fact they just cannot operate safely and economically without it. Today we have the mariner and the aviator — serving rival but complementary forms of transport — both supplying the meteorologist with up-to-date information about the weather they encounter on their routes. The meteorologist, in turn, is thus able to provide navigators both on the sea and in the air with a picture of the weather covering a large area, and can advise them on anticipated meteorological changes.

Early progress in the field of meteorology was necessarily slow mainly because of communication and organisational difficulties. For progress in meteorological knowledge, international co-operation is a first essential, and there is no doubt that meteorologists, through the medium of the World Meteorological Organisation, have made enormous advances in this direction, and set an example to the world.

One of the personal duties I have the privilege to undertake is to represent the World Meteorological Organisation at the International Maritime Organisation

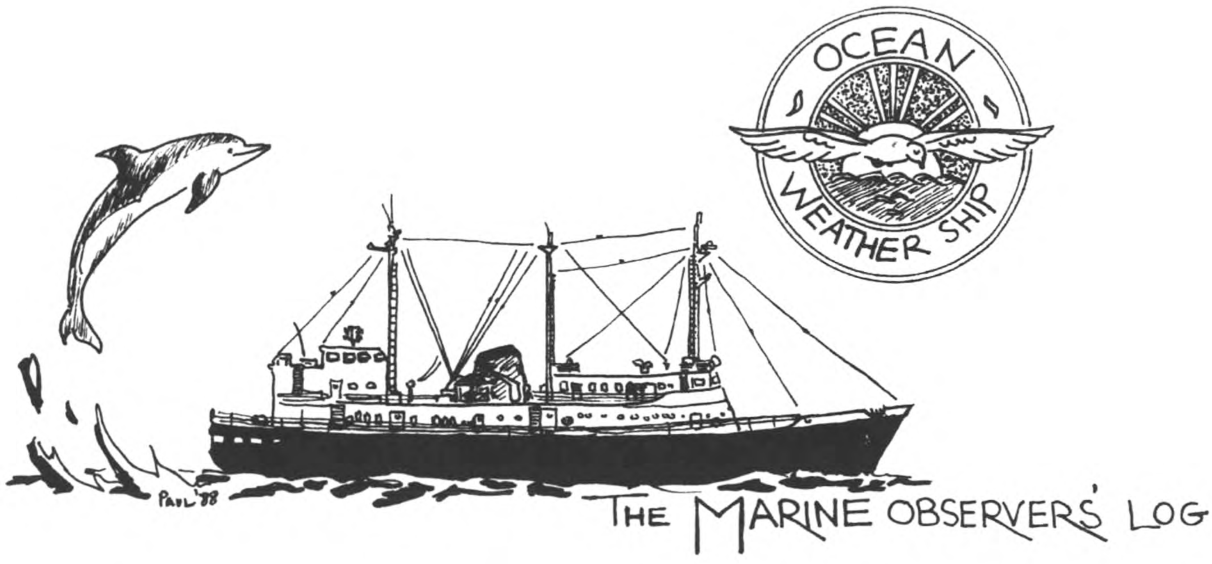
(IMO) in particular at Maritime Safety, Safety of Navigation and Radio Communications Sub-committee meetings. Association with this latter IMO Sub-committee afforded me the opportunity to become actively involved in the design of the new WMO system for the preparation and dissemination of meteorological forecasts and warnings for the high seas under the Global Maritime Distress and Safety System (GMDSS). From the seaman's viewpoint very considerable advances, which include GMDSS, have been made towards improving the accuracy and dissemination of meteorological information, thereby contributing significantly to safety at sea. Practically all coastal areas throughout the world and most oceanic areas are now provided with weather bulletins and forecasts and storm warnings in one form or another, via NAVTEX, SATCOM, VHF radio and facsimile and increasingly by graphical display to onboard PC equipment. The weather bulletins issued by various means for shipping around the British Isles and in the Eastern Atlantic are as comprehensive as those of any area in the world. The accuracy of meteorological forecasts provided in the United Kingdom is of a high standard. However, this accuracy, whether the information be of a synoptic or climatological nature, depends to a considerable extent upon the available number of ship reports from the area concerned. The presence of our North Atlantic Ocean Weather Ship on station, providing both surface and upper-air observations from a fixed point at frequent intervals, has proved to be of considerable help to the meteorologist, primarily for the eventual benefit of trans-Atlantic aviation but also in connection with general surface forecasts and for research purposes.

But reports from a large number of merchant ships are always necessary in that ocean as in any other, in order to prepare a reasonable synoptic chart. 'We cannot have too many ship reports' is a frequent comment of a forecaster. Satellite data are of considerable value to the meteorological community, but their data cannot replace those from ships for details of surface conditions. We also require ships' reports to provide the ground truth for satellite data.

If those members of the Royal Society who had the foresight and faith to persuade the Treasury to establish the Meteorological Office 140 years ago, could today read Professor Hunt's Foreword to the Meteorological Office 1993/94 Annual Review, and could note that the CBI has listed the Met Office as one of this country's 100 top organisations, they would have good reason to be proud of the accomplishments of the organisation which they launched, and Admiral FitzRoy could justifiably feel that he had given the Meteorological Office a good departure with a fair wind.

On behalf of the Chief Executive, Directors and Staff of the Meteorological Office we wish all our readers a very Happy New Year.

Captain G.V. Mackie,
Marine Superintendent



January, February, March

The Marine Observers' Log is a quarterly selection of observations of interest and value. The observations are derived from the logbooks of marine observers and from individual manuscripts. Responsibility for each observation rests with the contributor. All temperatures are Celsius unless otherwise stated. The standard international unit for barometric pressure is the hectopascal (hPa) which is numerically equivalent to the millibar (mb).

SNOW

Houston Ship Channel

m.v. *Hermod.* Captain G. Philips. At Warrengas Terminal. Observers: the Master, Mr M. Youel, Chief Officer, Mr N. Blacker, 2nd Officer and members of ship's company.

1 February 1994. During the morning a continuous layer of medium cloud started to develop on the north-western horizon and the cloud base slowly decreased. By 0700 UTC the sky was covered by featureless pale-grey cloud with a level base at about 1500 feet while the wind was a steady NE'ly, force 2. The first snowflakes were seen at 0730, and by 0800 a steady light snowfall was reducing the visibility. The snow formed a fine coating on the ship's decks and drifted to a depth of about 5 cm against structures but within two hours of the snow ceasing, all evidence of it had gone.

By 1100, after the snow had stopped, what could only be described as Arctic sea smoke was observed developing on the surface of the water around the ship and on the Houston Ship Channel; it was 1.0–1.5 m in height and ran downwind in defined parallel lines above the small wavelets present, persisting until past midnight. Further light snow flurries were seen prior to midnight.

Despite photographs of the snow falling filling the local papers the next day, there was not enough to officially register as snow in downtown Houston; the ship's berth, located nine miles from the centre of Houston received a heavier fall.

Position of ship: 29° 44′N, 95° 12′W.

SEA SMOKE

Western North Atlantic

m.v. *Eridge*. Captain M.A. Hill. Hampton Roads to Dunkirk. Observers: the Master and ship's company.

15 January 1994. At 1630 UTC whisps of sea smoke were observed on the sea surface at some distance from the vessel, thus indicating entry into the area influenced by the Gulf Stream. This was confirmed by the fact that the sea temperature at the time was recorded as 18° while the air temperature was just 0.6°.

At 1800 the vessel entered the area of dense sea smoke and the visibility was reduced to approximately one-tenth of a mile. The sea smoke continued for the next 24 hours, with no signs of any improvement in the visibility (as indicated in the photograph). This phenomenon was accompanied by moderate snow and occasional ice pellets.

The wind during the entire period was NW'ly, force 7 while the cloud type was cumulonimbus and stratus fractus with a base at about 400 feet. The pressure showed a general rise in tendency, from 1010.2 mb at 1630 on the 15th, to 1028.6 mb at 1800 on the 16th when the visibility improved to about 11 n.mile and the snow gave way to slight rain showers.

Position of ship: 37° 48′N, 70° 33′W.

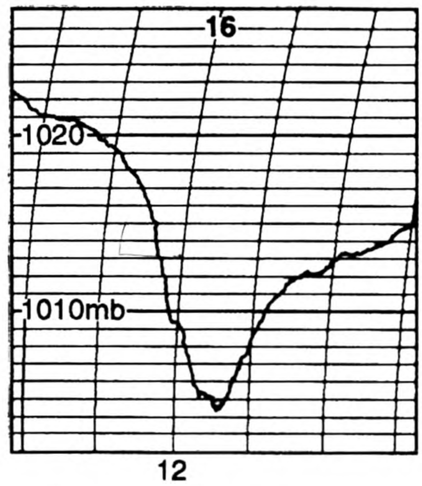
PASSAGE OF DEPRESSION

Eastern North Atlantic

m.v. *British Resource*. Captain J.O. Bailey. Brofjorden to the Canary Islands. Observers: the Master, Mr D.J. O'Neill, 2nd Officer and members of ship's company.

16 January 1994. Whilst on passage the vessel had been experiencing squally weather and showers but the wind speed decreased to force 5 during the early

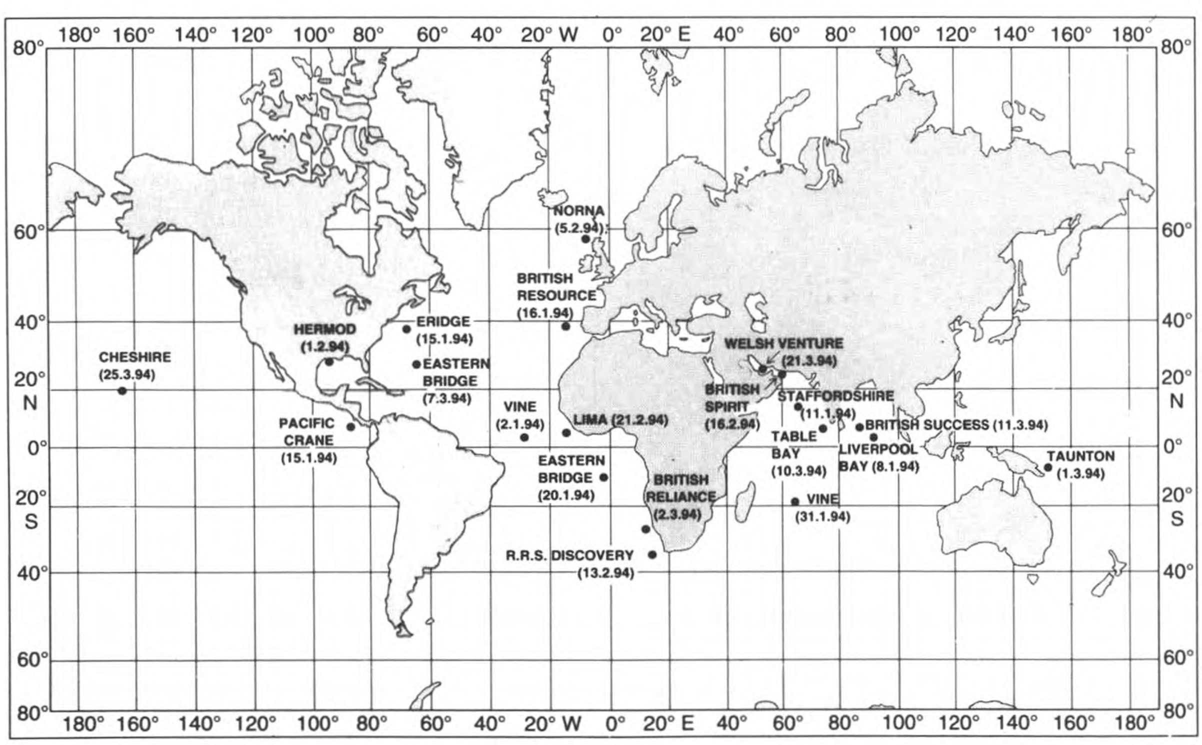
hours of the 16th and the sea was generally more agreeable. However, the barograph trace was seen to be falling rather sharply at 1100 UTC although there was nothing else to suggest a change in the weather conditions.



By 1200 the trace was showing a marked descent and the wind speed increased to force 7, veering somewhat at 1300 to N'ly, force 10 as the visibility fell to 2 n.mile owing to driven spray. At this time the corrected barometer reading was 1007.4 mb and the dry-bulb temperature was 11.6°. One hour later the wind reached its peak at force 11 with gusts of 60–65 knots; the sea was flattened and a northerly swell of 2.5 m was beginning to build. Shortly afterwards the pressure started to rise and the wind started to decrease. A minimum pressure of 1004.1 mb was recorded at 1420.

At 1500 conditions were starting to improve as the pressure rose to 1011.7 mb and the wind decreased to force 8 while the visibility improved to 4 n.mile.

Position of ship at 1200 UTC: 38°12′N, 12° 36′W.



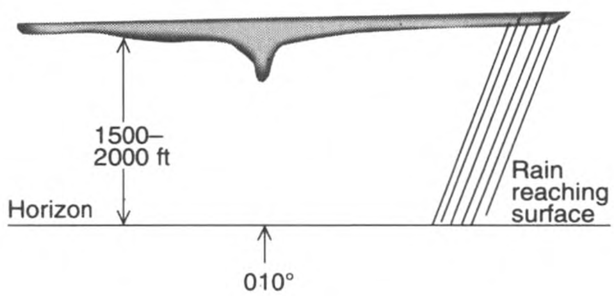
Position of ships whose reports appear in *The Marine Observer's Log*

WATERSPOUTS

Eastern North Atlantic

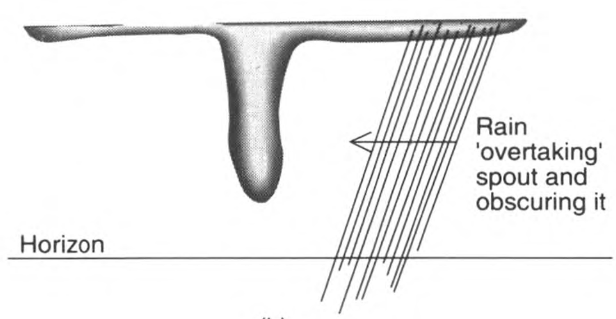
m.v. *Lima*. Captain H.M. Clifford. Ras Tannurah to Rotterdam. Observers: the Master, Mr M. Hodson, 3rd Officer, Mr M. Ryan, Radio Officer and Mr T. Jordan, SG1.

21 February 1994. At 0700 UTC a large band of rain was passing across the vessel from starboard to port in a roughly westerly direction when a waterspout was seen to form at a distance of 2.5-3.0 n.mile from the vessel. The spout started as a small funnel extending from a cumulus cloud of moderate to strong vertical extent which had a base of 1500-2000 feet, see sketch (a).



(a)

This rapidly increased in length and reached three-quarters of the way to the surface. Bearings were taken and it was found that the spout was on a steady course of 010° although there was no sign of disturbance at the sea surface. Avoiding action was taken and the spout started to move astern. Heavy rain at the vessel at 0710 obscured further observations when the spout was at a range of 1.5–2.0 n.mile, see sketch (b), and the spout had dissipated by the time the rain cleared.



(b)

The pressure was 1011.0 mb, wind E'ly, force 3, dry-bulb temperature 27.0° and there was an overall cloud cover of cirrostratus with isolated showers associated with large cumulus clouds. The vessel was on a course of 322° and passing through such a shower at the time of observation.

Position of ship: 03° 56′N, 13° 15′W.

