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The Marine Observer

A quarterly journal of Maritime Meteorology

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THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME METEOROLOGY PREPARED BY THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE

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CONTENTS

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, 1970

The list of ships, captains, principal observing officers and radio officers from whom, during the year 1970, we have received meteorological logbooks of such a high quality that they have qualified for an Excellent Award, is published on pages 89 to 92 of this issue.

Every July issue of *The Marine Observer* since its inception in 1924 has contained such a list and for the fortieth time (there were no full years of observing from 1940 to 1947 inclusive and therefore no Excellent Awards) it is our very great pleasure to congratulate those named in it. This is not to belittle the efforts of the 400 or more voluntary observing ships which are not named. Many of these ships have sent in logbooks which have been classed as 'Excellent' and the personal record card which we keep for every officer named on the inside back cover bears that annotation on it. But we are still limited to 300 awards to Selected and Supplementary Ships in each year and this means that in these categories only the best 100 ships can receive awards. Below is a 'short list' of those ships who sent us the best meteorological logbooks of the 100 nominated for awards:

1. *Port Nelson* (Blue Star Port Lines Ltd.), Captain T. G. S. Ward.
2. *Achilles* (Ocean Fleets Ltd.), Captain D. H. Stewart, R.D.
   Ethel Everard (F. T. Everard & Sons Ltd.), Captain H. O. Roberts.
3. *John Biscoe* (British Antarctic Survey), Captain M. J. Cole.
   Paparoa (New Zealand Shipping Co. Ltd.), Captain A. Dorkins.
4. *Potosi* (Pacific S.N. Co. Ltd.), Captain R. T. Riley.
   Northern Reward (Northern Trawlers Ltd.), Skipper W. Harris.
   Prometheus (Ocean Fleets Ltd.), Captain F. N. Curphey.

This is the second appearance of the *Paparoa* and the *Northern Reward* in a short list, the latter being in consecutive years, whilst the *John Biscoe* is appearing for the third time. The customary photographs of the three top ships, the *Port Nelson*, the *Achilles* and the *Ethel Everard* appear opposite page 106.

Awards to 'Marid' ships (vessels in the short sea trades taking and transmitting sea temperatures only) and to trawlermen making and transmitting observations without using meteorological instruments are also listed on page 91. Their work, though unspectacular and seldom highlighted in the pages of *The Marine Observer*, is nevertheless a very great help in the preparation of weather forecasts for the use of shipping and the general public and the study of weather around the home coasts and in far northern waters.

The recipients of the awards will, as in past years, be individually notified by letter and asked for an address to which they would like us to send it. Correspondence with ships is, however, subject to many delays which may be prolonged when an officer has recently changed his ship. If, therefore, an officer sees his name in this list before he receives the official letter or sees it in a modified list in his own company's house journal, we would be glad if he would write to us here in Bracknell, claiming the award and giving us an address to which he would like it sent.

We still find that a World Atlas is by far the most popular award closely followed by a Dictionary! We usually find it possible to make an officer's first award an Atlas and his second award a Dictionary, therefore if any officer coming up for the first or second time does not want his award to be either of these, we would be glad if he would let us know and we will then send him the alternative, *Weather Lore* by Richard Inwards.

L. B. P.

EXCELLENT AWARDS (Year ended 31st December 1970)

Ship	Captain	Principal Observing Officer	Radio Officer	Owner/Manager
Achilles	D. H. Stewart, R.D.	D. J. H. Custance	R. J. Lunt	Ocean Fleets Ltd.
Apollo	G. V. Barnes	J. S. Earl	E. H. Jones*	Bristol S.N. Co. Ltd.
Asprella	T. D. McDermott	I. N. Conabeare	M. Kennedy	Shell Tankers (U.K.) Ltd.
Baltic Sun	C. E. Thomson	G. S. Brazendale	R. J. Marshall	United Baltic Corporation Ltd.
Baron Cawdor	A. Mackinley, O.B.E.	W. A. Anderson	D. Hynd	Scottish Ship Management Ltd.
Benarty	A. Sinclair	A. I. MacFeate	A. D. Delaney	Ben Line Steamers Ltd.
Bencleuch	R. E. Cowie	R. I. Roberts	J. J. Daly	Ben Line Steamers Ltd.
Bendoran	R. Griffiths	N. M. Wight	J. Cullen	Ben Line Steamers Ltd.
Benstac	R. S. Lumsden	D. S. Collins	W. Paterson	Ben Line Steamers Ltd.
Benvorlich	R. A. Lymn	A. H. Cooke	M. O. Bunce	Ben Line Steamers Ltd.
British Bombardier	J. H. Jones	R. H. Fletcher	P. J. Trant	B.P. Tanker Co. Ltd.
Canopic	C. A. S. Borthwick	C. V. Farrant	R. J. Dixie	Shaw Savill & Albion Co. Ltd.
Cape York	T. C. D. Hogg	P. V. Flynn	W. MacLeod	Lyle Shipping Co. Ltd.
Ceramic	R. G. E. Grant	G. P. Colebrook	F. E. Page, M.B.E.	Shaw Savill & Albion Co. Ltd.
Chindwara	P. M. Pitcairn	J. S. W. Dyson	D. P. Hammond	British India S.N. Co. Ltd.
City of Eastbourne	R. H. Bellhouse	G. E. Shearer	W. Beverley	Ellerman Lines Ltd.
City of Guildford	T. Mallory, B.E.M.	R. P. Askew	A. J. D'Arcy	Ellerman Lines Ltd.
City of Ottawa	M. W. Hartley	G. D. Taylor	P. J. McGill	Ellerman Lines Ltd.
Clan Alpine	N. F. Stewart	A. D. Slater	D. A. P. Galbraith	Clan Line Steamers Ltd.
Clan Macgregor	G. A. Russ	E. I. Messer	J. K. Paterson	Clan Line Steamers Ltd.
Clan Malcolm	R. M. Bessant	R. G. Head	W. L. Herdman	Clan Line Steamers Ltd.
Coventry City	J. J. Butterworth	D. M. Dye	A. J. Cunnison	Bibby Line Ltd.
Crystal Crown	G. H. Griffiths	E. McEwen	B. Milliken	Sugar Line Ltd.
Crystal Gem	B. E. Evans	R. D. Mearns	B. M. McArthur	Sugar Line Ltd.
Crystal Sapphire	P. Sutcliffe	O. T. Stephenson	E. J. Kirby	Sugar Line Ltd.
Cumberland	C. P. Robinson	T. W. Carnduff	R. Comrie	Federal S.N. Co. Ltd.
Devon	J. Reid	D. J. Goodwin	M. J. Ellis	Federal S.N. Co. Ltd.
Dorset	C. A. Miller	K. Storey	S. J. N. Griffith	Federal S.N. Co. Ltd.
Dukesgarth	N. Richardson	D. A. Rayner	D. Edmondson	Cory Maritime Ltd.
Duncraig	A. J. MacDonald	R. K. Scott	R. J. MacDonald	J. & J. Denholm Ltd.
Echo	J. L. Jenkins	W. G. Sommerfield	N. Powell*	Bristol S.N. Co. Ltd.
Encounter Bay	R. A. Wilson	J. R. Penson	J. Bilton	Container Fleets Ltd.
Essex	J. F. Milner	D. J. Yeowell	R. N. J. Bush	Federal S.N. Co. Ltd.
Ethel Everard	H. O. Roberts	D. G. Green	J. Rimmer*	F. T. Everard & Sons Ltd.
Explorer (F.R.S.)	A. A. Baxter	J. G. Brown	J. Steven	Dept. of Agriculture & Fisheries for Scotland
Firbank	F. C. Abell	E. R. Bruce	W. D. Mullan	Bank Line Ltd.

Excellent Awards (*contd.*)

Ship	Captain	Principal Observing Officer	Radio Officer	Owner/Manager
Flintshire	M. G. Thomas	D. P. Wallace	W. E. Gell	Ocean Fleets Ltd.
Glenbeg	D. K. Dunlop, R.D.	J. P. H. Fisher	J. P. R. Binding	Ocean Fleets Ltd.
Glenearn	C. H. F. Hill	A. C. G. Leach	A. Brown	Ocean Fleets Ltd.
Glenfinlas	G. W. Povey	J. Walker	C. W. Knibb	Ocean Fleets Ltd.
Glengyle	E. L. Stubbings	M. L. M. Smith	D. P. Stoker	Ocean Fleets Ltd.
Glenlyon	J. A. Dougall, R.D.	I. M. Grant	T. H. Jones	Ocean Fleets Ltd.
Glenorchy	T. W. Willows	I. T. Whale	R. Buckles	Ocean Fleets Ltd.
Gorjistan	J. E. B. Belt	K. H. Gear	R. Milner	Frank C. Strick & Co. Ltd.
Hertford	A. B. Stalker	R. K. Blake	A. Rose	Federal S.N. Co. Ltd.
Howra	C. R. S. Monk	G. J. Taylor	M. J. W. Higgins	British India S.N. Co. Ltd.
Huntingdon	D. E. Moran	D. J. Walker	G. M. Turner	Federal S.N. Co. Ltd.
Hurunui	S. G. Robinson	A. R. Davidson	C. J. Elliott	New Zealand Shipping Co. Ltd.
Hyala	J. G. Cormack	R. C. Brooking	J. Dunne	Shell Tankers (U.K.) Ltd.
Illyric	A. Stevens	D. J. Stansbury	H. A. Sirett	Shaw Savill & Albion Co. Ltd.
Iron Horse	D. Martucci	J. P. Wood	C. W. Murray	Common Bros. Ltd.
Jason	J. Petticrew	M. F. Tomlinson	A. G. Watt	Ocean Fleets Ltd.
Jervis Bay	M. R. Ryan	C. J. Armstrong	E. R. C. Lamb	Container Fleets Ltd.
John Biscoe	M. J. Cole	C. R. Elliott	H. M. O'Gorman	British Antarctic Survey
John Murray	M. J. Perry	P. H. Maw	C. M. Wilton*	Natural Environment Research Council
Joseph Conrad	B. Taylor	—	J. S. Hallam	Newington Trawlers Ltd.
Juwara	F. Bell	R. A. Gammie	A. Bickford	British India S.N. Co. Ltd.
Karaghistan	T. D. Dumont	J. H. McMurren	I. M. Beattie	Frank C. Strick & Co. Ltd.
Machaon	J. K. Edmonds	C. D. G. Grahame	A. J. Thomson	Ocean Fleets Ltd.
Manapouri	J. D. Guyler	J. G. Martin	W. F. Shepherd	New Zealand Shipping Co. Ltd.
Manchester Courage	D. G. Thomas	R. Webb	D. E. Spicer	Manchester Liners Ltd.
Manchester Faith	P. D. Cullen	W. Moss	P. A. Byrne	Manchester Liners Ltd.
Mataura	K. Barnett, R.D.	B. R. Richardson	M. Moore	New Zealand Shipping Co. Ltd.
Montreal City	W. H. Stoodley	G. C. Wilkins	J. T. Moody	Bristol City Line Ltd.
Nevasa	F. A. J. Downer, D.S.C., R.D.	J. A. H. Cartlidge	W. C. G. Sturgess	British India S.N. Co. Ltd.
Newfoundland	C. W. Alison	N. C. E. Spencer	T. Parker	Furness Withy & Co. Ltd.
Nicolas Bowater	P. R. Kent	M. F. L. d'Esqagnac	B. Willcox	Cayzer Irvine & Co. Ltd.
Northern Reward	W. Harris	—	S. B. Barr	Northern Trawlers Ltd.
Northumberland	R. G. Hollingdale	D. A. Fyson	D. J. Lendrum	Federal S.N. Co. Ltd.
Nottingham	A. Britain	C. Sherwood	C. G. Anderson	New Zealand Shipping Co. Ltd.
Orotava Bridge	C. J. Welch	D. M. C. Allan	T. J. Bousfield	Ore Carriers Ltd.
Otaio	R. B. Hood	R. J. Fraser	A. J. McInnes	New Zealand Shipping Co. Ltd.

*	*Pando Point*	I. M. Adie	R. C. Hart	G. R. Latham	P. & O. Lines Management Ltd.
*	*Pando Strait*	B. S. C. Mordaunt	M. S. Burgoine	A. P. H. Stevenson	P. & O. Lines Management Ltd.
	Paparoa	A. Dorkins	R. A. Nixon	B. J. F. Adkin	New Zealand Shipping Co. Ltd.
	Patroclus	W. R. Willis	J. L. R. Saverimutto	R. A. Browne	Ocean Fleets Ltd.
	Pegu	M. Sheridan	A. M. Soe	J. A. McCool	Ocean Fleets Ltd.
	Peisander	W. F. Rockett	B. D. Noble	A. White	Ocean Fleets Ltd.
	Perseus	S. E. Allerton	B. D. Pollock	J. Gallego	Ocean Fleets Ltd.
	Piako	H. J. D. Sladen	D. A. Pidgeon	R. Ferries	New Zealand Shipping Co. Ltd.
	Pipiriki	R. M. Michael	J. Morrison	R. S. Cavie	New Zealand Shipping Co. Ltd.
	Port Chalmers	R. A. Wight	F. E. Beer	S. A. White	Blue Star Port Lines Ltd.
	Port Nelson	T. G. S. Ward	P. H. D. Coombs	J. M. Lyons	Blue Star Port Lines Ltd.
	Port Phillip	D. M. Kissane	M. V. Colman	M. M. Lynch	Blue Star Port Lines Ltd.
	Port Vindex	A. J. L. Smith	R. D. Theobald	J. A. Foreman	Blue Star Port Lines Ltd.
	Port Townsville	E. R. Jenkins	J. A. Hawkins	T. Slattery	Blue Star Port Lines Ltd.
	Potosi	R. T. Riley	C. G. G. Hawken	F. J. Curran	Pacific S.N. Co. Ltd.
	Prometheus	F. N. Curphey	R. I. Smart	E. O. Roberts	Ocean Fleets Ltd.
	Protesilaus	R. G. Rippon	M. S. Browning	R. A. Knight	Ocean Fleets Ltd.
	Rakaia	P. Lay	J. Parker	R. J. Parkinson	New Zealand Shipping Co. Ltd.
	Roonagh Head	F. R. N. Best	F. P. Gunning	B. P. Kennedy	G. Heyn & Sons Ltd.
	Ross Orion	R. Waller	—	R. R. N. Laing	Ross Trawlers Ltd.
	Rowanmore	J. Hogg	T. H. Lawrence	S. W. Morris	Furness Withy & Co. Ltd.
	St. Jasper	E. J. Johnson	—	R. T. Murphy	T. Hamling & Co. Ltd.
	Somerset Maugham	R. Taylor	—	B. E. K. Robinson	Newington Trawlers Ltd.
	Sugar Producer	N. S. Lancaster	P. M. Wilmot	P. Hogan	Sugar Line Ltd.
	Tekoa	T. F. J. Alderman, R.D.	A. D. Evans	J. E. Hocking	New Zealand Shipping Co. Ltd.
	Theseus	I. Webster	D. J. Waters	P. M. Weldon	Ocean Fleets Ltd.
	Warwickshire	A. Hudson	K. P. G. Bowers	A. Melia	Bibby Line Ltd.
	Westmorland	J. A. North	D. G. Beckett	M. J. Morrall	New Zealand Shipping Co. Ltd.
	MARID' SHIPS†				
	Hebrides	J. Hodgson	J. MacLean	J. Greenhalgh	David MacBrayne Ltd.
	Innisfallen	J. Sydenham	R. J. Needham	A. Davy	British & Irish Steam Packet Co. Ltd.
	Penelope Everard	J. D. Jewsbury	W. McInness	W. Woodger	F. T. Everard & Sons Ltd.
	Spero	F. Briggs, O.B.E.	J. H. Gabrielsson	K. Gardiner	Ellerman's Wilson Line Ltd.

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

TRAWLERS (non-instrumental)

Skipper	Wireless Operator	Trawler Owners
J. W. E. Boyle ..	—	Boyd Line Ltd.
H. Hall	—	Northern Trawlers Ltd.
J. W. Humphrey ..	—	T. Hamling & Co. Ltd.
B. McCall	—	British United Trawlers Ltd.
F. Myers	—	Hudson Bros. Trawlers Ltd.
R. Pepper	—	Northern Trawlers Ltd.
—	C. Bird	Boyd Line Ltd.
—	G. Duffield	Hudson Bros. Trawlers Ltd.
—	P. R. Hickson	Northern Trawlers Ltd.
—	H. G. Pask	T. Hamling & Co. Ltd.
—	W. J. Teare	Hellyer Bros. Ltd.
—	J. L. Thorpe	British United Trawlers Ltd.

July, August, September

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

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

LINE SQUALLS

off Cape Verde

m.v. *Duncraig*. Captain A. J. MacDonald. Newport, Mon. to Monrovia. Observer, Mr. G. D. Hopkin, Chief Officer.

23rd July 1970.

GMT

0800: Calm. Heavy black clouds approaching from east.

0825: Wind E'ly, force 10. Torrential rain and lightning. No thunder heard.

0835: Wind E'ly, force 9.
0840: Wind E'ly, force 5. Very heavy rain. During the heaviest rain the visibility was almost zero.
0850: Wind E'ly, force 5. Rain easing. Thunder heard for the first time.
0900: Wind NNE, force 4. Light rain.
0910: Rain ceased.
Position of ship at 0825: 15° 02'N, 17° 56'W.

m.v. *Ripon*. Captain J. Parsloe. Birkenhead to Monrovia. Observers, the Master, Mr. M. Pitick, Chief Officer, Mr. L. Elms, 2nd Officer and Mr. S. P. Tilbury, 3rd Officer.

