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THE MARINE OBSERVER

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COVER PHOTOGRAPH: The semi-submersible drilling rig *Henry Goodrich*, built 1985, displacing 49,410 metric tonnes at drilling draft and the largest of its kind in the world. Two of the four 75-man Harding free-fall lifeboats can be seen in the stowed position on the platform. (See *A day in the life of Iain Hendry, Offshore Adviser*, on page 121.) Photo by Courtesy of Sonat Offshore

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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.

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Editorial

One subject which Oliver Walston did not cover in his fascinating book reviewed later in this edition, was the appearance or otherwise of botanical life in the ice region of the North-east Passage through the Arctic. Judging from the latest informed reports on the effects of global warming, marine observers sailing through Arctic waters will increasingly be expected to report on the sighting of rare plants, such as the purple saxifrage, the northernmost flowering plant, which has been reported as spreading dramatically in the island of Spitzbergen, as the Arctic ice sheet retreats. The warming of the Arctic is now comparable to the recent dramatic warming of the Antarctic, where three gigantic ice shelves have disintegrated in the past three years and part of the continent is turning green as flowers and grasses grow over it.

These findings are reinforced by the latest report from the Met. Office's Hadley Centre for Climate Prediction and Research¹, in the form of a summary of the results of a recent computer modelling experiment which simulates human-induced climate change from 1860 to the present day and predicts future change up to the year 2050. The report was published to coincide with the First Conference of the Parties to the Framework Convention on Climate Change (the Rio Convention), held in Berlin between 27 March and 7 April this year. For the first time a General Circulation Model (GCM) has been able to replicate in broad terms the slow rise in global temperature since the middle of the last century. If greenhouse gases alone were influencing climate we would expect global temperatures to have risen some 0.6–1.3°C over the last century: by taking into account the sulphate aerosols resulting from emissions of sulphur dioxide, which mitigate some of the warming arising from the increase in greenhouse gases, the model simulates a rise in temperature close to the observed figure of 0.5°C. The experiment was carried out with the Hadley Centre's GCM which contains representations of the atmosphere, oceans, ice and vegetation. It required three months on one of the world's fastest supercomputers to complete.

These manifestations of a changing world climate were more generally recognised as World Meteorological Day came and went last March, when the World Meteorological Organization (WMO) special day celebrated annually on the 23rd of the month since 1961, was on this occasion celebrated with the theme of the Public Weather Services. The Chief Executive and weather experts were on hand during the day at the Met. Office exhibition trailer on show in Trafalgar Square, London, to outline our public weather services. The Met. Office is now the largest publisher of information by facsimile in the U.K., being included with television, radio and press forecasts and telephone services as the main public weather services provided.

All weather services are of course dependent on the weather data received, analysed and interpreted into weather forecasts. It bears repeating that surface observations by our many voluntary observers, at sea and on land, are as vital as ever, even though increasing use is made of Automatic Weather Stations. Unfortunately there are cases where reductions in manpower mean a change of observing site, as happened last April when the Butt of Lewis lighthouse team had to reduce the number of daily weather reports provided. This meant that another station in the area had to be found for inclusion in the BBC Radio4 Shipping Bulletin station reports. Stornoway Airport, less than 20 miles distant, was found to have the right observing pattern even though it may not have been the ideal site

with the possibility of local wind effects being felt. This explanation is offered for the many members of the general public who write to us every year, expressing an abiding, though abstract, interest in listening to the shipping forecasts, asking why it is necessary to make any alterations to the contents of the station reports in the bulletins.

At about the same time, automation was the cause of the demise of another weather observing station of long standing when the lighthouse at Muckle Flugga, the most northerly settlement in the British Isles, was automated and the three inhabitants were evacuated by helicopter for the last time. Again by good fortune the crew's useful weather observations were transferred to the nearby Muckle Holm lighthouse. What interested us in particular was the name of Stevenson linked with the Muckle Flugga lighthouse, one mile north of the Shetland island of Unst, from its construction in 1858 right up to the present day.

The builders were Thomas and David Stevenson, father and uncle of Robert Louis Stevenson who visited the lighthouse in 1869 at the age of 19. Legend has it that this experience on the isolated outcrop inspired him to write his famous book *Treasure Island*. The lighthouse was opened in January 1858 at a cost of £32,000, replacing another one built four years earlier which was unable to stand the ferocity of the Atlantic gales. Seas regularly burst in on the keepers, perched 250 feet above the waves. The last lighthouse keeper to leave the Muckle Flugga's metre-thick walls in 1995 was one John Stevenson, keeper for three and a half years, but claiming no relationship to the builders.

To mariners the name Stevenson conjures up one image — that of the thermometer screen that shall be opened and the thermometers therein read at the end of every watch and at every synoptic hour at sea. One wonders how many seafarers realise that their screens are made to the modified design of the same father of Robert Louis, Thomas Stevenson the lighthouse builder. The original design of a louvered screen is credited to a General Lefroy of Toronto, according to Dr Robert H. Scott (the first Director of the Met. Office from 1867 to 1877, following Admiral FitzRoy, and for whom the home of the Marine Division is now named) who offered the following fantastic account to the Meteorological Society in London in 1873²: 'I do not know whether any of you are aware of the origin of the Kew Stand; I have heard that it was simply, that Gen. Lefroy copied a meat safe, when he wanted a stand for use at Toronto, and used it for a Thermometer Stand, and hence we have the origin of the "Kew" Stand' (at the famous Observatory). The Kew Stand, as it was called in the 1870s, was a large double structure, almost six feet cubed, with two fully louvered boxes one inside the other, but with the bottom open. Thomas Stevenson's modifications for the smaller version of the screen saw the introduction of the double louvres sloping in opposite directions. This screen had a pyramidal roof with a ventilator, probably of little use. It was rather small, and a larger pattern with a double roof was later recommended by the Royal Meteorological Society.

Two organizations with which the Met. Office has always had very close ties since the time of Stevenson and earlier, both celebrating anniversaries, spring to mind. The Hydrographic Office has published the world renowned British Admiralty chart series since its establishment in 1795 to provide navigational information to the Royal Navy. Supply to merchant ships began 30 years later, and to this day a full set of chart folios and Admiralty publications is held at the Met. Office Marine Division, maintaining a mutually beneficial liaison between the two bodies. To mark the bicentenary the Hydrographic Marketing Branch have

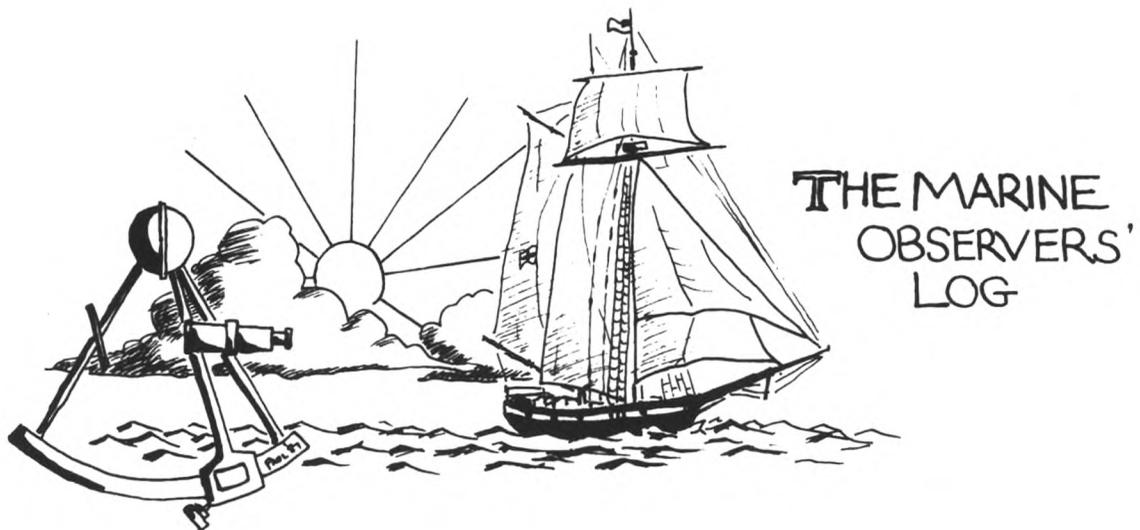
produced the *Admiralty Collection*, a series of quality reproductions of uniquely original documents (maps and charts) held in their extensive archives. Judging from the illustrations of part of the collection in this year's calendar, they are refreshingly different and will complement a variety of environments, be it home, office, or ward room.

The Royal Netherlands Meteorological Institute (KNMI) celebrates its 140th anniversary in 1995 by becoming an Agency (five years after the Met. Office) within the Ministry of Transport conglomerate, whilst remaining the Dutch National centre for weather, climate and seismology. Buys Ballot, best known by the seafarer for his laws for avoidance of tropical storms, was the founder of KNMI and first President of the International Meteorological Organization, the forerunner of WMO. Throughout our history we have always worked closely together in all matters associated with weather and climate, and particularly in the marine field with joint manning of ocean weather stations in the North Atlantic after World War II, and in recent times with our use of their Ocean Weather Ship *Cumulus* in keeping a vigil in one of the two remaining sea stations. Current co-operation includes the re-publication of the article on currents by Mr Venendaal, now Head of Marine Systems at De Bilt, and will continue with joint work on KNMI's computer program dealing with ocean current assessment, TURBO6. These projects will be of benefit to the observer on the ship's bridge.

J.F.T. Houghton

REFERENCES

1. *Modelling Climate Change 1860-2050*. The Hadley Centre (1995), p.2.
2. *Quart. J. Meteorol. Soc.*, Vol.2 (1873) p.41.



July, August, September

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).

TYPHOON 'ORCHID'

Korea Strait

m.v. *Jervis Bay*. Captain J.L. Peterson. Busan to Kobe. Observers: the Master and ship's company.

27-30 September 1994. The vessel sailed from Busan at 2000 UTC on the 27th with an ETA at Kobe of 0100 on the 29th, the route chosen being the inshore one, going inside Gotto Retto island. Weather reports, Navtex and the typhoon forecasts all showed that Orchid was moving north-north-east and was expected to pass over Kobe on the 29th between 0000 and 2100. In view of this information the Master decided that it would be better to steam up and down in an area from south-east of Gotto Retto to north-west of Koshiki Shima Retto where conditions were relatively calm. The port of Kobe was closed until further notice at 0400 on the 28th. The vessel remained west of Kyushu, steaming up and down in four-hour legs at a speed of 9 or 10 knots during which time the pressure was falling at a steady rate while the cloud cover was 8 oktas and visibility good. At 1200 on the 28th the weather was overcast and the wind was N'y, force 9.

According to satellite pictures and forecasts at 0000 on the 29th, the centre of the typhoon had passed the ship's latitude and was well to the east on its way to Kobe. The Master decided to head out from Sata Misaki towards Kobe so getting in behind Orchid, and as the vessel passed north-east off Sata Misaki the swell became longer and steeper at 5-6 m high. At 0300 on the 29th the vessel altered course again, heading in a south-westerly direction as the sea was becoming higher and rather uncomfortable. After steaming for three hours it was decided to turn

east for two hours and get out to deeper water before turning towards Kobe, so reducing the swell. As it happened, the swell became less steep as deeper water was reached. The port of Kobe was reopened on the 30th at 0000 and the vessel arrived at the Pilot Station at 0300 that day. Orchid had passed over and was heading towards the Sea of Japan, filling all the time until it was eventually downgraded to a tropical storm.

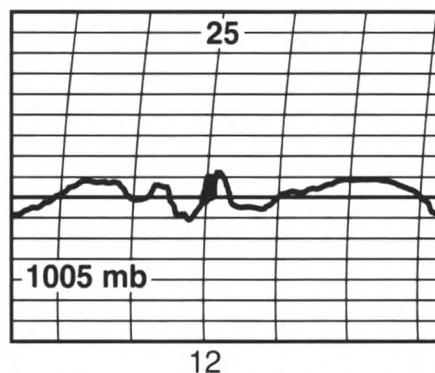
Position of ship at 1200 UTC on the 28th: 31° 54.4'N, 129° 23.6'E.

THUNDERSTORM Eastern North Pacific

m.v. *London Victory*. Captain R. Mayman. Manzanillo to Panama. Observers: the Master, Mr E.P. Mullan, 2nd Officer, Mr M. Khazi, Quartermaster and ship's company.

25 September 1994. The following sequence of events occurred whilst the vessel was off the southern coast of Mexico.

Time (UTC)	Remarks
0600:	Weather cloudy and clear. Wind N'y, force 3.
0700:	Band of rain visible on radar, moving slowly north and lying east to west for 48 n.mile, breadth 8 n.mile north to south.
0730:	Light rain commences at station. Heavy lightning, mainly sheet but also occasional forked lightning with thunder. Wind SE'y, force 3-4.
0800:	Rain now ceased and visibility improved. Sky covered with 8 oktas of low cloud. Continuous sheet lightning observed over the whole sky, with some flashes lasting up to 5 seconds giving a strobe light effect. Wind W'y, force 2-3.
0900:	Another band of rain now visible on radar, again lying approximately east to west across radar 24-n.mile range and about 8-10 n.mile breadth in a north to south direction.
0910:	Heavy rain commences at station and reduces visibility to zero. Severe lightning and thunder experienced, the lightning being mainly sheet but with occasional forks. A waterspout becomes clearly visible in the lightning just before the rain commences and passes at about 10 m down the starboard side. Barograph trace rises and falls by about 1 mb causing a distinctive blotch, as shown. The thunder wakes most people on board. Wind S'y, force 3-4.



0935:	Rain starts to ease and visibility increases. Sheet lightning only visible, no thunder.
1000:	Light rain with moderate visibility, improving slowly. Wind light and variable.

The storm was noteworthy for its intensity and for the rain which was like a wall of water at first before it slowly eased. The thunder and lightning was very intense between 0910 and 0930.

Position of ship at 0600 UTC: 15° 53'N, 99° 42'W.

WATERSPOUTS

North Sea

m.v. *Britannia Beaver*. Captain P. Phillips. On coastal passage. Observers: the Master, Mr M. Meehan, Chief Officer, Mr D. Pearson, 2nd Officer and ship's company.

30 August 1994. At 1458 UTC two waterspouts were sighted roughly 1.0–1.2 n.mile away and were approximately 1.4 n.mile apart. They formed from a bank of cumulonimbus cloud which had a base of 600–1000 feet and moved in a north-easterly direction at a speed of about 5 knots. The waterspouts were incomplete, only the lower 6–10 m being visible but the bases were estimated to be 1.5–3.0 m across while the rotation time was noted as 6 seconds. After seven minutes the waterspouts disappeared but during the following hour a further eight waterspouts were seen.

Weather conditions at the time were: air temperature 16.8°, wet bulb 10.5°, pressure 1014.2 mb, wind variable, force 1–2.

Position of ship: 52° 33.3'N, 02° 00.5'E.

m.v. *Shetland Service*. Captain R. Owen. On station, Kittiwake Oil Field. Observers: Mr I.G.C. Ferguson, Chief Officer, Mr P. Close, 2nd Engineer Officer and Mr A. Donaldson, AB.

6 September 1994. At 0618 UTC, shortly after sunrise, a vortex was observed developing rapidly from the base of a large cumulus cloud the base of which was estimated to be 800 feet. It was about 5 n.mile from the ship, bearing 070°. By 0620 the funnel was well developed to about 400 feet below the cloud and had a clearly defined 'spine' at its centre. Disturbance at the sea surface was noted at 0625 and this area was estimated to be 15 m across with the surrounding spray rising some distance into the air. The funnel suddenly collapsed at 0628 and the surface spray subsided within a minute.

Weather conditions were: air temperature 13.3°, wet bulb 11.6°, sea 13.6°, pressure 1011.3 mb, wind S'ly, force 4.

Position of ship: 57° 30'N, 00° 30'E.

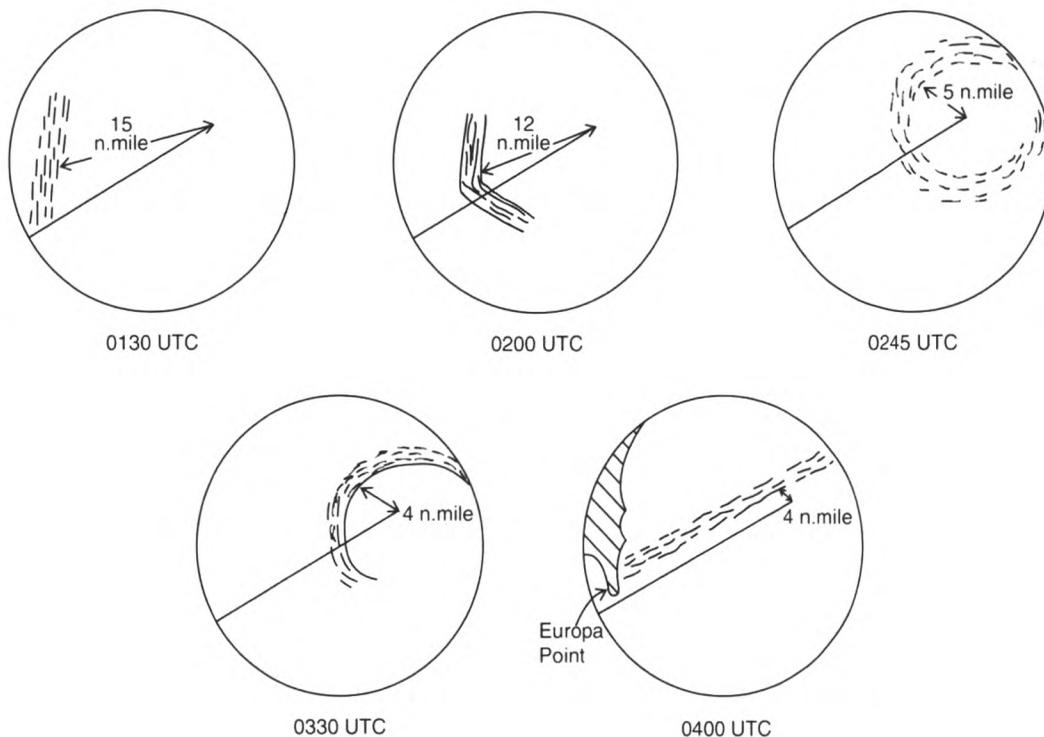
RADAR ECHOES

Mediterranean Sea

m.v. *Seki Pine*. Captain P.W. Jackson. Barcelona to Setubal. Observers: the Master and Mr G. Simpson, 2nd Officer.

8 August 1994. At 0130 UTC a north-south orientated target appeared on the radar display and was first thought to be either a line-squall or a disturbance owing to upwelling water. At the time the radar was set on a 12 n.mile range offset to the north-east and viewing 17 n.mile ahead. The target neared to 10 n.mile and then opened to 12 n.mile. The sketches show the sequence of echoes up to 0400.

At 0200 the wind freshened from W'ly, force 2–3 to force 4, the sea state being normal for the conditions, and the target started to close the vessel, slowly assuming a curved shape. It started to encircle the ship at a range of 4 n.mile and had completely surrounded it by 0300. The depth of the target at this point was 2 n.mile. At 0330 the 'disturbance' line started to disappear to the south, being



orientated 060° – 240° by 0400 and passing the ship at 4 n.mile to starboard. This was quite noticeable as Gibraltar appeared on the PPI, with the line of disturbance emanating from Europa Point.

Throughout the period of observation the sky was cloudless while the visibility remained good at more than 10 n.mile and there was no visual evidence of the disturbance. The air temperature at 0130 was 23.0° , wet bulb 20.0° and the pressure was slowly rising although the rate increased from 0300 when the reading was 1013.2 mb.

Position of ship at 0130 UTC: $36^{\circ} 22'N$, $04^{\circ} 30'W$.

CETACEA

North Atlantic Ocean

f.p.v. *Norna*. Captain D.L. Rattray. On patrol duties in Scottish Waters. Observers: Mr A. Davidson, Chief Officer and Mr B. Thomson, SM.

2 July 1994. At 1150 UTC whilst patrolling the fishing grounds on the edge of the continental shelf about 35 n.mile north-west of Shetland, the vessel steamed out of a fog-bank and two or three minutes later a school of about 12 Killer Whales was observed approaching out of the fog and on the starboard quarter.

The members of the leading group were swimming seven abreast and crossed the wake 2 cables astern, 'surfing' over the wash in the same way dolphins often do. Once on the port side the whales turned and re-crossed the wake, again surfing over the wash and they remained 'playing' there for 3–4 minutes before disappearing. All the whales seemed to be adults of varying sizes, with one particularly large individual having a dorsal fin estimated to be in excess of 1.8 m high.

At the time of observation the wind was E×S'ly, force 3, and the sea was slight with a long swell of 2 m.

Position of ship: $61^{\circ} 06'N$, $01^{\circ} 58'W$.

North Atlantic Ocean

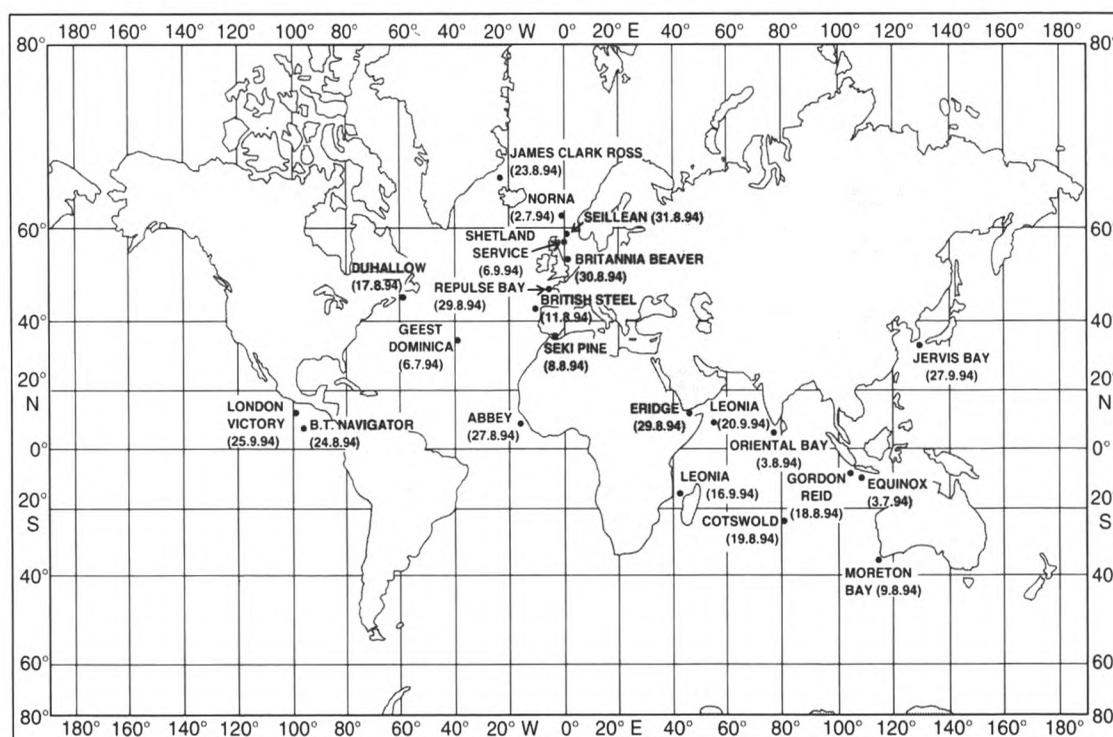
m.v. *British Steel*. Captain R.J. Cropper. Saldanha Bay to Redcar. Observers: Mr C. Jackson, 2nd Officer, Mr W. McCoubrey, Chief Engineer Officer, Mr J. Glover, 2nd Engineer Officer and Mr S. Draycott, E/G.

11 August 1994. At 1155 UTC a cry of 'Whale!' brought personnel rushing to the bridge wing from where a blow was observed approximately 0.5 n.mile on the starboard side, closely followed by a second one which was smaller. It was thought that the blows could be those of a cow and calf. Whilst watching further blows from the first pair, a sound of exhaling air was heard close to the vessel and then another pair was observed about 18 m away.