Bay of Bengal

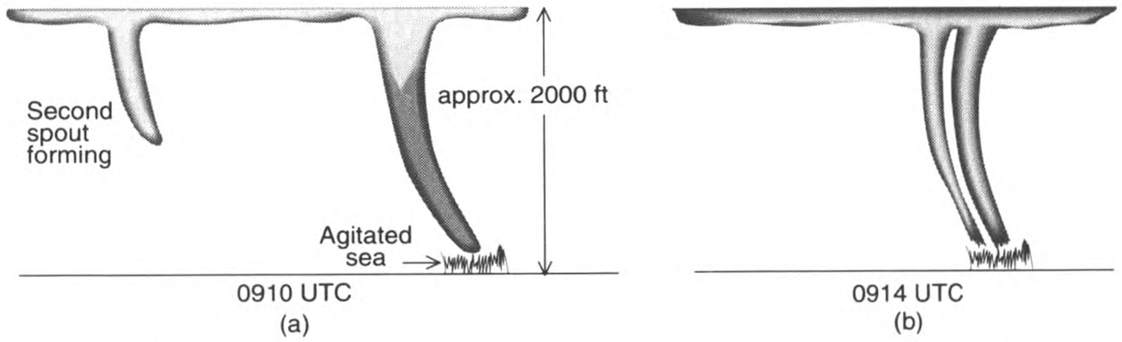
m.v. *British Success*. Captain J. Smith. Singapore to Fujairah. Observers: the Master, Mr T.R. Stringer, 2nd Officer, Mr G. Geremiah, Radio Officer and members of ship's company.

11 March 1994. The beginning of a waterspout was observed at 0906 UTC,

emerging on the vessel's starboard beam from a continuous layer of stratocumulus having an estimated base of 2000 feet. At first, the spout covered only about one-quarter of the way from the cloud to sea level but was lengthening all the time.

By 0910 the spout had just about reached sea level and was causing agitation of that localised patch, about 6 n.mile from the vessel. The now near complete column was bent towards the east in its lower half. At this time, another spout was noticed to be forming about 10°–15° ahead (to the west) of the first one and was following the same formation pattern, see sketch (a).

By 0913 the new spout seemed to be pulled towards the greater one but was still increasing all the time; it did not have the width of the first spout, or cause the disturbance at sea level but followed the same curvature. At 0914 the two spouts, both now reaching the surface, were parallel to each other but never joined into one, see sketch (b).



After this stage they gradually reduced in intensity and had disappeared by 0915. All the effects seemed to be localised as no noise or change in pressure or wind could be detected from the vessel.

Position of ship: 05° 57′N, 85° 54′E.

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

'This is an interesting report, and the detailed sketches are very informative. An unusual feature is that the spouts formed under stratocumulus, cumulonimbus being more usual. The duration of the spouts, about nine minutes, is very typical.'

CETACEA

Indian Ocean

m.v. *British Reliance*. Captain C.R. Shoolbraid. Qua Iboe (Nigeria) to Vadinar (India). Observers: Mr M. Johnston, 2nd Officer and Mr A. Chylack, 3rd Officer.

2 March 1994. At 1400 UTC the dolphin-like creatures shown in the sketch were observed off the ship's starboard beam.

One very noticable difference from dolphins was that they did not have any fins on their backs.

The creatures were in a school of 15–20, heading in a south-easterly direction while purposefully diving in and out of the water. Their colouring was black-and-white, as shown, they did not appear to be furry and their length was estimated to be 1.5–2.0 m although they could have been slightly longer as they were at least 150 m away. The observers were left wondering to which family the 'dolphins' belonged.

Position of ship: 27° 45′S, 14° 40′E.

Editor's note. As expert analysis of cetacea sightings is not available to us at present, we have reverted to our references on the subject and consider that these may have been Southern Rightwhale Dolphins (*Lissodelphis peronii*), so called because their smooth, finless backs have been compared with the Great Right Whale (also finless). However, these dolphins usually show black colouring on their topsides from near the beak right through to and including the flukes, the remainder being white but the sketch does not show this pattern. Possibly their distance from the ship made a more accurate assessment of the colouration difficult. The only alternative would seem to be seals although the observers have said that there appeared to be no sign of furriness.

FISH AND TURTLE

Indian Ocean

m.v. *Staffordshire*. Captain F.R.F. Martin. Ulsan to Arabian Gulf. Observer: Mr D.I. Mackinnon, 2nd Officer.

11 January 1994. At 1100 UTC while the vessel was drifting in the Indian Ocean, a small turtle was observed swimming slowly on the port side. It was dark-brown in colour with cream colouring on its flippers and also a few dark-brown speckles; it was possibly a Hawksbill Turtle. Also present, as they had been for the previous few days, were a number of yellowtails or amberjacks; they were usually observed in small groups of 4–20 fish. They had long slender bodies (as viewed from above) with a brilliant dark-blue colouring on their backs and also had some orange colouring. Some of the fish were estimated to be about 1 m long and they all swam in slow, lazy circles.

As the turtle attempted to swim away at right-angles to the ship, it was pursued by a group of about 10 fish which seemed to taunt the turtle with vigorous movements underneath and all around it. At this point the turtle was flapping wildly with its flippers as the yellowtails physically propelled it down the ship's side at right-angles to its original track, until they all disappeared from view under the transom. The yellowtails were observed the previous day chasing shoals of flying-fish.

During the afternoon a white-tip shark about 3.5 m long was seen. It had been in attendance for the last few days, sometimes observed cruising up and down the ship's side very slowly for hours on end, usually a metre or two below the surface and rarely surfacing. The shark showed no interest in the yellowtails, nor them in it. Always accompanying the shark were pilotfish, one of which was caught with hook and line; it was about 25 cm long with brilliant blue colouring and black-and white stripes across its back.

Later in the day, a squid-like creature was observed being about 61 cm long, dark-brown in colour with a large white spot at the centre of its body. It appeared to chase the yellowtails, swimming quite quickly but the fish easily outswam it. All the above creatures were identified from *The Seafarer's Guide to Marine Life* by P. Horsman.

Position of ship: 11° 44′N, 66° 49′E.

BIRDS

Solomon Sea

m.v. *Taunton*. Captain L.J. Hesketh. Kakogawa to Hay Point. Observers: the Master, Mr J. Smith, Chief Officer and Mr S. Panwar, 3rd Officer.

1 March 1994. At 0700 UTC four or five birds, one of which later settled on the DF loops arrived to accompany the vessel for two days.

The birds showed a close resemblance to the Red-footed Booby found futher south, having red webbed feet and white bodies. In flight, they swooped along without flapping their wings very often but their gliding periods were not too long and occasionally a crying call could be heard from the birds. Their size from head to tail was estimated to be about 60 cm while the wing-span was around 1.4 m.

Position of ship: 07° 21′S, 149° 47′E.

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

'The birds were Red-footed Boobies (*Sula sula*). They occur in tropical oceans and breed in trees on suitable islands including various locations in the area of the report. A small booby, they usually in flocks and are often seen many hundreds of miles from land; they are attracted to ships and frequently perch on board. As they have many plumage variations they are a difficult species to identify but always have red feet which is a sure identification.'

North Pacific Ocean

m.v. *Cheshire*. Captain C. Marsh. Panama to Ulsan. Observers: the Master Mr C.J. Doodson, Chief Officer and ship's company.

25 March 1994. At about 1600 UTC the bird shown in the photograph was found on the bridge wing of the vessel which, at the time, was some 500 n.mile west of Hawaii.

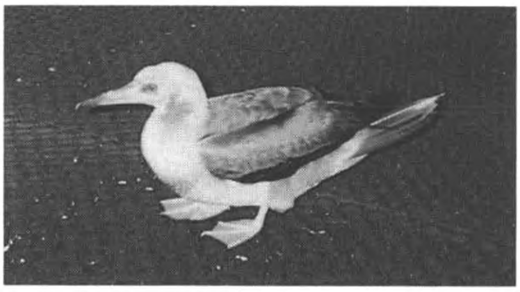


Photo. by C.J. Doodson

From previous descriptions in *The Marine Observer*, it was thought that the bird was some type of immature booby. The picture was taken about 2 m from the bird which did not seem to be at all bothered; during the 12–4 watch the 3rd Officer had almost stepped on it!

During the vessel's passage across the Pacific, a large flock of similar birds had been roosting in the foremast; before arrival in Hawaii, the Electrician had been up the mast to attend to a light and one bird had simply refused to move whilst he was working about 30 cm away, another had even tried to land on his head.

Position of ship: approximately 20° 36′N, 163° 00′W.

Editor's note. We hope the observers on the *Cheshire* will find Captain Chilman's comments for the previous report to be useful.

INSECTS

Indian Ocean

m.v. *Liverpool Bay*. Captain B. Cushman. Jebel Ali to Singapore. Observer: Mr J. Farquar, 3rd Officer and Mr R. Oliver, Steward.

8 January 1994. The butterfly shown in the sketch was found on board by the Steward.

The butterfly's wing-span was 12 cm and, moving from head to tail, its colouring was as follows: black antennae, black eyes, red head, upper wings black with white markings, thorax black with red colouring at the tail end, lower wings black with a row of orange markings at the top and red ones at the lower edge. Both pairs of wings showed white fringes at the rear edges. The undersides were black with red markings. Another specimen was found later on in the day.

Position of ship at 1200 UTC: 05° 54′N, 89° 18′E.

Eastern North Pacific

m.v. *Pacific Crane*. Captain G. Bates. Acapulco to Balboa. Observers: Mr W.R. Durrans, 3rd Officer and Mr A. Williams, AB.

15 January 1994. During the morning the moth shown in the photograph was found on the poop deck by the AB. The moth's body measured 65 mm whereas the wings were longer, measuring 68 mm from body to tip. The mottled colouring of the body and wings was mainly in shades of dark-brown and 'donkey' brown whilst the narrow antennae were cream or off-white.

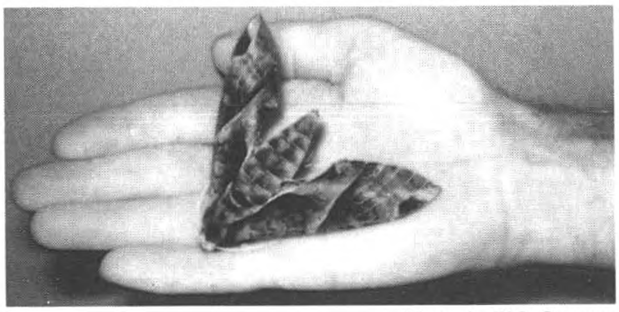


Photo. by W.R. Durrans

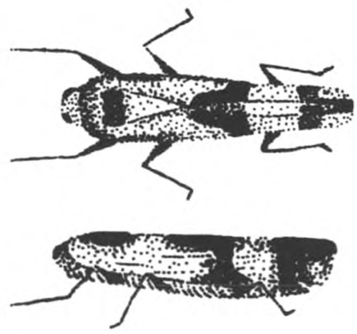
By the following day the moth was too weak to take flight and eventually died. At the time of the first observation the ship was on an easterly course along the southern coast of Panama, having recently passed south of Isla Jicarita at a distance of 8 n.mile.

Position of ship: approximately 07° 06′N, 81° 48′W.

Indian Ocean

m.v. *Table Bay*. Captain J.B. Watson. Colombo to Jeddah. Observers: The Master, Mr M.L. Mullins, 3rd Officer and Mr P. Timms, AB.

10 March 1994. During the morning following the vessel's departure from Colombo what was thought to be moth was discovered sheltering in the corner of the wooden bridge-wing door frame. The 'bug' was a pale, sandy yellow with shiny green markings on the wings, see sketch.



Measuring about 25 mm long by 5 mm wide, its overall appearance was of a pale wood chipping that had been branded, the green colour having a 'burnt' edge and a fresh charcoal gleam. The underside was hairy and the legs were half green and half yellow. The hitch-hiker did not move, even under close scrutiny but stayed for a day or two before disappearing.

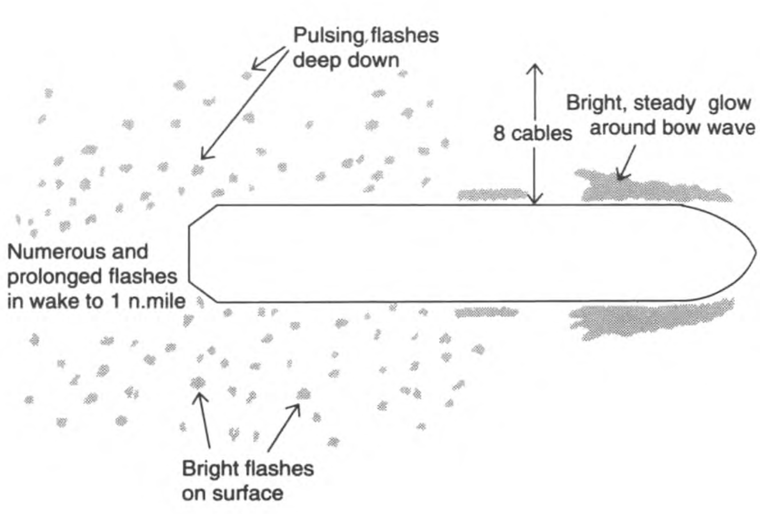
Position of ship: 07° 24′N, 77° 34′E.

BIOLUMINESCENCE

Persian Gulf

m.v. *Welsh Venture*. Captain M.C. Roberts. Ras Tannurah to Das Island. Observers: Mr T.T. Latto, 2nd Officer and Mr B. McCallum, 4th Engineer Officer.

21 March 1994. The vessel was part laden with draught of 16.33 m and on a course of 345° at 14.5 knots when, at 0020 UTC, intense bioluminescence was noticed around the vessel's wake. A constant and quite bright streak was observed around the bow wave and at the vessel's manifold area whilst numerous flashing pulses were seen around the stern, extending to a distance of about 8 cables, see sketch. These flashes were not only on the surface as some intense and prolonged flashes were observed deep in the water, lasting for about 3 seconds on average.



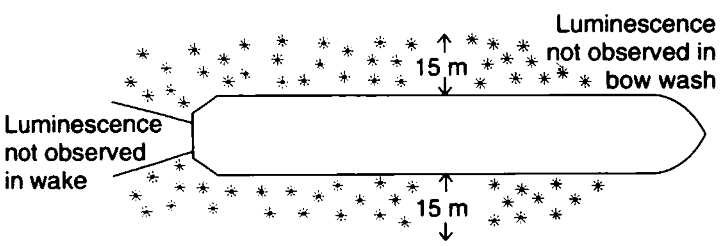
In the propeller wake numerous and prolonged activity in the form of flashes stretched to an estimated 1 n. mile from the stern. In all, it was quite a spectacular display which lasted until 0042, suggesting to the observers that this was a shoal of jellyfish or some other light-emitting species, rather than plankton.

Position of ship: 26° 30′N, 52° 31′E.

North Atlantic Ocean

m.v. *Vine*. Captain M.J. Walker. Rotterdam to Tubarao. Observers: Mr S. Gupta, 3rd Officer and Mr J. Quinones, Quartermaster.

2 January 1994. At 2200 UTC luminous spots of varying size were observed passing down the ship's side, they were circular and ranged from 10–35 cm in diameter and on careful observation it was noted that no two spots ever merged with each other. The luminescence formed a starry, speckled effect and was most marked in a band 15 m wide along the ship's length. It was not seen where the bow wash was predominant, see sketch.



This starry phenomenon lasted for three hours, on both sides, until the ship passed through rain showers of the ITCZ. Water samples were taken but luminescence or other organic life was not observed and no other effects, such as smell, were perceptible.

The sea temperature was 26.5°, the wind was NE'ly, force 4 and there were slight seas with a low swell.

Position of ship: 03° 05′N, 27° 08′W.