29th August 1970. At 1845 GMT the vessel was proceeding on a course of 173° in a rippled sea and there was a slight horizon haze. It was seen that tropical rain clouds were building up in an E/W direction from horizon to horizon ahead of the vessel and moving rapidly northwards. The sky astern was clear and the sun was shining. Wind was NNW, force 2. Three funnel clouds were clearly defined against the much darker background of the rain clouds. As these approached the wind increased rapidly and changed so suddenly to SSE, force 7 that it was impossible to say whether it backed or veered. Driving spray was whipped from the wave crests, violent thunder was heard and there was also incessant forked and sheet lightning. There was torrential rain until 2015 when the wind moderated to SSE, force 3. During the passage of this storm, which appeared on the radar as a line squall, the temperature dropped from 30°C to 25° in a matter of minutes and the barograph rose steeply by 2·5 mb.

Position of ship at 1800: 14° 36'N, 17° 54'W.

Note. These reports are fairly typical of the line squalls described in *Africa Pilot*, Vol. I.

UNUSUALLY LOW SEA TEMPERATURES

vicinity of Galapagos Islands

m.v. *Cumberland*. Captain C. P. Robinson. Balboa to Wellington. Observers, Mr. T. W. Carnduff, 3rd Officer and Mr. N. Bayley, Extra Deck-hand.

18th July 1970. At 1600 GMT an upwelling of the sea and strong current lines were observed running 130°/310°. The wind was a light force 3 but quite marked 'white horses' were seen. Before entering the area the sea temperature was 18·6°C but once within the area it dropped to 17·6°. (At 1200 it had been 23·3°.) A short time later a shallow fog bank was seen over the disturbed area.

Position of ship: 00° 18'N, 92° 17'W.

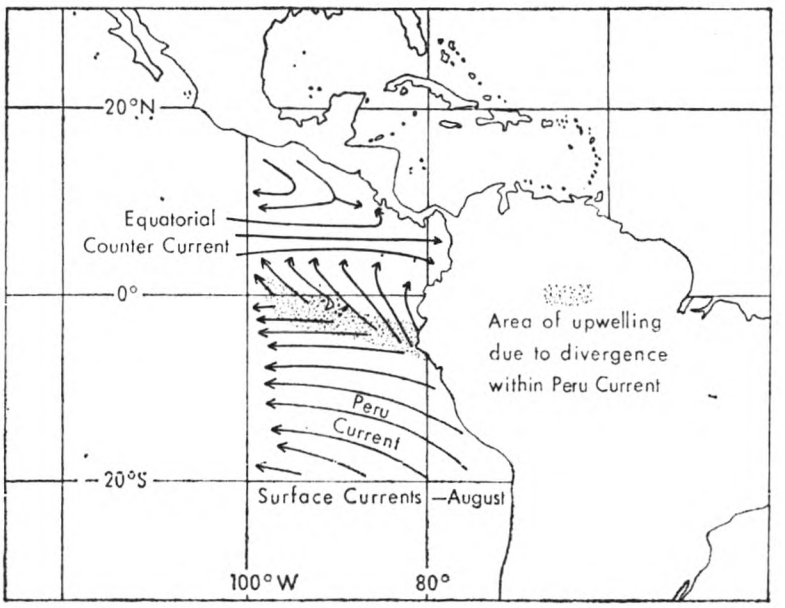
m.v. *Manapouri*. Captain J. D. Guyler. Balboa to Wellington. Observer, Mr. P. Cowdell, 2nd Officer.

22nd July 1970. When the vessel was passing to the NW of Isla Isabela the sea temperature dropped to 16·4°C, the lowest I have observed in the area. At 2005 we encountered dense fog which lasted for 20 min, during which the air temperature was 19·2° and the wet bulb 17·9°, despite a wind of force 4. Soon after entering the fog the sea temperature rose to 17·2° and it remained steady for the next 3 hours.

Usually off Isabela the sea is like a mill-pond but on this occasion the s'ly wind was a steady 16 kt. Little or no fauna were observed (again most unusual) except for a few whales. Later we heard that gales were being experienced in Panama. According to the climatic table for Balboa Heights there had been no gales for 25 years.

Position of ship at 1800: 00° 06'S, 91° 54'W.

Note. The occurrence of disturbed water, current rips, low sea surface temperatures and sea fog in the vicinity of the Galapagos Islands is due to the fact that this area lies in a zone where the waters of the Peru Current diverge. The southern part sets westward as the beginning of the South Equatorial Current while the western part sets north-west to recurve into the



Equatorial Counter-current (see diagram). To maintain the balance, cold water rises to the surface along the zone of divergence. When this upwelling is sufficiently vigorous, current rips and other manifestations of disturbances in the flow result. The cold water retains its temperature on rising and accounts for the extremely low values which are sometimes recorded in the area. The cooling of relatively warm, moist air by the cold, upwelled water gives rise to fog patches which are not an uncommon feature of the area.

LINE OF DEMARCATION

Gulf of Aden

m.v. *Mahout*. Captain S. Baxter. Djibouti to Calcutta. Observers, Mr. M. R. N. James, 2nd Officer and Mr. A. D. Marsden, Chief Radio Officer.

9th September 1970. At approx. 1205 GMT a distinct line of demarcation between rippled and smooth sea was observed about a mile ahead of the vessel. At 1207, just before arriving at this line, the sea temperature was 30·8°C. At 1209 the vessel crossed the line which lay 022°/202°; the sea appeared to be cloudy with algae. After crossing, the following sea temperatures were taken: at 1210, 29·2°; at 1213, 27·2°; at 1218, 26·9°; at 1220, 26·7°; at 1225, 27·2°. By 1240 the temperature of the water had risen to 30·1°. Wind calm. Course 084°.

Position of ship: 11° 52′N, 43° 56′E.

Note. The effect described is probably due to upwelling which has resulted from the lately prevailing SW monsoon.

RADAR PHENOMENON

Eastern North Pacific

s.s. *Arcadia*. Captain E. Cowen. Los Angeles to Vancouver. Observers, the Master, Mr. P. F. Johnson, Jnr. 2nd Officer and Mr. C. Mendoza, Jnr. 4th Officer.

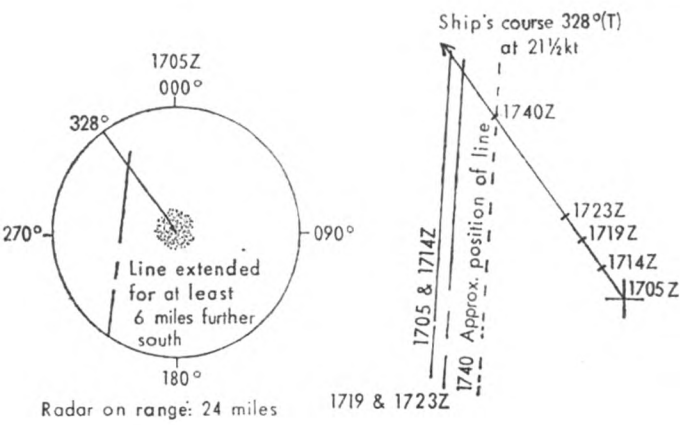
20th July 1970. At 1705 GMT a long line was seen on the radar running 005–185°, extending for over 40 miles in length at a distance of 10 miles from the ship on the port side. At 1714 it was 8 miles away. Visibility at the time was very good, no special cloud formation or change in the sea was observed and there was no precipitation. At 1719 the line was 6·4 miles from the ship and at 1723 it was 5·5 miles. On getting a little closer the width of the line was approx. 1 cable, fixed by radar range. At 1740 the vessel entered the line; there was no change in wind direction or speed, in sea or air temperature, or in pressure. The only visible change was a distinct break

in the cloud which had been a continuous layer of St at 300 ft with ragged shreds. Through the break could be seen Cc cloud. The radar continued to show this line until 1810 when it slowly faded out.

The several points of interest are the two breaks in the line, nothing unusual being actually seen except for the break in the cloud, no change in wind or temperatures on passing through the line and, of course, its very great length.

Afterwards a true plot was done of the line's movements and it can be seen that the speed was at some stages nil and at others very slow. The conclusion is that it was not atmospheric but how can one explain the break in the clouds? Air temp. 15·3°C, wet bulb 14·1°, sea 14·4°. Wind NNW, force 5. Pressure 1013·4 mb. Course 328° at 21½ kt.

Position of ship: 36° 24′N, 123° 04′W.



Note 1. When forwarding the above report, the Administrator of the Canadian Meteorological Service enclosed the following comments from his Research Division:

"Of at least three possible explanations for the line echo observed the most likely would seem to be a sharp discontinuity in the atmosphere in the horizontal sufficient to cause a so-called clear-air return (or angel echo). The configuration is somewhat unusual and this seems to be confirmed by the Officers' notes and their interest in reporting the event. The phenomenon was in all probability relatively short-lived and there is insufficient observational data on this scale to determine the exact cause.

"The observation of a 'distinct break in cloud' at the radar echo line supports the idea that there was some form of discontinuity present. Although a thorough study has not been made of the synoptic situation, the current weather maps indicate that at least the remnants of a cold frontal system were in the vicinity of the ship at that time on 20th July 1970. The orientation of the front is not unlike that of the line echo described in the report. It would therefore seem plausible that a sharp discontinuity could be present as either a direct or indirect result of the cold front. Although there was no visible sign of weather or heavy cloud at the surface sufficient to produce an echo, there could be strong gradients of temperature and humidity in the horizontal at elevations above the surface (an explanation supported by the cloud observation) which could act as an electromagnetic wave reflector.

"Radar echoes from relatively clear air have been recognized for many years and theoretical explanations for their existence have been made. Detailed observations in the areas of clear air echoes (on a scale of a few cm to a few metres) are difficult to obtain and rather scarce and not too much is known about the possible frequency and distribution of such atmospheric discontinuities. Thus, while the event described may be rather rare, there would appear to be a reasonable explanation. From the standpoint of the ship's crew, I suppose the important aspect is to recognize the echo and differentiate it from actual weather. Keen observation and experience are the best teachers. Text books such as Captain F. J. Wylie's *The Use of Radar at Sea* (Hollis & Carter, London, 1952) will provide help to the neophyte."

Note 2. The *Arcadia* is a Canadian Selected Ship.

BIRDS

South Atlantic Ocean

m.v. *Canterbury Star*. Captain N. Johnson. Cape Town to London. Observer, Mr. M. T. Barwell, 3rd Officer.

17th–22nd July 1970. After leaving Cape Town on the 17th the vessel was trailed by the usual number of sea-birds hunting for a free meal from the galley slops. After the third day at sea the followers were reduced to four albatrosses, three large and one small. On the morning of the 22nd two of the large albatrosses still remained, the other two having departed the previous night. However, shortly after breakfast (a close watch being kept on the birds) the two disappeared without trace in position 9° 13′S, 2° 30′W. In the October 1969 edition of *The Marine Observer* it was reported that the *Clan Ramsay* had experienced a similar situation with the disappearance of the birds in very close proximity to the above position. I would be grateful to know the northerly limits of the sightings of albatross as it may be of interest to future observers.

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

"In reply to your query regarding the northerly limits of the sightings of albatrosses, from our ocean plots the most northerly albatross actually occurred at the same longitude as in your report and in all cases Wandering Albatrosses are 11°S (June), 12°S (July), 15°S (August) and 19°S (September). Wandering Albatrosses may reasonably be expected about 15°S on this route from June to August. Albatrosses tend to disperse northwards from sub-Antarctic into more temperate waters on conclusion of breeding, thus escaping the extreme rigours of the Antarctic winter months, but do not cross the windless zone of the doldrums owing to lack of wind to sustain their form of flight."

Eastern North Atlantic

m.v. *Raphael*. Captain E. D. Spooner. Swansea to Montevideo. Observer, Mr. G. C. Stonehouse, 3rd Officer.

22nd–25th September 1970. On the 22nd, when the vessel was about 5 miles north of Las Palmas, we picked up a large number of feathered passengers. These consisted of swallows, swifts, house martins and others similar to finches—birds which are not sea-birds and which did not appear to be migrating to a warmer climate or as far south as Montevideo. They had ample opportunity to leave the vessel when we passed the Cape Verde Islands but were happy in their new home with as many as ten sleeping together inside the accommodation by the officers' lounge at night.

Eventually the birds left, or appeared to have left, by the time we had reached 11°N, 23°W, about 180 miles south of Cape Verde Islands, and did not stay for the whole passage after all.

Position of ship (approx.) on 22nd: 28° 15′N, 15° 28′W.

North Sea

m.v. *Rosemary Everard*. Captain W. G. Hunt. Kragero to Grimsby. Observers, the Master and ship's company.

21st August 1970. During the day a varied collection of birds was observed on board wandering about amongst the bales of wood-pulp deck cargo. These included a curlew, two knots, three sanderlings, a Ringed Plover, a female redstart, two flycatchers, one swift and two kittiwakes. The waders had probably been blown out from the Lim fjord area of Jutland where they may be observed in large numbers; the other land-birds had also probably come from the same area, all probably blown out over the North Sea by the strong E'ly wind accompanied by continuous rain and poor visibility which we had experienced earlier in the day. The waders and the kittiwakes left the vessel the following morning when she was about 30 miles

east of the Humber, but the two flycatchers and the swift were found dead on the deck cargo.

From previous observations it has been noticed that in prolonged stormy weather kittiwakes will occasionally land on the ship in a seemingly tired condition. They show no fear when approached and can be picked up and brought up into the shelter of the wheel-house where they will rest contentedly for hours, showing not the least concern at people moving about beside them. They will eat tinned sardines in olive oil but one sardine seems sufficient for them for several hours. They must be amongst the most docile birds one can find.

Position of ship at 1200 GMT: 56° 06′N, 5° 42′E.

Note. Captain N. B. J. Stapleton comments:

"This report is most interesting and the Society intends to record it in the 1971 edition of the RNBWS publication *Sea Swallow*."

Barents Sea

m.v. *St. Jasper*. Skipper J. R. Nelson. Hull to Barents Sea. Observer, Mr. K. C. Stone, Radio Officer.

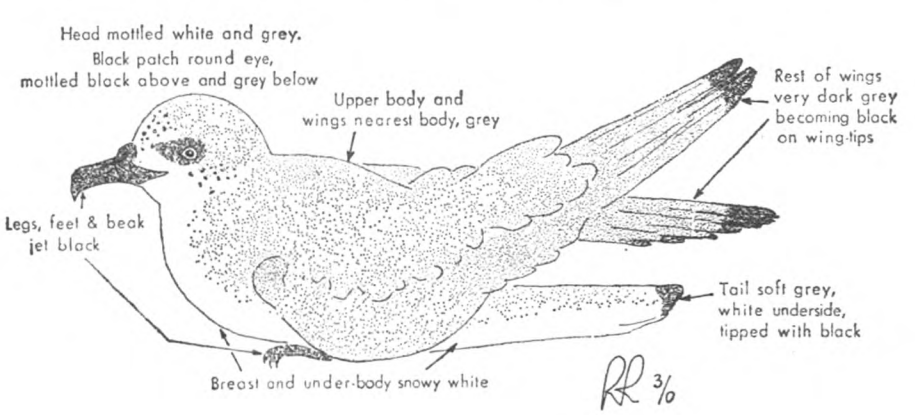
18th–26th August 1970. On the 18th we noticed the complete absence of sea-birds. As we approached the large group of ships fishing we passed through the fish offal, including the cod livers which are always a great attraction for sea-birds. On subsequent days one or two kittiwakes made an appearance but the fish livers were completely ignored. Eventually one or two other species of sea-birds arrived but only a very few and even the fulmars, which I consider the greediest of birds, ignored the fish offal. This state of affairs continued until we steamed west and shot at position 71° 40′N, 34° 36′E on the 26th when the usual amount of birds made their appearance, including kittiwakes, fulmars and herring gulls. Needless to say, the fish offal did not float for long. I have no explanation for the scarcity of birds and even less for the refusal of a good feed.

Position of ship on 18th: 70° 20′N, 32° 40′E.

North Pacific Ocean

m.v. *Ajax*. Captain J. Fisher. Honolulu to Yokohama. Observer, Mr. P. R. N. Richmond, 3rd Officer.

28th–30th September 1970. At 1000 GMT on the 28th while it was raining, a bird alighted on board near the bridge after being stunned from an argument with a steel bulkhead (which I heard!) and also was observed to be suffering from exhaustion. The bird was believed to be from the petrel family and showed no signs of fear when picked up. It was quite at home sitting in a box lined with flag bunting and occasionally liked taking a stroll in a most amusing fashion, head close to the floor, tail tilted high in the air, waddling along uncertainly on webbed feet. The bird's details were as follows: length, head to tail, 10½ inches; wing span 27 inches;



weight 140 grammes. The bird was exceedingly co-operative when being weighed, patiently sitting on the scales as the weights were loaded on and taken off. The bird refused fish and bread to eat but had a small quantity of milk and some water.

On the 30th at 0245 the bird was released in position approx. 26° 30′N, 158° 13′E as weather reports indicated that typhoon Hope was filling, hence it was reasonably safe to release our once-exhausted bird. The bird flew off strongly heading north in the direction of some precipitation which reached the sea's surface, appearing none the worse for its sojourn in an empty cardboard box nestled up in an old flag. Sun's altitude on bird's release approx. 50°. Wind s'ly, force 4. [The photographs opposite this page are reproduced from Mr. Richmond's colour slides.]

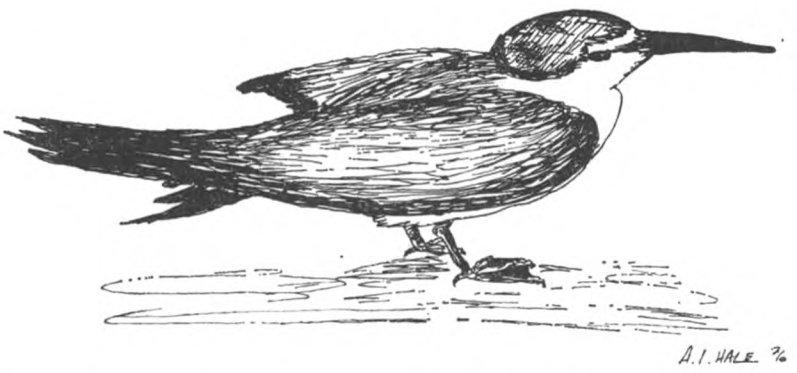
Position of ship at 1000 on 28th: 28° 03′N, 169° 48′E.

