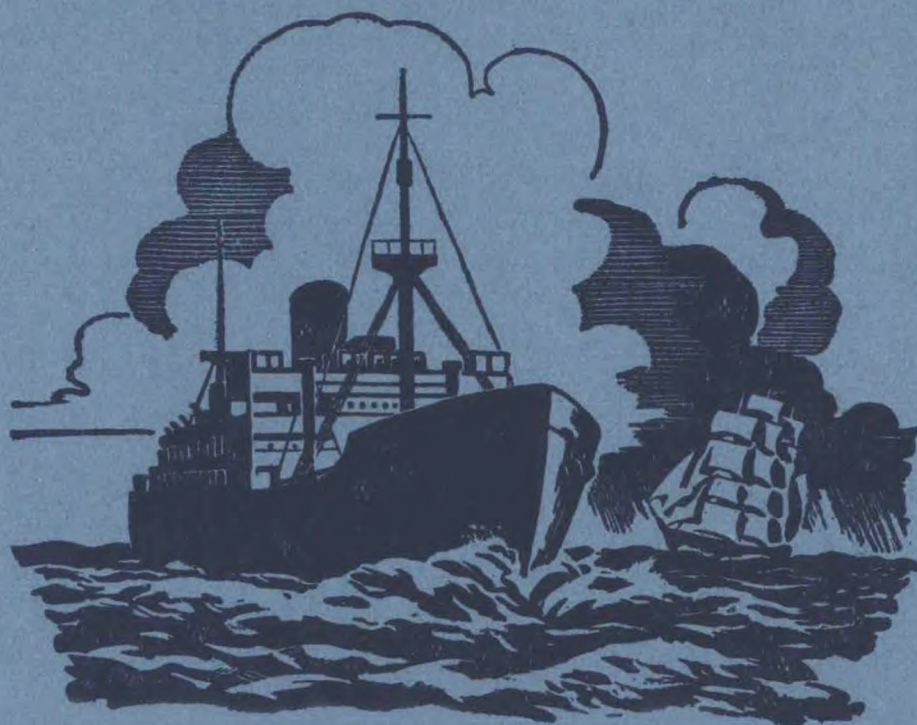


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The Marine Observer

*A quarterly journal of Maritime
Meteorology*



Volume XLV No. 249

July 1975

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THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME
METEOROLOGY PREPARED BY THE MARINE
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JULY 1975

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*Letters to the Editor, and books for review, should be sent to the Editor, "The Marine Observer,"
Meteorological Office, Eastern Road, Bracknell, Berkshire RG12 2UR*

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Excellent Awards 1974

Following the practice, instituted in 1924, of awarding an 'Excellent' assessment to the Masters, Principal Observing Officers and Radio Officers of the 100 Voluntary Observing Ships which have provided us with the highest standard of meteorological observations in the preceding year, we once again publish in the July edition of *The Marine Observer* the list of the ships to gain the awards.

The list for 1974 appears on pages 95-97 of this issue and we have great pleasure in congratulating the masters and officers named. Selecting the 100 best logbooks out of the total of 1,302 received in this Office in 1974 was no simple task, bearing in mind that no ship can qualify twice. A fast container ship can supply us with four or five logbooks in a year, with possibly two or three different masters and officers during this time and even although all these may be given an 'Excellent' assessment only one book can finally qualify for the award. We do sympathise with the very many masters and officers whose meteorological logbooks have been given the 'Excellent' grading but who have not qualified for an award.

As in former years the marking of the logbooks has been undertaken with care, taking into account the type of vessel and the trade in which she is engaged. Generally speaking, observing in a small two mate ship trading between, for instance, continental and Baltic ports in winter, does not give the opportunity for continuity of observations and requires far more physical effort by the observers than on a large passenger liner with four mates in the fine weather conditions. Surprisingly though, some of these small ships can and do surpass some of the bigger ones.

A 'short list' of those ships gaining the highest markings reads as follows:

1. *Glenfalloch* (Ocean Transport & Trading Ltd.), Captain A. Mackenzie.
2. *Ross Orion* (British United Trawlers Ltd.), Skipper A. Osler.
3. *Zaphon* (Shell Tankers Ltd.), Captain M. M. Wilkie.
4. *Liverpool Bay* (Ocean Transport & Trading Ltd.), Captain R. Moore.
5. *Encounter Bay* (Overseas Containers Ltd.), Captain M. Champneys.
6. *Summit* (F. T. Everard & Sons Ltd.), Captain W. G. Hunt.

Photographs of the first three ships are shown opposite page 100. Special congratulations are due to the *Ross Orion* and the *Liverpool Bay* both of whom are appearing for the third time in the short list.

The awards to Trawler Skippers and Radio Officers who make non-instrumental observations, together with the awards made to the four Marid ships (vessels on short sea trades who make observations of sea temperatures only, although wind and weather are also reported whilst they are in the North Sea) are shown on pages 97-98. Their assistance is also of considerable value to the Meteorological Office.

As in previous years the recipients of the awards will be notified by post and requested to provide an address to which the award may be sent. If however any Master or Officer sees his name in this list, or any other list which may be published by his company, before hearing individually from us, we would be pleased if he would write and claim his award giving us a forwarding address. The initial award is normally *The University Atlas*, followed by *The Concise Oxford Dictionary* given to any master or officer receiving a second award. The book selected this year for the third award is, *A History of Polar Exploration* by David Mountfield.

J.D.B.

EXCELLENT AWARDS (Year ended 31st December 1974)

SHIP	MASTER	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER	OWNER/MANAGER
<i>Amalric</i>	D. C. Aitchison	N. C. D. Hope	F. T. Howard	Shaw Savill & Albion Co. Ltd.
<i>Apollo</i>	G. V. Barnes	W. R. Kays	E. Foley*	Bristol S.N. Co. Ltd.
<i>Argyllshire</i>	R. D. Lofts	I. M. Ward	A. McLeod	Clan Line Steamers Ltd.
<i>Atlantic Causeway</i>	A. Bull	J. K. Brocklehurst	F. A. Dunn	Cunard-Brocklebank Ltd.
<i>Bellerophon</i>	J. Moore	K. S. Chong	R. Magowan	Ocean Transport & Trading Ltd.
<i>Benattow</i>	A. S. Hamilton	C. J. A. Cladingbowl	G. W. Dickson	Ben Line Steamers Ltd.
<i>Bencairn</i>	R. A. Lymn	W. Sinclair	J. W. Gilhooly	Ben Line Steamers Ltd.
<i>Bendearg</i>	R. E. Cowie	A. V. Thomson	T. D. Drummond	Ben Line Steamers Ltd.
<i>Bendoran</i>	R. Griffiths	S. C. Lee	N. Marwood	Ben Line Steamers Ltd.
<i>Benlawers</i>	W. D. Cowie	J. M. Ferguson	H. E. Brookfield	Ben Line Steamers Ltd.
<i>Benledi</i>	O. Henderson	R. S. Basford	C. L. Keeble	Ben Line Steamers Ltd.
<i>Benstac</i>	R. McPhee	K. A. G. Donaldson	J. W. Hurd	Ben Line Steamers Ltd.
<i>Benwinnach</i>	T. P. Barr	G. T. Watkins	J. J. Daly	Ben Line Steamers Ltd.
<i>Benvorlich</i>	J. M. MacLeod	I. Finlay	P. Mannion	Ben Line Steamers Ltd.
<i>British Cygnet</i>	R. Towell	C. B. Swindin	P. Worthy	B.P. Tanker Co. Ltd.
<i>British Destiny</i>	W. V. Frost	I. Plumer	P. Davies	B.P. Tanker Co. Ltd.
<i>British Forth</i>	R. D. Othick	P. N. Duffield	D. M. Dalton	B.P. Tanker Co. Ltd.
<i>British Guardsman</i>	D. Corp	S. Gammage	I. F. Alexander	B.P. Tanker Co. Ltd.
<i>California Star</i>	A. J. Cheshire	G. S. Hart	N. Maclean	Blue Star Line Ltd.
<i>Cape Leeuwin</i>	W. E. Greateorex	D. A. Clarke	P. Budden	Lyle Shipping Co. Ltd.
<i>Carchester</i>	D. S. Archibald	D. A. McKenzie	D. Morrison	Christian Salvesen (Shipping) Ltd.
<i>Cardigan Bay</i>	D. H. Stewart, R.D.	R. W. Bristow	P. M. Dolphin	Ocean Transport & Trading Ltd.
<i>City of Newcastle</i>	I. G. Lumley	S. W. Ponter	P. A. Whyley	Ellerman Lines Ltd.
<i>City of Worcester</i>	P. Redhead	K. Johnson	J. D. Hearne	Ellerman Lines Ltd.
<i>Clan Alpine</i>	I. W. Bennett	N. Caborn	R. Caine	Clan Line Steamers Ltd.
<i>Clan Grant</i>	T. R. Parsons	M. W. H. Williams	R. M. Lee-Smith	Clan Line Steamers Ltd.
<i>Clan Macindoe</i>	S. Hagan	K. T. Eurnson	E. I. Kelly	Clan Line Steamers Ltd.
<i>Clan Macintosh</i>	A. A. Graham	R. G. Head	R. J. Hubbard	Clan Line Steamers Ltd.
<i>Clan Menzies</i>	C. De F. Hedges	J. E. Millar	N. P. Sherin	Clan Line Steamers Ltd.
<i>Clan Ramsay</i>	J. B. Caley	N. J. Hughes	K. R. Fearnhead	Clan Line Steamers Ltd.
<i>Crystal Sapphire</i>	G. H. Griffiths	B. D. Cramond	T. A. Byrne	Sugar Line Ltd.
<i>Cyclops</i>	M. R. Foster	V. Vijayapalan	M. J. Furlong	Ocean Transport & Trading Ltd.
<i>Dart Atlantic</i>	A. F. Ashton	C. E. Walford	P. J. Stamford-Burrows	Bibby Line Ltd.
<i>Degema</i>	J. T. H. Bennion	W. J. Martin	J. C. Noonan	Ocean Transport & Trading Ltd.
<i>Discovery</i>	G. L. Howe	P. J. MacDermott	R. I. Hammerton	Natural Environment Research Council
<i>Discovery Bay</i>	M. J. Heron	J. C. Wise	R. B. Redhead	Container Fleets Ltd.
<i>Drina</i>	J. J. Rutter	P. C. Cockcroft-Oliver	R. D. Dingley	Shaw Savill & Albion Co. Ltd.

Excellent Awards (contd.)

SHIP	MASTER	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER	OWNER/MANAGER
<i>Echo</i> ..	J. L. Jenkins	I. R. Boulton ..	W. Ritchie* ..	Bristol S.N. Co. Ltd.
<i>Encounter Bay</i> ..	M. Champneys	S. C. Woodward	W. Kay ..	Container Fleets Ltd.
<i>Essex</i> ..	J. M. Burn	I. Cookson ..	A. J. Rose ..	P. & O. S.N. Co.
<i>Faristan</i> ..	D. Calvert	C. E. A. Barnes	R. Milner ..	P. & O. S.N. Co.
<i>Fremantle Star</i> ..	R. K. Bilton	G. J. Rawding	T. Milligan ..	Blue Star Line Ltd.
<i>Frontier</i> ..	D. Gregson	M. L. James ..	P. A. Byrne ..	Manchester Liners Ltd.
<i>Glenfalloch</i> ..	A. Mackenzie	P. J. Playle ..	W. C. A. Phillips	Ocean Transport & Trading Ltd.
<i>Glenlyon</i> ..	J. C. Liptrot	S. P. Walakulpola	C. W. Knibb ..	Ocean Transport & Trading Ltd.
<i>Glenogle</i> ..	P. J. Broomfield, R.D.	R. F. Kirker ..	D. G. Gunning	Ocean Transport & Trading Ltd.
<i>Hector Heron</i> ..	G. E. Trowsdale	D. J. R. Hart ..	R. P. Bate ..	Clan Line Steamers Ltd.
<i>Hinakura</i> ..	T. E. Kelso	A. Wymark ..	M. Mackenny	P. & O. S.N. Co.
<i>Historian</i> ..	W. E. Hinde	D. P. Farrell ..	H. G. Sparkes	T. & J. Harrison Ltd.
<i>Iberic</i> ..	C. A. S. Borthwick	M. J. Bishop ..	D. J. Warth ..	Shaw Savill & Albion Co. Ltd.
<i>Icenic</i> ..	R. E. Marshall	J. S. McKechnie	P. A. Braxton	Shaw Savill & Albion Co. Ltd.
<i>Jamaica Producer</i> ..	M. C. Harper	A. Barker ..	J. J. Kennedy ..	Kaye, Son & Co. Ltd.
<i>Jervis Bay</i> ..	J. K. Blackburn	S. D. Smith ..	N. G. L. Johns	Container Fleets Ltd.
<i>John Biscoe</i> ..	E. M. S. Phelps	I. Hotchin ..	C. R. Christiansen	British Antarctic Survey
<i>Junna</i> ..	G. A. Hankin	H. T. Kyi ..	J. H. Hutchinson	P. & O. S.N. Co.
<i>Laomedon</i> ..	J. P. Wishart	A. J. Baker ..	J. P. R. Binding	Ocean Transport & Trading Ltd.
<i>Laurentic</i> ..	M. Larrive	B. G. Appleby	D. C. Stephen	Shaw Savill & Albion Co. Ltd.
<i>Liverpool Bay</i> ..	R. Moore	J. E. McGregor	A. Holman ..	Ocean Transport & Trading Ltd.
<i>London Pioneer</i> ..	R. B. Tarbuck	B. J. Rogers ..	E. Crowley ..	London & Overseas Freighters Ltd.
<i>Manapouri</i> ..	H. J. D. Sladen	T. D. Hogg ..	G. H. Williams	P. & O. S.N. Co.
<i>Manchester Zeal</i> ..	T. B. Hancock	D. S. Lever ..	P. V. Lintzgy ..	Manchester Liners Ltd.
<i>Mataura</i> ..	F. C. Taylor	B. Kay ..	W. F. Law ..	P. & O. S.N. Co.
<i>Medic</i> ..	W. W. Newport..	R. Keutenius ..	A. Hudson ..	Shaw Savill & Albion Co. Ltd.
<i>Meganitic</i> ..	W. M. Wheatley	J. Spurgeon ..	J. Cowardine ..	Shaw Savill & Albion Co. Ltd.
<i>Moraybank</i> ..	T. D. Scott	C. C. W. Towne	F. McGuckin ..	Bank Line Ltd.
<i>Nevasa</i> ..	I. K. Bowerman	C. D. Knight ..	J. C. Furlong ..	P. & O. S.N. Co.
<i>Osaka Bay</i> ..	D. T. MacLachlan	W. B. Thomas	C. E. Gully ..	Ocean Transport & Trading Ltd.
<i>Otaio</i> ..	J. Fullbrook	J. G. Melrose ..	R. J. Woodward	P. & O. S.N. Co.
<i>Pando Gulf</i> ..	A. J. Field	G. J. Jones ..	A. C. Fraser ..	P. & O. S.N. Co.
<i>Patroclus</i> ..	I. R. Atkinson	P. Fielding ..	P. M. Weldon	Ocean Transport & Trading Ltd.
<i>Phemius</i> ..	D. M. Belk	J. Othman ..	R. F. Walsh ..	Ocean Transport & Trading Ltd.
<i>Phrontis</i> ..	J. Bold ..	D. Morrison ..	D. G. Holmes	Ocean Transport & Trading Ltd.
<i>Port Alfred</i> ..	M. H. C. Twomey	J. M. Bowie ..	P. W. Eccleson	Port Line Ltd.

<i>Post Champion</i>	..	B. Hammond	..	D. Bell	..	S. T. Smith	..	Panocean Shipping & Terminals Ltd.
<i>Protesilaus</i>	..	B. M. Ketchen	..	R. M. MacLure	..	E. Emmett	..	Ocean Transport & Trading Ltd.
<i>Registan</i>	..	P. W. Filcek	..	D. J. Austen	..	D. B. Ritchie	..	P. & O. S.N. Co.
<i>Ross Orion</i>	..	A. Osler	..	—	..	R. R. N. Laing	..	Hudson Bros. Trawlers Ltd.
<i>St. Benedict</i>	..	A. Iggleden	..	—	..	K. C. Stone	..	T. Hamling & Co. Ltd.
<i>St. Giles</i>	..	J. Nelson	..	—	..	H. G. Pask	..	T. Hamling & Co. Ltd.
<i>St. Loman</i>	..	T. Doyle	..	—	..	C. Watkins	..	T. Hamling & Co. Ltd.
<i>Sagamore</i>	..	A. W. Cameron	..	J. P. O'Hara	..	P. J. Regan	..	Furness Withy & Co. Ltd.
<i>Serbistan</i>	..	P. W. Price	..	G. C. Stonehouse	..	E. C. Madders	..	P. & O. S.N. Co.
<i>Shackleton</i>	..	M. A. Harding	..	P. H. D. Coombs	..	A. Landry	..	Natural Environment Research Council
<i>Silvershore</i>	..	D. Troup	..	R. W. Smith	..	O. Kirby	..	Silver Line Ltd.
<i>Somerset</i>	..	F. S. Angus, R.D.	..	P. J. Ewen	..	R. P. Murt	..	P. & O. S.N. Co.
<i>Somerset Maugham</i>	..	C. Dunne	..	—	..	J. S. Hallam	..	Newington Trawlers Ltd.
<i>Sugar Crystal</i>	..	D. Patrickson	..	S. U. Sharif	..	P. O. Sloyan	..	Sugar Line Ltd.
<i>Sugar Refiner</i>	..	P. Sutcliffe	..	J. H. Clark	..	B. R. A. Maskell	..	Sugar Line Ltd.
<i>Summity</i>	..	W. G. Hunt	..	A. MacIntyre	..	G. Leak	..	F. T. Everard & Sons Ltd.
<i>Tairea</i>	..	F. A. Stokes	..	N. B. H. Skinner	..	M. Reid	..	P. & O. S.N. Co.
<i>Tekoa</i>	..	J. D. Hellings	..	M. J. Fletcher	..	M. J. Ellis	..	P. & O. S.N. Co.
<i>Tokyo Bay</i>	..	C. S. Mackinnon	..	R. I. Smart	..	B. L. Drake	..	Ocean Transport & Trading Ltd.
<i>Tongariro</i>	..	D. E. Moran	..	C. T. Tilley	..	P. J. Owen	..	P. & O. S.N. Co.
<i>Treneglos</i>	..	D. T. Hughes	..	J. R. Mace	..	A. R. Kingdom	..	P. & O. S.N. Co.
<i>Trevidden</i>	..	C. R. S. Monk	..	R. R. R. Ley	..	M. Clifford	..	P. & O. S.N. Co.
<i>Turakina</i>	..	J. F. Milner	..	J. W. Bird	..	R. Harris	..	P. & O. S.N. Co.
<i>Turkistan</i>	..	A. W. Jones	..	G. A. Bridge	..	P. Hogan	..	P. & O. S.N. Co.
<i>Westmorland</i>	..	J. D. Guylor	..	D. C. Winter	..	C. P. McCann	..	P. & O. S.N. Co.
<i>Wild Cormorant</i>	..	J. S. Laidlaw	..	K. McGrath	..	R. G. Heath	..	P. & O. S.N. Co.
<i>Zaphon</i>	..	M. M. Wilkie	..	A. F. De Vanney	..	G. G. Graham	..	Shell Tankers (U.K.) Ltd.
'MARID' SHIPS†								
<i>Caesarea</i>	..	..	..	..	..	..	..	British Rail
<i>Esso Mersey</i>	..	P. H. Mattocks	..	N. Precious	..	M. Fraser	..	Esso Petroleum Co. Ltd.
<i>St. George</i>	..	W. Bramhill	..	E. Lee	..	A. Badham	..	British Rail
<i>Ulster Queen</i>	..	P. G. Lynch	..	T. Hunter	..	M. Hunter	..	Belfast S.S. Co. Ltd.

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

TRAWLERS (non-instrumental)

SKIPPER	RADIO OPERATOR					TRAWLER OWNERS
J. W. E. Boyle ..	—					Boyd Line Ltd.
P. Grayburn ..	—					T. Hamling & Co. Ltd.
J. N. Kerr ..	—					British United Trawlers Ltd.
R. Pepper ..	—					Northern Trawlers Ltd
J. Stevens ..	—					B. A. Parkes Ltd.
T. K. Thresh ..	—					Boyd Line Ltd.
—	C. Bird ..	..	..	..	..	Boyd Line Ltd.
—	P. R. Hickson ..	..	..	..	..	Northern Trawlers Ltd.
—	B. Rowbotham ..	..	..	..	..	B. A. Parkes Ltd.
—	R. Spall ..	..	..	..	..	British United Trawlers Ltd.
—	D. Walker ..	..	..	..	..	Boyd Line Ltd.



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.

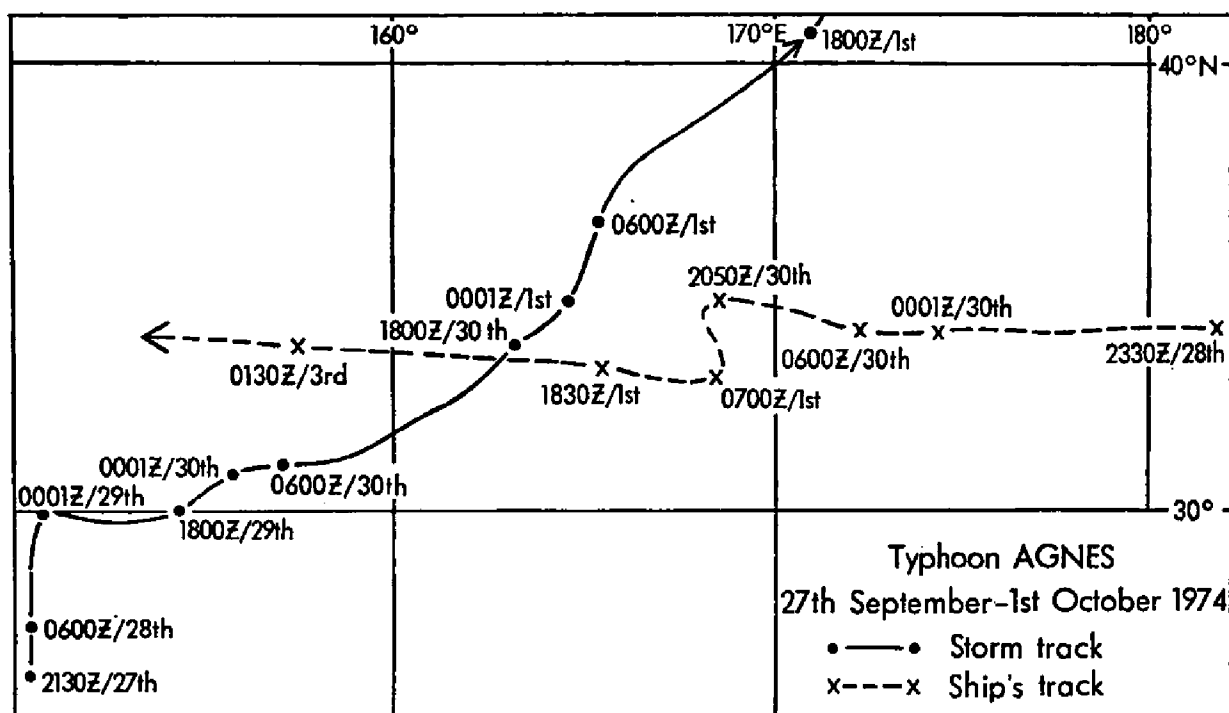
TYPHOON 'AGNES'

Western North Pacific

s.s. *Bendoran*. Captain R. Griffiths. Los Angeles to Yokohama. Observers, the Master, Mr. A. F. Walker, 1st Officer, Mr. J. M. Groat, 2nd Officer, Mr. A. R. Rendle, 3rd Officer and ship's company.

27th September–1st October 1974. At 2130 GMT a typhoon warning was received from Japan giving the position of Typhoon Agnes as $26^{\circ} 12' N$, $150^{\circ} 18' E$ moving north at 5 kt and with maximum winds of 70 kt near the centre. At this time the vessel's position was $34^{\circ} 38' N$, $171^{\circ} 21' W$ and the course was $269^{\circ} T$ at 15 kt. The air temp. was $19.8^{\circ} C$, pressure 1005.0 mb and wind w's, force 8.

Between 2130 on the 27th and 0600 on the 30th, Agnes was carefully plotted against the vessel's position and she appeared to be moving ENE at about 12 kt, so at 0300 on the 30th we altered course to $275^{\circ} T$ and increased speed to 16 kt as it was thought possible to outrun the centre to the north. Air temp. 17.1° , pressure 1018.6 mb and wind N'ly, force 2. At 0600 we altered course again to $280^{\circ} T$ whilst maintaining our speed of 16 kt; the position of Agnes at this time was $30^{\circ} 54' N$, $157^{\circ} 06' E$, moving ENE at 12 kt with winds of 90 kt near the centre and pressure at 960 mb. The next storm report at 1800 gave the storm's position as $33^{\circ} 48' N$, $163^{\circ} 12' E$, still moving ENE but at 27 kt. As it was now impossible to outrun the typhoon, the vessel altered course at 2020 to $170^{\circ} T$ and by this time was rolling moderately in rough quarterly seas and a moderate SE'ly swell. The air temp. was 22.8° , pressure 1004.8 mb falling steadily and wind SE'ly, force 8. At 2215 the vessel reduced speed to 12.5 kt and was pitching and rolling heavily in very rough seas and heavy swell while shipping occasional light water over all. The wind increased to force 9 by 2330 with overcast skies and occasional rain showers, pressure 1001.8 mb and temperature 25.2° . On the 1st October Agnes reached $34^{\circ} 38' N$, $164^{\circ} 18' E$ and 3-hourly observations were started. During the next four hours pressure continued to fall steadily, reaching a maximum low of 998.8 mb, the wind remained steady at S'E, force 10 and the



temperature was 26.0° . At 0330 the vessel was in very heavy confused swell and the wind veered to s'ly, force 11, the pressure increased slightly to 999.0 mb. During the next 8 hours the wind continued to veer and weaken and the pressure rose slowly until at 1130 the wind was w's, force 7 and pressure 1004.6 mb with the temperature at 25.3° . There was still a rough sea and swell causing the vessel to ship occasional spray over all, but the weather was fine with few clouds and good visibility. Between 0400 and 1000 the vessel was gradually brought round from 170° T to 280° T as weather conditions improved. At 1830 the vessel was at $33^{\circ} 25' \text{N}$, $165^{\circ} 33' \text{E}$ while the typhoon's 1800 position was approx. $40^{\circ} 30' \text{N}$, $171^{\circ} 00' \text{E}$ and from that time conditions improved steadily. During the time that we were experiencing force 11 winds and very high seas, it would appear that the reported position of Agnes could only have been approximate and that in actual fact the vessel was much nearer the centre than is indicated on the chart.

Position of ship at 0600 on 30th September: $34^{\circ} 11' \text{N}$, $172^{\circ} 22' \text{W}$.

Note. The accompanying chart shows the tracks of the *Bendoran* and Typhoon 'Agnes'. It can be seen that after about 0600 on the 30th, Agnes accelerated from about 12 kt to 27 kt. Despite the fact that at 0600 the typhoon was forecast to maintain its speed of 12 kt during the next 24 hours, it should be remembered that as the *Pacific Islands Pilot*, N.P. 60, p. 36 indicates, most typhoons accelerate shortly after recurvature to speeds of 20-30 kt. Agnes reached maximum intensity on the 30th when the highest sustained mean wind attained was 105 kt, and during this period gales extended out to 200 miles from the storm centre.

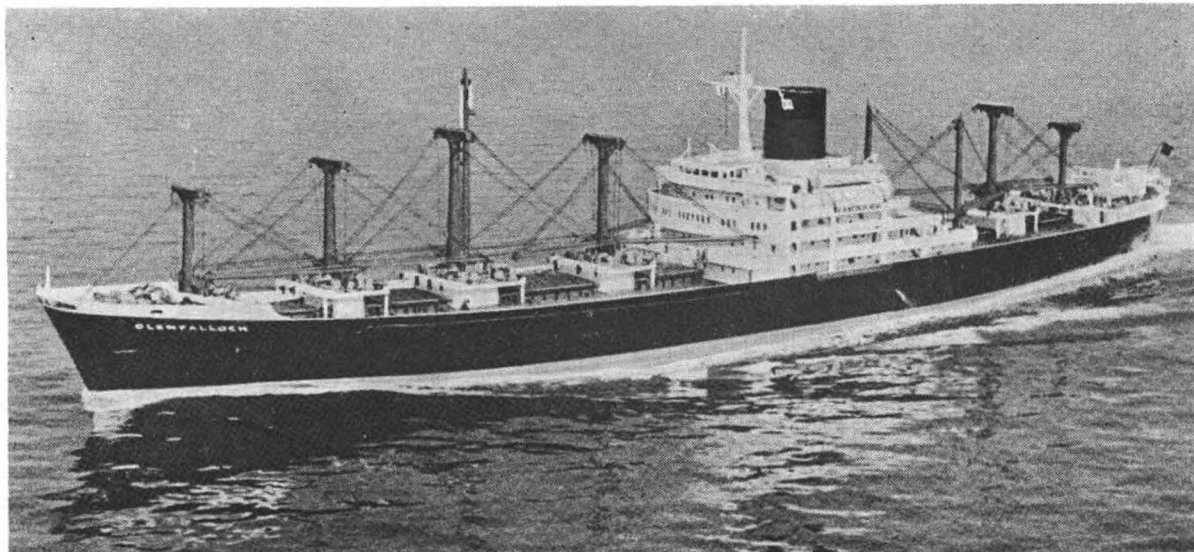
At the time of writing there is no more precise data on the actual storm track.

SEVERE DEPRESSION

English Channel

m.v. *Eagle*. Captain F. E. G. Renshawe. Southampton to Lisbon. Observers, the Master and ship's company.

2nd September 1974. At 0835 GMT when the vessel had altered course to 208° T in the southbound separation zone and was 'tacking' at reduced speed in order to avoid the head seas, we ran into a 'beauty'. I had just called Ushant Coastguard for the wind speed and force and it was given as ssw'ly at 38 kt. The wave broke on the



Glenfalloch (Ocean Transport & Trading Ltd.), Captain A. Mackenzie



Ross Orion (British United Trawlers Ltd.), Skipper A. Osler



Zaphon (Shell Tankers Ltd.), Captain M. M. Wilkie

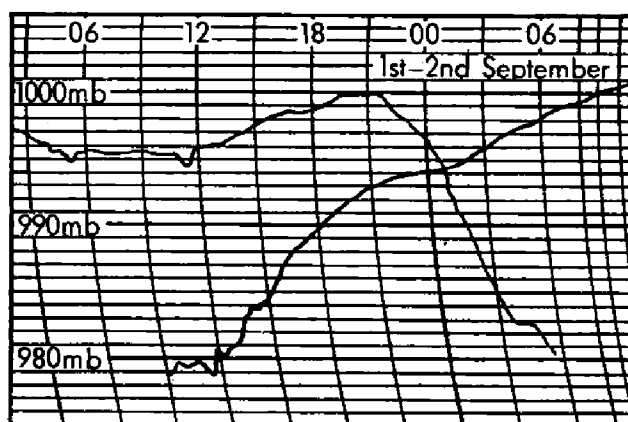
THE THREE SHIPS WHICH GAINED THE HIGHEST MARKINGS FOR THEIR METEOROLOGICAL LOGBOOKS DURING THE YEAR 1974 (see page 94).



Presentation of barographs at Bracknell on 26th February 1975; left to right: Captain and Mrs. A. B. Stalker, Captain and Mrs. J. A. North, Captain and Mrs. D. G. Thomas, Captain and Mrs G. V. Barnes (see page 124).

fore-deck and then curved upwards, taking out two of the wheelhouse windows and removing some of the deckhead panels; it was then deflected to the back of the wheelhouse where the barograph was. As the trace shows, the barograph was jolted by the force of the wave, but the pen-arm bounced back and kindly kept on recording for the rest of the day so we can have no complaints about the manufacture of the instrument. As the bridge navigation equipment was saturated, I am afraid we missed out on the Met. reports for the next few days.

Position of ship (approx.): $49^{\circ} 00'N$, $5^{\circ} 00'W$.