All the whales were moving in a southerly direction and seemed unconcerned that the vessel was so close. Estimates varied as to the size of the whales but the adults were generally thought to be about 12 m long and the calves about 7 m long. As the whales passed clear, a total of six separate blows could be seen. The second pair of whales, which could clearly be seen just below the surface, were blue-black in colour and had a small dorsal fin about two-thirds of the way along their bodies but at no time were any flukes raised. It was thought that the whales were enjoying the sunshine as much as everybody else and were identified as a pod of Humpback Whales.

At the time of observation the dry-bulb temperature was 19.1° and there was a slight sea with a low swell.

Position of ship: 43° 16'N, 10° 27'W.



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

BIRDS

North Sea

m.v. *Seillean*. Captain F.B. Whamond. On passage to the Donan Oil Field. Observers: Mr V.A. McAdam, 2nd Officer and Mr M.A. Pointon, 3rd Officer.

1 August 1994. Between 1300 and 1530 UTC a bird of prey [shown on page 110], thought to be either a kestrel or a sparrowhawk was observed generally flying around the vessel and occasionally landing. It was seen again during the first three days of September, again just flying around the vessel.

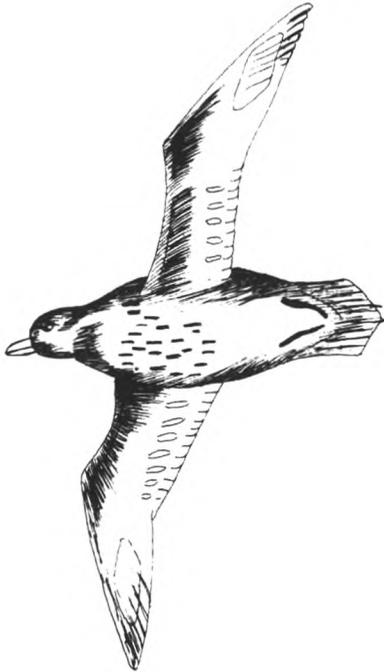
Position of ship: 58° 22.7'N, 00° 52.8'E.

Indian Ocean

m.v. *Moreton Bay*. Captain C.C. Woodward. Fremantle to Melbourne. Observers: Mr D. Stevens, 3rd Officer, Mr A. Dyer, Cadet and Mr S. Hayes, SM1.

9 August 1994. At 2300 UTC a bird about 50 cm long with a wing-span of roughly 1.3 m was observed 'gliding' around the poop deck. After about 10 minutes it moved to the bridge deck where it continued to glide on the updraught from the ship's accommodation. As shown in the sketch, the bird was dark in colour having white tips on the underside of the wings. Its head was small and was dark-brown on top and its rounded tail was darker than the rest of its body. The underbody was generally brown with light-brown flecks.

The bird, thought to be a Giant Southern Skua [sic], stayed around the bridge for 15 minutes and occasionally flew very close to the observers standing on the



bridge wing, passing within 1 m at times, apparently unintimidated. The skua then moved to and landed on the Sat-C dome, situated on the Monkey Island, and appeared to be drying itself with wings open. When food waste was thrown overboard, the skua quickly dived to the sea surface and into the waste where it sat all the while it was in sight.

About 10 minutes after the observers lost sight of it, the skua returned, this time with a partner. The second bird was slightly smaller and had brown markings on

top of the wings and back whereas the first bird was much darker in those areas, almost black in places. Both birds stayed around the ship for about 30 minutes before flying off northwards.

Position of ship: 35° 09'S, 116° 20'E.

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

'This was a Southern Great Skua, now known as the Antarctic Skua (*Catharacta antarctica*). It is very similar to the Great Skua of northern latitudes and breeds at various places in the Southern Hemisphere, ranging very widely, even having been identified in the West Indies. There are two other species of Great Skua breeding in the south which are difficult to differentiate from this one, reference to textbooks and practice required!'

Moçambique Channel

m.v. *Leonia*. Captain A.F. DeVanney. Point Tupper (Nova Scotia) to Fujairah. Observers: the Master, Mr A.T. Cross, 2nd Officer and ship's company.

16 September 1994. At 0500 UTC a number of what the Master identified as Grey-headed Gulls were seen flying around the area of the foremast, numbering about 20, and these birds stayed with the vessel for more than three days. One marked feature of their flight was that they seemed to be very reluctant to fly down the port side of the ship; they flew all down the starboard side, out on the bow and quarter, occasionally flying around the foremast but rarely if ever flew to port.

They landed for short periods on the foremast platform and were even active during the hours of darkness being visible as they flew across the loom of the foremast navigation light, causing the odd heart flutter of the Officer on Watch. Associating with the gulls was a large, predominantly black frigatebird which was identified as an adult male Great Frigatebird after referring to *Seabirds*, by P. Harrison. It was very distinguishable by its long, swallow-like tail and slender wings. During the period of observations the number of birds increased until there were about 30 in total, including eight frigatebirds.

Position of ship: 14° 31'S, 43° 37'E.

Note. Captain Chilman comments:

'Unfortunately there is no description of this bird, so I am unable to say whether the identification is correct or not. The Grey-headed Gull (*Larus cirrocephalus*) is more an inland species and not very often seen at sea and even then is usually very much a coastal species. It is found in Madagascar and therefore must cross the sea sometime. I have never seen it except close inshore. I wonder if it was seen feeding at all?

'The Great Frigatebird (*Fregata minor*) is certainly likely in the area of the report. They breed at various islands in the western Indian Ocean as well as other parts of the world. If the gulls were feeding, the frigatebirds would be preying on them.'

FISH

North Atlantic Ocean

m.v. *Duhallow*. Captain M.J. Walker. Rotterdam to Sept Isles. Observers: the Master, Mr L. Cusiter, Chief Officer, Mr C. Shaw, 2nd Engineer Officer, Mr A. Banerjee, Cadet and members of ship's company.

17 August 1994. A day prior to arrival at Sept Isles when all the ballast tanks were pressed up, a fish (called 'Wanda') landed on deck from the aft end ventilator

of No. 2 starboard water ballast tank. The fish had probably worked her way through the sea suction grid, through the ballast pump and into the tank when the ship departed Rotterdam.

An immediate rescue operation transferred Wanda from the deck to a bucket overflowing with ballast water. For a while she lay flat on her back, spinning with the movement of the water and showing no signs of life at all. To the observers' amazement however, she soon recovered and was swimming, full of life [see photograph on page 110]. She was soon given a meal of fine breadcrumbs and readily gulped it down as her fortnight's stay in the ballast tank had deprived her of any nutrition.

Just as her condition showed signs of improvement, she suddenly went still, the shock had probably killed her. Wanda was given a proper sea burial after surviving a little more than three hours on the decks of *Duhallow*.

Position of ship: approximately 47° 00'N, 60° 00'W.

SHARK

Eastern North Pacific

m.v. *B.T. Navigator*. Captain G.H. Gaunt. Callao to Manzanillo (Mexico). Observers: Mr J. Bose, 2nd Officer and Mr A. Talwar, Chief Engineer Officer.

24 August 1994. At 2140 UTC a lone shark was spotted right ahead fine on the starboard bow about 300 m from the vessel; the prominent sharp dorsal fin jutting from the sea surface had given the observers the first indication that it could be a shark.

On closer observation, as it passed the vessel as close as 150 m on the starboard side, it revealed a large, curved and pointed dorsal fin. The shark was brown in colour, 3–4 m long and its head and mouth were broad and curved, being bulbous in appearance as there was no 'beak' or pointed snout. The forward part of its upper body had a mottled appearance composed of white spots and patches together with barnacles. It was breaking the water very gently and submerging showing no part of its tail, and moved away from the ship having shown no particular interest in it.

The ship was in slight seas on a course of 320° at 14 knots.

Position of ship: 10° 55'N, 97° 23'W.

Note. Dr F. Evans, of the Dove Marine Laboratory, comments:

'There is not enough data here to give an exact identification of this shark but the prominent sharp dorsal fin together with the broad, bulbous head may indicate a nurse shark, as does the described colour. Nurse sharks have no regular colour pattern but show scattered spots and markings. Nurse sharks also carry the sobriquet "sleepy". They tend to be found in rather shallow water.'

BIOLUMINESCENCE

Gulf of Aden

m.v. *Eridge*. Captain M.A. Hill. Newcastle (N.S.W.) to Hadera. Observers: Mr W. Howell, Chief Officer, Mr C.K. Anthony, 2nd Officer and Mr H. Rameshwar, 3rd Officer.

29 August 1994. Between 1720 UTC and 1840 strong bioluminescence was encountered whilst the ship was on a heading of 341° about 30 n.mile east of the

Mayyun Islands. In addition, for about 40 minutes either side of this period, bioluminescence of lesser strength was encountered.

The sea water during the more active period had a greenish tinge and contained circular, green, semi-transparent algal forms about 1 mm in diameter suspended in it. The water was almost colourless and odourless, turning luminescent on being shaken in the container or on being stirred or even by the observers blowing hard on it. After being disturbed, the water remained luminescent for 3–4 seconds before slowly turning dark again. On being stirred with a finger, the algal forms stuck to the skin making the finger glow but after shaking the finger no glow was seen. The water in the container could still be made to glow on being shaken after a period of three hours.

The wind was W'ly, force 5–6 and the whole sea seemed to be lit from within so giving the horizon a greenish tinge and making it difficult to make out stars at low altitudes. Next to the ship, the light showed in streaks along the wave crests and the whole ship appeared to be alight. Bioluminescence was strongest in the wake which was almost uniformly strongly lit in the area of the propeller disturbance but with less intensity in the water adjacent to it.

At 1830 a water sample was taken and the temperature found to be 28.6°, lower than had been noted six hours earlier but it climbed to 31.0° at 2000.

Position of ship at 1720 UTC: 12° 24'N, 44° 00'E.

Indian Ocean

m.v. *Equinox*. Captain G. Cuthbert. Abbot Point to Zeebrugge. Observers: Mr N. Young, 3rd Officer and members of ship's company.

3 July 1994. At 1420 UTC the vessel appeared to be in a 'milky sea' for as far as the eye could see. At the same time, what were assumed to be the wakes of dolphins swimming nearby showed up as brilliant blue and white trails, the intensity of the white colour being sufficient to light up the decks as if an artificial light had been switched on. After 15 minutes the phenomenon faded away as quickly as it had arrived.

At 1510 the bioluminescence appeared again. This time the milky-white sea contained patches of brilliant-blue colouring, like the water inside a coral reef. So intense was this light that once again the decks were lit up as by an artificial light and every detail was made prominent. The phenomenon faded at 1518 and was not seen again.

Position of ship: 09° 33'S, 113° 25'E.

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

'Milky seas are known from these waters and the first observation may have been such a phenomenon but the dolphin trails were caused by something else, perhaps small crustaceans. True milky seas are unaffected by turbulence. If the area contained very large numbers of small crustaceans (such as ostracods) then the overall milky sea might simply have been these animals luminescing at lower light levels than those produced by the dolphins' disturbance. The second occurrence suggests that this was a more likely cause, though it is not clear what produced the stimulation in this case.'

m.v. *Gordon Reid*. Captain R.P. Court. Singapore to Christmas Island. Observers: Mr P. Hardy, Chief Officer, Mr D. Prockter, 2nd Officer, Mr N. Glover, Able Seaman and Mr M. Curran, Able Seaman.

18 August 1994. At 0715 UTC a waxing gibbous moon descended on the western horizon. As the moonlight faded the ocean itself began to reveal an eerie,

milky glow. The intensity of the glow gradually increased with the sea soon appearing as brilliant, white-blue, luminous 'ground glass' emitting its own magnificent, almost ethereal radiance. Within 20 minutes an uncanny inversion had taken place, the sky appearing black against the luminous bright white of the sea. The wash and wake became invisible and the sea had quietened noticeably although the wind speed had not changed substantially, at this time it was ESE'ly, force 4.

From about 0850 the milky glow lessened, then with the first visible twilight 20 minutes later, it abruptly disappeared. Bow and stern waves again became visible and the sea was once more dark against the lightening sky. The wind at this point was ESE'ly, force 3 and there was a noticeable rise in pressure at the beginning of morning twilight and the end of the 'milky sea' phenomenon.

Position of ship at 0715 UTC: 09° 10.8'S, 105° 29.5'E.

Note: The *Gordon Reid* is a Selected Ship of the Australian Voluntary Observing Fleet.

m.v. *Oriental Bay*. Captain B. Graham. Singapore to Suez. Observers: the Master, Mr D. King, Cadet, Mr J. Wright, SM1 and Mrs Graham.

3 August 1994. At about 1750 UTC an extremely large area of bioluminescence was encountered and was initially thought to be the lights of a large fishing fleet. The area was about 5–10 n.mile long and roughly 5 n.mile wide, occurring in thick patches; the area also extended in a north-westerly direction. At the time of observation the bioluminescence was stretched east to west by the wind which was approximately w'ly, force 3, and was extremely bright in nature.

On studying the *Marine Observer's Handbook*, it was decided that the display could have been one of two types: either 'white water' also known as 'milky sea', or it was the type caused by the upwelling of subsurface water.

Position of ship: 06° 21'N, 78° 00'E.

Note. Dr P.J. Herring comments:

'It would have been interesting to know whether there was a luminous bow wave associated with the patch. If there was then it was probably a large area of dinoflagellate bloom; if there was not then milky sea is certainly a possibility.'

EXCEPTIONAL VISIBILITY

Bay of Biscay

m.v. *Repulse Bay*. Captain A.J. Leslie. Suez to Southampton. Observers: Mr N.A. Voss, 3rd Officer and Mr D. McFarlane, SMS.

29 August 1994. Just before 2200 UTC whilst the ship was in the north of the Bay of Biscay, the lookout reported the loom of a light 'fine to starboard' followed shortly by the loom of another light 'two-and-a-half points to starboard'. These lights were the Ushant SW Lanby and the Pointe de Creach Light respectively. The SW Lanby was 38 n.mile away and had a nominal range of 20 n.mile whereas the Pointe de Creach Light was 54 n.mile away, having a nominal range of 34 n.mile. Pointe de Creach Light had a height of 70 m and its extreme range given the observers' height of eye of 29.5 m, was 29 n.mile. The looms of the lights were reflecting off the base of low cumulus or stratocumulus cloud.

Position of ship: 48° 02'N, 06° 15'W.

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

'Taking the observers' word for it that this was reflection off the cloud base rather than refraction, there are no very useful calculations that can be done since reflection is diffuse not specular, at any rate with droplet cloud. Range is effectively increased to the sum of ranges for an observer at cloud base height looking at the lights in question and that for another such at that height looking at the observers on the vessel. Evidently, since both light and observers are well below cloud base these purely geometric conditions are amply satisfied in this case, and as the observers realise, the determining factor is visibility owing to haze and other obstructions along the line of sight.'

LUNAR RAINBOWS

Indian Ocean

m.v. *Cotswold*. Captain L.J. Hesketh. Richards Bay to Kawasaki. Observers: Mr J.M. Milloy, Chief Officer and Mr J.A. Malicad, GP(1) Deck.

19 August 1994. Early in the morning watch a large area of cumulus cloud with strong vertical extent was observed well ahead of the vessel. At 2240 UTC when the cloud and what turned out to be rain was about 8 n.mile ahead, a dark protrusion was noticed coming from the cloud base on a bearing of about 060° and making roughly 25° of arc.

Initially thought to be the beginning of a waterspout, it rapidly developed into a full arc or bow similar in size and shape to a normal rainbow although silvery-white in colour. This colouring showed in very stark contrast against the extremely dark background of the clouds and rain. The bearing of the beginning of the bow was 045° and it ended at 120°.

At 2250 a distinct secondary arc appeared to the left of and above the main bow; the secondary one made about 45° of arc and was very narrow in relation to the main bow. Although still silvery in colour, it was not as light as the first one. Quick reference to the *Marine Observer's Handbook* revealed that the observers were watching a lunar rainbow so a bearing of the moon was obtained and found to be 261° at an altitude of 13.5°. In effect, nearly right astern.

At 2255 drizzle began as the clouds approached but the bows remained visible. Five minutes later the drizzle increased to light rain as the clouds passed overhead and at this point both bows quickly disappeared. The vessel then passed into clear weather as the clouds moved astern and obscured the moon.

Position of ship at 2250 UTC: 25° 14.8'S, 81° 43.8'E.

Note. Dr R. White comments:

'Lunar rainbows generally show little colour owing to the lack of sensitivity of the eye to the colour of faint light, though small drop size is another possible cause of whiteness. It is probably just coincidence that the bow vanished as the drizzle turned to rain: this would be when there ceased to be enough rain or drizzle ahead of the ship in moonlight (rather than in cloud shadow), though the ship itself had not yet quite passed into cloud shadow.

'If I can assume that the azimuth measurements given are to the inside of the primary bow, and that its width is somewhat exaggerated in the sketch, then we can say that what was seen is pretty well what would be expected for drop diameters of 1 or 2 millimetres (but if either of these assumptions fail, we have problems). The secondary is about where it should be if we assume the primary has been exaggerated into the space between the two bows. I do not have data immediately to hand on what the width of the secondary should appear to be under these conditions, but again I suspect the narrowness is exaggerated in the sketch.

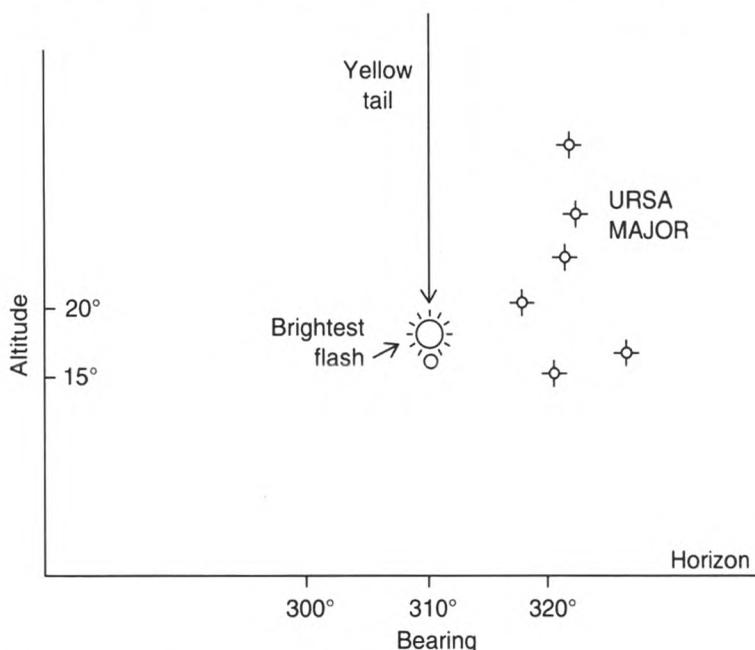
'The fact that the phenomenon vanished when the vessel passed to the other side of the rain from the moon shows pretty clearly that we are dealing with rainbows, not the antisolar *halo* of 38° which is sometimes confused with such.'

METEORS

North Atlantic Ocean

m.v. *Geest Dominica*. Captain G. deFerry Foster. Fort de France to Southampton. Observers: Mr A. Scales, 3rd Officer and Mr M. Bosworth, Cadet.

6 July 1994. At 0200 UTC whilst on a course of 049° at a speed of 21.35 knots, a bright-white light having about the same magnitude as Sirius appeared at an approximate altitude of 50° above the horizon and started a descent toward the horizon on a bearing of roughly 310° . When it had reached an altitude of about 20° above the horizon, it faded then flashed slightly brighter before fading again. As it fell it left a faint yellow trail in its wake, as shown in the sketch.



The total duration of the sighting was 2–5 seconds. The sea was flat calm and the sky cover was about 2 oktas of cloud along the horizon.

Position of ship: $34^\circ 39'N$, $39^\circ 59'W$.

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

‘This was without doubt a natural fireball produced when a small piece of interplanetary material entered the Earth’s atmosphere. The fading and flashing towards the end of its trajectory is a common feature. The material is thought to have been quite friable, hence the trail of small dust particles breaking away from the main body as it burned up.’

Arabian Sea

m.v. *Leonia*. Captain F.D. Hugo. Port Hawkesbury to Fujairah. Observer: Mr C.J.L. Speers, Deck Cadet.

20 September 1994. At 2111 UTC whilst the vessel was on a course of 025° at 14 knots, a shooting star was first observed bearing approximately 050° at an altitude of about 60° . It consisted of a large white ball with a small orange tail followed by a long, thin white trail stretching behind and lasting for several seconds. The object disappeared bearing 138° at an approximate altitude of 40° . It took a little over six seconds to cover the distance between bearings.

Position of ship: $09^\circ 04'N$, $54^\circ 07'E$.

Note. Mr H. Miles comments:

'This is an interesting report of an average brightness fireball but with a fairly rare phenomenon. The orange-coloured tail which followed the head was caused by dust particles generated during the ablation of the meteoroid. The long white trail which persisted for several seconds was an ionisation train which, in some cases, can persist for several minutes. Winds in the high atmosphere cause these trains to become distorted, reflecting the turbulence at these levels.'

SPACE DEBRIS

Western North Atlantic

m.v. *Abbey*. Captain D.G. Olley. Immingham to Saldanha Bay. Observers: the Master and Mr S. Moore, 3rd Officer.

27 August 1994. At 2100 UTC whilst the vessel was on a heading of 142°, a very bright white light was observed at an altitude of about 35°, bearing 257° from the starboard bridge wing the height of which was 28 m. After checking the nautical almanac it was discovered that no stars or planets of such a magnitude occupied this place in the heavens at the time.

The object appeared to be losing altitude against the backdrop of stars and dropped towards the westerly horizon. There was a concentration of cloud at the horizon but the observers judged that the object passed the visible horizon at approximately 2200. A calculated guess suggested that the light could have been space debris re-entering the Earth's atmosphere.

Position of ship: 09° 26.7'N, 16° 57.7'W.

Note. Mr H. Miles comments:

'No indication is given of how long the fireball was seen so it is difficult to say whether it was due to natural rock or a fragment of space junk. From the information given, in either case it would have been a fairly small object.'

AURORA BOREALIS

Denmark Strait

R.R.S. *James Clark Ross*. Captain C.R. Elliott. Survey duties in Arctic waters. Observers: Mr S. Wallace, 2nd Officer and Mr C. Chalk, SG1A.

23/24 August 1994. At 0100 UTC the sky was mainly cloudless although a large fog-bank lay to the north-north-west; the sun had set some three hours earlier but there was still an orange glow above the fog. The vessel was on a heading of 240°, crossing magnetic meridians when the auroral display commenced directly overhead in approximately the same direction, lying 240° to 060°.

The display commenced as a rayed band of short length which was tinted a very slight red colour. Following this, the display continued with both rayed and homogeneous bands extending from about 60° above the horizon ahead of the ship to 70° above the horizon astern. The bands pulsed from moderate to bright and, after the initial showing, were always white in colour. Each bout lasted for 30 seconds to one minute then faded. The major display ended at 0110 having started at 0045 and further minor displays were seen later. At 0132 a well defined bright rayed band was watched for about 50 seconds.

Position of ship: 68° 19'N, 22° 59'W.



Photo. by V.A. McAdam

Kestrel flying around the *Seillean*. (See page 102.)

