

Met.O.1026



The Met.Office

The Marine Observer

*A quarterly journal of Maritime
Meteorology*



Volume 69 No. 345
July 1999

THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME
METEOROLOGY PREPARED BY THE
OBSERVATIONS VOLUNTARY (MARINE)
BRANCH OF THE MET. OFFICE

VOL. 69

No. 345

JULY 1999

CONTENTS

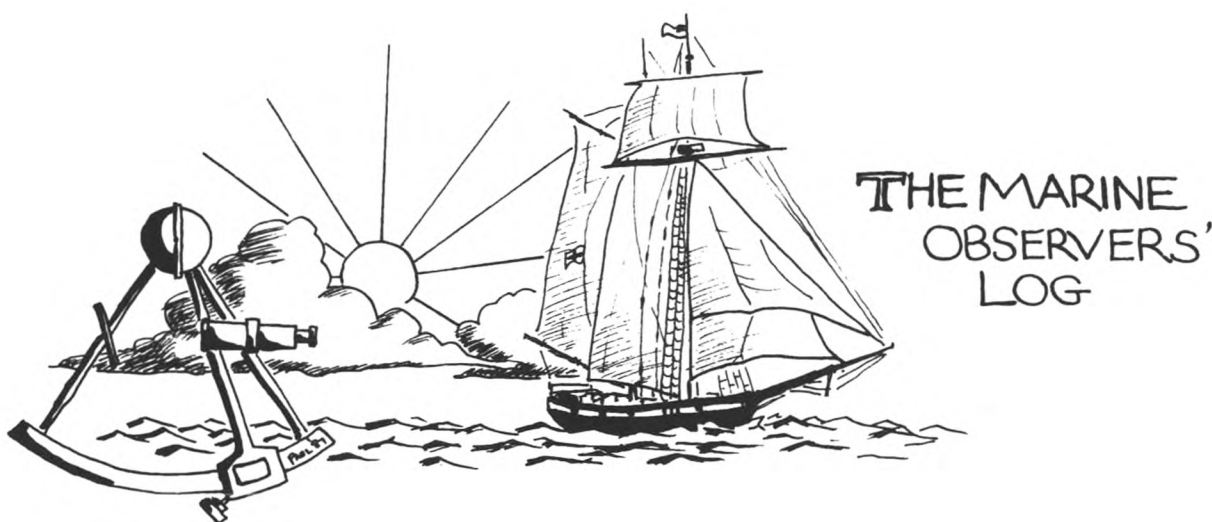
The Marine Observers' Log — July, August, September	<i>Page</i> 98
Marine Automatic Weather Stations	116
Giant icebergs. By J. FRANKLIN	121
Hints on observing birds at sea. By CAPTAIN M.K. BARRITT	125
Scene at Sea	128
Book Review	130
Fleet Lists	132

COVER PHOTOGRAPH: Gallahs pictured on board the *Maersk Surrey* on 7 August 1998 by J.D. Wilmot, Third Officer when the vessel was in the Bass Strait.

Views expressed in this journal are those of authors and not necessarily those of the Editor or of The Met. Office. Copyright remains with the originator. Photographers should ensure that their work is clearly identified.

All correspondence regarding the journal should be addressed to: The Editor The Marine Observer
The Met. Office OV(M) Scott Building Eastern Road Bracknell Berkshire RG12 2PW.

LONDON: THE STATIONERY OFFICE



July, August, September

The Marine Observers' Log is a quarterly selection of observations of interest and value compiled from the meteorological logbooks of the UK Voluntary Observing Fleet and from individual observers' contributions. 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 'YANNI'

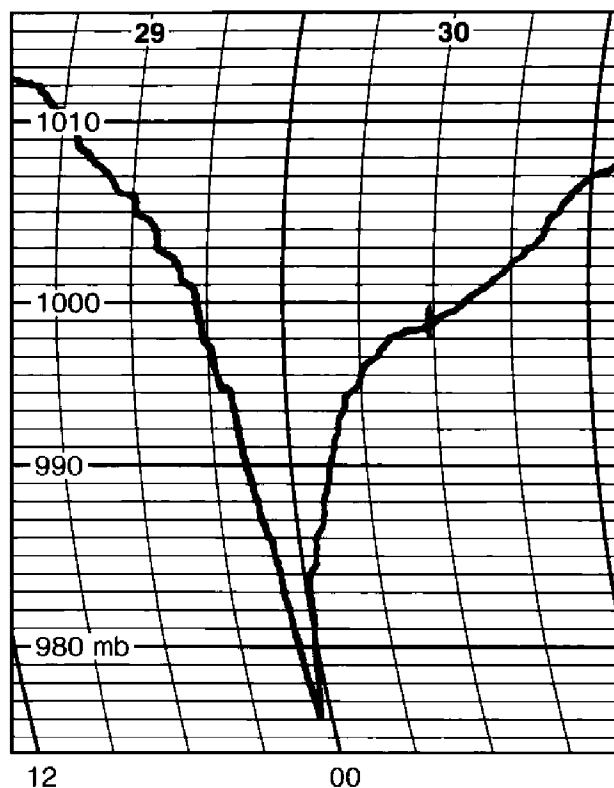
North China Sea

m.v. *Providence Bay*. Captain D. Batchelor. Busan to Kaohsiung. Observers: the Master, L. Rigby, Chief Officer, Z. Kuzmanov, 2nd Officer, P. Seaney, 3rd Officer and ship's company.

29–30 September 1998. During this period the vessel experienced the effects of typhoon Yanni. The barograph trace shows the very marked changes in pressure, and the following observations were made as the storm passed.

Date and time (UTC)	Temperature			Pressure (mb)	Wind	
	Air	Wet bulb	Sea		Dir'n	Force
29th 2000	24.2°	23.3°	25.7°	1003.0	ENE	4
2100	—	—	—	1005.0	ESE	6
2200	—	—	—	997.1	SE×E	6–7
2300	—	—	—	993.8	SE×E	8
30th 0000	26.0°	26.0°	27.9°	984.9	SE×E	10
0100	—	—	—	980.4	S×W	11
0400	24.0°	22.8°	26.3°	995.4	WNW	4
0500	—	—	—	997.9	—	—
0600	—	—	—	998.4	—	—
0800	24.0°	22.3°	25.2°	999.5	W	5

The vessel attempted to steam away from the predicted track of the typhoon but the eye came straight for the ship. The seas were very rough causing the vessel's speed to be reduced, and the course was altered into the wind to try and minimize any damage.



[At 0000 on the 30th, the ship's meteorological logbook records seas of 2.5 m with a period of 4 seconds, and also a swell of 6m from 190° with a period of 7 seconds.] On clearing the typhoon an inspection of the vessel was made, no damage being found.

Position of ship at 0000 UTC on the 30th: 33° 00' N, 125° 48' E.

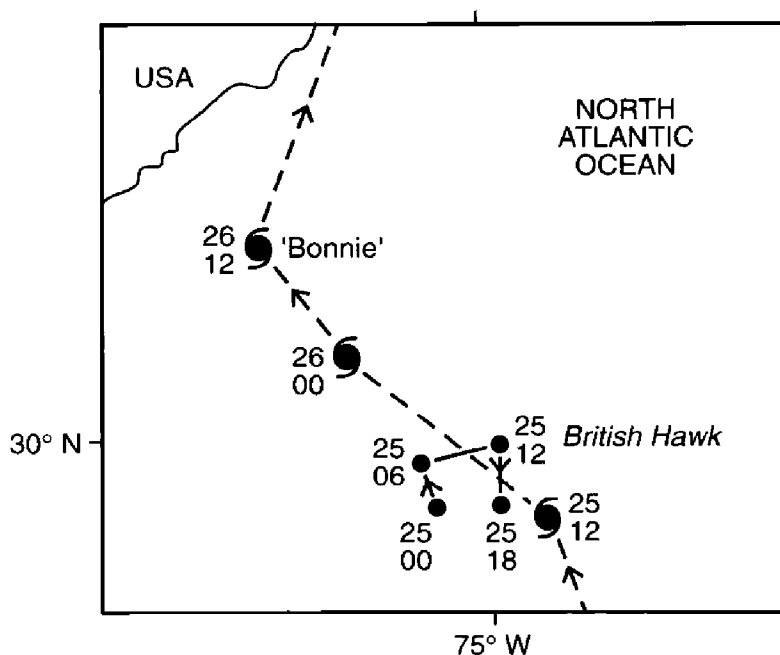
HURRICANE 'BONNIE'

North Atlantic Ocean

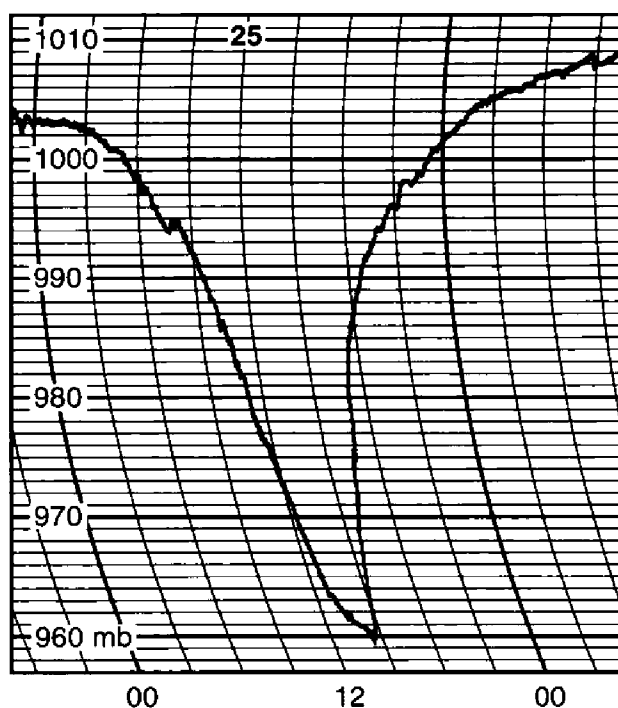
m.v. *British Hawk*. Captain K.E. Peacock. Dos Bocas to Sines. Observers: the Master, D. MacLeod, 3rd Officer and ship's company.

23–25 August 1998. Positions of the storm received from the American National Weather Bureau (relayed from Miami) on the 23rd and 24th indicated that the storm centre was either stationary or moving in a general north-westerly direction at 5 knots.

On the 24th at about 2300 UTC Bonnie was in position 26.3° N, 72.9° W; relative to the ship, this was about 60° on the starboard bow at a distance of 240 n mile. It was hoped that the storm could be outrun with its centre passing well astern. On the morning of the 25th with the pressure falling fast the vessel was steering 062° into NW'ly winds of force 12, the visibility was reduced to 0.5 n mile owing to spray, and there was swell of 8 m from 120°. After plotting the latest available position of the storm it was noted that the vessel was on a converging course with Bonnie, and at 1100 the Master decided to turn back onto a new course of 220°; this put the wind on the port quarter and meant that the vessel was heading in the opposite direction to the hurricane, in the navigable semicircle. (The chart shows the track of the vessel and of the storm.) Visibility at this time was 0.2 n mile and, shortly after 1100, both radar scanners stopped turning in sustained winds of force 12 with gusts up to 105 knots showing on the ship's anemometer.



When the vessel was turned, the centre of the storm was estimated to be in position 28.5° N, 74.2° W moving north-north-west at 8 knots putting it at 100° on the starboard bow at a distance of 85 n mile. At 1400 when the storm's position was next received, relative to the vessel it was now 60 n mile on the port beam and it looked as if Bonnie would pass 60 n mile astern; it was still moving north-west but had picked up speed to 14 knots. At this time a careful watch was being kept on the wind direction to confirm that Bonnie was passing behind the vessel, and it was noted that the wind was backing from NE'ly to NNE'ly and decreasing to force 8. The visibility also increased to 1.5 n mile and, owing to the decrease in wind speed, the smaller of the two radar scanners started to operate once more. The pressure 'bottomed out' at 965 mb between 1400 and 1500 before commencing a very sharp rise, as shown by the barograph trace.



The wind continued to back, and at 1500 it increased to NW'ly, force 10, maintaining this until 1700 when it peaked at SSW'ly, force 12. After this the wind slowly abated until, at 2300, it steadied to SSW'ly, force 9/10.

On turning, the vessel had picked up speed again, regaining manoeuvrability. Some extra engine power had been required (transferred to ECCR control as 'Power limited' had activated) to turn through the wind, the vessel taking her time to do so; however, although the vessel rolled heavily at times, the movement was not violent. In fact, for a storm it was riding quite well and there was no real cause for any alarm.

Positions received later indicated that Bonnie had passed some 20 n mile down the port side, and the storm moved away quite rapidly allowing the vessel to regain course and speed in the early evening.

Position of ship at 1100 UTC on the 25th: 29° 44' N, 74° 44.8' W.

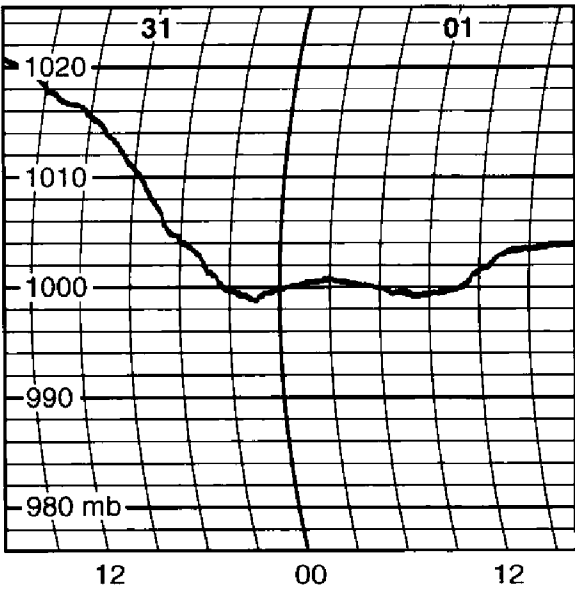
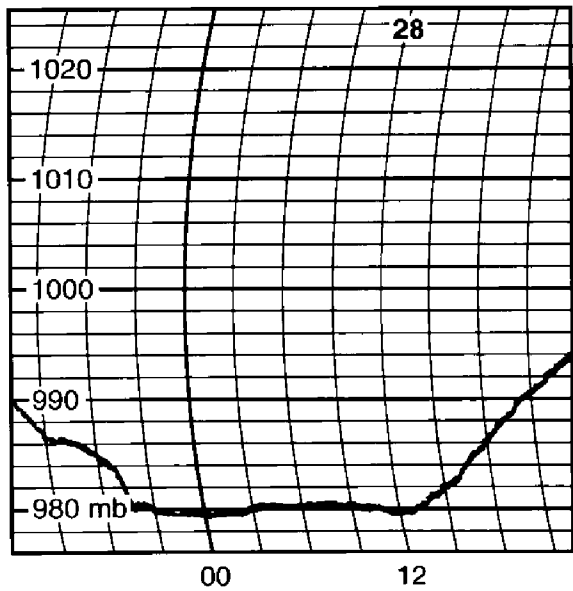
DEPRESSIONS

Tasman Sea

s.s. *Discovery Bay*. Captain T.G. Whittaker. Sydney to Singapore. Observers: the Master, P.E. Garner-Richards, 3rd Officer and ship's company.

27 July–2 August 1998. As the vessel steamed along the southern coast of Australia she was 'hit' by a series of low pressure areas. While passing through two of these between the 27th and 31st the pressure fell at 1 mb per hour for several hours, particularly on the 31st, as indicated on the second barograph trace.

The following weather conditions were noted:



Date and time (UTC)	Temperature		Sea	Pressure (mb)	Wind	
	Air	Wet bulb			Dir'n	Force
July						
27th 0000	16.0°	13.6°	19.0°	1004.7	NW	4
1200	13.2°	12.1°	14.8°	989.6	NE	4
28th 0000	11.0°	8.5°	13.8°	981.8	NW	8

Observed conditions (*contd*)

Date and time (UTC)	Temperature		Sea	Pressure (mb)	Wind	
	Air	Wet bulb			Dir'n	Force
July						
28th 1200	10.0°	9.0°	13.8°	983.9	W	9
29th 0000	8.7°	7.5°	14.9°	999.1	NW	5
1200	10.5°	7.8°	14.7°	1013.5	SW	6
30th 0000	8.1°	7.6°	15.0°	1019.1	SW	4
1200	11.4°	7.9°	13.6°	1021.6	SW	5
31st 0000	14.0°	12.1°	15.5°	1024.7	WSW	4
1200	13.7°	11.7°	14.9°	1013.6	E×S	7
Aug.						
1st 0000	14.0°	11.4°	16.0°	1002.9	NW	6
1200	13.8°	11.0°	17.0°	1002.9	NW	6
2nd 0000	15.5°	12.5°	17.8°	1009.9	W	5
1200	15.0°	13.5°	18.0°	1008.5	WNW	5

The vessel was rolling and pitching heavily to very rough seas and heavy swell for the whole passage across the 'bottom' of Australia. It was necessary to proceed at reduced speed and also to alter course from the intended track a number of times in order to avoid damage to the vessel.

Position of ship: 37° 15' S, 150° 16' E.

CETACEA

Coral Sea

m.v. *British Skill*. Captain B. Pritchard. Whangarei to Singapore. Observers: J. Stone, 2nd Officer, T. McDonald, Cadet and supernumeraries.

12 August 1998. At 0600 UTC when the vessel was 240 n mile north of New Caledonia some disturbance was observed on the port side about 1.5 n mile away. Through binoculars a white 'missile' shape was seen lifting from the water at an angle of about 40° then falling back to the surface. At the closest point of approach, about 0.5 n mile, two cetaceans could clearly be seen; they were bigger than dolphins but smaller than whales normally observed.

One whale had a light-coloured head while the other was darker in colour but not black. Their motion through the water was remarked upon as being strange, each mammal surfacing 'submarine style' a few times before disappearing for a minute or so.

Without an identification book on board it was difficult to determine the species, but from the limited information available the nearest identification that could be arrived at was that these were Cuvier's Whales.

Position of ship: 18° 52' S, 160° 07' E.

Mediterranean Sea

m.v. *Arunbank*. Captain J.J. Millar. Suez to Antwerp. Observers: J.P. Tyson, Chief Officer and A. Eyton, Cadet.

28 July 1998. At 1500 UTC the vessel was on a westerly heading at 12.5 knots towards the Straits of Gibraltar when a group of four large black dolphins were sighted on the surface off the port bow. Initially, it was thought that they might be whales but as they closed with the vessel it became apparent that they were dolphins, and closer inspection revealed them to be False Killer Whales.

Their behaviour was leisurely, swimming on a reciprocal course to the vessel's heading; three of them swam together while the fourth one tracked the others from 20–30 m further to port.

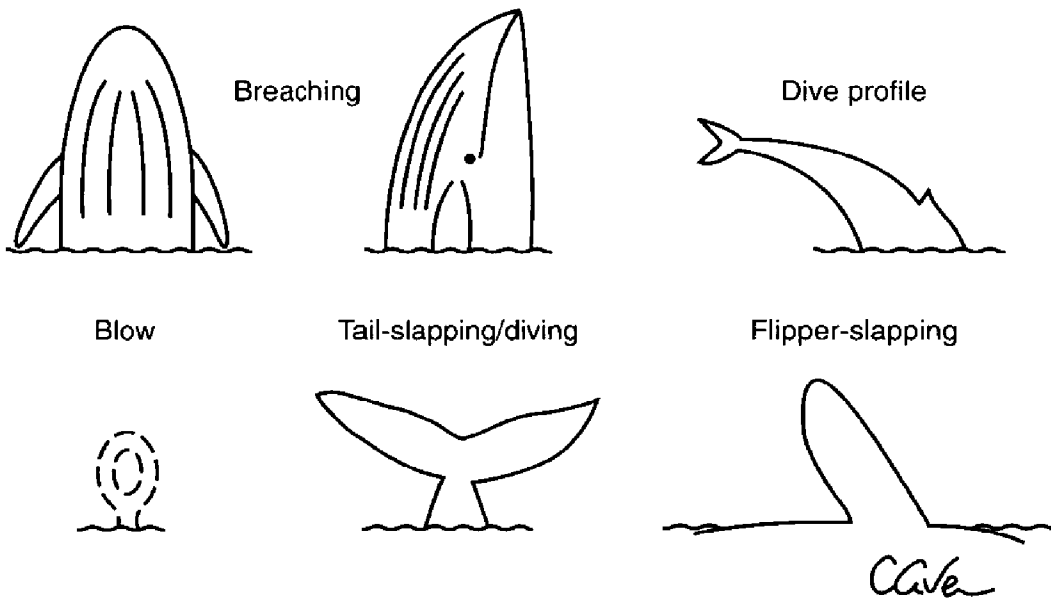
Position of ship: 36° 25' N, 02° 43' W.

Moçambique Channel

m.v. *British Valour*. Captain J.N. Gregson. Persian Gulf to US Gulf. Observers: C. Vernon, Chief Officer and F. Gilsenian, 2nd Officer.

15 July 1998. At 1430 UTC a small Humpback had been seen breaching close to the ship, and this had shown quite distinctly the pale underbelly contrasting with the dark-grey upper body. This event alerted the observers to the possibility of more sightings.

Thirty minutes later, splashes and plumes of water were noticed off to starboard and, upon further investigation, they were seen to be the products of two more Humpback Whales. The sketches indicate what was seen.



They were slapping the water with their flippers and flukes, and breached a number of times during the observation period which was about 20 minutes. Their distance away was too great for any colours to be noted but the blow was seen, being bushy and vertical. When the whales launched themselves out of the water they did so in a backward motion and then twisted, landing in the water on their sides.

Position of ship: 23° 28' N, 38° 50' E.

South Atlantic Ocean

m.v. *Harmac Dawn*. Captain R.P. Yadav. Portocel to Antwerp. Observers: A. Yadav, 4th Officer and B. Kannan, Cadet.

19 September 1998. At 1945 UTC a huge whale was observed fine on the port bow at a distance of about 6 n mile; at first it was considered to be a fishing boat because it was white in colour. It was in continuous sight until about 3 n mile away but then suddenly disappeared; it did not register on the radar display. However, it did resurface but disappeared again when at about 1.5 n mile off, the blow confirming it to be a whale.

The white crescent-shaped 'boat' which was seen originally was actually the tail of the whale, and efforts to take a photograph of it were made as the vessel slightly altered course to starboard in order not to disturb it but it did not reappear for another three minutes, this time surfacing on the starboard beam. The observers managed to get a closer glimpse of it, and also took a photograph; they then realised that there were two large whales present, both black in colour and about 15 m long.

After this sighting, many more whales were seen during the next hour although none were as close. Additionally, whales had previously been sighted close to the Abrolhos Islands but none were so big.