Indian Ocean

m.v. *Glenogle*. Captain R. C. Riseley. Penang to London. Observers, Mr. A. I. Hale, 2nd Officer, Mr. W. E. Godsell, Snr. 2nd Officer and Mrs. W. E. Godsell.

7th September 1970. At 0300 GMT a sea-bird was found on deck, utterly exhausted. As the foredeck was about to be used for fire drill the Snr. 2nd Mate's wife rescued it and took it to her cabin where it immediately disappeared under the wardrobe amongst a pile of shoes. A two-hour sojourn in the cabin with Mrs. Snr. 2nd Mate tempting it with bread and water did it a power of good and at 0500 it was brought up on the bridge. After a brief inspection of the bridge wing it hopped down to the boat-deck and then flew away to the south.

The bird was about 9 inches long over all and, as far as could be seen, its wing span was about 15 inches. It had a white breast and collar and a white band above its eyes and beak. The head was black and the wings were grey, shading to black at the wing tips and the end of the tail feathers. A black beak, black legs and webbed feet completed its outfit. The tail was forked like a swallow's but not so deeply.



I have tried to identify the bird using W. B. Alexander's *Birds of the Ocean* and have come to the conclusion that it was a tern. My attempts to find the correct classification has led me to think that we rank amateurs just do not know what to look for. Obtaining useful information from untrained people often depends on asking the right questions and I wonder if any Natural History organization has ever produced a questionnaire, the answers to which would build up a sort of identikit picture of the bird, animal or fish involved. I would imagine that even casual observations, primed with the right questions, could prove very useful. Regardless of whether such techniques are used, is there any advice you could give us about reporting observations of wild life?

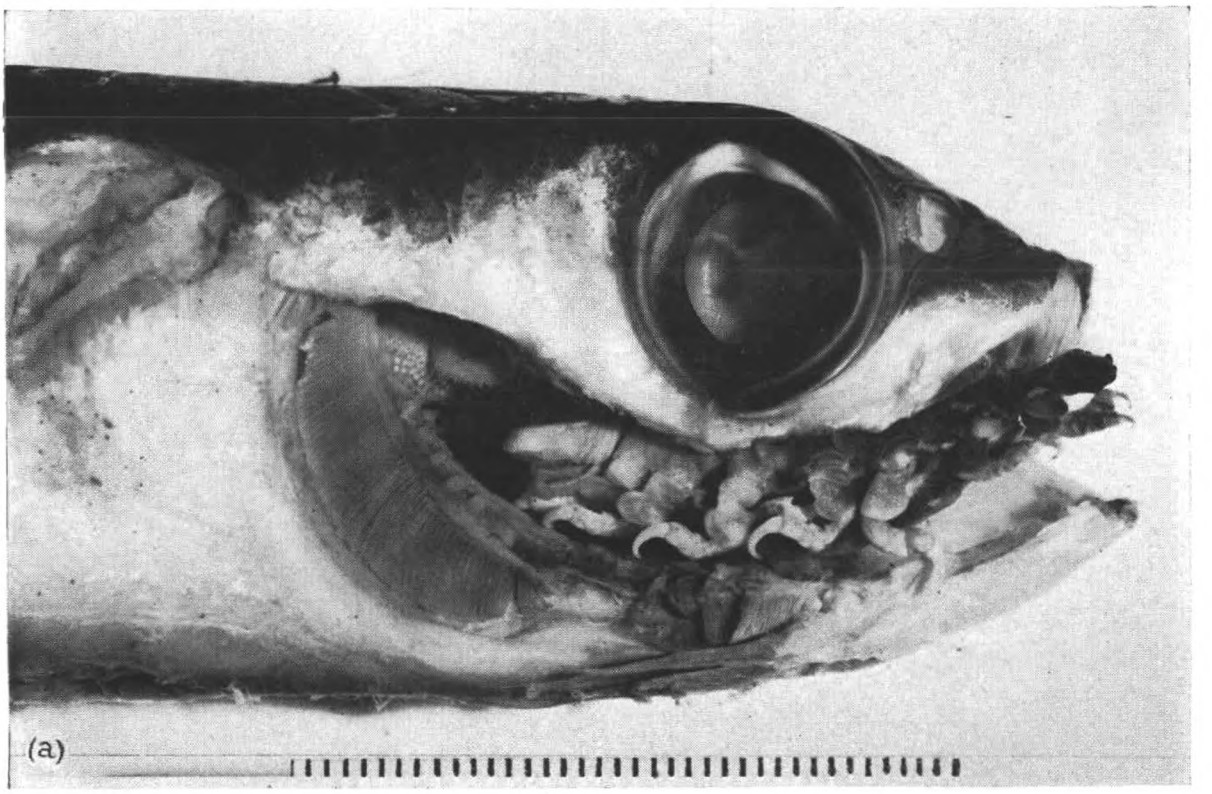
Position of ship (approx.): 2° 30′S, 83° 20′E.

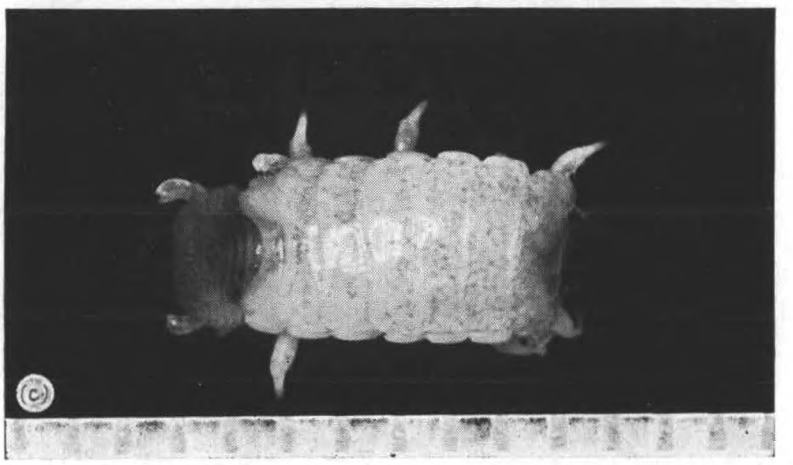
Note. We do not know of any questionnaires except those for specific research projects (such as for Whale observations in 1952) but Captain G. S. Tuck, Chairman of the Royal Naval Birdwatching Society, has kindly provided the short article on page 105 on the identification of birds.

The Black-winged Petrel which came aboard m.v. *Ajax* (*see* page 97).

(*Opposite page* 98)

(*Opposite page* 99)





(*a*) Head of the 9-inch flying fish found on m.v. *Northumberland* on 12th February 1970, with the mouth cut away to show the parasite *Ceratothoa impressa* (Say); (*b*) the large adult female and (*c*) the smaller adult male—all scales in millimetres (*see* page 103).

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

Australian waters

s.s. *Southern Cross*. Captain W. W. Newport. Melbourne to Sydney. Observers, Mr. W. Carruthers, 1st Officer, Mr. G. M. Pepper, 3rd Officer, Mr. M. Swann, Extra 3rd Officer and Mr. G. Smith, Cadet.

22nd–23rd September 1970. At 2230–2300 GMT on the 22nd and at 0630 on the 23rd very large numbers of dark brown/black birds were observed on or just above the surface of the sea. They were mainly just wheeling above the surface but frequently several hundred would dive into the sea where they were obviously getting a good catch. At the time of the first observation there were about 2–3,000 but probably considerably more at 0630. Identification has not been confirmed but they were believed to be Stormy Petrels. The general direction of movement at 0630 seemed to be E'S but there was no general movement at the first sighting. Wind during period SE, force 7–8.

Position of ship at 2300: 38° 14'S, 148° 21'E.

Position of ship at 0630: 37° 19'S, 150° 11'E.

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

"These birds were undoubtedly Short-tailed Shearwaters (*Puffinus tenuirostris*), the 'Mutton-birds' of the Bass Strait, which had probably just returned to the area at the conclusion of their return migration and before commencing to breed in the islands round Tasmania."

BAT

Indian Ocean

m.v. *Northumberland*. Captain R. G. Hollingdale. Townsville to Durban. Observers, the Master and all officers.

17th–18th August 1970. During the 4–8 watch in the evening (1030 GMT) the Chief Officer observed a large bat hanging down from the foremast stays. The bat was walnut-brown, approx. 12 inches long, with fairly long pointed ears. It was thought to be of the flying-fox variety (Pteropidae). The next morning the bat was

still on board and an apple was hung from the mast to tempt it! However, the bat seemed disinterested and disappeared from the vessel that evening.

Position of ship at 1030 on 17th: 13° 12′S, 123° 07′E.

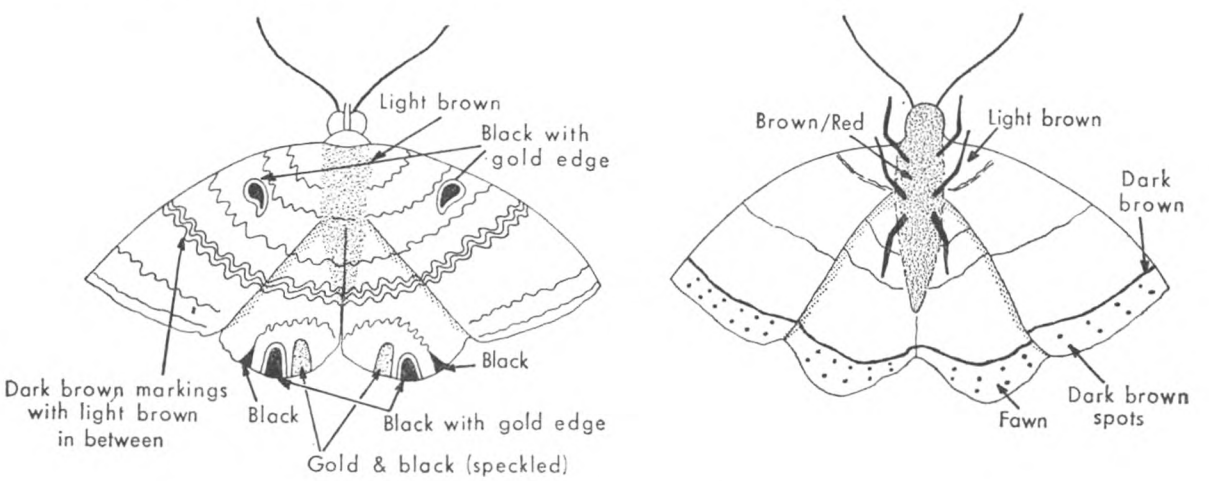
MOTH

Eastern Pacific Ocean

s.s. *Pando Strait*. Captain B. S. C. Mordaunt. Cristobal to Yokohama. Observers, Mr. I. C. Stutt, 3rd Officer and Mr. M. S. Burgoine, Jnr. 3rd Officer.

21st September 1970. At 1900 GMT a large moth landed on the bridge. Its wing span was $4\frac{3}{4}$ inches and its 'furry' body $1\frac{1}{2}$ inches in length. The over-all colour of its back was mid-brown with a purple tinge and its underside was mainly light brown. The other colours are indicated in the sketches.

Position of ship: 16° 30′N, 110° 00′W.



Note. This report and the sketches were sent to the Natural History Museum. A moth with very similar markings and colours alighted on the *Volvatella* on 6th July 1969 (see *The Marine Observer*, July 1970) in the Caribbean and Mr. A. H. Hayes of the Department of Entomology identified it as *Otosema odorata Linn.*, a large, common South American moth of the family Noctuidae.

SOUTHERN RIGHT WHALE DOLPHINS

Eastern Pacific Ocean

s.s. *Pizarro*. Captain R. K. C. Thomas. Antofagasta to Matarani, Peru. Observer, Mr. I. C. McLean, 2nd Officer.

17th September 1970. At 1745 GMT (1245 SMT), when the vessel was 76 miles from Cape Lobos, a school of Southern Right Whale Dolphins, estimated to number about 50, was sighted about a point before the port beam at a distance of about $\frac{1}{2}$ mile, travelling in a SW'S direction. The observation through binoculars, lasting 2–3 min, clearly showed that they had no dorsal fin and that they were black on the upper parts and white underneath, the division being very clearly defined. I could not see a white head but as they were moving away from the ship the heads were mainly obscured. The still photograph from the film made aboard the *Auckland Star*, reproduced opposite page 128 in *The Marine Observer* of July 1969, shows exactly how they appeared to me, the creatures moving in the same direction relative to the ship. They were about the same size as ordinary dolphins and were leaping to the same average height but more frequently and were travelling generally in line abreast.

As it was dinner-time I was unable to call anyone to the bridge to confirm the

sighting. I am aware that this observation is 642 miles further north than the previous most northerly sighting—also by this ship—on 31st January 1970 [see *The Marine Observer*, July 1970, p. 119.] Prior to reading all the facts concerning that sighting I would have said that these were killer whales but, knowing what to look for (i.e. the dorsal fin or lack of it), I am left in no doubt that they were quite definitely Southern Right Whale Dolphins. Air temp. 17·7°C, sea 17·9°. Wind SSW, force 2. Long, low SSW'ly swell and rippled sea. Course 349° at 16 kt.

Position of ship: 18° 53'S, 71° 43'W.

Note. Mr. S. G. Brown of the Whale Research Unit, National Institute of Oceanography, comments:

"The distribution of this dolphin is of considerable interest to marine biologists studying cetaceans. This new record is exceptionally interesting in view of its position some 600 miles to the north of the previous most northerly sighting off the west coast of South America. It is obvious that there is much to discover about the distribution and seasonal occurrence of this dolphin in this area, e.g. does it occur throughout the year in these northern waters or is there a seasonal migration up and down the coast? The presence of a cold current along the west coast of South America raises the possibility that the species may be recorded even further north than the present sighting."

WHALES

Gulf of Mexico

m.v. *S. A. Weltevreden.* Captain B. H. Lawrence. Veracruz to Mobile, Alabama. Observers, Mr. D. Reid, 3rd Officer, Mr. A. C. Cook, Radio Officer, Mr. K. Imhels, Chief Engineer and Mrs. Maitland, passenger.

6th August 1970. At 1500 GMT, with a calm sea, about six large Sperm whales were seen close to the ship, moving in a S'ly direction. They were identified by Mr. Imhels who had served for 10 years in whaling ships.

Position of ship: 27° 40'N, 90° 10'W.

Note. The *S. A. Weltevreden* is a South African Selected Ship.

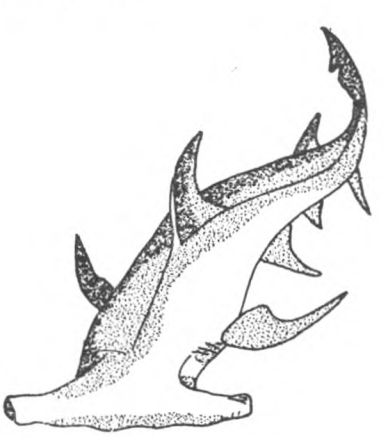
SHARKS

Eastern North Atlantic

m.v. *Taupo.* Captain F. C. Taylor. Las Palmas to Cape Town. Observers, the Master, Mr. R. C. Anderson, Chief Officer and Mr. P. Tester, Cadet.

27th August 1970. As the vessel was steaming due south six hammerhead sharks were observed between 1300 and 1330 LMT. The average length was approx. 10 ft. They were of a darkly mottled green/brown colour and clearly visible swimming just below the surface. Their presence was further indicated by numbers of flying fish scattering in all directions at their approach.

Position of ship: 20° 07'N, 17° 58'W.



Note. These powerful swimmers may frequently be seen at the surface, inshore or far at sea and are definitely known to attack humans. The hammerhead is readily distinguished by the widely expanded head with eyes at the outer edge. It may attain 15 ft length or more and closely related species are distributed throughout tropical warm temperate zones of all oceans, including the Mediterranean Sea.

SQUID

South China Sea

m.v. *Welsh City*. Captain J. D. Lloyd. Singapore to Moji, Japan. Observers, Mr. M. C. Hurst, 2nd Officer, Mrs. M. C. Hurst and Mr. W. C. Ciastula, 2nd Radio Officer.

2nd July 1970. At 0230–0315 SMT, while the vessel was stopped, a shoal of squid was observed chasing small fish. The eyes of the fish showed up in the Aldis beam like bright red and green jewels. Several fish jumped clear of the water in trying to escape. During the period of observation no fish was seen to have escaped. Probably the squid were aided by the Aldis beam reflection on their prey, although the squid dived when the Aldis beam was directly on them. The shoal was probably quite large as splashes could be heard in the surrounding darkness and long after the Aldis was switched off. The squid had a remarkable turn of speed and a great degree of accuracy in catching their prey and they reversed their direction with equal alacrity. Air temp. 28.7°C, sea 29·4°.

Position of ship: 18° 24′N, 118° 04′E.

LUMINESCENCE

Indian Ocean

s.s. *Venassa*. Captain C. C. Waugh. Durban to Persian Gulf. Observers, the Master, Mr. J. M. Paterson, 2nd Officer and Mr. A. M. Hoare, 3rd Officer.

22nd August 1970. Whilst reporting the weather for 1800 GMT the sea and swell, which had been running astern of us for most of the voyage, appeared to die down and up ahead the horizon, or what appeared to be the horizon, became most distinct. Then followed the strange phenomenon known as 'luminosity of the sea' of which a good description is to be found in the *West Coast of India Pilot* (No. 38).

The very distinct horizon was emphasized by a white wall of mist, not very high. The foremast light showed no loom so it could not have reached a height of more than 20 ft. The sea became very milky and the bow wave became very indistinct until the sea appeared as a carpet of white with no definition between the ship's wake and the sea. The luminosity developed until it was very bright and almost took on the appearance of a thick carpet of snow, with almost enough light to read a book by on the wing of the bridge. The first spasm of this phenomenon lasted for almost an hour when it looked as though it would die away, then shortly afterwards it recurred and did not finally die away until 2200. At 1800: Air temp. 24·6°C, sea 25·0°. Wind NNE, force 2–3. Visibility 7–10 miles.