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

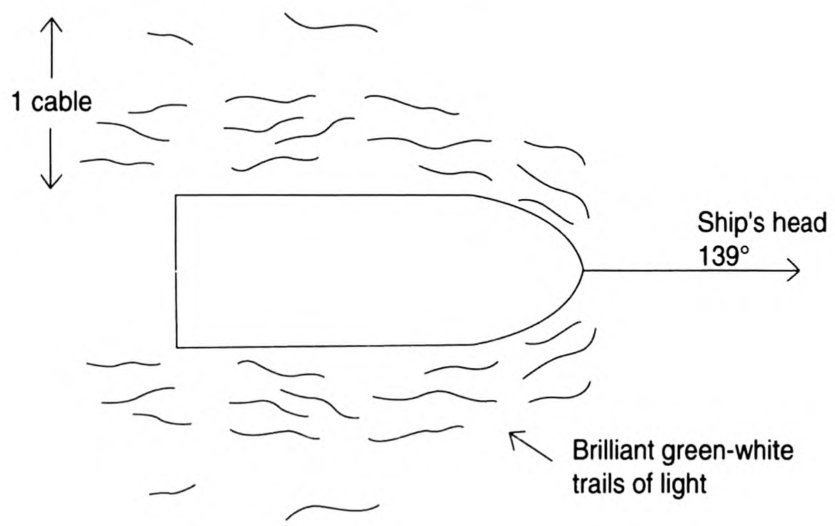
'I suspect that the spots were flashing jellyfish. There are many different luminous kinds of these animals and the size of the spots suggests the individuals were some way below the surface, perhaps explaining why they did not appear directly in the bow wash.'

Gulf of Oman

m.v. *British Spirit*. Captain M. Pocklington. Ras Tanura to Whangarei. Observers: the Master, Mr J. Tyson, 2nd Officer and members of ship's company.

16 February 1994. At 1515 UTC whilst the vessel was on a course of 139° at 14.5 knots, brilliant green-white ripples of light were observed radiating outwards from the vessel in the bow wave wash. In addition, similar flashes of light were noticed up to one cable out from the ship, see sketch.

The phenomenon was present along the length of the ship, producing the effect of a trail of light the brilliance of which was sufficient to light up the surrounding area and give a ghostly appearance as the vessel moved through the water. At 1945 the display ceased and the observers concluded that the phenomenon was bioluminescence, finding it easy to understand how myths and legends of



mermaids and creatures of the deep could have begun since luminescence could be an alarming sight if not experienced before.

At the start of the observation the sea was calm with light airs while the sky was brilliantly clear with a good horizon visible.

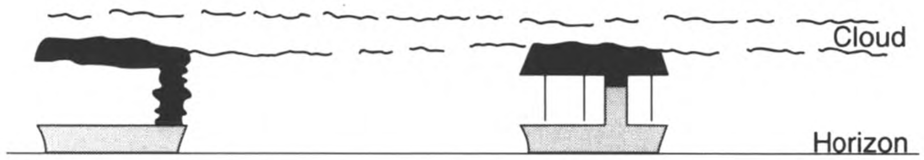
Position of ship at 1515 UTC: 23° 32′N, 59° 25′E.

REFRACTION

South Atlantic Ocean

R.R.S. *Discovery*. Captain A.R. Louch. Gibraltar to Cape Town. Observers: the Master, Mr J.C. Holmes, 3rd Officer, Mr B. Donaldson, Radio Officer and members of ship's company.

13 February 1994. At 1300 UTC whilst approaching Cape Town on a course of 143°, superior images of two ships 14 n.mile north of the vessel were observed. The inverted images of the ships were very well defined and almost touched, see sketches, and were viewed with the aid of binoculars.



On the horizon there was a thin line of cloud, possibly stratocumulus, which formed a horizontal band. The phenomenon was suspected to be the result of super-refraction due to warm air blowing offshore over the cooler sea and enhanced by the light airs present and the slight sea conditions. One ship viewed was a general cargo vessel with superstructure, masts and derricks clearly visible in its image and seeming to be better defined than those on the actual vessel.

Position of ship at 0600 UTC: 32° 48′S, 17° 24′E.

Note. Dr R. White, Director of Theoretical Research in Meteorological Optics, comments:

'In cases where there is a region in which the refractive index drops sufficiently rapidly with height, rays which make less than a certain angle with the atmospheric strata at the observer have been trapped or ducted for a long distance within a relatively narrow band of strata fairly near to the surface, and so fairly laden with dust etc. The angle can be made either above or below, hence the upper and lower boundaries of the apparent "line of cloud" formed as an optical illusion here. Rays making an angle bigger than the critical value with the strata at the observer have passed, at most, twice through the strata, and hence encountered far less dust.

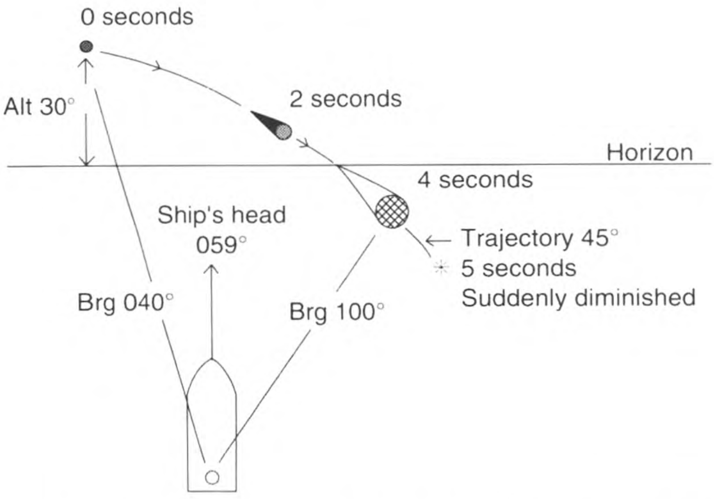
'The fact that we see here just a single, inverted image above the main erect one of the ship, with no sign of a third, erect image above the inverted one, suggests that here we have a rapid change of refractive index but confined to a very thin layer of air. The fact that the erect image possibly showed poorer definition than the inverted one may be attributable to the rays producing the former having travelled further through a more turbulent region of air to be expected nearer the sea surface.'

METEOR

Indian Ocean

m.v. *Vine*. Captain J. Scarisbrick. Tubarao to China. Observers: Mr S. Gupta, 3rd Officer and Mr J. Quinones, Quartermaster.

31 January 1994. At about 0415 UTC a very large and brilliant meteor was sighted. The vessel was on a course of 059° when a faint white light was observed bearing 040°, falling towards the Earth at an altitude of 30°. As shown in the sketch, the light followed a trajectory of 45° and, as it accelerated through the atmosphere, it increased in size and brilliance.



At its peak, the meteor was about one-eighth the diameter of the moon and lit the entire horizon. Its descent lasted 5 seconds before it was suddenly extinguished bearing 100°, altitude 5°. The fireball's mass was bright-white in colour with a green tinge whereas the tapered tail was pale yellow.

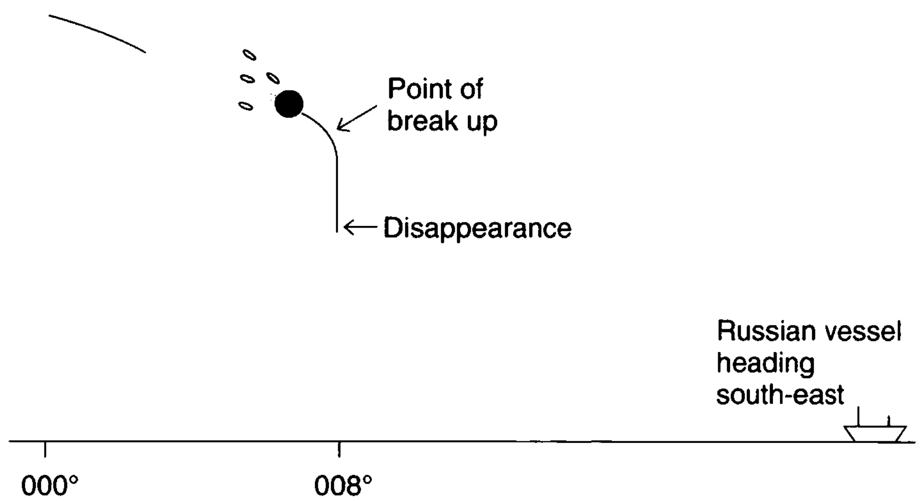
The meteor was so bright and powerful that the Quartermaster, who was standing on the bridge, was driven inside for shelter. Clear skies, excellent visibility and the absence of the moon enhanced the spellbinding event. The observers wondered if the green tinge was common and why the tail should be pale yellow, and also questioned the sudden disappearance of the object and whether it would have fragmented before hitting the surface.

Position of ship: 19° 34′S, 65° 06′E.

South Atlantic Ocean

m.v. *Eastern Bridge*. Captain A. Crofts. Saldanha Bay to Port Talbot. Observers: Mr B. Noel, 2nd Officer and Mr S. Kumaratne, AB.

20 January 1994. At 0146 UTC whilst on a course of 322° at 15.5 knots, a large, bright-orange ball with a long tail appeared bearing 000° and travelled in an easterly direction, see sketch.



The ball then broke into many fragments which then lost their velocity, fell straight down and disappeared. The large ball lit up the low clouds in the area while the fragments were twice as bright as any star in the sky. The sighting lasted for about 6 seconds, beginning at an elevation of approximately 12° and ending at about 7°. Five minutes prior to the observation a bright flash was seen further to the east, behind cloud cover, and lasted roughly 6 seconds. Later, the Principal Observing Officer suggested that the sighting may have been a missile test.

Position of ship: 08° 50′S, 02° 38′W.

UNIDENTIFIED LIGHT

North Atlantic Ocean

m.v. *Eastern Bridge*. Captain M. Bradley. Port Talbot to Davant. Observer: Mr M. Westcott, 3rd Officer.

8 March 1994. At 0452 UTC an intense white light (appearance point unknown) crossed the sky and disappeared in a south-westerly direction, bearing approximately 230°. It had no tail of any sort and was visible for 2–3 seconds during which time the whole area was lit up, literally as if it were daylight. The appearance of the object was like that of a white flare and was initially accepted as such. However, on further consideration it was believed that no flare could travel at such a speed or height, the estimated height being the higher levels of the D-layer or lower levels of the E-layer. The light was not thought to be a meteor because it lit up the entire area.

Conditions at the time were good: the sky was almost clear and many stars were visible; the object passed extremely close to the constellation of Orion.

Position of ship: 29° 18′N, 66° 29′W.

AURORA BOREALIS

North Atlantic Ocean

f.p.v. *Norna*. Captain B.A. Hall. In Scottish coastal waters. Observers: the Master, Mr K. MacKechnie, 2nd Officer and Mr S. Martin, AB.

5/6 February 1994. The aurora was first noticed as a bright glow in the north-western sky at 2100 UTC. Over the next two hours it intensified, consisting mainly of bright-white rayed bands and latterly homogeneous arcs. Peak intensity was reached at 2310 when red and greenish tinges were clearly discernible 'racing' along the rayed band. The arc of the horizon covered was from 330° through north to 040° and the altitude of the display was 30°–60° above the horizon. Lasting from 2100–0125, the display showed intensities which seemed to vary in approximately 20-minute cycles.

On the night of 6/7 February while off the island of South Uist, the aurora was noticed again at 2015 in the form of a homogeneous arc bearing 330° to 010° at an elevation of 30°; a pulsating characteristic was also noted. The sky became cloudy at 2100 but cleared again at 0430 when the aurora was visible as rayed bands. The display effectively weakened with the onset of twilight, at 0650.

Position of ship at 2100 UTC on 5/6 February: 58° 25'N, 06° 40'W.

Oceans of data*

BY O. TICKELL

The importance of the ocean in determining climate is something that few Britons should need reminding of: Newcastle-upon-Tyne lies some 55 degrees north of the equator — level with the frozen wastes of Labrador, and mirroring the bleak, windswept island of Tierra del Fuego at the southernmost tip of South America.

Of course, Britain's comparatively benign climate exists courtesy of the Gulf Stream: the current of tropical waters that is warmed under the Caribbean sun, circulated around the steamy Gulf of Mexico and squirted through the Florida Straits to drift majestically up into the high northeastern Atlantic.

Here the stream, properly known as the North Atlantic Current, delivers to the atmosphere an astounding 10^{15} watts of heat. It is the greatest thermal transfer in the entire global ocean circulation system, equivalent to the output of a million power stations, and responsible for warming northern Europe by an average of 6°C. The North Atlantic Current then plunges down as far as 1,000 metres to the ocean floor to begin its southwards return journey.

But this movement of tropical waters may not be as stable as it always seemed. In the last ice age, the stream hit Europe at the level of Portugal, while more northerly regions remained firmly under ice. Again, in the Younger Dryas, a severe cooling event that interrupted the warming trend some 11–12,000 years ago, the North Atlantic Current sank and reversed direction far south of its present latitude.

Were the North Atlantic waters to become less dense and saline, perhaps through the addition of fresh water from melting icecaps in Greenland and northeast Canada, the warm waters from the Gulf of Mexico might do the same again with catastrophic results. Depending on how the ocean responds to greenhouse conditions, our weather could become more like that of Alaska than the 'Costa del Bognor' of tabloid imagination.

As an example of the potential instability of the climate system, there is no better place to look than the southern tropical Pacific, and the self-reinforcing perturbation of ocean and atmosphere known collectively as El Niño and the Southern Oscillation (ENSO). This anomalous weather system develops every one to five years in the southern summer for reasons that have yet to be fathomed. It normally lasts for up to a year, but the latest ENSO is now in its third year.

In a 'normal' year, the southern Pacific region is dominated by an intense high pressure zone off the South American coast and a low pressure zone over Indonesia, linked by the southeast trade winds. As the wind blows over the ocean from high to low pressure, it draws the cold Humboldt current from the deep Antarctic up to the surface along the Peruvian coast. The cold ocean surface in turn accentuates the downward air flow of the high pressure system.

When the moisture-laden winds arrive at the Indonesian low, with its high surface water temperature, they rise up and shed their moisture in intense storms. Then the cold, dry air returns to the east at high altitude and descends over the rainless eastern face of the Andes to complete its circular motion.

* This article first appeared in *Geographical*, March 1994.

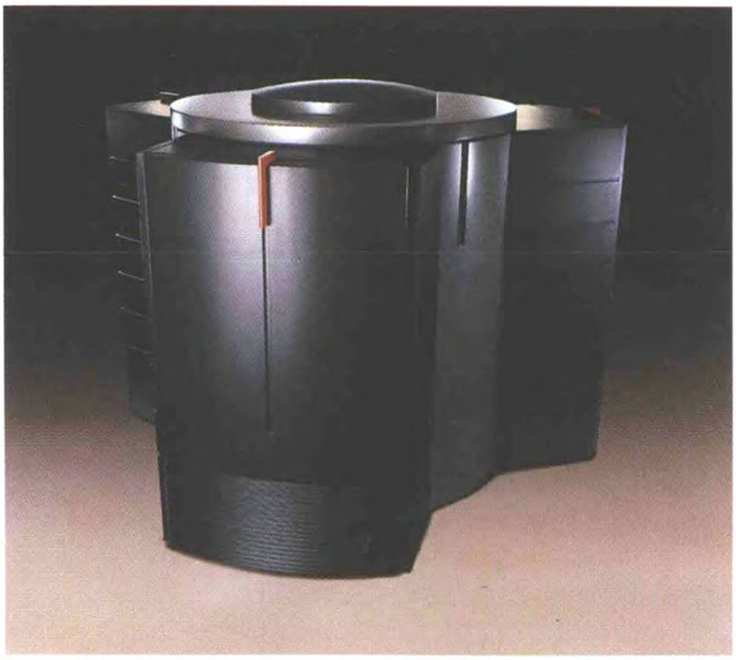
But in an ENSO year, the high and low pressure regions change places, bringing drought to the to the rain-forests of Indonesia, Papua New Guinea and Australia, and sometimes rain to the coastal deserts of Chile and Peru. Meanwhile, warm waters extend right to the Peruvian coast, depriving the region of the nutrient-rich deep Humboldt waters and causing the collapse of the rich fishery on which the country depends.

