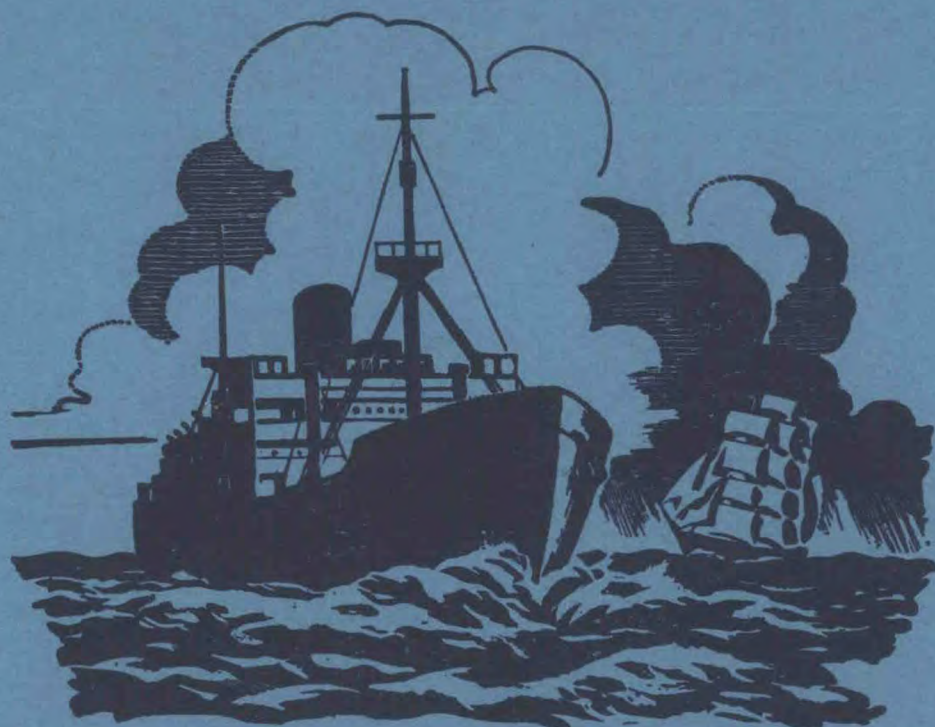


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JULY 1978

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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 1977

It has been the custom since 1924 to publish the names of Masters and Officers who have qualified for the above awards in the July edition of this journal and to offer them our congratulations and gratitude for the outstanding contributions they have made to the Meteorological Office during the year. We must not forget, however, the many books which have reached excellent standard, and indeed in many cases the same markings as some of the award winners, but have to be rejected in favour of others because of the length of the books involved. Obviously where two books are given the same marking, the book with the longer observing period is taken. To the Masters and Officers responsible for these shorter books we offer our sympathies.

The complexities of marking the books are many and we try to take into consideration all the factors involved including number of observing officers, type of vessel and trading area. With radio officers we have so many who have reached full marks that, to a large extent, their awards are governed by the number of observations transmitted, allowance being made for lapses in areas where difficulties in contacting shore stations are known to exist. The full list of award winners for 1977 appears on pages 99 to 104.

Due to the superior quality of their records the six ships heading the 1977 list reads as follows:

1. m.v. *Ajana* (Trinder Anderson and Company Limited), Captain P. D. Guerrier.
2. m.v. *City of Worcester* (Ellerman Lines Limited), Captain E. Finch.
3. m.v. *Cape Sable* (Scottish Ship Management), Captain G. Strachan.
4. s.s. *Moreton Bay* (Container Fleets Limited), Captain J. Cosker.
5. m.v. *Degema* (Ocean Transport and Trading Limited), Captain A. J. Palmer.
6. s.s. *British Dragoon* (B.P. Tanker Company Limited), Captain M. J. Goulding.

The above ships justifiably earn our particular congratulations and special mention must be made of m.v. *City of Worcester* whose name appeared in the 1974 short list and Captain A. J. Palmer of m.v. *Degema* (Captain Palmer's name appeared in 1976 as Master of *Antilochus*, one of the top three ships of 1975), and finally, s.s. *British Dragoon* whose maiden meteorological logbook this is. Photographs of the first three ships appear opposite page 112.

Also worthy of special mention are the nine deep-water trawlers which have gained awards this year. Awards to trawler skippers and radio officers who have made non-instrumental observations together with awards to the four Marid ships—vessels engaged in short sea trades taking sea temperatures only—are included in the list. Their observations are of considerable value in preparing forecasts for shipping and for coastal areas.

The recipients of the awards will be notified by post and requested to provide an address to which the award may be sent. Any Master or Officer seeing his name in this list, or in any other list published by his Company before hearing directly from us, is requested to write and claim his award giving us a forwarding address.

The initial award is normally *The University Atlas* followed as a second award by *Cassell's English Dictionary*. The book selected this year as the third award is *The World Encompassed* by Derek Wilson. The Atlas still appears to be very popular with the Dictionary a close second. When an officer's name comes up for the third time he receives the book of the year which has been selected by the Marine Division of the Meteorological Office. If any first or second award officer does not require either the Atlas or Dictionary, we would endeavour to send him the selected book as an alternative.

J.D.B.

EXCELLENT AWARDS (Year ended 31 December 1977)

CAPTAIN		COMPANY	CAPTAIN		COMPANY
F. S. Angus	..	P. & O. S.N. Co.	W. E. Harris	..	Northern Trawlers Ltd.
J. L. Baird	..	B.P. Tanker Co. Ltd.	D. R. Hayward	..	Ocean Transport & Trading Ltd.
A. Ball	..	T. Hamling & Co. Ltd.	M. J. Heron	..	Container Fleets Ltd.
J. Banna	..	Ocean Transport & Trading Ltd.	C. Hindess	..	Shell Tankers (U.K.) Ltd.
G. Barber	..	B.P. Tanker Co. Ltd.	J. F. Hobbs	..	B.P. Tanker Co. Ltd.
J. Bold	..	Ocean Transport & Trading Ltd.	R. A. Holmes	..	Cunard-Brocklebank Ltd.
C. A. S. Borthwick	..	Shaw Savill & Albion Co. Ltd.	S. T. S. Household	..	P. & O. S.N. Co.
P. J. Boundy	..	J. & J. Denholm Ltd.	K. E. Howard	..	Container Fleets Ltd.
B. A. Boyer	..	Sir Wm. Reardon Smith & Sons Ltd.	W. G. Howcroft	..	P. & O. S.N. Co.
K. Bramley	..	Shell Tankers (U.K.) Ltd.	L. E. Howell	..	Container Fleets Ltd.
W. Brettell	..	Newington Trawlers Ltd.	J. R. Howorth	..	Blue Star Line Ltd.
D. G. Brown	..	Ocean Transport & Trading Ltd.	W. J. Howson	..	Union-Castle Mail S.S. Co. Ltd.
H. E. Carlisle	..	Bibby Line Ltd.	W. G. Hunt	..	F. T. Everard & Sons Ltd.
R. R. Cawdery	..	Union-Castle Mail S.S. Co. Ltd.	J. H. Hutson	..	Container Fleets Ltd.
M. Champneys	..	Container Fleets Ltd.	E. J. Johnson	..	T. Hamling & Co. Ltd.
J. Cole	..	British Antarctic Survey	W. R. Jones	..	Blue Star Line Ltd.
J. K. Cooper	..	Cunard-Brocklebank Ltd.	W. G. Keys	..	Bristol S.N. Co. Ltd.
J. Cosker	..	Container Fleets Ltd.	J. N. Kerr	..	British United Trawlers Ltd.
R. E. Cowie	..	Ben Line Steamers Ltd.	M. Larive	..	Shaw Savill & Albion Co. Ltd.
D. Dickson	..	J. & J. Denholm Ltd.	S. J. Lawrence	..	British Antarctic Survey
A. Dorkins	..	P. & O. S.N. Co.	G. M. Long	..	Natural Environment Research Council
T. Doyle	..	T. Hamling & Co. Ltd.	C. S. Mackinnon	..	Ocean Transport & Trading Ltd.
J. S. Earl	..	Bristol S.N. Co. Ltd.	D. T. MacLachlan	..	Ocean Transport & Trading Ltd.
C. R. Elliott	..	British Antarctic Survey	D. McCaffery	..	Ocean Transport & Trading Ltd.
D. L. Emery	..	Ocean Transport & Trading Ltd.	J. McCormick	..	F. T. Everard & Sons Ltd.
E. R. Finch	..	Ellerman Lines Ltd.	D. S. Millard	..	Manchester Liners Ltd.
W. A. Fitzgerald	..	Ocean Transport & Trading Ltd.	R. Moore	..	Ocean Transport & Trading Ltd.
A. W. Forrest	..	Ellerman Lines Ltd.	N. Morrison	..	Northern Lighthouse Board
I. B. Gault	..	R. S. Dalglish Ltd.	J. W. Murray	..	Buries Marks Ltd.
W. P. Goldie	..	Ocean Transport & Trading Ltd.	C. S. Owston	..	Shell Tankers (U.K.) Ltd.
M. J. Goulding	..	B.P. Tanker Co. Ltd.	A. J. Palmer	..	Ocean Transport & Trading Ltd.
D. M. Grant	..	Wimpey Marine Ltd.	F. D. Parsons	..	Shell Tankers (U.K.) Ltd.
I. D. Grigor	..	Esso Petroleum Co. Ltd.	E. M. S. Phelps	..	Natural Environment Research Council
M. Grigor	..	British Rail	H. Powdrill	..	J. Marr & Son Ltd.
P. D. Guerrier	..	Trinder Anderson & Co. Ltd.	L. G. Powell	..	Ben Line Steamers Ltd.
M. A. Harding	..	Natural Environment Research Council	P. W. Price, M.B.E.	..	P. & O. S.N. Co.

Excellent Awards (*contd.*)

CAPTAIN	COMPANY	CAPTAIN	COMPANY
T. C. Ramsay ..	Esso Petroleum Co. Ltd.	C. O. Thomas ..	Bibby Line Ltd.
M. M. Reeves ..	Bibby Line Ltd.	D. G. Thomas ..	Manchester Liners Ltd.
G. Reid ..	Ben Line Steamers Ltd.	R. C. Thomas ..	Ben Line Steamers Ltd.
A. I. A. Richards ..	F. T. Everard & Sons Ltd.	J. D. Thomson ..	Container Fleets Ltd.
N. Richardson ..	Ocean Transport & Trading Ltd.	O. Tucker ..	Ben Line Steamers Ltd.
J. Ridout ..	Burries Marks Ltd.	D. G. Watson ..	Tor Line Ltd.
A. A. Rundle ..	Ocean Transport & Trading Ltd.	R. Weston ..	B.P. Tanker Co. Ltd.
A. Scott ..	Tor Line Ltd.	W. M. Wheatley ..	Shaw Savill & Albion Co. Ltd.
M. Sheridan ..	Ocean Transport & Trading Ltd.	P. L. Whitehouse ..	F. T. Everard & Sons Ltd.
C. R. Short ..	Container Fleets Ltd.	D. Whiting ..	British United Trawlers Ltd.
D. Spivey ..	British United Trawlers Ltd.	R. J. Williams ..	Shell Tankers (U.K.) Ltd.
A. J. Stewart ..	Wimpey Marine Ltd.	T. W. Willows ..	Ocean Transport & Trading Ltd.
C. Strachan ..	Lyle Shipping Co. Ltd.	J. C. Wilson ..	B.P. Tanker Co. Ltd.
W. D. Templeman ..	Esso Petroleum Co. Ltd.	R. A. Wilson ..	Container Fleets Ltd.

PRINCIPAL OBSERVING OFFICER	COMPANY	PRINCIPAL OBSERVING OFFICER	COMPANY
A. J. Airey ..	Ben Line Steamers Ltd.	N. Macinnes ..	B.P. Tanker Co. Ltd.
I. Aitchison ..	Ben Line Steamers Ltd.	A. MacIntyre ..	F. T. Everard & Sons Ltd.
I. T. Anderson ..	B.P. Tanker Co. Ltd.	P. A. S. Markland ..	Shell Tankers (U.K.) Ltd.
B. P. Andrew ..	Lyle Shipping Co. Ltd.	B. T. Marks ..	Union-Castle Mail S.S. Co. Ltd.
T. P. Barrett ..	T. Hamling & Co. Ltd.	P. R. Mason ..	F. T. Everard & Sons Ltd.
A. A. Beattie ..	B.P. Tanker Co. Ltd.	K. H. Milne ..	Esso Petroleum Co. Ltd.
H. D. Beck ..	Ellerman Lines Ltd.	M. R. Nelms ..	B.P. Tanker Co. Ltd.
W. A. Birrell ..	British Rail	D. M. Nicholson ..	Lampport & Holt Line Ltd.
I. R. Boulton ..	Bristol S.N. Co. Ltd.	R. T. Nield ..	Bibby Line Ltd.
M. Bregazzi ..	Ocean Transport & Trading Ltd.	D. R. Partridge ..	Ocean Transport & Trading Ltd.
T. Buskie ..	Ellerman Lines Ltd.	H. G. Pask ..	T. Hamling & Co. Ltd.
W. F. P. Cargill ..	Ben Line Steamers Ltd.	G. O. Pearson ..	Tor Line Ltd.
P. S. E. Cave ..	Container Fleets Ltd.	M. G. Phipps ..	Burries Marks Ltd.

C. J. A. Cladingbowl	..	Ben Line Steamers Ltd.	..	P. G. Powell	..	F. T. Everard & Sons Ltd.
I. C. Clark ..	..	British Antarctic Survey	..	M. J. Power	..	Container Fleets Ltd.
J. P. Collins	..	Cunard-Brocklebank Ltd.	..	J. T. Priestley	..	Esso Petroleum Co. Ltd.
D. Coombes	..	B.P. Tanker Co. Ltd.	..	M. S. Putman	..	Natural Environment Research Council
L. G. Copeman	..	P. & O. S.N. Co.	..	D. A. Pye ..	..	Natural Environment Research Council
R. C. Corbett	..	Shaw Savill & Albion Co. Ltd.	..	J. Rees ..	..	Manchester Liners Ltd.
S. J. Cutler ..	..	Blue Star Line Ltd.	..	J. L. Reynolds	..	Ocean Transport & Trading Ltd.
P. C. D'Arcy	..	Container Fleets Ltd.	..	J. Willis-Richards	..	Blue Star Line Ltd.
I. G. W. Dixon	..	Ocean Transport & Trading Ltd.	..	P. C. Roberts	..	Sir Wm. Reardon Smith & Sons Ltd.
P. B. Doyle	..	Manchester Liners Ltd.	..	I. J. Roemmele	..	Ocean Transport & Trading Ltd.
C. C. W. A. Eager..	..	Burmes Marks Ltd.	..	J. M. Rose ..	..	Shell Tankers (U.K.) Ltd.
P. C. J. Ellaby	..	Cunard S.S. Co. Ltd.	..	T. C. L. Rowe	..	Ben Line Steamers Ltd.
J. C. Etheridge	..	P. & O. S.N. Co.	..	D. J. Schulz	..	Ellerman Lines Ltd.
M. J. Evans	..	B.P. Tanker Co. Ltd.	..	R. M. Selvarajah	..	Ocean Transport & Trading Ltd.
J. P. H. Fisher	..	Ocean Trading & Transport Ltd.	..	M. S. Shakespeare..	..	Ellerman Lines Ltd.
E. Foley ..	..	Bristol S.N. Co. Ltd.	..	N. J. Shearman	..	P. & O. S.N. Co.
S. Gammage	..	B.P. Tanker Co. Ltd.	..	A. L. Smith	..	Container Fleets Ltd.
R. R. Gemmell	..	P. & O. S.N. Co.	..	I. M. Studley	..	Cunard-Brocklebank Ltd.
T. Goh Chin Guan	..	Ocean Transport & Trading Ltd.	..	M. I. Taxis..	..	Container Fleets Ltd.
K. S. Hardy	..	Ocean Transport & Trading Ltd.	..	E. H. N. Thomas	..	J. & J. Derholm Ltd.
S. N. Harris	..	Bibby Line Ltd.	..	K. B. Thorpe	..	Shaw Savill & Albion Co. Ltd.
D. L. A. Haynes	..	Container Fleets Ltd.	..	C. M. Turner	..	Union-Castle Mail S.S. Co. Ltd.
P. R. Haynes	..	Shaw Savill & Albion Co. Ltd.	..	D. R. K. Vickers	..	P. & O. S.N. Co.
M. H. S. Heng	..	Ocean Transport & Trading Ltd.	..	A. L. Walker	..	Ocean Transport & Trading Ltd.
M. V. Hobbs	..	Ocean Transport & Trading Ltd.	..	R. K. Walker	..	P. & O. S.N. Co.
R. J. Holland	..	Ocean Transport & Trading Ltd.	..	I. M. Ward	..	Union-Castle Mail S.S. Co. Ltd.
B. Hollywood	..	F. T. Everard & Sons Ltd.	..	G. J. Watt	..	J. & J. Derholm Ltd.
S. T. Houldsworth	..	Ocean Transport & Trading Ltd.	..	T. J. F. Welch	..	Esso Petroleum Co. Ltd.
J. C. Hoy ..	..	Container Fleets Ltd.	..	J. Wells ..	..	British United Trawlers Ltd.
R. Hurst ..	..	R. S. Dalgleish Ltd.	..	R. J. Wells	..	Tor Line Ltd.
A. Jackson	..	Wimpey Marine Ltd.	..	A. D. Welsh	..	Northern Lighthouse Board
M. T. James	..	Container Fleets Ltd.	..	S. R. Wigley	..	Ellerman Lines Ltd.
H. A. Johnson	..	Shell Tankers (U.K.) Ltd.	..	J. D. G. Williams	..	Ocean Transport & Trading Ltd.
I. E. Johnson	..	Shaw Savill & Albion Co. Ltd.	..	D. Wilson ..	..	Container Fleets Ltd.
R. J. Kingsworth	..	Trinder Anderson & Co. Ltd.	..	T. H. Withers	..	F. T. Everard & Sons Ltd.
R. F. Kirker	..	Ocean Transport & Trading Ltd.	..	J. N. Woolley	..	Bibby Line Ltd.
D. R. Lewis	..	Container Fleets Ltd.	..	A. A. Yunus	..	Ocean Transport & Trading Ltd.

Excellent Awards (contd.)

RADIO OFFICER		COMPANY		RADIO OFFICER		COMPANY	
A. Archibald	Panocean-Anco Ltd.	R. G. Kent..	..	B.P. Tanker Co. Ltd.	
D. Barlow	P. & O. S.N. Co.	R. R. N. Laing	..	Marconi International Marine Co. Ltd.	
P. A. Barratt	Marconi International Marine Co. Ltd.	N. Macfarlane*	..	Northern Lighthouse Board	
T. P. Barrett	T. Hamling & Co. Ltd.	C. A. Mackay	..	Ore Carriers Ltd.	
D. A. Barry	International Ore Carriers Ltd.	T. McGill ..	..	Marconi International Marine Co. Ltd.	
R. P. Bate	P. & O. S.N. Co.	D. R. McGovern	..	Redifon Telecommunications Ltd.	
A. Bateman	B.P. Tanker Co. Ltd.	H. J. McGroarty	..	Shell Tankers (U.K.) Ltd.	
H. Benson	B.P. Tanker Co. Ltd.	J. W. McFarlin	..	Shell Tankers (U.K.) Ltd.	
J. D. Boardman	Cunard-Brocklebank Ltd.	P. Mannion	..	Marconi International Marine Co. Ltd.	
I. Boyd	Kelvin Hughes Ltd.	P. A. Mathews	..	Container Fleets Ltd.	
B. Bradley	International Marine Radio Co. Ltd.	D. Matthews	..	T. Hamling & Co. Ltd.	
H. E. Brookfield	Ben Line Steamers Ltd.	R. M. Mercer	..	Union-Castle Mail S.S. Co. Ltd.	
R. J. Bryne	B.P. Tanker Co. Ltd.	E. E. Milburn	..	Ocean Transport & Trading Ltd.	
P. A. Byrne	Marconi International Marine Co. Ltd.	D. C. Millar	..	Marconi International Marine Co. Ltd.	
B. Cameron	B.P. Tanker Co. Ltd.	D. Miller ..	..	Ocean Transport & Trading Ltd.	
B. Campbell	R. S. Dalgliesh Ltd.	R. R. Mills	..	Marconi International Marine Co. Ltd.	
R. Dixon-Carter	Cian Line Steamers Ltd.	I. Morgan ..	..	B.P. Tanker Co. Ltd.	
R. D. Cause	Ocean Transport & Trading Ltd.	R. J. Nummery	..	British Antarctic Survey	
T. Chambers	Marconi International Marine Co. Ltd.	H. M. O'Gorman	..	International Marine Radio Co. Ltd.	
G. Christmas	Marconi International Marine Co. Ltd.	A. J. Pampling	..	P. & O. S.N. Co.	
W. Cole	United Marine Electronics (U.K.) Ltd.	C. A. Partridge	..	T. Hamling & Co. Ltd.	
J. I. G. Coman	Marconi International Marine Co. Ltd.	H. G. Pask	..	Ben Line Steamers Ltd.	
E. Connell	International Marine Radio Co. Ltd.	W. Paterson	..	Northern Trawlers Ltd.	
J. D. Coop	Panocean-Anco Ltd.	H. C. Pougher	..	Natural Environment Research Council	
R. B. Cooper	P. & O. S.N. Co.	R. V. Price	..	Container Fleets Ltd.	
E. G. Courtney	Marconi International Marine Co. Ltd.	R. Redhead..	..	British Rail	
J. R. Crockett	Bibby Line Ltd.	P. A. Roper	..	Cunard-Brocklebank Ltd.	
P. A. Cross	P. & O. S.N. Co.	D. J. Saunders	..	Marconi International Marine Co. Ltd.	
L. Crumby	Marconi International Marine Co. Ltd.	R. I. M. Scobie	..	International Marine Radio Co. Ltd.	
R. Dickson	Marconi International Marine Co. Ltd.	N. E. Scott	..	Ocean Transport & Trading Ltd.	
N. M. Doherty	Shell Tankers (U.K.) Ltd.	L. M. Sells..	..	P. & O. S.N. Co.	
F. A. Dunn	Cunard-Brocklebank Ltd.	R. S. Shone	..	Sir Wm. Reardon Smith & Sons Ltd.	
T. M. Elson	P. & O. S.N. Co.	D. C. Short	..		

M. G. Finn	..	Redifon Telecommunications Ltd.	D. C. Smart*	..	F. T. Everard & Sons Ltd.
G. F. Flaherty	..	Marconi International Marine Co. Ltd.	S. N. Smith	..	B.P. Tankers Co. Ltd.
D. S. Flemington	..	Container Fleets Ltd.	R. Smithson	..	Bristol S.N. Co. Ltd.
A. Fulcher	..	British United Trawlers Ltd.	R. Spall	..	British United Trawlers Ltd.
D. A. P. Galbraith	..	Union-Castle Mail S.S. Co. Ltd.	G. F. Stone	..	Cayzer Irvine & Co. Ltd.
J. Gilhooly	..	Ben Line Steamers Ltd.	P. C. Taylor	..	Clan Line Steamers Ltd.
P. Glover	..	B.P. Tanker Co. Ltd.	A. G. Thomson	..	Ocean Transport & Trading Ltd.
P. A. Gooch	..	Ocean Transport & Trading Ltd.	C. K. Thornallay	..	Container Fleets Ltd.
C. E. Gullely	..	Ocean Transport & Trading Ltd.	Tsang-Che-Chin	..	Ocean Transport & Trading Ltd.
A. P. Handley	..	Cunard S.S. Co. Ltd.	G. I. Urquhart	..	John Swire & Sons Ltd.
D. Hatchett	..	Shell Tankers (U.K.) Ltd.	R. W. Wade	..	Bibby Line Ltd.
D. W. Hiron	..	Panoccean-Anco Ltd.	M. Walker	..	British Antarctic Survey
A. E. Holman	..	Ocean Transport & Trading Ltd.	A. R. Watt	..	Ocean Transport & Trading Ltd.
D. A. Hunt	..	P. & O. S.N. Co.	J. C. Weedon	..	P. & O. S.N. Co.
G. Jacobs	..	Marconi International Marine Co. Ltd.	J. Wells	..	Marconi International Marine Co. Ltd.
P. J. Johnson	..	Marconi International Marine Co. Ltd.	R. E. Whitton	..	Bibby Line Ltd.
A. M. Jones*	..	Bristol S.N. Co. Ltd.	J. C. Yates	..	International Marine Radio Co. Ltd.

‘MARID’ SHIPS†

CAPTAIN	PRINCIPAL OBSERVING OFFICER	RADIO OFFICER	OWNER/MANAGER
F. Dogherty	T. Smith..	T. A. Ogbourne..	Esso Petroleum Co. Ltd.
M. G. Mills..	J. R. Penson	B. Coyle..	British Rail
I. Leggatt	J. Penwell	D. Atkinson	P. & O. Ferries
R. M. Chaplin	P. M. Adams/M. Wilson	..	Weston Shipping Ltd.

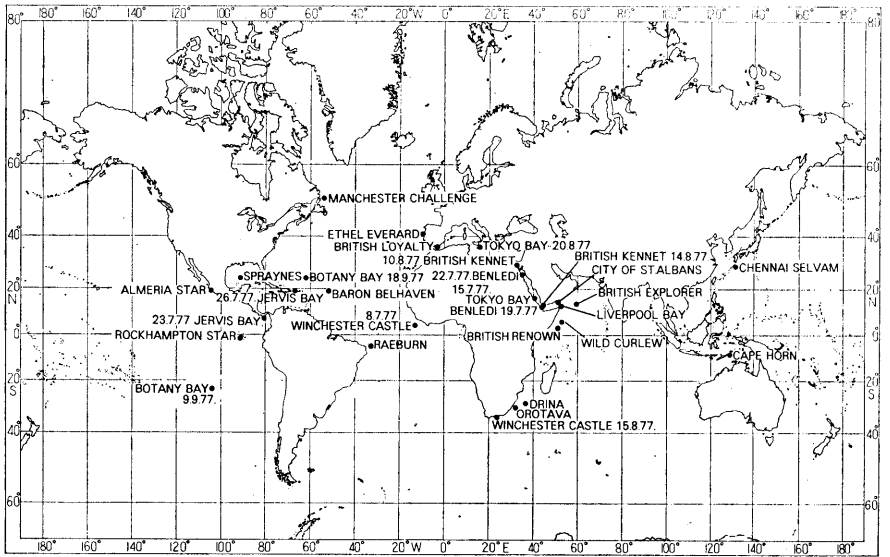
* Deck Officers.

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

Excellent Awards (contd.)

TRAWLERS (non-instrumental)

SKIPPER	RADIO OPERATOR				TRAWLER OWNERS
G. Kent					Boyd Line Ltd.
A. Osler					Hudson Bros. Trawlers Ltd.
H. Peterson ..					J. Marr & Sons Ltd.
D. P. Platten ..					T. Hamling & Co. Ltd.
M. Redfearn ..					Hudson Bros. Trawlers Ltd.
T. Sawyers ..					T. Hamling & Co. Ltd.
C. W. Walker ..					Boyd Line Ltd.
	M. Allison .. ..	..	..	..	Boyd Line Ltd.
	M. E. Morrow ..	..	..	..	T. Hamling & Co. Ltd.
	A. Spence .. ..	..	..	..	Boyd Line Ltd.
	E. Willey .. ..	..	..	..	T. Hamling & Co. Ltd.
	N. H. Willis .. ..	..	..	..	Boyd Line Ltd.



Position of ships whose reports appear in the Marine Observers' Log



July, August, September

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

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

TYPHOON 'BABE'

East China Sea

m.v. *Chennai Selvam*. Captain R. N. D'Souza. Fukuyama to Haldia (India), Observer, the Master.

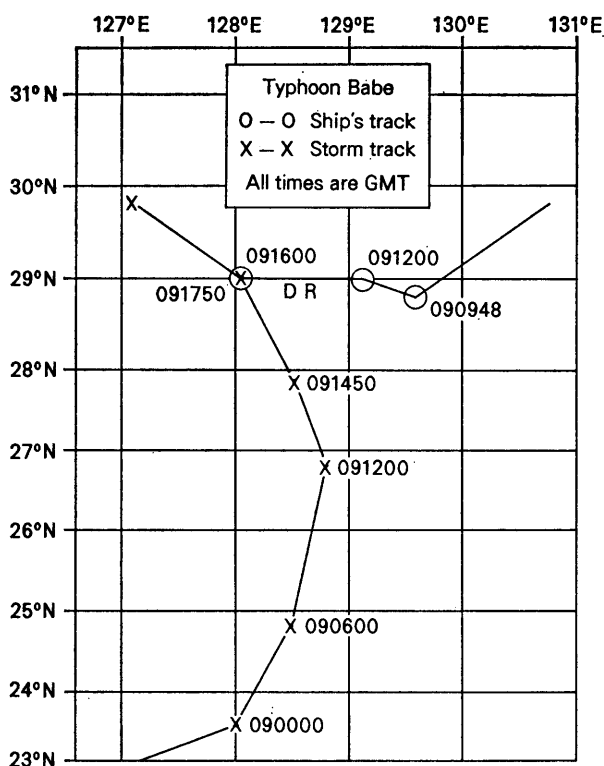
9 September 1977. The vessel encountered Typhoon Babe and the following report together with chart showing Babe's progress were made.

At 0600 GMT on 8 September, shortly after leaving Fukuyama, Babe was reported as being in position $21^{\circ} 24'N$, $126^{\circ} 54'E$ moving NNW at 10 knots with central pressure 905 mb. On dropping the pilot off Seka Saki at 0624, course was set towards the Bashi Channel and the vessel proceeded at reduced speed to await further developments in Babe's movements. At 1200 Babe was in position $22^{\circ} 12'N$, $126^{\circ} 42'E$ still moving NNW at 10 knots, the vessel, therefore, increased to full sea speed.

At 0001 on 9 September Babe was reported in position $23^{\circ} 30'N$, $128^{\circ} 00'E$, now moving NE at 8 knots. At 0300 the vessel's position was $29^{\circ} 40'N$, $130^{\circ} 50'E$, course $202^{\circ}T$, speed 12 knots. The barometric pressure was now reading 995 mb, wind NNW, force 3-4, the sky was overcast and there were occasional squalls.

At 0600 Babe was reported in position $24^{\circ} 54'N$, $128^{\circ} 30'E$ moving north at 10 knots with a central pressure of 920 mb. At 0948 with Kasari Si Light bearing $174^{\circ}T$, distance 20.3 n. mile and in anticipation of further eastward progression of the storm, the vessel's course was altered to $285^{\circ}T$ in an effort to get behind the storm.

At 1100 the wind had freshened to ESE, force 6 and the barometric pressure had fallen to 989 mb. By 1300 the wind had further increased and backed to become ENE, force 8-9, the barometric pressure now being 984 mb. By 1400 it was obvious that the vessel was in the path of the storm but, with the vessel only pitching and rolling moderately, course and maximum speed were maintained keeping the wind on the starboard quarter. At 1450 the storm was reported as being in position $27^{\circ} 48'N$, $128^{\circ} 30'E$, moving north at 20 knots with central pressure 910 mb. At 1500 the vessel's barometer read 975.7 mb, the wind had increased to ENE force 10-11



creating very rough seas with a moderate to heavy swell. Thereafter the barometric pressure fell rapidly as follows:

GMT

1630 barometer reading 965.8 mb

1700 barometer reading 956.7 mb

1715 barometer reading 940.0 mb

1730 barometer reading 926.0 mb

At 1630 the 'eye' of the typhoon was observed on the radar at a distance of about 18 n. mile. The centre appeared as two concentric circles of rain about 2 n. mile apart. The vessel was not making any headway in relation to the centre and steerage-way was only maintained by maximum engine revolutions. Visibility was very seriously restricted in the torrential rain. As the centre approached the barometric pressure continued to fall rapidly. The sea became very rough and confused causing the vessel to roll very heavily.

At 1700 the vessel was near the centre of the storm, the central cloud being about 8 n. mile in diameter. There was then a perceptible change in the noise level and strength of the wind as it increased suddenly to about force 12. At about 1716 the vessel was turned by the wind from a heading of 210°T to 040°T—a turn of 170° to port—in about 10 minutes. At this time the engines were on full ahead and the helm hard over to starboard. The rudder was totally ineffective and the vessel was entirely at the mercy of the wind. At this time also, the radar scanner was put out of commission due to the wind, therefore, it was impossible to track the storm further.

At 1730 the vessel's barometer attained its lowest reading of 926 mb and thereafter began to rise rapidly. At 1750 the storm was reported to be in position 29°

00°N, 128° 00'E now moving NNW at 23 knots with central pressure 915 mb. By 1900 the vessel's barometer read 968 mb and the wind had decreased to s'w force 9-10. After the passage of the storm the sea continued to be very rough and confused and the vessel could not resume her course until some time later. Fortunately the vessel was in ballast and hence only sustained damage caused by the wind.

Position of ship at 0300 GMT: 29° 40'N, 130° 50'E.

Note 1. The *Chennai Selvam* is an Indian Supplementary Ship.

Note 2. Babe formed amongst the Caroline Islands near Woleai on 2 September and developed into a tropical storm on the same day. It then moved north at first becoming a typhoon by the 6th and recurving west of north. By the 8th the storm had fully developed with maximum wind speeds estimated at 130 knots.

The storm passed near Okinawa late on the 9th and crossed the Chinese coast near Shanghai on the 11th.

WAVE DEPRESSION

Indian Ocean

m.v. *Drina*. Captain W. Wheatley. Napier (NZ) to Durban. Observers, the Master, Mr B. Jennings, 2nd Officer and Mr K. B. Thorpe, 3rd Officer.

1 July 1977. The vessel encountered heavy weather and the following are extracts from the report made at the time:

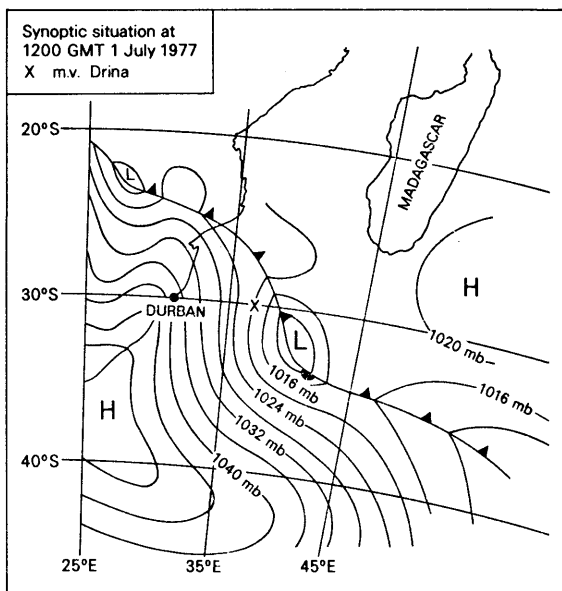
GMT

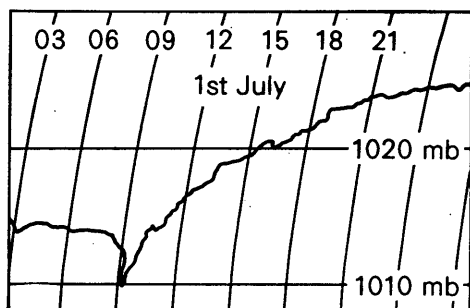
0730: Wind NW, force 5, visibility 10 n. mile, a few cumulus clouds.

0830: Wind began to back and increase a little.

0910: Wind w'ly force 6, a large bank of cloud with great vertical development observed ahead with precipitation reaching the sea surface, sea rough with moderate sw'ly swell, barometer reading 1012.8 mb.