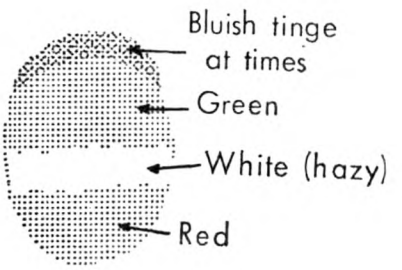
Position of ship at 1800 (approx.): 12° 54′N, 55° 42′E.

GREEN FLASH

Eastern Pacific Ocean

m.v. *Devon City*. Captain J. Cann. Panama to Manzanillo. Observers, Mr. J. R. Francis, 3rd Officer and Mr. B. T. Hernaman, Cadet.

22nd August 1970. At 0305 GMT Venus was observed to be exceptionally bright and to be glowing red as it neared the horizon. It was observed through binoculars



and could easily be seen to be divided horizontally, the top half glowing green and the bottom half red. The green seemed to vary in intensity, appearing to have a bluish tinge at times, while the red stayed at a constant brightness. Both colours could be plainly seen for about 6 min until the planet had fallen to an altitude of about 4° when it could no longer be seen. Its bearing on setting was 263°. The night was very clear with no moon or clouds although over Mexico, to the north, some low cloud could be seen occasionally illuminated by lightning. At 0001: Air temp. 29·3°C, wet bulb 26·7°. Wind, light and variable.

Position of ship: 14° 18′N, 95° 37′W.

Note. This interesting report belongs to the 'green flash' group of optical phenomena. At low altitudes the white light from a luminary, in travelling for a greater distance through the atmosphere, is refracted as it passes through the more dense lower layers and may be dispersed into the colours of the spectrum. When this happens the greater part of the orange/yellow range of colour will be removed by absorption due to invisible water vapour, while most of the blue/violet will be lost by scattering due to very small particles within the atmosphere. This leaves green and red as the remaining visible colours and these form two almost superimposed images of the luminary, one green and the other red, the green image appearing uppermost due to the fact that green light is bent more than red during refraction. In the overlap area the green and red, together with a small part of the other colours of the spectrum, combine to give white (see diagram)—the purity of the white depending on the proportions of the overlapped colours and the relative area of the white zone depending on the size of the luminary. When the atmosphere is very clear, and scattering is least, the upper segment may be observed to be blue/green, or sometimes blue and, much more rarely, blue/violet.

In the case of Venus (or Jupiter) the white area is relatively small, but with the sun as luminary the green and red colours appear only at the upper and lower rims, respectively, and it is only when the general brightness of the sun has been cut off by the horizon, as by a bank of cloud that the coloured segments can briefly be seen. When the sun is setting, even if only temporarily behind a bank of cloud at low altitude, the green rim may be observed as it disappears and the red rim may be observed as it re-appears. In either event the observation is normally brief, hence the name 'green flash' and, more rarely, 'red flash'.

The phenomenon may sometimes be observed when any celestial body is setting (or rising). The green flash has been observed at the time of rising of the brighter stars; it is here observed with a bright planet (Jupiter has also been associated with the green flash). It is most commonly associated with the sun and is rarely seen with the moon as luminary due to the low intensity of the light.

POSTSCRIPT

South Atlantic Ocean

m.v. *Northumberland.* Captain R. G. Hollingdale. Durban to Tenerife. Observers, the Master and all officers.

A report from the *Northumberland* on parasites found in the mouth of a flying fish was published in the January 1971 number of *The Marine Observer*, together with comments from Dr. R. J. Lincoln of the Department of Zoology, Natural History Museum. Dr. Lincoln has since written:

"I am enclosing a set of photographs [reproduced opposite page 99] which I have taken of the isopod; one showing the animal in position, with the side of the fish's mouth cut away

and the others showing a lateral view of the large adult female, and the smaller adult male (note difference in scale). I thought you might be interested in these photographs which give a good impression of the large size of the adult parasite in relation to the size of the fish's mouth, and the use made of the long curved dactyls for attachment."

AURORA

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

"We list here reports of aurora received at the Balfour Stewart Auroral Laboratory of the University of Edinburgh from British ships during the months of April–September 1970, a double ration due to the coincidence of delivery date of the notes for the last issue of the journal and failure in communication at the critical point.

"According to the index figures of planetary geomagnetic activity there was only one period during the first three months when a large display of aurora might have been expected to be visible at lower latitudes. This was April 21st/22nd. But a combination of cloud cover and bright moonlight ensured that in fact very few reports were received from the whole spread of our collecting area. Nor did we have reports of communications disturbance, other than one from a regular land observer whose television screen conveniently gives indication of auroral activity.

"The report and excellent sketches from the Master and 3rd Officer of the *Sugar Exporter* when in the Gulf of St. Lawrence on 4th May record a display, overhead in northern Quebec, following a slight upsurge in geomagnetic activity during a sustained period of low-level activity: in this instance a happy combination for our purpose—the right people in the right place at the right time with good observing conditions.

"In July there were two periods of high magnetic activity but long hours of daylight would make observation difficult except at lower latitudes.

"In August magnetic activity was high from the 16th to 18th, but cloud affected North Britain and the Ocean Weather Ships' positions, and a single report of a red glow over central England bridged the gap between rayed bands over northern Russia and aircraft reports from the western Atlantic. This lack of data at times of expected activity highlights an obvious difficulty of visual auroral data collection. Not only are we unable to predict occurrences, but we are at times unable also to be sure that the phenomenon has behaved according to accepted ideas. Every isolated report is therefore of much value.

"September figures were never more than moderate but there was a good deal of associated aurora at higher latitudes—expected at this equinoctial period—and good observing conditions resulted in a healthy batch of reports, and helpful sketches from observers in the *Weather Surveyor*.

"Reports from the *Hyala* on 5th and 6th July and the *Nina Bowater* on 10th September were, we think, of crepuscular rays.

"We recently supplied auroral data to a space scientist concerned with the analysis of information from Ariel 3 satellite during the period of its operation from May 1967 to May 1968. Original reports and sketches are being referred to as well as the reduced data, as detailed observations are required for specified points and times.

"We thank you for your help. Please keep watching and let us have your reports whenever convenient."

Date (1970)	Ship	Geographic Position		Λ	Φ	I	Time (GMT)	Forms
28th Feb.	*St. Jasper*	72°02′N	28°00′E	130	68	+79	0050	RA, RR, P
8th Mar.	*Methane Progress*	47°09′N	07°02′W	080	51	+64	2025–2115	RR, N
3rd Apr.	*Weather Monitor*	62°03′N	33°44′W	060	70	+76	0250	HA
							0450	N
7th	*Weather Monitor*	62°00′N	33°33′W	060	70	+76	0145–0215	SB
10th	*Weather Monitor*	61°56′N	33°23′W	060	70	+76	0344–0520	SB
11th	*Weather Monitor*	61°51′N	32°41′W	060	70	+76	0245	SA
12th	*Weather Monitor*	61°52′N	33°00′W	060	70	+76	0145	N
16th	*Weather Monitor*	61°41′N	32°47′W	060	70	+76	2345–0400	RB, R R
20th	*Weather Monitor*	61°51′N	31°32′W	060	70	+76	0300	RB
4th May	*Sugar Exporter*	50°00′N	66°00′W	360	61	+76	0215–0400	HA, RA, RR
27th June	*Elizabeth Bowater*	48°30′N	62°30′W	010	60	+75	0345–0500	RR, N
17th Aug.	*Northern Reward*	65°16′N	06°35′E	100	65	+75	2300–2400	P
19th	*Weather Reporter*	59°05′N	19°11′W	070	65	+72	0045–0100	RR
23rd	*Sugar Exporter*	59°10′N	50°00′W	030	70	+77	0330–0355	HB, RB, P
26th	*Baron Cawdor*	52°01′N	54°20′W	020	63	+75	0400–0420	HA, RA, RR
27–29th	*Silksworth*	63°30′N	74°30′W	360	73–75	+84	Hours of darkness	RB, V, N
1st Sept.	*Weather Surveyor*	58°57′N	19°01′W	070	65	+72	2150	RR
							2340–0200	HA, P, N
	Northern Reward	61°18′N	04°12′E	100	62	+73	2210–2240	RA, RB
2nd	*Weather Surveyor*	58°59′N	19°18′W	070	65	+72	2310–2332	P
3rd	*Weather Surveyor*	58°59′N	19°18′W	070	65	+72	0340–0420	HB, RR, N
4th	*Weather Surveyor*	59°00′N	18°56′W	070	65	+72	0115–0245	RA, RR
		59°09′N	18°32′W	070	65	+72	2240–2400	N
5th	*Weather Surveyor*	58°57′N	19°12′W	070	65	+72	2140–2300	N
7th	*Weather Surveyor*	58°54′N	19°27′W	070	65	+72	2240–2320	N
							0045	
10th	*Weather Surveyor*	59°11′N	19°34′S	070	65	+72	0140–0500	HA, N
13th	*Weather Surveyor*	58°58′N	19°08′W	070	65	+72	2305–2320	HA, RB, RR, P
15th	*Boston York*	75°40′N	16°34′E	130	72	+80	2230	P
19th	*Ross Renown*	66°48′N	15°30′W	080	72	+77	2130–2300	HA, RA
21st	*Ripon*	65°18′N	07°52′E	100	66	+75	2000–0015	HA, RA, RB, RR
26th	*Warkworth*	58°36′N	48°12′W	030	69	+76	0300–0320	All forms
							0425–0500	
	Ripon	68°25′N	17°30′E	110	66	+76	2000–0400	HA, RA
27th	*Weather Adviser*	59°00′N	19°03′W	070	65	+72	0001–0500	N
	Warkworth	59°55′N	58°55′W	020	71	+80	0230–0310	HA, HB, RR
	Ripon	68°25′N	17°30′E	110	66	+76	1900–2200	RA, RR
29th	*Weather Adviser*	58°50′N	19°00′W	070	65	+72	2300	N

Key: Λ = geomagnetic longitude; Φ = geomagnetic latitude; I = inclination; HA = homogeneous arc; HB = homogeneous band; RA = rayed arc; RB = rayed band; R(R) = ray(s); P = Patch; V = Veil; S = striated; N = unidentified auroral form.

551.46:598.2

Establishing the Identity of a Bird Observed at Sea

By Captain G. S. Tuck, D.S.O., R.N.
(Chairman, Royal Naval Birdwatching Society)

The lower air space over some seven-tenths of the world, that enormous area covered by the sea, belongs to the sea-birds even more than the ships whose narrow tracks cross the oceans, and it is the sea-birds that are a ship's ultimate companions.

To one who has been fortunate over a number of years to study the reports on sea- and land-birds included in ships' meteorological logs I have noticed the steadily increased interest in being able to put a name to the birds that appear and in providing details and sketches to assist in identifying species as yet unknown to observers.

It is my hope that through providing a separate member of RNBWS to analyse these reports, answers to queries may be sent back to more ships than hitherto.

One question has recently reached us: "How can an observer best supply information on an unknown bird?"

Three situations arise:

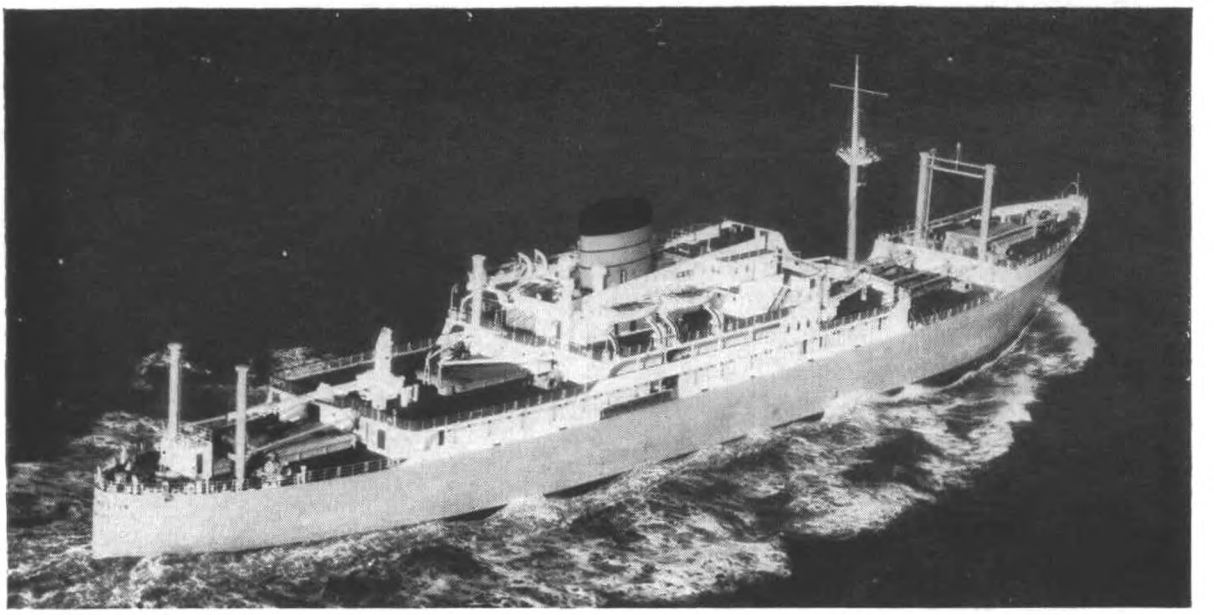
1. If the bird alights on board but cannot be captured to study in the hand. Here the ideal is first to establish whether it is land- or sea-bird and its feet are the first clue—webbed or unwebbed toes. The next point is to estimate its size from tip of bill to tip of tail feather. If a bird has a markedly elongated tail, give estimate of length of tail as well, and, if seen, whether a noticeably forked tail. Now look in detail for plumage of head and face, upper wings and upper parts, underparts and tail, type of bill, and any striking 'patches' about plumage. Note all this on a piece of paper and then make a sketch of its general proportions and pattern. The lengths can best be given in inches in this case.
2. If the bird flies by but does not alight. Your details will of course be less accurate but the following provide much help. How did it fly? Low over the sea, gliding or soaring over waves? High in the air? Were wing beats slow or very rapid or did it flutter mostly or follow in wake of ship? What was size and colour of bill? Long or stubby, yellow or black? What was colour of upper parts? What was the colour of its underbody? If seen, what was colour of legs? What was colour of underwing? Had underwing thick or thin dark margins? Did the bird dive from a height when feeding? Was it solitary or in flocks? Sketch once again.
3. If the bird can be caught. Here of course the best possible answer is to summon a photographer! A 35 mm camera at close range is excellent, especially a colour transparency! Arrange to take three aspects: (*a*) Side elevation; (*b*) Place bird on deck and, if possible, hold out wings and take view from above; (*c*) Hold bird in front of you, hold out wings and take view of underparts. Such photographs may well be unique. Otherwise a sketch should be made.

This also provides the opportunity to take measurements which may often supply a final answer to similar species. This is how it is done. Measurement in centimetres for large birds, millimetres for smaller birds:

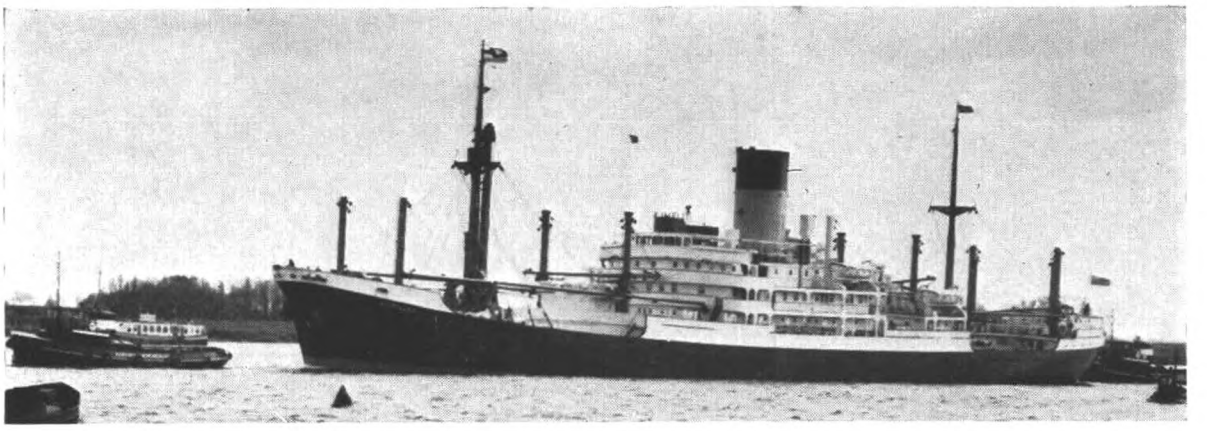
Greatest overall length. From tip of bill to tip of longest tail feather with bird gently extended on a flat surface.
Greatest wing span. Length between tips of spread wings across back.
Wing. Length from wing angle—outermost or carpal joint—to tip of longest primary flight feather. Wing closed and flattened against a ruler.
Tail. Length from base of central tail feathers to tip of longest tail feather.
Bill. Length from margin of feathers above to tip of bill.
Tarsus. Length of lowest leg bone—from notch behind last joint to front of knuckle at base of toes.
Toes. Extended middle toe or claw in large birds; hind claw in pipits.

It is realized that such full detail may not be possible and the meteorological log must not be overloaded but, if a sketch is possible, whatever details that are available could be listed on the sketch, no doubt. Of course the latitude, longitude and date of the sighting are vital.

