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Met.O. 859

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METEOROLOGY PREPARED BY THE MARINE
DIVISION OF THE METEOROLOGICAL OFFICE

VOL. XLIII

No. 241

JULY 1973

CONTENTS

	<i>Page</i>
Excellent Awards, 1972	96
The Marine Observer's Log—July, August, September	101
Bird-ringing. BY C. J. MEAD	116
Forecasting for Off-shore Drilling Rigs. BY R. J. OGDEN	125
Appointment of Nautical Officers	130
Indian Excellent Awards	132
Ice Conditions in Areas adjacent to the North Atlantic Ocean—January to March 1973	133
Book Reviews:	
<i>Treasures of the Armada</i>	138
<i>The Polar Rosses</i>	139
<i>Interpreting the Weather</i>	140
Personalities	141
Fleet Lists	146

*Letters to the Editor, and books for review, should be sent to the Editor, "The Marine Observer,"
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PRICE 42½p NET or £1.88 per annum (including postage)

Excellent Awards 1972

Every year since its inception in 1924 the July number of *The Marine Observer* has contained the names of the captains, principal observing officers and, since the war, the radio officers who, by the standard of the meteorological logbooks which they have sent in during the previous year, have earned the Excellent Award. The list for 1972 appears on pages 97-99 of this number and once again we have very great pleasure in congratulating those who are named thereon. We always add a note of commiseration here too, to the masters and officers in many observing ships whose books have attained the standard required for the Excellent marking but which, at the same time, lack that extra something which puts them in the award class.

The assessment of the meteorological logbooks and the placing of them in an order of merit is a task which is not lightly undertaken. It is always done by a seaman who has constantly in mind the varying opportunities of precise and continuous observations in differing types of ships and different trades. He realizes, for instance, that observing in a small two-mate ship in the North Sea, or in a trawler in the Arctic, calls for more effort than observing in a four-mate passenger liner on a fine weather run. The books are marked accordingly.

In the year 1972 the highest marks were gained by the following ships:

1. *Hertford* (P. & O. S.N. Co.), Captain J. M. Burn
Liverpool Bay (Ocean Fleets Ltd.), Captain D. H. Stewart, R.D.
2. *St. Loman* (T. Hamling & Co. Ltd.), Skipper A. T. Blenkin
3. *Apollo* (Bristol S.N. Co. Ltd.), Captain G. V. Barnes
Tairea (P. & O. S.N. Co.), Captain T. E. Kelso
4. *Benhope* (Ben Line Steamers Ltd.), Captain O. Henderson
Port Nicholson (Port Line Ltd.), Captain E. J. Arnold
Orsino (Hellyer Bros. Ltd.), Skipper W. Stockton

The customary photographs of the three top ships, *Hertford*, *Liverpool Bay* and *St. Loman* appear opposite page 110 and we must congratulate the *Hertford* on thus having her photograph (taken prior to repainting) published for the second successive year and on her fourth appearance in an annual short list whilst the *Apollo* is making her fifth appearance. It is heartening also to notice that two trawlers are named in the short list whilst the full list contains the names of a further six trawlers; for the fishing fleets to gain eight awards out of the hundred made is a most commendable achievement.

Awards to 'Marid' ships and to trawlermen making and transmitting observations without using meteorological instruments are also listed, on pages 99-100. The meteorological work done by these seamen seldom touches the headlines of *The Marine Observer* but it is nevertheless a vital contribution to our work of providing a meteorological service for shipping.

The recipients of the awards will, as in past years, be individually notified by letter and asked for an address to which they would like us to send it. Correspondence with ships is, however, subject to many delays and these seem to be getting longer nowadays when ships' officers change ships so frequently. If, therefore, an officer sees his name in this list or in a modified list in his own company's house journal before he receives the official letter we would be glad if he would write to us here in Bracknell, claiming the award and giving an address as mentioned above. Normally an officer's first award will be a world atlas and his second one will be a dictionary, but he may prefer the alternative, *The Wreck Detectives* by Kendall McDonald.

L. B. P.

EXCELLENT AWARDS (Year ended 31st December 1972)

SHIP	CAPTAIN	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER	OWNER/MANAGER
<i>Apollo</i> ..	G. V. Barnes	W. R. Kays	E. Foley*	Bristol S.N. Co. Ltd.
<i>Australia Star</i> ..	E. C. Smith	P. R. Harris	P. K. Power	Blue Star Line Ltd.
<i>Barriester</i> ..	F. H. Curry	M. K. Austin	F. C. Murrant	T. & J. Harrison Ltd.
<i>Benarmin</i> ..	J. C. Allan	J. A. Williamson	G. R. Kerr	Ben Line Steamers Ltd.
<i>Benatow</i> ..	A. S. Hamilton	Ong Choon Lim	B. R. Campbell	Ben Line Steamers Ltd.
<i>Bencairn</i> ..	W. C. S. Spencer	R. A. Dewar	D. N. Barlow	Ben Line Steamers Ltd.
<i>Bencleuch</i> ..	A. Burnett	T. D. Corbett	J. J. Daly	Ben Line Steamers Ltd.
<i>Benhope</i> ..	O. Henderson	A. H. Cooke	G. W. Dickson	Ben Line Steamers Ltd.
<i>Benkatlan</i> ..	J. M. Macleod	A. M. Begg	L. M. McCaffery	Ben Line Steamers Ltd.
<i>Benstac</i> ..	R. S. Lumsden	M. E. Harris	J. Lucey	Ben Line Steamers Ltd.
<i>Bewella</i> ..	R. L. Bruce	M. D. MacLeod	F. Paterson	Ben Line Steamers Ltd.
<i>Boston York</i> ..	J. Curtis	—	J. E. Billany	Boston Deep Sea Fisheries Ltd.
<i>Botany Bay</i> ..	G. A. Gibbons	D. J. Walker	W. J. R. Davenport	Container Fleets Ltd.
<i>Bransfield</i> ..	T. Woodfield	B. D. Cramond	H. M. O'Gorman	British Antarctic Survey
<i>British Kiwi</i> ..	R. J. Burleigh	K. P. Pickering	R. Lowe	B.P. Tanker Co. Ltd.
<i>Cardiff City</i> ..	J. D. Lloyd	R. J. Davis	H. M. S. Williams	Sir Wm. Reardon Smith & Sons Ltd.
<i>City of Auckland</i> ..	T. Rigg	G. E. Shearer	R. B. Cooper	Ellerman Lines Ltd.
<i>Clan Maclean</i> ..	R. S. Olden	T. G. Whitaker	D. J. M. Young	Clan Line Steamers Ltd.
<i>Cotswold</i> ..	E. D. Stewart	D. L. Bullingham	A. R. Watt	P. & O. S.N. Co.
<i>Crystal Gem</i> ..	W. M. Shirreff	R. D. Mearns	J. Hensley	Sugar Line Ltd.
<i>Discovery</i> ..	G. L. Howe	P. J. McDermott	T. J. Bousfield	Natural Environment Research Council
<i>Donegal</i> ..	F. J. Adams	P. D. Thackstone	D. J. Rooms	Trinder Anderson & Co. Ltd.
<i>Echo</i> ..	J. L. Jenkins	M. D. Coles	E. Evans*	Bristol S.N. Co. Ltd.
<i>Encounter Bay</i> ..	K. E. Howard	A. J. Fee	R. B. Redhead	Container Fleets Ltd.
<i>Essex</i> ..	R. M. Michael	D. Goodwin	J. P. Whiteley	P. & O. S.N. Co.
<i>Explorer (F.R.S.)</i> ..	A. M. Finlayson	J. G. Brown	J. Steven*	Dept. of Agriculture & Fisheries for Scotland
<i>Flinders Bay</i> ..	R. A. Wilson	D. G. Sinclair	C. E. Hughes	Container Fleets Ltd.
<i>Foreland</i> ..	J. L. Downie	P. J. Tehan	R. Elkins	Shipping & Coal Co. Ltd.
<i>Fremantle Star</i> ..	D. R. MacKillop	G. Rawding	E. Vassallo	Blue Star Line Ltd.
<i>Geescape</i> ..	D. N. Boon	G. D. Taylor	R. Hart	Geest Industries Ltd.
<i>Glenalmond</i> ..	I. R. Atkinson	P. Van-Dulken	J. V. Morgan	Ocean Fleets Ltd.
<i>Glenogle</i> ..	R. G. Williams	P. Johnson	B. Fraser	Ocean Fleets Ltd.
<i>Glenroy</i> ..	H. K. Timbrell	M. L. M. Smith	D. A. Pugh	Ocean Fleets Ltd.
<i>Gothland</i> ..	J. M. Laing	L. M. Sullivan	J. C. O'Leary	Currie Line Ltd.
<i>Hadra</i> ..	J. D. Baty	J. O'Brien	G. J. Lonsdale	Shell Tankers (U.K.) Ltd.
<i>Haparangi</i> ..	P. Lay	A. W. Noble	R. K. Kristiansen	P. & O. S.N. Co.

Excellent Awards (contd.)

SHIP	CAPTAIN	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER	OWNER/MANAGER
<i>Hector</i> ..	A. MacKenzie ..	J. Stewart ..	W. C. A. Phillips ..	Ocean Fleets Ltd.
<i>Helenus</i> ..	H. O. Williams ..	R. J. Moore ..	J. B. Carr ..	Ocean Fleets Ltd.
<i>Hertford</i> ..	J. M. Burn ..	G. A. Bridge ..	A. J. Rose ..	P. & O. S.N. Co.
<i>Hinakura</i> ..	B. Austen-Smith ..	M. J. Stopford ..	G. M. Turner ..	P. & O. S.N. Co.
<i>Hurui</i> ..	J. F. Milner ..	D. J. Robertson ..	G. Eddy ..	P. & O. S.N. Co.
<i>Icenic</i> ..	R. E. Marshall ..	J. S. McKechnie ..	F. O'Farrell ..	Shaw Savill & Albion Co. Ltd.
<i>Inishoven Head</i> ..	R. A. Maxwell ..	R. M. Swanson ..	H. L. Harris ..	G. Heyn & Sons Ltd.
<i>Jamaica Producer</i> ..	G. A. Foulds ..	G. W. H. Tennant ..	I. MacDonald ..	Kaye, Son & Co. Ltd.
<i>Jervis Bay</i> ..	J. K. Blackburn ..	S. D. Smith ..	W. Kay ..	Container Fleets Ltd.
<i>John Murray</i> ..	P. H. Maw ..	B. A. Chapman ..	J. E. Hagan* ..	Natural Environment Research Council
<i>Liverpool Bay</i> ..	D. H. Stewart, R.D. ..	J. E. McGregor ..	W. J. Lloyd ..	Ocean Fleets Ltd.
<i>Manapouri</i> ..	J. D. Guyler ..	W. N. C. Pinton ..	R. N. J. Bush ..	P. & O. S.N. Co.
<i>Manchester Concept</i> ..	J. M. Rushworth ..	T. P. Mather ..	J. A. L. MacDonald ..	Manchester Liners Ltd.
<i>Manchester Quest</i> ..	N. W. Cockshoot ..	C. R. Darnley ..	W. Williams ..	Manchester Liners Ltd.
<i>Mataura</i> ..	K. Barnett, R.D. ..	C. P. Wise ..	W. F. Law ..	P. & O. S.N. Co.
<i>Megantic</i> ..	W. M. Wheatly ..	D. A. Kett ..	T. F. M. Ralph ..	Shaw Savill & Albion Co. Ltd.
<i>Mercury</i> ..	P. B. Henderson ..	R. C. Phillips ..	J. D. Gallagher ..	Cable & Wireless Ltd.
<i>Monksgarth</i> ..	J. Sharp ..	N. J. Snowden ..	P. D. Chadwick ..	Cory Maritime Ltd.
<i>Moreton Bay</i> ..	J. Cosker ..	M. Watts ..	R. J. Parkinson ..	Container Fleets Ltd.
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<i>Nigaristan</i> ..	S. A. Booker ..	D. P. Ploughman ..	E. Marks ..	Frank C. Strick & Co. Ltd.
<i>Nina Bowater</i> ..	A. G. Allison ..	B. R. Richmond ..	I. M. Courtney ..	Cayzer Irvine & Co. Ltd.
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<i>Port Nelson</i> ..	J. G. Whyte ..	D. W. Lax ..	C. L. Keeble ..	Port Line Ltd.
<i>Port Nicholson</i> ..	E. J. Arnold ..	B. G. Appleby ..	W. C. Doyle ..	Port Line Ltd.
<i>Port Townsville</i> ..	M. L. Coombs ..	M. E. Russell ..	P. Mac'ten ..	Port Line Ltd.
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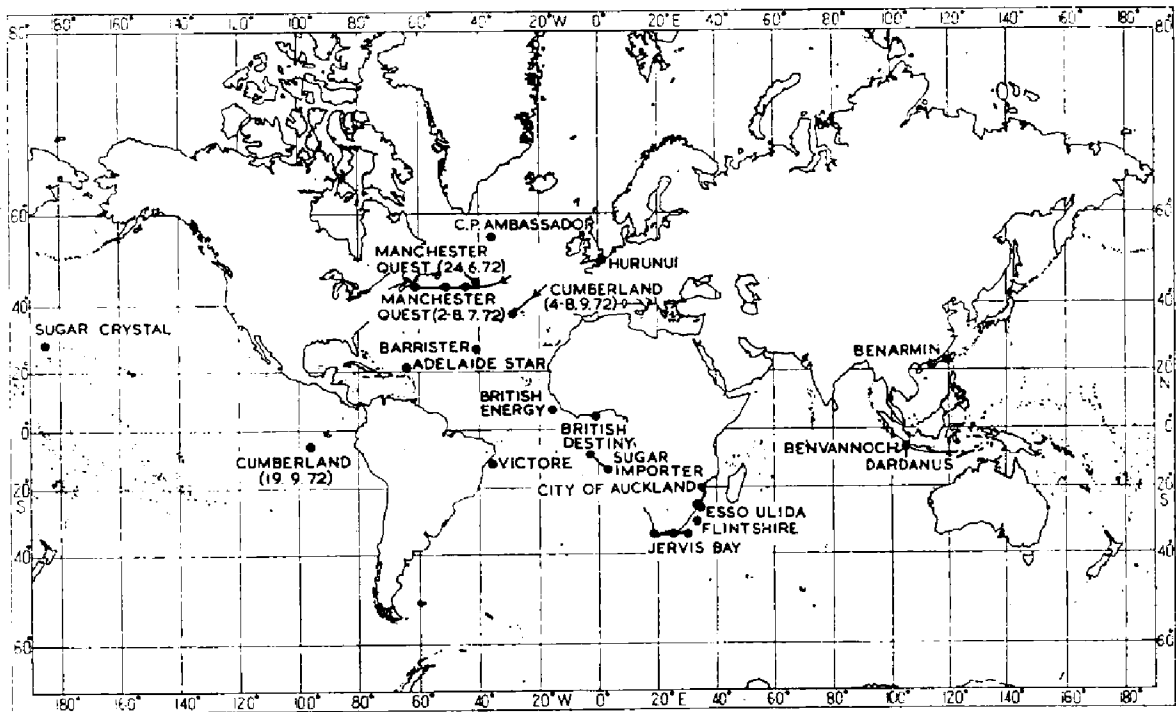
<i>Ross Orion</i>	..	A. Osler	—	R. R. N. Laing	..	Hudson Bros. Trawlers Ltd.
<i>St. Jasper</i>	..	P. Grayburn	..	—	H. G. Pask	T. Hamling & Co. Ltd.
<i>St. Loman</i>	..	A. T. Blenkin	..	—	R. T. Murphy	..	T. Hamling & Co. Ltd.
<i>St. Margaret</i>	..	J. S. Rutherford	..	S. Y. Michael..	P. A. Byrne	Houlder Bros. & Co. Ltd.
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<i>Whitethorn</i>	..	M. Hegarty	..	H. Rose ..	D. M. Burn*	..	S. William Coe & Co. Ltd.
<i>Windsor Castle</i>	..	R. M. Wright	..	L. C. Mitchell	R. S. Hough	Union-Castle Mail S.S. Co. Ltd.
'MARID' SHIPS†							
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<i>Cerdic Ferry</i>	..	P. F. Goodwin	..	D. M. Ledger	R. James	Atlantic S.N. Co. Ltd.
<i>Dragon</i>	W. H. Conway	..	W. Frampton..	L. R. Cathie	Southern Ferries Ltd.
<i>Penland</i>	A. Wallace	..	J. C. Priest ..	E. G. Stout*	..	Runciman Shipping Ltd.

* Deck Officer.

† Vessels recruited for the purposes of observing and transmitting sea temperatures together with non-instrumental observations when in the North Sea.

TRAWLERS (non-instrumental)

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R. Pepper		—			Northern Trawlers Ltd.
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—	H. C. L. Taylor	Boyd Line Ltd.



Position of ships whose reports appear in “The Marine Observers’ Log”.



July, August, September

The Marine Observers' Log is a quarterly selection of observations of interest and value. The observations are derived from the logbooks of marine observers and from individual manuscripts. Responsibility for each observation rests with the contributor.

Observing officers are reminded that preserved samples of discoloured water, luminescent water, etc. considerably enhance the value of such an observation. Port Meteorological Officers in the U.K. will supply bottles, preservative and instructions on request.

TROPICAL STORM 'SUSAN'

South China Sea

m.v. *Benarmin*. Captain J. C. Allan. Kaohsiung, Taiwan to Hong Kong. Observers, Mr. I. A. Hamilton, 1st Officer, Mr. J. A. Williamson, 2nd Officer and Mr. J. D. Beattie, 3rd Officer.

9th–11th July 1972. At 0300 GMT on the 9th, severe tropical storm Susan was reported within 30 miles of $20^{\circ} 06'N$, $116^{\circ} 30'E$ and forecast to move NW. At 1200 we departed Kaohsiung bound for Hong Kong, course $261^{\circ}T$ with speed reduced to allow Susan to pass ahead of the ship, as seemed likely. By 1800 the vessel was at $22^{\circ} 36'N$, $119^{\circ} 12'E$. Wind SE'E, force 6. Pressure 998.5 mb and falling. At 2100 Susan was reported to be centred at $21^{\circ} 00'N$, $115^{\circ} 18'E$ and still moving NW, indicating that she would pass ahead of the vessel.

At 0300 on the 10th we were at $22^{\circ} 48'N$, $117^{\circ} 46'E$, maintaining course of $261^{\circ}T$ at the reduced speed. Pressure 996.9 mb. Wind SE'E, force 5. By 0430 Fs cloud was invading the sky from the south-south-east with precipitation beyond 3 miles reaching the surface. At 0600 Susan was reported to be at $20^{\circ} 30'N$, $115^{\circ} 30'E$ while we were at $22^{\circ} 18'N$, $117^{\circ} 06'E$. Course $265^{\circ}T$ at about 13 kt. Wind SE, force 5. Pressure 994.5 mb and falling. Frequent rain showers were experienced at this time.

It was at this point that we realized that Susan was not following the predicted path and instead was remaining almost stationary. It was decided to maintain course and wait for further developments since the weather reports still indicated that the storm would move in a NW'ly direction towards Hong Kong. At 1200 we were at $22^{\circ} 12'N$, $116^{\circ} 18'E$. Course $261^{\circ}T$ at 10 kt. Wind E'N, force 5. Susan was still reported as being stationary and expected to move NW. At 1500 the vessel altered course to $090^{\circ}T$ to avoid crossing the path of the storm. At 2100 the wind was NE'E, force 7 with good visibility and occasional showers. Pressure 989.2 mb. At this point, after observing the wind backing, it was thought that Susan had possibly recurved and was heading slowly NE, in which case we would be heading back into the storm and not away from it. A careful watch was kept on the wind direction and at 2300 we

altered course to 270°T and increased speed to 16 kt. The wind had backed to NE'ly which seemed to confirm our suspicions that Susan had recurved; the swell was from a steady SE'E'ly direction.

At 0001 on the 11th we were at $22^{\circ} 06' \text{N}$, $116^{\circ} 12' \text{E}$. Course 270°T , speed 16 kt. Wind NE, force 7. Pressure 989.2 mb. At the same time Susan was reported to be within 30 miles of $21^{\circ} 18' \text{N}$, $116^{\circ} 18' \text{E}$, thus confirming our estimation of her position and the new forecast course of NNE. By 0300 our position was $22^{\circ} 18' \text{N}$, $115^{\circ} 13' \text{E}$ with the wind having backed to NNE, force 7. Pressure 991.0 mb and rising. By 0600 the wind was NW'ly and had decreased to force 3. Pressure 992.1 mb. Course 270°T at 19 kt.

Even after our arrival in Hong Kong Susan was to prove troublesome as the storm centre recurved again and headed back to Hong Kong, causing all the junks to head post-haste to the typhoon shelters. It also caused much chagrin aboard because after two typhoons within a few weeks no one was looking forward to a return visit from Susan. However, once more she proved fickle and headed off in a NE'ly direction much to everyone's relief.

On reflection of our actions in avoiding the storm it would appear that, despite the latest satellite reports and radar pictures, the old rule of facing the wind and 10 points to the right, etc. served us in very good stead in ascertaining the whereabouts of the storm centre.

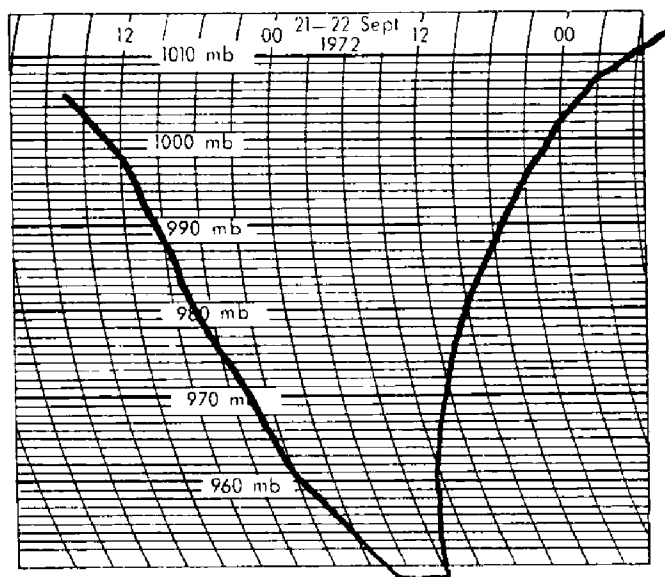
Position of ship at 0600 on 11th: $22^{\circ} 18' \text{N}$, $114^{\circ} 42' \text{E}$.

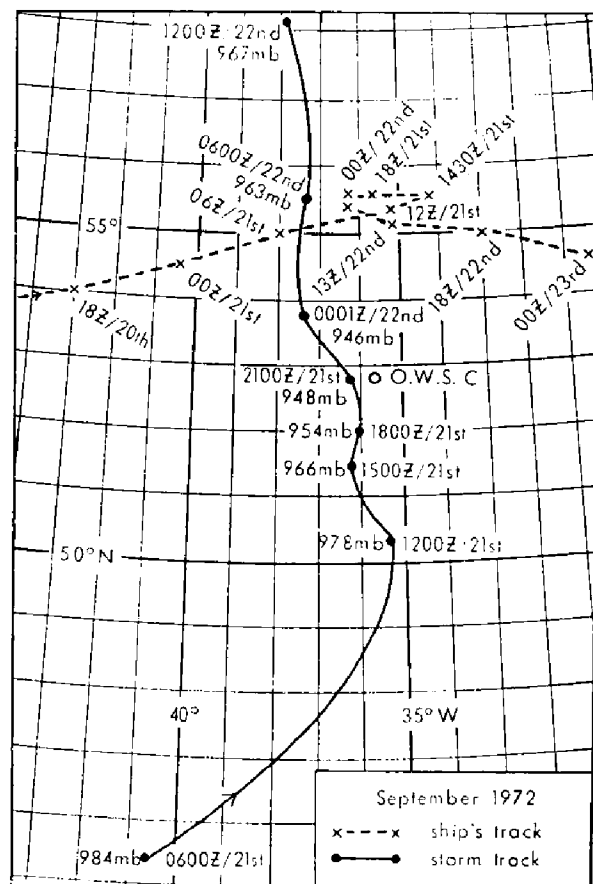
Note. Tropical storm Susan was one of a family of five tropical revolving storms which occurred simultaneously over the western North Pacific from 8th to 12th July. Its movement during this period was very erratic and would not be accounted for by one or two satellite pictures per day. When navigating in the vicinity of a tropical revolving storm it is of the utmost importance to apply continuously the 'Law of Storms'. The raw material upon which this Law depends, the wind, is always available.

INTENSE DEPRESSION North Atlantic Ocean

m.v. *C.P. Ambassador*. Captain W. E. Williams. Quebec to Greenock. Observers, the Master, Mr. M. J. Myers, Chief Officer, Mr. I. Smith-Wilkins, 2nd Officer and Mr. J. F. Barlow, 3rd Officer.

21st-22nd September 1972. The following observations were made while the vessel was in close proximity to a vigorous depression which was named 'Neutercane Charlie' in American broadcasts.





21st

GMT

1100: Position of ship $55^{\circ} 18'N$, $35^{\circ} 43'W$. After experiencing light w'ly winds for 24 hours the wind suddenly veered to ENE, force 4. Pressure 1000.2 mb. Continuous moderate rain. Moderate to heavy N'ly swell. Course $073^{\circ}T$ at 15 kt.

1330: Wind backed to NE'N and increased to force 7. Pressure 994.0 mb.

1430: Position of ship $55^{\circ} 38'N$, $34^{\circ} 03'W$. Weather report was obtained, predicting NE'ly movement of storm at 45 kt. We altered course to $270^{\circ}T$, vessel running with wind on starboard quarter, to permit storm to pass over quickly. Wind NE'E, force 8. Pressure 989.9 mb. Very rough sea and heavy NE'ly swell.

1700: Wind NE'E, force 9-10. Pressure 980.5 mb. NE'ly swell of 6 m. Sea waves up to 6 m.

1800: Wind NE, force 10-11. Pressure 976.9 mb.

1940: Position of ship $55^{\circ} 33'N$, $36^{\circ} 26'W$. It was decided to heave to before night-fall to ease vessel in seaway. Wind NE, force 10. Pressure 970.3 mb. NE'E'ly swell.

2200: Pressure 957.5 mb. NE'ly swell of 6-7 m. Very high seas.

2300: Wind veered to E's, force 10. Pressure 954.4 mb. NE'ly swell now 9-10 m. Sea waves 9 m.

22nd

0100: Position of ship $55^{\circ} 39'N$, $36^{\circ} 18'W$. Wind still E's, force 9-10. Pressure 950.4 mb. NE'ly swell of 9 m. Sea waves 7-9 m.

0300: Wind NE'E, force 7. Pressure 948.4 mb. E'ly swell, 7-9 m.

0400: Wind ENE, force 6-7. Pressure 946.1 mb. ESE'ly swell, 6-8 m.

0440: Wind variable, force 3-4. Lowest barometer reading of 946.0 mb. Moderate sea. SE'ly swell, 6-8 m.

0600: Wind SSE, force 5. Pressure 951.0 mb. SE'ly swell, 7-9 m. Sea waves 7-8 m.

0700: Wind veered to sw, force 7. Pressure 955.9 mb.
 0900: Wind sw, force 7. Pressure 964.0 mb. Swell SE's, 6-8 m.
 1100: Wind sw'w, force 8. Pressure 971.6 mb. Sea waves 4-6 m. s'ly swell, 6-8 m.
 1200: Wind wsw, force 8-9. Pressure 974.1 mb. Sea waves 4-6 m. ssw'ly swell, 4-6 m.
 1300: Wind backing to sw, force 8-9. Pressure 977.4 mb. ssw'ly swell. Resumed course 100°T.
 Position of ship at 1300 on 22nd: 55° 17'N, 35° 25'W.

Note. The track of the *C.P. Ambassador* and the path of the storm are shown above. With the expectation of a continued north-eastward movement of the storm, the ship's course was reversed although just before that time, and subsequently, forecasts were issued which indicated that the storm was expected to move northwards. It would appear that these forecasts were not received by the *C.P. Ambassador*. In the event, the subsequent course alteration in the afternoon of the 21st took the ship towards the storm and not away from it.

'Neutercane' is a term used by American meteorologists to define revolving storms of smaller dimensions than a hurricane. They originate between lats. 25° and 35° north and south and, typically, have diameters of less than 100 miles. However, neutercanes may well acquire much larger dimensions on becoming 'extra-tropical'.

LINE-SQUALL

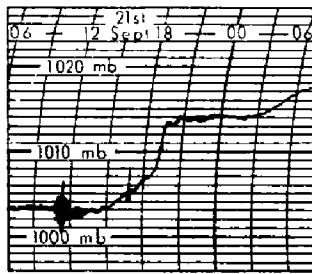
Indian Ocean

m.v. *Flintshire*. Captain M. G. Thomas. Las Palmas to Singapore. Observers, the Master, Mr. M. F. Tomlinson, 2nd Officer and Mr. G. Strang, Radio Officer.

21st September 1972. After leaving South African waters the following sequence of events were observed.

GMT

- 1800: Wind NE'N, force 8. Air temp. 20.8°C, wet bulb 20.0°, sea 20.0°. Cloud $\frac{1}{8}$ C_L 7, $\frac{3}{8}$ C_M 7 and 8/8 C_H 7. Course 067°T at 16 kt.
 1830: Wind NE'N, decreased to force 7.
 1910: Wind still NE'N, force 7. Air temp. 20.9°, wet bulb 20.3°.
 1915: Wind dropped and backed very quickly. Barometer rose rapidly. A line of dark, heavy cloud was observed astern and approaching quickly. Cloud had clearly defined leading edge which was straight and stretched from horizon to horizon.
 1925: Wind w'N, force 4. Waves from NE'N were still foaming and tumbling as sea rapidly arose from w'N. Unusual sight of two sets of opposing white horses.
 1935: Wind sw'w, force 5. Leading edge of cloud overhead. Edge was lying 150°/330°. The western edge of the cloud bank could then be seen; estimated width of belt 10 miles at that juncture. No precipitation was experienced or observed. Darkness made identification of the black, featureless cloud difficult but it was considered likely to be stratus. The sea was forming from sw'w, and the sea from NE dying down although the swell was still sufficiently steep to break into the wind on occasions. Barograph trace examined and found to indicate a pressure rise of 5 mb since 1915.
 1950: Barometer stopped rising at 1013.7 mb. Air temp. 21.0°, wet bulb 20.0°, sea 20.2°.
 2030: Western edge of cloud appeared to extend further westward than at 1935.
 2100: Barometer rose slowly again. Cloud 8/8 St. Sea was still confused.
 2200-2230: Wind died down and became variable. Cloud dissolved and cleared from the west.



2300: Wind NNE, force 4. Cloud cleared to $\frac{1}{8}$ small Cu. Air temp. 20.9° , wet bulb 19.6° , sea 20.0° .

Position of ship at 1800: $31^{\circ} 36'S$, $33^{\circ} 48'E$.

Note. The *Flintshire* appears to have encountered an eastward moving line squall. The wind changes recorded are remarkable.

SUDDEN WIND CHANGES

Moçambique Channel

s.s. *Esso Ulidia*. Captain K. MacKenzie. Lisbon to Ras Tanura. Observers, Mr. J. Dickinson, 2nd Officer and Mr. J. Hendrie, A.B.

2nd September 1972. At 0001 GMT the wind was NE'N, force 6 but between 0035 and 0050 it dropped suddenly to force 2 and backed visibly to w'ly. During the same period the pressure rose sharply to 1007.4 mb. After about 10 min the wind slowly began to veer and increase in speed. By 0115 it was N'E, force 4 and this was maintained for 5 min, with the pressure falling. At 0120 pressure was 1006.0 mb and the wind suddenly backed again to NW, force 4. Pressure began to rise sharply and by 0130 was 1007.3 mb. From 0130 to 0200 pressure was steady at 1007.5 mb. Wind N'W, force 4.

Throughout the period cloud cover was $\frac{7}{8}$ but cloud type was unidentifiable due to darkness. Full observations were not possible due to navigational duties at the time (altering course for traffic) but visibility was noted as 12 miles with binoculars.

Position of ship at 0001: $25^{\circ} 43'S$, $34^{\circ} 39'E$.

Note. The conditions reported are consistent with those associated with the passage of heavy showers close to the ship. Though no such showers were reported during the time of this report, the logbook from the *Esso Ulidia* reveals that a thunderstorm was reported shortly afterwards.

AGULHAS CURRENT

South African waters

s.s. *Jervis Bay*. Captain J. Blackburn. Fremantle to Marseilles. Observer, Mr. S. D. Smith, 3rd Officer.

29th–30th September 1972. The following observations on the Agulhas Current were made while the vessel was rounding the South African coast.

At 1930 GMT a Decca fix was obtained in position $34^{\circ} 11'S$, $31^{\circ} 20'E$, using D.R. run from star observations at 1612. Ship's speed 21.6 kt. The current was estimated to have set $140^{\circ}T$ 3.6 miles. When running in to Cape Recife at $270^{\circ}T$ and plotting Decca against D.R. course line the following observations were made.

2130 at $34^{\circ} 11'S$, $30^{\circ} 31'E$ to 0130 at $34^{\circ} 13'S$, $28^{\circ} 59'E$, current set $100^{\circ}T$ 2.8 miles. Sea temp. $20.6^{\circ}C$.

0130 at $34^{\circ} 13'S$, $28^{\circ} 59'E$ to 0630 at $34^{\circ} 15'S$, $25^{\circ} 32'E$, current set $250^{\circ}T$ 4.8 miles. Sea temp. $20.2^{\circ}C$.

From position $34^{\circ} 15'S$, $25^{\circ} 35'E$ the course was altered several times until Cape Recife Lighthouse was observed, bearing $302^{\circ}T$, distance 17.5 miles. The general

trend of current was wsw at approx. 2.8 kt. Sea temperature dropped to 18.5° by the latter position. Proceeding westwards from this point, course was altered frequently owing to heavy traffic and therefore normal positional changes and accurate current information were unobtainable. However, the general trend was an increase in the vessel's average speed against D.R. of between 0.5 and 0.8 kt between Cape Recife and Cape St. Blaize against a wsw wind of force 6, draft being 35 ft 5 inches aft, 32 ft 2 inches forward. When Cape St. Blaize was approx. abeam the wind decreased rapidly to force 3 but a 3-4 m sw'ly swell remained. With Yzervark Point abeam the wind was a steady wsw, force 3, sea temperature was 17.3° and the vessel's speed averaged 0.6 to 0.8 kt above D.R. From Cape Infanta bearing 000°T, distance 24.7 miles to Cape of Good Hope bearing 009°T, distance 8.2 miles the vessel maintained D.R. speed. Wind wsw backing to s'ly, force 3. From Cape Point to Table Bay the current was favourable with vessel's speed approx. 1 kt above D.R. Shortly before reaching Green Point observations ceased.

The lowest sea temperature, 16.6°, was recorded off Cape Infanta.

Position of ship at 1800 on 30th: 34° 42'S, 21° 48'E.

BIRDS

Dover Strait

m.v. *Hurunui*. Captain J. F. Milner. Curaçao to London. Observer, Mr. D. Reid, 2nd Refrigerating Engineer.

21st August 1972. At 2130 GMT, whilst off Folkestone in the act of picking up the pilot for London, a pigeon was found on the fo'c'sle head by Mr. Reid. It was quite tame and offered no resistance on being picked up. On its right leg was a plastic ring with the numbers NU72 253807 inscribed on it. On its left leg was a rubber band but with nothing attached to it. It was released on the after deck at about 2200 whilst the vessel was one mile off Dover harbour.

Position of ship at 2200 (approx.): 51° 06'N, 01° 19'E.

English Channel and North Atlantic Ocean

m.v. *Cumberland*. Captain D.C. Blackman. London to Curaçao. Observers, the Master and ship's company.

4th-8th September 1972. Whilst proceeding westward down the English Channel on the 4th, the second morning out from London, several pigeons were observed flying past and around the ship. Most of them flew on but two remained with the vessel for three more days. One positioned itself around the bridge while the other flew about the ship in general.

The bridge pigeon was quite friendly and allowed itself to be carried around with no trouble but would not eat or drink anything that was left out for it. Eventually we were considering ways of forcibly feeding the bird when, on the morning of the 7th, it was seen to fly away. We assumed that the other had done the same but unfortunately this was not the case as next morning the Lamptrimmer, Mr. C. Morris, found the pigeon in a barrel where it had died. He removed the rubber band and metal ring from its legs. [These were enclosed in the logbook. The rubber band bore the number R (or P) 245 and the metal ring was numbered NU 71 K22 268.]

Position of ship at 0800 LMT on 7th: 37° 33'N, 28° 13'W.

Note. The above report and the rings were sent to Major L. Lewis, M.B.E., Secretary of the Royal National Homing Union Council. He copied the report to the pigeon's owner, Mr. S. Cameron of Co. Down, who kindly wrote to thank us for the information; we forwarded his letter to the *Cumberland*. He said that his pigeon had been lost in the Derby race from Dinard, France—439 miles from his loft. It had previously won a race from Okehampton (267 miles) and, as a young bird, had won two other races. There must have been other casualties in the

Derby race because only four birds arrived at their lofts on the 'day of toss' and only a few arrived the next day.

North Atlantic Ocean

s.s. *Manchester Quest*. Captain N. W. Cockshoot. Manchester to Halifax, N.S. Observers, Mr. D. Smith, Chief Officer, Mr. M. Grover, 2nd Officer and Mr. D. Falaise, Cadet.

2nd-6th July 1972. Between Fastnet Rock and $44^{\circ} 30'N$, $44^{\circ} 00'W$ on the rhumb-line track an endeavour was made to get some idea of the distribution of shearwaters. From Fastnet to the mid-Atlantic ridge they were sighted regularly, usually adults, either in a very loose group or singly. Across the mid-Atlantic ridge they were more plentiful and several groups of more closely packed immature birds were sighted. This continued for about 200 miles after the ridge, the birds becoming less and less frequent in appearances. There was a gap from this point to within 100 miles of the Grand Banks. I put this down to the rise in the sea-water temperature. Just before and on the Bank the birds were present in large numbers, mostly immature birds but a few adults were also present. Types encountered were mainly Great Shearwaters and Cory's Shearwaters. A few Manx Shearwaters were seen in the eastern Atlantic.

8th July 1972. When the vessel was 100 miles east of Nova Scotia, on leaving my cabin to go on watch I [Mr. Grover] found a petrel attempting to get over the storm step into the accommodation. I took him to the bridge and he was inspected for damage but found to be quite healthy; he had probably flown into the ship's superstructure in the dark and stunned himself. He was put into a cardboard box with an old flag to make himself comfortable and was left in my cabin for the rest of the night. When I got up in the morning the smell in the cabin amply verified my reference book's note that "petrels have a pungent odour". When we opened the box fully he was almost buried under the flag, head down, and we thought he was dead but he wasn't. Although not in the least aggressive, making no attempt to peck at hands, he was certainly shy of human company and returned to the box, tunnelling under the flag. This was a Leach's fork-tailed Petrel and when we released him in Halifax the following day he flew off none the worse for his experiences.

Position of ship (approx.) on 8th: $44^{\circ} 38'N$, $61^{\circ} 12'W$.

Note. Captain N. B. J. Stapleton of the Royal Naval Birdwatching Society comments:

"The report on the pattern of distribution of shearwaters along that route closely accords with one of our own plots. In the eastern quarter the general southerly migration of Great Shearwaters is usually late July, increasing towards late August and September. In this quarter Cory's Shearwaters occur in considerably lesser numbers and begin to move southwards and are very common off the Azores. Cory's Shearwaters are rarely seen off the Grand Banks, an area where Great Shearwaters increase from May to July, feeding there before starting a movement north-east and swinging southwards some 200 miles (generally) west of Ireland. At this date Manx Shearwaters remain in the eastern quarter before also migrating southwards with Cory's south of the Equator.