0920: Wind backed to sw and increased to force 9, sea heavy, heavy rain, cloud base 400 feet, visibility 2 n. mile, barometer reading 1011.2 mb and falling rapidly.





- 0930: Vessel hove to, wind sw, force 9-10, barometer reading 1010.0 mb.
 0940: Barometer reading 1012.1 mb and rising, rain now light to moderate.
 1030: Wind sw, force 11-12, high seas and heavy swell, overcast with intermittent rain, visibility 3 n. mile.
 1130: Wind s'w, force 11, overcast but brightening.
 1230: Wind backed to sse, force 10, cloudy, visibility 8 n. mile, high seas and heavy sw'yly swell.
 1330: Wind sse, force 9, barometer reading 1018.2 mb.
 1430: Wind s, force 9, cloudy with rain squalls.
 1530: Wind veered sw, cloudy with rain squalls during next two hours.
 1750: Wind ssw, force 6, visibility 10 n. mile, sea rough, heavy sw'yly swell, barometer reading 1024.2 mb, vessel increased speed and resumed course.
 2130: Wind s, force 6, sea rough with heavy swell, barometer reading 1024.7 mb. Hereafter the barometric pressure continued to rise steadily to become 1029.5 mb at 1000 on the following morning, it then remained steady for the next 24 hours.

Position of ship at 0930: 29° 46'S, 36° 47'E.

Note. A well-developed wave depression had formed on the cold front, see sketch, with strong pressure gradients to the west of the frontal system. The depression and its associated fronts moved NE over the next few days. The *Drina* experienced the passage of the surface cold front at about 0920, followed by storm force winds to the west of the frontal system.

SEVERE THUNDERSTORM

Eastern North Pacific

m.v. *Almeria Star*. Captain A. Chivers. Acajutla (El Salvador) to Long Beach. Observer, Mr R. Cawthorne, 2nd Officer.

15 July 1977. At 0300 GMT lightning was observed some distance ahead and abeam over the coast.

At 0700 the vessel encountered a severe thunderstorm with heavy rain and both forked and sheet lightning were observed. The wind freshened to force 6 from a SE'yly direction.

About half an hour later the lightning became intense and the radar screen was completely obscured by rain clutter.

At 0815 the rain ceased, the lightning activity was reduced and the wind moderated to force 3. A short while later, however, the wind backed and freshened to become NE, force 6-7, the lightning increased in intensity and heavy rain reduced the visibility to 300 metres.

At 0920 the wind veered and moderated to become E, force 4-5. About this time lightning was observed to strike the sea just astern of the vessel.

The wind soon afterwards began to veer again to become SE and then S, force 4-5.

At 1400 the rain began to decrease in intensity and the cloud eventually broke up. Between 0815 and 1330 the sky was continuously illuminated by lightning.

Position of ship at 0600: 18° 54'N, 104° 42'W.

Note. The following is an extract from *The Pacific Coasts of Central America and United States Pilot* (NP8):

The doldrum belt including the inter-tropical convergence zone represents a belt of light and variable winds separating the trade winds of the two hemispheres. From June to September much of Central America south of latitude 18°N is in the doldrum belt, while the SE trades (diverted towards SW) affect Panama, at times, from July to September. By December NE trades again prevail. At times the transition from the trades to the doldrums is marked by frontal activity with dense cloud, rain and thunderstorms accompanying the change of wind.

ST ELMO'S FIRE

Eastern North Pacific

s.s. *Jervis Bay*. Captain G. C. Barrett. Lyttleton (NZ) to Panama. Observers, Mr J. M. Shiner, 2nd Officer and Mr P. Wallace.

23 July 1977. At 0800 GMT the vessel was approaching the Gulf of Panama from the south-west. After passing through a belt of heavy rain accompanied by thunder and frequent lightning flashes, the wind became calm and breaks appeared in the cloud. Constant very vivid forked and sheet lightning was, however, still observed, mainly to the south of the vessel.

The atmosphere around the vessel took on an electrical 'feel' and the tops of aerials and steel projections about the bridge and mast appeared to glow in a luminous fashion. The phenomenon was accompanied by a persistent buzzing noise not unlike that of electric pylons in the rain. It was also noted that the human body tingled and hair on the nape of the neck 'prickled'. The phenomenon lasted for 45 minutes and was presumed to be St Elmo's Fire. No apparent effect on the magnetic compass was observed.

Position of ship: 06° 48'N, 80° 24'W.

Note. The following is an extract from the *Meteorological Glossary*:

'St Elmo's Fire is a more or less continuous, luminous electrical discharge of weak or moderate intensity in the atmosphere, emanating from elevated objects at the earth's surface (lightning conductors, wind vanes, masts of ships) or from aircraft in flight (wing tips, propellers etc.).

'This phenomenon is usually bluish or greenish in colour, sometimes white or violet. It is accompanied by a crackling sound and occurs when the electrical field in the neighbourhood of the object becomes very strong, as when a cumulonimbus cloud is overhead.

'The phenomenon is also termed *corposant*, i.e. ghost-like, because of its once-supposed supernatural nature.'

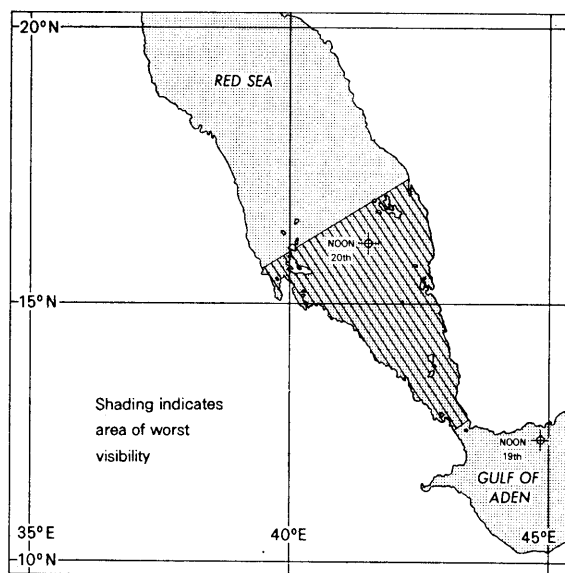
See also the *Marine Observer's Handbook*, page 95.

DUST CLOUDS

Red Sea

s.s. *Benledi*. Captain R. C. Thomas. Manila to London. Observers, the Master and ship's company.

19-22 July 1977. Between these dates, whilst the vessel was northbound in the Red Sea, varying amounts of dust in suspension were observed. The dust concentration was greater in southern parts, see sketch, where visibility was reduced to two n. mile.



We would be very grateful if the origin of the dust could be explained.

Position of ship at 1200 GMT on the 19th: $12^{\circ} 30'N$, $44^{\circ} 12'E$.

Position of ship at 1200 GMT on the 22nd: $26^{\circ} 05'N$, $35^{\circ} 06'E$.

Note. Dr L. R. Johnson of the Department of Mineralogy of the British Museum (Natural History), comments:

'It is quite probable that the dust cloud was the remnant of a dust storm raised over the eastern North African—or possibly the Saudi Arabian—desert areas several days before the *Benledi* passed through it in the Red Sea.

'Dust clouds raised in the western North African deserts have been similarly tracked across the North Atlantic as they were carried in the North East Trades. The larger particles fall out of the atmosphere during the early stages of transport leaving a very fine-grained dust which can be carried thousands of miles across oceans, slowly dispersing in the general air mass and being continually returned to the surface of the globe by gravitational fall-out and rainfall scavenging.'

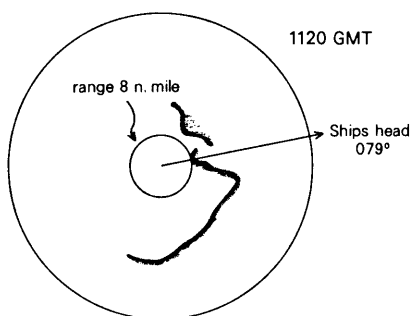
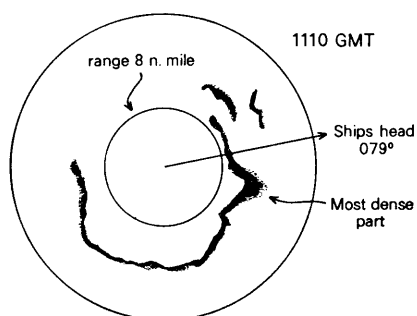
Indian Ocean

m.v. Winchester Castle. Captain R. Cowdery. Rotterdam to Maputo (Moçambique). Observers, the Master and Officers of the Watch.

15 August 1977. Throughout the morning dust clouds had been observed on the radar, see sketches; at the time the vessel was approximately 30 n. mile to the south of Cape Seal. The radar was set on the 24-n. mile range and the dust clouds were observed on the radar screen until the next day when the vessel had passed Durban.

Weather conditions at the time of the observation were as follows: dry bulb $18.0^{\circ}C$, wet bulb 16.2 , sea temp. 16.6 , wind NE'ly, force 3.

Position of ship: $34^{\circ} 35'S$, $23^{\circ} 23'E$.



Note. Dr L. R. Johnson comments:

'Most sea hazes encountered by British mariners are in the vicinity of the Cape Verde Islands off West Africa. However, dust clouds off South Africa are not unknown although more rare. Presumably in this case the dust had been raised by wind in the arid regions of South Africa and carried to the vessel by the roughly off-shore winds.'

Dr Johnson also adds that if it should be possible to collect a sample of dust, this would help to ascertain with certainty its nature and origin.

FISH AND SARGASSO WEED

North Atlantic Ocean

s.s. *Botany Bay*. Captain R. A. Wilson. Cristobal to Flushing. Observers, the Master, Mr W. C. Carruthers, Chief Officer and Mr J. A. Ball, 2nd Officer.

18 September 1977. From 1530 to 1930 GMT the vessel passed through a number of bands of Sargasso weed; it was of a fibrous texture and had long trailers. One patch of bright-green weed was observed, but in general it ranged in colour from a yellowish brown to a reddish orange.

Amongst the weed were a number of eel-like fish. They were silver and white in colour, 45-60 centimetres in length and each had transparent ribbed dorsal fins. The fish were swimming just below the surface of the water at a considerable speed but with the minimum of effort.

Position of ship at 1530: 24° 44'N, 61° 29'W.

Note. Dr F. Evans of the Dove Marine Laboratory, The University of Newcastle upon Tyne, comments:

'Most fish associated with Sargasso weed are small and camouflaged green or brown to resemble the weed. From their description these were not true Sargasso fish, but, as suggested, deep-sea eels having silvery oceanic colouring.'

SAW-FISH

Arabian Sea

m.v. *City of St Albans*. Captain P. E. Harwood. Aden to Karachi. Observer, Mr H. C. Tan, 3rd Officer.

16 July 1977. At 0630 GMT a violet-blue long-nosed fish was observed at a distance of about eight metres from the vessel. The fish made no attempt to swim away as the vessel passed by.

It was not possible to see the tail of the fish. Half of the forward fin and one third of the after fin were, however, above water. The total body length was estimated to be three metres, of which the snout was equal to about half.

Position of ship: $14^{\circ} 45'N$, $50^{\circ} 46'E$.

Note. Dr F. Evans comments:

'A fish of this size and shape could only be a saw-fish of the genus *Pristis*, one of the skate and ray family, but I wonder at the absence of a reference to the teeth—really large modified scales—around the edge of the saw.

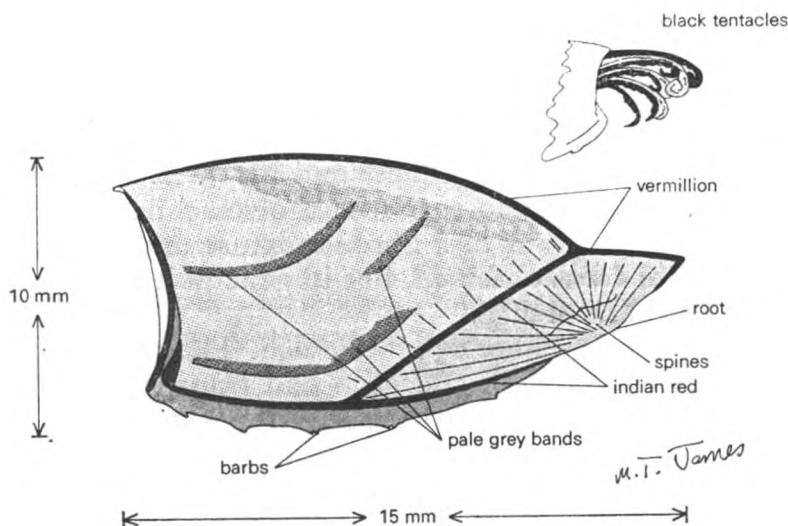
'Saw-fish grow to 7 or even 10 metres in length.'

MARINE LIFE

Western North Pacific

s.s. *Jervis Bay*. Captain G. C. Barrett. Panama to Flushing. Observer, Mr M. T. James, 3rd Officer.

26 July 1977. At 1420 GMT the vessel was stopped to investigate a parachute observed in the sea. The accident boat was sent out to recover it, and upon recovery a small piece of driftwood was found entangled in its lines and attached to the driftwood were found numerous molluscs, an example of which may be seen in the sketch.



The molluscs were in groups of four or five and appeared to be attached to a communal root; there were also one or two attached singly. They were pearl grey in colour, the edges were lined with vermillion or Indian red. An Indian-red stripe also ran diagonally across the shell.

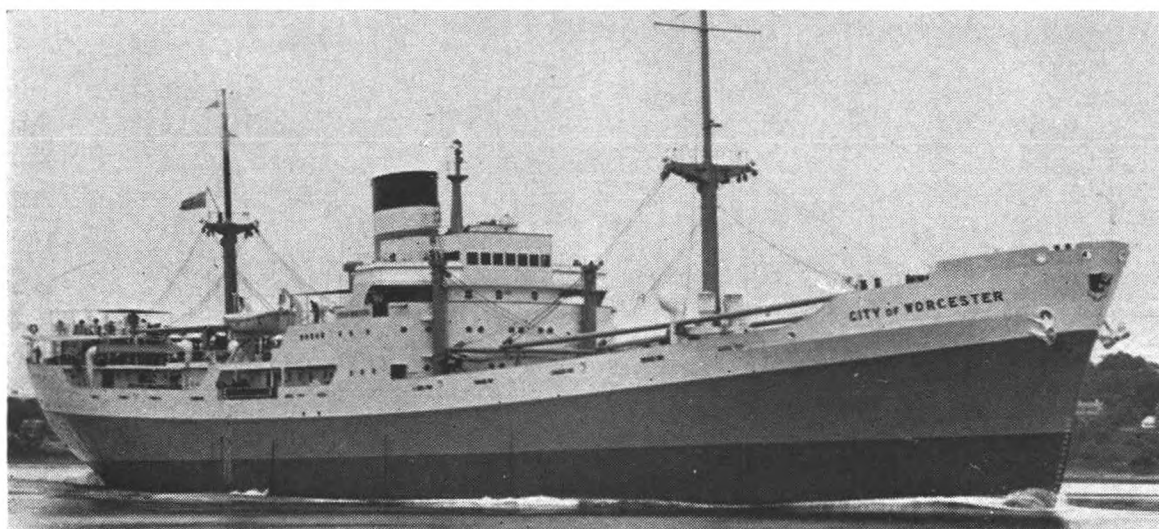
The shells were quite shiny and the bottom edges had from three to six barbs attached. Radiating from the root base were numerous spines, presumably for reinforcement.

After the molluscs had been out of the water for about 20 minutes tentacles appeared from the head of the shell. They were quite numerous and were about three quarters of the total body length.

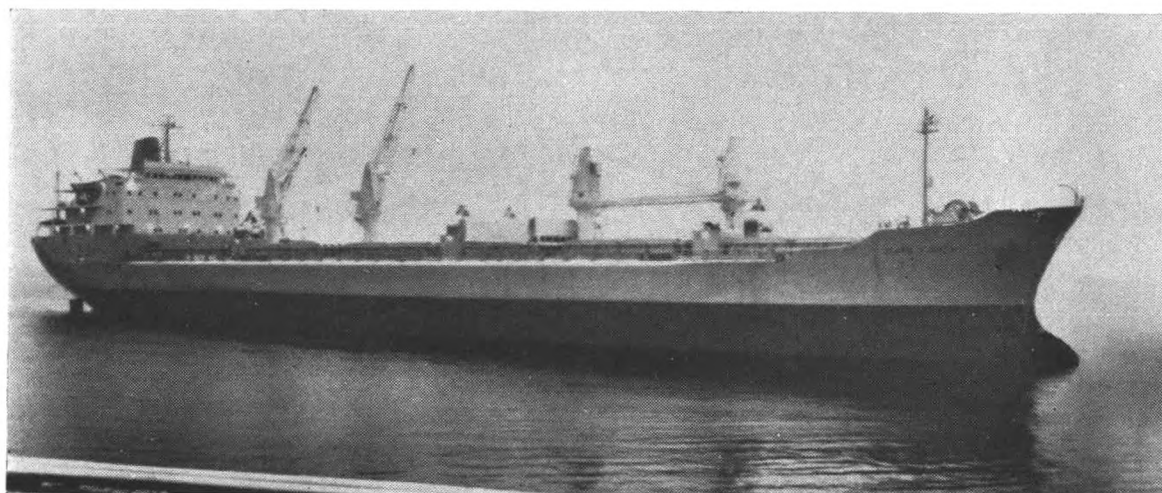
Position of ship: $18^{\circ} 58'N$, $67^{\circ} 15'W$.



Ajana (Trinder Anderson and Company Limited), Captain P. D. Guerrier
Copyright the Australind Steam Shipping Co Ltd



City of Worcester (Ellerman Lines Limited), Captain E. Finch



Cape Sable (Scottish Ship Management), Captain G. Strachan

THE THREE SHIPS WHICH GAINED THE HIGHEST MARKINGS FOR THEIR
METEOROLOGICAL LOGBOOKS DURING THE YEAR 1977 (see page 98)



Crown Copyright

Presentation of barographs on 10 January 1978 at Bracknell. Left to right: Captain and Mrs T. B. Hancock, Dr B. J. Mason, Captain and Mrs J. Cosker, Captain and Mrs W. W. Newport (see page 132)

BIRDS

Eastern North Atlantic

m.v. *Ethel Everard*. Captain A. J. A. Richards. London to Tripoli (Libya). Observers, the Master and Mr P. G. Powell, Chief Officer.

16 September 1977. In the early hours of the morning a small bird, about 15 cm long, was found on the boat deck by the look-out as he was returning to the bridge. The bird appeared to have a broken wing and leg and was also badly cut on the stomach. It was in an obvious state of shock and so was placed on rags in a cardboard box and left in a quiet place to rest. When the Master was informed he took an immediate interest in the bird and cleaned up the wounds.

After its rest the bird was much more frisky and as time progressed various attempts were made to feed it. Milk, eggs, seeds, giblets, raw meat and fruit—all were offered—but only the milk was accepted.

After a few days steaming along the North African coast a sand-fly was caught and accepted with relish by the bird. Hereafter the Master, Officers and members of the ship's company were to be seen chasing flies around the vessel.

The bird was very docile and would sit happily in the palm of a hand. It did make attempts to move its wings although at the time it was obviously unable to fly. It was able to move the damaged leg but was reluctant to put too much weight on it when walking about.

Various suggestions were put forward as to the kind of bird it was and eventually the Secretary of the Bird Preservation Society of Malta informed us that it was in fact a young female quail. The Secretary took the bird into his care during the vessel's stay in Malta. He informed us that the bird would fly again and would be set free as soon as was possible.

Mr Powell, as a postscript to this report, states that when he returned to Malta one week later he was informed that the quail was in good condition. The damaged wing was healing and the leg, thought to have been broken, was now completely healed and was being used once again by the bird.

Position of ship at 0600 GMT on 16 September: 41° 00'N, 9° 30'W.

North Atlantic Ocean

m.v. *Baron Belhaven*. Captain G. Downie. Jarrow to Chaguaramus (Trinidad). Observer, Mr P. Smart, Chief Officer.

25 July 1977. At 0930 GMT two birds were observed on the starboard quarter at a distance of about half a nautical mile.

They were at first thought to be land birds as they had the pigeon-like fast wing-beat even though they had the glider's long slim wing and the sea-diver's powerful body.

One of the birds eventually came close enough for the following description to be made:

The body shape and size was that of a fully grown, if slim, gannet. The underside was off-white and the back speckled grey and white. It was not possible to determine the shape of the bill, but it appeared to be straight and quite long; it and the face were a bright orange colour. The wings were long and very slim, the span measured approximately two metres and at no point did the wing exceed an estimated ten centimetres in width. The cry, which could be heard at some distance, was short and sharp but high-pitched, not unlike the squeak of a mouse.

The flight of both birds was very erratic—they changed course and altitude very rapidly. They were, however, not seen to land on the water even though bread was thrown from the bridge into the sea.

After a period of about 15 minutes the birds flew off.

The wind during the previous four days had been blowing from the east at a

steady force four to six and the nearest land, Barbados, was about 560 n. mile to the south-west.

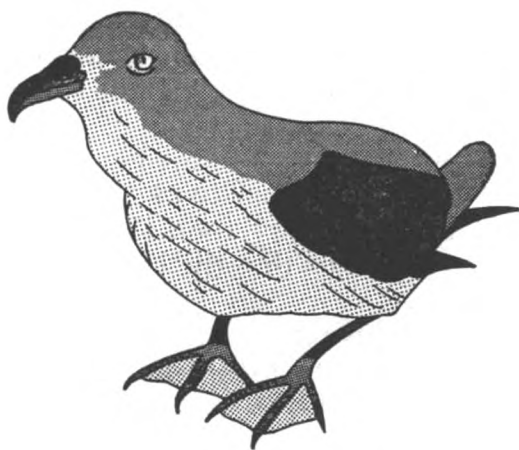
Position of ship: $18^{\circ} 34'N$, $51^{\circ} 42'W$.

Note. Captain G. S. Tuck, Chairman of the Royal Naval Birdwatching Society, comments: 'These are Red-billed Tropic-birds, *Phaethon aethereus*.'

Eastern South Pacific

m.v. *Rockhampton Star*. Captain P. Mathews. Panama Canal to Wellington. Observer, Mr M. A. Barker, 3rd Officer.

21 July 1977. When the bird shown in the sketch was first observed on board it was thought to be injured, but later inspection showed it to be in good condition and it was assumed that it had stopped for a rest. It appeared to be quite tame and raised no objections to being handled.



It was about 25 cm in overall length, it had small black webbed feet and was a glossy black in colour on the upper parts and white beneath. It was thought to be a species of diving petrel. Other birds of the similar species were also observed in the vicinity of the vessel.

The bird remained with us for three days.

Position of ship at 1800 GMT on 21 July: $01^{\circ} 36'S$, $91^{\circ} 36'W$.

Note. Captain G. S. Tuck comments:

'This is the Peruvian diving petrel *Pelecanoides garnoti*, the largest of the species with a more northern range than any others.

'It inhabits the west coasts of Peru and Chile from Paita south to Coronel.'

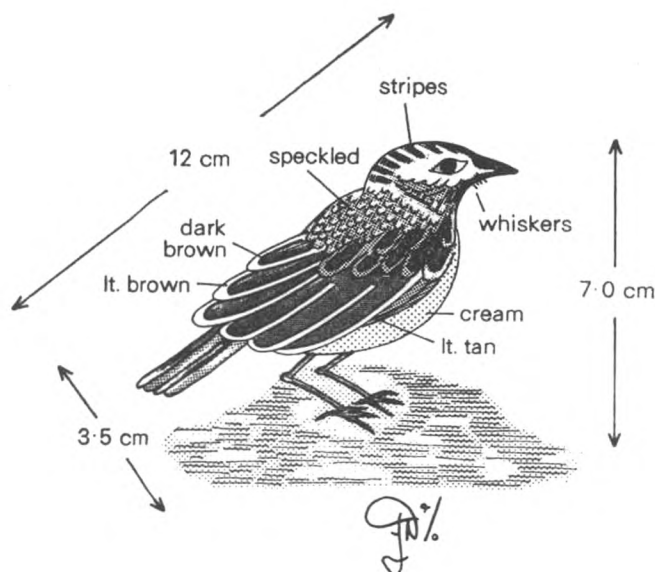
Red Sea

s.s. *Tokyo Bay*. Captain W. A. Fitzgerald. Suez to Port Kelang. Observers, the Master, ship's company and wives and children.

15 July 1977. During the morning the young bird portrayed in the sketch was found in an exhausted condition on deck by Mr J. Wallace; he placed it in the care of the Master's daughter.

The bird was fed on bread and milk and soon regained its strength; after three days it was able to fly without difficulty.

The bird's colouring was like that of a song thrush—dark brown feathers with light brown edges. The upper part of the beak was dark and the lower part lighter with whiskers. The legs were light brown and about five cm fully extended. It was



12 cm in overall length, the body was 3.5 cm wide, height was 7.0 cm, beak 1 cm long and wing span, fully extended, 20 cm.

Position of ship: 16° 16'N, 41° 11'E.

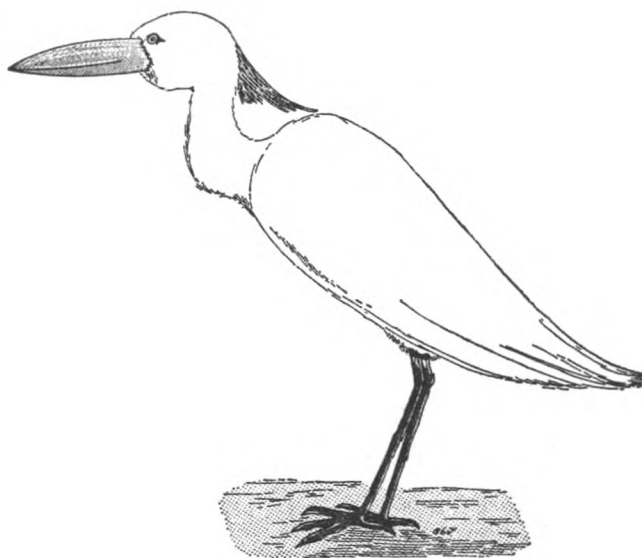
Note. Captain G. S. Tuck, comments:

'This is a member of the eastern race of Red-backed Shrike, *Lanius Collurio phoenicuroides*, it is either a female of the species or a young bird. The whiskers at the base of the bill are peculiar to shrikes. This bird migrates across the Red Sea from North Africa.'

Western Indian Ocean

m.v. *Orotava*. Captain B. Tyler. Norfolk (Va) to Chittagong. Observers, Mr J. C. S. Yeo, Chief Officer and Mr P. Jones, 3rd Officer.

18 September 1977. At 0920 GMT a white stork-like bird, see sketch, was observed flying around the vessel. After a short while it landed on No. 4 hatch where it remained for five minutes, after which it flew off for a few moments before landing again on the vessel's side rail on the port side of No. 3 hatch.



The bird seemed quite unperturbed there even though members of the crew were working in the vicinity and eight other sea birds, including two albatross, were flying around the vessel. After a further 25 minutes it flew off.

At 1435 the bird returned and landed on No. 7 hatch where it could be clearly seen from the bridge. The Chief Officer, who was on watch at the time, drew a rough sketch of it and a fair copy was made later in pen and ink by the Master. The bird remained on No. 7 hatch for about an hour after which time, it flew off and was not seen again.

It was about 30 cm long, beak to tail, and 23 cm tall, head to feet. The plumage was all white, the beak bright orange, legs and feet a brownish orange and the crest bright yellow.

Position of ship: 31° 30'S, 32° 00'E.

Note. This is a member of the Heron family. It is probably a cattle egret, *Bubulcus ibis*.

INSECTS

Gulf of Aden

m.v. *British Kennet*. Captain M. V. McCarthy. Djibouti to Aden. Observers, Mr M. D. Storey, 3rd Officer and Cadet R. G. Faulkner.

14 August 1977. During the mid-afternoon an insect was discovered and caught on the port bridge wing. Upon closer inspection of the bridge wing five smaller specimens were also observed and captured.

The large insect was five centimetres long and had a head length of five millimetres. The wings were a creamy colour speckled with brown and the head was dark and light brown in horizontal bands. The antennae were erect and there were spikes on the back of the jumping legs. The eyes were oval-shaped and measured four millimetres in length, they also had black and white vertical stripes.

Position of ship at 1200 GMT: 12° 24'N, 44° 18'E.

Note. Mr Jeremy Roffey of the Desert Locust Information Section of the Centre for Overseas Pest Research, comments:

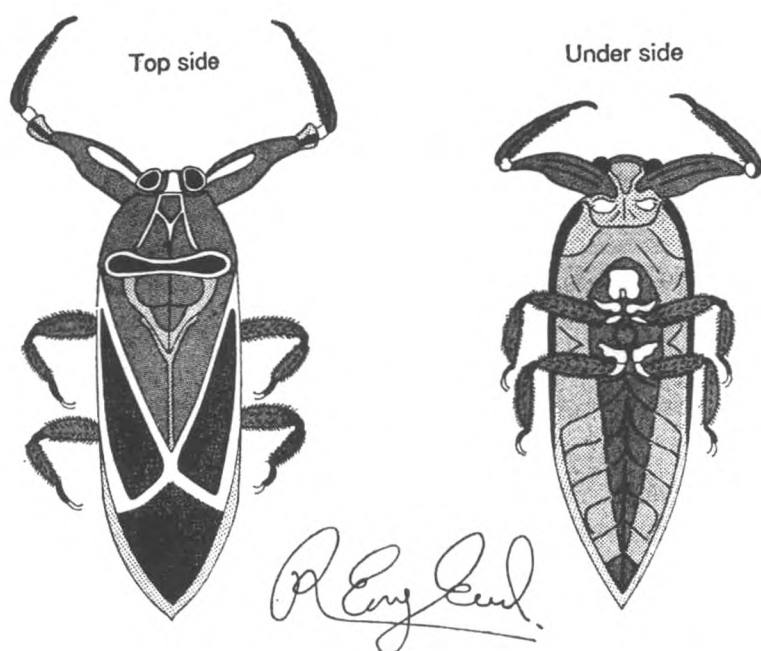
'From the description provided it would seem that the insect was a specimen of *Cyrtacanthacris tatarica* (Linnaeus 1758). This is a large grasshopper similar in shape and size and fairly closely related to the desert locust. It has a very wide distribution ranging from West Africa to south-east Asia. Although it is known from various islands off the coast of Africa, e.g., Cape Verde Islands, the Comoro Islands, Madagascar, Seychelles and Socotra, this appears to be the first record of a capture at sea, we are, therefore, most grateful for this report.

'I would only add that in order to make a definite determination of the insect's identity it is necessary to have a specimen, although in the case of locusts and grasshoppers, a front wing is often sufficient.'

Suez Bay

m.v. *British Kennet*. Captain M. V. McCarthy. Port Suez to Djibouti. Observer, Mr J. Swanson, 2nd Officer.

10 August 1977. The insect shown in the sketches was found on deck after the vessel had transitted the Suez Canal southbound.



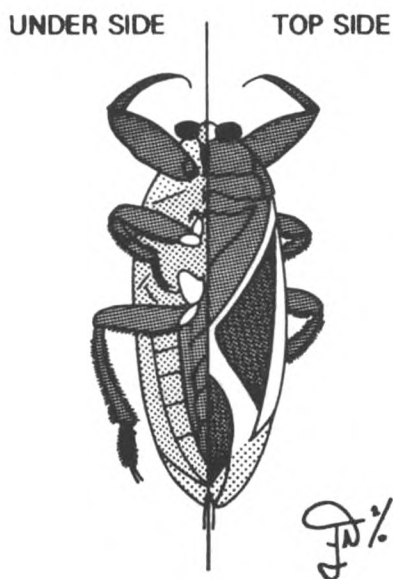
The body was about 9 cm and the fore-legs about 5 cm long. The top of the body was darkish brown in colour and had the appearance of extremely tough leather. Position of ship: 29° 58'N, 32° 33'E.

Mediterranean Sea

s.s. *Tokyo Bay*. Captain W. A. Fitzgerald. Port Said to Hamburg. Observer, Mr J. G. W. Dixon, 2nd Officer.

20 August 1977. The insect shown in the sketch was found dead in the swimming pool when the vessel was two days out from Port Said.

It was mainly brown with some black patches on the top side. The under side was



a light tan with green shading and had a dark ridge running down the belly. The legs were green and hairy.

Position of ship at 1200 GMT: $36^{\circ} 00'N$, $15^{\circ} 36'E$.

Note. Mr W. R. Dolling of the Department of Entomology, British Museum (Natural History), comments:

'This is probably *Hydrocyrius columbiae* Spinola. It is found in countries surrounding the Mediterranean.'

BIOLUMINESCENCE

North Atlantic Ocean

m.v. *Winchester Castle*. Captain K. Morton. Cape Town to Ushant. Observers, Mr C. M. Turner, 3rd Officer and Mr B. Davies.

8 July 1977. At 2230 GMT the vessel passed through parallel bands of bioluminescence which were approximately 65 centimetres wide with a distance of about 8 metres between each band; owing to the darkness it was not possible to determine the length of the bands. Each band lay along the direction of the wind which, at that time, was ssw'ly.

The phenomenon was observed for 15 minutes and it was interesting to note that throughout this time the calls of sea-birds could be heard and once or twice they were observed in the glow from the navigation lights. At no other time during the night were these birds heard or observed.

Position of ship: $04^{\circ} 21'N$, $12^{\circ} 50'W$.

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

'These are probably windrow accumulations of luminous organisms.'

South Atlantic Ocean

m.v. *Raeburn*. Captain A. H. White. Middlesbrough to Rio de Janeiro. Observer, Mr R. Wareing, 3rd Officer.

23 August 1977. At 0330 GMT in a position 35 n. mile south-west of the Fernando de Noronha Archipelago, the vessel entered a large area of bioluminescence; it took the form mainly of parallel bands, but there were also some patches of white water and some rapid flashes on the sea surface.

The bands were about 200 metres apart and they appeared to be about 5 n. mile in length and about 4 metres in width. They seemed to be moving with the wind in a north-westerly direction. The size of the individual luminous flashes varied in diameter from 15–60 centimetres. A sample of the water was taken and its temperature was found to be $26^{\circ}C$.

The glow from the bioluminescence was considerable, so much so that it was not necessary to switch on a torch to examine the sample of the sea-water taken.

The phenomenon was chiefly white in colour but there were emerald-green patches in the parallel bands and in the wake of the vessel.

The vessel steamed for about 40 n. mile before clearing the area of bioluminescence.

Position of ship: $5^{\circ} 00'S$, $33^{\circ} 00'W$.

Note. Dr Herring comments:

'Probably dinoflagellates but the larger patches or "organisms" may have been caused by local effects of fish etc.'

Timor Sea

m.v. *Cape Horn*. Captain D. Innes. Sydney to Lumut (Malaysia). Observers, the Master, Mr L. Morrison, Chief Officer and Cadet R. Simpson.

12 August 1977. At 1030 GMT a 'white sea', which appeared to light-up the whole sky, was observed. No effect was observed on the surface of the sea when the light from the Aldis lamp was directed onto it. However, when the light was directed into the air, patches of matter were observed in the beam. The visibility remained in excess of 16 n. mile. The phenomenon was observed for just over 2½ hours.

It was interesting to note that a sister ship, the *Cape Rodney*, observed this same phenomenon 24 hours earlier.

Weather conditions at the time were: dry bulb 29.5°C, wet bulb 25.0, sea temp. 25.5, wind SW, force 2.

Position of ship: 8° 29'S, 128° 08'E.

Note. Dr Herring comments:

'This is a typical milky sea appearance, but this observation is considerably further east than most reports.'