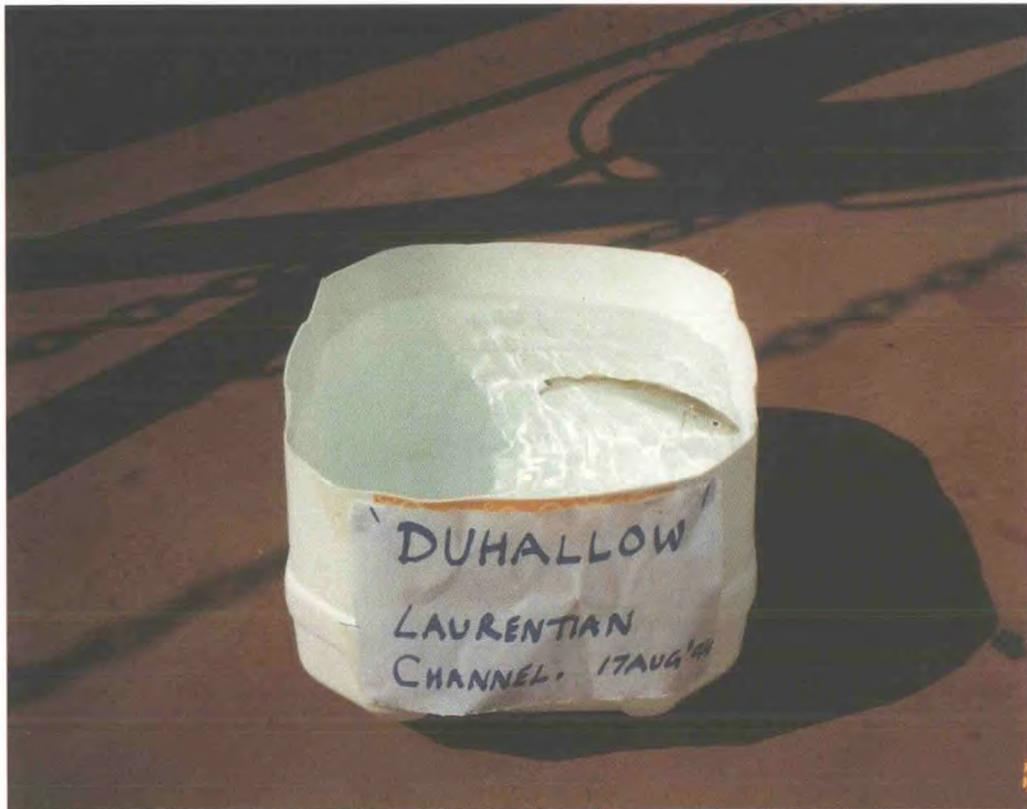


Photo. by A. Bannerjee

Fish discovered on board *Duhallow*. (See page 103.)

SCENE AT SEA



Photo. by Captain C.J. Flanagan

Orographic cloud forming over the island of St Eustatius, in the Netherlands Antilles, on 14 May 1994 when the *Geestbay* [now withdrawn from the U.K. VOF] was taking bunkers.

Current Practices

In the first of a short series of articles on the practice of ocean current observing, we reprint the first part of an article published ten years ago, but which contains much food for thought for today's practitioners. In later editions we will discuss today's methods and look into the crystal ball to try and divine the future for obtaining reliable ocean current data.

The Reliability of Surface Current Observations I*

BY G.E. VENENDAALS

For more than a century and a quarter ships' crews of the voluntary observing fleet have made meteorological and surface current observations. Those observations recorded in the ships' logbooks are the backbone of the Marine Archive now held in the Meteorological Office, Bracknell, U.K. Much use is made of computer processing for providing suitable statistical data which form the basis of maps and current roses. This article outlines the method of processing used in the Netherlands, illustrating various situations the observer at sea may encounter. The supposition that the use of modern navigation equipment could hamper the making of current observations is discussed, and situations that could cause the reduction of accuracy and reliability of current mean values are mentioned. In essence: how reliable are surface current observations from ships collected in the past few years, and particularly those that will be collected in years to come?

1. Introduction

Present knowledge of the general patterns of surface currents of the oceans has been largely derived from the systematically recorded observations made from ships on passage over more than a century and a quarter. The British Meteorological Office was formed in 1855 under Admiral FitzRoy with terms of reference 'to collect meteorological observations from ships at sea with the objective of compiling meteorological atlases and in order to provide other statistical information about the weather and surface currents of the oceans, for the benefit of shipping'. With words of the same tenor, emphasizing the benefit, Professor Buys Ballot succeeded in persuading the then Dutch government to subsidize the foundation of the Royal Netherlands Maritime Institute in 1854.

Since then about half a million current observations have been collected in the U.K., and almost one million in the Netherlands. Much work has been carried out over the years in studying and analysing these observations so that advice could be given to the seafarer as to the currents he might expect to encounter in any sea area. That work resulted in the publication of surface current charts and atlases¹.

Until 1976 individual nations collected the observations made by their voluntary observing fleet (selected ships), and to a limited extent there has been some exchange of data between nations. Now however, under a scheme of the World Meteorological Organization (WMO), the member nations pool their observations; the Meteorological Office of the U.K. has been designated to collect these and form them into a common archive (Marine Archive). The existence of the resulting large body of data could greatly facilitate work on surface currents, assuming that the stored data have an adequate accuracy level.

*Reprinted from *Journal of Navigation*, May 1985, by courtesy of the Editor.

§Netherlands Maritime Information Centre, Royal Netherlands Maritime Institute.

2. Reduced reliability

Sometimes it seems not to be sufficiently perceived that a number of surface current observations could be less reliable, viz:

(1) *Observations from very deep-draught ships (VLCC, ULCC)*. Ships with a draught of 20 m or more often experience less influence of surface currents; sometimes even the influence of other deeper situated currents is felt. Moreover the set and drift of the so-called Drift Currents, caused by the wind blowing continually over the surface in the same direction, change rapidly with increasing depth (Ekman Spiral). Estimating due allowance for leeway on these ships is very difficult, if not impossible. Some observers assume that current observations could be corrected for wind drift by the mariner on board with his full knowledge of the vessel's performance and state of loading. [See page 134, *Guiana Current*.]

(2) *Observations from ships in complex current areas*. Unexpected under-currents can be encountered in certain areas in the South Atlantic and Pacific Ocean (Equatorial Undercurrent). These currents can almost reach the surface, hindering even shallow-draught vessels. Processed current values from these observations could reduce the accuracy and reliability of surface current mean values in the relating ten-degree squares.

(3) *Observations from ships equipped with certain modern navigation systems*. The development and introduction of new electronic navigation equipment could reduce the accuracy and reliability of current observations made from ships. The advance of marine electronics may well lead to the phasing out of some essential parts of surface current observation — the DR position and the Sea-Position. Developments make it possible, and even likely, that speed logs and compasses may eventually disappear altogether. Course and speed through the water, the essential ingredients for calculating the effects of tide and current, can no longer be obtained other than roughly estimated. An adaptive autopilot connected to an integrated navigation system with modern or future sensors will keep the ship on a preset ground track, automatically making due allowance for leeway and correcting any course deviation, including the one caused by currents encountered. To illustrate this point we will now look into the method of processing currents used to date in the Netherlands.

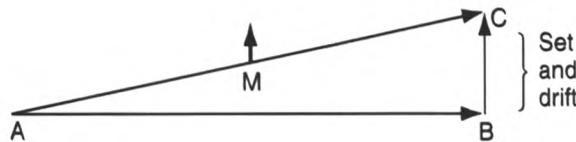
3. The Method of Processing Surface Currents from Ships

In effect the observed current is calculated from the difference between two vectors: the vector representing movement of the ship with respect to the water and the vector representing movement over the ocean bed. The first vector depends on course (corrected for compass error and for leeway) and on distance run through the water. If it is necessary to assess distance run from propeller revolutions (no log available), the allowance for slip under the prevailing conditions (wind, sea, draught, hull roughness) becomes important. The accuracy of values used to calculate this vector crucially affects the accuracy of the inferred current. The accuracy of the vector of movement over the sea bed is governed by the accuracy of the two fixes — the 'From'-position (when the DR plot was started) and the 'To'-position. High accuracy can be given by modern navigational aids, e.g. Satnav, Loran, Decca, and in particular Navstar GPS.

Apart from the accuracy requirements, the observers know the conditions and the limitations concerning the representativeness of the observations, such as: not too large or small an interval, no overlaps, no significant tidal streams, distance limitations etc. (*Marine Observer's Handbook*). Quality controls that can be

applied by computer have been formulated and accurate computer programs are available to process the observations and calculate the mean current values as follows.

From the first fix (A), the DR position (B) is calculated with the true course and distance run through the water. Using the equations for meridional difference (except for directions near 090° and 270°), the set and drift are derived from the vector BC, representing the direction and distance from the DR position (B) to the corresponding observed position (C), the second fix. The current so deduced is the



total current affecting the ship over the distance and time interval between the two fixes (A) and (C). The calculated mean value is attributed to a position (M) in the middle of vector AC (representing the ship's ground track, or movement over the sea bed).

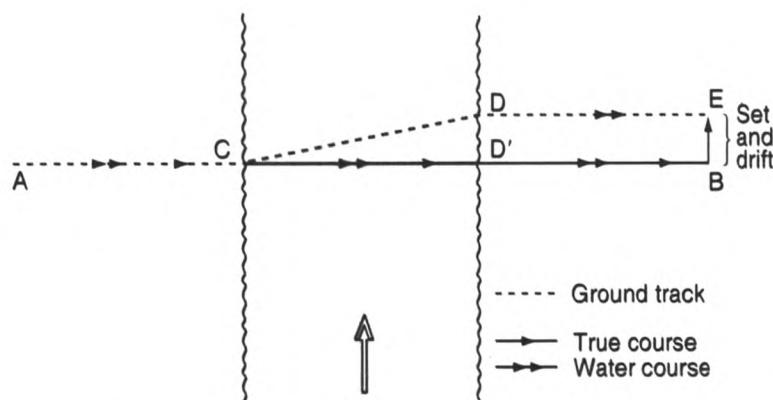
4. Various observations

Now in practice various observations can be met with, some of which will be discussed here to illustrate the hypothesis that the use of modern navigation equipment could hamper the making of current observations on board ships on passage.

For all situations dealt with it is assumed that a vessel has to sail a distance of 150 n.mile from A to B with a ground course = 090° and a propulsion speed = 10 kn. In the middle of the track a 50-n.mile wide ocean current area is encountered, current velocity = 2 kn, direction 360° .

Situation 1 (Figure 1)

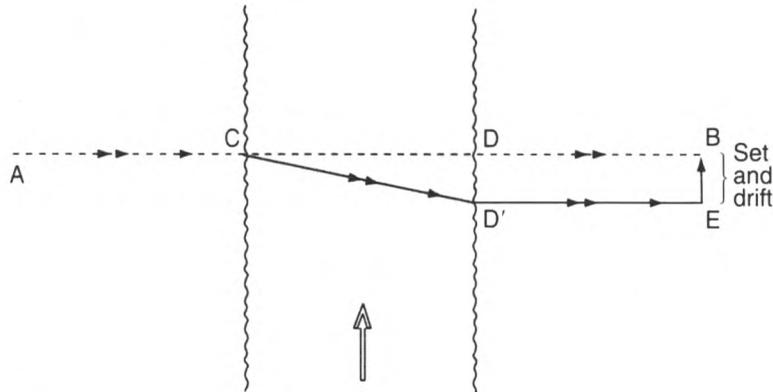
The ship sails with one true course = 090° without correcting for water drift. The figure shows that it is not difficult to determine the set and drift (vector BE, B = DR position, E = fix), provided that the correct course = 090° is applied.



Situation 2 (Figure 2)

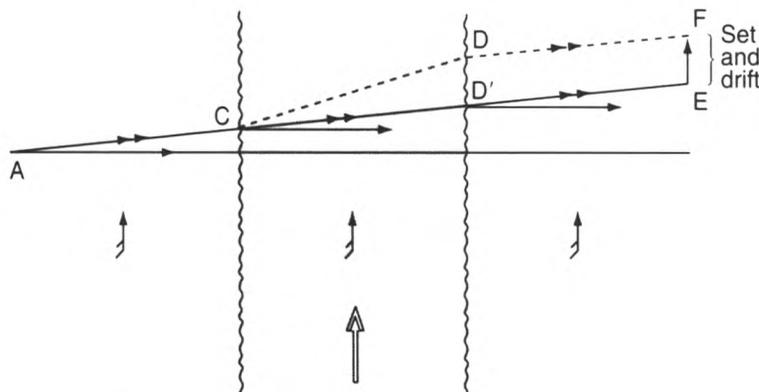
This situation arises from the fact that due allowance is made for the expected water drift on the trajectory part CD, in order to follow the intended ground track. Recording of this observation should be done in three parts with respective courses

090°, 101° and 090°. In this case the observation has to be split up just to facilitate the computation of the DR position. Here again the set and drift are derived from the vector EB (B = fix).



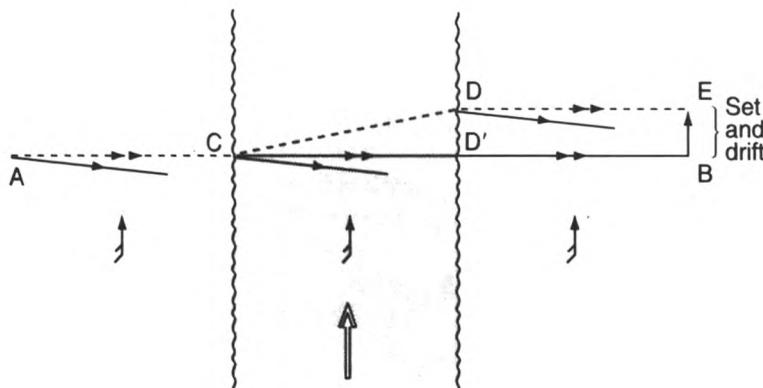
Situation 3 (Figure 3)

From now on a continuous wind from the south, force 5, is experienced causing a drift to port of 1 knot and a leeway angle of about 6°. When no allowance is made, the situation is comparable with the one described in the first case. However, the water course = 084° should be taken instead of the true course = 090° to get the correct set and drift vector EF (F = fix).



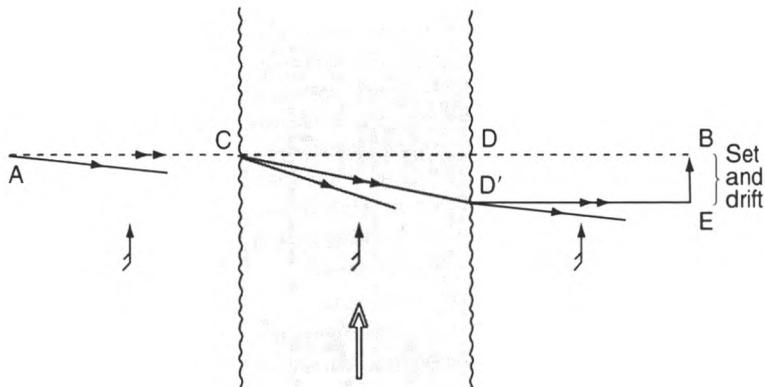
Situation 4 (Figure 4)

In this case allowance is made for leeway but not for current. To calculate the sea position (B), the water course = 090° is taken instead of the true course = 096°, as was the case in the preceding situation. The vector BE then indicates the set and drift.



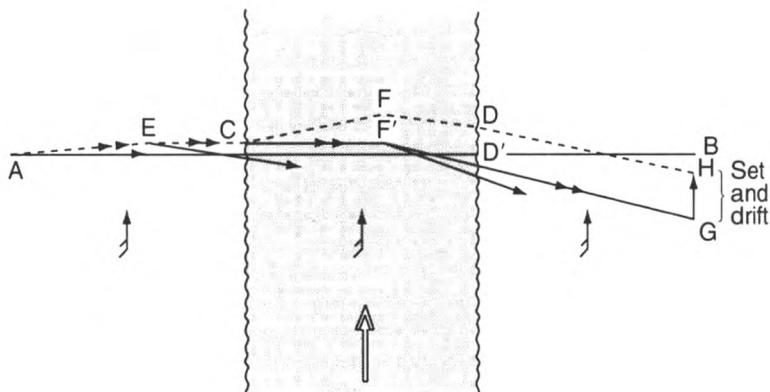
Situation 5 (Figure 5)

As the figure shows, allowance is made for leeway and for current where necessary, so that the ground track corresponds with the intended track on the chart. An observation like this should be recorded in three parts, viz. AC with water course = 090° , CD' with water course 101° , and D'E with water course = 090° .



Situation 6 (Figure 6)

This is the situation that most frequently occurs in surface current observations from ships. Departing from A, and not allowing for leeway, a Satnav fix at E shows that an allowance is necessary to follow the intended track. After an equally accurate position determination at F it is decided to allow for current, now taking into account the predicted offsetting effects of both wind and current. Although five different ground courses are discernible in this case, it takes only the three trajectory parts AE, EF' and F'G with the appropriate water courses to determine the sea position G. The vector GH then represents the inferred current.



[To be continued in the next edition.]

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The *Achille Lauro* rescue

BY CAPTAIN JOHN P. BRIAND

The 318,000 deadweight tonnes ULCC *Lima*, under my command, was just 200 miles to the north of the drama which was unfolding on that dreadful morning of 30 November 1994. The *Lima* was on passage from Galveston, Texas, to the Arabian Gulf via Table Bay, where I had joined the ship by launch from Cape Town less than 12 days earlier. A fire in the engine room of the elderly passenger ship *Achille Lauro* was slowly but inexorably getting out of control, despite the best efforts of the staff and crew to extinguish its heat. At daybreak in an area several days steaming away from the nearest hospitable land, Captain Guiseppe Orsi of the *Achille Lauro* made the decision to disembark all the passengers and most of the crew from the now mortally stricken vessel. The distress signal was relayed by the Norwegian Maritime Rescue Co-ordination Centre (MRCC) at Stavanger to all ships. It was my wife Brenda who brought to me the message that changed our lives dramatically for the next 36 hours: *Lima* was to become the focal point of the rescue and I found myself updating the world on how the rescue was progressing. At 0950 on 30 November we reversed our course to head those 200 long miles south to where the drama was unfolding.

The rescue centre in Norway had designated the *Lima* as the co-ordinating sea surface ship, and we slowly gathered together a small flotilla of eight rescue ships. Fortunately there were two ships much closer than ours to the stricken *Achille Lauro*, and they were the real heroes of the saga. Their names will be familiar - the *Hawaiian King* rescued 927 people and the *Bardu* another 50. Those on the *Bardu* fared a lot better than those on the first ship to arrive on the scene. A laden tanker of 91,000 tonnes usually has accommodation for only 30 people: what to do when you suddenly have 927 unexpected 'guests'? The majority of those rescued, mostly very poorly dressed and mainly without footwear, were to spend the next 36 hours being scorched by the sun, soaked by passing heavy rain showers or shivering in the cool of the night, until transferred to the small armada of vessels racing to the scene at their best speed to assist.

Lima arrived on the scene just half an hour into the new day of 1 December and took up her role as co-ordinating vessel. The first operation involved the U.S. Navy vessels *Gettysburg* and *Haliburton*. They were able to supply very urgently needed medical and food supplies, plus blankets and toiletries. The *Lima* and *Chevron Perth* were also able to donate quantities of the latter items, as the naval helicopter could land on the decks of each ship. This operation alone took several hours. After a short, but much needed break, the formidable logistics of moving over 800 survivors, a high percentage of whom were very elderly, with all their attendant but natural problems, was organised by Commander Peter Smith of the U.S.S. *Gettysburg* and Nadia Eckhardt, tour leader of the *Achille Lauro*. Her task was a major problem as so few of the survivors had any documentation, their passports and most of their possessions destroyed in the fire, their legal identities burnt to ashes. The missing passenger identities had yet to be confirmed.

At daybreak, the operation of transferring the survivors got underway, with sterling help from the two U.S. Navy ships. *Lima* continued to act as co-ordinating vessel between the rescue flotilla and the rest of the world, supplying regular updates as to the progress of the transfer operation. It was also necessary to try and ensure the operation was completed during the remaining daylight hours, and whilst the weather remained stable and calm. To assist in the transfer, we used one

of *Lima's* lifeboats and one from the now-abandoned *Achille Lauro* to help, transferring about 134 persons to rescue ships. Earlier that morning, and as a mark of respect to a fine old lady, I had steamed past the blazing hulk. It was both a fascinating and disturbing sight. Nineteen hours later, we were advised by the Master of the salvage tug *Solano* that the ship had slipped silently and gracefully below the surface, and the fire in her innards which until then had continued raging was finally extinguished. It was a day which both my wife and I (and so many others) will never forget, but we are proud that *Lima* was privileged to maintain the fine traditions of the sea.

Postscript to the *Achille Lauro* rescue

Shell International Shipping's supertanker *Lima* was recruited as an observing ship of the U.K. Voluntary Observing Fleet in May 1982, and Captain John Briand has been a weather observer for over 30 years. His crucial involvement in the *Achille Lauro* rescue also highlighted the value of the Global Maritime Distress and Safety System (GMDSS) as a saver of life.

Newspaper headlines throughout the world were dominated by reports of the fire that swept the *Achille Lauro* as she sailed around the Horn of Africa *en route* to the Seychelles on 1 December 1994. The first news of the drama to reach the MRCC at Stavanger came by Inmarsat-A from the Dutch livestock carrier *Corriedale Express*, and in the absence of MRCC facilities on the East African coast, the duty staff at Stavanger immediately set about notifying vessels in the area of the stricken ship through all Inmarsat systems. Several vessels responded by return and, having plotted their positions and courses, Stavanger appointed *Lima* as surface search co-ordinator, as she had the best overall communication with neighbouring vessels.

It was left to the *Hawaiian King*, as the first ship on the scene, to establish VHF communication with the *Achille Lauro* and set about transferring evacuated passengers and crew from the lifeboats and liferafts which they had boarded in their flight from the flaming ship. The *Bardu* took the remainder of the survivors from the stricken ship, and though sadly two people lost their lives, it is believed indirectly as a result of the casualty, the Italian Master of the *Achille Lauro*, Captain Giuseppe Orsi, was highly praised for doing everything in his power to get his passengers to safety, at the same time attempting to contain the fire on board.

The MRCC at Stavanger was in continuous contact with the rescuing vessels through Inmarsat-A and C. Stavanger also set up an exclusive telex link with both *Lima* and *Hawaiian King* through the Inmarsat coast-earth station at Eik, and became further involved in the mammoth task of co-ordination with shipowners, insurers, the survivors' home countries and the U.S. Navy. The GMDSS operations staff at Falmouth, U.K., MRCC also assisted in relaying Inmarsat-A messages via Inmarsat-C to ensure that ships fitted with differing communications equipment were kept in the picture.

The remarkable life of the *Achille Lauro* began nearly 50 years ago, when she was built in 1947 as the *Willem Ruys*, one of a trio of large Dutch liners of the day ordered between the wars for the Royal Rotterdam Lloyd company for the Dutch East Indies service. She was converted for Flotta Lauro of Naples in 1966 and employed on the U.K.-Australia service until the early 1970s, when she was switched to full-time cruising. Ironically she suffered two previous outbreaks of

fire, one of which was to occur in November 1981 as she was on a voyage similar to her final one, a repositioning voyage to South Africa. She was a distinctive and elegant ship, with her blue hull and wide open decks, and had many admirers who will long remember her.

The importance of ship weather reports*

The World Meteorological Organization (WMO) Voluntary Observing Ships' Scheme is a scheme whereby ships are recruited by meteorological services to make and transmit weather observations in relation to the provision of meteorological forecasts and warnings for the safety of ships at sea.

The Royal Observatory Hong Kong (ROHK), as a member of the WMO, began recruiting a fleet of locally based Voluntary Weather Observing Ships (VOS) in 1949. The number of ships in the fleet now stands at 94. ROHK receives via the Hong Kong Coast Station (VRX) an average of over 790 ship weather reports (commonly known as OBS by officers on VOS) every month from these ships.

Many shipmasters and officers have asked the question 'Do you really need our OBS? You have satellites.' The answer is an emphatic 'Yes, we really do.'