"The Leach's fork-tailed Petrels (second report) range right across the Atlantic, breeding both in the British Isles and Nova Scotia."

Moçambique Channel

m.v. *City of Auckland*. Captain T. Rigg. Beira to Lourenço Marques. Observers, the Master and all officers.

21st-23rd August 1972. During the afternoon of the 21st, whilst in Beira, a pigeon was observed strutting along the after main deck, quite unconcerned at the cargo work going on around. The predominant colours were pale blue and white with traces of light grey on the head and neck. On the right leg was a red plastic ring bearing the number PORT 71 70541 and on the left leg was a green rubber band.

Fred, as he later became known to everybody, was obviously a very well-cared-for bird, being very tame and quite content to be picked up and handled by numerous people and hand fed on rice and bread, not to mention his liking for cream biscuits too!

During the passage to, and the first day (23rd) at Lourenço Marques, Fred was observed to do his daily exercises by flying round the ship a few times and then to stroll up and down the foredeck. At night he made his bed on a sand box on the Captain's deck under the shelter of the bridge wing. The whole of the accommodation was also duly inspected by Fred (both inside and out) during the course of the voyage.

As Fred was not seen again after the 23rd we can only assume that he found better things ashore and was quite happy to have adopted us for his passage from Beira to Lourenço Marques.

Position of ship on 21st: $19^{\circ} 49'S$, $34^{\circ} 50'E$.

Position of ship on 23rd: $25^{\circ} 59'S$, $32^{\circ} 59'E$.

Note. Fred may not have been very far from home. The 'PORT' on his leg ring probably indicates that he was registered in Portuguese East Africa. The '71' would be the year of birth, followed by his registration number.

Eastern South Atlantic

m.v. *Sugar Importer*. Captain G. H. Griffiths. Cape Town to U.K. Observers, Mr. E. G. Winsor, Chief Officer and Mrs. Winsor.

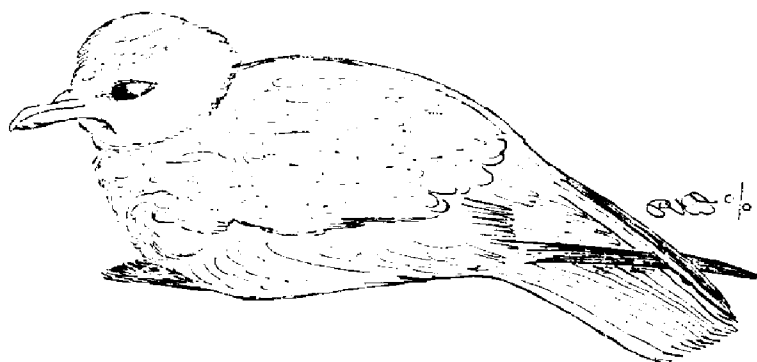
7th–8th August 1972. At 0800 SMT on the 7th a bird was found on deck apparently exhausted. No rough weather had been experienced so it was assumed that the bird had hit part of the ship's structure. By the time it was brought to us it had recovered sufficiently to show abject disapproval of humans; this proved difficult when we tried to clean off oil which covered its feathers from beak to tail on the underside. A combination of butter and Swarfega was used which worked well. It was given sugar water by means of a plastic syringe and ate a small amount of sausage meat, then was placed in a lined box in a quiet cabin where it slept for several hours.

The following morning it was sufficiently recovered to explore its surroundings (not without some difficulty owing to its large webbed feet). A large flying fish had landed on deck so this was cut up and offered to the bird but it was not interested.

From past issues of *The Marine Observer* we decided that the bird was a black-winged Storm Petrel. Length 30.5 cm, wing span 81.3 cm, body width 12.7 cm. We understand that normally Storm Petrels are very tame but this one was exceedingly upset by any noise; anything within close proximity was quite viciously attacked (including fingers) but when all was quiet he was quite content to be stroked and measured. At 1030 on the 8th he was put over the side and flew extremely strongly in a N'ly direction.

Position of ship at 0800 on 7th: $14^{\circ} 12'S$, $02^{\circ} 42'E$.

Position of ship at 1030 on 8th: $09^{\circ} 00'S$, $02^{\circ} 42'W$.



Eastern South Pacific

m.v. *Cumberland*. Captain D. C. Blackman. Auckland to Balboa. Observers, all deck officers.

19th September 1972. At 1100 SMT (1730 GMT) a small bird was captured on the boat deck by the 2nd Officer. It had been seen earlier flying around the vessel looking for a spot to rest. Eventually it alighted on one of the lifeboats and was easily captured, for identification, as it was exhausted. It was identified quite easily as one of the fly-catching variety because of its beak. Inspection of this category in O. L. Austin's book *Birds of the World* from the ship's library showed it to be almost certainly a Purple-beaked Martin. Since only the crown of the head was the blue-purple colour it was decided that it must be a female. All other characteristics fitted with the description, colouring and drawing contained in the book. Although the blue-purple crown was easily seen it was not as distinctive as shown in the book. At first sighting (approximately 0900 SMT) the ship was 470 miles from the nearest land, Isla Isabela in the Galapagos. The bird was placed in peace and quiet for the afternoon in the pilot's cabin to let it rest undisturbed. At 1630 it had apparently totally recovered and was very lively. It was therefore decided to let it go and, after a quick preening, sat on the hand in which it had been captured, showing no fear of being recaptured. It finally took off in a general NW'ly direction but was soon lost to sight.

For the two previous days the wind had been E's-SE, force 4-5. On the day of capture it was SE, force 2-4 and the day following it was SE-SSE, force 3-4.

Position of ship at 1100: 06° 45'S, 95° 56'W.

WHALES

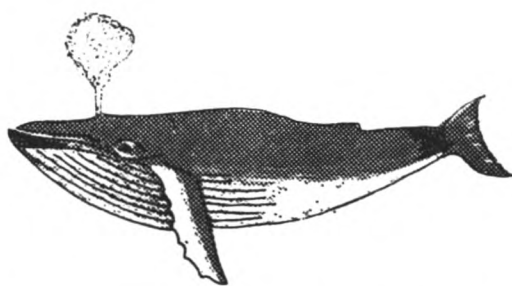
North Atlantic Ocean

s.s. *Manchester Quest*. Captain N. W. Cockshoot. Manchester to Halifax, N.S. Observers, Mr. M. Grover, 2nd Officer, Mr. D. Falaise, Cadet and Mr. D. Brown, E.D.H.

6th July 1972. After completing the 1800 GMT weather observations a whale was sighted blowing. A few minutes later it was seen to leap almost clear of the water, revealing its dimensions and shape. It was estimated to be 13-15 m long and distinctly hump-backed, with the blowhole directly on top of the hump. A long white appendage was observed in the position of the pectoral fin. As the whale approached the vessel it turned on an opposite and parallel course to the ship, passing at a distance of about 2½ cables down the starboard side. It was then clearly seen that the whale had indeed a 3-4 m long pectoral fin on either side. These were paddle-shaped like those of a turtle, white on both sides and serrated along the trailing edges. After we had passed, first one fin appeared, rising vertically out of the water to its full length and then smashing down on to the sea surface, then the same routine was followed by the other fin; presumably this was just the whale cleaning itself of parasites. Frankly I and the other observers were very puzzled by this sighting. Firstly, I did not know that whales had any fins except a somewhat stunted dorsal (more pronounced in the Killer Whale). Secondly, even if whales do have stunted pectoral fins, we were at a loss to think of any aquatic mammal with fins of such dimensions. As far as we could tell it was on its own and not under attack from any other creature. This sighting was on the Grand Banks where there were a lot of sea-birds about (mostly immature) and occasional small schools of dolphin. Sea temp. 17.4°C.

PS. [from Mr. Grover] Since writing up this observation I have found a reference book containing details of whales; our whale would appear to have been a Hump-back Whale and whales do have pectoral fins!

Position of ship: 44° 30'N, 50° 40'W.

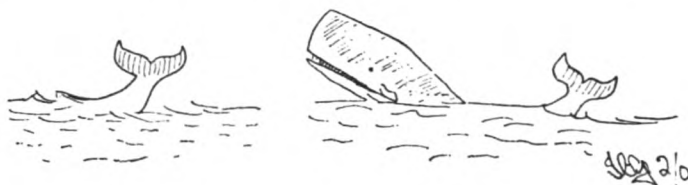


Note. A drawing of a Humpback Whale is reproduced above and confirms Mr. Grover's identification. The Humpback reaches a length of about 15 m and has long, knobbly flippers about a third of the length of its body.

North Pacific Ocean

m.v. *Sugar Crystal*. Captain J. E. Leaver. Cristobal to Tokyo. Observers, the Master, Mr. I. C. Gravatt, 2nd Officer and Mrs. Gravatt.

14th September 1972. At 0350 GMT a number of whales were observed close to the ship; there were about 20 of them as near as could be estimated and they appeared to be Sperm Whales. They remained on or near the surface blowing and lifting their tails clear of the water, then bringing them down with a resounding smack on the water. As the ship passed by one lifted the whole fore part of its body and tail clear of the water (see sketch), then came back into the sea in a great spume of water



which was quite impressive, the distance being about 370 m. The interesting thing which was noted was that as the spray died away a large brown patch was seen on the surface of the water where the whale had submerged and this was visible for several minutes afterwards. The same whale surfaced again some 30 seconds later but this time it only lifted the fore part of its body clear of the water almost vertically (the fore fin could clearly be seen), then slid back into the sea on its back. They all appeared to be full grown although this may not have been so; the probable length of the one mentioned above was about 21 m.

Position of ship: 28° 44'N, 175° 05'E.

SHARKS

South Atlantic Ocean

m.v. *Victore*. Captain C. Newson. Vitória, Brazil to Amsterdam. Observers, Mr. I. P. T. Mathias, Chief Officer and Mr. R. Sistuson, Chief Engineer.

5th August 1972. At about 1630 LMT, in depth of water approx. 44 m, a huge fish about 9 m long shot out of the water about a mile away and about 30° off the star-board bow. It appeared to be truly a fish, not a whale, as at no time was a whale's tail seen. It was grey on its back and had a white under-belly; it appeared to have a short snout. It continued to shoot out of the water at an angle of about 30° from the vertical, always falling on its back, about six or eight times until well abaft the beam, disappearing about 3 miles away. The Chief Engineer took a photo of it and the Chief Officer attempted to get a cine shot of it when it was about 2½ cables

(Opposite page 110)



Hertford (P. & O. S.N. Co.), Captain J. M. Burn.



Liverpool Bay (Overseas Containers Ltd.), Captain D. H. Stewart, R.D.

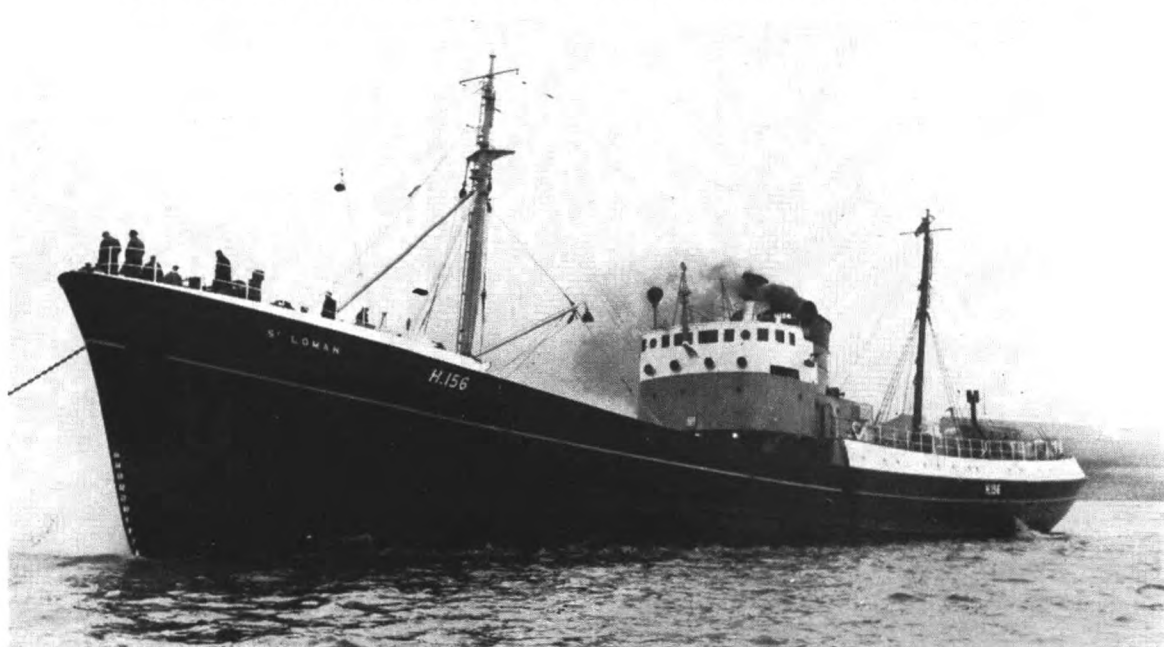


Photo by Hull Daily Mail

St. Loman (T. Hamling & Co. Ltd.), Skipper A. T. Blenkin.

THE THREE SHIPS WHICH GAINED THE HIGHEST MARKINGS FOR THEIR METEOROLOGICAL LOGBOOKS DURING THE YEAR 1972 (see page 96).

(Opposite page 111)

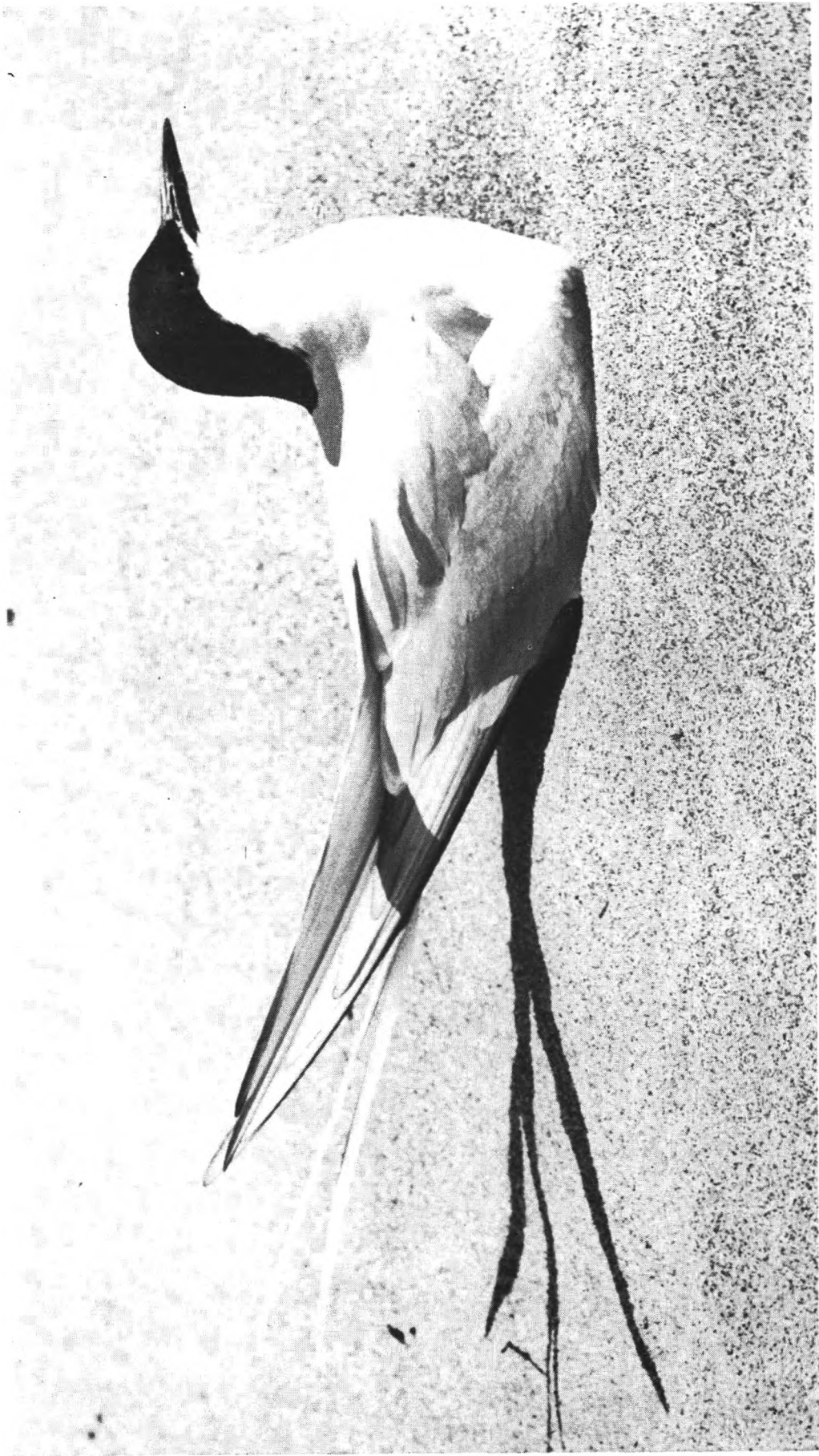
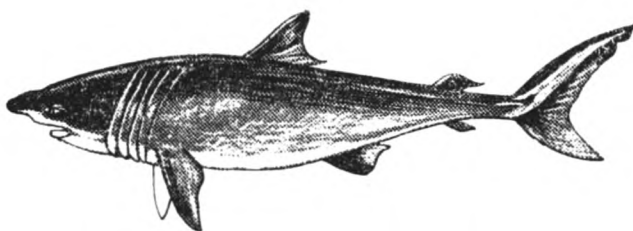


Photo by M. S. Wood

The Arctic Tern enjoys more daylight during the year than any other animal. Some which breed north of the Arctic Circle spend the winter near the Antarctic Circle (see page 116).



away on the port bow. The wind was E'ly with a moderate sea and moderate E'ly swell. Weather fine and clear. Course 018°T.

Position of ship: 12° 14'S, 35° 20'W.

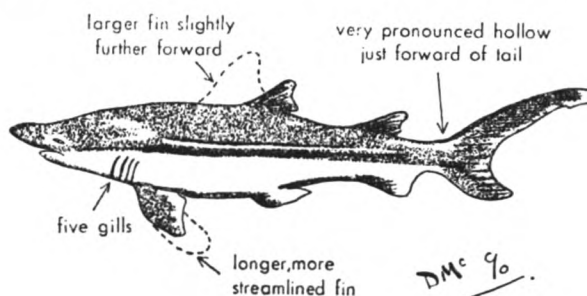
Note. Mr. G. Palmer of the Fish Section, Department of Zoology, Natural History Museum comments:

"From the information given, the fish seen by the officers could have been a basking shark (*Cetorhinus maximus*). This species [as illustrated above] is known to reach a length of some 12 m and, despite its size, has been seen leaping out of the water on a number of occasions, even in comparatively shallow water of less than 73 m depth."

Gold Coast

s.s. *British Destiny*. Captain W. V. Frost. Escravos River, Nigeria to Las Palmas. Observer, Mr. D. McCallum, Chief Officer.

24th–29th September. While the vessel was stopped about 9 miles ESE of Takoradi the crew caught several sharks, all the same type and more or less the same size.



The one we measured was 183 cm in length and 76 cm maximum girth. It was wrongly identified as a Thresher Shark but, after considerable argument, reference was made to the B.P. Tanker Co. *Apprentices' Newsletter*, the only book on board known to illustrate sharks. The sketch is of a Sand Shark, copied from the book, with the major differences noted (the Sand Shark being the nearest in physical detail to the ones caught). The tips of fins and tails of some of the sharks were white and one shark had a sucker fish attached to it.

Position of ship: 4° 32'N, 00° 17'W.

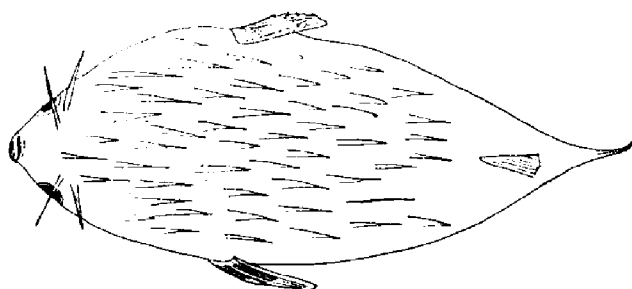
Note. Mr. G. Palmer, Department of Zoology, Natural History Museum thought that the shark was probably a species of Whitetip, *Carcharhinus* sp.

FISH

Eastern North Atlantic

s.s. *British Energy*. Captain J. Mackay. Cape Town to Las Palmas. Observers, Mr. R. MacD. Mair, Chief Officer, Mr. T. Smith, Cadet and Mr. R. F. Smith, Radio Officer.

4th July 1972. At 0700 SMT this fish was found on deck (see sketch). It was coloured blue on top and white underneath and was covered with spikes. The underside was very soft and appeared to be inflatable. Two spikes immediately above the



eyes were sticking out sideways but these were already stiffened up so we were unable to tell if this was a permanent feature, though I should not think so. The weather was fairly good and the ship steady so we do not know how the fish managed to land on deck 3 m above the water. Air temp. 26.5°C , sea 27.2° . Wind s'ly, force 4. Position of ship: $07^{\circ} 00' \text{N}$, $15^{\circ} 48' \text{W}$.

Note. Mr. G. Palmer, Department of Zoology, Natural History Museum, comments:

"The sketch suggests that this was a porcupine fish, *Chilomycterus* or *Diodon*. It does seem strange that a sluggish swimming fish of this kind should have been found 3 m above the water level in fairly good weather. The coloration as quoted is also unusual."

MARINE LIFE

North Atlantic Ocean

s.s. *Manchester Quest*. Captain N. W. Cockshoot. Halifax, N.S. to Manchester. Observers, the Master, Mr. M. Grover, 2nd Officer, Mr. C. R. Darnley, 3rd Officer, Mr. W. Ditchburn, A.B. and Mr. D. Brown, A.B.

24th June 1972. During the period 1200–1800 GMT, whilst steaming at 16 kt on a course of 062°T from $44^{\circ} 42' \text{N}$, $42^{\circ} 18' \text{W}$, unusual marine activity was observed. The sea temperature had been rising steadily since 0600, from 19.4°C to 20.1° by 1200 and 23.6° by 1800. The wind had been calm but had freshened to w'ly, force 3 by 1800.

Three large schools of dolphin, estimated at well over 100 animals in each, were observed in areas no larger than a football field during the 3-hour period 1200–1500. These schools were accompanied by concentrations of sea-birds. There was no significant change in the sea temperature and none of the dolphin approached the ship. At 1230 the first of more than 100 Portuguese men-of-war were sighted. These varied in size from about 15 cm in diameter to one large one of approx. 60 cm in diameter. They were mostly transparent but a few were tinged shocking-pink and a light, almost metallic blue around the edges of the dorsal-type fin and body.

At 1315 the remains of a very large shark were observed passing close to the ship. This shark was still just alive, having been recently halved immediately behind the dorsal fin—the tail section was missing—and blood was still oozing from the head section. The length of this part was approx. 120 cm and was a light battleship-grey in colour with a white underside. The trailing edge of the dorsal fin was tinged pink and its eye was red. Its snout was about 30 cm in depth and rather sharp with the mouth set close to the bottom. It was thought that it could possibly be a Great White Shark. As to how it had been cut in two is rather a mystery as the tail section was missing. It was thought that it could have been severed by a ship but none had been sighted for 8 hours.

Shortly after this, at 1345 and 1415, two small sharks were observed swimming lazily past the ship. These were coloured in grey, green and brown patches not unlike the design of the modern Army combat jacket. These sharks were thought to be young Tiger Sharks.

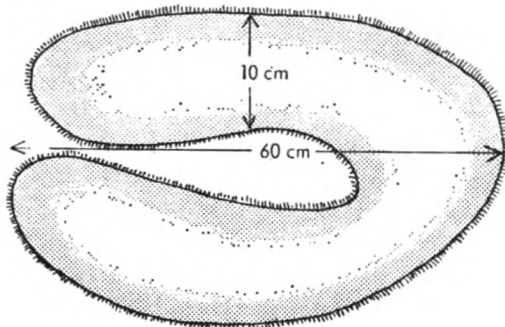
Position of ship at 1800: $45^{\circ} 54' \text{N}$, $40^{\circ} 24' \text{W}$.

North Atlantic Ocean

m.v. *Barrister*. Captain G. Lovell. London to Grenada. Observers, the Master and Mr. K. A. Ellis, 3rd Officer.

24th September 1972. In a calm sea with a moderate NNW'ly swell we observed a jellyfish, as sketched below. Its horseshoe shape was about 60 cm long and about 10 cm in diameter. The thing was 'see through' and appeared to have the consistency of a normal jellyfish; its movement through the water was like the regular version. No other forms of marine life were evident but some small growths of gulf weed were in the area. Sea temp. 26°C.

Position of ship: 27° 12'N, 40° 49'W.



Note. Miss A. M. Clark, Echinoderm and Protochordate Sections, Department of Zoology, Natural History Museum, comments:

"A copy of the latest extracts from logbooks sent to the Keeper of Zoology has gravitated to me via Dr. Cornelius, who deals with jellyfishes, for comment on the observation from the m.v. *Barrister*. The horse-shoe shape does not fit in with any of his animals, with the possible exception of the Venus's girdle, which is a more flattened, belt-like thing, probably not more than 5 cm wide and found in the Mediterranean. In spite of the bent shape I can only think it was a *Pyrosoma*, one of those cylindrical colonial animals allied to salps, which are more often recorded on account of their luminescence in the dark. The same conclusion was reached by a colleague from the National Institute of Oceanography, to whom I described it. *Pyrosoma* is semi-transparent and has a jellyfish-like consistency, though I would have thought its motion less jerky than that of a regular jellyfish—it moves by a sort of jet-propulsion but this is said to be a cumulative current produced by the individuals working independently, passing water through themselves into the central cavity."

ACTIVE VOLCANO

Sunda Strait

s.s. *Benvenutoch*. Captain J. R. Rodger. Durban to Djakarta. Observers, the Master, Mr. W. Sinclair, 2nd Officer, Mr. G. B. McConnachie, 3rd Officer, Mr. R. W. Lawrie and Mr. L. E. McIntosh, Cadets.

11th April 1972. At 0330 GMT the vessel was passing 9 miles south of Anak Krakatau [or Anak Rakata] when we observed a disturbance on the south side of the island which at first looked like breakers. On closer observation it was seen that an underwater eruption was taking place all along the south side of the coast and gases were also seen to be given off from this disturbance. Smoke was also observed from fissures on the peak of the island. The smoke started at about 30 m from the summit up to about 120 m and a considerable amount of white ash was seen on the south-west side of the island.

Position of ship: 6° 18'S, 105° 26'E.

Note. Dr. C. W. A. Browitt of the Institute of Geological Sciences, Edinburgh comments:

"We have had no other report of an eruption in the region of Anak Krakatau at that time and will pass on this valuable observation to the Smithsonian Institution, U.S.A. a body which collects such data for circulation to interested units throughout the world."

m.v. *Dardanus*. Captain D. M. Belk. Durban to Djakarta. Observer, Mr. J. G. W. Dixon, 3rd Officer.

21st July 1972. At 1345 GMT the vessel was approaching the Sunda Strait and the sky in the north-east had a reddish tinge, varying in intensity. Soon it was observed through binoculars that it was an island throwing hot ashes and lava into the sky. At first the island was thought to be Rakata (812.3 m), more commonly known as Krakatau, but was difficult to ascertain as it was still 25 miles away. When the vessel was 5 miles off Rakata it was observed that the island erupting was Anak Rakata, a small island about $2\frac{1}{2}$ miles north of Rakata and about 155 m high. The eruptions lasted for periods of 20–30 sec at intervals of 2–7 min. When seen through binoculars the whole island seemed to be ablaze for 40–50 sec after each eruption. The ashes and lava were being thrown into the air to a height of about 150 m (estimated by the height of the island itself). When to leeward of Anak Rakata the smell of burning was strong but not much smoke was encountered. Wind SSE, force 2.

Position of ship at 1500 (approx.): $6^{\circ} 15' S$, $105^{\circ} 26' E$.

Note. Dr. Browitt comments:

"We have not received any other report on Anak Krakatau for this period and will forward your observation to the Smithsonian Institution for circulation to interested bodies."

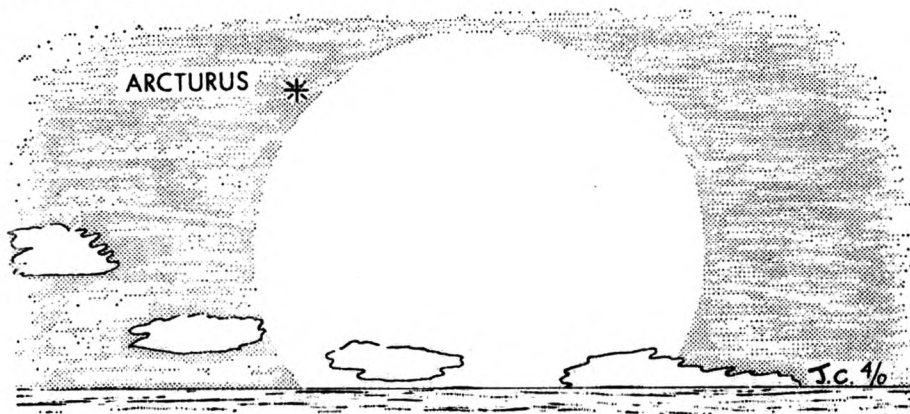
UNIDENTIFIED PHENOMENON

Western North Atlantic

m.v. *Adelaide Star*. Captain H. K. Dyer. Panama to Liverpool. Observer, Mr. J. E. Clayton, 4th Officer.

25th September 1972. At 2245 GMT a large luminous area, the centre bearing of which was 310° , was seen above the horizon (as shown in sketch). It increased in size and altitude from about 20° to 80° within 10 minutes after which it could no longer be distinguished. Although the sky was rapidly becoming darker (nautical twilight at 1841), the sky in the enclosed area was noticeably lighter, pale blue/grey. The moon had not yet risen. Course $056^{\circ} T$ at 15 kt.

Position of ship: $21^{\circ} 03' N$, $63^{\circ} 42' W$.



Note. It is possible that a rocket experiment carried out from either Florida or Puerto Rico may account for the phenomenon described. Reports of a similar phenomenon were published in the April 1971 edition of *The Marine Observer*.

AURORA

The following notes have been received from Mrs. Mary Hallissey of the Aurora Survey:

"Auroral reports from British ships during July, August and September 1972 appear in abbreviated form in the accompanying list, and a short account of the highlights of the period follows.

"July was a quiet month; only on the 24th/25th might it have been possible for observers

in lower latitudes to have observed aurora. The only colour on the chart for the month is provided by reports from KLM pilots and the U.S. Weather Ship at Station 'Bravo'.

"August, however, surpassed itself and after a quiet start geomagnetic activity went quite mad from 0119h on the 4th, the index figure around midnight being 9 (in a 10-point scale). This great magnetic storm continued until late on 6th August and associated brilliant aurora was reported from a very wide area, our first indication of extraordinary activity being reports of rays up to 20° elevation seen by the pilots of aircraft flying near Dijon and north of Bilbao.

"The storm and aurora were the result of solar activity of magnitude to warrant mention in the daily press, and a list of associated events includes such diverse effects as voltage surges on long-distance power-transmission lines, birds unable to navigate, taxi drivers in a U.S. city receiving radio orders relayed in distant cities, while Mr. Webb of the *Manchester Quest* in his very detailed report of this period mentioned interrupted radio communications, compass deviations (also noted by Mr. Rowley of the *Monksgarth*) and upsets to more sophisticated navigational aids. Mr. Webb's vivid description of the auroral displays was read with great pleasure and is ill-represented in the accompanying list by the bare fact that 'all forms' were recorded. This is equally so for the report from the *Weather Adviser* where all forms and combinations of colours were visible 'throughout the celestial dome'.

"Land stations in northern Scotland and Shetland confirmed the simultaneous presence of noctilucous cloud and aurora from 0001h to 0130h. As has been noticed previously when the two phenomena are visible, the noctilucous cloud showed whirl formation. This was the last report of these clouds for the 1972 observing season in the British Isles, as they recede northwards at this time of the year.

"These events of 4th-6th August occurred near the start of a 10-day period of solar activity and alerted solar and space scientists who then put the relevant region of the sun's surface under intense surveillance, and on 7th August there erupted the greatest flare of the current solar cycle. This caused a renewal of geomagnetic activity from 2354h on 8th August. It died down after midday on the 9th, having never quite reached the strength of the earlier period. Associated aurora of great brilliance was reported in detail by officers of the *Sugar Crystal*, again from the Gulf of St. Lawrence area, and by officers of the *Weather Adviser* at Station 'India' where the brilliance was dimmed by the presence of cloud.

"After all this excitement, September was more restrained. Most reports from ships were from higher latitudes. But after midday on the 13th there began a short active period lasting about 20 hours. Observers on the *Manchester Crusade* off the north coast of Ireland reported around midnight the presence of a strong auroral arc. A peak period with red rays overhead in central Scotland had occurred around 2145h, and a second peak was recorded around 0320h when rays were overhead far enough south to have been visible from the mainland of Europe.

"We are indebted to all who have sent us information, whether of a briefly glimpsed glow or the full detail of a prolonged and brilliant spectacle."

DATE (1972)	SHIP	GEOGRAPHIC POSITION	λ	ϕ	I	TIME (GMT)	FORMS
4th Aug.	<i>Monksgarth</i>	50°00'N 65°53'W	010	61	+76	0200-0600	RR
	<i>Weather Reporter</i>	52°23'N 20°11'W	060	59	+69	0315-0400	RR
5th	<i>Weather Adviser</i>	59°00'N 18°50'W	070	65	+72	0001-0400	All forms
	<i>Weather Reporter</i>	52°37'N 19°57'W	060	59	+69	0050-0350	RB, RR, N
	<i>Manchester Quest</i>	49°23'N 65°00'W	010	61	+76	0100-0802	All forms
6th	<i>Weather Reporter</i>	52°33'N 19°56'W	060	59	+69	0142, 0250	N
	<i>Weather Adviser</i>	59°00'N 19°11'W	070	65	+72	0230-0330	All forms
	<i>Manchester Quest</i>	Cap Brule	360	60	+77	0620-0630	HB, RR, P
9th	<i>Weather Adviser</i>	58°57'N 18°48'W	070	65	+72	0145-0335	HA, N
	<i>Sugar Crystal</i>	47°22'N 58°56'W	010	59	+74	0504-0734	RA, RB, RR
18th	<i>Weather Surveyor</i>	52°30'N 19°42'W	060	59	+69	2330-2345	RB
20th	<i>Weather Monitor</i>	58°59'N 19°16'W	070	65	+72	0035-0055	RR, N
2nd Sept.	<i>Weather Monitor</i>	59°00'N 19°00'W	070	65	+72	2355-0115	RR, N
6th	<i>Miranda</i>	66°40'N 20°42'W	070	72	+77	0001-0200	RA, RR
	<i>Weather Monitor</i>	58°24'N 17°00'W	070	64	+72	0245	N
10th	<i>Duhallow</i>	59°50'N 58°15'W	020	71	+80	0130	RB, RR
13th	<i>Manchester Crusade</i>	Off N. Irish coast	080	62	+70	2300-0130	HA
16th	<i>Duhallow</i>	60°00'N 58°00'W	020	71	+80	—	RR, N
27th	<i>Weather Reporter</i>	58°50'N 18°50'W	070	65	+72	0002-0007	N
29th	<i>Weather Reporter</i>	59°07'N 18°46'W	070	65	+72	0350	HA, RB
30th	<i>Weather Reporter</i>	58°56'N 18°24'W	070	65	+72	0250-0500	HA
	<i>Weather Surveyor</i>	58°08'N 16°00'W	070	63	+72	2315-0400	All forms

KEY: λ = geomagnetic longitude; ϕ = geomagnetic latitude; I = inclination; HA = homogeneous arc; HB = homogeneous band; RA = rayed arc; RB = rayed band; R(R) = ray(s); P = Patch, V = veil; S = striated; N = unidentified auroral form.

Bird-ringing

By C. J. MEAD

(British Trust for Ornithology, Beech Grove, Tring, Hertfordshire)

Several reports of bird rings have come from readers of *The Marine Observer*; the last to be published was of a Herring Gull on the *Sagamore*, appearing in the April 1972 issue. It was felt that readers would be interested in hearing more about bird-ringing and the result is this article. All over the world bird-ringers mark wild birds with numbered and addressed metal rings to trace their movements and find out about their life histories. Unlike most bird-watchers, who are self-sufficient, bird-ringers need other people, from all walks of life, to help them by finding and reporting the birds they have marked.

Racing (Homing) Pigeons

Various forms of bird-ringing are done domestically—poultry are ringed or tagged, cage-birds are ringed and zoo birds are also often marked—but there are only two forms of rings likely to appear on birds at sea. We are concerned with scientific investigations of wild birds but the other form of ringing is of Homing Pigeons. Many pigeon races are flown across the Channel and lost birds often come down on ships. The correct organization to contact in Great Britain is: The Royal National Homing Union, The Reddings, Nr. Cheltenham, Gloucestershire GL51 6RN [the address to which relevant extracts from ships' logbooks are forwarded].

The metal pigeon rings are closed (complete and without a gap in their circumference) and are sometimes set in clear plastic. They seldom (if ever) have an intelligible address on them but a series of initials (e.g. NHU, NURP, etc.) a series of numbers and letters and, often, a number set sideways giving the year of hatching of the bird. The folded 'rubber-band' on the other leg is for the timing device in the home loft. Sometimes the name and address of the owner (or his club) is stamped on the vane of a white wing feather. The R.N.H.U. like to know where their birds get to but do not guarantee that the owners will contact finders. Sometimes the owners are very anxious to get their birds back—one whose bird presumably 'stowed away' and reached Honduras offered to refund air-freight charges!

The principles of ringing and its history

The basic principles of bird-ringing are the same all over the world. The ringer catches (or finds nestlings of) wild birds and fits a metal ring with an address on it and a serial number which will subsequently uniquely identify the bird. He notes down and sends to the central office details of species, age, sex, date, locality and so on for his marking of the bird. It is then hoped that any person finding the ring will write to the address on the ring giving details of ring number, place of finding, date, circumstances of finding and so on. These two sets of information are then matched, using the ring number, by the central ringing office and both the ringer and the finder are told about the bird's movement, life-span etc.

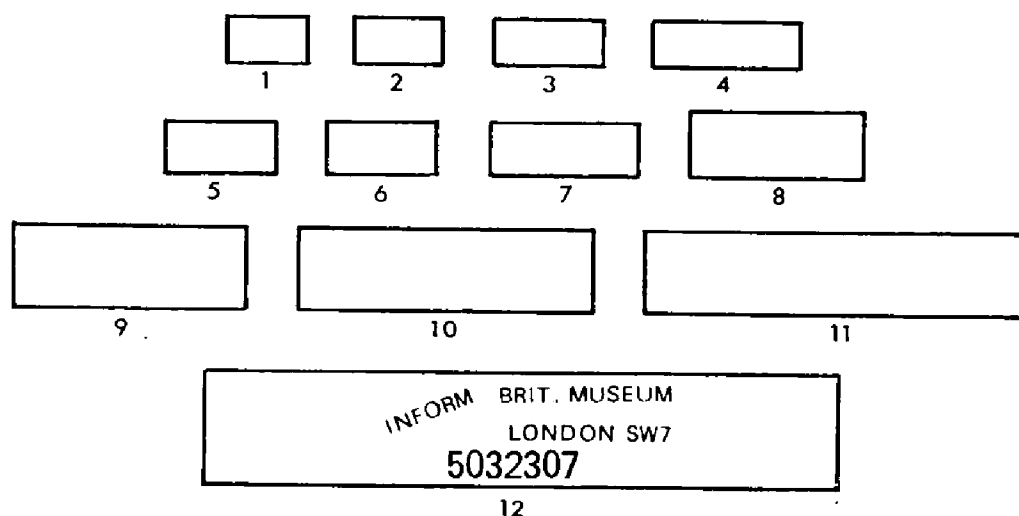
The two first recorded markings of wild birds are from Roman times, both involving Swallows taken from their nestlings to carry information back to their nest sites.¹ The first was smuggled from a garrison besieged by the Ligurians during the Punic Wars so that the relieving force could tell the garrison how long they had to hold out. The other, some 300 years later, was used to convey the results of the chariot races in Rome to Volterra (135 miles away)—one wonders whether the local bookies became suspicious! This was really using the Swallows like Homing Pigeons. The first scientific marking experiments took place over a hundred years ago and involved the use of coloured or silver threads to see whether the same

individual birds returned after migration. This was not really bird-ringing since the threads could only mean something to the person who originally placed them on the birds.