Arabian Sea

s.s. *British Explorer*. Captain N. D. Brookes. Persian Gulf to Land's End. Observer, Mr P. Hebden.

5 September 1977. At 1700 GMT the vessel encountered an area of milky sea. When the Aldis lamp was switched on and the radar was turned on and off, no effect on the brightness of the water was observed.

A water sample was taken and as the water was being poured into the sample bottle, bright 'spots' were observed in it. After a few seconds the 'spots' faded away.

It was decided to try a different method of preserving the sample and so it was treated with four drops of an alkali solution. After about one hour the bottom fifth of the sample had turned cloudy.

Weather conditions at the time were: dry bulb 25.6°C, wet bulb 24.2, sea temp. 25.2, visibility good, wind SW, force 5.

Position of ship: 13° 20'N, 59° 10'E.

Note. Dr Herring comments:

'A typical milky sea observation. The presence of spots of light in the sea-water sample is interesting as it implies the presence of dinoflagellates or small crustaceans. Luminous bacteria are sometimes said to be responsible for milky seas but they would not have given this appearance.'

Indian Ocean

m.v. *Wild Curlew*. Captain A. Dorkins. Abadan to Cape Town. Observers, the Master, Mr M. Brown, 2nd Officer, Mr R. Gemmell, 3rd Officer and Mr P. Murt. Radio Officer.

6 September 1977. At 1830 GMT an area of bioluminescence, which had the appearance of white sea fog, was observed to the west of the vessel.

About 20 minutes later, when the vessel entered the affected area, a diffuse milky light effect was observed just above the sea surface. The sea was clearly visible but the white horses were noticeably reduced in brightness. No effect was observed on the bioluminescence when the Aldis lamp was switched on.

At its brightest the phenomenon was sufficient to illuminate the clouds. There was no moon that night, the luminous effect was, therefore, due entirely to the phenomenon.

The bioluminescence began to reduce in intensity at about 2100 and was no longer observed about half an hour later.

A sample of sea-water was taken and was observed to be clear and normal. It was also noted that the water showed no response when exposed to a fluorescent ultra-violet light.

Position of ship: 06° 16'N, 52° 43'E.

Note. Dr Herring comments:

'The appearance of aerial light was probably an illusion and the observers were experiencing a typical milky sea.'

Arabian Sea

s.s. *Liverpool Bay*. Captain R. Moore. Suez to Port Kelang. Observers, the Master and Mr S. Heng, 2nd Officer.

16 September 1977. At 1725 GMT the vessel entered an area of bright milky sea and about five minutes later the surface of the sea seemed to be glowing all around as far as the horizon. Neither the bow waves nor the light from the Aldis lamp had any effect on the degree of brightness or other characteristics of the bioluminescence. Stars were visible from approximately 10 degrees above the horizon. Earlier, at 1600, the sea temperature had fallen from 30 to 23°C.

Weather details at the time of the observation were: dry bulb 23°C, sea temp. 23.1, wind SSW, force 5, visibility 15 n. mile, cumulus cloud in patches.

Position of ship: 12° 53'N, 52° 25'E.

Note. Dr Herring comments:

'This is a typical milky sea. These conditions are associated with the July–September monsoon period in the Arabian Sea area.'

Indian Ocean

s.s. *British Renown*. Captain J. S. Allen. Isle of Grain to Dubai. Observer, Mr R. R. Frankis, 3rd Officer.

4 August 1977. At 1735 the vessel encountered a very large area of milky sea, the area stretched as far as the horizon. The intensity was so great that the deck appeared to be just a black shadow. There was an apparent increase in humidity and a small number of fish together with a small amount of sea-weed were observed.

During the phenomenon the Radio Officer reported a decrease in signal strength on HF and static on MF frequencies.

The intensity of the phenomenon decreased for five minutes at about 1800, thereafter, it increased again and was observed until 1911.

Weather conditions at the time were: dry bulb 24.4°C, wet bulb 23.2, sea temp. 24.5, wind SSW, force 2.

Position of ship: 03° 12'N, 50° 30'E.

Note. Dr Herring comments:

'An impressive milky sea situation. I doubt if the radio interference was directly related.'

PARHELIA

Alboran Sea

m.v. *British Loyalty*. Captain R. Weston. Cagliari (Sardinia) to Europoort. Observers, the Master and Mr J. A. Robertson, 2nd Officer.

24 September 1977. At 1700 GMT an image of the sun was observed, through a layer of cirrostratus cloud, on a bearing of 258° and at an altitude of 15° 32'. At the same time a similar image of almost the same brilliance was observed at the same altitude but on a bearing of 275°; this phenomenon lasted for two minutes. After a further five minutes the same phenomenon was observed again, on this occasion, on a bearing of 285°.

On both occasions small arcs were observed between the sun and the images, these, however, were not very distinct and were predominantly red in colour.

What made the observation so interesting was that the images appeared to be of a similar intensity to that of the sun, particularly at the initial moments of sighting.

Position of ship: 36° 32'N, 3° 23'W.

Note. The following is an extract from the *Meteorological Glossary*:

'Parhelion (plural parhelia) is an image of the sun, coloured or white, it is also termed "mock sun".'

'The parhelia seen most frequently are at the same elevation as, and on both sides of the sun, and are coloured red nearest the sun.'

'Parhelia are caused by the refraction of sunlight within hexagonal ice crystals whose axes are vertical.'

See also the *Marine Observer's Handbook* page 102.

METEOR SHOWERS

Gulf of Mexico

m.v. *Spraynes*. Captain P. B. Bagley. New Orleans to Vera Cruz. Observers, the Master and Mr R. D. Rogers, 3rd Officer.

12 August 1977. Between 0330 and 0400 GMT an unusually large number of meteors were observed; at times they fell singly and at others as many as three or four could be seen simultaneously. The interval between sightings varied from a few seconds to as much as five minutes.

All the meteors appeared to be travelling on a course parallel to the vessel—that is to the south-east. Most of them displayed the normal characteristics of meteors, however, one dropped vertically and burned with a very brilliant white glow like a magnesium flare and illuminated the area for two or three seconds. The limits of display were 20° to 40° above the south-east horizon.

At about 0430 a further display was observed in the same area. This display lasted for about 10 minutes.

A separate shower was observed for a short time astern of the vessel in the general vicinity of Cassiopeia. Four or five meteors were visible at one time. These were all moving in different directions with their trails criss-crossing.

Position of ship: $24^{\circ} 30'N$, $92^{\circ} 15'W$. (approx.)

AURORA

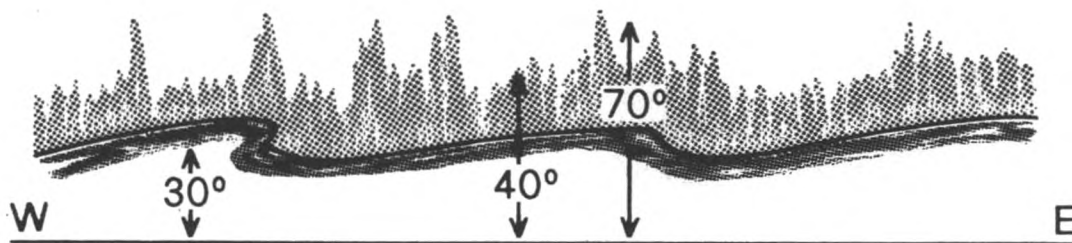
Western North Atlantic

m.v. *Manchester Challenge*. Captain J. Illingworth. Montreal to Liverpool. Observer, Mr A. E. Joss, 3rd Officer.

3 September 1977. At around 0001 GMT a white glow in a band across the northern sky was observed, the eastern edge bearing $055^{\circ}T$ and the western edge $280^{\circ}T$.

About 20 minutes later the glow took the form of a rayed band, the rays appearing to move to the east. A number of the rays were very long, see sketch, some reaching an altitude of 70° . The degree of brightness was considered to be bright to brilliant.

About 10 minutes later the lower edge formed a very bright homogeneous band with rays stretching upward. A thin arc was later observed stretching from each end of the band and passing through the vessel's zenith—this arc was about 5° – 10° wide.



The activity gradually decreased and by 0050 there was just a band similar to that initially observed.

Further activity was observed for a few hours. This took the form of a glow and a weak homogeneous band with rays.

Position of ship: $52^{\circ} 04'N$, $54^{\circ} 27'W$.

Editor's note: A summary of, and comments on, Aurora observed by the VOF during 1977 will appear in the October edition.

HIGH-FREQUENCY RADIO SIGNAL DISRUPTION

South Pacific Ocean

s.s. *Botany Bay*. Captain R. A. Wilson. Port Chalmers (NZ) to Balboa. Observer, Mr. S. J. Braithwaite, Radio Officer.

9 September 1977. At 1600 GMT Portishead Radio (GKA) was tuned in and received at strength three on 12 MHz, but the signal gradually faded to become strength one, readability one by 1620; at 1640 it was noted that almost all signals had disappeared from the HF bands of both main and emergency receivers. The signals were not heard again until approximately 1725 at which time reception conditions returned to normal fairly quickly. Between 1700 and 1715 Balboa Radio (NBA) could not be heard on 17 MHz, but between 1725 and 1730 this station increased from strength one to strength three. Possibly the effects were associated with the appearance of sunspot activity on 12 September.

Position of ship: $23^{\circ} 00'S$, $104^{\circ} 00'W$.

Note. Mr R. G. Flavell of the Propagation Studies Committee of the Radio Society of Great Britain, comments:

'We have investigated the circumstances and can tell you that the events recorded were a direct result of a major solar flare, located near the east limb of the sun at the time, 10 degrees north and 80 degrees east of the centre of the visible disk.

'A visual sighting of the flare recorded the maximum at 1646 by which time Mr Braithwaite was experiencing a severe lack of signals on the HF bands. A number of Observatories reported sudden ionospheric disturbances at around the same time.

'As the region which produced the flare moved across the face of the sun (at approximately 13 degrees east-to-west per day) it gave rise to several other similar events. There were major flares and ionospheric disturbances at 0020 and 0125 on the 18th when it was 37 degrees west, on the 19th at 1027 and 1045 when it was 49 degrees west and 0321 on the 20th when it was 55 degrees west. These are all heliocentric longitudes.'

Meteorological Services to Aid Navigation

BY CAPTAIN G. A. WHITE, EXTRA MASTER

Marine Superintendent, Meteorological Office

(A paper presented at the Safety at Sea International Symposium held in London in October 1977 and reproduced by kind permission.)

During the mid-nineteenth century shipping casualties on the home coasts reached such proportions that Parliament decided to institute measures to reduce the very serious loss of life. About the same time, 1853, an International Conference was convened in Brussels to consider international co-operation on matters appertaining to weather information and to produce a uniform system of weather observing. Consequently the Meteorological Office was established in 1854 as a department of the Board of Trade with Vice-Admiral FitzRoy as its Superintendent. By 1861 the first gale warning system was introduced whereby certain ports were informed of impending gales and they notified local shipping by hoisting gale warning signals. By 1909 North Atlantic liners were transmitting weather observations by radio to coast stations for onward transmission to the Meteorological Office where the data were used for weather forecasting. Previously the data from ocean areas had only been received in ships' meteorological logbooks at the completion of voyages and were used for compiling climatological tables. The first weather bulletin for shipping was transmitted by radio telegraphy in 1924.

Since those early days the Meteorological Office has developed into a highly scientific organization utilizing one of the most powerful computers in the world and a large, complex global telecommunication system designed for receiving and relaying vast quantities of meteorological data. Nevertheless, its association with shipping and its contribution to safety at sea continues.

In 1872 the International Meteorological Organization (IMO) was formed to standardize meteorological codes and observing practices and to promote research. It acted as an advisory body to national meteorological services but was only semi-official. After World War II the growing importance of meteorology for commercial, economic and scientific purposes was realized and its status was changed to an inter-governmental body and in 1951 became the World Meteorological Organization (WMO).

The purposes of WMO as a specialized agency of United Nations are: to promote the establishment and maintenance of systems for the rapid exchange of meteorological and related information,

to promote standardization of meteorological and related observations and to ensure the uniform publication of observations and statistics, to further the application of meteorology to aviation, shipping, water problems, agriculture and other human activities,

to promote activities in operational hydrology and to further close co-operation between meteorological and hydrological services, and, to encourage research and training in meteorology and, as appropriate, in related fields and also to assist in co-ordinating the international aspects of such research and training.

In order to promote, execute and co-ordinate meteorological and related activities within WMO the globe is divided into six regions and eight technical commissions have been established, the commissions consisting of technical experts. Meteorological services to shipping are dealt with by the Commission for Marine Meteorology (CMM) and these services have been receiving more attention during the last five years. At CMM meetings where matters of importance to shipping are

discussed, other United Nations (UN) agencies who may also be interested are represented. WMO is in turn represented at meetings of other UN Organizations such as the Inter-Governmental Maritime Consultative Organization where matters of meteorology may be raised. The national and international machinery of the Meteorological Office, CMM and WMO for co-ordinating systems may at times appear cumbersome; it is, nevertheless, necessary if the ultimate aims are to be achieved and mariners are to obtain the best global service that can be provided.

The United Kingdom meteorological services for shipping are described in government publications, e.g. *The Admiralty List of Radio Signals Volume 3, Ships' Code and Decode Book* and *Meteorological Office Leaflet No. 3. Volume 3 of Admiralty List of Radio Signals* also includes services provided by other Members of WMO and goes into considerable detail, the other two publications are prepared by the Meteorological Office for quick and easy reference.

This is not the forum to describe the details of our services but comments on the objectives and problems will no doubt be pertinent. The United Kingdom has undertaken an international commitment to provide weather forecasts for the eastern part of the North Atlantic, the western limit of our area is 40°W and it extends in a north/south direction from the north of Iceland and Denmark Strait to the parallel of 35°N taking in areas Biscay, Finisterre and Sole. Ships navigating in the area comply with the International Convention for the Safety of Life at Sea, they should therefore be well found and would normally be of such a size that they would be required to carry radio telegraphy. The radio transmission of the North Atlantic Weather Bulletin is broadcast twice daily from Portishead Radio Coast Station by W/T. The transmission times are selected to suit, as closely as possible, the regular production by the Central Forecast Office of the analyses and prognostic charts for the North Atlantic and also ships' radio watchkeeping hours. The Bulletin specifically contains storm warnings of force 10 and over, but not warnings of gales force 8 and 9 although wind forces and directions are described in a general forecast given in Part 3 of the Bulletin. If this Bulletin covered an area frequented by an abundance of small weather-sensitive ships then there would be a need to consider including and giving more emphasis to gale warnings of force 8 and over. Part 4 of this Bulletin, the International Analysis Code, is transmitted at 1130 GMT and is coded and produced in such a form that the navigator may reproduce his own weather chart for the area. Although the decoding and procedure are designed to accomplish the objective within the shortest period of time and with minimum effort this is still a somewhat time-consuming exercise. The introduction of radio facsimile receivers on many North Atlantic ships may replace the requirement of Part 4, and possibly Part 5 and 6 which describe, in code, the weather reported by ships and coastal weather observing stations.

The weather bulletin for shipping in coastal areas takes into account a number of other factors. Many of the ships are small and are therefore likely to suffer from heavy weather, they may not be fitted with W/T and a ship may have recently sailed without having received a weather bulletin prior to departure. Many more transmissions are obviously desirable and greater detail is required, consequently coastal forecast areas are smaller than those of the North Atlantic and gale warnings force 8 and over are specifically mentioned. Post Office coast radio stations located in the British Isles transmit by radio-telegraphy and radio-telephony weather bulletins for coastal areas in the vicinity of the radio station. Special forecasts for port areas are available by telephone from 18 forecast centres in the British Isles and reports of present weather can be obtained by telephoning any of approximately 70 weather observing stations. The BBC kindly give valuable assistance by broadcasting our weather bulletins for shipping. BBC Radio 2 broadcast these four times a day which cover all coastal areas surrounding the United Kingdom, Ireland and also the entire North Sea. The transmission times are not governed to any extent by ships' radio watchkeeping hours but by times available to Radio 2. A selection of

actual weather reports from a number of stations is a feature of the bulletin and, from recent investigations carried out by the Meteorological Office into their services for shipping, are considered to be of appreciable importance. They may on occasions contribute to safety at sea as those in command of a ship may make important navigational decisions based on the knowledge of the weather conditions prevailing a few hours earlier at a certain point on the coast.

Forecasts for UK inshore waters are broadcast on BBC Radio 4 before the English, Welsh and Northern Ireland programs close down for the night. The forecast for Scottish inshore waters with station reports is given towards the end of the Scottish Radio 4 program. These cover areas extending up to 12 miles from the coast for the period until 1800 the next day. Thus, a smaller area and a shorter period of time are covered and the forecast should be more accurate. Bulletins of this nature are useful to inshore fishermen and the yachting fraternity. BBC Radio 3 should not escape attention as forecasts for inshore waters, similar to late night forecasts given on Radio 4, are broadcast at an early hour in this program.

The Meteorological Office continues to press the BBC to make more time available for weather bulletins for shipping and to make changes to the broadcast times to suit the industry. The BBC are most co-operative but obliged to resist as they are an entertainment media and the general public cannot be expected to accept weather bulletins for shipping as entertainment.

It will be seen from the above that, as a ship approaches a UK port from the Atlantic, so more weather bulletins become available giving greater local detail. Most of these bulletins have been broadcast for many years but have been modified in style from time to time as the Meteorological Office endeavours to keep abreast of the requirements of the shipping and fishing industries and to ensure that their needs are fully met.

In recent years, the use of radio facsimile on merchant ships has become more widely accepted as the value of regularly receiving a variety of meteorological charts is realized by a growing number of masters and navigating officers. This is possibly the best medium for disseminating meteorological information to shipping and the headquarters of the UK Meteorological Office in Bracknell is one of the world's principal radio facsimile transmission stations. Very few of the facsimile charts are produced solely for the purpose of surface navigation, but a person with a knowledge of basic meteorology should, with a little practice, experience no difficulty in interpreting the surface charts such that a good appreciation of forthcoming weather can be obtained. The charts transmitted by Bracknell and of use to navigators cover most of the North Atlantic, the North Sea, the Baltic and Mediterranean. They include surface analyses charts and surface prognostic charts for 24, 48 and 72 hours, also wave prognostic charts and sea ice observations. The detail is sufficient to enable the master of a ship on a North Atlantic passage to avoid some of the depressions which might otherwise have been encountered. One of the greatest advantages of the facsimile receiver is its capability to receive weather charts for practically any area in which a ship is navigating and, unlike weather forecasts from foreign radio stations, language is not a problem. However, some thought regarding the interpretation of symbols will be necessary as internationally accepted symbols for marine facsimile charts have not been agreed by WMO. As an aid to navigation it could not be suggested that radio facsimile makes a real contribution to safety but it is a valuable economic aid.

Improved standards of weather forecasting achieved since World War II have made it possible to develop an advisory Ship Routeing Service in Bracknell for vessels on passage in the North Atlantic and North Pacific. This service is operated by experienced master mariners who devote their full time to routeing ships. They are briefed by professional weather forecasters who have at their disposal the output from the Meteorological Office computer together with meteorological data obtained from the whole of the Northern Hemisphere.

Prior to the first routeing of any class of ship the ship routeing officers, wherever

possible, visit the ship to study its performance characteristics from information recorded in the deck logbook. Wave and speed curves are produced in order that they may be applied to wave prognostic charts to determine the optimum course. Currents, ice, probability of encountering tropical storms and fog together with the master's and owner's requirements are all taken into account. After advising the master of the initial course for the ocean passage, regular weather reports are received from the ship so that the routing officer may monitor the ship's progress and follow a twice-daily tracking procedure. He can then advise on alterations of course and speed as necessary throughout the voyage so that the ship may avoid the worst of the weather and accomplish a saving of time on passage, fuel economy, reduction in heavy weather damage and greater comfort for those on board. This is an advisory service with direct dialogue, wherever possible, between the ship's master and the ship routing officer. Obviously it is extremely difficult to quantify in financial terms the actual benefits of the service to the shipowner or charterer, but, where attempts have been made to produce evidence of the value of the service, there were clear indications of a very profitable outcome for the client.

The principal objectives of providing meteorological services to the shipping and fishing industries is to reduce casualties at sea, some of which involve the loss of life. There are also financial benefits to be obtained by the conscientious use of the services. There can, however, be no clear line of demarcation between the services that contribute to safety and those that produce information which is available for use simply for commercial and financial gain. Much depends on the type of ship and her trade. A large powerful container ship, for instance when at sea, may not pay much heed to a force 8 gale warning but the master of a quarter million ton tanker may decide not to leave the berth when experiencing winds of force 6. Further, a small ship, on receiving a forecast of winds of force 6 or 7, may seek shelter and treat this as a serious warning. It is appreciated that many warnings and forecasts pass unheeded and this is borne out by casualty figures. An association, which produces monthly casualty returns, classifies the nature of casualties under headings such as weather, foundering and abandonments, strandings, collisions, contacts, fires etc. On investigating foundering, strandings and collisions it may be found that the majority of these occur under unfavourable weather conditions which may well have been forecast and of which the mariner was obviously aware. It might also be realized that had the responsible personnel taken due cognizance of the weather, many of the casualties might well have been avoided. The mariner is only too well aware that collisions frequently occur in the English Channel when fog has persisted for more than a few hours and of the sudden increase in the number of distress signals received from coastal sea areas when gales are being experienced.

The United Kingdom is a leading maritime nation with a low casualty rate of which she can be justly proud, but efforts should still be made to reduce this rate and reap the maximum financial benefit by making full use of the meteorological services available, and to which shipping contributes by virtue of the weather observations made by officers at sea.

A Brief History of the Ice-breakers of the United States Coast Guard

(This article is reproduced by kind permission of the US Coast Guard)

Historically the Coast Guard's need for an ice-breaker arose out of the purchase of Alaska by the United States from the Imperial Russian Government in 1867. In fact the US Revenue Cutter Service's—as the Coast Guard was then known—cutter *Lincoln* had been dispatched north that same year to make the first official exploration of the new territory. Out of this voyage was born the Service's Bering Sea Patrol and other Alaskan activities, some of which are still carried on to the present day.

At this time both whaling and sealing were enjoying a boom period in the polar regions. Through bitter experience a strengthened version of the ordinary wooden sailing ship, with the addition of auxiliary steam engines and a feathering or hoisting screw, had been developed and had proved quite successful. These ships had heavier bow framing and the hull planking was sheathed with ironbark or greenheart along the waterline to withstand the scoring action of ice. The stem was also plated with iron but in most other respects their design and construction followed the general shipbuilding practice of the period.

A notable example of this type was the renowned auxiliary barquentine *Bear*, which was the first Coast Guard-acquired vessel specially strengthened for work in Arctic ice. Other early vessels were the *Thetis* and the *Corwin* but the *Bear* was destined to have the longest association with the Service.

Built at Dundee, Scotland in 1894 as a whaler and sealer, the *Bear* had an overall length of 198 feet, a maximum draught of 18 feet, displaced 1700 tons and had a reciprocating steam engine as her main propulsion plant. The US Navy had originally purchased this ship as a relief vessel in connection with the ill-fated Greeley Expedition. In 1885, after successfully completing several Arctic missions for the Navy, the *Bear* was transferred to the US Revenue Cutter Service for the purpose of patrolling Alaskan territorial waters. From 1885 until 1926, when she was assigned elsewhere, she operated in Alaskan waters. To replace her in these waters, the Coast Guard built the *Northland* in 1927.

Since the *Bear* had proved so satisfactory in performing the routine Coast Guard duties during her many years of service in Arctic waters, many of her characteristics were incorporated into the *Northland*. Built by the Newport News Shipbuilding Company in Virginia, this new vessel had an overall length of 216 feet, a maximum draught of 15 feet, displaced 2050 tons, and was propelled by two diesel engines. Although the massive wooden hull of the old *Bear* had been replaced with steel in the *Northland*, she was still rigged as a barquentine to satisfy the experienced Arctic skipper, who hesitated to take a vessel into Arctic ice without sails as an auxiliary means of propulsion.

One of the new features incorporated into the *Northland* was a cut-away bow—typical of European vessels which had proved successful in Arctic operations by other nations. Although *Northland* was able to break light ice, she was not built primarily as an ice-breaker. Instead she was built with sufficient strength to navigate in fields of broken ice, with sufficient endurance to permit operating away from a base for long periods of time, and also to give the crew a reasonably good chance of surviving until the thaw should the vessel become entrapped.

All things considered, the *Northland* proved to be a worthy successor to the *Bear*. The Coast Guard used her in Arctic operations during World War II. She was decommissioned in 1946.

For some time the Coast Guard's extensive experience in the Arctic had indicated the desirability of having vessels designed not only for operating in ice, but also

capable of breaking ice. Moreover, the Service's mission of assistance to vessels in distress also indicated a need for ice-breakers. A vessel beset by ice is in some form of distress and Coast Guard cutters traditionally go to their assistance. All of this experience and background, nevertheless, had little effect upon the design of Coast Guard ships until the 1930s.

Prior to this time there had been little serious attention paid within the United States to ice-breaking or even a need for it. The reason for this neglect was probably a two-fold one: firstly all US tidal ports are relatively ice-free, and secondly the development of US transportation came about without relying upon ice-breaking as coastwise traffic did not need it and the inland regions were served by rail. Unlike northern Europe the United States did not depend upon canals and inland waterways to any great extent.

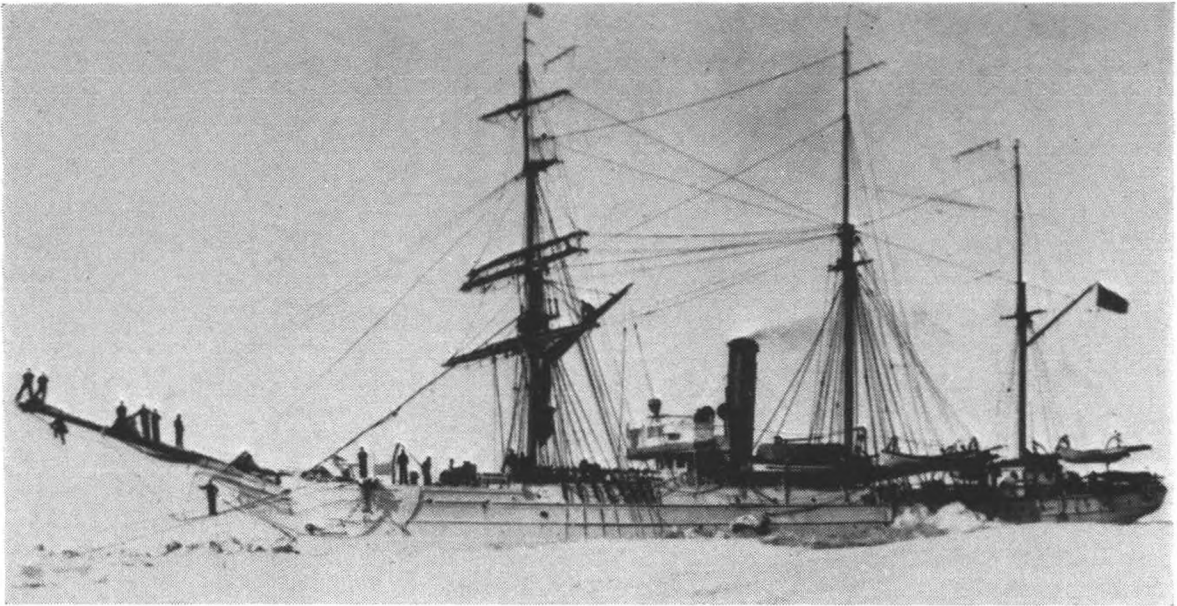
During the 1930s meanwhile, an additional ice-breaking requirement developed with the coming of the oil barge and the expedient of using waterways, especially in New England, for fuel deliveries. This ultimately led to President Roosevelt directing the Coast Guard 'to assist in keeping open to navigation by means of ice-breaking operations . . . channels and harbours within the reasonable demands of commerce'. Even with this new authority, however, no requirement was spelled out for either the United States Navy or the Coast Guard to secure a vessel specifically designed as an ice-breaker. It would take the advent of World War II to bring about the acquisition of such vessels.

Subsequent to the launching of the *Northland*, the Coast Guard built several other vessels with ice-operating features such as the six cutters of the Escanaba Class built from 1931 to 1935. Much was learned from the ice operation of these vessels in regard to the desirability of various types of propulsion machinery, the design precautions necessary to insure proper operation of the machinery in ice and the structural effects of ice operations upon the hull.

In 1937 the Coast Guard instituted a study of the entire problem of ice-breaking which included a review of all the data obtainable on the characteristics and performances of all ice-breakers ever built. It even dispatched a representative to Europe to inspect and gather information on the ice-breakers built for Russia, Sweden, Denmark and Holland. In addition investigations were conducted to find the most effective hull form for breaking ice as well as for developing the proper relation between displacement, hull strength and horsepower. The results of this study were incorporated into the design of a group of harbour tugs of about 110 feet in length.

The first Coast Guard cutters to be designed primarily with ice-breaking characteristics, therefore, were the *Raritan* and *Naugatuck* which were completed in April 1939. They were single-screw, diesel-electric vessels of 110 feet length overall, 10 feet 6 inches draught, 328 tons displacement and 1000 shaft horsepower. Once placed into service they proved very successful, even breaking sheet ice 20 inches thick without resorting to charging and ramming. During World War II they worked under very severe ice conditions without suffering hull damage. Because of their eminently successful performance as ice-breakers, many of the characteristics of these vessels were included in the group of buoy tenders next to be built and known as the Cactus Class which were slightly larger than the harbour tugs but had the same hull form and general structural arrangement.

During the uncertain days just prior to World War II, naval operations in the vicinity of Greenland had revealed a need for an ice-breaker to cope with the ice conditions existing offshore and in the fjords. Based on the general duty requirements known at that time, construction of the cutter *Storis*, which was somewhat larger than the Cactus Class but of the same general type, was commenced in 1941 for operating in the sub-polar regions of Greenland and Labrador. The general dimensions of the *Storis* were: length overall 230 feet, maximum draught 15 feet and displacement 1715 tons. The main propulsion was diesel-electric on a single screw, developing 1800 shaft horsepower.



USCGC *Bear*, the first US Coast Guard cutter to be specially reinforced for work in the Arctic ice



USCGC *Staten Island*, the first of the 'Wind' class ice-breakers (*see* page 127)



USCGC *Polar Star*, the first new US ice-breaker to be built in over 20 years



The bridge of the USCGC *Polar Star* (see page 127)

The culmination of this series of vessels was the four heavy duty ocean-going ice-breakers of the Wind Class, so called because it was planned to name them *Northwind*, *Eastwind*, *Southwind* and *Westwind*. These vessels were unique being the first of their kind to be specially constructed to withstand the terrific pressure of polar ice and to deal shattering blows to it. They were born as a result of World War II emergencies.

When the German invasion of Denmark in May 1940 made it advisable for the United States to assume Denmark's burden of defending Greenland, two Coast Guard cutters were ordered to proceed there immediately. Soon other vessels were attached to the Greenland Patrol Force thus increasing its effectiveness. As Greenland operations were extended it was discovered that the proposed US Army and US Navy bases would be located in sites that only could be reached, in certain seasons, with the help of a most able type of ice-breaker.

Design on the type of polar ice-breaker that would be needed started immediately. Fortunately the many years of studying, planning and improving on the designs of the older European types of ocean-going ice-breakers by Coast Guard engineers now paid off. Initial appropriation for the Wind Class of four of the heaviest ice-breakers yet to be constructed was received on 28 October 1941.

For more ice-breaking ability the design called for greater displacement and horsepower, for manoeuvrability a restricted length and efficient steering gear, also, because of the remoteness of the field of operation, reliability and economy of fuel were important considerations. In view of her outstandingly successful record, the Swedish ice-breaker *Ymer* was selected as a prototype for the Wind Class. The characteristics finally adopted were length 269 feet, beam 63 feet 6 inches, draught 25 feet 9 inches and displacement 5300 tons.

Meanwhile as part of the defence effort, the Coast Guard had chartered several Great Lakes car ferries for systematic ice-breaking operations on the lakes. One of the major problems throughout World War II, particularly in the early stages, was the need to deliver iron ore in sufficient quantities to meet the demand for increased steel production. One of the steps taken was to prolong the navigation season of the ore carriers on the Great Lakes by freeing the channels of congested ice. An outcome of this effort was the construction of the *Mackinaw* and on 17 December 1941, just 10 days after the attack on Pearl Harbour, her construction was authorized. Nothing in her basic design was to detract from her ice-breaking capabilities she was to be a true ice-breaker in all respects.

The dimensions and characteristics of the Great Lakes ice-breaker *Mackinaw* were length overall 290 feet, beam 74 feet 4 inches, draught 19 feet, a displacement of about 5000 tons and 10 000 shaft horsepower driving three propellers. She was built by the Toledo Shipbuilding Company, Inc., at Toledo, Ohio and was launched sideways on 4 March 1944 and commissioned in the service of the Coast Guard on 20 December 1944. The ice-breaker arrived on 31 December 1944 at Cheboygan, Michigan, which has been her home port ever since. At the time of the *Mackinaw's* launching she was the most powerful, most modern and most capable ice-breaker in the world.

As the Wind Class ice-breakers were being built the United States was a participant in World War II. Since the Coast Guard had been transferred to the Navy, these vessels were constructed under the joint auspices of the Navy and the Coast Guard, although their operation remained primarily with the Coast Guard. Before the first one was even launched, however, the Soviet Union requested that the four polar ice-breakers be transferred to its custody. Since the military situation had changed by the time the ships were being finished, all but the *Eastwind* were transferred to the Russians.

The first, *Northwind*, was delivered to the Soviet Union under the Lend-Lease Program in 1944. They renamed the ship *Severnny Veter*, which is Russian for *Northwind*, and assigned her to the Northern Sea Route Command, where she served until her ultimate return to the United States in 1951. The following year

the ice-breaker was renamed the USS *Staten Island* and became part of the Navy's ice-breaker fleet.

The Coast Guard ice-breaker *Southwind* was commissioned on 15 July 1944. After service on the Greenland Patrol, during which she took part in the capture of the German weather observation trawler *Externsteine*, the *Southwind* was transferred to the USSR on 20 March 1945. The Russians renamed her the *Admiral Makarov* after the famous Russian Mariner and naval architect who designed and built the world's first ocean-going ice-breaker, the *Yermak*, in 1898. For the next four and a half years the *Admiral Makarov* operated as a unit of the Russian Merchant Marine along the northern sea route north of Russia and Siberia. In 1950 Russia returned this Lend-Lease ship. After two months of repair work the vessel was commissioned in the US Navy as the USS *Atka* and became part of the Navy's ice-breaker fleet.

The Coast Guard ice-breaker *Westwind* was commissioned on 18 September 1944. In late November of the same year orders were received aboard her that she was to be loaned to the USSR. In a matter of months, instead of English, Russian was spoken on her decks and her new name was *Severny Polus*. In 1952 Russia returned this ice-breaker to the United States and the Coast Guard and she was once again named the *Westwind*.

The Coast Guard ice-breaker *Eastwind* was commissioned on 3 June 1944. Her first mission during World War II was to take a part in the Greenland Patrol. Upon reaching north-east Greenland she fought through thick ice to rescue two men in a small boat that had been lost from an Allied patrol. Pushing still further northward the *Eastwind* sighted a German weather station in October 1944. During the next 15 days landing parties from the *Eastwind* captured the station, its valuable documents and a German expeditionary vessel. The rest of the war was spent working in the thick polar ice and ferreting out various enemy infiltrations.

When World War II ended the United States possessed one sea-going deep-draught ice-breaker manned and operated by the Coast Guard. This vessel, the *Eastwind*, remained a part of the Coast Guard's fleet when the Service reverted from the Navy back to the Treasury Department in 1946.