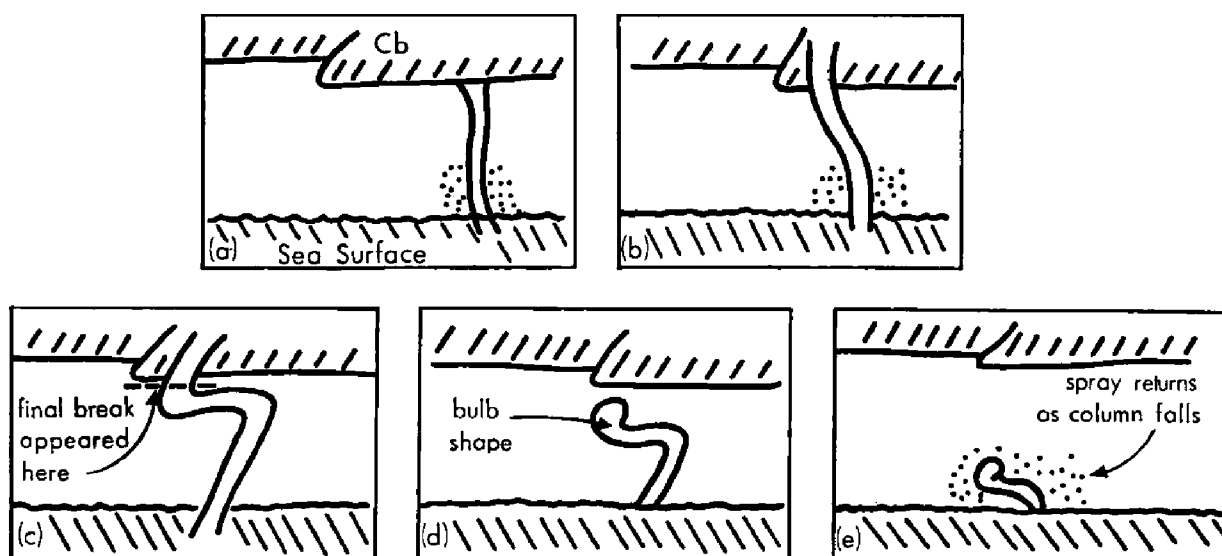
Note. This incident was due to a deepening secondary depression which formed as a wave on a cold front near Newfoundland on the 31st August. It ran quickly east at about $48^{\circ}N$ and turned ENE on the 1st September to reach $51^{\circ}00'N$, $6^{\circ}40'W$ by 0900 on the 2nd, the pressure at this time being 970 mb. A number of reports in this area gave the wind as SW-SSW, force 9-10, (45-50 kt), with waves of 7 m and a sw'ly swell of 4-5 m. The wave which struck the *Eagle* was larger than this and may have been caused by the wind and swell waves running in phase at that moment. Thus a probable maximum wave height of 11 m in phase with the swell could have produced an isolated wave of about 16 m capable of inflicting structural damage to a vessel. This was the same depression that caused the loss of the *Morning Cloud*, Mr. Heath's yacht.

WATERSPOUTS

Eastern North Pacific

s.s. *Benvrackie*. Captain J. M. Macleod. Hakata, Japan to Balboa. Observers, the Master, Mr. M. P. Tennent, Chief Officer, Mr. R. I. Roberts, 1st Officer, Mr. J. F. Holmes, 2nd Officer, Mr. A. Large and ship's company.

25th September 1974. At 0001 GMT the first of a series of approx. 12 waterspouts was observed about 2 miles from the vessel; it was well formed and was complete from the base of the Cb cloud down to the sea surface. The height of the spout was approx. 300 m, its base was in the region of 38 m in diameter and it was moving in a sw'ly direction obliquely to that of the wind which was $330^{\circ}T$. It was also revolving in what looked like an anti-clockwise direction. As the spout moved further away from the vessel it was observed to take on some spectacular shapes as shown in the diagrams. It is stated in the *Marine Observer's Handbook* that these spouts do not contain water but only vapour, however, our impression from the bulb that formed and fell with a sudden rush to the sea, was that it was a gigantic droplet-shaped mass of water. This was partly confirmed by the increased agitation that appeared at the base of the spout which had calmed down about 5 min earlier. This was the beginning of a series of waterspouts, but as the ship was steaming away from the area,



less detailed observations were noted. However, at one time 5 spouts were seen to extend from the same Cb cloud but no bases at sea-level were observed. Air temp. 22.5°C , wet bulb 20.6° , sea 23.6° . Pressure 1013.7 mb. Wind 330°T . Course 106°T at 14.4 kt.

Position of ship at 0001 on 25th: $25^{\circ} 42'\text{N}$, $132^{\circ} 45'\text{W}$.

Note. Waterspouts are described in the *Marine Observer's Handbook* as hollow columns of condensed water-vapour. The condensed water droplets would not immediately evaporate as the waterspout weakened, but would fall out as 'precipitation' as in the occurrence reported by the *Benvrackie*. The distorted nature of the column was probably due to vertical wind-shear close to the cloud base.

CURRENTS

Indian Ocean

s.s. *Argyllshire*. Captain R. D. Lofts, R.D., R.N.R. Durban to East London. Observers, Mr. C. H. Wood, 2nd Officer and Mr. I. M. Ward, 3rd Officer.

9th September 1974. During the morning, observations were made of the Agulhas Current which seemed initially to be acting in a strange manner. On leaving Durban a course was set to join the current and at 0630 GMT when the vessel reached the 100-fathom line, a new course of 209°T was set. At 0700 full sea speed revolutions were attained which should have given us a speed of 13.7 kt allowing for 10 per cent slip, which was about average for this ship. When the 0800 position was plotted on the chart it indicated (much to our dismay) that the speed made good was only 12 kt. By 0900 it became apparent that the Agulhas Current had deserted us, or had even turned rebel and was setting in the opposite direction as we managed only 11.5 kt in that hour. At 1000 a conference was held on the bridge in an attempt to combat the vagaries of our rebel current and it was decided to let the vessel run further outside the 100-fathom line rather than on it. This seemed to work and later that afternoon the ship's speed had increased to give a more respectable average of 17 kt.

Position of ship at 1000 (approx.): $30^{\circ} 30'\text{S}$, $30^{\circ} 48'\text{E}$.

Note. The inshore limit of the Agulhas Current usually lies at about the 100-fathom line, but it sometimes lies a few miles further seaward. Ships navigating in this area therefore, should not always expect to find the Agulhas Current at this line. A more interesting feature of this report is the presence of a 2-kt counter-current close to the 100-fathom line. On most occasions the counter-current will run at a weaker rate further inshore.

Eastern Pacific

s.s. *Bencruachan*. Captain O. Tucker. Kobe to Balboa. Observer, Mr. A. J. Montgomerie, 2nd Officer.

26th August 1974. Between 1730 GMT and 2100 GMT the vessel encountered a heavy adverse current. The Pitometer log gave a distance of 65 miles during this period, in which time the vessel's course was 118°T at a mean speed of 19 kt. The set and drift of the current was found to be 302° 15 miles and could possibly be due to the many tropical storms west of this area giving w'ly winds which would accelerate the surface drift.

Position of ship at 1730: 10° 48'N, 89° 04'W.

Position of ship at 2100: 10° 25'N, 88° 18'W.

Note. A NW'ly set is to be expected in this region in July, though the mean rate is only about $\frac{1}{2}$ kt. On rare occasions currents in excess of 3 kt have been reported.

CHANGE IN SEA TEMPERATURE

White Sea

m.v. *Summit*. Captain W. G. Hunt. Brussels to Arkhangel'sk. Observers, the Master and Mr. P. R. Jackson, Chief Officer.

2nd July 1974. At 1200 GMT the sea temperature was 4.6°C at approx. 66° 12'N, 40° 18'E and at 1800 it was 17.9° at approx. 65° 12'N, 39° 48'E (we took the temperature three times to verify it). The following day, the river temperature at Arkhangel'sk was found to be 22.5°.

Position of ship at 1200 (approx.): 66° 12'N, 40° 18'E.

Observers, the Master and Mr. C. L. Pickles, Chief Officer.

2nd August. At 0200 GMT whilst the vessel was 5 miles west of Mys Zimnegorskiy and in thick fog, the sea-water temperature was found to be 5°C. Later at 0250 when we were 4 miles west of Mys Kerets, the fog cleared rapidly and the sea temperature rose to 11°. On the two previous voyages to Arkhangel'sk the vessel always encountered fog off Mys Svyatoy Nos when eastbound in approx. position 68° 12'N, 40°E and cleared it at approx. 65° 26'N, 39° 30'E between Mys Zimnegorskiy and Mys Kerets. When westbound, the vessel always met the fog at the latter position and cleared it when off Mys Svyatoy Nos. Between these two positions the sea-water temperature was always about 5° rising rapidly south of Mys Kerets.

Position of ship (approx.): 65° 26'N, 39° 30'E.

Note. This interesting report on fog and sea surface temperatures is very useful as few observations are available in this area. It would appear that the high frequency of fog encountered in July and August was chiefly due to unusually low sea surface temperatures. The

sharp rise in the sea temperature in the vicinity of Mys Kerets would result in the dramatic clearance of the fog. Air temperatures over the land area to the south of the White Sea were unusually high in June and July, and accounted for the abnormally high sea temperatures in the approaches to Arkhangel'sk.

BERGY BIT

Eastern South Pacific

m.v. *Icenic*. Captain R. Marshall. Tauranga, N.Z. to Santos, Brazil. Observer, Mr. T. N. O'Driscoll, Chief Officer.

16th July 1974. At 1200 GMT a bergy bit was sighted. It was approx. 6 m long with approx. 1.5 m showing above water. This observation makes the bergy bit 62 miles north of the stated mean ice limit on Admiralty Chart No. 789. The vessel's course was altered to 090°T and no further icebergs were sighted. Air temp. 5.2°C, sea 5.9°. Course 103°T at 14 kt.

Position of ship: 51° 05'S, 102° 47'W.

Note. The ice limit shown on Chart No. 789 is based on sparse pre-war data. When navigating in this region, the mariner should refer to the ice limits displayed in the *New Zealand Pilot*, N.P. 51 (13th edition, 1971). This particular sighting lies more than 100 miles south of the extreme limit of ice shown in N.P. 51.

FALSE RADAR ECHOES

South African waters

m.v. *Sugar Crystal*. Captain D. Patrickson. Fremantle to Immingham. Observer, Mr. S. U. Sharif, 2nd Officer.

14th August 1974. Between 1920 and 1940 GMT whilst proceeding off the southern coast of South Africa, a fairly well-defined radar picture was displayed on the PPI of the coastline between Cape Barracouta and Bull Point. The light on Yzervark Point was observed visually at about 0920 but was of reduced intensity and at this time the radar picture of the land approx. 22 miles away began to fade, being replaced by a false but strong echo of the coastline at a range of 5.8 miles. At this time the light on Yzervark Point became quite brilliant. During the time that the false echo lasted, about 20 min, the true echo disappeared completely although some 25 ships on various ranges and bearings including those well inshore remained unaffected and showed up in their true positions throughout. Just before the false coastline faded away it drifted from abeam to lie NW/SE for about 5 min, then it disappeared and the true coastline reappeared on the screen and the light on Yzervark Point resumed its original intensity. Course 261°T at 15.0 kt.

Position of ship: 34° 45'S, 21° 46'E.

DOLPHIN

off Algiers

s.s. *Frontier*. Captain D. Gregson. Valletta, Malta to Manchester. Observers, the Master, Mr. M. L. James, 3rd Officer, Mr. J. A. P. Hall, Cadet and Officers' wives.

27th August 1974. At 0830 GMT a sea creature was observed on the starboard beam about 2 cables away. Although many dolphins had been sighted recently, this particular specimen was slightly larger and was about 3 m in length. However, the most noticeable features were its white colour, long dorsal fin and blunt head. It was seen occasionally surfacing, but did not leave the water as dolphins usually do and was heading in a general E'ly direction. The Master thought it was an albino Blackfish and although nobody on board was an expert on marine life, this seemed the most likely answer. The sea was rippled with a long, low E'ly swell. Sea temp. approx. 25.0°C. Course 264°T.

Position of ship: 37° 10'N, 03° 25'E.



Note. Mr. S. G. Brown of the Whale Research Unit, Institute of Oceanographic Sciences, comments:

"The description noting the length, long dorsal fin and blunt head, white colour, the behaviour at the surface and the fact that it was a solitary animal, suggest that it was perhaps more likely to be a Risso's dolphin (*Grampus griseus*) rather than an albino Blackfish or Pilot whale which would probably have been in a school of this species rather than solitary. Risso's dolphin grows to a length of about 4 m, has a prominent dorsal fin and blunt head, and appears white or very pale grey when seen at sea in clear, sunny conditions. It is well known in the Mediterranean Sea."

FISH

North Atlantic Ocean

O.W.S. *Weather Monitor*. Captain K. R. H. Wern. Observers, the Master, Messrs. D. C. Rudge, J. H. Halls, R. Basingthwaite, Meteorologists, Mr. W. J. Felgate, Chief Steward, Mr. G. Coombs, Marine Biologist and ship's company.

2nd July 1974. At 2230 GMT whilst experimental fishing was being carried out at Station 'India', Mr. Rudge and Mr. Coombs caught and landed what was later identified as a Torsk. The fish (*see* photograph opposite page 117) took mackerel feathers at a depth of 456 m with the sea-water temperature at that depth being 9.0°C as estimated by the evening bathythermograph trace. The Torsk weighed 3.8 kg and was approx. ½–1 m in length. Samples of the flesh, blood and liver were taken by Mr. Coombs for study at the Marine Laboratories, but the remains were cooked and eaten by Messrs. Rudge, Coombs, Felgate and Davies, all of whom agreed on the excellent flavour. Air temp. 10.5°, wet bulb 8.5°, sea 11.5°. Pressure 1013.9 mb. Wind NW'ly, force 3. Cloud 7/8 Cu and Sc.

Position of ship: 58° 44'N, 18° 10'W.

O.W.S. *Weather Surveyor*. Captain P. Robertson. At Station 'Juliett'. Observers, the Master and ship's company.

17th August 1974. During a search exercise a number of fish (see photograph opposite page 117) were seen feeding below flotsam thickly-encrusted with Goose-barnacles (*Lepas sp.*) and weed. The weather was very sunny and the sea calm so it was easy to catch about thirty of the fish. Most of these were filleted and eaten, but a few were deep frozen and forwarded to the Institute for Marine Environmental Research, Oceanographic Laboratory, Edinburgh.

Position of ship at 2200 GMT: 52° 02'N, 18° 35'W.

Note. Mr. R. Williams of the Oceanographic Laboratory comments:

"The fish caught were Wreck fish (Stone Bass) *Polyprion americanus* (Bloch and Schneider, 1801). It is a fish of the high seas occasionally reported in inshore waters in northern Europe. The habit of closely following floating wood etc. as reported, is characteristic of this fish. The largest of the three fish sent to us weighed 2.8 kg and like the other fish caught, was young and immature. Wheeler (1969) states that, 'adults are believed to adopt a bottom-dwelling existence and may reach a weight of 45 kg or more.' Nothing has been authenticated in the literature as to their food as all three fish examined had empty guts. A record specimen of this fish weighing 3.8 kg was caught by Mr. T. Rogers, a meteorologist from the *Weather Surveyor* on the 17th October 1972 at Weather Station 'India' (59° 00'N, 19° 00'W) which was one of the most northerly records of this fish for the North Atlantic Ocean. This specimen is now with the Royal Scottish Museum at Edinburgh."

BIRDS

Gulf of St. Lawrence

m.v. *Silvershore*. Captain D. Troup. Immingham to Pointe Noire. Observers, Mr. N. C. I. de Spon, 3rd Officer and Mr. E. A. S. Bradford, Cadet.

23rd April 1974. At 0600 GMT a bird alighted on board. As it was still dark at the time, it was assumed that the bird was attracted by the lights, although as it flew almost directly into the officers' bar, it may also have had some other interests. After it was captured it spent the night in a cardboard box with some water, bread and a tomato. The bird's back and wings were a mixture of black, grey and brown while the head and undersides were mainly white. (See photograph opposite page 116.) It had a dark streak on top of its head, a yellow bill and black feet and tail feathers. After an extensive photographic and modelling session, the bird was released within sight of land and flew towards it.

Position of ship at 0600 on 23rd: 48° 24'N, 62° 00'W.

Note 1. Captain G. S. Tuck, D.S.O., R.N., Chairman of the Royal Naval Birdwatching Society, comments:

"The bird was easily identified as a Snow Bunting. These breed far north in the Arctic tundra, in this case in the Canadian arctic, migrating to winter in open country in the north of the U.S.A. and along the east coast as far as North Carolina. They spread similarly across central U.S.A. In our Ocean Weather Ship reports we find reference to them occurring quite frequently while migrating; in fact they are very common at times usually from September to November when migrating southwards and again between April and May. They breed also in Scandinavia, arctic Europe and arctic Asia. They are mostly winter visitors to the high ground and coasts of Scotland, but occasionally a few pairs remain to breed in the mountains. They are often recorded on the higher North Atlantic sea routes."

Note 2. This report reached us too late for inclusion in the April 1975 edition.

North Atlantic Ocean

m.v. *British Guardsman*. Captain D. Corp. Göteborg to Forcados. Observers, Mr. S. Gammage, 2nd Officer and ship's company.

11th July 1974. At 1215 GMT a blue-grey pigeon with dark-barred wings was observed inspecting the hatch coaming of No. 10 port tank. The vessel had just cleared the Canary Islands and it was assumed that our new tank inspector had flown out to join us from there. At 1500 Jose (it was a Spanish bird) walked calmly through the wheelhouse door and immediately presented his 'calling card' which elicited great mirth from my wife and the cadet. By 1530 Jose was happily tucking into a bread bun, consuming a whole one in about 15 min which led us to conjecture that perhaps he was hungry.

To save further unorthodox uses of the wheelhouse by the bird, we apprehended it with little effort and 'put it to bed' in an empty whisky box where Jose immediately became quiet, but whether this was due to the darkness or to the residual fumes we don't know. On close inspection later, Jose was found to be wearing a green rubber band on his right leg and a gold polythene one on his left leg. The gold band bore the legend; 73-A/ESPANA 30728. He also appeared to have several parasites which were about the same size and appearance of common house flies, having hooked feet which made small indentations in the fronds of the pigeon's feathers. When Jose was feeding or at rest, these 'flies' would appear on his back and wings, but would disappear under the feathers if anyone approached. They did not appear to cause any discomfort, but due to their agility no specimen was obtainable. Jose was released on deck and showing no signs of imminent departure was provided with water, bread and a tin of assorted pulses.

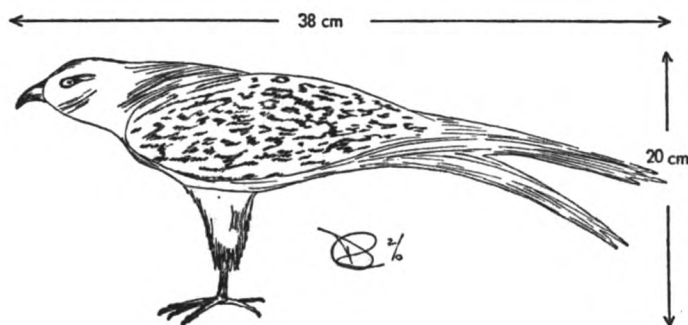
While observing Jose for several days, we were led to wonder whether pigeons were susceptible to hot feet as when the decks became warm in the sun, he used to walk picking up each foot deliberately and looking as if about to blow on it before completing the step. It appears that Jose tired of our hospitality on the 19th July and departed while the vessel was loading at Forcados. He was observed by all on board with the possible exception of the bhandary (Indian cook), as nobody remembers him preparing for a pigeon curry.

Position of ship (approx.) at 1200 on 11th: 22° 36'N, 17° 36'W.

m.v. *Elbe Ore*. Captain B. S. Biggs. Amsterdam to Monrovia. Observers, the Master and Mr. D. Colley, 2nd Officer.

28th July 1974. During the day a hawk alighted on board and remained for about six hours. It was approx. 38 cm in length from the tip of the hooked bill to the end of the tail and was approx. 20 cm high. The throat and chest were cream-coloured while the back was light brown and mottled, with a darker tail. The bird sported yellow 'socks' and also had a yellow head with a dark brownish-grey flash over each eye. Perhaps you would be good enough to let us know more about this bird.

Position of ship: approx. 25 miles off Dakar.



Note 1. Captain G. S. Tuck comments:

"The bird was a Lanner Falcon (*Falco biarmicus*) in its pale North African form. It is in fact distributed over the whole of South Africa and also southern Greece and Mesopotamia. This hawk swoops on its prey, largely doves and plovers, it usually nests on cliff ledges and lays its eggs in the early summer months. The Lanner Falcon is also used in falconry."

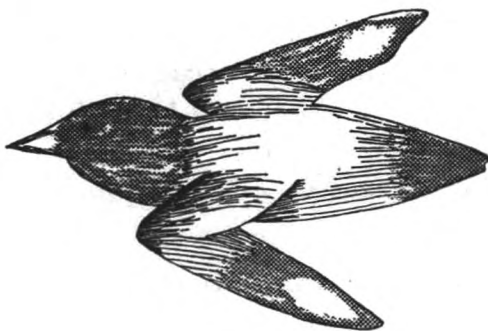
Note 2. The *Elbe Ore* is a 'SHRED' ship.

South Atlantic Ocean

s.s. *Edinburgh Castle*. Captain C. R. Kelso. Las Palmas to Cape Town. Observer, Mr. S. Jackson, 4th Officer.

7th August 1974. At about 1625 GMT the vessel passed near a South African fishing fleet. Among the large number of birds in the area was one particular variety distinctive because of its prominent black and white markings. Altogether 5 birds of this type were counted; they were between 23 cm and 30 cm long from bill to coal-black tail having black heads, grey backs and wings and snow-white bellies. There was also a snow-white patch on the wing tips of each bird. The birds always flew separately along with the large flocks of Cape Gannets, Giant Petrels and Albatrosses rather than in a group.

Position of ship: 31° 09'S, 16° 02'E.

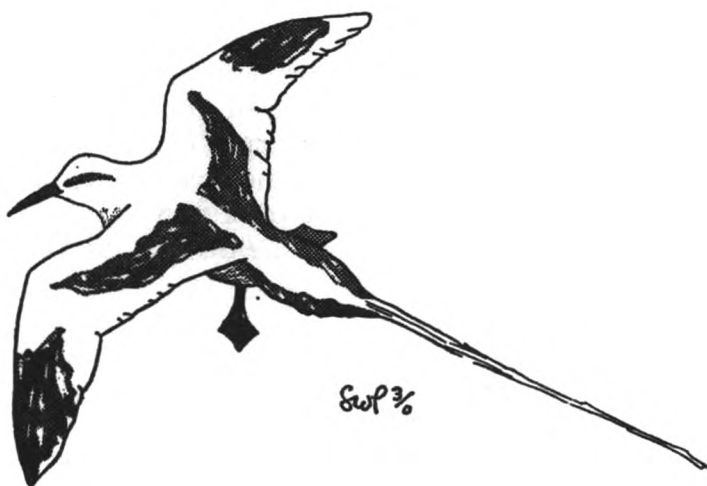


Note. Captain G. S. Tuck identified the birds as Pintado Petrels (*Daption capensis*) which are common and regular ship followers in the Southern Oceans. They are also called Cape Pigeons.

m.v. *City of Newcastle*. Captain I. G. Lumley. Mombasa to Avonmouth. Observer Mr. S. W. Ponter, 3rd Officer.

8th September 1974. At 1300 GMT two Red-billed Tropic-birds were sighted, being joined a little later on by a third bird. Two of the birds had faint black shading on their bodies, whilst the third had very clear markings. All three birds had bright red bills and black webbed feet. Their tails varied in length from about 60 cm to approx. 1.2 m. The birds also made similar noises to that of sea-gulls and they followed the ship for about 2 hours. Air temp. 20.1°C, wet bulb 18.0°, sea 19.0°. Wind SE'ly, force 2-3. Course 324°T at 14.5 kt.

Position of ship: 13° 10'S, 00° 22'W.



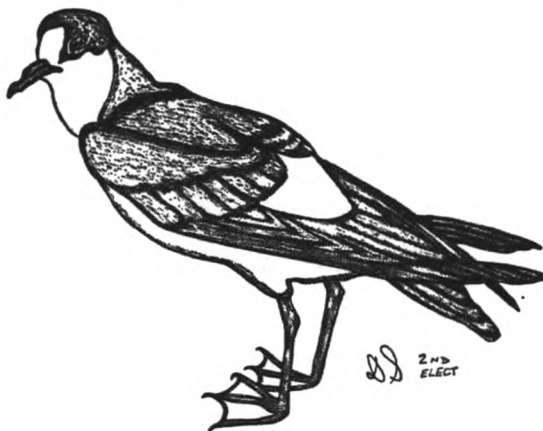
Note. Captain G. S. Tuck comments:

"The two birds with 'faint black shading' on their bodies probably were Red-billed Tropic-birds (*Phaethon aethereus*) as suggested. The third bird as in the very good sketch was a White-tailed Tropic-bird (*Phaethon lepturus*). Both occur in the area and breed on Ascension and St. Helena Islands."

Northern Pacific

s.s. *Bencruachan*. Captain O. Tucker. Kobe to Balboa. Observers, Mr. A. J. Montgomerie, 2nd Officer, Mr. A. J. Smith, Senior Cadet and Mr. D. Grant, Junior Cadet.

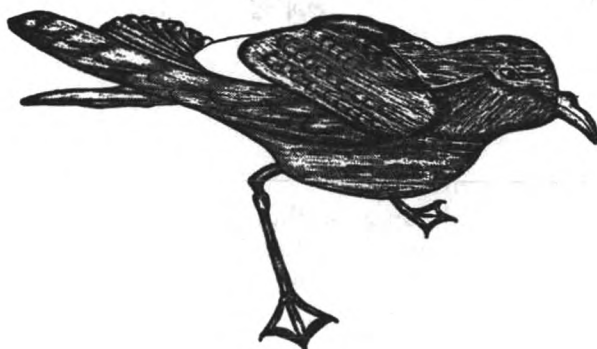
15th August 1974. At 1545 GMT, a small sea-bird was found huddled on the poop deck of the vessel. It was assumed that it had flown into the vessel's superstructure as when an approach was made towards the bird, no escape was attempted. We found that the bird was very tame and didn't object to being handled. It was placed in a cardboard carton and left until 2100.



At 2100, the bird was found to be more active and was attempting to escape from the box. As the bird was found to be in good health with no visible injuries, it was released and flew off. Its dimensions were; overall length approx. 23 cm, height 10 cm and wing span 50 cm. We believe it to have been a Hornby's Storm-petrel. Air temp. 21.0°C. Wind sw'ly, force 4.

Position of ship at 1545: 39° 10'N, 178° 42'W.

Observers, Mr. A. J. Montgomerie, 2nd Officer and Mr. R. Sadler, Radio Officer.
16th August 1974. At 1030 GMT another small seabird was found huddled in a corner on the poop deck. It was found to be quite tame when being handled and was brought to the bridge. It appeared to be in good condition and it was then placed in a cardboard carton when it stayed peacefully all night apart from every so often trying to climb out of the box. It was found that when light was shining in the box, the bird was restless, but when in the dark it was peaceful. At 1700 it was placed in an officer's hand out on the wing of the bridge. It stretched itself and then



flew off. The bird was thought to be a Storm-petrel as shown in the drawing. Its dimensions were: overall length approx. 15 cm, height 10 cm and wing span 28 cm.

Position of ship at 1030: 39° 00'N, 171° 05'W.

Note. Captain G. S. Tuck comments:

"The Storm-petrel was not a Hornby's Storm-petrel (*Oceanodroma hornbyi*) which occurs off South America in the Humboldt Current and breeds in the Chilean Andes. It was a White-throated Storm-petrel, very similar to Hornby's but lacks a white all-round 'collar' which Hornby's has. It breeds on tropical islands south of the central Pacific. It is the first time I have a record of it north of the Equator. Very good sketches. The second Storm-petrel was a Leach's Storm-petrel of which I have records already in the area."

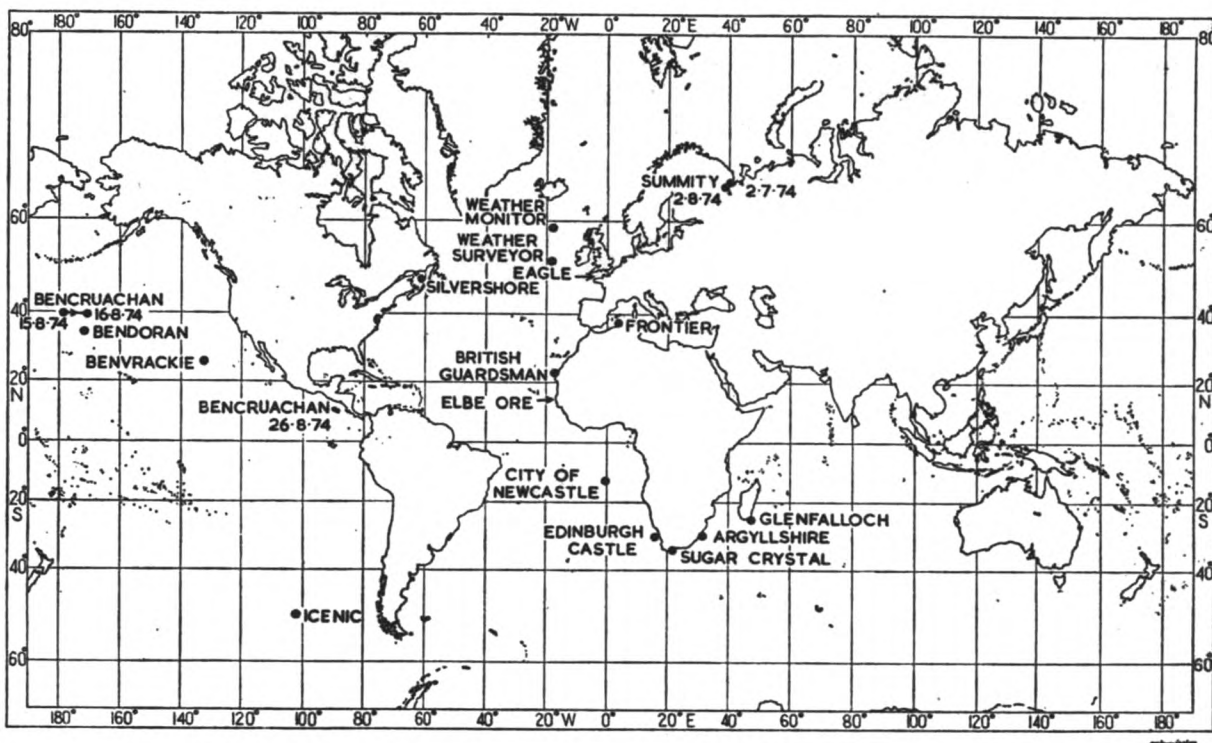
m.v. *Rudby*. Captain A. Dekonski. Japan to Huasco, Chile. Observers, Mr. R. C. Jackson, Chief Officer and ship's company.

1st September 1974. At 0400 GMT a flock of gannet-like birds was seen flying near the vessel with individuals (see photograph opposite page 116) also diving for fish. There were between 9 and 12 birds all of which alighted on the vessel at dusk. They resumed fishing the following morning but departed during the afternoon.

Position of ship: 05° 54'N, 148° 40'W.

Note. Captain G. S. Tuck comments:

"This was an immature Blue-faced Booby (*Sula dactylatra*). These have dark brown heads and necks with greyish-brown upper parts and white under-parts. I expect there were also some adults in the group. In the adult, the head and body is mainly white but with chocolate-brown wing quills and tail feathers. The bill is blue-grey or yellowish and the naked skin about the face is black."



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

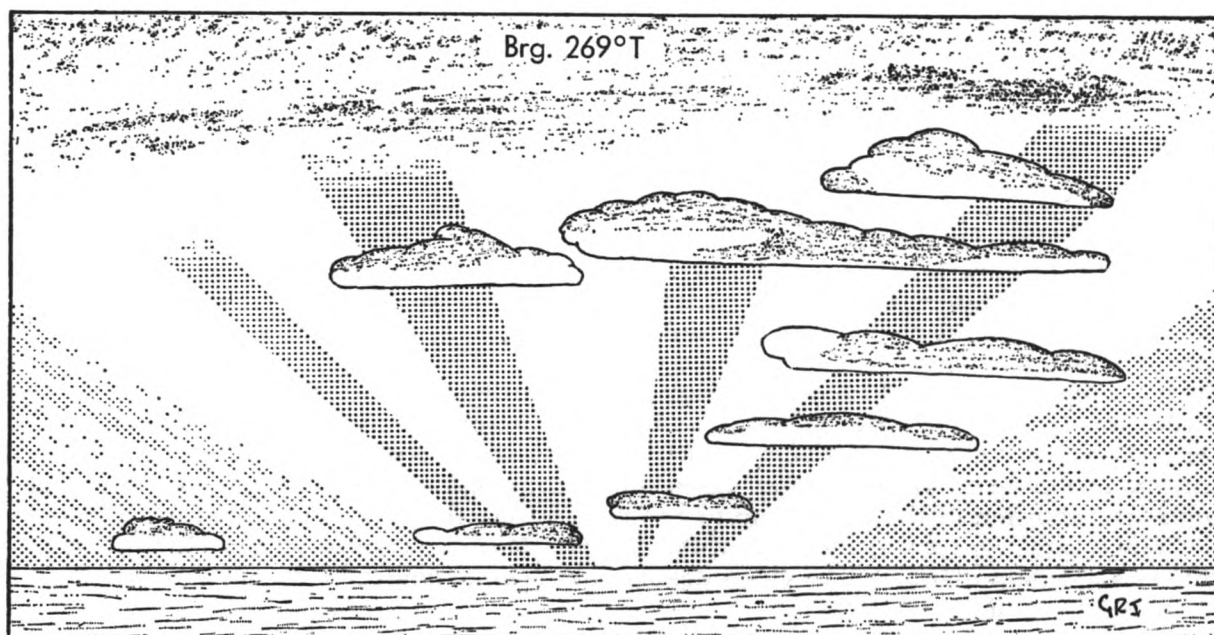
CREPUSCULAR RAYS

Indian Ocean

m.v. *Glenfalloch*. Captain W. Bellamy. Colombo to Cape Town. Observers, Mr. A. J. Leslie, Chief Officer and Mr. G. R. Illingworth, Cadet.