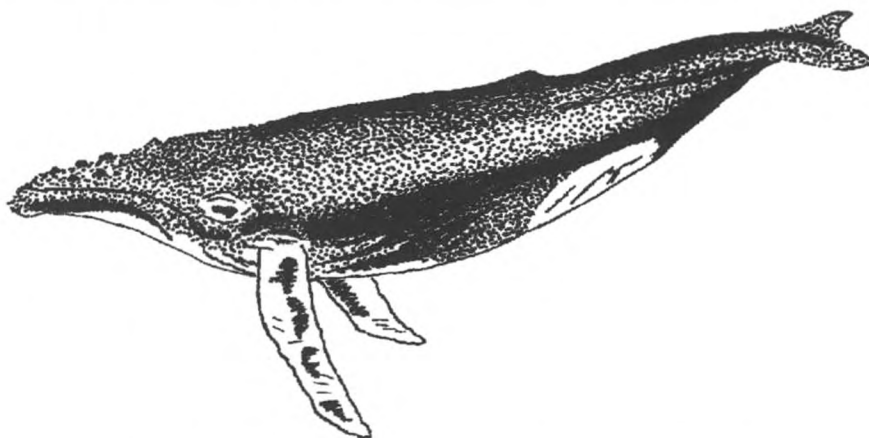
Position of ship: 19° 04.4' S, 39° 05.6' W.

Editor's note. Although the observers mention some photographic activity during the sighting, we have to say that no photograph was received with the ship's logbook.

Indian Ocean

m.v. *City of Cape Town*. Captain J.C. Harris. Port Elizabeth to Durban. Observers: the Master, S. Holding, 2nd Officer and G.E. Wade, 3rd Officer.

30 July 1998. At 1100 UTC whilst rounding Brazen Head, several Humpback Whales were sighted blowing and breaching approximately 2 n mile offshore. They varied in size, some appearing to be young, but all had large areas of white on the underbelly, and black bodies as indicated in the sketch.



The most significant feature of all was the very long white flippers which appeared to be in the order of one-third of the total body length. The whales were watched blowing, diving and also swimming with their flippers pointing upwards.

Position of ship: 32° 00' S, 29° 00' E.

TURTLES AND CETACEA

Mediterranean Sea

m.v. *Colombo Bay*. Captain D.G. Thompson. Northern Europe to the Far East. Observer: G.H. Smith, 2nd Officer.

4 August 1998. Over a short period of only about 30 minutes, three separate observations were made of marine life on what had been, to this point, a very bare observation voyage.

At about 1300 UTC the ship altered course to avoid what appeared to be stacked pallets lying in the water. On closer inspection the 'stacks' were four pallets each with a turtle lying on it, obviously enjoying the sun while hitching a free ride. The turtles were quite large, being approximately 1 m across, and were a mottled green-brown colour while the individual 'segments' of their shells were quite discernible.

Shortly after this, a pod of up to 10 whales were spotted. Initially, they were sighted 4 points on the bow, not seeming to be the slightest bit concerned as the ship closed with them. They could not be identified because they did not dive at all, and they were also obscured by their own blows.

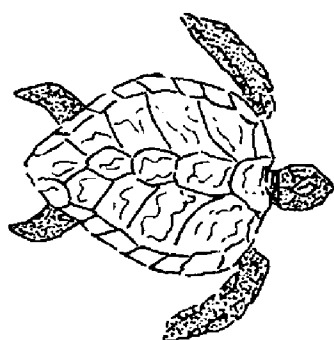
About 30 minutes after the turtles had been sighted a large group of Common Dolphins were spotted trying to race the ship's bow wave. Unfortunately, as the ship's speed was 22.5 knots, it appeared to be a little too fast for them to keep up with the ship for a prolonged period.

Position of ship: 36° 54' N, 02° 00' E.

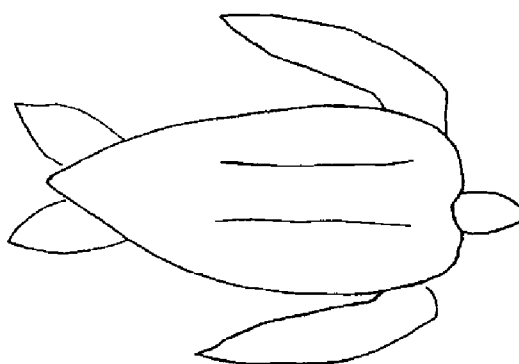
Eastern North Atlantic

m.v. *Resolution Bay*. Captain J.N. Kelleher. Rotterdam to Cape Town. Observers: G. Culkin, 3rd Officer and E. Staff, Cadet.

4 August 1998. Between 0930 UTC and 1200 a number of turtles were sighted; they mainly appeared to be Green Turtles but sadly five of them were dead. The live turtles were of two species, four of them being Green Turtles about 70–80 cm long, see sketch (a). The two others were larger, about 1.5–2 m long, and their shells were smooth-looking and black in colour with the shape of an elongated tear-drop, as shown in sketch (b). Unfortunately they were 3–4 m below the surface, so it was impossible to make a more detailed description.



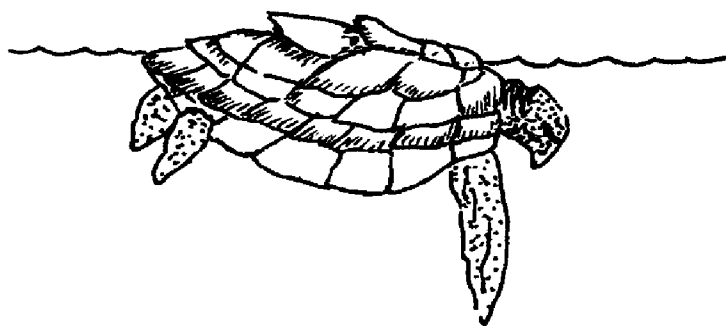
(a)



(b)

Of the dead turtles, one was about 70 cm long and was entangled in plastic, and did not look long dead; two more which were about one metre long were bloated, one more so than the other; the final two were also about 70 cm long and were bloated too, some of the plates starting to rise from the shells, see sketch (c).

It was suggested that they could have been thrown from a fishing boat having been killed in a net; perhaps the only thing that could have indicated otherwise was the fact that they were bloated to differing extents, maybe having died at different times. The observers also noted that one of the live turtles acted 'sick', not swimming away like the others or even moving very much after being tossed around by the ship's wake.



(c)

E. Staff

One other point which may have been of relevance was that just below the surface of the water there were a couple of pieces of what looked like tissue and fat about one metre square, the sides of these were shredded as though fish (or something) had been tearing at them.

All the turtles were on the starboard side although the observers felt that would have more been to port if it had been possible to see them against the sun.

Weather conditions at the time were: air temperature 26.9°, wet bulb 25.3°, sea 27.0°, pressure 1016.1 mb, wind NNE'y, force 1. The ship's speed was 21.5 knots.

Position of ship at 0930 UTC: 16° 40' N, 18° 00' W.

BIOLUMINESCENCE

Arabian Sea

m.v. *Botany Bay*. Captain S.G. Millar. Singapore to Jeddah. Observers: M.K. Hill, 3rd Officer and I. Murray, Cadet.

18 July 1998. At 1650 UTC, whilst approximately 120 n mile south-east of Cape Comorin and 130 n mile east-by-north of Dondra Head, heading west across the Arabian Sea on a course of 285° at 17.5 knots, spectacular bioluminescence was observed on the starboard side of the ship.

It appeared to be a single column of light-blue or turquoise light approximately 10 m on the starboard bow, rising up from beneath the sea and then exploding as it reached the surface before radiating outwards into a much brighter area of blue-turquoise light about 35 m in diameter.

As the observers went out onto the starboard bridge wing, the now very large patch of luminescence went by about 15 m from the side of the ship. As it passed by, many more smaller such patches could be seen rising to the surface like thousands of tiny light-blue bubbles and then exploding into much smaller patches of luminescence. The 'bubbles' were occurring in a band about 15 m wide, and the luminescence left the water looking very cloudy as it passed away astern.

As it was thought the phenomenon had ceased, the observers returned to the wheelhouse but on looking out of the window, many more large patches of bright-blue or turquoise luminescence started to appear all around the vessel, ranging in size from about 15–40 m in diameter.

Once more the observers went out onto the starboard bridge wing, taking the Aldis lamp along to get a better look at the water as it passed by. When shining the

lamp on the sea beside the vessel, the water appeared cloudy but it was soon realised that by shining it further away from the vessel, much more bioluminescence could be caused.

When the lamp was turned off, the luminescence caused by it seemed to be moving rapidly away from the vessel and then, about one second later, it would explode into a larger and brighter area about 0.75 n mile away. The whole observation ceased at 1710. During the 20 minutes of the phenomenon the sky was heavily overcast and frequent showers had been encountered during the preceding hours. The wind was W'ly, force 5, and the sea temperature was 27.6°. There was a moderate sea and low swell. The visibility was good.

The following morning, the Third Officer investigated what had actually been watched, coming to the conclusion (with reference to the *Marine Observer's Handbook*) that it was one of the "more remarkable" forms of bioluminescence caused by the "upwelling of subsurface water or organisms breaking into vivid luminosity at the surface".

Position of ship: 06° 23' N, 78° 24' E.

m.v. *British Skill*. Captain B. Pritchard. Fujairah to Whangarei. Observers: N. Hopgood, 3rd Officer and S. Sumabat, Watchkeeper.

16 July 1998. At about 2100 UTC a bright patch of light was sighted on the port bow, slowly increasing in intensity and size. When viewed through binoculars it appeared as a series of 'lightning bolt' flashes upon the horizon. As they drew closer the sea started to become illuminated quite brightly, and the flashes became more pronounced until they were all around the ship, extending to the horizon in all directions.

At one point the illumination was so intense that the ship's hull could be seen below the surface to a depth of several metres. The brightest stage of the display came at about 2130 when a quite spectacular light-show was visible all around the ship. Then about 10 minutes later the light started to fade slowly until disappearing completely at about 2210.

The ship's heading was 139° at 14 knots. Weather conditions at the time were: dry bulb 26.0°, sea 27.5°, wind NNW'ly, force 3. The visibility was good to moderate; there was drizzle and also rain showers throughout the phenomenon, and a lightning storm was visible in the distance on the port bow.

Position of ship: 06° 19' N, 77° 42' E.

Gulf of Mannar

m.v. *Maersk Surrey*. Captain K. Hammerman. Gulf of Mannar to Kharg Island. Observers: S. Gallaway, Chief Officer, A.P. Hodgson, 2nd Officer, R. Balita, GP Seaman and E. Diaz, GP Seaman.

16 September 1998. Between 1900 UTC and 2130 zones of intense bioluminescence were seen around the vessel from the bow wave to the wake, the colour changing from pale-green to an intense electric-blue. During this period it was possible to read a book on the bridge wing without an additional light source. Samples of sea water taken at the time showed an amount of suspended matter in the form of opaque 'threads'. When the samples were agitated, these filaments glowed with the same electric-blue colour. A search-light was shone over the affected areas of the sea but little or no effect on the bioluminescence was noted.

The display faded, but between 2200 and 2359 it increased once more, becoming most vivid at 2225 although not as bright as its first appearance; additionally, 'white horses' in the water up to 2 n mile around the ship were visible as splashes of a bluish-green colour. Thereafter the display decreased in intensity until, at the reporting hour, when low cloud passed within one mile of the ship and produced rain, all activity ceased.

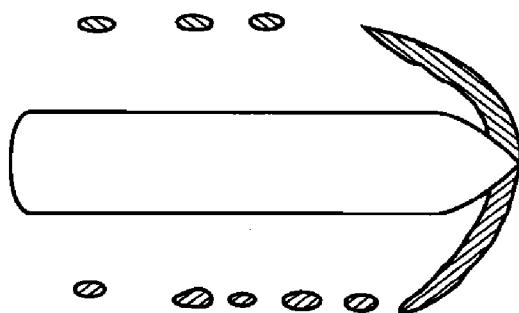
The sea temperature was 25.5°, and the wind at 2000 was SW×W'ly, force 4.

Position of ship at 2000 UTC: 07° 29.7' N, 78° 21.6' E.

Gulf of Aden

m.v. *P&O Nedlloyd Liverpool*. Captain M.D. Moore. Jeddah to Colombo. Observers: N.J. Sharp, 3rd Officer and E. Rosales, AB.

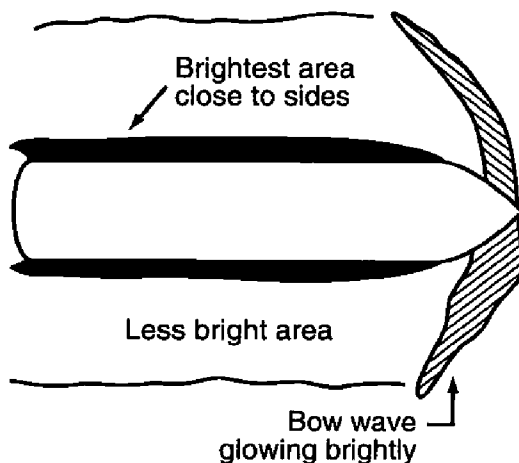
7 September 1998. Whilst the vessel was passing through the Gulf of Aden on a course of 087° at 20 knots, bright blue-green bioluminescence was observed in the ship's bow wave and along edges of the wake at 1820 UTC, as shown in the sketch.



The glowing areas were very bright although the wake itself was generally not illuminated at all. This effect lasted for about 15 minutes before becoming more faint and then disappearing from the wake although remaining within the bow wave. By 1850 the glow had faded completely.

At the time of the observation the sea was calm and there was a low south-easterly swell.

11 September 1998. At 1400 UTC bioluminescence was noted again. In addition to the observers of the earlier event, C. Hall, Chief Officer, F. Munro, Cadet and D. Mora, AB noted a milky-white glow in the ship's wake and bow wave as well as in nearby 'white horses'.



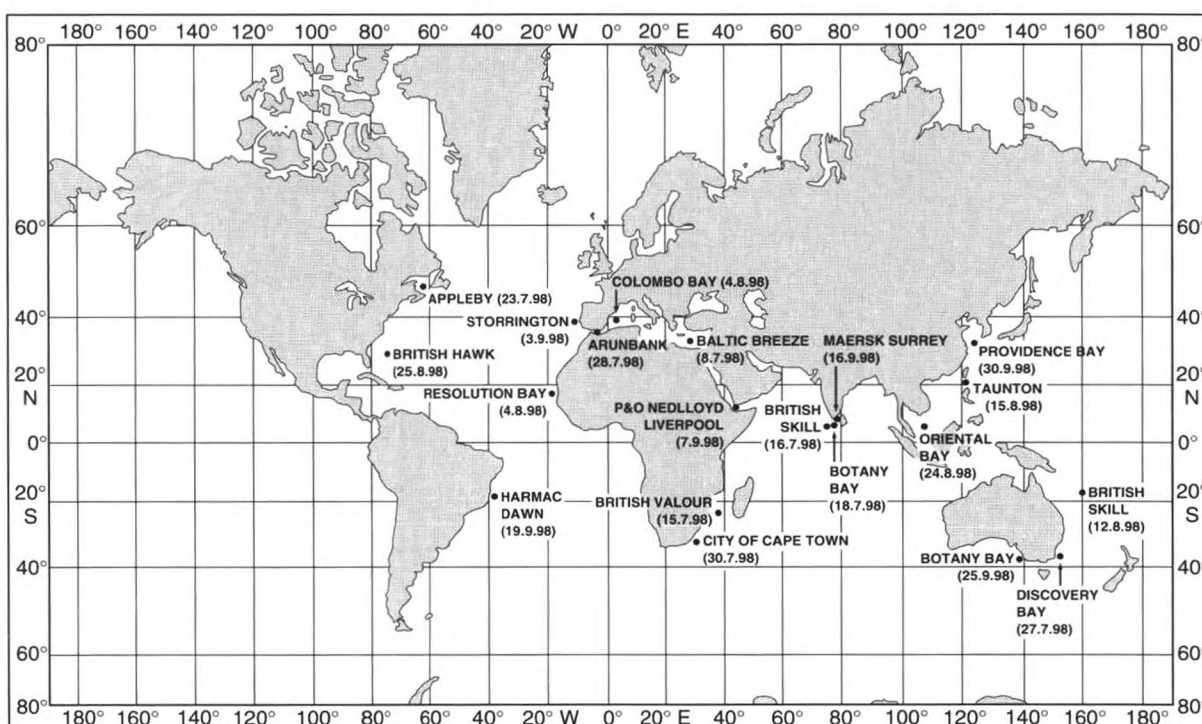
It was brightest in the bow wave itself and also in a narrow area along the ship's sides, as indicated in the sketch.

By 1500 the glow had faded and was no longer visible. However, 45 minutes later the glow returned, as though a light had suddenly been switched on, and the entire wake was glowing brightly with the most intense areas in the bow wave and along the ship's sides as before. It was also visible in numerous white horses around the vessel out to a distance of 2 n mile. A water sample was taken at 1600 but nothing was visible, it failed to glow even when shaken or stirred; a torch was shone over the side, and both radars were stopped for a time but neither measure had any noticeable effect on the bioluminescence .

This milky-white glow continued, with varying degrees of intensity, until about 1730 when it gradually faded from view. The ship's course at the time was 100° at 21 knots.

Position of ship at 1820 UTC on the 7th: 12° 26.7' N, 44° 15.1' E.

Position of ship at 1400 UTC on the 11th: 07° 38.8' N, 76° 01.4' E.



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

GLORY

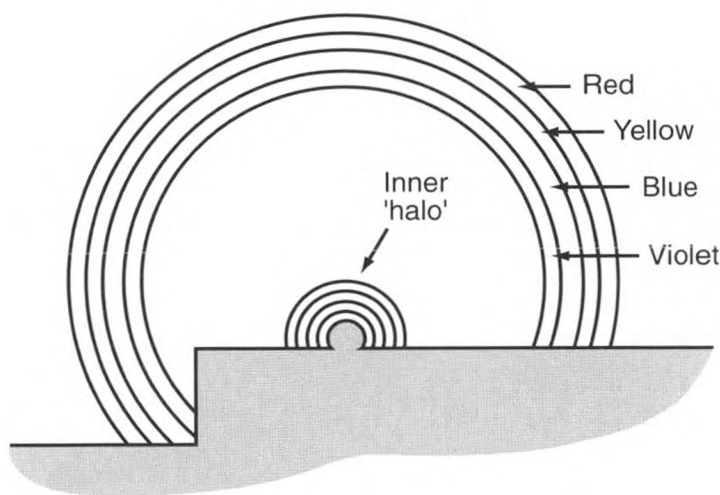
Eastern North Atlantic

m.v. *Storrington*. Captain C.D. Grahame. Casablanca to Setubal. Observer: the Master.

3 September 1998. At about 1355 UTC the vessel passed into an isolated patch of fog in which the visibility was reduced to about 150 m; the fog was shallow, its depth being about 20 m, and there was clear sky above it.

As the observer glanced over the starboard side of the bridge wing (his height of eye being approximately 14 m), a 'fogbow' in the form of three-quarters of a circle was noted. The overall impression of the colour of the bow was white but there

were also underlying colours of the full spectrum (red, yellow, blue and violet being predominant, with red on the outer edge). The observer was then surprised to see the shadow of his own head on the fog, with another set of rings acting as a 'halo' around it, see sketch. (The observer had not previously been credited with saintly qualities!)



The colours of the inner set were similar to that of the outer one. It was not possible to measure the radius of the outer ring but it was estimated to be about 45° . At the time of the observation the sun's elevation was approximately $56^\circ 30'$, and the ship's heading was 315° .

Weather conditions were: air temperature 20.0° , wet bulb 19.9° , there was little wind, just light airs, and the sea was slight.

Position of ship: $38^\circ 15' \text{ N}$, $09^\circ 11' \text{ W}$.

Editor's note. The Met. Office *Meteorological Glossary* (Sixth Edition, 1991) states that a glory is, "the system of coloured rings similar to those of a corona round the sun or moon, surrounding the shadow of an observer's head on a bank of cloud or mist. The phenomenon is also termed 'anticorona'. A several-fold effect is sometimes observed, while a fogbow may be seen to surround a glory."

This definition would seem to indicate that Captain Grahame's observation was indeed 'glorious'.

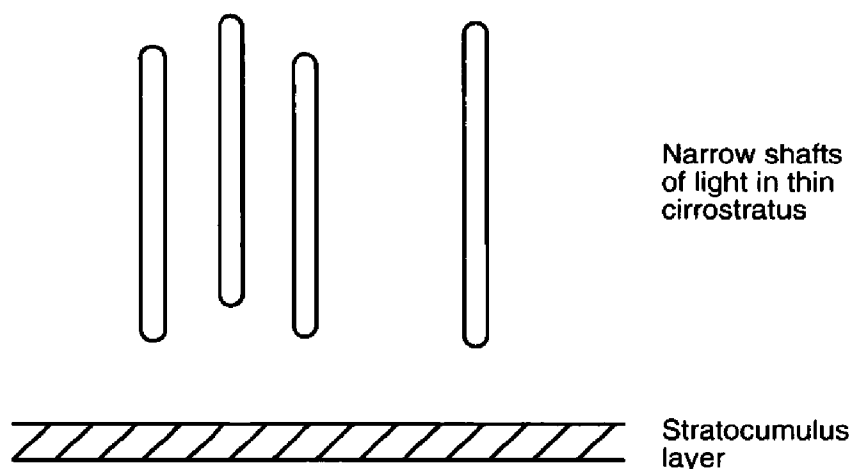
OPTICAL PHENOMENON

South China Sea

m.v. *Oriental Bay*. Captain J.L. Peterson. Hong Kong to Singapore. Observers: C. Robins, 2nd Officer, Miss L.M. Butler, 2nd Officer and S. Rainford, 3rd Officer.

24 August 1998. Four shafts of narrow vertical light were observed reflected in the sky. Upon consulting the chart it was revealed that they were 'reflections' of the four flares of the Kakap Natuna oil terminal which at this point was 75 n mile away.

As indicated in the sketch, the shafts of light were visible above a lower layer of stratocumulus cloud and, when measured by sextant, their upper tips were calculated to be nearly 13 km high. The shafts appeared to be reflected in a thin layer of cirrostratus and, as the vessel approached to 60 n mile from the terminal, the glow from the flares was also visible on the horizon.



In all these 'reflections' were seen for more than one hour but were obscured when clouds developed over the area. At the time of the observation the dry-bulb temperature was 27.5° , the wind was variable, force 2 and the pressure was 1012 mb.

Position of ship: $05^{\circ} 39' \text{ N}$, $107^{\circ} 05' \text{ E}$.