Previously, during the war, money had been allocated for three replacement ice-breakers of the Wind Class to take the place of those loaned to Russia. These vessels were not completed, however, until 1946 and 1947. At that time the Coast Guard was being cut back from a wartime strength of about 40 000 to approximately 17 000 officers and men. Unable to man three ice-breakers, the Coast Guard accepted one of the new ice-breakers as the new or second *Northwind* and the remaining two were commissioned into the US Navy as the *Burton Island* and *Edisto*.

While the Navy had operated in the polar regions for many years, this action marked the beginning of the Navy's ice-breaker fleet. Within a decade, in 1954, the Navy built another ice-breaker, the USS *Glacier*. Although the design of this new 5100 ton ice-breaker followed that of the Wind Class, the *Glacier* was improved and enlarged to increase its capability.

Thus the postwar period found the United States with eight sea-going ice-breakers—five operated by the Navy and three by the Coast Guard. The remaining US ice-breaking capability, which was essentially domestic in nature, was represented by the *Mackinaw* on the Great Lakes, the *Storis* for sub-polar Alaskan duty primarily and the buoy tenders and harbour tugs that had ice-breaking features incorporated into their designs.

In 1960 Congress had authorized the construction of a nuclear powered ice-breaker for operation by the Coast Guard. The Soviet Union had pioneered this by constructing the nuclear powered ice-breaker *Lenin* which was far larger and more powerful than any that the US possessed. However, Presidential opposition, based primarily upon the prohibitive cost of an atomic ice-breaker, doomed this legislation.

Within five years, however, the Coast Guard's ice-breaker fleet was to undergo a tremendous increase. The Navy and the Coast Guard had made an exhaustive study of their joint operation of ice-breakers in polar regions. The study showed that consolidation of the ice-breaking function in the Coast Guard would be in the best national interest. It concentrated the Federal ice-breaking function in an agency that was qualified both historically and legislatively to carry out the responsibility.

Undoubtedly the increasingly tense international situation—heated up by the Vietnam conflict—played an important part in this transfer. The Navy found itself deploying fleet units to an ever growing number of crisis areas. With the transfer of the polar ice-breaking function to the Coast Guard, the Navy would be in a position to free larger numbers of personnel for combat tasks. In short this transfer amounted to a re-alignment of logistic plans to meet the realities of the troubled world situation.

Under the agreement between the Treasury and Navy Departments, the entire Navy's ice-breaker fleet was transferred individually to the Coast Guard during the period October 1965 to December 1966. The Coast Guard retained the names of these ice-breakers, except for the *Atka*, which resumed its former Coast Guard name of *Southwind*.

After the decommissioning of the *Eastwind* in 1968 the ice-breakers *Southwind*, *Staten Island* and *Edisto* were also decommissioned which left only the *Burton Island*, *Glacier*, *Northwind*, *Westwind* and *Mackinaw* as the only active Coast Guard ice-breakers.

On 25 August 1971 the Secretary of Transportation announced that the Lockheed Shipbuilding and Construction Company of Seattle, Washington had been awarded the contract to build America's most powerful ice-breaker for the US Coast Guard.

The new ice-breaker, *Polar Star*, was commissioned on 17 January 1976 in Seattle and was followed by a sister ship, *Polar Sea*, the following year. The characteristics of these ships are length 399 feet, beam 83 feet 6 inches, draught 28 feet and displacement 10 863 tons. They are propelled by Combined Diesel or Gas Turbine (CODOG) engines of which the diesel-electric system can develop 18 000 SHP and the gas turbine system 60 000 SHP. The propulsion power is equally divided between three shafts each driving a controllable pitch propeller. The shape of the hull and design of the bows are such that the ship will ride up over and break ice up to 21 feet thick. The cruising range at 13 knots is 28 275 n. mile and maximum speed is 21 knots. Under maximum power these new ice-breakers are capable of maintaining a constant speed of three knots through ice up to six feet thick without having to continually go astern and then ahead to ram the ice. Should the vessels be beset they are equipped with heeling tanks whereby 400 tons of water can be transferred from one side of the vessel to the other in 50 seconds thus allowing them to 'roll' free of the ice.

Each vessel is fitted with a glass-enclosed crow's nest some 104 feet above the water-line fully equipped with engine and rudder controls together with navigational aids.

Two turbine-powered helicopters are assigned to each vessel which, in addition to ice reconnaissance, are used for logistical support and transportation of personnel and supplies to isolated research stations.

Although the primary duty of these vessels is ice-breaking, they also function as research vessels and up to 10 scientists can be accommodated on board. In addition to a meteorological office and two oceanographic laboratories, various other offices and a scientific library are available for their use.

PRESENTATION OF BAROGRAPHS

For the second successive year the presentation of barographs to shipmasters with long and outstanding service to the Meteorological Office took place at the Meteorological Office College at Shinfield Park, near Reading, on 10 January 1978.

For the benefit of those who may be unfamiliar with the procedures leading up to the selection of the four recipients, the requirements needed to qualify for the Long Service Award List are a minimum of 15 years of voluntary observing which, combined with the number of logbooks received and the character thereof, decides the order of precedence. The practice of making these special awards was commenced in 1948.

As announced in the January 1978 edition of this journal the Masters qualifying for this award for the year ending 1976 were:

Captain E. T. Rowland of P. & O. Lines, Captain J. Cosker of Container Fleets, Captain W. W. Newport of Shaw Savill Line and Captain T. B. Hancock of Manchester Liners Limited.

Unlike 1977 however, this year only three recipients were able to be present on this occasion. Captain E. T. Rowland was unfortunately at sea and not expected to return to the UK until about mid-March 1978 when we hope arrangements can be made to hold a second presentation.

Nevertheless, it was with considerable pleasure that we were able to welcome the other three Masters, together with their wives, and the following members of the managerial side of the three shipping companies: Mr P. M. Pennell, Assistant Operations Manager of Container Fleets, Captain A. H. Baber, Marine Manager of Shaw Savill and Captain J. McKay, Marine Superintendent (Personnel) of Manchester Liners.

Dr B. J. Mason, Director-General of the Meteorological Office officiated at this year's ceremony, and, after expressing his gratitude to the three Masters for their long and unstinting voluntary services to meteorology, he went on to stress that, in spite of meteorological satellites, surface observations from ships were still of primary importance and likely to remain so for some years ahead.

The Masters were then able to examine their first meteorological logbooks, all of which had been compiled some 25 years previously. This brought forth the usual nostalgic discussions between Masters and Marine Superintendents as to the subsequent careers of their ex-shipmates. A photograph taken at the presentation appears opposite page 113.

The visitors were then entertained to luncheon by Dr Mason and senior officers of the Meteorological Office after which the guests were conducted to Meteorological Office Headquarters in Bracknell where they were shown through the Central Forecasting Office, Storm Tide Warning Service and the Telecommunications Centre.

J.D.B.

AURORA NOTES FOR 1976

By R. J. LIVESEY

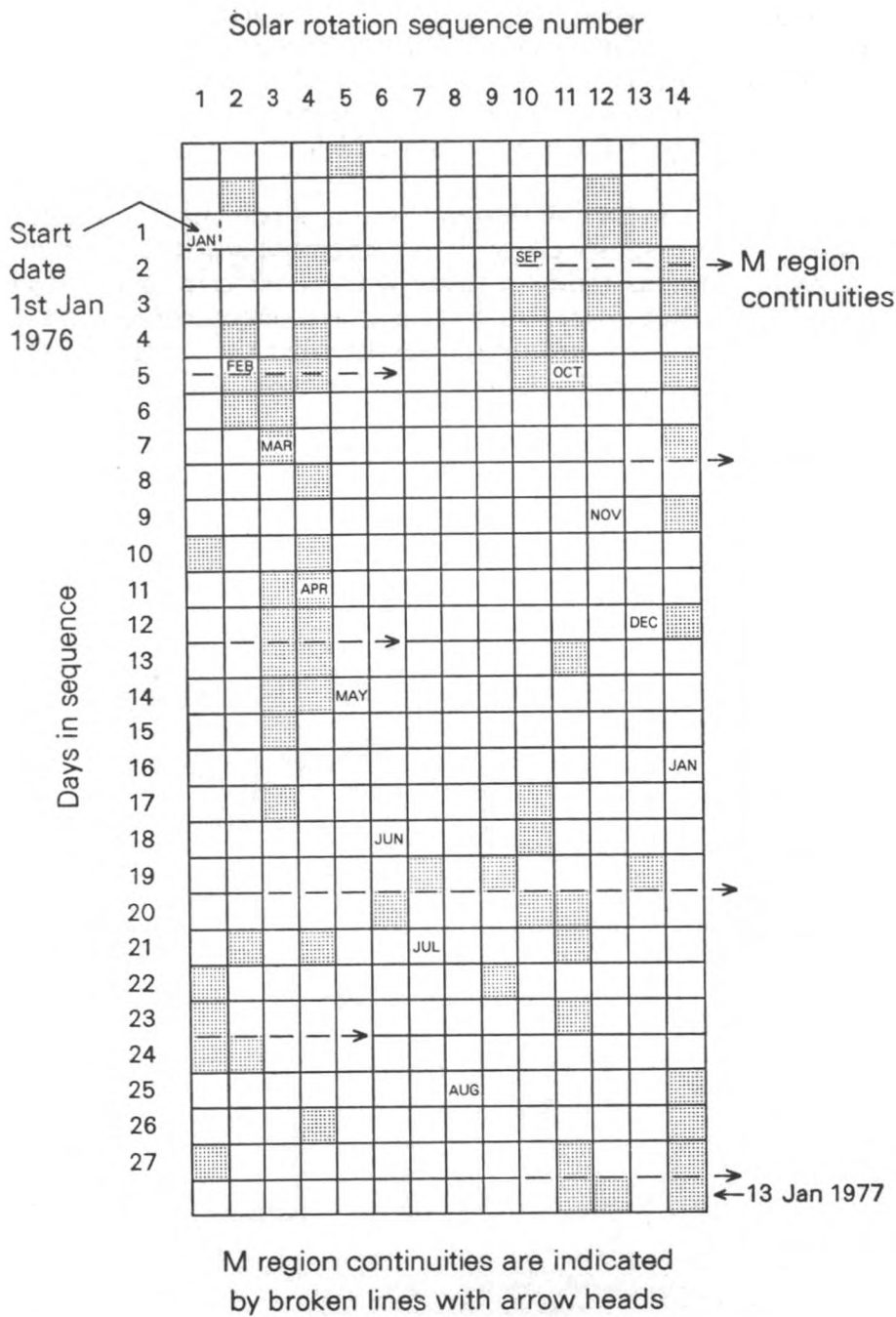
(Co-ordinator of Auroral Observing, the Solar Section of the British Astronomical Association)

Editor's note. Recording of observations of visual aurora at the Balfour Stewart Auroral Laboratory of the University of Edinburgh ceased on 31 December 1975. From 1 January 1976 to 1 July 1977 all aurora observations received from the VOF were forwarded to the Aurora Section of the British Astronomical Association but were not collated and analyzed.

On 1 July 1977 the Aurora Section of the British Astronomical Association was disbanded and the responsibility for the collection and analysis of aurora observations passed to the Solar Section. The current policy is to maintain an observing

network and to relate observations received with others made of the sun, the earth's magnetic field and ionosphere by appropriate groups of investigators. Although the complex mechanism of solar-terrestrial phenomena, of which the aurora forms a part, is by no means fully understood, the following is a brief guide to the situation.

Electrified particles are discharged from the sun either as the result of an explosive-like event called a Flare, or by a continuous spray effect from a point of weakness in the sun's atmosphere called an M region. In the former the effects are non-recurring but in the case of the latter, as the sun rotates once about every 27 days, the spray may encounter the earth at intervals rather like a rotating lighthouse beam. The particle streams, because they are electrically charged, affect the earth's magnetic field together with electrical currents flowing in the upper atmosphere.



Aurora activity observed by Mariners in 1976 plotted against 27-day solar rotation sequences

The net result is that when the earth encounters a solar particle stream, electrically charged particles are injected into the atmosphere, which, on colliding with air molecules, produce light rather akin to the way neon signs are made to glow.

If aurora are caused by M regions they will tend to recur at about 27-day intervals. This may be demonstrated by plotting the aurorally active nights reported on a diagram on which each vertical column comprises 27 consecutive calendar days. M region aurora will tend to form groups of horizontally orientated dates. Some M regions may be short-lived and survive only one or two solar rotations but others may last up to a year or more.

The observations of auroral activity obtained from mariners in 1976 and the beginning of 1977 were examined and plotted on a 27-day diagram. It was most interesting to find that M region activity initially observed on 22 January 1976 was still active until 30 January 1977. There were a number of shorter duration regions, notably 31 January to 25 March, 23 September to 11 January and particularly 2 September to 14 January as well as 5 March to 1 April. Knowing the M region tendency, once a recurrence has been identified, aurora observers can step up their efforts to make contact with the aurora at the next predicted apparition. Recurrence is not precise and activity may be found for several days before or after the theoretical date according to the nature and width of the beam of particles being ejected by the sun.

The next sunspot cycle is now developing and it is reasonable to suppose that the frequency of auroral storms, especially Flare-generated storms, will rise in the next year or so. M region storms tend to be most frequent during the declining solar cycle. It is to be hoped that observers will be able to enjoy some good displays and that they will take the time and trouble to report what they see. The past efforts of the voluntary marine observers have been most welcome and are gratefully acknowledged.

DATE 1976	SHIP	GEOGRAPHIC POSITION	TIME (GMT)	FORMS
10 Jan.	.. <i>St Jason</i> ..	.. 71° 30'N 30° 14'E ..	.. 1745-2300 ..	N
10	.. <i>Joseph Conrad</i> ..	.. 71° 30'N 32° 06'E ..	.. 1830-2400 ..	QN, RA, PR, FR, C
22	.. <i>Weather Surveyor</i> ..	.. 57° 02'N 20° 07'W ..	.. 1945-0145 ..	QN
23	.. <i>St. Jason</i> ..	.. 70° 30'N 17° 08'E ..	.. 1940 ..	QHB
23	.. <i>Weather Surveyor</i> ..	.. 56° 57'N 20° 36'W ..	.. 0145-0345 ..	QN
24	.. <i>Weather Surveyor</i> ..	.. 56° 39'N 20° 48'W ..	.. 2345 ..	QN
27	.. <i>Weather Surveyor</i> ..	.. 57° 05'N 19° 46'W ..	.. 0145-0240 ..	QN
31	.. <i>Weather Surveyor</i> ..	.. 57° 11'N 20° 20'W ..	.. 2200-0357 ..	QN, C
1 Feb.	.. <i>Weather Surveyor</i> ..	.. 57° 01'N 20° 52'W ..	.. 2052-2150 ..	QN
1	.. <i>St Jason</i> ..	.. 71° 12'N 17° 00'E ..	.. 1745 ..	R, AmN
2	.. <i>St Jason</i> ..	.. 71° 05'N 17° 03'E ..	.. 1720-1830 ..	PuB, HA
17	.. <i>Weather Reporter</i> ..	.. 56° 58'N 20° 08'W ..	.. 2140 ..	N
20	.. <i>Weather Reporter</i> ..	.. 57° 00'N 19° 35'W ..	.. 2140-2145 ..	N
28	.. <i>Weather Reporter</i> ..	.. 56° 18'N 13° 25'W ..	.. 0440-0547 ..	N
28	.. <i>Weather Surveyor</i> ..	.. 56° 50'N 18° 03'W ..	.. 2345-0045 ..	QN
29	.. <i>Weather Surveyor</i> ..	.. 57° 07'N 19° 41'W ..	.. 2055 ..	QN
1 Mar.	.. <i>Cape Howe</i> ..	.. 71° 12'N 24° 30'W ..	.. — ..	N, R
5	.. <i>Weather Surveyor</i> ..	.. 57° 05'N 20° 33'W ..	.. 2145-0250 ..	QN
6	.. <i>Weather Surveyor</i> ..	.. 57° 08'N 20° 45'W ..	.. 2240-0600 ..	QN, QHB
7	.. <i>Weather Surveyor</i> ..	.. 56° 57'N 20° 34'W ..	.. 0248 ..	QN
8	.. <i>Moreton Bay</i> ..	.. 47° 44'S 81° 00'E ..	.. 1700-1900 ..	RA, HA
9	.. <i>Moreton Bay</i> ..	.. 48° 35'S 92° 00'E ..	.. 1500-1700 ..	RB, RR, P
11	.. <i>Weather Surveyor</i> ..	.. 56° 57'N 20° 00'W ..	.. 0540 ..	QN
23	.. <i>Vitore</i> ..	.. 64° 42'N 06° 00'E ..	.. 2130-2300 ..	R, RA
23	.. <i>Weather Surveyor</i> ..	.. 56° 51'N 20° 27'W ..	.. 0450 ..	QN
25	.. <i>Weather Surveyor</i> ..	.. 56° 37'N 17° 14'W ..	.. 0235-0500 ..	QN, QR
25	.. <i>Weather Reporter</i> ..	.. 56° 27'N 15° 22'W ..	.. 0140-0455 ..	N, QRB, AmRB
25	.. <i>Manchester Concorde</i> ..	.. 47° 22'N 48° 08'W ..	.. 0330-0615 ..	QN, RA, QRB
26	.. <i>Queensgarth</i> ..	.. 65° 22'N 09° 19'E ..	.. 2300-2400 ..	AmN, AR, PuR
26	.. <i>Manchester Concorde</i> ..	.. 49° 35'N 62° 00'W ..	.. 0100-0500 ..	QN, QA, C
26	.. <i>Vitore</i> ..	.. 65° 54'N 09° 20'E ..	.. 0145-0220 ..	AmRA
26	.. <i>Discovery Bay</i> ..	.. 41° 39'S 13° 50'E ..	.. 1500-1830 ..	PuN, RA, PuR, QN, R
29	.. <i>Orsino</i> ..	.. 71° 25'N 26° 10'E ..	.. 2230 ..	PuR
31	.. <i>Weather Reporter</i> ..	.. 57° 10'N 19° 30'W ..	.. 2200-0500 ..	N
1 Apr.	.. <i>Weather Reporter</i> ..	.. 57° 01'N 20° 05'W ..	.. 2200 ..	N
2	.. <i>Weather Reporter</i> ..	.. 56° 26'N 15° 12'W ..	.. 0400-0500 ..	N
2 May	.. <i>Weather Surveyor</i> ..	.. 56° 55'N 20° 14'W ..	.. 0010-0355 ..	AmRP, QRB, QN, QHB
3	.. <i>Weather Surveyor</i> ..	.. 52° 10'N 20° 05'W ..	.. 2345-0245 ..	QHP
3	.. <i>Manchester Challenge</i> ..	.. 46° 37'N 71° 58'W ..	.. 0318-0340 ..	HB, Pu, RB
4	.. <i>Weather Surveyor</i> ..	.. 50° 59'N 20° 37'W ..	.. 2345 ..	QHP
11	.. <i>Weather Surveyor</i> ..	.. 57° 05'N 20° 12'W ..	.. 0042-0048 ..	N
16	.. <i>Weather Reporter</i> ..	.. 57° 03'N 19° 39'W ..	.. 2240-2357 ..	QN
3 Jun.	.. <i>Queensgarth</i> ..	.. 49° 32'N 65° 09'W ..	.. 0100-0400 ..	AmP, RB, P
29	.. <i>Union New Zealand</i> ..	.. 40° 05'S 146° 30'E ..	.. 1100-1130 ..	HA, R
22 Aug.	.. <i>Summit</i> ..	.. 69° 17'N 15° 07'E ..	.. 2248-2310 ..	R, RB, AmR
25	.. <i>Cornish Wasa</i> ..	.. 47° 23'N 59° 35'W ..	.. 0215 ..	QRA
2 Sep.	.. <i>Summit</i> ..	.. 69° 03'N 37° 00'E ..	.. 1937-2320 ..	AmR, N, HA
2	.. <i>Nina Bowater</i> ..	.. 54° 35'N 05° 30'W ..	.. 2400 ..	R, N, AmA
3	.. <i>Summit</i> ..	.. 71° 18'N 25° 25'E ..	.. 2135-2150 ..	AmR, AmRB
4	.. <i>Summit</i> ..	.. 69° 11'N 14° 30'E ..	.. 2142-2145 ..	R
16	.. <i>Summit</i> ..	.. 68° 00'N 12° 20'E ..	.. 1945 ..	AmP, AmR, N
17	.. <i>Summit</i> ..	.. 71° 23'N 25° 00'E ..	.. 1915-2215 ..	AmR
19	.. <i>Atlantic Causeway</i> ..	.. 53° N 40° W ..	.. 0010-0700 ..	N, HA, AmR
30	.. <i>Summit</i> ..	.. 68° 35'N 38° 49'E ..	.. 1930-2000 ..	AmR, AmP, AmN
1 Oct.	.. <i>Summit</i> ..	.. 71° 01'N 30° 09'E ..	.. 1900-2100 ..	QR, QP, QN
9	.. <i>Manchester Courage</i> ..	.. 51° 50'N 55° 30'W ..	.. 0300-0500 ..	N
16	.. <i>Summit</i> ..	.. 71° 14'N 25° 56'E ..	.. 1800-2330 ..	QRB, QP
17	.. <i>Summit</i> ..	.. 68° 19'N 39° 24'E ..	.. 1700-1915 ..	HA, HB
17	.. <i>Weather Reporter</i> ..	.. 57° 01'N 19° 51'W ..	.. 2050-0055 ..	QN
19	.. <i>Weather Reporter</i> ..	.. 56° 58'N 20° 06'W ..	.. 2340-0052 ..	QN, AmRB
23	.. <i>Weather Surveyor</i> ..	.. 56° 05'N 11° 30'W ..	.. 2145-2245 ..	QN
24	.. <i>Weather Surveyor</i> ..	.. 56° 06'N 12° 00'W ..	.. 2350 ..	QN
26	.. <i>Voyageur</i> ..	.. 48° 53'N 67° 42'W ..	.. 0800 ..	RA
20 Nov.	.. <i>Aventure II</i> ..	.. 32° 50'N 09° 50'W ..	.. 1914-1920 ..	N
8 Dec.	.. <i>Vitore</i> ..	.. 57° 24'N 16° 42'W ..	.. — ..	AmR
18	.. <i>Weather Surveyor</i> ..	.. 56° 57'N 20° 39'W ..	.. 2145-0250 ..	N, AmRB, QN
19	.. <i>Weather Surveyor</i> ..	.. 56° 53'N 20° 45'W ..	.. 2345 ..	QN
22	.. <i>Weather Surveyor</i> ..	.. 57° 13'N 18° 53'W ..	.. 0145-0245 ..	QN
23	.. <i>Weather Surveyor</i> ..	.. 57° 02'N 20° 15'W ..	.. 2245 ..	QN
25	.. <i>Manchester Courage</i> ..	.. 51° 50'N 55° 30'W ..	.. 2330-0330 ..	B
29	.. <i>Weather Surveyor</i> ..	.. 56° 50'N 20° 23'W ..	.. 0145-0800 ..	QN

KEY: Am = actively moving, Q = quiet, Pu = pulsating, H = homogeneous, F = flaming, N = Auroral light form unspecified, B = band, A = arc, C = corona, R = ray, P = patch of light form indefinite.

Marine Aurora Observations for 1976

ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM JANUARY TO MARCH 1978

The charts on pages 137 to 139 display the actual and normal ice edges (4/10 cover), sea-surface and air temperatures and surface-pressure anomalies (departures from the mean) so that the abnormality of any month may be readily observed. (The wind anomaly bears the same relationship to lines of equal pressure anomaly as wind does to isobars. Buys Ballot's law can therefore be applied to determine the direction of the wind anomaly). Southern and eastern iceberg limits will be displayed during the iceberg season (roughly February to July). In any month when sightings have been abnormally frequent (or infrequent) this will be discussed briefly in the text.

The periods used for the normals are as follows. Ice: 1966-75 (Meteorological Office). Surface pressure: 1951-70 (Meteorological Office). Air temperature: 1951-60 (US Department of Commerce, 1965). Sea-surface temperature: area north of 68°N, 1854-1914 and 1920-50 (Meteorological Office, 1966), area south of 68°N, 1854-1958 (US Navy, 1967).

JANUARY

A feature of the month was the complex low pressure system over much of the Arctic. East of Greenland and over the Barents Sea temperatures were much lower than normal. Despite a large deficit in the previous month ice spread further east than normal in parts of the Greenland Sea by the end of January and some excesses also developed in the Barents Sea. Cold north-westerly winds were more prevalent than normal over Davis Strait and the deficits in ice of the previous month were eliminated. Freezing was less rapid than normal in the approaches to Belle Isle and the St Lawrence. Freezing proceeded in the northern Baltic much as normal.

FEBRUARY

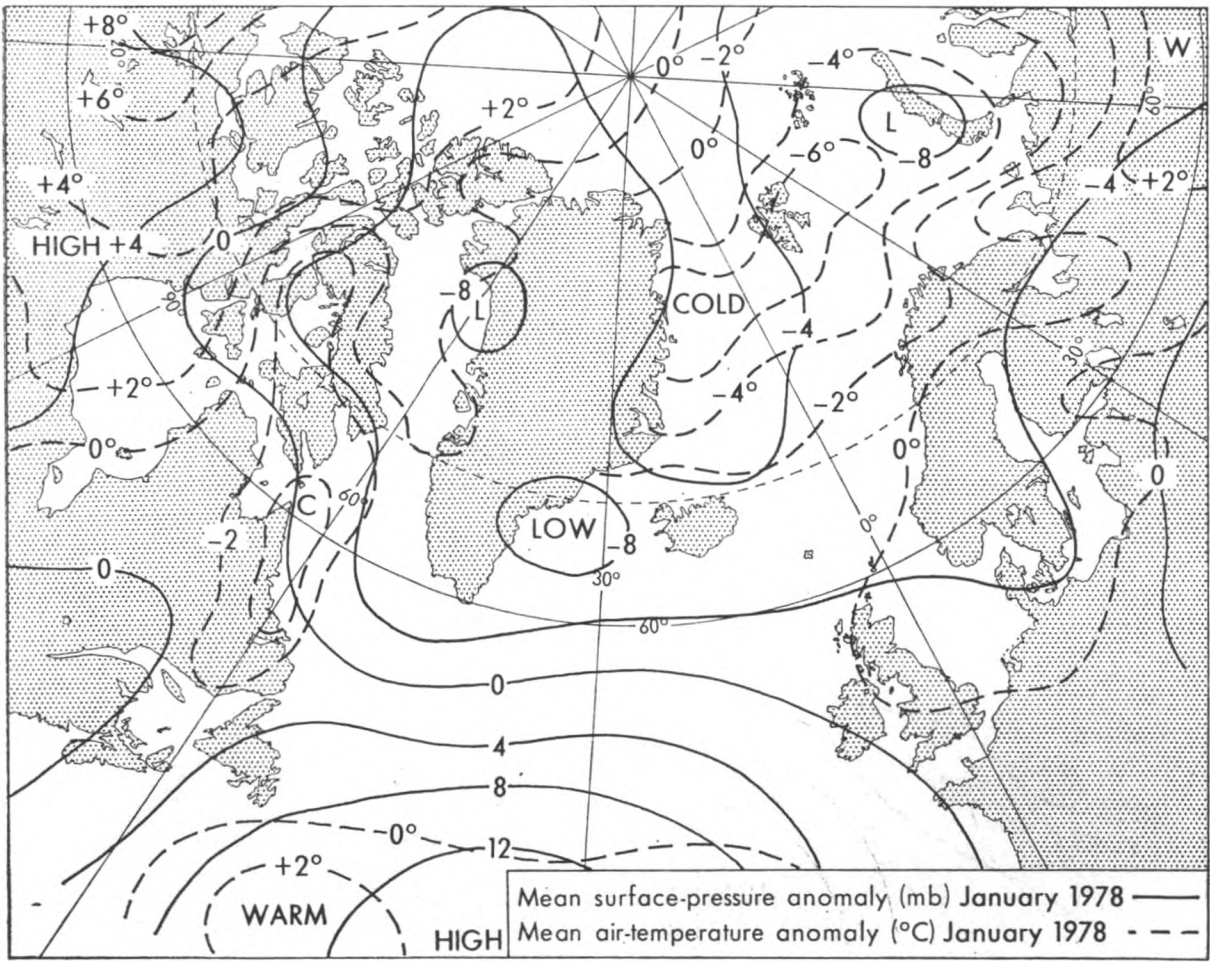
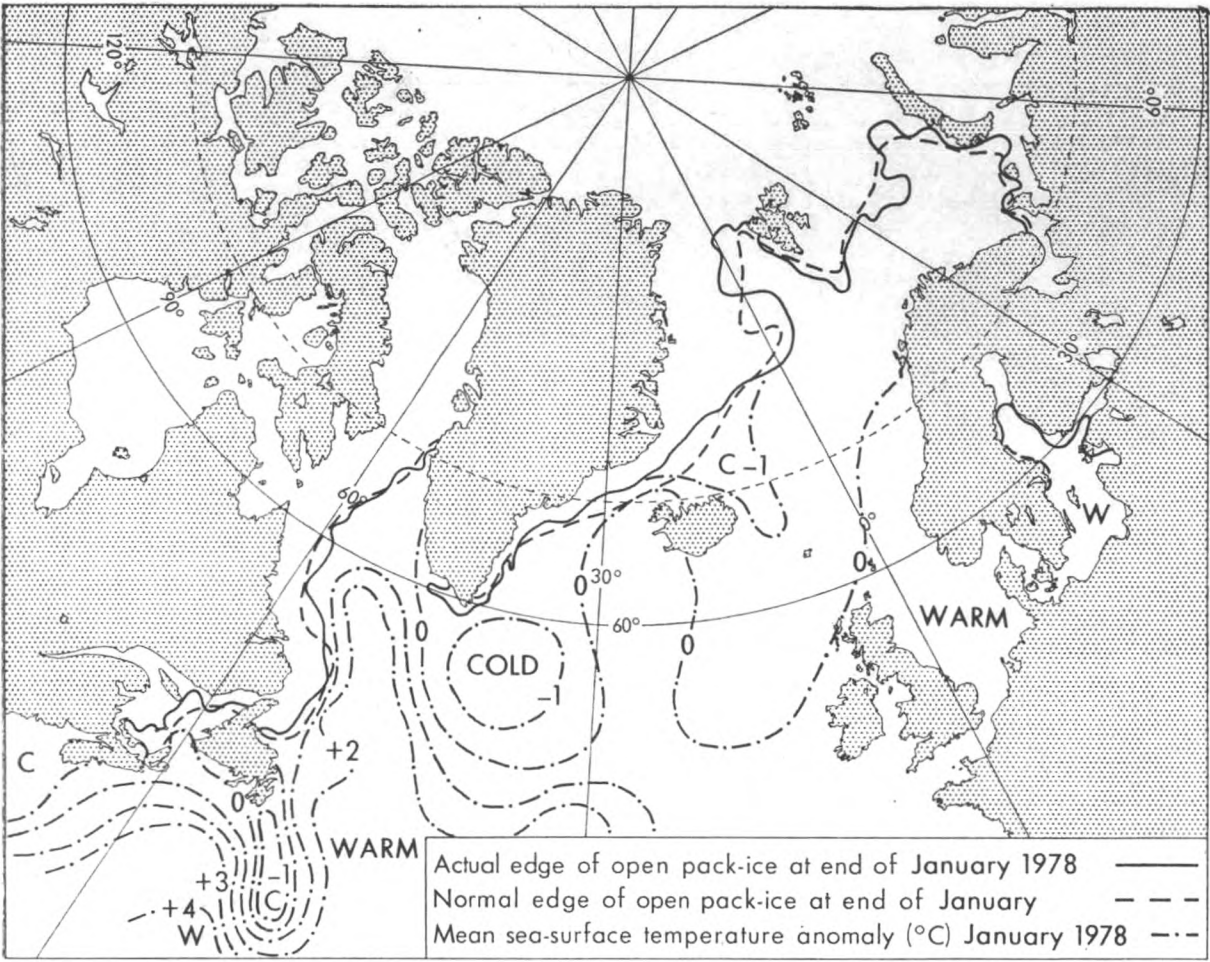
There was a marked anomaly for high pressure over Greenland and cold northerly winds over the Barents Sea. General excesses of ice developed around Spitzbergen and eastwards. Off eastern Canada the anomalies were generally for onshore winds and above-average temperatures; substantial deficits of ice developed off Labrador and in the St Lawrence. The development of ice in the Baltic continued much as normal.