13th September 1974. At 0300 GMT unusual reflection of the sun's rays was noticed. With the rising sun bearing 089°T at an altitude of 5°, rays of light were being converged to a focal point below the opposite horizon as shown in the accompanying sketch. The cloud present at the time of the observation was an upper layer of Sc with small Cu below. Air temp. 21.3°C, wet bulb 18.5°. Pressure 1024.4 mb.

Position of ship: 25° 10'S, 47° 45'E.



Note. Crepuscular rays are more often reported as forming a divergent pattern emanating from the sun's direction. On some occasions these rays can be seen to converge towards the anti-solar point at the opposite horizon. As the sun's elevation was 5° the anti-solar point was at a similar angle below the horizon.

AURORA

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

"Reports of aurora received at the Balfour Stewart Auroral Laboratory of the University of Edinburgh from British ships for the months July–September 1974 appear in the accompanying list.

"During these three months the outstanding solar event occurred on 6th July giving rise to high levels of geomagnetic disturbance with magnificent auroral displays over North America; it did not, however, contribute to our charts, due to unfortunate timing of the maximum activity in relation to the short period of darkness at high and mid-latitudes over the Atlantic and Western Europe.

"The spectacular and classic displays seen in the Newfoundland area on 12th–16th July were associated with lower levels of magnetic activity, and it seems relevant here to refer to the note made by observers in the *Longstone* regarding the occurrence of visible aurora in Canadian waters around geographic latitude 50°N and the absence of such occurrences at a similar latitude in the Eastern Atlantic generally and Cornwall in particular.

"The reason for this seeming anomaly is that the two zones where aurora can be expected to be visible at some time on every clear night—one in each hemisphere, are centred on the geomagnetic poles (the northern one being about 79°N 70°W geographic) and at roughly 23° distance from them. The northern auroral zone runs across Alaska, the southern part of Hudson Bay, south of Greenland and Iceland, north of Norway and along the north coast of the U.S.S.R. With any increase in magnetic disturbance, associated with solar activity, the southern boundary of the visible aurora moves equatorwards. The St. Lawrence region—Anticosti Island, say—is in geomagnetic latitude 61° and with a good northern outlook is an excellent viewing point; a high percentage of our reports from ships' observers comes from there.

"To the north of Scotland the auroral zone swings away, so that Cornwall is only in geomagnetic latitude 54° . Parts of northern Scotland are at the same geomagnetic latitude as the entrance to the St. Lawrence and in 1974, 83 auroral sightings (these include horizon glows) were registered there, while at the latitude of Cornwall only one sighting was made.

"Referring further to the log entry of the *Longstone*, and the reported lack of success with photographs of aurora, we would suggest that good results have been achieved with 28 mm wide-angle lens, exposures of 1 minute (or under 2 minutes) at $f/2.8$ with high speed Ektachrome or Fujichrome film. (It is perhaps rather obvious to point out that however good a photograph of aurora may be—and discounting its undoubted value to the researcher—it allows the photographer to recall a fascinating spectacle but conveys most inadequately to the non-observer at home the movement, multiplicity of form, perhaps colouring, of the phenomenon which have given rise to so much folk lore.)

"Two reports of noctilucent cloud were received from Weather Ships during July. The earlier was from the *Weather Surveyor* at 0215 GMT on 9th July when sailing off north-west Ireland. Other reports for that night came from fairly widely separated points—from Kinloss, Linton-on-Ouse and Wirral, but all agreed on a fairly high maximum angle of elevation, i.e. southern extension of the clouds; up to 35° as seen from the *Weather Surveyor* at 55°N .

"The second report was made from the *Weather Reporter* at 0030 on 24th July when the ship was at Station 'India'. The cloud was seen at the same time from northern England and West and Central Scotland.

"The months for maximum noctilucent cloud sightings at latitudes 50° – 60°N geographic

occur from the end of May to mid-August, and we shall again be grateful for any reports of the clouds identified by ships' observers during the 1975 season.

"We thank you all for your reports, for sketches from observers in the *C.P. Voyageur*, the *Queensgarth* and o.w.s. *Weather Monitor* and o.w.s. *Weather Adviser*, and for the help of all concerned."

DATE (1974)	SHIP	GEOGRAPHIC POSITION	Λ	Φ	I	TIME (GMT)	FORMS
12th July	<i>Queensgarth</i>	Cap de Gaste	010	60	+75	0300-0500	HB, RA, RB, N
	<i>C.P. Voyageur</i>	49°30'N 66°07'W	010	61	+70	0400-0415	HB, RB, RR
14th	<i>Queensgarth</i>	Cape Ray	020	59	+73	0220-0400	All forms
	<i>Manchester Concorde</i>	54°02'N 45°40'W	030	64	+72	0245-0310	HA, HB, RA, RR, N
16th	<i>Manchester Concorde</i>	49°09'N 67°40'W	360	61	+77	0610-0700	HB
19th	<i>Silvershore</i>	46°36'N 56°06'W	020	58	+72	0430-0530	RR
24th	<i>Weather Reporter</i>	58°55'N 19°35'W	070	65	+72	0057-0103	RA
4th Aug.	<i>Weather Monitor</i>	58°22'N 16°58'W	070	65	+72	0045-0110	HB, RB, RR
10th	<i>Weather Monitor</i>	58°49'N 19°17'W	070	65	+72	0100-0110	N
17th	<i>Weather Monitor</i>	58°59'N 19°16'W	070	65	+72	0250-0315	N
18th	<i>Weather Monitor</i>	58°46'N 19°14'W	070	65	+72	0020-0125	HA, RA, RB
19th	<i>Summit</i>	66°41'N 10°50'E	110	66	+76	2325-2335	RA, RR
21st	<i>Weather Monitor</i>	58°51'N 19°24'W	070	65	+72	0240-0330	N
23rd	<i>Weather Monitor</i>	58°59'N 19°15'W	070	65	+72	2245-0400	RR, V, N
24th	<i>Weather Monitor</i>	58°52'N 19°34'W	070	65	+72	2145-0200	N
25th	<i>Weather Monitor</i>	58°57'N 19°33'W	070	65	+72	2330-0040	N
26th	<i>Weather Monitor</i>	58°53'N 19°00'W	070	65	+72	2245-0230	N
	<i>Summit</i>	64°00'N 05°15'E	100	65	+75	2250-2253	RR
28th	<i>Summit</i>	71°15'N 23°50'E	120	67	+78	2143-2215	HB, RR
29th	<i>Weather Monitor</i>	58°43'N 18°40'W	070	65	+72	0150-0300	N
30th	<i>Manchester Courage</i>	52°35'N 52°40'W	020	63	+75	0050-0340	HB, RR, P
1st Sept.	<i>Mabel Warwick</i>	64°10'N 05°00'E	100	65	+75	2315-2330	HA, P
2nd	<i>Weather Adviser</i>	59°06'N 19°26'W	070	65	+72	2245-2255	RA
5th	<i>Weather Adviser</i>	59°03'N 19°08'W	070	65	+72	0005-0013	RB
						2315-2325	RB
8th	<i>Summit</i>	70°00'N 33°16'E	130	65	+78	1945-2048	All forms
10th	<i>Weather Adviser</i>	59°00'N 19°12'W	070	65	+72	0030-0055	P
	<i>Summit</i>	68°00'N 12°18'E	110	67	+77	2045-2300	All forms
	<i>Weather Adviser</i>	58°54'N 19°12'W	070	65	+72	2230-2250	N
12th	<i>Summit</i>	60°16'N 04°00'E	090	62	+73	2040-0150	HA, RR
13th	<i>Weather Adviser</i>	59°07'N 18°55'W	070	65	+72	2140-0330	HA, RB, RR, P, N
14th	<i>Weather Adviser</i>	59°06'N 18°54'W	070	65	+72	2150-2330	RB, V, N
16th	<i>Gothland</i>	51°33'N 56°30'W	020	63	+75	0300-0600	RA, RR
19th	<i>Weather Adviser</i>	59°00'N 19°12'W	070	65	+72	0200, 0400	N
	<i>R.R.S. Challenger</i>	59°15'N 02°11'W	080	62	+72	2200	HA, RR
	<i>Ross Orion</i>	60°05'N 46°15'W	030	70	+77	2325-2345	All forms
20th	<i>Gothland</i>	49°55'N 59°35'W	010	61	+75	0100-0145	RA, RR
	<i>Ross Orion</i>	60°05'N 46°15'W	030	70	+77	2330-2345	All forms
22nd	<i>Weather Monitor</i>	57°51'N 17°07'W	070	63	+71	0005-0400	RB, N
		58°49'N 19°07'W	070	65	+72	2145-0241	N
23rd	<i>Weather Monitor</i>	58°39'N 18°59'W	070	65	+72	2235-0056	N
25th	<i>Weather Monitor</i>	59°00'N 18°43'W	070	65	+72	2047-0310	HA, RR, V, P

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; N = unidentified auroral form.

Voluntary Observing Ships' Contributions to a Scientific Investigation in 1973

In 1973 the Meteorological Office was requested by the Secretary General of the World Meteorological Organization to arrange for Voluntary Observing Ships and other British ships passing through an area off the west coast of Africa during the periods January to April and July to September 1973 to make certain meteorological observations and transmit them to the coastal radio stations of Morocco or Senegal.

The observations were required by the International Council for the Exploration of the Seas (ICES) who were co-ordinating an investigation, known as the "Co-operative Investigation of the Northern Part of the Eastern Central Atlantic" (CINECA), into the circulation and composition of ocean water where it upwells from the great depths of the area in question. The upwelling cold water masses are rich in nutrients and the circulation is therefore of great importance to fisheries. The process of upwelling is strongly dependent on wind conditions over a large area and it is for this reason that observations were required from as many ships as possible during the periods of survey by oceanographical ships.

The Secretary General of the World Meteorological Organization (WMO) is pleased to inform the Meteorological Office that results obtained in response to his request have been most gratifying in that more than 9,000 observations were made by 340 ships. He wishes to convey the appreciation of the WMO to the personnel of ships participating in this important scientific investigation programme.

The organisers of CINECA in conveying their deep appreciation of the voluntary co-operation of meteorological observing ships have stated as follows:

"We would very much like the observing officers to know that their efforts have provided much valuable material and that they have thereby contributed considerably to the scientific results of the whole operation. The interest they have shown in it is also a source of inspiration and encouragement for the scientists working on the problems of the area."

The Marine Division of the Meteorological Office and Port Meteorological Officers wish to thank those observing officers in British ships who gave their support to CINECA.

The following is the list of ships from which observations were received during the periods of the investigation.

Argentina:

Lago Argentino, Lago Lacar, Rio Carcarana, Rio San Juan, Rio Quequen.

France:

Germinal, Ivondro, Jean Charcot, Nivose.

India:

Jalavikram.

Italy:

Augustus, Marcus Lolli Ghetti.

Spain:

Cornide de Saavedra.

Jugoslavia:

Bocna, Korotan, Makarska.

Netherlands:

Abel Tasman, Achilles, Adrastus, Alcor, Algol, Algorab, Alkes, Alkmaar, Amstellaand, Amstelpark, Amstelstad, Amstelveen, Archimedes, Aristoteles, Asterope, Balong, Banggai, Barendrecht, Batjan, Batu, Bawean, Bengalen, Bovenkerk, Britsum, Capiluna, Capisteria, Capulonix, Cartago, Castilla, Chevron Arnhem, Chevron Kentucky, Chevron Nederland, Chiron, Choluteca, Copan, Dallia, Deltadrecht,

Diadema, Diogenes, Dosina, Duivendrecht, Eemland, Esso Bonaire, Esso Den Haag, Esso Europoort, Gaasterland, Gaasterdyk, Giessenkerk, Gooiland, Gorredyk, Grave-land, Grotedyk, Gulf Hansa, Gulf Hollander, Gulf Sude.

Heelsum, Hercules, Hermes, Holendrecht, Jason, Katendrecht, Katwijk, Kennemerland, Kermia, Korovina, Kylis, Laarderkerk, Leersum, Leiderkerk, Lelykerk, Leuve Lloyd, Loire Lloyd, Lycaon, Maas Lloyd, Machaon, Macoma, Madison Lloyd, Marathon, Marne Lloyd, Medon, Meerdrecht, Metula, Miso, Moerdyk, Montferland, Musi Lloyd, Neder Rhone, Neder Rijn, Neder Waal, Nedlloyd Carwell, Nedlloyd Dejima, Nedlloyd Katwijk, Nedlloyd Kembla, Niso, Noord-Holland, Nykerk, Oldekerk, Ommenkerk, Oostkerk, Ouwerkerk, Palamedes, Patro, Pericles, Philidora, Philippia, Rotte, Rudolph Peterson, Schelde Lloyd, Schiekerk, Schie Lloyd, Seine Lloyd, Sepia, Serooskerk, Simonskerk, Sinoutskerk, Sliedrecht, Spaarnekerk, Steenkerk, Streefkerk, Talamanca, Tanamo, Tinto, Toltec, Trident Amsterdam, Veendam, Waalekerk, Westerkerk, Wioldrecht, Willemskerk, Wissekerk, Woensdrecht, Zaankerk, Zonnekerk, Zuiderkerk, Zwijndrecht.

United Kingdom:

Act 1, Act 2, Act 6, Almaric, Amastra, Anadara, Antilochus, Araluen, Argyllshire, Aureol, Barrister, Benalder, Benarty, Benattow, Benavon, Bencairn, Bencruachan, Bendearg, Benlawers, Benledi, Bennevis, Benreoch, Benrinnis, Benvannoch, Benvrackie, Botany Bay, Brandon Priory, Brasilia Star, Bridgepool, British Bombardier, British Commodore, British Hazel, British Maple, Buenos Aires Star, Cape Franklin, Cape Nelson, Cardigan Bay, Cheviot, City of St. Albans, City of Auckland, City of Cape Town, City of Colombo, City of Glasgow, City of Guildford, City of Lancaster, City of Liverpool, City of London, City of Oxford, City of Wellington, Clan Grant, Clan Macgillivray, Clan Macgregor, Clan Macilwraith, Clan Macindoe, Clan Macinnes, Clan Macintosh, Clan Macintyre, Clan Maclaren, Clan Maclay, Clan Macleod, Clan Macnab, Clan Macnair, Clan Matheson, Clan Ramsay, Clan Ranald, Clan Robertson, Clan Ross, Cotswold, Cretic, Crystal Sapphire, Cumberland, Cyclops.

Deido, Demodocus, Derbyshire, Donegal, Dukesgarth, Dumbaia, Dumurra, Dunadd, Ebani, Edenmore, Edinburgh Castle, Egton, Encounter Bay, Esso Caledonia, Esso Cambria, Esso Mercia, Esso Warwickshire, Esso Ulidia, Eucadia, Fernie, Fern Moor, Flinders Bay, Flintshire, Floristan, Foreland, Fourah Bay, Furness Bridge, Galway, Geestcape, Gene Trefethen, Gladstone Star, Glenfalloch, Glenlyon, Glenogle, Glenpark, Gothland, Hazelmoor, Himalaya, Huntingdon, Ionic, Illyric, Jervis Bay, Jumna, Kano Palm, King Alfred, Kinnaird Castle, Kohistan, Kowloon Bay, Longstone, Liverpool Bay, London Harmony, Mabel Warwick, Mahronda, Manchester Vigour, Mahseer, Mataura, Menestheus, Mitra, Moreton Bay, Newcastle Star, Nigaristan, Nurjehan, Orenda Bridge, Osaka Bay, Otaio, Otaki, Pando Gulf, Pegu, Pendennis Castle, Pennyworth, Port Auckland, Port Chalmers, Port Launceston, Port New Plymouth, Raeburn, Registan, Ronsard, Rothesay Castle, St. Merriel, Serbistan, Serenia, Silversand, Southampton Castle, St. Margaret, Sugar Refiner, Sydney Bridge, Tabaristan, Tactician, Tairea, Tantalus, Temple Arch, Teviotbank, Titan, Tokyo Bay, Tongariro, Toronto City, Townsville Star, Trefusis, Treneglos, Trentwood, Turakina, Turkistan, Ulster Star, Victore, Westminster Bridge, Westmorland, Worcestershire, Zaphon.

Electrification in the Atmosphere

BY G. E. MILLWARD

(This article is reproduced from *Safety at Sea International*, November 1974, by kind permission of the Editor.)

Atmospheric electricity presents a hazard to shipping and there have been several serious fires caused by lightning strikes on tankers. There have also been a number of explosions during tanker cleaning. It has been suggested that there are some similarities between electrical conditions in a thunder-cloud and the mists in tankers. This article attempts to clarify the situation.

Introduction

During 1971 over a quarter of a million tons of shipping totalling 42 vessels, was lost due to fire and explosion. The cause of these and other similar disasters can be classified into three main categories: (a) events caused by electrical failure or human error (with which we are not concerned), (b) events caused by natural phenomena, such as thunderstorms and (c) events taking place during tank cleaning. The incidences of explosions during tank cleaning are well known (*Safety at Sea*, 1973). However, the effects of lightning have a long history (Hampshire, 1974), and there have been several serious misfortunes recently. In 1970, the *British Architect* was struck by lightning, when in ballast in the Persian Gulf and an explosion took place followed by a fire. On 26th February 1971, the *British Bombardier* was loading crude oil (non-inerted tanks) in Baniyas, Syria, when one of the foredeck gas risers was struck by lightning and venting hydrocarbons were ignited. Thunder had been heard and the storm headed in the direction of the ship, so the loading should have stopped. In this case it was fortunate that the fire was put out by forcing steam up the gas riser. This was a makeshift operation that was hindered by burning paint falling from the mast. The gas riser of the *British Energy* was struck when the vessel was north-north-west of Cap Bengut on 3rd February 1973. It took three hours to extinguish the fire and no doubt all concerned were aware of the consequences of a "blow-back" explosion. A major tank tragedy occurred in 1972 when the Greek ship the *Princess Irene* was struck by lightning off St. Nazaire. This resulted in six deaths and injured more than 30 of the crew.

In addition to these reports of fires and explosions, atmospheric electricity can pose other hazards for the mariner. In April 1972 the *Flinders Bay* experienced continuous lightning off the south-east coast of Africa. The electrical activity was so intense that the Decca navigator was rendered useless. Also there have been numerous reports of St. Elmo's Fire on pointed objects (*The Marine Observer*, 1974) which is symptomatic of high electrical charges and is a potential danger, particularly in the presence of combustible atmospheres.

Clearly then atmospheric electrical phenomena pose a problem for the continued safety of ships' personnel and for successful commercial operation, particularly with the transport of inflammable cargo such as crude oil and liquid natural gas. In addition, there are substantial charges generated during tank cleaning and the question of man-made thunderstorms has been raised (*Safety at Sea International*, Vol. 59, p. 25, 1974). This article attempts to rationalise the observed phenomena, both natural and man-induced.

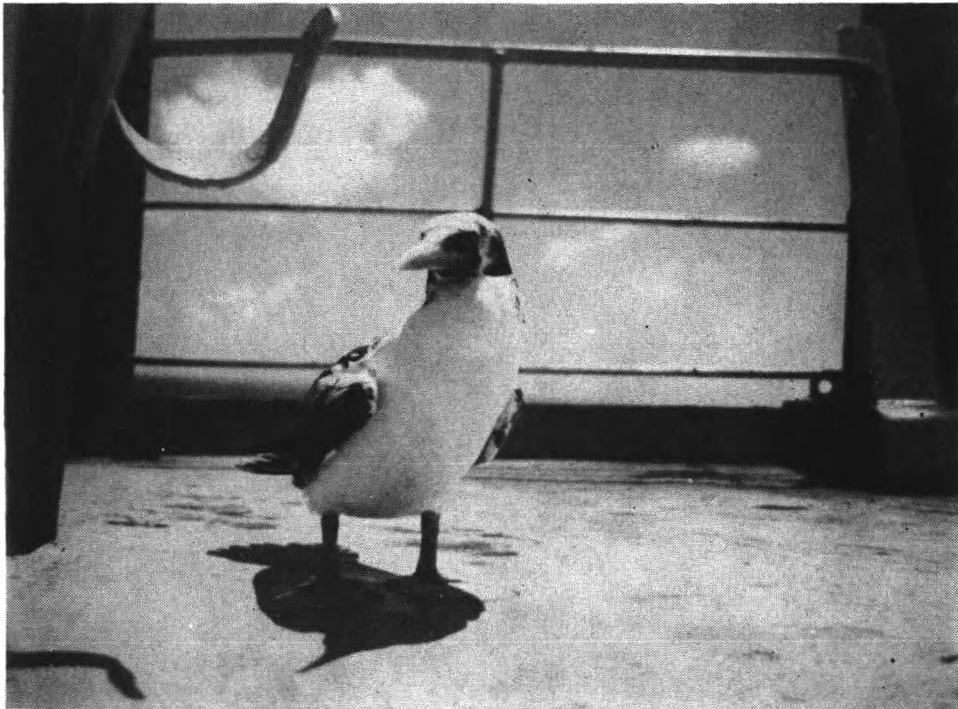
The fine weather electrical field

The atmosphere has a vertical electric field, in clear sky conditions, which is directed downwards. The field is due to the presence of small, mobile carriers of



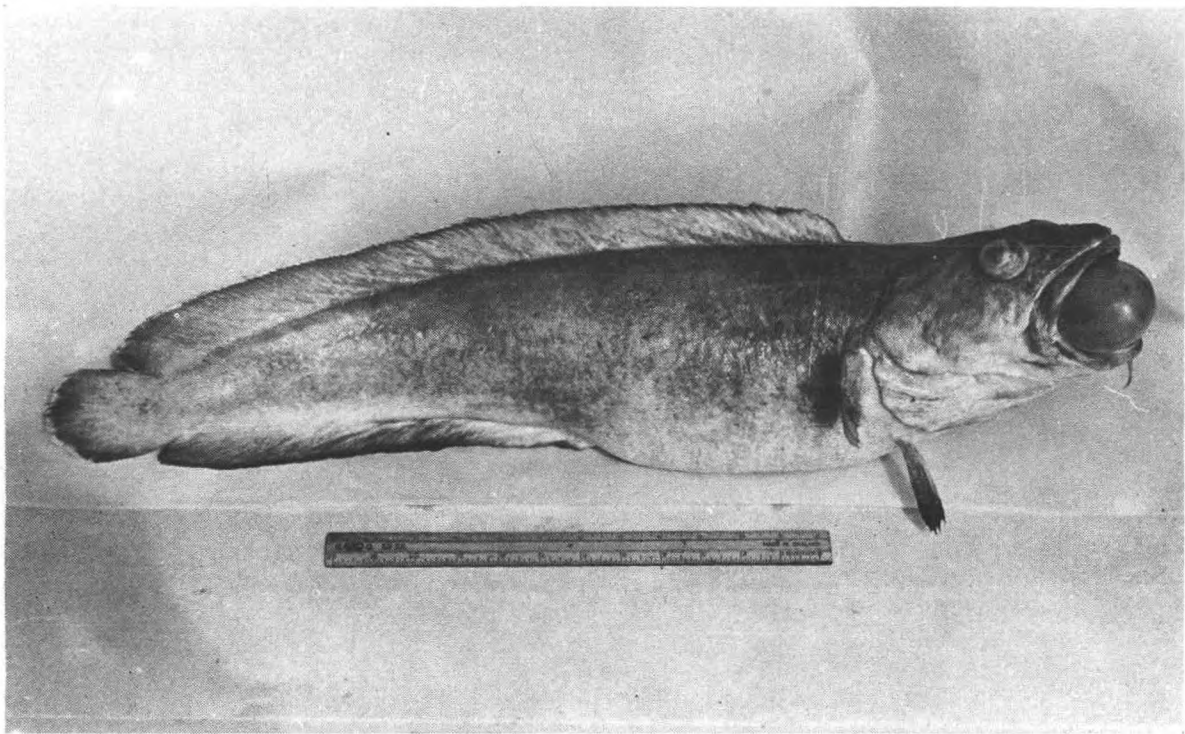
Photo by N. C. I. de Spon

A Snow Bunting aboard the *Silvershore* (see page 106).



An immature Blue-faced Booby which visited the *Rudby* (see page 110).

(Opposite page 117)



A Torsk caught at Station 'India' (see page 105).

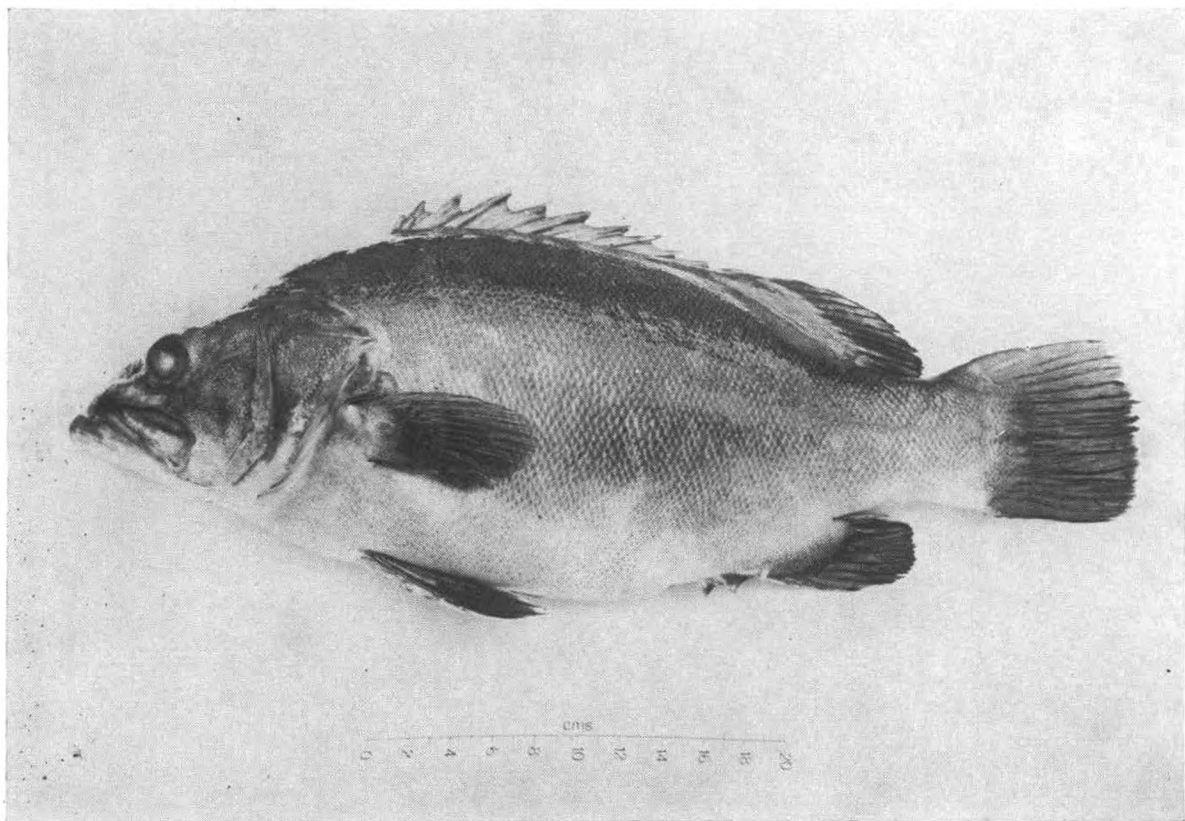


Photo by T. S. Bain

A Wreck Fish (*Polyprion americanus*), caught at Station 'Juliett' (see page 106).

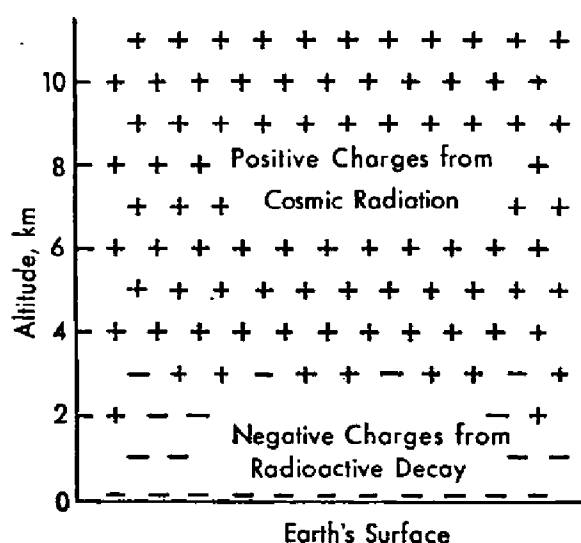


Fig. 1. The fine weather distribution of positive ions and negative ions in the lower atmosphere.

electricity called ions, which are charged either positive or negative. The latter are more prevalent in the first 2 kms of the atmosphere, so that the earth's surface is negatively charged, as shown in Fig. 1. These ions are produced mainly by the decomposition of radioactive material in this region of the atmosphere. The positive ions become more important above the 2-km level and these are produced mainly by extra-terrestrial cosmic rays which are continually bombarding the upper atmosphere. The intensity of the vertical electric field averaged over the whole earth is about 12 V/m, although in industrial regions, where the air is polluted, 350 V/m is not uncommon. Clear air discharges are virtually unknown because dry air is a poor electrical conductor and requires a potential gradient of about 3×10^6 V/m, although the presence of water drops in the air reduces the maximum required. It becomes clear that in order for discharges to take place, the fine weather field must be substantially enhanced within a thunderstorm.

Thunderstorms and charge generation

Cumulonimbus (Cb) clouds towering up to heights of 12 km are usually the indication of an approaching thunderstorm. Usually they are associated with great upward and downward movements of air which are the driving force behind the storm. The life cycle of a Cb cell lasts several hours, although should a cluster of cells exist they can be self-sustaining so that the whole system may last several days. The rising moist air in a growing thunder cell begins to form cloud droplets and latent heat of condensation is released, which assists the vertical ascent of the air. Raindrops then begin to form through the collision and coalescence of the cloud droplets and this means that they are subjected to varying temperatures according to their height, as shown in Fig. 2. The lower part of the cloud is composed mainly of water droplets. Supercooled droplets, which exist in the middle part of the cloud, are still liquid at temperatures well below 0°C. At -40°C all the water freezes so that in the highest reaches of the cloud the water is in the form of ice crystals.

Lightning commonly begins more or less simultaneously with the appearance of precipitation and so it is possible to infer that the water droplets are responsible for charge generation. Indeed, Simpson in 1909, proposed that the violent disruption of a water drop (after reaching a size of about 5mm diameter) tends to make the largest fragments positive and the fine spray from the surface film negative. The large positive drops fall to the base of the cloud while the negative spray is carried aloft by the updraft, but observations have shown an opposite charge distribution, as shown in Fig. 2. Although the Simpson mechanism cannot explain the generation

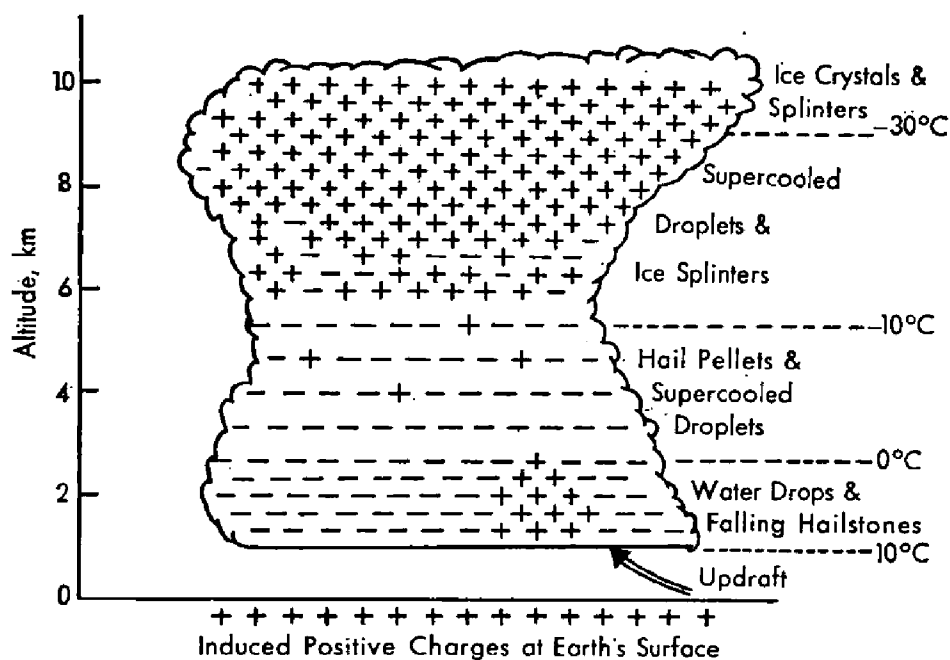


Fig. 2. The distribution of ions and water in a cumulonimbus cloud. The light ice splinters and crystals carry positive charges into the upper levels while the heavier hailstones and rain carry negative charges to the base of the cloud. The area of positive charge at the base, near the region of the updraft, is of uncertain origin at present.

of the main charges in the cloud, it may explain the small positive centre at the cloud base, whose actual origin is still under discussion.