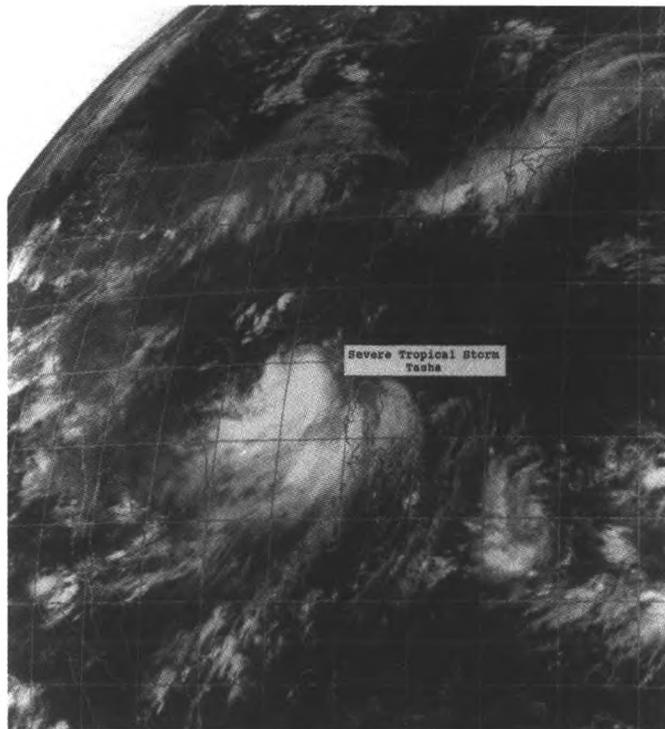
Satellite pictures and OBS complement each other as indispensable tools in meteorology and oceanography. The former gives a 'bird's eye view' of the global distribution of clouds and weather systems, while the latter gives local values (over the sea) of meteorological and oceanographical elements such as pressure, wind speed and direction, visibility, temperatures as well as of wave and swell. The following example illustrates this.

As can be seen from the satellite imagery in Figure 1, at 0600 UTC on 19 August 1993, Severe Tropical Storm Tasha was located over the South China Sea. Without a distinct eye, the centre of Tasha was determined by following the spiral cloud bands and this puts it at a small distance to the southwest of Dongsha. The wind and pressure reported by *Dock Express 12* (call sign PDRM) to the southwest of Tasha now came in useful. For between its report and Dongsha's weather report the centre of Tasha could be confidently confirmed at where it is shown in the weather chart (see Figure 2). Furthermore, the report from *Dock Express 12* also allowed the intensity of Tasha and radius of strong and gale force winds to be better determined. This in turn enabled a better forecast to be formulated.

Operational meteorology has in recent years come to rely more and more on products from numerical weather prediction (NWP) models. The usefulness of these products depends on the quality of the initial conditions used. OBS augments the number of observations available for the generation of these initial conditions and thereby contributes to the quality of NWP products.

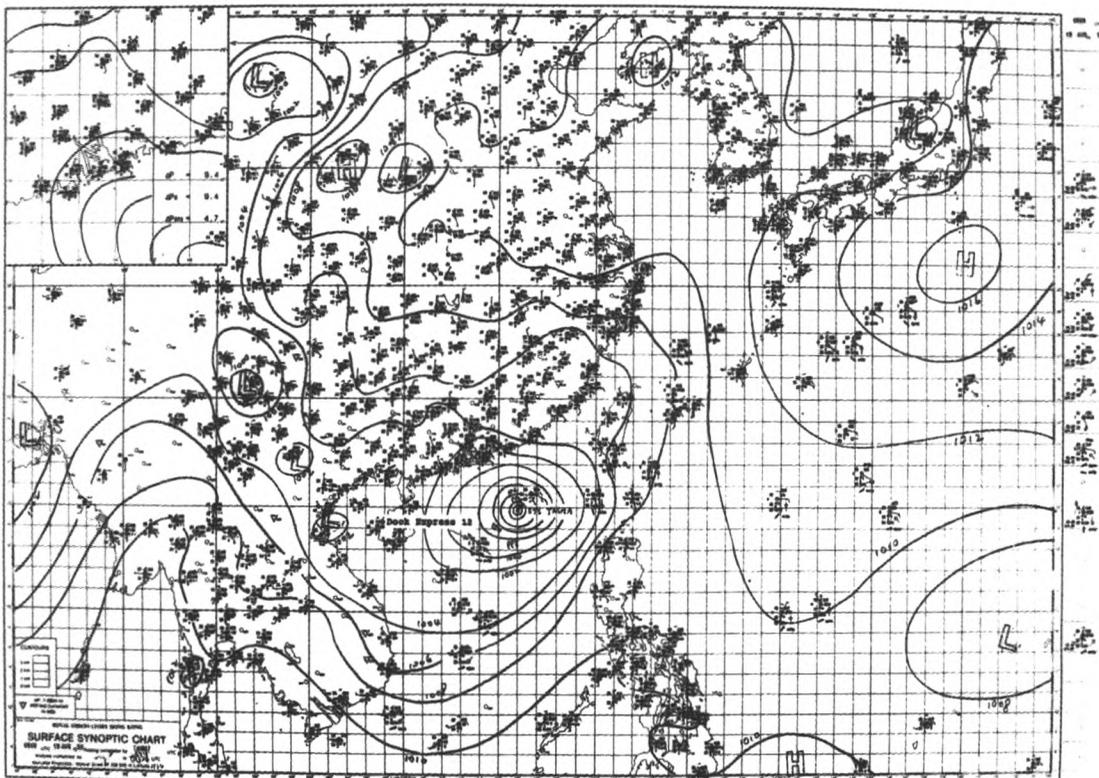
In 1963, the WMO established the Marine Climatological Summaries Scheme (MCSS), whereby OBS recorded in ships' logbooks are extracted, quality-controlled, exchanged, and processed into climatological summaries in a globally co-ordinated and consistent way.

*Reprinted from *Wallem Fleet News*, Autumn 1994, by courtesy of Wallem Shipmanagement Limited (Hong Kong), and Director, Royal Observatory, Hong Kong.



Courtesy: Director — the Royal Observatory, Hong Kong

Figure 1. An Infra-red Satellite Imagery received from Japanese Geostationary Meteorological Satellite, GMS-IV, at around 0600 UTC on 19 August 1993.



Courtesy: Director — the Royal Observatory, Hong Kong

Figure 2. An analysed surface weather chart for 0600 UTC on 19 August 1993.

OBS archived under the MCSS have found a large and increasing number of applications.

- (i) They are the basis for the development of comprehensive marine climatological atlases;
- (ii) They are used extensively in the provision of a variety of non-operational marine services, such as the development of design statistics for the offshore oil industry;
- (iii) They form an invaluable source of climatological data for the study of global climate and climate change.

In view of the importance of OBS in both operational and non-operational applications, WMO has put forth amongst others the following recommendations for improving the quantity and quality of OBS:

- (i) Increasing automation in shipboard observation, message compilation and transmission, taking advantage of the INMARSAT communication facilities and shipboard computerization;
- (ii) Increasing awareness among ships' officers and companies of the applications and importance of OBS;
- (iii) Targeting to recruit VOS which sail in the identified data-void areas such as oceans in the Southern Hemisphere.

In respect of the above recommendations, ROHK has started distributing a computer software developed by the Royal Netherlands Meteorological Institute (KNMI) to HKVOS for compiling, encoding and transmitting OBS via INMARSAT-C; continued to emphasize to ships the importance of OBS during ship visits by the Port Meteorological Officer (PMO) and through regular publications such as *The Newsletter for Hong Kong VOS*; and stepped up its efforts in recruiting ships which ply the Southern Hemisphere.

OBS will continue to be a primary source of meteorological and oceanographic data. Their usefulness in operational meteorology and marine climate is not likely to be replaceable.

A day in the life of Iain Hendry, Offshore Adviser

Iain Hendry is the Met. Office's Offshore Adviser based in Aberdeen, the Oil Capital of Europe. He has been flying around the U.K. continental shelf area since 1983 and will be well known to most of the marine observers working in the U.K. offshore oil and gas industry, be they on platforms, rigs or on some of the standby and supply ships calling at Aberdeen. He acts as a roving Port Met. Officer, but rather than wait for his installations to enter a port (an unlikely event for a fixed platform), he travels to them.

Recently he had the pleasure of spending two nights on Sonat Offshore's drilling rig, the *Henry Goodrich*. It was here that he 'enjoyed' a new experience — free-falling lifeboats.

The *Henry Goodrich*, built in 1985, is the largest semi-submersible drilling rig in the world and at drilling draught displaces some 49,410 metric tons. The rig is designed to operate in the harshest of environments north of the Arctic Circle and

in temperatures as low as -30°C . Maximum waves of 110 ft and wind speeds of 115 kt should not prove troublesome to this installation. The rig is presently situated in the northern North Sea in position $58^{\circ} 20' \text{N}$, $00^{\circ} 00' \text{W}$, about 100 n.mile east of Wick in Scotland.

As part of the safety equipment held on the rig are 4×75 -man Harding free-fall lifeboats. These can be launched from heights up to 40 m and on launching will carry enough momentum to sail away from the rig at a speed of 10–12 kt. For insurance purposes each lifeboat must be launched at least once per year. Weather conditions must be very good for this exercise in order to facilitate the recovery of the boats.

Iain Hendry takes up the story. “During my visit to the *Henry Goodrich*, a drill was called to launch No.4 lifeboat. Three other ‘volunteers’ joined me and the lifeboat crew of three for the launch. Full exposure suits needed to be worn in case of any incident occurring during the recovery, which would mean someone ending up in the water. Each lifeboat consists of 75 high-back seats, all but four facing to the rear. A full safety harness, including head restraint, needed to be worn. The boat is boarded when it is in the horizontal position, then tilted to an angle of 35° before being released.



Photo. by courtesy of Sonat Offshore

The *Henry Goodrich* oil rig, showing one of the forward Harding lifeboats tilted to 35 degrees prior to release.

As the boat tilted and came to rest, tension mounted (in me, anyway). There was a brief but loud screeching as the lifeboat slid from its cradle, followed by a period of complete silence as the boat fell. Then the loud splash and G-force which pinned me into the back of my seat. Water poured through a ‘sealed’ hatch cover and drenched the unfortunate passenger sitting beneath it. There was a loud cheer at this as well as sighs of relief. And then we were up and away; much better than anything at Alton Towers. The coxswain started the engine and we cruised about, testing the water sprinkler system and air supply.

After about ten minutes, two Fast Rescue Craft (FRCs) from the standby ship came alongside and rescued the four passengers. There then followed a 30-minute run at speeds of over 30 kt around the ‘awesome’ *Henry Goodrich*, culminating

with the collection of the lifeboat crew and being deposited at the base of one of the vertical ladders leading up to the main deck from sea level. Quite a warm climb whilst still wearing an exposure suit.

Then it was back to work in the Ballast Control Room, to compile my Offshore Inspection Report. My thanks to Sonat Offshore and the marine personnel on the *Henry Goodrich* for the opportunity of gaining two new experiences.”

Observations of fish behaviour from R.R.S. *Discovery*

The following account, written by Paul Burridge, Second Officer, is of observations made by the ship's company during a period when R.R.S. *Discovery*, Master, Captain K.O. Avery, was stopped on station in the Arabian Sea, in position 14° 18'N, 66° 57'E on 25 September 1994.

During the forenoon watch, a good deal of marine activity was observed in the vicinity of the vessel. Dorado were very much in evidence as were sharks, squid, swimming crabs, puffer fish and other species which remained unidentified. The vessel had come across a drifting fishing buoy along with about 18 m of weedy, barnacle-encrusted rope all of which was recovered on board but a shoal of unidentified amber-coloured fish were apparently at a loss when this disappeared from their world. Afterwards, every item of scientific equipment that was lowered into the water caused them to swarm around it, giving it the 'once over' as a prospective new habitat. As the day consisted of numerous similar 'dips' of different pieces of equipment, the fish must have been thoroughly confused. By noon they had retreated in apparent resignation to the shade offered by the counter where they remained save for the occasional forays to attack bait intended for the dorado. The 'Goldfish' as they were christened, were also accompanied by one or two fish of similar size and shape but shaded turquoise and lilac in vertical stripes. These fish were about 15–20 cm long and classically 'fish-shaped' but closer inspection could not be made since none of them deigned to swallow one of the many hooks being dangled hopefully over the side.

Meanwhile, the dorado were doing an acrobatic display, leaping clear of the water with gay abandon. Various styles were on display: first, there was the approach from the deep followed by a nearly vertical leap into an ungainly 'stall' and a messy re-entry. The second style entailed making very high speed at a depth of about 1.2 m before planing up rapidly and breaching the surface smoothly prior to hanging with fins gloriously extended in full blue, silver and gold majesty, followed by a graceful re-entry. With the dorados' colouration and the slant of the mouth, they looked as if they were showing off in mid-air with a smug 'Look at me, aren't I wonderful' attitude, seen more frequently beside pools throughout the Mediterranean during the '18–30' season. The final style was a sort of half-hearted 'plop' as if an acrobat had prepared for a particularly stunning leap but changed his or her mind at the last moment. Obviously, these antics were connected with the pursuit of prey of some description but the objects of the dorados' attention could not be seen from the bridge.

At one point in the morning, a number of light-brown 'blobs', perhaps a dozen, appeared on the surface. They were about 7 cm in diameter and seemed to be vibrating enough to cause ripples on the glassy, calm surface. When viewed through binoculars the blobs proved to be inflated puffer fish, the vibration in the water being caused by the frantic cycling of their pathetically scaled fins. The

puffers were mobbed by the dorados but were too large to be consumed in their inflated state; instead they were simply butted around. The consequence of this jostling was that they were pushed together in groups of two or three although the butting may have been an attempt by the dorados to get the puffer fish to move. The dorados certainly seemed unable to fathom a stationary meal and would far rather it moved. On occasions, the observers had seen stunned flying-fish (having flown into the ship's side at night) goaded into action by the dorado, only to be snapped up after a futile escape attempt. Where flying-fish have remained 'doggo' in their dazed state they have been passed by, unnoticed by the bigger fish. This lack of motion, incidentally, also works for squid but not when there are sharks around. While the puffers were inflated and vibrating on the surface and being butted around, an occasional brave or perhaps foolhardy dorado would try to take a bite notwithstanding the spines presented by the smaller fish; needless to say, these attacks were effectively repulsed indicating that the defence worked. However, the puffers had probably not anticipated such a protracted assault on their numbers. Inflated as they were, they bobbed to the surface and became embroiled in a 'no win' scenario: on one hand they could deflate and so attempt evasion and escape but although puffers have worked miracles to evolve their defence, they have had to sacrifice virtually all agility in the swimming stakes, and with dorado being one of the ocean's best high-speed pursuit machines, this course would only lead to consumption. On the other hand, the puffers could remain inflated at the surface and easily defeat the dorado but become baked by the sun in temperatures of around 30.0°. The puffers were caught on the horns of an apparently insoluble dilemma but were uncharacteristically rescued by a school of sharks. There were about five sharks in a loose school, ranging in size from 76 cm to 1.2 m, and were grey in colour with no distinctive traits such as a hammer head or white tips to the fins. They neatly plucked the puffers from their predicament by the timely use of well honed jaws and apparently indestructible digestive tracts. To say that they simply ate the puffer fish understates the act; they swam by quite leisurely and just 'hoovered' them up. Having disposed of the puffers, the sharks continued to loiter about the ship as baited hooks were splashing out aft in the hope of some sport.

The fishermen were not disappointed as a 76 cm dorado and the largest of the sharks were boated in quick succession. The dorado was consigned to the fish room and fishing continued throughout the afternoon, delivering a further seven dorado to the fish room (with a complement of 50 souls on board a miracle would have been needed to feed everyone with just one fish). A particularly memorable tussle was had with one fish and lasted 15–20 minutes, catching a big fish on light tackle being afterward considered 'the only way to do it'. Several other dorado were hooked but the ferocity of their response combined with their sheer speed and strength often left lines slack and offered the prospect of another tackling up session.

A number of points were noted during the afternoon.

1. When a dorado is hooked it makes spectacular runs at great speed in no particular direction. If it happens when the fish is pointing upwards it just rings on Full Speed anyway and hurtles into the air, gaining altitudes of about 2.4 m at times. The fight is limited to short powerful sprints followed by a brief calm phase. It was this characteristic which caused so many lost fish as the return to action could best be described as explosive.

2. The hooked dorado is immediately mobbed by others which butt and jostle it. Perhaps it is an attempt to remove it from its peril or, more likely, shoulder charge it off whatever item of food it had discovered. This action almost caused one fish to be gaffed instead of the one on the line. For fishermen this behaviour was a boon since a hooked fish only served to excite the others into a more rabid feeding frenzy.

3. Bait itself is unimportant; many dorado would hit the lead weights and not the baits as they splashed down and sank. Much like other shoaling fish, they did not hesitate to sample something lest the others snapped it up in the meantime. Again stationary food held no attraction. To really get their attention the bait had to be moving smoothly and quickly, once one fish had had a taste it became a race between all of them to get it. This could lead to a bait being taken by a fish travelling at near top speed, so handliners beware! Another trait they displayed was the reaction to the 'splat' of the bait hitting the water. On most occasions the bait would be taken within 10 seconds of its arrival at the surface and as much could be gained by having the bait out of the water as in it. The 'splat' would attract the fish which arrived only to see the meal disappear upwards and out of sight; upon the second or third 'splat' the strike was instantaneous and very decisive. This reaction may be attributed to their principal prey being flying-fish. The dorado's hunting and pursuit may rely heavily on the aural input from flying-fish re-entries, and as the prey fish appear to pause briefly at this time, perhaps to reorient themselves, the dorado gets its meal.

4. On a number of occasions flying-fish on the wing were taken. As the sea surface was mirror calm and the wind non-existent, any fish taking to the air did not gain much altitude. Dorado would pursue the fleeing flying-fish on the surface, their bulbous heads cleaving the water for their passage. At this point the dorado's eyes and mouth were still just below the surface but as the fish closed on its target it would lift itself up, like a hydrofoil, on its prominent pectoral fins so as to bring prey and mouth to a satisfactory juxtaposition. At no time in such spectacular pursuits did the dorado fully leave the water. It appeared that the fish was well aware that in order to feed it required the speed that only remaining waterborne could impart but with the prey being airborne, it needed to utilise the surface effect in order to bring it down.

5. Finally, the dorado diet is fairly cosmopolitan. When gutted, the fish revealed puffer fish (surprisingly), swimming crabs and remnants of mictophids in abundance.

Note. Dr Frank Evans, of the Dove Marine Laboratory was pleased to receive R.R.S. *Discovery's* report and made the following comments:

This account of the marine life surrounding the ship while she was stopped in the Arabian Sea was a real cornucopia of information. It is well known, especially to fishermen, that a great many creatures will congregate around a drifting object on the high seas. In the tropics you can be sure that dorado will be there. Long ago I counted (and filmed) over 200 dorado round a drifting yacht in the tropical Atlantic. I am not able to say what the amber fish were, but believe that the fish in vertical turquoise and lilac stripes were pilot fish (*Naucrates ductor*) which also congregate around drifting objects.

I too have seen dorado leaving the water in the various ways described but have never seen them take flying-fish in the air as portrayed in the account; it is completely new to me. I have mentioned before now that an examination of a dorado's eye might be interesting; can they see and focus in both

air and water? Certainly the eye is not obviously divided horizontally into two as in some freshwater fishes that can see in both media. It is tempting to believe that leaping fish falling back sideways into the water are trying to rid themselves of fish lice but this obvious explanation is not necessarily correct. We just don't know.

The swimming crabs are well known from this region; seen often far from land they are the portunid swimming crab *Charybdis edwardsi*. Unfortunately, I am personally short of information on the cephalopods of these waters, so cannot help much with suggestions for squid identity. The puffer fish, so amusingly described, belong to a group whose close relatives include trigger-fish and sunfish. Puffer fish are known to feed on squid, and perhaps this was the attraction here. The species was very possibly *Lagocephalus lagocephalus*, a fish occasionally found as a vagrant on the west coast of Great Britain but better known from open water in the Indian Ocean. Puffer flesh is often declared to be poisonous and indeed a neurotoxin known to cause violent respiratory paralysis has been isolated in some species of puffer. I suspect the sharks that swallowed these inflated delicacies have an immunity.

The account concluded with the expressed hope that the *Discovery* might one day be considered for a book prize in which case it was suggested that the book should be a field guide to fish identification. [Not printed.] While of course sympathising with this wish, I have to say that such a book does not exist, to my knowledge, although there are books which treat fish *groups* world-wide. It would have to be huge volume. A count on my bookshelf turned up more than a dozen tomes covering different parts of the world, mostly titles in the form of 'Guide to the Sea Fishes of ... (locality)'. I think Paul Horsman's book *The Seafarer's Guide to Marine Life* makes a good start, although it of necessity lacks detail for any geographical region. A new edition is due out very soon.

Has anybody seen my whale?

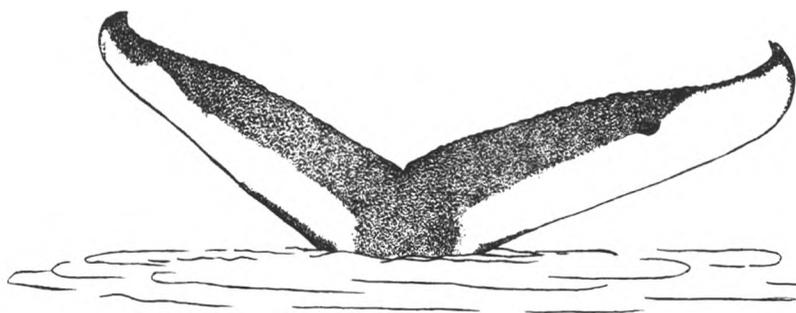
BY J. FREEMAN

(Sub-Editor: *The Marine Observer*)

Well, there's a phrase with which to halt or change the course of a conversation. Actually, the opportunity to try it out has not yet occurred since comparatively few people who spend the greater portion of their lives on terra firma have seen a live whale in its natural surroundings, let alone a specific whale of an individual species. The writer has seen only four Sperm Whales. Professional seafarers have a head start on the rest of us in this respect, of course. Unlike the weekend sailor who may not venture as far as deep ocean waters, those whose business it is to cross and recross vast areas of the oceans are afforded many opportunities to see whales of numerous species going about their daily lives although that is not to say that such sightings are either frequent or regular. Likewise, it must be supposed that the whales are afforded the prospect of viewing humans trundling about on the surface in powered boxes, no wonder they sometimes get curious and approach ships. Perhaps in 'whalespeak' they have hysterics because we have not found an easier way to get around at sea whereas cetaceans have been cruising underwater with the currents for millions of years.

However, for the time being sea-going humans stay mainly on the surface while the whales stay below. This situation allows us to observe them as opportunity permits, and to record their characteristics and behaviour. When it comes to the Humpback Whale, one of its most distinctive features is the enormous flippers which are about one-third the length of the body and are generally white on the underside. It has also been known for some time that these whales' flukes, thrown into the air upon sounding, can be used to identify individual mammals since the patterns on the underside are the equivalent of human fingerprints.

The International Wildlife Coalition (IWC), which has offices in the United States, the United Kingdom, Canada and Brazil, has tracked and studied Humpback Whales migrating from mating grounds in the Caribbean to the feeding grounds of Stellwagen Bank off the coast of Cape Cod, and has identified and named many individuals mainly for their fluke markings. For a very modest fee the proceeds of which help to fund research and provide practical aid for cetaceans in distress, the IWC also offers a scheme whereby interested parties can 'adopt' a specific whale from a 'catalogue' of 50 and be informed of its movements and activities throughout twelve months. Having been fascinated by whales since childhood after first seeing the exhibits in the Natural History Museum in London, the writer recently adopted a female Humpback named 'Arrow', known by the IWC to have had three calves and to regularly commute between the Dominican Republic and the coast of Cape Cod. Her flukes are quite distinctive and are shown in the sketch.



IWC research has shown that between December and April, Humpbacks in the western Atlantic can be found from the Bahamas to the Grenadines in the West Indies, where calves are born and mating occurs. The most important location in the West Indies is Silver Bank which, at the peak of the mid-winter season can host as many as 3,000 whales. Beginning in March, the whales start to arrive in the North Atlantic feeding grounds and spend the spring, summer and autumn months in waters as far north as Long Island, up through Cape Cod, Nova Scotia, Newfoundland and east to Iceland. In late autumn they begin the long migration south to the tropics.

The members of the formidable team of observers in the VOF are always ready to note down encounters with cetaceans of all species; perhaps one day a report will be received of a Humpback Whale with Arrow's markings. Or is that wishful thinking?

Note. Further information on the International Wildlife Coalition's Whale Adoption Project can be obtained from the following offices:

United Kingdom: P.O. Box 73, Hartfield, East Sussex, TN7 4EY.