The scientific form of marking, with individual birds made uniquely traceable by a serial number on an addressed ring, was pioneered in 1899 by a Dane, Christian Mortensen. Ringing started in Britain during 1909 when, independently, Harry Witherby of the magazine *British Birds* and A. Landsborough Thomson of Aberdeen University started schemes. These were amalgamated a few years later and the national Ringing Scheme has grown into a very large-scale operation with half a million birds ringed each year in Britain and about 12,000 reported from far and wide. Other schemes exist in most countries of the world; both the Russians and the Americans are currently ringing close on a million birds a year. Co-operation between different schemes has always been good and even during the war information was passed between the British and German schemes, using the Embassies in Dublin. Indeed the recovery rate for German-ringed White Storks in British East Africa went up during the war. The German rings were thought to be communications with spies and were reported to the District Officer!

The rings and ringing techniques

The rings used for scientific purposes are almost always made of metal and are split so that they can be fitted around the bird's leg, using special pliers, regardless of the age of the bird. The correct size of ring, when closed, could only be fed over the bird's toes in the first few days of life. In Britain some fifteen basic sizes of ring are used so that all species can be ringed with a suitably sized ring (see Fig. 1). Indeed when different materials are taken into account the total is almost 30. Some species of sea-birds and most waders need hard rings to combat the abrasion of the ring on rocks, pebbles and sand and also to keep corrosion at bay. Monel [an acid-resisting alloy] was used for some years until it was found that tiny electric cells could, under tropical conditions, be set up within the cracks of the inscription in the ring and eat it away! Critics of ringing often feel that the weight of the ring must hamper the bird but this is not so; even on our tiniest bird, the Goldcrest, the relative weight of the ring is less than a pair of shoes on a man.



1-4. The four most commonly used sizes on land-birds (Willow Warbler, Swallow, Greenfinch, Redwing).

5-8. Four of the sizes used for waders and terns (Dunlin, Ringed Plover, Knot, Sandwich Tern).

9-12. Four of those used on sea-birds (Kittiwake, Fulmar, Guillemot, Cormorant)—the largest showing the type of engraved inscription used on all sizes of rings, the numerals sometimes preceded by two letters.

Fig. 1. A selection of basic sizes of (split) bird rings.

Until the 1950s most ringing was done of young birds in the nest and the numbers of birds, and their variety, were obviously rather restricted. However, methods of catching free-flying birds had been developed over the years both in Britain and abroad, often using modified traditional bird-catcher's traps and equipment. Undoubtedly the biggest boost to the ringing of small birds came with the introduction of very fine, almost invisible nets strung vertically between poles to catch flying birds. These are called mist-nets and were developed, using silk, in Japan during the Middle Ages. The technique is to pocket the bird, in a fold of the loosely hanging net, behind taut strings passing through the netting and fixed to the poles. At about the same time the development of rocket- and cannon-powered nets for catching Geese and Waders on the ground also allowed good numbers of these difficult species to be ringed. At the moment 500,000 birds are ringed in Britain each year of which only some 100,000 are nestlings.

From this ringing some 12,000 to 15,000 will subsequently be reported as 'recoveries' for which details of ringing and finding will be matched together at the ringing office and filed. Most of these recoveries will have been reported by members of the public although some will be from ringers who have caught birds ringed elsewhere. The individual ringers keep their own records of birds ringed at their sites which they 're-trap' again themselves—for some species many ringers have re-trap rates approaching 85 or 90 per cent. Obviously most recoveries will be of birds ringed in the immediate vicinity because many of the species ringed are sedentary or, if they do move away, return to the same area in later seasons. These recoveries are still important to the ringing scheme because they provide vital information about mortality rates and longevity. However, it is the spectacular, long-distance recoveries which really fire the imagination. At the moment the only large area in the world from which a British bird has not been recovered is Polynesia!

Information on the life-span of birds

The current longevity table (Table 1) shows that there is good correlation between the size of the bird and its potential life-span.² What it does not show is the much greater age that some captive specimens have attained. Obviously living in the wild with hazards such as weather, food-shortages, predators (including man), traffic (land, sea and air) and wires and other obstructions very seldom allows a bird to reach 'old-age'. The soft life in an aviary with food provided may seem unrewarding but it is potentially longer. For example, we have recently heard of an injured Blackbird and an injured Greenfinch—both found about a year after ringing and then kept in captivity—which died older than the oldest of the thousands of records we have in the wild.

Table 1. Record ages; ringing to recovery in years

Oystercatcher	34	Heron	20	Cormorant	18	Blue Tit	12
Herring Gull	32	Buzzard	24	Coot	18	Robin	11
Curlew	32	Swift	21	Jay	18	Chaffinch	11
Black-headed Gull	30	Mallard	20	Tawny Owl	17	Duncock	8
Arctic Tern	27	Rook	20	Swallow	16	Sand Martin	8
Common Tern	26	Turnstone	20	Song Thrush	14	Willow Warbler	5

Obviously this list can never be definitive but, for instance, for the Sand Martin, with over a third of a million ringed so far, we know that a ten-year-old bird in the wild would be very, very exceptional. These short lifespans and their associated high mortality rates are not a cause for concern because the bird species are adapted

(*Opposite page 118*)



An Arctic Tern alighting at its nest (*see page 116*).

Photo by M. S. Wood

(Opposite page 119)



The Fulmar only comes to land to breed (here on St. Kilda) and spends the rest of its life at sea (*see* page 116).



Photos by J. J. M. Flegg

This Puffin has a numbered metal ring on its left leg and an engraved plastic ring on its right—this is to enable detailed observation of it without having to capture it to read the ring number each time (*see* page 116).

to them. For instance, a pair of adult Robins can easily produce 2 broods of 4 young to fledging during the breeding season. Their family now numbers 10 and, unless 8 die before the start of the next breeding season, when all could breed, the Robin population would start to rise. If, for example, the mortality dropped from 8 out of 10 to 7 out of 10 the over-all Robin population at the end of ten years would be a thousand times the initial population. We know from very detailed work that most bird populations keep fairly static with even a threefold fluctuation being exceptional, so these mortality rates are normal for the bird. Unfortunately the big rings necessary for our largest species, the Mute Swan and Golden Eagle, have only been in use for about fifteen years but these two species would certainly be near the top of the table. Internationally speaking, the Wandering Albatross should be right at the top since it lays only one egg, has a breeding cycle taking two years and a long period of immaturity before breeding takes place.

Records from all over the world

The first map (Fig. 2) shows some of our most far-flung recoveries. Some are very surprising and far from where we would have expected them—like the Redwing caught on a ship in the Atlantic during the very cold weather of January 1963 and the Mallard in Alberta. However, many of the recoveries do show the limits of wintering areas of our breeding birds, the breeding quarters of our winter visitors or where passage migrants, who visit us during part of their migration, can be found at other times of the year. Startling mixing occurs quite often. British-bred ducks, which would normally be relatively sedentary, rub shoulders with thousands of Russian birds coming to us only during the winter. Sometimes mixed pairs are formed on the wintering grounds and the British-bred birds follow their mates eastwards right into Siberia. The phenomenon is now well known and is called abmigration. It also seems to happen with other species (for instance, Lapwings) and explains why there is so little plumage and size variation over the whole of the Eurasian range in many migrant species; the abmigrants provide a highly efficient means of gene flow and so stop distinct forms from evolving since none of the mainland populations are genetically isolated from the main body of the species.

Unfortunately building up the file of recoveries takes a very long time. Many tens or even hundreds of thousands of a small warbler species have to be ringed before we get even a single recovery in its winter quarters. High Arctic breeding species of waders and geese breed in desolate areas where few men, even Eskimos and scientists, ever penetrate and the chances of recovery on their breeding grounds is remote indeed. Even when recoveries of Knot from the southern end of Baffin Island are reported they may well be 600 or even 1,000 miles south of their breeding area. The vastness of the oceans presents another problem. Very few of our recoveries come from ships—the Redwing from the Atlantic, the Arctic Tern off the Antarctic and the Chiffchaff off the Canary Islands being the most famous instances. The Redwing had been ringed in the ringer's garden at Nuneaton (Warwickshire) on 4th January 1963 during the start of the intensely cold weather. It was found dead on the 7th on the deck of the Danish vessel *Mary Nordh* at 47° 20'N, 34° 45'W. The ship was bound for Spain from Greenland and the bird, having overshot Ireland, the normal place for it to be heading in response to cold weather, was destined to die anyway. Actually Lapwings, performing the same type of cold-weather movements, do quite regularly make North America and we have a recovery, dating from the 1920s, of one from Cumberland to Newfoundland. The Arctic Tern had been ringed as a chick in July 1961 on the Farnes (off Northumberland) and had performed the normal migration for the species—down the coast of Europe and Africa to winter in the southern oceans. However, it was actually found and reported there, the first ringed Arctic Tern we have had from so far south. It was unfortunate enough to hit the *Chiyoda Maru No. 2*, a Japanese whaling vessel, on 8th

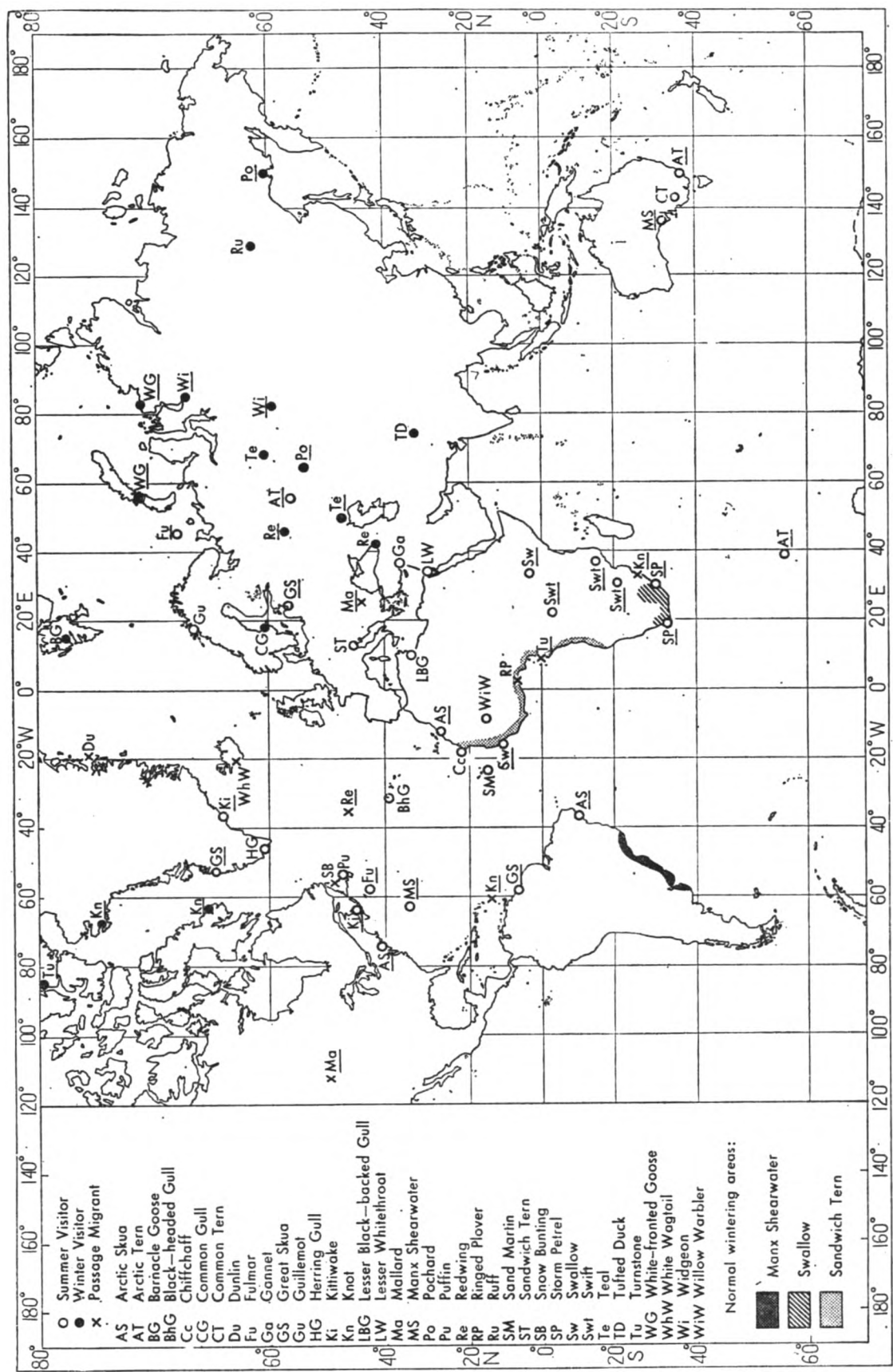


Fig. 2. Some spectacular world-wide recoveries of birds ringed in Great Britain and Ireland. Many of the species involved are sea-birds, including all three which have reached Australia. (There are two or more records plotted for each species underlined. The extent of the normal wintering areas for Manx Shearwater, Swallow and Sandwich Tern are based on 80, 250 and 1,000 records respectively.)

December 1961 at 56° 20's, 39° 30'E during cold snowy weather. Interestingly enough one always expects thrilling foreign recoveries to come in envelopes posted from distant lands but this recovery report arrived from Grimsby! The Farnes are 55° 37'N so this is, so far, the only British-ringed bird to get further south from the equator than it had been ringed to the north. The Chiffchaff was one of three birds that landed on a trimaran 300 miles south-south-west of the Canary Islands on 6th November 1971. It died and had been ringed a month and a day earlier in Sussex. One of the crew reported it when they reached Antigua early in December.

Some sea-bird analyses

Most of the ship-board recoveries come from small fishing vessels and refer to birds caught up in fishing gear. Some from quite a depth—diving ducks have entered traps and nets set at 55 metres. In some areas sea-birds are used as bait (off Newfoundland, Spain and Portugal), as targets for 'sport shooting' (Norway, France and Spain) or for human food (Greenland, Iceland, Faeroes and West Africa). Detailed analysis of the records for a species (or group of species) can show a surprising degree of detail. For instance a current analysis of the Auk recoveries (Puffin, Guillemot and Razorbill) has shown that more than half of all the deaths of ringed birds are directly attributable to man's activities (see Table 2). Many of the birds for which no cause of death was given may also have been killed by oil, nets or shooting.

Table 2. Method of recovery of Auks reported up to August 1971

	PUFFIN	GUILLEMOT	RAZORBILL	TOTAL
No cause mentioned	115 (69%)	210 (42%)	278 (48%)	603 (49%)
Oiling	32 (19%)	139 (29%)	104 (18%)	275 (22%)
Nets	4 (2%)	23 (5%)	32 (6%)	59 (5%)
Shooting	17 (10%)	112 (23%)	150 (26%)	279 (22%)
1969 Wreck*	—	10 (2%)	13 (2%)	23 (2%)
Total numbers	168	494	577	1239

* The 1969 autumn wreck in the Irish Sea was never completely explained but startling residues of the organo-chlorine chemicals 'PCBs' were found in the bodies which were analyzed.

In addition this analysis showed a very complicated pattern of movements for Guillemots and Razorbills; unfortunately there are not yet enough Puffin recoveries to show if a pattern exists. For both species young birds (less than one year from hatching) moved further than immature birds (between two and five years old) and the adult birds, mature and able to breed, moved least far. Different colonies went to different areas and these areas shifted, in many cases, even during the winter when it was thought previously that the birds were static. This is most important for our understanding of the threats posed by oil pollution and other disasters which might affect populations of Auks in winter. For instance an oiling incident affecting the Dover Strait during December and January would not affect any of the ringed Puffin populations in Great Britain nor would it affect many adult Guillemots or first-year Razorbills. It might affect immature Razorbills from any of the British colonies as they spend the autumn off Norway and then migrate to Biscay and the north-western Mediterranean. It would affect adult Razorbills, particularly from the northern Scottish colonies and, if it was towards the end of January, from the Pembrokeshire colonies. First-year and immature Guillemots from the Farne Islands and northern Scottish colonies would be caught but only a minority of those from the Irish Sea. Fig. 3 shows the mid-winter recoveries of Guillemots from four areas that have been quite well ringed. The complete northern

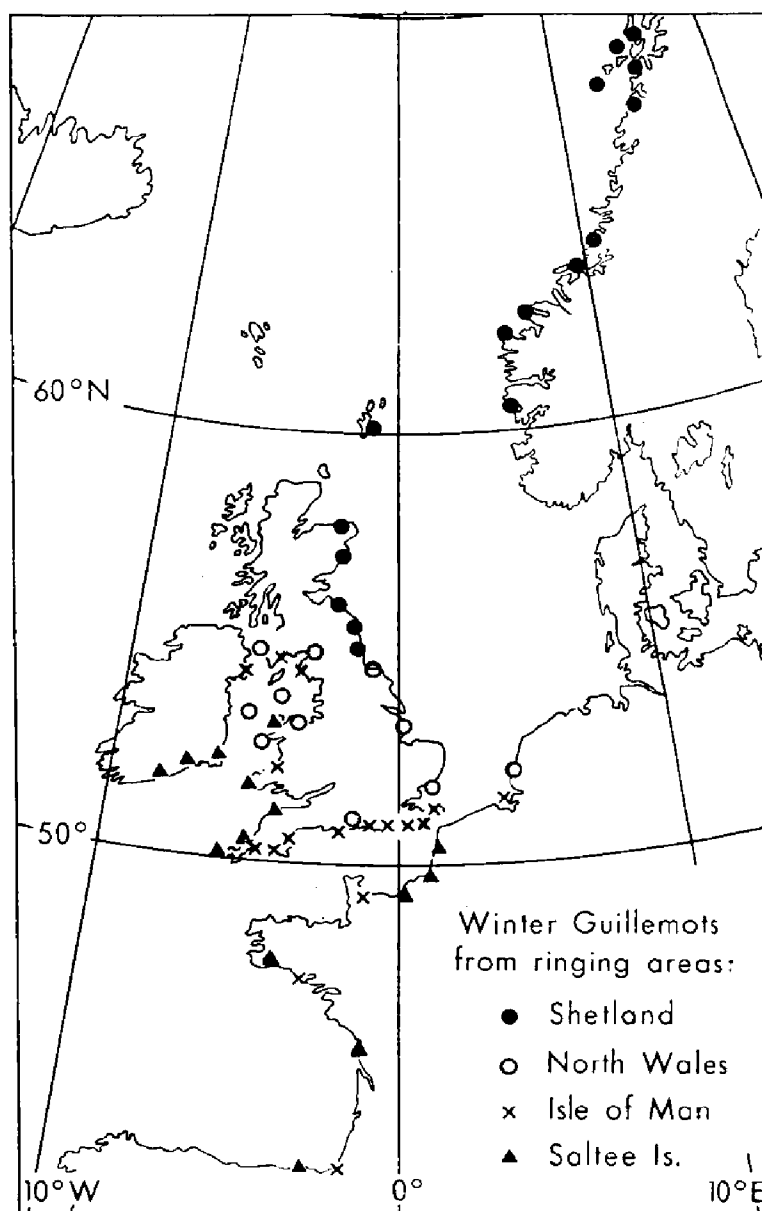
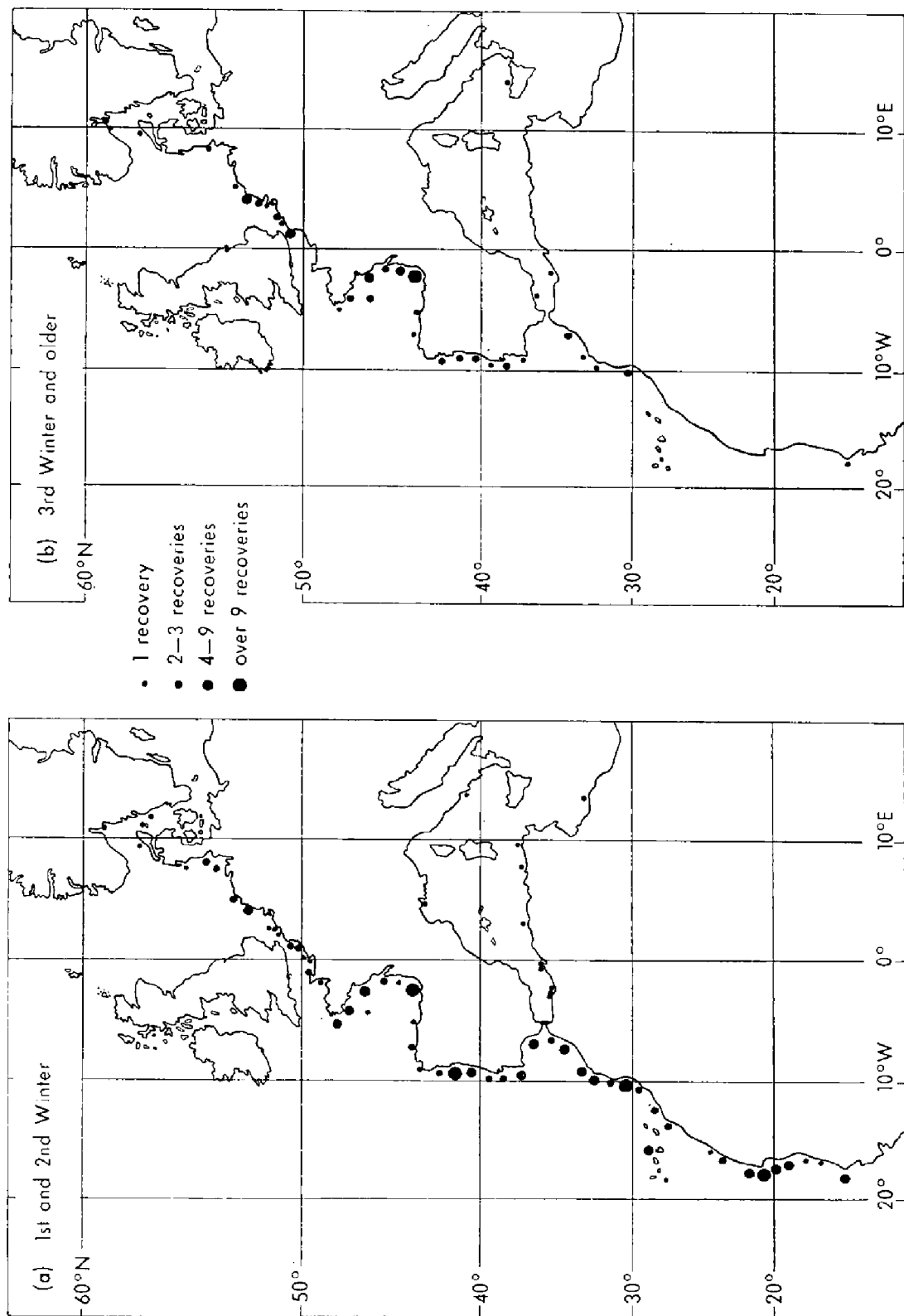


Fig. 3. The mid-winter recoveries from four different groups of Guillemot colonies indicate that the wintering populations are quite well segregated.

segregation of the Shetland birds and the differences between Isle of Man and North Wales birds, ringed less than 150 kilometres apart, are most striking.

Such analyses have been done or are in preparation for a wide variety of species. Two further examples are shown in Figs. 4 and 5, both of familiar species of sea-birds.³ Figs. 4 (a) and (b) show how the young Gannets, in their first and second winters, venture further south down the west coast of Africa than do the older birds. The young birds are largely brown and the older ones mostly white, white birds with a yellow cast to their heads and black wing tips being fully adult—a plumage attained in the fourth or fifth year. Fig. 5 shows the Kittiwake recoveries. Here the first-year birds are mostly recovered in the eastern part of the North Atlantic and are certainly greatly outnumbered by older birds off Greenland and Newfoundland. No adults have been recovered south of Biscay although there are eight first-year recoveries. Again old and young birds can easily be told apart. The first winter birds, sometimes called Turrocks, have a very distinctive **W** across their wings. Unfortunately this is a feature which they share with immature Little Gulls. The



Figs. 4 (a), (b). Gannets recovered during the winter (November to February) of their first 2 years of life have often travelled much further south (and east in the Mediterranean) than older birds.

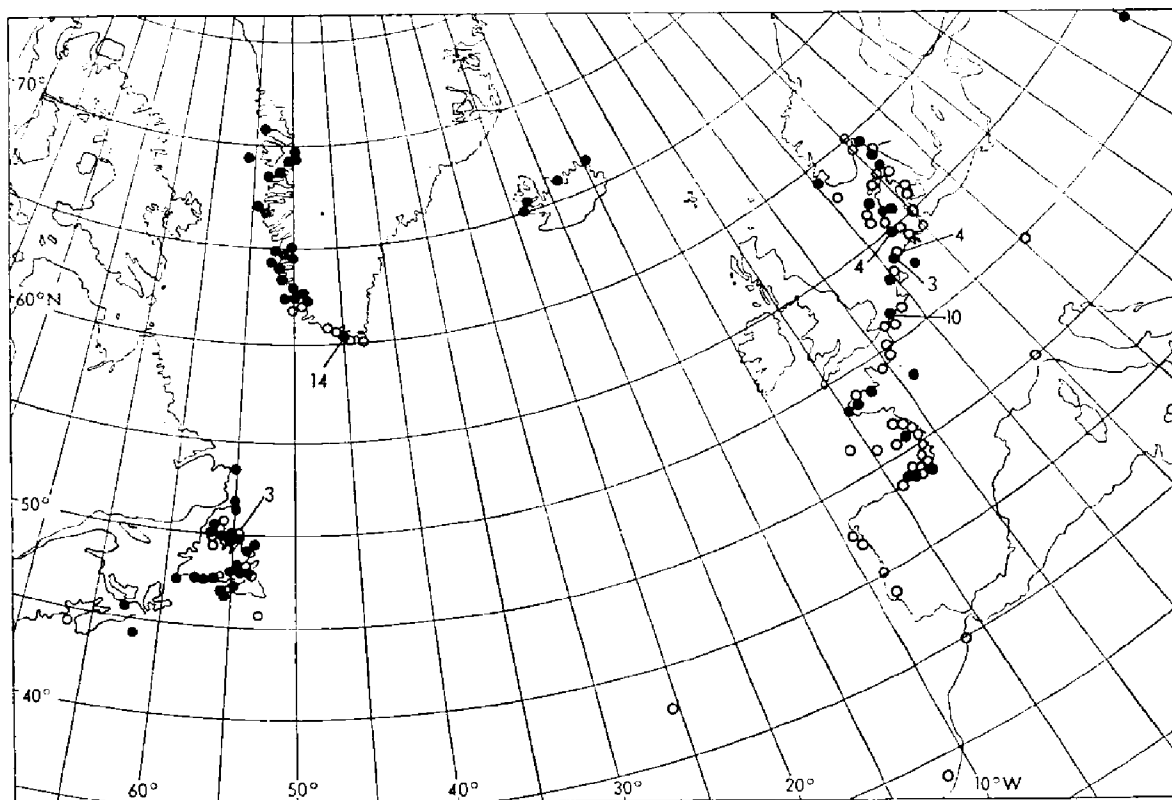


Fig. 5. Kittiwake recoveries in Iceland, Greenland and North America are generally of older birds. First-year recoveries are more usual in the east, particularly in Biscay and further south.

two species can, however, be distinguished since the young Kittiwakes have a dark bar on the nape of the neck, a feature lacking in the young Little Gulls.

What you can do to help

In addition to the United Kingdom, British rings have been (or are being) used in many places abroad. Quite extensive marking involving sea-birds has been in progress on the Galapagos, Malta and at various British Antarctic Survey bases for many years. Expeditions have ringed in the Indian Ocean, on Nightingale Island (Tristan group) and in various areas of west Africa. Please report any bird rings you find either to the address on the ring, if it is clear, or to the British Ringing Scheme for forwarding to the relevant institute. [Any such reports extracted from meteorological logbooks from Voluntary Observing Ships will be forwarded.] The information needed includes the ring number and address (even if the ring is enclosed—they sometimes fall out), date, place (with geographical co-ordinates if possible) and the circumstances of finding, the identification of the bird if this is possible and, of course, your address so that you can be sent details of the bird's history.

If you are interested in keeping in touch with the ringing scheme, regular items about recoveries appear in *B.T.O. News* and analyses in the journal *Bird Study*; both are available free to members of the British Trust for Ornithology which runs the national scheme. The annual 'Ringing Reports' are sold separately by the B.T.O. In addition the B.T.O. is concerned with many different forms of research on birds and has a membership of about 6,000, most of whom actively participate in the research. Unfortunately the technique of ringing requires a considerable amount of ornithological knowledge and field experience which can take many months or even years to acquire. It is therefore seldom possible for the many volunteer would-be

ringers to obtain training and actually start ringing on their own, but the ringing office will always try to put potential ringers in touch with active ringers qualified to train them in the art and science.

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Forecasting for Off-shore Drilling Rigs

BY R. J. OGDEN

(London Weather Centre)

The first drilling in the U.K. sector of the North Sea (see Fig. 1) took place about Christmas 1964 in the Dogger Bank area, and the London Weather Centre has been concerned with the weather problems of marine drilling rigs from that first operation to the present time. Early activities were confined to the relatively shallow southern areas of the North Sea, but within the past few years there has been a steady extension of interest northwards. At first this led to areas around 57°N but, during the past two years, rigs have approached the edge of the continental shelf and are now operating in some 120-180 metres of water to the east and north of Shetland; this is an almost totally unprotected position from the weather point of view.

Marine drilling rigs

The weather forecasting service we provide for the off-shore drilling industry is tailored to meet the special requirements of the rig operators. Before turning to the

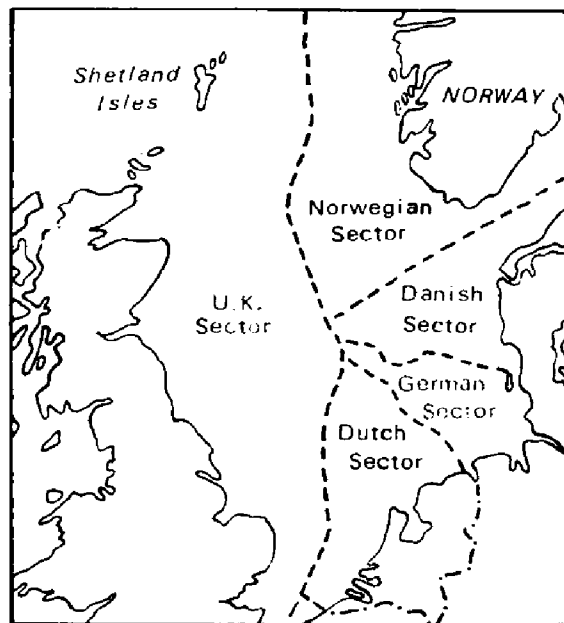


Fig. 1. North Sea drilling concession areas.

meteorological problems, therefore, it may be helpful to describe very briefly the main types of drilling rig and their response to meteorological conditions.

In fairly shallow water it is possible to use a 'Jack-up Rig'. This has three or more legs which can be lowered on to the sea-bed; the drilling platform can then be jacked up on the legs until it is some 15 metres above the sea, making a more or less rigid structure from which drilling can continue in quite rough weather. The rig is, however, extremely vulnerable to weather whilst jacking up (or down), an operation that takes up to 12 hours and which requires that waves be no more than about 1.5 metres. During moves under tow from one location to another the drilling platform floats and the legs then protrude 46 metres or more above the water-line, making a somewhat unstable structure that is extremely sensitive to both wind and waves. As the maximum towing speed is 3-5 knots the whole operation of jacking down, towing to a new location and jacking up again takes a long time and rigs sometimes have to wait several weeks for a suitably long spell of quiet weather.

If a successful strike is made in reasonably shallow waters, a Fixed Production Platform can be constructed or assembled on site; this has been done, for example, at the Amoco/Gas Council well on the Leman Bank. It has now been decided to assemble a Fixed Platform in nearly 120 metres of water over the B.P. Forties Oil-field. This is clearly a major constructional undertaking and, as with all such work at sea, certain stages of the operation (including the associated pipe-laying from special barges that carry large cranes) will be highly weather-sensitive. Once built, however, Platforms are more or less impervious to weather, although men working on them are subject to obvious hazards in gale conditions.

Even the largest Jack-up Rigs (such as ORION, which has legs nearly 120 metres long) cannot drill in water deeper than about 90 metres, so the type of rig now most frequently used for deep-water operations is the Semi-submersible Rig, for example STAFLO which is owned and operated in northern waters by Shell (U.K.). The superstructure rises some 30-60 metres above the water-line, and buoyancy is provided by pontoons, up to 30 metres below the water-line, into which water can be pumped as required. The response of the rig to waves is less than that of a surface vessel and towing can take place in much more adverse conditions than could be tolerated by a Jack-up Rig. But tows have broken in severe gale conditions and if there is insufficient sea room this can be very worrying despite the inherent

stability of the rig. Future Semi-submersible Rigs are likely to be self-propelled, which should help to overcome this difficulty.

On location, Semi-submersible Rigs are firmly anchored in position into the prevailing wind and should then be able to ride out all storms. They have a natural oscillation period of some 15 to 20 seconds; they are thus reasonably insensitive to short-period wind waves, even when quite high, but they become very responsive to long-period swell waves. In bad swell conditions there is considerable heave (particularly when the swell comes from a direction other than the climatic normal direction assumed when the rig is anchored) and drilling then has to stop. Some other operations have even lower limits; for example, diving cannot be done with waves higher than 3 or 4 metres. A further problem arises from the fact that the response to seas is different from that of a surface vessel; off-loading supply trawlers in high seas can be difficult or indeed impossible.

A further type of rig that can be used in deep waters is the Drill Ship; this has the lines of a normal surface vessel but carries a tall drilling tower. As with Semi-submersible Rigs, most ships of this type are firmly anchored when drilling, but a new type of Drill Ship, the *Pelican*, has recently come into service for Total Oil Marine; this maintains station by means of computer-controlled thrusters fore and aft.

Weather forecasts—general principles

It is clear from the above brief account that the overwhelming meteorological interest of rig operators is with the two related elements of wind and waves. The seas which impose operational limitations depend on the type of rig and on the activity in which it is currently engaged; our forecast service cannot merely concentrate on particular threshold values, but must cover the whole spectrum of conditions. Moreover, since many of the operations (for example rig moves) take a long time, we must provide forecasts to the limit of our capability; this is at present taken to be 72 hours. We must also pay particular attention to long-period swell.

It is important to emphasize that a rig operator is interested in weather conditions not over an area but at the point where his rig is located; separate forecasts are therefore required for each individual rig. It is sometimes assumed that weather conditions at sea are reasonably homogeneous over large areas, but at least over the continental shelf and within a few hundred miles of land this is not so. There can be real and very marked differences in both wind and waves over quite short distances; in May 1972, for example, one of two rigs about 50 n. miles apart experienced persistent gale conditions for some hours whilst the other had no more than light winds. The problems of the off-shore forecaster are thus, in some ways, much more akin to those of the aviation forecaster preparing landing forecasts for a particular airfield; both are concerned with forecasting for a point, whereas, by contrast, the sea-area forecaster and ship-routeing officer must take a broader view of the weather over large areas of the ocean. But the off-shore forecaster shares with the latter the problems inherent in all marine forecasting; in particular he has to predict for an area in which weather reports are sparse by comparison with land areas. Observations from Selected Ships in the North Sea, and especially from its northern approaches, are of tremendous help.

Fairly soon after the commencement of drilling activity in the North Sea the detailed meteorological requirements of the rig operators became clear and it was possible to devise a standard form of presentation. The forecast is given in five sections: Inference, Forecast for first 12 hours, Forecast for second 12 hours, Forecast for next 24 hours, and Forecast for Day 3. A roughly similar amount of detail is given throughout the first 48 hours, but the Day 3 section is in more general terms.

The importance attached to wind and waves is clear, if only from the number of

references to these elements. Other meteorological factors are of interest rather than of vital concern although, for example, fog would clearly have a bearing on supply by helicopter or surface vessel; but no special techniques are employed when forecasting these other elements and no further reference will be made to them.

Unfortunately our forecasting capabilities are not such that we can guarantee precision even in 12 to 24 hours' time, let alone over 3 days. The Inference in the standard forecast thus assumes a special importance, because it is here that we explain the current synoptic situation and the expected evolution on which the forecast is based. But we also indicate our degree of confidence in the chosen solution and, in addition, we can discuss other possible evolutions and their likely consequences *at the rig position*. The rig operator is thus given as much information as possible to assist him with the vital operational decisions he must make.

Wave forecasting

As Debussy so brilliantly illustrated, there is a constant dialogue between the wind and the sea. The effect of wind is to produce a train of waves of different height (measured from trough to crest). These component waves will also have different periods and will move at different speeds, thus constantly getting into and out of step with each other to produce waves of many different sizes. There is consequently no such thing as a unique wave height and in order to describe the spectrum of wave activity it is necessary to use a statistical approach. The longer a wave train is observed the greater is the chance of viewing the simultaneous arrival of many wave components leading to a very large wave. It is therefore necessary to stipulate a period of observation and, although the terminology is a little confusing, the following definitions are now generally accepted:

Maximum Wave Height	H_m = Highest wave observed in a typical 10-minute period.
Significant Wave Height	H_s = Mean height of the highest one-third of the waves observed in a typical 10-minute period.
Extreme Wave Height during a storm	H_e = Highest wave observed during the entire period of a storm.

Wave heights will clearly depend on wind speed; the stronger the wind, the higher the wave will be. It is also fairly evident that wave height may depend on the fetch of the wind and on the time it has been blowing; these two effects are inter-related, and in practice either factor could be limiting. The relationships between the speed, fetch and duration of the wind, and the resultant wave heights and periods were investigated by Darbyshire and Draper¹ of the National Institute of Oceanography, using 10 years of records from British Ocean Weather Ships and records for about 1 year from light-vessels in Morecambe Bay and at Smith's Knoll. The results from these latter two locations proved to be quite consistent, so the data were combined to produce relationships applicable to shallow water (say 30–45 metres), while the O.W.S. data were taken as representative of deep water (say 180 metres or more).

The graphs for deep and shallow water respectively enable the Maximum Wave Height (H_m) to be determined from given values of the speed, fetch and duration of the wind. Darbyshire and Draper also established that, in accordance with theory, the Maximum and Significant Wave Heights are related by the equation: $H_m = 1.60 H_s$. The period of the significant waves (i.e. of the highest one-third observed during a 10-minute period) may be determined from a second pair of graphs. It is evident from these four graphs that, for given wind conditions, waves in oceanic waters are higher and of longer period than those in coastal waters.

The Extreme Wave Height (H_e) during a storm is related statistically to the Maximum Wave Height (H_m). The relationship was investigated by Longuet-Higgins and his results are reproduced in graphical form in Darbyshire and Draper's paper. The effect of a storm of long duration is such that once in 48 hours one would

expect to see a wave some 50 per cent higher than that likely to occur every 10 minutes.