Many of the current theories of the generation of electrical charges are based on the effects of freezing. A generally-accepted theory involves the thermo-electric

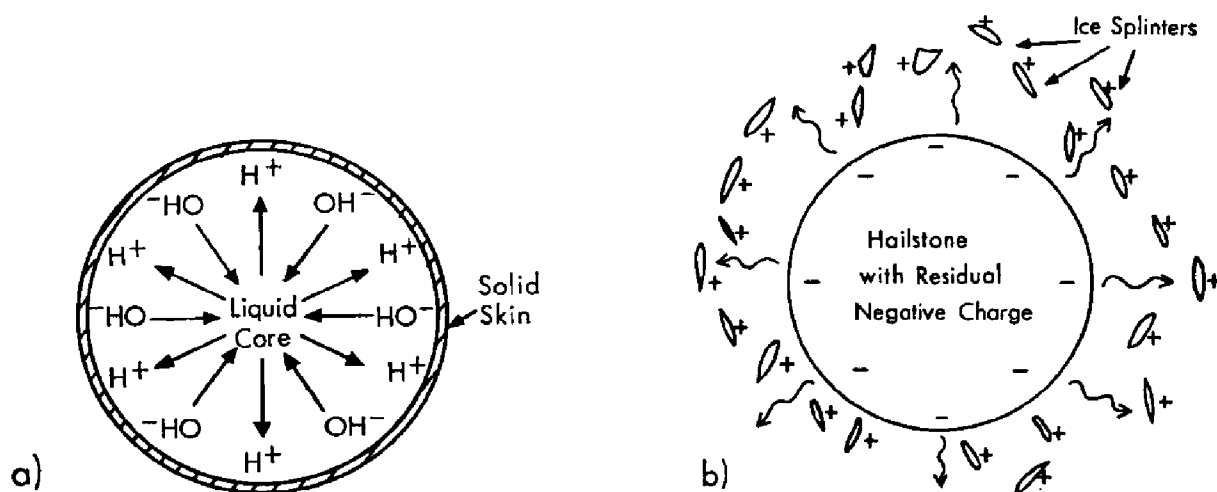


Fig. 3. The thermo-electric effect in supercooled droplets, actual size 0.2 mm. a. The migration of positively and negatively charged ions under the influence of the temperature gradient. The drop has a solid skin and a liquid centre.

b. The freezing process continues and the expansion of the centre causes the shattering of the outer skin.

effect in supercooled droplets, a schematic diagram is shown in Fig. 3. The supercooled droplet freezes inwards from its surface and during the initial stages, when only the surface skin is frozen, there is a migration of H^+ and OH^- ions (the ionic constituents of water). The positively charged hydrogen ions (H^+) migrate toward the cooler surface, while the hydroxyl ions (OH^-) move towards the relatively warmer interior. Subsequently, the core will begin to freeze with the consequence that the water expands. This expansion causes the previously frozen outer skin to

rupture, producing small ice splinters which are positively charged. The lighter splinters are raised to the top of the convection cell in the updraft, while the negatively charged pellets fall to the cloud base under gravity. It is this process which is probably the most important in the generation of intense potential gradients and which produces typical distributions of charge shown in Fig. 2. However, there are a number of other mechanisms, of minor importance which have been suggested, but the electrical conditions inside a thunderstorm are so complex that the understanding is far from complete.

The lightning discharge

A lightning flash will occur when sufficient charge has been generated and separated to overcome the resistance of the air. The discharge may take place between clouds, within clouds or between cloud and ground (usually about 40 per cent of all flashes in the U.K.). The intracloud discharges take place where the potential gradient is maximized (Fig. 4), as shown by the close grouping of the lines of equal charge density in the diagram. The electrical field strengths eventually become so large that in spite of the poor conductivity of the air, electrical neutralization takes place in the form of a spark discharge. However, a single flash or series of flashes does not result in complete neutralization as new positive and negative species are being continually produced in the cloud. In the case of cloud-to-ground flashes the negative part of the cloud induces an equal positive charge in the earth below it, and from time to time flashes occur to neutralize this charge.

Numerous observations show that the lightning flash consists of several successive strokes which follow the initial discharge channel (Fig. 5). The leader stroke builds steadily downward in a step-wise fashion, from the cloud to the ground at a speed of about 15 km/sec. The steps have a length of 100 metres, with resting stages of several millionths of a second, and reach the ground in 0.01 seconds. This stroke is only faintly luminous. The second stage is the return stroke from ground to cloud and transfers positive charge from the earth at speeds of up to 100,000 km/sec, with maximum currents of 20,000 amps. This stroke is intensely luminous. After a tenth of a second the dart leader descends along the channel, taking approximately a thousandth of a second. This is followed by a second return stroke and the dart/return stroke cycle may be repeated several times during which successive portions of negative charge, in the lower part of the cloud, are tapped off.

Usually, the discharges are directed earthwards at a pointed, electrical conductor, which has a high positive charge density induced at its surface. Suitable conductors are ice needles in the free atmosphere, vegetation, ships' rigging and even hair and hands. The conductors are sometimes surrounded by a luminous glow which is produced by the migration of the positive ions under the influence of the intense electric field. This is a 'point-discharge' and is often described as St. Elmo's Fire. The 'point-discharge' has an important role since it assists the discharge of lightning from the cloud. Lightning occurring over the sea is usually more violent than over land because of the lack of raised objects to strike. The consequence is that the field strength becomes relatively greater before a lightning flash takes place.

Ball lightning can be described as a roughly spherical mass of glowing air of about 20 cm diameter with a lifetime of a few seconds. Unfortunately, ball lightning is a random phenomena so that no scientist has actually set up an apparatus in its presence. However, laboratory simulations have been attempted and it is assumed to arise from the intersection of one lightning channel with another. The charged particles at the intersection are held by the magnetic fields associated with the strokes, but work on this phenomena continues. Recently there has been some study (Karma, 1972) of the electrification in dust storms. Electric sparks, several metres long, have been observed from the tops of sand dunes, with potential gradients as low as 2,500 V/m. Again, further work is being done to elucidate the precise nature of this discharge.

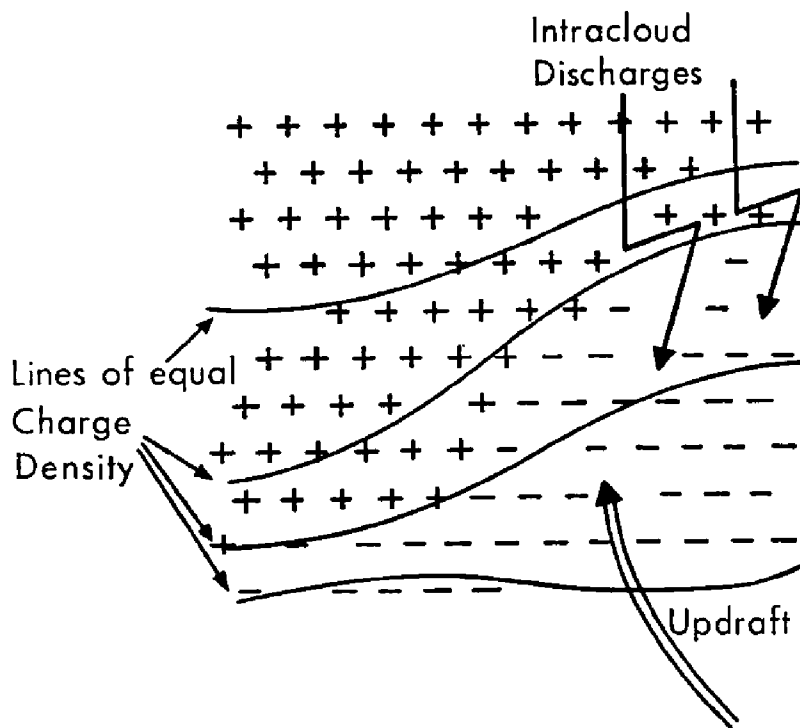


Fig. 4. Electrical discharges within clouds. The lines are of equal charge density and the discharges take place in a region where the potential gradient is at a maximum. The updrafts assist the charge separation process and ultimately the field strength becomes so large that a lightning flash occurs.

Lightning damage

The damage caused by lightning falls into four important groups—electrical, thermal, mechanical and magnetic. The first effect is due to the passage of an extremely large current, in the kilo-ampere range, in a short time. This means that damage to electrical equipment can be caused, through inductive effects, without a direct strike. Thermal damage is caused by the high temperatures, in excess of 20,000°C, generated in a lightning stroke. This heat may cause the quartz in sand to liquify and there have been reports of thermal damage to glass caused by ball lightning (McIntosh, 1973). In order for lightning to cause combustion, a sufficiently high temperature has to be generated for a sufficient length of time. Many laboratory tests show that gas ignition is possible providing the fuel/oxidant ratio is correct. However, currents of greater than 10 kilo-amps lasting for ten millionths of a second will not set fire to wood, but there are numerous reports of organic materials, such as straw, catching fire under these conditions. The mechanical effect of lightning is caused by the fact that the pressures developed in a lightning channel may be 20 or more times atmospheric pressure, so that a large pressure gradient is set up. The pressure waves travel at the speed of sound and can cause significant mechanical damage to ships, such as the crushing of hollow steel masts. The magnetic effect of lightning is still an area for active research, but its influence is manifest by objects having their exterior walls sucked outwards.

Distribution of thunderstorms

At any one instant it is estimated that approximately 3,000 thunderstorms are in operation over the globe. They reach their greatest frequency in equatorial latitudes, which have roughly 20 thunderstorm days per year over the sea and 60 days per year over the land. The combination of heat, humidity, buoyancy and the presence of numerous weak disturbances in the vicinity of the equatorial convergence is an ideal situation for thunderstorm generation. From equatorial latitudes there is

a general decrease in frequency toward the poles, beyond latitudes 60° to 70° thunderstorms are very few. This poleward decrease is evidence of the requirement for high surface air temperatures in the production of strong upward convection. There is also a latitudinal shift of thunderstorms following the seasonal movement of solar radiation, so that their frequency tends to maximize in the summer hemisphere.

‘Man-made thunderstorms’

Tests made during tanker cleaning operations indicate that an electrically charged mist is created by the high-velocity water jets. The conditions in the mist have been linked to those in a thunderstorm, since the origin of tanker explosions appears to come from electrostatic effects within the mist. The field strengths measured in the tanks rarely exceed $50,000 \text{ V/m}$ which is well below the breakdown potential in air, even in the presence of water drops. This precludes intramist discharges and possible conventional mist-to-ground strikes. However, the possibility of inducing high surface charge densities in pointed objects is real and point-discharges have been observed from probes inserted into tanks during cleaning. This discharge is not of sufficient intensity to cause ignition to the combustible gases. The main danger seems to arise from the dissipation of the accumulated charge on a pointed object, to nearby ground. The spark produced is often of sufficient intensity and duration to cause ignition.

Uncertainty still surrounds the origin and distribution of charges in these mists, but the icing of water plays no part in the generation of an electric field as it does in Cb clouds. Therefore, it may be possible that a re-evaluation of the mechanisms of charge generation involving the rupture of water droplets (as proposed by Simpson), is necessary. If this is the case one might expect to find the reverse charge distribution in tanks to that observed in clouds (Fig. 2), namely the positive charges would accumulate at the bottom of the mist. Whatever the case, the results of the European, American and Japanese research teams are eagerly awaited by the maritime community.

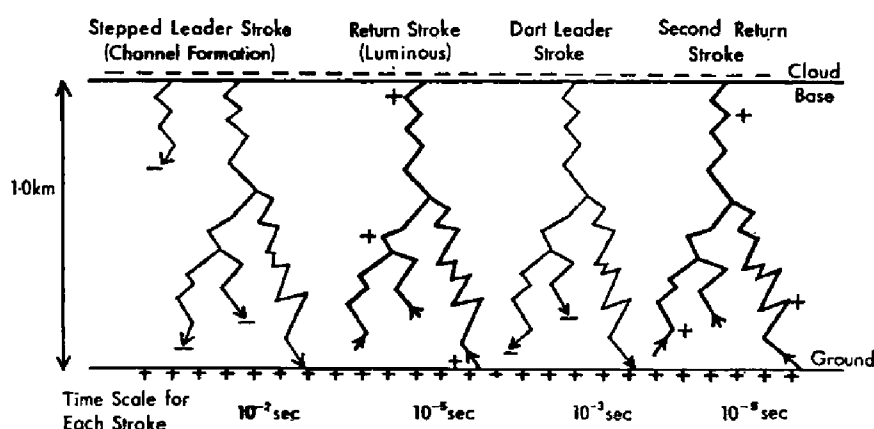


Fig. 5. The series of events in a lightning discharge from cloud to ground. After the initial channel formation stroke, the subsequent strokes move along the same path.

Conclusions

The solutions to the problems posed by atmospheric electricity, both natural and man-made, are being approached on two fronts. Firstly, the maritime community is laying down guidelines of safety to minimize the risk of explosions during tanker cleaning operations (*Safety at Sea International*, 1973). However, it does seem that the rules regarding the cessation of loading in the presence of atmospheric electrical

activity need to be more strictly enforced. In addition, more advanced instrumentation is being fitted to tankers in order to prevent explosions. The inert gas systems which give an extra margin of safety, are being fitted to some VLCCs, although there are still many vessels without the system. Recently B.P. have placed an order for flame arresters to be fitted to the masthead gas riser of their tankers. This device prevents the passage of flame into the cargo tanks, should the exhaust gasses be set alight during an electrical storm. However, until these devices are installed on all ships, lightning strikes will still pose problems. It may be worthwhile therefore, reconsidering the use of properly designed lightning conductors, so that should a strike occur it is directed away from the danger areas of the ship. The second approach is being made by scientists who are seeking to evaluate the mechanisms of charge generation and studies are also being undertaken to find methods whereby the electrical 'sting' can be taken out of thunderstorms using a seeding technique. Lightning suppression has been achieved by seeding thunderstorm clouds with large numbers of fine aluminium strips, but the precise value of this technique has yet to be estimated.

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Birds Aboard

BY MAJOR THE HON. H. DOUGLAS-HOME

During my very pleasant voyage from Cape Town to Hamburg, Captain P. A. Chubb, Master of the m.v. *S.A. Tzaneen* lent me some copies of the magazine *The Marine Observer*. In this publication a section is devoted to interesting observations made by ships' officers of birds, insects, fish, whales, bioluminescence, tropical storms and other phenomena.

This magazine is sent regularly to the *S.A. Tzaneen* for she is one of the many vessels that every six hours log observations of the weather. These entries are formed into code known internationally and transmitted either to the Weather Bureau at Pretoria or to the British Meteorological Office at Bracknell.

One of the articles concerned a bird which landed on a vessel in mid-Pacific and refused to eat the meat, fish and vegetables it was offered. The bird was later identified as an osprey which feeds exclusively on live fish, hovering with beating wings over the water and plunging feet first to secure its prey below the surface with its talons.

For the benefit of mariners who may find birds on their voyages, I thought it would be of interest to describe the food best suited to their feathered visitors.

Sea-birds

Food. Some birds will eat anchovies but generally, small birds will eat whole or chopped sardines with oil from the tin and large birds will take raw pieces of fish and thin strips of liver or beef.

Drink. Salt water.

Casualties. For broken legs or wings use a thin splint of wood firmly fixed with elastoplast.

Passerines (small perching birds)

Food. One could carry a packet of budgie or canary seed and a packet of grit which is essential. If there is no seed, then use crumbed cornflakes, grapenuts or biscuits.

Drink. Fresh water and a bath (a soup plate with a few stones in it to prevent the bird slipping).

Casualties. Usually a match and elastoplast is adequate for broken wings or legs.

Birds of prey (falcons and hawks)

Food. Thin strips of raw liver or beef.

Drink. Nothing.

These birds eat a lot and they like a dark place to sleep. They are also the easiest types to keep alive and tame.

Insect feeders (warblers, i.e. small or very small migratory land birds)

Food. They are almost impossible to keep alive unless one has packets of goldfish food or ants' eggs. Grit is also necessary.

Drink. The remarks about small perching birds apply.

SPECIAL LONG-SERVICE AWARDS

On 26th February 1975 the Annual Barograph Awards were made to four shipmasters who qualified for these awards by virtue of their long and enthusiastic service to the Meteorological Office. Four of these awards are made annually and on this occasion we were fortunate to have present three of the 1973 recipients and the final recipient of 1972 who had been unable to attend previously. The uncertainties of the shipping industry being what they are; only twice since the innovation of these awards in 1948 have we been able to get all four shipmasters, in any one year, together at the same time.

The three shipmasters able to be present this year were, as announced in the April edition of *The Marine Observer*, Captain A. B. Stalker of P. & O. Lines, Captain D. G. Thomas of Manchester Liners and Captain G. V. Barnes of the Bristol Steam Navigation Co.; together with Captain J. A. North, also of P. & O., who had been unable to collect his award on former occasions. We were pleased also to welcome to the ceremony the wives of all four shipmasters; two representatives of P. & O., Captain Davies Assistant Marine Superintendent and Mr. Fisher of Personnel and two representatives of the Bristol Steam Navigation Co., Mr. M. M. Melsom and Mr. R. W. Knapp.

The presentations were made by Mr. J. K. Bannon, Director of Services of the Meteorological Office. Mr. Bannon after thanking the recipients for their valuable voluntary work on behalf of the Meteorological Office, stressed the importance of ships' observations, not only now but also in the future. In spite of meteorological satellites, surface observations were of primary importance and would continue to be so in the foreseeable future. A photograph taken at the presentation is reproduced opposite page 101.

After luncheon with Mr. Bannon and senior officers of the Meteorological Office the visitors were conducted on a visit through the more interesting sections of the Office.

Captain J. H. B. Weston of P. & O. Lines, the fourth qualifying Master for the 1973 awards was unable to be present; but as soon as opportunity offers it will be our pleasure to present Captain Weston with his award.

J.D.B.

ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM JANUARY TO MARCH 1975

JANUARY

In the Gulf of St. Lawrence, the ice developed rapidly with the temperatures lower than normal. In the Davis Strait and off the coast of Labrador and eastern Newfoundland there was an excess of ice, the spread eastward being associated with anomalies for offshore winds and low temperatures. The deficit of ice in the previous month over the Greenland Sea was largely eliminated as a result of anomalies for northerly winds with low temperatures. Deficits of ice persisted, though, in the Barents Sea and the Baltic where the anomalies were mostly for south-westerly winds with higher than normal temperatures.

FEBRUARY

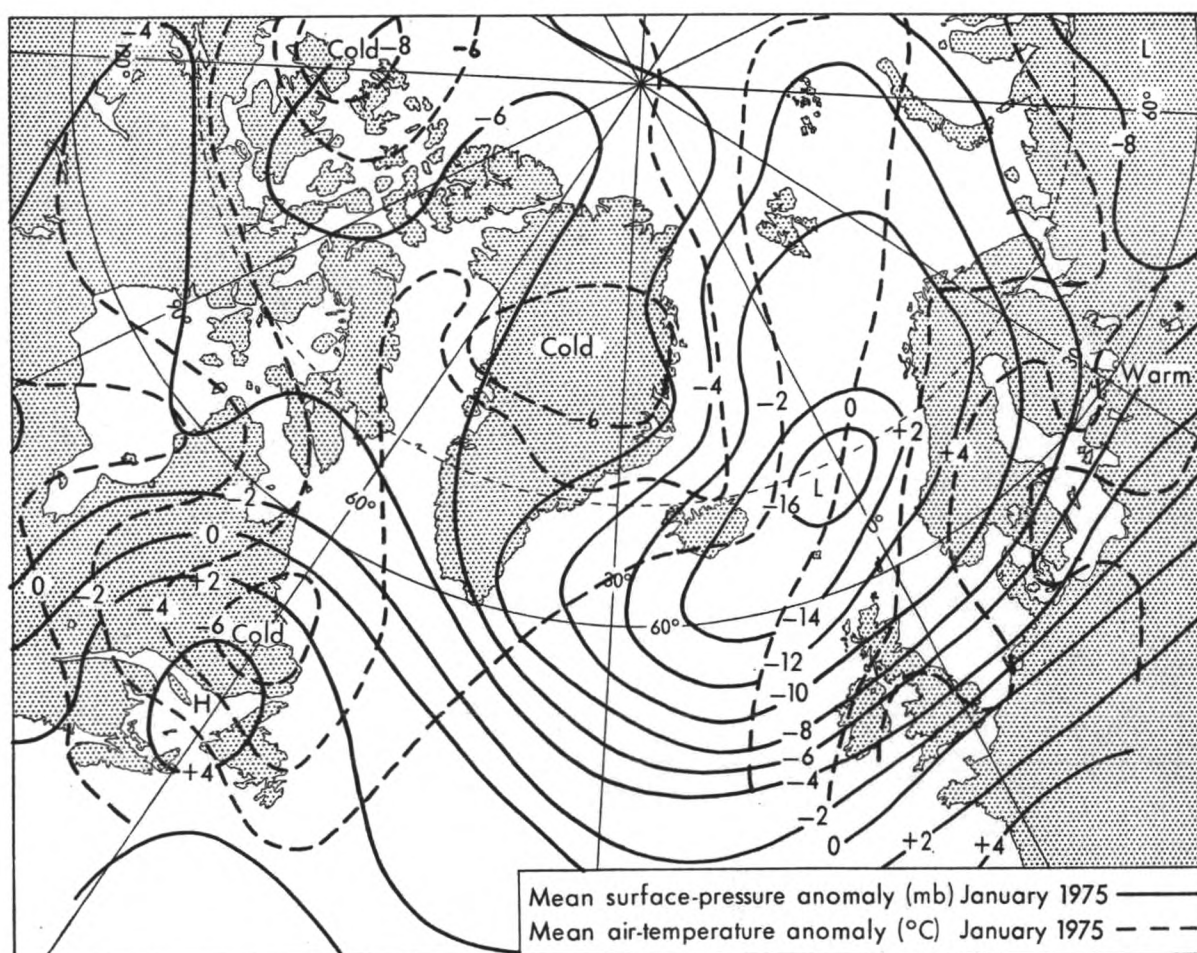
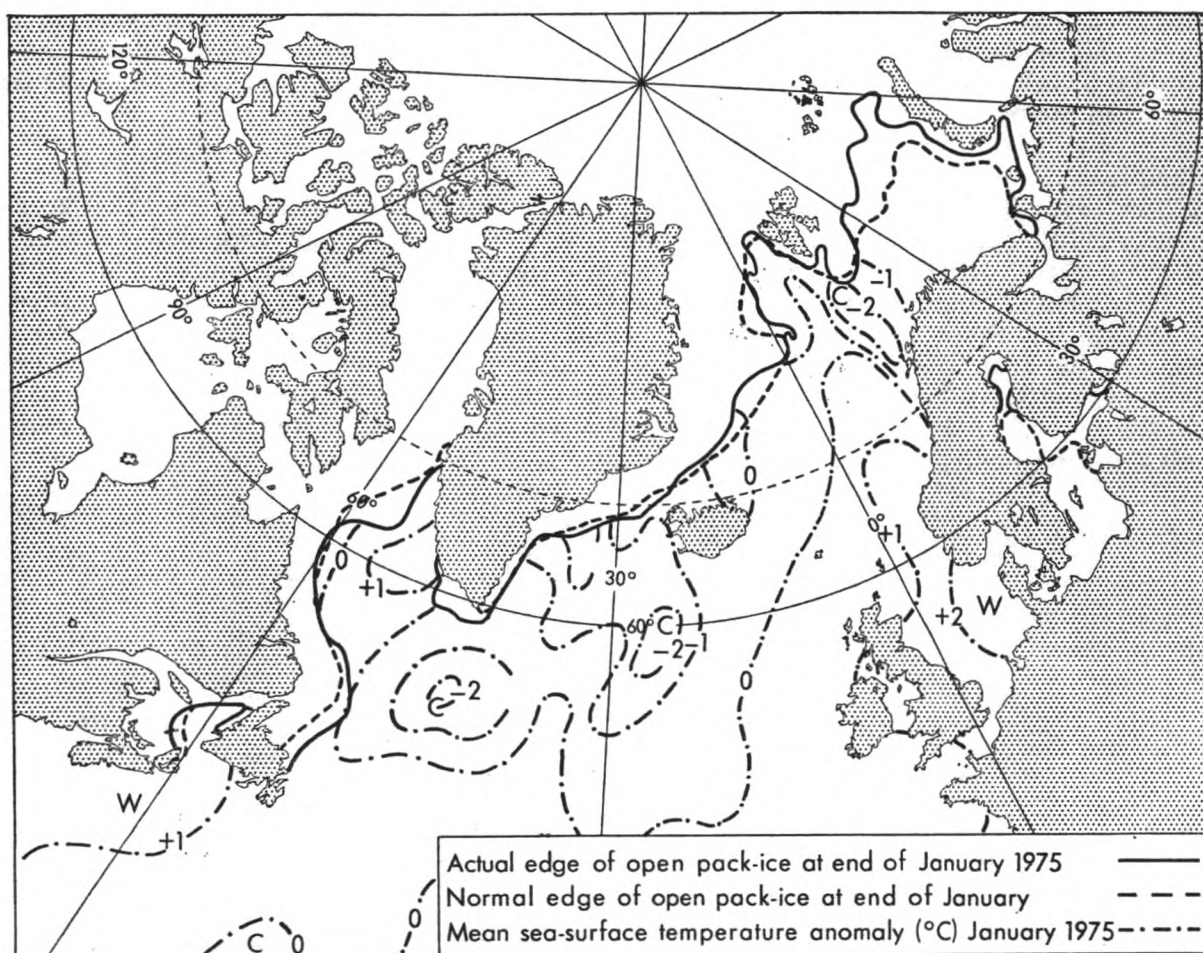
The spread of ice in the Gulf of St. Lawrence continued rapidly and with a west to north-west wind anomaly and temperatures much lower than normal there was an excess of ice by the month end. A strong north-west wind anomaly and much below normal temperatures also brought a spread of ice south-eastwards off the coast of Newfoundland, well south of the

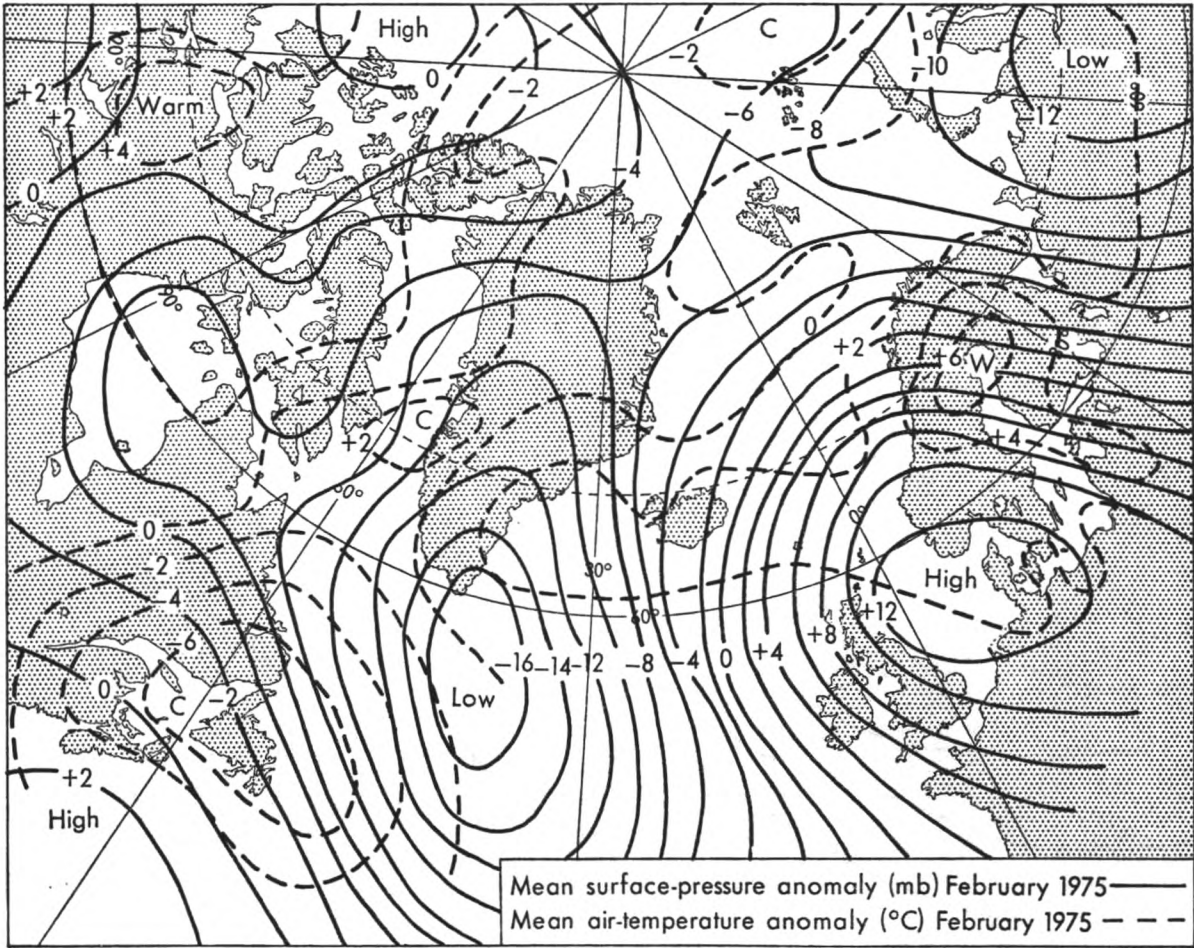
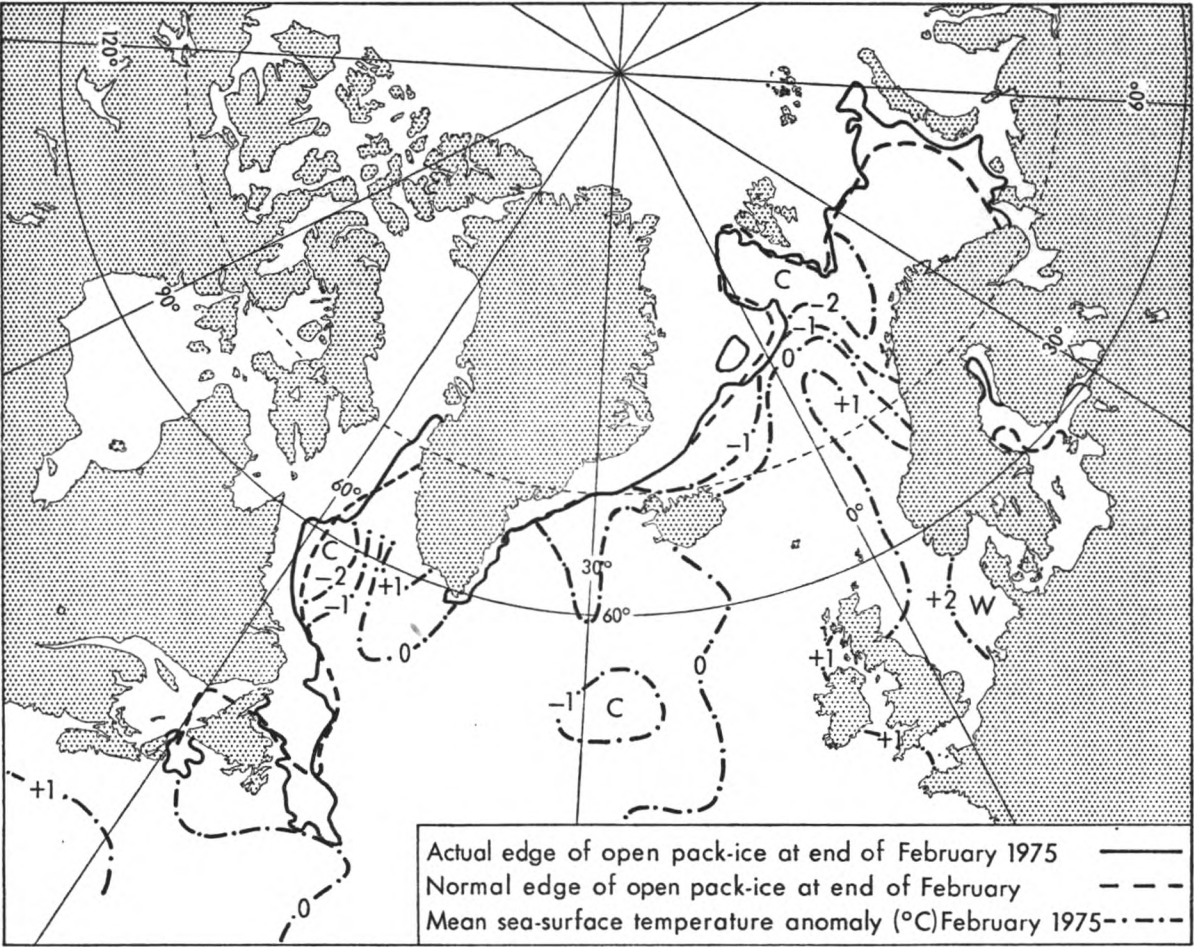
normal edge at this time of year. The deficiency of ice in the eastern Barents Sea was maintained while in the Baltic the higher than normal temperatures kept the ice cover predominantly within the Gulf of Bothnia. In the Greenland Sea, north of 71° north, the excess of ice can be accounted for by the strong south-west to west wind anomaly.