EXTREME RADIO PROPAGATION

Mediterranean Sea

m.v. *Baltic Breeze*. Captain W. Yeo. Port Said to Bristol. Observer: the Master.

8 July 1998. At 0500 UTC a conversation from Port Control at Marsaxlokk was heard on VHF Channel 16; at the time Malta was about 720 n mile away from the vessel's position.

This was not the only example of extreme propagation encountered; the whole voyage within the Mediterranean Sea was blessed with good TV reception tuned in from stations more than 200 n mile away. On one occasion, there was reception from TV Jordan for a period of 28 minutes.

At 0500 the air temperature was 24.2° , the wet-bulb reading was 20.9° and the pressure was 1009.4 mb. The ship's heading was 288° .

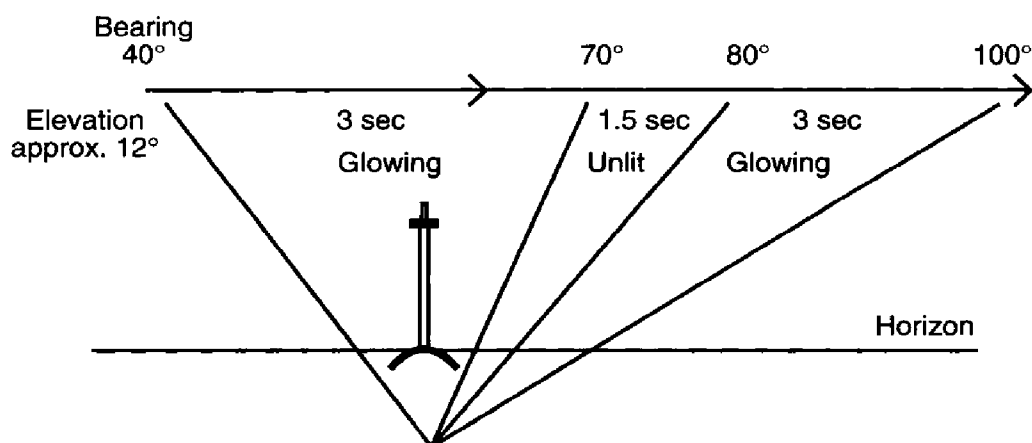
Position of ship: $32^{\circ} 41.3' \text{ N}$, $28^{\circ} 35.3' \text{ E}$.

METEORS

Luzon Strait

m.v. *Taunton*. Captain J.A. Smeeton. Richards Bay to Kimitzu. Observer: S. Singh, 3rd Officer.

15 August 1998. At about 1538 UTC a meteor with a remarkably horizontal flight path was observed. It was first seen at an elevation of about 12° degrees above the horizon, and $1\frac{1}{2}$ points on the port bow; it travelled across to the starboard side, then seemed to burn out. After about 1.5 seconds, however, it reappeared and was sighted for a further 3 seconds before it finally disappeared.



See sketch. Using the ship's foremast as a guide, it was noted that elevation of the meteor was almost constant throughout the observation.

Three nights later a very bright meteor was observed at 1110 bearing approximately 045°, and the whole sky was brightly lit, enough to enable reading by its light. Just before disintegrating about 4 seconds later, there was a brilliant green flash, the transition of colours from yellow to orange and finally to green being clearly observed. The elevation of the meteor at its disappearance was about 2°.

Position of ship at 1538 UTC on the 15th: 20° 48' N, 121° 00' E.

AURORA BOREALIS

Gulf of St Lawrence

m.v. *Appleby*. Captain J.L. Wilson. Port Cartier to Immingham. Observers: J. Morton, 3rd Officer and A. Senarathna, AB.

23/24 July 1998. The aurora borealis was sighted at 0330 UTC. There was a band measuring 35° long in azimuth, with deep-blue almost black vertical bands lying between the altitudes of 15° and 25°. The colour changed to brilliant blue at 0335, lasting for about 15 minutes before cloud began to obscure it. Thereafter all that could be seen were light-blue bands running 'horizontally' across the cloud tops.

Position of ship: 48° 50.7' N, 62° 38' W.

Note. Ron Livesey, Director of the Aurora Section of the British Astronomical Association said:

"The Gulf of St Lawrence is a location from where UK VOF observers often report aurorae. On this occasion the Earth encountered a stream of solar particles that caused a magnetic storm which peaked on 23 July. Active aurorae were reported by observers in Canada and the USA on the nights of 22/23, 23/24 and 24/25 July. Jay Brausch at Glen Ullin, North Dakota, photographed the display on 22/23 July and captured blue rays and blue glows as well as red and green glows and rays at lower elevations.

"Blue-coloured auroral forms may be common during or after very active displays, owing to activity in the nitrogen of the atmosphere; in a mixture with red emissions from oxygen activity it gives the aurora a purple colouration. Blue or purple is most evident in the upper layers of an aurora, and is enhanced where the aurora lies above the Earth's shadow and is in sunlight; here it reacts with the aurora to form constituents of the atmosphere.

"There is a phenomenon called the 'black aurora' which consists of small regions of very low luminosity embedded in brighter auroral light; the 'black' rays reported from the *Appleby* could have been a phenomenon of this type."

AURORA AUSTRALIS

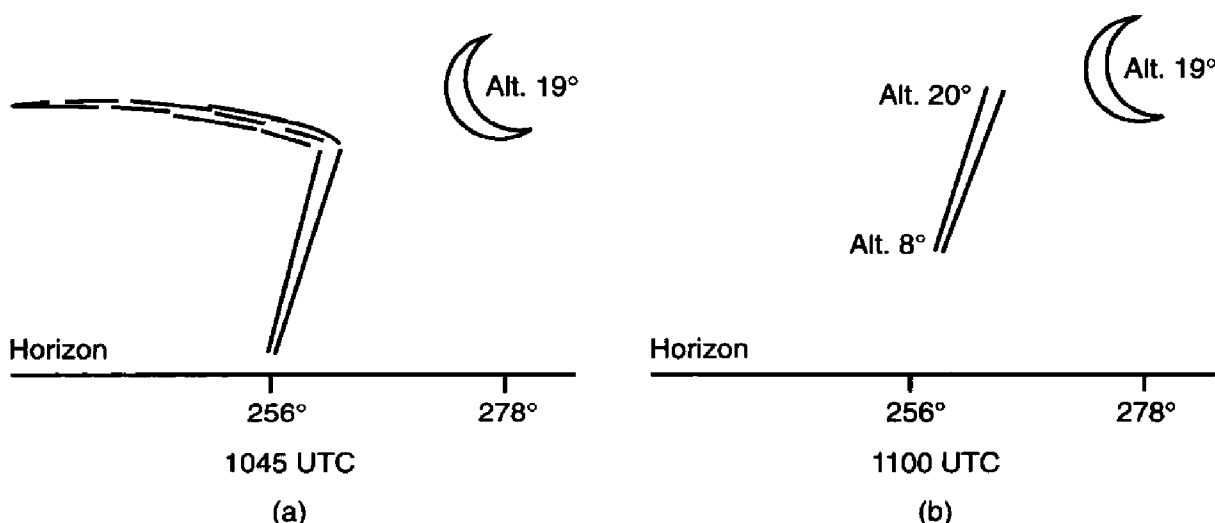
Indian Ocean

m.v. *Botany Bay*. Captain L.J. Fletcher. Melbourne to Fremantle. Observers: P. Handley, 3rd Officer and N. MacDonald, SMS.

25/26 September 1998. At 1010 UTC aurora australis activity was reported by the 8-12 lookout (a native of the Western Isles, he was therefore an observer familiar with auroral activity), and over the next 75 minutes a display was observed that, using the reporting terms detailed in the *Marine Observer's Handbook* (1969 Edition), would be described as a quiet glow with occasional rays of weak to moderate brightness. In the main, the sky was clear apart from scattered altocumulus which quickly cleared, and indeterminate cloud on the southern horizon. This situation, coupled with the poor light of a five-day old moon (elevation 19° , bearing 278°) prevented the taking of accurate elevations.

At 1030 the glow was at its maximum extent and brightness, being visible on the horizon from 130° to 250° with a maximum elevation of about 18° . From this arc of light, which was greyish-white in colour at all times, rays would develop and fade, reaching a maximum elevation of 50° . Whilst these rays were short-lived there was no noticeable horizontal movement or wave-like effect.

At 1045, while the main area was diminishing, a single ray was observed well clear of it, on a bearing of 256° ; this ray extended from just above the horizon to an elevation of 17° from which point it produced an arc that pointed south, see sketch (a).



During the next 10 minutes the isolated ray appeared to retract from both ends, but at 1055 it started to grow again, minus the arc, until a new maximum extent was reached at 1100 when the elevation of the ends of the ray lay between 8° and 20° , see sketch (b). By this time the main glow was just visible above the clouds on the horizon, and the isolated ray started to diminish too. All signs of auroral activity had disappeared by 1125. A further sighting of the aurora was made at 1400 but lasted for only a minute or two before fading again.

Position of ship at 1100 UTC: $38^\circ 36' \text{ S}$, $140^\circ 50' \text{ E}$.

Note. Ron Livesey said:

“There was a solar flare on 23 September at 0713 UTC which led to a shock wave in the solar wind striking the Earth’s magnetic field on the 24th at 2300. From about 2330 on the 24th until 1800 on the

25th, the north-south component of the interplanetary magnetic field turned strongly southward to a maximum of -27 nanoteslas [a 'tesla' is the SI unit of magnetic flux density]. This was the classic trigger mechanism to start a magnetic storm on Earth during the 25th.

"Active aurora was observed from all over North America down to Colorado on the night of 24/25 September, and high energy particles from the sun were affecting the polar regions between 1300 on the 23rd and 1800 on the 25th. Having regard to their position in the Southern Hemisphere, the observers were seeing part of the activity as the spinning Earth took first the Americas and then Australasia under the auroral storm."

MISCELLANY ...

An additional mélange of maritime sightings

Chiquita Bremen. 20 September 1998. A rainbow was seen at 0925 UTC when the vessel was approaching a shower, and a secondary bow appeared about five minutes later. Both bows were complete, fading as the vessel entered the shower. The bows were observed by Captain H.S. Wright, Chief Officer M. Dziurka and E. Villanueva, AB.

Cotswold. 20 September 1998. At 2315 UTC bioluminescence had been noticed around the vessel; it was bright in the bow wave with light flashes extending to 20 m on either side of the ship, gradually fading into the wake and the darkness of the night (the sky was overcast and the moon was new). The display lasted until 0130 on the 21st. The vessel was loaded with iron ore to a draft of 16.56 m, the wind was E'ly, force 6, the sea temperature was 17.0° and the ship was on passage between Port Cartier and Rotterdam, in position 50° 19' N, 15° 20' W.

Elk. 2 August 1998. At 1702 dolphins were sighted around the vessel whilst it was on passage between Helsingborg and Teesport, its position being 55° 42' N, 02° 34' E.

European Pathfinder. 29 August 1998. About 45 n mile north of Land's End at 0600 UTC a large whale was sighted on the surface about 0.2 n mile off the starboard bow. Chief Officer G.R. Henderson and J. Rey, AB noted that it did not appear to be perturbed by the very close presence of the ship, not diving until well abaft the beam. After consulting *The Seafarer's Guide to Marine Life* by Paul Horsman, the whale was identified as a probable Sei Whale from its shallow dive, small dorsal fin and its blow.

Maersk Suffolk. 13 August 1998. Deck Cadet D. Lambert, while taking the sea temperature at 0630 UTC, observed a shooting star fall and impact the water approximately 450 m from the vessel. The 'star' was shimmering blue in colour and made a dull thudding sound on impact. The GPS position at the time was 25° 36.7' N, 71° 20.3' W.

Maersk Surrey. 22 July 1998. Captain M. Smith-Burley and D. Willmore, Cadet watched a bird circle the vessel two or three times before it flew off in a northerly direction. It was predominantly white with a deep-orange bill, black eye and a short tail from which was noted a single long and thin feather. The shape and size of the bird was similar to that of a fairly large tern and, with reference to a postage

stamp previously purchased on Pitcairn Island, it was identified as a tropicbird. The ship's position was 26° 01' S, 136° 52' W.

P&O Nedlloyd Texas. 7 August 1998. At 1407 UTC the vessel started to pass through an area of marked current rips. Three bands were encountered over a distance of 2 n mile, each one being about 0.5 n mile apart, while the width of the affected area was 5 n mile. The set and rate was initially 062° × 1.8 knots; this became 052° × 2.5 knots by 1414 and, at 1418 (when the vessel had passed through the area) was 040° × 2.4 knots. The ship's position was 22° 13.8' N, 115° 33.5' E.

Repulse Bay. 12 July 1998. A school of dolphins passed down the starboard side of the vessel at 0045 UTC. Third Officer A.G. Soper identified them as Spinner Dolphins by their colouring and by their reaction to the vessel. As it passed, they started to jump clear of the water and, while in mid-flight, turned to stare up at the ship; one of them even started 'dancing' along on his tail-fin as the vessel cleared the school. The ship's position was 38° 32' N, 145° 55' E.

Seki Cedar. 4 August 1998. Whilst between Cabo da Roca and Cape St Vincent, a single whale blow was sighted at 0600 UTC by Captain P.W. Jackson and Chief Officer S.J. Cole; further observation revealed the following details: two blows about 30 seconds apart followed by a lapse of about four minutes, then two more blows as before. This sequence was repeated five times after which the whale disappeared. The blows were vertical, rounded in shape and about 4 m tall, and lingered for about 20 seconds. The whale's head was not seen although there was a long, shallow, dark-grey back showing a small fin curving to rearward. It was thought to be a Fin Whale.

Singapore Bay. 22 August 1998. Whilst in the Strait of Malacca the weather was typical for the area: altocumulus cloud at different levels with cumulonimbus also present. The morning light appeared particularly dull for a while, and it was then noticed that the sun was crescent-shaped although only observable through gaps in the cloud. Consultation with the almanac confirmed that this was the annual [sic] partial eclipse.

Tasman Spirit. 29 August 1998. Captain T. Elam observed a waterspout roughly 2 n mile away at 1733 UTC. It was 1600–1800 m high, 14–16 m in diameter and caused disturbance of 6–7 m high at the surface. Many cumulus clouds were present in the area of the waterspout, and the vessel had experienced moderate rain 10 minutes before the sighting. The ship's position was 18° 34' N, 105° 40' W.

Ullswater. 23 September 1998. Whilst on passage between East London and Port St Johns at a distance from land of 2–5 n mile, whales were almost always in sight and were watched by Captain J.H. Lacey and the ship's company. Sometimes there were individual whales, sometimes there were groups of two or three, or more. They were breaching, tail-lobbing and flipper-slapping although all seeming to be heading south-west. They were all thought to be Humpback Whales.

(*Editor's note*. Another report of Humpbacks behaving in a similar fashion in this area of the South African coastline appears on page 104.)

... and finally

Wherever possible we endeavour to print observers' sightings together with full expert comment and analysis. Should our production schedule preclude this, then we will publish comments retrospectively, referring readers to the appropriate edition of *The Marine Observer*.

ISSUE	PAGE	SHIP	COMMENTS
January 1999	16	<i>British Resolution</i>	Dr Peter Herring, of the Southampton Oceanography Centre, said: "This sounds very like the 'red tide' phenomenon I described in <i>The Marine Observer</i> [January 1998, pp. 19–25], also in the Gulf of Oman at a similar time of year. The bright flashes in the wavelets were probably caused by the tiny dinoflagellates which are the organisms involved in red tides. The most likely species, <i>Noctiluca scintillans</i> , is very buoyant and in calm periods collects right at the surface where it forms the typical reddish scum. In the huge densities in these scums the luminescence appears very bright, producing an intense blue flash at the breaking wavecrests. The propellers are below the main concentrations, so because it is aggregated only at the surface the effect in the wake is much less noticeable. When the organisms are mixed deeper the light appears less bright because they are much more dispersed."

Marine Automatic Weather Station Network

(The Met. Office, Marine Systems Operations)

For more than 10 years the UK Met. Office (UKMO) has been at the forefront of Marine Automatic Weather Stations (MAWS) development. MAWS are designed to provide continuous observations from specified locations in the data-sparse oceanic and coastal regions. The current network extends from the north-west of Scotland to the Bay of Biscay. Although a network existed prior to the Great Storm of 1987, it was primarily developed and extended after this, as it was determined that an increase in the number of long term marine surface observations would significantly improve the accuracy of weather forecasts. Currently UKMO operates a network of different types of MAWS which include 12 Open-ocean buoys, three Inshore buoys, three Islands, four Light Vessel AWS and MAWS on several oil and gas platforms. Data from these systems are not only used in routine forecasting and model simulation to monitor developing weather conditions, but also provide information on the climatology of oceanic and coastal areas and ground truth for satellites.

Originally the needs of the network were developed in response to the UKMO requirements under the auspices of United Kingdom Observational Network (UKON4). This specified that there was a requirement for marine stations to report synoptic observations every three hours and to be spaced every 300 km. The

network implementation was completed two years ahead of schedule with hourly observations being automatically transmitted via satellite to Bracknell where they were available to the users within minutes of being taken.

The MAWS network can, and has been adapted to both internal and external user requirements when the customer demand arises. This was recently demonstrated with the inclusion of the K7 buoy near Shetland (Figure 1).

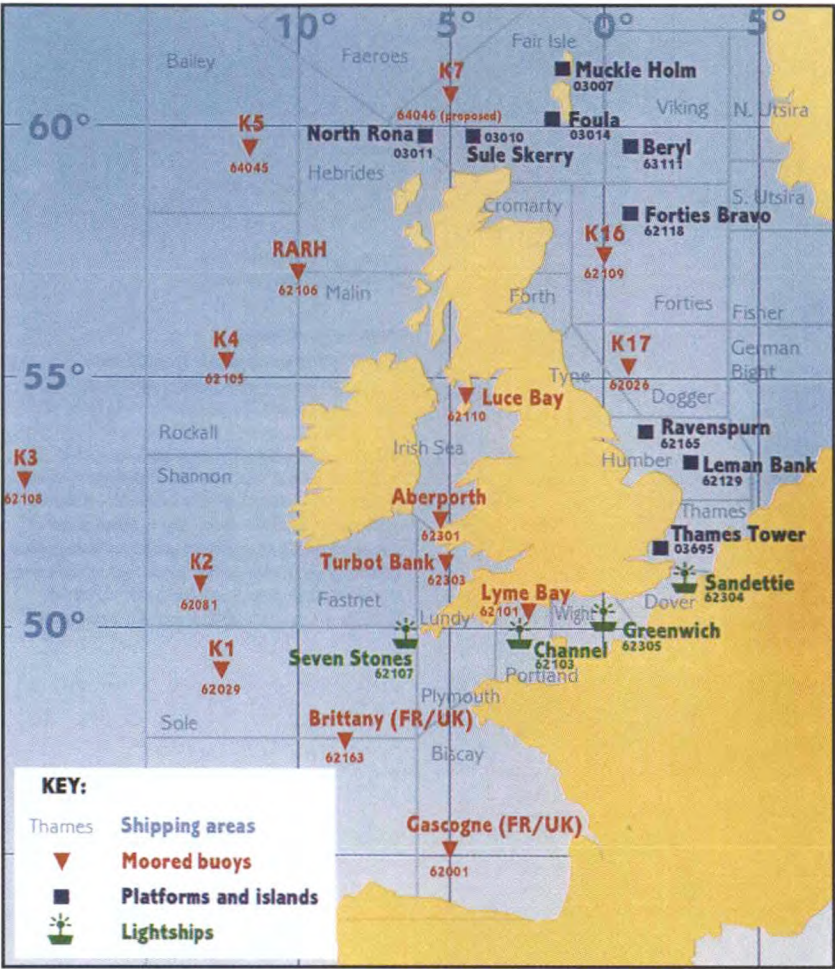


Figure 1. The MAWS Network

The UK Met Office MAWS Network

MAWS measure a range of meteorological observations (Table 1) with a required accuracy that often exceeds the standards set for similar land Automatic Weather Stations (AWS). All observations are compared with the UKMO fine resolution model which provides an estimation of the predicted weather conditions. The accuracy of the observations and the comparisons can be validated against a second independent set of sensors on each system.

The MAWS Moored Buoys are deployed, serviced and recovered by Royal Maritime Auxiliary Service (RMAS) mooring vessels (Figure 2). Buoys are deployed for two years with additional sensor changes every six months and mooring inspections annually. On all servicing visits observations from the MAWS are validated against at least two-hourly manual observations to ensure their integrity.

Table 1. — Observations available from MAWS

OBSERVATIONS	UNITS	SENSOR ACCURACY \pm	MAXIMUM VARIATION FROM BACKGROUND FIELD	
			MAWS	LAND AWS
Wind speed	kn	0.2	10	15
Maximum gust	kn	0.2	$\times 3$ the difference of the mean	
Wind direction	$^{\circ}$ T	1.0	35	35
Barometric pressure	hPa	0.2	1.5	2.0
Air temperature	$^{\circ}$ C	0.1	3.0	5.0
Sea temperature	$^{\circ}$ C	0.1		
Dew-point temperature	$^{\circ}$ C	Calculated	3.0	5.0
Relative humidity	%	0.06		
Visibility ⁱ	km	0.1		
Significant wave height ⁱⁱ	m	0.1		
Wave period ⁱⁱ	sec	0.1		

ⁱ Light vessel MAWS only.

ⁱⁱ excluding Island Automatic Weather Stations



Figure 2. UK Met. Office Open-ocean Buoy

The Open-ocean Buoy provides a platform for both meteorological and oceanographic instruments, in depths down to 4.5 km. The buoy has been designed to withstand the severest conditions experienced in the North Atlantic. All Open-ocean buoys transmit hourly synoptic observations of local conditions via two largely independent identical systems. Only the wave sensor and certain minor housekeeping functions are common to both. This arrangement provides a highly reliable unit which continues to operate even in the event of the failure of any major component. The duality of the system also permits the comparison of data from two completely independent sets of sensors at the same location. This unique facility means that a comparison can be used to assess the validity and accuracy of the observations transmitted from the buoy, against predictions made by the UKMO fine resolution model.

The buoys possess Global Positioning Systems (GPS) units which allow the monitoring of the buoy location at the time of each hourly observation. Data

Collection Platforms (DCP) are also positioned on the buoys, which transmit and process data via the Meteosat geostationary satellite system, to land-based receiving stations. These observations are then available to the World Meteorological Organization (WMO) via the Global Telecommunications System (GTS).