In view of the fact that the coastal graphs were based on limited data and that some extrapolations had to be made, it is pertinent to ask how reliable they are within their claimed field of application, i.e. to predict locally wind-generated waves with no reference to swell. Experience at the London Weather Centre on this point is very favourable and we have noted very few cases indeed where wind waves outside the predicted height range have definitely occurred. Our confidence in the graphs was, moreover, strengthened when in October 1970 they were used successfully to predict extreme waves of over 18 metres at 57°N, higher than any waves previously reported from the North Sea; this was admittedly an extreme northerly situation.

When the complicating effects of swell are considered the picture is far less satisfactory and there is no known prediction technique. Swell may simply be defined as waves generated by winds in a remote area. Once a wave system becomes established it will move away from the area in which it is produced, the wave height attenuating after about 300 n. miles. Short-period waves attenuate quite quickly, waves of 5-second period disappearing within a few hours even in deep water. Attenuation is also marked in confined, relatively shallow waters; thus, for example, heavy Atlantic swell in the Western Approaches may still be several feet in Lyme Bay, but becomes quite small near the Isle of Wight and is negligible at Royal Sovereign. We therefore have no complications due to swell at the rig positions in the shallow waters of the southern North Sea.

North of the Dogger Bank, however, swell effects can become apparent and at 60°N swell can be an acute problem. Waves with a period of 15 seconds could travel round the world and swell generated by intense depressions can thus, all too readily, reach Shetland both from the Atlantic and from the Norwegian Sea.

Trials have been made of a possible method of predicting the arrival of swell at a distant point, but the results so far are inconclusive. The only regular reports of swell (identified by its long period) are those from Ocean Weather Ships and these are so widely scattered that the number of cases that can be used, both for prediction and verification, is very small indeed. In practice, therefore, our forecasting technique for swell is perforce subjective and is based largely on experience, added to such scanty data as are available from Ocean Weather Ships and from the rigs themselves.

Assuming that the arrival or occurrence of swell is known, the waves which would result from the combination of this with the wind waves generated locally can readily be calculated as the square root of the sum of the squares of the two wave heights; for example, a 3-metre swell added to 3-metre wind waves produce a resultant sea of 4.25 metres.

In view of the importance of long-period swell to Semi-submersible Rigs, experiments on swell prediction will continue.

Wind forecasting

It is evident that accurate wind prediction is the key to successful wave forecasting. Given a blocked situation with a reasonably static pressure pattern, wind prediction is not difficult; but, in general, in the mobile westerlies of temperate latitudes there are great difficulties.

The first step in surface-wind forecasting must be prediction of the pressure field, using prognostic charts for 24, 48 and 72 hours ahead and interpolating suitably between them. Prediction over this period of time cannot possibly be achieved from charts covering a purely local area; one has only to think of some of the dramatic meridional extensions that take place within 48 hours over the U.K. and the North Sea as a result of happenings on the other side of the Atlantic. Preparation of the guidance charts is thus quite outside the capability of an outstation alone, in

view of the limited data and data-processing resources available; at the London Weather Centre we therefore lean heavily on the medium-range charts produced in the Central Forecast Office at Bracknell. The situation is thoroughly discussed between our specialist rig forecaster and the medium-range forecaster at Bracknell, and, having agreed on the lines of development over the next 72 hours, the London Weather Centre rig forecaster translates the forecast pressure charts into terms of wind, making allowance for friction and curvature, and taking note of all available actual reports. From our point of view the most important feature of a prognostic chart is the pressure gradient; all gradients shown in the North Sea area must be critically examined and unrealistic values must be modified to give a coherent evolution over 72 hours. Gradual wind changes during a forecast period are usually dealt with by giving expected values at the beginning and end of the period, but some attempt must be made to predict the time of abrupt changes, as at a sharp trough line.

Having produced the wind forecasts, the corresponding wind-wave forecasts must be made, using the methods already described, and making some allowance for the lag in the response of the sea to wind changes. The effects of swell are then subjectively estimated and the whole process is repeated for each and every individual rig.

Conclusion

Forecasting for the off-shore industry is a most exacting commitment, but it is also a very great challenge. Close contact with rig personnel (by means of R/T conversations and, whenever possible, through visits by forecasters to rigs) is a most useful way to bring home to us the operational consequences of our predictions. And it should never be forgotten that these consequences can not only involve the safety of life, but are also economic. Sea-area gale warnings are not cancelled if they are expected to be renewed within 6 hours; but if the off-shore forecaster misses a 5-hour lull in a stormy period, during which vital supplies might have been landed on the rig from a supply trawler, the rig could suffer enforced idleness for several days and such incidents are not welcome when rig-hiring charges are some £6,000 per day. The work of the forecaster can indeed be frustrating, but equally the rewards can be great; it is no mean satisfaction to be able successfully to predict the height of the waves at a dot in the ocean 48 hours ahead.

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APPOINTMENT OF NAUTICAL OFFICERS

The retirements of Captain White and Lt.-Cdr. Pullan (see page 144 of this number) have metaphorically added another Beaufort number to the wind of change which seems to have been blowing through the Marine Division for the past year or two and it seems timely now to advise shipmasters and officers of these changes so that at least they may have some idea of the identity of the officer who is likely to visit them next time home, or if they are about to be weather routed.

Captain A. D. White has been succeeded in the post of Senior Nautical Officer and Deputy Marine Superintendent at Headquarters by Captain G. V. Mackie who has come from the weather-routeing section. Captain Mackie served his time with the Lyle Shipping Co. of Glasgow. He stayed with them after passing for 2nd Mate but later joined Elders and Fyffes where, after passing for Master, he

became Chief Officer. Later, he transferred to the Canadian Pacific passenger service and then, after a short spell as a surveyor in the Clyde area, he joined the Ocean Weather Service in 1963; he was latterly Master of the *Weather Surveyor*. In March 1968 he was brought ashore at the commencement of the Weather-routeing Service.

He is being succeeded in the routeing service by Captain R. C. Cameron who served his time in the Blue Star Line, remaining with them until he was appointed to command the *Imperial Star* in 1968. In 1970 he joined the Ocean Weather Service and stayed there until this, his first shore appointment.

Also coming ashore at the start of the weather-routeing scheme was Captain D. R. McWhan, now Port Meteorological Officer at Southampton. McWhan served his time in the Donaldson Line and stayed with them until he passed for Master. From 1955 to 1960 he was in the Blue Star Line and joined the Ocean Weather Service in 1961. Eight years later, having been relieving Master in Ocean Weather Ships, he came ashore to the new service. Later, when it was decided that Southampton, having been a part-time agency for some years, should again be served by a full-time Port Meteorological Officer, Captain McWhan was appointed.

His post in the Weather-routeing Section was filled by Mr. A. Blackham who had gone to sea in 1936 with the then Anglo-Saxon Petroleum Co. After passing for 2nd Mate he joined Allan Black's of Sunderland and later, with a Master's Certificate, he was appointed Chief Officer of the *Samsturdy*, engaged on military duties in Far Eastern waters. Blackham came ashore in 1947 to join the Meteorological Office on the scientific side but transferred to the Weather-routeing Section as Nautical Officer in 1971.

Lt. Cdr. Pullan has been succeeded in Liverpool by Mr. W. G. Cullen who has moved across from Hull. Cullen served his time in Andrew Weir's and, after passing for 2nd Mate, served in Donaldson's until he passed for Master. He was in the Ocean Weather Service for two years before coming ashore to join the Meteorological Office on the scientific side, his appointment being as Assistant to the Port Meteorological Officer in Glasgow. He stayed there until appointed Port Meteorological Officer in Hull when Pullan went to Liverpool. He is thus relieving Pullan for the second time.

Mr. Cullen is being relieved in Hull by Mr. W. A. McCrindle who served his time in the Dene Shipping Co. He moved thence, with a Mate's (Home Trade) Certificate to Moller Line (U.K.) Ltd. and then to the Clyde Shipping Co. He joined the Ocean Weather Service in 1958, leaving it for the few months' additional sea service required by the Board of Trade to enable him to sit for Mate and then for Master. These periods he spent respectively in P. Henderson's and the Anchor Line. He has been relieving Master in the Ocean Weather Ships.

Captain R. Reid, Port Meteorological Officer in Glasgow, died on 17th February 1972 (*The Marine Observer*, April 1972) and the post was filled by Mr. H. M. Keenan, who served his time with H. Hogarth and Sons, moving on to the Anchor Line after he had passed for Master. He remained there until fleet reduction sent him to Donaldson's from whence he went to Burns & Laird in the Irish Sea trade. A further fleet reduction sent him into the Ocean Weather Service where he stayed until brought ashore to his present post.

Captain F. G. C. Jones, who had been Port Meteorological Officer in Cardiff for sixteen years, retired in January 1972 (*The Marine Observer*, April 1972) and he was succeeded in post by Mr. D. J. F. Southon who had served his time in the British Tanker Company, staying with them to get all his Certificates and then joining the Ocean Weather Service in 1970. He was in Ocean Weather Ships for two years before coming ashore.

Finally Captain C. J. D. Sutherland, who had been our part-time Agent in the Tyne area for a number of years, has resigned owing to the pressure of his own business and the Agency is therefore closed for the meantime. We would be very glad if the Master of any observing ship which is coming home with a port in the Tyne area as her only U.K. destination, would please let us know as far ahead as

possible so that arrangements may be made for some other Port Meteorological Officer to visit the ship and see to her requirements. It would help also if the Master would let us know the name and address of his Agents in the Tyne area so that we may find out a little later her expected time of arrival, berth etc.

L.B.P.

INDIAN EXCELLENT AWARDS

(From the Deputy Director-General of Observatories (Forecasting), India)

The end of the year 1971-72 marks the completion of yet another year of useful co-operation by the ships of the Indian Voluntary Observing Fleet (V.O.F.) with the India Meteorological Department. During the year the co-operation of 22 new ships were enlisted and 5 ships were decommissioned from the V.O.F. At the end of the year the strength of the V.O.F. was 166 consisting of 43 Selected Ships, 113 Supplementary Ships and 10 Auxiliary Ships. These ships have rendered commendable service to the cause of meteorology by recording and reporting valuable meteorological observations from the high seas purely on a voluntary basis. During the year 1,568 logs containing 18,527 meteorological observations were received from the ships of our V.O.F.

The weather observations recorded and transmitted by these ships were of great value in the day-to-day forecasting work of the Department and, in particular, for locating and tracking tropical storms and for issuing warnings to the shipping services and to the community at large. The Department wishes to convey its thanks to all Captains and Officers of the V.O.F. and the owners of the ships who have all co-operated whole-heartedly with the department during the year.

As is the practice, the meteorological logs have been scrutinized and assessed in respect of accuracy and coding of observations and also in respect of the number of observations recorded (making due allowance for the number of days spent at sea by individual ships). Weightage has also been given to the number of observations transmitted and to the general upkeep of meteorological instruments on board. On the basis of these assessments, the work of the following ships has been adjudged as the best for the year 1971-72. I am happy to state in this connection that the Government of India has approved a proposal made by this Department to increase the allocation of funds for making Excellent Awards. Hence 16 ships have been selected this year to receive Excellent Awards as against 12 in 1970-71.

The Excellent Awards, in the form of books, were distributed at the National Maritime Day function held in Bombay on 5th April 1973. The names of the prize-winning ships are listed in order of merit.

NAME OF VESSEL	OWNER
<i>Jalavijaya</i>	Scindia S.N. Co. Ltd.
<i>Jalajyoti</i>	Scindia S.N. Co. Ltd.
<i>Lok Sevak</i>	Mogul Line Ltd.
<i>Vishva Maya</i>	Shipping Corporation of India Ltd.
<i>State of Haryana</i>	Shipping Corporation of India Ltd.
<i>State of Bombay</i>	Shipping Corporation of India Ltd.
<i>Jalajawahar</i>	Scindia S.N. Co. Ltd.
<i>Jalavikram</i>	Scindia S.N. Co. Ltd.
<i>Vishva Marg</i>	Shipping Corporation of India Ltd.
<i>Jalazad</i>	Scindia S.N. Co. Ltd.
<i>Jagat Mohini</i>	Dempo S.S. Co. Ltd.
<i>Karanja</i>	British India S.N. Co. Ltd.
<i>Jag Vijay</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Kisan</i>	Great Eastern Shipping Co. Ltd.
<i>Jalaratna</i>	Scindia S.N. Co. Ltd.
<i>Rajula</i>	British India S.N. Co. Ltd.

In addition to the ships mentioned above, the following have been awarded a Certificate of Merit for commendable work done during the same year.

Apj Ambika
Jagat Neta
Jaladharti
Jaladuta
Jalakrishna
Jalamangala

Jalamani
Jalavishnu
Mohammedi
Mozaffari
Sirdhana
State of Assam

State of Maharashtra
State of West Bengal
Vishva Jyoti
Vishva Sudha
Vishva Tej

ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM JANUARY TO MARCH 1973

The charts on pages 135 to 137 display the actual and normal ice edges (4/10 cover), sea-surface and air temperatures and surface-pressure anomalies (departures from the mean) so that the abnormality of any month may be readily observed. (The wind anomaly bears the same relationship to lines of equal pressure anomaly as wind does to isobars. Buys-Ballot's law can therefore be applied to determine the direction of the wind anomaly.) Southern and eastern iceberg limits will be displayed during the iceberg season (roughly February to July). In any month when sightings have been abnormally frequent (or infrequent) this will be discussed briefly in the text.

The periods used for the normals are as follows. Ice: Eurasian sector, all data up to 1956,¹ North American sector, 1952-56 (for north of 68°N)¹ and all data up to 1963 (for south of 68°N).² Surface pressure: 1951-66.³ Air temperature, 1951-60.⁴ Sea-surface temperature: area north of 68°N, 1854-1914 and 1920-50,⁵ area south of 68°N, 1854-1958.⁶

JANUARY

A cold north-westerly wind anomaly persisted off eastern Canada maintaining a large excess in the Davis Strait and off Newfoundland. In the latter region the ice edge was located further south-east than any known extreme limit.

A warm south-west to west anomaly accounts for the continued deficit in the Greenland and Barents Seas and in the Baltic, though an excess was established in the region to the north-east of Jan Mayen by the cold Jan Mayen Current. (Since this bulge appears to be a recurring feature each spring it will be referred to as the 'Jan Mayen Tongue'. The indentation on the northern side of this bulge is known as the 'North Bay'.)

FEBRUARY

Though a cold north-westerly anomaly maintained a large excess in the Davis Strait, a north-easterly anomaly off Labrador produced a deficit in that region. Further south, a less cold south-westerly anomaly off Newfoundland brought the southern ice limit within the normal boundary though it maintained the eastern limit well beyond normal.

A boosting of the Jan Mayen Current probably accounts for the further growth of the Jan Mayen Tongue, while the development of the North Bay can be attributed to the fresh north-north-easterly anomaly which prevailed over that region. Since air temperatures remained below normal it is probable that new ice was constantly being formed within this indentation.

Normal east-north-easterly winds prevailed over the northern Barents Sea, resulting in a reduction in the ice deficit in that region. Light ice conditions persisted in the northern Baltic where warm westerly winds prevailed throughout the month.

MARCH

A return to cold north-westerly winds off Eastern Canada removed the deficit off Labrador and enlarged the excess off Newfoundland. The Jan Mayen Current continued to run strongly, thus maintaining the Jan Mayen Tongue, while the North Bay reached further southwards under the influence of a northerly wind anomaly.

A warm westerly anomaly accounts for the enlarged deficit in the Barents and White Seas and in the Baltic.

Reports received from the International Ice Patrol indicate that 1973 may well prove to be another severe iceberg year.

R.M.S.

Baltic Ice Summary: January-March 1973

No ice was reported at the following stations during the period: Ventepils, Kalmar, Göteborg, Visby, Emden, Lubeck, Bremerhaven, Kiel, Flensburg, Gdansk, Aarhus, Copenhagen, Oslo, Kristiansandfjord.

STATION	JANUARY						FEBRUARY						MARCH															
	LENGTH OF SEASON			ICE DAYS			NAVIGATION CONDITIONS			ACCUMULATED DEGREE DAYS			LENGTH OF SEASON			ICE DAYS			NAVIGATION CONDITIONS			ACCUMULATED DEGREE DAYS						
	A	B	E	C	D	E	F	G	H	I	A	B	E	C	D	E	F	G	H	A	B	C	D	E	F	G	H	I
Leningrad ..	1	31	19	31	19	2	17	14	0	197	1	28	28	28	0	0	28	0	362	1	31	31	31	0	0	31	1	398
Riga ..	0	0	0	0	0	0	0	0	0	128	28	28	1	0	0	0	0	0	142	1	5	5	0	0	0	0	0	154
Pärnu ..	2	31	22	30	22	7	19	11	0	89	1	28	28	27	1	0	28	0	160	1	31	31	28	3	3	28	0	168
Viborg ..	1	31	31	31	31	0	14	5	12	—	1	28	28	28	0	0	0	28	—	1	31	31	31	0	0	2	29	—
Klaipeda ..	2	29	15	0	0	0	9	0	0	68	13	28	3	0	1	2	0	0	12	1	13	7	0	0	3	0	0	—
Tallin ..	0	0	0	0	0	0	0	0	0	—	28	28	1	0	0	1	0	0	—	1	16	16	0	12	8	5	0	—
Helsinki ..	20	31	12	0	0	0	3	0	0	80	1	28	28	5	0	0	20	1	204	1	31	31	10	0	0	10	0	232
Mariehamn ..	0	0	0	0	0	0	0	0	0	1	27	28	2	0	0	0	0	0	73	1	7	7	0	0	0	0	0	25
Turku ..	0	0	0	0	0	0	0	0	0	56	12	28	10	3	0	5	0	0	160	1	19	19	7	0	0	0	0	161
Marjaluoto ..	0	0	0	0	0	0	0	0	0	—	12	28	7	0	0	3	0	0	—	1	9	4	0	0	2	0	0	—
Vaasa ..	20	31	12	10	0	0	12	0	0	72	1	28	28	28	0	0	2	26	192	1	30	30	28	0	0	28	0	221
Oulu ..	1	31	31	31	0	0	0	31	0	292	1	28	28	28	0	0	0	28	497	1	31	31	31	0	0	31	0	631
Roytaa ..	22	31	10	0	7	2	7	0	0	—	1	28	28	4	21	3	25	0	—	1	31	31	16	0	0	31	0	—
Lulea ..	1	31	31	31	0	0	0	31	0	288	1	28	28	28	0	0	28	0	526	1	31	31	31	0	0	31	0	598
Bredskar ..	0	0	0	0	0	0	0	0	0	—	10	28	8	5	0	0	6	1	—	1	10	10	2	0	7	3	0	—
Sundsvall ..	0	0	0	0	0	0	0	0	0	—	24	28	5	0	0	5	0	0	—	1	11	11	0	0	10	0	0	—
Stockholm ..	0	0	0	0	0	0	0	0	0	1	9	28	20	0	0	0	6	0	31	1	31	31	5	0	25	0	0	—
Skellefteå ..	30	31	2	0	0	2	0	0	0	—	1	28	24	17	0	0	21	3	—	1	20	15	12	0	0	28	0	—
Hamburg ..	2	5	4	0	0	0	1	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Stettin ..	1	18	14	1	0	7	0	0	0	51	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	—
Stralsund ..	3	28	23	5	0	0	0	4	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Rostock ..	5	6	2	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—

CODE:

A First day ice reported.
B Last day ice reported.

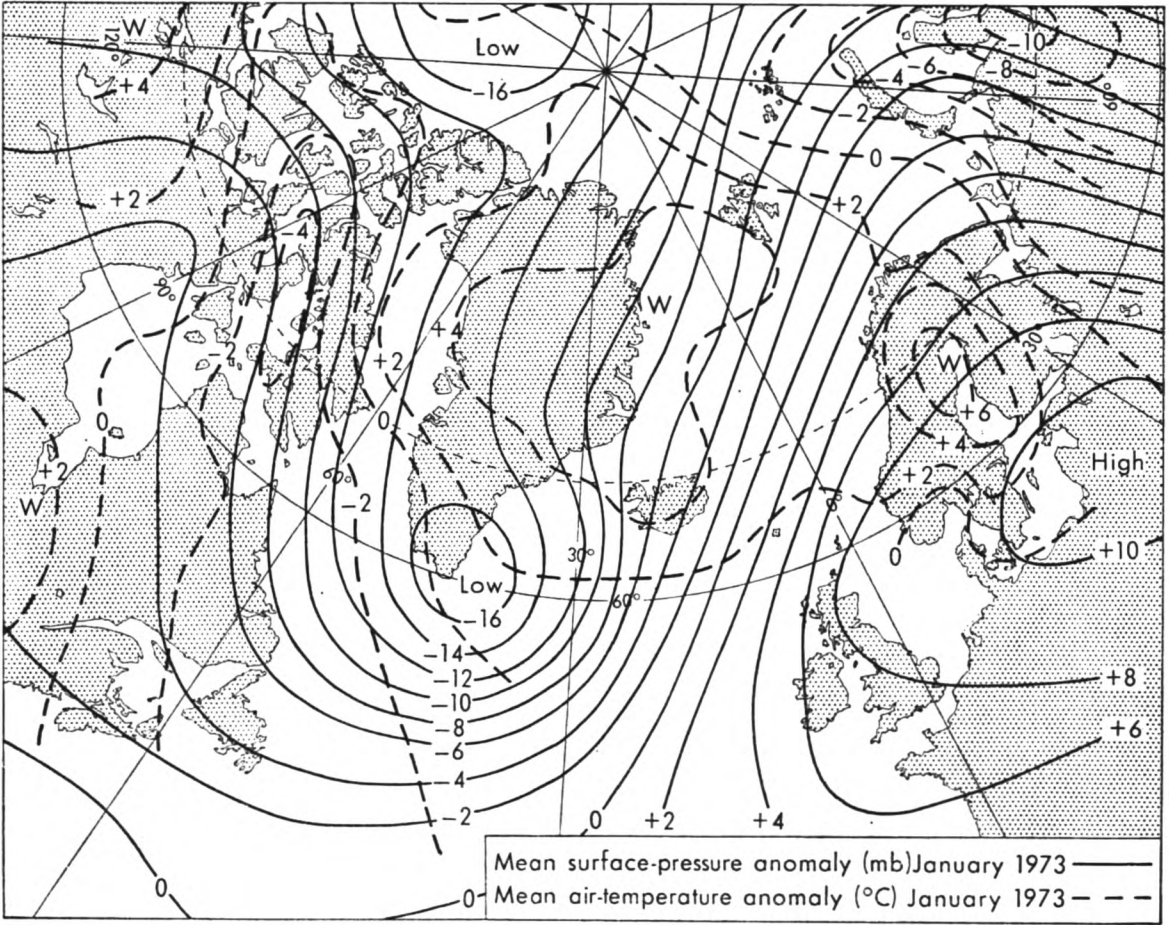
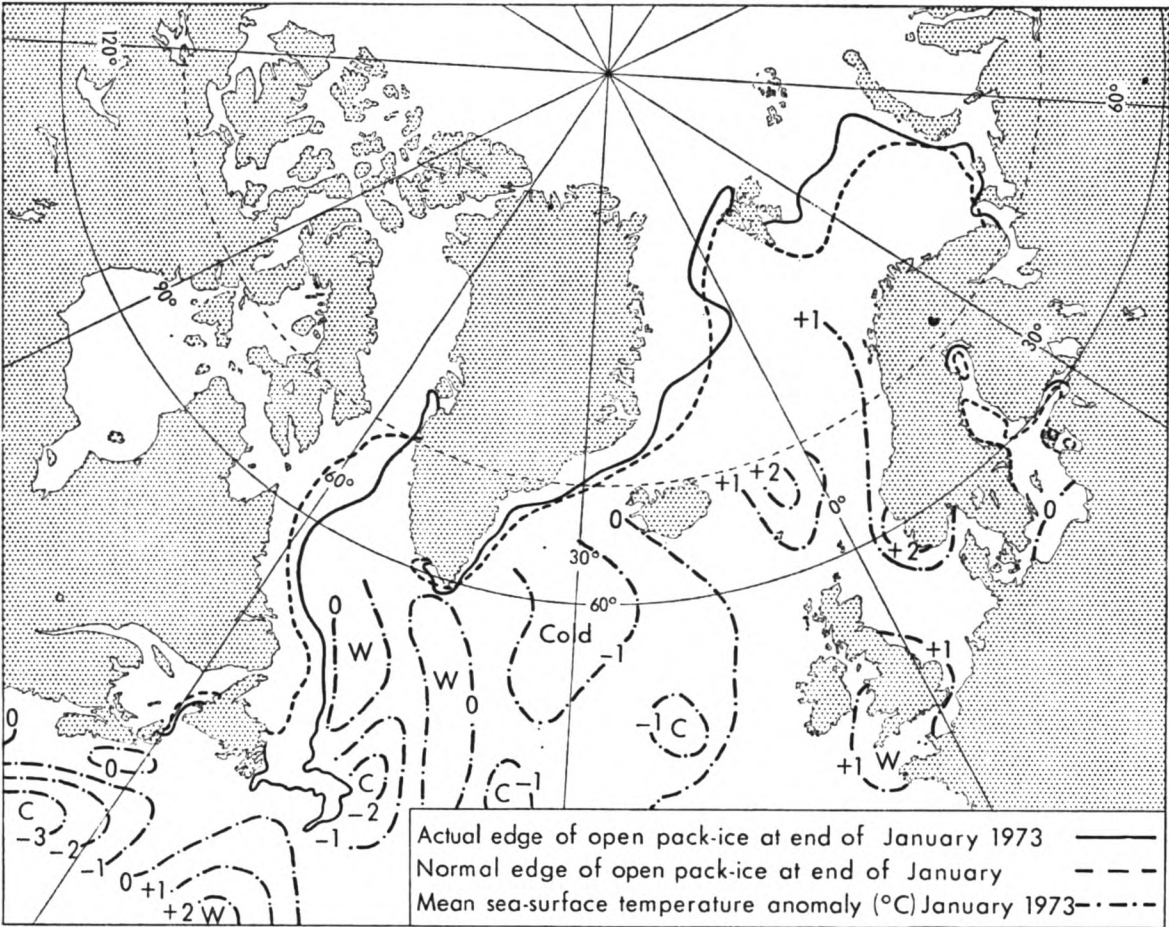
C No. of days that ice was reported.
D No. of days continuous land-fast ice.

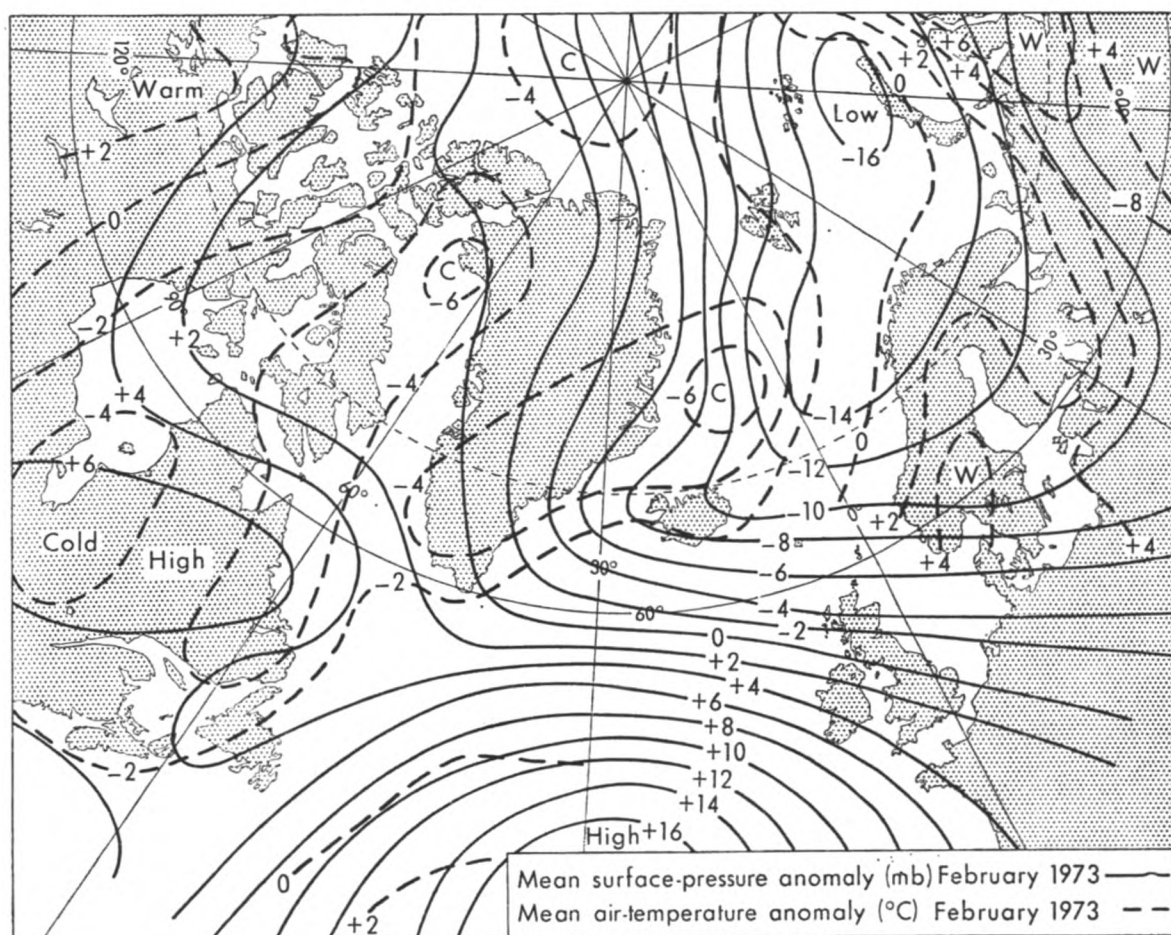
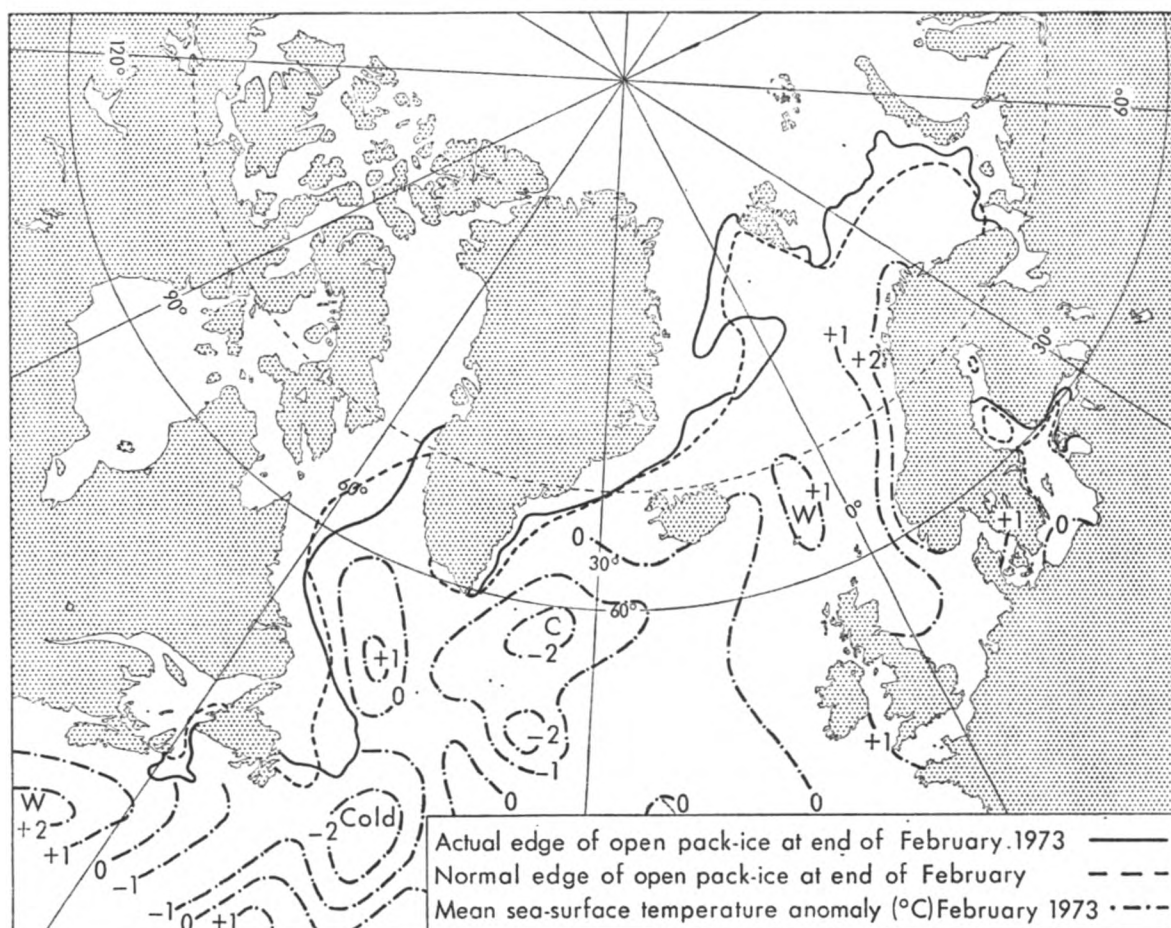
E No. of days of pack-ice.
F No. of days dangerous to navigation, but assistance not required.

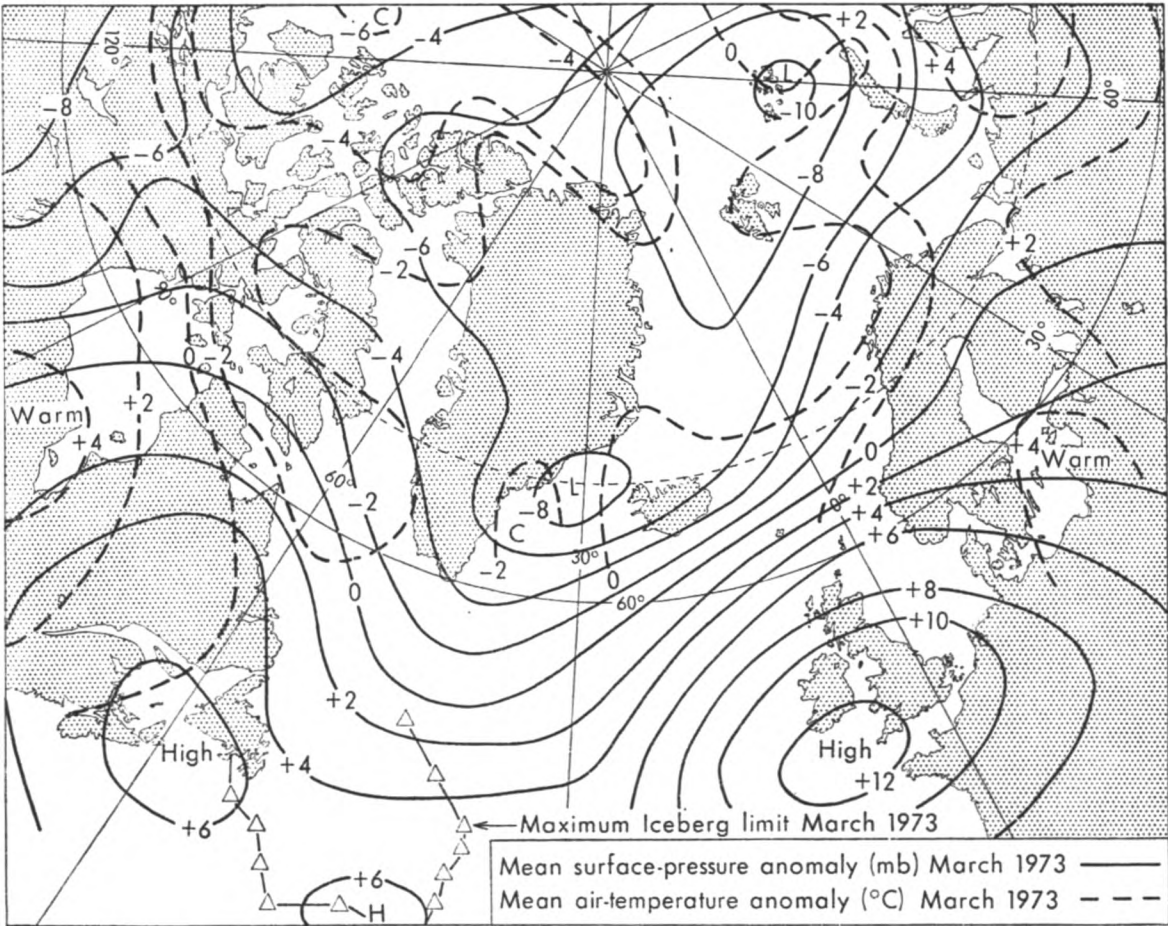
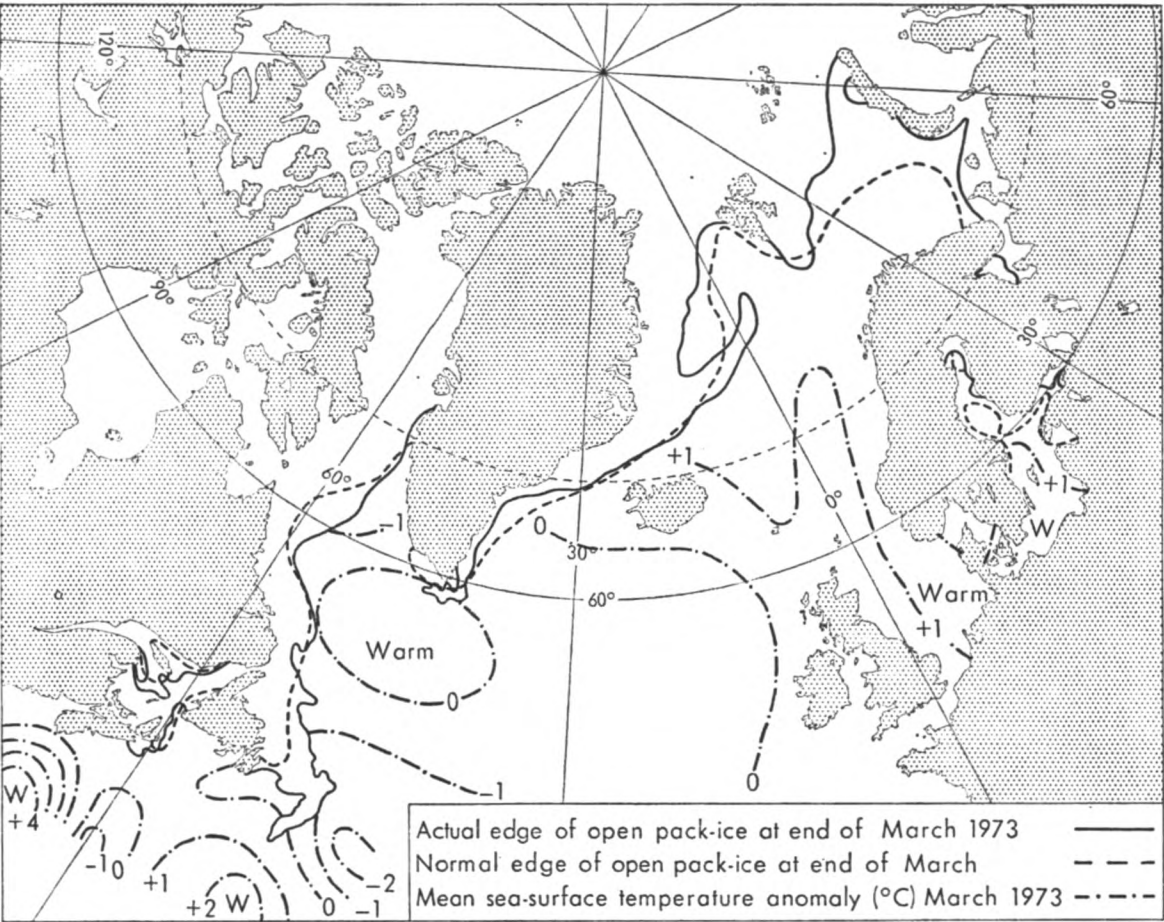
G No. of days assistance required.
H No. of days closed to navigation.