In addition, ENSO years are associated with cyclones striking far east of their normal limit, with unusually cold winters in North America, Europe and Asia, and the failure of the Indian monsoon, itself linked with a seasonal current reversal in the Indian Ocean. Under stress, it is not far-fetched to imagine that new climatic instabilities could develop in the North Atlantic and elsewhere, with far-reaching, if unpredictable, consequences

Clearly, the behaviour of the oceans is fundamental to determining climate and, in a greenhouse world, the course of future climate change. Oceans transport as much heat around the globe every year as does the atmosphere. Together, they form a closely coupled system with a constant exchange of heat, kinetic energy, momentum, water and gases. And the oceans store as much heat in their top few metres as the entire atmosphere, providing a total heat capacity 1,000 times greater.

But in spite of this, climate research remains heavily biased towards atmospheric science. One reason is that climate research has grown out of weather forecasting. With its worldwide network of meteorological stations and weather balloons, climate researchers have been able to make use of a massive stream of atmospheric data. By contrast, oceanographic data from ships and satellites is sparse, incomplete and very expensive to obtain.

With contemporary supercomputers operating at a maximum speed of about one billion floating point operations per second (flops), it is now possible to model global atmospheric movements to a reasonable degree of accuracy. In a typical atmospheric circulation model, the world is divided up into fairly large blocks of about 3 degrees, roughly 300 kilometres square. This is good enough to resolve major atmospheric features such as cyclones or anticyclones, which generally span 1,000 kilometres or more.



CRAY C916, the model that is installed at the Meteorological Office. The system has 16 processors and has a peak performance rate of 16 GFlops (16 billion floating point operations per second). One floating point operation involves adding, subtracting, dividing or multiplying two numbers to an accuracy of 14 decimal places.

Photo by courtesy of CRAY Research (U.K.) Ltd

But the analogous oceanic weather, which involves circular motions of water known as eddies, typically span only 50 to 100 kilometres across. So to observe them in two dimensions, over 100 times as many measurements are needed. To model them in three dimensions needs at least 1,000 times the computer power. Supercomputers with the capacity to carry out this task are only just emerging, and there are still none in the U.K.

As an example of the difficulties, consider the Atlantic Isopycnic Model (AIM), under investigation by a team led by Adrian New at Southampton's James Rennell Centre for Ocean Circulation, part of the Institute of Oceanographic Sciences Deacon Laboratory (IOSDL). AIM reproduces the dynamics of just the tropical and northern Atlantic Ocean to an average resolution of 0.33 degrees — roughly 40 kilometres. This is just enough to resolve major eddies. But to do this, it requires a total of 2.5 million grid points.

The software that AIM uses is not large — just 4,000 lines of FORTRAN developed at the University of Miami by Rainer Bleck. But it devours an enormous amount of computer time. With each time step representing 12 minutes in the real world, it will take some 5,000 hours of processor time to model 20 years of oceanic movement.

The model is so far proving successful reproducing all the major features including the subtropical and subpolar gyres, and the northern Atlantic subduction of the Gulf Stream. Come April, yet finer features of ocean circulation will come within its grasp as it reduces its grid size to an average of 0.25 degrees, going down to 0.11 degrees at 70 degrees North.

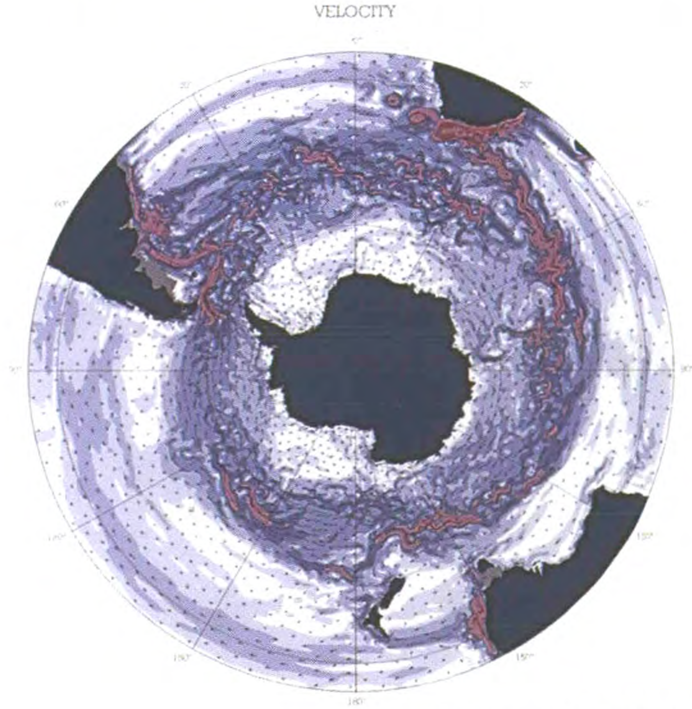


Illustration by courtesy of FRAM/IOSDL

A horizontal plot of current speeds taken from the FRAM simulation of the Antarctic Ocean run by the Institute of Oceanographic Sciences Deacon Laboratory. Light blue colours indicate velocities of less than one centimetre per second, while bright red indicates speeds of over 1 metre per second. Note the many small jets and large meanders in the Antarctic Circumpolar Current which encircles the Antarctic continent. Although in fine resolution, single ocean models such as FRAM rely on arbitrary boundaries being drawn in the oceans, so their usefulness in predicting climate changes is limited. To model the global ocean system, you have to compromise on resolution.

Another ocean circulation model, also being run at IOSDL, is the Fine Resolution Antarctic Model (FRAM), which examines one third of the world's ocean surface — the open sea surrounding Antarctica. This is the one place on Earth where ocean currents, unobstructed by land, spin freely, creating the great mixing bowl that joins together all the world's oceans. The model has so far generated 16 years of real time ocean movement to a resolution of 0.5 degrees in longitude by 0.25 degrees latitude, giving blocks of some 30 kilometres.

But even as the results of AIM and FRAM are being evaluated, oceanographers are acutely aware of their limitations. The models are partial and bounded by arbitrary walls in the ocean. Boundary conditions on those walls, such as flow rates of water of a defined salinity and temperature, are not calculated by the model, but decided by the modellers. As a result, says FRAM specialist Peter Killworth, head of Oxford University's Oceanography Unit, you have to fudge the models at the edges.

The focus of interest has therefore shifted to whole-ocean models, the first of which was only developed in 1992 by Albert Semter and Robert Chervin of the National Centre for Atmospheric Research (NCAR) in Boulder, Colorado. Initially, it was based on a 0.5 degree grid, but by early 1993 they had doubled its resolution to 0.25 degrees, producing the first realistic global model of ocean circulation.

In particular, the globe-spanning 'conveyor belt' current was visible for the first time. Beginning at the surface of the tropical Pacific, its sun-warmed waters travel west through the Indian Ocean and around the Cape, then swing northwest across northern South America to the Caribbean. From there onwards, they are recognised as the Gulf Stream. Chilled in the high North Atlantic, the current sinks and returns southwards in the deep ocean to join the eastward circumpolar Antarctic flow, before heading north once more into the Pacific — parts of it as the Humboldt current that sweeps up the southwest coast of South America — thus completing the loop several centuries after it began.

A key factor in NCAR's achievement was access to a 1 billion flop 8-processor Cray YMP supercomputer, on which a year of global ocean behaviour could be modelled in just 100 hours. And now, with access to a 'massively parallel' CM5 Connection Machine at Los Alamos National Laboratory, whose 1024 parallel processors are theoretically capable of 100 billion flops, Semter and Chervin have developed a whole ocean model based on a high resolution 0.16 degree grid.

But despite the greater detail rendered by this set-up, the model's usefulness in predicting climate change remains limited. In particular, the north Atlantic sinking of the Gulf Stream — the most critical part of the entire conveyor belt current — is not well reproduced and needs constant correction.

One reason for the NCAR model's incomplete success may be that Semter and Chervin use a simple three-dimensional rectilineal grid. By contrast, the vertical dimension of AIM is defined by undulating surfaces of constant seawater density, known as isopycnals. While this approach is superficially more complex, with the distance between isopycnals highly variable, it may hold the key to a better understanding of the ocean's three-dimensional behaviour. This is because water moves in the ocean not along level horizontal surfaces, but along isopycnals, always holding its level with other water of the same density.

Back in Britain, Adrian New's team is now preparing to test the isopycnic approach beyond the confines of the Atlantic, in a Global Isopycnic Model (GIM). To begin with, says New, GIM will run at a one degree resolution, requiring

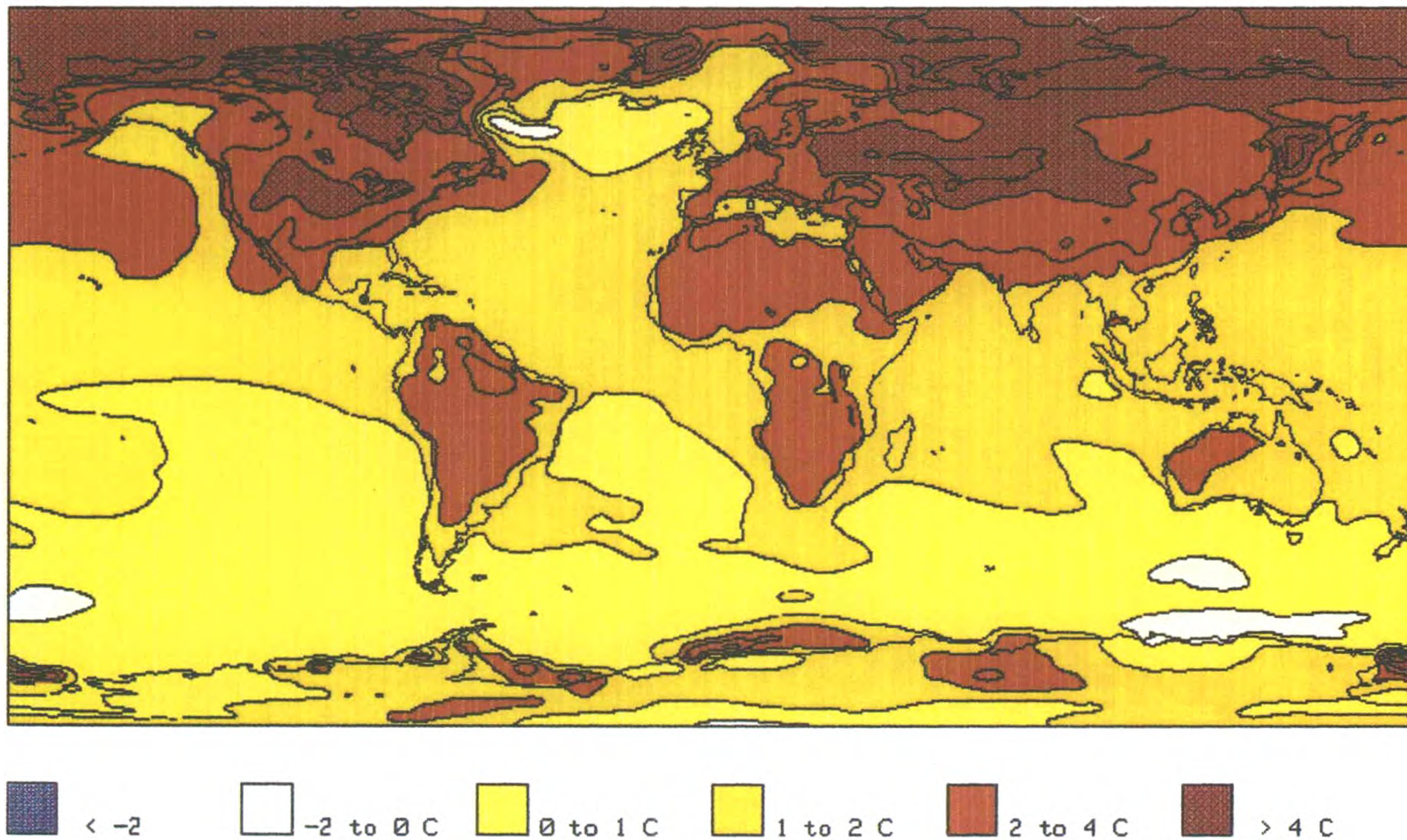


Illustration by courtesy of GCM/Hadley Centre for Climate Prediction and Research

A plot from an Atmosphere Ocean General Circulation Model (AOGCM) simulating average surface temperature change over a 10-year period. This section covers years 66 to 75 of an experiment which sought to determine the climate response, over a 75-year period, if atmospheric carbon dioxide (CO_2) concentrations increased by one per cent per year (compound). Under this scenario, CO_2 concentrations would double in 70 years, the point at which this plot is centred. Run by the U.K.-based Hadley Centre, it is one of the few models in existence which simulate both ocean currents and their complex interaction with the atmosphere. It clearly shows a moderate warming over mid-latitude regions, increasing in magnitude towards the Arctic. Previous Hadley Centre General Circulation Models which have not factored in the full depth of the ocean have indicated a significant warming at both poles.

roughly the same computer power as AIM does now. But after three or four years, the team should be running an eddy-resolving version based on a 0.25 degree grid, using about 10 times the computer power.

The GIM will initially run on a 16-processor Cray C90 ** computer, capable of four to five billion flops. The computer belongs to the Hadley Centre for Climate Prediction and Research (part of the U.K. Meteorological Office), which is also funding the GIM programme. Meanwhile, the Hadley Centre will be running a rectilinear model in parallel with GIM, also based on a one degree grid and working from the same base data. The results from each model type will then be compared.

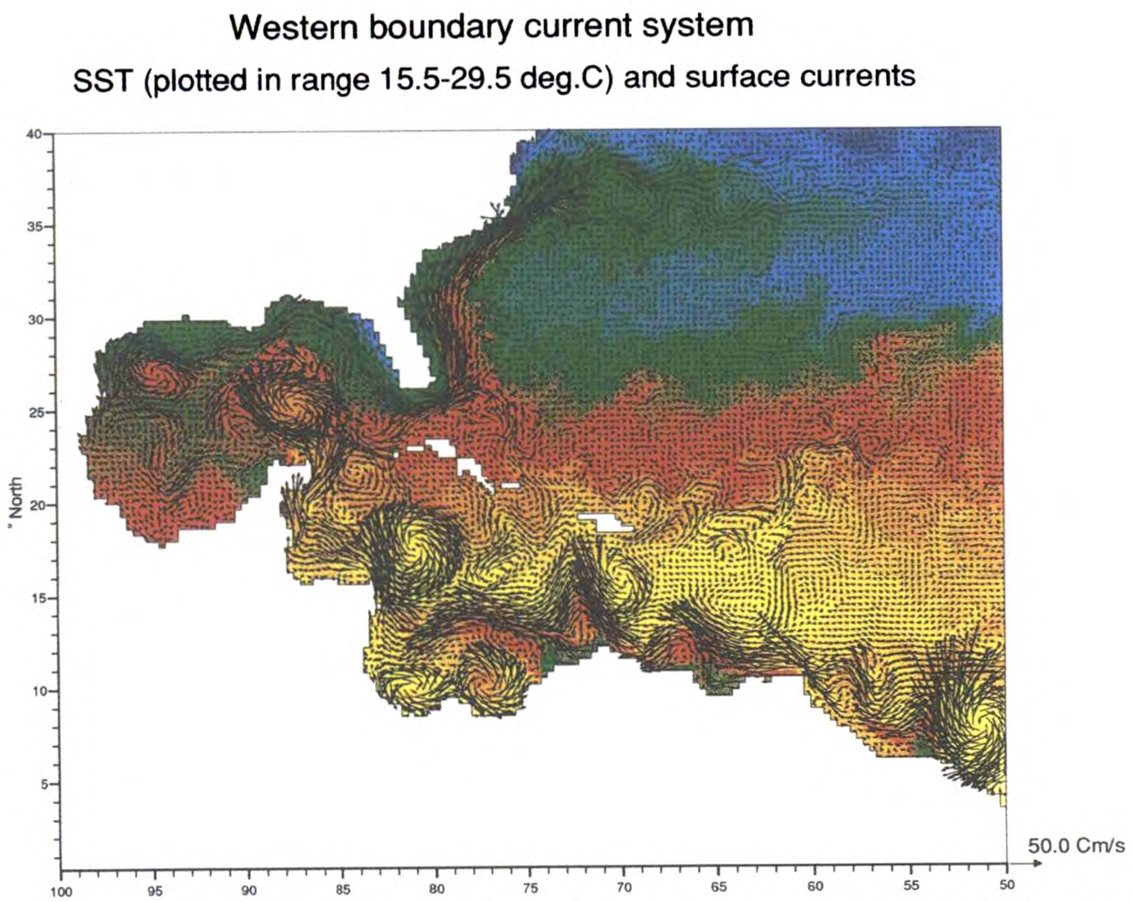


Illustration by courtesy of the James Rennell Centre for Ocean Circulation.