Inshore Buoys (Figure 3) are smaller and deployed in relatively sheltered coastal waters with depths up to 50m. Due to their size and location these MAWS use only one suite of sensors. The communications also differ significantly from that of the Open-ocean Buoy as they use an UHF data link with line-of-sight to a receiving station on the shore. This can be up to 20 miles away. The main



Figure 3. The UK Met. Office Inshore Data Buoy

advantage of the inshore buoy is that, in addition to the automatic synoptic data transmissions, it can be interrogated from the shore whenever data are required. The data available from Inshore Buoys are valuable for Port Authorities, coastal defences and MOD ranges.

The UKMO has installed automatic weather stations (AWS) on four Trinity House Light Vessels in the English Channel. These operate in the same way as an Open-ocean Buoy with two identical sensor and data gathering suites, transmitting data via Meteosat to land based receiving stations and onto the GTS.

In addition to the main MAWS systems the UKMO use Drifting buoys. As the name suggests, drifters are free drifting platforms fitted with instruments to measure barometric pressure, air and sea surface temperature although some are deployed with wind speed and direction capabilities. Drifters are a relatively cheap way of obtaining meteorological measurements from the data sparse areas of the oceans. These buoys are disposable and can be deployed at sea by untrained volunteer ship crews or air dropped by suitably equipped aircraft. The drifters transmit data via the NOAA series of polar orbiters and GTS to the meteorological community. UKMO currently deploys between 25 and 30 drifters per year as part of its contribution to the European Group on Ocean Stations (EGOS) to produce meteorological observations in the Atlantic Ocean.

Future Developments in the MAWS Network

Plans are now being laid to extend the network in the future. Developments are being made to increase the number of instruments on the moored buoys, therefore increasing the types of observations available from the MAWS network. Feasibility studies are being undertaken to assess whether spectral and directional wave data can be derived from the Open-ocean Buoys. There is also the potential to increase the use of the Open-ocean Buoy for marine measurements, such as sub-surface temperature, salinity and current depth profiles. The operational MAWS network has been highly reliable, producing valuable observations from data-sparse oceanic regions. This MAWS network has the potential to be further exploited to provide increasing types of observations from other oceanic regions in the near future.

**For further information on The UK Met Office MAWS Network, please contact: Met O (OLA)4 Marine Systems Operations Room B6 Beaufort Park Easthampstead Wokingham Berkshire RG40 3DN.
Telephone: +44 (0)1344 855837**

Preface to the article ‘Giant icebergs’. On 31 January 1998 R.R.S. *Bransfield* encountered two ‘mega bergs’ whilst on passage along the Ronne and Filchner ice shelves in the course of laying aircraft fuel depots. Whilst plotting the leading edge of the first berg, A23-A, communications antennae from the abandoned Russian base Druzhnaya were spotted and it was found that since 1989 when the berg was last plotted, the antennae had moved 36 miles to the north-west in company with its icy host. Berg A23-A measured approximately 30 miles long by 34 miles wide. The second berg, A22-A, was encountered a little later in the day, and was found to be about 22 miles long. The observers on this occasion were O. O’Keefe, 4th Officer, and D. Taylor, SG1.

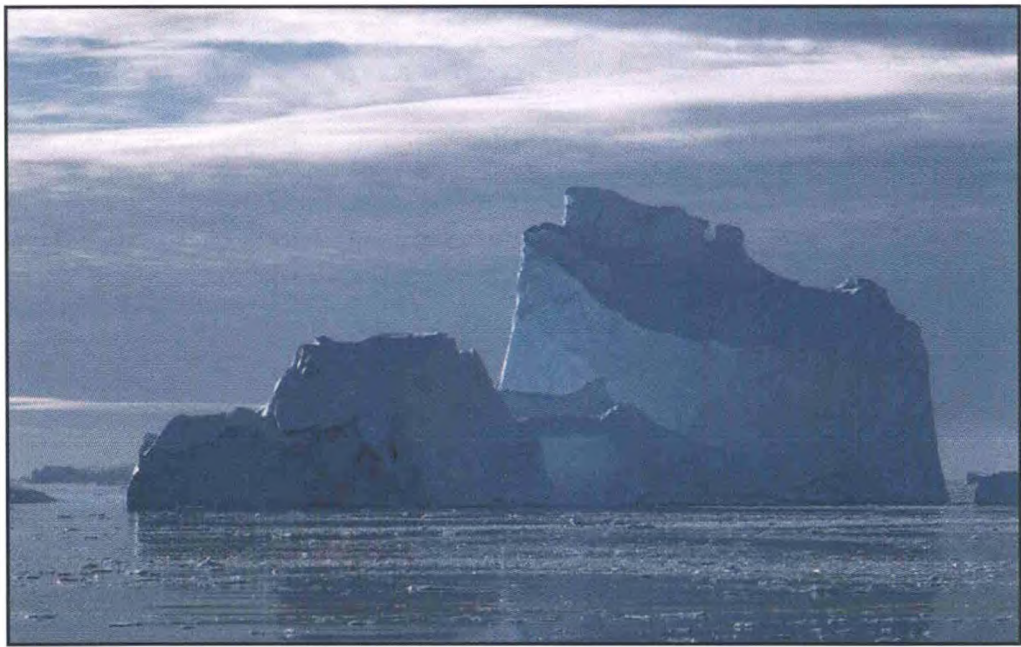
In March 1999, Dr Jon Franklin returned to the UK following the British Antarctic Survey’s 1998/99 southern summer season in the Antarctic.

Giant icebergs

BY JON FRANKLIN

(British Antarctic Survey)

Icebergs are a familiar sight in Antarctic waters; they come in all shapes and sizes, ranging from small growlers and bergy bits to giant tabular bergs. There are freshly formed young ones, smoothly sculpted middle-aged ones and deeply eroded old ones (Figure 1). The colour of ice is not just the white of a coating of surface snow, but an infinite range from pastel blue to ‘electric’ violet, shades of green to black and, on occasion, pink or yellow from a coating of snow algae.



(C.J. Gilbert, British Antarctic Survey)

Figure 1. An old weathered iceberg.

The life history of these floating islands often begins thousands of years ago when a fine rain of diamond dust fell deep in Antarctica, and ends in the warm waters of the tropical oceans.

Very little snow falls deep in Antarctica, and in some senses the continent is the world's largest desert. The majority of precipitation in the continental interior is in the form of diamond dust, tiny crystals of ice which form directly from water vapour and fall to the ground. If the sun is shining, each crystal catches the light and reflects it back to the observer in a myriad of scintillating flashes of sunlight. Over the millenia this ice has slowly built up forming a sheet of ice several kilometres thick which flows northward towards the continental edge. Here there is much more precipitation, mostly from major storm systems, which can dump tens of centimetres of snow in a single day. The flowing ice either reaches the sea in relatively narrow glacier tongues or forms sheets of floating ice thousands of square kilometres in extent and several hundred metres thick. Altogether something like 1,450 cubic kilometres of ice leaves Antarctica every year, which is around half the world's consumption of fresh water.

The ice is lost from the glaciers and ice sheets in several ways, the most obvious of which is calving to form icebergs. Some is also lost by ablation (evaporation and scouring by the wind) from the top and by melting from below. The majority of icebergs are small, less than a mile across, and are formed continuously to maintain a steady balance with the outflow from the continent, which may be up to several miles a year in active glaciers. Infrequently (and we just don't know how infrequently) more dramatic events take place.

Ever since the first explorers ventured into the Southern Ocean, reports of giant icebergs have been entered in ships' logs. Halley wrote in his log on 1 February 1700, when at latitude $52^{\circ} 24' S$ that he "fell in with great Islands of Ice, of Soe Incredible a hight and Magnitude that I scarce dare to write my thoughts of it". Some of these reports seem beyond belief, but others were by reliable witnesses. Particularly large numbers of icebergs were reported from the southern South Atlantic in the mid 1850s, 1890s and late 1920s and these episodes may relate to the break up of giant icebergs. With the advent of monitoring by polar orbiting satellites we have built up a much better picture of how often these giant bergs form and how they move in response to ocean currents (Figure 2). The majority of the large bergs leave the Weddell Sea through a narrow region around 100 miles across near $61^{\circ} S$, $51^{\circ} W$. Interestingly the deepest water, between the South Shetland and South Orkney Islands, lies further to the east. The most northerly remnant of an Antarctic iceberg was logged by the *Dochra* on April 30 1894 when at latitude $26^{\circ} 30' S$, $25^{\circ} 40' W$ in the South Atlantic.

The largest iceberg on record was reported by the *USS Glacier* on November 12 1956, when she sighted a berg measuring 180 miles long by 50 miles wide. Observations by early polar orbiting weather satellites in 1967 reported an iceberg 85 miles long which had broken off a glacier tongue near the Greenwich Meridian. Named Trolltunga, it slowly moved along the coast until it went aground off Berkner Island in 1969. There it remained stuck for over five years before setting off on its travels once more. In March 1976 it collided with the Larsen Ice Shelf and spawned another giant berg some 50 miles long. Such collisions may be one way in which these large bergs form.

In 1986 a section of the Filchner Ice Shelf, some 150 miles long and 40 miles wide, broke off from what was known as the Grand Chasm (*The Marine Observer*, July 1992). It quickly fragmented into three main icebergs, numbered A22, A23 and A24 by the US Joint Ice Center (now the National Ice Center). [Each iceberg with dimensions larger than 10 miles across is given a sequential identification number, with icebergs from the Bellingshausen and Weddell Sea sector between

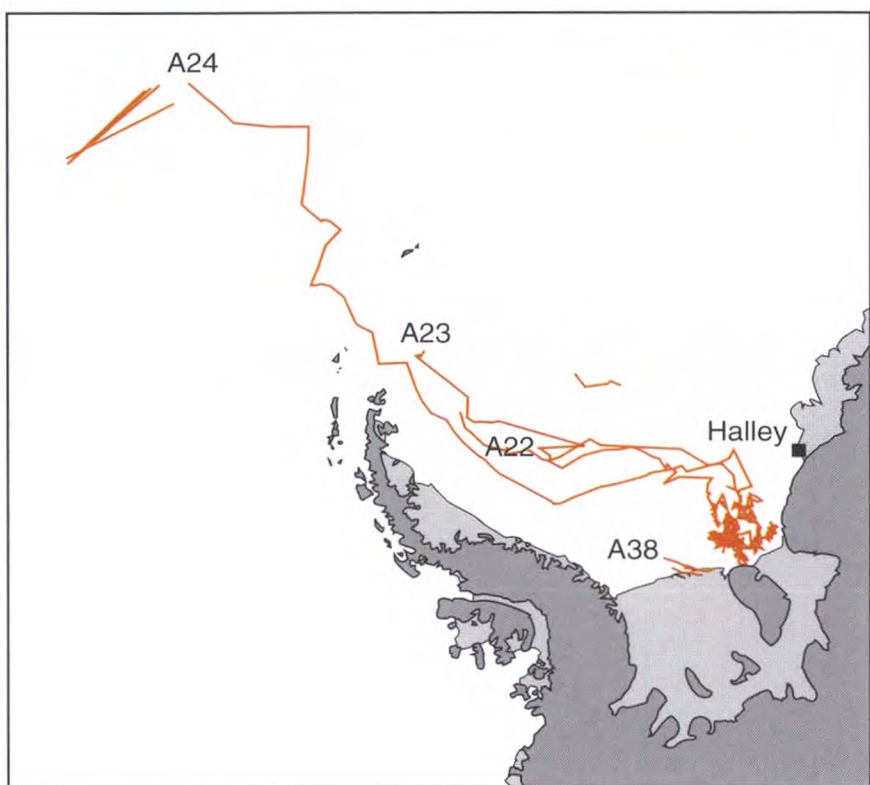
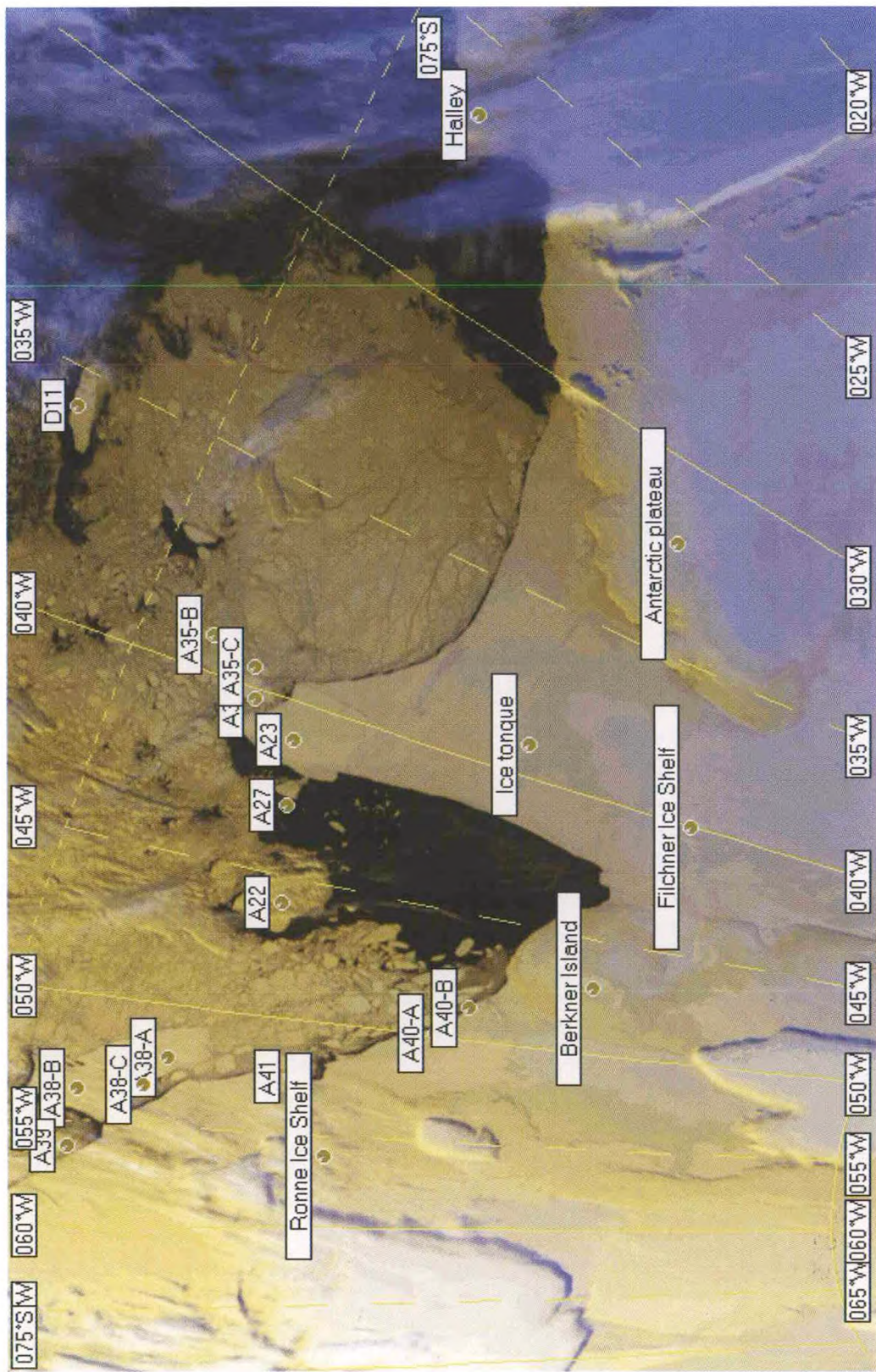


Figure 2. The tracks of the recent giant icebergs. Once smaller than 10 miles across they are no longer tracked by satellite.

0° and 90° W prefixed by A, and the other quadrants counter-clockwise prefixed by B, C and D]. These soon went aground as the topography shoals rapidly just to the north-west of the area. In 1990, A24 broke free and began moving north, travelling past Shag Rocks to the west of South Georgia with the last fragments disappearing near the latitude of Montevideo. The remaining bergs have split, but the primary bergs A22-A and A23-A are still there and have blocked the surface circulation of the Weddell Sea causing a giant tongue of low shelf ice to build out from the coast to A23-A (Figure 3). In 1997, A22-B and A23-B, large fragments of the original bergs, began moving and will soon enter the Scotia Sea.

In October 1998 a section of the Ronne Ice Shelf, some 80 miles long by 25 miles wide, broke off from west of the Berkner Ice Dome and was designated A38. This has also fragmented to give two large bergs A38-A and A38-B and a smaller fragment A38-C. These bergs are less likely to run aground as the water depth here is over 500 m and they will probably drift north under the influence of the Weddell Sea gyre, much as happened to Shackleton's ship the *Discovery*. The German Filchner unmanned summer station was one one of these bergs, and in January 1999 their ice research ship the *Polarstern* was able to recover most of the equipment. The R.R.S. *Bransfield* had put in a large fuel depot near to the Filchner station in January 1998, and British Antarctic Survey Twin Otter aircraft recovered this in December. Detailed inspection of the satellite images shows that there are a number of large crevasses running inland further west still, and these may mark the birthplace of future giant bergs.

When Halley made his sightings of icebergs the world was in the grip of the Little Ice Age. Conditions have ameliorated since then and passing ships now see only occasional bergs off South Georgia. The mean annual temperature of the



NOAA 14 HRPT (Multi-plane) on Wednesday 17 February 1999 at 18:58:06. Raw (unprojected format) Standard channel data — enhanced calibration.

Figure 3. False colour NOAA 14 image obtained with the Dartcom HRPT system on board R.R.S. *Bransfield*. High cloud shows as blue, low to medium cloud and ice as yellow or white, and open sea as black. Much of the sea in the northern part of the image is covered with pack-ice.

northern part of the Antarctic Peninsula has also risen significantly over the past 50 years. The climatic record at Vernadsky (formerly Faraday) station shows a rise in mean annual temperature of around 2.5° since detailed records began in the 1940s, with the largest changes happening in the winter months. This warming is having a profound effect on many of the ice shelves fringing the Antarctic Peninsula and they are disintegrating. The most spectacular demise is that of the Larsen Ice Shelf, which lies to the east of the peninsula. In 1994/95 the entire northern sector (Larsen A) disintegrated in the space of a few weeks and it is now possible to sail all the way round James Ross Island. Robertson Island and Jason Island hold the centre section (Larsen B) in place, but it too is predicted to disintegrate. Satellite imagery recorded from the R.R.S. *Bransfield* over the 1998/99 Antarctic summer shows a steady retreat of the ice front, with long thin icebergs calving off week by week. The ice front has lost around 10 miles in the space of four months, and next season Robertson Island will truly be an island. During the past Antarctic summer a total of 10 new giant bergs have formed in the Weddell Sea, giving a total of 18 being tracked. Both figures are the largest in the National Ice center record, which began in 1976.

Climate change is likely to exacerbate the break-up of some of the fringing ice shelves, but in a warmer world there will be more precipitation so that more ice will flow off the Antarctic continent. Eventually a new balance will be reached, but icebergs will always be a hazard for the mariner sailing the Southern Ocean.

Establishing the identity of a bird at sea *

BY CAPTAIN M.K. BARRITT RN

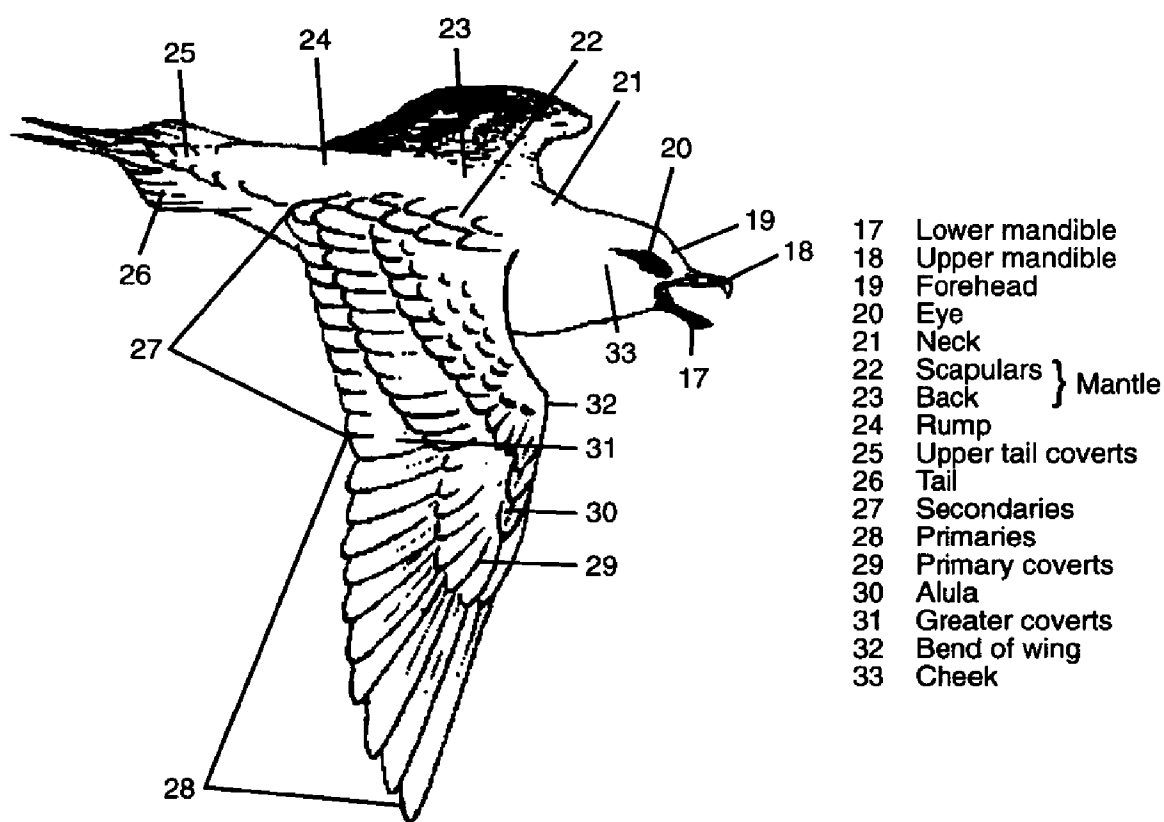
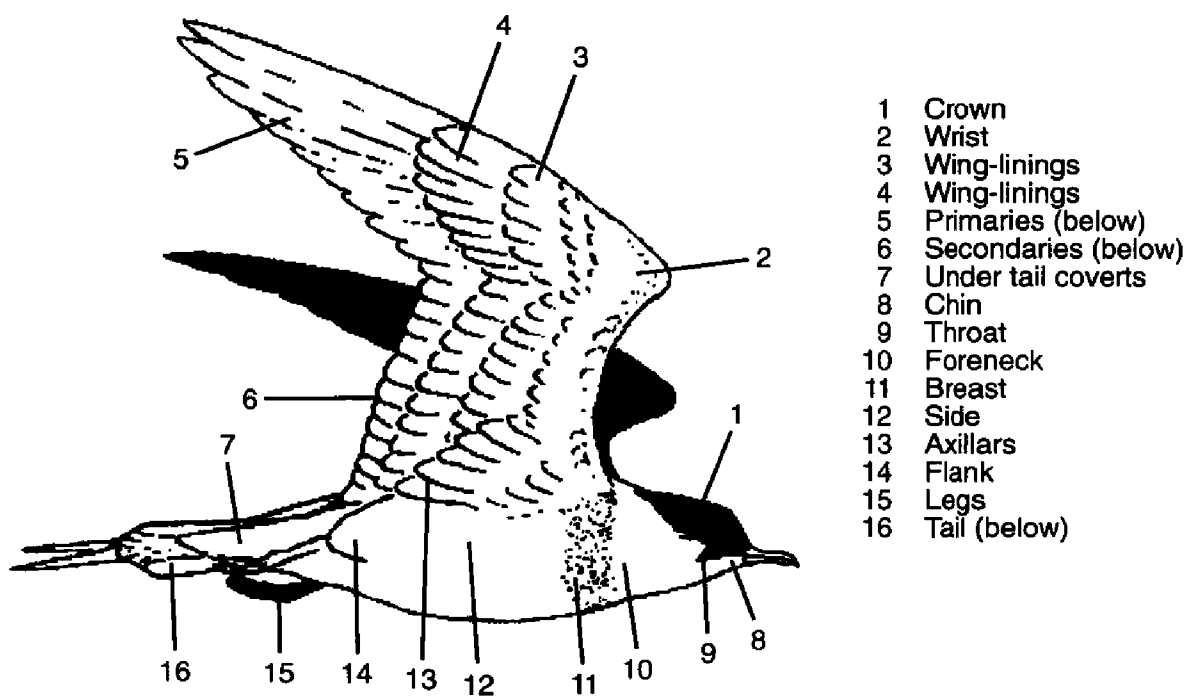
(Chairman of The Royal Naval Birdwatching Society)

The lower air space over some seven-tenths of the world, that enormous area covered by the sea, belongs to the seabirds even more than the ships whose narrow tracks cross the oceans, and it is the seabirds that are a ship's ultimate companions. Although observers are familiar with many species of birds, the most frequent question remains 'How can an observer best supply information on a bird which he cannot positively identify?' Three situations arise.