I Accumulated degree-days of air temperature (°C) where known.*

* These figures give a rough measure of first the probability of the formation of sea ice, and later the progress of the growth and of its thickness. They are derived from daily averages of temperature (00 + 06 + 12 + 18 GMT) and are the sum of the number of the degrees Celsius below zero experienced each day during the period of sustained frost.







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Book Reviews

Treasures of the Armada, by Robert Stenuit. (Translated by Francine Barker.) 216 mm × 152 mm, pp. 282, *illus.* David & Charles (Publishers) Ltd., South Devon House, Newton Abbot, Devon. 1972. Price: £3.50 (in U.K. only).

This book has much in common with *The Wreck Detectives*, reviewed in the April number, for both are basically concerned with the discovery and recovery of historical treasure from the coastal areas of the British Isles. But *Treasures of the Armada* deals in great detail with only one wreck, that of the Spanish galleass *Girona* which met her end on the coast of Ulster carrying not only her own treasure and equipment but that also of five other Armada vessels which had been wrecked.

The story is truly a fascinating one, well set out and admirably told; one must also pay tribute to the translator who has kept the smoothness of the narrative throughout.

We are taken right back to 1568 when Spain's maritime supremacy, monopoly of the mineral wealth of the Americas and territorial ambitions in Europe were first challenged by the England of the first Elizabeth. In that year a heavily escorted Spanish ship, taking a million gold ducats as pay for the Duke of Alba's troops in Flanders, was molested and the feud was on. Twenty years of cut and thrust culminated in "The Enterprise of England". We are given details of the preparation for this famous operation, descriptions of ships and crews, their many set-backs, hopes and fears for the success of the expedition and, finally, the battle in the English Channel and the subsequent dispersal of the Armada itself.

Many times must the story of this fight and the loss of so many ships and lives, largely due to weather, have been told but never, in the opinion of the reviewer, can it ever have been told so thoroughly and realistically.

To this is added, in the second part of the book, the equally exciting story of the months of patient research and sub-aqua work which led to the discovery of the wreck of the *Girona* herself.

The author tells us that it was in 1958 that he first heard her mentioned and immediately his imagination was caught by her story. "My blood was up! Battles, storms, five crews, the noblest, richest, bravest men in the whole fleet, jammed with all their treasures into one ship. Three wrecks in succession! At least 1,000 dead! This is what tragedy was made of, what romance was made of. This was what treasures were made of." Nine years afterwards, in June 1967, he found her; the treasure which he found, some of it illustrated in the 60 photographs, both in colour and black and white, is now housed safely in the Ulster Museum, Northern Ireland's National Museum. But the author says that much still remains to be done because, from some 12,000 pieces, "I must extract every bit of information they can still yield—about the galleass and her passengers, about life aboard, about the technical skills and the art of the period and, having done that, I must publish it all. After that we will all set off together to a new wreck."

Certainly a book which must be read.

L.B.P.

The Polar Rosses: John and James Clark Ross and their Explorations, by Ernest S. Dodge. 208 mm x 140 mm, pp. 260, *illus.* Faber & Faber Ltd., 3 Queen Square, London WC1N 3AU, 1973. Price: £2.95.

Self-depreciation is said to be a British national characteristic and when one considers that no biography of Sir John Ross or of his nephew Sir James Clark Ross appeared until each had been dead for more than a century, and then not from a British pen, one must grant that there is some truth in the saying. But Dr. Dodge, Director of the Peabody Museum of Salem, Massachusetts, is a maritime historian of unimpeachable authority and has given us a wholly unbiased account of the lives and times of these two great Scotsmen.

Little seems to be known of the early lives of either of them and the elder, John Ross, was already a war-scarred veteran, thirteen times wounded in the French wars and now looking forward to an honourable retirement when, in 1817 at the age of 40, quite old enough to be going north in those days, he was called upon to lead an Admiralty expedition in search of the North-west Passage, a dream which had been handed down since Elizabethan times. The driving force behind the idea was now John Barrow, Second Secretary at the Admiralty, who later organized many another expedition of the same nature. For little apparent reason there seems to have sprung up between the two men an animosity which was to last for the rest of their days, though at times the co-operation between them was quite remarkable.

John Ross took in the leading ship *Isabella*, 385 tons, the favourite nephew, 23 years his junior, whom he had groomed for a career in the Royal Navy; the second ship of the expedition was the *Alexander*, 252 tons, and the story really starts here.

James Clark Ross, the nephew, after this first voyage to the Arctic with his uncle, made four Arctic expeditions under Parry. He then, as a mature Arctic explorer, joined his uncle's second expedition during which he determined the position of the North Magnetic Pole. This expedition spent four and a half continuous years in the Arctic and was generally given up for lost. "Rescue", says the author, "brought honours, work and squabbles—the harvest of fame."

Later, James Clark Ross conducted the first systematic magnetic survey of the British Isles and, indeed, became the acknowledged expert on terrestrial magnetism. When, in the late 1830s, the Admiralty turned its thoughts towards the Antarctic, principally with a view to carrying out a magnetic survey in high southern latitudes, he became the obvious choice to lead an Antarctic expedition. This was mounted in two ships, the *Erebus* and the *Terror* which left in late September 1839. When they returned four years and five months later they had fulfilled the main purpose of the expedition, the magnetic survey, and had also made many geographical discoveries of the utmost importance, the most spectacular of which was undoubtedly that of the great Ross Ice Barrier. This was the last great voyage of discovery made solely under sail and Ross's ships were free from scurvy and other illnesses; he brought home healthy men just as his uncle had done.

As Ross returned from the Antarctic, Sir John Franklin (whom he had met in Tasmania as Governor during his late expedition) was, at the age of 58, preparing to go north again; the story of that tragic expedition and the subsequent search has been well documented and among those who went north to attempt rescue were old Sir John Ross at the age of 73 and his nephew approaching 50, working separately this time and at different seasons.

This is a book about the Heroic Age of Exploration and we should be grateful to Dr. Dodge for writing such a story whilst there is still time. Piquancy is often added to the narrative by mention of the frequent quarrels which sprang up over the ordering of the expeditions but, as the author so rightly says of the long feud between the elder Ross and Barrow, "one cannot give space to the acrimonious controversy of ageing and implacable enemies". Let the Admiralty charts of the Polar regions have the last word on this; the names Ross, both John and James, together with Barrow and many others of their generation frequently appear on them, all feuds forgotten, in token of the greatness of them all.

Only one minor irritation can the reviewer find throughout the book; on the map of Antarctica on page 197 the British territory of Graham Land is styled Palmer Peninsula after the American fashion. One hopes that the current proposal to rename this piece of land Antarctic Peninsula will settle this difference, if difference it be, once and for all.

In an enlightening preface the author pays tribute to the various authorities whom he consulted or who gave him facilities for his extensive researches. Prominent among these is the Scott Polar Research Institute at Cambridge; no doubt he consulted the meteorological records kept in the many ships mentioned in this book, from H.M.S. *Briseis* in 1812, James Clark Ross's first voyage at the age of 12 with his uncle, to those from the *Erebus* and the *Terror* covering the Antarctic venture 1840-43, all of which we deposited with that Institute in 1960-61 when the Marine Branch of the Meteorological Office moved to Bracknell.

L.B.P.

Interpreting the Weather, by Ingrid Holford. 224 mm × 142 mm, pp. 175, *illus.* David & Charles (Holdings) Ltd., South Devon House, Newton Abbot, Devon, 1973. Price: £3.25.

This is an attempt to produce a 'do-it-yourself' manual on Weather Forecasting, useful to the gardener, painter, yachtsman and "anyone interested in the world around him".

Trying to condense such a vast subject as meteorology into one small volume and avoiding any scientific treatment has resulted in a collection of chatty notes and jottings. These deal with most of the aspects of weather as it affects our activities but the explanations are, at times, peculiar to the author. Some of these will confuse the reader and one or two will mislead him.

In the second chapter, for example, in dealing with the transfer of heat by radiation and conduction, we read that water is suitable for cooking since it is a good conductor of heat and that the slow rise of temperature of the sea in summer is due to the spreading of the sun's heat through a considerable depth since the water is a good conductor! One wonders if the waves know anything about this and if school children are still shown the experiment of water boiling at the top of a test-tube while ice remains unmelted at the bottom.

That the idea of taxes and subsidies can explain the effects of ascent and descent on air temperatures or that cutting down the sides of beakers can make the phenomena of condensation and dew formation more readily understood by the novice passes my simple mind. Similarly the statement in Chapter 7 that it is the absence of hoar frost which decides when temperatures below 0°C give an air frost is equally questionable. The author knows, and the meteorologist infers, what these vague descriptions mean but the non-expert reader is surely made more confused.

Chapter 13, dealing with Isobaric Patterns, is good enough to erase the memory of all that which has annoyed one before and it could well be expanded with much benefit to the viewers of the TV Weather Man and the readers of those papers which publish a synoptic chart.

The chapters following again fall to the level of those of the earlier part of the book. The instructions on how to draw a Weather Chart, using only the data provided in the Shipping Bulletins broadcast on Radio 2, is not an exercise which one can endorse. Making a chart for amusement is one thing; using it to make decisions on whether to sail or not is vastly different.

Only two errors appear to have escaped the eye of the proof-reader: on page 30 we learn that a water barometer would need to be 960 inches high while on page 123, line 5, 'east' should be replaced by 'west'. Apart from these blemishes the standard

of printing and the reproduction of photographs fully justify the high regard one has for this publishing firm, but it is doubtful if this is sufficient to compensate for the price.

F.J.A.

Personalities

OBITUARY.—We regret to record the death, at the age of 77, of DR. J. N. CARRUTHERS of the National Institute of Oceanography.

Virtually unknown, even by name, to any but a few voluntary marine observers, Dr. Carruthers had nevertheless made no small contribution to their professional welfare in Chapters 19–26, the section on Oceanography, which he wrote specially for *Meteorology for Mariners*.

James Norman Carruthers had been a student at Nottingham University College for barely a year when World War I broke out; like so many of his generation he was a ready volunteer and joined the Highland Light Infantry as a Private. Commissioned in 1917, he was seriously wounded in the German offensive of March 1918. He returned to his study of geology at Leeds University after his discharge and in 1920 graduated with 1st Class Honours.

He then joined the scientific staff of the Fisheries Laboratory at Lowestoft where he became an expert in the water movement of the North Sea and the English Channel. He devised a very efficient, though surprisingly simple current-meter to secure continuous recordings of the flow of water past moored light-vessels; the information gained from this programme is still being used. His persistence did much to keep physical oceanography going in England during the years of the great depression when it found little support.

On the outbreak of World War II he was appointed to the civilian staff of the Hydrographic Department of the Admiralty where his unique and profound knowledge of water movement, temperature layering and underwater topography, together with his remarkable memory for the literature pertaining to each, became increasingly valuable as the war progressed from the initial stages of mine-laying in tidal waters to the underwater operations and beachhead landings which marked the turn of the Allied fortunes. When peacetime research could again be visualized Dr. Carruthers took a prominent part in the documentation and discussions which led to the post-war formation of the National Oceanographic Council and the National Institute of Oceanography.

At the end of the war in Europe Dr. Carruthers went with the Allied Control Commission to Germany where he literally dominated the proceedings which led to the restoration of marine sciences in Germany and the foundation of the new Deutsches Hydrographisches Institut. In gratitude for this the University of Hamburg later conferred on him the Diploma and Gold Medal of its Citizenship of Honour.

Dr. Carruthers went to the National Institute of Oceanography in 1953 as Assistant Director and continued his studies of water movement. He devised a number of instruments for measuring currents, always striving for the most elementary principles of construction and operation, readily understood and easily made. In 1964 he was awarded the Albert I Medal of the Institut Océanographique of Monaco. He had been a member of the Challenger Society since 1923 and in 1965 was elected an Honorary Life Member. In 1972 he was elected to an Honorary Life Fellowship of the Royal Geographical Society.

In addition to the Oceanographical Section of *Meteorology for Mariners* referred to above, Dr. Carruthers had also contributed occasional papers to *The Marine Observer*: in the January 1939 number an account of the exceptional tidal streams in the southern North Sea and English Channel of February 1938 when the sea

burst over the low lying coastland at Horsey in Norfolk causing considerable flooding; in the July 1939 number an article concerning water movements past certain light-vessels in the southern North Sea and eastern English Channel under different wind conditions during the winter of 1938-39; and in the January 1951 number an article on the water movements at the North Goodwin Light-vessel; all of these articles contained tabular data gathered by his current-meters. He also contributed a paper concerning the Horsey floods of February 1938 to our shore-tide contemporary the *Meteorological Magazine*, in May 1938.

We extend our sympathy to his widow and family of three generations.

L.B.P.

OBITUARY.—It is with much regret that we record the death on 25th February of COMMANDER M. CRESSWELL, R.N.R. in Durban where he had lived in retirement for many years.

Mortimer Cresswell retired in June 1956 after nearly 32 years' service as Port Meteorological Officer at Liverpool. The death of his wife a few months previously had been a great shock to him.

Mortimer went to sea in 1907, serving his apprenticeship in Crawford and Rowat's sailing ships. His first ship was the full-rigged ship *Port Crawford* in which he served for two years. He finished his apprenticeship in the four-masted barque *Port Caledonia*. He continued as an officer in sail until passing for Master in 1914. From 1914 to 1918 he served in the Royal Navy as navigating officer in the 10th Cruiser Squadron, and latterly in command of patrol vessels. In 1919 he passed for Extra Master, Square Rig, and joined the Canadian Pacific Steamship Company as 4th Officer. He continued in their service until his resignation in October 1924 to take up his appointment with the Meteorological Office.

No doubt Mortimer Cresswell is still remembered by many who knew him as Port Meteorological Officer at Liverpool.

We extend our sympathy to his family.

A.D.W.

OBITUARY.—We regret to record the death of CAPTAIN R. O. VENN which occurred suddenly whilst he was on leave from the *Atlantic Causeway*.

Reginald Owen Venn was born in Bury in 1913 and signed indentures with Manchester Liners in April 1930, his first ship being their *Manchester Merchant*. He passed for 2nd Mate in 1935 and was appointed to the *Manchester Producer*.

After leaving Manchester Liners, he spent some time in a ship engaged in blockade-running during the Spanish Civil War but he joined the Royal Fleet Auxiliary early in 1939, serving as 3rd and 2nd Officer in the *War Sirdar* until she was torpedoed in 1942. He passed for Master in 1943 and then joined the Cunard Line as 3rd Officer of the *Mauretania*. The following year he was appointed 2nd Officer of the *Queen Mary*.

After the war he served as Chief Officer of the cargo ships *Fort Miami* and *Hillcrest Park* but returned to passenger ships in 1949. In April 1964 he was promoted to command the *Media*.

In the middle 1960s he was appointed Master of the *Scotia*; this new ship was ice-strengthened for trading in the St. Lawrence River during the winter months. He gained quite a reputation in shipping circles in Montreal and Quebec because of his skill in handling her in the ice. During the winter of 1967-68 the *Scotia* was icebound in Montreal until the spring thaws.

Captain Venn went back to the cargo fleet as Master of the *Atlantic Causeway* in 1970, thence he went to the *Atlantic Conveyor* and returned to the *Causeway* early in 1973.

Captain Venn enjoyed a high reputation. A shipmate and friend of many years

with whom he had served his time writes, "Reggie was basically a retiring, simple man who was proud of his Lancashire background and scorned any kind of personal aggrandizement. Hardly ever was his voice raised in anger and, in the 43 years that it was my privilege to know him as a friend, I cannot recall any of his ship-mates ever speaking badly of him. He was loved equally by his officers and men. The Western Ocean has lost a fine seaman."

Captain Venn sent us his first meteorological logbook in May 1936 when he was in the *Manchester Producer*; his first Cunard Line book came in 1946 from the *Queen Elizabeth*. In all he had observed for us in 15 separate years and had sent us 34 meteorological logbooks in that time.

We extend our sympathy to his widow.

L.B.P.

OBITUARY.—It is with deep regret we record the death of SKIPPER E. A. WOOLDRIDGE at his home at Cottingham on 9th January 1973.

Edward Arthur Wooldridge was born in Hull on 11th November 1912 and came of seafaring stock. He went to sea as a 'Deckie Learner' at the age of 15 with Pickering & Haldane's Steam Trawling Company Ltd. He continued to serve with the same company although, due to mergers, it later became known as Lord Line Ltd., Hellyer Brothers Ltd. and finally British United Trawlers Ltd.

He obtained his Skipper's Certificate on 9th May 1938 and later that same year his first command, the *Lord Austin*. With the onset of World War II he served as Skipper Lieutenant R.N.R. and was involved in the siege of Tobruk. Following the war Skipper Wooldridge returned to trawling, commanding several trawlers including the *Lord Ancaster*, *Lord Mountevans*, *Lord Beattie*, *Lord Alexander* and *Portia*.

In November 1966 he took command of the stern freezer trawler *Orsino* on her maiden voyage, in which he continued to serve until illness forced him to come ashore six months prior to his death. On the *Orsino*'s first voyage he picked up 10 survivors on Christmas Day from the burning Hull trawler *St. Finbarr* and took her in tow. Unfortunately his valiant attempt to tow her to safety failed when the *St. Finbarr* later sank. Skipper Wooldridge held the distinction of being the Skipper to command Britain's first Trawler Weather Advisory Service Vessel, when the converted *Orsino* spent the winters 1968/69 and 1969/70 off north-west Iceland.

Skipper Eddie Wooldridge was one of the best known and respected Skippers sailing out of Hull and, despite the pressures of his duties, was always prepared to make time available for a friendly word and discussion about meteorology in which he was keenly interested. His record of voluntary observing was all from the *Orsino* and during the four years he sent us 16 logbooks and received an Excellent Award in 1972.

Our sincere condolences are extended to his widow, daughter and two sons in their sad bereavement.

W.G.C.

RETIREMENT.—CAPTAIN P. L. HOPKINS has left the sea owing to imperfect eyesight.

Peter Lloyd Hopkins was born in London from a line of seafaring ancestors on both sides, his father's going back to the last century.

In 1942 he joined the Anglo-American Oil Co. as a cadet in their m.v. *F. J. Wolfe*. She was a large tanker for those days, of 18,000 tons, and she was then sailing with convoys in order to replenish their escorts at sea. This was all on the North Atlantic run and later in the Leyte Gulf area. He was torpedoed in her in September 1942 during his second voyage but she made port and he remained in her for the next four years.

In 1946 he passed for 2nd Mate and was appointed 3rd Officer of the *Empire Tagalam*, belonging to the same company which was later to be known as the Esso Petroleum Company.

Captain Hopkins passed for Master in 1951 and in 1954 he joined the Silver Line as Chief Officer in their oil-tanker fleet. Command came to him in 1957 when he was appointed to the *Silverbrook*.

Captain Hopkins's record of observing for us goes back to March 1947 when he sent us a meteorological logbook from the *Esso Glasgow*; his first returns from a Silver Line ship came from the *Silverbrook* in 1958 and since then we have had meteorological logbooks from him in every year. He received Excellent Awards in 1948, 1959, 1962, 1963 and 1973.

We wish him health and happiness and fulfilment of his wish, for congenial employment in some other sphere.

L.B.P.

RETIREMENT.—LIEUTENANT COMMANDER E. R. PULLAN, R.D., R.N.R., Port Meteorological Officer at Liverpool, retired on 20th June.

Edwin Ronald Pullan was born in Yorkshire in 1911 and commenced his sea career in 1927. After serving his apprenticeship with the Hain Steamship Company he joined the Blue Funnel Line and continued in their service until he left the sea in 1949 on medical grounds and joined the Meteorological Office as a Senior Scientific Assistant.

In 1956 Pullan was the successful candidate in a Civil Service competition to fill a vacancy for a Nautical Officer in the Meteorological Office and was posted to Southampton as Port Meteorological Officer. After seven years as P.Met.O. Southampton he was posted to Hull in the same capacity. In 1967, on promotion to Senior Nautical Officer, he went to Liverpool as Port Meteorological Officer.

As a Royal Naval Reserve Officer Pullan did his long training in submarines and when hostilities were declared in 1939 he was called up for service in the Royal Navy and appointed navigator of the 'River' class submarine *Severn*. After twelve months' service in submarines he was appointed to the light cruiser H.M.S. *Dragon* as a watchkeeper and while serving in this ship was severely wounded in the Dakar engagement. On recovery from his injuries he joined the anti-aircraft cruiser H.M.S. *Tynwald* and was again wounded, during the North African landings, when the ship was sunk by enemy action. He was subsequently lent to the Royal Indian Navy and appointed in command of H.M.I.S. *Travancore* employed on convoy escort duty in the Indian Ocean. On demobilization in 1946 he returned to the Blue Funnel Line.

During his service at sea Pullan served in a number of voluntary observing ships and always took a great interest in meteorology.

We wish him a long and happy retirement and hope that his health will improve sufficiently to allow him to again enjoy fly-fishing, his favourite recreation.

Mr. W. G. Cullen, Port Meteorological Officer at Hull since October 1967, has succeeded Lt.-Cdr. Pullan at Liverpool.

A.D.W.

RETIREMENT.—CAPTAIN A. D. WHITE, R.D., Deputy Marine Superintendent in the Meteorological Office for the past eighteen years, has retired.

Arthur Denis White was born in Hampstead and went to sea in 1926, serving his time with Furness Withy & Co. He continued in their service after passing for 2nd Mate in 1930, mainly in the North Pacific trade.

After passing for Master in 1937 he joined the Union-Castle Line and was appointed 4th Officer of their *Garth Castle*. In the years before the war he sent us meteorological logbooks from the *Dunvegan Castle*, *Arundel Castle* and *Caernarvon Castle*.

White had joined the Royal Naval Reserve as a probationary Sub-Lieutenant in 1932 and had been through all the prescribed specialist courses and periods of sea time in H.M. Ships. In September 1939 he was called into the Royal Navy for World War II which he spent mostly in command of convoy escort vessels in the North Atlantic with the exception of six months on the staff of the Royal Naval College, Greenwich and short periods of duty in the Mediterranean and South Atlantic. During this phase, in 1942 when in command of H.M.S. *Orchis*, he was mentioned in despatches and was awarded the Royal Naval Reserve Officers' Decoration in 1943; a clasp to this decoration came in 1955.

White took part in the Norwegian Campaign and the Allied landings on the Normandy beaches in the summer of 1944. After this he went to the Far East in command of H.M.S. *Hind* and was present at the Japanese surrenders in Hong Kong and Shanghai.

He returned to the Union-Castle Line in 1946 and left them, as Chief Officer in their Cape Mail service, in 1953 to take command of H.M. Revenue Cruiser *Vigilant*. He was in her two years until, in 1955, he joined the Meteorological Office as Senior Nautical Officer and Deputy Marine Superintendent.

Captain White is a Liveryman of the Honourable Company of Master Mariners, a Member of the Court of Assistants of the Company and a Freeman of the City of London.

We wish him health and happiness in his retirement.

Captain G. V. Mackie, from our Weather-routeing Service, succeeds Captain White as Deputy Marine Superintendent.

L.B.P.

RETIREMENT.—CAPTAIN R. M. WRIGHT, Commodore of the British and Commonwealth fleet retired on the 1st May.

Ronald McMillan Wright was born in Greenock in 1910 and spent his early life at Millport on the Isle of Cumbrae where he still lives. As a youngster much of his time was spent afloat, fishing and sailing in the waters of the Firth of Clyde so perhaps it was not surprising that he decided on a sea career.

He went to sea in 1928, serving his apprenticeship in Hogarth's *Baron Fairlie* and stayed with this company until he passed for Master in 1939. He joined the Union-Castle Line the same year and was appointed 4th Officer of the mail ship *Arundel Castle*. By 1952 he had reached the rank of Chief Officer in the Cape Mail ships after service as 3rd, 2nd and 1st Officer of several of the company's passenger and cargo ships. His first command came in 1957 when he was appointed master of the cargo ship *Riebeeck Castle*. In 1954 he was appointed master of the passenger ship *Braemar Castle* and subsequently made several voyages as relieving master of the cruise ship *Reina del Mar*; and in 1969 was appointed her permanent master. In August 1970, coinciding with his appointment of Commodore of the B. & C. fleet, he was appointed master of the 36,000 ton *Windsor Castle*.

Captain Wright's association with the Meteorological Office goes back to 1939 when he was 4th Officer of the *Arundel Castle* and, during nearly 24 years as a Voluntary Observer, 25 meteorological logbooks have been returned bearing his name as Master or Observing Officer. Many of these logbooks were classed Excellent. He received Excellent Awards in 1968 and 1973.

Captain Wright's interests include photography, fishing, sailing, cycling, walking and bird-watching so he has plenty to occupy his time. We wish him good health and happiness in retirement.

A.D.W.

Fleet Lists

GREAT BRITAIN (Information dated 31.3.73)

The following is a list of British ships which have been equipped with instruments and which voluntarily co-operate with the Marine Division of the Meteorological Office. The names of the Captains, Observing Officers and Senior Radio Officers are given as ascertained from the last written returns received. The date of receipt of the last return received is given in the second column; an asterisk indicates a new recruitment who has not yet sent in a logbook.

All returns received from observing ships will be acknowledged, direct to the ship, by the Marine Superintendent of the Meteorological Office.

The Port Meteorological Officers will make personal calls on the Captains and Observing Officers as opportunity offers, or on notification from the ship at any time when their services are desired.

Excellent Awards are made at the end of each calendar year. The names of the Captains, Principal Observing Officers and Senior Radio Officers gaining these awards are published each July in *The Marine Observer*.

It is requested that prior notification of changes of service, probable periods of lay-up, transfer of Captain or other circumstances which may prevent the continuance of voluntary meteorological service at sea, may be made to a Port Meteorological Officer or to the Marine Superintendent of the Meteorological Office at Bracknell.

Captains and Officers are invited to point out any errors or omissions which may occur in the list.

Selected Ships

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Acacus</i>	6.3.73	C. Close	I. A. Campbell, A. P. Shenton	H. Finlay	Shell Tankers (U.K.) Ltd.
<i>Act 1</i>	15.1.73	J. R. dit-Leschery	B. E. Langman, D. D. Turner, J. Hinchliffe	J. V. Horsburgh	Associated Container Transportation Ltd.
<i>Act 2</i>	19.3.73	D. M. McPhail	T. D. Mackay, A. Pritchard, J. M. Harger	D. Owens	Associated Container Transportation Ltd.
<i>Act 6</i>	*	R. A. Holmes	P. W. Ings, —, Hogg, —, Hampson	H. Jefferson	Associated Container Transportation Ltd.
<i>Adelaide Star</i>	6.3.73	C. P. Leighton	J. E. Clayton, R. S. Downie, C. R. Mundy	W. A. Wade	Blue Star Line Ltd.
<i>Adventurer</i>	29.11.72	H. S. Bladon	M. Stoddart, R. B. Cox, M. R. Rutter	D. Daly	T. & J. Harrison Ltd.
<i>Albright Explorer</i>	3.11.72	J. Wise	G. R. Walker, M. Rossiter, W. Coull	W. P. Edmunds	James Fisher & Sons Ltd.
<i>Albright Pioneer</i>	22.3.73	J. Wise	C. Bell, J. S. Northcott, R. Berry	W. D. Brown	James Fisher & Sons Ltd.
<i>Alert</i>	15.3.72	J. P. Ruddock, O.B.E.	R. L. Cheshire, W. T. Selby, D. T. Kirkwood	C. G. Macaulay	Post Office
<i>Alinda</i>	27.6.72	P. I. Blackshaw	K. Jones, B. Wilson, J. H. Clamp	D. W. McIntyre	Shell Tankers (U.K.) Ltd.
<i>Amalric</i>	12.1.73	G. Roberts	C. Livingstone, C. B. Taylor, K. Whittaker	I. Lamb	Shaw Savill & Albion Co. Ltd.
<i>Amara</i>	30.10.72	E. I. Plater	J. P. Simcox, D. Toomer, A. W. Abbott	T. F. McCarthy	Moss Hutchison Line Ltd.
<i>Amastrea</i>	24.2.72	D. M. C. Renton	A. Joyce, R. C. Ray, R. Aitken	J. O'Donoghue	Shell Tankers (U.K.) Ltd.
<i>America Star</i>	*	J. Noyon	R. J. Payne, P. J. Watson	T. R. K. Bermingham	Blue Star Line Ltd.
<i>Amoria</i>	20.9.71	D. A. Laidler	J. Moxley, P. A. Cocker, L. H. McBain	J. A. Phelan	Shell Tankers (U.K.) Ltd.
<i>Anadara</i>	29.3.73	G. Anderson	J. W. A. Campbell, P. K. S. Neale	P. M. Weldon	Shell Tankers (U.K.) Ltd.
<i>Anniaty</i>	10.1.73	D. G. Munro	E. J. Williams, E. J. Watterson, A. C. G. Leach	I. Kane	F. T. Everard & Sons Ltd.
<i>Antiochus</i>	17.1.73	J. R. Teare	I. Chidiav, J. Jackson, —, McConville	P. Duffy	Ocean Fleets Ltd.
<i>Antrim</i>	20.2.73	N. Luck	A. P. Lowe, A. Betts, Z. Greber	I. Kane	P. & O. S.N. Co.
<i>Araluen</i>	11.12.72	D. Dickinson	M. J. Marsh, C. Ennis, B. Spiller	A. MacLeod	Trinder Anderson & Co. Ltd.
<i>Argyllshire</i>	22.3.73	G. S. Cochran	K. D. Kordt, A. Peter, W. Kimberley	I. Newman	Trinder Anderson & Co. Ltd.
<i>Armadale</i>	22.3.73	F. I. Adams	H. R. P. Baker, T. Chantler, I. Stewart	P. Kelly	Frank C. Strick & Co. Ltd.
<i>Armanistan</i>	14.12.72	N. Wray	H. Holmes, J. Liddle, J. McEwan	S. Musgrave	J. & J. Denholm Ltd.
<i>Asiafreighter</i>	*	G. E. Mayne	D. E. MacIver		
<i>Asialiner</i>	24.1.73	G. E. Mayne			J. & J. Denholm Ltd.

<i>Asprella</i>	..	15.3.73	H. G. Sangster	..	G. Caldecott, A. Browne, B. A. Royle	..	B. Gibbons	..	Shell Tankers (U.K.) Ltd.
<i>Athelchief</i>	..	6.10.72	J. M. Jones	..	R. J. Williams, G. J. H. Peatson, M. StE. Cardew	..	F. A. Dunn	..	Athel Line Ltd.
<i>Atlantic Causeway</i>	..	21.3.73	R. O. Venn	..	R. G. Brooks, P. G. Dunford	..	M. A. Johnson	..	Cunard-Brocklebank Ltd.
<i>Atlantic Conveyor</i>	..	17.1.73	D. L. des Landes	..	A. G. Gibb, M. K. Thet, M. R. Hardmeat	..	G. L. Ball	..	Cunard-Brocklebank Ltd.
<i>Auckland Star</i>	..	15.11.72	E. J. Jones	..	J. Percival	..	R. F. Seward	..	Blue Star Line Ltd.
<i>Aureol</i>	..	20.3.73	D. Campbell	..	P. Thackstone, C. Ingledew, R. F. Perkins	..	J. Green	..	Ocean Fleets Ltd.
<i>Australind</i>	..	4.12.72	I. D. Blake	..	D. Cox, B. Bell, S. Fraser	..	J. Green	..	Trinder Anderson & Co. Ltd.
<i>Author</i>	..	21.2.73	T. Wilson	..	I. Shaw, P. Cavanagh, W. Pugsley	..	A. Irwing	..	T. & J. Harrison Ltd.
<i>Avonfield</i>	..	6.11.72	M. A. Wilson	..	A. P. Sweeney, A. C. McCulloch, R. P. Stevenson	..	J. J. McRory	..	Hunting & Son Ltd.
<i>Baharistan</i>	..	22.1.73	R. L. Andrews	..	K. Crawford, J. R. Smith, P. S. Hardy	..	E. Smith	..	Frank C. Strick & Co. Ltd.
<i>Barnburgh Castle</i>	..	26.8.71	J. Hetherington	..	D. Houston, A. MacLeod, C. G. Stephenson	..	G. Walker	..	W. A. Souter & Co. Ltd.
<i>Baron Ardrossan</i>	..	1.1.73	M. Turton	..	C. S. MacDonald, J. S. Johnstone, M. F. Kelly	..	F. A. McNulty	..	Scottish Ship Management Ltd.
<i>Baron Cawdor</i>	..	16.2.72	I. H. Tyrrell	..	M. K. Austin, F. Bisset, K. Ellis	..	R. Faulds	..	Scottish Ship Management Ltd.
<i>Barrister</i>	..	7.12.72	G. Lovell	..	T. D. Faithfull, A. Mackie	..	F. C. Murrant	..	Scottish Ship Management Ltd.
<i>Beechbank</i>	..	23.6.72	H. Barber	..	H. Towers, C. M. Ashton	..	A. K. Watson	..	T. & J. Harrison Ltd.
<i>Beechwood</i>	..	31.7.72	G. B. Ireland	..	J. T. H. Carrwright, P. J. Barratt	..	O. Ismail	..	Bank Line Ltd.
<i>Bellerophon</i>	..	27.10.72	J. C. Morris	..	J. E. MacCobb, A. D. Paterson, H. M. MacNeil	..	A. Brown	..	John I. Jacobs & Co. Ltd.
<i>Belnes</i>	..	10.10.72	N. Campbell	..	R. G. N. Aiken	..	A. Dunbar	..	Ocean Fleets Ltd.
<i>Benader</i>	..	5.3.73	K. H. Hardie	..	G. Buckley, J. Main, G. Taylor	..	A. McGilvray	..	I. & J. Denholm Ltd.
<i>Benarly</i>	..	23.3.73	A. Sinclair	..	D. A. Gunn, J. V. Steel, R. S. Basford	..	J. Kelly	..	Ben Line Containers Ltd.
<i>Benatow</i>	..	1.1.73	R. C. Thomas	..	P. I. Ewart, J. Fleming, F. G. Walker	..	G. W. Dickson	..	Ben Line Steamers Ltd.
<i>Benavon</i>	..	4.9.72	J. R. Morrison	..	R. A. Dewar, I. Aitchison, A. J. M. Greig	..	A. Gordon	..	Ben Line Steamers Ltd.
<i>Bencarn</i>	..	4.1.73	W. C. S. Spencer	..	R. Hay, B. C. Spaven, M. Wills	..	D. N. Barlow	..	Ben Line Steamers Ltd.
<i>Bencruachan</i>	..	26.10.72	K. R. Wilson	..	A. H. Glen, N. M. Wight, A. V. Thomson	..	R. Sadler	..	Ben Line Steamers Ltd.
<i>Bendearg</i>	..	7.3.73	R. E. Cowie	..	D. Keillor, D. I. Nesbit, M. K. Judson	..	N. A. Lawrence	..	Ben Line Steamers Ltd.
<i>Bendoran</i>	..	18.4.72	D. E. Ross	..	J. Pirkliss, G. Harfoot, R. Maxwell	..	W. J. M. Campbell	..	Ben Line Steamers Ltd.
<i>Benefactor</i>	..	17.11.72	W. G. Jackson	..	D. I. Leece, A. J. M. Wilson, I. W. Henderson	..	F. Smythe	..	T. & J. Harrison Ltd.
<i>Benlawers</i>	..	22.3.73	W. D. Cowie	..	J. H. Third, G. Byers, W. A. Horsbrough	..	H. E. Brookfield	..	Ben Line Steamers Ltd.
<i>Benledi</i>	..	5.2.73	C. Donnelly	..	J. M. Groat, W. M. Kay, I. Finlay	..	P. Mannion	..	Ben Line Steamers Ltd.
<i>Benlomond</i>	..	24.1.73	A. D. Hay	..	T. D. Corbett, D. Bremner, A. J. Sandison	..	D. J. Worth	..	Ben Line Steamers Ltd.
<i>Benreoch</i>	..	3.1.73	R. S. Schofield	..	W. D. Rutland, M. L. C. Reynolds, A. O. Dundas	..	W. Parkinson, M.B.E.	..	Ben Line Steamers Ltd.
<i>Benrines</i>	..	8.11.72	J. S. Lumsden	..	M. E. Harris, D. D. Sutherland, G. McDonald	..	W. Patterson	..	Ben Line Steamers Ltd.
<i>Benstac</i>	..	13.9.71	J. R. Rodger	..	T. V. Roberts, J. I. Brown, R. Arkless	..	J. J. Daly	..	Ben Line Steamers Ltd.
<i>Benvennoch</i>	..	20.6.72	J. D. Pryde	..	L. S. Gibbins	..	G. R. Kerr	..	Booth S.S. Co. Ltd.
<i>Benwick</i>	..	21.6.72	J. P. Evans	..	P. C. O. Uzor, R. P. Willis, A. Afatay	..	S. J. Singleton	..	Ocean Fleets Ltd.
<i>Bhano</i>	..	21.6.72	D. G. Brown	..	P. A. Southworth, C. H. Allister, S. Monk	..	G. Tyrrell	..	Booth S.S. Co. Ltd.
<i>Boniface</i>	..	21.6.72	I. S. Garrett	..	P. A. Southworth, I. D. Watson, S. Ross	..	A. P. Moss	..	Booth S.S. Co. Ltd.
<i>Booker Venture</i>	..	21.2.73	R. McKechnie	..	C. H. James, P. J. Donnelly, H. M. Bares	..	D. T. Blockley	..	Booker Line Ltd.
<i>Border Castle</i>	..	12.9.72	C. L. Southcombe	..	T. D. Johnson, T. R. Nicholls	..	G. Minay	..	Booker Line Ltd.
<i>Border Shepherd</i>	..	3.2.72	T. W. Y. Dowson	..	K. W. S. MacMillan, B. V. Chipperfield	..	J. Ryan	..	Common Bros. Ltd.
<i>Bolany Bay</i>	..	9.3.73	J. K. Blackburn	..	K. M. Calladine, J. Parker, J. D. Bailey	..	W. Kay	..	Common Bros. Ltd.
<i>Brandon Priory</i>	..	2.6.72	P. Saunders	..	B. D. Cramond, D. McCub, R. W. Parsons	..	B. Flynn	..	Container Fleets Ltd.
<i>Bransfield</i>	..	6.9.72	T. Woodfield	..	N. P. Colling, N. S. Schroeter, R. A. Aitken	..	H. M. O'Gorman	..	Warwick Tankers Ltd.
<i>Brasilia Star</i>	..	5.3.73	F. Pounder	..	C. T. Jamieson, J. A. Doyle, T. Waugh	..	W. Harrison	..	British Antarctic Survey
<i>Bridgepool</i>	..	1.11.72	S. C. Carr	..	D. H. Thackray, R. G. Calder, G. M. Pepper	..	D. Ball	..	Blue Star Line Ltd.
<i>Britannic</i>	..	4.10.72	J. MacKay	..	R. F. Hagley, M. Percival, D. F. Archer	..	J. A. McDonnell	..	Sir R. Ropner & Co. Ltd.
<i>British Ambassador</i>	..	6.2.73	D. Henderson	..	R. A. Forsyth, N. C. Kendall, D. Hope, M. F. Fowles	..	W. Kennedy	..	Shaw Savill & Albion Co. Ltd.
<i>British Avon</i>	..	1.12.72	P. Richards, M.B.E.	..	D. J. Pengelly, R. Schouten, F. B. Whamond	..	P. Kennedy	..	B.P. Tanker Co. Ltd.
<i>British Bombardier</i>	..	23.3.73	J. Hutchison	..	B. V. Kemp, P. T. Morris, P. Taylor, R. M. Enoch	..	E. A. McGauran	..	B.P. Tanker Co. Ltd.
<i>British Confidence</i>	..	..	D. W. Powell	..	G. C. Belsom, R. F. Fraser, J. Dunford	..	I. P. Price	..	B.P. Tanker Co. Ltd.
<i>British Cormorant</i>	..	..	J. L. Gillan	..	P. A. O'Donovan, R. G. Letchford, A. M. Smith	..	D. Edgar	..	B.P. Tanker Co. Ltd.
<i>British Fulmar</i>	..	..	W. Hare	..	..	..	A. L. Taylor	..	B.P. Tanker Co. Ltd.
	..	..	..	..	..	..	R. J. King	..	B.P. Tanker Co. Ltd.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>British Hazel</i>	•	B. H. Hughes	R. H. Burtenshaw, M. Cannon, M. Keiller	D. Lever	B.P. Tanker Co. Ltd.
<i>British Holly</i>	22.3.73	N. D. Brookes	R. F. A. Batt, J. E. Howe, P. A. Edwards	P. Stewart	B.P. Tanker Co. Ltd.
<i>British Kiwi</i>	11.12.72	R. J. Burleigh	K. P. Pickering, P. A. Martin, M. King	R. Lowe	B.P. Tanker Co. Ltd.
<i>British Liberty</i>	10.1.73	G. S. Willis	A. R. Duggins, P. W. Hillier, R. D. Wallace	P. Trant	B.P. Tanker Co. Ltd.
<i>British Maple</i>	17.1.73	A. A. Beattie	D. F. Campbell, R. J. Webber, G. N. Gaunt	R. Quinn	B.P. Tanker Co. Ltd.
<i>British Trust</i>	6.11.72	J. W. Ward	R. Jackson	S. M. McFaul	B.P. Tanker Co. Ltd.
<i>British Valour</i>	20.6.72	N. J. Packard	J. L. Stewart, M. Hustwith, P. A. O'Donovan	I. G. James	B.P. Tanker Co. Ltd.
<i>Bucleuch</i>	19.1.73	J. E. Hodgson	R. W. Hales, D. M. Swetnam, R. D. Matthews, A. C. Peace	B. Prynn	P. & O. S.N. Co.
<i>Buenos Aires Star</i>	24.1.73	R. J. McDonald	D. P. Marsh, D. W. Thomas, D. G. Wilson	B. R. Warren	Blue Star Line Ltd.
<i>C.P. Ambassador</i>	26.2.73	W. E. Williams	J. H. Arton, W. Myers, I. Smith-Wilkins	G. A. Evans	Canadian Pacific Steamships Ltd.
<i>C.P. Discoverer</i>	15.6.72	J. Hooley	D. M. Shaw, J. A. Dunlop, P. G. Davis	N. H. Prince	Canadian Pacific Steamships Ltd.
<i>C.P. Explorer</i>	27.10.72	B. O. H. Brown	P. J. Baxter, D. J. O'Neill	T. McMahon	Canadian Pacific Steamships Ltd.
<i>C.P. Trader</i>	7.3.73	I. Waling	B. G. C. Powney, M. J. Howden, M. Gray	J. K. Holland	Canadian Pacific Steamships Ltd.
<i>C.P. Voyager</i>	5.3.73	P. J. Roberts	D. C. West-Watson, W. C. Gardiner, E. J. O'Toole	N. E. Scott	Canadian Pacific Steamships Ltd.
<i>California Star</i>	19.2.73	W. Davidson	D. Moodie, R. B. Tilley, P. C. Holtby	D. Briggs	Blue Star Line Ltd.
<i>Canopic</i>	16.2.72	C. A. S. Borthwick	A. M. Powell, P. V. Hunter, G. Coleridge	P. McLaughlin	Shaw Savill & Albion Co. Ltd.
<i>Canterbury Star</i>	21.2.73	P. A. Stevens	J. H. Turner, P. M. Stacey, C. A. F. Ledson, P. M. C. Sanderson	P. S. Henderson	Blue Star Line Ltd.
<i>Cape Clear</i>	5.2.73	J. M. Mackay	R. Mullen, F. Kelly, P. Montgomery	J. Trotter	Lyle Shipping Co. Ltd.
<i>Cape Franklin</i>	14.12.72	A. B. Sutherland	L. J. Gilheoly, P. T. H. Smart, A. Weir	C. Richie	Lyle Shipping Co. Ltd.
<i>Cape Hawke</i>	•	J. Hetherington	R. S. Reid, D. Morris	T. Blair	Lyle Shipping Co. Ltd.
<i>Cape Horn</i>	6.11.72	G. W. Roger	C. Twomey, M. F. Kelly, P. Dyson	C. C. Houston	Lyle Shipping Co. Ltd.
<i>Cape Howe</i>	14.2.73	A. H. C. Strachan	R. Cullen, H. Williams, R. Wiggins	M. Cumming	Lyle Shipping Co. Ltd.
<i>Cape Nelson</i>	22.3.73	I. E. Jennings	P. J. Ritchie, A. G. Maxwell, M. Arden	L. Cameron	Lyle Shipping Co. Ltd.
<i>Cape Sable</i>	6.11.72	N. G. W. Walsh	J. W. Wright, A. G. F. Michie, C. G. P. Stephenson	C. A. Adamson	Lyle Shipping Co. Ltd.
<i>Cape Wrath</i>	14.9.72	G. Towers	P. V. Flynn, P. Richardson, D. K. Lunn	C. W. Page	Lyle Shipping Co. Ltd.
<i>Cape York</i>	22.1.73	I. I. Barclay	P. T. H. Smart, W. Kean, H. Aitchison	M. R. Palmer	Ocean Fleets Ltd.
<i>Cardigan Bay</i>	31.1.73	C. S. MacKinnon	G. C. Vickery, A. S. Jackson	S. F. Bence	Jardine Matheson & Co. Ltd.
<i>Carrel</i>	20.12.71	K. Millar	D. MacIntyre, D. Favri, R. Lyon	J. MacFarland	Shaw Savill & Albion Co. Ltd.
<i>Cedric</i>	29.12.70	J. G. Street	T. B. Miller, I. Park, R. Mallam		Natural Environment Research Council
<i>Challenger</i>	•	A. W. J. Justen	G. Coventry, A. G. Marsh, D. Noden		
<i>Chelsea Bridge</i>	3.1.72	J. J. Rose	I. N. Fraser, D. S. Fuller	J. E. Eggington	J. & J. Denholm Ltd.
<i>Cherrywood</i>	22.9.72	I. S. Cunningham	J. Baxter, W. Kennedy, J. C. Willcox	J. Gardhouse	John I. Jacobs & Co. Ltd.
<i>Cheviot</i>	18.12.72	I. Walker	S. C. Dennis, A. S. Hardy, B. C. Deer	R. M. Rigg	W. A. Souter & Co. Ltd.
<i>Cirolana</i>	22.12.72	M. R. Sutcliffe	E. N. Williams, G. Welbourne	J. Turnbull	Ministry of Agriculture, Fisheries & Food
<i>City of Auckland</i>	2.2.73	T. Rigg	J. J. G. McEnewey, D. W. Pounder, J. Harrison-Nayes	R. B. Cooper	Ellerman Lines Ltd.
<i>City of Cape Town</i>	29.12.72	D. B. Williams	M. De Silva, E. S. M. Kitching, D. C. Walker	A. W. T. Camp	Ellerman Lines Ltd.
<i>City of Colombo</i>	20.8.72	A. G. Hine	J. D. Foley, M. J. Main, M. A. Searle	E. D. Hannigan	Ellerman Lines Ltd.
<i>City of Dundee</i>	23.3.73	W. M. McGregor	M. East, R. M. Nortcliffe, W. A. MacRitchie	D. J. Crouchman	Ellerman Lines Ltd.
<i>City of Glasgow</i>	•	A. A. Jamieson	M. P. Beattie, N. H. Willott, R. S. Gibson	B. Coward	Ellerman Lines Ltd.
<i>City of Guildford</i>	6.3.73	G. H. Salter	R. S. Gibson, J. F. Blackie, W. A. MacRitchie	J. McMillan	Ellerman Lines Ltd.
<i>City of Lancaster</i>	28.6.72	T. Mallory, B.E.M.	I. W. Burton	P. J. McGill	Ellerman Lines Ltd.
<i>City of Leeds</i>	19.3.73	M. W. Hartley	D. MacPherson, I. Dorse, C. Hainsworth	H. R. Bassford	Ellerman Lines Ltd.
<i>City of Liverpool</i>	19.4.72	H. Swinney	J. M. Doddworth, D. T. Davies, G. Eyles	J. M. Mordey	Ellerman Lines Ltd.
<i>City of London</i>	14.2.73	K. B. B. James			