United States: 70 E. Falmouth Highway, East Falmouth, MA 02536-5954.

Canada: P.O. Box 461, Port Credit Postal Station, Mississauga, Ontario L5G 4M1.

Brazil: P.O. Box 5087, Florianopolis, S.C. 88041.

AURORA NOTES JANUARY TO MARCH 1993

By R.J. LIVESEY

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

Table 1 contains details of marine observations of the aurora which have been received up until the time of writing. It is a pity that there have been so few reports from ships, for land-based observers in America and in British waters confirm that the aurora has been seen in mid-latitudes from time to time.

Table 1 — Marine aurora observations July to September 1994

DATE	SHIP	GEOGRAPHIC POSITION	TIME (UTC)	FORMS IN SEQUENCE
14/15 July	<i>Cumulus</i>	52° 54'N, 19° 18'W	0050	qN.
23/24 Aug.	<i>James Clark Ross</i>	68° 19'N, 22° 59'W	0100–0132	mRB.mHB.pHB.pRB Covering 90% of sky.

KEY: m = multiple, p = pulsating, q = quiet, HB = homogeneous band, RB = rayed band.

The period was dominated by coronal holes on the sun which have been emitting streams of high-speed particles jetting out to hit the Earth on each rotation of the sun. This activity is a feature of the period when sunspots decline to their minimum. Each time the active particle stream encounters the Earth, magnetic disturbances accompanied by relatively quiet aurorae seen in the mid-latitudes are developed. In addition, radio operators working the VHF bands make use of the increased density of the ions in the E layer to transmit messages over longer distances than normal by reflecting signals from the active ionosphere.

In the period under review, mid-latitude aurorae were observed particularly on the dates shown in Table 2.

Table 2 — Distinctive auroral nights

MONTH	LOCATION AND DATE	
	North America	Scottish Waters
July	14/15, 15/16, 16/17	—
August	13/14	—
September	6/7, 7/8, 10/11, 25,26	25/26

Figure 1 compares the frequency in 1994 with which auroral light or activity has been recorded at various geomagnetic latitudes in North America and in British waters. The geomagnetic latitude is that derived by rotating the geographic axis of the Earth and its latitude co-ordinates until the axis passes through the magnetic poles, as a first approximation. In fact, the magnetic field of the Earth and the positions of the magnetic poles is more complex, one result of which is that 'magnetically speaking', British waters are at a lower corrected geomagnetic latitude than that given by the geomagnetic latitudes in Figure 1. This explains in part the lower aurora frequency experienced in British waters.

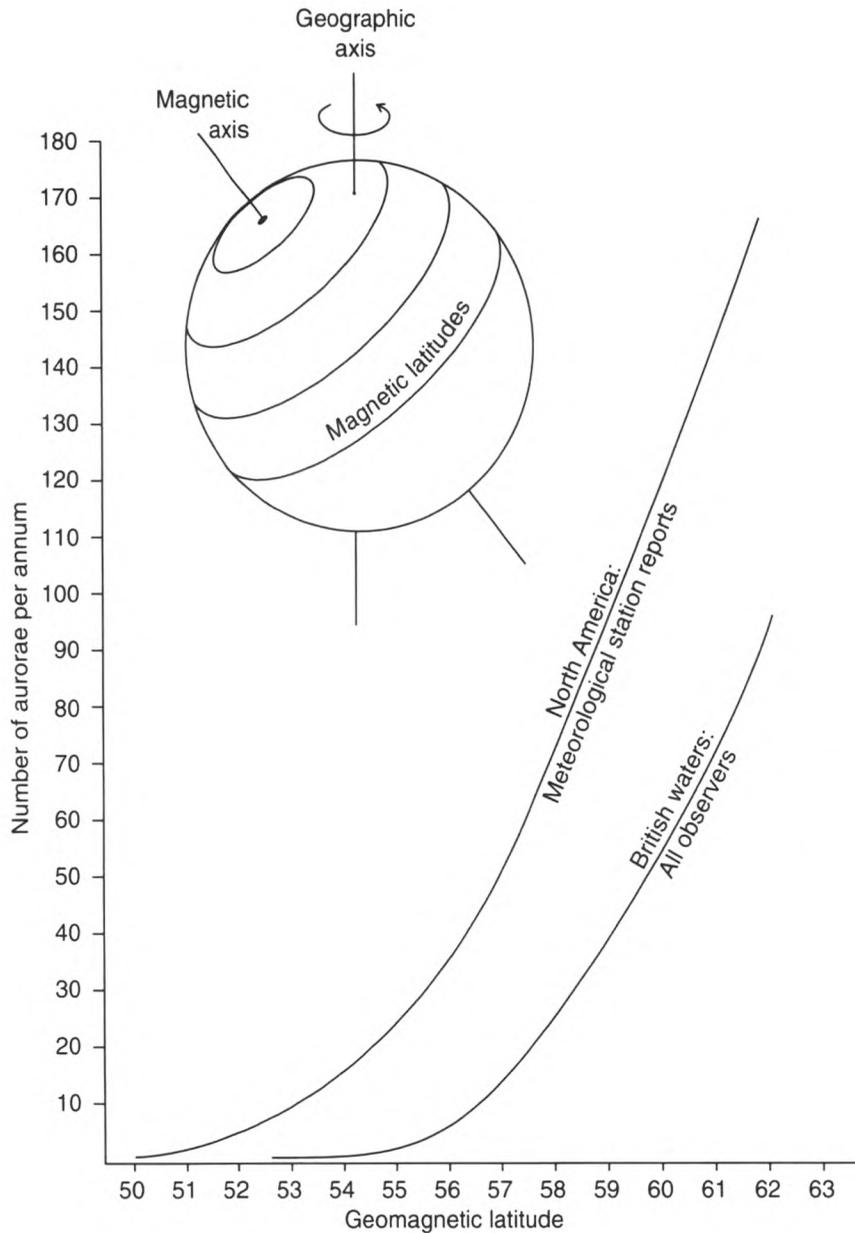


Figure 1. Annual frequency of aurorae in 1994

Because of problems with weather and the availability of observers there is evidence to suggest that the curves given in Figure 1 may be underestimates of the auroral frequency particularly with respect to the North American meteorological station figures. It has been found that individual amateur auroral observing stations at particular stations in Scotland and in the U.S.A. have recorded much higher auroral frequencies than meteorological station records at similar geomagnetic latitudes in their respective countries might suggest. These aurorae may have been a glow down on the horizon or a full-blown overhead storm with coronal or other features: this raises an interesting question. Where have all the marine aurora observers gone? The aurora is still there and we would like to hear about it from you. *Quicquid nitet notandum* — 'If it shines, observe it'. That is the motto of the Royal Astronomical Society.

Book Reviews

Sea Power: A Global Journey by Luc Cuyvers. 230 mm × 302 mm, 250 pp. *illus.* Naval Institute Press, Annapolis, Maryland. Distributed in the U.K. and Europe by Airline Publishing Ltd, 101 Longden Road, Shrewsbury, Shropshire SY3 9EB. Tel: 01743 235651. Fax: 01743 232944. Prices: £17.95 paperback, £29.95 hardback.

This excellently illustrated book is the offshoot of a TV series, originally screened for U.K., U.S. and Japanese audiences, but standing alone as a fine achievement by the Belgian/American author, who has managed to encapsulate the subject of travel by sea, past and present, in a most attractive way in a book of this length. His success in arranging passages on six very different types of vessel is a small victory in itself, and he makes full use of each assignment. With each voyage, he intersperses his narrative with historical facts about the various aspects of maritime development through the ages, and produces an absorbing account in the process.

He starts his sea journey on a Greek super-tanker, the *Crown* of 173,000 deadweight tonnes, joining at Suez and sailing to Taranto in Italy via the Canal. Next he embarks on the container ship *OOCL Envoy* at Hong Kong and calls at Kaohsiung and Nagoya before leaving the ship after a 12,000-mile trip to Seattle. Captain Martin Weir, the British Master of this ship, is as hospitable as all the author's hosts afloat, perhaps even more so, as he is normally the only westerner in the crew. [Captain Weir is also a keen weather observer and bird watcher, having helped to compile many meteorological logbooks in Ben Line and CP Ships in the 1970s and '80s, before transferring to OOCL and gaining command in 1990.]

The author hardly considers his next ride to have been on a ship; on a week's round cruise from Miami to Cozumel, Jamaica and the Bahamas, Royal Caribbean Cruise Lines' 74,000 gross *Majesty of the Seas*, with her 2,400 passengers, could easily make you forget you are afloat at all. For his experience of real power at sea, the author joins the United States Navy in the shape of *USS Ranger*, an aircraft carrier with a crew of more than 5,000 and 70 aircraft, then transferring to the cruiser *USS Valley Forge* with a mere 400 on board, which he finds much more like a ship than the impersonal carrier, where becoming lost in corridors was a daily hazard. Watching the U.S. Navy at work whilst on passage from the Arabian Gulf to Mogadishu to join in Operation 'Restore Hope', he was impressed with the utter professionalism of all on board the two ships.

Next, on to the Norsk Hydro Supply Vessel *Far Sky* for experience running from a Norwegian fjord to the Oseberg Alpha oilfield to witness the unloading of the supply ship onto the impressive giant oil platform, fortunately having chosen a period of relative calm in the normally turbulent waters off Norway's west coast. Finally the journeying author makes a trip on the Japan Marine Science and Technical Centre research vessel *Yokosuka*, witnessing the launch of the ship's submersible *Shinkai 6500* which was then monitored to a diving site near the epicentre of the 1933 earthquake, at a depth of 6,423 metres.

Luc Cuyvers' research into marine history is no less thorough than his inquiries into modern marine operations. He intersperses his commentary on actual happenings with facts about the early navigators, Greek, Phoenician, Chinese and Syrian, right through to the modern holders of sea power. He writes of the evolution of cargo carriage, of marine losses and of naval power. Developing on

the latter subject, he devotes a section to Alfred Thayer Mahan, who taught in Newport Rhode Island in the 1890s and is considered (by the author) the father of modern sea power, having expounded the theory that the way to national greatness was by the protection and control of shipping on the great highway of the sea.

Besides providing an absorbing text, the author has managed to include more than 120 good-quality photographs of his own taking, adding to 30 or so from outside sources, to create an enormous fount of information and interest in one volume.

J.F.T.H.

Arktika — through the North-East Passage by Icebreaker by Oliver Walston. 160 mm × 240 mm, 298 pp. *illus.* Sinclair Stevenson, Reed Consumer Books Ltd, Michelin House, 81 Fulham Road, London SW3 6RB. Price: £18.99.

The subtitle is more appropriate, as the book follows the Russian Icebreaker *Arktika* on a passage to the Pacific from the Atlantic. All the accompanying acts, and actions, by the crew are duly related with humour and clear explanations. As the Russians have opened the North-East Passage to international trade, the fact that the breaker went virtually alone must be disturbing. It is an expensive operation.

That Oliver Walston managed to acquire a 'ticket' for this ride is a tribute to his tenacity, endows him with the 'Glamour of Polar Explorers', and must add to the value of the book.

This is not a work of reference, but it is essentially a study of life in Russian ships. The attitudes and behaviours are all well related, and the formidable bureaucracy governing day to day life seems to pervade every page. The human voice and friendliness of the mariners shows the life and work-place — anything but glamorous — in a human and friendly fashion. The glimpse we have of the private lives shows that these are very personal, and the seamen have generously allowed an intrusion by a foreigner. Without this action the courage, understanding and generosity of the crew would not have been apparent, and much of the value of the book would have been lost.

The book provides a rich insight into the working of icebreakers in general, and the people in particular: also of the flora and fauna encountered, which are likely to be dangerous. It was also shown as unnecessary to leave the safety of the vessel, to go looking for trouble on the ice, as any fire on a nuclear icebreaker, however small, can be considered hazard enough. The concern about food is understandable from a mariner's point of view, and shows that this topic is still uppermost in the minds of most mariners: some may consider this concern misplaced, and they should try a trip on any general trader to understand this attitude.

For my part, I enjoyed the book enormously. I found it refreshing to read an account of life at sea in a hostile environment, without acrimonious words for shore establishments or country folk, unused to change or advancement. It is also interesting to discover the problems to be overcome by the vessel, which cannot be considered teething troubles, and the hope that the vessel can survive in a free-market economy. The book describes the operational practices and many bureaucratic requirements which are essentially marine — and Russian. The result is a guided tour of the North-East Passage, firstly by icebreaker, and finally by

conventional steamer, to the Vladivostock conclusion. The footnotes supply a greater depth of understanding to the already well documented and clearly enjoyable experience, and the book is probably worth reading for the footnotes alone. Oliver Walston is a lucky man.

Captain A.P. Maytham*

*Former Sea Ice Officer with MetROUTE, and presently Port Met. Officer Bristol Channel.

Personalities

RETIREMENT — CAPTAIN M.B. BRADLEY decided to retire in January at the age of 57, to 'make way for the younger element who live more at ease with modern technology'.

Michael Bradley was born on 5 August 1937 and educated at Cowbridge Grammar School. Following pre-sea training at Cardiff College of Technology, he joined Graig Shipping Company of Cardiff and in December 1954 commenced his first voyage as Apprentice on s.s. *Graiglwyd*. In August 1958, before completing his apprenticeship, he was promoted to Third Mate of m.v. *Graig*, from which ship we received in January 1959 the first of 61 meteorological logbooks he helped to compile.

Following his studies resulting in obtaining his Second Mates Certificate, Captain Bradley joined Lamport and Holt Line in October 1959 for a one-year appointment, before transferring to the Ropner Shipping Company in January 1961, remaining with that company until his retirement 34 years later. He obtained his Master's Certificate at Cardiff in April 1965 and was promoted to his first command, m.v. *Wandby*, in June 1971. During his 23 observing years, he received an 'excellent' marking to 15 of his meteorological logs and says he was delighted to receive in late 1994 his fifth Excellent Award since becoming Master.

Captain Bradley writes about the remarkable changes there have been in his 40 years at sea, both in the ships and the pattern of sea life. In his early days one could expect to be away for up to two years on a voyage, with very few crew changes, whereas today the normal voyage duration is three to four months with constantly changing staff. He describes the difference between his first steamer of wartime vintage and his present command, *Western Bridge*, as 'incredible'. He has alternated between this self-discharge bulk carrier, and her sister-ship *Eastern Bridge*, both of 96,725 dwt, since the former's maiden voyage in 1991. These ships can unload iron ore at 6,000 tonnes per hour and computers are involved in most aspects of the ships' operations. The automation also applies to weather reporting, which has become much easier with the aid of the MOSS equipment.

We offer our thanks to Captain Bradley for his long and keen co-operation in voluntary observing at sea, and for his own kind words about the weather information provided by our organisation and appreciated by all mariners. We wish him well in his retirement plans to devote more time to his family, home with his wife Anne of 18 years being near Neath, West Glamorgan, and their 17-year old son Mark who attends Tertiary College, not forgetting the desire to reduce the golf handicap.

RETIREMENT — CAPTAIN P.J.S. BISHOP retired after 44 years at sea, mainly with the Ellerman group of shipping companies.

Peter James Shawcross Bishop was born in Woolwich in April 1933 and brought up in India where his father was stationed with the Royal Air Force. On returning to England in 1945 he attended St. George's School, Windsor, before undergoing pre-sea training on H.M.S. *Worcester* between 1947 and 1950, in September of which year he joined his first ship, *Trevelyan* of Hain Steamship Company.

Captain Bishop remained with Hain's until 1955 when he joined Ellerman Wilson's Line as Third Officer. He obtained his Master's Certificate in 1969, remaining with Ellerman's Wilson Line when it came under Ellerman's of London in 1973. On his promotion to Master in 1974 he was appointed to command the *Silvio*, a general cargo ship of the 'S' class, which he stayed with for two years until being transferred to the Hustler container class, trading to Portugal and the Mediterranean.

In 1979 he was appointed to the *City of Ipswich* for her maiden voyage, this ship being one of Ellerman's newly built 'Appledore' container class. He remained with this class until 1992, following Ellerman's take over by Denholm Isle of Man. He was then privileged to command two different new Car Carriers owned by Nissan and managed by Denholm, *City of Sunderland* and *City of Barcelona*, both of which he had recruited into the VOF after bringing them on their maiden voyages from Japan to the U.K.

The first of 27 meteorological logbooks received from Captain Bishop reached the Met. Office in January 1956 when he was in Ellerman's *Sacramento*, and 13 of his logs were marked 'Excellent'. He received Excellent Awards on five occasions.

Captain Bishop says he was in command of *City of Plymouth* running to Israeli ports during the Gulf War, with corresponding precautions taken against possible chemical warfare, such as the issuing of gas masks, and ships remaining on readiness to get underway when in port.

In June 1994 he had to have a heart by-pass operation, which although successful, entailed his early retirement from the sea. Captain Bishop states that he thoroughly enjoyed his years at sea and will miss the comradeship and variety of life that is special to the Merchant Navy, despite the noticeable reductions in manning that have taken place during his career. Our thanks to him for his many years of co-operation in marine weather observing, and our good wishes for an enjoyable retirement.

LETTERS TO THE EDITOR

During the five voyages that we made together between 1988 and 1992 when Robert was Senior Radio Officer in the two ships successively named R.M.S. *St Helena*, a total of 104 bottles containing messages were tossed over the side in various positions during our voyages between the Bristol Channel and Cape Town via the island of St Helena [see *The Marine Observer* 316, April 1992, pages 79–83]. To date we have had 15 replies and we eagerly await the return of the other 89, but we would like to share with you news of the latest return which reached us after a remarkable interval of three years and seven-and-a-half months.

This message was thrown overboard by Christine on 1 June 1991 in position 31° 47'N, 14° 46'W, between Madeira and the Canaries. It contained the usual message indicating from where it came and the position of jettisoning. This included the information that the *St Helena* was bound from Tenerife to Cardiff with 178 persons and one dog on board, and was message number 32.

The bottle was picked up on the west coast of Ireland by Mr and Mrs Paddy Scanlan of Ardfety, Tralee, Co. Kerry, who had found it on the beach at Banna Strand in position 52° 20'N, 09° 50'W one Sunday afternoon, on 15 January 1995. After its 3½ year journey, the finders said that although they found that the paper inside the bottle had deteriorated and cracked with drying, though not very wet, they thought from the smell of the paper that the wine must have tasted good. Banna Beach, where they discovered the bottle, is a five-mile long strip between Tralee Bay's north shore at Fenit and Kerry Head. Its infamous past includes the gun-running incident by *Marita Ann* in the mid-1980s, as well as for gun-running by Roger Casement in 1916, when the spy landed from a German submarine during the Irish War of Independence.

Bob and Christine Wilson, Shellback Shipmodels, Penwortham, Lancashire.

If this bottle had made three clockwise gyres around the North Atlantic as the Wilsons surmise, it could have travelled between 25,000 and 30,000 miles at an average speed of over one knot. *Editor.*

Guiana Current

July 3rd, 1994 in position 05° 59.6'N, 49° 45.2'W. It has been noted during the past two or three days that the vessel [*Lepeta*] has been encountering very erratic current speeds around the Amazon and up to French Guiana. Until 1 July the vessel was encountering currents of up to 4 knots, increasing the ship's chartering speed from its normal 13.5 knots to 17.5 knots and the speed of 16–17 knots was maintained for the rest of that day. By the 2nd, the vessel was experiencing exactly the opposite effect and was slowed to 13 knots throughout most of the day, also encountering huge sets; on the evening of the 2nd, a left correction of 16° had to be applied to maintain the course of 306°. One hour afterwards, in position 04° 36'N, 47° 46.4'W, this set and drift was not apparent but three hours later in position 04° 49.9'N, 48° 07.1'W the vessel started setting to the west and needed 4° right set to maintain its course. By 1200 UTC in position 05° 59.6'N, 49° 45.2'W more adjustment was needed, the vessel still maintaining a speed of around 13.2 knots.

As the vessel has a draught of 20 m, my observing team and myself have come to the conclusion that, contrary to the routing chart for this area where we encounter the Guiana Current and the Equatorial Counter Current, deeper draught vessels such as supertankers may observe a different current below the surface and/or be affected more by river tidal flow. On occasion the ship's speed may increase up to about 16 knots but then suddenly decrease again.

It would be of benefit to mariners if a closer observation of these currents was made by oceanographers, or by mariners themselves so that data could be incorporated into the *South America Pilot* Volume IV and routing charts, enabling a more economical route around north-east Brazil to be found.

Mr D.O. Evans, Principal Observing Officer, m.v. *Lepeta*.

Notices to Marine Observers

PORT MET. OFFICERS — APPOINTMENTS AND ADDRESS CHANGES

Appointments

On 1 April 1995 two members of the Marine Division Staff took up their new appointments on promotion to the posts of Port Met. Officer (PMO) South-east England and Bristol Channel, succeeding Captains Downes and Ashton respectively on their retirements (see *The Marine Observer*, April 1995).

Captain Edward J. O'Sullivan moves up to the PMO post at Grays, near Tilbury, after 16 months as Nautical Officer responsible for Voluntary Observing Fleet liaison matters, based at Scott Building attached to Bracknell Headquarters. His other Met. Office service includes two years with MetROUTE, the Met. Office ship routeing arm, and 3½ years as PMO at Hull. Captain O'Sullivan went to sea in the 1960s, serving with Elder's and Fyffes and Salen (UK). Between 1985 and 1990 he was the owner/operator of a 600 dwt general cargo vessel on the coastal trades.

Captain Austin P. Maytham transfers from the Port Met. Office at Greenock to take on the post at Cardiff, after seven years with the Met. Office. He moved to the Scotland and Northern Ireland post in September 1994 after his six years as the Sea Ice Officer in the MetROUTE team, which he joined in early 1988. Captain Maytham trained at H.M.S. *Worcester* before going to sea in 1965, gaining experience with Blue Funnel Line and a variety of other shipping concerns, serving many years with Bank Line and then as Master with several companies, before coming ashore in 1987.

Port Met. Officer Bristol Channel

On 29 March the Port Met. Officer for the Bristol Channel, formerly at the Cardiff Weather Centre, moved to the following address:

Port Met. Office,
Room 3.52,
Companies House,
Crown Way,
Cardiff CF4 3UZ.
Tel: 01222 221423.
Fax: 01222 225295 (both unchanged).

Port Met. Officer NW England

On 30 April the Port Met. Officer for NW England changed room number and post code details to:

Room 313,
Royal Liver Building,
Liverpool L3 1JH.
Telephone and facsimile numbers remain unchanged.

Fleet Lists

UNITED KINGDOM

As for 1 March 1995

1. The following is a list of ships recruited to the United Kingdom Voluntary Observing Fleet.
2. The names of the Masters, Observing Officers and Radio Officers are as shown in the latest meteorological logbooks to be received at the Marine Division in Bracknell, up to the date shown above. The date of the latest receipt is given in the second column. Masters and Officers are invited to notify the Editor of any errors or omissions found in the lists.
 - * Indicates a recently recruited ship from which a logbook has not yet been received.
 - † Indicates a ship from which no logbook has been received during the last 12 months, and therefore for which it is impractical to show the Master's and Officers' names.
3. All logs received from ships will be acknowledged by the Marine Superintendent of the Met. Office.
4. Port Met. Officers will personally call on Masters and Observing Officers as opportunity offers, and on receipt of requests from ships.
5. Masters and operators of ships are particularly requested to advise the Marine Superintendent or a Port Met. Officer with prior notice of any changes of service or ownership which may necessitate the withdrawal from the ship of equipment on loan from the Met. Office.