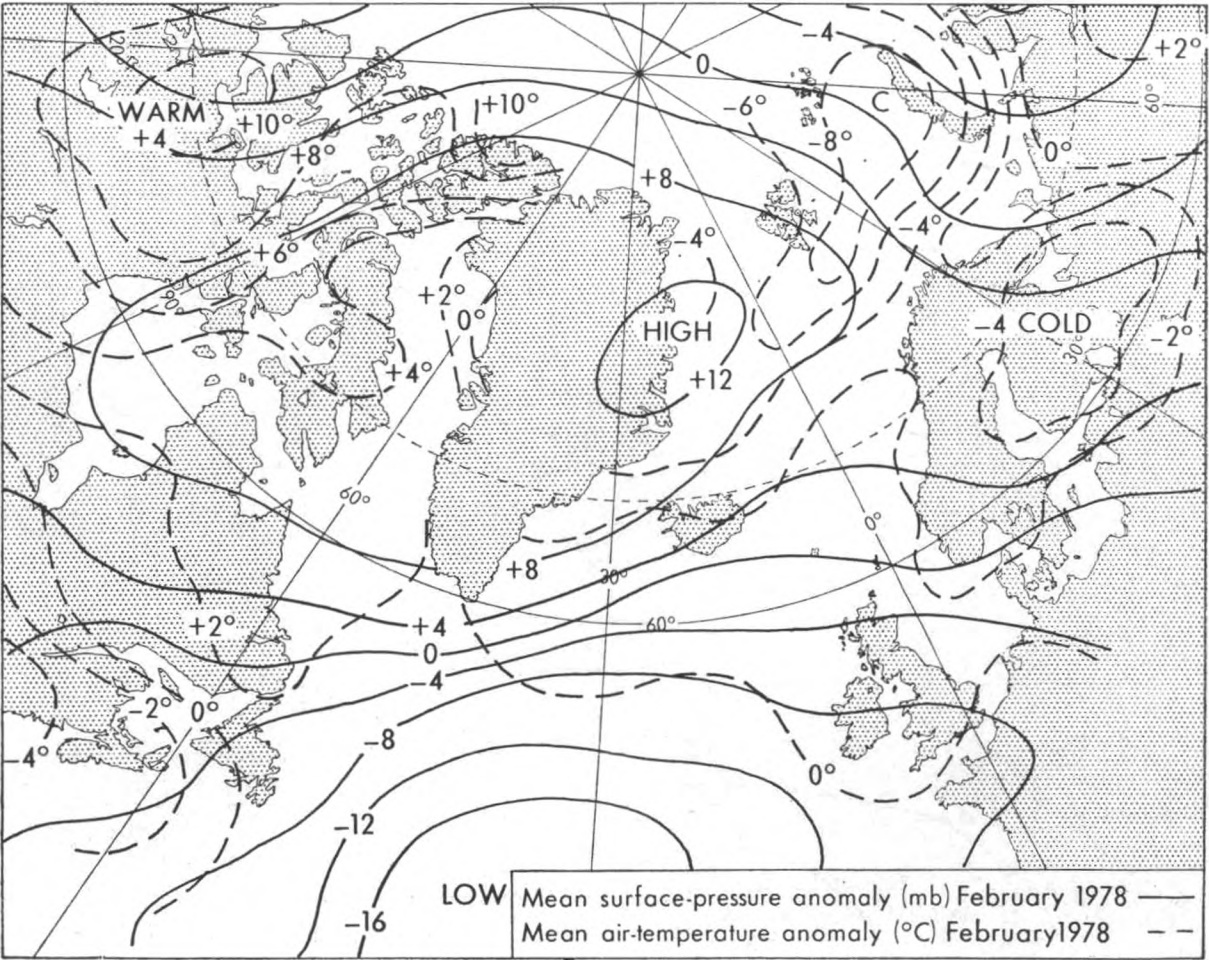
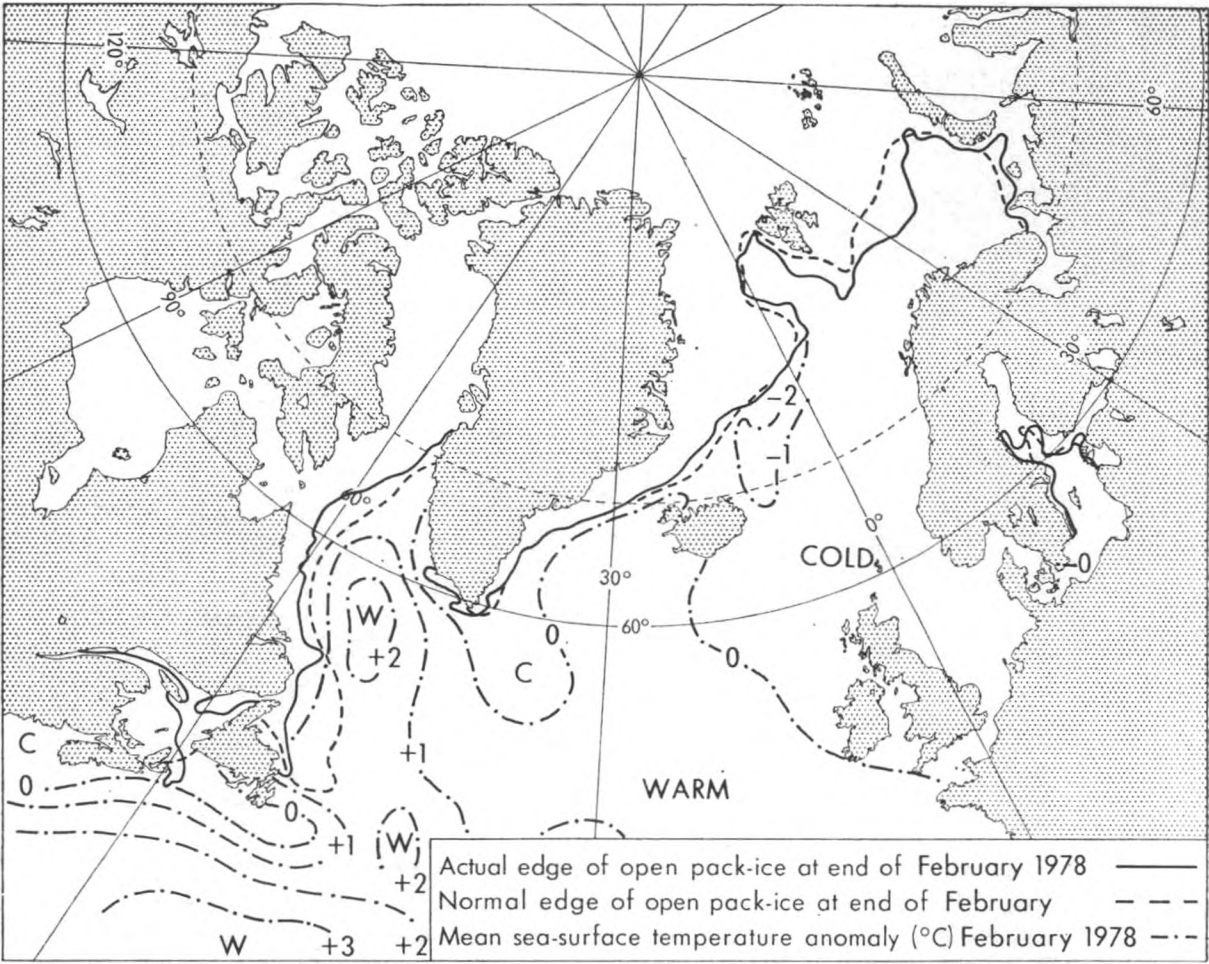
MARCH

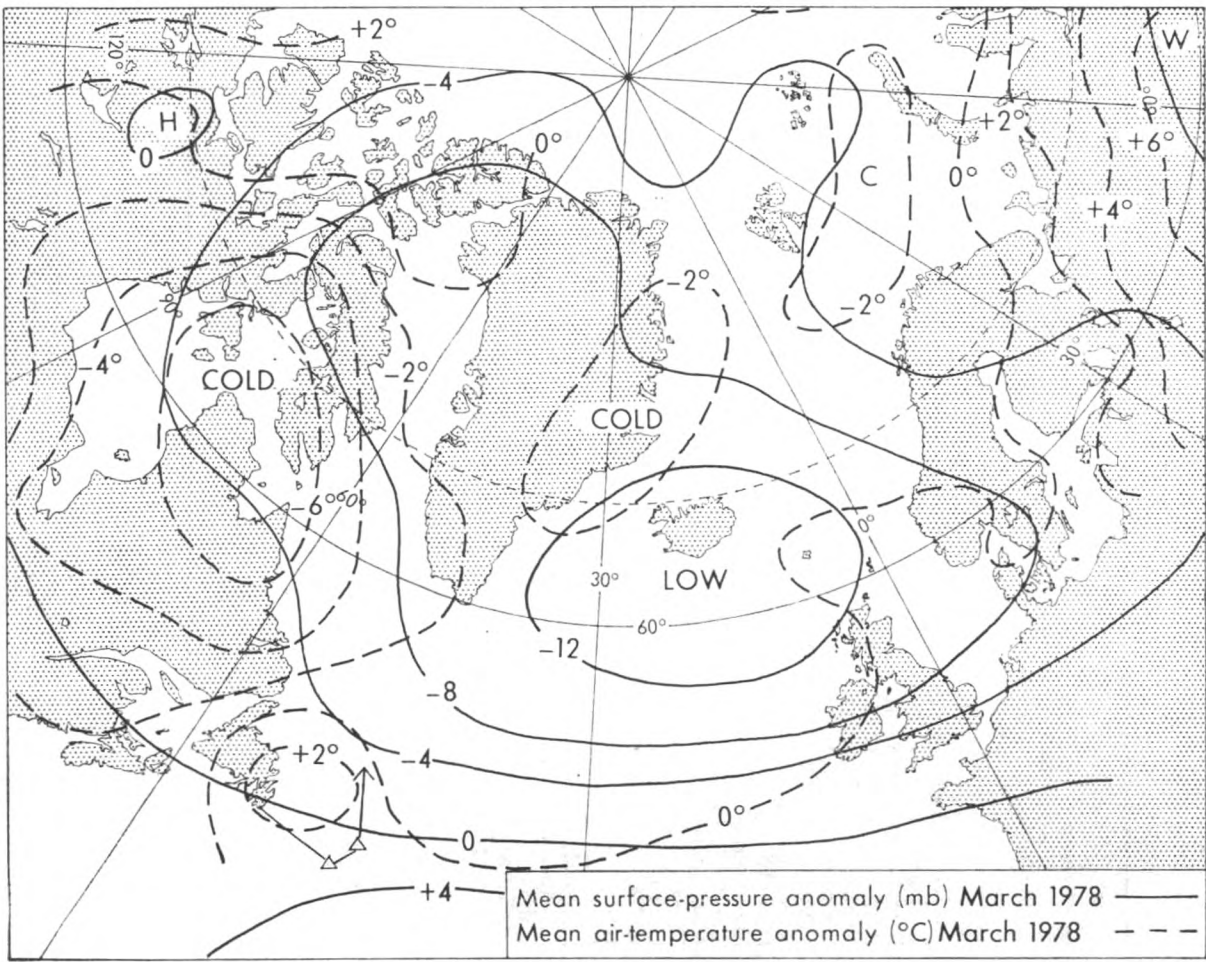
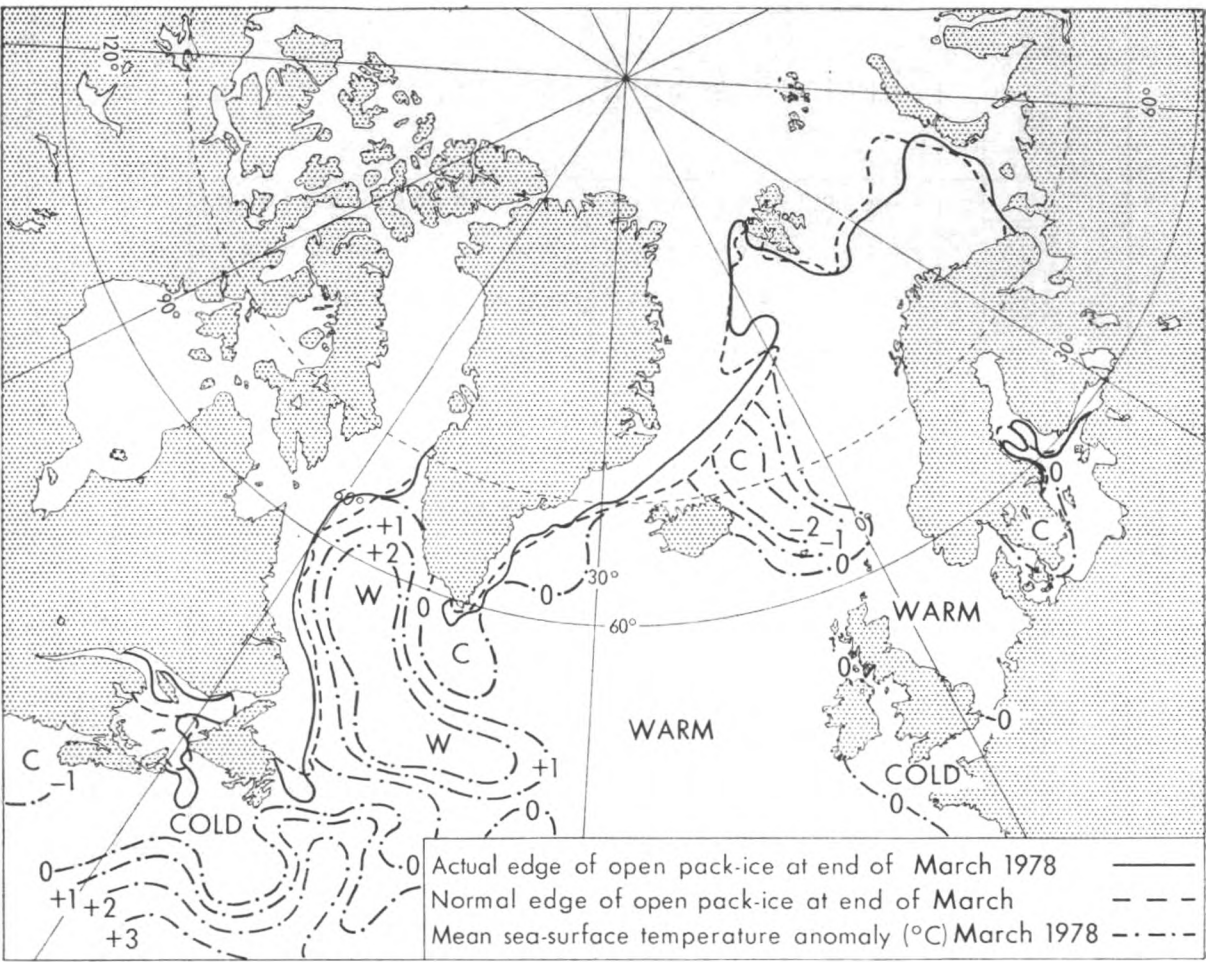
Pressure and temperature anomalies were to a large extent the reverse of those during February, e.g. there was a marked anomaly for low pressure near Iceland (instead of high pressure over Greenland) with cold north-westerly winds off eastern Canada and south-easterly or southerly winds over the Greenland and Barents Seas. In most places temperature anomalies were reversed or much reduced. The ice extended to near the normal over the Davis Strait and north-east of Newfoundland. Previous excesses of ice in the vicinity of the Barents Sea were reduced and some deficit developed north of Iceland. Elsewhere there was a tendency for ice to revert to near normal with only small areas of excess or deficit.

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Baltic Ice Summary: January-March 1978

No ice was reported at the following stations during the period: Visby, Oslo, Kristiansundfjord

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 ..	1	31	31	31	0	0	31	0	481	1	28	28	28	0	0	28	0	829
Riga ..	18	31	11	2	0	5	0	0	184	1	28	28	20	0	17	11	0	384
Pyarnu ..	1	31	31	31	0	0	15	16	—	1	28	28	28	0	0	0	28	—
Viborg ..	1	31	31	31	0	0	31	0	—	1	28	28	28	0	0	28	0	—
Klaipeda ..	7	29	18	0	9	14	0	0	—	1	26	21	2	10	14	0	0	—
Ventspils ..	24	29	5	0	0	1	0	0	—	1	26	24	0	6	18	0	0	—
Tallin ..	25	31	7	0	5	4	3	0	288	1	28	28	28	0	19	7	19	0
Helsinki ..	1	31	31	10	16	23	3	0	33	1	28	28	28	0	0	28	0	617
Mariehamn ..	0	0	0	0	0	0	0	0	220	10	28	19	14	0	18	0	0	251
Turku ..	5	31	21	7	0	7	0	0	—	1	28	28	28	0	10	18	0	516
Mantyluoto ..	2	29	28	7	2	27	1	0	—	4	28	24	16	0	7	14	0	—
Vaasa ..	1	31	31	31	0	0	31	0	341	1	28	28	28	0	0	28	0	701
Oulu ..	1	31	31	31	0	0	31	0	567	1	28	28	28	0	0	28	0	1001
Roytaa ..	1	31	31	2	29	0	31	0	—	1	28	28	28	14	0	28	0	—
Lulea ..	1	31	31	31	0	0	31	0	573	1	28	28	28	0	0	28	0	967
Bredskar ..	3	31	16	0	0	14	3	0	—	1	28	25	0	8	8	15	0	—
Sundsvall ..	1	31	13	0	0	10	0	0	—	1	28	28	23	0	9	19	0	—
Stockholm ..	27	31	5	0	0	5	0	0	47	1	28	28	20	0	28	0	0	222
Kalmar ..	0	0	0	0	0	0	0	0	7	10	28	19	13	0	17	1	0	113
Skeleftea ..	1	31	31	23	0	6	24	0	—	1	28	28	26	2	0	28	0	—
Goteborg ..	0	0	0	0	0	0	0	0	19	18	24	7	0	0	5	0	0	154
Emden ..	0	0	0	0	0	0	0	0	—	15	25	9	0	1	9	0	0	—
Lubeck ..	0	0	0	0	0	0	0	0	—	14	24	11	0	0	7	0	0	—
Hamburg ..	0	0	0	0	0	0	0	0	—	18	24	7	0	0	0	0	0	—
Bremerhavn ..	0	0	0	0	0	0	0	0	—	20	21	2	0	0	0	0	0	—
Kiel ..	0	0	0	0	0	0	0	0	—	20	22	3	0	0	1	0	0	—
Flensburg ..	0	0	0	0	0	0	0	0	—	20	23	4	0	0	1	0	0	—
Stettin ..	0	0	0	0	0	0	0	0	—	13	22	10	0	0	0	0	0	—
Gdansk ..	0	0	0	0	0	0	0	0	—	19	20	2	0	0	0	0	0	—
Stralsund ..	0	0	0	0	0	0	0	0	—	7	28	22	16	0	20	0	0	—
Rostock ..	0	0	0	0	0	0	0	0	—	20	24	5	0	0	0	0	0	—
Aarhus ..	0	0	0	0	0	0	0	0	—	20	20	1	0	0	0	0	0	—
Copenhagen ..	0	0	0	0	0	0	0	0	—	20	22	3	2	0	1	0	0	—

CODE

- A First day ice reported.
- B Last day ice reported.
- C No. of days when ice was reported.
- D No. of days continuous land-fast ice.
- E No. of days of pack ice.
- F No. of days dangerous to navigation, but assistance not required.
- G No. of days assistance required.
- H No. of days closed to navigation.
- I Accumulated degree-days of air temperature (°C) where known.*

* These figures give a rough measure of the first probability of the formation of sea ice, and later the progress of the growth and 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.

Book Reviews

The New Collision Regulations, by Richard H. B. Sturt MA. 245 mm × 170 mm, pp. 144, *illus.* Lloyd's of London Press Ltd, Lloyd's, Lime Street, London EC3M 7HA. Price £4.50.

The International Regulations For Preventing Collisions At Sea 1972 adopted by an International Conference on 20 October 1972 in London, came into force on 15 July 1977. This may be the second major revision of collision regulations that many of those serving at sea have experienced. In some respects the new regulations are stricter than those they replaced and the author, Richard Sturt, a solicitor experienced in prosecutions for breaches of International Maritime Regulations has gone to great lengths to give a legal interpretation of many aspects of these rules. As one example, to clearly explain the legal meaning of 'the Master of a British Ship registered in the United Kingdom . . .' which is thought by the layman to be easily understood the author refers to the description of 'Master,' 'British Ship,' 'registered' and 'United Kingdom' in various sections of The Merchant Shipping Act and Statutory Instruments. The book contains numerous cross-references which, with a little care, are not difficult to follow.

The history of the Regulations is interestingly described, also the application in the legal sense with again a vast amount of cross-referencing which is a valuable contribution and must have involved the author in a vast amount of preparation. The reviewer is not aware of any book of this size on the subject which contains such quality and quantity of information but inconsistencies exist in the plates showing 'examples of lights'.

The administration and enforcement of the rules and the Merchant Shipping Act are adequately dealt with and make for interesting and useful reading for those who may be studying for academic qualifications where a legal knowledge, possibly above the level of Master (FG), is required.

This is possibly a book that a mariner might well read after being involved in a collision at sea rather than before although a careful and wide reading of it may well contribute to a reduction in collisions at sea.

G. A. W.

Seastate and Tides, by Ken Duxbury. 215 mm × 135 mm, pp. 84, *illus.* Stanford Maritime Ltd, 12 Long Acre, London WC2E 9LP. Price: £2.25.

In this small book the author, who describes himself as a practical sailor, endeavours to explain waves and tides in practicable terms easily understood by the non-academic. As he states in his foreword, there are few opportunities for those of us who are not physicists to actually watch the transmission of energy through a medium. The sea, however, is one such and seamen are lucky in being in a position of advantage to experience this phenomenon in a form which is comprehensible to them.

The book opens with definitions of sea waves and discusses their generation and behaviour. It then deals with the effects that coast lines have upon sea waves, the release of energy by breaking waves and the results of waves meeting tides or currents. This section also includes a brief account of the formation and development of tsunamis.

The book then goes on to explain the causes of ocean currents and their influence on climate. The coriolis effect on currents is rather tentatively explained as is also the movement of ocean water in the vertical plane associated with surface currents.

Then follows a chapter on tides and the tidal generating forces of the sun and moon. Within this chapter, also, the author expounds the theory that the tides themselves are causing the speed of the earth's rotation to slow down whilst, at the

same time, the moon's speed in her orbit is being slowly increased. Given these, the author poses the question as to which will happen first in the far distant future—will the earth cease to rotate, or will the moon move out of her orbit?

The final chapter discusses the formation of the ocean bed, its movement in conjunction with the theory of Continental Drift and concludes with an explanation of the salt content of salt water.

An appendix gives a few basic equations which apply to theoretical simple sinusoidal wave-trains.

Mr Duxbury writes in a lucid and lively style. The text makes very interesting reading and, being devoid of tedious mathematical formulae, is easily assimilated. In the reviewer's opinion, however, the book would have been immensely improved had more diagrams been included. Nevertheless, the book serves as a most useful introduction to a very complex subject of great importance to the mariner.

C. R. D.

Lloyd's Maritime Atlas. 11th Edition. 245 mm×185 mm. Lloyd's of London Press Ltd, Lime Street, London EC3M 7HA. 1977. Price: £7.00.

The re-appearance of this book was inevitable for, although in this the 11th edition much of the original matter of necessity remains, numerous additions and amendments have been made.

To those unfamiliar with the work, the Atlas contains a list of approximately 10 000 ports and shipping places each with its geographical position and each cross-referenced to its appropriate map.

The Atlas is divided into three main parts. Section I is a set of maps of which the first is a world map showing 'Bad Weather Areas and Periods' based on data provided by the UK Meteorological Office and Det Norske Meteorologiske Institutt of Oslo. Section II contains a distance table showing distances from Gravesend to many principal ports followed by a geographical list of ports and shipping places of the world together with their latitudes, longitudes and map references. Section III is an index of port names which are given appropriate geographical numbers in order that the reader may refer to Section II which, in turn, advises which map to use in Section I.

Users of this book obviously wish to know in what respects it differs from its predecessors. The main differences are that many new ports have been added and changes in port names together with political boundaries have been brought up to date.

This very comprehensive and compact little Atlas has proved to be of great value to the Marine Division of the Meteorological Office for many years now. It must surely be an indispensable part of any shipowner's, or other interested organization's, library of every-day reference books.

J. D. B.

Personalities

RETIREMENT.—CAPTAIN F. C. O'NEILL R.D., R.N.R. has retired after 44 years at sea, the whole of which was spent with Ellerman Lines Limited.

Captain O'Neill was indentured as an Apprentice with Ellerman Hall Line in August 1933 and was appointed to the *City of Yokohama*.

He joined the Royal Naval Reserve in 1938 and served in the Royal Navy from 1939 to 1946, mainly as First Lieutenant in frigates but later in command of Landing Ships.

Captain O'Neill obtained his Master's Certificate in 1947 and was promoted to Master in March 1961, his first command being the *City of Stafford*. He was

promoted Captain R.N.R. in 1962. From May 1976 until his retirement Captain O'Neill was Commodore of the Ellerman Fleet. He is a Liveryman of the Honourable Company of Master Mariners and a Freeman of the City of London.

Captain O'Neill sent us his first meteorological logbook from the *City of Swansea* in 1952. Since then we have received a further 34 logbooks bearing his name.

We wish him a long, healthy and happy retirement.

RETIREMENT.—CAPTAIN R. A. LEACH retired recently after completing 44 years service with Bank Line Limited.

Captain Leach was educated at King's College Taunton and in October 1933 was apprenticed to Bank Line Limited, his first ship being s.s. *Forthbank*.

He obtained his Master's Certificate in December 1944 and was promoted to Master in July 1952, his first command being s.s. *Springbank*.

During World War II he was torpedoed twice. The first time, in 1940, was in s.s. *Empire Miniver*—owned by the Government and operated by Bank Line—whilst in Convoy SC 7 an excellent account of which is recorded in *Night of the U-Boats* by Paul Lund and Harry Ludlam. The second time was whilst serving in m.v. *Teesbank* and near St Paul's Rocks—almost on the Equator in the North Atlantic. He subsequently sailed about 700 n. mile in a ship's life-boat before being picked up. For this, together with others of the ship's officers, he was Mentioned in Despatches.

In 1961 Captain Leach was transferred to a shore position and until his retirement was Assistant Marine Superintendent of Bank Line.

During the years 1955–58, whilst in command of the *Levernbank*, Captain Leach sent us six meteorological logbooks. Whilst Assistant Marine Superintendent of Bank Line he continued to render every assistance to the Meteorological Office, being especially helpful with the recruitment of his Company's vessels into the Voluntary Observing Fleet. In a recent letter to the Meteorological Office Captain Leach writes: 'What gave me satisfaction was, whereas when on or near a trade route our observations were taken with many others, being Bank Line we were frequently traversing areas where few other ships sailed. One had the impression, therefore, that our efforts on those occasions were especially worthwhile'.

We can only add that they certainly were and wish Captain Leach a long and happy retirement.

RETIREMENT.—CAPTAIN F. D. PARSONS retired on 31 March, on medical grounds, after serving almost 20 years with Shell Tankers (UK) Limited.

Frederick Donald Parsons joined Shell Tankers in October 1958 as 3rd Officer and was appointed to the s.s. *Hadriana*. He obtained his Master's Certificate in 1963 and was promoted to Master in 1974, his first command being that of the *Hemimactra*. Since joining Shell Tankers Captain Parsons has served in many of their vessels, his last command being the *Anadara*.

Captain Parsons sent us his first meteorological logbook from the *Hindsia* in 1963. Since then we have received a further 15 logbooks bearing his name of which three have been classed as Excellent. He received an Excellent Award for his services to the Meteorological Office in 1977.

We wish him a speedy recovery in health and best wishes for the future.

RETIREMENT.—MR F. P. F. LAWTON Radio Officer, retired from the sea-going staff of Marconi International Marine Company on 15 December 1977.

Francis Peter Forsythe Lawton was appointed Radio Officer in Marconi's by the British Wireless Marine Service in December 1938. During July 1939 he was serving in the *Blairlogie* which was torpedoed and sunk by enemy action. Subsequently, Mr Lawton served on a number of vessels owned by T. & J. Harrison Limited and, in particular, served in m.v. *Tactician* continuously from December 1962 until July 1974.

We received the first meteorological logbook bearing Mr Lawton's name from the *Delilian* in 1948. Since then he has sent us a further 21 logbooks of which 8 were classed as Excellent.

We wish him health and happiness in his retirement.

RETIREMENT.—MR J. BUCHANAN, Radio Officer, retired on 4 February from Marconi International Marine Company after serving nearly 39 years at sea.

John Buchanan joined Marconi as Radio Officer on 26 May 1939 and served continuously from that date. During World War II he was appointed to the *Empire Lynx* which was subsequently sunk by enemy action in November 1942. Thereafter, a large part of Mr Buchanan's service was in vessels owned by Manchester Liners Limited.

Mr Buchanan's name first appeared in a meteorological logbook received from the *Ashburton* in 1949. Since then we have received a further 41 logbooks bearing his name of which 17 were classed as Excellent.

We wish him a long, healthy and happy retirement.

FLEET LISTS
1977

Fleet Lists

GREAT BRITAIN (Information dated 28.3.78)

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 of the Meteorological Office.

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>	8.9.77	I. R. Farnell	P. I. Jameson, A. Bridger	C. D. Arnold	Shell Tankers (U.K.) Ltd.
<i>Act 1</i>	31.1.78	W. G. J. Jones	R. E. Lough, W. R. Houghton-Boreham	D. Owen	Blue Star Line Ltd.
<i>Act 2</i>	15.2.78	L. J. Brown	M. E. Parsons, J. K. Brocklehurst, R. A. Critchlow		Cunard Line Ltd.
<i>Act 6</i>	11.1.78	M. H. C. Twomey	M. Lange, N. Elks, J. Gladstone	J. S. Barlow	Cunard Line Ltd.
<i>Act 7</i>	6.1.78	D. McPhail	M. R. Atkinson, S. Nicholls, J. Morcom-Harness	J. Ramsay	Blue Star Line Ltd.
<i>Adventurer</i>	31.8.77	B. Jones	R. J. Johnston	P. H. Crowe	T. & J. Harrison Ltd.
<i>Afghanistan</i>	14.2.78	W. Woodman	N. J. Hamer, J. Mockett, A. Norman	P. Webster	Common Brothers Ltd.
<i>Afric Star</i>	1.6.77	G. D. Easton	A. K. Dagnall, P. N. Lookhar, D. H. Atkin	P. J. Robertson	Blue Star Line Ltd.
<i>Agamemnon</i>	20.3.78	M. P. Stone	P. D. Orman, S. T. Comfort, W. E. Kimberley	A. Bridger	Ocean Transport & Trading Ltd.
<i>Ajana</i>	5.12.77	A. R. Wood	J. Stewart, R. F. C. Browne, D. Willoughby	T. A. Byrne	Trinder Anderson & Co. Ltd.
<i>Al Ahmadiyah</i>	8.2.78	J. G. McArdle	R. J. Yelland, B. R. Denley, R. L. Hall, R. Allen, I. H. Clark, A. Hughes	C. R. Orpen	United Arab Shipping Co. Ltd.
<i>Al Rumaithiah</i>		B. Hird			United Arab Shipping Co. Ltd.
<i>Al Shamiah</i>	31.8.77	I. Stroud	M. Wood, H. Gale, J. Coombe		United Arab Shipping Co. Ltd.
<i>Alban</i>	*	J. D. Igoe	J. G. Darlington, P. Holtby, R. V. Baboaram	P. A. Forteau	Blue Star Line Ltd.
<i>Albright Explorer</i>	8.11.77	M. Rossiter	N. J. B. Fisher, E. Carney, G. E. M. Steven	H. A. Chambers	James Fisher & Sons Ltd.
<i>Albright Pioneer</i>	22.3.78	J. H. Kitching	N. J. Hutchings, D. J. Thomas, J. G. Nixon	W. D. Brown	James Fisher & Sons Ltd.
<i>Alert</i>	8.1.78	J. Lofts	J. Coughlan, A. Robinson, W. Ellis	A. R. Carr	Post Office
<i>Algol</i>	22.2.78	A. I. Cattell	J. E. Graham, A. J. Younger, B. T. Hingley	M. A. Carpenter	Silver Line Ltd.
<i>Alinda</i>	21.9.77	C. Hindess	H. A. Johnson, R. J. Hunt	V. Haidak	Shell Tankers (U.K.) Ltd.
<i>Almeda Star</i>	28.6.77	F. P. McGuckin	M. Roche, B. Truban, J. E. Chitty	C. Hill	Blue Star Line Ltd.
<i>Almeria Star</i>	8.2.78	I. G. Calabrese	S. K. Hardcastle, J. E. Chitty, D. P. Cross	I. Acland-Martin	Blue Star Line Ltd.
<i>Alsatia</i>	19.1.78	E. R. Jenkins	D. R. Moody, A. G. Ley	G. Stockton	Cunard S.S. Co. Ltd.
<i>Amastira</i>	19.9.77	G. C. Turnbull	R. A. Smith, D. L. Hines		Shell Tankers (U.K.) Ltd.
<i>America Star</i>	15.2.78	G. Ferriday	D. S. Schultz, J. S. Gee, C. J. Robuliard	J. Carwardene	Blue Star Line Ltd.
<i>Amoria</i>	1.9.77	A. W. Aitken	G. Armitage, C. J. R. Wheatley, N. B. Campbell	P. G. Furniston	Shell Tankers (U.K.) Ltd.
<i>Anadara</i>	22.8.77	G. Ramsden	W. M. Green, C. D. Eke	D. Hatchett	Shell Tankers (U.K.) Ltd.
<i>Anchises</i>	10.3.77	M. Sheridan	M. V. Hobbs, L. J. Drummond, G. Wood	R. D. Cause	Ocean Transport & Trading Ltd.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Booker Vanguard</i>	6.3.78	E. I. Jones	B. Goodall, R. G. Palmer, D. I. Macellian	E. Smith	Booker Line Ltd.
<i>Booker Viking</i>	6.3.78	R. E. Dunne	P. P. Rowland, P. Fineron, J. Burke	D. A. C. Macrae	Booker Line Ltd.
<i>Border Castle</i>	31.5.77	N. Macleod	A. K. Woodward, G. R. Proud	S. N. Smith	B.P. Tanker Co. Ltd.
<i>Border Chieftain</i>	25.1.78	T. J. Taylor	D. R. A. Diggory, S. Allibone, H. J. Stribblehill	N. Richardson	B.P. Tanker Co. Ltd.
<i>Border Shepherd</i>	28.2.78	D. Campbell		A. P. Hilder	B.P. Tanker Co. Ltd.
<i>Botany Bay</i>	9.3.78	R. T. Wood	M. J. Power, A. P. Baker, P. Simpson	S. J. Braithwaite	Container Fleets Ltd.
<i>Bransfield</i>	19.5.77	S. J. Lawrence	I. Clark, R. C. Plumley, H. F. Monkton	H. M. O'Gorman	British Antarctic Survey
<i>Briarthorn</i>	17.8.76	K. Fox			S. William Coe & Co. Ltd.
<i>British Avon</i>	6.3.78	I. A. Potter	D. McCullum, J. C. Harley, P. Robinson	T. Cook	B.P. Tanker Co. Ltd.
<i>British Beech</i>	25.1.78	A. E. Marshall	J. Howard, S. A. Brown, R. Friar	J. L. Pearson	B.P. Tanker Co. Ltd.
<i>British Centaur</i>	7.3.78	R. Towell	J. B. Swanson, C. Petley, G. C. Belson	G. Collins	B.P. Tanker Co. Ltd.
<i>British Commerce</i>		M. Dunning	S. J. Viney, N. MacInnes, A. Lumsden, B. P. Cooper	S. J. Whitehead	B.P. Tanker Co. Ltd.
<i>British Commodore</i>	15.3.78	R. F. Shaw	R. Gibbs, I. T. Wake, B. Dixon	D. Lawrence	B.P. Tanker Co. Ltd.
<i>British Dragoon</i>	28.3.78	D. Jones	D. Archer, S. Gammage, D. Thomas	A. Bateman	B.P. Tanker Co. Ltd.
<i>British Esk</i>	20.12.77	J. Cliffe	R. A. Dickson, N. Howard	R. V. Kellett	B.P. Tanker Co. Ltd.
<i>British Explorer</i>	31.1.78	N. D. Brookes	N. J. Palmer, P. Hebden, D. J. Pengelly	R. G. Hall	B.P. Tanker Co. Ltd.
<i>British Fern</i>	1.2.78	I. Black	G. P. Meadoway, C. Wignall, D. Harris	M. MacFall	B.P. Tanker Co. Ltd.
<i>British Forth</i>	14.3.78	E. K. Williams	D. C. Wilson, R. I. Webber	V. S. Cullinan	B.P. Tanker Co. Ltd.
<i>British Hazel</i>	26.7.77	M. Boyd	D. R. Roberts, J. Shannon	R. J. Bryne	B.P. Tanker Co. Ltd.
<i>British Holly</i>	17.11.77	J. C. Wilson	F. W. Wilkinson, D. Morrison, D. M. Thwaites	R. J. Nummery	B.P. Tanker Co. Ltd.
<i>British Ivy</i>	15.2.78	B. Hersey	K. B. MacInnes, M. Tomkins, P. Morris	R. Deakin	B.P. Tanker Co. Ltd.
<i>British Kennet</i>	17.11.77	D. Dwight	J. Swanson, D. L. Culton, K. Gardiner	G. R. Wilson	B.P. Tanker Co. Ltd.
<i>British Laurel</i>	6.12.77	W. O. Burns	M. G. Dawes, G. Lovatt, P. D. Seaman	C. Kelly	B.P. Tanker Co. Ltd.
<i>British Liberty</i>	6.10.77	R. Weston	A. G. Morgan, H. Nightingale	I. F. Alexander	B.P. Tanker Co. Ltd.
<i>British Loyalty</i>	28.11.77	K. J. Mackay	J. C. L. Dunford, J. A. Robertson	J. Macdonald	B.P. Tanker Co. Ltd.
<i>British Maple</i>		P. Edwards	D. W. Maund, G. Holland	R. J. Robinson	B.P. Tanker Co. Ltd.
<i>British Pioneer</i>	1.2.78	W. V. Frost	R. Massingham, I. Alexander, G. Hunt	J. Smith	B.P. Tanker Co. Ltd.
<i>British Poplar</i>	13.9.77	I. Walker	G. R. J. Joshua	C. F. Handel	B.P. Tanker Co. Ltd.
<i>British Promise</i>	22.3.78	P. Dimmock	J. A. Scobie, R. A. Beaumont, D. N. Allan	R. Lowe	B.P. Tanker Co. Ltd.
<i>British Respect</i>	22.2.78	A. Gill	B. J. Turnbull, S. Turk	I. Mackenzie Macleod	B.P. Tanker Co. Ltd.
<i>British Security</i>	24.8.77	I. Macnaughton	M. Fordham, A. White, C. R. White	W. K. Ryan	B.P. Tanker Co. Ltd.
<i>British Spy</i>	10.1.78	M. Searle	P. D. Jackson, D. Handley	D. I. Hart	B.P. Tanker Co. Ltd.
<i>British Tamar</i>	18.8.77	R. Longhorn	H. Griffin, J. H. Brechin, L. Lingham	E. Salmon	B.P. Tanker Co. Ltd.
<i>British Tenacity</i>	6.3.78	P. Mannen	S. Gammage, C. P. Heweth	J. C. Saphier	B.P. Tanker Co. Ltd.
<i>British Trent</i>		D. H. Henderson	N. Palmer, T. R. P. Dean, N. Criag	D. Galloway	B.P. Tanker Co. Ltd.
<i>British Trident</i>	5.7.77	N. W. C. Rutherford	K. Lorimer, J. G. M. Watt	I. Jenkins	B.P. Tanker Co. Ltd.
<i>British Vine</i>	24.11.77	I. K. Miller	D. C. Blackburn, J. Denford, A. Brown	E. Ruddick	B.P. Tanker Co. Ltd.
<i>Buenos Aires Star</i>	28.3.78	J. L. Baird	J. D. Shelley, I. Ritchie, A. Ambury	M. J. White	B.P. Tanker Co. Ltd.
<i>C.P. Discoverer</i>	1.12.77	R. Burns	H. Griffin, R. Petch, D. Shield	C. J. A. Skinner	B.P. Tanker Co. Ltd.
<i>C.P. Trader</i>	21.12.77	P. J. Roberts	A. J. C. Peeters, M. Daniels	A. Johnson	B.P. Tanker Co. Ltd.
<i>C.P. Voyager</i>	22.3.78	J. D. Jeavons	S. G. Hardy, A. P. S. Lark, N. R. Vardy	A. R. Kingdom	B.P. Tanker Co. Ltd.
<i>C.S. Forester</i>		W. Bretnell	D. A. A. Jenkins, B. P. Philip, M. G. Weir	D. I. Anson	Blue Star Line Ltd.
<i>Cairnmore</i>	17.6.77	M. G. Bishop	R. R. N. Laing	S. O'Neal	Canadian Pacific Steamships Ltd.
			K. Muttitt, J. Anderson, K. Moore	R. R. N. Laing	Canadian Pacific Steamships Ltd.
			S. Cheung, D. A. Hawkins, S. M. Chow	J. Gallagher	Canadian Pacific Steamships Ltd.
				K. T. Wong	Newington Trawlers Ltd.
					Cable & Wireless Ltd.
					Matheson Shipping Services Ltd.