A blow-up of ocean currents in the Caribbbean-Gulf of Mexico region, taken from the Atlantic Isopycnic Model (AIM) established by the James Rennell Centre for Ocean Circulation. This data represents mid-February conditions after seven years of simulated circulation with an average resolution of 40 kilometres. A series of eddies can be seen along the northern coast of Latin America. The Gulf Stream, or North Atlantic Current, is clearly visible flowing strongly northward off the coast of Florida, before 'separating' in the Cape Hatteras vicinity and heading eastwards. This phenomenon can be observed in satellite images. The AIM is not quite resolving mesoscale eddies downstream of the Gulf Stream separation, but meandering is apparent.

But the ultimate goal — to integrate realistic models of ocean and atmosphere circulation into a single working unit — remains distant. Present coupled models all operate at a very coarse resolution, like the Hadley Centre model whose three degree grid is unable to resolve even the Gulf Stream. Again, the limiting factor is

[** Now superseded by the CRAY C916. See photograph on page 23.]

the power of computers. According to New, climate researchers need machines which can deliver a minimum of 1,000 billion flops to provide the necessary speed and detail.

This may be achieved in the near future, by bringing as many as 64,000 parallel processors together in a single massively parallel computer. But for the time being U.K. researchers have to make do with whatever time they can get on the 8-processor Cray at the Rutherford-Appleton laboratory. Fortunately, things will soon improve as U.K. research councils have allocated £6 million to buy a new supercomputer in 1994. But this will only be one step towards the goal of accurate climate prediction.

As Peter Killworth points out, models need to be able to run efficiently and at fine resolution, but they also need to be right. There is a need to take 'a great leap backwards' and think again about the physical processes described in the software code.

Killworth has sought to do this for a new global ocean model he is assembling under the Ocean Circulation and Climate Advanced Modelling (OCCAM) experiment. Unlike the NCAR model, which stops at the Arctic Circle, it will extend right to the North Pole. And rather than following a single grid system, like AIM or the NCAR models, it will choose whichever works best in each part of the ocean.

A coarse resolution model is already working, based on a one degree grid. And Killworth has the code ready and waiting for a 0.16 degree model, as soon as the new NERC/SERC MP supercomputer is up and running. He is also preparing for a model based on an ultrafine five kilometre grid, covering land as well as ocean, which he believes is needed to obtain the required precision for long-term climate forecasting.

But even having achieved this oceanic holy grail, his real problems will only just have begun. 'Even now we are dumping 100 megabytes of data every time we take a snapshot of the model,' he says. 'At a five kilometre resolution, we will be talking gigabytes — more than our computer disks can hold, and enough to keep the computer busy for half an hour just unloading it all.'

That is not the only complication. Models must be checked against real oceanographic observations, to make sure that the phenomena generated by computers are real, not just artefacts of models. John Mitchell, head of climate modelling at the Hadley Centre, warns that centuries-long oscillations in temperature and salinity generated by ocean models may be no more than computer phantoms.

And although atmosphere models are fairly insensitive to initial conditions, the same is not true of ocean models. When FRAM was first set up, it developed major self-sustaining eddies with no counterpart in reality. They were eventually removed by changing the initial conditions. To initialise a global, high resolution coupled ocean-atmosphere model with realistic start-up data will be a major task in itself. Get it wrong, and the terabytes of computer output will be no more than science fiction.

Editor's note. Further information about the Fine Resolution Antarctic Model (FRAM) can be found in the April 1991 edition of this journal.

The WMO Voluntary Observing Ships (VOS) Scheme

To encourage the shipping industry and associated organizations to support WMO and National Meteorological Services in the enhanced recruitment of merchant ships into the VOS, the Sub-Committee on Safety of Navigation of the World Meteorological Organization was recommended at its 40th Session to circulate the following Note, including the extra bold type and capital letters as copied below.

Background

The international scheme by which ships plying the various oceans and seas of the world are recruited by National Meteorological Services (NMSs) for taking and transmitting meteorological observations is called the *WMO Voluntary Observing Ships' (VOS) scheme*. The forerunner of the scheme dates back as far as 1853, the year in which delegates of ten maritime countries came together at a conference in Brussels, on the initiative of Matthew F. Maury, then director of the United States Navy Hydrographic Office, to discuss his proposal for the establishment of a uniform system for the collection of meteorological and oceanographical data from the oceans and the use of these data for the benefit of shipping in return.

The conference accepted his proposal and adopted a standard form of ship's log and a set of standard instructions for the necessary observations.

From the very beginning, ships' meteorological observations were recognised as being essential for the provision of safety-related meteorological services for ships at sea, as well as for climatological purposes.

The situation today

At the present time, the contribution which VOS meteorological reports make to operational meteorology, to marine meteorological services and to global climate studies is unique and irreplaceable. During the past few decades, the increasing recognition of the role of the oceans in the global climate system has placed even greater emphasis on the importance of marine meteorological and oceanographical observing systems.

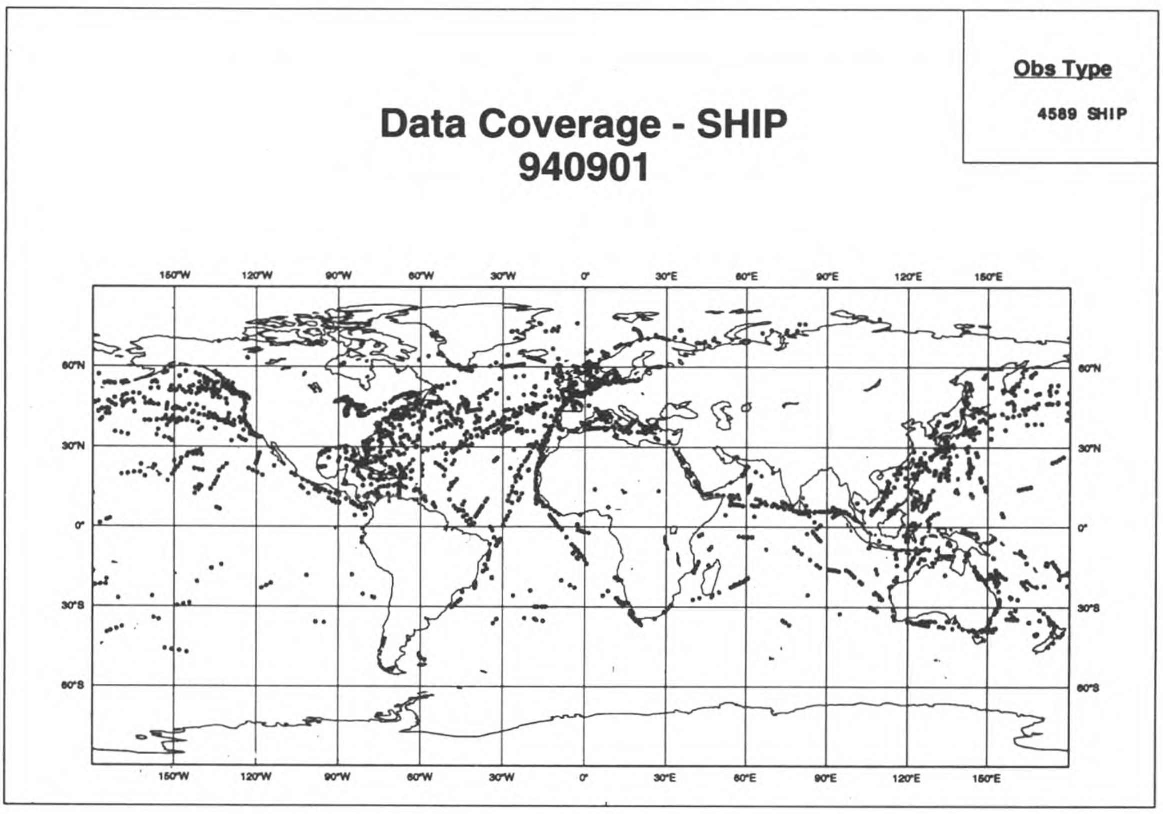
One of the major continuing problems facing meteorology is the scarcity of data from vast areas of the world's oceans (the so-called 'data-sparse areas') in support of basic weather forecasting, the provision of marine meteorological and oceanographic services, and climate analysis and research.

While the new generation of meteorological satellites will help substantially to overcome these problems, data from more conventional platforms, in particular the voluntary observing ships, will remain essential for the foreseeable future, to provide ground truth for the satellite observations, to provide important information which the satellites cannot observe, to provide an essential contribution to the data input for the numerical weather prediction (NWP) models which are the basis of the present-day forecasts and warnings, and to provide real-time reports which can be used immediately in services for the mariner. In addition to their use in NWP, reports from ships at sea are also used operationally, even more directly, in the preparation of forecasts and warnings, including those for the GMDSS, and issued specifically for the mariner.

Thus, without VOS observations, reliable and timely services for mariners cannot be provided.

The VOS Fleet Size

A peak in total VOS was reached in 1984/85 when about 7700 ships worldwide were on the WMO VOS Fleet List. Since then there has been an irregular but marked decline and in June 1994, the Fleet strength was about 7200 ships. As might be expected, real-time reports from the VOS are heavily concentrated along the major shipping routes, primarily in the North Atlantic and North Pacific Oceans. The chart shows details of the geographical distribution of ships weather reports for the 24 hours of 1 September 1994 and the most striking feature is the large data-void areas in all southern hemisphere oceans. While this situation certainly reflects the relatively small numbers of ships sailing in these waters, it also makes it more essential that ships sailing in these areas should be part of the VOS and thus contribute to the global observing programme and consequent enhancement of the forecast and warning services to the mariner.



Of course, as VOS reports are part of a global data capture programme, their reports are of value from all the oceans and seas of the world, and even the well-frequented North Atlantic and North Pacific Oceans require more observational data.

What are the charges to be part of the VOS scheme?

THERE ARE NO CHARGES TO THE SHIP OR TO THE OPERATOR. The tested marine meteorological instruments necessary to undertake weather observing at sea are supplied free of charge to the ship, installed by a professional from the NMS, usually a trained Port Met. Officer, who will provide advice on the technique of observing at sea, explain the use of the WMO *SHIP* code and offer guidance on the transmission of the observations from the ship to shore, using the ship's own satcom or terrestrial communications equipment. **THERE ARE NO CHARGES TO THE SHIP FOR THE TRANSMISSION OF VOS WEATHER REPORTS.** After recruitment into the VOS, the meteorological instruments will be regularly serviced, without charge to the ship or shipowner, by an official of either the 'recruiting NMS' or from the worldwide network of WMO Members who operate the VOS.

How can you become involved?

If an Administration

(i) Be aware that ships' meteorological reports can make a significant contribution to safety of life and navigation through better quality forecasts and warnings.

(ii) Ensure that your ship operators are aware of the WMO VOS scheme and encourage their participation.

If a Ship Operator

(i) Contact your NMS, or a local Port Met. Officer, and nominate your ships for recruitment into the WMO VOS scheme.

REMEMBER: HELP IMPROVE THE QUALITY OF FORECASTS AND WARNINGS, AND CONTRIBUTE TO THE ENHANCEMENT OF SAFETY AT SEA.

Become involved with the VOS

For further information, contact Dr Peter Dexter, Chief, Ocean Affairs Division, WMO, 41 Ave Giuseppe-Motta, Case postale No 2300, CH 1211, Geneva 2, Switzerland. Tel: (Int) 4122 730 8237. Fax: 4122 733 0242.

Tropical cyclone 'Geralda'

BY EDLEY MICHAUD*

On 27 January 1994 the Port Louis Harbour Radio issued a warning of an active low pressure area to the south of Diego Garcia; its position at 0000 UTC on the 27th was 12° 00'S, 71° 00'E. The fishing vessel m.v. *FAKI III* was working in position 10° 12'S, 62° 12'E at 0200 and at this time recorded the pressure as 1012.2 mb, wind variable, force 2 with a slight to moderate sea. Similar conditions continued until 0800 on the 28th; in the meantime the Mauritius Meteorological Services had upgraded the low pressure system to a moderate tropical depression and named it Geralda. By 0000 on the 28th Geralda was in position 13° 12'S, 67° 48'E moving west-south-westerly at 8 knots.

At this time the *FAKI III* was at 10° 48'S, 61° 48'E and drifting. During the next 24 hours the pressure dropped to 1007.5 mb, and from the 29th the sea started to get rough, so as fishing was complete the course was set for Tamatave. Geralda deepened into an intense tropical cyclone on the 30th at 1800.

* Edley Michaud is an amateur meteorologist collaborating with the Mauritius Meteorological Services.

The following [selection of] observations are extracts from the ship's logbook through the courtesy of Seafalcon Ltd and the Master, Captain L.C. Rowse.

Date and time (UTC)		Wind Dir'n	Wind Force	Pressure (mb)	Remarks
30th	0000	W	6	1006.0	Overcast with rain showers. Sea rough. Speed reduced.
	0600	NW	6	1007.0	Overcast. Rough sea.
	0900	WNW	6–7	1004.0	Pressure falling rapidly. Rolling heavily. Rough sea. Overcast.
	1200	NNW	5	1003.6	Overcast. Rough sea.
	1500	WNW	5–6	1005.0	Overcast. Rough sea.
	1800	NW	6	1005.6	Cloudy. Rough sea.
31st	0000	NW	7-8	1004.0	Overcast. Rough to very rough sea. Ship's position: 11° 06'S, 58° 54'E.

Weather conditions remained similar until 2 February at 0010 when the ship's speed was again reduced and course altered to the north-west because of very heavy rolling. In ship's position 14° 48'S, 54° 36'E the wind veered to N'ly, force 6 and remained so until the ship arrived at Tamatave on 3 February at 1930.

Note 1. The *FAKI III* is a fishing vessel of 426 grt, with a crew of 95 men, and is equipped with 20 small boats each having 10 hp outboard motors and working with three fishermen, hand line fishing. The Mauritius Meteorological Services have upgraded the vessel to carry a marine barograph as well as a thermometer screen.

Note 2. Geralda hit Madagascar on 2 February, the centre passing some 35 km to the north of Tamatave. The strongest gusts of wind recorded at that station were in excess of 136 knots while the minimum pressure was 942.6 mb. Some 43 people were said to have perished and there was significant structural damage.

Editor's note. Readers may be interested to know that upper-air readings are soon to be supplied from above vast tracts of the Indian Ocean by aircraft of the Mauritian national airline, Air Mauritius. Carrying U.K.-funded and built meteorological systems, the aircraft fly over some of the world's most data-sparse areas between Mauritius and the Far East. The Aircraft to Satellite Data Relay (ASDAR) system takes automatic readings from flying 'weather station' aircraft and transmits the data hourly to Bracknell and Washington via satellite ground stations. Although primarily of use to aviation, ASDAR should also contribute valuable upper-air data for use in forecasting weather developments at the surface and so should be of additional benefit to shipping in data-sparse areas of the Indian Ocean.