Selected and Supplementary Ships

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
Abbey	17.11.94	J.O. Jubb	D.G. Lyon, J.N. Balkwill, S. Moore	—	Furness Withy (Shipping) Ltd
Aberthaw Fisher	14.3.94	D.A. MacLean	B.A. Hoyle, M. Nicholson, H. Cassidy	—	James Fisher & Sons plc
African Ruby	*	—	—	—	MOL Tankship Management Ltd
Africa Star	17.11.94	M.J. McGilvray	A.P. Agabao, E.P. Porras, H.J. Jalos	E.C. De Guzman	Blue Star Refeers
Al Awdah	†	—	—	—	Kuwait Oil Tanker Co.
Al Funtas	12.1.95	P.J. Ward	N. Kapur, A.A. Elgharabawy	—	Kuwait Oil Tanker Co.
Al Rayyan	†	—	—	—	United Arab Shipping Co. (S.A.G.)
Al Samidoun	22.2.95	R.M. Linley-Munro	S.K.Z. Moosavian, M. Haq, E.T. Al Hazaweh Mond	—	Kuwait Oil Tanker Co.
Al Shuhadaa	12.1.95	A.R. Wilkinson	J.W. Farmer, S.N. Haider, G.L. Al Dhafeeri	M.J. Alveta	Kuwait Oil Tanker Co.
Al Tahreer	9.2.95	G.M. Abbott	A.G. Pinto, M. Haider, M.H.A. Atta	B. Nalam	Kuwait Oil Tanker Co.
Alam Selarus	*	—	—	—	Kuwait Oil Tanker Co.
Alcides	†	—	—	—	Pacific Carriers Pte Ltd
Aldrington	17.11.94	P. Johnson	R. Duff, P.M. Frost, K. Doyle	—	Mobil Shipping Co. Ltd
Alexis	†	—	—	—	Stephenson Clarke Shipping Ltd
Alliance	30.11.94	J.A. Holst	S.M. Hamer, C. Fraser	—	Thorstone Ship Management Ltd
Almeda Star	6.1.95	L.M. Colam	J.V. Sheridan, R.P. Cambil, R.R. Elissorio	J.J. Stone	Denholm Ship Management (U.K.) Ltd.
				E.L. Pardillo	Columbia Shipmanagement Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>British Ranger</i>	23.8.94	K.E. Peacock	A. Brown, E.M. Morrice, T. Blyth	J. Ferson	BP Shipping Ltd
<i>British Reliance</i>	31.1.95	C.R. Shoobraid	S. Ferguson, B. McMahon, K. Dann	M. Saunders	BP Shipping Ltd
<i>British Resolution</i>	9.2.95	J.A. Buchanan	R. Holt, S.J. Terry, P. Garratt	D.W. Bone	BP Shipping Ltd
<i>British Resource</i>	9.2.95	M.R. Mansbridge	M.J. Walker, J.G. Hamilton	D.P. Riddle	BP Shipping Ltd
<i>British Skill</i>	31.1.95	G.M. Hallett	T.T. Laito, G. Wahmond	—	BP Shipping Ltd
<i>British Spirit</i>	30.11.94	M. Pocklington	S.D. Wade, C.W.M. Stewart, P.N.W. Collings	C.M. Taylor	BP Shipping Ltd
<i>British Steel</i>	9.2.95	R.A. Whistler	P.N. Newman, F. O'Driscoll, O. Power	S. Gissing	Furness Withy (Shipping) Ltd
<i>British Success</i>	6.1.95	J. Smith	P.M. Thompson, G. Butler	J.A. Brogan	BP Shipping Ltd
<i>British Tamar</i>	4.7.94	J.M. Ronald	R.J. Spearing, P.M. Thompson	P.D. Hyde	BP Shipping Ltd
<i>Brodspas Sun</i>	*	—	—	—	Coastguard Stornoway
<i>Broompark</i>	30.11.94	C. Biswal	Syed Saad Rizvi, J. Banerjee	Z.P. Fernandes	Denholm (I.O.M.) Ltd
<i>Brussel</i>	9.2.95	J-P. Hasselle	J. Moons, D. Hepp, F. Willemen	H. Cruz	ABC Container Line N.V.
<i>Buenaventura</i>	†	—	—	—	Jardine Ship Management (U.K.) Ltd
<i>Buffalo</i>	31.1.95	J.E. Boswell	S.C. Formstone, A. Hamilton, J. Murray	—	POETS Fleet Management Ltd
<i>CAM Defender</i>	†	—	—	—	CAM Shipping Ltd
<i>CAM Supporter</i>	1.7.94	R. Monkman	S.C. Ucraft	—	CAM Shipping Ltd
<i>CGM Magellan</i>	13.2.95	T.R. Barton	S. Gissing, J.N. Balkwill, S. Gallacher	P. Hyde	Furness Withy (Shipping) Ltd
<i>CMB Ebony</i>	†	—	—	—	Aseco (Antwerp) Ltd
<i>CMBT Emerald</i>	†	—	—	—	V. Ships (U.K.) Ltd
<i>C.S. Alert</i>	26.7.94	I. Acland	S. Hayes, N. Smith, J. Sanderson	B. Pryn	Cable & Wireless Marine (Southampton) Ltd
<i>C.S. Iris</i>	†	—	—	—	Cable & Wireless Marine (Southampton) Ltd
<i>C.S. Monarch</i>	†	—	—	—	Cable & Wireless Marine (Southampton) Ltd
<i>C.S. Nexus</i>	6.1.95	T.D. Faithful	I.R. Lewis, D. Billington, W.A. Roger	—	Coe Metcalf Shipping Ltd
<i>C.S. Sovereign</i>	†	—	—	—	Cable & Wireless Marine (Southampton) Ltd
<i>CSAV Los Angeles</i>	†	—	—	—	Jardine Ship Management (U.K.) Ltd
<i>Cableman</i>	†	—	—	—	P&O Tankships Ltd
<i>Cable Venture</i>	1.7.94	F. Kitt	V.J. Walters, A.M. Nash, P.A. Adams	D.R. Woods	Cable & Wireless (Marine) Ltd
<i>Cable Negro</i>	†	—	—	—	MOL Tankship Ltd
<i>Caledonian Isles</i>	*	—	—	—	Caledonian MacBryne Ltd
<i>Canberra</i>	9.2.95	D. Lumb	G.F. Pears, P.T. Johnston, C.M. Bourne	N. Whyte	P&O Cruises Ltd
<i>CanMar Conquest</i>	8.3.94	K.N. Debo	S. Dhowan, H.P. Lobo, A. Rodrigues	S.S. Mendes	Thomas Carr & Sons (Genoa)
<i>CanMar Europe</i>	6.10.94	K. Anderson	L. Fernandes, S. Venkateswaran	K. Murleedhar	OOCL (U.K.) Ltd
<i>CanMar Glory</i>	†	—	—	—	Thomas Carr & Sons (Genoa)
<i>CanMar Triumph</i>	6.1.95	J.M. Mistry	S. Bharti, S. Sharma, U.T. Lwin	V. Khullar	Canada Maritime Agencies Ltd
<i>CanMar Victory</i>	28.3.94	P. Moore	J.S. Parker, R.M. Santero, S.M.R. Santy	J.M. Tanna	Canada Maritime Agencies Ltd
<i>Canterbury Star</i>	23.5.94	M.J. Power	J. Carriativo, M. Tuballa, J. Bayoneta	E. Espera	Blue Star Ship Management Ltd
<i>Cape Horn</i>	4.7.94	R. Robison	J. Paiwas	E. Salazar	MOL Tankship Management Ltd
<i>Cardigan Bay</i>	22.11.94	D.W. Lax	M. Barraclough, M. Stewart, R. K. Jones	C.K. Thormalley	P&O Containers Ltd
<i>Cartagena</i>	†	—	—	—	Dole Fresh Fruit International Ltd

<i>Cast Elk</i>	9.2.95	Yeo Teck Hing William	Belal Ahmed, U Aung Htut Kyaw, U Tun Nyunt	U Tun Zaw	OW Ship Mgmt Pte Ltd
<i>Celtic Challenger</i>	23.12.94	V.F. Moorman	A.P. MacLean, L.D. Pettitt, M. Horridge	—	OW Ship Mgmt Pte Ltd
<i>Cervantes</i>	31.1.95	R. Bourne	R. Atkinson, D. Moden, P.T. Oldfield	—	C.M. Willie & Co. (Shipping) Ltd
<i>Challenger</i>	13.12.94	C.C. Baines	K.W. Mulholland, C. Taylor, D.J. Sweet	—	NERC Research Vessel Services
<i>Charles Darwin</i>	18.10.94	R. Bourne	P. Newton, C.E. Holmes, J.C. Holmes	J.G. Baker	NERC Research Vessel Services
<i>Cheshire</i>	30.11.94	C.H. Marsh	C.J. Doodson, S.J. Palmer, A. Davidson	—	Bibby Line Ltd
<i>Chilham Castle</i>	+	—	—	—	Kuwait Oil Tanker Co.
<i>Chiquita Baracca</i>	17.11.94	C. Bunt	F. Ramos, B. Dongon, A.T. Mercado	M. Ferjoles	Logbridge Ltd
<i>Chiquita Baru</i>	23.11.94	B.F. Hawkins	C.G. Lontoc, R.D. Husain, J.S. Tamayo	A.C. Beltran	Logbridge Ltd
<i>Chiquita Belgie</i>	31.1.95	R.N. Cumbers	M.D. Nash, I. Gazmin, B. Diana	A.C. Sorilla	Logbridge Ltd
<i>Chiquita Bocas</i>	16.2.95	P.G. Pinkerton	F. Ramos, J.N. Cagampan, M.J. Leyesa	Lp.P. Tipo	Logbridge Ltd
<i>Chiquita Bremen</i>	+	—	—	—	Union Kuhl-Schiffahrt GmbH
<i>Chiquita Brenda</i>	18.10.94	N.P. Coung	P.T. Clegg, J. Bautista, R.R. Lina	—	Logbridge Ltd
<i>Chiquita Burica</i>	17.11.94	M.R. Lovibond	E.S. Deoma, J.M. Bermudo, R.V. Inserto	S.M. Bernal	Logbridge Ltd
<i>Chiquita Deutschland</i>	18.10.94	R.N. Cumbers	G. Walker, N. Tuvida, A. Egos	M. Fabreiro	Logbridge Ltd
<i>Chiquita Elke</i>	9.11.94	M.L. Kinneer	P.J. Gallic, A.Y. Villarubia	—	Logbridge Ltd
<i>Chiquita Frances</i>	22.11.94	M.A. Buil	P.J. Brown, N.B. Acedo, R. Elosorio	E.S. Cagasán	Logbridge Ltd
<i>Chiquita Italia</i>	30.11.94	J.K. Wilkinson	B.J. Bartlett, N.I. Umbania, D.P. Dospueblós	M. Esguerra	Logbridge Ltd
<i>Chiquita Jean</i>	4.10.94	C.I. Kitchen	E.L. Sumbillo	—	Logbridge Ltd
<i>Chiquita Joy</i>	31.1.95	E.M. Meare	M.G. Biba	—	Logbridge Ltd
<i>Chiquita Nederland</i>	22.11.94	A. Ruszczynski	P. Ruszczynski, R. Cayabyab, H. Descuaton	F. Balondo	Logbridge Ltd
<i>Chiquita Rostovk</i>	6.1.95	G. Weaver	E.C. Lyon, E. Francia, L.S. Delfin	—	Logbridge Ltd
<i>Chiquita Scandinavia</i>	6.11.94	N. Flinerman	J.F. Badham, N.B. Acedo, B.S. Gret	R.P. Tipo	Union Kuhl-Schiffahrt GmbH
<i>Chiquita Schweiz</i>	23.8.94	W.J. Harwood	N.D. Peters, R.P. Macuto, R.R. Dabuol	J.P. Lortion	Logbridge Ltd
<i>Cirolana</i>	16.2.95	B.A. Chapman	—	—	MAFF Fisheries Laboratory
<i>City of Barcelona</i>	26.1.95	S.J. Henney	J.C. Hague, B.R.G. Tusker, J.C. Barton	—	Denholm Ship Management (U.K.) Ltd
<i>City of Durban</i>	16.2.95	R.M. Herring	B.P. Murphy, J.M. Smith, A.S. Dean	—	P&O Containers Ltd
<i>City of Sunderland</i>	10.5.94	W. Bartlett	P.S. Sinclair, B.R.G. Tasker, E.L. Dzameh	—	Denholm Ship Management (U.K.) Ltd
<i>Claymore</i>	+	—	—	—	Caledonian MacBrayne Ltd
<i>Clydebank</i>	10.10.94	P.G.H. Stapleton	D. Gora, J. Dziadecki, R. Morton	M. Brzozowak	Andrew Weir Shipping Ltd
<i>Columbus</i>	+	—	—	—	V. Ships (U.S.A.) Inc.
<i>Columbus Valparaiso</i>	+	—	—	—	Jardine Ship Management (U.K.) Ltd
<i>Condor Arrow</i>	16.2.95	Karna Deo Mandel	A.L. Mukhopadhyay	—	United Ship Management Ltd
<i>Copenhagen</i>	22.11.94	D. W. Bunyan	C.F. Faulcun, C. Bryson, N. Ceniza	—	Marine Management Services Ltd
<i>Cordella</i>	24.8.94	J.B. Nichols	G. Strachan, A.T. Buchan, G. McClean	P.J. Appleyard	Marr Vessel Management Ltd
<i>Cormorant Arrow</i>	27.4.94	I. Kucic	E.P. Crucillo	G.R. Barbosa	K.G. Jebsen Skipsrederi A/S
<i>Cornelis Veroline</i>	23.5.94	R. Maquestiau	S. Laloux, Y. Schnabel, Y. Vlaeminck	A. Renard	ABC Containerline N.V.
<i>Corystes</i>	16.2.95	B.A. Chapman	—	—	MAFF Fisheries Laboratory
<i>Coitinga</i>	+	—	—	—	F.T. Everard & Sons Ltd
<i>Cotswold</i>	6.1.95	L.J. Hesketh	J.M. Millroy, S. Panwar, S. Singh	J.K. Bhadra	P&O Bulk Shipping Ltd
<i>Cottica</i>	22.11.94	D.J. Robinson	S. Kumar, W.C. Eleria, J. Clemente	—	Marine Management Services Ltd
<i>Dallington</i>	21.3.94	—	—	—	DFDS Ltd
<i>Dana Anglia</i>	+	—	—	—	Stephenson Clarke Shipping Ltd
<i>DeLoris</i>	+	—	—	—	ABC Containerline N.V.
<i>Discovery (R.R.S.)</i>	7.1.95	G. Long	P.A. Burridge, J.C. Holmes, R.A. Warner	B. Donaldson	NERC Research Vessel Services

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Discovery (C.S.)</i>	23.5.94	P. Verhaegen	G.R. Jackson, R.J.C. Neale, J.E. Parnaby	G. Birchen	Cable & Wireless Marine (Southampton) Ltd
<i>Discovery Bay</i>	23.11.94	T.G. Whitaker	S.J. Heggie, R.D. Spooner	R.B. Redhead	P&O Containers Ltd
<i>Donnington</i>	18.10.94	C. Grahame	L.T. Cossiter, R.K. Srivastava, S.F. Ahmed	F.R. Patel	Stephenson Clarke Shipping Ltd
<i>Duhallow</i>	31.10.94	W.J. Scarisbrick	S.J. Heggie, M.B. Wdowikowski, G.T. Davies	—	P&O Bulk Shipping Ltd
<i>Durrington</i>	20.9.94	E. Gaffney	E.T. Bibby, M.J. Catt, C.L. Rochon	—	Stephenson Clarke Shipping Ltd
<i>Eagle</i>	23.11.94	P.D. Kelly	—	—	Mobil Shipping Co. Ltd
<i>Eagle Arrow</i>*	—	—	—	—	Geabulk (U.K.) Ltd
<i>Eastern Bridge</i>	9.2.95	A. Crofts	S.J. Windle, T.M. Ryan, J. Parkin	—	Ropner Shipping Services Ltd
<i>Ebalina</i>	23.12.94	R.N. Richards	A.J.M. Leach, R.D.S. Arthur, D. Geddes	R. Haviland	Shell Marine Personnel (I.O.M.) Ltd
<i>Eburna</i>	14.3.94	D.J. Conway	M.C. Ridger, G.D. Nicholls, J.R. Wilson	A. Stewart	Shell Marine Personnel (I.O.M.) Ltd
<i>Echoman</i>	23.5.94	K. MacDonald	N.A. Lovesy	—	P&O Tankships Ltd
<i>Edinburgh Fruid</i>	24.1.95	R.J. Smeaton	A. Kumar, R. Krishnan, V. Prasad	R.J. Seguiera	Denholm Ship Management (U.K.) Ltd
<i>Edinburgh Maersk</i>	4.10.94	K. Sehested	A. Samuelsten, S.E. Nielsen, M. Simonsen	D. Cooper	Dansk S.
<i>Edinburgh Satsuma</i>	7.9.94	R.J. Smeaton	M. Rahman, A.R. Dias, R. Dubey	B.J. Jhala	Denholm Ship Management (U.K.) Ltd
<i>Ek-River</i>	†	—	—	—	Ekstank AB
<i>Elk</i>	6.1.95	B. Luke	K.J. Wilson, J.A. Robbie, R.W. Maadden	C. Keeble	POETS Fleet Management Ltd
<i>Ellen Hudig</i>	24.1.95	B. Hoornaert	M. Walgraeve, Y. Schabel, B. Van Rossen	F. Limbaga	ABC Containerline N.V.
<i>Encounter Bay</i>	20.9.94	A.M. Tweedie	P.R. Kaye, M.N. Messenger	C. Hardie	P&O Containers Ltd
<i>Endeavor</i>	31.1.95	R.W. Purser	W.T. Lawrie, D. Richardson, N.G. Young	A.P. Daff	Souter Shipping Ltd
<i>English Star</i>	30.11.94	N.J. Barr	R.J. Camara, D.A. Pablo, B.B. Garing	D.L. Balita	Blue Star Ship Management Ltd
<i>Enterprise</i>	1.7.94	R. Carr	J. Barrett, M. Monk, G.M. Taylor	R. Spencer	Souter Shipping Ltd
<i>Equinox</i>	6.1.95	P.A. Helm	J. Barrett, K.A. Brown, W.J.A. Gilbert	A. Campbell	Souter Shipping Ltd
<i>Eredine</i>	30.11.94	E.J. Calton	P.F. Stolberger, R.C. Stewart, C.W. Chung	R.P. Bradsell	The China Navigation Co. Ltd
<i>Eridge</i>	6.10.94	M.A. Hill	W. Howell, R. Sethi, H. Rameshwar	M.V. Miranda	P&O Bulk Shipping Ltd
<i>Erradale</i>	6.1.95	P.A. Frewer	C.A. Frappell, J.M. Bulusan, N.A. Gozano	—	The China Navigation Co. Ltd
<i>Erville</i>	†	—	—	—	Shell Marine Personnel (I.O.M.) Ltd
<i>Explanade</i>	17.11.94	R. Carr	P.J. Curran, J.M. Towler, M.A. Sloan	J. Shefferd	Souter Shipping Ltd
<i>Euplecta</i>	†	—	—	—	Shell Marine Personnel (I.O.M.) Ltd
<i>Euro Merchant</i>	9.11.94	J. Wanczyk	J. Jezewski, W. Przekwas	—	C.M. Willie & Co. (Shipping) Ltd
<i>Euro Trader</i>	30.11.94	J. Alwin	S. Kowalski, Jablonski	—	C.M. Willie & Co. (Shipping) Ltd
<i>European Clearway</i>	*	—	—	—	POETS Fleet Management Ltd
<i>European Shearwater</i>	27.4.94	G. Bates	R. Legg, B. Miller, J. Goddard	P. Austen	James Fisher & Sons Plc
<i>European Trader</i>	1.7.94	R.J. Ross	M. Burford, P.I. Hillman, J.E. Hutchins	—	P&O European Ferries (Felixstowe) Ltd
<i>Exelstar</i>	18.10.94	P.C. Harris	S.K. Nixon, P.W. Holliday, M.J. Ellison	I.R. Williams	Souter Shipping Ltd
<i>Exemplar</i>	5.7.94	R. Cordon	S.K. Nixon, K.A. Brown, W.J.A. Gilbert	W.T. Heaslip	Souter Shipping Ltd
<i>Eye of the Wind</i>	1.7.94	A.R. Timbs	G. Wilson, D. Gold	—	Credition Country Courier
<i>Fairwind</i>	*	—	—	—	C.M. Willie & Co. (Shipping) Ltd
<i>Fuki III</i>	†	—	—	—	Sea Falcon Fishing Co.
<i>Falcon Arrow</i>	31.10.94	T.C. O'Callaghan	H.J. Janeo, R.A. Matquez, H.L. Cabe	M.P. Esquivel	Jardine Ship Management (U.K.) Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Hyundai Vancouver</i>	28.3.94	P.D. Miquitta	P. Kumar, A.S.J. Mhatye, J.T. Pereira	S. Bose	Wallem Ship Management (H.K.) Ltd
<i>Ibn Abdoun</i>	†	—	—	—	United Arab Shipping Co. (S.A.G.)
<i>Ibn Rushd</i>	†	—	—	—	United Arab Shipping Co. (S.A.G.)
<i>Iolair</i>	30.11.94	P. Giffin	R. Bounds, M. Davies, N. Alwood	R. Lodge	BP Exploration (U.K.)
<i>Ironbridge</i>	30.11.94	I.B. Middleton	B.P. Keegan, J.R. Hollamby, D.A. Grennan	—	Furness Withy (Shipping) Ltd
<i>Island Princess</i>	*	—	—	—	P&O Cruises Ltd
<i>Isle of Arran</i>	12.1.95	N.W. Martin	C.D. McCurdy, S. Hamill, N.W. Martin	—	Caledonian MacBrayne Ltd
<i>Isle of Mull</i>	13.5.94	K. Gunn	K. Elder, S. Ross, I. Scarr	—	Caledonian MacBrayne Ltd
<i>Isocardia</i>	17.8.94	E. Wilkinson	R.A. Eames, C.M. Renton, R.A. Burnett	—	Shell Marine Personnel (I.O.M.) Ltd
<i>Isameria</i>	11.4.94	T.P. Doherty	M. Stickley, D. Galloway, K. Cowin	R. Lucas	Shell Marine Personnel (I.O.M.) Ltd
<i>Ivbank</i>	9.2.95	P.R.N. Maynard	J. Warren, J. Kukiello, A. Fraszczak	M. Jarecki	Andrew Weir Shipping Ltd
<i>Jahre Prospect</i>	26.7.94	S.R. Dang	—, Ahmad, A. Akbar	C. D'Souza	Wallem Ship Management (H.K.) Ltd
<i>Jahre Spirit</i>	†	—	—	—	Wallem Ship Management (H.K.) Ltd
<i>Jahre Spray</i>	†	—	—	—	Wallem Ship Management (H.K.) Ltd
<i>James Clark Ross</i>	20.9.94	C.R. Elliott	J.B. Marshall, S.I. Wallace, A. Gatti	M.E.P. Gloisten	British Antarctic Survey
<i>Jarrikaba</i>	30.11.94	B.C. Preece	J. Charlton, R. Decretales, E. Enspe	A.N. Grant	Marine Management Services Ltd
<i>Jervis Bay</i>	12.1.95	J.N. Kelleher	K. Worthington, H.A.K.F. Ajam, K.F. MacDonald	—	P&O Containers Ltd
<i>Jevington</i>	†	—	—	—	Stephenson Clarke Shipping Ltd
<i>John Bluhm</i>	†	—	—	—	Wolf-Ruediger Bluhm
<i>Jostelle</i>	1.7.94	J.M. Bullard	D. Richardson, P.W. Bennett, C. MacSweeney	J. O'Driscoll	Souter Shipping Ltd
<i>Kahe Sif</i>	†	—	—	—	Jeppesen Heaton Ltd
<i>Kazimah</i>	†	—	—	—	Kuwait Oil Tanker Co.
<i>Kedah</i>	8.8.94	K.J. Fear	A. Ahmed, P. Gerard, K. Ramadan	R. Edralin	Kapal Management (PTE) Ltd
<i>Kevin Fortune</i>	†	—	—	—	Acomarit (U.K.) Ltd
<i>Keia Lagoon</i>	†	—	—	—	Black Star Line Ltd
<i>Kiukiang Career</i>	†	—	—	—	Kapal Management (PTE) Ltd
<i>Kiwi Arrow</i>	†	—	—	—	Jardine Ship Management (U.K.) Ltd
<i>Kommandor Subsea</i>	†	—	—	—	Hayes Ships Ltd
<i>Kowloon Bay</i>	30.11.94	I. Collister.....	S. Fish, N.A. Voss	G. Kelly	P&O Containers Ltd
<i>Kukawa</i>	6.1.95	B.N. Jones	J.R. Acquah, E.A. Kodjoe	M.M. Cavallida	Acomarit (U.K.) Ltd
<i>Kumasi</i>	31.1.95	W.E.L. Godsell	R.J. Smith, E. Boye, S.E. Oduro	V. Ariegono	Acomarit (U.K.) Ltd
<i>Lackeny</i>	9.2.95	K. Milburn	G. Mair, I.T. Davies, J. Parkin	C.J. Delahunty	Ropner Shipping Services Ltd
<i>Lampas</i>	22.12.94	R. Firth	J.H. Ratcliffe, R.D.S. Arthur, E. Parrott	—	Shell Marine Personnel (I.O.M.) Ltd
<i>Lantau Trader</i>	30.8.94	A. Dhurandhar	E.M. Pereira, C.B. Lopes, A.J. Simoes	V. Meghani	T.& J. Harrison Ltd
<i>Leonia</i>	4.10.94	A.F. Devanney	K. Mahmood, A.T. Cross, S.M. Farid Masud	—	Shell Marine Personnel (I.O.M.) Ltd
<i>Lepeta</i>	23.1.95	M. Geddes	I. Kendall, D.O. Evans, A.N. Ashraf	—	Shell Marine Personnel (I.O.M.) Ltd
<i>Lerma</i>	1.7.94	R.W. Davies	D.A.R. Chavez, I.A. Valquez	V. Cullen	Cardiff Ship Management & Services Ltd
<i>Lima</i>	23.12.94	J.P. Briand	S.P. Thompson, R.A. Lane	D.J. Atkinson	Shell Marine Personnel (I.O.M.) Ltd
<i>Limnea</i>	31.10.94	B.J. Mitchell	P. F. McNeil, C.G. Smith, M.O. Khan	A. Fielding	Shell Marine Personnel (I.O.M.) Ltd