1. The bird alights on board but cannot be studied in the hand

Here the ideal is first to establish whether it is a bird of land or of the sea, and its feet are the first clue — webbed or unwebbed toes. The next point is to estimate its size from tip of bill to tip of tail feather. If a bird has a markedly elongated tail, give a separate estimate of its length as well, and, if seen, whether a noticeably forked tail. Now look in detail for the plumage of head and face, upper wings and upper parts, underparts and tail, the type of bill, and any striking 'patches' about plumage. Note all this on a piece of paper and then make a sketch of its general proportions and pattern. If a few terms which describe the parts of a bird in more detail are used, this may increase the value of the overall description. Most field guides contain a simple diagram, the examples in Figure 1 are reproduced from Captain Tuck's *Field Guide to Seabirds of Britain and the World*. (In 1978

* This article updates that written by the late Captain Gerald Tuck DSO, RN (then Chairman of the RNBWS), and published in *The Marine Observer* in 1971.



[Figure 1. The topography of a seabird.]

Captain Tuck's *Field Guide to Seabirds of Britain and the World*, illustrated by Hermann Heinzel, was published by Collins. It was followed by a second volume *A Guide to Seabirds on the Ocean Routes*. Both books, though still firm favourites with many seafarers, are now out of print. However, a good substitute which can be recommended to readers of *The Marine Observer* is *Seabirds: an identification guide* by Peter Harrison (1983, published by Croom Helm Ltd).

2. The bird flies by but does not alight

The details will of course be less accurate but the following provide much help to the analyst. How did it fly? Low over the sea, gliding or soaring over waves? High in the air? Were the wing beats slow or very rapid or did it flutter mostly or follow in the wake of the ship? What was the size and colour of the bill? Long or stubby? Yellow or black? What was the colour of its underbody? If seen, what was the colour of its legs? What was the colour of the underwings? Had the underwings thick or thin dark margins? Did the bird dive from a height when feeding? Was it solitary or in flocks? Again, a sketch, irrespective of artistic ability, is a vital aid to subsequent identification.

3. The bird can be caught and examined in the hand

Here of course the best possible answer is to summon a photographer! A 35-mm camera at close range is excellent, especially a colour transparency (polaroid-type 'instant' pictures generally do not show great detail but will help in the absence of an alternative). With the aid of colleagues arrange to take photographs from three aspects: (a) side elevation; (b) place the bird on deck and, if possible, hold out the wings and take a view from above; (c) support the bird and hold its wings out so that the undersides can be photographed. Such photographs may well be unique.

If measurements can be made (in centimetres for larger birds, millimetres for smaller ones) they may prove to be the only means of positively distinguishing one possible species from another. A word of warning — a seabird's bill can do painful damage to human hands! It may be wise to place a rubber band around the bill before measurements are taken, but **do** remove the band before subsequently releasing the bird. The measurements should be made as follows:

Greatest overall length. From tip of bill to tip of longest feather with bird gently extended on a flat surface.

Greatest wing span. Length between tips of spread wings, across back.

Wing. Length from wing angle — outermost or carpal joint — to tip of longest primary flight feather. Wing closed and flattened against a ruler.

Tail. Length from base of central tail feathers to tip of longest tail feather.

Bill. Length from margin of feathers above to tip of bill.

Tarsus. Length of lowest leg bone — from notch behind last joint to front of knuckle at base of toes.

Toes. Extended middle toe or claw in large birds; behind claw in pipits.

If it is possible to handle a bird it may well be because it is too exhausted or hungry to struggle. Sometimes birds just need to rest and are best left alone. It may be possible to feed a bird, and the following are worth a try:

Hawks and owls. Raw meat wrapped in a thin layer of cotton wool to simulate feathers.

Seabirds, herons and kingfishers. Place small fish, or pieces of fish, lengthwise in the bill.

Songbirds. Water with glucose or sugar. Crumbs, scraps of cheese or soft fruit. It may help to bring birds into the warm in cold climates, and into the shade in hot climates.

In summary, those reports in *The Marine Observer* which are of most value are those which contain plenty of detail, and which are accompanied by a photograph and/or sketch. A latitude and longitude, and date of sighting are vital; details of weather conditions, other environmental phenomena, and an indication of the direction of movement and activity of the bird may be of considerable scientific interest.

SCENE AT SEA



I.C. Oke

Rainbow with weak secondary bow outside it, photographed from the *La Cordillera* on 10 September 1998.

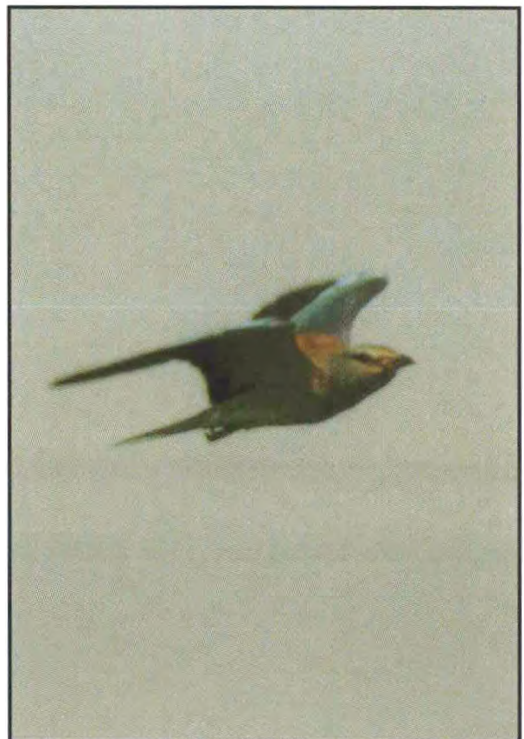
SCENE AT SEA



I.C. Oke

Above: A Cape Gannet at close range on 7 September 1998.

Below: A Roller which visited the *La Cordillera* on 26 August 1998.



I.C. Oke

Book Review

Cargo Work, by Kemp and Young, Sixth Edition revised by David J. House. 148 × 210 mm, *illus.*, ix + 166 including Index. Published by Heinemann Publishers Oxford PO Box 382 Halley Court Jordan Hill Oxford OX2 8RU. ISBN: 0 7506 3988 1. Available from the Customer Services Department. Price: £14.99.

This sixth edition of Kemp and Young has the appearance of being a useful acquisition for the ship's library. Kemp and Young have always played an essential part in passing 2nd Mates, Mates and Masters, and it was with enthusiasm, therefore, that the updated work was approached. After a rather uninspired Preface to this edition (which is then followed by the Preface to the original edition) the book is laid out in nine chapters beginning with 'General Principles', leading to a most useful final chapter dealing with 'Miscellaneous Calculations'; in the intervening chapters the reader is led from 'Bulk Cargoes' through to 'Cargo Handling practices'. Each chapter has a set of definitions somewhere within it; had these been placed at the start of the chapter, and in alphabetical order, they would be of more help. For example, in General Principles the text begins with Cargo Gear and then proceeds to a mixed bag of definitions which could be confusing and difficult to follow. The general principles of cargo work cannot change too much, they can only be amended as cargo carriage changes, but some of the ideas are new, such as fresh-water washing of a 'bulker', and I have been pleased to note there must now be vessels capable of carrying enough fresh water to wash the holds after a salt-water wash. No doubt the fresh-water washing of bulk cargo holds ensures that new buildings can cope with all requirements.

The subsequent chapters have many new points which I am interested to note, for example, a 'turnbuckle' is now termed a 'bottle screw'; and coke can be carried on deck (despite its massive absorption of liquid, and spoiling by sea water). These new pieces of information will no doubt be of practical value to cadets.

The student must treat with caution some of the statements relating to general cargoes, which could be misleading, for example, "Tin ingots – bottom stowage often under refrigerated cargo". How on earth can it be guaranteed that where tin ingots are loaded, there is a freezer cargo going the same way, or even available? Such loosely assumed relationships would have been better omitted in favour of the dangerous cargoes information.

Over all, there is much to admire in this book but there are also important omissions: in the section on vegetable oil cargoes, the information is glaringly incomplete, and although this would be covered at the point of loading, the inclusion here should have been mandatory. Reference is made in two consecutive paragraphs to the Code of Safe Practices for Bulk Cargoes; this is a 'must' for the student as it contains many useful points for safe practice regarding all cargoes. However, a real hazard — which is not mentioned — is the oxidation of some cargo. With this in mind, a chapter about safety would have helped greatly with the book's credibility, for safety is one of the major factors which influences all parts of modern cargo operations of all descriptions; and without missing information about some cargoes, the book is not the authority it could, indeed should, have been.

Captain A.P. Maytham
Port Met. Officer (Bristol Channel)

Fleet Lists

Fleet Lists

UNITED KINGDOM — Information dated 15 March 1999

The names of ships' personnel are as given in the latest meteorological logbooks received to 15 March 1999. Radio Officers (where carried) are indicated by **bold type**. Recently recruited vessels from which a logbook has yet to be received, are indicated by * under 'Latest Receipt', while vessels from which no logbook has been received during the 12 months prior to the above date, are indicated by †.

All logbooks received will be acknowledged by the Observations Voluntary (Marine) branch of The Met. Office. Port Met. Officers will call on vessels as opportunity permits or upon request.

Masters or operators of ships are particularly requested to advise of any circumstances which may call for the removal from the ship of equipment loaned by The Met. Office.

Selected and Supplementary Ships

NAME OF VESSEL	LATEST RECEIPT	MASTER	OBSERVING OFFICERS and RADIO OFFICERS	OWNER/MANAGER
<i>Aberdeen</i>	11.06.98	I. Chadwick	J. Davies, G.P. Watts, K.D. Blackwood, T.J. Crowley	Northern Marine Management Ltd
<i>African Ruby</i>	†	—	—	MOL Tankship Management Ltd
<i>Al Awdah</i>	28.10.98	A.R. Wilkinson	M. Afifi, Z. Nader, M. Salman	Kuwait Oil Tanker Co.
<i>Al Funtas</i>	†	—	—	Kuwait Oil Tanker Co.
<i>Al Samidoon</i>	31.12.98	A. Aranba	R. Ghufiran, M. Taieb, B. Daba, M.S. Espino	Kuwait Oil Tanker Co.
<i>Al Shuhadaa</i>	29.01.99	P.J. Ward	W. Fares, S.O. Bari, O. Habib, F. Tarres	Kuwait Oil Tanker Co.
<i>Al Tahreer</i>	†	—	—	Kuwait Oil Tanker Co.
<i>Al Wajba</i>	†	—	—	United Arab Shipping Co. (S.A.G.)
<i>Al-Farahidi</i>	*	—	—	United Arab Shipping Co.
<i>Alam Selaras</i>	†	—	—	Pacific Carriers Pte Ltd
<i>Alexis</i>	†	—	—	Wilson Ship Management (Bergen) AS
<i>Alkman</i>	21.08.98	M. Nakra	Y. Agapov, Y. Lazarenko, S. Eliviera, L.V. Mascarenhas	Wallem Shipmanagement Ltd
<i>Alliance</i>	30.10.98	J.A. Holst	D. Wood, K. McNeill, N. Samson, J. Stone	Denholm Ship Management (UK) Ltd
<i>Ambon</i>	04.02.99	R. Hariharan	C.B. Berthwal, R. Bonin, J. Mathew	Wallem Shipmanagement Ltd
<i>Amfitritii</i>	†	—	—	Acomarit (UK) Ltd
<i>Anja-C</i>	15.02.99	J.W. Jackson	D. Rustandi	Carisbrooke Shipping plc
<i>Arcadia</i>	†	—	—	P&O Cruises Ltd
<i>Arctic Goose</i>	†	—	—	Holy House Shipping AB
<i>Arctic Swan</i>	†	—	—	Holy House Shipping AB

<i>Argentina Star</i>	11.03.99	P.C. French	A.C. Rayburn, A. Hemedez, D. Pablo	Blue Star Ship Management Ltd
<i>Artis Force</i>	†	—	—	Elite-Shipping A/S
<i>Arktis Vision</i>	†	—	—	Elite-Shipping A/S
<i>Arunbank</i>	18.08.98	J.T. Millar	J.P. Tyson, V. Mantull, K. Klyucharev	Andrew Weir Shipping Ltd
<i>Auckland Star</i>	01.10.98	S.G. Mortimer	S. Sedezma, R. Siricio, F. Alcazar	Norbulk Shipping UK Ltd
<i>Audacity</i>	†	—	—	F.T. Everard & Sons Ltd
<i>Auk Arrow</i>	20.04.98	B.S. Gill	Z.A. Pagarkar	Gearbulk (UK) Ltd
<i>Aya II</i>	13.01.99	A. Rodriguez	L. Janidio, V. Chavez	Transportacion Maritima Mexicana
<i>BT Nautilus</i>	†	—	—	BT Shipping (London) Ltd
<i>BT Navarin</i>	†	—	—	BT Shipping (London) Ltd
<i>BT Navigator</i>	14.04.98	G.N. Sutherland	P.T. Reddy, D.E. Binyon, A.C. Kulkarni, K. Mohammad	BT Shipping (London) Ltd
<i>BT Neptune</i>	26.11.98	M.J. Heffer	W. Fletcher, K.J. Vyapure, P. Singh	BT Shipping (London) Ltd
<i>BT Nestor</i>	†	—	—	BT Shipping (London) Ltd
<i>BT Nimrod</i>	†	—	—	BT Shipping (London) Ltd
<i>BT Stream</i>	†	—	—	BT Shipping (London) Ltd
<i>Baltic Breeze</i>	01.09.98	William T.H. Yeo	U. Myint, S.P. Mya, M.R. Samad, U. Baw	Wallenius Lines (Japan) Ltd
<i>Baltic Elder</i>	14.05.98	D.R. Cripps	D. Histon, C.W. Nesbitt, D.F. Morton	Andrew Weir Shipping Ltd
<i>Baltic Spirit</i>	13.01.99	B.R. Richmond	C.P. Medagedara, H.A. Weerakkody, W.S. De La Cruz, P.H. Mendis	London Ship Managers Ltd
<i>Baltic Tern</i>	23.12.98	K. Steven	C.R. Stone, C. Taylor, M. Causon	Andrew Weir Shipping Ltd
<i>Barbet Arrow</i>	28.09.98	P.S. Moseley	Cordeiro, A.J. Plenos, W.R. Abellanosa	Northern Navigation Ship Mgmt. Inc.
<i>Belo Oriente</i>	†	—	—	Eurasia Shipping & Management Co. Ltd
<i>Berge Atlantic</i>	05.03.99	O. Grimsild	S. Debashis, S. Sankarajayan, N. D'Souza	Bergesen d.y. ASA
<i>Berlin Express</i>	26.01.99	J.A. Fee	M. Shahadah, D.C. Winter, C.J. Hughes	P&O Nedlloyd Ltd
<i>Blue Flame I</i>	†	—	—	Boston-Putford Offshore Safety Ltd
<i>Bow Tribute</i>	†	—	—	MOL Tankship Management Ltd
<i>Bransfield</i>	11.05.98	S.J. Lawrence	A.P. Wallis, O. O'Keefe, N. Bailey, S. Mee	British Antarctic Survey
<i>Brenda</i>	20.01.99	G.M. Walker	J.A. Tampus, A. Scarratt, D.C. Orcales	Great White Fleet Ltd
<i>British Admiral</i>	30.10.98	J.E. Docker	H.M. Robinson, D.N. Brighton, M. Czerpak, C.M. Taylor	BP Shipping Ltd
<i>British Adventure</i>	06.11.98	N.K. Price	B. Blythe, D.L. West, C. Nesbitt	BP Shipping Ltd
<i>British Argosy</i>	13.08.98	M. Pocklington	J.G. Preston, J.E. Tyson, M.P. Radochonski	BP Shipping Ltd
<i>British Esk</i>	06.04.98	J.M. Ronald	M. Murphy, M. Rickaby, S. Woodward, M.D. Smith	BP Shipping Ltd
<i>British Harrier</i>	15.03.99	C. Shoolbraid	T.R. Forrest, G.R. Butler, D. Brighton	BP Shipping Ltd
<i>British Hawk</i>	12.01.99	G. Hallett	T. Radford, D.A. Macleod, D.J. Gillespie	BP Shipping Ltd
<i>British Ranger</i>	13.08.98	R.D. Mead	J. Mielniczuk, S.D. Ware, N.A. Hull	BP Shipping Ltd
<i>British Reliance</i>	07.01.99	C.C. Rowdon	M. Graaskov, A.N. Shearer, T. Rauh, J. Minogue	BP Shipping Ltd
<i>British Resolution</i>	07.01.99	J.Y. MacAlpine	B.J. McMahon, M.J. Walker, M. Czerpak, M.A. Anuszkiewicz	BP Shipping Ltd
<i>British Resource</i>	10.08.98	P. Hebden	A.D. Roaf, S.C. Magalotti, A.D. Wheatley, M. Pacholczyk	BP Shipping Ltd
<i>British Skill</i>	21.12.98	B. Pritchard	J. Stone, P.D. Green, N. Hopgood, P. Blow	BP Shipping Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LATEST RECEIPT	MASTER	OBSERVING OFFICERS and RADIO OFFICERS	OWNER/MANAGER
<i>British Spirit</i>	10.02.99	B. Wardman	C.P. Doolan, D.A. Hill, P. Adamowicz	BP Shipping Ltd
<i>British Steel</i>	06.10.98	P. Creber	P. Newman, A. Daria, S. Punay, A. Daria	Furness Withy (Shipping) Ltd
<i>British Success</i>	†	—	—	BP Shipping Ltd
<i>British Tamar</i>	†	—	—	BP Shipping Ltd
<i>British Valour</i>	11.03.99	M.R. Etherington	M. Ramsay, L.N. Paul, L.M. Williams	BP Shipping Ltd
<i>British Vigilance</i>	10.11.98	P.R. Anderson	D.A. Moss, P.E. Simpson, A. Chruscinski	BP Shipping Ltd
<i>Buccleuch</i>	†	—	—	Associated Bulk Carriers (London) Ltd
<i>C.S. Iris</i>	†	—	—	Cable & Wireless (Marine) Ltd
<i>C.S. Monarch</i>	†	—	—	Cable & Wireless (Marine) Ltd
<i>C.S. Nexus</i>	24.06.98	P.M. Crowe	P.G. Lloyd, J.P. Vine, A.K. Ullah, I. Pinney	James Fisher & Sons (Liverpool) Ltd
<i>C.S. Sovereign</i>	†	—	—	Cable & Wireless (Marine) Ltd
<i>Cable Innovator</i>	†	—	—	Cable & Wireless (Marine) Ltd
<i>Cable Installer</i>	†	—	—	Cable & Wireless (Marine) Ltd
<i>Cable Retriever</i>	†	—	—	Cable & Wireless (Marine) Ltd
<i>Cabo Negro</i>	†	—	—	Cable & Wireless (Marine) Ltd
<i>Caledonian Isles</i>	†	—	—	MOL Tankship Management Ltd
<i>CanMar Bravery</i>	08.12.98	T.N. O'Driscoll	M.A. O'Morchoe, B. Keegan, P.G. Ivory	Caledonian MacBrayne Ltd
<i>CanMar Conquest</i>	†	—	—	Canada Maritime Services Ltd
<i>CanMar Courage</i>	20.05.98	M.B. Iranpur	A.K. Sarma, A.S. Bajpai, P. Bland	Canada Maritime Agencies (Montreal)
<i>CanMar Fortune</i>	05.08.98	J.P. Simcox	H.M. Surve, R. Chauhan, D.M. Das	Thamesport London Ltd (Agency Dept.)
<i>CanMar Glory</i>	19.05.98	C.M. Mendonce	M. Laliberte, S.M. Prabhakar, D. Morin, R. Pankaj	Thamesport London Ltd (Agency Dept.)
<i>CanMar Honour</i>	*	—	—	Canada Maritime Agencies (Montreal)
<i>CanMar Pride</i>	*	—	—	Thamesport London Ltd (Agency Dept.)
<i>CanMar Triumph</i>	†	—	—	Canada Maritime Agencies (Montreal)
<i>CanMar Victory</i>	†	—	—	Canada Maritime Agencies (Montreal)
<i>Canterbury Star</i>	25.01.99	D.J. Jones	O.O. Astronomo, F.R. Nabon, V.M. Ballesteros	Norbulk Shipping UK Ltd
<i>Cap Blanco</i>	08.12.98	R. Gibbons	A. Queally, T. Aheme, J.L. McCorquodale	Furness Withy (Shipping) Ltd
<i>Cape Horn</i>	18.08.98	P.B.G. Jeitanger	R. Menez, R.C. Natural, D.A. Bolano, R.C. Natural	MOL Tankship Management Ltd
<i>Cape Finisterre</i>	*	—	—	Jamaica Producers Shipping & Distribution Ltd
<i>Cape Vincente</i>	*	—	—	Jamaica Producers Shipping & Distribution Ltd
<i>Caribbean Reef</i>	25.01.99	R. Hutchinson	K.D. Sedrick, D.M. Danasrkara, P. Gunaratna, S.K. Kooikara	London Ship Managers Ltd
<i>Cartagena</i>	†	—	—	Enterprises Shipping & Trading S.A.
<i>Cast Bear</i>	23.11.98	G. Raczkowski	R. Potestades, E. de Leon, L. Deang	Cast Line (Liverpool)