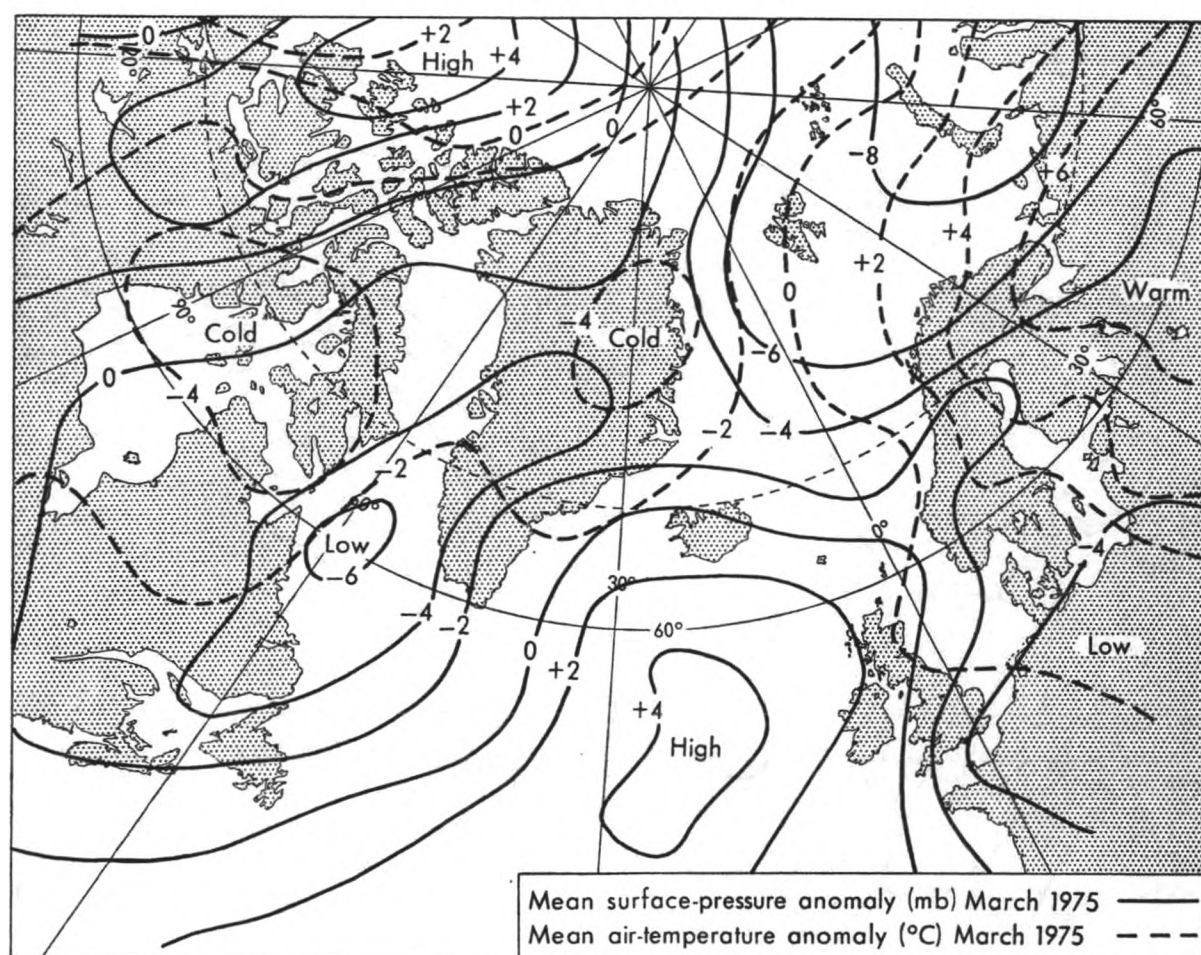
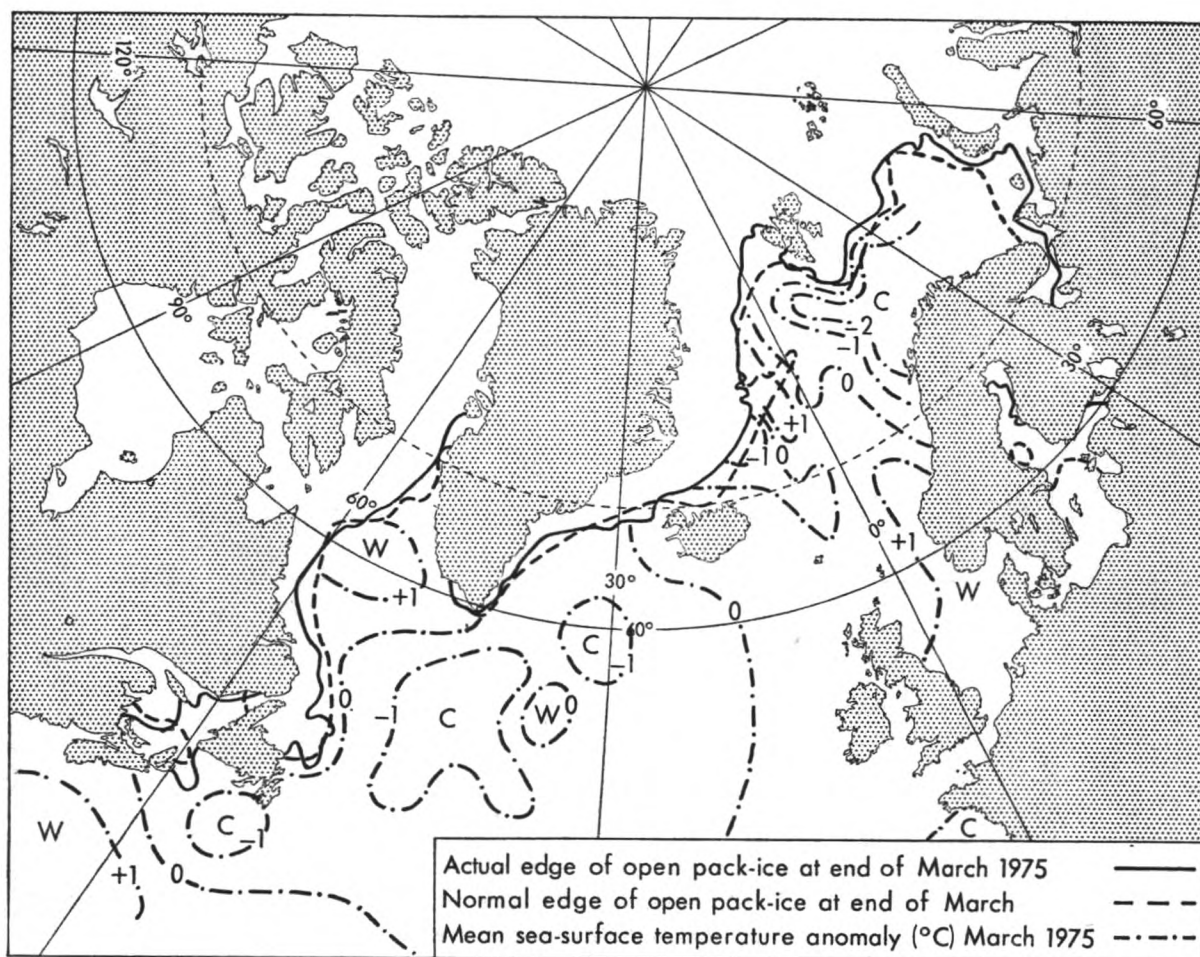
MARCH

More extensive ice than normal persisted over the Gulf of St. Lawrence after the exceptionally cold February. However, the tongue of ice which previously extended south-east off the coast of Newfoundland cleared quickly during March with an anomaly for south westerly winds. Southerly winds moved back the ice edge along the south-east coast of Greenland but there was some advance of ice towards western Iceland with more veered winds in that area. The deficit of ice that developed between Iceland and Spitzbergen are not really explained by the anomalies of pressure and temperature. In the eastern Barents Sea and the Baltic, the deficits of ice—a feature of recent months—persisted, with temperatures well above normal.

P.A.







Baltic Ice Summary: January-March 1975

No ice was reported at the following stations during the period: Ventspils, Tallin, Mariehamn, Mantyluoto, Sundavall, Kalmar, Göteborg, Visby, Ernden, Lübeck, Hamburg, Bremerhaven, Kiel, Flensburg, Stettin, Gdansk, Stralsund, Rostock, 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		LENGTH OF SEASON	
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Leningrad ..	3	31	28	28	0	4	25	0	-97	1	28	28	28	0	0	28	0	-258
Riga ..	8	31	0	0	0	0	0	0	-6	15	23	8	0	0	4	0	0	-35
Pyarnu ..	8	31	23	6	14	21	0	0	—	1	28	28	27	1	13	15	0	—
Viborg ..	3	31	29	28	1	0	29	0	—	1	28	28	28	0	0	28	0	—
Klaipeda ..	0	0	0	0	0	0	0	0	—	16	19	4	0	0	3	0	0	—
Helanki ..	0	0	0	0	0	0	0	0	-54	Missed data		0	0	0	0	0	0	-138
Turku ..	0	0	0	0	0	0	0	0	-32			0	0	0	0	0	0	-93
Vaasa ..	8	31	24	20	0	0	0	0	—	Missed data		0	0	0	0	0	0	—
Oulu ..	1	31	31	31	0	5	26	0	—			0	0	0	0	0	0	—
Roytaa ..	1	31	24	0	14	10	14	0	—	Missed data		0	0	0	0	0	0	—
Lulea ..	1	31	31	31	0	0	31	0	-540			0	0	0	0	0	0	-625
Bredskar ..	20	26	3	0	0	3	0	0	—	1	28	28	28	0	0	28	0	—
Stockholm ..	0	0	0	0	0	0	0	0	+1	2	26	14	4	0	11	1	0	—
Skellefteå ..	1	31	29	20	0	11	17	0	—	14	28	15	12	0	15	0	0	-41
										1	28	21	16	0	0	18	0	—

CODE:

A First day ice reported. C No. of days that ice was reported. E No. of days of pack-ice. G No. of days assistance required.
 B Last day ice reported. D No. of days continuous land-fast ice. F No. of days dangerous to navigation, but assistance not required. H No. of days closed to navigation.
 * 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.

Personalities

TRANSFER.—MISS ELLA J. SUTHERLAND, after serving for 8 years as Sub-Editor of *The Marine Observer* has been transferred from the Marine Division to another branch in the Meteorological Office.

During the years Miss Sutherland served in the Marine Division she carried a very heavy work load in dealing with all our marine publications and devoted tireless energy to the problems of sifting meteorological logbook extracts, assisting in obtaining valuable comments from experts on ornithology, biology, entomology and numerous other subjects, sub-edited articles, log items and comments. The tidy presentation of the magazine and its despatch to ships with the minimum of delay is to be credited to Miss Sutherland who has kept the interests of observing officers in the Voluntary Observing Fleet uppermost in mind.

We hope her new job will be less arduous and equally rewarding.

G.A.W.

NOTICE TO MARINE OBSERVERS

Port Meteorological Office, Miami, Florida

On page 91 of the April 1975 edition of this journal we published the name and address of the Port Meteorological Officer in Miami. Since then the telephone number of the office has been changed and is now amended to (305) 350-1333.

Fleet Lists

GREAT BRITAIN (Information dated 31.3.75)

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 Masters, 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 Masters 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 Masters, 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 Master 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.

Masters 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	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Acacus</i>	11.12.74	B. B. Pearson	H. Tibbs, J. Ross, D. C. Bull	B. Phelan	Shell Tankers (U.K.) Ltd.
<i>Act 1</i>	6.2.75	R. Brownbill	I. M. Dunkley, M. R. Hardmeat, A. R. Redcliffe	D. Owen	Associated Container Transportation Ltd.
<i>Act 2</i>	6.2.75	D. L. des Landes	P. J. Hyde-Linaker, P. Meyerhoff, A. M. P. Henderson	C. Pratt	Associated Container Transportation Ltd.
<i>Act 6</i>	7.11.74	G. Carling	R. J. Hawkins, V. Marchesi, R. Hoad	A. D. Marsden	Associated Container Transportation Ltd.
<i>Adventurer</i>	19.12.74	A. T. Creer	L. Kinsella, E. Oddy, K. Inskip	W. Agnew	T. & J. Harrison Ltd.
<i>Albright Explorer</i>	25.3.75	J. Wise	D. A. Maclean, R. T. Berry, W. M. Campbell	W. D. Brown	James Fisher & Sons Ltd.
<i>Albright Pioneer</i>	18.3.75	J. H. Kitching	M. Rossiter, P. A. Pepler	W. P. M. Edmunds	James Fisher & Sons Ltd.
<i>Alert</i>	18.11.74	J. P. Ruddock, O.B.E.			Post Office
<i>Alinda</i>	27.6.72	P. I. Blackshaw	R. L. Cheshire, W. T. Selby, D. T. Kirkwood	C. G. Macaulay	Shell Tankers (U.K.) Ltd.
<i>Amalric</i>	19.12.74	D. C. Aitchison	N. C. D. Hope, C. J. Redman, R. Hayes	F. T. Howard	Shaw Savill & Albion Co. Ltd.
<i>Amaria</i>	8.10.74	R. G. Roberts	M. S. Putman, F. P. Gunning, D. F. Macfadden	W. Williams	P. & O. S.N. Co.
<i>Anatira</i>	29.10.73	T. G. Wormald	D. F. Cammish, A. Gardiner, G. Wilkinson	B. Mullally	Shell Tankers (U.K.) Ltd.
<i>America Star</i>	4.4.74	E. J. Jones	A. L. Stout, A. R. Redcliff, S. J. Nichols	K. A. Hardy	Blue Star Line Ltd.
<i>Ani</i>	11.2.75	P. Kausland			Marine Exploration Ltd.
<i>Amoria</i>	26.7.74	P. Sharer			Shell Tankers (U.K.) Ltd.
<i>Anadara</i>	13.6.74	A. W. Hoyle	J. A. Harnan, M. E. Schollar, B. J. V. Cook	M. Baig	Shell Tankers (U.K.) Ltd.
<i>Anatuty</i>	24.1.74	D. G. Munro			Shell Tankers (U.K.) Ltd.
<i>Anilochus</i>	30.1.75	A. J. Palmer	R. M. Ellsmoor, P. A. E. Sambrook, S. P. Walakulpola		F. T. Everard & Sons Ltd.
<i>Antrim</i>	9.5.74	R. J. Ogilvy	J. E. Rolfe, A. Betts, A. Peter	R. A. Wakeley	Ocean Transport & Trading Ltd.
<i>Argyllshire</i>	29.10.74	R. D. Lofis	I. M. Ward, J. Macaulay, C. Wood	S. K. Murgatroyd	P. & O. S.N. Co.
<i>Armadale</i>	29.10.74	F. J. Adams	B. J. Wright, W. Kimberley, S. Turner	A. McLeod	Clan Line Steamers Ltd.
<i>Asafreighter</i>	6.2.75	I. C. Graham	A. Harper, F. Miller, R. McKenzie	P. A. Barratt	Trinder Anderson & Co. Ltd.
<i>Ascaliner</i>	30.10.74	G. E. Mayne	W. N. Maddox, J. Davidson, D. J. Agnew	S. A. Lamb	J. & J. Denholm Ltd.
<i>Asian Renown</i>	8.11.74	L. Taylor	R. A. Reid, A. G. Lacey, T. Mather	F. Farthing	J. & J. Denholm Ltd.
<i>Asprella</i>	7.11.74	H. A. Miller	O. Satur, G. J. Franklin	H. Finlay	Manchester Liners Ltd.
					Shell Tankers (U.K.) Ltd.

<i>Atlantic Causeway</i> ..	26.10.74	B. L. O'Brien ..	J. K. Brockhurst, D. W. Lax, R. B. Lloyd	F. A. Dunn ..	Cunard-Brocklebank Ltd.
<i>Atlantic Conveyor</i> ..	14.2.75	B. L. O'Brien ..	T. East, P. A. Richardson, D. Barnett	J. Whitton ..	Cunard-Brocklebank Ltd.
<i>Auckland Star</i> ..	14.2.75	G. I. R. Bowden ..	S. R. M. Mills, R. Shore, G. R. Henderson	W. A. Wade ..	Blue Star Line Ltd.
<i>Author</i> ..	6.2.75	D. A. Dickson ..	R. R. Lorne, W. Ames, A. Peters ..	R. Dolby ..	Trinder Anderson & Co. Ltd.
<i>Avon Forest</i> ..	27.3.75	J. M. Procter ..	W. J. Butcher, J. Butterworth, J. Denman	N. Cordial ..	T. & J. Harrison Ltd.
<i>Avonfield</i> ..	25.11.74	R. MacDougall ..	D. Laughlin, G. Hamilton, A. Thompson	S. A. White ..	Harrisons (Clyde) Ltd.
<i>Bamburgh Castle</i> ..	17.1.74	J. I. Sharp ..	L. T. Cairns, S. K. Rashid ..	D. G. Gavin ..	Hunting & Son Ltd.
<i>Baron Ardrossan</i> ..	30.10.74	R. Carr ..	N. D. Riley, J. D. Robinson, R. B. Hurst	M. Hogan ..	W. A. Souter & Co. Ltd.
<i>Baron Inchcape</i> ..	8.5.73	I. A. Roberts ..	J. Melville, R. Abercrombie, S. Fowler	A. Honan ..	Scottish Ship Management Ltd.
<i>Baron Renfrew</i> ..	9.10.74	M. Dalby ..	F. N. Beeley, P. C. MacKay, P. Cookson	T. Michael ..	Scottish Ship Management Ltd.
<i>Beechbank</i> ..	9.5.74	D. Sinclair ..	P. N. Goding, F. Mouat, O. F. Monk	A. G. Jones ..	Bank Line Ltd.
<i>Beechwood</i> ..	20.9.73	A. E. Newton ..	G. Berry, N. Harris, J. Sabourne ..	P. Brennan ..	John I. Jacobs & Co. Ltd.
<i>Bellerophon</i> ..	5.12.74	J. S. Cunningham ..	K. S. Chong, W. Broadbent ..	R. Magowan ..	Ben Line Steamers Ltd.
<i>Benalbanach</i> ..	6.2.75	J. S. Schofield ..	C. G. M. Dale, T. D. Corbett, G. D. Fergus	I. C. O'Leary ..	Ben Line Containers Ltd.
<i>Benarder</i> ..	11.2.75	A. McKenzie ..	J. Main, E. P. Gibb, A. Rankin ..	F. Paterson ..	Ben Line Steamers Ltd.
<i>Benarthy</i> ..	30.1.75	I. F. Mackay ..	N. I. Harwood, N. M. Wight, B. Hammett	B. Holness ..	Ben Line Steamers Ltd.
<i>Benatow</i> ..	9.1.75	C. P. Browne ..	A. A. McCalmont, A. H. Glen, T. H. Hills	J. S. Hallam ..	Ben Line Steamers Ltd.
<i>Benavon</i> ..	11.3.75	K. R. Wilson ..	J. N. Macnish, F. A. Anderson, D. D. Sutherland	P. Mannion ..	Ben Line Steamers Ltd.
<i>Benaruachan</i> ..	12.3.75	A. S. Hamilton ..	J. Gadd, I. Sheppherd, A. Gunner	R. Sadler ..	Ben Line Steamers Ltd.
<i>Bendearg</i> ..	6.12.74	W. C. S. Spencer ..	A. V. Thomson, J. D. Lewthwaite, A. C. Whitehead	T. D. Drummond ..	Ben Line Steamers Ltd.
<i>Bendorian</i> ..	14.1.75	R. Griffiths ..	J. M. Groats, A. F. Walker, A. R. Rendle	J. Kelly ..	Ben Line Steamers Ltd.
<i>Benefactor</i> ..	16.5.74	W. G. Jackson ..	M. Hudson, D. Riley, P. Jones ..	P. G. Lyons ..	T. & J. Harrison Ltd.
<i>Bengloe</i> ..	18.3.75	H. H. McIntosh ..	R. W. Lawrie, J. Phillips, D. Gilmore ..	G. F. Cummings ..	Ben Line Steamers Ltd.
<i>Benlawers</i> ..	25.3.75	R. McPhee ..	A. J. Montgomerie, D. S. Collins, S. J. Hall	J. Degnan ..	Ben Line Steamers Ltd.
<i>Benledi</i> ..	9.10.74	O. Henderson ..	R. S. Basford, A. D. Fraser, I. A. Hamilton	C. L. Keeble ..	Ben Line Steamers Ltd.
<i>Benlomond</i> ..	28.11.74	A. Yuill ..	N. C. Reid, A. Robinson, C. Gregory ..	W. C. Cumming ..	Ben Line Steamers Ltd.
<i>Bennoch</i> ..	13.6.74	C. P. Browne ..	S. A. Edmundson, J. S. Cruickshank, R. Webster	W. J. D. Cooper ..	Ben Line Steamers Ltd.
<i>Benrac</i> ..	30.9.74	R. McPhee ..	I. Finlay, R. S. A. Coles, G. T. Trousdale	J. W. Hurd ..	Ben Line Steamers Ltd.
<i>Benrorlich</i> ..	4.4.74	J. M. MacLeod ..	I. Finlay, J. N. MacNish ..	P. Mannion ..	Ben Line Steamers Ltd.
<i>Benruackie</i> ..	25.3.75	J. E. Pritchard ..	H. C. Miller, L. Jones, D. Beattie ..	W. Parkinson ..	Ben Line Steamers Ltd.
<i>Benwyvis</i> ..	7.1.75	S. F. Garside ..	M. Roberts, K. Kennedy, D. Push ..	J. Campbell ..	Ben Line Steamers Ltd.
<i>Bhama</i> ..	23.5.74	A. K. H. MacBain ..	B. N. Jones, D. J. Anderson ..	F. J. Farrell ..	Ocean Transport & Trading Ltd.
<i>Birchbank</i> ..	26.2.75	C. H. J. Allister ..	J. P. Dawson, E. T. Kinnaird, J. B. H. Swain	A. Moss ..	Bank Line Ltd.
<i>Booker Vanguard</i> ..	2.10.74	E. J. Jones ..	D. I. MacLellan, M. Corner, B. Lloyd	W. Gilger ..	Booker Line Ltd.
<i>Booker Venture</i> ..	6.2.75	J. Pearson ..	D. Heaton, I. Bain, P. Morris ..	D. A. C. MacRae ..	Booker Line Ltd.
<i>Border Castle</i> ..	29.10.74	C. L. Southcombe ..	D. Gregory, W. A. Hill, F. J. Chandler ..	G. Minay ..	Common Bros. Ltd.
<i>Botany Bay</i> ..	12.9.74	T. W. Y. Dowson ..	C. H. James, P. J. Donnelly, H. M. Bates	J. Ryan ..	Common Bros. Ltd.
<i>Brandon Priory</i> ..	3.2.72	K. E. Howard ..	T. D. Johnson, T. R. Nicholls ..	R. Redhead ..	Container Fleets Ltd.
<i>Bransfield</i> ..	24.9.74	P. Saunderson ..	A. I. Ball, J. Welch, N. H. Lampe	D. Hobson ..	Warwick Tankers Ltd.
<i>Brasilia Star</i> ..	5.6.74	H. W. McNeil ..	K. W. D. Shears, A. Proctor, R. Nykolyszyn	H. M. O'Gorman ..	British Antarctic Survey
<i>Briarhorn</i> ..	20.3.75	R. Alderice ..	E. Dewhurst ..	S. Hudson ..	Blue Star Line Ltd.
<i>Bridgepool</i> ..	7.11.74	H. W. Finn ..	M. Selby, J. Moore, J. Harris ..	I. M. Harpham ..	S. William Coe & Co. Ltd.
<i>British Clipper</i> ..	24.9.74	W. H. J. Chippendale ..	J. Maier, T. Devine ..	D. A. Kyle ..	Sir R. Ropner & Co. Ltd.
<i>British Avon</i> ..	30.12.74	I. B. McNaughton ..	A. B. Prentice ..	T. Kitchen ..	Whitco Marine Services Ltd.
<i>British Beech</i> ..	13.6.74	G. Coulson ..	A. Panjair, T. N. Geesin, D. R. Duffield ..	A. Divekar ..	B.P. Tanker Co. Ltd.
<i>British Bombarider</i> ..	7.1.75	D. H. Powell ..	F. S. Whamond, R. W. Tate, H. C. Patience	W. K. Ryan ..	B.P. Tanker Co. Ltd.
<i>British Commodore</i> ..	7.3.75	N. McLeod ..	M. J. Evans, T. Drennan, J. B. Corris	D. Logan ..	B.P. Tanker Co. Ltd.
<i>British Confidence</i> ..	19.12.74	F. E. Preece ..	S. T. Mead, I. S. Charman, J. C. Gillespie	A. C. Gent ..	B.P. Tanker Co. Ltd.
<i>British Cormorant</i> ..	11.1.74	J. Horner ..	E. G. Thorp ..	P. Cooney ..	B.P. Tanker Co. Ltd.
<i>British Cygnet</i> ..	27.3.75	R. Towell ..	J. E. Priest, C. B. Amos, N. C. Strickland	R. D. Bragg ..	B.P. Tanker Co. Ltd.
<i>British Eek</i> ..	30.1.75	R. Weston ..	J. L. Drewitt, R. P. Sharnan, J. MacHardy		
<i>British Forth</i> ..	11.9.74	D. H. J. Henderson ..	I. G. Worthington, A. C. Yates, R. H. Gwynn		
	13.11.74		T. A. Wood, S. Tuck, R. Hood ..		

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>British Fulmar</i>	14.1.75	W. A. M. Hare	R. Denman, D. Exley	D. M. Gleeson	B.P. Tanker Co. Ltd.
<i>British Guardsman</i>	28.11.74	D. Corp	R. Owen, C. J. Davison, T. V. Watkins	I. F. Alexander	B.P. Tanker Co. Ltd.
<i>British Hazel</i>	23.1.75	P. R. Waller	M. A. Cannon, W. Young, M. Pratt	R. V. Kellert	B.P. Tanker Co. Ltd.
<i>British Holly</i>	25.3.75	N. J. Packard	G. J. Pearson, G. Vandenberg, P. Knox	C. Kelly	B.P. Tanker Co. Ltd.
<i>British Ivy</i>	25.11.74	D. C. Goodwin	C. Mitchell, R. I. Webber, N. Greig	M. Boughton	B.P. Tanker Co. Ltd.
<i>British Kennet</i>	9.1.75	D. G. Downie	P. J. Phillips, S. Batt, M. Pratt	D. Bone	B.P. Tanker Co. Ltd.
<i>British Kiwi</i>	7.3.74	C. O. Picken	D. A. Smith, D. H. Maer, G. M. Hopkins	J. L. Pearson	B.P. Tanker Co. Ltd.
<i>British Liberty</i>	23.1.75	J. A. Potter	I. Plummer, D. Fowler, S. W. Hart	G. Harris	B.P. Tanker Co. Ltd.
<i>British Maple</i>	30.12.74	F. W. Lamb	C. I. Spink, N. R. Huggins, R. Taylor	D. C. Noble	B.P. Tanker Co. Ltd.
<i>British Mariner</i>	11.2.75	A. Phillips	N. E. Johnson, O. B. Embleton, G. D. Knapp	G. C. Kemp	B.P. Tanker Co. Ltd.
<i>British Spey</i>	30.1.75	M. V. McCarthy	P. M. McCorry, C. Parry, L. J. Minor	H. C. Kemp	B.P. Tanker Co. Ltd.
<i>British Staff</i>	7.11.74	B. Sexton	D. Anderson, G. W. Tomlinson, C. C. Belson	G. Burras	B.P. Tanker Co. Ltd.
<i>British Tamar</i>	12.7.74	J. W. Guy	G. J. Blaney, S. Chapman, N. C. Strickland	S. Buckley	B.P. Tanker Co. Ltd.
<i>British Trust</i>	25.9.74	I. Potter	T. J. Boden, J. W. Graves, H. Patience	D. Lever	B.P. Tanker Co. Ltd.
<i>British Vine</i>	23.10.74	R. Rickman	A. L. Stout, D. P. Marsh, K. D. Pykett	I. Hughan	B.P. Tanker Co. Ltd.
<i>Buenos Aires Star</i>	4.3.75	H. Dyer	V. Edwards, J. Findlay, M. K. Montgomery	P. J. Robinson	Blue Star Line Ltd.
<i>C.P. Discoverer</i>	28.2.75	H. Ross	P. Goodwin, D. M. Shaw, H. V. Griffiths	D. J. Ellis	Canadian Pacific Steamships Ltd.
<i>C.P. Trader</i>	30.1.75	J. Walling	P. S. Hinton, B. G. Alexander, P. C. Adair	M. J. Corry	Canadian Pacific Steamships Ltd.
<i>C.P. Voyager</i>	24.1.75	J. Richardson	G. S. Hart, J. F. Rowe, G. J. Rawding	T. A. Verling	Blue Star Line Ltd.
<i>California Star</i>	31.12.74	A. J. Cheshire	K. L. Miller, C. Darke, J. Barber	N. Maclean	Blue Star Line Ltd.
<i>Canopic</i>	11.2.75	P. K. Murchison	J. H. Turner, P. M. Stacey, P. M. C. Sanderson	P. Braxton	Shaw Savill & Albion Co. Ltd.
<i>Cantaloup</i>	9.12.74	C. J. Knight	G. S. Adams, D. I. Jones, A. Logan	P. S. Henderson	Druidston Ltd.
<i>Canterbury Star</i>	22.5.73	P. A. Stevens	D. Gordon	R. Burton	Blue Star Line Ltd.
<i>Cape Horn</i>	9.1.75	B. W. Lawson	K. O'Neill, R. Harper, N. G. Smith		Lyle Shipping Co. Ltd.
<i>Cape Howe</i>	11.9.74	A. Peebles	B. D. Ellis, J. S. Anderson, A. G. E. Michie		Lyle Shipping Co. Ltd.
<i>Cape Leuwin</i>	29.10.74	L. M. Hocking	J. S. Johnstone, D. Taylor, H. Coriterhill	B. Breslin	Lyle Shipping Co. Ltd.
<i>Cape Nelson</i>	25.11.74	N. Walsh	R. Richardson, J. H. Jenkinson, N. G. Smith	J. Tomlinson	Lyle Shipping Co. Ltd.
<i>Cape Nelson</i>	15.8.74	G. Towers	D. A. McKenzie, V. L. Cox, R. Watson	I. Leese	Lyle Shipping Co. Ltd.
<i>Cape Sable</i>	24.2.75	C. Strachan	J. L. Wilson, G. D. Warren, S. T. Houldsworth, M. Holden	R. H. Boatman	Lyle Shipping Co. Ltd.
<i>Cape Wrath</i>	24.2.75	A. MacLeod		D. Morrison	Christian Salvesen (Shipping) Ltd.
<i>Cape York</i>	14.6.74	J. Rendall		W. J. Lloyd	Ocean Transport & Trading Ltd.
<i>Carcharter</i>	28.11.74	M. Lees			
<i>Cardigan Bay</i>	24.2.75				
<i>Carrel</i>	14.6.74	P. J. Sullivan	A. M. Alcott, D. F. Durbin, Cang Kim Wing	R. L. Swinestead	Jardine Matheson & Co. Ltd.
<i>Cast Beaver</i>	30.1.75	W. F. Joyce	J. Beattie, R. Copeland, T. Gordon	W. Williams	G. Heyn & Sons Ltd.
<i>Cedric</i>	25.9.74	I. S. M. Condie	R. Cubbage, J. Huddleston, J. Brown	M. Murphy	Shaw Savill & Albion Co. Ltd.
<i>Challenger</i>	28.11.74	A. J. Justen	J. D. Noden, K. O. Avery, A. R. Neil	D. E. Brown	Natural Environment Research Council
<i>Cheriot</i>	31.1.75	H. Dishman	I. G. Robertson, R. McAdam, G. A. Jones	H. H. Lyon	W. A. Souther & Co. Ltd.
<i>Chrysantema</i>	31.12.74	T. H. Finn	R. A. Taylor, G. W. Argomont, W. J. Saxby	C. Wicks	Whitco Marine Services Ltd.
<i>City of Auckland</i>	19.7.74	T. Rigg	J. A. Turner, J. T. Bennett, T. Weale		Ministry of Agriculture, Fisheries & Food
<i>City of Canberra</i>	20.12.74	M. W. Hartley	P. Askew, M. Fagen	R. B. Cooper	Ellerman Lines Ltd.
<i>City of Capetown</i>	20.12.74	D. B. Williams	D. J. Miller, P. G. White, D. Macpherson	J. Fields	Ellerman Lines Ltd.
<i>City of Colombo</i>	26.3.75	D. Brown	J. C. L. Perera, P. J. Butterfield	A. W. T. Camp	Ellerman Lines Ltd.