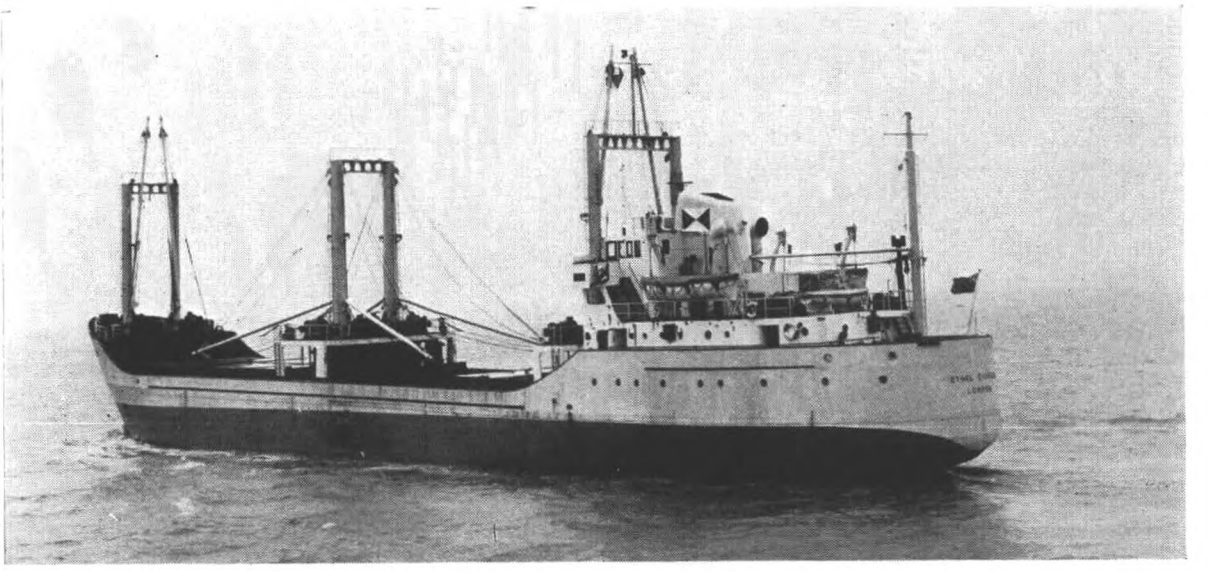
(*Opposite page* 106)



Port Nelson (Blue Star Port Line Ltd.), Captain T. G. S. Ward



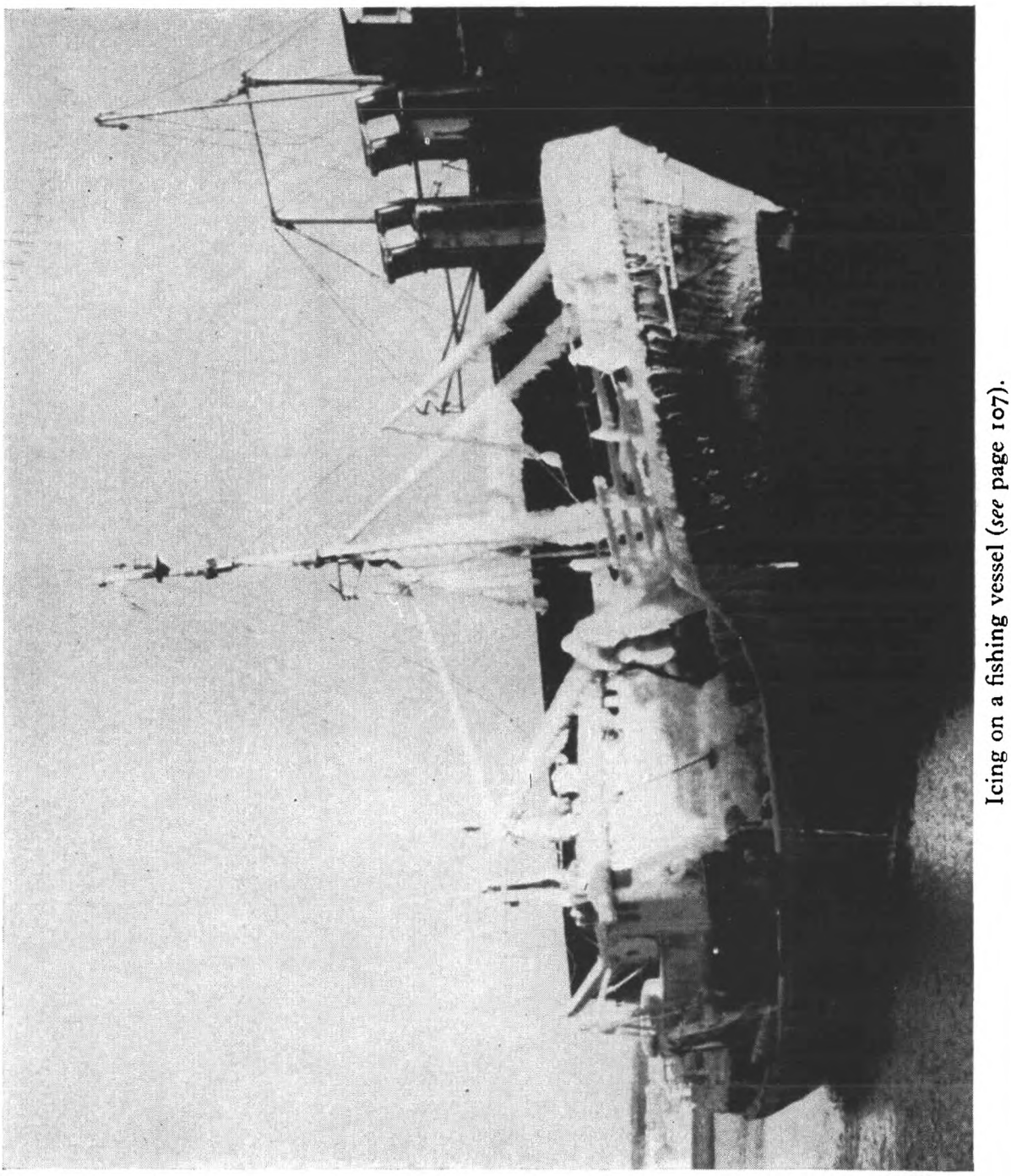
Achilles (Ocean Fleets Ltd.), Captain D. H. Stewart, R.D.



Ethel Everard (F. T. Everard & Sons Ltd.), Captain H. O. Roberts

THE THREE SHIPS WHICH GAINED THE HIGHEST MARKINGS FOR THEIR METEOROLOGICAL LOGBOOKS DURING THE YEAR ENDED 31st DECEMBER 1970 (*see* page 88).

(*Opposite page* 107)



Icing on a fishing vessel (*see* page 107).

551.515.12:551.574.42:551.465:629.12

Meteorological and Oceanographic Aspects of Trawler Icing off the Canadian East Coast

By J. R. Stallabrass
(National Research Council of Canada)

Perhaps the greatest hazard of operating fishing vessels off the Canadian east coast in winter-time is that of icing (*see* photograph opposite this page). In recent years three Canadian vessels have been lost with all hands, a total of 40 lives. The most recent disaster was the *Blue Mist II* lost in February 1966 with 13 lives, leaving behind 44 dependants in one Newfoundland village.

Icing can result from a number of causes:

(*a*) Supercooled fog, such as 'Arctic frost smoke'.
(*b*) Freezing rain or drizzle.
(*c*) Falling snow, in particular wet snow.
(*d*) Wind-generated sea spray, i.e. spindrift.

However, the principal and most serious cause of icing is the sea spray generated by the passage of a vessel through heavy seas when the air and sea-surface temperatures are low.

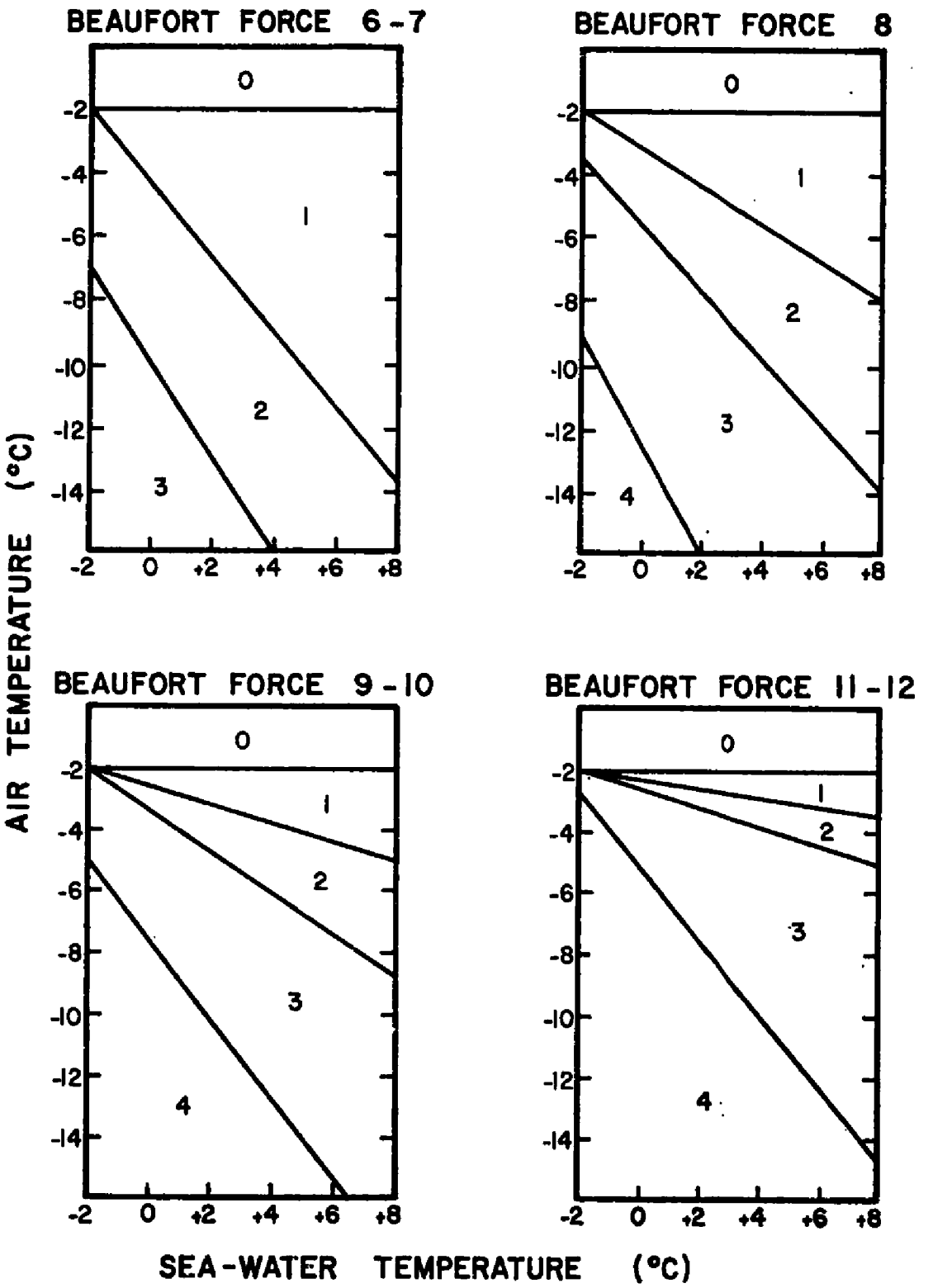
The purpose of this note is to present an analysis of icing reports from vessels operating off the coasts of Nova Scotia and Newfoundland in the period January to March 1970, with a view to determining the synoptic situations conducive to icing and the geographical areas over which such situations will result in the icing of vessels.

Data on the actual occurrence of icing conditions are taken from icing questionnaires completed and returned by the masters of fishing and other vessels operating out of east coast ports. These questionnaires were distributed by the Canadian Department of Transport as part of a joint study with the National Research Council of Canada into the problem of icing as it relates to the east coast fishing fleets.

As it turned out, the winter of 1969–70 was substantially milder than usual and only 27 reports of icing occurrences were received, many of which reported no more than a trace of icing, with a result that any conclusions regarding the statistical occurrence and geographical extent of icing conditions relate to this winter only, and are undoubtedly too optimistic for the average winter. However, data are being collected on a continuing basis with a view to eventually presenting a representative analysis of the situation.

Conditions conducive to icing

Various sources[1,2,3,4] indicate that serious icing occurs at air temperatures below the freezing point of sea-water (about $-2°C$ or $28{\cdot}5°F$) and down to about $-18°C$ ($0°F$), and with sea-surface temperatures between about $+4°C$ ($40°F$) and the freezing temperature, $-2°C$. This combination of air and water temperatures will permit the supercooling of spray droplets (the smaller droplets being cooled more nearly to the air temperature than large drops), and on striking a solid surface, the temperature of which is below the freezing point, a certain proportion of their mass will freeze.[5,6] The production of dangerous quantities of sea spray depends on the speed of the vessel, the wind speed, the heading of the vessel relative to the wind direction, and the state of the sea. In addition the size and design of the vessel has a bearing on the amount of water and spray thrown over the decks and superstructure. However, as far as fishing trawlers are concerned, the previously quoted sources suggest a wind of Beaufort Force 6 (22 knots) and above for significant icing



DEGREE OF ICING : 0 - NONE

1 - LIGHT = ½ - 1¼ IN/24 HR

2 - MODERATE = 1½ - 2½ IN/24 HR

3 - SEVERE = 2¾ - 5½ IN/24 HR

4 - VERY SEVERE = ≥ 6 IN/24 HR

Fig. 1. Icing on fishing vessels at slow speeds in winds of Beaufort Force 6–12. (From Mertins[4])

when the vessel is steaming into wind at low speed. Icing is less severe when running before the wind, or when steaming into a wind of Force 5 or less.

The state of the sea (i.e. roughness) depends on the wind strength, the duration of blow, and the fetch (i.e. the distance over which the wind acts on the sea surface from the same direction). The probable wave height in a Force 6 wind is $9\frac{1}{2}$ feet[10] or almost 3m.[3] Steep waves of short period will result in more spray than long-period waves or swell.

Mertins[4] has collected information on icing from fishing vessels over a period of many years and has correlated the severity of icing with the factors of air temperature, sea-water temperature and wind force. These correlations are presented in Fig. 1. They suggest the possibility of icing with sea-water temperatures as high as +8°C (46°F) at very low air temperatures, but since the surface air temperature is rapidly modified by that of the sea over which it passes, the probability of icing at such high sea temperatures is small. Vasil'yeva[3] states, however, that no icing of ships has been observed at water temperatures in the range 5° to 8°C, while Smith[7] tends to corroborate Mertins when he states that icing can occur with sea temperatures as high as +8°C in winds of Force 10–12 with air temperatures well below −5°C.

Local conditions

The sea area of interest in this present study lies approximately between the latitudes 42°N and 52°N and between the 50°W and 67°W meridians. In this area the combination of strong winds and low air temperatures, two of the factors required for icing, are provided by the passage of intense cyclones. Archibald[8] states that, for a five-year period (1963–67) for January, February and March, the predominant path of the most intense storms lies right along the Nova Scotia coast and across the southern part of Newfoundland, with a somewhat less frequent track lying parallel and south-eastward of this predominant track. This is illustrated in Fig. 2 which is

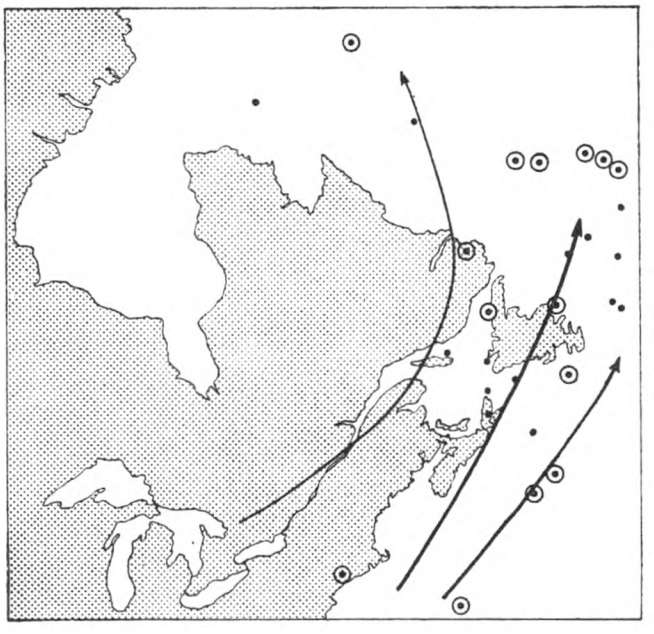


Fig. 2. Principal tracks of intense storms for January, February and March 1963–67.
(From Archibald[8])

reproduced from Archibald's paper. The dots with concentric circles around them indicate the most intense storms, i.e. those with a pressure at the centre of between 956 and 972 mb and with a very steep pressure gradient. Less intense storms, with pressures of between 972 and 980 mb, are represented by solid dots. It is clear that

many of these storm centres will produce in their wake strong northerly or north-westerly winds carrying cold Arctic air to the sea area of interest. The result is, therefore, that these regions are particularly susceptible to the meteorological conditions most conducive to icing.

The oceanographic conditions of interest are the sea-surface temperature, the sea state and, to a lesser extent, the sea-surface salinity. Monthly mean sea-surface temperatures for January, February and March are presented in Fig. 3.[9] These suggest that in an average year the limit of icing conditions, taken as a water temperature of 46°F, i.e. 8°C, might be expected to extend from about 150 miles south of the southern tip of Nova Scotia (Cape Sable) to some 250 miles off Cape Race, and far more extensively to the east of Newfoundland and Labrador.

As stated earlier, the roughness of the sea depends not only on the wind strength, but also on the fetch and the duration of the wind. This is illustrated in Table 1.[10]

Table 1.