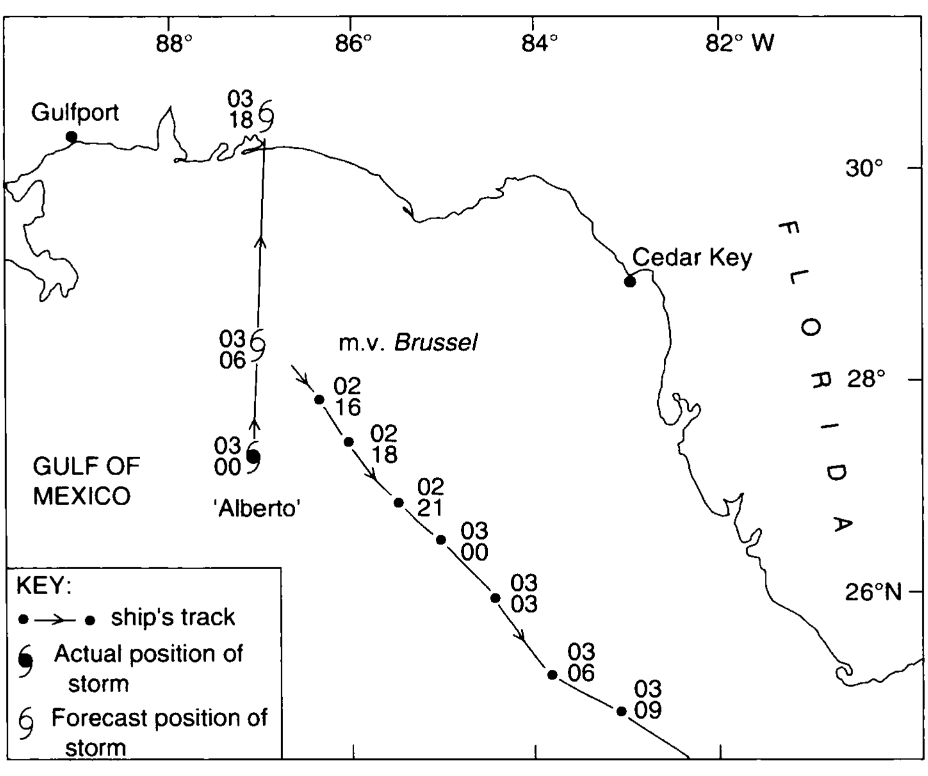
Tropical Storm 'Alberto'

July 1994 saw the development in the Gulf of Mexico of tropical storm 'Alberto', and although it was not to become a feature of major significance it was nevertheless tracked mercilessly by the National Weather Service (NWS) in Miami with the help of shipping in the area of the storm.

One vessel which was able to assist was the *Brussel* (ABC Container Line), *en route* from Gulfport, Mississippi to Charleston. During 2 July, violent rain showers had given way to continuous moderate or heavy rain which was also termed 'torrential' by the observers who were, in addition, experiencing relative humidities in excess of 90 per cent at times. The wind was SSE'ly, force 6 at 2100 (UTC) causing seas of about 4 m which were accompanied by a roughly south-easterly swell of 3–3.5 m. On the 3rd at 0000, NWS issued a hurricane warning for the north-east gulf coast from Gulfport to Cedar Key; the storm was located near 27° 30'N, 87° 00'W and was moving north at 11 knots. Its estimated central pressure was 996 mb with maximum sustained winds of 50 knots with gusts to 60 knots. Miami requested 3-hourly ship observations from vessels within 300 n.mile of the storm.

The *Brussel* was able to contribute the following information [derived from the observations in her meteorological logbook] while the chart shows the ship's track along with actual and forecast positions of Alberto.

Date and time (UTC)		Wind Dir'n	Wind Force	Dry bulb	Pressure (mb)	Remarks
3rd	0000	150°	6	24.8°	1009.9	Visibility about 200 yards in periods of heavy rain. Relative humidity 97 per cent.
	0300	180°	5	27.6°	1012.8	Lightning visible. Cloud cover breaking to 4 oktas. Moderate rain showers.
	0600	180°	5	27.5°	1013.8	Lightning visible. Cloud cover 2 oktas.
	0900	190°	4	27.7°	1014.0	No cloud.



As the vessel continued towards the Florida Straits, out of useful range in relation to observing Alberto's effects, the storm continued northwards and was forecast to weaken eventually before making landfall in time for Independence Day.

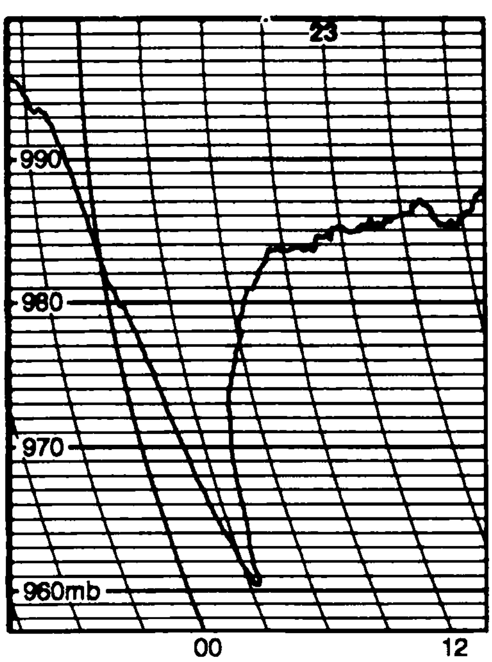
Heavy weather in Shetland

On 23 January 1994, the *Matco Thames* (Mobil Shipping Co. Ltd) and the *C.S. Iris* (B.T. Marine Ltd) were unlucky enough to be able to monitor the effects of an intense depression as it tracked across Shetland. The two ships were some 35 n.mile apart, the *Matco Thames* steaming 8–10 n.mile off the east coast of Mainland, in the area of Out Skerries while the *C.S. Iris* was alongside in Lerwick for a crew change.

The conditions experienced by each ship's observers are tabled below while the barograph and anemograph traces offer their own evidence.

Matco Thames. Position on 23rd January at 0400 UTC: 60° 30'N, 00° 15'W.

Date and time (UTC)	Wind Dir'n	Wind Force	Pressure (mb)	Remarks
22nd 2000	WSW	7	1001.0	
23rd 0000	SWxS	10	990.7	
0200	SSW	10		
0400	WSW	10	968.9	Sudden wind change. Heavy wintry showers. Poor visibility.
0500	NW	12		Wind at vessel recorded as 110 knots.
0800	NW	9	987.7	
1200	WNW	10	991.5	

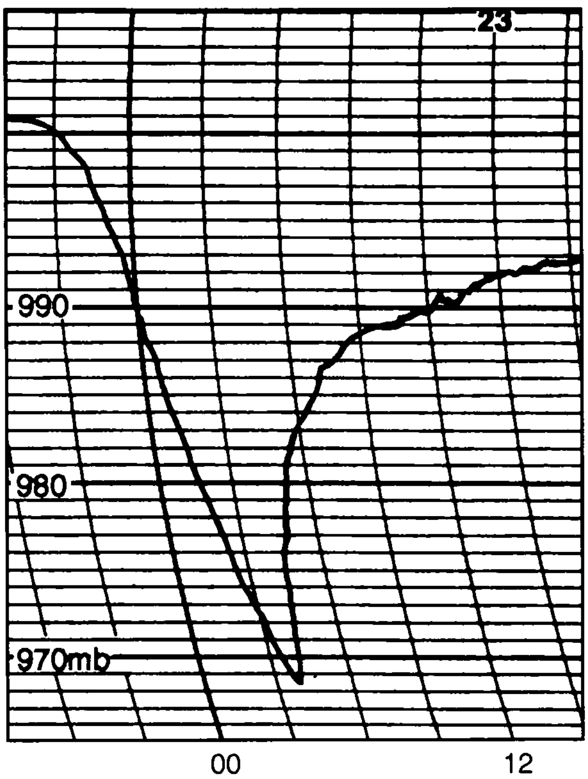


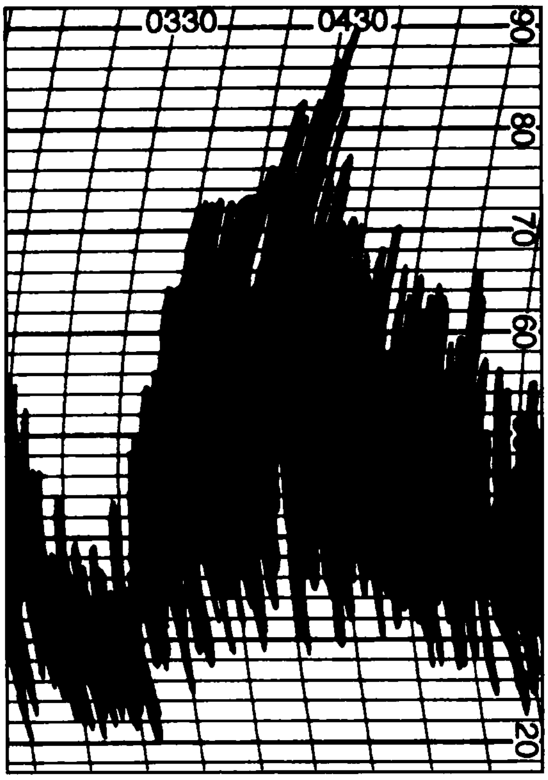
The weather was driving snow and hail with driving spray and very rough seas. Although the vessel noted a wind speed of 110 knots, this was exceeded at Sullom Voe where a speed of 120 knots was recorded.

C.S. Iris. Alongside at Lerwick. Wind data taken from anemograph.

Date and time(UTC)	Wind Dir'n	Wind Speed (knots)	Pressure	Dry bulb	Remarks
23rd 0330	NW	80/90+	968.5	2.0°	Heavy snow.
0400	NW	80/90+	976.6	1.0°	Heavy snow.
0430	NW	60/75	981.5	2.5°	Rain.
0500	NW	45/55	983.8	3.0°	Fine.
0530	NW	40/50	985.5	3.0°	Squally rain showers.

0600	NW	35/45	986.8	3.0°	Squally rain showers.
0630	WNW	35/45	988.1	2.5°	Squally rain showers.
0700	WNW	35/60	988.8	1.0°	Squally, heavy snow.
0730	WNW	35/40	989.7	2.0°	Fine.
0800	WNW	35/45	991.5	2.0°	Squally, heavy snow.





The exact wind speed for 0330 and 0400 are unknown since the recorder pen went off the scale at these times. No observations of sea state could be made since the vessel was alongside but the harbour waters were white with driven spray which seriously affected the visibility.

PRESENTATION OF BAROGRAPH

On 21 July 1994 the fourth and final nominee for the 1992 Long-Service barograph awards was able to respond to the invitation to attend at Bracknell. Captain T. Richard Barton, of Furness Withy (Shipping) Ltd, recently Master of m.v. *CGM Magellan*, formerly the *Andes*, was received at the Marine Division's Scott Building headquarters by the Marine Superintendent. Some of Captain Barton's observing records from the Archives were on show, notably his first meteorological logbook, sent from Shaw Savill and Albion's *Athenic* in July 1957. The first log received from a Shaw Savill ship was also on display, that from the *Crusader*, commenced on 26 September 1874.

Captain Gordon Mackie presented the inscribed barograph at a small reception, also attended by Mrs Barton, Captain Nigel Matthews, Marine Superintendent of Furness Withy and other Met. Office Marine Division staff. (See photographs overleaf).

Following the formal reception the guests were entertained to lunch and were

Crown Copyright

Presentation of barograph at Scott Building, 21 July 1994. Standing, left to right: Captain J.F.T. Houghton, Nautical Officer (Publications); Captain G.V. Mackie, Marine Superintendent, Met. Office; Captain N.L. Matthews, Marine Superintendent, Furness Withy (Shipping) Ltd.; Captain S.M. Norwell, Deputy Marine Superintendent, Met. Office; Captain E.J. O'Sullivan, Nautical Officer (PMO Liaison). Seated: Captain Richard Barton; Mrs Norma Barton.

Crown Copyright

Captain Mackie presents the inscribed barograph to Captain Barton.

Following the formal reception the guests were entertained to lunch and were subsequently taken on a comprehensive guided tour of the Central Forecasting Office, by Branch Director, Mr Martin Stubbs, whose father was Master in Blue Star Line before and during World War II.

SCENE AT SEA

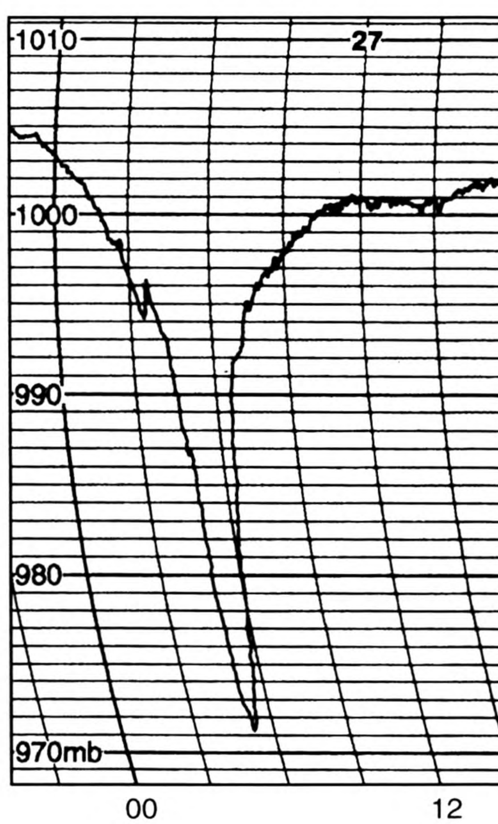
Photo by M.A. Pagente

Mystery 'duck' which waited on the port bridge wing of the *Hemina* for flying-fish on 19 October 1993. The *Hemina* was at 24° 06.5′N, 87° 13.5′W.

Captain P.W. Chilman, of the Royal Naval Birdwatching Society has identified the bird as a Double-crested Cormorant (*Phalacrocorax auritus*) which is the most common North American cormorant breeding on the Atlantic, Pacific and Gulf coasts and also inland. The crest is only present for a short while in the early part of the year before breeding starts. They are mainly coastal birds so it was slightly unusual for one to be so far out to sea.

Right: Barograph trace resulting from the encounter with tropical cyclone 'Theodore' by the *Direct Kea* (New Zealand VOF) on 27 February 1994 in position 23° 42′S, 169° 48′E.

At 0600 UTC on the 27th the wind speed was logged as 70 knots and there were moderate to heavy rain showers.



AURORA NOTES JANUARY TO MARCH 1994

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

As is customary, the marine observations of the aurora received to date with respect to the period under review are listed in Table 1.

Table 1 — Marine aurora observations January to March 1994

Date	Ship	Geographic Position		Time (UTC)	Forms in Sequence
11/12 Jan.	*Cumulus*	57° 23'N,	22° 12'W	0010–0040	qR_1A.
5/6 Feb.	*Norna*	58° 25'N,	06° 40'W	2100–0125	G.RB.mHA.a_3RB. Max. alt. 60°.
6/7	*Norna*	57° 00'N,	07° 30'W	2015–0620	p_1HA.RB. Max. alt. 30°.
21/22	*CanMar Europe*	50° 03'N,	63° 28'W	2230–0330	aG.aRB. Max alt. 90°.

KEY: a = active, a_3 = horizontal movement, m = multiple, p_1 = flaming upwards, q = quiet, A = arc, G = glow, HA = homogeneous arc, RB = rayed band, R_2 =short ray.