<i>Cast Elk</i>	15.03.99	William T.H. Yeo	A. Bin Omar, K. Kyaw Thet, S. Bin Paimon, U.T. Zaw	Cast Line (Liverpool)
<i>Cast Lynx</i>	13.11.98	G. Raczkowski	S. Macatiag, V. Chavez, E. Malfort	Cast Line (Liverpool)
<i>Cast Wolf</i>	†	—	—	Cast Line (Liverpool)
<i>Celtic Horizon</i>	22.06.98	M.K. Wainman	J.W. Wilson, C. Duff	Marr Vessel Management Ltd
<i>CGM Caravelle</i>	†	—	—	Andrew Weir Shipping Ltd
<i>Challenger</i>	16.11.98	J.D. Noden	M.P. Devaney, M.P. Hood, R.A. Warner	NERC Research Vessel Services
<i>Charles Darwin</i>	03.09.98	G.M. Long	P.T. Oldfield, M.P. Hood, R.A. Warner	NERC Research Vessel Services
<i>Cheshire</i>	21.07.98	J.S. Gavin	B. Cowell, R. MacSweeney, L.V. Larsen	Bibby Line Ltd
<i>Chilham Castle</i>	†	—	—	Kuwait Oil Tanker Co.
<i>Chiquita Belgie</i>	25.01.99	W.M. Laverick	N. Jejino, H. Eriksson, R. Salamat	Great White Fleet Ltd
<i>Chiquita Bremen</i>	11.11.98	W. Tebbutt	F.V. Burgos, A.C. Dominguez, D. Marek	Great White Fleet Ltd
<i>Chiquita Deutschland</i>	06.11.98	G. Fink	B. Tiongco, S. Davison, D. Orcales	Great White Fleet Ltd
<i>Chiquita Italia</i>	†	—	—	Great White Fleet Ltd
<i>Chiquita Nederland</i>	10.08.98	P. Nicholson	A. Medel, J. Tabisaura, M.D. Cherry	Great White Fleet Ltd
<i>Chiquita Rostock</i>	10.02.99	M. Cherry	C. Rose, B. Dumanic, E. Nierras	Great White Fleet Ltd
<i>Chiquita Scandinavia</i>	29.04.98	J.F. Badham	R. Brummitt, B. VanHulle, E.M. Nierras	Great White Fleet Ltd
<i>Chiquita Schweiz</i>	13.11.98	A.R. Tinsley	B.H. Vanmeensel, J.R. Tindog, R. Guillang	Great White Fleet Ltd
<i>Chrismir</i>	25.01.99	R. Cordon	A.J. Morton, K.A. Brown, G. Wall	Souter Shipping Ltd
<i>Cirolana</i>	†	—	—	CEFAS
<i>City of Barcelona</i>	17.11.98	A.F. Hamilton	J.P. Tyson, J.E. Smith, J.C. Hague	Denholm Ship Management (UK) Ltd
<i>City of Cape Town</i>	08.12.98	J.C. Harris	G.E. Wade, R. Smith, J.G. Swindlehurst	P&O Nedlloyd Ltd
<i>City of Sunderland</i>	22.12.98	W. Bartlett	M.W. Goodman, J.C. Hague, J.P. Steen	Denholm Ship Management (UK) Ltd
<i>Clansman</i>	*	—	—	Caledonian MacBrayne Ltd
<i>Clydebank</i>	27.07.98	P. Stapleton	K. Kazakon, Y. Voloshin	Andrew Weir Shipping Ltd
<i>Colombo Bay</i>	03.02.99	D.C. Thompson	J.L. Annand, C.R. Jackson, J.P. Slatford	P&O Nedlloyd Ltd
<i>Columbus</i>	†	—	—	V. Ships Marine Ltd
<i>Condor Arrow</i>	†	—	—	Gearbulk (UK) Ltd
<i>Contship Endeavour</i>	22.09.98	S.S. Crasto	F. D'Souza, N. Abhi	Canada Maritime Services Ltd
<i>Contship Success</i>	06.11.98	A. Sharma	H.S. Tyagi, G. Chawla, R. Tavadia	Canada Maritime Services Ltd
<i>Coplapo</i>	02.10.98	A.R. Macpherson	A.F. Pila, M.D. Hogue, D.A. Selvido	London Ship Managers Ltd
<i>Coppename</i>	03.02.99	A.W. Barr	D.R. Alagon, R.Q. Qutambao	Celtic Marine Ltd
<i>Coral Reef</i>	12.06.98	R. Kendall	W.K. Kumara, E. Mocorol, A.P. Alviado	London Ship Managers Ltd
<i>Cordella</i>	26.05.98	J. Harvey	J. Hollett, D. Beaumont, A. Pasik, K. Batty	Marr Vessel Management Ltd
<i>Cormorant Arrow</i>	†	—	—	Gearbulk (UK) Ltd
<i>Corytes</i>	31.07.98	B.A. Chapman	—	CEFAS
<i>Coiswold</i>	20.11.98	J.H. Brierly	H.B. Lamba, A.M. Joshi, G.C. Squirrel, F.R. Shaikh	Associated Bulk Carriers (London) Ltd
<i>Cotica</i>	15.12.98	D. Robinson	J.B. Clemente, V.A. Javier, P. Coles	Celtic Marine Ltd
<i>Crisilla</i>	10.02.99	G.C. Grey	J.A. Jagger, N. Wilcock, J.B. Tulley	Marr Vessel Management Ltd
<i>CSO Marianos</i>	20.11.98	J. Sutcliffe	P.R. Binks, P. Williams, R.J. Light, M. Gibbs	Coflexip Stena Offshore Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LATEST RECEIPT	MASTER	OBSERVING OFFICERS and RADIO OFFICERS	OWNER/MANAGER
<i>Curico</i>	15.12.98	M.R. Rutter	C.S. Batagoda, M.F. Quader, C.A. Samaranyake	London Ship Managers Ltd
<i>Dallington</i>	23.10.98	B. Standerline	R. Spooner, M.B. Wdowikowski, J. Bore	Stephenson Clarke Shipping Ltd
<i>Discovery</i>	01.10.98	R. Plumley	T. Owoso, M. Parotte, P.T. Oldfield	NERC Research Vessel Services
<i>Discovery</i>	03.08.98	D. Young	W.M. Axon, T.T. Latto, I. Gator	Stolt Comex Seaway Ltd
<i>Dominica</i>	06.11.98	R.A. Cole	D. Makowski, S. Tan, M. Lesniewski	Interocean Ugland Management AS
<i>Donnington</i>	12.08.98	A. Wormald	M. Arden, M. Smith, R.M. MacIure	Stephenson Clarke Shipping Ltd
<i>Duhallow</i>	25.01.99	B.J. Kirtley	S.E. Fernandes, D.A. Williams, D. Cutinho	Associated Bulk Carriers (London) Ltd
<i>Durrington</i>	15.02.99	B. Uday	R.J. Duff, E. Dodds, H. Shaw	Stephenson Clarke Shipping Ltd
<i>Eagle</i>	04.02.99	P.J. Chambers	M.P. Littlewood, C.J. Hubbard, W.B. Goswell	Mobil Shipping Co. Ltd
<i>Eagle Orion</i>	†	—	—	Neptune Shipmanagement Services (Pte) Ltd
<i>Eastern Bridge</i>	14.09.98	I.C. Gravatt	S. Dasanayake, A.G. French, G.J. Terriza	Ropner Ship Management Ltd
<i>Eburna</i>	†	—	—	Shell Marine Personnel (IOM) Ltd
<i>Egoli</i>	†	—	—	Target Marine S.A.
<i>Elk</i>	21.12.98	N.M. Hardy	D.L. Shields, J.T. Jamieson, J.M. Wright, M. Sheldon	P&O Ferrymasters Ltd
<i>Elke</i>	02.11.98	D. Farquhar	R. Famaloan, R.A. Somerville, T.S. Cubelo	Great White Fleet Ltd
<i>Emily C</i>	†	—	—	Canisbrooke Shipping plc
<i>English Star</i>	08.03.99	K. Sykes	J.E. Noche, P.S. De Ocampo, P.R. Gepilano	Norbulk Shipping UK Ltd
<i>Enterprise</i>	†	—	—	Denholm Ship Management (UK) Ltd
<i>Equinox</i>	23.10.98	J. Barrett	J.A. Donnelly, D. Richardson, S. Rabbitt	Souter Shipping Ltd
<i>Eridge</i>	04.03.99	E.M. Holmyard	A. Rodrigues, S.K. Majumdar	Associated Bulk Carriers (London) Ltd
<i>Erradale</i>	17.11.98	E.V. Carlton	H.M. Escare, D.L. Cariav, A.T. Clarke	The China Navigation Co. Ltd
<i>Ervillea</i>	†	—	—	Shell Marine Personnel (IOM) Ltd
<i>Esplanade</i>	05.03.99	N. Riley	J. Greig, M. Sloan, M.J. Samus	Souter Shipping Ltd
<i>Euplecta</i>	†	—	—	Shell Marine Personnel (IOM) Ltd
<i>European Envoy</i>	29.04.98	J.P. Morton	E.C. Morton, T. Colclough, G. Strangwood, K. Whittaker	P&O Ship Management (Irish Sea) Ltd
<i>European Leader</i>	20.10.98	K.P. Riley	A.G. Hamilton, E.H. Millar, E.C. Morton	P&O Ship Management (Irish Sea) Ltd
<i>European Navigator</i>	02.11.98	B.J. Gordon	P. Brookes, I. Birch, T.C. Culclough	P&O Ship Management (Irish Sea) Ltd
<i>European Pathfinder</i>	12.01.99	I. Griffiths	A. O'Dwyer, G.R. Henderson	P&O Ship Management (Irish Sea) Ltd
<i>European Pioneer</i>	04.03.99	D.W. Eccles	D. Billington, N. Atkinson, E.C. Morton	P&O Ship Management (Irish Sea) Ltd
<i>European Seafarer</i>	09.10.98	N.C.E. Spencer	J.F. Barkley, R. Kilroy, M. Butcher	P&O Ship Management (Irish Sea) Ltd
<i>European Shearwater</i>	02.11.98	G.P. Farrell	W.M. Barry, T.I. Dixon, C.A. Bates	James Fisher & Sons plc
<i>European Trader</i>	†	—	—	P&O Ship Management (Irish Sea) Ltd
<i>Eye of the Wind</i>	†	—	—	Crediton Country Courier

<i>Falcon Arrow</i>	18.03.98	A. Dua	H.S. Vora, B. Nirmal, D.P. Ravi	Gearbulk (UK) Ltd
<i>Federal Bergen</i>	†	—	—	Anglo-Eastern Ship Management Ltd
<i>Fernie</i>	08.03.99	R. Lakhotia	M. Fonseca, S. Banerjee, U. Sane	Associated Bulk Carriers (London) Ltd
<i>Finch Arrow</i>	26.10.98	S.K. Singh	S. Dutt, N.K. Anil, M. Sood, S. Dutt	Gearbulk (UK) Ltd
<i>Flinders</i>	†	—	—	ASP Ship Management
<i>Forthbank</i>	15.02.99	J.J. Millar	L.C. Pink, B. Dooley, M. Razbitonov	Andrew Weir Shipping Ltd
<i>Foylebank</i>	15.02.99	C.C. Bains	V. Mantul, K. Kluchareu, D. Cheredalou	Andrew Weir Shipping Ltd
<i>France</i>	21.07.98	B. Erikson	L.S. Delfin, E. Lyon, A. Rocha	Great White Fleet Ltd
<i>Francis Drake</i>	†	—	—	Ocean Youth Club
<i>Frines</i>	†	—	—	Donnelly Shipmanagement Ltd
<i>Front Guider</i>	†	—	—	Nordic Oriental Shipmanagement Pte Ltd
<i>Front Rider</i>	†	—	—	Nordic Oriental Shipmanagement Pte Ltd
<i>General Delgado</i>	†	—	—	Aboitiz Jebsen Bulk Transport Corp.
<i>General Tirona</i>	†	—	—	Aboitiz Jebsen Bulk Transport Corp.
<i>General Villa</i>	†	—	—	Aboitiz Jebsen Bulk Transport Corp.
<i>Geo Prospector</i>	†	—	—	Eidesvik Shipping Ltd
<i>Glen Maye</i>	†	—	—	MOL Tankship Management Ltd
<i>Glen Roy</i>	15.09.98	C.A. McDowall	P.S. Westgate, J.A. Ramos	MOL Tankship Management Ltd
<i>Global Mariner</i>	†	—	—	Acomarit Services Maritimes S.A.
<i>Golden Duke</i>	06.10.98	J.K. Joy	M.D. Papio, J.I. Flores, E.A. Tayyab	Jardine Ship Management Ltd
<i>Grafton</i>	†	—	—	Associated Bulk Carriers (London) Ltd
<i>Greater Manchester</i>	†	—	—	Ocean Youth Club
<i>Challenge</i>	*	—	—	North Star Shipping (Aberdeen) Ltd
<i>Grampion Frontier</i>	*	—	—	Princess Cruises Inc
<i>Grand Princess</i>	†	—	—	Gearbulk (UK) Ltd
<i>Gull Arrow</i>	†	—	—	Kuwait Oil Tanker Co.
<i>Hadiyah</i>	†	—	—	Barber Ship Management AS
<i>Harmac Dawn</i>	23.11.98	R.P. Yadav	N. Hafiz, Z. Hassan, A. Yadav, G.B. Rodrigo	Mobil Shipping Co. Ltd
<i>Harrier</i>	†	—	—	Gearbulk (UK) Ltd
<i>Hato Arrow</i>	20.08.98	S. Bozidah	S. Stabile, M. Matijas, L. Pachero, M. Matijas	Bergesen d.y. ASA
<i>Havdrott</i>	15.04.98	R. Tanguy	A. Thomson, M. Steel, R. Nolasco, R. Reilly	Bergesen d.y. ASA
<i>Havjarl</i>	†	—	—	Bergesen d.y. ASA
<i>Havkong</i>	†	—	—	Bergesen d.y. ASA
<i>Hawk</i>	†	—	—	Mobil Shipping Co. Ltd
<i>Hebridean Isles</i>	27.07.98	D. Gunn	L. Mackenzie, D. Macdonald	Caledonian MacBrayne Ltd
<i>Hekabe</i>	†	—	—	Bergesen d.y. ASA
<i>Helene Maersk</i>	†	—	—	A.P. Moller
<i>Helios</i>	28.09.98	H.G. Pollard	E. Tapia, T.F. Senador, M.F. Coyoca	Bergesen d.y. ASA
<i>Hemina</i>	15.03.99	P. Vennell	R. Cubelo, M. MacPhail, C. Martin	Bergesen d.y. ASA

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LATEST RECEIPT	MASTER	OBSERVING OFFICERS and RADIO OFFICERS	OWNER/MANAGER
<i>Hesiod</i>	30.04.98	P. Beresford	L. V. Juban, A.A. Cabrillas, N.Q. Makasiar	Bergesen d.y. ASA
<i>Hoegh Duke</i>	†	—	—	Leif Hoegh & Co. A/S
<i>Hoi Siong No.1</i>	†	—	—	IKS Fishing Co. Ltd
<i>Ibis Arrow</i>	17.02.99	I. Pavasic	E. Gamboa, P. Jardo, T. Macapayag	Gearbulk (UK) Ltd
<i>Ibn Abdoun</i>	†	—	—	United Arab Shipping Co. (S.A.G.)
<i>Isolair</i>	30.11.98	A.S. Kenyon	S.J. Viney, L.C. Farquhar, A.H. Glen	Reading & Bates (UK) Ltd
<i>Ironbridge</i>	29.01.99	T. Saddington	E. Muyana, D. Lyon, J.A. Daria	Furness Withy (Shipping) Ltd
<i>Island Princess</i>	†	—	—	P&O Cruises Ltd
<i>Isle of Arran</i>	†	—	—	Caledonian MacBrayne Ltd
<i>Isle of Lewis</i>	†	—	—	Caledonian MacBrayne Ltd
<i>Isle of Mull</i>	†	—	—	Caledonian MacBrayne Ltd
<i>Isocardia</i>	†	—	—	Shell Marine Personnel (IOM) Ltd
<i>Isomeria</i>	18.08.98	D.H. Rayfield	M.J. Thompson, L.A. Walder, J.P. Slight	Shell Marine Personnel (IOM) Ltd
<i>Jahre Spirit</i>	25.01.99	G. Kandpal	S. Singh, V. Manhas, S. Rafiuddeen, B.D. Trehan	Wallem Shipmanagement Ltd
<i>James Clark Ross</i>	22.06.98	M.J. Burgan	D. Goberman, A. Gatti, G. Chapman, M. Gloistein	British Antarctic Survey
<i>Jarikaba</i>	01.12.98	C. Eames	E.E. Erispe, M. Sofronio, C.G. Smith	Celtic Marine Ltd
<i>Jean</i>	04.03.99	F. Hill	W. Cortazar, J. Velasco, P. Scarrott	Great White Fleet Ltd
<i>Jervis Bay</i>	23.11.98	C.J.A. Hughes	R.M. Barnsley, N.P. Mayers, H. Ajam	P&O Nedlloyd Ltd
<i>Joy</i>	20.10.98	D. Tomlinson	—	Great White Fleet Ltd
<i>Judith Borchard</i>	†	—	—	C.M. Willie & Co. (Shipping) Ltd
<i>Kagoro</i>	30.09.98	W.E.L. Godsell	I. Osei-Amoako, S. Gyasi, P. Humado	Acomarit (UK) Ltd
<i>Kalahari</i>	11.11.98	J. Birtles	A.N. Hermoso, D. Soltis, R. Imperial	Safmarine Ship Management
<i>Karoo</i>	†	—	—	Safmarine Ship Management
<i>Kazimah</i>	31.12.98	G.M. Abbott	A.I. Osman, H.A. Moataz, M.A. Mady, R. Hipolito	Kuwait Oil Tanker Co.
<i>Kedah</i>	†	—	—	Kapal Management (Pte) Ltd
<i>Kent Voyagueur</i>	04.02.99	I. Biggs	M. Adamiak, N. Masilang, M. Catanyag	Kent Line Ltd
<i>Kintampo</i>	15.03.99	J. Wrigley	M.B. Ocampo, E. Babida, D. Minnow	Acomarit (UK) Ltd
<i>Kiwi Arrow</i>	†	—	—	Gearbulk (UK) Ltd
<i>Knock Allan</i>	25.01.99	K. Walas	—	Red Band AS
<i>Knock Stocks</i>	30.10.98	J. Masny	J.K. Jeppesen, D. Ortiz, T. Dye	Red Band AS
<i>Koningin Beatrix</i>	†	—	—	Stena Line Holland B.V.
<i>Kumasi</i>	17.02.99	M.A. Cully	M. Tabliba, S. Gyasi, E. Boye, A.C. Villas	Acomarit (UK) Ltd
<i>Lady Barbara</i>	29.06.98	E.A. Cellini	S. Pandey, G. Suri, N. Samant	Pacific Navigation Ltd