(Reproduced from Ref. 10)

Beaufort Force of Wind	Theoretical Max. Wave Height (ft), Unlimited Duration and Fetch	Duration of Winds (hours), with Unlimited Fetch, to Produce Percent of Max. Wave Height Indicated			Fetch (n. miles), with Unlimited Duration of Blow, to Produce Percent of Max. Wave Height Indicated		
		50%	75%	90%	50%	75%	90%
3	2	1·5	5	8	3	13	25
5	8	3·5	8	12	10	30	60
7	20	5·5	12	21	22	75	150
9	40	7	16	25	55	150	280
11	70	9	19	32	85	200	450

Considerable sheltering of the fishing grounds off Nova Scotia and south of Newfoundland from northerly winds is afforded by the proximity of the land; a large part of the winter fishing is done within 100 nautical miles of land, resulting in significant reduction in potential wave height for winds of Force 6 and above. However, a large part of the St. Pierre Bank (45°–47°N, 55°–57°W) and the Scatari Bank (46°N, 59°W) is not protected from the north-westerly winds which sweep across the Gulf of St. Lawrence and through the Cabot Strait. Similarly the fetch may be considered unlimited over most of the Grand Banks and for sea areas east of Newfoundland.

The freezing temperature of sea-water is a function of its salinity as demonstrated in Fig. 4. Fig. 5 shows the mean isohalines for the three winter months January to March,[9] and indicates a considerable variation in the area of interest, from about 30‰ (parts per thousand) on the south-west side of Cabot Strait to about 35‰ at the southern edge of the Grand Banks. However, this variation in salinity only results in a variation in the freezing temperature of about a quarter of a degree, i.e. from about −1·65°C to −1·9°C, hardly significant enough to have any effect on the onset or the severity of icing.

These considerations suggest that conditions conducive to icing, although frequent in the area under consideration, may in general be less severe than in such exposed areas as the Labrador Sea or Denmark Strait.

Icing reports

The foregoing generalizations will next be compared with specific icing reports for the winter of 1969–70.

Icing questionnaires were first distributed during the winter of 1968–69, but few returns were received, largely because of the lateness of their distribution, but also

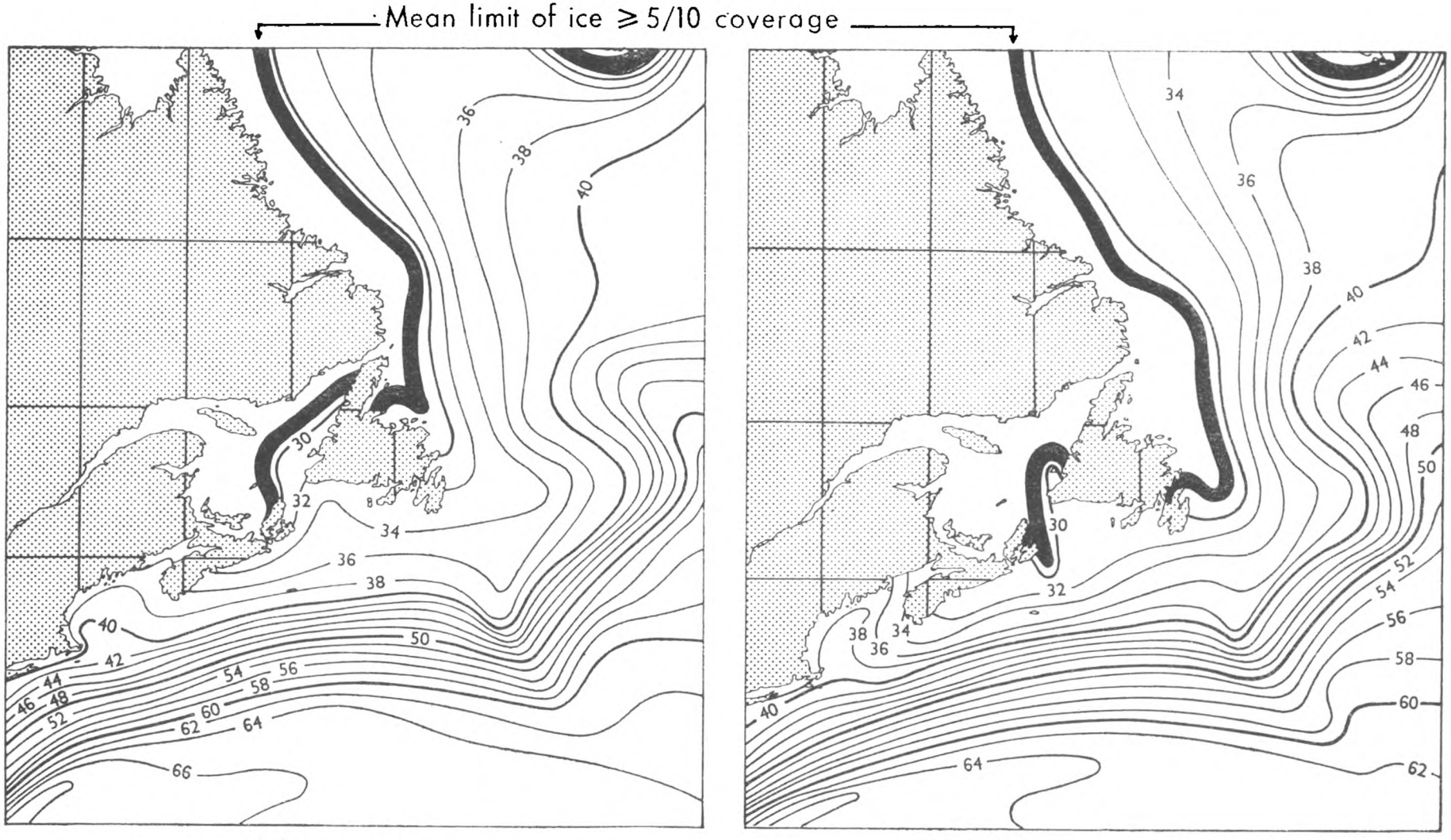
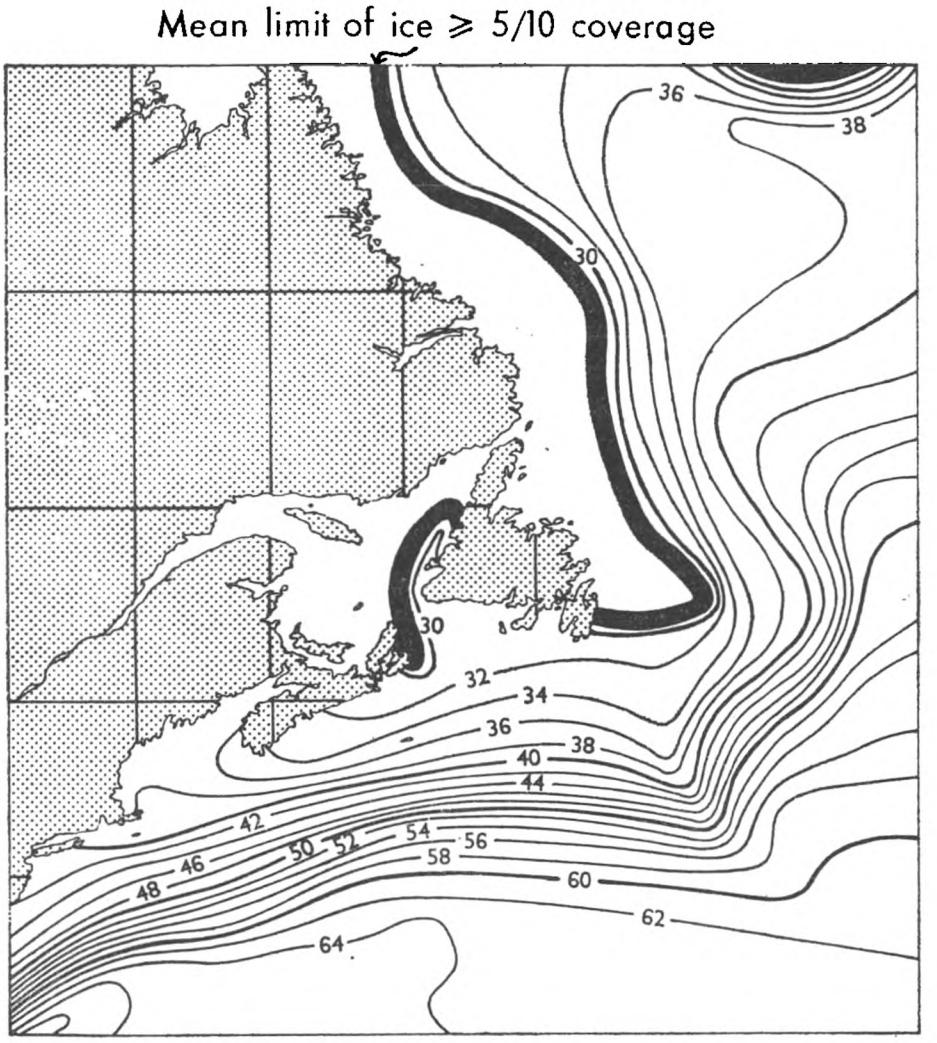


Fig. 3(a) and (b). Mean sea-surface temperatures(°F).
(From Oceanographic Atlas[9]).



(c) March

Fig. 3(c). Mean sea-surface temperatures (°F).
(From Oceanographic Atlas[9]).

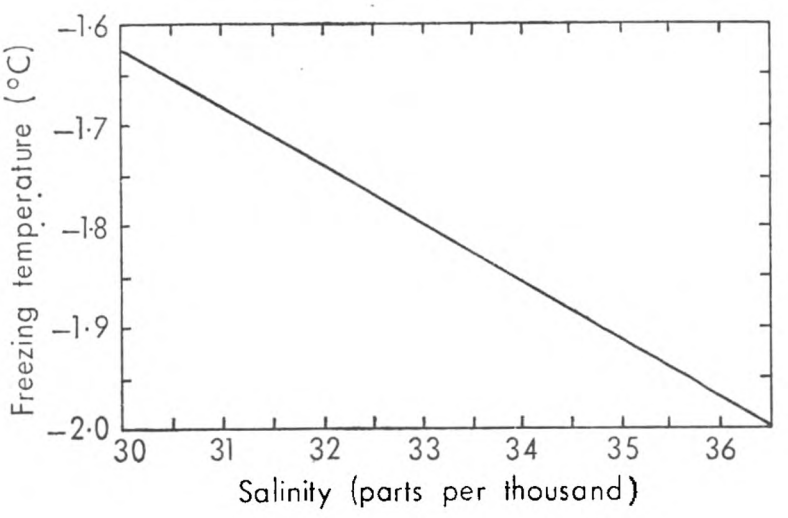


Fig. 4. Freezing temperature of sea water as a function of salinity.

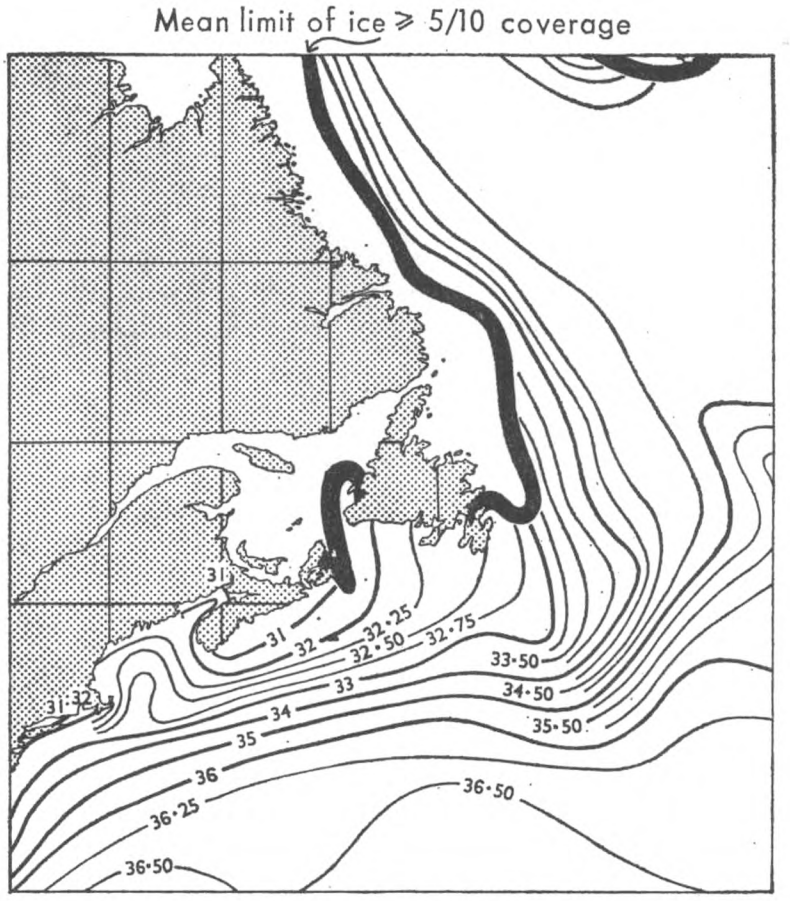


Fig. 5. Mean sea-surface salinity (parts per thousand) January, February, March. (From Oceanographic Atlas[9]).

perhaps because it was "yet another form" to fill out. Response during the 1969–70 winter was better, but still disappointing; however, it is on these reports that the present correlations are made.

The reports cover a period from 21st January 1970 to 3rd April 1970, during which time seven periods of icing can be identified. These are listed in Table 2.

Table 2. Periods during which measurable amounts of icing were reported and corresponding temperature and wind conditions

Date 1970	No. of Vessels Reporting Icing	Reported[1] Temperature Range °C	Mean of Reported Wind Strength (Bft.) and Direction	Reported[2] Icing Severity	Potential[3] Icing Severity
19th–22nd Jan.	1	−8	8 N	Moderate	Mod./Severe
14th–15th Feb.	9	−8 to 0	6 NW	Trace to Severe	Moderate
16th–17th Feb.	3	−4·5 to −1	5 NW	Trace to Light	Trace to Light
20th–22nd Feb.	4	−6·5 to −1	5 NW	Trace	Light to Mod.
24th–25th Feb.	4	−12	8 WNW	Trace to Mod.	Severe
26th–28th Feb.	4	−1 to >0	4 NE	—	Trace (Frz. rain)[4]
9th Mar.	2	−1	7 NE	Trace	Trace

Notes: (1) In many cases reported air temperatures were estimates.
(2) Estimates of icing severity were sparsely reported.
(3) Icing severities noted here are based on Mertins' correlations of wind force and air and sea temperatures.
(4) During this period icing was mainly the result of freezing rain rather than sea spray.

The potential icing severities given in Table 2 are derived from the Mertins correlations (Fig. 1) using the wind strengths and temperatures reported in the questionnaires, and the sea temperatures as determined from the sea-surface temperature charts (Fig. 6) at the reported positions of the vessels. These severities may be considered as indicating the potential icing hazard, but the actual degree of icing experienced involves other contributing factors such as the vessel's speed, its heading relative to the wind, and its size and bow design. It is largely for this reason that in those cases when an estimate of icing severity was given in the questionnaires it did not necessarily correlate with these classifications. In addition, any estimates given were the subjective assessments of the individual masters of the vessels concerned and were not based on any standardized objective criterion. It was found difficult to assess the severity of icing from the rate of ice build-up, since in most of the reports the duration of icing was given only vaguely or not at all; also there was uncertainty as to which part of the vessel to use, since the icing rate varies with the scale of the structure on which the ice is forming.[6]

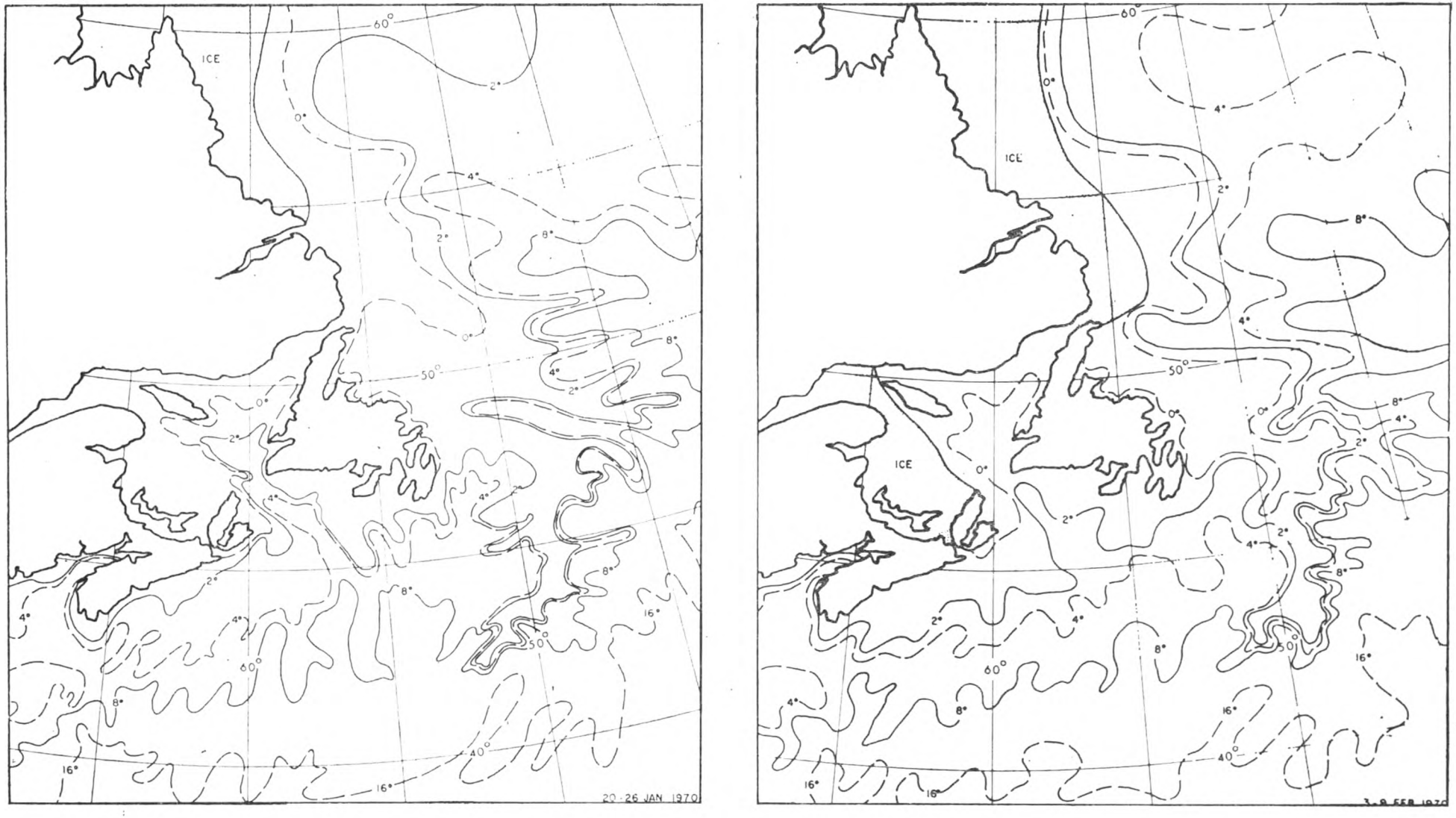
Actual weekly average sea-surface temperatures* for the icing periods of interest are presented in Fig. 6. These illustrate how the cold water of the Gulf of St. Lawrence and the Davis Strait (the Labrador Current) pushed south as the season progressed; the general growth of the ice pack is also shown, although actual extents are very variable from day to day. Comparison with Fig. 3 shows that this winter was considerably less severe than the average. Fig. 6 does perhaps illustrate more graphically than Fig. 3 that where the cold water from the north meets the warm current of the Gulf Stream from the south-west in the Grand Banks region a very steep temperature gradient results, giving a well-defined extreme limit of icing conditions in this particular region.