City of Dundee	18.3.75	D. Brown	J. D. Bailey, I. C. Dorset, I. W. Gurton	..	..	P. G. Barnard	Ellerman Lines Ltd.
City of Edinburgh	11.2.75	A. Maclean	H. G. Holland, G. Byers, K. W. Muir	..	..	A. Gordon	Ben Line Containers Ltd.
City of Exeter	27.3.75	T. E. Kelso	A. M. Bradley, D. T. Perry, C. V. Umrigar	..	..	S. J. Griffith	Ellerman Lines Ltd.
City of Glasgow	15.8.74	W. S. Coult	I. Robertson, K. Moger, P. Perham	..	..	M. Argent	Ellerman Lines Ltd.
City of Guisford	31.12.74	B. E. Torrance	H. C. Thorburn, B. F. Keith, D. D. Pavri	..	..	R. J. Clayton	Ellerman Lines Ltd.
City of Lancaster	8.11.74	E. R. Finch	D. Monk, E. W. Webster, N. Hardy	..	..	J. McCarthy	Ellerman Lines Ltd.
City of Leeds	21.8.74	J. L. Blanch	C. Hewitt, C. Dowty	..	..	T. Cruft	Ellerman Lines Ltd.
City of Limassol	18.3.75	A. S. Matheson	P. E. Westcott, P. E. Harwood, K. T. Engineer	..	..	F. I. A. Stickland	Ellerman Lines Ltd.
City of Liverpool	2.10.74	F. C. O'Neill	N. Adams, T. Davies, C. P. Wake	..	..	P. J. McLaughlin	Ellerman Lines Ltd.
City of London	11.2.75	D. D. Jamieson	T. J. Foot, C. Bunt, J. Harrison-Nayes	..	..	P. T. Wambley	Ellerman Lines Ltd.
City of Montreal	25.3.75	G. H. Salter	S. W. Ponter, P. A. Statham, C. W. Rapley	..	..	P. A. Whyte	Ellerman Lines Ltd.
City of Newcastle	30.9.74	I. G. Lumley	..	..	..	..	Ellerman Lines Ltd.
City of Ottawa	26.3.75	K. G. Maclean	..	..	..	..	Ellerman Lines Ltd.
City of Oxford	17.10.74	R. Frame	..	..	..	..	Ellerman Lines Ltd.
City of Ripon	6.6.74	L. W. Roberts	..	..	..	..	Ellerman Lines Ltd.
City of St. Albans	31.1.75	J. Sapp	M. L. Kinnear, R. S. Gibson, M. Herring	..	..	L. Phillips	Ellerman Lines Ltd.
City of Toronto	28.11.74	P. Soones	P. Sumpton, R. G. Hornshaw, M. Caruthers	..	..	J. Brierley	Ellerman Lines Ltd.
City of Wellington	17.2.75	J. A. Macleod	S. C. O'Callaghan, S. K. Wadhvani, M. R. Russel	..	..	P. J. McGill	Ellerman Lines Ltd.
City of Worcester	17.2.75	J. Petter	N. F. Ellison, J. Main, A. Tavendale	..	..	N. Barlow	Ellerman Lines Ltd.
Clan Alpine	18.3.75	T. R. Parsons	A. Staveley, T. Weale, V. John	..	..	R. Wallington	Ellerman Lines Ltd.
Clan Grant	18.3.75	N. Wallace	A. C. Johnstone, D. E. C. Stevenson, P. Marcon	..	..	E. I. Davies	Clan Line Steamers Ltd.
Clan Macgillivray	4.3.75	H. J. Thorn	R. G. Head, H. Cameron, J. Macsaulay	..	..	D. Withers	Clan Line Steamers Ltd.
Clan Macgregor	15.1.75	P. N. V. Rewell	A. D. Joel, A. J. Blackler, P. H. Broom	..	..	J. K. Paterson	Clan Line Steamers Ltd.
Clan Macleuraith	9.1.75	A. G. Allison	C. R. MacFadyen, P. J. MacArthur, P. A. Diggins	..	..	..	Clan Line Steamers Ltd.
Clan Macindoe	5.12.74	S. Hagan	M. A. Negus, H. M. Cameron, D. A. Hawker	..	..	..	Clan Line Steamers Ltd.
Clan Macinnes	31.12.74	R. Fullerton	M. Johnson, D. King, B. King	..	..	..	Clan Line Steamers Ltd.
Clan Macintosh	3.7.74	A. A. Graham	K. T. Eunsion, J. A. Ross, M. J. Gardiner	..	..	A. Campbell	Clan Line Steamers Ltd.
Clan Macintyre	25.3.75	S. K. Williams	A. D. Joel, B. R. Richmond, R. H. Allen	..	..	E. I. Kelly	Clan Line Steamers Ltd.
Clan Maciver	31.5.73	W. G. McFarland	R. G. Head, R. Kendall	..	..	L. J. Bloye	Clan Line Steamers Ltd.
Clan MacLaren	7.2.75	R. R. Cawdery	M. J. Weston, H. M. Jones, K. R. Bark	..	..	R. A. Mayfield	Clan Line Steamers Ltd.
Clan Macleay	31.12.74	R. E. Todd	J. R. Hughes, N. F. Combes, W. G. Ferrier	..	..	T. J. Martel	Clan Line Steamers Ltd.
Clan Maclean	24.2.75	M. Whiteley	D. J. Kalua, E. Martin, R. Hauratty	..	..	J. W. Wright	Clan Line Steamers Ltd.
Clan Macleod	18.11.74	G. S. Gann	N. Caborn, J. A. Mortimer, A. I. Aston	..	..	D. Gibbs	Clan Line Steamers Ltd.
Clan Macnab	26.4.74	W. J. Howson	J. R. Gilbert, M. Butterfield, B. Richmond	..	..	P. Sullivan	Clan Line Steamers Ltd.
Clan Macnair	25.9.74	M. P. R. Turner	S. C. B. Curtis, S. F. Renfree, C. H. Vickers	..	..	R. Wheeler	Clan Line Steamers Ltd.
Clan Malcolm	13.11.74	R. M. Bessant	J. F. Pink, D. Funnell, A. M. H. Mohamed	..	..	R. R. Miller	Clan Line Steamers Ltd.
Clan Matheson	16.1.75	A. R. Macintyre	B. J. Ross-Smith, F. Murray, R. M. Thomas	..	..	D. A. P. Galbraith	Clan Line Steamers Ltd.
Clan Menzies	5.12.74	T. D. Young	C. W. Laycock, P. J. Ward, C. Jones	..	..	R. Lee-Smith	Clan Line Steamers Ltd.
Clan Ramsay	5.9.74	P. R. Kent	R. T. Owen, J. P. Allan, C. R. McFadyen	..	..	D. M. Rutter	Clan Line Steamers Ltd.
Clan Ronald	17.10.74	N. F. Wray-Cook	J. E. Millar, P. J. Manning, R. W. Speight,	..	..	D. R. McLean	Clan Line Steamers Ltd.
Clan Robertson	30.10.74	J. H. Beavan	P. M. Simpson	..	..	G. L. Macindoe	Clan Line Steamers Ltd.
Clan Ross	28.11.74	J. R. French	J. R. Gilbert, L. A. Bartrip, A. Blakeley	..	..	..	Clan Line Steamers Ltd.
Clione	31.12.74	P. I. Sullivan	S. Foster, P. Best	..	..	J. Blackwell	Clan Line Steamers Ltd.
Collin	12.2.74	D. Newlin	M. J. O'Neill, P. W. Brown, P. I. Philpott	..	..	R. Caine	Clan Line Steamers Ltd.
Columbia Star	20.2.75	N. Campbell	J. T. F. Broughton, T. G. Whitaker, C. Binks	..	..	J. A. Chalkley	Clan Line Steamers Ltd.
Conon Forest	25.3.75	J. E. M. Balfour	..	..	..	..	Ministry of Agriculture, Fisheries & Food
Corella	30.11.73	T. K. Corbett	J. C. Keer, C. W. Hurst, J. Smith	..	..	P. T. Cook	Jardine Matheson & Co. Ltd.
Craigallan	25.1.74	R. C. Lister	M. J. McGilvray, J. H. Turner, D. H. Smith,	..	..	J. V. Horsburgh	Blue Star Line Ltd.
Cumberland	30.5.74	G. Spong	P. M. Moore	..	..	..	J. & J. Denholm Ltd.
Cumbria	18.3.75	J. B. Clemenson	B. C. Legarda, G. Bowie	..	..	..	Ministry of Agriculture, Fisheries & Food
Cunard Carrier	26.10.74	..	C. Snowling, E. Bridge, H. Saunders	..	..	..	Scottish Ore Carriers Ltd.
			P. Bloomer, J. M. Bryan, J. M. Craig	..	..	T. P. Bolan	P. & O. S.N. Co.
			A. Coxon-Smith, A. Clayton-Green, D. Pierce	..	..	S. L. Ludgate	Hadley Shipping Co. Ltd.
			W. F. R. Whiting, M. Nutbrown, T. Franklin	..	..	J. Clare	Cunard S.S. Co. Ltd.
			R. G. Tanner, P. T. Bingley, P. D. Meverhoff	..	..	M. J. Harrison	..

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Cuthbert</i>	•	P. Clark ..	A. Nazim, M. R. Murray, I. S. Grant, P. T. Evans	B. Gallagher ..	Booth S.S. Co. Ltd.
<i>Cyclops</i>	9.1.75	R. M. Simpson ..	A. G. D. Murray, I. S. Grant, P. T. Evans	..	Ocean Transport & Trading Ltd.
<i>Daghestan</i>	7.3.75	C. Lawson ..	..	..	Common Bros. Ltd.
<i>Dalesman</i>	7.8.74	E. Maxwell ..	..	..	T. & J. Harrison Ltd.
<i>Dart America</i>	7.1.75	M. J. Butler ..	K. J. O'Neill, M. Stoddart ..	R. E. Stewart ..	Bibby Line Ltd.
<i>Dart Atlantic</i>	27.3.75	J. R. Woodfield ..	C. E. Walford, M. Pain, A. Poynder ..	P. A. Cross ..	Bibby Line Ltd.
<i>Degema</i>	17.2.75	C. Woodward ..	P. J. Burden, M. D. D'Souza, G. Ross ..	T. Flatley ..	Ocean Transport & Trading Ltd.
<i>Dado</i>	16.5.73	E. Woosey ..	S. H. Barnett, C. D. Warren ..	R. J. P. Williams ..	Ocean Transport & Trading Ltd.
<i>Derbyshire</i>	2.5.73	D. R. Clayton ..	S. A. McClure, R. A. Morris, R. Q. Palmer ..	S. W. A. Stenton ..	Bibby Line Ltd.
<i>Discoverer</i>	13.11.74	R. H. Jones ..	D. Newton, M. S. Dixon, D. G. Jones ..	G. A. Ferrand ..	T. & J. Harrison Ltd.
<i>Discovery</i>	31.12.74	M. A. Harding ..	P. H. Warne, N. R. Austin ..	R. I. Hammerton ..	Natural Environment Research Council
<i>Discovery Bay</i>	27.3.75	J. S. Thorpe ..	T. Steel, D. Wilson, R. Wightman ..	H. McDine ..	Container Fleets Ltd.
<i>Donegal</i>	21.3.74	J. Blake ..	A. P. Lowe, G. K. Milne, C. de Souza ..	P. F. E. Kuchenbecker ..	Trinder Anderson & Co. Ltd.
<i>Donga</i>	16.5.73	W. E. Bowden ..	G. A. Bateman, S. J. Houldsworth ..	T. J. Smith ..	Ocean Transport & Trading Ltd.
<i>Drina</i>	25.11.74	J. J. Rutter ..	C. Glover, I. Chadwick, B. J. Rams Shaw ..	L. C. Taylor ..	Shaw Savill & Albion Co. Ltd.
<i>Dukegarth</i>	3.7.74	N. Richardson ..	K. W. Smith, J. Main, M. Cawood ..	S. Kirkwood ..	Ocean Transport & Trading Ltd.
<i>Dumbria</i>	24.3.75	E. Woosey ..	D. W. Feather, G. E. Metcalf, M. S. Brown ..	J. N. S. Fox ..	Ocean Transport & Trading Ltd.
<i>Dunkwa</i>	17.2.75	D. Howe ..	J. G. Swindlehurst, J. B. Summerhill ..	J. Madden ..	Elder Dempster Lines Ltd.
<i>Dunstanburgh Castle</i>	14.2.74	J. MacVean ..	K. Henderson, K. Wilcox, W. Hanley ..	D. Chalmers ..	W. A. Souther & Co. Ltd.
<i>Durango</i>	26.11.74	D. A. Statham ..	I. H. Barker, S. Merrells, R. D. Kelsall ..	B. Hutchison ..	Shaw Savill & Albion Co. Ltd.
<i>Eagle</i>	29.10.74	R. P. Morton ..	B. E. Peck, D. Best, R. Fearnley ..	J. Ernest ..	Southern Ferries Ltd.
<i>Ebani</i>	10.10.74	J. P. Dinnie ..	J. F. I. French, I. S. Grant, F. Moran ..	N. Foulkes ..	Ocean Transport & Trading Ltd.
<i>Edinburgh Castle</i>	18.9.74	C. R. Kelso ..	P. J. Hickmott, D. A. Reid, G. C. Koch ..	J. Walker ..	Union Castle Mail S.S. Co. Ltd.
<i>Edinburgh Clipper</i>	31.1.75	D. M. Swettenham ..	R. S. Nassor ..	..	Whitco Marine Services Ltd.
<i>Edward Forbes</i>	5.12.74	B. A. Chapman ..	P. T. Oldfield, H. Bedford, P. Tilbury ..	..	Natural Environment Research Council
<i>Edward Wilshaw</i>	11.6.68	N. H. Smith ..	R. M. Keyzor, K. Brammer, A. F. Wilson ..	J. Odley ..	Cable & Wireless Ltd.
<i>Egton</i>	14.9.73	S. Ward ..	J. Mallam, A. Legg, R. Green ..	D. Prescott ..	Roland & Marwood S.S. Co. Ltd.
<i>El Lobo</i>	14.10.74	R. Knowles ..	..	..	Bowring S.S. Co. Ltd.
<i>Elmbank</i>	6.6.74	F. C. Abell ..	..	..	Bank Line Ltd.
<i>Encounter Bay</i>	19.3.75	M. Champneys ..	M. T. Lindley, I. G. Booker, M. J. Stevens ..	J. E. Crerand ..	Container Fleets Ltd.
<i>Erawan</i>	14.1.75	R. Kennett ..	D. C. Davies, P. Manson, A. Thompson ..	M. Joniec ..	John Swire & Sons Ltd.
<i>Ernebank</i>	11.2.75	A. B. Osborne ..	R. V. Legaspi, A. W. Curtis, K. R. Hawkins ..	P. Y. C. Hsu ..	Bank Line Ltd.
<i>Essex</i>	2.10.74	J. M. Burn ..	D. W. Bunder, R. G. Whisker, M. J. West ..	A. K. Ray ..	P. & O. S.N. Co.
<i>Esso Caledonia</i>	16.1.75	J. A. Phillips ..	I. Cookson, P. T. Clegg, T. Sears ..	A. J. Rose ..	Esso Petroleum Co. Ltd.
<i>Esso Cambria</i>	24.2.75	E. Gulwell ..	E. C. Davies, C. Goddard, P. Harbut ..	D. Leeson ..	Esso Petroleum Co. Ltd.
<i>Esso Hampshire</i>	4.9.73	F. W. Christian ..	T. Ports, I. Jewitt, W. D. Craigs ..	M. Davies ..	Esso Petroleum Co. Ltd.
<i>Esso Mercia</i>	12.12.74	F. W. Stubbs ..	M. Russell, M. Halle ..	I. Morgan ..	Esso Petroleum Co. Ltd.
<i>Esso Pembrokehire</i>	31.1.75	W. D. Templeman ..	B. W. Burton, C. Perr, A. Ramsey ..	G. Roberts ..	Esso Petroleum Co. Ltd.
<i>Esso Ulidia</i>	20.12.74	E. Grigor ..	G. W. Menzies, G. Tattersall, C. A. Clague ..	R. A. Milliken ..	Esso Petroleum Co. Ltd.
<i>Esso Warwickshire</i>	19.7.74	I. D. Grigor ..	D. Thetford, G. F. Thomas, F. Clayton ..	C. Needham ..	Esso Petroleum Co. Ltd.
<i>Ethel Everard</i>	15.7.74	H. O. Roberts ..	S. McGillivray ..	..	F. T. Everard & Sons Ltd.
<i>Eucadia</i>	28.11.74	T. R. Rowe ..	..	..	Walter Runciman & Co. Ltd.
<i>Eurofreighter</i>	30.9.74	R. Sharp ..	K. Cassidy, J. F. Houghton, F. C. Maciver ..	D. B. O'Donoghue ..	J. & J. Denholm Ltd.
<i>Euroliner</i>	18.9.74	W. R. Williamson ..	P. J. Yates, D. Mackay, J. F. Houghton ..	A. J. Blane ..	J. & J. Denholm Ltd.

Explorer Explorer (F.R.S.)	20.2.75 5.9.74	E. Sherlock D. L. Ratray	H. P. Farrel, P. Holloway, P. K. Halhead. J. Ross, J. Horne	D. Murphy	T. & J. Harrison Ltd. Dept. of Agriculture & Fisheries for Scotland
<i>Fernie</i>	5.3.75	D. C. Penberty	C. Raymond, V. Cook, K. P. Berry	R. Harrison	P. & O. S.N. Co.
<i>Finnmore Meadow</i>	12.12.74	C. Newson	P. G. I. Rodgers-Gray, J. Morrison, P. I. Roberts	S. H. Dobson	Mavroleon Bros. Ltd.
<i>Flinders Bay</i>	20.2.75	M. J. Heron	R. J. McLarty, J. P. Pym, D. R. Peel, C. Wise	A. Titley	Container Fleets Ltd.
<i>Floristan</i>	7.2.75	A. W. Jones	N. D. Graham, R. A. Childs, G. W. Renshaw	J. F. Bryson	P. & O. S.N. Co.
<i>Foreland</i>	24.2.75	J. L. Downie	F. Birnie, C. D. Bishop-Laggett		Shipping & Coal Co. Ltd.
<i>Fourah Bay</i>	16.9.74	R. G. Rippon	D. W. Elliott, P. J. Houghton, D. M. Dixon	R. Allender	Ocean Transport & Trading Ltd.
<i>Fremantle Star</i>	20.12.74	W. G. Jones	N. B. Meek, K. I. Holden, R. Guy, I. S. Franklin	T. Milligan	Blue Star Line Ltd.
<i>Fresno City</i>	15.8.74	W. J. Cross	R. G. H. Webb, K. B. Whitting, T. Haxell	D. P. Bidmead	Sir Wm. Reardon Smith & Sons Ltd.
<i>Frontier</i>	28.11.74	D. Smith	P. O'Toole, M. L. James, W. H. Jackson	P. A. Byrne	Manchester Liners Ltd.
<i>Furness Bridge</i>	22.8.74	J. S. Leask	R. A. Hawkins, D. Gow, M. Holland-Lloyd		Houlder Bros. & Co. Ltd.
<i>Galway</i>	28.11.74	A. C. R. Murray	D. Caplan, J. Jackson, R. Apperley-Jones	A. Horton	P. & O. S.N. Co.
<i>Gambada</i>	18.3.75	S. O. Copeland	N. Vause, E. J. Hadfield, K. B. Lowery	S. Lovick	P. & O. S.N. Co.
<i>Gazara</i>	10.10.74	S. Harwood	N. C. Hall, J. L. Burton, R. B. Smith-Wilkins	I. L. Spanner	P. & O. S.N. Co.
<i>Gestcrest</i>	17.2.75	M. Wilks	A. C. Enos, L. A. S. Cooper, I. Smith-Wilkins	T. D. Soundy	Geest Industries Ltd.
<i>Gesthaven</i>	16.9.74	J. Milner	K. P. Slade, C. Jenkins, S. J. Wozniak	P. Forteau	Geest Industries Ltd.
<i>Gestland</i>	2.10.74	O. Springett	D. Roberts, D. F. John, M. Davies	M. I. McGregor	Geest Industries Ltd.
<i>Geststar</i>	26.9.74	A. Cole	J. Ford, G. Gough, D. Bedford	G. Selby	Geest Industries Ltd.
<i>Geest-tide</i>	26.3.75	R. Skinner	T. Evans, C. J. Flanagan, M. Tomlinson	R. Hart	Geest Industries Ltd.
<i>Gene Trefethen</i>	10.1.75	H. D. Osthoff	D. Elson, A. G. Williams, W. Selby	D. A. Barry	International Ore Carriers Ltd.
<i>Gladstone Star</i>	23.11.73	G. Ferriday	C. A. F. Ledsam, D. S. Fforde, S. L. Leuty	F. G. Huggett	Blue Star Line Ltd.
<i>Glasgow Clipper</i>	12.3.75	N. M. Johnson	D. Mwako, A. Sutherland, B. Youles		Whitco Marine Services Ltd.
<i>Glenalloch</i>	24.2.75	W. E. Bellamy	J. P. Garner, A. J. Leslie, I. Russel, O. B. Hamzah	C. W. Knibb	Ocean Transport & Trading Ltd.
<i>Glenhyon</i>	15.8.74	J. C. Liptrot	R. S. Addison, T. L. Watson, P. F. Noonan	J. A. Nottley	Ocean Transport & Trading Ltd.
<i>Glenmoor</i>	26.3.75	W. Mathers	N. McLaughlin, J. Hurton, A. Simson	D. G. Gunning	Anchor Line Ltd.
<i>Glenoglie</i>	26.11.74	P. J. Broomfield, R.D.	C. G. Fabella, K. F. Vickery, D. S. Walker	R. J. McNulty	I. & J. Denholm Ltd.
<i>Glenpark</i>	7.3.75	A. T. Johnston	D. Mallett, R. F. Shea, R. Tavarro	R. A. Russell	Stag Line Ltd.
<i>Gloxinia</i>	24.1.75	P. Eckford	E. A. Lamb, E. Bertelsen, M. Johnson	R. A. Wilson	Union-Castle Mail S.S. Ltd.
<i>Good Hope Castle</i>	24.3.75	J. K. Liston	G. C. Koch, A. J. Goringe		Currie Line Ltd.
<i>Gothland</i>	10.10.74	D. Davies	M. E. Schollar, G. S. Mycroft, J. Still	P. Higham	Shell Tankers (U.K.) Ltd.
<i>Hadra</i>	13.11.74	D. Mackillop	D. H. Smith, A. J. Brown, C. J. Poulter	I. C. Macdonald	Blue Star Line Ltd.
<i>Hallfax Star</i>	3.7.74	F. West	N. Simpson, J. Dunlop, G. R. Howe, M. Kidby	W. W. Adams	Shell Tankers (U.K.) Ltd.
<i>Hanetia</i>	31.5.74	M. D. Whiteley	H. M. C. Cameron	T. F. McCarthy	Marine Oil Industry Repairs Ltd.
<i>Hartland Point</i>	5.8.74	P. Donoghue	G. W. Petty, J. Astles	M. C. Murphy	British United Trawlers Ltd.
<i>Hausa</i>	25.11.74	D. Lamont	W. Prins, J. Henderson, M. A. Griffiths		Bank Line Ltd.
<i>Hazelbank</i>	31.12.74	R. E. Annett	D. Haughey, L. McKenzie, D. Ilderton	C. G. MacAulay	Walter Runciman & Co. Ltd.
<i>Hazelmoor</i>	17.3.75	I. A. Potts	R. A. Battye, P. Fox	M. O. Bunce	Shell Tankers (U.K.) Ltd.
<i>Hemifusus</i>	6.6.74	K. Arthur	A. P. Willmore, C. E. Jarrett, M. H. Pryce	K. Lacey	Bibby Line Ltd.
<i>Hemimactra</i>	21.6.74	R. C. Anderson	L. H. M. Johnson, P. Anderson, M. R. Robans	S. Sundaraman	P. & O. S.N. Co.
<i>Herefordshire</i>	21.2.75	D. J. Hodson	S. R. Matthews, A. R. Davidson, R. G. Dando	H. G. Sparkes	Shell Tankers (U.K.) Ltd.
<i>Hertford</i>	16.4.74	W. E. Hinde	D. P. Farrell, G. W. Bentley, A. H. MacIennnon	J. Ryan	T. & J. Harrison Ltd.
<i>Hinea</i>	17.2.75	E. G. Bee	W. F. Hughes, R. Durham, C. A. F. Ledsam	J. C. Weedon	Blue Star Line Ltd.
<i>Historian</i>	22.8.74	J. Atkinson	D. N. Baxter, R. V. Goodridge, R. G. Stollery	J. R. Williamson	Shell Tankers (U.K.) Ltd.
<i>Hobart Star</i>	23.12.74	E. C. V. Sharples	A. Webber, D. M. Cambridge, C. Darke	F. E. Anderson	Shaw Savill & Albion Co. Ltd.
<i>Horonya</i>	17.2.75	C. A. S. Borthwick	T. Deneyer	H. A. Sirett	Shaw Savill & Albion Co. Ltd.
<i>Iberic</i>	5.2.75	R. E. Marshall	J. P. Nicholl, R. Eastwood, P. Wheatley	P. N. Draper	Bank Line Ltd.
<i>Illyric</i>	26.3.75	D. L. Young	H. Macdonald, M. K. McLeod	R. D. Dingley	Shaw Savill & Albion Co. Ltd.
<i>Inverbank</i>	7.2.74	H. Nixon	P. Henderson, M. Price, V. Moorman	J. M. Delaney	Bank Line Ltd.
<i>Ioric</i>	25.11.74	P. H. Thomas	P. E. Morrant, R. Snape, A. N. Watson	J. J. Kennedy	Kay, Son & Co. Ltd.
<i>Iribank</i>	27.8.74	M. C. Harper	A. Barker, J. Twisleton, A. E. Cowans		
<i>Jamaica Producer</i>	5.12.74				

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
Jedforest ..	..	G. A. Gibbons ..	A. C. W. Lipscombe, D. G. Sinclair, C. J. C. Johnston ..	W. Kay ..	P. & O. S.N. Co.
Jervis Bay ..	11.2.75	E. M. S. Phelps ..	I. Hotchin, C. Elliot, D. J. Bray ..	C. R. Christiansen ..	Container Fleets Ltd.
John Biscoe ..	3.5.74	G. Long ..	B. A. Chapman ..	..	British Antarctic Survey
John Murray ..	25.11.74	..	..	..	Natural Environment Research Council
Joni ..	7.2.75	S. Olsen ..	R. S. Bhambral, M. A. Collier, J. E. Turner ..	S. J. Rolfe ..	Marine Exploration Ltd.
Kano Palm ..	23.12.74	R. Vinton ..	J. E. Dingle, D. Morris, R. Case ..	P. Hammond ..	Palm Line Ltd.
King Alfred ..	31.12.74	G. Beaumont ..	..	..	Cayzer Irvine & Co. Ltd.
King William ..	12.3.75	D. Lockhart ..	..	..	Cayzer Irvine & Co. Ltd.
Kilmaird Castle ..	8.8.74	J. K. Currie ..	J. B. Harbord, M. Baker, D. Mugal ..	C. J. Nicholson ..	Union-Castle Mail S.S. Co. Ltd.
Kohinar ..	13.11.74	R. O. Cunningham ..	H. W. Perry, R. Fisher, K. K. Sood ..	G. Palmer ..	P. & O. S.N. Co.
Kowloon Bay ..	14.1.75	D. H. Stewart ..	R. Tanguy, A. Ewart-James, S. Yeaman, T. James ..	D. Miller ..	Ocean Transport & Trading Ltd.
L.N.G. Challenger ..	..	P. C. T. Shepherd ..	P. A. Eliacott, M. G. Phipps, K. Dearlove ..	E. Towers ..	P. & O. S.N. Co.
La Loma ..	7.3.75	B. Wilcock ..	M. D. N. B. Ismail, L. Godsell, A. J. Baker ..	G. Lineham ..	Burles Marks Ltd.
Laomedon ..	5.3.75	J. P. Wishart ..	P. C. Haysom, A. Mitchell, J. Coyle ..	W. S. Young ..	Ocean Transport & Trading Ltd.
Laurentian Forest ..	12.2.75	N. C. Kerr ..	E. T. Hawkins, J. B. Fowler, R. B. Perks ..	E. H. R. Dickson ..	Harrisons (Clyde) Ltd.
Laurentic ..	10.1.75	M. Larrive ..	T. T. Kent, D. Wilson, K. O'Kelly ..	D. Cooper ..	Shaw Savill & Albion Co. Ltd.
Letchworth ..	23.12.74	K. Jewell ..	A. M. Healey, J. Griffiths ..	D. M. Chalmers ..	R. S. Dalgliesh Ltd.
Leven Fisher ..	31.12.74	J. Y. Cairns ..	N. A. Goodwin, P. V. Hunter, B. G. Appleby ..	P. Lynch ..	James Fisher & Sons Ltd.
Limpfield ..	23.1.75	J. G. Street ..	M. A. Mackenzie, P. Crowhurst ..	D. C. Elsey ..	Shaw Savill & Albion Co. Ltd.
Lindenbank ..	18.2.75	F. D. Parsons ..	S. M. Tankard, I. D. Pattison, S. U. Sharif ..	I. Crompton ..	Bank Line Ltd.
Lindisfarne ..	5.4.74	M. Bentley ..	R. G. Outram, A. P. Minns, A. Dyne ..	R. P. Woods ..	W. A. Souter & Co. Ltd.
Liverpool Bay ..	5.3.75	D. M. Belk ..	G. J. Smith, J. A. Atwater, C. C. D. Archer ..	R. P. R. Sibley ..	Ocean Transport & Trading Ltd.
London Pioneer ..	24.2.75	P. J. Cornish ..	A. Whitfield, R. Cordon, M. Scott ..	P. D. Neill ..	London & Overseas Freighters Ltd.
Longstone ..	10.1.75	P. Marshall ..	A. I. Malgarine, P. C. H. Adair ..	J. Fogarty ..	W. A. Souter & Co. Ltd.
Lord Strathcona ..	26.10.72	M. H. Scott ..	C. M. Brown, G. S. Rolla, R. G. Whisker ..	I. Lawrie ..	Canadian Pacific (Bermuda) Ltd.
Lossiebank ..	15.3.74	P. Simpson ..	S. Woodward, J. M. E. Fish, A. Hamber ..	K. R. G. D. Mackintosh ..	Bank Line Ltd.
Lutetian ..	4.7.74	A. W. Leyland ..	P. Sayers, R. M. P. Nykolyszyn, S. Woodward ..	E. C. Stout ..	Oregon S.S. Co. Ltd.
Mabel Warwick ..	20.2.75	D. S. Craven ..	..	S. Kelly ..	Houlder Bros. & Co. Ltd.
Mahout ..	12.12.74	G. D. B. Thomas ..	..	..	Cunard-Brocklebank Ltd.
Mahonda ..	17.3.75	R. A. Holmes ..	R. C. Hyde-Linaker, A. M. Tweedie, M. Fuchs ..	C. Clarke ..	Cunard-Brocklebank Ltd.
Mahsud ..	23.12.74	G. D. Symonds ..	I. R. Lewis, C. Heard, J. D. Cook ..	G. P. Coombe ..	Cunard-Brocklebank Ltd.
Makaria ..	12.2.75	A. Sugden ..	J. P. Clarke, N. Humbleton, B. Luke ..	G. G. Graham ..	Cunard-Brocklebank Ltd.
Manapouri ..	23.12.74	H. J. D. Sladen ..	P. M. Bennett, R. H. A. Chester, E. M. Robertson ..	D. M. Matheson ..	P. & O. S.N. Co.
Manchester Challenge ..	17.3.75	P. Cullen ..	P. Doyle, R. Waterton, G. Shadbolt ..	W. F. Stirling ..	P. & O. S.N. Co.
Manchester Concept ..	31.12.74	K. Lehenuu ..	J. B. Kityson, K. Whitaker ..	N. Samuel ..	Manchester Liners Ltd.
Manchester Concorde ..	2.12.74	P. N. Fielding ..	K. J. O'Neill, J. B. Turnbull ..	I. McDonald ..	Manchester Liners Ltd.
Manchester Courage ..	24.1.75	J. Illingworth ..	C. Livingstone, J. Williams, D. Smith ..	R. Leatham ..	Manchester Liners Ltd.
Manchester Crusade ..	5.3.75	I. Rushworth ..	B. Larcombe, W. Williams, P. B. Moran ..	D. E. Spiler ..	Manchester Liners Ltd.
Manchester Quest ..	18.2.75	D. Smith ..	G. Dodsworth, R. S. Holt, A. Bond ..	J. Buchanan ..	Manchester Liners Ltd.
Manchester Vigour ..	31.12.74	J. Baker ..	D. J. Bancroft, R. Waterton, W. D. Porter ..	A. Cope ..	Manchester Liners Ltd.
Manipur ..	3.2.75	K. J. Rourke ..	L. Mitchell, S. M. Carlisle, P. Doyle ..	J. McKory ..	Cunard-Brocklebank Ltd.
Marabank ..	9.3.75	L. J. Brown ..	..	..	Bank Line Ltd.
Maranga ..	15.10.71	D. I. R. Davies ..	M. Weight, J. Brooks, S. P. Hockley ..	L. Robinson ..	Whitco Marine Services Ltd.
Markhor ..	12.3.75	M. Hollinsrake ..	H. P. Bird, A. M. Mussa, D. J. Turner ..	R. G. Bell ..	Cunard-Brocklebank Ltd.
..	24.3.75	G. F. Kay ..	R. W. Tappenden, A. C. MacCutchen, T. N. Dudman ..	V. G. Merriott ..	..