<i>Lady Stephanie</i>	†	—	—	Herbert Watson & Co. (Shipping) Ltd
<i>Lampas</i>	†	—	—	Shell Marine Personnel (IOM) Ltd
<i>Lapponian Reefer</i>	10.11.98	I.J. Minns	M. Sorra, R. Gabutin, R. Dajay	Holy House Shipping AB
<i>Leopardi</i>	31.12.98	R. Aqueche	L.E. Uriarte, J.M. Auteneche, J. Lopez-Ceron	Souter Shipping Ltd
<i>Licorne Pacifique</i>	07.10.98	M. Kennedy	V.T. Flores, J.P. Suffissais, I.C. Borja, B. Andaya	Sosema S.A.
<i>Linares</i>	28.07.98	D.P. Colley	N.H. Kumara, T.I. Kug, R.N. Jayasekara	London Ship Managers Ltd
<i>Lincoln Spirit</i>	09.03.99	P.M. Frost	M.H. Rifkhan, W.D. Mahanama, R. Abenis	London Ship Managers Ltd
<i>Lincolnshire</i>	10.08.98	R.A.F. Edwards	P.R. Cassidy, R. Hodgson, D. Morton	Bibby Line Ltd
<i>Linderos</i>	16.12.98	S.P. Harris	J.B. Weerabahu, T.P. Relayosa, Z.R. Iqbal	London Ship Managers Ltd
<i>Lord Nelson</i>	27.04.98	J.P.H. Fisher	C.L. Cupples, W.M. Allen, D.G. Hood	Jubilee Sailing Trust Ltd
<i>Lord of the Isles</i>	01.09.98	N.W. Martin	—	Caledonian MacBrayne Ltd
<i>Lough Foyle</i>	†	—	—	G. Heyn & Sons Ltd
<i>Lucky Bulker</i>	†	—	—	Valles Steamship Co. Ltd
<i>Maersk Gannet</i>	10.02.99	S. McCollin	F.P. Wight, M. Leader, D.M. McCleod	Maersk Co. (IOM) Ltd
<i>Maersk Mariner</i>	15.09.98	I.S.G. Black	R.M. Kendrick, N. Smith, S. Close, R.M. Kendrick	The Maersk Co. Ltd
<i>Maersk Scotland</i>	†	—	—	The Maersk Co. Ltd
<i>Maersk Shetland</i>	09.11.98	T. Sinclair	I. Blair, I. Hounsell, M. Le Dorven	The Maersk Co. Ltd
<i>Maersk Somerset</i>	15.09.98	N. Vause	A. Cross, N. Fagan, M. Iles	The Maersk Co. Ltd
<i>Maersk Stafford</i>	29.01.99	S.A. Cresswell	S. Hedelund, P. O'Shea, J.A. Struthers	The Maersk Co. Ltd
<i>Maersk Suffolk</i>	01.03.99	A.B. Walker	S.J. Eves, J. Wilmot, M. Mahon	The Maersk Co. Ltd
<i>Maersk Surrey</i>	23.12.98	K.E. Hammerman	G.S. Miller, J.M. Daly, A.P. Hodgson	The Maersk Co. Ltd
<i>Maersk Sussex</i>	14.01.99	J.W. Blake	J. Carter, A.A. Simpson, R. Kulkarni	The Maersk Co. Ltd
<i>Magnolia</i>	24.03.98	K.M. Calladine	L. Campbell, L. McCarthy, G. Webb	Mobil Shipping Co. Ltd
<i>Mairangi Bay</i>	11.01.99	A. Ellis	T.B. Leyland, P.J. Fowler, J.G. Townsend	P&O Nedlloyd Ltd
<i>Mansal 18</i>	†	—	—	Marr Vessel Management Ltd
<i>Maracas Bay</i>	†	—	—	MOL Tankship Management Ltd
<i>Mark C</i>	†	—	—	Carisbrooke Shipping plc
<i>Mary C</i>	†	—	—	Carisbrooke Shipping plc
<i>Matco Clyde</i>	04.02.99	P.D. Kelly	B.N. Roberts, D.S. McIntosh, P. Lawson-Earley	Mobil Shipping Co. Ltd
<i>Matco Thames</i>	01.05.98	M.S. Browning	D.G. Laughton, C. Ryan, T.R. Bray	Mobil Shipping Co. Ltd
<i>Matilde</i>	28.04.98	N.D. Riley	R.R. Flinham, S. Hocknull, G.R. Meridith	Souter Shipping Ltd
<i>Mbashi</i>	†	—	—	Target Marine S.A.
<i>Merchant Premier</i>	08.06.98	R. Sidney	M.K. Chauhan, O. Noronha, S. Kumar, D. Shinde	V.Ships (UK) Ltd
<i>Merchant Principal</i>	30.12.98	C.W. Harvey	B.S. Pabla, M.J. Mehta	V.Ships (UK) Ltd
<i>Mineral Century</i>	10.08.98	R. Rajagopal	A.R. Syed, M. Sharma, A.D. Moghe, M.K. Sharma	Anglo-Eastern Ship Management Ltd
<i>Mineral Colombia</i>	22.09.98	S.K. Sharotri	A.R. Shetty, P.S. Hudekar, R.G. Carvalho	Anglo-Eastern Ship Management Ltd
<i>Mineral Europe</i>	†	—	—	Anglo-Eastern Ship Management Ltd
<i>Mineral Prosperity</i>	24.08.98	R. Gupta	S. Sameer, M.D. Yakub, P.S. Cheeroth	Anglo-Eastern Ship Management Ltd
<i>Mineral Venture</i>	†	—	—	Wah Kwong Shipping Agency Co. Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LATEST RECEIPT	MASTER	OBSERVING OFFICERS and RADIO OFFICERS	OWNER/MANAGER
<i>Mineral Zulu</i>	15.02.99	B.U. D'Silva	R. Sharma, A. Paranjape, R.S. Yadav	Anglo-Eastern Ship Management Ltd
<i>Mountain Cloud</i>	†	—	—	Wallem Shipmanagement Ltd
<i>Murex</i>	14.10.98	H. Clifford	J.D. Aguilar, S.M. Masud, A.F. Hasevoet	Shell Marine Personnel (IOM) Ltd
<i>Myrina</i>	†	—	—	Shell Marine Personnel (IOM) Ltd
<i>Nand Nidhi</i>	†	—	—	Essar Sisco Ship Mgmt. Co. Ltd
<i>Nandu Arrow</i>	†	—	—	Gearbulk (UK) Ltd
<i>Nefertiti</i>	30.10.98	D. Buckfitt	R. Little	Nefertiti Yachting Ltd
<i>New Generation</i>	29.01.99	J. Sharples	B. Ahmed, A.C. Jacobsen	James Fisher & Sons plc
<i>Newport Bay</i>	15.12.98	R.B. Gurney	T.A. Howse, M.P. Green, S.J. Illingworth	P&O Nedlloyd Ltd
<i>Newton</i>	03.02.99	J. Hughes	A. Clements, M. Beazley, I. Felwick, J. Perry	Royal Maritime Auxiliary Service
<i>Nicky L</i>	17.11.98	C.R. Profit	N. Finn, P. Robertson, P. Linehan	R. Laphorn & Co. Ltd
<i>Nivaga II</i>	†	—	—	Government of Tuvalu
<i>NOL Agate</i>	†	—	—	Neptune Shipmanagement Services (Pte) Ltd
<i>NOL Cyprine</i>	†	—	—	Neptune Shipmanagement Services (Pte) Ltd
<i>NOL Pearl</i>	†	—	—	Neptune Shipmanagement Services (Pte) Ltd
<i>Nolizwe</i>	†	—	—	Safmarine Ship Management
<i>Nordstrand</i>	07.09.98	J.W. Jackson	C.G. Walker, J.A. Deeney	Carisbrooke Shipping plc
<i>Norna</i>	11.03.99	N.E. McInnes	D.A. Smith, J.J. Coyle, M.P. Donnelly	Scottish Office, Agr. & Fisheries Dept
<i>Norrisia</i>	†	—	—	Shell Marine Personnel (IOM) Ltd
<i>Norsea</i>	†	—	—	P&O North Sea Ferries Ltd
<i>North Pacific</i>	†	—	—	Wallem Shipmanagement Ltd
<i>Northella</i>	†	—	—	Marr Vessel Management Ltd
<i>Northern Horizon</i>	†	—	—	Marr Vessel Management Ltd
<i>Northern Light</i>	08.12.98	R. Crespo	A. Robles, J.I. Rebolledo, A. Penela	Souter Shipping Ltd
<i>Northern Prince</i>	†	—	—	Marr Vessel Management Ltd
<i>Northia</i>	26.10.98	A.T. Cross	K.G. Ward, J.I. Doyle, E.W. D'Souza	Shell Marine Personnel (IOM) Ltd
<i>Ocean Goose</i>	†	—	—	Captain D.A. Church
<i>Ogooue</i>	†	—	—	Jolane S.A.
<i>OOCL Belgium</i>	*	—	—	OOCL (UK) Ltd
<i>OOCL Britain</i>	21.05.98	D.R. Llewellyn	C.L. Wong, C.K. Gwee, N.P. Goh	OOCL (UK) Ltd
<i>OOCL Canada</i>	13.11.98	D.J. Prichard	P.G. Ivory, B.P. Keegan, S. Begley	OOCL (UK) Ltd
<i>Oriana</i>	31.12.98	-	P.J. Miller, R.B. Martin, J. Tratt	P&O Cruises Ltd
<i>Oriental Bay</i>	03.02.99	P.R. Kaye	S. Azim, R.K. Harding, D.R. Lewis	P&O Nedlloyd Ltd

<i>Oriental Venture</i>	†	—	—	A. Majid, R.S. John	BP Shipping Ltd
<i>Orion Reefer</i>	05.03.99	—	—	A. Majid, R.S. John	Wallem Shipmanagement Ltd
<i>Ormond</i>	27.11.98	M.J. Howorth	—	T.W. Noronha, R.N. Doshi, K.A. Malitby, M.V. Miranda	Associated Bulk Carriers (London) Ltd
<i>P&O Nedlloyd Kobe</i>	*	—	—	—	P&O Nedlloyd Ltd
<i>P&O Nedlloyd Lyntelton</i>	†	—	—	—	Blue Star Ship Management Ltd
<i>P&O Nedlloyd Marseille</i>	*	—	—	—	P&O Nedlloyd Ltd
<i>P&O Nedlloyd Southampton</i>	09.03.99	R.A. Kenchington	—	A.W. Piggott, S. Gallacher, R.M. Barnsley	P&O Nedlloyd Ltd
<i>P&O Nedlloyd Texas</i>	06.11.98	K. Worthington	—	L.A. Jenkins, S. Frediani, I.D. Hebborn, T.B. Bayley	P&O Nedlloyd Ltd
<i>Pacheco</i>	†	—	—	—	Andrew Weir Shipping Ltd
<i>Pacific Crane</i>	†	—	—	—	James Fisher & Sons plc
<i>Pacific Guardian</i>	†	—	—	—	Cable & Wireless (Marine) Ltd
<i>Pacific Pintail</i>	†	—	—	—	James Fisher & Sons plc
<i>Pacific Princess</i>	03.06.98	M. Carr	—	G. Pears	P&O Cruises Ltd
<i>Pacific Sandpiper</i>	20.01.99	P.A. Booker	—	R.G. Barry, J.B. Appleby, J.I. Marsham, T. McMahon	James Fisher & Sons plc
<i>Pacific Swan</i>	06.07.98	B.D. Miller	—	M.J. Booth, A. Morley, R.C. Mitcheson, A.P. Austen	James Fisher & Sons plc
<i>Pacific Teal</i>	†	—	—	—	James Fisher & Sons plc
<i>Pacific Venture</i>	†	—	—	—	MOL Tankship Management Ltd
<i>Pacific Wave</i>	†	—	—	—	MOL Tankship Management Ltd
<i>Palliser Bay</i>	09.03.99	D.K. MacCorquodale	—	R.J. Platt, M. Stewart, R. Ellison	P&O Nedlloyd Ltd
<i>Pegasus Bay</i>	01.03.99	D.A. Bamford	—	T.D. Morrison, T.J. Mead, M.E. Bosworth	P&O Nedlloyd Ltd
<i>Pelican Arrow</i>	†	—	—	—	Gearbulk (UK) Ltd
<i>Peninsular Bay</i>	17.02.99	P.J. Manson	—	D.J. Harkness, J.P. Melles-Sawyers, A. Haider	P&O Nedlloyd Ltd
<i>Petro Fife</i>	31.12.98	R.W. Noakes	—	D.C. Mohammed, D.J. Buckley, M.K. Elson	Standard Marine Services Ltd
<i>Pharos</i>	20.08.98	D. Davidson	—	C.O. Gill, M.R. Courtney, S.S. Tylfe	Northern Lighthouse Board
<i>Pioneer Leader</i>	†	—	—	—	Wallem Shipmanagement Ltd
<i>Pisces Trader</i>	09.03.99	M.S. Jacob	—	R. Faiz, K. Janvekar, S. Singh, M.R. Monsterrate	Bibby-Harrison Mgmt. Services Ltd
<i>Pisces Voyager</i>	25.01.99	K.S. Sandhu	—	P. Chakravrti, J. Yayati, A.N. Diwan	Bibby-Harrison Mgmt. Services Ltd
<i>Pride of Bilbao</i>	05.10.98	R.J. Ross	—	N.P. Dunn, A.B. Rugg, P.G. Bourtt	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Bristol</i>	*	—	—	—	The Pride of Bristol Trust
<i>Pride of Cherbourg</i>	13.08.98	P.D. Meyerhoff	—	P.M. Eastwood, R. Hayward, C.P. Robins	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Hampshire</i>	†	—	—	—	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Le Havre</i>	†	—	—	—	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Portsmouth</i>	14.07.98	A.F. Bonehill	—	J.P. Whiteley P.G. Bowett	P&O European Ferries (Portsmouth) Ltd
<i>Pride of Suffolk</i>	17.12.98	D. Kirkwood	—	A.M. Smith	P&O European Ferries (Portsmouth) Ltd
<i>Primo</i>	21.10.98	V. De Vicente	—	J.M. Sanchez, J. Ausin, H. Blanco	P&O European Ferries (Portsmouth) Ltd
<i>Providence Bay</i>	01.03.99	D. Batchelor	—	S.M. Granger, J. Poulter, H. Rahda	P&O North Sea Ferries Ltd
<i>Pudahuel</i>	†	—	—	—	Souter Shipping Ltd
<i>Puerto Cortes</i>	†	—	—	—	P&O Nedlloyd Ltd
<i>Pufford Achates</i>	*	—	—	—	Dockendale Shipping Company
					Sea Containers Services Ltd
					Boston-Putford Offshore Safety Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LATEST RECEIPT	MASTER	OBSERVING OFFICERS and RADIO OFFICERS	OWNER/MANAGER
<i>Puiford Achilles</i>	30.11.98	M.A. Chapman	R.W. Cartwright, S.J. Murphy	Boston-Putford Offshore Safety Ltd
<i>Puiford Aries</i>	31.07.98	I. Finlay	P.G. McCardle, W. McCormack, H. Reese	Boston- Putford Offshore Safety Ltd
<i>Puiford Skua</i>	30.11.98	W. Buckley	K.D. Edmunds, G. Smith	Boston-Putford Offshore Safety Ltd
<i>Pythchley</i>	*	—	—	Associated Bulk Carriers (London) Ltd
<i>Queen Elizabeth 2</i>	07.01.99	R.W. Warwick	M.A. Hooley, O.S. Ghoshroy, H.F. Elliott	Cunard Line Ltd
<i>Queensland Star</i>	18.08.98	D.R. Johnston	E.S. Galope, N.F. Codera, G.Y. Geoca	Blue Star Ship Management Ltd
<i>Raven Arrow</i>	†	—	—	Gearbulk (UK) Ltd
<i>Regent Rose</i>	†	—	—	United Sea Services S.A.
<i>Regina Oldendorff</i>	†	—	—	Egon Oldendorff
<i>Repulse Bay</i>	31.12.98	K.P. Byrne	K.J. Platt, A. Mackenzie, I.M. Percival	P&O Nedlloyd Ltd
<i>Resolution Bay</i>	11.02.99	A.M. Tweedie	G. Collier, A.N. Murray, M. De La Rue	P&O Nedlloyd Ltd
<i>Rhone</i>	†	—	—	United Ship Management Ltd
<i>Rixta Oldendorff</i>	22.09.98	P.S. Rawat	A.K. Sawant, N.D. Yillouez, M. Maringas, M. Abostate	Egon Oldendorff
<i>Rohnie</i>	20.10.98	W.E. Lewis	J. Nestorov, A.W. Kopjansen, Z. Wozniak	Sandford Ship Management Ltd
<i>Royal Princess</i>	19.11.98	A.J. Proctor	R. Hodges, C. Middleton, T. Draper, R. Maddler	P&O Cruises Ltd
<i>Royal Star</i>	24.03.98	A.K. Rang	J.M. Almeida, N.S. Gajendrasingh, G.P. Medhekar	Unique Shipping (H.K.) Ltd
<i>St Clair</i>	10.07.98	S. Allen	J. Strathearn, G. Gove, E. Mackay	P&O Scottish Ferries Ltd
<i>St Helena</i>	08.03.99	D.N. Roberts	A. Greentree, B. Bennett, N.R. Mogg	Curnow Shipping Ltd
<i>St Lucia</i>	†	—	—	Interocean Ugland Management AS
<i>St Sumniva</i>	†	—	—	P&O Scottish Ferries Ltd
<i>Sachem</i>	31.07.98	P.D. Kelly	K.C. Taylor, S.A. Henderson, M.J. Catt	Mobil Shipping Co. Ltd
<i>Saga Horizon</i>	†	—	—	Patt Manfield & Co. Ltd
<i>Saga Wind</i>	30.11.98	A.C. Hitcham	N.P. Sirilan, A.V. Hilario, N.D. Arligue	Patt Manfield & Co. Ltd
<i>Sagacity</i>	13.11.98	T. Hatalski	J. Bielawski, B. Ciesielski, M. Smigielski	F.T. Everard & Sons Ltd
<i>Saldanha</i>	11.03.99	P. Thompson	N.G. Minnitt, E. Jugudan, D.A. Selvido, L. Castillo	Safmarine Ship Management
<i>Saudi Splendour</i>	04.03.99	I.D. McKenzie	R.G. Saludez, C. Blacker, R.L. Abingosa	Mobil Shipping Co. Ltd
<i>Scillonian III</i>	08.04.98	P. Row	P. Crawford	Isles of Scilly Steamship Co.Ltd
<i>SCL Infanta</i>	25.01.99	J. Smith	A. Vergel, E. Isla, D. Mijares	Safmarine Ship Management
<i>Scotia</i>	†	—	—	Marr Vessel Management Ltd
<i>Scott Guardian</i>	20.07.98	R.M. Coull	J. Cowie, M. Bradley, F.J. McKay	Tidewater Marine North Sea Ltd
<i>Scottish Star</i>	06.11.98	P. Buckley	L. Cabardo, I. Damolo, A.F. Gopez	Norbulk Shipping UK Ltd
<i>Sea Amethyst</i>	11.01.99	D. Fardo	R.M. MacIure, T. Szmigiel	Stephenson Clarke Shipping Ltd
<i>Sea Princess</i>	*	—	—	Princess Cruises Inc

<i>Seki Cedar</i>	17.02.99	P.W. Jackson	D.J. Ayling, T. Nyunt, M. Bingham	Denholm Ship Management (UK) Ltd
<i>Seki Pine</i>	05.03.99	R. Lyall	B.R. Tasker, J. Constable, S. Ding	Denholm Ship Management (UK) Ltd
<i>Selectivity</i>	13.11.98	T.L. Jeffery	I.A. Marson, E.K. Andoh-Wilson	F.T. Everard & Sons Ltd
<i>Semac I</i>	†	—	—	European Marine Contractors Ltd
<i>Seniority</i>	26.01.99	R.A. Parsons	D. Spurling, G. Oliver, M. Smith	F.T. Everard & Sons Ltd
<i>Severn Fisher</i>	26.01.99	A.G. Mount	C.F. Phillips, P.B. Fewster, S.K. Corcoran	James Fisher & Sons (Liverpool) Ltd
<i>Shenzhen Bay</i>	31.12.98	M. Watts	P.E. Garner-Richards, A.H. Abid, D.G. Bell	P&O Nedlloyd Ltd
<i>Shetland Service</i>	20.11.98	P. Emby	B. Brown, D. Lemon, J. Thompson	Tidewater Marine North Sea Ltd
<i>Singapore Bay</i>	05.10.98	J.G.W. Dixon	K.E. Fuller, C. Henderson, A.N. Murray	P&O Nedlloyd Ltd
<i>Sir Eric Sharp</i>	†	—	—	Cable & Wireless (Marine) Ltd
<i>Siskin Arrow</i>	†	—	—	Gearbulk (UK) Ltd
<i>Snow Crystal</i>	†	—	—	Holy House Shipping AB
<i>Snow Drift</i>	17.12.98	B. Yelland	J. Salgado, J. Cabrera, R. Sayomac	Holy House Shipping AB
<i>Snow Flower</i>	30.09.98	M. Baker	L. Olsson, N. Tonog	Holy House Shipping AB
<i>Snow Land</i>	15.02.99	W. Lockie	R. Sobrepena, M. Sorra	Holy House Shipping AB
<i>Sociality</i>	†	—	—	F.T. Everard & Sons Ltd
<i>Solena</i>	†	—	—	Shell Marine Personnel (IOM) Ltd
<i>Solitaire</i>	*	—	—	Allseas Engineering
<i>Spar Topaz</i>	†	—	—	Spar Shipping A/S
<i>Spear</i>	†	—	—	Good Faith Shipping Co. S.A.
<i>Speciality</i>	†	—	—	F.T. Everard & Sons Ltd
<i>Speybank</i>	16.11.98	W. Campbell	A. Plisenko, E. Kemp, A. Siyukhov	Andrew Weir Shipping Ltd
<i>Storrington</i>	23.12.98	C.D.G. Grahame	I.J. Roennele, R.M. MacIure, M. Arden	Stephenson Clarke Shipping Ltd
<i>SubSea Mayo</i>	†	—	—	SubSea Offshore Ltd
<i>Sulsker</i>	11.02.99	P. Laycock	P. Walton, T. Wilson, D. Pritchard	Scottish Office, Agr. & Fisheries Dept
<i>Summer Flower</i>	11.02.99	W.P. Masnayon	R.C. Paala, R. Torres, J. Gumba	Hoegh Fleet Services AS
<i>Summer Meadow</i>	08.03.99	C.X. Pinheiro	V.S. Demchenko, A. Pachori	Hoegh Fleet Services AS
<i>Summer Wind</i>	†	—	—	Hoegh Fleet Services AS
<i>Sun Suma</i>	†	—	—	United Ship Management Ltd
<i>Sunda</i>	11.01.99	R. Peris	S. Marcel	Wallem Shipmanagement Ltd
<i>Sunny Clipper</i>	†	—	—	Grand Seatrade Shipping Agencies Ltd
<i>Superiority</i>	†	—	—	F.T. Everard & Sons Ltd
<i>Swan Arrow</i>	12.01.99	N.I. Beg	E.M. Kutty, J.M. Singh	Gearbulk (UK) Ltd
<i>Swan Bay</i>	03.04.98	E. Fransson	F.N. Roco, R.C. Pualo, F.N. Cabaylo	Swan Shipping A/S
<i>Swan River</i>	20.07.98	A.L. Echin	B.C. De Gulman, E.B. Borres, M.L. Sapare	Swan Shipping A/S
<i>Swan Stream</i>	24.08.98	B. Hamilton	D. Manguardia, J. Valencia, A. Alvarez	Swan Shipping A/S
<i>Tanamonta</i>	†	—	—	V. Ships (UK) Ltd
<i>Tamar F.I.</i>	†	—	—	Byron Marine Ltd
<i>Tasman Spirit</i>	06.11.98	T. Elahi	J. Saparamadu, C.P. Medagedara, L. Abarquez	London Ship Managers Ltd

Selected and Supplementary Ships (contd)