Fig. 7 illustrates the meteorological systems responsible for five of the seven periods of icing of Table 2. With the exception of the period of freezing rain (26th–28th February 1970), well-developed lows influenced the area and were responsible for the strong northerly winds that brought the cold Arctic air down over the fishing grounds. The storm of 19th to 22nd January 1970 was particularly intense and prolonged and was comprised of two lows (Figs. 7 (a) and (b)) passing through the area in rapid succession. It may be wondered why there was no more than one report of icing during this period; it seems probable, however, that distribution of the questionnaires was not complete by this time, for it is known that other cases of icing had been experienced but not reported. Fig. 7 (b) to (f) also show the locations of the reported icing incidents together with the positions of vessels reporting no icing during the same period of cold weather. Of particular interest is the storm of 14th–15th February (Fig. 7 (c)) during which nine vessels reported icing ranging from a trace to severe; however, one vessel working up from Tail of Bank (approximately 43° 20′N, 51° 00′W) to approximately 45° 00′N, 54° 00′W experienced no severe weather and made no ice. Reference to sea-surface temperatures (Fig. 6 (c)) shows that her course took her across a tongue of warmer water ranging from about 3°C to about 7°C, while the other nine vessels were all operating in water having a temperature of less than 2°C. Although the severity of the icing experienced by these nine vessels was not great, the effect of sea-water temperature is demonstrated by the vessel that encountered no icing.

Discussion

Although there are to date insufficient detailed data from the sea area of interest to draw any certain conclusions on the specific circumstances conducive to icing in this area, some trends are nevertheless apparent. In particular, every reported case of icing was associated with the passage of a low-pressure system through the

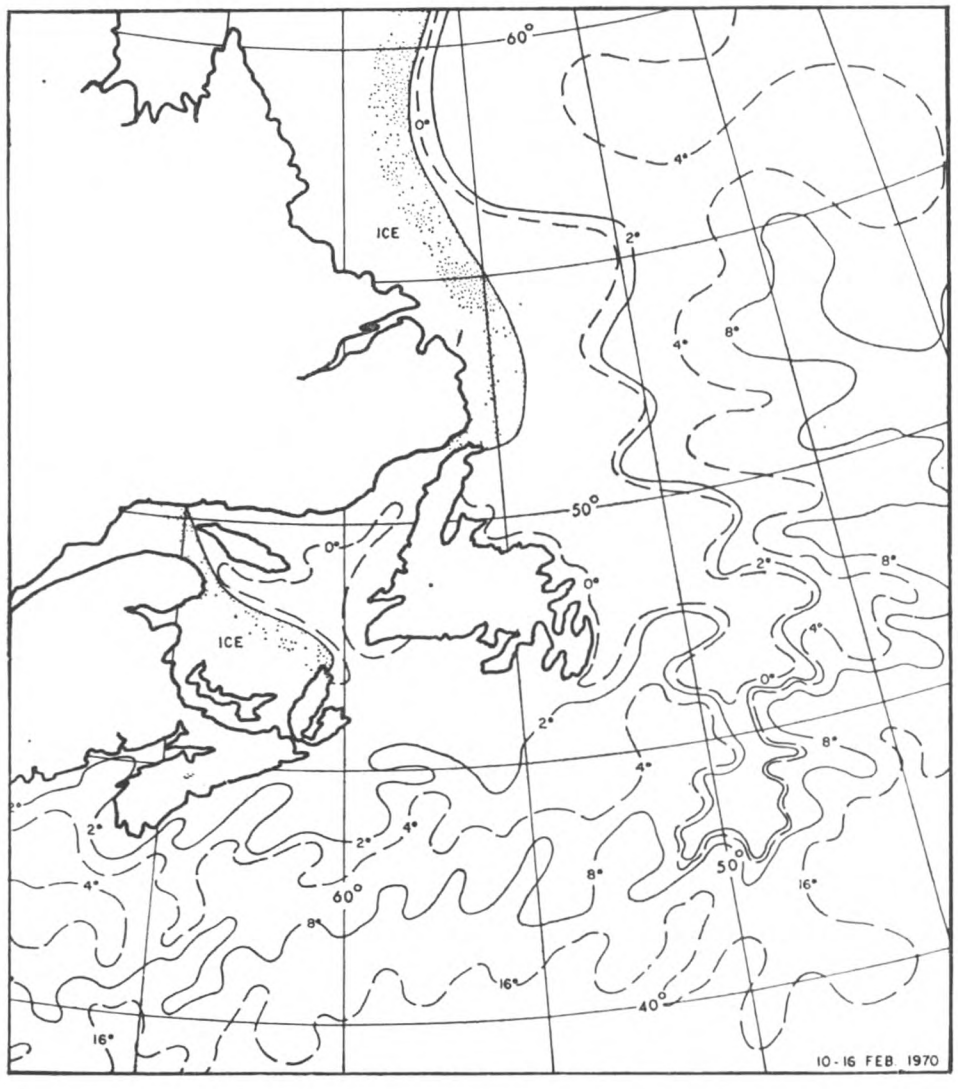
* Derived from Canadian Oceanographic Services charts of Sea Surface Temperature.



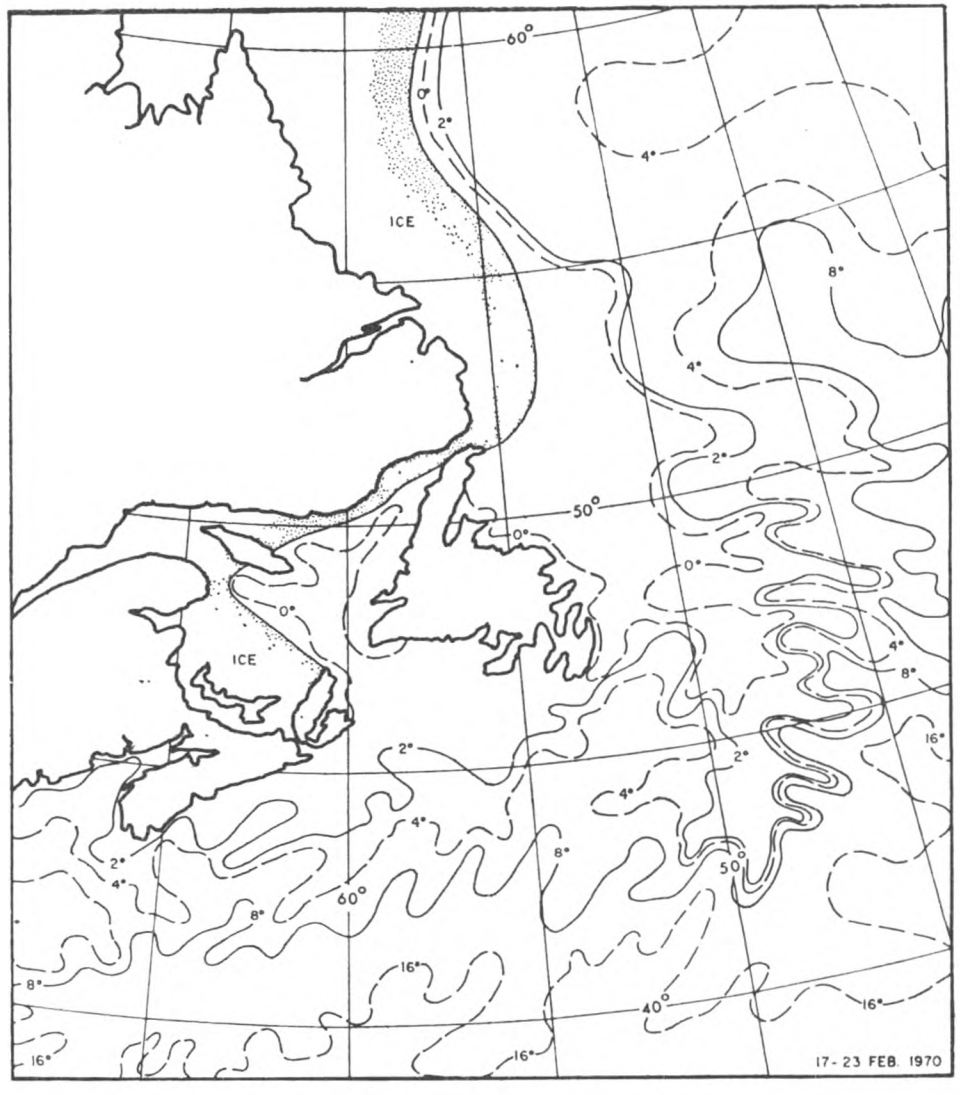
(a) 20th—26th January 1970

(b) 3rd—9th February 1970

Fig. 6(a) and (b). Weekly average sea-surface temperatures (°C).

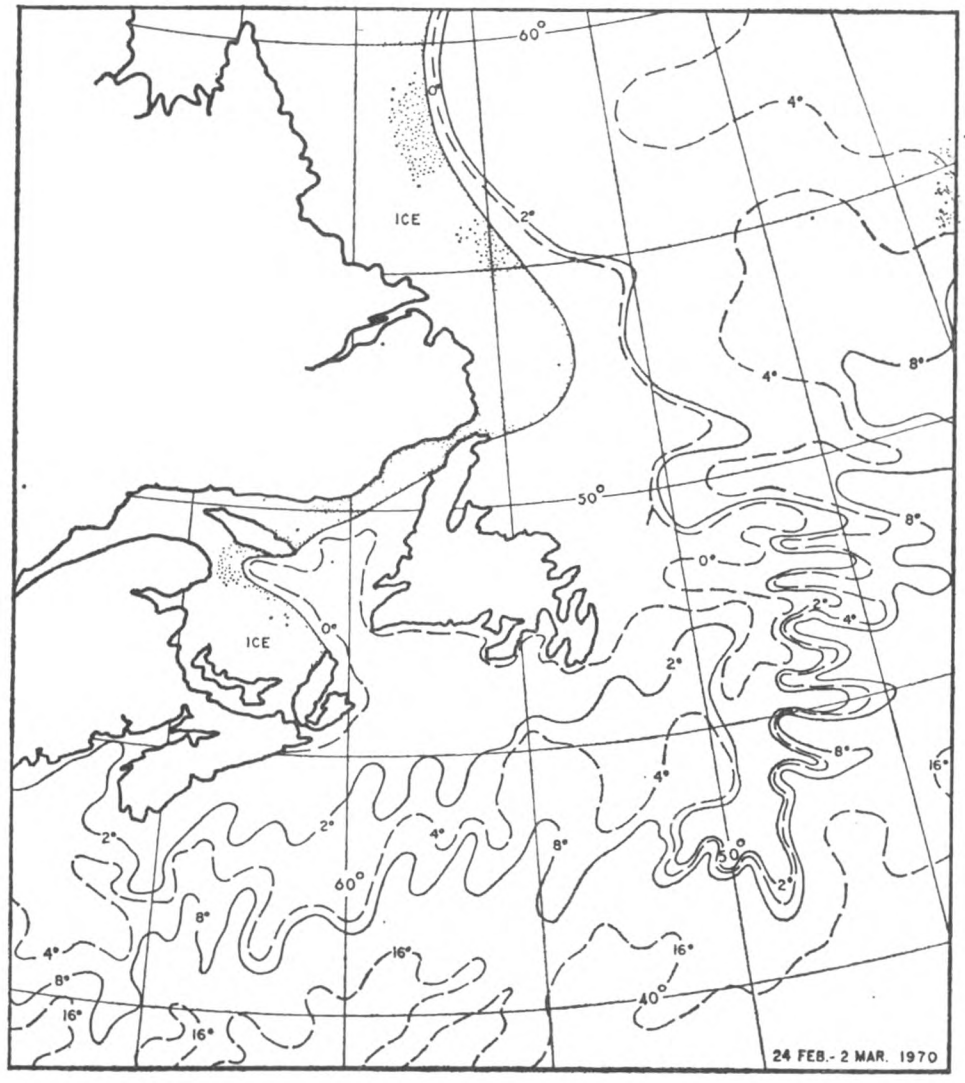


(c) 10th—16th February 1970

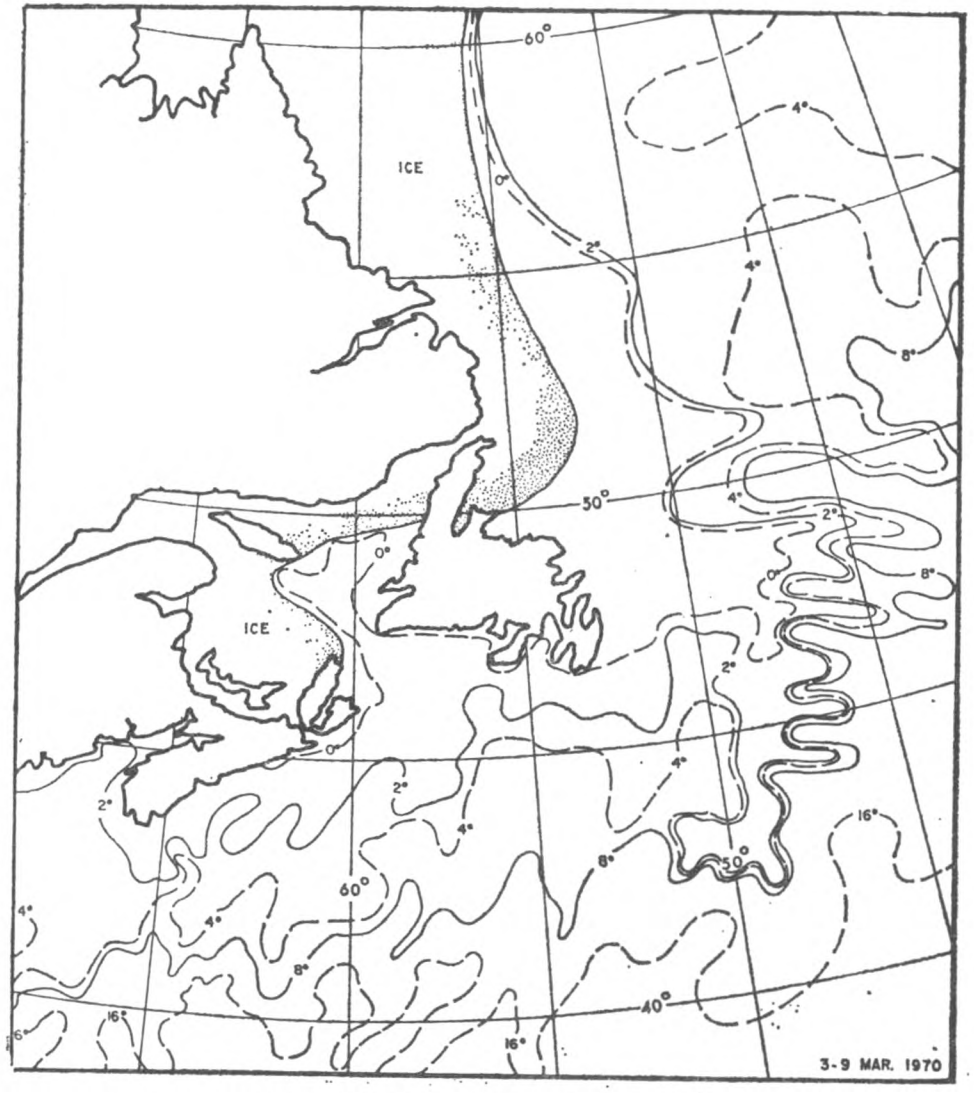


(d) 17th—23rd February 1970

Fig. 6(c) and (d). Weekly average sea-surface temperatures (°C).