The Earth's magnetic field has been experiencing recurrent periods of very high magnetic activity that began in December 1993 and continued until June 1994. The first period was short, only two or three days in length and was associated with an equatorial coronal hole at or about solar longitude 180 degrees. The second period, lasting ten to fourteen days was associated with a complex of southern solar hemisphere coronal holes at or about solar longitude 180 degrees. Both short and long periods recurred at least eight times as the sun rotated and brought the active sources into the same position with respect to the Earth.

These magnetic disturbances were accompanied by aurorae and, to date, some 225 reports in all have been received from European and American observers. The most active nights in British waters may be summarised in Table 2.

Table 2 — Most active auroral events visible from British waters

Date	Number of Observers	Lowest Latitude Sighting	Maximum Altitude
11/12 Jan.	5	Forth Estuary	5°
5/6 Feb.	19	Solway Firth	30°
6/7	18	Cardigan Bay. (Corona over Moray Firth.)	30°
8/9	7	Forth Estuary	15°
7/8 Mar.	13	Moray Firth, coronal structures	90°
8/9	11	Solway Firth	20°
9/10	11	Solway Firth. (Corona over Shetland	20°
11/12	7	Solway Firth	12°
16/17	4	Tay Estuary	20°
30/31	2	Clyde Estuary	10°

Many aurorae observed were of the quiet form associated with coronal hole activity and were reported only from northern Scotland, Orkney or Shetland.

The aurora observed by the *CanMar Europe* is typical of many sightings of the phenomenon made in the region of Belle Isle, Anticosti Island and the Gulf of St

Lawrence. It is of interest to look at the visibility of the aurora in Canada and the U.S.A. in recent months noting the relative nearness to the magnetic pole and the darker skies obtained by many observers in summer with respect to those enjoyed by European observers. For the period July 1993 to July 1994 inclusive, the North American meteorological station with the lowest geomagnetic latitude to have observed aurora on any auroral event night was recorded. In Figure 1 are given the

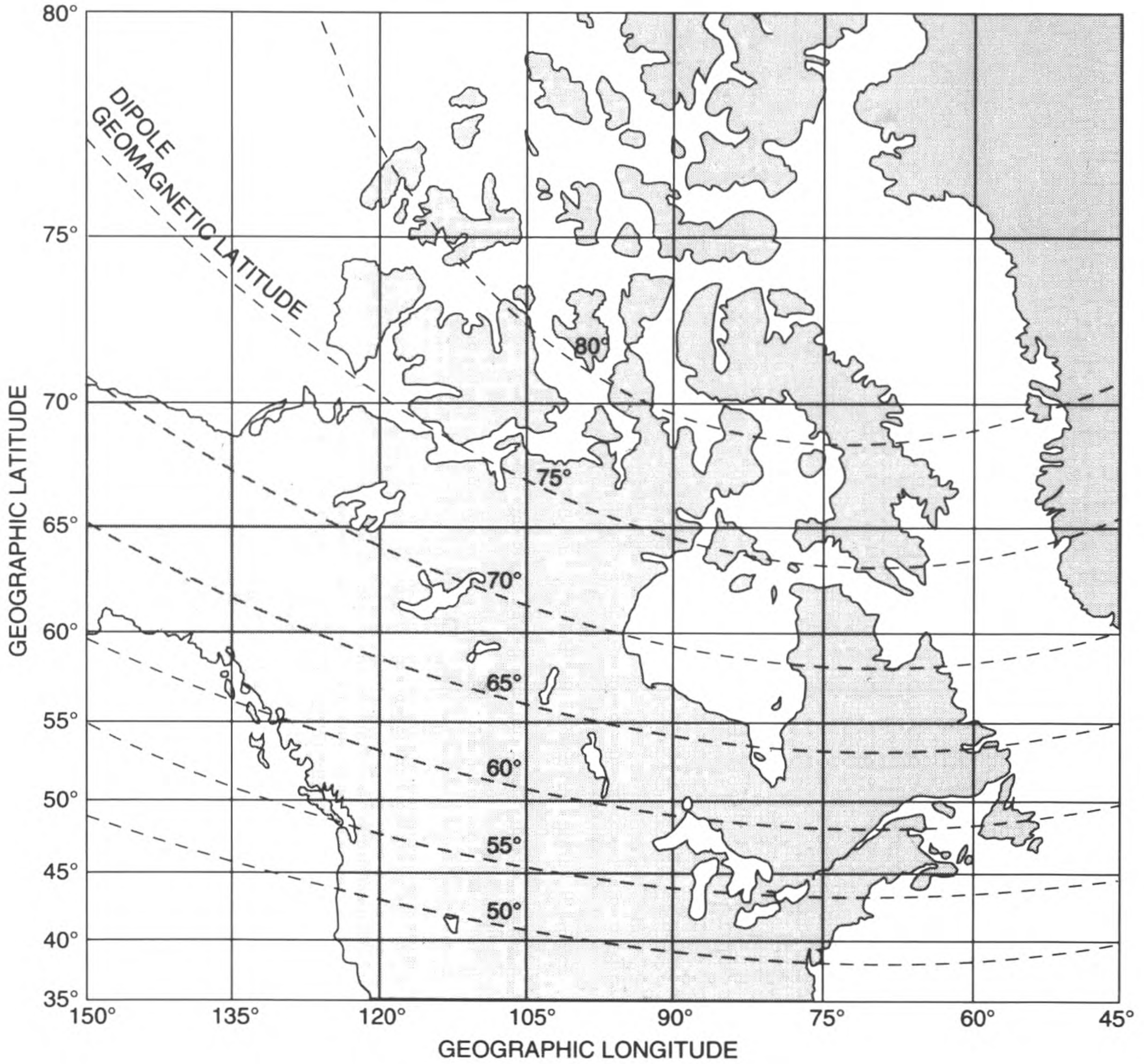
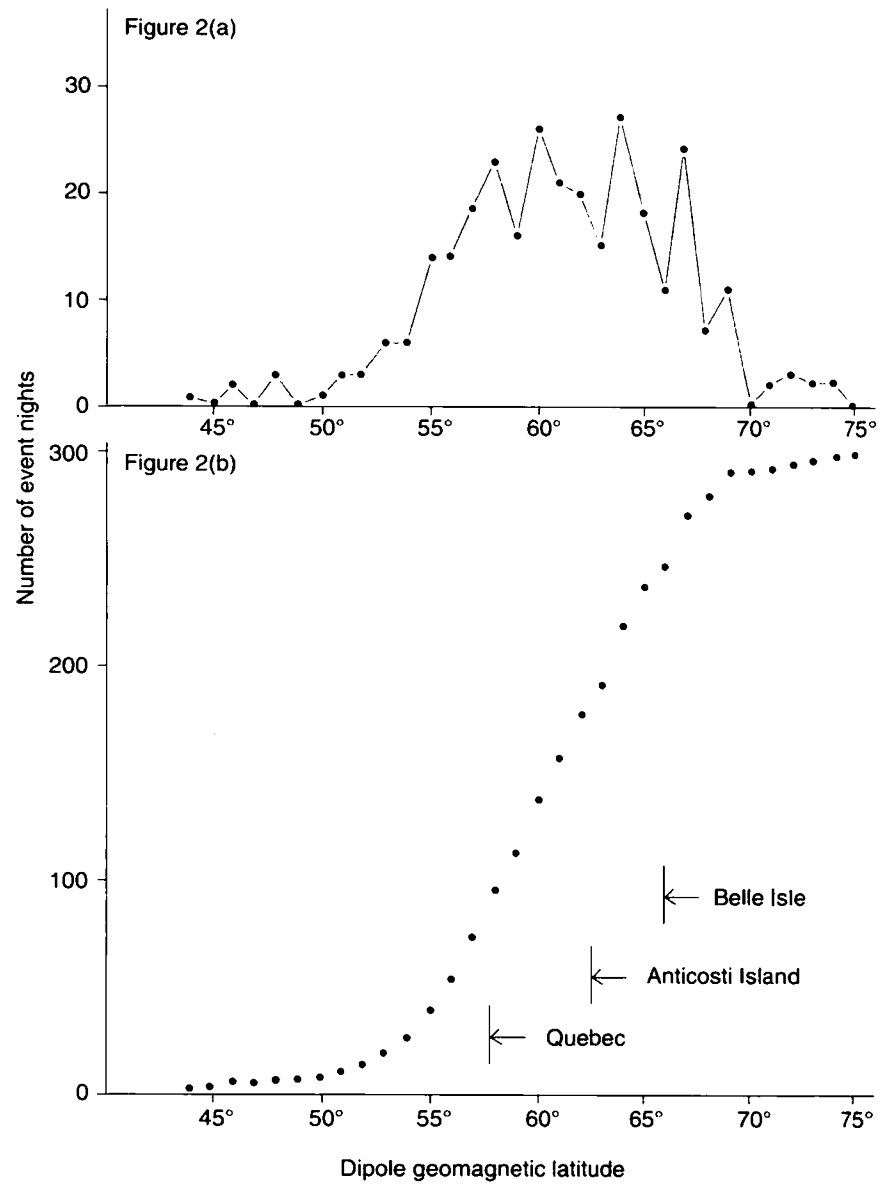


Figure 1. North America. Dipole geomagnetic latitudes.

geomagnetic latitudes in North America drawn with respect to a theoretical magnetic axis passing through the centre of the Earth as if a dipole, or bar magnet, was placed in the Earth's core. No corrections are made for deviation of the Earth's actual magnetic field from the geometrical model. In Figure 2(a) are plotted the frequencies with which aurora has been recorded down to each magnetic latitude. In Figure 2(b) the assumption is made that if aurora is seen at one geomagnetic latitude it will have been visible at all other geomagnetic latitudes northwards to the polar auroral zone. The graph thus gives the total number of event nights that aurora would have been visible at each geomagnetic latitude.



North America. July 1992–July 1993 (396 days)

Figure 2(a). Lowest geomagnetic latitude at which each auroral event night was seen.
Figure 2(b). Total number of auroral event nights possible at given geomagnetic latitudes. (Data obtained from Canadian and American meteorological stations.)

For the period concerned the frequencies and geomagnetic latitudes for Belle Isle, Anticosti Island and Quebec are shown for comparison. It would seem that a ship has a reasonable chance of observing aurora in the region of Anticosti Island, given clear weather.

It should be noted that as solar activity rises and falls, the auroral frequency does likewise. Weather plays a part in the ability to observe. In addition, auroral activity can be restricted in longitude which is also related to the time of commencement of auroral activity. The data is related to the whole of North America and not to the longitude of the Gulf of St Lawrence alone. From the data it would appear that given clear skies perhaps only five aurorae might have been visible at Anticosti Island in January 1994 but up to 20 might have been visible in April.

Book Reviews

Bridge Watchkeeping — a Practical Guide, published by the Nautical Institute, 202 Lambeth Road, London SE1 7LQ. Telephone: 0171-928 1351. Facsimile: 0171-401 2537. 220 mm × 295 mm, 181 pp., *illus.* ringbound paperback. Prices: Nautical Institute Members — £20. Non-members — £28.57. Airmail extra — £7.50. Special rates for bulk orders on request.

Nautical Institute President Captain Len Holder introduced this guide at an invitation launch of the book at The Marine Society last July, saying it was the result of a survey amongst seagoing personal, seeking views on particular needs of seafarers. Returns showed that there was a desire to fill a gap where few books on bridge watchkeeping existed, the expectation being that all the necessary skills would be learnt on the job. Captain Holder remembers experiencing this at first hand when his apprenticeship took a turn for the better when he was elevated from chipping decks to watchkeeping training. His Master explained that driving a ship was as easy as driving a car - there was an engine, a wheel and a windscreen. 'Can you drive a car?', he asked. 'No, Sir.' was the Cadet's disconcerting reply.

Having demonstrated the need for such a practical study guide, Captain Holder's Bridge Watchkeeping Advisory Group of experienced Nautical Institute Members, and Lead Writers Julian Parker and Captain Terry Rooney, have clearly produced a very satisfactory answer. *Bridge Watchkeeping* has been designed as a training manual for companies and individuals and covers all aspects of taking over the watch, and watchkeeping in pilotage, coastal and ocean passages, at anchor and in reduced visibility. There are also chapters on preparing for sea, calling the Master, emergencies, collision avoidance and record keeping. Annexes embrace IMO and other Nautical Institute Briefing materials, to provide a very comprehensive volume.

The book should easily achieve its aim of showing Watchkeeping Officers how to conduct, hand over and carry out the tasks required on their bridge watches, including equipment monitoring, error checking and prevention, and supporting the Master and pilot. Besides being a careful teaching guide, with self-assessment questions which are an essential part of an officer's training, a long-term advantage of this book is clearly all the useful advice it contains which can be learnt and will be needed by the more senior officer aspiring to command. The inclusion of the Collision Regulations in full is a sensible decision, ensuring that almost all basic information for safe watchkeeping is contained or referred to in this invaluable guide.

Mature and long-beached mariners must be wishing, as I am, that such a comprehensive manual on so important a subject had been available in our formative days at sea.

J.F.T.H.

The Mariner Project, Training Game and Competition, by Captain Tomas and Jill Vedebrand. Mariner Ltd., Benbuie, Moniaive, Dumfriesshire DG3 4JE. Telephone and facsimile: 018482 638. For initial purchase by ship operators, price £300 per year per ship for ten ships or more, or £325 per ship.

Tomas and Jill Vedebrand's original high-quality question and answer game for all hands on ships, together with its concomitant competitions, has already received considerable publicity since their launch of the project in April 1994. The game is a unique training aid, at the same time being of proven social value.

The game, *Mariner*, is a question and answer challenge, not unlike Trivial Pursuit, and has seven categories containing 1300 questions, on subjects ranging from Navigation and Seamanship through History at Sea to a subject called Jolly Roger. This last category is a pot luck selection concerning nautical books, songs, films and sailing of all sorts. Many of the questions are deliberately difficult, to provide a challenge for the competitors, but there are simpler ones as well, which can be used selectively to encourage the less-experienced and comparative beginners at the game. The game can also be seen as an aid to those wishing to practice their spoken English. Each player acts as a question master for the category he or she holds. As prizes, Mariner provide 12 high-quality T-shirts per year, for presentation on board to the monthly winners.

The Competition, *Master Mariner*, is issued to all crew members of ships holding the game, four times a year with 25 new, multiple-choice questions. Mariner provides the questions and answers, and will administer the competition, although companies may wish to provide some direct input for part or the whole of the competition, to their own specialisations. These could include company regulations, particular training requirements and safety needs. Cash prizes are awarded to winners of these quarterly competitions.

'The main aim of the game is to remind seafarers of the ongoing need to study,' says Jill Vedebrand. 'They can also gain enjoyment from the challenge initiated by playing the game, at the same time benefitting from the additional social stimulus by sitting round a table discussing the game's questions. The man who thinks he knows enough already is sure to find the game a stimulating challenge, and in this way he can pass on his knowledge to others.

'One or two open-minded people need to be found on each ship, who will provide the enthusiasm to get the game going on board. This will break the ice and many more will want to join in the fun of the game. Inexperience need not deter anyone from joining in, and the instigator can take on the lead role of the "Jolly Roger" and provide the motivation to others to play a part. One of the benefits of the game would therefore be to create more discussion and interaction amongst crew members, who may otherwise spend far too much of their spare time in isolation, or in the company of others, but silently staring at the flickering video screen.'

Shipping concerns who have already decided to provide their ships with the *Mariner Project* include BP Shipping, Petroleum Shipping (formerly Esso Petroleum) and Denholm Ship Management of Glasgow. Part of the proceeds go towards providing the annual and quarterly prizes. The game alone may also be purchased privately for £115.00, though naturally without eligibility for the prizes or the competitions.