NAME OF VESSEL	LATEST RECEIPT	MASTER	OBSERVING OFFICERS and RADIO OFFICERS	OWNER/MANAGER
<i>Taunton</i>	09.03.99	S.B. Tudor	S. Singh, M. Bansal, I.J. Wardhaugh, P.D. Dewan	Associated Bulk Carriers (London) Ltd
<i>Teignbank</i>	25.01.99	D.E. Ginger	I. Tofan, S. Romankevich, A. Khil	Andrew Weir Shipping Ltd
<i>Tema Star</i>	†	—	—	Target Marine S.A.
<i>Tepozteco II</i>	18.08.98	V.G. Cruz	R.R. Ramos, G.C. Antonio, S.S. Esteban, J.R. Prieto	Transportacion Maritima Mexicana
<i>Thorkil Maersk</i>	02.02.99	A.H. Permohamed	J. Legge, J. Thygesen, A.R. Heuvel	The Maersk Co Ltd
<i>Tidewater Integrity</i>	29.01.99	G. Main	A. Campbell, S. Mason, J.P. Meyes	Tidewater Marine North Sea Ltd
<i>Tobias Maersk</i>	26.10.98	A.K. Lloyd	K.J. Coates, R.W. Forrest, G. Griffiths	The Maersk Co Ltd
<i>Toisa Conqueror</i>	†	—	—	Sealion Shipping Ltd
<i>Toisa Cougar</i>	†	—	—	Sealion Shipping Ltd
<i>Toisa Petrel</i>	04.03.99	V. Whitty	F.J. Hansen, B. Oriatto, N.A. Rizvi	Sealion Shipping Ltd
<i>Toisa Puffin</i>	†	—	—	Sealion Shipping Ltd
<i>Toisa Sentinel</i>	08.12.98	R.T. Blackman	J.S. Martinez, R.O. Chaplin	Sealion Shipping Ltd
<i>Toisa Widgeon</i>	†	—	—	Sealion Shipping Ltd
<i>Torben Maersk</i>	†	—	—	Sealion Shipping Ltd
<i>Torben Spirit</i>	†	—	—	The Maersk Co Ltd
<i>Trade Apollo</i>	14.05.98	B.F. Keith	S.G. Ping, A.N. Chowdhury, C.W. Yuen	Norbulk Shipping UK Ltd
<i>Trade Cosmos</i>	†	—	—	Wah Tung Shipping Agency Co. Ltd
<i>Trade Eternity</i>	01.07.98	M.C. Cameron	I. Chowdhury, S.I. Babor, S.R. Jayawickreme	Wah Tung Shipping Agency Co. Ltd
<i>Trade Maple</i>	30.09.98	A.B. Liddin	C. Ming Keung, L. Chang Ming, D.P. Gunawardane	Wah Tung Shipping Agency Co. Ltd
<i>Trade Selene</i>	12.05.98	R. McMillan	Liu Rong Tu,	Wah Tung Shipping Agency Co. Ltd
<i>Trojan Star</i>	11.06.98	D. Johnston	V.M. Ballesteros, N.R. Canon, F.F. Mercado	Norbulk Shipping UK Ltd
<i>Tsuru Arrow</i>	03.07.98	M. Riise	W.F. Pabelo, D. Jovo, J. Eduardo	Gearbulk (UK) Ltd
<i>Tudor Star</i>	29.09.98	J. Suddes	P.F. Sonador, D. Hornogino, E. Bombaso	Norbulk Shipping UK Ltd
<i>Tundra Princess</i>	17.12.98	I. Hansson	J. Garrovillas, E. Ebarle, J. Buhay	Swan Reefer ASA
<i>Tycho Brahe</i>	23.03.98	N. Stevens	W.C. Ramoran, F. Collado, W. Krebs	Hanseatic Shipping Co. Ltd
<i>Uisge Gorm</i>	†	—	—	Bluewater Operations (UK) Ltd
<i>Ullswater</i>	31.12.98	J.H. Lacey	B.S. Lasheer, K. Maher-Homji, D.J. Nelson, L.D. Potnis	Associated Bulk Carriers (London) Ltd
<i>Victoria</i>	05.08.98	S. Burgoin	J.A. Brown	P&O Cruises Ltd
<i>Vigilant</i>	10.08.98	D.L. Beveridge	R. Whyte, A. MacCullum, G. Wale	Scottish Office, Agr. & Fisheries Dept
<i>Vine</i>	16.11.98	S.B. Tudor	A.A. Lahiri, T. Rajesh, S. Singh, J.D. Crasto	Associated Bulk Carriers (London) Ltd
<i>Waasland</i>	03.07.98	M. Robert	—	Tecto N.V
<i>Waterford</i>	15.02.99	J.M. Milloy	U.C. Shenai, R. Bhatia, P.T. Clegg, P.D. Dhule	Associated Bulk Carriers (London) Ltd
<i>Western Bridge</i>	04.02.99	C. Bamford	K.C. Townley, D.C. Alwis, M.A. Anthony	Ropner Ship Management Ltd

‘Marid’ Ships

The following are ships recruited primarily to report sea temperatures from UK coastal waters.
Masters are requested to point out any errors or omissions.

NAME OF VESSEL	MASTER	OWNER/MANAGER
<i>Achatina</i>	R.M. Astridge	Shell International Trading & Shipping Co. Ltd
<i>Amity</i>	A.S. Craggs	F.T. Everard & Sons Ltd
<i>Amoria</i>	—	Shell International Trading & Shipping Co. Ltd
<i>Anchorman</i>	C. Hampson	James Fisher & Sons (Liverpool) Ltd
<i>Arco Avon</i>	J. Quayle	ARC Marine Ltd
<i>Arco Dart</i>	—	ARC Marine Ltd
<i>Arianta</i>	B. Lohnes	Shell International Trading & Shipping Co. Ltd
<i>Asprella</i>	—	Shell International Trading & Shipping Co. Ltd
<i>Blackfriars</i>	T. Baker	Crescent Shipping Ltd
<i>Briarthorn</i>	—	James Fisher & Sons (Liverpool) Ltd
<i>Celtic Terrier</i>	—	Campbell Maritime Ltd
<i>Chartsman</i>	W. Millar	James Fisher & Sons (Liverpool) Ltd
<i>City of Cardiff</i>	E. Natt	United Marine Dredging Ltd
<i>City of Chichester</i>	—	United Marine Dredging Ltd
<i>European Highlander</i>	H.T. Jones	P&O EF/IS Ltd
<i>Hera</i>	E. Onsoien	Skibsaksjeselskapet Solvang AS
<i>Hernes</i>	—	Wilson Ship Management (Bergen) AS
<i>Hordnes</i>	—	Wilson Ship Management (Bergen) AS
<i>Lord Rank</i>	—	Ocean Youth Club
<i>Lough Fisher</i>	P. Mercer	James Fisher & Sons (Liverpool) Ltd
<i>Marine Explorer</i>	V.B. Webster	Eidesvik Shipping Ltd
<i>Merchant Brilliant</i>	C. Morrison	Merchant Ferries / V.Ships (UK) Ltd
<i>Merchant Venture</i>	N. Barningham	Merchant Ferries / V.Ships (UK) Ltd
<i>Mersey Fisher</i>	—	James Fisher & Sons (Liverpool) Ltd
<i>Michael M</i>	—	James Fisher & Sons (Liverpool) Ltd
<i>Northern Star</i>	—	Marine Management Services Ltd
<i>Ocean Defender</i>	—	EarthKind
<i>Petro Avon</i>	J.A. Dunlop	Standard Marine Services Ltd
<i>River Lune</i>	N. Humphreys	Belfast Freight Ferries
<i>Royalist</i>	—	Sea Cadet Offshore Office
<i>Saga Moon</i>	G. Black	Belfast Freight Ferries
<i>Sanguity</i>	—	F.T. Everard & Sons Ltd
<i>Spheroid</i>	D. Peers	Belfast Freight Ferries
<i>Stena Antrim</i>	—	Stena Line Ltd
<i>Stena Caledonia</i>	—	Stena Line Ltd
<i>Stena Challenger</i>	R.A. Hollows	Stena Line Ltd
<i>Stena Galloway</i>	—	Stena Line Ltd
<i>Stolt Avocet</i>	T. Van Manen	Stolt-Nielsen Rederi AS
<i>Stolt Kittiwake</i>	Q. Bretherton	Stolt-Nielsen Rederi AS
<i>Superferry</i>	V. Diamantis	Swansea-Cork Ferries Ltd
<i>Taikoo</i>	—	Ocean Youth Club
<i>Tyne Fisher</i>	—	James Fisher & Sons (Liverpool) Ltd
<i>UKD Bluefin</i>	—	UK Dredging
<i>Union Arbo</i>	D. Wright	Union Transport Group plc
<i>Vanessa C</i>	—	Carisbrooke Shipping plc
<i>Waverley</i>	—	Waverley Excursions Ltd
<i>Wear Fisher</i>	—	James Fisher & Sons (Liverpool) Ltd
<i>Welsh Piper</i>	J. Norman	British Dredging Aggregates Ltd

Fixed and Mobile Installations

INSTALLATION	OWNER/OPERATOR
<i>AH001</i>	Amerada Hess Ltd
<i>Beryl A</i>	Mobil North Sea Ltd
<i>Beryl B</i>	Mobil North Sea Ltd
<i>Buchan A</i>	Talisman Energy (UK) Ltd
<i>Captain WPP A</i>	Texaco North Sea (UK) Co.
<i>Drill Star</i>	Sedco-Forex
<i>Glomar Adriatic IX</i>	Global Marine Drilling Company
<i>Glomar Arctic III</i>	Global Marine Drilling Company
<i>Gryphon A</i>	Kerr-Magee Oil (UK) plc
<i>Henry Goodrich</i>	Reading & Bates Falcon Ltd
<i>Hewett Arpet A</i>	Phillips Petroleum Co. (UK) Ltd
<i>Iolair</i>	Reading & Bates Falcon Ltd
<i>Jack Bates</i>	Reading & Bates Falcon Ltd
<i>Janice A</i>	Kerr-Magee Oil (UK) plc
<i>John Shaw</i>	Transocean Offshore (UK) Ltd
<i>Maureen A</i>	Phillips Petroleum Co. (UK) Ltd
<i>Montrose A</i>	BP Amoco Ltd
<i>Morecambe Bay API</i>	British Gas Hydrocarbon Resources Ltd
<i>Noble Ton Van Langeveld</i>	Noble Drilling (UK) Ltd
<i>Northern Producer</i>	Atlantic Floating Production Company
<i>Ocean Guardian</i>	Diamond Offshore (UK) Ltd
<i>Paul B. Loyd Jr.</i>	Reading & Bates Falcon Ltd
<i>Santa Fe Britannia</i>	Santa Fe Techserv (North Sea) Ltd
<i>Santa Fe Galaxy I</i>	Santa Fe Techserv (North Sea) Ltd
<i>Santa Fe Magellan</i>	Santa Fe Techserv (North Sea) Ltd
<i>Santa Fe Monarch</i>	Santa Fe Techserv (North Sea) Ltd
<i>Santa Fe Monitor</i>	Santa Fe Techserv (North Sea) Ltd
<i>Santa Fe Rig 135</i>	Santa Fe Techserv (North Sea) Ltd
<i>Santa Fe Rig 140</i>	Santa Fe Techserv (North Sea) Ltd
<i>Sedco 706</i>	Sedco-Forex
<i>Sedco 711</i>	Sedco-Forex
<i>Sedco 712</i>	Sedco-Forex
<i>Sedco 714</i>	Sedco-Forex
<i>Sovereign Explorer</i>	Sedco-Forex
<i>Tartan A</i>	Texaco North Sea (UK) Co.
<i>Tiffany Platform</i>	Agip (UK) Ltd
<i>Transocean Explorer</i>	Transocean Offshore Ltd
<i>Viking B</i>	Conoco (UK) Ltd

The Commonwealth

The following lists give the names of Selected and Supplementary Ships, and the number of Auxiliary Ships where known (those which only report in 'sparse areas'), which voluntarily co-operate within The 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 8 February 1999)

NAMES OF VESSELS		
Selected Ships:	Selected Ships (contd):	Selected Ships (contd):
<i>Aburri</i>	<i>Iron Carpentaria</i>	<i>Northwest Stormpetrel</i>
<i>Al Khaleej</i>	<i>Iron Chieftain</i>	<i>Ormiston</i>
<i>Al Kuwait</i>	<i>Iron Curtis</i>	<i>Pacific Gas</i>
<i>Al Messilah</i>	<i>Iron Flinders</i>	<i>Papuan Chief</i>
<i>Alltrans</i>	<i>Iron Kembla</i>	<i>Pathfinder II</i>
<i>Aotearoa Chief</i>	<i>Iron Monarch</i>	<i>Portland</i>
<i>Arafural</i>	<i>Iron Newcastle</i>	<i>Provider</i>
<i>Aurelia IV</i>	<i>Iron Prince</i>	<i>Rig Seismic</i>
<i>Aurora Australis</i>	<i>Iron Spencer</i>	<i>River Boyne</i>
<i>Australia Star</i>	<i>Iron Sturt</i>	<i>River Embley</i>
<i>Australian Endeavour</i>	<i>Iron Whyalla</i>	<i>River Torrens</i>
<i>Australian Enterprise</i>	<i>Iron Yandi</i>	<i>Saraji Trader</i>
<i>Australian Pride</i>	<i>Klang Reefer</i>	<i>Seakap</i>
<i>Bader III</i>	<i>Kokopo Chief</i>	<i>Sedco 703</i>
<i>Boral Gas</i>	<i>Kowulka</i>	<i>Sina</i>
<i>Botany Triumph</i>	<i>Leeuwin</i>	<i>Sitka</i>
<i>Brigit Maersk</i>	<i>Lillo</i>	<i>Southern Surveyor</i>
<i>Cape Grafton</i>	<i>Lindesay Clark</i>	<i>Spirit Of Tasmania</i>
<i>Capitaine Cook</i>	<i>Maersk Hakata</i>	<i>Swan Reefer</i>
<i>Capitaine Fearn</i>	<i>Maersk Oceania</i>	<i>Tasman Chief</i>
<i>Challis Venture</i>	<i>Maersk Sydney</i>	<i>Tradewind Express</i>
<i>Coral Chief</i>	<i>Mawashi Al Gassem</i>	<i>Young Endeavour</i>
<i>Danny F II</i>	<i>Mosdeep</i>	
<i>El Cordero</i>	<i>Mrs Pioneer</i>	
<i>Endeavour River</i>	<i>Nivosa</i>	
<i>Fair Princess</i>	<i>Nol Amber</i>	
<i>Farid F</i>	<i>Northwest Sanderling</i>	
<i>Fitzroy River</i>	<i>Northwest Sandpiper</i>	Supplementary Ships:
<i>Franklin</i>	<i>Northwest Seaeagle</i>	<i>Maersk Taiyo</i>
<i>Fua Kavenga</i>	<i>Northwest Shearwater</i>	<i>One And All</i>
<i>Highland Chief</i>	<i>Northwest Snipe</i>	<i>Pacific Sentinel</i>

Auxiliary Ships:

Australia has one Auxiliary Ship currently reporting.

NEW ZEALAND (Information dated 1 February 1999)

NAMES OF VESSELS		
Selected Ships:	Supplementary Ships (contd):	Supplementary Ships (contd):
<i>Ariake</i>	<i>New Zealand Pacific</i>	<i>Tangaroa</i>
<i>America Star</i>	<i>Ngamaru III</i>	<i>Tasman Venture</i>
<i>Capitaine Kermadec</i>	<i>Pacific Chieftain</i>	<i>Toanui</i>
<i>Capitaine Wallis</i>	<i>Pacific Onyx</i>	<i>Union Rotoiti</i>
<i>Challenger</i>	<i>P&O Nedlloyd Napier</i>	<i>Union Rotoma</i>
<i>Columbia Star</i>	<i>P&O Nedlloyd Tauranga</i>	<i>Wellington Express</i>
<i>Crusader</i>	<i>SeaTow 22</i>	
<i>Direct Kea</i>	<i>SeaTow 25</i>	
<i>Forum Samoa</i>	<i>Soren Larsen</i>	
<i>Golden Bay</i>	<i>Spirit of Competition</i>	
<i>Italian Reefer</i>	<i>Spirit of Freedom</i>	Supplementary Ships:
<i>Karamea</i>	<i>Sydney Express</i>	<i>Arahanga</i>
<i>Maersk Belawan</i>	<i>Sydney Star</i>	<i>Arahura</i>
<i>Maersk Barcelona</i>	<i>T A Explorer</i>	<i>Aratika</i>
<i>Marico</i>	<i>T A Navigator</i>	<i>Straitsman</i>
<i>Melbourne Star</i>	<i>Taiko</i>	<i>Suilven</i>

Auxiliary Ships:

New Zealand has a fleet of 12 Auxiliary Ships currently reporting.

INDIA (Information dated 1 March 1999)

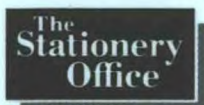
NAMES OF VESSELS

Selected Ships:	Supplementary Ships (contd):	Supplementary Ships (contd):
<i>Akbar</i>	<i>Gandhar</i>	<i>Mandakini</i>
<i>Arunachal Pradesh</i>	<i>Ganga Sagar</i>	<i>Maratha Prudence</i>
<i>B R Ambedkar</i>	<i>Gem of Madras</i>	<i>Mizoram</i>
<i>Bharatendu</i>	<i>Guru Bachan Singh Salaria</i>	<i>Motilal Nehru</i>
<i>Bhavabhuti</i>	<i>PVC</i>	<i>Murshidabad</i>
<i>Harshavardhan</i>	<i>Hardwar</i>	<i>Naik Jadunath Singh PVC</i>
<i>Lokmanya Tilak</i>	<i>Harkishan</i>	<i>Nancowry</i>
<i>Major Dhansingh Thapa PVC</i>	<i>Havildar Abdul Hamid PVC</i>	<i>Nand Hari</i>
<i>Sabarimala</i>	<i>Homi Bhabha</i>	<i>Nand Kishore</i>
<i>Sagar Kanya</i>	<i>Indian Goodwill</i>	<i>Nand Rati</i>
<i>Sagar Sampada</i>	<i>Indian Valour</i>	<i>Nand Smiti</i>
<i>Samudra Manthan</i>	<i>Indira Gandhi</i>	<i>Nand Srishti</i>
<i>State of Andhra Pradesh</i>	<i>Jag Manek</i>	<i>Nanga Parbat</i>
<i>State of Gujarat</i>	<i>Jag Pari</i>	<i>Netaji Subash Bose</i>
<i>State of Nagaland</i>	<i>Jag Prabhat</i>	<i>Nicobar</i>
<i>Tirumalai</i>	<i>Jag Pradip</i>	<i>Patilputra</i>
<i>Vishva Pallav</i>	<i>Jag Pragati</i>	<i>Prabhu Das</i>
<i>Vishnu Sagar</i>	<i>Jag Prakash</i>	<i>Prabhu Daya</i>
	<i>Jag Preeti</i>	<i>Prabhu Gopal</i>
	<i>Jag Ratna</i>	<i>Prabhu Puni</i>
	<i>Jag Vasant</i>	<i>Prabhu Satram</i>
	<i>Jag Vijay</i>	<i>Rabindranath Tagore</i>
Supplementary Ships:	<i>Jagat Swamini/Priyamvada</i>	<i>Rafi Ahmed Kidwai</i>
<i>A B Tarapore PVC</i>	<i>Jagat Samrat</i>	<i>Raja Mahendra</i>
<i>APJ Anand</i>	<i>Jagat Vijeta</i>	<i>Rajiv Gandhi</i>
<i>APJ Angad</i>	<i>Jala Doot</i>	<i>Rama Raghoba Rane PVC</i>
<i>APJ Anjali</i>	<i>Jawaharlal Nehru</i>	<i>Ramdas</i>
<i>APJ Priti</i>	<i>Jay Narayan Vyas</i>	<i>Ravidas</i>
<i>APJ Shalin</i>	<i>Jhulelal</i>	<i>Sagar Deep</i>
<i>APJ Sushma</i>	<i>Kabirdas</i>	<i>Sagar Samrat</i>
<i>Aditya Vijaya</i>	<i>Kanchan Junga</i>	<i>Sanmar Pioneer</i>
<i>Alaknanda</i>	<i>Kanpur</i>	<i>Sarojini Naidu</i>
<i>Ankaleshwar</i>	<i>Kolandia</i>	<i>Satya Murti</i>
<i>Annapurna</i>	<i>Lal Bahadur Shastri</i>	<i>Skandy Surveyor</i>
<i>Aurobindo</i>	<i>Lance Naik Albert Ekka PVC</i>	<i>State of Haryana</i>
<i>Bankimchandra Chatterjee</i>	<i>Lt Arun Khetrapal PVC</i>	<i>State of Manipur</i>
<i>Bharat Seema</i>	<i>Lok Kirti</i>	<i>State of Orissa</i>
<i>CHM Piru Singh PVC</i>	<i>Lok Maheshwari</i>	<i>State of Tripura</i>
<i>C.V. Raman</i>	<i>Lok Pragati</i>	<i>Subhedar Jogindar Singh</i>
<i>Chandidas</i>	<i>Lok Prakash</i>	<i>PVC</i>
<i>Chennai Oorkam</i>	<i>Lok Pratap</i>	<i>Tulsidas</i>
<i>Chennai Perumai</i>	<i>Lok Pratima</i>	<i>Uttar Kashi</i>
<i>Chennai Polivu</i>	<i>Lok Rajeshwari</i>	<i>Varanasi</i>
<i>Chennai Veeram</i>	<i>Lok Vikas</i>	<i>Vishva Kaumudi</i>
<i>Chennai Velarchi</i>	<i>MMP Wealth</i>	<i>Vishva Nandini</i>
<i>Chhatrapati Shivaji</i>	<i>Maharashtra</i>	<i>Vishva Pankaj</i>
<i>Continental Rose</i>	<i>Maharshi Dayanand</i>	<i>Vishva Parag</i>
<i>Dadabhai Nowroji</i>	<i>Maharshi Karve</i>	<i>Vishva Parijat</i>
<i>Dakshineshwar</i>	<i>Major Hoshiar Singh PVC</i>	<i>Vishva Parimal</i>
<i>Diglipur</i>	<i>Major Shaitan Singh PVC</i>	<i>Vivekananda</i>
<i>Dweep Setu</i>	<i>Major Somnath Sharma PVC</i>	<i>Yerawa</i>
<i>Fonj Shekhon PVC</i>		

Auxiliary Ships:

India has 40 Auxiliary Ships currently reporting.

Printed in the United Kingdom for The Stationery Office
434205 C16 7/99 19585



Published by The Stationery Office and available from:

The Publications Centre

(mail, telephone and fax orders only)
PO Box 276, London SW8 5DT
Telephone orders / enquiries 0870 600 5522
Fax orders 0870 600 5533
Subscription enquiries 0870 600 5522

The Stationery Office Bookshops

123 Kingsway, London WC2B 6PQ
020 7242 6393 Fax 020 7242 6394
68–69 Bull Street, Birmingham B4 6AD
0121 236 9696 Fax 0121 236 9699
33 Wine Street, Bristol BS1 2BQ
0117 9264306 Fax 0117 9294515
9–21 Princess Street, Manchester M60 8AS
0161 834 7201 Fax 0161 833 0634
16 Arthur Street, Belfast BT1 4GD
028 9023 8451 Fax 028 9023 5401
The Stationery Office Oriel Bookshop
18–19 High Street, Cardiff CF1 2BZ
029 2039 5548 Fax 029 2038 4347
71 Lothian Road, Edinburgh EH3 9AZ
0131 228 4181 Fax 0131 622 7017

Accredited Agents

(see Yellow Pages)

and through good booksellers

© Crown Copyright 1999

Published with the permission of The Met. Office on behalf of the
Controller of Her Majesty's Stationery Office.

Applications for reproduction should be made in writing to
The Copyright Unit, Her Majesty's Stationery Office,
St. Clements House, 2-16 Colegate, Norwich, NR3 1BQ.

Annual subscription
£29 including postage

£8

ISSN 0025-3251