<i>Mataura</i>	12.2.75	K. Barnett	J. R. Lewis, A. W. Noble	J. Bilton	P. & O. S.N. Co.
<i>Mayfield</i>	10.2.75	K. L. Row	J. Farrell, D. G. Lyon, J. A. Gover	R. V. Price	Shaw Savill & Albion Co. Ltd.
<i>Medic</i>	30.9.74	W. W. Newport	R. Keutenius, J. Hurley, P. Rush	A. Hudson	Shaw Savill & Albion Co. Ltd.
<i>Megantic</i>	27.2.75	W. M. Wheatley	J. Spurgeon, R. A. Wooding, P. Costales	G. S. Thomson	Shaw Savill & Albion Co. Ltd.
<i>Mellia</i>	5.3.75	R. D. Leckie	I. R. Bunning, B. Taylor, H. W. Whiston	M. D. A. Walsh	P. & O. S.N. Co.
<i>Menestheus</i>	12.2.75	H. Davies	V. D. Dharmadhikari, J. R. Pearson, K. N. Athureliya	J. B. Sergeant	Ocean Transport & Trading Ltd.
<i>Merchant</i>	23.12.74	G. W. Sigsworth	D. Macleod, C. D. Riley, G. Stevens	D. W. Cross	T. & J. Harrison Ltd.
<i>Mercury</i>	2.10.74	G. T. Robinson	I. F. Gilmour, I. R. Bosworth, S. M. Winter	P. Money	Cable & Wireless Ltd.
<i>Miranda</i>	18.2.75	W. Bown	B. D. Hunt, A. Smith	R. Vinall	Dept. of Trade and Industry
<i>Montegarth</i>	20.2.75	J. Sharp	D. W. Tearle, N. Robinson, J. Mitchell	B. Coward	Ocean Transport & Trading Ltd.
<i>Montevideo Star</i>	26.2.75	A. H. White	R. S. J. Hosking, L. A. De Lecameta, B. R. Aspin	D. P. MacNeil	Blue Star Line Ltd.
<i>Montreal Star</i>	15.1.75	A. I. Chivers	R. Hill, C. R. Mundy, N. A. Ineson	L. C. Taylor	Blue Star Line Ltd.
<i>Moreybank</i>	23.12.74	M. Macdonald	A. H. Pronk, K. E. Critchley, M. Hardy	T. Kucharski	Bank Line Ltd.
<i>Moreton Bay</i>	3.2.75	M. R. Ryon	C. C. Woodward, R. Wood, M. Warts	C. Hughes	Container Fleets Ltd.
<i>Nairnbank</i>	5.12.74	J. W. Greatorex	E. Smith, F. D. Harrow, M. Heron	P. T. Murphy	Bank Line Ltd.
<i>Newarth</i>	31.12.74	G. Preston	A. Dodds, R. H. Stephenson, D. Weighill	G. M. Duncan	R. S. Dalgleish Ltd.
<i>Newfoundland</i>	2.10.74	D. J. Houghton	I. Paton, M. E. Jones, G. Mapplebeck	C. G. Macey	Furness Withy & Co. Ltd.
<i>New Westminster City</i>	28.10.74	N. Johnson	M. J. Selby, T. Black, B. Penrose	G. Simmons	Sir Wm. Reardon Smith & Sons Ltd.
<i>New Zealand Star</i>	18.2.75	L. H. A. Bainton	R. A. Chadney, P. J. Fawcett, T. L. Tollervey	C. Sawyer	Blue Star Line Ltd.
<i>Nina Bowater</i>	12.2.75	F. Danks	D. H. Thomas, R. Dootson, J. Federigan	J. Davies	Cayzer Irvine & Co. Ltd.
<i>Nordic Tallisman</i>	13.11.74	A. M. Valentine	A. Scarratt, J. McWilliam, J. Barrow	V. Trebartha	J. & J. Denholm Ltd.
<i>Norman Lady</i>	24.1.75	R. Waller	N. Stark, H. Syed	A. Ramsay	Burkes Marks Ltd.
<i>Norse</i>	18.2.75	E. Muir	H. Churchill, J. W. Parkinson, A. C. Wilson	I. B. Carter	British United Trawlers Ltd.
<i>Norse Marshal</i>	1.10.74	J. E. Roddham	J. F. Doyle, H. Towers, P. Kelly	H. Hebblewhite	Cardigan Shipping Co. Ltd.
<i>Norse Viking</i>	1.10.74	D. C. Murison	J. Simmons, P. Howard, P. Chandler, A. Turner	P. J. O'Carroll	Harrisons (Clyde) Ltd.
<i>Northern Star</i>	29.8.74	E. H. Gregson	J. Bolt, R. Crawford, T. Harris	M. B. Murray	Cardigan Shipping Co. Ltd.
<i>Novia Scotia</i>	10.2.75	M. Watson	P. J. Gadd, J. N. Brook, B. Balal	W. A. Smith	Shaw Savill & Albion Co. Ltd.
<i>Novelst</i>	26.11.74	R. D. Cookman	I. D. Haynes, I. Anderson, N. C. Davidson	B. J. Britton	Furness Withy & Co. Ltd.
<i>Nurjehan</i>	5.12.74	J. S. Wisden	H. F. Bond, N. O. Morrice, M. Mahendra	K. Brennan	T. & J. Harrison Ltd.
<i>Oakworth</i>	16.1.75	H. E. Carlisle	T. R. Moore, N. O. Hunter, P. Christopherson	P. Brevik	P. & O. S.N. Co.
<i>Ocean Bridge</i>	3.2.75	B. A. Hills	R. E. V. O'Donnell, C. J. Wright	W. M. Fryer	R. S. Dalgleish Ltd.
<i>Ocean Monarch</i>	7.6.74	R. J. Williams	T. W. Charlesworth, D. Pringle, C. G. Rowsell	W. Macleod	Bibby Line Ltd.
<i>Opalia</i>	28.11.74	R. K. C. Thomas	J. Cooper, P. Gregson, C. Rowntree	D. Glasson	Shaw Savill & Albion Co. Ltd.
<i>Orbita</i>	27.8.74	R. E. Fairley	I. R. Hunt, T. F. Hill, D. Bridgman	R. F. Collins	Shell Tanker (U.K.) Ltd.
<i>Orcma</i>	3.2.75	R. T. Riley	H. M. Close, P. Jones, A. M. Shaw	M. S. Skinner	Pacific S.N. Co. Ltd.
<i>Orduna</i>	22.7.74	W. Backhouse	J. J. Wren, C. Nicholls, M. Boland	R. Harris	Furness Withy & Co. Ltd.
<i>Orenda Bridge</i>	24.12.74	I. A. Le Fevre	P. G. Goodman, P. E. King, P. A. Tate	G. Waller	Pacific S.N. Co. Ltd.
<i>Oronsay</i>	11.1.74	N. Oddy	G. W. Patrick	I. E. Bissell	Ore Carriers Ltd.
<i>Orotava</i>	6.12.74	P. Waddingham	M. K. Lee, E. Jones, S. Szarletta	C. Adkin	P. & O. S.N. Co.
<i>Ortiga</i>	20.2.75	C. W. Alison	K. S. Hardy, J. B. Hughes, P. A. Furneaux	M. J. Gamble	Hellyer Bros. Ltd.
<i>Osaka Bay</i>	6.12.74	R. T. MacLachlan	T. L. Leuty, D. Mountford, J. Shiner	P. Arkley	Ocean Transport & Trading Ltd.
<i>Otaiki</i>	9.3.75	P. D. F. Low	A. C. Lobo, R. Coldham, T. Hogg	B. W. J. Peters	Ocean Transport & Trading Ltd.
<i>Othello</i>	18.2.75	I. A. Jennings	B. D. Hunt	N. Kinley	Union-Castle Mail S.S. Co. Ltd.
<i>Partula</i>	15.1.75	D. H. G. Mortimer	M. D. Owen, D. J. Collins, A. Winkell	J. Peters	Ocean Transport & Trading Ltd.
<i>Patanga</i>	27.9.74	G. S. Savage	K. Milnes, D. Carver, D. Tomkiss	S. Ashcroft	Ocean Transport & Trading Ltd.
<i>Patroclus</i>	15.10.74	H. O. Williams	S. O. Chua, E. D. Somes, D. W. Bunyan		Ocean Transport & Trading Ltd.
<i>Pegu</i>	13.2.75	D. K. Dunlop	Chua Say Ong, D. Pluck, W. T. Stainer		Ocean Transport & Trading Ltd.
<i>Pesander</i>	25.2.75	P. St. Q. Beadon	A. B. Thomas, R. W. Steigh, B. Noble		Ocean Transport & Trading Ltd.
<i>Pendennis Castle</i>	1.10.74	N. A. Joyce	S. F. W. Bradley, M. McLellan, M. Wise		Ocean Transport & Trading Ltd.
<i>Persius</i>	12.12.74	W. P. Goldie	A. French, I. Mackenzie, P. Smith		Ocean Transport & Trading Ltd.
<i>Philosopher</i>	18.2.75	R. B. Simmons	J. G. Swindlehurst, D. Todd, D. Illingworth		Ocean Transport & Trading Ltd.
			J. A. Cook, S. Fraser, R. W. Cramp		T. & J. Harrison Ltd.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Photinia</i> ..	18.2.75	W. A. Sutherland	J. B. Young, K. Hughes, B. Holdred	E. J. Davies ..	Stag Line Ltd.
<i>Phronitis</i> ..	8.8.74	I. Webster	P. R. Robinson, M. G. Morrison, M. D. Agnew	D. G. Holmes ..	Ocean Transport & Trading Ltd.
<i>Piako</i> ..	7.6.74	B. Austen-Smith	D. J. Peck, N. W. Stephenson, F. Jarvis	D. Tudor-Cole ..	P. & O. S.N. Co. Ltd.
<i>Plainsman</i> ..	10.10.74	J. Maddison	A. Atkin, M. S. Brooks, N. Howgego	P. Dennehy ..	T. & J. Harrison Ltd.
<i>Port Alberni City</i> ..	28.6.74	T. R. McNulty	A. K. Smith, K. Fulker, K. Jones	J. Pagnum ..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Port Alfred</i> ..	28.10.74	P. R. R. Ramsey	J. P. Broe, F. E. Beer, C. Hamilton	D. S. Saunders ..	Port Line Ltd.
<i>Port Auckland</i> ..	15.1.75	D. Sinclair	J. Hooper, R. Langmuir, I. C. Bevis	M. Fitzgerald ..	Port Line Ltd.
<i>Port Brisbane</i> ..	8.11.74	M. L. M. Coombs	D. Percy, J. Lewis	..	Port Line Ltd.
<i>Port Caroline</i> ..	31.12.74	M. H. C. Twomey	T. W. Judge, C. H. Denny, R. F. Fitch	S. R. Wheelodon ..	Port Line Ltd.
<i>Port Chalmers</i> ..	24.1.74	V. A. Hunt	B. A. Argent, D. Atkinson, A. Pritchard	C. J. Lamb ..	Port Line Ltd.
<i>Port Launceston</i> ..	24.12.74	I. St. H. Webber	I. D. Tranter, I. F. Gosden, J. J. Gladstone	P. Bradley ..	Port Line Ltd.
<i>Port New Plymouth</i> ..	17.10.74	W. J. Williams	J. P. Collins, R. Soames, C. Bryson	N. Cresdee ..	Port Line Ltd.
<i>Port Nicholson</i> ..	11.3.75	R. A. Wight	N. J. Elason, D. S. Hughan, J. M. Bowie	L. Climo ..	Port Line Ltd.
<i>Post Champion</i> ..	30.12.74	R. Sawers	R. Regan, A. Child ..	N. Sayle ..	Panoean Shipping & Terminals Ltd.
<i>Post Charger</i> ..	*	D. Williams	C. Rackham, R. Cox, M. King, P. Turner	H. Smith ..	Panoean Shipping & Terminals Ltd.
<i>Post Runner</i> ..	17.3.75	R. R. Crump	A. L. Selmer, R. M. Grant, E. B. P. Gamman	S. J. Tyler ..	Panoean Shipping & Terminals Ltd.
<i>Priam</i> ..	13.2.75	D. L. Emery	Ang Chin Eng, J. C. Cox, P. A. Smith	W. Britton ..	Ocean Transport & Trading Ltd.
<i>Prince Rupert City</i> ..	31.5.74	J. S. Murray	K. J. Cribbin, M. C. Hurst, W. D. Howell	G. Thomas ..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Prometheus</i> ..	20.10.74	A. S. Thompson	I. M. Good, A. G. Watson, A. Shukor	S. D. Price ..	Ocean Transport & Trading Ltd.
<i>Protesilaus</i> ..	15.1.75	B. M. Ketchen	R. M. Macfure, P. S. Carr, B. I. Moor	E. E. Milburn ..	Ocean Transport & Trading Ltd.
<i>Queen Elizabeth 2</i> ..	10.1.75	M. Hehir	R. H. Jowett, T. A. Kershaw, P. Buckley	A. Holmes ..	Cunard S.S. Co. Ltd.
<i>Queensgarth</i> ..	19.2.75	J. P. Waldock	P. Marshall, W. Engles, J. Leatherbarrow	D. M. Hughes ..	Ocean Transport & Trading Ltd.
<i>Raeburn</i> ..	3.2.75	S. M. Williams	E. Buick	J. Fraser ..	Blue Star Line Ltd.
<i>Raphael</i> ..	16.8.74	S. M. Williams	I. K. Schofield, T. P. D. Gladwin, R. F. Loraine	L. P. Thurston ..	Lampport & Holt Line Ltd.
<i>Remuera</i> ..	25.11.74	F. G. Bevis	D. W. Carsey, T. Chantler, G. Pettinger	B. Davis ..	P. & O. S.N. Co.
<i>Rochampton Star</i> ..	16.8.74	W. A. Davidson	S. P. Harrison, N. Colling, C. E. Elms	S. Ashbrook ..	Blue Star Line Ltd.
<i>Roland</i> ..	11.10.74	M. J. MacNeil	P. Boistelle, S. G. Willis, D. A. Ganderton	H. Harris ..	Lampport & Holt Line Ltd.
<i>Romney</i> ..	31.7.74	J. I. Jones	C. Bufton, T. H. Withers	C. S. Currie ..	Lampport & Holt Line Ltd.
<i>Rosamond</i> ..	31.12.74	J. P. Skinner	R. A. Somerville, A. Milligan, C. A. Roy	R. Prole ..	F. T. Everard & Sons Ltd.
<i>Rosemary Everard</i> ..	12.11.73	E. Start	T. L. Jeffery ..	..	Hudson Bros. Trawlers Ltd.
<i>Ross Orion</i> ..	19.2.75	C. W. Gowans	R. R. N. Laing	R. R. N. Laing ..	Union-Castle Mail S.S. Co. Ltd.
<i>Rothsay Castle</i> ..	9.12.74	W. Ellarby	F. J. Bailey, M. A. T. McMillan, D. Magulu	O. J. Nicholson ..	Bank Line Ltd.
<i>Rowanbank</i> ..	6.11.73	A. Dekonski	F. G. Mealyer, D. M. Macleod, T. A. Hollows	R. C. Shrimpton ..	Southern Ferries Ltd.
<i>Rudby</i> ..	13.2.75	C. Godderidge	R. C. Jackson, R. Dodd, R. C. Gonsalves	A. C. Cawdery ..	Sir R. Ropner & Co. Ltd.
<i>S. F. Panther</i> ..	*	J. Potter	R. A. Hardman, R. P. Ogden, M. R. Godfrey	J. Ernest ..	Shoulder Bros. & Co. Ltd.
<i>St. Margaret</i> ..	11.10.74	P. J. Borroughs	R. T. Harrison	J. Newman ..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Sara Lupe</i> ..	16.7.74	P. S. Burn	G. Sizer, K. Milburn, J. P. Andrews	S. C. Horne ..	Dept. of Agriculture & Fisheries for Scotland
<i>Scotia</i> ..	12.9.74	F. Danks ..	A. Main, W. Henderson, W. Laws ..	J. MacIntyre ..	..
<i>Scotspark</i> ..	21.5.74	D. Hoyle ..	R. MacSweeney, J. Tirel	M. Corrigan ..	J. & J. Denholm Ltd.
<i>Serenia</i> ..	19.2.75	D. Macdonald	A. Browne, R. Tupper, W. A. Hemming	E. T. Keane ..	Shell Tankers (U.K.) Ltd.
<i>Severn Bridge</i> ..	6.3.75	G. H. Selby-Smith	R. Macleod, F. O. Wahutu, L. K. Jaffer	J. Kilkenny ..	J. & J. Denholm Ltd.
<i>Shackleton</i> ..	8.8.74	..	P. Coombs, A. Justen, R. A. Graham	J. Ellis ..	Natural Environment Research Council

Sheaf Tyne ..	19.2.75	M. Bentley	K. Henderson, R. Trotter, J. Crockett	D. Johnson	W. A. Souter & Co. Ltd.
Sherbro ..	29.10.74	J. M. Johnston	D. Small, J. French, D. Waring	J. Crotty	Ocean Transport & Trading Ltd.
Shonga ..	2.12.74	R. Wild ..	R. J. Pearce, R. J. Edmonds, M. F. Tomlinson	T. Scott	Ocean Transport & Trading Ltd.
Sig Ragne ..	1.5.74	I. C. Campbell	D. E. MacIver, D. A. Wedderburn	F. Wilson	I. & J. Denholm Ltd.
Silverdon ..	16.10.74	F. Moorcraft	A. M. Preece, J. D. Robinson, D. W. Brennan	R. E. Routh	Silver Line Ltd.
Silverford ..	23.11.73	J. W. Whitelaw	A. D. Campbell, P. Lewis, C. Macleod	B. C. Bull	Silver Line Ltd.
Silverforth ..	9.5.74	R. Sidney ..	P. J. Taylor, A. McGibbon, H. Loveday	E. Dunford	Silver Line Ltd.
Silverman ..	10.2.75	A. Smith ..	M. J. Holbrook, R. Sharp, T. Kirpatrick	F. Wareing	Silver Line Ltd.
Silvershore ..	26.10.74	M. Crawford	A. P. Terris, A. Tester, K. P. Mellor	O. Kirby	F. T. Everard & Sons Ltd.
Sincerity ..	1.10.74	H. D. Brown	I. C. Hay ..	A. W. Stephen	Ministry of Technology
Sir William Hardy	1.1.71	J. A. Whittleton ..	J. Tulley, S. Churcher	R. W. Aldridge	Marine Exploration Ltd.
Skagerak ..	26.3.75	B. Darwell	R. C. Bradbury, E. M. Robertson, G. P. D. Combe	J. S. Hallam	P. & O. S.N. Co.
Somerset ..	19.3.75	T. C. Mathews	J. S. Hallam ..	J. S. Hallam	Newington Trawlers Ltd.
Somerset Maugham	16.5.74	B. Taylor	P. R. Manning, S. Cobbley, R. M. Thomas	J. C. Taylor	Union-Castle Mail S.S. Co. Ltd.
Southampton Castle	6.3.75	M. N. Ure	S. Mills, I. C. Mackillop, M. B. Foster	J. A. Foreman	Blue Star Line Ltd.
Southland Star	13.11.73	D. M. McPhail			Anchor Line Ltd.
Star Assyria	13.11.74	M. J. Martin		T. O'Neill	R. S. Dalgliesh Ltd.
Star Blackford	11.2.74	N. Storey	K. O'Kelly, H. Bond, N. O. Morrice	J. Briggs	Houlder Bros. & Co. Ltd.
Star Bulford	8.1.75	J. Hinchliffe	R. B. Middleton, D. Hassan, C. Slater	D. J. Taylor	Bowring S.S. Co. Ltd.
Stephano ..	16.8.74	E. V. Piper	A. Lewis, R. Wall, A. Hollidge	J. T. Meskill	I. & J. Denholm Ltd.
Strirling Bridge	13.1.75	C. P. W. White	H. G. Holmes, E. Taylor, J. E. Tirl	R. Milner	P. & O. S.N. Co.
Strithadie ..	17.2.75	M. Robinson	C. E. A. Barnes, C. S. Langford, I. Peel	E. Marks	P. & O. S.N. Co.
Strathaird ..	2.8.73	R. L. Cain	D. C. Stonehouse, J. G. Jackson, B. B. Curen	S. L. Ludgate	P. & O. S.N. Co.
Strathangus ..	9.12.74	L. Seddon	A. R. Christie, C. A. Baker, D. K. Karonjo	M. J. A. McKenny	P. & O. S.N. Co.
Strathanna ..	6.3.75	R. C. Lister	M. E. McGaham, R. G. Tull	Ping-Hong Wong	P. & O. S.N. Co.
Strathappin ..	20.2.75	G. L. Andrews	A. W. Askew, P. Dyer, P. R. Owen	G. Hetherington	P. & O. S.N. Co.
Stratharale ..	15.10.74	H. C. Walker	R. Hayshe, H. R. P. Baker, E. R. Bruce	R. Massingham	P. & O. S.N. Co.
Stratharros ..	28.10.74	J. J. Woodmass	P. J. Ewen, R. McWilliams, R. W. Gordon		P. & O. S.N. Co.
Strathasick ..	12.2.75	J. Johnston	D. S. Comley, T. J. Fox, R. Gessow		P. & O. S.N. Co.
Strathassynt ..	12.3.75	I. M. Adie	M. P. Bloodel, A. A. Noor, D. Goodwin		P. & O. S.N. Co.
Strathathlow ..	23.1.75	A. M. J. Jenkins	T. Wilkinson, J. G. S. Manicham, J. Appadurai		P. & O. S.N. Co.
Strathavoch ..	13.11.74	M. H. Wilson	N. R. Barnes, D. J. Austen ..	T. C. Baldwin	P. & O. S.N. Co.
Strathbrara ..	31.12.74	J. Chedzelski	E. Madden, P. Watson, R. A. Gammit	Lanshing Yan	P. & O. S.N. Co.
Strathconon ..	3.2.75	C. E. Willoughby	R. A. Critchlow, T. T. Veitch, I. L. Roberts	J. C. Thompson	P. & O. S.N. Co.
Strathdixon ..		H. E. Wrightson	N. J. McGovern, C. F. Balaporia, L. Johnson, M. A. Hill	E. Marks	P. & O. S.N. Co.
Strathlondon ..	20.2.75	W. Howcroft	M. A. Hamby, P. Davies, T. J. Shone	A. A. C. Fraser	P. & O. S.N. Co.
Strathmauer ..	26.3.75	G. F. N. M. Swain	M. M. Adams, H. Jhangiani	J. H. Hutchinson	P. & O. S.N. Co.
Strathneuton ..	12.3.75	B. G. McKerrill	J. R. Mace, D. Scott, M. B. Wdowikowski	D. Bailey	P. & O. S.N. Co.
Strathruim ..	13.12.74	D. T. Hughes	K. D. Yeomans, D. Peck, D. Kirkham	A. R. Kingdom	P. & O. S.N. Co.
Strathreviot ..	30.10.74	J. T. Jenkins	G. A. Bisacre, W. Brothers, P. Robson	R. Richardson	Sugar Line Ltd.
Sugar Carrier ..	27.3.75	R. M. Pitts	J. C. Dixon, W. H. Walker, S. Hill	M. L. Phillips	Sugar Line Ltd.
Sugar Crystal ..	27.1.75	D. Patrickson	T. L. J. Evans, J. Ford, A. R. Best	K. Darwen	Sugar Line Ltd.
Sugar Exporter ..	9.5.74	C. N. L. Davies	S. C. Dixon, J. Allen, D. Sherwin	A. Roberts	Sugar Line Ltd.
Sugar Importer ..	22.7.74	B. E. Evans	P. Crowe, J. Allen, W. Rebello	W. Parker	Sugar Line Ltd.
Sugar Producer ..	19.2.75	R. M. Pitts	R. E. Shore, E. F. Boyd, W. Brothers	T. Fortune	Sugar Line Ltd.
Sugar Refiner ..	13.3.75	P. Sutcliffe	P. Leech, G. Ansell, T. Smith	G. Cracknell	Sugar Line Ltd.
Sugar Trader ..		A. F. Lunn	S. W. Hill, O. T. Stephenson, M. I. J. Carroll	P. J. Kilbane	Sugar Line Ltd.
Sugar Transporter ..	26.11.74	W. G. Hunt	A. MacIntyre, P. J. Dominey, C. L. Pickles		F. T. Everard & Sons Ltd.
Summit ..	13.11.74	P. L. Whitehouse	B. Hollywood, J. Sargeant, W. Gittens		F. T. Everard & Sons Ltd.
Supremity ..	17.3.75	D. J. Harrison	D. T. Simpson, J. Ross, D. E. Turrell	M. Hill	P. & O. S.N. Co.
Sussex ..	14.2.75	P. B. Robier		B. Young	Bowring S.S. Co. Ltd.
Sydney Bridge ..	28.8.74	S. T. S. Household	I. F. Stewart, R. Young, R. Tull	M. J. Ellis	P. & O. S.N. Co.
Tabarstan ..	12.9.74	W. D. Jones	G. L. Bent, S. P. Gorford ..	D. C. Short	Sir Wm. Reardon Smith & Sons Ltd.
Tacoma City ..	13.1.75	W. Ashton	J. S. Pirkis, D. Iveson, D. Teal	F. P. Lawton	T. & J. Harrison Ltd.
Tactician ..	8.4.74				

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Tamworth</i> ..	14.2.75	N. Storey	J. A. Denton, P. M. C. Morris, W. Raisbeck	P. Higgins	R. S. Dalgliesh Ltd.
<i>Tantania</i> ..	28.10.74	I. I. Laing	J. T. H. Cartwright, C. R. Goodwin, D. F. Baker	L. M. Sells	Ocean Transport & Trading Ltd.
<i>Tamara Star</i> ..	9.12.74	E. J. Jones	J. S. Gee, P. Tann	..	Blue Star Line Ltd.
<i>Taupo</i> ..	6.3.75	D. Blackman	N. R. G. Robinson, R. Pearce, P. J. Garman	M. J. Ellis	P. & O. S.N. Co.
<i>Teinde Clipper</i> ..	..	I. J. Tait	—, Hicks, —, Garnham, —, Thompson	..	Whitco Marine Services Ltd.
<i>Tekoa</i> ..	31.12.74	J. D. Hellings	A. J. L. Evans, P. R. Simpson, M. J. Fletcher	N. W. Harrison	P. & O. S.N. Co.
<i>Temple Arch</i> ..	29.8.73	A. L. Davie	R. D. Matthews, J. K. McKellar, A. Logan	D. Poole	Whitco Marine Services Ltd.
<i>Temple Bar</i> ..	7.12.73	A. M. Fraser	H. Aitchinson, J. H. Jenkinson, I. J. Waters	G. Walker	Scottish Ship Management Ltd.
<i>Textiobank</i> ..	9.5.74	H. I. Taylor	A. Watson, S. Ramage, R. K. Pitt	C. Lockwood	Bank Line Ltd.
<i>Texaco Brussels</i> ..	25.10.73	G. M. Smith	M. J. Perry	..	Texaco Overseas Tankship (U.K.) Ltd.
<i>Texaco Durham</i> ..	25.11.74	J. Blundell	..	J. P. D. Fitzgerald	Texaco Overseas Tankship (U.K.) Ltd.
<i>Texaco Gloucester</i> ..	17.8.73	P. H. Morgan	A. J. C. Metcalfe, C. M. Moloney, R. A. R. Baddaloo	..	Texaco Overseas Tankship (U.K.) Ltd.
<i>Texaco Saigon</i> ..	9.7.68	R. G. A. Barnea	R. A. Russell, J. Campbell, R. R. Brooks	G. Cockburn	Texaco Overseas Tankship (U.K.) Ltd.
<i>Timaru Star</i> ..	17.7.74	G. Stubblings	R. Hampshire, P. M. Stacey, W. F. Hughes	G. L. Ball	Blue Star Line Ltd.
<i>Titan</i> ..	27.1.75	J. K. Winn	W. B. Westwood, W. Williams, P. Voorthuis	I. P. R. Binding	Ocean Transport & Trading Ltd.
<i>Tokyo Bay</i> ..	27.2.75	J. Banna	P. Johnson, M. J. Godbehear, C. Cunningham	K. Bent	Ocean Transport & Trading Ltd.
<i>Tongariro</i> ..	28.11.74	D. E. Moran	C. T. Tilley, K. N. Metcalfe, G. Weaver	M. Reid	P. & O. S.N. Co.
<i>Townsville Star</i> ..	20.2.75	J. G. Reeve	D. I. McKay, R. D. James, A. Geels, R. C. Ray	F. Huggett	Blue Star Line Ltd.
<i>Trader</i> ..	6.12.74	B. Crook	W. M. McDermott, J. H. Brierley, M. J. Owen	K. Alexander	T. & J. Harrison Ltd.
<i>Trebartha</i> ..	11.10.74	J. W. Cole	E. T. Kinaid, J. Appadurai, M. Wdowakowski	D. A. Keohane	P. & O. S.N. Co.
<i>Trentwood</i> ..	21.2.75	V. Thiede	E. Wells, A. G. Brown, G. Furluga	D. Handorff	International Ore Carriers Ltd.
<i>Trevidden</i> ..	25.2.75	E. T. Rowland	A. W. Christie, P. L. Phillips, A. K. Rashid	M. C. Cumming	P. & O. S.N. Co.
<i>Troll Park</i> ..	31.10.74	A. Blackie	I. W. Bird, D. A. Foster, C. F. Campbell	D. A. H. Vowles	P. & O. S.N. Co.
<i>Turakina</i> ..	11.11.74	J. F. Milner	A. Macleod, J. D. Gray, C. S. Burt	R. Harris	J. & J. Denholm Ltd.
<i>Uganda</i> ..	2.5.74	J. Young	K. J. A. Brook-Hart, N. Lampe	J. F. Mennell	P. & O. S.N. Co.
<i>Ulster Star</i> ..	14.2.75	G. Easton	B. George, M. Power, J. Mackereth	D. Taylor	Blue Star Line Ltd.
<i>Vancouver City</i> ..	2.5.74	G. F. Ellerby	H. H. Gale, J. S. Pearall, D. Hotchkiss	A. S. Coward	Sir Wm. Reardon Smith & Sons Ltd.
<i>Vancouver Forest</i> ..	19.3.75	J. F. Houghton	W. D. Beattie, J. M. Craig, T. R. J. Popplewell	W. Richards	J. & J. Denholm Ltd.
<i>Vancouver Island</i> ..	2.10.74	R. M. Paton	M. B. Tjani, S. C. Aikman, W. T. Wood	R. W. McInnes	J. & J. Denholm Ltd.
<i>Vancouver Trader</i> ..	12.9.74	R. Frater	R. S. Nassor	T. I. Bousfield	J. & J. Denholm Ltd.
<i>Varda</i> ..	20.9.73	G. Carmichael	K. Gally, J. Henderson, D. J. Smith	D. Wilkinson	Haverton Shipping Ltd.
<i>Venasia</i> ..	28.11.74	A. L. Dales	A. C. MacKenzie, C. Woodnutt, D. Travis	R. T. Graham	Shell Tankers (U.K.) Ltd.
<i>Victoire</i> ..	15.10.74	I. A. McCulloch	B. T. Hernandez, J. Morrison, I. P. T. Mathias	R. Cunningham	Maroleon Bros. Ltd.
<i>Victoria City</i> ..	11.11.74	R. K. Stuart	K. D. Ricketts	B. B. Everett	Sir Wm. Reardon Smith & Sons Ltd.
<i>Viking Vigilant</i> ..	19.2.75	P. H. King	W. G. Kieley, P. W. F. Moran, R. Abbott	J. G. Boyle	Vigilant Marine Ltd.
<i>Volvatella</i> ..	31.12.74	A. W. Aitken	R. I. Taylor, N. H. Malpass	..	Shell Tankers (U.K.) Ltd.
<i>Wareickshire</i> ..	25.9.73	M. J. Horn	A. A. Field, T. Hazell, K. B. Whitting	C. J. Burt	Bibby Line Ltd.
<i>Welsh City</i> ..	11.3.75	J. J. Kalnins	L. Eyang, T. Cook, M. Valeran	J. Stockdale	Sir Wm. Reardon Smith & Sons Ltd.
<i>Welsh Herald</i> ..	15.10.74	M. L. Thomas	D. P. Hicks, D. Bowman, P. R. H. Kenyon	G. Fisher	Welsh Ore Carriers Ltd.
<i>Wetbury</i> ..	28.10.74	J. C. Woodbridge	D. C. Winter, M. J. Ball, L. Heskeith	M. C. Hill	P. & O. S.N. Co.
<i>Westmorland</i> ..	1.10.74	J. D. Guyler	R. Mill-Irving, D. K. Dickson, B. H. Henderson	..	Dept. of Agriculture & Fisheries for Scotland
<i>Westra</i> ..	..	D. Corse	..	..	..

<i>Whitethorn</i> ..	..	..	..	A. L. Anthony, W. Adair ..	..	..	R. Rea ..	..	S. William Coe & Co. Ltd.
<i>Wild Auk</i> ..	..	..	..	N. J. Benson, D. E. Turrall, T. E. McLaren ..	..	..	D. L. Byrne ..	..	P. & O. S.N. Co.
<i>Wild Avocet</i> ..	..	..	..	A. Wymark, S. Chamberlain, A. J. Hughes ..	..	..	C. Gamwell ..	..	P. & O. S.N. Co.
<i>Wild Cormorant</i> ..	..	..	..	K. McGrath, M. B. Harvey, C. Marryat ..	..	..	J. Malinowski ..	..	P. & O. S.N. Co.
<i>Wild Curlew</i> ..	..	..	..	D. R. K. Vickers, W. D. Phinister, D. Dorman ..	..	..	J. F. A. Sharples ..	..	P. & O. S.N. Co.
<i>Wild Fulmar</i> ..	..	..	..	J. Barnett, S. Lintott, N. W. Stephenson ..	..	..	..	..	P. & O. S.N. Co.
<i>Willowbank</i> ..	..	..	..	C. M. Campbell, S. Gleadhill, M. J. A. Richens ..	..	..	D. Power ..	..	Bank Line Ltd.
<i>Wimpey Sealab</i> ..	..	..	..	M. G. Robinson, G. W. Hargreaves, A. Foster ..	..	..	R. M. Friswell ..	..	Wimpey Marine Ltd.
<i>Windsor Castle</i> ..	..	..	..	M. R. Line, R. Wadham, F. Yeulett ..	..	..	S. Harden ..	..	Union-Castle Mail S.S. Co. Ltd.
<i>Wooting</i> ..	..	..	..	Siu Wai Lum, R. P. Fairbrother, J. D. S. F. Bird ..	..	..	Tsang Kau ..	..	China Navigation Co. Ltd.
<i>Worcestershire</i> ..	..	..	..	D. W. McCluskey, R. I. Taylor, R. F. Milton ..	..	..	J. D. Walsh ..	..	Bibby Line Ltd.
<i>Zaphon</i> ..	..	..	..	A. Smith, K. M. Whiting, P. Jeffery ..	..	..	L. Edgecumbe ..	..	Shell Tankers (U.K.) Ltd.
<i>Zealandic</i> ..	..	..	..	B. Hickey, P. W. Garlick, J. W. Salter ..	..	..	T. Chambers ..	..	Shaw Savill & Albion Co. Ltd.
16.9.74	..	..	..	H. S. Cully ..	..	..	..	..	..
24.6.74	..	..	..	D. V. Harradine ..	..	..	..	..	..
19.2.75	..	..	..	L. E. Quigley ..	..	..	..	..	..
13.12.74	..	..	..	J. S. Laidlaw ..	..	..	..	..	..
7.3.75	..	..	..	P. Lay ..	..	..	..	..	..
*	..	..	..	M. J. Strubbington ..	..	..	..	..	..
16.8.74	..	..	..	R. J. Bridger ..	..	..	..	..	..
27.1.75	..	..	..	A. J. Stewart ..	..	..	..	..	..
3.2.75	..	..	..	H. Charnley ..	..	..	..	..	..
12.8.74	..	..	..	A. L. Carter ..	..	..	..	..	..
5.8.74	..	..	..	J. R. Woodfield ..	..	..	..	..	..
10.2.75	..	..	..	H. I. Jones ..	..	..	..	..	..
13.1.75	..	..	..	S. C. Carr ..	..	..	..	..	..