Less well known is the fact that, at the Vedebrands' main launch of the *Mariner Project* at the Safety at Sea and Marine Exhibition in London last April, our Deputy Marine Superintendent, whilst standing-by the Met. Office Marine Division stand, was awarded a copy of the game after entering a quiz competition, set by Jill Vedebrand and based on her game. The prize was donated to the Greenock Mariners Home.

J.F.T.H.

Ocean Vigil. 160 mm × 222 mm. Loose-leaf ring-binder. pp. 10+illustrated guide and observation template. Published by and available from the Marine Conservation Society, 9 Gloucester Road, Ross-on-Wye, Herefordshire HR9 5BU. Price: £9.95 plus £1.20 p+p.

The Marine Conservation Society (MCS) is setting out to collect hard facts about what is going in the sea whether in coastal waters or in the oceans, and has produced the *Ocean Vigil* spotter pack which can be used by any concerned volunteer to note anything from '6-pack' holders to the great whales. Originally devised for use in the British Steel Challenge, in 1992, the subsequent database now awaits additional contributions.

The pack includes background information and advice about the project together with excellent fold-out colour pages depicting the mammals, birds, fish, reptiles and some invertebrates which can be found in the north-eastern Atlantic. (In due course MCS intends to expand the pack's contents to cover all the world's oceans.) Volunteers in deep water are also encouraged to note fishery activities and methods used while expressly instructed to maintain an observing role only.

A waterproof card enables cetacean and seabird characteristics to be easily added to permanent outlines for later identification. Pencils of all types and also wax markers proved most suitable, all of which were readily erased with a standard rubber. The ring-binder format works well although eventually the non-reinforced holes of the identification sheets will give way, as will the sheets' creases. The single-sided observation cards themselves are quite robust and colour coded for four categories: day lookout; cetaceans; pollution, litter and illegal fishing; port details. However, having supplied a bird identification sheet showing 65 species of seabird, there appears to be only one line on one card for recording bird observations. This seems a little mean since even a land-based volunteer having a day at the coast could expect to see more than one species, probably several more.

There is no provision for returning completed cards to MCS, apart from supplying the address, so observers must find their own methods for that; and once the cards from the initial pack (about 50 in total) have been used, replacements are to be purchased from MCS, allowing 28 days for delivery. This arrangement may not prove entirely satisfactory for some, and I suspect that photocopiers may well come into occasional use. Doubtless, as a registered charity MCS would regret that move.

The *Ocean Vigil* project is open to absolutely any individual, establishment or organisation having cause to be near or on the sea, and has good educational value for all participants, making them more aware through observation, of the life and problems in the waters of the world's oceans.

J.F.

Personalities

OBITUARY — CAPTAIN J.O. SPENCE died suddenly of a heart attack on 14 February 1994, just a few years after taking retirement from sea life.

John Owen Spence, naturally known as 'Jo' by his friends at sea, was born in January 1933 and educated at Brinkburn Grammar School, West Hartlepool. Following pre-sea training as a Cadet on board H.M.S. *Conway*, North Wales, in May 1950 he was appointed as Apprentice in the Hain Steamship Company, joining m.v. *Tresillian*. The first of 55 meteorological logbooks he helped to compile was sent from the *Tregenna* in May 1954. An Excellent assessment was made of a total of 19 of his logs, and he received Excellent Awards in 1958 and 1984.

Jo Spence was one of the fortunate ones who had little trouble in passing exams for his Certificates, and he was promoted to command in June 1967 at the age of 34, being appointed as Master of the *Trevaylor*. He never changed company himself, as the change came to him in the form of various amalgamations, to Hain Nourse and then to P&O.S.N.Co. All his ships were either general cargo or bulk shipping, and in 1972 he joined the tanker fleet, sailing in such gas carriers as *Garala* and *Garinda*. Whilst in the latter ship he received the 'Geddes' Award in 1983 for outstanding achievement in the shipping industry. He was clearly a man of accomplishment, being presented with a Long-Service barograph from the Met. Office in September 1988, for his enduring work in voluntary weather observing at sea. The final log we received from him came from the *Hermod* (ex *Garbeta)*.

He leaves a wife, Margaret, and two daughters at the family home in Hartlepool. Mrs Spence says that his passing at the age of 60 was sudden and unexpected, just as he was really enjoying his retirement with gardening, keen membership of the rugby club, and reunions with the *Conway* 'boys'. Our sincere sympathy goes out to Jo's family and relatives in their untimely loss.

OBITUARY — It is with great sadness that we have to report the untimely death of CAPTAIN M.L.McN. COOMBS on 2 October 1994.

Michael Coombs was indulging in his recently acquired skill of bell-ringing at his local church in South London, when he had a heart attack and died instantly, within days of his 66th birthday. Coming a mere nine months since his retirement, following ten good years serving the Met. Office Marine Division, the news of his passing came as a great shock to his former colleagues.

Mike Coombs was born in London in 1928 and spent 36 years at sea with the Port Line, for the last 20 of which he was in command of the company's refrigerated cargo ships. A full review of his career appeared in the April 1994 edition of this journal, under the heading of 'personalities'.

Captain Coombs brought friendliness and enthusiasm to the Marine Division, attributes which showed in his earlier offerings of 37 meteorological logbooks which he sent to the office during his 22 observing years. Unfortunately he came ashore within a year or two of becoming eligible for a long-service barograph award, which would have been fair recognition of his successes.

His finest achievement in the Met. Office was to play a large part in augmenting the liaison between Port Met. Officers internationally, putting much effort into the personal approach, persuading colleagues overseas to service other countries' ships whenever possible. His former compatriots in the Met. Office, and in the Marine Division in particular, will miss his cheery salutations, with the older members enjoying his outgoing goodwill, whilst the younger fraternity appreciated his kindness and courtesy, looking upon him more as a favourite uncle than a brother-in-arms.

Mike will be missed by all, not least by his wife Pat, by his two married sons and four grandchildren, for all of whom he was always ready with practical help and advice, and our sympathy goes out to them at their time of loss.

RETIREMENTS — Captain T.R. Barton has retired from Furness Withy (Shipping) Ltd after 42 years at sea.

Richard Barton was born at Barry, South Wales, in June 1936 and educated at Monkton House Grammar School, Cardiff, followed by twelve months pre-sea training at the Marine Division of Cardiff Technical College. He joined his first ship, s.s. *Springbank*, a Liberty ship, in August 1952 for a world-wide tramping voyage that took him away from the U.K. for two years, taking up half of his apprenticeship with Bank Line. Having admired the impressive-looking ships of the Shaw Savill and Albion company during earlier calls on the New Zealand coast, he joined that company on obtaining his Second Mate's Certificate, and was appointed to the refrigerated ship *Waipawa* in September 1956. His first meteorological logbook followed a year later from the passenger ship *Athenic*, and he served as he progressed up to Chief Officer, on many of the Shaw Savill passenger ships, including *Dominion Monarch, Gothic, Northern Star* and *Southern Cross*.

Captain Barton's promotion to command came in November 1968 when he was appointed to the *Cedric*: he was then Master of many ships in Shaw Savill and on the joint Bank/Savill Australasia service, before commanding the Dart Line ships on the new North Atlantic container service in the early '80s. Apart from short periods on bulk carriers, he spent the last ten years at sea in command of the refrigerated cargo ship *Andes*, which ship he had joined at the builders in Korea in 1984. The ship was renamed *CGM Magellan* not long before his early retirement on 1 July 1994.

Captain Barton writes that he enjoyed his career, gaining much satisfaction from the many challenges that came his way, particularly those of the latter 15 years, during which he has gone from a small coal-burner without gyro or radar, but with a large crew, to present day large vessels with all the high-tech equipment and very little crew. His record of voluntary weather observing is certainly an auspicious one, his 60 logs submitted over 27 observing years containing no fewer than 23 Excellent markings, for which he received Excellent Awards on three occasions.

This dedication to the cause of marine observing brought him the ultimate reward in the form of the presentation in 1994 of a Long-Service Award barograph for his efforts up to the end of 1992. He says that with the help of his wife Norma and his much-appreciated barograph he will be keeping an eye on the weather pattern in his corner of Kent near Dover, taking time to catch up on life ashore and embarking on long overdue projects and new interests. We can only wish Captain Barton and his wife happiness and fulfilment in all their plans for retirement.

Fleet Lists

GREAT BRITAIN

Updated information regarding the list published in the July 1994 edition of *The Marine Observer*. Amendments for this list are required by 15 September. Information for the main listing in July is required by 15 March.

Name of Vessel	Date of Recruitment	Master	Observing Officers	Senior Radio Officer	Owner/Manager
African Ruby	22.7.94	—	—	—	MOL Tankship Management Ltd
Alam Selaras	10.5.94	J.N. Gowrie	—	—	Pacific Carriers Pte Ltd
Ambon	30.6.94	R. Erceg	S. Biswas, B. Pradhan, S. Modak	S. Sharon	Wallem Shipmanagement (H.K.) Ltd
Bison	8.7.94	D.W. Eccles	R. Henderson, P. Brooks, A.M. Leach	I. Stockton	Pandoro Ltd
Cast Elk	14.8.94	Yeo Teck Hing, William	J.A. Maw, Soe Yee, Aung Htut Kwaw	Soe Thein	Cast Europe (U.K.) Ltd
Chiquita Elke	21.4.94	C.I. Kitchen	W. Laverick, D. Awat, J. Mongcal	—	Logbridge Ltd
Condor Arrow	27.7.94	Karna Deo Mandal	Tun U. Aung, C.A.G. D'Sousa, J.K. Patnaik	—	Gearbulk Shipping Ltd
Erradale	22.3.94	G.A. Drewery	C.A. Frappell	—	The China Navigation Co. Ltd
Faki III	28.3.94	L.C. Rowse	—	—	Sea Falcon Fishing Co.
Fifi	17.8.94	I. Hagensen	A. Majzner, E. Dziduszko, R. Lauritsen	—	Barber International A/S
Glen Maye	18.3.94	G. Hooiveld	I. Hakstok, J. Umabi, G.E. Daldrop	—	MOL Tankship Management Ltd
Golden Harvest	13.5.94	S. Kinghorn	C.S. Pattiasina	—	Guan Guan Shipping (Pte) Ltd
Island Princess	14.7.94	C. Sample	C. Ward	J. Blyth	P&O Cruises Ltd
Kiukiang Career	26.3.94	B.C.W. Norton	I.C. Oke, F.M. Oniot, J.A. Provido	B. Shaw	Kapal Management (Pte) Ltd
Nand Nidhi	10.5.94	R. Sekar	P. Mohanty, V. Scudder, Y.V.R. Ch. Babu	A. Iqbal	Essar Sisco Ship Management Co. Ltd
Orient Star	11.4.94	Mandan S. Sharma	A. Pillai, K.V. Joshi, S. Agarwal	N.D. Kulkarni	Orient Ship Management Ltd
Pride of Le Havre	3.8.94	C.E. Walford	P. Hill, G. Snow, G. Starkey	—	P&O European Ferries (Portsmouth) Ltd
Pride of Portsmouth	8.8.94	R.A. Shopland	N. Beckett, A.A. Henley, S. Collins	—	P&O European Ferries (Portsmouth) Ltd
Providence Bay	2.8.94	R. Kenchington	C. Jones, C. Macleod, M. Barraclough	—	P&O Containers Ltd
Regent Park	25.8.94	B. Damjanovic	S. Mamjic, I. Jutruvic	—	Rederiet Otto Danielsen
Rixta Oldendorff	18.8.94	A. Samuel	H.B. Tenoso, K. Elkazez, R. Damadaran	A.K. Palit	Egon Oldendorff
St Rognvald	24.3.94	B. Robertson	J. Moncrieff, D. Wheeler, M. Pickles	—	P&O Scottish Ferries Ltd
St Sunniva	24.3.94	W. Duncan	D. Pitt, L. Robinson, B. Campbell	—	P&O Scottish Ferries Ltd

Seki Cedar	14.4.94	S. Henney	G. Simpson, M.H. Baker	—	Denholm Ship Management (U.K.) Ltd
Seki Pine	12.5.94	G. Railson	B. Tasker, A. Hamilton	—	Denholm Ship Management (U.K.) Ltd
Selectivity	—	T.L. Jeffery	G.C. Harwood, R. McNab	—	F.T. Everard & Sons Ltd
Solena	19.3.94	R. Matuszak	O. Jacinto, R. Wendlant, N. Tameta	E.D. Della Cruz	Shell International Shipping Ltd
Stena Europe	15.3.94	G. Neilsen	S. Horne, R. Daya, P. Leason	—	Stena Sealink (U.K.) Ltd
Torben Spirit	29.3.94	—	—	—	Teekay Shipping Ltd
Tunisian Reefer	20.6.94	Z. Juretic	D. Kovacevic, D. Barbaca, D. Cetkovic	R. Price	Mermaid Management Ltd
Vectis Falcon	21.7.94	S. Smith	J. Coupe, D. Miller	—	Carisbrooke Shipping plc
Whitcrest	2.9.94	H.A. Williams	D.J. Williams, J. Forbes-Simpson	—	John H. Whitaker (Tankers) Ltd

The following Selected Ships have been withdrawn:

British Renown, CAM Retriever, Cast Husky, Cast Muskox, Cast Otter, Cheryl C, Ga Chau, Gry Maritha, Harold La Borde, Havsul, Hemera, Hoo Venture, Kelvin Challenge, Lady of Mann, Luminence, Maersk Harrier, Mistral, Napier Star, OOCL Charger, Pegasus, Perseus, Pride of Winchester, Prince of Scandinavia, Santos Express, Sea Profiler, Shropshire, Star Jasmine, Stena Britannica, Stolt Birchwood, Stolt Cedarwood, Stolt Falda, Strider Juno, Veronica Viking, Washington, Wiltshire, World Light.

BRITISH COMMONWEALTH

The following Selected and Supplementary Ships have been recruited to or withdrawn from the lists published in the July 1994 edition of this journal.

AUSTRALIA

Recruited (Sel.): *Apollo Peak, Barbican Success, Cape Grafton, Express, Ocean Reaper, Sina, STS Leeuwin.*
Withdrawn (Sel.): *Al Rayyan I, Aurelia IV, Australia Star, Botany Triton, Canopus, Cape Moreton.*

INDIA

Recruited (Sup.): *CHM Piri Singh PVC, INS Magar, INS Taragiri, Rajiv Ghandi.*
Withdrawn (Sup.): *Jala Jayoti, Jala Yamini, Indian Progress, Indian Prosperity, Jala Gauri, Jala Godavari.*

HONG KONG

Recruited (Sel.): *Grand Noble, Jin Fa, Maritime Challenger.*
Withdrawn (Sel.): *Maritime Champion, Maritime Loyalty, OOCL Advance, OOCL Charger, Red Sea Pioneer.*
Recruited (Sup.): *Rickmers Shanghai, Rowan.*

SOUTH AFRICA

(This list appears for the first time and will be updated in July and January, as usual.)

Selected Ships: *Africana, Algoa Bay, Boundary, Douglas Bay, Eagle, Energos, Falcon, Ferosa, Infanta, Kiuseb, Louis G. Murray, Nolizwe, Omega, Oranje, Protea, Rampart, Recife, Royal Sphere, S.A. Agulhas, S.A. Drakensberg, S.A. Helderberg, S.A. Sederberg, S.A. Waterberg, Sea Trader, Sezela, Shearwater Bay, Spencer Bay, Stellenbosch, Transvaal, Umgeni, Vaal.*

Trawlers: *Aloe, Anemone, Arum, Azalea, Crassula, Dahlia, Godetia, Iris, Ixia, Larkspur, Lobelia, Nerine, Protea, Rosalind, Roxanne B, Sacip, Salvia, Stevia, Storess, Verbena.*

ERRATUM: The caption to the photograph of the *Dawn Blazer* in the October 1994 issue (page 167) states that the ship has been renamed to *Boston Blazer*. The latter is incorrect and should read *Putford Blazer*, we apologise for the oversight.

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