City of Ottawa	23.5.72	G. H. Salter	M. De Silva	C. A. Henry	Ellerman Lines Ltd.
City of Oxford	29.1.73	F. C. O'Neill	P. M. Bonney, H. Owen, T. R. Page	L. Phillips	Ellerman Lines Ltd.
City of Ripon	27.3.73	L. W. Roberts	N. C. Framton, M. J. Raisson, J. K. Wilson	M. C. Saunders	Ellerman Lines Ltd.
City of St. Albans	9.3.73	J. A. McLeod	P. J. Godding, R. Owens, E. Betts	G. Barling	Ellerman Lines Ltd.
City of Toronto	16.2.73	M. Graham	W. T. Field, R. S. Hurdling, M. J. Herring	D. C. Smith	Ellerman Lines Ltd.
City of Wellington	20.2.73	B. E. Torrance			Ellerman Lines Ltd.
City of Worcester	2.11.72	P. S. Morrison	C. W. Rapley, J. T. Bennett, D. W. Nelson	G. Barling	Ellerman Lines Ltd.
Clan Alpine	22.3.73	I. W. Bennet	F. O. Wahu, R. E. Todd, I. Cuthbertson	D. Withers	Clan Line Steamers Ltd.
Clan Grant	2.2.73	S. Hay			Clan Line Steamers Ltd.
Clan Macgillivray	12.2.73	P. R. Kent	C. Cooke, R. A. Milne, P. J. Fawcett	W. Latus	Clan Line Steamers Ltd.
Clan Macgregor	22.3.73	I. M. Shearer	W. G. MacFarland, W. B. Rebello, S. Renfree	A. Campbell	Clan Line Steamers Ltd.
Clan MacIntyre	20.3.73	E. L. Besley	R. M. Potter, J. Hancock, J. Mortimer	J. R. Parry	Clan Line Steamers Ltd.
Clan Macindoe	9.3.73	F. W. Moss	J. A. Dick, T. Petch, D. King	R. Lyon	Clan Line Steamers Ltd.
Clan Macintosh	30.10.72	T. L. Kirby	D. P. Isaac, P. Ward, S. H. Suckworth	J. R. Hubbard	Clan Line Steamers Ltd.
Clan Macintyre	2.2.73	A. A. Graham	A. P. Mauger, A. Oxley, R. A. Slack	R. Caine	Clan Line Steamers Ltd.
Clan Macintyre	1.6.72	H. J. Thorn	I. M. Scott, D. O. Tourrell, D. H. Worrin	D. C. J. Laing	Clan Line Steamers Ltd.
Clan Macnair	27.11.72	S. K. Williams	B. J. Goldworthy, N. F. Combs, J. Wallbridge	J. Wright	Clan Line Steamers Ltd.
Clan Macnair	26.9.72	W. J. Howson	A. A. Blakely, A. J. Stewart, G. M. Nduto	D. Wakeford	Clan Line Steamers Ltd.
Clan Macleay	22.3.73	W. Ross			Clan Line Steamers Ltd.
Clan Maclean	11.12.72	R. S. Olden	T. G. Whittaker, A. Rapkin, J. D. MacMartin	D. J. M. Young	Clan Line Steamers Ltd.
Clan Macleod	22.3.73	E. R. Everitt	M. J. Phillips, D. A. Hawker, S. J. Ivey	A. C. Sawyer	Clan Line Steamers Ltd.
Clan Macnab	21.11.72	A. M. Kennedy	G. C. Jenkins, R. A. Robertson, P. G. Wakeling	P. Dixon-Carter	Clan Line Steamers Ltd.
Clan Macnair	11.1.73	E. C. Martyn	M. Barnett, J. Macauley, E. Martin	C. E. G. Pratt	Clan Line Steamers Ltd.
Clan Macnair	22.11.72	T. D. Young	C. R. Vackman, D. S. McWilliam, P. G. T. Atkinson	J. MacNeil	Clan Line Steamers Ltd.
Clan Matheson	22.3.73	K. Morton	G. M. S. Olotci, D. T. King	N. C. Ellis	Clan Line Steamers Ltd.
Clan Menzies	15.1.73	C. De F. Hedges		E. I. Kelly	Clan Line Steamers Ltd.
Clan Ramsay	2.11.72	J. K. Currie	R. Kamau, J. P. Madge, A. H. Fussell	J. A. Cardownie	Clan Line Steamers Ltd.
Clan Ronald	22.3.73	G. Beaumont	E. Kanjo, A. M. McMillan, N. G. Precious	I. Shaw	Clan Line Steamers Ltd.
Clan Robertson	24.10.72	F. G. King	J. S. Price, H. Cameron, J. H. Leonard	G. MacDonald	Clan Line Steamers Ltd.
Clan Ross	10.11.72	D. H. MacMillan	W. M. Ouko, C. Green, J. Simpson	J. L. Spanner	Clan Line Steamers Ltd.
Clan Ross	22.8.72	A. M. Allan	L. Allert, C. Ling, D. MacCallum	C. Thermon	Clan Line Steamers Ltd.
Clan Ross	28.4.69	M. R. Sutcliffe	A. R. G. Everett, A. Burton		J. & J. Denholm Ltd.
Collin	1.1.73	P. J. Sullivan			Ministry of Agriculture, Fisheries & Food
Columbia Star	22.3.73	R. Brownbill	C. M. Hirst, L. K. Dhawan, J. W. Burton	C. J. Shaughnessy	Jardine Matheson & Co. Ltd.
Concordia Gulf			R. H. Foden, D. Eckworth, D. S. Fford	R. Singleton	Blue Star Line Ltd.
Conon Forest					Blue Star Line Ltd.
Corella	23.3.73	I. R. Haldane	I. McKendrick, T. T. Lunt, R. Dootson	M. Webster	J. & J. Denholm Ltd.
	3.2.70	W. Craig	R. A. Aldred		Ministry of Agriculture, Fisheries & Food
Cotswold	19.9.72	E. D. Stewart	D. L. Bullingham, D. C. Spurrell, M. J. Ingamells	A. R. Watt	P. & O. S.N. Co.
Coventry City	4.8.72	J. R. Woodfield	P. Howland, R. I. Taylor, D. T. MacLeod	R. P. Emmett	Bibby Line Ltd.
Craigallan	25.1.73	T. K. Corbett	P. E. Shaw	J. S. Mathis	Scottish Ore Carriers Ltd.
Criman	13.11.72	A. J. MacDonald			J. & J. Denholm Ltd.
Crystal Sapphire	6.3.73	W. M. Shirreff			Sugar Line Ltd.
Cumberland	4.12.72	D. C. Blackman	J. Leveck, J. T. Buckham, N. D. C. East	J. Evans	P. & O. S.N. Co.
Cumbria	13.2.73	D. S. Craven	W. D. Pharmister, R. J. Doman, K. Storey	J. P. Whiteley	Hadley Shipping Co. Ltd.
Cyclops	20.2.73	H. Davies	P. R. Mason, A. Barton, C. Nicholls	C. Hutchison	Ocean Fleets Ltd.
Daghestan	22.1.73	J. V. Beswick	R. Hare, W. A. Cowan, J. E. Tunmore	M. Smith	Common Bros. Ltd.
Dalman	19.12.72	G. Cubbin	G. C. Dixon, R. J. Smith, D. Davies	W. A. Smith	T. & J. Harrison Ltd.
Dalhanna	20.11.72	P. Robinson			Hunting & Son Ltd.
Dart America	9.1.73	A. F. Ashton	C. E. Walford, R. A. F. Edwards, A. Poynder	M. K. Wilnot	Bibby Line Ltd.
Dart Atlantic	12.2.73	E. Irish	P. A. Waldron, G. Alexander, D. A. Keenan	D. A. Cross	Bibby Line Ltd.
Deido	17.11.72	E. Woosley	K. E. Seery	G. R. Douglas	Ocean Fleets Ltd.
Derbyshire	4.8.72	M. C. Mills	T. Nyunt, R. A. F. Edwards, A. L. Bath	C. Beyer	Bibby Line Ltd.
Discoverer	20.9.72	R. H. Williams	C. Hoskison, G. Bentley, D. S. Woods	G. Ferrand	T. & J. Harrison Ltd.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Discovery</i> ..	1.1.73	G. L. Howe	P. J. McDermott, S. D. Mayl, D. A. Pye ..	P. J. Taylor ..	Natural Environment Research Council
<i>Discovery Bay</i> ..	20.2.73	L. E. Howell	A. R. Jarvis, D. E. Spencer, J. R. Williams	W. J. R. Davenport ..	Container Fleets Ltd.
<i>Donegal</i> ..	21.2.73	R. J. Ogilvy	R. I. Wilson, M. I. Ali ..	W. J. O'Dwyer ..	Trinder Anderson & Co. Ltd.
<i>Donga</i> ..	*	W. E. Bowden	S. T. Houldsworth, M. Powell ..	T. Smith ..	Ocean Fleets Ltd.
<i>Drina</i> ..	15.2.73	J. Rutter ..	P. W. Jarvis, P. Hunter, D. G. Olley ..	M. Lynch ..	Shaw Savill & Albion Co. Ltd.
<i>Duthallow</i> ..	9.2.73	I. E. W. Denholm	F. H. Taylor, A. J. Lawson, J. A. Smeeton	B. I. Bicknell ..	P. & O. S.N. Co.
<i>Dukesgarth</i> ..	22.3.73	K. W. Keithley	N. M. Williams, C. L. Reynolds ..	R. Powell ..	Cory Maritime Ltd.
<i>Dumbata</i> ..	*	R. M. Munro	R. Moxon, A. P. Jaggars, B. A. Hood	S. G. Yates ..	Ocean Fleets Ltd.
<i>Dunadd</i> ..	27.10.72	P. Kilvington	I. T. Donaldson, A. Tattersall, P. Evans ..	D. J. Gardener ..	J. & J. Denholm Ltd.
<i>Dunblane</i> ..	10.10.72	I. C. Graham	S. G. Fry, D. N. Macnair ..	J. & J. Denholm Ltd.	J. & J. Denholm Ltd.
<i>Dunclrag</i> ..	29.12.72	B. Jordan	S. T. Houldsworth, P. Martin, P. A. Smith	D. J. Courtney ..	Elder Dempster Lines Ltd.
<i>Dunkwa</i> ..	11.7.72	F. M. Howe	J. M. Bullard, K. E. Greest, B. G. Longley	J. A. Davies ..	W. A. Souther & Co. Ltd.
<i>Dunstanburgh Castle</i> ..	17.11.70	P. S. Gardner	J. Furey, P. G. Fry ..	J. J. Cameron ..	Shaw Savill & Albion Co. Ltd.
<i>Durango</i> ..	14.8.72	F. M. Dickenson	J. Robinson, D. I. Rowland ..	N. Foulkes ..	Southern Ferries Ltd.
<i>Eagle</i> ..	22.3.73	I. H. Leggatt	J. B. Summerill, E. R. Chalkley, P. O'Neil	I. Fjelstad ..	K&re, Misje & Co.
<i>Ehami</i> ..	20.3.73	R. Wild ..	S. Olsen, T. Angelveit ..	T. C. Duncan ..	Furness Withy & Co. Ltd.
<i>Edelstein</i> ..	21.3.73	S. Olsen ..	J. A. Williams, T. M. Hackett ..		Union-Castle Mail S.S. Co. Ltd.
<i>Edenmore</i> ..	27.3.73	J. Jacques	J. P. Bevis ..		Whitco Marine Services Ltd.
<i>Edinburgh Castle</i> ..	26.3.73	J. S. Catterall	K. W. Gordon, A. Jones, J. W. Bonner, A. M. Young		Natural Environment Research Council
<i>Edinburgh Clipper</i> ..	23.9.72	B. C. Lee	S. Sykes, D. J. Flower ..		Cable & Wireless Ltd.
<i>Edvard Forbes</i> ..	*	P. J. MacDermott			Roland & Marwood S.S. Co. Ltd.
<i>Edward Wilshaw</i> ..	11.6.68	N. H. Smith	R. M. Keyzor, K. Brammer, A. F. Wilson	J. Otley ..	Bowring S.S. Co. Ltd.
<i>Egton</i> ..	6.12.71	M. Turton	S. K. Brewster, F. T. Chapman, T. R. Fulthorpe	C. R. Peet ..	Bank Line Ltd.
<i>El Lobo</i> ..	27.11.72	K. J. Lyall	R. R. Baker, A. P. Terris, L. Davis, R. Smelle ..	D. Cooper ..	Container Fleets Ltd.
<i>Elmbank</i> ..	4.1.73	D. G. McCaffery			Blue Star Line Ltd.
<i>Encounter Bay</i> ..	1.2.73	R. A. Wilson	P. G. Devenport, C. Armstrong, C. T. Dampier ..	C. Hughes ..	John Swire & Sons Ltd.
<i>English Star</i> ..	9.1.73	D. S. Gilmore	J. D. Peake, N. S. Schroeter, W. F. Hughes	K. Bourke ..	P. & O. S.N. Co.
<i>Erawan</i> ..	26.7.71	R. J. Smith	R. F. A. Kendrick, K. R. Strudwick, N. J. Alexander	U. In San ..	Esso Petroleum Co. Ltd.
<i>Essex</i> ..	15.1.73	R. M. Michael	R. Ley, R. J. Avers, J. R. Jackson, M. McCartan	R. G. Heath ..	Esso Petroleum Co. Ltd.
<i>Eso Caledonia</i> ..	7.2.73	E. Gulwell	F. W. Ling, R. W. Gunns, P. Johnson	D. Leeson ..	Esso Petroleum Co. Ltd.
<i>Eso Cambria</i> ..	31.1.73	G. E. Daykin	T. Smith, D. T. McIntosh ..	J. McCarthy ..	Esso Petroleum Co. Ltd.
<i>Eso Hampshire</i> ..	11.1.73	T. E. Jernison	K. A. Bodman, K. A. Hart ..	I. Morgan ..	Esso Petroleum Co. Ltd.
<i>Eso Mercia</i> ..	26.3.73	J. W. Barrowdale	B. Pollock, B. Park ..	A. Pampling ..	Esso Petroleum Co. Ltd.
<i>Eso Pembrokehire</i> ..	25.9.72	R. Hyam ..	K. W. Soulsby, C. A. Clague, P. Grant ..	C. M. Dunwoody ..	Esso Petroleum Co. Ltd.
<i>Eso Ulidia</i> ..	24.10.72	K. McKenzie	J. Dickinson, I. B. Stephenson, J. R. Rose	P. V. Cagney ..	Esso Petroleum Co. Ltd.
<i>Eso Warwickshire</i> ..	4.1.73	C. L. Thomas	R. D. Izatt, K. D. Whiting, K. H. Watts ..	T. A. Verling ..	Esso Petroleum Co. Ltd.
<i>Eucadia</i> ..	11.7.72	F. Howlett	F. J. McDade, L. J. Cummings ..	R. Gaul ..	Walter Runciman & Co. Ltd.
<i>Eurofighter</i> ..	24.10.72	T. Cornack	S. Baker, D. H. Wright, R. Samson	J. Winchester ..	J. & J. Denholm Ltd.
<i>Euroliner</i> ..	28.3.73	W. R. Williamson	D. Beel, R. Taylor, D. Lycett ..	D. Murphy ..	T. & J. Harrison Ltd.
<i>Explorer</i> ..	3.1.73	G. W. McGuinness			Dept. of Agriculture & Fisheries for Scotland
<i>Explorer (F.R.S.)</i> ..	31.1.73	J. Clark ..			Frank C. Strick & Co. Ltd.
<i>Faristan</i> ..	11.12.72	I. M. Adie	V. L. Cox, R. Alderdice, S. Yeamans	T. M. Robins ..	P. & O. S.N. Co.
<i>Fernie</i> ..	26.10.72	D. C. Penberthy	J. H. Bache, C. S. Holloway	T. K. Barnett ..	Mavroleon Bros. Ltd.
<i>Finnamore Meadow</i> ..	11.7.72	J. McCulloch	W. Davison, J. R. Peters, D. Reid ..	R. Lloyd ..	Container Fleets Ltd.
<i>Flinders Bay</i> ..	19.1.73	M. R. Ryan	C. A. Sheffield, J. H. Hutson, J. N. A. Hallmark	E. R. C. Lamb ..	

<i>Flintshire</i>	..	4.12.72	M. G. Thomas	..	M. F. Tomlinson, H. T. Reid, A. R. O. Wilson	..	G. Strang	..	Ocean Fleets Ltd.
<i>Florian</i>	..	23.3.73	M. Robinson	..	P. Strachan, B. J. Bartlett, N. C. I. Despon	..	J. F. Bryson	..	Frank C. Strick & Co. Ltd.
<i>Foreland</i>	..	6.10.72	J. L. Halcrow	..	P. J. Tehan, C. D. Bishop-Laggett, R. W. Paul	..	A. Reidy	..	Shunting & Coal Co. Ltd.
<i>Forthfield</i>	..	4.12.72	T. Armstrong	..	K. Horsley, K. Gray, H. A. Hansen	..	J. Bell	..	Hunting & Son Ltd.
<i>Fourah Bay</i>	..	8.12.72	W. J. S. Eynon	..	R. M. Ellsmoor	..	..	..	Ocean Fleets Ltd.
<i>Fremantle Star</i>	..	9.1.73	W. Pitcher	..	R. Shore, R. L. Stoot, P. R. Harris, T. R. Loneman	..	J. K. Dunham	..	Blue Star Line Ltd.
<i>Fresno City</i>	..	22.3.73	A. L. G. Gosset	..	R. M. Bayley, A. P. Stapley, P. J. Warren	..	H. Macoy	..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Frontier</i>	..	22.3.73	T. B. Hancock	..	C. R. Darnley, W. A. Lowe, G. G. Shadbolt	..	P. A. Byrne	..	Manchester Liners Ltd.
<i>Furness Bridge</i>	..	23.3.73	J. Leask	..	..	..	..	..	Houlder Bros. & Co. Ltd.
<i>Gallig Bridge</i>	..	3.1.73	K. Turner	..	R. J. Byles, G. H. Marsland, F. C. MacIver	..	R. W. McInnes	..	J. & J. Denholm Ltd.
<i>Galway</i>	..	2.1.72	A. R. T. Wood	..	B. J. Wright, K. Grodzicki, A. Bruce	..	D. Connolly	..	Trinder Anderson & Co. Ltd.
<i>Gambada</i>	..	22.3.73	P. C. T. Shepherd	..	J. Harvey, —, Abramow, S. Harwood	..	T. Towers	..	P. & O. S.N. Co.
<i>Gazana</i>	..	13.12.72	P. C. T. Shepherd	..	R. G. Jenkin, I. A. Fraser	..	R. G. Bell	..	P. & O. S.N. Co.
<i>Geestcape</i>	..	22.3.73	M. Wilks	..	K. Pearson, K. Slade, W. A. Boddington	..	D. R. A. Young	..	Geest Industries Ltd.
<i>Geestcrest</i>	..	29.1.73	C. Beck	..	..	..	..	..	Geest Industries Ltd.
<i>Geesthaven</i>	..	2.2.73	M. C. Hollinrake	..	G. D. Taylor, S. J. Wozniak, A. J. A. Richards	..	D. H. Letcher	..	Geest Industries Ltd.
<i>Geeststar</i>	..	7.3.73	A. MacNeil	..	D. Cruickshanks, D. Flynn, P. G. Gough	..	J. E. Conway	..	Geest Industries Ltd.
<i>Geest-tide</i>	..	12.2.73	D. N. Boon	..	M. Jackson, R. Skinner	..	M. R. Brooks	..	Geest Industries Ltd.
<i>Georgina V. Everard</i>	..	20.3.73	O. L. Springett	..	J. Ibbotson, A. W. Breach, I. Grant	..	R. B. Geale	..	Geest Industries Ltd.
<i>Glasgow Star</i>	..	15.1.73	R. V. Everett	..	G. Macleod	..	D. J. Wilson	..	Geest Industries Ltd.
<i>Glasgow Clipper</i>	..	22.3.73	E. I. Jones	..	..	..	F. G. Huggatt	..	F. T. Everard & Sons Ltd.
<i>Glenfalloch</i>	..	15.1.73	R. E. Brooks	..	R. E. T. Sneeden, O. H. Cook, W. R. Owen	..	A. O'Sullivan	..	Blue Star Line Ltd.
<i>Glenlyon</i>	..	7.3.73	A. MacKenzie	..	R. I. Smart, D. S. Walker, G. Price	..	G. Scullivan	..	Whitco Marine Services Ltd.
<i>Glenmoor</i>	..	2.11.72	J. C. Liptrout	..	J. D. C. Williams, M. R. Foster, H. Singh	..	C. Branthwaite	..	Ocean Fleets Ltd.
<i>Glenogle</i>	..	5.2.73	R. G. Williams	..	A. MacInnes, J. Robertson, R. Hargreaves	..	M. Pitcher	..	Ocean Fleets Ltd.
<i>Glenpark</i>	..	3.10.72	A. H. Smart	..	P. Johnson, A. W. Richards, C. Cunningham	..	B. Fraser	..	Ocean Fleets Ltd.
<i>Gloxina</i>	..	15.1.73	L. Hopper	..	H. Samson, J. E. MacCobb, A. Tattersall	..	D. Bradshaw	..	Ocean Fleets Ltd.
<i>Good Hope Castle</i>	..	31.1.73	H. N. Dryden	..	..	..	..	..	J. & J. Denholm Ltd.
<i>Gorleston</i>	..	13.11.72	P. W. Price	..	C. Bagwell, P. Silver, C. N. Isaac	..	D. A. P. Galbraith	..	Stag Line Ltd.
<i>Gothland</i>	..	29.11.72	J. Williamson	..	M. A. Saleh, B. J. Toft, E. D. J. Brown	..	M. Breathnach	..	Union-Castle Mail S.S. Co. Ltd.
<i>Hadra</i>	..	26.1.73	A. B. Pereir	..	D. Caillon, V. Adams, J. M. Brierley	..	M. W. Perry	..	Frank C. Strick & Co. Ltd.
<i>Hanetia</i>	..	11.7.72	I. R. Farnell	..	P. M. Malling, S. J. Garrod	..	T. O'Neill	..	Currie Line Ltd.
<i>Haparangt</i>	..	7.3.73	P. Lay	..	D. D. M. Lindon, R. R. H. Arkle	..	L. R. Mitcham	..	Shell Tankers (U.K.) Ltd.
<i>Hauraki</i>	..	28.3.73	J. S. Laidlaw	..	A. J. Wilson, R. A. Date	..	A. McInnes	..	Shell Tankers (U.K.) Ltd.
<i>Hazelmoor</i>	..	2.2.73	R. G. Dickson	..	R. S. Holt, R. E. Hughes, C. J. Highfield,	..	A. A. Fraser	..	P. & O. S.N. Co.
<i>Hector Heron</i>	..	9.3.73	G. E. Trowsdale	..	C. G. Rolleston	..	..	..	Walter Runciman & Co. Ltd.
<i>Hemicardium</i>	..	19.7.72	J. Booth	..	E. G. Stout, J. C. Priest, J. McKinnon	..	M. Atkinson	..	Hector Whaling Ltd.
<i>Hemifusus</i>	..	3.10.72	A. W. Aitken	..	R. J. Kamau, D. R. Cox, C. R. Finch	..	D. A. Skarstein	..	Shell Tankers (U.K.) Ltd.
<i>Hemimactra</i>	..	14.9.72	P. Saunders	..	J. Sharp, P. J. Dominey, —, Strait	..	D. Wade	..	Shell Tankers (U.K.) Ltd.
<i>Hertford</i>	..	19.2.73	A. Britain	..	P. E. Dorman, A. Daly	..	M. J. Hyde	..	Shell Tankers (U.K.) Ltd.
<i>Himalaya</i>	..	26.3.73	M. R. Prowse	..	J. A. Corcoran, M. R. Robins, P. E. Smith	..	D. J. O. Berry	..	Shell Tankers (U.K.) Ltd.
<i>Hinakura</i>	..	19.2.73	H. J. O. Sladen	..	B. Kay, M. W. Williams, A. R. Davidson	..	M. Reid	..	Bibby Line Ltd.
<i>Hinea</i>	..	10.10.72	H. A. Miller	..	B. J. Kirtley, J. A. Child	..	C. Adkin	..	P. & O. S.N. Co.
<i>Historian</i>	..	23.6.72	W. E. Hinde	..	F. S. Sprought, D. Mounford, D. B. Truscott,	..	H. Williams	..	P. & O. S.N. Co.
<i>Hobart Star</i>	..	13.11.72	N. D. T. Johnson	..	M. McCartan	..	A. J. Rose	..	Shell Tankers (U.K.) Ltd.
<i>Hudson Trader</i>	..	11.12.72	D. Willey	..	N. B. Woodhouse, T. A. Smith, R. I. Duce, W. S. Trought	..	W. R. Burlington	..	T. & J. Harrison Ltd.
<i>Humilaria</i>	..	21.2.73	S. W. Taylor	..	R. B. Cox, E. Maxwell, J. Cook	..	H. G. Sparkes	..	Blue Star Line Ltd.
<i>Huntingdon</i>	..	30.3.73	A. B. Stalker	..	N. J. Barr	..	..	..	Hudson S.S. Co. Ltd.
<i>Hurunui</i>	..	29.9.72	J. F. Milner	..	P. A. Cocker, J. R. Sexton, A. G. Groom	..	R. P. Robertson	..	Shell Tankers (U.K.) Ltd.
<i>Hyala</i>	..	18.12.72	M. Patterson	..	A. N. Pike, C. J. M. Bosworth, D. Scott	..	D. Tudor-Cole	..	P. & O. S.N. Co.
<i>Iberic</i>	..	11.1.73	J. Richmond	..	D. J. Robertson, C. J. M. Bosworth, D. Winter	..	G. Eddy	..	P. & O. S.N. Co.
<i>Ienic</i>	..	12.2.73	R. E. Marshall	..	D. F. Starr, M. J. Ellison	..	K. Seargill	..	Shell Tankers (U.K.) Ltd.
	..			..	W. Langton, P. E. Ward, J. Cuthbert	..	J. Breen	..	Shaw Savill & Albion Co. Ltd.
	..			..	C. M. Croucher, G. McDonald	..	M. A. Starnier	..	Shaw Savill & Albion Co. Ltd.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Ilyric</i>	26.3.73	M. E. Musson	C. H. B. Bailey, M. G. Bullock, I. Chadwick	H. A. Sirett	Shaw Savill & Albion Co. Ltd.
<i>Inshoreman Head</i>	31.10.72	R. A. Maxwell	R. M. Swanton, J. McAllister, B. A. H. Kane, W. G. R. Wheeler	H. L. Harris	G. Heyn & Sons Ltd.
<i>Inverbank</i>	1.11.72	A. J. Whiston	W. M. Marshall, A. N. Watson, B. Mylcreest	T. A. O'Hara	Bank Line Ltd.
<i>Ionic</i>	13.10.72	D. A. Statham	M. F. Lovell-Smith, K. S. Cruden, S. J. Barber	R. Langford-Baker	Shaw Savill & Albion Co. Ltd.
<i>Irisbank</i>	4.12.72	J. J. Reed	R. Harris, R. Morton, D. Finlayson	M. Manning	Bank Line Ltd.
<i>Yamaica Planter</i>	7.3.73	G. A. Harper	T. Moodie, K. L. Johnstone, M. J. Battson	M. Pearson	Kaye, Son & Co. Ltd.
<i>Yamaica Producer</i>	12.1.73	K. E. Foulds	K. L. Johnstone, C. F. Browning, A. Barker	I. Macdonald	Kaye, Son & Co. Ltd.
<i>Yervis Bay</i>	2.6.72	M. J. Cole	A. J. Fee, R. T. Wood, Q. J. Murphy	R. B. Redhead	Container Fleets Ltd.
<i>Yohn Biscoe</i>	1.1.73	P. H. Maw	M. L. Shakesby, I. Hotchin	C. M. Hodson	British Antarctic Survey
<i>John Murray</i>			M. J. Coventry, A. G. Marsh, R. P. Griffiths		Natural Environment Research Council
<i>Yumna</i>	23.3.73	D. P. Barry	D. W. Woods, A. R. Lindsay, G. C. Hatcher	A. McIver	P. & O. S.N. Co.
<i>Kano Palm</i>	13.11.72	G. Phillips	I. N. McHarnish, J. D. Hebblethwaite, J. P. Pym	J. W. Kiddle	Palm Line Ltd.
<i>King Alfred</i>	2.1.73	D. Lockhart	A. Oxley, P. Silver, W. Davidson	M. G. Eskins	Cayzer Irvine & Co. Ltd.
<i>Kinnaird Castle</i>	14.12.72	T. R. Halliday	T. J. Tye, D. B. C. Morris, D. P. Drew	P. R. Mounsdon	Union-Castle Mail S.S. Co. Ltd.
<i>Kohinar</i>	4.1.73	W. Alexander	S. Kumar, G. B. Baxter, F. Garfit	R. Limbert	P. & O. S.N. Co.
<i>Kohistan</i>	13.2.73	S. R. Arnold	G. K. Thomson, P. R. Dew, R. G. Wall	W. J. Lloyd	Frank C. Strick & Co. Ltd.
<i>Kouloon Bay</i>	20.1.73	J. A. Iliff	W. J. Roberts, J. S. McKechnie, J. D. Allen	J. Kelleher	Ocean Fleets Ltd.
<i>Langstone</i>	19.1.73	J. Harper	P. Hayson, T. Clements, A. Thompson	R. J. Ashworth	Shaw Savill & Albion Co. Ltd.
<i>Laurentian Forest</i>	9.11.72	J. J. Rutter	A. Costalas, G. Horn, A. Ross	S. White	Ocean Fleets Ltd.
<i>Laurentic</i>	26.9.72	A. Hurst	P. Dodds, D. Peers, K. Duggan	E. Barnes	Harrisons (Clyde) Ltd.
<i>Letchworth</i>	5.7.72	R. A. Brant	P. Spinks, D. Harran, R. Claridge	A. Humphries	Shaw Savill & Albion Co. Ltd.
<i>Lindenbank</i>	30.3.73	B. G. Longley	T. I. Drewer, I. D. Pattison, P. Anderson	D. Elmer	R. S. Dalgleish Ltd.
<i>Lindisfarne</i>	9.1.73	R. Moore	R. I. Blackburn, R. McClelland	G. W. Lomax	Bank Line Ltd.
<i>Liverpool Bay</i>	26.10.72	A. C. McNab	C. Davidson, G. A. Gunn, P. J. Wade	A. E. Holman	W. A. Souther & Co. Ltd.
<i>London Pioneer</i>	26.1.73	A. Clish	K. Stewart, C. A. Smith	C. Stuart	Ocean Fleets Ltd.
<i>Longtone</i>	19.1.73	L. W. Thorne	A. J. Magarin, P. C. H. Adair	J. S. Fee	British & Overseas Freighters Ltd.
<i>Lord Strathcona</i>	19.1.73	E. Walters	H. Dillon, D. A. Spalding, N. J. Sparrow	J. Lawrie	W. A. Souther & Co. Ltd.
<i>Losiebank</i>	19.3.73	A. L. Wood	J. Westerman, A. Bamber	S. K. Murgatroyd	Bank Line Ltd.
<i>Lutetian</i>	4.12.72	D. Craven	J. Davis, A. Krumm, E. J. Owen	S. Pearson	Oregon S.S. Co.
<i>Lyntinge</i>	15.11.72	A. P. Briggs	W. G. Patterson, P. E. King, E. Dillen	W. C. Doyle	Constants Ltd.
<i>Mabel Warwick</i>	1.2.73	W. H. C. Hicks	J. K. Brocklehurst, L. W. Crump, J. Chalmers	I. S. Newmarch	Houlder Bros. & Co. Ltd.
<i>Mahout</i>	19.10.72	S. Pascoe	N. N. A. Elias, D. S. Hughan, J. D. Cook	D. W. Spencer	Cunard-Brocklebank Ltd.
<i>Mahonda</i>	29.12.72	F. Taylor	R. M. Hillier, R. H. Shurtleworth, C. Heard	R. Simons	Cunard-Brocklebank Ltd.
<i>Mahver</i>	5.5.72	N. W. Cockshoot	K. Bretherick, W. Whiston, B. Luke	G. Graham	Moss Hutchison Line Ltd.
<i>Makarita</i>	1.2.73	P. N. Fielding	W. N. Pointon, I. L. Roberts, G. Jones	C. McCan	P. & O. S.N. Co.
<i>Manapouri</i>	1.1.73	J. E. Askew	D. Smith, M. Grover, W. Moss	D. E. Spicer	Manchester Liners Ltd.
<i>Manchester Challenge</i>	25.3.73	D. P. Humphrey	D. Falaise, T. P. Mather, D. Smith	J. A. L. MacDonald	Manchester Liners Ltd.
<i>Manchester Concept</i>	29.11.72	E. C. Watkins	R. Darneley, B. Hannaford, W. Lowe	R. Percival	Manchester Liners Ltd.
<i>Manchester Concorde</i>	15.10.71	D. J. R. Davies	W. Moss, D. Smith, M. Grover	C. Leatham	Manchester Liners Ltd.
<i>Manchester Courage</i>	29.9.72	J. B. Clemenston	C. M. Phillips, M. Grover	E. Marks	Manchester Liners Ltd.
<i>Manchester Crusade</i>			D. Smith, T. P. Mather, M. J. Miles	W. Williams	Manchester Liners Ltd.
<i>Manchester Quest</i>			P. W. Ings, A. McVean, P. A. C. Beveridge	N. H. Prince	Cunard-Brocklebank Ltd.
<i>Manipur</i>			M. Waight, J. Brooks, S. P. Hockley	L. Robinson	Bank Line Ltd.
<i>Marabank</i>			D. Corrie, M. Patton, R. Roberts		Cunard-Brocklebank Ltd.
<i>Marikhor</i>					