California Star	30.11.77	D. Newlin	J. H. Mockett, M. Fraser	J. V. Horsburgh	Blue Star Line Ltd.
Canterbury Star	10.5.77	G. I. A. Seaye	R. V. Baboaram, C. Gibson, C. E. Elms	J. Hickinbotham	Blue Star Line Ltd.
Cape Horn	25.11.77	D. Taylor	C. Campbell, J. MacCuskie, A. C. Henderson	J. Hitchinbotham	Lyle Shipping Co. Ltd.
Cape Leewards	10.8.77	I. H. Tyrell	R. Abercrombie, R. Mullen, P. Dyson	A. Macallum	Lyle Shipping Co. Ltd.
Cape Ortel	7.12.76	K. N. Dootson	W. Andersen, J. Patton, C. R. Williamson		Lyle Shipping Co. Ltd.
Cape Rodney	30.11.77	A. M. Fraser	C. J. Pyper, P. Smart, F. R. Simpson	D. F. Wilson	Lyle Shipping Co. Ltd.
Cape Sable	23.11.77	W. Anderson	B. P. Andrew, R. G. Wiggins, E. R. Williams	M. Thomas	Lyle Shipping Co. Ltd.
Cape York	14.2.78	I. R. Wernys	H. McWilliam, A. Logan, H. M. Bajwa	M. H. Baig	Ellerman Lines Ltd.
Carchester	14.10.77	N. Corkill	S. Hayward	B. Drake	Ocean Transport & Trading Ltd.
Cardigan Bay	22.2.78	W. P. Goldie	P. R. D. Brewer, H. B. Gobey, T. Callan	J. Cooney	Cunard S.S. Co. Ltd.
Carinthia	14.11.77	M. Twomey	D. John, D. E. Peers, D. Silverlock	D. Duggan	Cunard S.S. Co. Ltd.
Carmania	*	D. M. Swetnam	J. Templeton, J. Hooper, D. Atkinson	W. Fitzpatrick	Denholm MacLay Co. Ltd.
Cast Beaver	*	F. Best	I. Elder, M. O'Regan, A. McDiarmid		Denholm MacLay Co. Ltd.
Cedarbank	19.12.77	I. Townsley	R. D. Newman, B. A. Atkinson, G. Davey		Bank Line Ltd.
Challenger	14.11.77	E. M. Bowen	S. Jackson		Natural Environment Research Council
Choctaw II	1.2.78	I. L. Evans	H. C. L. Taylor, C. Bird	C. Bird	Santa Fe (U.K.) Ltd.
Cirolana	30.12.77	R. A. Taylor	W. J. Saxby, F. W. Brown, M. Tyrell	R. F. Horsley	Ministry of Agriculture, Fisheries & Food
City of Canterbury	21.11.77	E. G. George	S. O'Callaghan, S. Mortimer, N. Frampton	R. F. Collins	Ellerman Lines Ltd.
City of Dundee	1.3.78	H. Owen	E. J. Griffith, M. S. Shakespeare, A. B. Parry	G. A. Rodger	Ellerman Lines Ltd.
City of Edinburgh	12.12.77	S. Murray	J. E. Atkinson, T. J. Mooney, D. I. Walker	W. Paterson	Ben Line Containers Ltd.
City of Exeter	7.11.77	A. S. Matheson	P. C. Webber, P. W. Underhill, G. Williams	M. Dunn	Ellerman Lines Ltd.
City of Glasgow	5.12.77	P. G. Weldon	E. Betts, S. A. Edmundson	J. N. Hanly	Ellerman Lines Ltd.
City of Gloucester	10.1.78	H. P. Wharton	C. F. Thompson, P. H. Winstanley, D. E. C. Stevenson	D. Von Wein	Ellerman Lines Ltd.
City of Guildford	10.1.78	I. L. Blanch	R. M. Mitchel, P. Hanock, D. Ayre	G. Jacobs	Ellerman Lines Ltd.
City of Hull	10.5.77	F. Smith			Ellerman Lines Ltd.
City of Lancaster	30.12.77	L. W. Roberts			Ellerman Lines Ltd.
City of Lichfield	*	I. G. Hill	J. A. Davies, J. J. McEnaney, R. G. Wickham	R. Bradshaw	Ellerman Lines Ltd.
City of Liverpool	14.2.78	N. A. Perry	K. Mills, D. D. Pavri, S. R. Poole	S. P. Kavanagh	Ellerman Lines Ltd.
City of London	1.7.77	D. B. Roe	A. J. Parker, S. G. Mortimer, K. C. Kharas	G. P. Crothers	Ellerman Lines Ltd.
City of Newcastle	28.11.77	E. Finch	A. J. Parker, R. M. Herring, G. J. Braganza	P. T. Murphy	Ellerman Lines Ltd.
City of St. Albans	22.11.77	P. E. Harwood	H. D. Beck, N. Frampton, S. R. Poole	J. R. Cowan	Ellerman Lines Ltd.
City of Wellington	15.11.77	A. W. Forrest	S. Jesson, M. N. Smith, J. G. Braganza	J. Neenan	Ellerman Lines Ltd.
City of Winchester	17.2.78	J. I. Owen	S. R. Wagley, B. F. Keith, M. K. Ashok-Menon	I. Scott	Ellerman Lines Ltd.
City of Worcester	15.3.78	D. B. Roe	K. A. Dean, C. Bunt, A. P. James	J. D. C. Laurie	Ellerman Lines Ltd.
City of York	30.11.77	E. G. George	S. J. Mountford, P. C. Williams, M. L. Kinnear	S. Shaves	Ellerman Lines Ltd.
Clan Alpine	23.11.77	R. A. G. Simmons	C. J. Lee, D. Macpherson, B. G. Phipps	K. Watkins	Clan Line Steamers Ltd.
Clan Graham	26.9.77	T. R. Parsons	R. Sisson, K. A. Maltby, R. E. Mennell	J. Chalkley	Clan Line Steamers Ltd.
Clan Grant	12.12.77	R. D. Lofts	G. A. McEwan, I. Barton, F. Murray		Clan Line Steamers Ltd.
Clan Macgillivray	23.1.78	T. Aitchison	H. Mwasigallah, P. J. Macarthur, A. J. Weller	J. C. Dawson	Clan Line Steamers Ltd.
Clan Macgregor	12.12.77	T. R. Parsons	P. J. M. Hickmott, A. J. Blackler, B. J. Ross-Smith	E. Banach	Clan Line Steamers Ltd.
Clan Macintyre	23.11.77	A. R. Macintyre	A. Cox, K. R. Bark, R. M. Thomas	D. A. Skarstein	Clan Line Steamers Ltd.
Clan Macindoe	28.11.77	P. R. Kent	A. M. T. Reading, M. Gardner, M. Marsh	G. Stainthorpe	Clan Line Steamers Ltd.
Clan Maciver	13.6.77	R. Fullarton	M. Birch, M. Baker, D. Mugala	I. R. Shaw	Clan Line Steamers Ltd.
Clan Macnab	5.9.77	G. B. Thompson	R. A. East, C. A. Jones, C. R. Finch	F. Wallace	Clan Line Steamers Ltd.
Clan Macnair	20.9.77	G. S. Gann	R. Griddle, R. G. Ward	P. Boyle	Clan Line Steamers Ltd.
Clan Malcolm	7.11.77	W. G. McFarland	C. R. Precious, J. Simpson, T. Roddis	J. P. Sharpley	Clan Line Steamers Ltd.
Clan Matheson	23.2.78	A. G. Cruickshank	E. Swale, M. A. J. McMillan, C. J. R. Williams	K. Whytok	Clan Line Steamers Ltd.
Clan Menzies	28.3.78	O. Barnsley	A. Watkins, R. Mennell, P. Ashcroft		Clan Line Steamers Ltd.
Clione	13.10.77	J. R. French	G. F. Lee		Ministry of Agriculture, Fisheries & Food
Clyteneus	20.7.77	I. I. Laing	R. Samson, A. Provan, I. Fraser-Mitchell	R. A. Browne	Ocean Transport & Trading Ltd.
Columbia Star	1.2.7	T. D. Brewster	G. J. Rawding, H. Owen	D. E. O'Halloran	Blue Star Line Ltd.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
Conant Forest	1.2.78	L. Bell	N. D. I. Macdonald, S. J. Sinclair	R. M. Rigg	J. & J. Denholm Ltd.
Corella	1.12.77	J. E. M. Balfour			Ministry of Agriculture, Fisheries & Food
Coriolanus	*	B. Kelly	A. S. Warman	A. S. Warman	British United Trawlers Ltd.
Cortes	13.10.77	E. Merino	D. W. Morgan, D. J. Sweet	A. N. Simpson	United Baltic Co. Ltd.
Cumbria	1.11.77	K. James	A. G. Morgan, L. D. George, J. Exley	J. Miller	Hadley Shipping Co. Ltd.
Cunard Calamanda	9.2.78	D. M. Kissane	P. H. C. Moxom, R. J. Hill, G. K. C. Smith	C. Clark	Cunard S.S. Co. Ltd.
Cunard Carrier	21.2.77	C. J. Burtinsbaw			Cunard S.S. Co. Ltd.
Cunard Cavalier	*	R. W. Crump			Cunard S.S. Co. Ltd.
Dalesman	5.12.77	B. Crook	S. Rashid, K. Hodson, I. Rankin	W. Jenner	T. & J. Harrison Ltd.
Dart America	15.2.78	R. H. Wyatt	A. Patterson, D. J. Smith, F. G. Bissett	E. A. Ferrand	Bibby Line Ltd.
Dart Atlantic	22.3.78	M. J. Butler	A. G. Thelwell, S. H. Gledhill	W. Ferry	Bibby Line Ltd.
Dart Canada	*	N. R. Prike	D. W. McCluskey, J. H. Lowe, P. A. Brown	I. Conn	Associated Maritime Co. Ltd.
Degema	29.12.77	A. J. Palmer	D. Kennedy, C. A. Macmillan, C. A. Lawrence	R. Lowe	Ocean Transport & Trading Ltd.
Deido	1.2.78	A. W. Richards	R. J. Holland, V. J. Indiran, G. N. G. Price	C. Butterworth	Ocean Transport & Trading Ltd.
Desado	17.1.78	J. J. Rutter	C. J. Stone, F. W. Davies	N. Hadley	Shaw Savill & Albion Co. Ltd.
Discovery	19.1.78	P. J. Macdermott	A. R. Graham, C. J. Wright	T. J. Harris	Natural Environment Research Council
Discovery Bay	16.3.78	G. A. Gibbons	R. I. P. Coutts, S. D. Mayl		Container Fleets Ltd.
Donga	25.10.77	W. F. Wood	B. J. Coupland, P. C. D'arcy	J. A. McKay	Ocean Transport & Trading Ltd.
Domington	15.9.77	G. B. Pances	J. Glover, J. W. Ashworth, P. G. Lloyd	D. F. Murray	Stephenson Clark Ltd.
Dover Castle	16.3.78	R. Ross-Will	G. A. Hunter, P. Barratt, D. Matthews	M. Berrisford	Union-Castle S.S. Co. Ltd.
Drupa	23.11.77	J. S. L. Ayre	A. Bateman, P. E. Davidson	G. Scott	Shell Tankers (U.K.) Ltd.
Dumbella	28.3.78	S. F. Garside	L. Y. Chiang, J. H. Warburton	B. Murgatroyd	Ocean Transport & Trading Ltd.
Dunelmia	*	A. Stuart	M. Hislop, C. Kay, G. Morrison	A. Jones	J. & J. Denholm Ltd.
Dunkua	22.6.77	I. D. Jackson	D. W. Stocks, C. D. Levesley, D. M. Dixon	C. Branthwaite	Ocean Transport & Trading Ltd.
Dunstanburgh Castle	10.5.77	T. Wilson	J. Greig, S. Sowerby	D. Warner	W. A. Souter & Co. Ltd.
Edenfield	17.2.78	J. A. Conlon	D. Sim, K. W. Love, H. D'Souza	W. Black	Hunting & Sons Ltd.
Edward Forbes	10.3.77	B. A. Chapman	S. P. Tilbury, R. I. P. Coutts		Natural Environment Research Council
Egidia	*	D. Lamont	P. J. Donnelly, R. Hargreaves, K. Hunter	P. Kinsella	Walter Runciman & Co. Ltd.
Encounter Bay	8.3.78	J. S. Thorpe	A. L. Smith, W. C. Carruthers, A. H. Fussell	V. A. Gorny	Container Fleets Ltd.
Eravan	6.12.77	G. Cornforth	C. Harper, R. H. Lewis, R. C. Dundas	L. Chan	John Swire & Sons Ltd.
Ernebank	1.9.77	P. H. Thomas	K. Medlicott, G. O'Malley, I. Blenkinsopp	A. K. Ray	Bank Line Ltd.
Erskine Bridge	29.12.77	W. McCrae	I. F. Mackay, D. Wood, J. E. Tirel	J. K. Morris	Silver Line Ltd.
Esso Caledonia	23.2.78	J. M. Phillips	P. Q. Rees, J. J. Keating, J. Pratt	D. Leeson	Esso Petroleum Co. Ltd.
Esso Cambria	3.2.78	I. D. Grigor	K. H. Milne, A. M. Hoare	R. E. Byng	Esso Petroleum Co. Ltd.
Esso Dalriada	*	F. Verbist	A. M. McGill, M. Bottoms, J. Patel	D. Nott	Esso Petroleum Co. Ltd.
Esso Demetia	20.3.78	T. Harper	M. George, S. Crawley, A. Nields	A. J. Pampling	Esso Petroleum Co. Ltd.
Esso Northumbria	17.1.78	F. Stubbs	T. J. Lowe, B. Saffery, C. O'Brien	G. Minay	Esso Petroleum Co. Ltd.
Esso Scotia	*	W. D. B. Boler	G. G. Pritchard, J. Barkess, M. J. Wise	R. T. Jolliffe	Esso Petroleum Co. Ltd.
Esso Ulidia	14.2.78	R. B. Walker	I. Roberts, D. Bunker, G. Foxcroft	N. Samuel	Esso Petroleum Co. Ltd.
Esso Warwickshire	16.3.78	W. D. Templeman	D. S. Thetford, R. Jones	I. Morgan	Esso Petroleum Co. Ltd.
Ethel Everard	21.11.77	A. J. A. Richards	P. G. Powell	P. G. Powell	F. T. Everard & Sons Ltd.
Eucadia	20.3.78	J. Williamson	M. M. Manekshaw, J. C. Priest, A. M. Simpson	L. S. Hartney	Walter Runciman & Co. Ltd.
Eurofreighter	23.9.77	I. Donaldson	A. J. Eccleston, S. H. M. Lee	M. Webster	J. & J. Denholm Ltd.
Euroliner	3-8.76	W. R. Williamson	C. W. Harvey, S. M. Ferguson, A. Patterson	M. Webster	J. & J. Denholm Ltd.

<i>Explorer</i>	..	11.1.78	J. Fletcher	..	A. T. Joyce, K. I. Milton, M. Bell	..	S. Bentley	..	T. & J. Harrison Ltd.
<i>Explorer (F.R.S.)</i>	..	19.8.77	J. Gillon	..	A. Murray, W. Ferguson	..	J. A. Main	..	Department of Agriculture & Fisheries for Scotland
<i>Farnella</i>	..	7.2.77	H. Powdrell	..	G. Christmas	..	A. C. Catt	..	J. Marr & Son Ltd.
<i>Fernie</i>	..	14.2.78	P. R. Crabb	..	J. L. Burton, D. Springett, R. Crone	..	R. Milne	..	P. & O. S.N. Co.
<i>Fleetbank</i>	..	21.3.78	I. C. N. Shrubsole	..	S. J. Messruther, C. Medlicott, J. D. Lorking	..	A. Titley	..	Bank Line Ltd.
<i>Flinders Bay</i>	..	28.3.78	W. A. Murison	..	R. J. Baldock, M. Watts, A. J. Ball	..	I. P. Wan Wo	..	Container Fleets Ltd.
<i>Fochow</i>	..	15.12.77	G. A. Drewery	..	N. G. Wan Chin, J. S. MacLeod, Choi Kar Fung	..	J. Fitzgerald	..	John Swire & Sons Ltd.
<i>Fort Victoria</i>	..	8.3.78	T. W. Corney	..	R. S. Drew, M. A. Campbell, J. Callan	..	S. C. Griffiths	..	Shipping & Coal Co. Ltd.
<i>Fortes Kiwi</i>	..	21.3.78	J. S. Rind	..	A. P. Sharp, C. Riches	..	B. Cameron	..	Canadian Pacific Steamships Ltd.
<i>Fremantle Star</i>	..	18.1.77	I. Guy	..	A. A. Beattie, C. Spink	..	E. Connell	..	B.P. Tanker Co. Ltd.
<i>Fresno City</i>	..	15.3.78	D. Gilmour	..	D. Turner, N. B. Meek, A. Redcliff	..	E. A. Willocks	..	Blue Star Line Ltd.
	..		R. K. Stuart	..	J. A. Doodv, A. M. Beevor-Reid	..	H. Holdridge	..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Frontier</i>	..	20.2.78	D. R. Llewellyn	..	J. B. K. Tyson, N. F. Edwards, D. J. Bancroft	..	I. Spiden	..	Manchester Liners Ltd.
<i>G. A. Raey</i>	..	20.7.77	G. Clark	..	P. McKay	..	A. Watson	..	Torrey Research Station
<i>Gambada</i>	..	19.1.78	R. J. Turney	..	J. N. Balkwill, D. C. Dastur, D. J. Payne	..	R. S. James	..	P. & O. S.N. Co.
<i>Gandara</i>	..	3.5.77	J. K. Levertton	..	R. S. James, R. Nuten	..	R. E. Goring	..	P. & O. S.N. Co.
<i>Gardine Locater</i>	..	25.8.77	R. B. Reid	..	A. C. Wilson, N. Stevens	..	P. Enrico	..	Gardline Shipping Ltd.
<i>Gardula</i>	..	16.12.77	R. B. Reid	..	J. Hunt, N. Stevens, C. W. Raymond	..	T. D. Soundy	..	P. & O. S.N. Co.
<i>Gazana</i>	..	31.8.77	P. Malarky	..	K. Berry, C. L. Callaway, A. Thomson	..	J. N. McConnell	..	P. & O. S.N. Co.
<i>Geestcrest</i>	..	28.3.78	G. de F. Foster	..	T. Evans, K. P. Slade, D. Roberts	..	T. R. Rhimes	..	Geest Industries Ltd.
<i>Geestland</i>	..	23.1.78	M. Wilks	..	I. M. Grant, P. J. Seabrooke, K. T. Thomas	..	W. P. Cameron	..	Geest Industries Ltd.
<i>Geeststar</i>	..	13.12.77	R. A. Cole	..	J. R. Durnford, C. J. Flanagan, P. B. Giles	..	G. Wetherall	..	Geest Industries Ltd.
<i>Geest-tide</i>	..	11.10.77	O. Springett	..	R. H. Mason, M. J. Davies	..	D. C. Millar	..	Geest Industries Ltd.
<i>Gela</i>	..	24.1.77	D. B. Jack	..	G. Evans, J. W. Gorton, P. G. Deschamps	..	R. Spall	..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Gene Trefethen</i>	..	29.11.77	I. L. Stevens	..	R. Ivo, G. Williams, J. Williams	..	G. Smith	..	International Ore Carriers Ltd.
<i>Gladstone Star</i>	..	21.6.77	S. Williams	..	E. Buick, A. I. Middleton, K. O'Brien	..	D. J. McNaughton	..	Blue Star Line Ltd.
<i>Glenbark</i>	..	13.1.78	I. C. Campbell	..	T. Mitchell, T. R. J. Popplewell, I. McKendrick	..	S. W. Pearson	..	J. & J. Denholm Ltd.
<i>Goth</i>	..	29.12.77	J. N. Kerr, M.B.E.	..	R. Spall	..	K. D. Boyes	..	British United Trawlers Ltd.
<i>Gothia Team</i>	..	9.2.78	E. J. O'Keefe	..	M. J. Macdonald, D. Wedderburn, C. M. Schiller	..	B. Elching	..	J. & J. Denholm Ltd.
<i>Gowanbank</i>	..	17.11.77	F. C. Abell	..	P. J. Gates, T. P. Dodkins, J. Swain	..	G. A. Ferrand	..	Bank Line Ltd.
<i>Grafton</i>	..	8.1.78	D. Lambell	..	N. T. French, T. J. Napper, H. F. Harris	..	C. Constantinov	..	P. & O. S.N. Co.
<i>Graigaur</i>	..	25.8.77	A. C. Hunter	..	S. W. H. Rawlings, M. J. Phillips, A. Humphreys	..	G. P. Carew	..	Graig Shipping Co. Ltd.
<i>Halifax Star</i>	..	31.12.75	G. A. Findlay	..	R. J. Tucker, B. M. Campbell, M. R. Hardmeat	..	D. W. B. Kellas	..	Blue Star Line Ltd.
<i>Hazelbank</i>	..	13.12.77	D. M. Maclean	..	G. Copping, M. Thompson, C. Notman	..	S. P. Kavanagh	..	Bank Line Ltd.
<i>Hector</i>	..	21.3.78	H. K. Timbreil	..	D. H. Atkin, A. Maitra, P. R. Robinson	..	J. J. G. Coman	..	Ocean Transport & Trading Ltd.
<i>Helene</i>	..	28.11.77	M. R. Robins	..	B. Cushman, G. English, I. S. R. Bell	..	P. G. Symonds	..	Bibby Line Ltd.
<i>Herefordshire</i>	..	9.8.77	I. E. W. Denholm	..	M. Backs, B. Dhruv-Kumar, N. Marshall	..	K. Lancashire	..	P. & O. S.N. Co.
<i>Hewthorp</i>	..	29.3.76	T. Butler	..	E. J. Hadfield, A. C. Peace, S. Chopra	..	C. P. Beverstock	..	T. & J. Harrison Ltd.
<i>Historian</i>	..	24.3.77	J. O. White	..	I. R. F. Davis, T. Connor	..	W. P. Guiry	..	Blue Star Line Ltd.
<i>Hobart Star</i>	..	1.3.78	W. M. Seybold	..	C. G. Gillies, K. O'Brien, D. Craddock	..	T. Searle	..	Blue Star Line Ltd.
<i>Im Ardoun</i>	..	8.12.77	R. P. W. Roberts	..	A. M. Arshad, Y. Alkhanderi, I. S. Dow	..	P. Cooper	..	United Arab Shipping Co. Ltd.
<i>Icemic</i>	..	25.8.77	F. G. Bolze	..	J. K. Chikatah, B. D. McIntyre, T. N. Dudman	..	R. Wade	..	United Arab Shipping Co. Ltd.
<i>Illyric</i>	..	7.2.78	M. Larrive	..	S. J. Card, G. C. Clay, P. A. Foulds	..		..	Shaw Savill & Albion Co. Ltd.
<i>Industria</i>	..	18.7.77	C. P. W. White	..	I. E. Johnson, J. S. McKechnie, I. R. Linke	..		..	Shaw Savill & Albion Co. Ltd.
<i>Inishowen Head</i>	..	2.8.77	F. R. N. Best	..	J. Cameron, R. L. Dewick, A. McGregor	..		..	J. & J. Denholm Ltd.
<i>Ionic</i>	..	10.1.77	D. T. Mouldley	..	K. C. Robertson, M. A. Chapple, T. Gordon	..		..	G. Heyn & Sons Ltd.
<i>Irisbank</i>	..	8.2.78	B. Gerstel	..	M. T. Hardy, G. Grime, J. Lewis	..		..	Shaw Savill & Albion Co. Ltd.
<i>Jamaica Producer</i>	..	11.1.78	M. C. Harper	..	A. Fischbacher, F. J. Nichol, K. L. Johnstone	..		..	Bank Line Ltd.
<i>Jedforest</i>	..	3.2.78	B. R. B. Blood	..	C. G. Trappe, N. Muhsin, H. A. Smith	..		..	Kay, Son & Co. Ltd.
<i>Jervis Bay</i>	..	18.4.77	B. Chipperfield	..	A. Kirkham, J. Wise, R. Lorraine	..		..	P. & O. S.N. Co.
<i>John Biscoe</i>	..		C. R. Elliott	..	J. Webb, M. J. S. Burgan	..		..	Container Fleets Ltd.
	..			..		..		..	British Antarctic Survey

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>John Murray</i> ..	18.8.76	A. Justen ..	G. M. Long, A. R. Neil, J. T. Morse ..	..	Natural Environment Research Council
<i>Yara</i> ..	•	P. Burn ..	I. Pollock, A. Hunt, J. McLeod, J. McCutcheon	..	Department of Agriculture & Fisheries for Scotland
<i>Kano Palm</i> ..	26.10.76	J. A. Crook ..	A. J. Radford, P. H. D. Coombs ..	..	Palm Line Ltd.
<i>King Alfred</i> ..	7.2.78	M. N. Ure ..	F. J. Bailey, S. H. Grant ..	..	Cayzer Irvine & Co. Ltd.
<i>King Charles</i> ..	•	I. M. Shearer ..	M. R. Swaffield, P. M. J. O'Sullivan, H. Cameron	..	Cayzer Irvine & Co. Ltd.
<i>King George</i> ..	12.4.77	P. C. Byrne ..	N. Jones, D. Funnell, P. Best ..	..	Cayzer Irvine & Co. Ltd.
<i>King James</i> ..	14.3.78	M. D. Whiteley ..	F. J. Mack, A. Fienley, I. A. Ross ..	..	Cayzer Irvine & Co. Ltd.
<i>King Richard</i> ..	9.3.78	E. J. E. Owen ..	P. S. Whittle, R. Kendall, M. Jackson ..	..	Cayzer Irvine & Co. Ltd.
<i>King William</i> ..	27.2.78	S. M. Grant ..	G. Hobbs, J. Dingle, P. S. Whyte ..	..	Cayzer Irvine & Co. Ltd.
<i>Kingurnie Castle</i> ..	24.1.78	J. M. Brackenbridge ..	C. A. Neave, H. Jones, M. Williams ..	..	Cayzer Irvine & Co. Ltd.
<i>Kowloon Bay</i> ..	30.11.77	C. S. Mackinnon ..	S. T. Houldsworth, M. J. Godbehear, R. J. Edmonds	..	Union-Castle Mail S.S. Co. Ltd.
<i>Kurdistan</i> ..	3.2.78	W. D. James ..	P. Johnson, M. Carrigan, P. Dowde ..	..	Ocean Transport & Trading Ltd.
<i>L.N.G. Challenger</i> ..	12.6.75	C. G. Hunt ..	T. W. Morey, T. James, A. J. Lewis ..	..	Common Bros. Ltd.
<i>La Loma</i> ..	10.1.78	I. W. Murray ..	P. J. Weston, D. J. Heale, N. Wiggins ..	..	P. & O. S.N. Co.
<i>Lackenby</i> ..	22.3.78	T. Jones ..	R. Whyte, C. Bamford, W. K. Mutch ..	..	Burles Marks Ltd.
<i>Laganbank</i> ..	•	J. Appleby ..	T. Wright, C. MacInnes, R. Newman ..	..	Sir R. Ropner & Co. Ltd.
<i>Lancashire</i> ..	12.12.77	K. Gowsell ..	J. H. Lowe, N. C. Baker, J. R. Hughes ..	..	Bank Line Ltd.
<i>Laurentian Forest</i> ..	9.9.77	A. Mitchell ..	J. J. Coyle, J. Turnbull ..	..	Bibby Line Ltd.
<i>Laurentic</i> ..	22.8.77	C. A. S. Borthwick ..	P. R. Haynes, I. Chandler, J. Hurley ..	..	Harrison (Clyde) Ltd.
<i>Leathworth</i> ..	4.1.78	J. S. Wisden ..	P. D. Cowie, E. Szpyrka, T. Dickson ..	..	Shaw Savill & Albion Co. Ltd.
<i>Leven Fisher</i> ..	28.3.78	J. T. Langstaff ..	D. W. Little, J. A. P. Ryan ..	..	R. S. Dalgliesh Ltd.
<i>Lindfield</i> ..	10.2.78	A. T. Williams ..	A. J. Tanner, A. McConway ..	..	James Fisher & Sons Ltd.
<i>Linguist</i> ..	1.3.78	J. A. Creer ..	D. Macleod, J. G. Windlehurst, M. S. Brooks	..	Shaw Savill & Albion Co. Ltd.
<i>Liverpool Bay</i> ..	16.3.78	J. Banna ..	I. S. Cairn, A. J. Leslie ..	..	T. & J. Harrison Ltd.
<i>Loch Lomond</i> ..	13.12.77	C. W. Harvey ..	A. Wallace, J. R. Thompson ..	..	Ocean Transport & Trading Ltd.
<i>Loch Maree</i> ..	10.1.78	C. W. Harvey ..	E. H. N. Thomas, J. R. K. Corrin, P. Cooper	..	J. & J. Denholm Ltd.
<i>London Baron</i> ..	18.11.77	R. B. Tarbuck ..	P. J. Wade, R. M. Patmore, N. Gennemkin	..	London & Overseas Freighters Ltd.
<i>London Bombardier</i> ..	13.12.77	A. C. Armstrong ..	C. D. Bailey, J. A. Attwater, D. Gibson	..	London & Overseas Freighters Ltd.
<i>London Cavalier</i> ..	24.1.78	I. Clark ..	K. B. Ferries, A. P. J. Hilliard, A. H. Atkins	..	London & Overseas Freighters Ltd.
<i>London Earl</i> ..	24.2.78	R. Nelson ..	C. L. De Lisle, G. R. Hicks, S. Hyams	..	London & Overseas Freighters Ltd.
<i>London Fusilier</i> ..	25.7.77	W. W. Brown ..	G. A. J. Boucher, A. J. Sinclair, D. J. D. Woodley	..	London & Overseas Freighters Ltd.
<i>London Grenadier</i> ..	•	P. J. Wright ..	K. Bryant, K. Horsley, J. Morrison ..	..	London & Overseas Freighters Ltd.
<i>London Viscount</i> ..	28.3.78	R. C. Mortimer ..	G. A. Boucher, A. J. Sinclair, D. Shoobridge	..	London & Overseas Freighters Ltd.
<i>Lord Strathcona</i> ..	16.3.77	T. L. Simpson ..	M. T. McAuley, L. C. Taylor, T. Fisher	..	London & Overseas Freighters Ltd.
<i>Lothabank</i> ..	29.11.77	C. C. Creasey ..	E. R. Mainland, C. S. Latchford, G. S. Rolls	..	London & Overseas Freighters Ltd.
<i>Lutetian</i> ..	•	R. T. Mudd ..	S. Woodward, M. J. C. Court ..	..	London & Overseas Freighters Ltd.
<i>Lynton Grange</i> ..	1.3.78	J. Gilzean ..	P. Burrow, T. Banton, P. Healey ..	..	Canadian Pacific (Bermuda) Ltd.
<i>Maersk Cadet</i> ..	18.8.76	J. L. Frain ..	A. Cochrane-Barnett, L. E. Macintosh ..	..	Bank Line Ltd.
<i>Maersk Commander</i> ..	20.12.77	J. Lundberg ..	G. W. Miller, G. Thompson, J. Anderson	..	Continental London Ltd.
<i>Makaria</i> ..	2.3.78	C. Prescott ..	E. O. Morris, A. King, F. P. Gunning ..	..	Houlder Bros. & Co. Ltd.
<i>Manchester Challenge</i> ..	30.11.77	I. Rushworth ..	J. Rees, D. Teal, A. Reid ..	..	Maersk (U.K.) Co. Ltd.
<i>Manchester Concept</i> ..	5.12.77	T. B. Hancock ..	J. D. Hill, B. Frost, A. Bond ..	..	P. & O. S.N. Co.
<i>Manchester Concorde</i> ..	19.10.77	J. E. Askew ..	A. Milwright, N. J. Hughes, W. D. Porter	..	Manchester Liners Ltd.
<i>Manchester Courage</i> ..	2.11.77	N. W. Cockshoot ..	J. Milcross, A. Niblock, N. Glendinning	..	Manchester Liners Ltd.
<i>Manchester Crusade</i> ..	•	J. Illingworth ..	C. Dodsworth, I. Buckley, G. Gleave ..	..	Manchester Liners Ltd.