<i>Lincolnshire</i>		A.G. Smith	G. Watson, I.D. Handford, A.B. Fleming	G.J. Simpsons	Bibby Line Ltd
<i>Lincoln Universal</i>	9.2.95	D.P. Neaves	M.L. Quezon, S.G. Pedregosa, N.C. Acot	B.A. Carmelita	London Ship Managers Ltd
<i>Lioness</i>	16.5.94	—	—	—	Wallem Ship Management (H.K.) Ltd
<i>Liverpool Bay</i>	+	B. Cushman	I.S. Norris, D.L. Dodsworth, S. Gallacher	R.C. Masters	P&O Containers Ltd
<i>London Enterprise</i>	8.8.94	J.W.W.Peters	I.V. Hughes, B.St.J. Thomas, T.J. Hamer	P.M. Miller	London & Overseas Freighters (U.K.) Ltd
<i>London Spirit</i>	+	—	—	—	London & Overseas Freighters (U.K.) Ltd
<i>London Victory</i>	22.12.94	R.E. Mayman	R. Fullager, E.P. Mullan, G. Gellatly	D. Hicklin	London & Overseas Freighters (U.K.) Ltd
<i>Lord Nelson</i>	20.4.94	J.P.H. Fisher	J.P. Paling, G.R. Mills, J.W. Atherton	—	Jubilee Sailing Trust Ltd
<i>Lord of the Isles</i>	8.8.94	C.W. Billimore	C.S. MacLeod, D. Malcolm, C.D. McCurdy	—	Caledonian MacBrayne Ltd
<i>Lough Foyle</i>	+	—	—	—	Heyn Engineering & Shipping Service
<i>Lucky Bulker</i>	6.12.94	D.I. Pagarkar	N.K. Sarkar, S. Biswas	R. Raghavan	Valles Steamship Co. Ltd
<i>Maersk Gannet</i>	31.1.95	J.W. Blake	F.P. Wight, P. Wendleken, J. Anderson	—	The Maersk Co. (I.O.M.) Ltd
<i>Magnolia</i>	10.5.94	J.A. Horgan	A. Keep, P. Lawson-Earley, W.D. Russell	—	Mobil Shipping Co. Ltd
<i>Mairangi Bay</i>	18.10.94	A.W. Ellis	A. Azam, S.C. Lugg, D.J. Buckley	M.R.T. Hannan	P&O Containers Ltd
<i>Malcolm Miller</i>	*	—	—	—	Sail Training Association
<i>Mark-C</i>	+	—	—	—	Carisbrooke Shipping Ltd
<i>Martha II</i>	6.12.94	R. Maquestiau	J.P. Van Hamme, G. Somers, J. Rimbart	Peniello Ramon	ABC Containerline N.V.
<i>Matco Clyde</i>	21.9.94	J.M. Bell	S.R. Ainscow, C.W. Blacker, J. Steen	—	Mobil Shipping Co. Ltd
<i>Matco Thames</i>	9.2.95	J. Birchenough	C.W. Blacker, D. Middlemass, C.G. Fowler	—	Mobil Shipping Co. Ltd
<i>Med Barcelona</i>	+	—	—	—	Antwerp Technical Services N.V.
<i>Med Singapore</i>	+	—	—	—	Antwerp Technical Services N.V.
<i>Merchant Patriot</i>	+	—	—	—	V. Ships (U.K.) Ltd
<i>Merchant Premier</i>	17.8.94	C.W. Harvey	N.G. Wadia, H. Singh, M.A. Azhari	M.J. Mehta	V. Ships (U.K.) Ltd
<i>Merchant Principal</i>	+	—	—	—	V. Ships (U.K.) Ltd
<i>Mercury</i>	*	—	—	—	Cable & Wireless (Marine) Ltd
<i>Moraybank</i>	30.11.94	A. Haynes	J. Kolacinski	M. Jarecki	Andrew Weir Shipping Ltd
<i>Moreton Bay</i>	6.1.95	G.J.H. Peaston	R.M. Eaton, J.G. Swindlehurst, J.C. Bennett	S.C. Parsad	P&O Containers Ltd
<i>Mountain Cloud</i>	*	—	—	—	Norbulk Shipping (U.K.) Ltd
<i>Nand Nidhi</i>	*	—	—	—	Essar Sisco Ship Mgmt Co. Ltd
<i>Nanda Arrow</i>	+	—	—	—	Jardine Ship Management (U.K.) Ltd
<i>Neptune Jasper</i>	18.10.94	B.P. Kumar	—	—	Neptune Ship Mgmt Services (PTE) Ltd
<i>New Generation</i>	+	—	—	—	James Fisher & Sons plc
<i>Newport Bay</i>	31.1.95	A.C. McCulloch	A.N. Murray, M. Langford, M.C. Wise	—	P&O Containers Ltd
<i>Nirja</i>	+	—	—	—	Wallem Ship Management (H.K.) Ltd
<i>Nivaga II</i>	+	—	—	—	Government of Tuvalu
<i>Noli-we</i>	+	—	—	—	Antwerp Technical Services N.V.
<i>Nord Jahre President</i>	+	—	—	—	Wallem Ship Management (H.K.) Ltd
<i>Norma</i>	23.12.94	B.A. Hall	M.C.J. Jewell, S. Whalley, G.W. Maitland	—	Scottish Office Agr. & Fisheries Dept.
<i>Norrsta</i>	+	D.J. Walker	F. Casson, S. Thompson, P.J. Wade	—	Shell Marine Personnel (I.O.M.) Ltd
<i>Norsea</i>	22.2.95	—	—	—	North Sea Ferries Ltd
<i>Northella</i>	+	—	—	—	Marr Vessel Management Ltd
<i>Northern Desire</i>	9.2.95	P. Taylor	A. Robinson, S. Brown, G.C. Grey	A. Gamblin	Marr Vessel Management Ltd
<i>Northern Horizon</i>	18.10.94	P. Taylor	P. Cannon, G. Renardson, L. Hadfield	—	Marr Vessel Management Ltd
<i>Northern Prince</i>	6.1.95	A.I. MacFeate	A. Newinski	—	Marr Vessel Management Ltd
<i>Northia</i>	+	—	—	—	Shell Marine Personnel (I.O.M.) Ltd
<i>Oukby</i>	17.11.94	A. Crofts	S. Susanthan, D.A. Mendis, T.D.H.V. De Alwis	—	Ropner Shipping Services Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Ocean Goose</i>	†	D.A. Church	—	—	Captain D.A. Church
<i>Olivebank</i>	†	—	—	—	Andrew Weir Shipping Ltd
<i>Onda</i>	†	—	—	—	Wallem Ship Management (H.K.) Ltd
<i>OOCL Assurance</i>	27.4.94	D.P. Llewellyn	E. Godolphin, F. McNulty, W.J. Coxon	T.S.G. Jarra	OOCL (U.K.) Ltd
<i>OOCL Bravery</i>	9.2.95	J.L. Mitchell	W.J. Coxon, E. Godolphin, A.C. Baxter	T.S. Jarra	OOCL (U.K.) Ltd
<i>Orient Star</i>	23.12.94	M.M. Sharma	A.Z.M.K. Islam	N. Kulkarni	Orient Ship Management Ltd
<i>Oriental Bay</i>	31.10.94	A.P. Talbot	L.M. Percival, M.K. Hands, L.J. Cheesbrough	—	P&O Containers Ltd
<i>Oriental Venture</i>	31.1.95	R.A.W. Jarrett	L.N. Paul, E.M. Morrice, D.P. Wilts	M. Glendenning	BP Shipping Ltd
<i>Orion Reefer</i>	17.8.94	S. Mitra	F.R. D'Souza, G.C. Sarile, P.K. Krishnadas	A. Maqsood	Wallem Ship Management (H.K.) Ltd
<i>Ormond</i>	12.1.95	G. Nicholls	A.M.P. Henderson, J. Dhindsa, V.S.S. Fernandes	B. Ravindrana	P&O Bulk Shipping Ltd
<i>Osaka Bay</i>	9.2.95	P.D. Davies	W.J. Stoker, H.M. McClenahan, G.H. Smith	J.J. Cooney	P&O Containers Ltd
<i>Pacific Crane</i>	†	—	—	—	James Fisher & Sons plc
<i>Pacific Guardian</i>	†	—	—	—	Cable & Wireless (Marine) Ltd
<i>Pacific Horizon</i>	†	—	—	—	Marr Vessel Management Ltd
<i>Pacific Pintail</i>	31.1.95	A.G. Lacey	J.B. Appleby, T.C.R. Riley, D.R. Young	—	James Fisher & Sons plc
<i>Pacific Princess</i>	†	—	—	—	P&O Cruises Ltd
<i>Pacific Sandpiper</i>	1.7.94	M.J. Stares	R.M. Watt, B. Elston, T. Bannister	A.R. Watt	James Fisher & Sons plc
<i>Pacific Swan</i>	†	—	—	—	James Fisher & Sons plc
<i>Pacific Teal</i>	9.8.94	J.M. Miller	N.S. Patterson, T.I. Dixon, P.R.S. Cutler	N.H. Read	James Fisher & Sons plc
<i>Pacific Universal</i>	17.8.94	R. Hutchinson	E. Jusay	S.N. Gurusinghe	London Ship Managers Ltd
<i>Pacific Venture</i>	†	—	—	—	MOL Tankship Management Ltd
<i>Pacific Wave</i>	†	—	—	—	MOL Tankship Management Ltd
<i>Palliser Bay</i>	30.11.94	D. Tracey	S.G. Miller, M.E. Harrington, J.S. Orr	D.W. Ray	P&O Containers Ltd
<i>Pelican Arrow</i>	17.11.94	B. Jayanand	A.P.S. Shisodia, R. Tyagi, P. Mehrotra	V.P. Parab	United Ship Management Ltd
<i>Peninsular Bay</i>	9.2.95	J.W. Welch	A.W. Lewington, A. Murray, C. Henderson	—	P&O Containers Ltd
<i>Petro Aberdeen</i>	30.11.94	G.T. Rymter	K.J. Tanner, S.J. Reed, A.J. Adams	—	Petroleum Shipping Ltd
<i>Petro Fife</i>	19.4.94	R. Noakes	M.K. Elson, A.J. Biukerdike, K.H. Watts	—	Petroleum Shipping Ltd
<i>Petro Milford Haven</i>	†	—	—	—	Petroleum Shipping Ltd
<i>Petro Tyne</i>	†	—	—	—	Petroleum Shipping Ltd
<i>Pholas</i>	17.11.94	P.M. Crowe	D. Clavering, A.W. Jones, J.P. Vine	D.A.C. MacRae	Coe Metcalf Shipping Ltd
<i>Pisces Pioneer</i>	†	—	—	—	T. & J. Harrison Ltd
<i>Pride of Bilbao</i>	30.8.94	P.St.J. Jarvis	J. Burrows, G. Starkey, S. Telford	—	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Cherbourg</i>	20.9.94	C.E. Walford	J. Hutchins, R. Hallett, N.S. Beckett	A. Patterson	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Hampshire</i>	31.10.94	A.F. Bonehill	N.J. Carter, J.M. Webster, R. Dickson	A. Patterson	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Le Havre</i>	*	—	—	—	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Portsmouth</i>	*	—	—	—	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Suffolk</i>	31.1.95	D. Kirkwood	A.M. Smith, P.G. Bowett, R. Hall	—	P&O European Ferries (Portsmouth) Ltd
<i>Providence Bay</i>	9.2.95	R. Kenchington	D. Hinson, M. Hands, E.M. Esinduy	—	P&O European Ferries (Felixstowe) Ltd
<i>Puerto Cortes</i>	12.1.95	S.A. Francis	M.I.J. Carroll, S.J. Rodrigues, R.A. Pliar	A. Scarrot	P&O Containers Ltd
				A.C. Dudley	Pacific Ship Mgmt (Singapore) Pte Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
Selectivity.....	21.7.94	T.L. Jeffery	G.C. Harwood	—	F.T. Everard & Sons Ltd
Semac I.....	†	—	—	—	European Marine Contractors Ltd
Seniority.....	17.11.94	L.C. Pink	C. Odle, E. Oseroff	—	F.T. Everard & Sons Ltd
Shabonee.....	22.12.94	M. Newall	R.L. Horne, M. Dent, E.T. Bibby	—	Mobil Shipping Co. Ltd
Shen-Chen Bay.....	22.2.95	M. Watts	D.R. Peel, M.C. Sutcliffe, C.I. MacLeod	—	P&O Containers Ltd
Shenland Service.....	30.11.94	M. Hooson	N. Sheard, D.E. Grief, D. McIntyre	—	Tidewater Marine (U.K.) Ltd
Sifliqua.....	31.10.94	A.D. Guillaume	J. Kennedy, A.E. Darlington, A. O'Hare	—	Shell Marine Personnel (I.O.M.) Ltd
Singapore Bay.....	31.1.95	P.A. Furneaux	P.M. Rud, F.H. Alrai	—	P&O Containers Ltd
Siratus.....	*	—	—	—	Shell Marine Personnel (I.O.M.) Ltd
Sir Eric Sharp.....	†	—	—	—	Cable & Wireless (Marine) Ltd
Snow Crystal.....	7.7.94	A. Hamill	R. Cubal, R. Colindres, R.A. Carumba	R.M. Banzon	Norman International AB
Snow Drift.....	28.4.94	B. Yelland	R.C.L. Manaton, R.B. Manatan, R.B. Arenal	P.V. Cambonga	Norman International AB
Snow Flower.....	7.9.94	M. Baker	L. Espelita, R.P.B. Buiedo, M. Penafiorida	J. Gapido	Norman International AB
Sociality.....	6.10.94	T.L. Hooper	B. McNally, J. Funge, J. Tetteh	—	F.T. Everard & Sons Ltd
Solena.....	26.7.94	R. Matuszak	—	—	Shell International Shipping Ltd
Speciality.....	23.5.94	D. Cooper	L. Archer, R. MacNab	—	F.T. Everard & Sons Ltd
Stability.....	†	L. Franke	W. Navakowski, M. Zetinski	—	F.T. Everard & Sons Ltd
Staffordshire.....	20.9.94	M. Reeves	P. Harrison, D. Morton, E.C. Morton	—	Bibby Line Ltd
Star Penbrake.....	4.10.94	G. Armstrong	C. Farmer, M. Dinan, W. Pearce	D. Laybourn	Texaco Overseas Tankship Ltd
Star Westminster.....	†	—	—	—	Texaco Overseas Tankship Ltd
Star Windsor.....	†	—	—	—	Texaco Overseas Tankship Ltd
Stena Constructora.....	†	—	—	—	Stena Offshore Ltd
Stena Europe.....	†	—	—	—	Stena Sealink (U.K.) Ltd
Stena Felicity.....	†	—	—	—	Stena Sealink (U.K.) Ltd
Stena Londoner.....	4.10.94	R.A. Forsyth	R. Mills, C.G. Cowell, H. Corkhill	J. Gilbert	Stena Sealink Ltd
Stena N ormandy.....	†	—	—	—	Stena Sealink (U.K.) Ltd
Stena Seawell.....	†	—	—	—	Stena Offshore Ltd
Stolt Oakwood.....	†	—	—	—	Stolt-Nielsen Shipping Ltd
Storrington.....	17.10.94	C. Graham	T. Hill, B.K. Quayson	—	Stephenson Clarke Shipping Ltd
Stressa.....	28.3.94	N.M. Whyte	P.K. Chatterjee, N.C. Arroyo	—	Wallem Ship Management (H.K.) Ltd
Sullivan.....	†	—	—	—	Caledonian MacBrayne Ltd
Sulsker.....	16.2.95	D.W. Temple	I. Campbell, P.C. Waiton, S. Whalley	—	Scottish Office, Agr. & Fisheries Dept.
Sumda.....	*	—	—	—	Wallem Ship Management (H.K.) Ltd
Sun Suma.....	†	—	—	—	United Ship Management Ltd
Sunny Clipper.....	21.7.94	D.B. Kapadia	J. Rajput, K.K. Kanojia, B.A. Sarkar	—	Grand Seatrade Shipping Agencies Ltd
Superiority.....	31.1.95	P.L. Whitehouse	N. Coombs	C.M. Joseph	F.T. Everard & Sons Ltd
Swan Arrow.....	†	—	—	—	K.G. Jebsen Skipsrederi A/S
Swan Bay.....	18.10.94	Stroom Bo Valter	Erik Ingemar Skolt, Mikael Anvelt	—	Swan Shipping A/S
Swan River.....	3.11.94	A.L. Echin	R. De La Dena, J.C. Ondovillaa, U.T. Esperancilla	P.R. Cueto	Swan Shipping A/S

Swift	27.4.94	S. Jose	A.L. Pareno, E.P. Solano	R. Santos	Mobil Shipping Co. Ltd
Table Bay	22.12.94	P.J.R. Manson	C.K. Unwin, D.C. Collins-Williams	P. Mathews	P&O Containers Ltd
Tamamonia	17.8.94	S.R. Allakar	W. Twardokex, A. Mazur	A. Russak-Polska	Andrew Weir Shipping Ltd
Tamapaicharee	†	—	—	—	Andrew Weir Shipping Ltd
Tamar Fl	†	G.P. Chapman	D. Amphlett	J. Crawshaw	Byron Marine Ltd
Tamathai	†	—	—	—	Andrew Weir Shipping Ltd
Tankerman	†	A.G. Mount	R. Everleigh, A. Nolan	—	P&O Tankships Ltd
Tarago	6.1.95	J. Wrigley	M. Cully, R. Paderes, R. Abesantis	R. Gabrido	Acomart (U.K.) Ltd
Tasman Universal	20.9.94	D.S. Winsor	J.L. Panghulan, I.G.C. Likewela, E.C. Marcorol	N.M. Balachandran	London Ship Managers Ltd
Taunton	12.1.95	J.A. Smeeton	A.M. Baker, G. Krishnaswamy, P. Dasgupta	R. Aurora	P&O Bulk Shipping Ltd
Tepozteco 2	†	—	—	—	Cardiff Ship Management & Services Ltd
Thorsaga	6.1.95	L.A. Lobo	P.K. Krishnadas	S. Chakraborty	A/S Thor Dahl Shipping
Toisa Conqueror	31.10.94	A. Pedder	R. MacLeod, J. Strachan, S. Hossain	—	Sealion Shipping Ltd
Toisa Cougar	9.2.95	R. Chaplin	F.J. Hansen, F. Brearley, R. Thomas	R. Thomas	Sealion Shipping Ltd
Toisa Gryphon	1.7.94	R.O. Chaplin	F. Smiles, A.J. Blazey	—	Sealion Shipping Ltd
Toisa Petrel	*	—	—	—	Sealine Shipping Ltd
Toisa Plover	*	—	—	—	Sealine Shipping Ltd
Toisa Puffin	5.7.94	S.L. Thomas	F.J. Hansen, J. Beale, K. Boxall	—	Sealion Shipping Ltd
Toisa Puma	†	—	—	—	Sealine Shipping Ltd
Toisa Sentinel	†	—	—	—	Sealion Shipping Ltd
Toisa Widgeon	†	—	—	—	Sealion Shipping Ltd
Tokyo Bay	6.1.95	D.P. Worsnop	J. Holmshaw, R.E. Smith, R.G.C. Noble	T.B. Bayley	Sealion Shipping Ltd
Tonbridge	12.1.95	I. Kaye	R.J. Taylor, A.H.A. Hamdy	H. D'Souza	P&O Containers Ltd
Torben Spirit	18.10.94	A.J. Hayes	B. Bugul, A.F. Antonio, D.M. MacDonald	—	Kuwait Oil Tanker Co.
Ullswater	6.12.94	C.J. Davies	M. Samus, S.C. Chawla	—	Norbulk Shipping (U.K.) Ltd
Uruguay Express	2.7.94	W. Liuberas	S. Gormaran, J.L. Sagarro, F. Pereira	J. Ansari	P&O Bulk Shipping Ltd
Vectis Falcon	22.12.94	D.M. Miller	R.W. Spenceley, J. Wood	Omar Silva	World Shipping Agency
Vidal	31.1.95	E.J. Warwick	M. Girish, H. Fernandes, S. Surender	J. Coupe	Carisbrooke Shipping Ltd
Vigilant	6.12.94	H.A. MacKenzie	R.J. Sheldon, D.S.J. Craig, A. MacCallum	L. Joseph	V.Ships (U.K.) Ltd
Vine	17.11.94	G. Hepple	B.G. Hardy, L.J. Vaz, K.C. Joshi	—	Scottish Office, Agr. & Fisheries Dept.
Waterford	*	—	—	L.D. Ponnis	P&O Bulk Shipping Ltd
Welsh Venture	25.1.95	M.C. Roberts	J.S.C. Patterson, C. Winterbottom, G.J. Davies	—	P&O Bulk Shipping Ltd
West Moor	6.1.95	R. Phillips	M.J. Clark, F. Servento	A.D. Moore	BP Shipping Ltd
Western Bridge	30.1.95	S.J. Honey	I.C. Gravatt, K.C. Townley, K. Henderson	—	Jeppesen Heaton Ltd
Westra	21.9.94	N.E. Innes	J. Ebby, A.W. Blance	—	Ropner Shipping Services Ltd
Whitcrest	16.2.95	R.N. Dixon	D.J. Williams, J. Forbes-Simpson	—	Scottish Office, Agr. & Fisheries Dept.
World Spear	30.1.95	A. Thomson	C.S. Latchford, M.A. Akbar, M.R.I. Howlander	—	J.H. Whitaker (Tankers) Ltd
York	†	—	—	Chuk Yuk Loy	Marine Navigation Co. Ltd
Zealous	†	—	—	—	P&O Bulk Shipping Ltd
Zenatia	16.8.94	G.P. Donnelly	J. Flaherty, T.J. Luke, R.A. Lane	P.M. Denelhy	Coe Metcalf Shipping Ltd
Zetland	7.9.94	S. Tudor	K.A. Maltby, S.F. Ahmed, M.S. Noronha	A. Mamaparo	Shell Marine Personnel (I.O.M.) Ltd
					P&O Bulk Shipping Ltd

‘Marid’ Ships

The following is a list of ships recruited for the observing and reporting of sea temperatures from coastal waters of Great Britain.
Masters are requested to point out any errors or omissions in the lists.