<i>Maron</i>	17.5.72	J. Bold	E. M. Robertson, H. Hynard, A. D. G. Bell	W. F. Law	Ocean Fleets Ltd.
<i>Matara</i>	12.1.73	K. Barnett, R.D.	P. Wheatley, G. P. D. Coleridge	W. Beverley	P. & O. S.N. Co.
<i>Medic</i>	10.1.73	W. W. Newport	B. Jennings, D. M. Cole, G. Brett	T. F. M. Ralph	Shaw Savill & Albion Co. Ltd.
<i>Megantic</i>	1.12.72	W. M. Wheatley	D. P. Morton, S. Venner, R. Blacklock	M. D. A. Walsh	Shaw Savill & Albion Co. Ltd.
<i>Melita</i>	19.3.73	R. D. Leckie	V. S. Pui, W. F. Wood, B. D. Noble	M. S. McLaren	Moss Hutchison Line Ltd.
<i>Menestheus</i>	21.2.73	E. L. Stubbings	R. C. Phillips, I. Gilmour	J. D. Gallagher	Ocean Fleets Ltd.
<i>Mercury</i>	8.11.72	P. B. Henderson	P. A. Watts, A. Smith, R. Roberts	R. E. Vinnall	Cable & Wireless Ltd.
<i>Miranda</i>	19.12.72	C. S. Adams	P. M. Morgan	J. C. Yates	Dept. of Trade & Industry
<i>Mitra</i>	13.2.73	J. J. Greener	A. C. Rowley, J. Cubbons, J. Nash, P. L. Challenger	P. G. Chadwick	Shell Tankers (U.K.) Ltd.
<i>Monksgarth</i>	30.8.72	T. Spencer	R. H. Foden, C. Jackson, J. A. Spear	R. A. Cockett	Cory Maritime Ltd.
<i>Montreal Star</i>	10.4.72	G. D. Easton	M. Clowes, J. Thorpe	A. Tidley	Blue Star Line Ltd.
<i>Moreton Bay</i>	21.2.73	M. J. Heron	C. G. G. Hawken, J. H. Owens, P. J. Dixon	D. Tobin	Container Fleets Ltd.
<i>Mystic</i>	25.7.72	D. R. G. Taylor	R. A. Gamble, W. P. Mercer	P. Daniels	Furness Withy & Co. Ltd.
<i>Nardana</i>	13.10.72	D. E. P. Colley	J. Marden, R. Hart	R. D. Campbell	P. & O. S.N. Co.
<i>Nevasa</i>	8.12.72	I. K. Bowerman	M. Duffy, J. H. Mockett	H. Hutt	P. & O. S.N. Co.
<i>Newcastle Star</i>	14.7.72	E. J. Jones	C. Redman, P. Griffin, P. Hoey	A. S. Ferguson	Blue Star Line Ltd.
<i>Newfoundland</i>	14.7.72	E. H. Gregson	N. Waldron, A. J. H. Crowther, A. M. Beevor-Reid	B. Wynne	Furness Withy & Co. Ltd.
<i>New Westminster City</i>	12.2.73	M. J. Higgins	R. Shore, M. S. Clare, J. A. H. Gray	J. S. Wallace	Sir Wm. Reardon Smith & Sons Ltd.
<i>New Zealand Star</i>	4.7.72	J. G. King	A. M. H. Mohamed, I. S. Wise, C. Green	B. Wilcox	Blue Star Line Ltd.
<i>Nicolas Bowater</i>	22.1.73	J. B. Caley	D. P. Ploughman, J. W. Wightman, K. K. Good	J. M. Courtney	Cayzer Irvine & Co. Ltd.
<i>Nigaristan</i>	4.1.73	R. L. Cain	B. R. Richmond, A. C. McCutcheon, A. Hodges	H. Hebble-White	Frank C. Strick & Co. Ltd.
<i>Nina Bowater</i>	18.1.73	A. G. Allison	W. Campbell, A. Lewis	P. J. O'Carroll	Cayzer Irvine & Co. Ltd.
<i>Norse Marshall</i>	1.11.72	J. Harper	W. Phillips, A. Hunt, R. W. Henderson, H. Towers	I. P. Doherty	Sir R. Ropner & Co. Ltd.
<i>Norse Viking</i>	23.3.73	A. Dekonski	C. D. Marshall, M. W. Douglas, N. R. Watkins	M. J. W. Humphreys	Sir R. Ropner & Co. Ltd.
<i>Northern Star</i>	31.5.72	D. T. Mouldy	S. Fletcher, P. Iveson, J. Cotter	T. G. White	Shaw Savill & Albion Co. Ltd.
<i>Novelist</i>	12.2.73	F. L. Steele	M. G. Keates	J. P. Doherty	T. & J. Harrison Ltd.
<i>Nurmahal</i>	27.10.72	P. E. Sellars	K. P. Guy, M. Nicholson, J. Stringfellow	P. & O. S.N. Co.	P. & O. S.N. Co.
<i>Nuryetan</i>	7.11.72	R. C. Lister	T. T. Kent, K. O'Kelly, G. N. Wilson	R. S. Dalgliesh Ltd.	P. & O. S.N. Co.
<i>Oakworth</i>	7.12.72	K. B. Jewell	J. W. Jewell, J. Gavin, W. Davis, H. Gibson	Bibby Line Ltd.	P. & O. S.N. Co.
<i>Ocean Bridge</i>	7.12.72	H. E. Carlisle	D. J. Stansbury, M. Eden-Smith, J. Grant, N. Huxsted	Shaw Savill & Albion Co. Ltd.	P. & O. S.N. Co.
<i>Ocean Monarch</i>	30.6.72	B. A. Hills	T. J. Sax, I. Middleton, D. Bridgman	Pacific S.N. Co. Ltd.	P. & O. S.N. Co.
<i>Orbita</i>	17.1.73	K. Thomas	M. W. Knight, K. Swinburne, S. Winter	Furness Withy & Co. Ltd.	P. & O. S.N. Co.
<i>Orcoma</i>	12.12.72	G. Turner	C. Rowntree, D. G. Outen, M. Greenwood	Ore Carriers Ltd.	P. & O. S.N. Co.
<i>Orduna</i>	12.12.72	R. T. Riley	M. J. P. Seane, H. Burgess	Ore Carriers Ltd.	P. & O. S.N. Co.
<i>Orenda Bridge</i>	26.9.72	F. B. Woolley	J. W. Beveridge, J. A. Macadam, W. Crook	Hellyer Bros. Ltd.	P. & O. S.N. Co.
<i>Oronsay</i>	13.2.73	K. Nielson	A. C. Chadwick, B. Minter, N. Lampe	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Orotava Bridge</i>	13.3.73	W. Backhouse	D. McCaffrey, C. Cunningham, R. C. Middleton	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Orsino</i>	9.1.73	D. A. Hansing	C. R. Dalzell, G. D. Younger, F. S. Sprought	P. & O. S.N. Co.	P. & O. S.N. Co.
<i>Osaka Bay</i>	13.2.73	J. Bentley	D. H. Moorhouse, M. M. Lindsey, H. M. Close,	Hellyer Bros. Ltd.	P. & O. S.N. Co.
<i>Otao</i>	2.1.73	F. G. Bevis	T. W. King	P. & O. S.N. Co.	P. & O. S.N. Co.
<i>Otake</i>	13.3.73	J. H. B. Weston	K. Walker, M. E. Spurgeon, J. Astles	Shell Tankers (U.K.) Ltd.	P. & O. S.N. Co.
<i>Othello</i>	13.3.73	F. Drewery	R. J. A. Brook-Hart, R. Coldham, R. P. Bass	P. & O. S.N. Co.	P. & O. S.N. Co.
<i>Pando Gulf</i>	30.8.72	T. A. M. Lincoln	C. F. Campbell, N. Lampe	Shell Tankers (U.K.) Ltd.	P. & O. S.N. Co.
<i>Pando Point</i>	13.4.72	R. Bullock-Webster	D. L. Holgate, F. A. Sluggert	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Partula</i>	12.1.73	A. W. Aitken	A. Murray, P. C. May, L. Watson	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Patonga</i>	8.12.72	C. B. Cooke	P. F. Noonan, S. F. Garside, H. W. Simmonds	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Patroclus</i>	7.6.72	L. H. Pound	M. B. Williams, P. L. Jones, C. Galbraith, M. Malin	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Pegu</i>	11.12.72	J. E. Webb	T. P. Seel, J. W. Niblock, R. B. Lough	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Pasander</i>	4.1.72	D. MacLachlan	L. Martin, P. Crabtree, D. J. Funnell	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Pendennis Castle</i>	15.2.73	H. Charnely	P. F. Currey, N. Morrice, A. Dodds, D. McSherry	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Pennyworth</i>	22.3.73	N. Storey	C. J. A. Hughes, A. I. Hale, A. J. Dyne	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Perseus</i>	19.9.72	H. O. Williams	R. A. Berry, R. H. L. Henry, N. F. Smith	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Phenias</i>	16.2.73	A. S. Thompson	H. P. Farrell, J. N. Brook, P. G. Masters	Ocean Fleets Ltd.	P. & O. S.N. Co.
<i>Philosopher</i>	16.2.73	F. H. Curry, R.D.		Ocean Fleets Ltd.	P. & O. S.N. Co.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Photinia</i> ..	19.12.72	A. Collins	E. A. Lamb, E. Hutchinson, P. Davis	D. Rogers	Stag Line Ltd.
<i>Phrontis</i> ..	19.10.72	W. R. Willis	I. N. Burrows, C. M. Sandy, G. D. Morris	H. N. Kinley	Glen Line Ltd.
<i>Piako</i> ..	27.11.72	A. D. Johnston	E. Fawcett, J. Murt ..	I. H. Snowden	P. & O. S.N. Co.
<i>Plagiola</i> ..	17.4.72	G. Bradley	A. W. Gibbs, R. A. Batty, G. B. Porter	M. J. Ennis	Shell Tankers (U.K.) Ltd.
<i>Planisman</i> ..	*	E. D. Ashdown	R. K. Domin, H. Traynor, R. Babooram	T. & J. O'Brien	T. & J. Harrison Ltd.
<i>Platidia</i> ..	31.8.72	C. Hindess	K. J. Sprowles, R. W. Birch, P. J. Dominey, M. J. Whichelow	W. N. Greene	Shell Tankers (U.K.) Ltd.
<i>Port Alberni City</i> ..	26.3.73	G. S. Garlick	B. R. Hopper, T. Haxell, R. K. Stuart	A. S. Ferguson	Sir Wm. Reardon Smith & Sons Ltd.
<i>Port Alfred</i> ..	*	J. St.H. Webber	R. Harvey ..	C. I. Lamb	Port Line Ltd.
<i>Port Auckland</i> ..	20.3.73	D. Sinclair	R. J. Adamson, M. Ramsay ..	M. Winn	Port Line Ltd.
<i>Port Brisbane</i> ..	15.2.73	M. L. Coombs	W. B. Wheeler, W. J. Corbett, W. Olaman	J. C. Roberts	Port Line Ltd.
<i>Port Caroline</i> ..	21.12.72	F. M. Barton	A. J. R. May, J. C. Jones, A. J. Turner	N. L. H. Cresdee	Port Line Ltd.
<i>Port Chalmers</i> ..	19.2.73	R. A. Wight	P. W. J. Kirby, P. J. Dicken, G. Sutherland	C. Hardie	Port Line Ltd.
<i>Port Launceston</i> ..	1.6.72	I. McManus	T. Paton, R. Bolton, G. Waugh	B. Forde	Port Line Ltd.
<i>Port New Plymouth</i> ..	17.1.73	G. Carling	I. F. Gosden, A. Craigie-Lucas, M. Parkes	R. C. Simeons	Port Line Ltd.
<i>Port Nicholson</i> ..	22.3.73	W. J. Williams	P. A. Carter, R. D. Theobald, W. V. Rowlinson	C. W. Hodgson	Ocean Fleets Ltd.
<i>Priam</i> ..	5.3.73	H. O. Williams	P. T. Evans, M. S. Browning, N. Bolland	I. R. Mathews	Sir Wm. Reardon Smith & Sons Ltd.
<i>Prince Rupert City</i> ..	30.8.72	W. J. Cross	C. R. Goddard, R. E. Clifford, K. Jones	R. D. Cause	Ocean Fleets Ltd.
<i>Prometheus</i> ..	23.2.73	F. N. Curphey	K. W. Elias, T. M. Walder, H. N. Ward	A. W. Jones	Ocean Fleets Ltd.
<i>Proteslaus</i> ..	15.3.73	R. G. Rippon	I. I. Kazi, A. M. Walsh, J. D. Mountain	D. Butterworth	Cunard S.S. Co. Ltd.
<i>Queen Elizabeth 2</i> ..	2.11.72	W. J. Law	N. H. Osborne, R. W. Warwick	D. O'Halloran	Cory Maritime Ltd.
<i>Queensgarth</i> ..	13.3.73	J. P. Waldoek	J. Leatherbarrow, J. C. Jackson, K. W. Smith	F. Brickwood	Blue Star Line Ltd.
<i>Raeburn</i> ..	*	R. K. Bilton	A. K. Brown, P. Holby, S. A. Feldman, A. Hurrell	K. E. Pritchard	Ranger Fishing Co. Ltd.
<i>Ranger Briseis</i> ..	2.1.73	P. Donaghue	E. Cayhill, F. Powdrill, A. Martin ..	H. Harris	Ellerman's Wilson Line Ltd.
<i>Rapallo</i> ..	26.1.73	J. E. Wray	B. Vaughan, C. Simmonds, M. A. Watt	K. E. Pritchard	Lampport & Holt Line Ltd.
<i>Raphael</i> ..	21.11.72	S. M. Williams	I. M. Rendle, D. Bedford, J. Lock, P. Milton	H. Harris	Frank C. Strick & Co. Ltd.
<i>Registan</i> ..	24.11.72	R. B. Arthur, M.B.E.	S. G. Willis, D. Ganderton, A. Milligan	K. E. Pritchard	Blue Star Line Ltd.
<i>Rockhampton Star</i> ..	6.10.72	I. Hunter	J. K. Schofield, K. Grierson	H. Holdsworth	Lampport & Holt Line Ltd.
<i>Roland</i> ..	22.3.73	W. A. Sparks	F. W. Dainty, J. R. Webber, J. Donn	C. S. Currie	Lampport & Holt Line Ltd.
<i>Romney</i> ..	23.10.72	M. J. MacNeil	I. P. Skinner ..	R. Prole	Lampport & Holt Line Ltd.
<i>Ronsard</i> ..	26.2.73	A. M. Watkin	R. R. N. Lang	R. R. N. Laing	F. T. Everard & Sons Ltd.
<i>Rosemary Everard</i> ..	11.11.71	W. G. Hunt	S. W. Gitau, C. R. Finch, R. Smith	G. O. Auld	Hudson Bros. Trawlers Ltd.
<i>Ross Orion</i> ..	27.3.73	A. Osler	T. D. Faithfull, D. Mackrell, M. J. Monger	J. A. Maxwell	Union-Castle Mail S.S. Co. Ltd.
<i>Rothsay Castle</i> ..	18.10.72	J. T. Maltman	D. Matheson, M. H. Boland, P. J. Burrow	J. Newman	Bank Line Ltd.
<i>Rowanbank</i> ..	21.3.73	I. A. McCoy	A. G. Miker, R. Waterton, J. H. Bletsoe	K. Moore	Houlder Bros. & Co. Ltd.
<i>St. Margaret</i> ..	18.12.72	A. W. Cameron	F. P. Gunning, N. C. Stark, T. J. L. Evans	A. P. G. Gray	Furness Withy & Co. Ltd.
<i>St. Merriel</i> ..	19.12.72	W. S. Lewis	K. T. O'Higgins, G. Mapplebeck, P. Reynard	R. T. Jacques	G. Heyn & Sons Ltd.
<i>Sagamore</i> ..	22.1.73	N. A. C. Smith	J. G. Brown ..	J. Steven	Sir Wm. Reardon Smith & Sons Ltd.
<i>Santana</i> ..	27.3.73	E. L. Seaton	J. D. Morrison, J. B. W. Edgar, R. G. Marshall	S. W. Morris	Dept. of Agriculture & Fisheries for Scotland
<i>Sara Lupe</i> ..	11.7.72	A. L. G. Gossett	A. J. Luckett, R. W. Lorains, J. A. Ryan	I. & J. Denholm Ltd.	
<i>Scotia</i> ..	*	G. Caull ..	C. J. Drewitt, B. L. Stewart, D. B. Travis	A. J. Blaydes	Frank C. Strick & Co. Ltd.
<i>Scotspark</i> ..	16.1.73	D. T. Jackson	M. G. Robson, B. J. Ward, P. E. Shaw	P. S. B. Cooper	Shell Tankers (U.K.) Ltd.
<i>Serbistan</i> ..	8.8.72	M. Robinson	P. H. Warne, J. Hagan, G. M. Long	R. J. Mantle	J. & J. Denholm Ltd.
<i>Serenia</i> ..	16.3.73	D. E. Belk		J. J. Smith	Natural Environment Research Council
<i>Severn Bridge</i> ..	16.3.73	I. A. Dunipace			
<i>Shackleton</i> ..	28.12.72	E. M. Bowen			

<i>Shahristan</i> ..	..	19.2.73	L. Liddle	..	M. C. J. Jewell, J. E. Duclet des Rauches, J. A. Scallan, E. E. Currie	W. H. Huer	..	Frank C. Strick & Co. Ltd.
<i>Sheaf Crest</i> ..	..	20.11.72	R. W. Webb	..	R. S. Ashton, B. F. Rogers, T. Stone	W. D. Mullan	..	W. A. Souter & Co. Ltd.
<i>Sheaf Tyne</i> ..	..	21.12.72	M. Bentley	..	P. S. Harvey, P. B. Marshall, R. B. Hurst	R. F. Carron	..	W. A. Souter & Co. Ltd.
<i>Sig Ragne</i> ..	..	26.2.73	N. Campbell	..	J. Morton, W. Orgill, R. Sturrock	S. Walker	..	J. & J. Denholm Ltd.
<i>Silverdon</i> ..	..	31.1.73	A. A. Walker	..	M. N. Osborne, A. S. Green, F. Hanson	D. Duggan	..	Silver Line Ltd.
<i>Silverford</i> ..	..	6.11.72	F. Moorcraft	..	D. W. Brennan, J. Barnes, P. Lewis	D. Duggan	..	Silver Line Ltd.
<i>Silvermain</i> ..	..	26.3.73	J. G. Tew	..	C. Thorpe, T. Wright, N. F. Liddell	E. H. Pringle	..	Silver Line Ltd.
<i>Silverstrand</i> ..	..	13.2.73	J. A. Hirst	..	J. R. Wilde, M. MacDonald, J. D. Robinson	R. J. Felgate	..	Silver Line Ltd.
<i>Silvershore</i> ..	..	17.10.72	J. G. Tew	..	A. D. Preece, V. Isidoro, P. Neville	J. D. Rush	..	Silver Line Ltd.
<i>Sincerity</i> ..	..	1.1.71	H. D. Brown	..	I. C. Hay	A. W. Stephen	..	F. T. Everard & Sons Ltd.
<i>Sir William Hardy</i> ..	..	22.3.73	J. A. Whittleton	..	L. J. Hesketh, M. A. Hill, R. Dowse	M. J. Ellis	..	Ministry of Technology
<i>Somerset</i> ..	..	20.11.72	B. Taylor	..	M. R. Brown, C. S. Marman, T. Cairns	J. S. Hallam	..	P. & O. S.N. Co.
<i>Southern Mingham</i> ..	..	24.10.72	A. Crawford	..	K. P. Wind, I. Alexander, I. Wilson	R. M. Mercer	..	Newington Trawlers Ltd.
<i>Southampton Castle</i> ..	..	19.10.72	M. J. Martin	..	C. A. B. McDonald, I. Swan, A. MacVicar	C. Freeman	..	Union-Castle Mail S.S. Co. Ltd.
<i>Star Acadia</i> ..	..	3.1.73	P. J. E. Charman	..	B. L. Bass, W. F. R. Whiting, P. Yull	R. Jolliffe	..	Anchor Line Ltd.
<i>Star Assyria</i> ..	..	11.12.72	G. Bowman	..	S. N. Marshall, A. Dodds, R. Bracewell	E. A. Dunford	..	Anchor Line Ltd.
<i>Star Pinewood</i> ..	..	22.3.73	M. L. Ogden	..	I. C. Jewitt, G. Farmer, J. Mitchell	A. Baird	..	Wm. France Fenwick & Co. Ltd.
<i>Starworth</i> ..	..	15.1.73	W. McCrae	..	H. Jackson, P. Kilvington	J. Hanly	..	R. S. Dalgliesh Ltd.
<i>Stephano</i> ..	..	29.1.73	L. A. E. Laurent	..	J. D. Nicholson, M. D. Davidson, P. Boyce, P. Bennett	V. P. Dalton	..	Bowring S.S. Co. Ltd.
<i>Striding Bridge</i> ..	..	1.6.72	L. C. Kingswood	..	G. Combe, J. Reeves, S. Bowles	J. C. Thompson	..	J. & J. Denholm Ltd.
<i>Strathardle</i> ..	..	1.11.72	D. J. Harrison	..	G. Pettingell, I. Macdonald, N. Langrish	R. A. Wignall	..	P. & O. S.N. Co.
<i>Strathbrora</i> ..	..	5.5.72	R. D. Jones	..	A. Henwood, W. E. P. Downing, R. C. Lescombe	D. J. Atkinson	..	P. & O. S.N. Co.
<i>Strathconon</i> ..	..	14.12.72	J. E. Leaver	..	I. C. Gravatt, O. T. Stephenson, T. L. J. Evans	A. G. Cracknall	..	Shaw Savill & Albion Co. Ltd.
<i>Suevic</i> ..	..	1.2.73	B. E. Evans	..	G. P. Ansell, T. A. Smith, C. B. Walton	P. C. Tolcher	..	Sugar Line Ltd.
<i>Sugar Crystal</i> ..	..	29.1.73	D. N. L. Thomson	..	I. G. Robertson, R. E. Easley, R. A. Lockhart-Smith	R. B. Woods	..	Sugar Line Ltd.
<i>Sugar Exporter</i> ..	..	4.1.73	G. N. Pirie	..	J. Ford, A. Longbottom	P. A. Bowen	..	Sugar Line Ltd.
<i>Sugar Importer</i> ..	..	28.3.73	N. S. Lancaster	..	C. E. Houghton, G. J. B. Leith, F. E. Brown	B. Milliken	..	Sugar Line Ltd.
<i>Sugar Producer</i> ..	..	16.11.72	A. F. Lunn	..	A. W. Smith, W. Cowan, S. Dixon	P. I. Hartwell	..	Sugar Line Ltd.
<i>Sugar Refiner</i> ..	..	22.1.73	W. G. Hunt	..	A. MacIntyre, L. Dollin	L. Dollin	..	Sugar Line Ltd.
<i>Sugar Transporter</i> ..	..	..	J. Reid	..	R. C. Palmer, R. M. Exelby, A. Leachman, C. Rollaston	R. J. Harris	..	F. T. Everard & Sons Ltd.
<i>Summit</i> ..	..	..	K. J. Lyall	..	J. H. Lewis, C. R. S. Wall, B. E. Crowden	D. S. M. Spence	..	P. & O. S.N. Co.
<i>Sussex</i> ..	..	..	A. M. Jenkins	..	D. W. Parke, G. Phillips, C. A. Baker	W. J. Roberts	..	Bowring S.S. Co. Ltd.
<i>Sydney Bridge</i> ..	..	..	T. W. D. John	..	A. A. McCalmont, M. C. Hurst, N. P. Epps	F. G. Taylor	..	Frank C. Strick & Co. Ltd.
<i>Tabaristan</i> ..	..	..	H. P. Roberts	..	T. H. Kyi, L. Johnson, B. S. Dean	D. P. Hammond	..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Tacoma City</i> ..	..	..	T. E. Kelso	..	A. Hamilton, D. Newham, I. Hyndmarsh	J. S. Murray	..	T. & J. Harrison Ltd.
<i>Tactician</i> ..	..	..	G. Bowman	..	I. O. Bease, J. M. Hughes, I. A. Hale, P. Tillman	D. Griffith	..	P. & O. S.N. Co.
<i>Tairea</i> ..	..	..	R. J. Paterson	..	P. Moodie, P. E. Tann, J. A. Bielawski	R. Greaves	..	R. S. Dalgliesh Ltd.
<i>Tamworth</i> ..	..	..	E. F. H. Allen	..	R. Walker, A. J. Ward, M. A. Barnett	D. Griffith	..	Ocean Fleets Ltd.
<i>Tantalus</i> ..	..	..	I. J. Tait	..	— Hicks, — Garnham, — Thompson	M. J. Morrall	..	Blue Star Line Ltd.
<i>Tasmania Star</i> ..	..	..	A. C. Rollinson	..	D. K. MacCorquodale, P. Scarrott, P. Simpson	C. J. Elliott	..	P. & O. S.N. Co.
<i>Taupo</i> ..	..	..	P. B. Hall	..	D. C. Vatch, A. Peeble, J. A. Macdonald	C. M. Cumming	..	Whitco Marine Services Ltd.
<i>Teeside Clipper</i> ..	..	..	T. P. Edge	..	J. C. Gillespie, L. M. Hocking, G. Dobbie, J. Mackie	D. W. Humble	..	P. & O. S.N. Co.
<i>Temple Arch</i> ..	..	..	A. B. Osborne	..	D. J. Campbell, I. G. Booker, C. S. Collings	S. J. Ashcroft	..	Scottish Ship Management Ltd.
<i>Temple Bar</i> ..	..	..	R. S. Hawkins	..	D. Roberts, J. Knights, P. F. Priestley, T. Page	G. I. Beveridge	..	Scottish Ship Management Ltd.
<i>Teutobank</i> ..	..	..	J. Walker	..	J. W. Archbold, R. C. Cottam, A. J. C. Metcalf	G. Rutherford	..	Bank Line Ltd.
<i>Texaco Brussels</i> ..	..	..	P. N. Blaney	..	G. J. Steed, D. Eadie, D. Campton	C. F. Page	..	Texaco Overseas Tankship (U.K.) Ltd.
<i>Texaco Durham</i> ..	..	..	R. G. A. Barnes	..	R. A. Russell, J. Campbell, R. R. Brooks	G. Cockburn	..	Texaco Overseas Tankship (U.K.) Ltd.
<i>Texaco Gloucester</i> ..	..	..	J. Hutton	..	D. T. Ali, M. J. Harness	..	..	Texaco Overseas Tankship (U.K.) Ltd.
<i>Texaco Saigon</i> ..	..	..	..	..	..	..	..	Blue Star Line Ltd.
<i>Timaru Star</i> ..	..	..	..	..	..	..	..	..

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
Titan ..	22.1.73	D. Hayward ..	M. L. M. Smith, D. J. Johnson, H. M. Thompson ..	P. D. Stapleton ..	Ocean Fleets Ltd.
Tokyo Bay ..	21.2.73	D. H. Stewart, R.D. ..	M. J. Hindley, J. P. Duncan, A. J. Palmer ..	K. Bent ..	Ocean Fleets Ltd.
Tongariro ..	30.10.72	J. A. North ..	J. C. Blattman, C. J. Roberts, R. C. Slater, N. Benson ..	R. Cormie ..	P. & O. S.N. Co.
Toronto City ..	9.2.72	P. Saunders ..	J. R. P. O. Magner, M. R. Robins, R. N. Bell ..	M. D. O'Brien ..	Bibby Line Ltd.
Townsville Star ..	26.3.73	H. K. Dyer ..	J. Franklyn, M. Jarvis, D. Sayle ..	D. Caws ..	Blue Star Line Ltd.
Trader ..	*	M. Watson ..	I. Pickup, M. Hudson, D. Skillander ..	P. Neve ..	T. & J. Harrison Ltd.
Trebartha ..	7.12.72	L. J. Lennox ..	R. C. Avenun, R. J. Cape, T. E. McLaren ..	D. Keohane ..	P. & O. S.N. Co.
Trecarne ..	31.7.72	L. E. Quigley ..	A. P. Singh, G. Cowling, S. R. E. Pardon ..	N. Dunbar ..	P. & O. S.N. Co.
Trefusis ..	9.3.73	F. L. Newell, M.B.E. ..	B. B. Curum ..	F. McLoghlin ..	P. & O. S.N. Co.
Tremedown ..	26.10.70	F. L. Newell, M.B.E. ..	T. E. Clark, R. Stephenson, T. Raddings, C. Flanagan ..	D. B. O'Donoghue ..	P. & O. S.N. Co.
Treneglos ..	13.11.72	L. J. Annett ..	T. J. Sears, A. Kitchenham, C. Kinnard ..	B. A. Fitzsimmons ..	P. & O. S.N. Co.
Trewidden ..	2.2.73	W. J. Perkins ..	W. V. Venning, J. N. Cracknell, M. B. Wdowikowski ..	J. Smith ..	P. & O. S.N. Co.
Troll Park ..	21.3.73	H. McDonald ..	C. W. Harvey, P. R. Marshall, D. J. Agnew ..	K. Lacey ..	I. & J. Denholm Ltd.
Tropic ..	17.10.72	S. D. Gibson ..	A. J. Saunders, P. Weldon ..	G. S. Thomson ..	Furness Withy & Co. Ltd.
Turakina ..	22.3.73	J. Hellings ..	W. Harris, A. R. Tinsley, H. M. Munro ..	R. Glasson ..	P. & O. S.N. Co.
Turkistan ..	20.2.73	P. W. Filceck ..	P. B. Doyle, D. F. Gates ..	G. S. Thomson ..	Frank C. Strick & Co. Ltd.
Uganda ..	1.5.72	E. C. Plowman ..	A. R. P. Geels, P. H. Daniel, A. Orford ..	L. K. Dillon ..	British India S.N. Co. Ltd.
Ulster Star ..	21.11.72	A. H. White ..	I. Pearsall, G. J. Waldron, M. Gater ..	G. Thomas ..	Blue Star Line Ltd.
Vancouver City ..	19.3.73	M. J. Higgins ..	S. A. Huise, G. J. Watt, P. Cooper ..	D. Waller ..	Sir Wm. Reardon Smith & Sons Ltd.
Vancouver Forest ..	19.1.73	A. M. Blair ..	G. Bowie, L. Buchanan, R. Montgomery, R. Cale ..	M. H. Taylor ..	J. & J. Denholm Ltd.
Vancouver Island ..	5.3.73	B. Hill ..	D. Wood, C. Mallet, E. Harnes ..	G. W. Burke ..	J. & J. Denholm Ltd.
Vancouver Trader ..	*	G. A. Anderson ..	J. Henderson, K. Gelley, D. Smith ..	D. Wilkinson ..	Haverton Shipping Ltd.
Varda ..	9.6.72	G. Carmichael ..	A. Cumpatey, C. T. Doak, P. G. Allen ..	C. D. McNeilly ..	Shell Tankers (U.K.) Ltd.
Venassa ..	15.2.73	I. A. McCulloch ..	T. G. Tobiasen, I. P. T. Mathias, R. Bancroft ..	R. Cunningham ..	Mavroleon Bros. Ltd.
Victore ..	26.2.73	D. C. Griffith-Jones ..	I. R. Francis, D. L. Bell, J. R. Curry ..	S. C. Horne ..	Sir Wm. Reardon Smith & Sons Ltd.
Victoria City ..	28.12.72	G. Griffiths ..	M. J. Pearson, D. W. Clements, D. Spargo ..	J. M. Ahern ..	Shell Tankers (U.K.) Ltd.
Votatella ..	14.9.72	M. R. M. Seale ..	A. G. Lydell, D. R. Parkinson, D. Shelton ..	Tsang Che Chin ..	China Navigation Co. Ltd.
Wairua ..	8.5.72	A. Hudson ..	M. C. Ingram, K. Cribbin ..	H. Williams ..	Bibby Line Ltd.
Welsh City ..	17.10.72	J. Vaughan ..	A. C. K. Rawson ..	C. W. Murray ..	Sir Wm. Reardon Smith & Sons Ltd.
Welsh Herald ..	2.11.71	W. Knight ..	S. E. H. Wigley, A. L. Bath, R. N. Bell ..	J. C. Cortier ..	Welsh Ore Carriers Ltd.
Westminster Bridge ..	5.2.73	I. W. Waldie ..	N. I. Horobin, R. A. M. Leighton, M. J. Charlesworth ..	B. J. F. Adkin ..	P. & O. S.N. Co.
Westmorland ..	13.2.73	I. V. Batley ..	D. M. Burn, A. McDonald ..	E. C. Madders ..	S. William Coe & Co. Ltd.
Whitethorn ..	27.11.72	M. Hegarty ..	R. Stephenson, E. G. Dixon, R. K. Blake ..	J. Hegarty ..	Bank Line Ltd.
Wild Ark ..	1.2.73	E. T. Rowland ..	T. G. Bailey, A. W. Mackay, P. K. Leppington ..	J. Blackwell ..	Union-Castle Mail S.S. Co. Ltd.
Willowbank ..	30.10.72	H. J. Taylor ..	P. B. Ashcroft, A. Wigham, L. Morris ..	U. Chun Yee ..	China Navigation Co. Ltd.
Windsor Castle ..	20.3.73	R. M. Wright ..	C. S. Moir, J. L. Simpson, K. Strudwick ..	M. J. O'Brien ..	Bibby Line Ltd.
Woosung ..	23.1.73	J. H. Gomersall ..	J. Gooding, A. F. Lightfoot, K. P. J. Bowers ..	R. J. MacDonald ..	Bank Line Ltd.
Worcestershire ..	*	M. J. Horn ..	D. Carmichael, I. Bryan, F. J. Rogers ..	A. Young ..	Shell Tankers (U.K.) Ltd.
Yeabank ..	26.10.72	G. F. Smith ..	P. N. Ralph, P. F. Gill, J. A. Legg, C. T. O'Connell ..	J. E. Blane ..	Shaw Savill & Albion Co. Ltd.
Zaphon ..	14.3.72	P. I. Blackshaw ..	P. H. R. Mehner, J. E. Flood, R. J. Eastwood ..	..	..
Zealandic ..	18.12.72	M. Larrive ..	..	..	..