<i>Manchester Vigour</i>	6.3.78	K. Lehepuu ..	I. Buckley, C. Livingstone, D. M. Oliver	S. G. Price ..	Manchester Liners Ltd.
<i>Manchester Zeal</i>	17.10.77	K. Rourke ..	A. Reid, M. Broadhead, N. Glendinning	P. Rowe ..	Manchester Liners Ltd.
<i>Marabank</i>	22.3.78	D. Martin ..	C. Smith, J. C. Osman ..	T. O'Dwyer ..	Bank Line Ltd.
<i>Marhor</i>	8.2.77	G. D. Symonds ..	J. G. Ward, D. W. Lax, C. Latham ..	..	Cunard-Brocklebank Ltd.
<i>Matco Avon</i>	3.10.77	D. Anderson ..	M. Avery, J. W. Parkinson, I. M. Boyd ..	..	Mobil Shipping Co. Ltd.
<i>Matco Thames</i>	29.12.77	G. Cram ..	A. P. Marshall, P. K. Cadet, A. T. Turner ..	..	Mobil Shipping Co. Ltd.
<i>Mayfield</i>	28.3.78	T. R. Barton ..	R. Mitchell, R. A. Lescombe, A. T. Turner ..	..	Shaw Savill & Albion Co. Ltd.
<i>Medic</i>	5.1.77	W. E. Musson ..	R. S. Moass, C. E. W. Sturke, C. C. MacDonald ..	..	Shaw Savill & Albion Co. Ltd.
<i>Megantic</i>	10.1.78	R. Dando ..	N. J. Jeffery, J. Payne, R. Taylor ..	..	P. & O. S.N. Co.
<i>Melita</i>	1.2.78	I. D. Barbour ..	W. J. Butcher, G. A. Walter, M. Bowkley ..	..	T. & J. Harrison Ltd.
<i>Merchant</i>	30.11.77	A. G. P. Murray ..	K. R. Ingamells, S. Bell, A. Smith ..	..	Department of Trade
<i>Miranda</i>	23.2.78	G. J. Robertson ..	M. H. McFarlane ..	..	Mobil Shipping Co. Ltd.
<i>Mobil Concor</i>	..	I. Atkins ..	M. Goodfellow ..	..	Blue Star Line Ltd.
<i>Montreal Star</i>	25.11.77	D. MacPhail ..	K. Mills, M. E. Turner, D. E. Ginder ..	..	Bank Line Ltd.
<i>Morebank</i>	8.1.78	R. A. Wilson ..	J. C. Hoy, M. J. W. Baker, L. J. Fletcher ..	..	Container Fleets Ltd.
<i>Moreton Bay</i>	8.3.78	R. Mackenzie ..	T. F. Morgan, W. J. Cowie, M. W. Shoolbraid ..	..	J. & J. Denholm Ltd.
<i>Muirfield</i>	1.11.77	G. Brice ..	V. L. Mitchell, R. A. Curtis, J. D. Beeton ..	..	Bank Line Ltd.
<i>Nairnbank</i>	7.11.77	I. B. Gault ..	C. Sutherland, E. Curling, K. J. Dye ..	..	R. S. Dalgliesh Ltd.
<i>Naworth</i>	18.10.77	A. Newton ..	W. Langton, P. Drinkwater, H. Fogarty ..	..	Bank Line Ltd.
<i>Nessbank</i>	..	A. L. G. Gosset ..	T. L. Lawrence, R. E. Baker, I. H. Woolley ..	..	Sir Wm. Reardon Smith & Sons Ltd.
<i>New Westminster City</i>	30.12.77	..	..	..	..
<i>New York Star</i>	..	W. A. Wilson ..	C. Burling, J. Wilkinson, S. Kumar ..	V. Whittaker ..	Blue Star Line Ltd.
<i>Nordic Breeze</i>	..	J. C. Twite ..	D. A. Hore, S. S. Parnar, S. R. Lyons ..	G. Rees ..	Wallem Ship Management (U.K.) Ltd.
<i>Nordic Commander</i>	8.1.78	W. Brown ..	R. Mobey ..	J. D. Walsh ..	J. & J. Denholm Ltd.
<i>Norman Lady</i>	16.3.78	G. S. Willis ..	M. Johnson, K. Dearlove ..	W. T. Guinan ..	Burles Marks Ltd.
<i>Norse</i>	7.11.77	R. Waller ..	..	..	British United Trawlers Ltd.
<i>Norse Marshal</i>	24.1.75	A. Barker ..	..	..	Harrisons (Clyde) Ltd.
<i>Norse Viking</i>	13.10.77	H. W. Finn ..	..	..	Cardigan Shipping Co. Ltd.
<i>Northamptonshire</i>	..	R. A. Glassup ..	..	..	Harrisons (Clyde) Ltd.
<i>Oakworth</i>	23.2.78	G. Preston ..	N. Stark, H. Syed ..	J. Scarr ..	R. S. Dalgliesh Ltd.
<i>Ocean Transport</i>	..	M. Mortimer ..	B. G. Amott, P. G. Ramm, H. Towers ..	A. G. Howard ..	Houlder Bros. & Co. Ltd.
<i>Opalia</i>	13.3.78	M. T. John ..	J. Kirk, G. Ross, K. Reynolds ..	E. E. White ..	Shell Tanker (U.K.) Ltd.
<i>Orbita</i>	28.3.78	R. K. C. Thomas ..	U. Easby, J. Cripps, K. J. Dye ..	M. Morgan ..	Pacific S.N. Co. Ltd.
<i>Orcoma</i>	20.2.78	T. J. Sax ..	I. Wilson, R. Gibbons, R. Hooley ..	I. W. Hurd ..	Pacific S.N. Co. Ltd.
<i>Orduna</i>	27.2.78	R. T. Riley ..	G. Dyson, P. M. Gregg, B. V. Roberts ..	M. P. J. Davies ..	Pacific S.N. Co. Ltd.
<i>Orient City</i>	20.2.78	R. Stuart ..	G. H. S. Darling, M. R. Greenwood, S. D. Bell ..	B. B. Everett ..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Orolava</i>	12.1.78	B. C. Tyler ..	S. Szaroleta, K. Thompson, T. E. Hill ..	..	..
<i>Ortega</i>	6.1.78	C. W. Alison ..	W. P. Barnes, A. M. Young, G. P. Eyles ..	D. Pullan ..	Houlder Bros. & Co. Ltd.
<i>Osaka Bay</i>	16.3.78	J. Bentley ..	..	A. Landry ..	Pacific S.N. Co. Ltd.
<i>Parula</i>	15.11.77	E. C. V. Sharples ..	D. Outen, M. Molloy ..	C. G. Gully ..	Ocean Transport & Trading Ltd.
<i>Pegu</i>	31.5.77	J. McGeachen ..	F. R. Barry ..	N. K. R. Hollingbury ..	Shell Tankers (U.K.) Ltd.
<i>Perseus</i>	20.3.78	C. H. F. Hill ..	A. H. Price, S. Dunbar ..	T. Flatley ..	Ocean Transport & Trading Ltd.
<i>Phenius</i>	27.2.78	C. H. F. Hill ..	W. S. Payne, J. H. Thacker, J. Caluin ..	N. Kinley ..	Ocean Transport & Trading Ltd.
<i>Photinia</i>	4.10.77	W. H. Selkirk ..	A. W. D. Brown, J. Braddock ..	O. B. H. Hussin ..	Ocean Transport & Trading Ltd.
<i>Phrontis</i>	31.1.78	I. M. Dick ..	..	J. E. B. Sams ..	Stag Line Ltd.
<i>Piako</i>	20.10.77	D. Foreman ..	B. W. Hildred, S. J. Andrucci, E. A. Lamb ..	M. J. Walker ..	Ocean Transport & Trading Ltd.
<i>Plainsman</i>	20.2.78	R. Maxwell ..	D. Le Page, D. Mountford, J. Meirose ..	E. McMahon ..	P. & O. S.N. Co.
<i>Pole Star</i>	13.1.78	N. Morrison ..	B. Birch, I. Henderson, M. Hudson ..	T. Lawton ..	T. & J. Harrison Ltd.
<i>Port Alberni City</i>	3.2.78	L. Staines ..	A. D. Welch ..	..	Northern Lighthouse Board
<i>Port Alfred</i>	14.10.77	D. Sinclair ..	I. A. Smith, D. J. Cooke, J. E. S. York ..	S. Whitmore ..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Port Caroline</i>	14.3.78	J. R. dit-Leschery ..	..	M. V. Bushnell ..	Port Line Ltd.
			S. Daniel, P. R. Fawcett, D. Stone ..	J. F. P. Magee ..	Port Line Ltd.
			J. E. Atkins, C. C. Latham ..	..	..

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
Port Chalmers	6.3.78	M. L. Coombs	P. Bailey, A. Haxby, R. H. Jowett	M. Pearson	Port Line Ltd.
Port New Plymouth	17.6.77	G. Carling	S. Staples, M. Welton	T. Robinson	Port Line Ltd.
Port Nicholson	4.8.77	A. Lawson-Smith	N. J. Stephens, M. Read, P. M. Doyle	J. W. K. Powell	Port Line Ltd.
Post Challenger	27.10.77	P. Bennisson	T. R. Lane, J. P. O'Mahony	J. D. Coop	Panocean-Anco Ltd.
Post Champion	12.10.77	N. Hayward	S. Woods, G. P. Harris	W. M. Greig	Panocean-Anco Ltd.
Post Charger	11.1.78	G. Milburn	J. P. O'Hara, S. R. Jones, D. Coiley	F. Glynn	Panocean-Anco Ltd.
Post Chaser	2.9.77	A. K. Froggatt	S. Byron, P. S. K. Hook	R. J. Deakin	Panocean-Anco Ltd.
Post Enterprise	25.11.77	B. Hammond	R. J. Murray, P. Singh, T. Bayley	E. E. Millburn	Ocean Transport & Trading Ltd.
Prism	21.1.77	J. C. Morris	D. P. Kirley, T. J. Hunter, J. R. Ashley	G. P. S. Watts	Sir Wm. Reardon Smith & Sons Ltd.
Prince Rupert City	25.1.78	A. D. Lightfoot	C. D. Levesley, K. W. Smith	A. G. Bond	Ocean Transport & Trading Ltd.
Protesilaus	15.2.78	G. I. Wright	P. Chandler, J. W. Salter	D. Butterworth	Cunard S.S. Co. Ltd.
Queen Elizabeth 2	13.9.77	R. H. Arnott	R. A. Somerville, C. D. Waddingham, G. M. Clark	J. A. Foreman	Blue Star Line Ltd.
Queensland Star	27.3.78	G. A. Findlay	R. Wareing, P. Richards, J. S. Gee	D. C. Millar	Blue Star Line Ltd.
Raeburn	19.10.77	A. H. White	R. D. Anderson, A. J. Fee, R. Bourne	R. Redhead	Cable & Wireless Ltd.
Recorder	28.3.78	J. H. Hutson	A. M. Boyd, S. D. Smith	B. A. Mullan	Container Fleets Ltd.
Remuera Bay	20.1.78	M. J. Heron	P. S. Warrall, D. MacFarlane	K. Jackson	Cable & Wireless Ltd.
Resolution Bay	10.2.78	A. W. Henderson	T. J. Noble, C. R. Mundy, D. McNeil	S. Ashbrook	Bank Line Ltd.
Retriever	14.3.78	J. J. Reed	D. G. Lyon, C. R. Darke, K. Walsh	R. A. Grey	Blue Star Line Ltd.
Riverbank	6.1.78	D. A. Van Der Merwe	B. George, D. S. Forde, P. Milton	L. K. Lovie	Shaw Savill & Albion Co. Ltd.
Roebuck	1.2.78	S. Williams	A. M. Ashton, B. Luke, D. McKay	A. Steel	Blue Star Line Ltd.
Roland	14.3.78	J. Needham	P. M. Moore, S. J. Nicholls	R. Prole	Lampport & Holt Line Ltd.
Romney	1.2.78	R. K. Bilton	A. Monteath, S. E. Ford, V. L. Mitchell	M. A. Brennan	Lampport & Holt Line Ltd.
Ronsard	16.1.78	A. Clish	R. Kennett, T. B. Healey	P. Dempsey	Ben Line Steamers Ltd.
Ros Castle	22.3.77	J. Campbell	P. F. Bayliss, W. Mutch, K. Hughes	E. Perkins	Bank Line Ltd.
Rowanbank	13.10.77	J. D. Cooper	T. P. Barrett	G. Thomas	Bolton Steam Shipping Co. Ltd.
Rubens	22.2.77	F. B. Pounder	H. G. Paek	P. Bradley	Sir R. Ropner & Co. Ltd.
Rudby	18.10.77	T. Doyle	D. Knight, R. B. Lloyd	T. Hamling & Co. Ltd.	T. Hamling & Co. Ltd.
St. Benedict	12.1.78	A. Ball	K. F. Ballard, D. Ellis, J. Shirley	P. MacIntyre	Cunard S.S. Co. Ltd.
St. Jason	8.12.77	J. Watson	A. Frost, P. Rafferty, M. Hartnell	M. Shearer	Sir Wm. Reardon Smith & Sons Ltd.
Samaria	25.10.77	K. W. Fulker	W. G. S. Williams, L. C. Irvine, M. T. Camm	J. Nicolson	Cunard-Brocklebank Ltd.
Sara Lupe	18.10.77	C. R. Knight	A. Main, W. Henderson, W. Laws	J. MacIntyre	T. & J. Harrison Ltd.
Saxonia	12.9.74	C. D. Riley	D. J. Arnold, D. MacNair	W. E. Harrison	Department of Agriculture & Fisheries for Scotland
Scholar	16.12.77	P. S. Burn	M. J. Blacklock	S. Farmer	I. & J. Denholm Ltd.
Scotspark	19.1.78	G. Motley	J. A. P. Hall, F. P. Garbutt, J. B. Norcliffe	R. Moloney	Cunard S.S. Co. Ltd.
Scythia	28.3.78	P. R. Ramsay	N. Glendinning, M. Broadhead, T. P. Mather	J. Hammerton	Manchester Liners Ltd.
Seatrain Bennington	1.3.78	N. W. Cockshoot	D. Freeman, D. L. Hines, A. Holmes	J. J. Crotty	Shell Tankers (U.K.) Ltd.
Seatrain Trenton	2.11.77	J. B. Turnbull	D. A. Pye, N. A. C. Jonas, J. D. Noden	..	Natural Environment Research Council
Serenia	5.1.78	K. Bramley	M. S. Bagley, D. Robertson	..	Ocean Transport & Trading Ltd.
Shackleton	2.11.77	G. M. Long	M. J. Banks	..	Bank Line Ltd.
Sherbro	5.1.78	S. A. McInnes	..	..	..
Shiracabank	2.11.77	G. D. Scott	..	..	..

<i>Shonga</i>	..	27.9.77	R. Wild	..	B. W. Jamaluddin, J. M. Wood, T. Callan	..	J. Nolan	..	Ocean Transport & Trading Ltd.
<i>Sibonga</i>	..	23.5.77	C. B. Davies	..	M. J. Goldsmith, P. K. Leppington, J. A. Leenders	..	R. B. Cooper	..	Bank Line Ltd.
<i>Sig Ragne</i>	..	11.1.78	K. Swinburne	..	D. L. Pereira, M. A. Gough	..	L. Taylor	..	J. & J. Denholm Ltd.
<i>Silverclayde</i>	..	*	A. A. Walker	..	M. Holbrook, R. Despon, - Watkins	..	C. Jenkins	..	Silver Line Ltd.
<i>Silverford</i>	..	8.12.76	N. Tuddenham	..	S. A. Telford, A. M. Huntingdon, A. G. Tester	..	C. G. A. Turner	..	Silver Line Ltd.
<i>Silverforth</i>	..	16.3.78	J. Graham	..	R. N. Franklin, E. McAteer, C. Olsen	..	..	..	Silver Line Ltd.
<i>Silverman</i>	..	16.3.78	J. D. Robinson	..	B. Baial, R. H. Grassam	..	..	..	Silver Line Ltd.
<i>Simonburn</i>	..	*	I. Gyte	..	M. McCabe, G. Davies, B. Hart	..	D. Boswell	..	Common Bros. Ltd.
<i>Sincerity</i>	..	1.10.74	H. Brown	..	I. Hay	..	..	..	F. T. Everard & Sons Ltd.
<i>Singularity</i>	..	22.3.78	T. K. Dawson	..	N. B. H. Skinner, N. R. Wood	..	..	..	F. T. Everard & Sons Ltd.
<i>Somers</i>	..	8.1.78	B. Austen-Smith	..	I. M. Overton, D. T. Simpson, H. M. Munro	..	J. C. Tompson	..	P. & O. S.N. Co.
<i>Southland Star</i>	..	5.5.77	R. Stubbings	..	P. Richards, K. D. Pykett, S. J. Nichols	..	S. Cooper	..	Blue Star Line Ltd.
<i>Spanish Wasa</i>	..	*	G. A. Reay	..	B. Yasophapalan, A. Malpas	..	..	..	Salen (U.K.) Ship Management Ltd.
<i>Speciality</i>	..	*	P. Whitehouse	..	I. J. Sarjeant, T. L. Jeffery	..	..	..	F. T. Everard & Sons Ltd.
<i>Spraynes</i>	..	31.1.78	P. B. Bagley	..	J. Edkins	..	P. Dredge	..	Jebsons (U.K.) Ltd.
<i>Star Blackford</i>	..	20.2.78	L. Street	..	A. P. Terris, C. Nicholls, R. Roberts	..	L. Moreton	..	Blandford Shipping Co. Ltd.
<i>Star Bulford</i>	..	6.1.78	M. Haley	..	W. P. Broadley, D. Mathias	..	M. R. Contradi	..	Blandford Shipping Co. Ltd.
<i>Stirling Bridge</i>	..	20.1.78	N. MacIver	..	K. Macleod, D. H. Thompson, P. Kapoor	..	D. Macneil	..	Silver Line Ltd.
<i>Stonepool</i>	..	*	F. B. Pounder	..	R. Lorne, N. Johnstone, T. Moody	..	..	..	Sir R. Ropner & Co. Ltd.
<i>Strathaird</i>	..	8.1.78	T. A. M. Lincoln	..	B. N. O'Demba, A. Prideaux, C. N. Cadman	..	C. Adkin	..	P. & O. S.N. Co.
<i>Strathatvie</i>	..	15.9.77	F. G. Bevis	..	P. Tarrant, S. Kocherla, S. R. Kelkar	..	C. Madders	..	P. & O. S.N. Co.
<i>Strathangus</i>	..	21.12.77	E. Fawcett	..	S. P. Webber, G. Norton, J. M. Savur	..	R. S. Shone	..	P. & O. S.N. Co.
<i>Strathanna</i>	..	27.1.78	F. G. Bevis	..	R. C. Woodford, J. F. Hannath	..	K. Pengelly	..	P. & O. S.N. Co.
<i>Strathappin</i>	..	18.11.77	L. J. Lennox	..	P. N. J. Cowdell, J. Press, J. E. Ducler	..	C. P. Marshall	..	P. & O. S.N. Co.
<i>Strathardle</i>	..	1.11.77	A. D. Johnston	..	M. M. Saggi, J. V. Billowes	..	M. Leung	..	P. & O. S.N. Co.
<i>Stratharick</i>	..	17.1.78	P. W. Filcek	..	P. Steen, R. C. Bloomfield, T. Chantler	..	..	..	P. & O. S.N. Co.
<i>Strathastak</i>	..	17.1.78	I. M. Adie	..	M. A. Cook, D. J. Tomkiss, P. A. Fernandes	..	W. Grant	..	P. & O. S.N. Co.
<i>Strathatlow</i>	..	10.10.77	P. D. Low	..	D. G. Wilcockson, R. F. Harris	..	J. Bilton	..	P. & O. S.N. Co.
<i>Strathavoch</i>	..	21.2.78	I. A. North	..	R. N. Hocking, R. Walker, J. Nicholson	..	C. Allen	..	P. & O. S.N. Co.
<i>Strathbrora</i>	..	4.8.76	D. A. C. Windle	..	I. T. Blackley, S. M. Patel	..	Y. C. Lo	..	P. & O. S.N. Co.
<i>Strathconon</i>	..	18.5.77	H. B. Chambers	..	R. I. Maine, S. N. Monks	..	C. Young	..	P. & O. S.N. Co.
<i>Strathdeon</i>	..	14.7.77	A. B. Stalker	..	M. C. J. Jewell, J. Mann, L. L. Dharmani	..	A. A. C. Fraser	..	P. & O. S.N. Co.
<i>Strathdink</i>	..	7.10.77	M. J. Charlesworth	..	S. R. Allen, C. R. Tutty, S. White	..	W. F. Law	..	P. & O. S.N. Co.
<i>Strathdoon</i>	..	24.1.78	A. B. Stalker	..	S. P. Johnson, C. N. Cabman	..	M. P. Frankland	..	P. & O. S.N. Co.
<i>Strathduns</i>	..	3.2.78	D. J. Harrison	..	I. Ebdy, D. Moorhouse, M. C. J. Jewell	..	G. N. Basnett	..	P. & O. S.N. Co.
<i>Strathdyce</i>	..	14.2.78	E. G. Dixon	..	S. Robinson, R. McNeill, R. Lorains	..	J. M. Slade	..	P. & O. S.N. Co.
<i>Stratheden</i>	..	*	R. Hedgson	..	C. J. Tilley, W. G. Poole, P. Cowdell	..	B. J. F. Atkin	..	P. & O. S.N. Co.
<i>Strathesk</i>	..	13.10.77	A. M. J. Jenkins	..	K. F. Duff, T. E. Wright, R. H. Gavine	..	M. Charlton	..	P. & O. S.N. Co.
<i>Streambank</i>	..	27.5.77	A. Stewart	..	P. W. Mills, L. J. Williams, C. E. Houghton	..	J. G. L. Baker	..	Bank Line Ltd.
<i>Sugar Carrier</i>	..	26.12.77	I. E. Leaver	..	T. J. MacGuire, T. L. J. Evans, J. Allan	..	E. G. Gegan	..	Sugar Line Ltd.
<i>Sugar Crystal</i>	..	13.7.77	D. Patrickson	..	M. R. Harris, D. A. A. Jenkins, J. Allen	..	R. R. Mills	..	Sugar Line Ltd.
<i>Sugar Producer</i>	..	12.1.78	C. N. L. Davies	..	W. Brothers, J. Clark, P. Mills	..	J. Ryan	..	Sugar Line Ltd.
<i>Sugar Refiner</i>	..	8.2.78	G. Pirie	..	G. A. Bisacre, D. Wood, F. E. Brown	..	J. W. Phipp	..	Sugar Line Ltd.
<i>Sugar Trader</i>	..	7.2.78	B. E. Evans	..	P. W. Mills, P. J. Greenan, W. H. Walker	..	B. Bicknell	..	Sugar Line Ltd.
<i>Sugar Transporter</i>	..	26.1.78	W. G. Hunt	..	A. Macintyre, H. D. R. Mitchell, G. Bryan	..	J. W. Kenny	..	Sugar Line Ltd.
<i>Summit</i>	..	1.2.78	A. McKinnon	..	B. Priddus, W. Woodger	..	..	..	F. T. Everard & Sons Ltd.
<i>Supremity</i>	..	12.1.78	D. J. Robinson	..	H. A. Finlay-Norman, I. D. Cuthbertson, A. W. Humber	..	D. H. Kinrade	..	F. T. Everard & Sons Ltd.
<i>Swedish Wasa</i>	..	28.8.74	P. B. Robier	..	A. A. Field, A. P. Jagger, E. J. Dunk	..	..	..	Salen (U.K.) Ship Management Ltd.
<i>Sydney Bridge</i>	..	5.1.78	R. I. Crawford	..	..	..	B. Young	..	Bowring S.S. Co. Ltd.
<i>Tacoma City</i>	..	5.12.77	J. Maddison	..	P. Kavanagh, M. Stoddart, D. W. Eccles	..	M. Amos	..	Sir Wm. Reardon Smith & Sons Ltd.
<i>Tactician</i>	..	6.12.77	G. F. Williams	..	A. Othman, L. J. Drummond	..	..	..	T. & J. Harrison Ltd.
<i>Tantalus</i>	..	31.1.78	C. M. Gibbs	..	A. Dockeray, W. D. Phimister, R. J. Smith	..	W. C. Doyle	..	Ocean Transport & Trading Ltd.
<i>Taupo</i>	..	10.2.78	R. Whitehead	..	..	..	S. R. Cloutte	..	P. & O. S.N. Co.
<i>Taybank</i>	..	..	..	..	..	..	..	..	Bank Line Ltd.

Selected Ships (contd.)

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Tekoa</i> ..	17.2.78	S. T. S. Household	P. E. Martin, R. P. Lonsdale, G. Stalker	A. Rose	P. & O. S.N. Co.
<i>Teviotbank</i> ..	30.5.77	N. J. Munro ..	R. J. B. Collinson, M. J. Banks	R. D. Hope	Bank Line Ltd.
<i>Texaco Brussels</i> ..	26.1.78	J. D. Wilkinson	P. G. Darton, P. Turner, V. Golding	F. Kirk	Texaco Overseas Tankship (U.K.) Ltd.
<i>Texaco Gloucester</i> ..	21.2.78	K. F. R. Holding	T. Stone, A. Garner, T. R. Burke	R. M. Arnold	Texaco Overseas Tankship (U.K.) Ltd.
<i>Texaco Singapore</i> ..	15.11.77	J. Coleman ..	W. S. Blair, N. Morganti, K. Stewart	H. M. S. Cherry	Texaco Overseas Tankship (U.K.) Ltd.
<i>Thamesfield</i> ..	*	P. Robinson ..	R. C. Sampath, K. W. Love, J. Eyton	I. Wilson	Hunting & Sons Ltd.
<i>Timaru Star</i> ..	17.9.77	G. Seaye ..	D. Sayle, M. Fleming, T. Kershaw	J. Donnan	Blue Star Line Ltd.
<i>Tokyo Bay</i> ..	20.3.78	D. G. Brown ..	R. Edmonds, M. G. Godbehear, S. T. Houldsworth	E. B. Stephenson	Ocean Transport & Trading Ltd.
<i>Tongarua</i> ..	6.9.77	R. M. Michael	K. D. W. Edwards, J. F. Farquharson, I. A. E. Cookson	A. P. Rhind	P. & O. S.N. Co.
<i>Tourmaline</i> ..	*	J. Meigue ..	W. Darby ..	H. Harper	Wm. Robertson & Co. Ltd.
<i>Townsville Star</i> ..	16.8.77	D. A. Vander Merwe	J. Stanton, M. F. Chinn, C. R. Mundy, T. T. Veitch	J. A. Foreman	Blue Star Line Ltd.
<i>Trader</i> ..	5.1.77	O. M. Owen ..	B. R. Cox, R. W. Maddocks, W. W. Gibson	A. P. Gray	T. & J. Harrison Ltd.
<i>Trinculo</i> ..	*	M. Ogden ..	G. Amos, B. Bridge, N. Peckham	- Swinstead	Bowring S.S. Co. Ltd.
<i>Trojan Star</i> ..	20.3.78	E. C. Smith ..	B. Luke, C. J. Grayson, A. Hurrell	M. M. Sime	Blue Star Line Ltd.
<i>Troll Park</i> ..	12.1.78	J. B. Morris ..	I. A. Souter, J. Duthie, R. Baillie	C. Booth	J. & J. Denholm Ltd.
<i>Uganda</i> ..	4.10.77	J. W. Terry ..	R. W. Borwick, P. J. Thornthwaite, R. J. Spread	H. F. Murphy	P. & O. S.N. Co.
<i>Ulster Star</i> ..	20.10.77	J. A. H. Gray ..	C. H. Prior-Willbard, D. G. Maidment, I. L. Moist	W. Redfearn	Blue Star Line Ltd.
<i>Vancouver City</i> ..	21.2.77	L. R. Staines ..	M. J. Clarke, J. York, P. Lewis	E. Bromham	Sir Wm. Reardon Smith & Sons Ltd.
<i>Vancouver Forest</i> ..	18.11.77	D. M. R. Maxwell	H. Murray, R. I. MacKenzie	B. F. Killilea	J. & J. Denholm Ltd.
<i>Vancouver Trader</i> ..	11.10.77	W. D. Beattie ..	J. Martlew, A. Sekhar, A. MacPherson	M. L. Davies	J. & J. Denholm Ltd.
<i>Vanda</i> ..	18.4.77	M. J. Wharf ..	I. D. Smith, H. R. Vyas	J. O'Brien	Haverton Shipping Ltd.
<i>Vendee</i> ..	24.6.77	C. Prescott ..	A. W. Christie, B. Luke, C. Bell	E. Marks	P. & O. S.N. Co.
<i>Vickers Viking</i> ..	25.8.77	L. Edwards ..	G. W. Hargreaves, P. M. Le Tissier	J. C. Yates	James Fisher & Sons Ltd.
<i>Vickers Viscount</i> ..	18.11.77	A. J. Mellor ..	P. G. MacAulay, D. J. McMurdo, D. J. Smythe	L. Edwards	James Fisher & Sons Ltd.
<i>Victoria City</i> ..	18.7.77	J. Porteous ..	P. C. Roberts, D. Toon, P. P. Lewis	C. J. Burt	Sir Wm. Reardon Smith & Sons Ltd.
<i>Vimeira</i> ..	16.5.77	H. Churchill ..	D. J. McIntosh, P. Breslin, A. Stoddart	E. Smith	Harrisons (Clyde) Ltd.
<i>Vosges</i> ..	6.3.78	T. E. Kelso ..	S. R. Mathews, D. Morton, D. C. Skentelberry	G. Kraus	P. & O. S.N. Co.
<i>Warwickshire</i> ..	27.7.77	A. F. Lightfoot	S. H. Gledhill, M. G. Robinson, K. R. Madell	P. Dennison	Bibby Line Ltd.
<i>Wellington Star</i> ..	6.10.77	A. Chivers ..	D. McKay, T. Lloyd-Jones	A. Wills	Blue Star Line Ltd.
<i>Wellpark</i> ..	*	G. Anderson ..	P. C. Roberts, J. Henderson, K. G. Whittingham, B. J. Bellamy	A. J. L. Cottle	J. & J. Denholm Ltd.
<i>Welsh City</i> ..	*	D. L. G. Jones	T. A. C. Baker, M. H. C. Lunn, H. G. Thomas	I. C. Byrne	Sir Wm. Reardon Smith & Sons Ltd.
<i>Welsh Endeavour</i> ..	*	B. Rayner ..	G. L. Conlon, R. B. Ibalie, A. Grant, J. S. Cunningham	L. R. McGovern	Welsh Ore Carriers Ltd.
<i>Welsh Voyager</i> ..	9.8.77	D. W. Luff ..	D. C. Mackenzie, W. Lynn	D. Maher	Welsh Ore Carriers Ltd.
<i>Westbury</i> ..	11.10.77	J. F. Milner ..	P. W. Harris, D. C. Winter, R. H. Fisher	J. Evans	Houlder Bros. & Co. Ltd.
<i>Westmorland</i> ..	14.6.77	D. R. G. Stephen	I. G. Mutch, J. R. Mace		P. & O. S.N. Co.
<i>Westra</i> ..	23.6.77	A. Dorkins ..	K. W. Mulholland, G. W. Bryson, P. Costalas		Department of Agriculture & Fisheries for Scotland
<i>Wild Ark</i> ..	7.2.78	A. Anson ..	S. R. Deans, B. Dowse, J. W. Bird	N. W. Hanson	P. & O. S.N. Co.
<i>Wild Avocet</i> ..	12.9.77	J. S. Laidlaw ..	R. P. Swinney, C. Stubbs	R. Harris	P. & O. S.N. Co.
<i>Wild Cormorant</i> ..	13.3.78	M. A. Hill ..		G. Bradshaw	P. & O. S.N. Co.

<i>Wild Flamingo</i>	..	10.2.78	P. Lay	..	..	K. D. W. Edwards, M. J. Winterbottom, G. W. Weaver	W. Blacklaws ..	..	P. & O. S.N. Co.
<i>Wild Fulmar</i>	..	20.10.77	H. C. Hynard	..	..	K. W. Newman, L. C. Walter	J. P. Whiteley	..	P. & O. S.N. Co.
<i>Wild Gannet</i>	..	15.11.77	I. T. Batley	..	..	K. C. Riddick, D. Macdonald, S. C. Richardson	M. J. Charlton	..	P. & O. S.N. Co.
<i>Wild Grebe</i>	..	*	A. Dorkins	..	..	K. J. Sprange, J. R. Mace, D. R. Lewis	D. L. Byne	..	P. & O. S.N. Co.
<i>Wild Mallard</i>	..	21.6.77	F. C. Taylor	..	..	J. C. Donnelly, N. J. Horobin, G. McInnes	S. Ludgate	..	P. & O. S.N. Co.
<i>Wild Marlin</i>	..	2.8.77	R. E. Lowther	..	..	A. J. Bairstow, C. S. Price, B. Penman	J. D. Lyttle	..	P. & O. S.N. Co.
<i>Wiltshire</i>	..	11.1.78	R. A. F. Edwards	..	..	P. Kenyon, J. W. R. Best, M. Wright	I. Conn	..	Bibby Line Ltd.
<i>Wimpey Sealab</i>	..	23.2.78	D. Grant	..	..	T. M. Maloney, J. F. Doyle	R. Rea	..	Wimpey Marine Ltd.
<i>Winchester Castle</i>	..	28.3.78	K. Morton	..	..	C. M. Turner, R. K. Mercalfe, R. P. Gribble	J. A. R. Walker	..	Union-Castle Mail S.S. Co. Ltd.
<i>Zealandic</i>	..	3.3.77	B. A. Hills	..	..	C. Sharp, C.R. Darke, A. W. Jones	R. Draper	..	Shaw Savill & Albion Co. Ltd.
<i>Zinnia</i>	..	*	B. Rowlands	..	..	N. Reid, J. Wright, B. Hildred	D. G. Priestland	..	Stag Line Ltd.