Supplementary Ships

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Albrit</i> ..	•	R. C. Hawkes	R. Pitt		Jeppesen Heaton Ltd.
<i>Apollo</i> ..	25.11.74	G. V. Barnes	W. R. Kays, E. Foley, R. D. Clarke	A. Lafond	Bristol S.N. Co. Ltd.
<i>Baltic Star</i> ..	7.8.74	M. Delacy	D. M. Healey, C. C. Starr, J. H. Telfer	J. Masterman	United Baltic Co. Ltd.
<i>Baltic Vanguard</i> ..	21.8.74	J. C. Collins	W. Chippendale, C. Springthorpe, D. B. Izatt	P. L. Mason	United Baltic Co. Ltd.
<i>British Fern</i> ..	19.11.73	J. W. Bruce	P. J. Wild, I. D. Walker, E. C. Howes	R. Lowe	B.P. Tanker Co. Ltd.
<i>British Kestrel</i> ..	25.9.74	R. Towell	M. C. Roberts, N. W. Shepherd, I. McL. Storie	D. E. Dale	B.P. Tanker Co. Ltd.
<i>British Mallard</i> ..	28.8.74	D. A. G. Lloyd	W. Hopkins, J. R. Binnie, J. R. Weglarz	N. D. L. Le Gresley	B.P. Tanker Co. Ltd.
<i>British Robin</i> ..	11.9.74	J. Barclay	R. Lees, J. P. Q. Waller, K. Young	G. E. Shearer	Ellerman Lines Ltd.
<i>City of Ankara</i> ..	7.3.74	W. White	G. E. Shearer, T. Fugill, G. Tsanos	J. Noonan	Ellerman Lines Ltd.
<i>City of Athens</i> ..	31.1.75	C. Everingham	J. A. Fraser, D. Walker, M. S. Bean	B. Holdsworth	Ellerman Lines Ltd.
<i>City of Delhi</i> ..	21.5.73	K. G. MacLean	J. Bailey, R. Hornshaw, A. Lavis-Jones		Oil Search Marine Management
<i>City of Famagusta</i> ..	26.7.74	A. S. Matheson	H. Skelton		Bristol S.N. Co. Ltd.
<i>Decca Surveyor</i> ..	•	T. Sheehan	I. R. Boulton, W. Ritchie		Esso Petroleum Co. Ltd.
<i>Echo</i> ..	28.11.74	I. L. Jenkins	R. W. Gott, R. N. Gardener	P. J. Griffin	Palm Line Ltd.
<i>Esso Lancashire</i> ..	10.10.72	I. Baskerville	J. Stetch, W. Forsyth, J. McCardill	J. W. Barry	P. & O. S.N. Co.
<i>Ilorin Palm</i> ..	26.10.73	E. Brawn	C. A. Yates, R. Kapoor, D. James	E. Chelchowitz	Newington Trawlers Ltd.
<i>Jelunga</i> ..	5.12.74	R. A. G. Windle			St. Andrew's Steam Fishing Co. Ltd.
<i>Joseph Conrad</i> ..	17.3.75	K. Hinchcliffe			
<i>Lady Parkes</i> ..	29.7.74	P. E. Chaven			
<i>Lord Nelson</i> ..	10.1.75	N. E. Longthorp		G. W. Taylor	Hellyer Bros. Ltd.
<i>Marbella</i> ..	30.4.74	L. Feuster			J. Marr & Son Ltd.
<i>Marella</i> ..	13.3.60	S. Christy		J. Hind	J. Marr & Son Ltd.
<i>Methane Princess</i> ..	16.7.73	R. S. Murchie	J. West, S. Cutler, S. W. Pigott	R. Elliot	Shell Tankers (U.K.) Ltd.
<i>Methane Progress</i> ..	15.1.75	B. L. Oliver	T. A. Platt, T. D. McArthur, D. N. Pritchard	A. H. G. Wall	Shell Tankers (U.K.) Ltd.
<i>Mobil Acme</i> ..	23.5.73	R. T. Watson	A. R. Evans, T. R. Parish, J. A. Eldred	J. H. Jones	Mobil Shipping Co. Ltd.
<i>Mobil Endurance</i> ..	2.5.74	R. I. Philip	L. M. Wright, M. Larkin	P. V. Cagney	Mobil Shipping Co. Ltd.
<i>Mobil Energy</i> ..	23.7.73	R. D. Stevenson	J. B. McGrath, G. Wrigley	A. B. Crossland	Mobil Shipping Co. Ltd.
<i>Mobil Pegasus</i> ..	16.5.73	J. Millar	S. B. Barr	R. J. Thompson	Mobil Shipping Co. Ltd.
<i>Northern Reward</i> ..	4.4.73	W. Harris	G. J. S. Ives, M. Kirk	S. B. Barr	Northern Trawlers Ltd.
<i>Oil Supplier</i> ..	•	C. Cunningham	J. P. Warren, R. Upsdell, G. C. Hatcher	P. A. Metra	Ocean Inchcape Ltd.
<i>Orchidea</i> ..	18.10.73	J. F. Adams	G. R. Smith	G. R. Smith	Whitco Marine Services Ltd.
<i>Primella</i> ..	29.12.72	D. Atkinson	J. E. Thornton		J. Marr & Son Ltd.
<i>Researcher</i> ..	•	J. W. Dunn	Chan Chi Yuen	Chan Chi Yuen	Guardline Ltd.
<i>Ros Implacable</i> ..	31.12.71	G. Smith	W. Allison		Ross Trawlers Ltd.
<i>Ros Sirius</i> ..	•	L. H. Wigham	J. F. Barkley, N. K. MacDonald, A. E. Scales		Hudson Bros. Trawlers Ltd.
<i>Roybank</i> ..	11.2.74	A. Iggleeden	H. G. Pask	J. T. Clare	Bank Line Ltd.
<i>St. Benedict</i> ..	15.10.74	I. Nelson	R. T. Murphy	C. Watkins	T. Hamling & Co. Ltd.
<i>St. Giles</i> ..	16.9.74	A. T. Blenkin	K. C. Stone, E. Robinson	H. G. Pask	T. Hamling & Co. Ltd.
<i>St. Jason</i> ..	23.7.73	E. J. Johnson	R. H. Jenkins, A. Kruum, R. Rutherford	R. C. Stone	T. Hamling & Co. Ltd.
<i>St. Jasper</i> ..	27.1.75	T. G. Goldie	T. Brunagh	J. Fudge	W. A. Souther & Co. Ltd.
<i>Scottish Wata</i> ..	27.9.74	H. Roberts			F. T. Everard & Sons Ltd.
<i>Serenity</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
B. Ball	B. Rowbotham	B. A. Parkes
J. W. E. Boyle	C. Bird	Boyd Line Ltd.
P. Grayburn	C. Watkins	T. Hamling & Co. Ltd.
A. Jagger	M. W. Stather	T. Hamling & Co. Ltd.
J. N. Kerr	R. Spall	British United Trawlers Ltd.
R. Pepper	P. R. Hickson	Northern Trawlers Ltd.
D. Platten	M. W. Stather	T. Hamling & Co. Ltd.
J. Stevens	B. Rowbotham	B. A. Parkes
T. Thresh	C. Bird	Boyd Line Ltd.

Light-vessels

NAME OF VESSEL	MASTERS
<i>Dousing</i>	R. Halfnight, A. Richards
<i>East Goodwin</i>	F. J. Shilling, B. E. Nobes
<i>Falls</i>	A. H. Robinson, W. Semple
<i>Gallopier</i>	H. R. Barnes, E. L. Jaeger
<i>Humber</i>	F. W. Grice, S. F. Goose
<i>Newarp</i>	G. A. Harris, L. R. Long
<i>North Carr</i>	J. Leask, T. H. Henderson
<i>Royal Sovereign</i> (Lt. Tower)	A. T. Whiston, W. F. Fagg
<i>St. Gowan</i>	M. J. Shearer, S. R. Woolnough
<i>Seven Stones</i>	A. W. Allum, T. G. Northcott
<i>Shambles</i>	H. Price, J. Rudd
<i>Shipwash</i>	W. F. Dalby, R. Cadman
<i>Smith's Knoll</i>	F. Harrison, B. H. Holmes
<i>South Rock</i>	D. Hawkins, S. E. Griffin
<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	MASTER	OWNER/MANAGER
<i>Ashington</i>	A. M. Arkley	Stephenson Clarke Shipping Ltd.
<i>Avalon</i>	W. Bramhill	British Rail
<i>Bardic Ferry</i>	C. K. Hughey	Atlantic S.N. Co. Ltd.
<i>Brenda</i>	J. A. Henderson	Dept. of Agriculture & Fisheries for Scotland
<i>Brian Boroime</i>	C. B. Powell	British Rail
<i>Caesarea</i>	J. D. MacMillan	British Rail
<i>Cambria</i>	G. Davey	British Rail
<i>Cerdic Ferry</i>	A. D. Young	Atlantic S.N. Co. Ltd.
<i>Clansman</i>	D. M. Martin	David MacBrayne Ltd.
<i>Claymore</i>	A. Campbell	David MacBrayne Ltd.
<i>Columba</i>	A. C. Free	David MacBrayne Ltd.
<i>Corbank</i>	J. Green	Ocean Transport & Trading Ltd.
<i>Doric Ferry</i>	R. Hockings	Atlantic S.N. Co. Ltd.
<i>Dorset Coast</i>	J. Spence	P. & O. Short Sea Shipping Ltd.
<i>Dragon</i>	F. E. G. Renshaw	Southern Ferries Ltd.
<i>Duke of Argyll</i>	J. D. Nash	British Rail
<i>Duke of Lancaster</i>	D. A. Ponting, M.B.E.	British Rail
<i>Duke of Rothesay</i>	S. Gardner	British Rail
<i>Esso Mersey</i>	P. Mattocks	Esso Petroleum Co. Ltd.
<i>Ferryhill II</i>	J. G. Innes	Aberdeen Coal & Shipping Co. Ltd.
<i>Fingal</i>	F. K. Davidson	Northern Lighthouse Board
<i>Frampton dyke</i>	H. S. Platten	Klondyke Shipping Co. Ltd.
<i>Frendo Star</i>	G. A. Paton	Frendo (London) 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>Hibernia</i>	J. Peters	British Rail
<i>Iganess Bay</i>	W. G. Dennison	Elwick Bay Shipping Co. Ltd.
<i>Ionic Ferry</i>	W. Close	Atlantic S.N. Co. Ltd.
<i>Lairdsfox</i>	K. Sudgeon	Belfast S.S. Co. Ltd.
<i>Loch Carron</i>	J. McKinnon	David MacBrayne Ltd.
<i>Malling</i>	N. Munger	Stephenson Clark Shipping Ltd.
<i>Moyle</i>	W. Davey	Shamrock Shipping Co. Ltd.
<i>Navigator</i>	J. N. Cannock	Decca Navigator Co. Ltd.
<i>Penelope Everard</i>	E. Lear	F. T. Everard Ltd.
<i>Pharos</i>	M. Fraser	Northern Lighthouse Board
<i>Pointer</i>	W. B. Browne	Coast Lines Ltd.
<i>Pole Star</i>	G. Reid	Northern Lighthouse Board
<i>Portelet</i>	J. D. McFaul	Onesimus Dorey Ltd.
<i>Rhondri Mawr</i>	I. Pritchard	British Rail
<i>Rosemarkie</i>	S. R. Gurton	W. N. Lindsay & Co. Ltd.
<i>St. Clair</i>	D. C. Gray	North of Scotland Shipping Co. Ltd.
<i>St. Edmund</i>	M. Gregor	British Rail
<i>St. George</i>	A. C. P. Brading	British Rail
<i>Sarnia</i>	C. Barker	British Rail
<i>Slieve Donard</i>	R. Crane	British Rail
<i>Sussexbrook</i>	A. Cooper	County Ships Ltd.
<i>Ulster Queen</i>	P. Lynch	Belfast S.S. Co. Ltd.
<i>William J. Everard</i>	A. Whurr	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 1.2.75)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>Abel Tasman</i>	Abel Tasman Shipping Co. Pty. Ltd.
<i>Al-Kuwait</i>	Kuwait S.S. Co. Ltd.
<i>Arafura</i>	Overseas Containers Australia Pty. Ltd.
<i>Ariake</i>	Overseas Containers Australia Pty. Ltd.
<i>Ariana</i>	Overseas Containers Australia Pty. Ltd.
<i>Australian Endeavour</i>	Australian National Line
<i>Australian Enterprise</i>	Australian National Line
<i>Australian Exporter</i>	Australian National Line
<i>Baron Dunmore</i>	Scottish Ship Management Ltd.
<i>Baron MacLay</i>	Scottish Ship Management Ltd.
<i>Beroona</i>	Western Australian State Shipping Service
<i>Bogong</i>	Associated S.S. Pty. Ltd.
<i>Boogalla</i>	Western Australian State Shipping Service
<i>B.P. Endeavour</i>	B.P. Tankers Pty. Ltd.
<i>B.P. Enterprise</i>	B.P. Tankers Pty. Ltd.
<i>Cape Don</i>	Dept. of Shipping & Transport, Australia
<i>Cape Moreton</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>	Blue Funnel Line Ltd.
<i>Chakdina</i>	P. & O. Lines of Australia
<i>Chitral</i>	P. & O. Lines of Australia
<i>Clutha Capricorn</i>	Clutha Development Pty. Ltd.
<i>Clutha Oceanic</i>	Clutha Development Pty. Ltd.
<i>Corabank</i>	Bank Line Ltd.
<i>Coral Chief</i>	New Guinea—Australia Line Pty. Ltd.
<i>Eigamoitya</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 Petroleum (Australia)
<i>Forresbank</i>	Bank Line Ltd.
<i>Forthbank</i>	Bank Line Ltd.
<i>Gjertrud Bakke</i>	Knutsen Line
<i>Guavacore</i>	Maritime Fruit Carriers Pty. Ltd.
<i>Harry Messel</i>	University of New South Wales
<i>Iron Arnhem</i>	Broken Hill Pty. Co. Ltd.
<i>Iron Cavalier</i>	Broken Hill Pty. Co. Ltd.
<i>Iron Dampier</i>	Broken Hill Pty. Co. Ltd.
<i>Iron Endeavour</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>Iron York</i>	Broken Hill Pty. Co. Ltd.
<i>Island Chief</i>	New Guinea—Australia Line Pty. Ltd.
<i>Ivybank</i>	Bank Line Ltd.
<i>John Burke</i>	John Burke Pty. Ltd.
<i>Kanimbla</i>	Union Bulkships Pty. Ltd.
<i>Koorunga</i>	Union Bulkships Pty. Ltd.
<i>Lalandia</i>	Scanaustral East Asiatic Shipping Co.
<i>Malaysia</i>	Australia 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>Meadowbank</i>	Bank Line Ltd.
<i>Merkara</i>	P. & O. Lines of Australia
<i>Milos</i>	Australian West Pacific Line
<i>Morvada</i>	P. & O. Lines of Australia
<i>Mulbera</i>	P. & O. Lines of Australia
<i>Mundoora</i>	Union Bulkships Pty. Ltd.
<i>New Guinea Chief</i>	New Guinea—Australia Line Pty. Ltd.
<i>Nimos</i>	Containers Pacific Express Line
<i>Nyanda</i>	Western Australian State Shipping Service
<i>Papuan Chief</i>	New Guinea—Australia Line Pty. Ltd.
<i>Recorder</i>	Cable & Wireless Ltd.
<i>Rhexenor</i>	Blue Funnel Line Ltd.
<i>Rosie D</i>	Nauru Pacific Shipping Line
<i>Sprucebank</i>	Bank Line Ltd.
<i>Stentor</i>	Blue Funnel Line Ltd.
<i>Surenes</i>	Jebsen (U.K.) Ltd.
<i>Tauloto II</i>	Pacific Navigation Co. Ltd.
<i>Temple Hall</i>	British Phosphate Commissioners

Australia (contd.)

NAME OF VESSEL						OWNER/MANAGER
<i>Thorsorient</i>	..	..	..	..	..	Norse Orient Line
<i>Triadic</i>	..	..	..	..	..	British Phosphate Commissioners
<i>Wambiri</i>	..	..	..	..	..	Western Australian State Shipping Service
<i>Weirbank</i>	..	..	..	..	..	Bank Line Ltd.
<i>Wongala</i>	..	..	..	..	..	Tucker Shipping Pty. Ltd.
Supplementary Ship:						
<i>Bass Trader</i>	..	..	..	..	..	Australian National Line

CANADA (Information dated 31.3.75)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>Achatina</i>	Shell Tankers (U.K.) Ltd.
<i>Achilles</i>	Ocean Fleets Ltd.
<i>Agamemnon</i>	Ocean Transport & Trading Ltd.
<i>Alert</i>	Government of Canada
<i>Allunga</i>	Australian National Line
<i>Antenor</i>	Ocean Transport & Trading Ltd.
<i>Arcadia</i>	P. & O. S.N. Co.
<i>A. T. Cameron</i>	Government of Canada
<i>Baffin</i>	Government of Canada
<i>Bernes</i>	Kristian-Jepsen Ltd.
<i>Bluenose</i>	Canadian National Railways
<i>Camsell</i>	Government of Canada
<i>Canberra</i>	P. & O. S.N. Co.
<i>Cape Grenville</i>	Lyle Shipping Co. Ltd.
<i>Chebucto</i>	Government of Canada
<i>Cornish City</i>	Sir Wm. Reardon Smith & Sons Ltd.
<i>Cygnus</i>	Government of Canada
<i>Dawson</i>	Government of Canada
<i>d'Iberville</i>	Government of Canada
<i>Dilkara</i>	Empire Shipping Co. Ltd.
<i>Dumurra</i>	Ocean Transport & Trading Ltd.
<i>Frobisher</i>	Federal Commerce & Navigation Co.
<i>G. B. Reed</i>	Government of Canada
<i>Gulf Canada</i>	Gulf Oil Canada Ltd.
<i>H 1060</i>	Kent Line Ltd.
<i>H 1070</i>	Kent Line Ltd.
<i>Harfleet</i>	J. & C. Harrison Ltd.
<i>Hector</i>	Ocean Transport & Trading Ltd.
<i>H. R. MacMillan</i>	Canadian Pacific S.S. Ltd.
<i>Hudson</i>	Government of Canada
<i>Imperial Acadia</i>	Imperial Oil Ltd.
<i>Imperial Bedford</i>	Imperial Oil Ltd.
<i>Irving Glen</i>	Irving Oil Ltd.
<i>Irving Stream</i>	Irving Oil Ltd.
<i>Ixia</i>	Stag Line Ltd.
<i>J. E. Bernier</i>	Government of Canada
<i>John A. Macdonald</i>	Government of Canada
<i>John Cabot</i>	Government of Canada
<i>J. V. Clyne</i>	Canadian Pacific S.S. Ltd.
<i>Kakawi</i>	Transpolair Ltd.
<i>Labrador</i>	Government of Canada
<i>Limnos</i>	Government of Canada
<i>Maxwell</i>	Government of Canada
<i>Nahidik</i>	Government of Canada
<i>N. B. McLean</i>	Government of Canada
<i>Norman McLeod Rogers</i>	Government of Canada
<i>Northern Shell</i>	Shell Canada Ltd.
<i>N. R. Crump</i>	McMillan & Clyne Ltd.
<i>Oriana</i>	P. & O. S.N. Co.
<i>Pacific Logger</i>	Canadian Pacific S.S. Ltd.
<i>Ponza</i>	Cia Maritima Clavelina
<i>Port Dauphine</i>	Government of Canada
<i>Princess of Acadia</i>	Canadian Pacific S.S. Ltd.
<i>Quebec</i>	Messabec Ltd.
<i>Queen of Prince Rupert</i>	British Columbia Ferry Authority
<i>Sedco H</i>	Shell Canada Ltd.
<i>Sedco J</i>	Mobil Oil Canada Ltd.
<i>Silvercove</i>	Silver Line Ltd.
<i>Sir Humphrey Gilbert</i>	Government of Canada
<i>Sir William Alexander</i>	Government of Canada
<i>Sun Princess</i>	P. & O. S.N. Co.
<i>T. Akasaka</i>	Canadian Pacific S.S. Ltd.
<i>Temple Inn</i>	Scottish Ship Management Ltd.
<i>Thomas Carleton</i>	Government of Canada
<i>Thorshope</i>	Thor Dahl A/S
<i>Thorsisle</i>	Thor Dahl A/S
<i>Thorsriver</i>	Thor Dahl A/S
<i>Thorsstream</i>	Thor Dahl A/S
<i>Thorswave</i>	Thor Dahl A/S
<i>Ungava Transport</i>	Hall Corp. Shipping Ltd.
<i>W. C. Van Horne</i>	Canadian Pacific S.S. Ltd.
<i>Wild Famingo</i>	P. & O. S.N. Co.
Supplementary Ship:	
<i>Emerillon</i>	Shell Canada Ltd.

Auxiliary Ships:

Canada has 68 ocean-going Auxiliary Ships and 66 Auxiliary Ships operating on the Great Lakes.

NEW ZEALAND (Information dated 1.3.75)

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>Athel Viscount</i>	Union S.S. Co. N.Z. Ltd.
<i>Bulknes</i>	Shipping Corporation of N.Z.
<i>Coastal Trader</i>	Shipping Corporation of N.Z.
<i>Erne</i>	Union S.S. Co. N.Z. Ltd.
<i>Fijian Swift</i>	Reef Shipping Co.
<i>Hamilton</i>	Union S.S. Co. N.Z. Ltd.
<i>Haweia</i>	Union S.S. Co. N.Z. Ltd.
<i>Holmburn</i>	Union S.S. Co. N.Z. Ltd.
<i>Holmdale</i>	Union S.S. Co. N.Z. Ltd.
<i>James Cook</i>	N.Z. Government (Fisheries)
<i>John Wilson</i>	Tarakohe Shipping Co. Ltd.
<i>Kaituma</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>Koramui</i>	Union S.S. Co. N.Z. Ltd.
<i>La Bonita</i>	Reef Shipping Co.
<i>Ligar Bay</i>	Tarakohe Shipping Co. Ltd.
<i>Lorena</i>	Shipping Corporation of N.Z.
<i>Luhesand</i>	Omega Shipping Co.
<i>Mahemo</i>	Union S.S. Co. N.Z. Ltd.
<i>Marama</i>	Union S.S. Co. N.Z. Ltd.
<i>N.Z. Aorangi</i>	Shipping Corporation of N.Z.
<i>N.Z. Waitangi</i>	Shipping Corporation of N.Z.
<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>Parera</i>	Union S.S. Co. N.Z. Ltd.
<i>Pukeko</i>	Union S.S. Co. N.Z. Ltd.
<i>Rangatira</i>	Union S.S. Co. N.Z. Ltd.
<i>Storm</i>	Union S.S. Co. N.Z. Ltd.
<i>Tongaroa</i>	N.Z. Government (Oceanographic)
<i>Toa Moana</i>	Shipping Corporation of N.Z.
<i>Union Aotearoa</i>	Maritime Carriers Ltd.
<i>Union Auckland</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Australia</i>	Maritime Carriers Ltd.
<i>Union New Zealand</i>	Maritime Carriers Ltd.
<i>Union South Pacific</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Sydney</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Trans Tasman</i>	Maritime Carriers Ltd.
<i>Union Wellington</i>	Union S.S. Co. N.Z. Ltd.
<i>Valetta</i>	British Phosphate Commissioners
<i>Waikare</i>	Union S.S. Co. N.Z. Ltd.
<i>Wanaka</i>	Union S.S. Co. N.Z. Ltd.
<i>Wenchow</i>	China Navigation Co.
<i>Zaida</i>	P. & O. (N.Z.) Ltd.
<i>Zira</i>	P. & O. (N.Z.) Ltd.
Supplementary Ships:	
<i>Arahunga</i>	N.Z. Railways Department
<i>Aramoana</i>	N.Z. Railways Department
<i>Aramui</i>	N.Z. Railways Department
<i>Aratika</i>	N.Z. Railways Department
<i>Milburn Carrier</i>	N.Z. Cement Holdings Ltd.
<i>Teesta</i>	P. & O. (N.Z.) Ltd.
<i>Titoki</i>	Anchor Shipping & Foundry Co. Ltd.
<i>Totara</i>	Anchor Shipping & Foundry Co. Ltd.

Auxiliary Ships:

New Zealand also has a fleet of 5 Auxiliary Ships currently reporting.

HONG KONG (Information dated 13.3.75)

NAME OF VESSEL	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>American Main</i> ..	L. H. McLaughlin ..	W. R. Donaldson, L. Blanch, Cheung So ..	Fung Chun Che ..	United States Lines
<i>American Ming</i> ..	D. McNaughton-Smith ..	Chan Shui Hoi, C. C. Felix, Cheung Kwok Keung ..	Chan Hing Choi ..	United States Lines
<i>American Mist</i> ..	N. A. H. Funston ..	A. A. St. Claire, Wong Ho Sum, V. Faling ..	Yeung Kei Che ..	United States Lines
<i>Asian Exporter</i> ..	T. J. Wilson ..	A. D. Hotchkiss, D. B. Cooper, Lo Sai Shing ..	Mok Hon Ming ..	China Navigation Co. Ltd.
<i>Aska St. Mary</i> ..	D. A. C. Windle ..	E. Fawcett, L. Hodgson, R. Singh, M. Saggi ..	E. A. Rodgers ..	MacKinnon, Mackenzie & Co. Ltd.
<i>Cardross</i> ..	Chan Hok-min ..	Kwok Yung-sung, Ngau Min-shang ..	Leung Ho-wah ..	Agriculture & Fisheries Dept., H.K. Govt.
<i>Carl Offersen</i> ..	Cheung Hi Loi ..	Yeung Kin Shing, Sung Yim Wing, Cheung Wan Wah ..	Leung Ki On ..	Kian Hin Leong Enterprises Ltd.
<i>Coral Princess</i> ..	J. I. Toennesen ..	E. Rasmussen, S. Nissen, K. O. Iversen ..	Lai Li-kut ..	Jebsen & Co. Ltd.
<i>Cree</i> ..	L. Lough ..	M. J. Hudson-Ansell, Tse Kui Chi, Yeung Man Chor ..	F. Chan ..	China Navigation Co. Ltd.
<i>Eristak</i> ..	C. R. Humphry ..	C. J. Pooley, D. C. Clark, R. H. Lewis, R. A. Lowe ..	Z. Marr ..	China Navigation Co. Ltd.
<i>Foh Kim</i> ..	N. C. E. Cook ..	R. Winn, S. R. Banerjee, Tam Wing Kit ..	Wong Kam Tong ..	Indo-China S.N. Co. (H.K.) Ltd.
<i>Hallborg</i> ..	H. J. Stagg ..	P. J. Drake, R. C. Layton, Tong Ho Lok ..	U In San ..	China Navigation Co. Ltd.
<i>Hallford</i> ..	W. Davis ..	G. Singh, S. P. A. Ali, G. C. Planta ..	Chan Wing Shing ..	Hong Kong Borneo Shipping Co. Ltd.
<i>Hallward</i> ..	A. Lerstang ..	R. E. Nilsen, A. Larsen ..	M. L. Narasimhan ..	Thoresen & Co. Ltd.
<i>Hoi King</i> ..	O. Schibsted ..	I. O. Olsen, H. P. Rogné, A. M. Larsen ..	Lau Kam Piu ..	Thoresen & Co. Ltd.
<i>Hupoh</i> ..	E. F. Andreassen ..	S. B. Mevatne, G. J. Sandvik ..	Lai Kwong Yim ..	Thoresen & Co. Ltd.
	J. Wroldsen ..	A. Dietrich, R. Vold, A. Grindhaug ..	C. H. Carney ..	Karsten Larssen & Co. (H.K.) Ltd.
	J. B. H. J. Aldiss ..	P. D. Clarke, G. E. Franklin, M. A. Siddle, R. P. Villareal ..	J. W. K. Powell ..	China Navigation Co. Ltd.
<i>Hyria</i> ..	J. Russell ..	L. Walton, A. Groom, D. Douglas, L. Arcilla ..	R. Milne ..	Jardine, Matheson & Co. Ltd.
<i>Kim Seng</i> ..	R. V. Pope ..	H. Brown, M. M. E. H. Chowdhury, Hau Cheung Yan ..	Sun Yun Wing ..	Guan Guan Shipping (PTE) Ltd.
<i>Kuanlung</i> ..	J. R. Haines ..	J. A. Hamilton, Ho King Man, R. J. Torreallas ..	Choi Fuk Keung ..	China Navigation Co. Ltd.
<i>Manoloverett</i> ..	A. D. Roxas ..	S. G. Flores, J. Quiroga, R. Langkay ..	R. Poblete ..	Everett S.S. Corporation S/A
<i>Orient Mariner</i> ..	W. T. Willmott ..	Li Yiu Mang, Cheung Sun Wai, D. Chiang ..	Chan Wing Lam ..	New Orient Transport Service Inc.
<i>Pabloverett</i> ..	C. G. Villanueva ..	E. G. Bejarasco, N. V. Tallorin, C. S. Pilapil ..	T. C. C. Yuson ..	Everett S.S. Corporation S/A
<i>Pampa Argentina</i> ..	C. Bianchi ..	C. Avena, J. C. Peluffo ..	L. Bonilla ..	Everett S.S. Corporation S/A
<i>Shensi</i> ..	G. Cornforth ..	G. E. Garrett, T. B. Muller, J. Clarke, B. E. Espinosa ..	Chan Wing ..	China Navigation Co. Ltd.
<i>Sinkang</i> ..	R. J. Shipp ..	C. W. Tannock, D. I. Stobie, A. C. Alegiojo ..	Leung Man Hin ..	China Navigation Co. Ltd.
<i>Soochow</i> ..	J. M. Parker ..	M. A. J. Dawes, T. Riwata, N. F. Drake, H. Eusebio ..	Tsang Che Chin ..	Everett S.S. Corporation S/A
<i>Star Aldebaran</i> ..	R. Vabasal ..	N. J. I. Augrell, L. E. Erikson, G. Sunborger ..	S. L. B. Davidsson ..	Everett S.S. Corporation S/A
<i>Star Altair</i> ..	I. Westerholm ..	M. Larsson, K. Kristiansson, K. Strom ..	S. Adolfsen ..	Everett S.S. Corporation S/A
<i>Star Antares</i> ..	S. A. Bengtsson ..	G. O. Holm, S. T. U. Rosen, H. N. Soderberg ..	T. B. Ruden ..	Everett S.S. Corporation S/A
<i>Star Bellatrix</i> ..	K. I. Axelsson ..	C. M. Magnusson, N. S. Andersson, U. A. Nilsson ..	A. G. W. Paulsson ..	Everett S.S. Corporation S/A
<i>Taichungshan</i> ..	Ko Keng Jen ..	Lam Tsan Wa, Lam Chi Chiu, H. R. Morker ..	Choi Chung Shu ..	Shun Cheong S.N. Co. Ltd.
<i>Tailungshan</i> ..	N. B. Manning ..	Mok Che Ho, To Sze To, Chiang Shing Cheung ..	Mui Chung ..	Shun Cheong S.N. Co. Ltd.
<i>Taiposet</i> ..	G. T. Henshaw ..	Tan Ngian Swee, Lain Hong Chye, Li Hoi Ming, K. Kumar ..	Chuk Yuk Loy ..	Shun Cheong S.N. Co. Ltd.
<i>Thomaswerett</i> ..	J. S. Vapor ..	I. B. Hugo, B. N. Ordiz, M. Ismael ..	J. R. Jo ..	Everett S.S. Corporation S/A
<i>Woosung</i> ..	J. A. Derrick ..	D. W. Fellowes, G. D. Rutherford, S. R. Malthus, D. R. Viray ..	Wong Chun Kuen ..	China Navigation Co. Ltd.

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