Supplementary Ships

NAME OF VESSEL	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Apollo</i> ..	11.12.72	G. V. Barnes	W. R. Kays, E. Foley, B. Thompson	J. Masterman ..	Bristol S.N. Co. Ltd.
<i>Arcadian</i> ..	1.1.73	A. S. Matheson	A. Hood, P. W. Rowe, B. Bowden ..	P. J. Fensome	Ellerman Lines Ltd.
<i>Baltic Vanguard</i> ..	17.10.72	J. C. Collins	I. Chester, D. Saunders	B. W. Matten ..	United Baltic Co. Ltd.
<i>Baltic Venture</i> ..	19.7.72	R. Kreamer	A. N. Smith, M. Huxwith, M. A. Collins	R. Jones	United Baltic Co. Ltd.
<i>British Destiny</i> ..	29.12.72	W. V. Frost	C. T. Henningway, R. MacD. Maur, A. G. M. Hepburn	P. J. Abdey	B.P. Tanker Co. Ltd.
<i>British Energy</i> ..	4.1.73	D. C. Dalton	E. J. Turner	W. Jeffries	B.P. Tanker Co. Ltd.
<i>British Fern</i> ..	•	G. S. Willis	N. Shepherd, C. Shirer, I. Storie, C. Watson	J. Yates	B.P. Tanker Co. Ltd.
<i>British Kastrel</i> ..	15.11.72	N. A. Roberts	R. A. Forsyth, M. Weller	J. A. Smith	B.P. Tanker Co. Ltd.
<i>British Mallard</i> ..	19.9.72	R. Crombie	R. D. Neely, C. Mills, R. Marsh	S. M. McPaul	B.P. Tanker Co. Ltd.
<i>British Patrol</i> ..	9.1.73	R. Towell	R. Williams, P. Partington, J. F. Coyne	R. B. Hoskins	B.P. Tanker Co. Ltd.
<i>British Reliance</i> ..	28.12.72	C. O. Picken	I. J. Harries, J. F. S. Axe, A. J. Lange	P. B. Bradley ..	B.P. Tanker Co. Ltd.
<i>British Robin</i> ..	•	A. Woodcock	W. Hopkins	E. R. LeGear ..	Ellerman Lines Ltd.
<i>British Swift</i> ..	•	P. J. Burtleigh	J. Fraser, R. Gibson, D. Campbell ..	•	•
<i>City of Delhi</i> ..	22.1.73	K. MacLean	B. W. Gott, R. N. Gardener	•	•
<i>Echo</i> ..	10.10.72	J. L. Jenkins	D. G. Green ..	•	•
<i>Esso Lancashire</i> ..	5.8.70	I. Baskerville	A. Roberts	•	•
<i>Ethel Everard</i> ..	•	H. O. Roberts	A. M. Howard, J. Gill, J. MacArdle	•	•
<i>Garrybank</i> ..	•	W. W. Davies	A. Ramsay	•	•
<i>Ilorn Palm</i> ..	28.12.72	N. C. Swan	P. W. Bennett, D. Lewis, C. Bridges	•	•
<i>Imvincible</i> ..	17.2.72	R. Waller	J. S. Hallam ..	•	•
<i>Jelunga</i> ..	3.1.73	P. G. Farrell	C. Sheen	•	•
<i>Joseph Conrad</i> ..	4.9.72	E. R. Wooldridge	G. W. Taylor ..	•	•
<i>Lady Parkes</i> ..	14.12.72	P. E. Craven	G. R. Smith ..	•	•
<i>Lord Nelson</i> ..	26.3.71	N. E. Longthorp	J. Hind	•	•
<i>Marbella</i> ..	13.3.69	S. Christy	N. Whiteoak, A. Charlesworth, A. W. Knight	•	•
<i>Marella</i> ..	14.9.72	A. M. Andrews	D. M. Garden	•	•
<i>Methane Princess</i> ..	9.1.73	R. Lumsden	A. Johnson, M. J. Whichelow	•	•
<i>Methane Progress</i> ..	9.8.71	R. T. Watson	D. P. Bell, R. T. Atkins, T. Pickard	•	•
<i>Mobil Acme</i> ..	2.2.72	A. R. Goddard	P. D. Kelly, C. M. Wilton, M. Larkin, N. Holman	•	•
<i>Mobil Endurance</i> ..	2.11.72	R. A. Gale	B. McGrath, G. Kelly	•	•
<i>Mobil Energy</i> ..	9.1.73	J. George	R. Baillie ..	•	•
<i>Mobil Pegasus</i> ..	19.10.72	W. Wilson	S. B. Barr	•	•
<i>Northella</i> ..	31.1.72	W. Harris	G. J. S. Ives, M. Kirk	•	•
<i>Northern Reward</i> ..	•	C. Cunningham	D. Latter, R. Upsdell, J. Hopkin	•	•
<i>Oil Supplier</i> ..	•	S. D. Mayl	G. R. Smith ..	•	•
<i>Orchidea</i> ..	29.12.72	D. Atkinson	Chan Chi Yuen	•	•
<i>Primella</i> ..	31.12.71	G. Whurr ..	A. H. Giles, N. J. Munro, W. J. Butcher	•	•
<i>Ross Implacable</i> ..	26.10.72	J. A. Appleby	H. G. Pask ..	•	•
<i>Roybank</i> ..	3.7.72	J. W. Humphrey	P. M. Denehy	•	•
<i>St. Giles</i> ..	29.8.72	T. Doyle ..	K. C. Stone, H. G. Pask	•	•
<i>St. Jason</i> ..	21.11.72	P. Grayburn	M. Winter	•	•
<i>St. Jasper</i> ..	29.12.72	W. Gouldson	R. T. Murphy	•	•
<i>St. Leger</i> ..	28.12.72	A. T. Blenkin	M. R. Bowler, B. T. Wood, M. Johnson, R. G. O. Hason	•	•
<i>St. Loman</i> ..	10.5.72	C. Hansen	J. Brennan, P. Bannison, C. J. Rolling	•	•
<i>Sangro</i> ..	8.11.72	I. Walker	T. Brunaugh	•	•
<i>Scottish Waza</i> ..	•	H. Roberts	J. Q. Lees, M. J. Crocker, C. R. Jenkins	•	•
<i>Serenity</i> ..	27.10.72	J. Mulligan	•	•	•
<i>Stolt Tudor</i> ..	•	•	•	•	•

Trawlers

The following is a list of trawler skippers and radio operators who voluntarily observe and report those elements of the weather which do not entail the use of any meteorological instruments (irrespective of the vessel in which they sail).

SKIPPER	RADIO OPERATOR	OWNER/MANAGER
W. Ball	B. Rowbotham	B. A. Parkes
J. C. Gibson	K. H. Massey	T. Hamling & Co. Ltd.
P. Grayburn	J. Beasty	Firth Steam Trawling Co. Ltd.
H. Hall	A. Sheridan	Northern Trawlers Ltd.
J. R. Nelson	K. Ward	T. Hamling & Co. Ltd.
R. Pepper	P. R. Hickson	Northern Trawlers Ltd.
J. A. Williams	G. A. Ellis	Boyd Line Ltd.

Light-vessels

NAME OF VESSEL	MASTERS
<i>Dowsing</i>	A. S. Richards, R. Halfnight
<i>East Goodwin</i>	B. E. Nobes, F. J. Shilling
<i>Falls</i>	H. R. Barnes, A. H. Robinson
<i>Galloper</i>	E. Marsden, D. E. Jeager
<i>Humber</i>	F. W. Grice, S. F. Goose
<i>Newarp</i>	G. A. Harris, L. R. Long
<i>North Carr</i>	J. Leask
<i>Royal Sovereign</i> (Lt. Tower) ..	A. T. Whiston, W. F. Fagg
<i>St. Gowan</i>	S. R. Woolrough, H. J. Warnes
<i>Seven Stones</i>	A. W. Allum, T. G. Northcott
<i>Shipwash</i>	W. G. Burroughs, R. Cadman
<i>South Rock</i>	D. Hawkins, S. E. Griffin
<i>Smith's Knoll</i>	F. Harrison, F. George
<i>Varne</i>	G. Kozak, F. Betts

‘Marid’ Ships

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

NAME OF VESSEL	CAPTAIN	OWNER/MANAGER
<i>Ashington</i>	R. Atkinson	Stephenson Clarke Shipping Ltd.
<i>Avalon</i>	W. F. Bramhill	British Railways Board
<i>Bardic Ferry</i>	C. K. Hughey	Atlantic S.N. Co. Ltd.
<i>Brenda</i>	J. Henderson	Dept. of Agriculture & Fisheries for Scotland
<i>Brian Boroime</i>	J. Peters	British Railways Board
<i>Caesarea</i>	B. A. Caws	British Railways Board
<i>Caernarvonbrook</i>	W. V. Taylor	Comben Longstaff & Co. Ltd.
<i>Cambria</i>	J. R. Rowlands	British Railways Board
<i>Cerdic Ferry</i>	A. D. Young	Atlantic S.N. Co. Ltd.
<i>Claymore</i>	A. Campbell	David MacBrayne Ltd.
<i>Corbank</i>	A. H. Lamming	Cory Maritime Ltd.
<i>Doric Ferry</i>	R. Hockings	Atlantic S.N. Co. Ltd.
<i>Dorset Coast</i>	D. Anderson	Coast Lines Ltd.
<i>Dragon</i>	P. F. Stoddart	Southern Ferries Ltd.
<i>Duke of Argyll</i>	L. C. Mills	British Railways Board
<i>Duke of Lancaster</i>	J. D. Nash	British Railways Board
<i>Duke of Rothesay</i>	H. H. Coney	British Railways Board
<i>Eileen M</i>	C. Cadogan	Metcalf Motor Coasters Ltd.
<i>Ferryhill II</i>	J. Innes	Aberdeen Coal & Shipping Co.
<i>Fingal</i>	R. McEachern	Northern Lighthouse Board
<i>Frampton dyke</i>	H. Upperton	Klondyke Shipping Co. Ltd.
<i>Hamble</i>	N. MacLeod	Shell-Mex & B.P. Ltd.
<i>Hebrides</i>	J. Hodgson	David MacBrayne Ltd.
<i>Helmsdale</i>	A. F. Ross	Northern Trading Co. Ltd.
<i>Hesperus</i>	F. K. Davidson	Northern Lighthouse Board
<i>Hibernia</i>	R. I. Griffith	British Railways Board
<i>Ionic Ferry</i>	W. Close	Atlantic S.N. Co. Ltd.
<i>Lairdsfox</i>	N. McIntyre	Burns & Laird Lines Ltd.
<i>Lairdsglen</i>	A. Palmer	Burns & Laird Lines Ltd.
<i>Loch Carron</i>	J. McKinnon	David MacBrayne Ltd.
<i>Loch Dunvegan</i>	A. C. Mathieson	David MacBrayne Ltd.
<i>Malling</i>	A. Gardner	Stephenson Clarke Shipping Ltd.
<i>Moyle</i>	N. McAskill	Shamrock Shipping Co.
<i>Navigator</i>	R. D. Yell	Decca Navigator Co. Ltd.
<i>Penelope Everard</i>	H. Wadhams	F. T. Everard & Sons Ltd.
<i>Pharos</i>	M. Fraser	Northern Lighthouse Board
<i>Pointer</i>	— Sanders	Burns & Laird Lines Ltd.
<i>Pole Star</i>	G. Reid	Northern Lighthouse Board
<i>Portelet</i>	D. McFaul	Onesimus Dorey (1972) Ltd.
<i>Rhodri Mawr</i>	O. W. Jones	British Railways Board
<i>St. Clair</i>	J. Johnstone	North of Scotland Shipping Co. Ltd.
<i>St. David</i>	D. O. Griffiths	British Railways Board
<i>St. George</i>	S. E. Dale	British Railways Board
<i>St. Patrick</i>	N. Deadman	British Railways Board
<i>Sarnia</i>	H. Walker	British Railways Board
<i>Scarba</i>	P. R. S. Burn	Dept. of Agriculture & Fisheries for Scotland
<i>Slieve Donard</i>	A. Robertson	British Railways Board
<i>Spray</i>	A. Cockburn	Ellis & McHardy Ltd.
<i>Stormont</i>	E. Knight	Belfast S.S. Co. Ltd.
<i>Sussexbrook</i>	W. Taylor	County Ships Ltd.
<i>Torquay</i>	J. Smith	J. D. Davidson Ltd.
<i>Ulster Queen</i>	W. W. Lucas	Belfast S.S. Co. Ltd.
<i>Westminsterbrook</i>	J. H. Shaw	Comben Longstaff & Co. Ltd.
<i>William J. Everard</i>	M. B. Elsey	F. T. Everard & Sons Ltd.

BRITISH COMMONWEALTH

The following lists give the name of Selected and Supplementary Ships, and the number of Auxiliary Ships where known (i.e., those which only report when in 'sparse areas'), which voluntarily co-operate with meteorological services of the British Commonwealth.

Information for these lists is required by 10th April each year. Information for the January corrective lists is required by 10th October each year.

AUSTRALIA (Information dated 23.1.73)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>Abel Tasman</i>	Abel Tasman Shipping Co. Pty. Ltd.
<i>Al Mahrosa</i>	Kuwait S.S. Co. Ltd.
<i>Al-Kuwait</i>	Kuwait S.S. Co. Ltd.
<i>Andros</i>	Australian West Pacific Line
<i>Arafura</i>	Overseas Containers Australia Pty. Ltd.
<i>Ariake</i>	Overseas Containers Australia Pty. Ltd.
<i>Australian Exporter</i>	Australian National Line
<i>Australian Endeavour</i>	Australian National Line
<i>Australian Enterprise</i>	Australian National Line
<i>Belle Isle</i>	Karlander New Guinea Line Ltd.
<i>Beroona</i>	Western Australian Coastal Shipping Commission
<i>Bogong</i>	Associated S.S. Pty. Ltd.
<i>BP Endeavour</i>	B.P. Tankers Co. Ltd.
<i>BP Enterprise</i>	B.P. Tankers Co. Ltd.
<i>Cape Don</i>	Dept. of Shipping & Transport, Australia
<i>Cape Pillar</i>	Dept. of Shipping & Transport, Australia
<i>Carpentaria</i>	P. & O. Lines of Australia
<i>Cathay</i>	P. & O. Lines of Australia
<i>Cenpac Rounder</i>	Nauru Pacific Shipping Line
<i>Centaur</i>	Ocean Fleets Ltd.
<i>Chakdina</i>	P. & O. Lines of Australia
<i>Chakraia</i>	P. & O. Lines of Australia
<i>Chitral</i>	P. & O. Lines of Australia
<i>Citos</i>	Australian West Pacific Line
<i>Clutha Capricorn</i>	Clutha Development Pty. Ltd.
<i>Clutha Oceanic</i>	Clutha Development Pty. Ltd.
<i>Coral Chief</i>	China Navigation Co. Ltd.
<i>Eigamoiya</i>	Nauru Pacific Shipping Line
<i>Empress of Australia</i>	Australian National Line
<i>Enna G</i>	Nauru Pacific Shipping Line
<i>Eso Gippsland</i>	Eso Standard Oil (Australia) Ltd.
<i>Guavacore</i>	Maritime Fruit Carriers Pty. Ltd.
<i>Iron Cavalier</i>	Broken Hill Pty. Co. Ltd.
<i>Iron Dampier</i>	Broken Hill Pty. Co. Ltd.
<i>Iron Flinders</i>	Broken Hill Pty. Co. Ltd.
<i>Iron Kimberley</i>	Broken Hill Pty. Co. Ltd.
<i>Iron Yampi</i>	Broken Hill Pty. Co. Ltd.
<i>Island Chief</i>	China Navigation Co. Ltd.
<i>Kangaroo</i>	Western Australian Coastal Shipping Commission
<i>Kanumbra</i>	Union Bulkships Pty. Ltd.
<i>Koolama</i>	Western Australian Coastal Shipping Commission
<i>Koorunga</i>	Union Bulkships Pty. Ltd.
<i>Lemnos</i>	Australian West Pacific Line
<i>Malaysia</i>	Austasia Line Ltd.
<i>Manoora</i>	Union Bulkships Pty. Ltd.
<i>Manora</i>	P. & O. Lines of Australia
<i>Matthew Flinders</i>	Flinders Shipping Co. Pty. Ltd.
<i>Merkara</i>	P. & O. Lines of Australia
<i>Milos</i>	Australian West Pacific Line
<i>Moana Raoi</i>	Government of the Gilbert & Ellice Islands Colony
<i>Morvada</i>	P. & O. Lines of Australia
<i>Nanchang</i>	China Navigation Co. Ltd.
<i>New Guinea Chief</i>	China Navigation Co. Ltd.
<i>Nimos</i>	Containers Pacific Express Line
<i>Ore Regent</i>	Clutha Development Pty. Ltd.
<i>Papuan Chief</i>	China Navigation Co. Ltd.
<i>Port St. Lawrence</i>	Port Line Ltd.
<i>Rhexenor</i>	Ocean Fleets Ltd.
<i>Rosie D</i>	Nauru Pacific Shipping Line
<i>Safia</i>	Karlander New Guinea Line Ltd.
<i>Salamaua</i>	Karlander New Guinea Line Ltd.
<i>Samos</i>	Australian West Pacific Line
<i>Sariba</i>	Karlander New Guinea Line Ltd.
<i>Stentor</i>	Ocean Fleets Ltd.
<i>Tauloto</i>	Pacific Navigation Co. Ltd.
<i>Temple Hall</i>	British Phosphate Commissioners
<i>Teesta</i>	P. & O. Lines of Australia
<i>Tenos</i>	Containers Pacific Express Line
<i>Thorsorient</i>	Norse Orient Line
<i>Triadic</i>	British Phosphate Commissioners
<i>Tri-Ellis</i>	British Phosphate Commissioners
<i>Troubridge</i>	South Australian Government
<i>Wambiri</i>	Western Australian Coastal Shipping Commission
<i>Wongala</i>	Tucker Shipping Pty. Ltd.
Supplementary Ships:	
<i>Bass Trader</i>	Australian National Line
<i>Lady Christine</i>	Dept. of National Development, Australia

INDIA (Information dated 1.4.73)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>Andamans</i>	Shipping Corporation of India Ltd.
<i>Dumra</i>	British India S.N. Co. Ltd.
<i>Dwarka</i>	British India S.N. Co. Ltd.
<i>Indian Reliance</i>	India S.S. Co. Ltd.
<i>Indian Renown</i>	India S.S. Co. Ltd.
<i>Indian Security</i>	India S.S. Co. Ltd.
<i>Indian Success</i>	India S.S. Co. Ltd.
<i>Jag Kisan</i>	Great Eastern Shipping Co. Ltd.
<i>Jaladhanya</i>	Scindia S.N. Co. Ltd.
<i>Jaladharna</i>	Scindia S.N. Co. Ltd.
<i>Jaladukita</i>	Scindia S.N. Co. Ltd.
<i>Jaladhruv</i>	Scindia S.N. Co. Ltd.
<i>Jalaganga</i>	Scindia S.N. Co. Ltd.
<i>Jalagouri</i>	Scindia S.N. Co. Ltd.
<i>Jalajawahar</i>	Scindia S.N. Co. Ltd.
<i>Jalakanta</i>	Scindia S.N. Co. Ltd.
<i>Jalakrishna</i>	Scindia S.N. Co. Ltd.
<i>Jalapalaka</i>	Scindia S.N. Co. Ltd.
<i>Jalavikram</i>	Scindia S.N. Co. Ltd.
<i>Jalavishnu</i>	Scindia S.N. Co. Ltd.
<i>Jalazad</i>	Scindia S.N. Co. Ltd.
<i>Karanja</i>	British India S.N. Co. Ltd.
<i>Lok Sevak</i>	Mogul Line Ltd.
<i>Maharaja</i>	South East Asia Shipping Co. Ltd.
<i>Mahavikram</i>	South East Asia Shipping Co. Ltd.
<i>Mohammedi</i>	Mogul Line Ltd.
<i>Mozaffari</i>	Mogul Line Ltd.
<i>Nicobar</i>	Shipping Corporation of India Ltd.
<i>Rajula</i>	British India S.N. Co. Ltd.
<i>Saudi</i>	Mogul Line Ltd.
<i>State of Assam</i>	Shipping Corporation of India Ltd.
<i>State of Bihar</i>	Shipping Corporation of India Ltd.
<i>State of Gujarat</i>	Shipping Corporation of India Ltd.
<i>State of Haryana</i>	Shipping Corporation of India Ltd.
<i>State of Kutch</i>	Shipping Corporation of India Ltd.
<i>State of Maharashtra</i>	Shipping Corporation of India Ltd.
<i>State of Orissa</i>	Shipping Corporation of India Ltd.
<i>State of Tamilnadu</i>	Shipping Corporation of India Ltd.
<i>State of Tr. Cochin</i>	Shipping Corporation of India Ltd.
<i>State of Uttar Pradesh</i>	Shipping Corporation of India Ltd.
<i>Vishva Maya</i>	Shipping Corporation of India Ltd.
<i>Vishva Prabha</i>	Shipping Corporation of India Ltd.
<i>Vishva Sudha</i>	Shipping Corporation of India Ltd.
Supplementary Ships:	
<i>Akash Maru</i>	New India Fisheries
<i>Akhar</i>	Mogul Line Ltd.
<i>Akbar Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Apj Akash</i>	Apeejay Line Ltd.
<i>Apj Ambika</i>	Apeejay Line Ltd.
<i>Apj Anjali</i>	Apeejay Line Ltd.
<i>Apj Sushma</i>	Apeejay Line Ltd.
<i>Bailadila</i>	Shipping Corporation of India Ltd.
<i>Bande Nawaz</i>	Hind Agencies Ltd.
<i>Barauni</i>	Shipping Corporation of India Ltd.
<i>Bellary</i>	Shipping Corporation of India Ltd.
<i>Bhaskara Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Chanakya Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Chennai Selvam</i>	South India Shipping Corporation
<i>Chudambaram</i>	Shipping Corporation of India Ltd.
<i>Cosmos Pioneer</i>	Cosmosteels Private Ltd.
<i>Damodar Zuari</i>	Damodar Bulk Carriers Ltd.
<i>Desh Bandhu</i>	Shipping Corporation of India Ltd.
<i>Gandhi Jayanti</i>	Jayanti Shipping Co. Ltd.
<i>Indian Endeavour</i>	India S.S. Co. Ltd.
<i>Indian Industry</i>	India S.S. Co. Ltd.
<i>Indian Resolve</i>	India S.S. Co. Ltd.
<i>Indian Resource</i>	India S.S. Co. Ltd.
<i>Indian Splendour</i>	India S.S. Co. Ltd.
<i>Indian Strength</i>	India S.S. Co. Ltd.
<i>Indian Tradition</i>	India S.S. Co. Ltd.
<i>Indian Tribune</i>	India S.S. Co. Ltd.
<i>Indian Triumph</i>	India S.S. Co. Ltd.
<i>Indian Trust</i>	India S.S. Co. Ltd.
<i>Indian Valour</i>	India S.S. Co. Ltd.
<i>Indian Venture</i>	India S.S. Co. Ltd.
<i>Jag Anand</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Anjali</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Arti</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Asha</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Dev</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Jawan</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Jwala</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Jyoti</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Laxmi</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Ratna</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Ravi</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Rekha</i>	Great Eastern Shipping Co. Ltd.
<i>Jag Vijay</i>	Great Eastern Shipping Co. Ltd.

INDIA (contd.)

NAME OF VESSEL	OWNER/MANAGER
Jagat Neta	Dempo S.S. Ltd.
Jagat Swamini	Dempo S.S. Ltd.
Jagat Vijeta	Dempo S.S. Ltd.
Jaladharati	Scindia S.N. Co. Ltd.
Jaladhir	Scindia S.N. Co. Ltd.
Jaladurga	Scindia S.N. Co. Ltd.
Jaladuta	Scindia S.N. Co. Ltd.
Jalagirija	Scindia S.N. Co. Ltd.
Jalagomati	Scindia S.N. Co. Ltd.
Jalagopal	Scindia S.N. Co. Ltd.
Jalayoti	Scindia S.N. Co. Ltd.
Jalakala	Scindia S.N. Co. Ltd.
Jalakendra	Scindia S.N. Co. Ltd.
Jalakirti	Scindia S.N. Co. Ltd.
Jalamangal	Scindia S.N. Co. Ltd.
Jalamani	Scindia S.N. Co. Ltd.
Jalamatsya	Scindia S.N. Co. Ltd.
Jalamayur	Scindia S.N. Co. Ltd.
Jalamohan	Scindia S.N. Co. Ltd.
Jalamorari	Scindia S.N. Co. Ltd.
Jalamoti	Scindia S.N. Co. Ltd.
Jalapankhi	Scindia S.N. Co. Ltd.
Jalarajan	Scindia S.N. Co. Ltd.
Jalarashmi	Scindia S.N. Co. Ltd.
Jalaratna	Scindia S.N. Co. Ltd.
Jalatarang	Scindia S.N. Co. Ltd.
Jalaveera	Scindia S.N. Co. Ltd.
Jalayamuna	Scindia S.N. Co. Ltd.
Jawaharlal Nehru	Shipping Corporation of India Ltd.
Krishna Jayanti	Jayanti Shipping Co. Ltd.
Mahabharat	South East Asia Shipping Co. Ltd.
Maratha Progress	Chowgule S.S. Co.
Maratha Providence	Chowgule S.S. Co.
Onge	Shipping Corporation of India Ltd.
Prabhu Daya	Tolani Shipping Co. Ltd.
Rama Jayanti	Jayanti Shipping Co. Ltd.
Ratna Manjushree	Ratnakar Shipping Co. Ltd.
Ratna Usha	Ratnakar Shipping Co. Ltd.
Red Snapper	Central Institute of Fisheries Operatives
Sagar Sudha	Africana Shipping Co. Ltd.
Satya Kamal	Seven Seas Shipping Co.
Shahajahan Jayanti	Jayanti Shipping Co. Ltd.
Shompen	Shipping Corporation of India Ltd.
State of Andhra	Shipping Corporation of India Ltd.
State of Kerala	Shipping Corporation of India Ltd.
State of Madhya Pradesh	Shipping Corporation of India Ltd.
State of Mysore	Shipping Corporation of India Ltd.
State of Punjab	Shipping Corporation of India Ltd.
State of Rajasthan	Shipping Corporation of India Ltd.
State of West Bengal	Shipping Corporation of India Ltd.
Varuna Kanchan	Thakur S.S. Co. Ltd.
Vishva Bhakti	Shipping Corporation of India Ltd.
Vishva Bindu	Shipping Corporation of India Ltd.
Vishva Chetana	Shipping Corporation of India Ltd.
Vishva Darshan	Shipping Corporation of India Ltd.
Vishva Dharma	Shipping Corporation of India Ltd.
Vishva Jyoti	Shipping Corporation of India Ltd.
Vishva Kalyan	Shipping Corporation of India Ltd.
Vishva Kanti	Shipping Corporation of India Ltd.
Vishva Karuna	Shipping Corporation of India Ltd.
Vishva Kaushal	Shipping Corporation of India Ltd.
Vishva Kirti	Shipping Corporation of India Ltd.
Vishva Mahima	Shipping Corporation of India Ltd.
Vishva Mangal	Shipping Corporation of India Ltd.
Vishva Marg	Shipping Corporation of India Ltd.
Vishva Nayak	Shipping Corporation of India Ltd.
Vishva Nidhi	Shipping Corporation of India Ltd.
Vishva Pratap	Shipping Corporation of India Ltd.
Vishva Prem	Shipping Corporation of India Ltd.
Vishva Rekha	Shipping Corporation of India Ltd.
Vishva Sandesh	Shipping Corporation of India Ltd.
Vishva Seva	Shipping Corporation of India Ltd.
Vishva Shakti	Shipping Corporation of India Ltd.
Vishva Shobha	Shipping Corporation of India Ltd.
Vishva Siddhi	Shipping Corporation of India Ltd.
Vishva Suman	Shipping Corporation of India Ltd.
Vishva Tej	Shipping Corporation of India Ltd.
Vishva Tilak	Shipping Corporation of India Ltd.
Vishva Tirth	Shipping Corporation of India Ltd.
Vishva Usha	Shipping Corporation of India Ltd.
Vishva Vandana	Shipping Corporation of India Ltd.
Vishva Vibhuti	Shipping Corporation of India Ltd.
Vishva Vijay	Shipping Corporation of India Ltd.
Vishva Vikas	Shipping Corporation of India Ltd.
Vishva Vinay	Shipping Corporation of India Ltd.
Vishva Vir	Shipping Corporation of India Ltd.
Vishva Vivek	Shipping Corporation of India Ltd.
Yerewa	Shipping Corporation of India Ltd.

Auxiliary Ships: India has 26 Auxiliary Ships.

NEW ZEALAND (Information dated 13.3.73)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>Act 3</i>	Blue Star Port Line Ltd.
<i>Act 4</i>	Blue Star Port Line Ltd.
<i>Act 5</i>	Blue Star Port Line Ltd.
<i>Hawae</i>	Union S.S. Co. N.Z. Ltd.
<i>Holmburn</i>	Union S.S. Co. N.Z. Ltd.
<i>Holmlea</i>	Union S.S. Co. N.Z. Ltd.
<i>James Cook</i>	N.Z. Government
<i>Jean Philippe</i>	Trans Pacific Marine
<i>Kaimiro</i>	Union S.S. Co. N.Z. Ltd.
<i>Kaituna</i>	Union S.S. Co. N.Z. Ltd.
<i>Karepo</i>	Union S.S. Co. N.Z. Ltd.
<i>Karetu</i>	Union S.S. Co. N.Z. Ltd.
<i>Katea</i>	Union S.S. Co. N.Z. Ltd.
<i>Kawerau</i>	Union S.S. Co. N.Z. Ltd.
<i>Koraki</i>	Union S.S. Co. N.Z. Ltd.
<i>Koranui</i>	Union S.S. Co. N.Z. Ltd.
<i>Lorena</i>	Cook Is. Shipping Co.
<i>Luhesand</i>	Omega Shipping Co.
<i>Maheno</i>	Union S.S. Co. N.Z. Ltd.
<i>Marama</i>	Union S.S. Co. N.Z. Ltd.
<i>Moana Roa</i>	N.Z. Government
<i>Ngahere</i>	Union S.S. Co. N.Z. Ltd.
<i>Ngakuta</i>	Union S.S. Co. N.Z. Ltd.
<i>Ngapara</i>	Union S.S. Co. N.Z. Ltd.
<i>Ngatoro</i>	Union S.S. Co. N.Z. Ltd.
<i>Rangatira</i>	Union S.S. Co. N.Z. Ltd.
<i>Tarawera</i>	Union S.S. Co. N.Z. Ltd.
<i>Tavenui</i>	Union S.S. Co. N.Z. Ltd.
<i>Tofua</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Australia</i>	Maritime Carriers Ltd.
<i>Union New Zealand</i>	Maritime Carriers Ltd.
<i>Valetta</i>	British Phosphate Commissioners
<i>Waikare</i>	Union S.S. Co. N.Z. Ltd.
<i>Waimea</i>	Union S.S. Co. N.Z. Ltd.
Supplementary Ships:	
<i>Arahanga</i>	N.Z. Railways Department
<i>Aramoana</i>	N.Z. Railways Department
<i>Aranui</i>	N.Z. Railways Department
<i>Holmdale</i>	Union S.S. Co. N.Z. Ltd.

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

HONG KONG (Information dated 15.3.73)

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>American Main</i>	J. R. Denney ..	D. F. Durbin, M. S. Wilkinson, M. R. Shelverton	Fung Kwok Yuk ..	Indo-China S.N. Co. Ltd.
<i>American Mist</i>	A. H. Dalton ..	P. C. Cawthorn, J. F. H. Welch, I. F. Godber	Keung Tsun Ki ..	Indo-China S.N. Co. Ltd.
<i>Aska</i>	..	..	..	Mackinnon, Mackenzie & Co. Ltd.
<i>Cape St. Mary</i>	Chan Hok-min ..	Kwok Yung-sing, Ngau Min-Shing	Wong Kam-tim ..	Agriculture & Fisheries Dept., H.K. Govt.
<i>Cardross</i>	P. D. Nicoll ..	Cheung Hi Loi, Yeung Kin Shing, Lam Siu Wai	Leung Ki On ..	Kian Hin Leong Enterprises Ltd.
<i>Carl Offersen</i>	R. A. D. Nielsen ..	E. Petersen, I. S. Petersen, H. H. Petersen	W. G. McLaren ..	Jebsen & Co. Ltd.
<i>Changtu</i>	C. R. Humphry ..	T. C. Mordaunt, Leung Lai Kit, Tam Hung Ming	Chan Wing Lam ..	China Navigation Co. Ltd.
<i>Coral Princess</i>	M. T. Anderson ..	J. N. Edwards, R. J. Platt, D. W. Fellowes, G. A. B. Ward	Tsui Sung Kwan ..	China Navigation Co. Ltd.
<i>Cree</i>	..	..	..	..
<i>Eastern Ranger</i>	P. L. Ballantyne ..	J. H. Pring, R. DeB. Riches, J. K. Coughlan	P. Twambley ..	Indo-China S.N. Co. Ltd.
<i>Eastern Rover</i>	J. M. Marshall ..	F. L. Pickering, D. J. Macintyre, Cheung Sun Wai	A. Hudson ..	Indo-China S.N. Co. Ltd.
<i>Eredine</i>	D. McNaughton-Smith ..	F. D. Holden, J. A. Cameron, P. G. Thomas	Chau Kwok Ling ..	Indo-China S.N. Co. Ltd.
<i>Ertikay</i>	I. N. Bolton ..	D. G. Falkner, M. J. Hudson-Ansell, Tse Kui Chi	Wong Kwok Keung ..	China Navigation Co. Ltd.
<i>Foh Kim</i>	B. G. Dixon-Ward ..	A. J. Davies, M. A. J. Dawes, D. I. Stobie	U Chun Yee ..	China Navigation Co. Ltd.
<i>Hai Hing</i>	W. Davis ..	A. P. Advani, S. P. A. Ali, Fu Wai Sun	Cheung Shing Cheung ..	Hong Kong Borneo Shipping Co. Ltd.
<i>Hallborg</i>	H. Yndestad ..	I. Myhren, K. Henriksen, A. Larsen	Poon Chee Pooi ..	Thoresen & Co. Ltd.
<i>Hallador</i>	A. Lerstang ..	L. Lie, S. E. Hansen, B. Nordgaard	M. L. Narasimhan ..	Thoresen & Co. Ltd.
<i>Hallvard</i>	O. Schibsted ..	T. Egeland, H. P. Rogne, J. Kartevold	Lau Kam Pui ..	Thoresen & Co. Ltd.
<i>Hoi Kung</i>	A. Solbak ..	E. F. Andreassen, A. J. Haroy, I. O. Olsen	Lai Kwong Yin ..	Thoresen & Co. Ltd.
<i>Hoi Wong</i>	L. Moen ..	G. Gundersen ..	J. Flatebo ..	Karsten Larsen & Co. Ltd.
<i>Huaph</i>	H. I. Stagg ..	B. Vold ..	N. H. Berge ..	Karsten Larsen & Co. Ltd.
<i>Hyria</i>	A. M. Tennat ..	P. Barton, C. L. Pickles, G. D. Rutherford	Ho Yuk Lun ..	China Navigation Co. Ltd.
..	..	J. S. Rind, F. F. Perrott, P. A. Rybarczyk, P. J. Talbot	R. D. Carswell ..	Shell Bermuda (Overseas) Ltd.
<i>Jacob Jebsen</i>	..	..	..	..
<i>Kim Seng</i>	F. Poulsen ..	C. A. Ejlersen, G. Soerensen, U. W. Biel	Tam Kwok-wah ..	Jebsen & Co. Ltd.
<i>Kuangtung</i>	I. R. M. Haworth ..	V. K. Gargi, Anwar Saeed, Li Ming Ho	Sun Yun Wing ..	Guan Guan Shipping Ltd.
<i>Kweichow</i>	R. Kennett ..	W. F. Elton, F. J. Thorogood, Ko Kam Leung	Tsui See Man ..	China Navigation Co. Ltd.
<i>Kwelin</i>	M. H. A. Swift ..	P. Appleyard, J. W. Madeley, A. Espiritu	Leung Man Hin ..	China Navigation Co. Ltd.
<i>Manoloverett</i>	D. R. Groves ..	K. I. Barnett, A. J. Gregg, D. Shelton, T. R. Steel	Tang Yuen ..	China Navigation Co. Ltd.
<i>Pabloverett</i>	A. D. Roxas ..	A. Q. Lirio, S. Flores, E. Almazan	T. Bullicer ..	Everett S.S. Corporation S/A
<i>Pampa Argentina</i>	L. S. Castolo ..	C. N. Pedroso, G. Sanchez, J. P. Quiroga	A. Cabral ..	Everett S.S. Corporation S/A
<i>Shansi</i>	L. D. Faure ..	J. G. Ibarra, H. J. Picasso, J. C. Peluffo	A. A. Avalle ..	Everett S.S. Corporation S/A
<i>Sinkiang</i>	C. Cornforth ..	T. S. Payne, B. A. Cushing, Ng Fuk Sang	Yau Ming Tak ..	China Navigation Co. Ltd.
<i>Soochow</i>	J. Paisley ..	O. A. Overland, G. Whitfield, M. T. W. Breese	Yue Shui Ming ..	China Navigation Co. Ltd.
<i>Star Aldebaran</i>	I. Westerholm ..	H. Hallgren, B. Ronsen, P. Soderlund	F. Chan ..	China Navigation Co. Ltd.
<i>Star Altair</i>	G. V. A. Almstrom ..	K. Valkre, G. Wetterholm, J. Daugaard	D. S. E. Westlund ..	Everett S.S. Corporation S/A
<i>Star Antares</i>	S. A. Bengtsson ..	L. A. Loven, A. S. Lundmark, O. Anders, C. Hampf	B. A. I. Carlson ..	Everett S.S. Corporation S/A
<i>Tailangshan</i>	N. B. Manning ..	F. K. Tso, W. W. Kan, T. T. Lui	K. G. Ljungberg ..	Everett S.S. Corporation S/A
<i>Taiposek</i>	D. C. MacLean ..	H. S. Dehia, H. S. Boparai, R. H. Morker	M. S. To ..	Shun Cheong S.N. Co. Ltd.
<i>Taiipooshan</i>	W. M. Pearson ..	K. H. Wong, C. C. Lau, K. L. Chak	M. Aslam ..	Shun Cheong S.N. Co. Ltd.
<i>Thomaseverett</i>	A. O. Asinas ..	A. B. Fernandez, M. Cullo, B. N. Ordiz	Y. L. Chuk ..	Shun Cheong S.N. Co. Ltd.
..	..	..	A. Padica ..	Everett S.S. Corporation S/A

SINGAPORE (Information dated 1.4.73)

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	RADIO OFFICERS	OWNER/MANAGER
<i>Golden Haven</i> ..	R. A. Fraser ..	H. E. Damping, H. Pilat, R. Katiandagho ..	U. T'wan Lwin ..	Guan Guan Shipping (Pte.) Ltd.
<i>Golden Lion</i> ..	R. V. Corbett ..	S. D. Miller, G. T. Tuwaidan, Wong Liang Tong ..	Edwin Tan ..	Guan Guan Shipping (Pte.) Ltd.
<i>Golden Summer</i> ..	C. D. Foster ..	Alfred Evans, Mok Kim Seng ..	Maung Maung ..	Guan Guan Shipping (Pte.) Ltd.
<i>Golden Tower</i> ..	A. T. Avon ..	Ridwan Malino, P. Ramilbhai, James Low ..	Lim Aik Tow ..	Guan Guan Shipping (Pte.) Ltd.
<i>Keningau</i> ..	R. C. Barker ..	Teo Huat Seng, Lim Soon Hoe ..	K. A. Mennon ..	Straits S.S. Co. Ltd.
<i>Kimams</i> ..	Yan Chow Jang ..	W. J. Nair, Hou Hee Phat ..	Tan Chong Huan, Heng Chai Seng ..	Straits S.S. Co. Ltd.
<i>Kim Hock</i> ..	J. H. Longmire ..	Tan Kim Leong, Nursahid, Alias B. Jumat ..	Thomas Yong ..	Guan Guan Shipping (Pte.) Ltd.
<i>Kltas</i> ..	J. H. Martin ..	A. G. Ujra, Wong Tak Choy, Hamzah Ismail ..	Low Chong Pin ..	Straits S.S. Co. Ltd.
<i>Kunak</i> ..	G. C. Carter ..	Robert Gomez, Phillip Fung, E. Kissey ..	P. V. Abraham, Wong Tong Wee ..	Straits S.S. Co. Ltd.
<i>Mahsuri</i> ..	J. Cranswick ..	A. F. Killingerberg, Chong Kok Man, Christopher Lee ..	Toh Leong Teck ..	Austasia Line Pte. Ltd.
<i>Neptune Agate</i> ..	M. A. Bala ..	Teddy Yap, Koh Pak Tong, Tang Teng Seah ..	Woo Seng Fook ..	Neptune Orient Lines Ltd.
<i>Neptune Amber</i> ..	Quek Soo Seng ..	Jerry Lau, Nghoh See Woe, Pang Jue Saik, Wong Toon Yee ..	R. S. Fernandis ..	Neptune Orient Lines Ltd.
<i>Neptune Amethyst</i> ..	Z. A. Zidva ..	S. K. Menon, Asad Jahingir, Tay Juet Hui ..	Goh Sin Siew ..	Neptune Orient Lines Ltd.
<i>Neptune Aquamarine</i> ..	H. Schiemann ..	Eddie Tan, R. Q. Villanueva, Lim Yew Chee ..	Terence Tan Hla ..	Neptune Orient Lines Ltd.
<i>Neptune Beryl</i> ..	M. W. L. Tozer ..	Y. Wilfred, S. M. Berry, Murni Jamil ..	Cheong Hon Kee ..	Neptune Orient Lines Ltd.
<i>Neptune Jasper</i> ..	Lim Kian Hock ..	Hong Kok Chuan, Chia Eng Kat, Chan Yew Meng ..	Wong Kai Meng ..	Neptune Orient Lines Ltd.
<i>Neptune Topaz</i> ..	D. A. Chadwick ..	C. J. Mendoza, W. McGrety, Tay Yoh Huat, Lim Meng Kiat ..	Yeo Siang Lam, Mok Kwok Wah ..	Neptune Orient Lines Ltd.
<i>Neptune Zircon</i> ..	Lim Ong Tong ..	Lee Chong Yue, Lee Kok Beng, B. P. Ngoh ..	David Lange ..	Neptune Orient Lines Ltd.
<i>Thorscape</i> ..	J. Soerenson ..	Q. Osmundsen, K. H. Karlsson, H. Larsen ..	Janne Livrod ..	Norse Oriental Lines

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