Supplementary Ships

NAME OF VESSEL	LAST RETURN RECEIVED	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Apollo</i> ..	1.2.77	J. Earl	H. Bond, A. M. Jones	D. W. Hirone..	Bristol S.N. Co. Ltd.
<i>Ardmore</i> ..	30.12.77	W. J. Perkins	T. Chantler, J. Adcock, R. B. Spencer	..	P. & O. S.N. Co.
<i>Baltic Jet</i> ..	8.11.76	T. Sinclair	D. M. Whitehead, J. M. Reed	..	United Baltic Co. Ltd.
<i>Caroline Weston</i> ..	..	J. G. P. Van der Ham	P. King, W. Dambly	..	Western Shipping Ltd.
<i>City of Ankara</i> ..	..	M. Salsbury	B. A. Hammett	..	Ellerman Lines Ltd.
<i>Decca Surveyor</i> ..	10.6.77	T. Sheehan	H. Skelton	..	Oil Search Marine Management
<i>Echo</i> ..	6.3.78	W. R. Kays	K. Parkin, R. D. Smithson	..	Bristol S.N. Co. Ltd.
<i>Eden Bridge</i> ..	4.5.77	L. Bell	R. I. Gibson, N. Stewart, C. V. Gnana-Lone	..	Silver Line Ltd.
<i>Esso Severn</i> ..	26.9.77	G. R. Rowe	P. E. Russell, K. Connor	..	Esso Petroleum Co. Ltd.
<i>Gardline Researcher</i> ..	..	J. W. Dunn	J. E. Thornton	..	Gardline Ltd.
<i>Ilorin Palm</i> ..	2.11.76	G. Davidson	A. J. Russell, A. D. Wright, R. T. Blomfield	..	Palm Line Ltd.
<i>Kurd</i> ..	13.6.77	C. Thresh	H. Bryant	..	British United Trawlers Ltd.
<i>Lord Mount Stephen</i> ..	25.10.77	J. Findlay	B. M. Owen, G. Walteson	..	Canadian Pacific Steamships Ltd.
<i>Lord Nelson</i> ..	5.7.77	N. E. Longthorp	G. W. Taylor	..	Hellyer Bros. Ltd.
<i>Methane Princess</i> ..	25.11.77	M. Goddard	J. F. Winter, R. L. Redding	..	Shell Tankers (U.K.) Ltd.
<i>Methane Progress</i> ..	24.1.78	I. R. Farnell	W. S. Trought	..	Shell Tankers (U.K.) Ltd.
<i>Mobil Pegasus</i> ..	16.5.73	J. Millar	J. B. McGrath, G. Wrigley	..	Mobil Shipping Co. Ltd.
<i>Northern Reward</i> ..	11.7.77	W. E. Harris	H. C. Pougher	..	Northern Trawlers Ltd.
<i>Oil Hustler</i> ..	..	N. Brown	L. Elms	..	Ocean Inchcape Ltd.
<i>Oil Supplier</i> ..	..	C. Cunningham	G. J. S. Ives, M. Kirk	..	Ocean Inchcape Ltd.
<i>Princess Anne</i> ..	5.7.77	P. E. Craven	C. Sheen	..	Boston Deep Sea Fisheries Ltd.
<i>Prins Oberon</i> ..	15.11.77	J. E. Johansson	P. Eriksson, L. Axelsson	..	Lion Ferry A/B
<i>Rocknes</i> ..	13.12.77	I. G. Sleight	W. Brackenbridge, D. P. Platt, E. G. Everingham	..	Jebsen (U.K.) Ltd.
<i>Roybank</i> ..	17.5.77	H. Dillon	A. R. Maytham, J. J. M. Beggs, A. R. Manly	..	Bank Line Ltd.
<i>St. Edmund</i> ..	8.6.77	M. Grigor	M. D. Horn, M. J. Rice, P. Perera	..	British Rail
<i>St. George</i> ..	..	W. Bramhill	R. Sopwith	..	British Rail
<i>St. Jasper</i> ..	16.6.77	E. J. Johnson	D. Matthews	..	T. Hamling & Co. Ltd.
<i>St. Jerome</i> ..	5.1.78	J. C. Gibson	T. J. Conway, F. Shuttleworth, B. Hall	..	T. Hamling & Co. Ltd.
<i>Susan Miller</i> ..	31.1.77	G. W. Moss	S. R. Dowler, J. J. M. Beggs, A. R. Hudson	..	St. Vincent Shipping Co. Ltd.
<i>Tor Belgia</i> ..	21.11.77	P. J. Miller	R. J. Wells, A. Page	..	Tor Line Ltd.
<i>Tor Gothia</i> ..	29.11.77	D. G. Watson	G. Trousdale, E. Morrison, M. Blight	..	Tor Line Ltd.
<i>Vegaman</i> ..	..	W. Burnett	..	..	C. Rowbotham & Sons Management Ltd.
<i>Viking Gallant</i> ..	..	R. A. Shopland	P. St. J. Jarvis, C. E. Walford	..	Townsend-Thoresen Car Ferries Ltd.
<i>Viking Venturer</i> ..	..	H. H. Plant	M. L. Bachley, W. Field, W. J. C. Clarke	..	Townsend-Thoresen Car Ferries Ltd.

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
A. Osler	E. Willey	British United Trawlers Ltd.
M. Redfearn	E. Willey	Hudson Bros. Trawlers Ltd.
T. Sawyer	M. E. Morrow	T. Hamling & Co. Ltd.

Light-vessels

NAME OF VESSEL	MASTERS
<i>Dowsing</i>	A. S. Richards, F. Turner
<i>East Goodwin</i>	L. Mortimer, F. J. Shilling
<i>Falls</i>	A. H. Robinson, W. Scmple
<i>Humber</i>	T. W. Grice, S. F. Goose
<i>Newarp</i>	G. A. Harris, L. R. Long
<i>Royal Sovereign</i> (Lt. Tower) ..	W. E. J. Ellis, M. O'Sullivan
<i>St. Gowan</i>	M. F. Roche, P. Roche
<i>Seven Stones</i>	R. Goddard, T. G. Northcott
<i>Shipwash</i>	R. Cadman, W. F. Dalby
<i>Smith's Knoll</i>	F. Harrison, E. Jaeger
<i>South Rock</i>	C. Dunigan, J. Scanhian
<i>Tongue</i>	-. Barnes, J. H. Wilson
<i>Varne</i>	F. Betts, J. Rudd

‘Marid’ Ships

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

NAME OF VESSEL	MASTER	OWNER/MANAGER
<i>Anglezark</i>	B. Smith	Effluent Services Ltd.
<i>Arco Scheldt</i>	R. A. Hatch	A.R.C. (Marine) Ltd.
<i>Arco Severn</i>	I. J. Constance	A.R.C. (Marine) Ltd.
<i>Arco Thames</i>	C. M. Hart	A.R.C. (Marine) Ltd.
<i>Ashington</i>	R. Kay	Stephenson Clarke Shipping Ltd.
<i>Avalon</i>	R. M. Lidgate	British Rail
<i>Bass Shore</i>	S. Sage	Offshore Marine Ltd.
<i>Brenda</i>	C. McMillan	Dept. of Agriculture & Fisheries for Scotland
<i>Brian Boroime</i>	J. Bakewell	British Rail
<i>British Security</i>	I. McNaughton	B.P. Tanker Co. Ltd.
<i>Caesarea</i>	M. E. Bodiam	British Rail
<i>Caledonian Princess</i>	E. M. Scott	British Rail
<i>Castle Point</i>	M. Umilski	Hudson S.S. Co. Ltd.
<i>Clansman</i>	J. Gun	David MacBrayne Ltd.
<i>Columba</i>	A. C. Free	David MacBrayne Ltd.
<i>Cymbeline</i>	A. M. Kirkby	Houlder Bros. Ltd.
<i>Dolphin Point</i>	H. MacKay	Ocean Transport & Trading Ltd.
<i>Doric Ferry</i>	R. Hockings	Atlantic S.N. Co. Ltd.
<i>Dragon</i>	I. H. Leggatt	Southern Ferries Ltd.
<i>Duke of Lancaster</i>	J. A. Mason	British Rail
<i>Earl Godwin</i>	G. Evans	British Rail
<i>Esso Fawley</i>	F. W. Dogherty	Esso Petroleum Co. Ltd.
<i>Esso Mersey</i>	P. H. Mattocks	Esso Petroleum Co. Ltd.
<i>Esso Milford Haven</i>	W. L. Lowndes	Esso Petroleum Co. Ltd.
<i>Ferryhill II</i>	J. Watt	Aberdeen Coal & Shipping Co. Ltd.
<i>Fort Point</i>	R. Dickson	Christian Salvesen (Shipping) Ltd.
<i>Garrison Point</i>	H. M. Horsley	Hudson S.S. Co. Ltd.
<i>Hamble</i>	N. McLeod	Shell U.K. Ltd.
<i>Hebrides</i>	J. M. McQueen	David MacBrayne Ltd.
<i>Helmsdale</i>	A. F. Ross	Northern Trading Co. Ltd.
<i>Hilary Weston</i>	P. R. R. Warburton	Weston Shipping Ltd.
<i>Inganess Bay</i>	E. Bailey	Elwick Bay Shipping Co. Ltd.
<i>L. M. Odin</i>	D. Thompson	Land & Marine Engineering Ltd.
<i>Mairi Everard</i>	L. Davis	F. T. Everard & Sons Ltd.
<i>Moler Venture</i>	L. A. Clark	C.M.S. Shipping Co. Ltd.
<i>Navigator</i>	C. P. R. Collis	Decca Navigator Co. Ltd.
<i>Oswestry Grange</i>	- Millie	Houlder Bros. Ltd.
<i>Penelope Everard</i>	D. Stewart	F. T. Everard & Sons Ltd.
<i>Pharos</i>	M. Fraser	Northern Lighthouse Board
<i>Portelet</i>	- Fall	Onesimus Dorey Ltd.
<i>Rhodri Mawr</i> .. ..	.. ..	British Rail
<i>Ringnes</i>	W. Ross	Jebsens (U.K.) Ltd.
<i>St. Clair</i>	D. C. Gray	P. & O. S.N. Co.
<i>St. Columba</i>	J. E. Milburn	British Rail
<i>St. Modan</i>	J. Boldan	J. & A. Gardner Co. Ltd.
<i>Somersetbrook</i>	W. Taylor	Comben Longstaff & Co. Ltd.
<i>Suavity</i>	- Anderson	F. T. Everard & Sons Ltd.
<i>Suffolk Shore</i>	R. Dawson	Offshore Marine Ltd.
<i>Sumburgh Head</i>	A. Alvis	Christian Salvesen (Shipping) Ltd.
<i>Sussexbrook</i>	J. MacCormack	Comben Longstaff & Co. Ltd.
<i>Ulster Queen</i>	R. E. Wildgoose	Belfast S.S. Co. Ltd.
<i>Wendy Weston</i>	W. Taylor	Weston Shipping Ltd.
<i>Whitegate</i>	C. H. Roberts	Turnbull Scott Management Ltd.
<i>Wilmington</i>	E. Welsh	Stephenson Clark Shipping Ltd.

BRITISH COMMONWEALTH

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

Information for these lists is required by 31 March each year. Information for the January corrective lists is required by 30 September each year.

NEW ZEALAND (Information dated 1.2.78)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
<i>Act 3</i>	Blue Port Act (N.Z.) Ltd.
<i>Act 4</i>	Blue Port Act (N.Z.) Ltd.
<i>Act 5</i>	Blue Port Act (N.Z.) Ltd.
<i>Aotea</i>	Container Fleet (N.Z.) Ltd.
<i>Athel Viscount</i>	Union S.S. Co. N.Z. Ltd.
<i>Blue Whale</i>	Marine Offshore Construction
<i>Bulknes</i>	Shipping Corporation of N.Z.
<i>Coastal Trader</i>	Shipping Corporation of N.Z.
<i>Dunedin</i>	Maritime Carriers Ltd.
<i>Erne</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>Karepo</i>	Union S.S. Co. N.Z. Ltd.
<i>Karetu</i>	Union S.S. Co. N.Z. Ltd.
<i>Kotuku</i>	Union S.S. Co. N.Z. Ltd.
<i>Kuaka</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>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>Penrod 74</i>	Hunt International Petroleum
<i>Tangaroa</i>	N.Z. Government (Oceanography)
<i>Tasman Enterprise</i>	Tasman Pulp & Paper Co. Ltd.
<i>Tasman Venture</i>	Tasman Pulp & Paper Co. Ltd.
<i>Tiare Moana</i>	Shipping Corporation of N.Z.
<i>Titoki</i>	Anchor Dormon Ltd.
<i>Toa Moana</i>	Shipping Corporation of N.Z.
<i>Totara</i>	Anchor Dormon Ltd.
<i>Tui Cakau</i>	Pacific Line
<i>Union Auckland</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Hobart</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Lyttelton</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Melbourne</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Rotoiti</i>	Union S.S. Co. N.Z. Ltd.
<i>Union Rotorua</i>	Union S.S. Co. N.Z. Ltd.
<i>Valetta</i>	British Phosphate Commission
<i>Waitaki</i>	Maritime Carriers Ltd.
<i>Westport</i>	N.Z. Cement Holdings Ltd.
Supplementary Ships:	
<i>Arahanga</i>	N.Z. Railways
<i>Aramoana</i>	N.Z. Railways
<i>Aranui</i>	N.Z. Railways
<i>Aratika</i>	N.Z. Railways
<i>Columbus Victoria</i>	Columbus Line
<i>Columbus Virginia</i>	Columbus Line
<i>Columbus Wellington</i>	Columbus Line
<i>Kolle D</i>	Nauru Pacific Line
<i>Torrens</i>	Scanzeal

Auxiliary Ships:

New Zealand also has a fleet of 16 Auxiliary Ships currently reporting.

HONG KONG (Information dated 13.3.78)

NAME OF VESSEL	MASTER	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER/MANAGER
<i>Bali</i> ..	Yeung Kee-fun	Leung King-hong, Eduardo Portacio, Loreto A. Lopez	Tse Sung-kong ..	Trans Safety Shipping Co.
<i>Cape St. Mary</i> ..	H. M. Chan ..	Y. S. Kwok, M. S. Ngau ..	K. H. Li ..	Agriculture & Fisheries Dept. H.K. Govt.
<i>Carl Offersen</i> ..	C. L. Petersen	G. Nielsen, S. Nissen, P. Henriksen	E. V. Arlund ..	Jebsen & Co. Ltd.
<i>Coral Princess</i> ..	C. R. Humphry	D. R. Fellowes, D. I. Stobie, R. D. Gardner, M. K. Judson	Zimmon Marr ..	Swire Pacific Ship Management Ltd.
<i>Eriskay</i> ..	B. A. Owen ..	R. P. Fairbrother, A. A. Browning, Wong Kun Lun	Kwok Man Wai ..	Swire Pacific Ship Management Ltd.
<i>Foh Kim</i> ..	R. H. Stark ..	K. Y. Chan, G. P. Apa ..	H. Raman ..	Hong Kong Borneo Shipping Co. Ltd.
<i>Haldis</i> ..	J. Nicolaisen	R. E. Nilsen, S. Djonne, T. Lund	S. M. Wong ..	Thoresen & Co. Ltd.
<i>Hongkong Container</i> ..	A. I. Solbak	T. Egeland, P. Tolgensbakk, M. O. Engvik ..	Lai Kwong Yin ..	Thoresen & Co. Ltd.
<i>Hupei</i> ..	F. G. Dagger	P. W. Yeung, C. S. Sheu, H. S. Yu ..	K. L. Ng ..	Hong Kong Export Lines Ltd.
<i>Kwangtung</i> ..	A. J. Gregg ..	G. E. Franklin, N. F. Drake, Li Kam Biu ..	Fan Kwan Wah ..	Swire Pacific Ship Management Ltd.
<i>Lamma Island</i> ..	R. Kennett ..	Ho King Man, Hui Man Kit, T. Torna ..	Ho Kwok Chan ..	Hong Kong Island Shipping Co. Ltd.
<i>Lycan</i> ..	Man Kam Yan	Tsui Kun Hing, Lin Keh Lih, Ko Fung Sau	Cheung Chi Yee ..	Swire Pacific Ship Management Ltd.
<i>Maersk Tempo</i> ..	L. H. Pound	T. S. Main, J. M. McPherson, S. M. Yassin, A. D. M. McRea	J. S. Evans ..	Maersk Line (Hong Kong) Ltd.
<i>Manoloverett</i> ..	L. B. Nikolajsen	E. Jensen, B. Marinsson, H. Jensen	H. C. Nielsen ..	Everett Steamship Corporation S/A
<i>Melampus</i> ..	A. D. Roxas ..	I. G. Daco, R. D. Mercado, E. T. Bullicer ..	R. P. Poblete ..	Barber Lines Hong Kong Ltd.
<i>Menelaus</i> ..	A. M. Blackburn	A. J. Dyne, M. J. Harrison, C. J. Tucker ..	G. A. Hemming ..	Barber Lines Hong Kong Ltd.
<i>Mui Kim</i> ..	Gordon A. W. Fisher	P. J. Burden, C. M. Goddard, T. O. Stuart, J. A. Williams	W. McK. Britton ..	Hong Kong Borneo Shipping Co. Ltd.
<i>Oriental Chief</i> ..	J. Keates ..	R. S. Sahi, J. E. De Souza, L. D. Dardas ..	Chau Wing ..	Hong Kong Export Lines, Ltd.
<i>Oriental Enterprise</i> ..	R. F. H. Mason	S. C. Yew, C. L. Wong, W. H. Kong ..	C. S. Ow ..	Hong Kong Export Lines, Ltd.
<i>Oriental Mariner</i> ..	C. I. Farren ..	Tong Ho Lok, Chiu Sze Lap, Law Hing Piu ..	Yu Ho Lun ..	Hong Kong Export Lines, Ltd.
<i>Pabloverett</i> ..	A. R. Dyason	B. S. Young, T. L. Ying, C. S. Kou ..	C. Y. Leung ..	Everett Steamship Corporation S/A
<i>Poyang</i> ..	C. G. Villanueva	E. R. Almazan, Q. V. Diesta, D. P. Nepomuceno	R. B. Tablada ..	Swire Pacific Ship Management Ltd.
<i>Sinkiang</i> ..	G. Cornforth ..	M. J. Phillips, Yeung Man Chor, R. Noble ..	Pow Kwok Wah ..	Everett Steamship Corporation S/A
<i>Star Alcayone</i> ..	J. M. K. Kelly	J. Clark, T. Kaiteie, Ip Ting On ..	Sven Jonsson ..	Everett Steamship Corporation S/A
<i>Star Aldebaran</i> ..	Goran Axelsson	Marten Stenevad, Henry Soderberg, Lars Johansson	S. L. Davidsson ..	Everett Steamship Corporation S/A
<i>Star Altair</i> ..	Gustaf Heinze	Bjorn Ostlund, Anders Lahti, Jorgen Norling	Leif Petersson ..	Everett Steamship Corporation S/A
<i>Star Antares</i> ..	I. Westerholm	L. E. Eriksson, Pekka Pohjonen, A. Weinberg	S. I. Adolfsson ..	Everett Steamship Corporation S/A
<i>Star Bellatrix</i> ..	S. A. Bengtsson	Kaljo Vakre, Karl Kristiansson, Gudmund Sundell	Bertil Jonsson ..	Everett Steamship Corporation S/A
<i>Star Procyon</i> ..	Ake Olafsson	Nils Augrell, Dan Emil Pettersson, Leif Schonbeck	Arne G. W. Paulsson	Everett Steamship Corporation S/A
<i>Strathcarrol</i> ..	Ingvar Axelsson	C. J. Roberts, J. K. Williamson, B. G. Fowler	T. C. Mackenny	MacKinnon Mackenzie Ltd.
<i>Strathcarrol</i> ..	I. A. McCowan	W. J. Harwood, P. G. Costalas, N. G. G. Barrat	T. C. Baldwin ..	MacKinnon Mackenzie Ltd.
<i>Tagaytay</i> ..	I. M. Narang	V. U. Punjabi, R. M. D'souza, A. S. Katre, Tin Mg. Win	K. S. Doshi ..	Barber Lines Hong Kong Ltd.
<i>Taichungshan</i> ..	K. J. Ko ..	Woo Shui Ping, So Wing Hong, Tang Fuk Key	Tam Chiek ..	Shun Cheung S.N. Co. Ltd.
<i>Taifookshan</i> ..	T. W. Duncan	Ng Chew Ming, D. Alam, Lim Ewe Seng ..	Cheung Kam Tim ..	Shun Cheung S.N. Co. Ltd.
<i>Taipoosek</i> ..	G. T. Henshaw	Lui Yan Hon, Chan Kwok Leung, S. K. Kumar	Chuk Yuk Loy ..	Shun Cheung S.N. Co. Ltd.
<i>Tai Ping</i> ..	A. M. M. Pagarkar	D. J. F. D'Souza, E. M. Pereira, E. J. Hessing, Mg Myint Thein	S. S. Parkhi ..	Barber Lines Hong Kong Ltd.
<i>Tarantel</i> ..	W. G. Kaisare	K. D. Ketkar, A. N. Rodrigues, S. Kapoor, R. Chachha	V. P. Deshpande ..	Barber Lines Hong Kong Ltd.
<i>Tema</i> ..	P. M. Abraham	N. L. Peresdasilva, W. B. Fernandes, W. J. Nazareth, V. Rodrigues	S. A. Choksi ..	Barber Lines Hong Kong Ltd.
<i>Thomaseverett</i> ..	Juanito S. Vapor	L. G. Torres, M. E. Ismael, F. Anchuélo ..	Mauricio Suria ..	Everett Steamship Corporation S/A
<i>Trition</i> ..	V. S. Patwardhan	G. R. Kelkar, L. M. Gomes, S. Palat ..	G. A. J. D'silva ..	Barber Lines Hong Kong Ltd.

INDIA (Information dated 1.3.78)

NAME OF VESSEL	OWNER
Selected Ships:	
<i>Akbar</i>	Mogul Line Ltd.
<i>Andmans</i>	Shipping Corporation of India
<i>Chidambaram</i>	Shipping Corporation of India
<i>Daman</i>	Damodar Bulk Carriers
<i>Dwarka</i>	British India Steam Navigation
<i>Gaveshani</i>	National Institute of Oceanography
<i>Indian Reliance</i>	India Steam Navigation Co. Ltd.
<i>Indian Renown</i>	India Steam Navigation Co. Ltd.
<i>Indian Security</i>	India Steam Navigation Co. Ltd.
<i>Indian Success</i>	India Steam Navigation Co. Ltd.
<i>Jag Kisan</i>	Great Eastern Shipping Co.
<i>Jal Azad</i>	Scindia Steam Navigation Co.
<i>Jaladharna</i>	Scindia Steam Navigation Co.
<i>Jaladhanya</i>	Scindia Steam Navigation Co.
<i>Jaladuhita</i>	Scindia Steam Navigation Co.
<i>Jaladhruv</i>	Scindia Steam Navigation Co.
<i>Jalaganga</i>	Scindia Steam Navigation Co.
<i>Jalagirija</i>	Scindia Steam Navigation Co.
<i>Jalagouri</i>	Scindia Steam Navigation Co.
<i>Jalajyoti</i>	Scindia Steam Navigation Co.
<i>Jalakanta</i>	Scindia Steam Navigation Co.
<i>Jalakrishna</i>	Scindia Steam Navigation Co.
<i>Jalamangala</i>	Scindia Steam Navigation Co.
<i>Jalamoti</i>	Scindia Steam Navigation Co.
<i>Jalapalaka</i>	Scindia Steam Navigation Co.
<i>Laxmi Sagar</i>	Parekh Ocean Carriers
<i>Lok Sevak</i>	Mogul Line Ltd.
<i>Mohemmedi</i>	Mogul Line Ltd.
<i>Mozaffari</i>	Mogul Line Ltd.
<i>State of Assam</i>	Shipping Corporation of India
<i>State of Bihar</i>	Shipping Corporation of India
<i>State of Gujarat</i>	Shipping Corporation of India
<i>State of Kutch</i>	Shipping Corporation of India
<i>State of Maharashtra</i>	Shipping Corporation of India
<i>State of Orissa</i>	Shipping Corporation of India
<i>State of Punjab</i>	Shipping Corporation of India
<i>State of Tamil Nadu</i>	Shipping Corporation of India
<i>State of Tr. Cochin</i>	Shipping Corporation of India
<i>State of Uttar Pradesh</i>	Shipping Corporation of India
<i>Vishva Anurag</i>	Shipping Corporation of India
<i>Vishva Maya</i>	Shipping Corporation of India
<i>Vishva Prabha</i>	Shipping Corporation of India
<i>Vishva Sudha</i>	Shipping Corporation of India
<i>Vishva Vir</i>	Shipping Corporation of India
<i>Vishnu Sagar</i>	Parekh Ocean Carriers
Supplementary Ships:	
<i>Annapoorna</i>	Shipping Corporation of India
<i>Anupama</i>	Shipping Corporation of India
<i>Apj Anjali</i>	Appejay Line Ltd.
<i>Apj Ambika</i>	Appejay Line Ltd.
<i>Apj Sushma</i>	Appejay Line Ltd.
<i>Arunachal Pradesh</i>	Shipping Corporation of India
<i>Aradhana</i>	Shipping Corporation of India
<i>Archana</i>	Shipping Corporation of India
<i>Bailadila</i>	Shipping Corporation of India
<i>Bellary</i>	Shipping Corporation of India
<i>Barauni</i>	Shipping Corporation of India
<i>Bhagat Singh</i>	Shipping Corporation of India
<i>Bhaskar</i>	Shipping Corporation of India
<i>B. R. Ambedkar</i>	Shipping Corporation of India
<i>Chanakya</i>	Shipping Corporation of India
<i>Chatrpati Shivaji</i>	Shipping Corporation of India
<i>Chennai Jayam</i>	South India Shipping Corporation
<i>Chennai Muryarchi</i>	South India Shipping Corporation
<i>Chennai Ookkam</i>	South India Shipping Corporation
<i>Chennai Perumai</i>	South India Shipping Corporation
<i>Chennai Selvam</i>	South India Shipping Corporation
<i>Desh Bandhu</i>	Shipping Corporation of India
<i>Digilpur</i>	Shipping Corporation of India
<i>Dev Raya</i>	Shipping Corporation of India
<i>Gauri Shankar</i>	Himalaya Shipping Co.
<i>Harshavardhana</i>	Shipping Corporation of India
<i>India Endurance</i>	India Steamship Co. Ltd.
<i>Indian Explorer</i>	India Steamship Co. Ltd.
<i>Indian Faith</i>	India Steamship Co. Ltd.
<i>Indian Fame</i>	India Steamship Co. Ltd.
<i>Indian Fraternity</i>	India Steamship Co. Ltd.
<i>Indian Freedom</i>	India Steamship Co. Ltd.
<i>Indian Industry</i>	India Steamship Co. Ltd.
<i>Indian Prestige</i>	India Steamship Co. Ltd.
<i>Indian Progress</i>	India Steamship Co. Ltd.
<i>Indian Prosperity</i>	India Steamship Co. Ltd.
<i>Indian Resolve</i>	India Steamship Co. Ltd.

India (contd.)

NAME OF VESSEL	OWNER
Indian Resource	India Steamship Co. Ltd.
Indian Splendour	India Steamship Co. Ltd.
Indian Strength	India Steamship Co. Ltd.
Indian Tradition	India Steamship Co. Ltd.
Indian Triumph	India Steamship Co. Ltd.
Indian Tribune	India Steamship Co. Ltd.
Indian Trust	India Steamship Co. Ltd.
Indian Valour	India Steamship Co. Ltd.
Indian Venture	India Steamship Co. Ltd.
Jag Anjali	Great Eastern Shipping Co.
Jag Dev	Great Eastern Shipping Co.
Jag Dharma	Great Eastern Shipping Co.
Jag Doot	Great Eastern Shipping Co.
Jag Jawan	Great Eastern Shipping Co.
Jag Jiwan	Great Eastern Shipping Co.
Jag Jyoti	Great Eastern Shipping Co.
Jag Manek	Great Eastern Shipping Co.
Jag Prakash	Great Eastern Shipping Co.
Jag Ravi	Great Eastern Shipping Co.
Jag Rekha	Great Eastern Shipping Co.
Jag Shakti	Great Eastern Shipping Co.
Jag Shanti	Great Eastern Shipping Co.
Jagat Neta	Dempo Steamship Co. Ltd.
Jagat Swamini	Dempo Steamship Co. Ltd.
Jagat Samrat	Dempo Steamship Co. Ltd.
Jagat Vijeta	Dempo Steamship Co. Ltd.
Jainarayan Vyas	Shipping Corporation of India
Jalabala	Scindia Steamship Co. Ltd.
Jaladharati	Scindia Steamship Co. Ltd.
Jaladhir	Scindia Steamship Co. Ltd.
Jaladurga	Scindia Steamship Co. Ltd.
Jaladoot	Scindia Steamship Co. Ltd.
Jalagomati	Scindia Steamship Co. Ltd.
Jalajaya	Scindia Steamship Co. Ltd.
Jalakala	Scindia Steamship Co. Ltd.
Jalakendra	Scindia Steamship Co. Ltd.
Jalakirti	Scindia Steamship Co. Ltd.
Jalamani	Scindia Steamship Co. Ltd.
Jalamatsya	Scindia Steamship Co. Ltd.
Jalamayur	Scindia Steamship Co. Ltd.
Jalamohan	Scindia Steamship Co. Ltd.
Jalamukambi	Scindia Steamship Co. Ltd.
Jalamorari	Scindia Steamship Co. Ltd.
Jalapankhi	Scindia Steamship Co. Ltd.
Jalarajan	Scindia Steamship Co. Ltd.
Jalarashmi	Scindia Steamship Co. Ltd.
Jalaratna	Scindia Steamship Co. Ltd.
Jalatarang	Scindia Steamship Co. Ltd.
Jalaveera	Scindia Steamship Co. Ltd.
Jalavijaya	Scindia Steamship Co. Ltd.
Jalayamuna	Scindia Steamship Co. Ltd.
Jalayamini	Scindia Steamship Co. Ltd.
Jalavallabh	Scindia Steamship Co. Ltd.
Jana Priya	Mogul Line Ltd.
Jana Vijaya	Mogul Line Ltd.
Jawahar Lal Nehru	Shipping Corporation of India
Jay Ambika	Jayashree Shipping Co.
Kanishka	Shipping Corporation of India
Karnataka	Karnataka Shipping Co.
Kairali	Kerala Shipping Corporation
Kedarnath	Himalaya Shipping Co.
Laxmi	Shipping Corporation of India
Lal Bahdur Shastri	Shipping Corporation of India
Lok Adhar	Mogul Line Ltd.
Lokmanya Tilak	Shipping Corporation of India
Lok Nayak	Mogul Line Ltd.
Lok Palak	Mogul Line Ltd.
Lok Sahayyak	Mogul Line Ltd.
Lok Vihar	Mogul Line Ltd.
Lok Vinay	Mogul Line Ltd.
Lok Vivek	Mogul Line Ltd.
Mahabharat	South East Asia Shipping Co.
Mahabhakti	South East Asia Shipping Co.
Mahabir	South East Asia Shipping Co.
Maharashmi	South East Asia Shipping Co.
Mahavijay	South East Asia Shipping Co.
Maratha Melody	Chowgule Steamship Co.
Maratha Progress	Chowgule Steamship Co.
Maratha Providence	Chowgule Steamship Co.
Mizoram	Shipping Corporation of India
Nancowery	Shipping Corporation of India
Nandkala	Essar Constructions and Carriers
Netaji Subhash Bose	Shipping Corporation of India
Onge	Shipping Corporation of India
Prabhudaya	Tolani Shipping Co.
Prabhu Goopal	Tolani Shipping Co.

India (contd.)

NAME OF VESSEL	OWNER
<i>Rafi Ahmad Kidwai</i>	Shipping Corporation of India
<i>Ratna Kirti</i>	Ratnakar Shipping Co.
<i>Ratna Nandini</i>	Ratnakar Shipping Co.
<i>Ratna Shobhana</i>	Ratnakar Shipping Co.
<i>Ratna Usha</i>	Ratnakar Shipping Co.
<i>Rishi Vishvamitra</i>	Garware Shipping Corporation
<i>Sagar Deep</i>	Shipping Corporation of India
<i>Sagar Samrat</i>	Oil and Natural Gas Commission of India
<i>Samudra Gupta</i>	Shipping Corporation of India
<i>Sanchi</i>	Shipping Corporation of India
<i>Sarojini Naidu</i>	Shipping Corporation of India
<i>Satya Kamal</i>	Seven Seas Transportation Ltd.
<i>Satya Murti</i>	Seven Seas Transportation Ltd.
<i>Satya Padam</i>	Seven Seas Transportation Ltd.
<i>Satya Sohan</i>	Seven Seas Transportation Ltd.
<i>Sahajahan</i>	Shipping Corporation of India
<i>Shompen</i>	Shipping Corporation of India
<i>State of Himachal Pradesh</i>	Shipping Corporation of India
<i>State of Kerala</i>	Shipping Corporation of India
<i>State of Meghalaya</i>	Shipping Corporation of India
<i>State of Madhya Pradesh</i>	Shipping Corporation of India
<i>State of Mysore</i>	Shipping Corporation of India
<i>State of Rajasthan</i>	Shipping Corporation of India
<i>State of West Bengal</i>	Shipping Corporation of India
<i>Tamil Anna</i>	Poomphur Shipping Corporation
<i>Teesta</i>	Mackinnon Mackenzie and Co.
<i>Vaishnavi</i>	Hind Shipping Agency
<i>Vallabhabhai Patel</i>	Shipping Corporation of India
<i>Varun Yan</i>	Thakur Shipping Co. Ltd.
<i>Vishva Abha</i>	Shipping Corporation of India
<i>Vishva Aditya</i>	Shipping Corporation of India
<i>Vishva Ambar</i>	Shipping Corporation of India
<i>Vishva Amitabh</i>	Shipping Corporation of India
<i>Vishva Apurva</i>	Shipping Corporation of India
<i>Vishva Asha</i>	Shipping Corporation of India
<i>Vishva Bandhan</i>	Shipping Corporation of India
<i>Vishva Bhakti</i>	Shipping Corporation of India
<i>Vishva Bindu</i>	Shipping Corporation of India
<i>Vishva Chetana</i>	Shipping Corporation of India
<i>Vishva Dharma</i>	Shipping Corporation of India
<i>Vishva Jyoti</i>	Shipping Corporation of India
<i>Vishva Kalyan</i>	Shipping Corporation of India
<i>Vishva Kanti</i>	Shipping Corporation of India
<i>Vishva Karuna</i>	Shipping Corporation of India
<i>Vishva Kaushal</i>	Shipping Corporation of India
<i>Vishva Kirti</i>	Shipping Corporation of India
<i>Vishva Lalita</i>	Shipping Corporation of India
<i>Vishva Madhuri</i>	Shipping Corporation of India
<i>Vishva Mahima</i>	Shipping Corporation of India
<i>Vishva Mamata</i>	Shipping Corporation of India
<i>Vishva Mangal</i>	Shipping Corporation of India
<i>Vishva Marga</i>	Shipping Corporation of India
<i>Vishva Nayak</i>	Shipping Corporation of India
<i>Vishva Nidhi</i>	Shipping Corporation of India
<i>Vishva Pratap</i>	Shipping Corporation of India
<i>Vishva Pratibha</i>	Shipping Corporation of India
<i>Vishva Prayas</i>	Shipping Corporation of India
<i>Vishva Prem</i>	Shipping Corporation of India
<i>Vishva Raksha</i>	Shipping Corporation of India
<i>Vishva Sandesh</i>	Shipping Corporation of India
<i>Vishva Seva</i>	Shipping Corporation of India
<i>Vishva Shakti</i>	Shipping Corporation of India
<i>Vishva Shobha</i>	Shipping Corporation of India
<i>Vishva Siddhi</i>	Shipping Corporation of India
<i>Vishva Suman</i>	Shipping Corporation of India
<i>Vishva Tarang</i>	Shipping Corporation of India
<i>Vishva Tej</i>	Shipping Corporation of India
<i>Vishva Tirth</i>	Shipping Corporation of India
<i>Vishva Umang</i>	Shipping Corporation of India
<i>Vishva Usha</i>	Shipping Corporation of India
<i>Vishva Vandana</i>	Shipping Corporation of India
<i>Vishva Vibhuti</i>	Shipping Corporation of India
<i>Vishva Vijay</i>	Shipping Corporation of India
<i>Vishva Vikas</i>	Shipping Corporation of India
<i>Vishva Vinay</i>	Shipping Corporation of India
<i>Vishva Vivek</i>	Shipping Corporation of India
<i>Vishva Yash</i>	Shipping Corporation of India
<i>Vivekanand</i>	Shipping Corporation of India
<i>Vishveshvarayya</i>	Shipping Corporation of India
<i>Yerewa</i>	Shipping Corporation of India
<i>Zakir Hussain</i>	Shipping Corporation of India

Auxiliary Ships:
India has 32 Auxiliary Ships.

SINGAPORE (Information dated 1.3.78)

NAME OF VESSEL	MASTER	OBSERVING OFFICERS	RADIO OFFICER	OWNER/AGENT
<i>Anro Asia</i> ..	W. F. Rockett	D. I. Drummond, T. D. Snell, Gopalan Krishnan..	Saw Samuel	Straits Shipping Pte. Ltd.
<i>Anro Temasek</i> ..	Lim Gam Hing	Han Tuck Hong, Yeh Seh Sye, Mohideen Hameed	Yip Siu Keung	Neptune Orient Lines Ltd.
<i>Golar Buatan</i> ..	A. I. Juvala	Pushkarna Vinod Kumar, A. O. Malate, D. S. Sunartu	U. Aung Naing	Wallern Shipping (Singapore) Pte. Ltd.
<i>Golden City</i> ..	M. P. R. Turner	H. H. Cimd, R. Katiamdagho, Saiful Nawar	A. C. Lubis	Guan Guan Shipping Ltd.
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