NAME OF VESSEL	MASTER	OWNER/MANAGER
<i>Achatina</i>	R.M. Astridge.....	Shell International Shipping Ltd
<i>Acila</i>	B. Crum.....	Shell International Shipping Ltd
<i>Amity</i>	C. Jones.....	F.T. Everard & Sons Ltd
<i>Anchorman</i>	M. Corner.....	P&O Tankships Ltd
<i>Arco Adur</i>	C.I. Proctor.....	ARC Marine Ltd
<i>Arco Arun</i>	R.J. Peck.....	ARC Marine Ltd
<i>Arco Avon</i>	D. Griffiths.....	ARC Marine Ltd
<i>Arianta</i>	B. Lohnes.....	Shell International Shipping Ltd
<i>Ashington</i>	P. Johnson.....	Stephenson Clarke Shipping Ltd
<i>Asprella</i>	S. Mead.....	Shell International Shipping Ltd
<i>Authenticity</i>	J.L. Taylor.....	F.T. Everard & Sons Ltd
<i>BP Joustier</i>	J. Samson.....	BP Oil U.K. Ltd
<i>BP Springer</i>	A. Heather.....	BP Oil U.K. Ltd
<i>Brentwood</i>	C.J. Horsnell.....	Crescent Shipping Ltd
<i>Briarthorn</i>	D.J.H. Custance.....	Coe Metcalf Shipping Ltd
<i>City of Bristol</i>	R. Hemmings.....	United Marine Dredgers Ltd
<i>David M</i>	E. Lear.....	Coe Metcalf Shipping Ltd
<i>Eastgate</i>	H. Hall.....	P&O Tankships Ltd
<i>Emerald</i>	P. Johns.....	Stephenson Clarke Shipping Ltd
<i>Frank M</i>	M. Edmons.....	Coe Metcalf Shipping Ltd
<i>Frederick M</i>	G. Cattanack.....	Coe Metcalf Shipping Ltd
<i>Hera</i>	S. Hanson.....	Kvaerner Shipping A/S
<i>Hermes</i>	—	Chelston Ship Management Ltd
<i>Irishgate</i>	P. Holstock.....	P&O Tankships Ltd
<i>Lady Stephanie</i>	K. Kalia.....	Exmar N.V.
<i>Michael M</i>	R. McQuat.....	Coe Metcalf Shipping Ltd
<i>Nicholas M</i>	A.S. Anand.....	Coe Metcalf Shipping Ltd
<i>Norman Commodore</i>	B. Hayball.....	Commodore Ship Management Ltd
<i>Northgate</i>	A. Everett.....	P&O Tankships Ltd
<i>Pamela Everard</i>	C. Kelly.....	F.T. Everard & Sons Ltd
<i>Pentland</i>	R. Clifford.....	Torbult Ltd
<i>Petro Avon</i>	A.I.D. Preece.....	Petroleum Shipping Ltd
<i>Petro Clyde</i>	R. Jorgensen.....	Petroleum Shipping Ltd
<i>Petro Fawley</i>	K. Hebdon.....	Petroleum Shipping Ltd
<i>Petro Inverness</i>	D. Fairbrass.....	Petroleum Shipping Ltd
<i>Petro Mersey</i>	D.J. Wilson.....	Petroleum Shipping Ltd
<i>Robert M</i>	R. Rea.....	Coe Metcalf Shipping Ltd
<i>Rosethorn</i>	J. O’Sullivan.....	Coe Metcalf Shipping Ltd
<i>Sanguity</i>	D. Golden.....	F.T. Everard & Sons Ltd
<i>Silverthorn</i>	G. Bedwell.....	Coe Metcalf Shipping Ltd
<i>Stena Antrim</i>	R. White.....	Stena Sealink Ltd
<i>Stena Caledonia</i>	T. Griffiths.....	Stena Sealink Ltd
<i>Stena Galloway</i>	R. McCready.....	Stena Sealink Ltd
<i>Stena Hibernia</i>	R.L. Jones.....	Stena Sealink Ltd
<i>Stolt Avocet</i>	J. Frisby.....	Stolt-Nielsen Rederi A/S
<i>Superferry</i>	N. Volvinis.....	Swansea-Cork Ferries Ltd
<i>Susanne</i>	L. Bak.....	Terkol Tank A/S
<i>Taikoo</i>	I. Lerner.....	Ocean Youth Yacht Club
<i>Tillerman</i>	J. Souter.....	P&O Tankships Ltd
<i>Vanessa C</i>	T. Gladwin.....	Carisbrooke Shipping PLC
<i>Vibrence</i>	K.D. Kordt.....	Crescent Shipping Ltd
<i>Waverley</i>	D.L. Neill.....	Waverley Excursions Ltd
<i>Welsh Piper</i>	D.J. Jones.....	British Dredging Aggregates Ltd
<i>Whitide</i>	H. Elliot.....	J.H. Whitaker (Tankers) Ltd
<i>Whitsea</i>	—	J.H. Whitaker (Tankers) Ltd
<i>Whitstar</i>	K. Batty.....	J.H. Whitaker (Tankers) Ltd

Oil Rigs and Platforms

NAME OF RIG OR PLATFORM	OWNERS/OPERATORS
AH001	Amerada Hess Ltd
Beryl A	Mobil North Sea Ltd
Beryl B	Mobil North Sea Ltd
Buchan A	BP Petroleum Development Ltd
Cleeton Platform	BP Petroleum Development Ltd
Dan Countess	Lauritzen Offshore Ltd
Drill Star	Sedco-Forex Drilling Services Ltd
Emerald Producer	Midland & Scottish Resources PLC
Glomar Arctic III	Global Marine Drilling Co. Ltd
Heather A	Unocal (U.K.) Ltd
Henry Goodrich	Sonat Offshore (U.K.) Ltd
John Shaw	Sonat Offshore (U.K.) Ltd
Montrase A	Amoco (U.K.) Exploration Co.
Morecambe Bay (API)	British Gas
Neddrill 6	Neddrill U.K. Ltd
Ocean Guardian	Diamond Offshore Ltd
Polyconcord	Shell U.K. Exploration & Production
Santa Fe Galaxy I	Santa Fe Drilling Co. Ltd
Santa Fe Magellan	Santa Fe Drilling Co. Ltd
Santa Fe Rig 135	Santa Fe Drilling Co. Ltd
Santa Fe Rig 140	Santa Fe Drilling Co. Ltd
Sedco 706	Sedco-Forex Drilling Services Ltd
Sedco 707	Sedco-Forex Drilling Services Ltd
Sedco 712	Sedco-Forex Drilling Services Ltd
Sedco 714	Sedco-Forex Drilling Services Ltd
Sonat Arcade Frontier	Sonat Offshore (U.K.) Ltd
Sovereign Explorer	Sedco-Forex Drilling Services Ltd
Tartan A	Texaco North Sea (U.K.) Co. Ltd
Viking B	Conoco (U.K.) Ltd

BRITISH COMMONWEALTH

The following lists give the names of Selected and Supplementary Ships, and the number of Auxiliary Ships where known (i.e., those which only report in 'sparse areas'), which voluntarily co-operate with meteorological services of the British Commonwealth. Information for these lists is required by 15 March each year. Information for the January corrective lists is required by 15 September each year.

AUSTRALIA (Information dated 16.2.95)

NAMES OF VESSELS

Selected Ships:	Selected Ships (contd)	Selected Ships (contd)
<i>Al Khaleej</i>	<i>Fua Kavenga</i>	<i>Northwest Sandpiper</i>
<i>Al Kuwait</i>	<i>Glenda Lee</i>	<i>Northwest Shearwater</i>
<i>Al Qurain</i>	<i>Gordon Reid</i>	<i>Northwest Snipe</i>
<i>Al Yasrah</i>	<i>Hanna Bakke II</i>	<i>Ormiston</i>
<i>Altrans</i>	<i>Highland Chief</i>	<i>Pacific Conquest</i>
<i>Anro Australia</i>	<i>Iron Baron</i>	<i>Pacific Gas</i>
<i>Anro Fremantle</i>	<i>Iron Carpentaria</i>	<i>Papuan Chief</i>
<i>Apollo Peak</i>	<i>Iron Dampier</i>	<i>Pathfinder II</i>
<i>Arafura</i>	<i>Iron Flinders</i>	<i>Portland</i>
<i>Ariake</i>	<i>Iron Gippsland</i>	<i>Primera Peak</i>
<i>Aurora Australis</i>	<i>Iron Kembla</i>	<i>Rig Seismic</i>
<i>Australian Achiever</i>	<i>Iron Newcastle</i>	<i>River Boyne</i>
<i>Australian Advance</i>	<i>Iron Pacific</i>	<i>River Embley</i>
<i>Australian Endeavour</i>	<i>Iron Prince</i>	<i>River Torrens</i>
<i>Australian Spirit</i>	<i>Iron Shortland</i>	<i>Roberta Jull</i>
<i>Australian Trader</i>	<i>Iron Spencer</i>	<i>STS Leeuwin</i>
<i>Australian Venture</i>	<i>Iron Sturt</i>	<i>Sedco B.P. 471</i>
<i>Barbican Spirit</i>	<i>Iron Whyalla</i>	<i>Sina</i>
<i>Barbican Success</i>	<i>Island Gas</i>	<i>Sitka</i>
<i>Bass Trader</i>	<i>Island Seaway</i>	<i>Southern Surveyor</i>
<i>Boral Gas</i>	<i>Jabiru Venture</i>	<i>Spirit of Tasmania</i>
<i>Botany Triad</i>	<i>Joana Bonita</i>	<i>Swan Reefer</i>
<i>Botany Trinity</i>	<i>Karina Bonita</i>	<i>TNT Capricornia</i>
<i>Brahman Express</i>	<i>Kelvin</i>	<i>TNT Carpentaria</i>
<i>Buffalo Express</i>	<i>Klang Reefer</i>	<i>Tranztas Trader</i>
<i>Cape Grafton</i>	<i>Kowulka</i>	<i>Uniceb</i>
<i>Coral Chief</i>	<i>Lindsay Clark</i>	<i>Wyuna</i>
<i>Danny F</i>	<i>Maersk Oceania</i>	<i>Young Endeavour</i>
<i>El Cordero</i>	<i>Maria Bonita</i>	
<i>Express</i>	<i>Mawashi Al-Gassem</i>	
<i>Fairstar</i>	<i>Mawashi Tabuk</i>	
<i>Fernanda F</i>	<i>Mobil Astral</i>	Supplementary Ships:
<i>Flinders</i>	<i>Mosdeep</i>	<i>Iron Curtis</i>
<i>Frank Konency</i>	<i>Nivosa</i>	<i>Iron Monarch</i>
<i>Franklin</i>	<i>Northwest Sanderling</i>	<i>Kapala</i>

Auxiliary Ships:

Australia has 2 Auxiliary Ships currently reporting.

HONG KONG (Information dated 1.1.95)

NAMES OF VESSELS

Selected Ships:	Selected Ships (<i>contd</i>)	Selected Ships (<i>contd</i>)
<i>Al Mariyah</i>	<i>Micronesian Chief</i>	<i>Seafalcon</i>
<i>Al Muharraq</i>	<i>Mundogas Orinoco</i>	<i>Seamaster</i>
<i>Anna</i>	<i>Navios Bulker</i>	<i>Sishen</i>
<i>Asian Challenger</i>	<i>Nongkhai Navee</i>	<i>Talabot</i>
<i>Bunga Kantan</i>	<i>OOCL Alliance</i>	<i>Tampa</i>
<i>Bunga Suria</i>	<i>OOCL Award</i>	<i>Tapiola</i>
<i>Chengtu</i>	<i>OOCL Challenge</i>	<i>Texas</i>
<i>Delmas Bougainville</i>	<i>OOCL Educator</i>	<i>Torrens</i>
<i>Delmas Joinville</i>	<i>OOCL Envoy</i>	<i>Trade Dawn</i>
<i>Delmas Tourville</i>	<i>OOCL Executive</i>	<i>Wawasen Setia</i>
<i>Eagle Pride</i>	<i>OOCL Explorer</i>	
<i>Eagle Respect</i>	<i>OOCL Exporter</i>	
<i>Fair Bridge</i>	<i>OOCL Fair</i>	
<i>Gallantry</i>	<i>OOCL Faith</i>	
<i>Grand Glory</i>	<i>OOCL Fidelity</i>	
<i>Grand Noble</i>	<i>OOCL Fortune</i>	
<i>Hawk Arrow</i>	<i>OOCL Freedom</i>	
<i>Highlander</i>	<i>OOCL Friendship</i>	
<i>Jin Fa</i>	<i>OOCL Frontier</i>	
<i>K.I.A. Waleed</i>	<i>OOCL Honour</i>	
<i>Kamaleverett</i>	<i>OOCL Hope</i>	
<i>Karabieverett</i>	<i>Ocean Centaurus</i>	
<i>Kwangtung</i>	<i>Ocean Competence</i>	
<i>Maersk Nanhai</i>	<i>Ocean Elite</i>	
<i>Marienvoy</i>	<i>Ocean Sincerity</i>	
<i>Maritime Challenger</i>	<i>Ocean Sirius</i>	
<i>Maritime Champion</i>	<i>Ocean Strength</i>	
<i>Maritime Goliath</i>	<i>Osprey Arrow</i>	
<i>Maritime Grace</i>	<i>Pacific Islander</i>	
<i>Maritime Joy</i>	<i>Pearl</i>	
<i>Maritime Success</i>	<i>Poyang</i>	
<i>Mercury Diamond</i>	<i>Ratana Valai</i>	
		Supplementary Ships:
		<i>Andes Challenger</i>
		<i>Eastern Sea</i>
		<i>Grand Fortune</i>
		<i>Green Era</i>
		<i>Ivyeverett</i>
		<i>Kurama</i>
		<i>Lamphun Navee</i>
		<i>Maritime Faith</i>
		<i>Maritime Victory</i>
		<i>OOCL Fame</i>
		<i>Rainbow</i>
		<i>Rickmers Shanghai</i>
		<i>Rowan</i>
		<i>Seamaster I</i>
		<i>Shaplaeverett</i>
		<i>Silver Clipper</i>
		<i>Splendor River</i>
		<i>Success Bulker</i>
		<i>Toba</i>

Auxiliary Ships:

Hong Kong also has 1 Auxiliary Ship currently reporting.

INDIA (Information dated 1.3.95)

NAMES OF VESSELS

Selected Ships:	Supplementary Ships:	Supplementary Ships (<i>contd</i>)
<i>Akbar</i>	<i>A.B. Tarapore</i>	<i>Bharat Seema</i>
<i>Arunachal Pradesh</i>	<i>APJ Anand</i>	<i>Chandidas</i>
<i>B.R. Ambedkar</i>	<i>APJ Angad</i>	<i>Chennai Jaayam</i>
<i>Bharatendu</i>	<i>APJ Anjali</i>	<i>Chennai Ookkam</i>
<i>Bhavabhuti</i>	<i>APJ Priti</i>	<i>Chennai Perumai</i>
<i>Harshavardhan</i>	<i>APJ Shalin</i>	<i>Chennai Polivu</i>
<i>Lokmanya Tilak</i>	<i>APJ Sushma</i>	<i>Chennai Sadhanai</i>
<i>Sagar Kanya</i>	<i>Aditya Usha</i>	<i>Chennai Veeram</i>
<i>Sagar Sampada</i>	<i>Alaknanda</i>	<i>Chennai Velarchi</i>
<i>Samudra Manthan</i>	<i>Annapurna</i>	<i>Chatrapati Shivaji</i>
<i>State of Andhra Pradesh</i>	<i>Li Arun Khetrapal PVC</i>	<i>Chm Piru Singh PVC</i>
<i>State of Nagaland</i>	<i>Aurobindo</i>	<i>Continental Rose</i>
<i>Vishnu Sagar</i>	<i>Bhagat Singh</i>	<i>Dadabhai Nowroji</i>

India (contd)

NAMES OF VESSELS

Supplementary Ships (contd)	Supplementary Ships (contd)	Supplementary Ships (contd)
<i>Dakshineswar</i>	<i>Jay Laxmi</i>	<i>Prabhu Gopal</i>
<i>Diglipur</i>	<i>Jay Narayan Vyas</i>	<i>Prabhu Puni</i>
<i>Dweep Setu</i>	<i>Kabirdas</i>	<i>Prabhu Satram</i>
<i>FONJ Shekhan PVC</i>	<i>Kalidas</i>	<i>Rafi Ahmed Kidwai</i>
<i>Ganga Sagar</i>	<i>Kanchan Junga</i>	<i>Rajiv Gandhi</i>
<i>Guru Bachlan Singh Salaria</i>	<i>Kanpur</i>	<i>Rama Raghoba Rane PVC</i>
<i>Hardwar</i>	<i>Kolandia</i>	<i>Ramdas</i>
<i>Harkishan</i>	<i>Lal Bahadur Shastri</i>	<i>Ratna Vandana</i>
<i>Har Govind</i>	<i>Lance Naik Albert Ekka</i>	<i>Ravidas</i>
<i>Havildar Abdul Hamid</i>	<i>Lok Maheshwari</i>	<i>Sabarimala</i>
<i>Homi Bhabha</i>	<i>Lok Prakash</i>	<i>Sagar Deep</i>
<i>Indian Endurance</i>	<i>Lok Pratap</i>	<i>Sagar Samrat</i>
<i>Indian Goodwill</i>	<i>Lok Pratima</i>	<i>Samarat Ashok</i>
<i>Indian Resolve</i>	<i>Lok Preeti</i>	<i>Sarojini Naidu</i>
<i>Indian Valour</i>	<i>Lok Rajeshwari</i>	<i>Satya Murti</i>
<i>Indira Gandhi</i>	<i>Lok Vikas</i>	<i>Skandy Surveyor</i>
<i>INS Deepak</i>	<i>MMP Wealth</i>	<i>State of Gujarat</i>
<i>INS Godavari</i>	<i>Maharshi Dayanand</i>	<i>State of Haryana</i>
<i>INS Gomati</i>	<i>Maharshi Karve</i>	<i>State of Manipur</i>
<i>INS Kripan</i>	<i>Major Dhansingh Thapa PVC</i>	<i>State of Orissa</i>
<i>INS Magar</i>	<i>Major Hoshier Singh</i>	<i>Subhedar Joginder Singh</i>
<i>INS Ranvir</i>	<i>Mandakini</i>	<i>Tirumalai</i>
<i>INS Taragiri</i>	<i>Maratha Melody</i>	<i>Tulsidas</i>
<i>INS Trishul</i>	<i>Maratha Prudence</i>	<i>Uttar Kashi</i>
<i>INS Vikrant</i>	<i>Mizoram</i>	<i>Varanasi</i>
<i>INS Vindiyagiri</i>	<i>Motilal Nehru</i>	<i>Varuna Adhar</i>
<i>Jag Manek</i>	<i>Murshidabad</i>	<i>Vishva Bandhan</i>
<i>Jag Pari</i>	<i>Naik Jadunath Singh PVC</i>	<i>Vishva Karuna</i>
<i>Jag Prabhat</i>	<i>Nand Hari</i>	<i>Vishva Kaumudi</i>
<i>Jag Prakash</i>	<i>Nand Kavita</i>	<i>Vishva Madhuri</i>
<i>Jag Preeti</i>	<i>Nand Rati</i>	<i>Vishva Mohini</i>
<i>Jag Skakti</i>	<i>Nand Smiti</i>	<i>Vishva Nandini</i>
<i>Jag Shanti</i>	<i>Nand Srishti</i>	<i>Vishva Pallav</i>
<i>Jag Vijay</i>	<i>Nanda Kala</i>	<i>Vishva Pankaj</i>
<i>Jag Vivek</i>	<i>Nanda Kishore</i>	<i>Vishva Parag</i>
<i>Jagat Samrat</i>	<i>Nandu</i>	<i>Vishva Parijat</i>
<i>Jagat Swamini/Priyamvada</i>	<i>Nanga Parbat</i>	<i>Vishva Parimal</i>
<i>Jagat Vijeta</i>	<i>Nancauri</i>	<i>Vishva Vikram</i>
<i>Jala Murugan</i>	<i>Netaji Subhash Bose</i>	<i>Vishva Yash</i>
<i>Jala Tapi</i>	<i>Nicobar</i>	<i>Vishwesharayya</i>
<i>Jala Vallabh</i>	<i>Ongé</i>	<i>Vivekananda</i>
<i>Jala Vijaya</i>	<i>Patliputra</i>	<i>Yerawa</i>
<i>Jameela</i>	<i>Prabhu Das</i>	
<i>Jawaharlal Nehru</i>	<i>Prabhu Daya</i>	

NEW ZEALAND (Information dated 1.2.95)

NAMES OF VESSELS		
Selected Ships: <i>America Star</i> <i>Atlantic Defender</i> <i>Auckland Express</i> <i>California Star</i> <i>Canterbury Express</i> <i>Capitaine Tasman</i> <i>Challenger</i> <i>Chitral</i> <i>Columbia Star</i> <i>Crusader</i> <i>Direct Kea</i> <i>Fishguard Bay</i> <i>Forum Papua New Guinea</i> <i>Forum Samoa</i> <i>Fulmar</i> <i>Golden Bay</i> <i>Kotuku</i> <i>Kuaka</i>	Selected Ships (contd) <i>Melbourne Star</i> <i>New Zealand Pacific</i> <i>New Zealand Star</i> <i>Pacific Ariki</i> <i>Rangikura</i> <i>Ranginui</i> <i>Rangitane</i> <i>Rangitata</i> <i>Rangitikei</i> <i>Rangitoto</i> <i>Socofl Stream</i> <i>Søren Larsen</i> <i>Spirit of Competition</i> <i>Spirit of Freedom</i> <i>Swan Tide</i> <i>Sydney Star</i> <i>T.A. Navigator</i> <i>Taiko</i>	Selected Ships (contd) <i>Tainui</i> <i>Takitimu</i> <i>Tangaroa</i> <i>Tarihiko</i> <i>Tasman Enterprise</i> <i>Tasman Venture</i> <i>Tui Cakau III</i> <i>Union Auckland</i> <i>Union Rotoiti</i> <i>Union Rotoma</i> <i>Union Rotorua</i> Supplementary Ships: <i>Arahanga</i> <i>Arahura</i> <i>Aratika</i>

Auxiliary Ships:

New Zealand has a fleet of 13 Auxiliary Ships currently reporting.

SOUTH AFRICA (Information dated 1.3.95)

NAMES OF VESSELS		
Selected Ships: <i>Africana</i> <i>Algoa Bay</i> <i>Boundary</i> <i>Douglas Bay</i> <i>Eagle</i> <i>Energos</i> <i>Falcon</i> <i>Ferosa</i> <i>Infanta</i> <i>Kiuseb</i> <i>Louis G. Murray</i> <i>Nolizwe</i> <i>Omega</i> <i>Oranje</i> <i>Protea</i> <i>Rampart</i> <i>Recife</i> <i>Royal Sphere</i>	Selected Ships (contd) <i>S.A. Agulhas</i> <i>S.A. Drakensberg</i> <i>S.A. Helderberg</i> <i>S.A. Waterberg</i> <i>S.A.S. Outeniqua</i> <i>Sea Trader</i> <i>Sezela</i> <i>Shearwater Bay</i> <i>Spencer Bay</i> <i>Stellenbosch</i> <i>Transvaal</i> <i>Umgeni</i> <i>Vaal</i> Trawlers: <i>Aloe</i> <i>Anemone</i> <i>Arum</i>	Trawlers (contd) <i>Azalea</i> <i>Crassula</i> <i>Dahlia</i> <i>Godetia</i> <i>Iris</i> <i>Ixia</i> <i>Larkspur</i> <i>Lobelia</i> <i>Nerine</i> <i>Protea</i> <i>Rosalind</i> <i>Roxanne B.</i> <i>Sacip</i> <i>Salvia</i> <i>Stevia</i> <i>Storess</i> <i>Verbena</i>



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