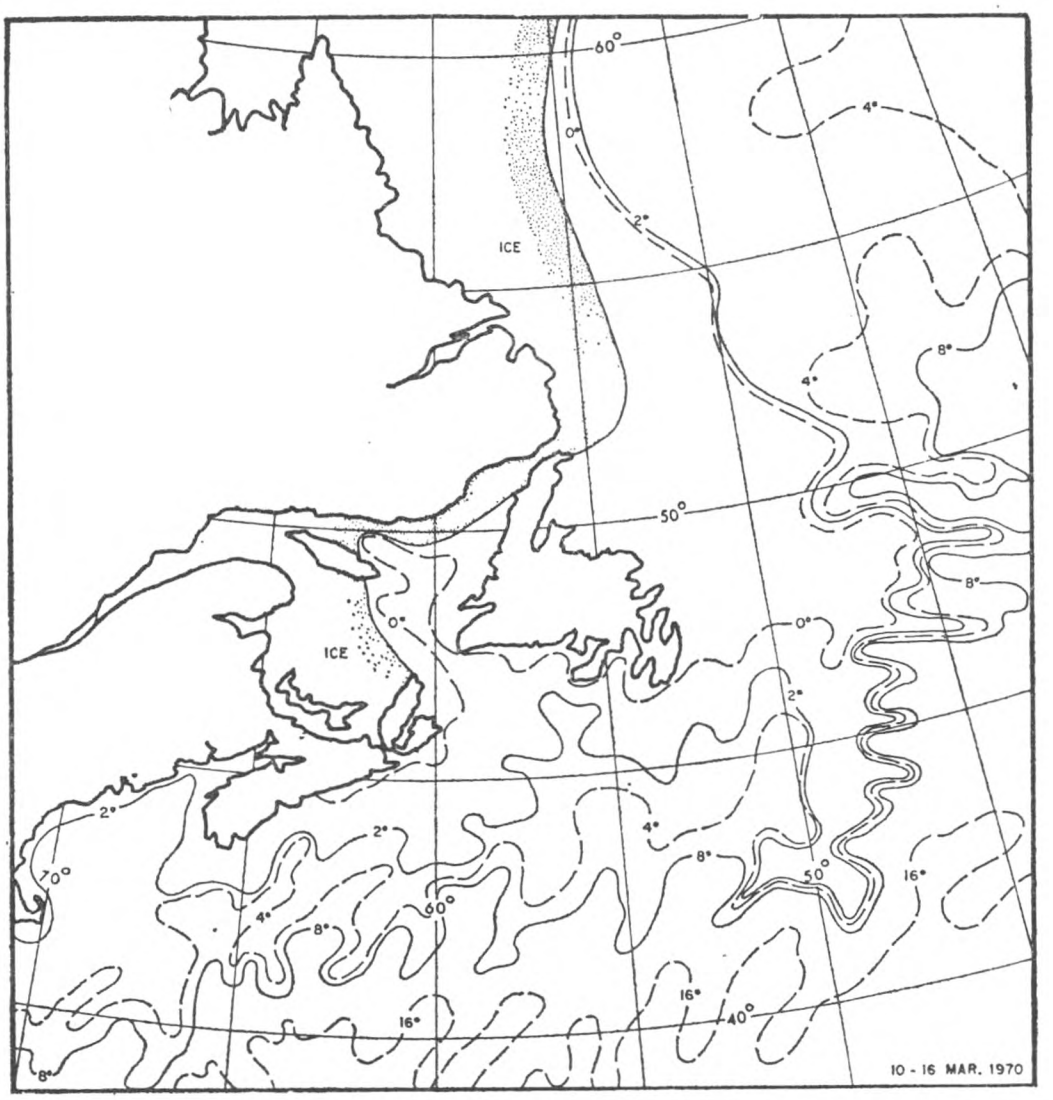


(e) 24th February—2nd March 1970



(f) 3rd—9th March 1970

Fig. 6(e) and (f). Weekly average sea-surface temperatures (°C).



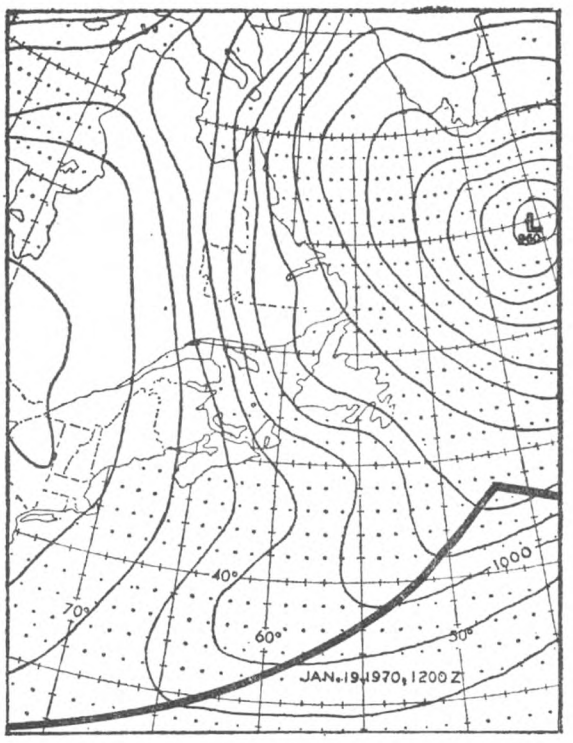
(g) 10th—16th March 1970

Fig. 6(g). Weekly average sea-surface temperatures (°C).

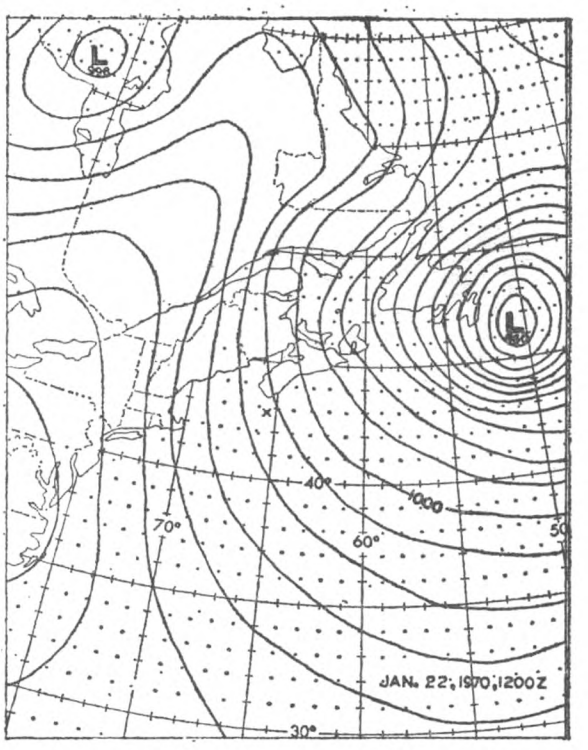
area, bringing in its wake cold air from the NW quadrant. Thus it appears that there should be little difficulty in forecasting in a general way the probable occurrence of icing conditions, although it is highly unlikely that the degree of severity could be predicted. By way of example, let us assume a forecast of Force 8 winds with air temperature -4°C and sea temperature $+1$°C. Fig. 1 suggests a moderate icing severity. However, forecasts of air temperatures may be out by 3° or 4°C, of wind speeds by one Beaufort Force number, and sea temperature by at least 1°C. With these tolerances applied, the expected icing severity might be anything from none to severe.

Based on the weekly charts of sea-surface temperature (Fig. 6), the southern extent of probable icing conditions appeared to correspond approximately to the edge of the continental shelf, with the possible exception of an incursion of warm water extending across the Grand Banks for most of the winter. It therefore seems that all of the fishing grounds (with the possible exception of part of the Grand Banks) lie within the area of icing susceptibility. Whether the warm water incursion into the Banks is a perennial feature is uncertain; the long-term monthly means (Fig. 3) give a slight hint of it, but study of the weekly averages over a number of years would be needed to make sure.

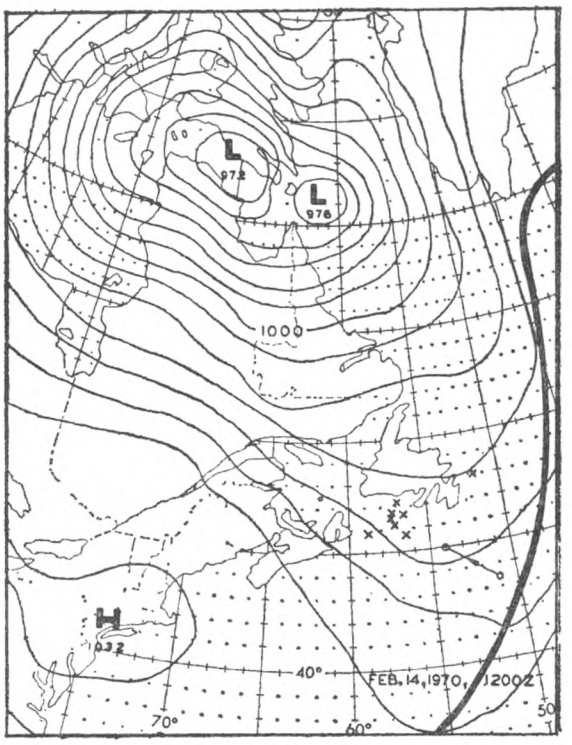
The programme of gathering icing data from fishing vessels is being continued (this is in general accord with a request by IMCO—the Inter-Governmental Maritime



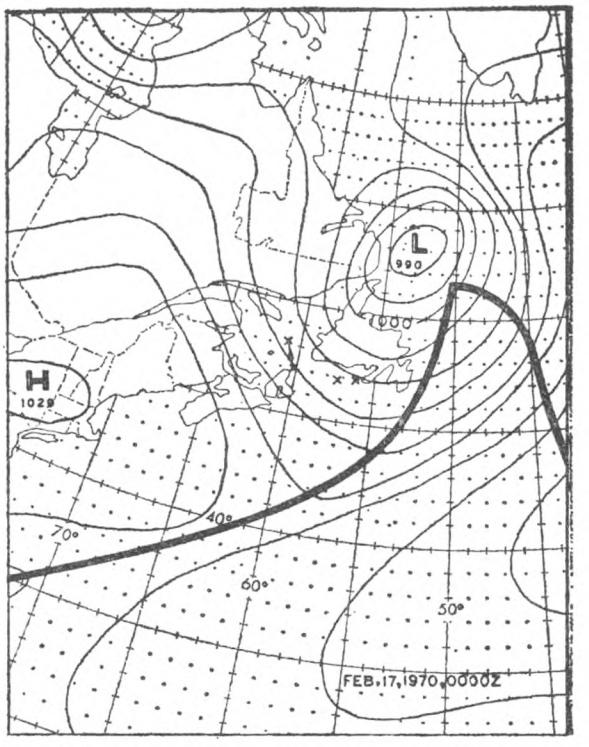
(a) 1200 GMT, 19th January 1970



(b) 1200 GMT, 22nd January 1970



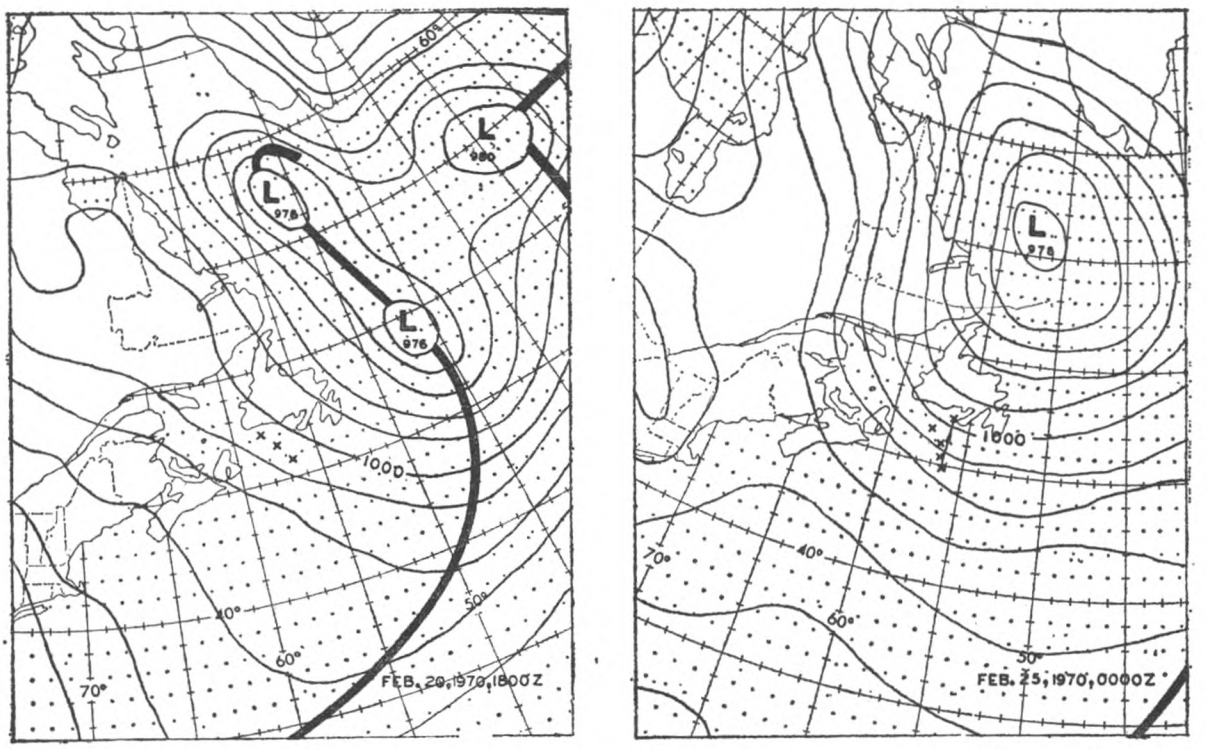
(c) 1200 GMT, 14th February 1970



(d) 0001 GMT, 17th February 1970

x— Position of vessel experiencing icing
o— Position of vessel not experiencing icing
↗ — Course of vessel

Fig. 7(a), (b), (c) and (d). Surface charts showing meteorological systems responsible for icing occurrences.



(e) 1800 GMT, 20th February 1970 (f) 0001 GMT, 25th February 1970

Fig. 7(e) and (f). Surface charts showing meteorological systems responsible for icing occurrences.

Consultative Organization) so that, in time, a fairly accurate statistical picture of the frequency and location of icing conditions may be established as well as a more detailed picture of the local weather and ocean conditions causing icing. Until more data are available that may be used to relate conditions to the severity of icing, it is suggested that the Mertins correlations (Fig. 1) be used as a severity index in the forecasting of icing conditions.

Conclusions

A start has been made in the collection of icing data from fishing vessels operating from Canadian east coast ports. The data so far gathered are completely insufficient to draw any conclusions as to the specific range of meteorological and oceanographic conditions causing the icing of vessels in the fishing grounds off Nova Scotia and Newfoundland; however, as more data are collected in the future, it is expected that a clearer and more detailed picture will emerge.

Preliminary indications, however, are that icing conditions occur as the result of the passage of well-developed low-pressure systems through the area, and that the extent of the area of icing probability corresponds roughly to the edge of the continental shelf.

Acknowledgements

The author wishes to acknowledge the helpful comments and suggestions of Mr. L. Willis of the Marine Regulations Branch, Department of Transport, and Mr. D. W. Boyd of the Meteorological Branch, Department of Transport (attached to the Division of Building Research, National Research Council). In addition, special thanks are accorded to Dr. H. O. Mertins of the Marine Weather Section, German Weather Service, for allowing the reproduction of the curves presented in Fig. 1.

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551.5:629.12

Weather Routeing—an Example of Time-Saving

By A. T. Dorrell and Captain G. V. Mackie
(Weather Routeing Section, Meteorological Office)

Since the introduction by the Meteorological Office in 1968 of a weather-routeing service for shipping on the North Atlantic, evaluation of the effectiveness of the service provided has been difficult to assess since ship operators and charterers ask to have their vessels weather routed for a variety of reasons. These include passages in the shortest possible time, or maintenance of schedules both consistent with ship and cargo safety—or a reduction in the risk of damage to ship and/or cargo without special consideration to time-saving on the voyage; or, on occasion, avoidance of heavy weather on account of the nature of the cargo being carried.

For vessels on time charter it is obviously in the charterer's interests that the vessels make their voyages in the shortest possible time—consistent with ship safety—and the following account of the voyages of two vessels of similar size and power is chosen to illustrate how effective weather routeing can be in the matter of time-saving.

Both vessels were bound for the St. Lawrence from west coast ports of Britain. Ship A sailed first and was relying for weather advice on the normal North Atlantic Weather Bulletins broadcast from Portishead and Washington. Ship B was weather routed. Neither ship carried a facsimile receiver. Ship A passed Fastnet Rock 35 hours ahead of Ship B and, from observations received at Bracknell, it was clear that the Master had elected to set course on the great circle from Fastnet to Belle Isle. Weather reports received from Ship A and plotted on the accompanying chart (Fig. 1) show that for rather more than 48 hours from Fastnet the vessel encountered a full westerly gale, and was forced to heave to at times. Eventually at about 20°W a new course was set, heading in a south-westerly direction, presumably in an attempt to find less disturbed weather. On this new course, which was a rhumb-line to Virgin Rocks, the weather did eventually improve and the vessel made the remainder of the passage in reasonably quiet weather.

Ship B, under the guidance of the Weather Routeing Section at Bracknell, was advised before sailing to follow the rhumb-line Fastnet to Belle Isle with a prospect of disturbed weather for a few days over the North Atlantic and strong to gale south-west to westerly winds. However, before the vessel had reached Fastnet, it had become clear to the Ship Routeing Section that less disturbed weather would be found not so very far south of the vessel's advised course and a message was sent via Portishead Radio advising an alteration of course to 48°N, 20°W and thence rhumb-line to Belle Isle since it was considered that weather conditions over the west Atlantic would not be so unfavourable as to justify the extra distance by proceeding to Cape Race.

This advice was followed and, as may be seen from the weather reports plotted on the map of the voyage (Fig. 1), the vessel avoided the heavy weather which had forced Ship A to heave to and was able to maintain an average speed of 10·3 knots, compared with an average speed of 8·7 knots for Ship A.

The decision of the Weather Routeing Section to advise Ship B to proceed from 48°N, 20°W on a rhumb-line to Belle Isle was clearly justified in the light of the weather the vessel actually encountered.

The voyage distance for Ship A from Fastnet to Seven Islands, by way of Cabot Strait, was 2,301 miles. Ship B, between the same two points but by way of Belle Isle, covered only 2,278 miles. Moreover, Ship B, although 35 hours behind Ship A at Fastnet, passed Seven Islands 7 hours ahead of Ship A—a total time-saving of 42 hours on this particular voyage—and avoided all winds of gale force.

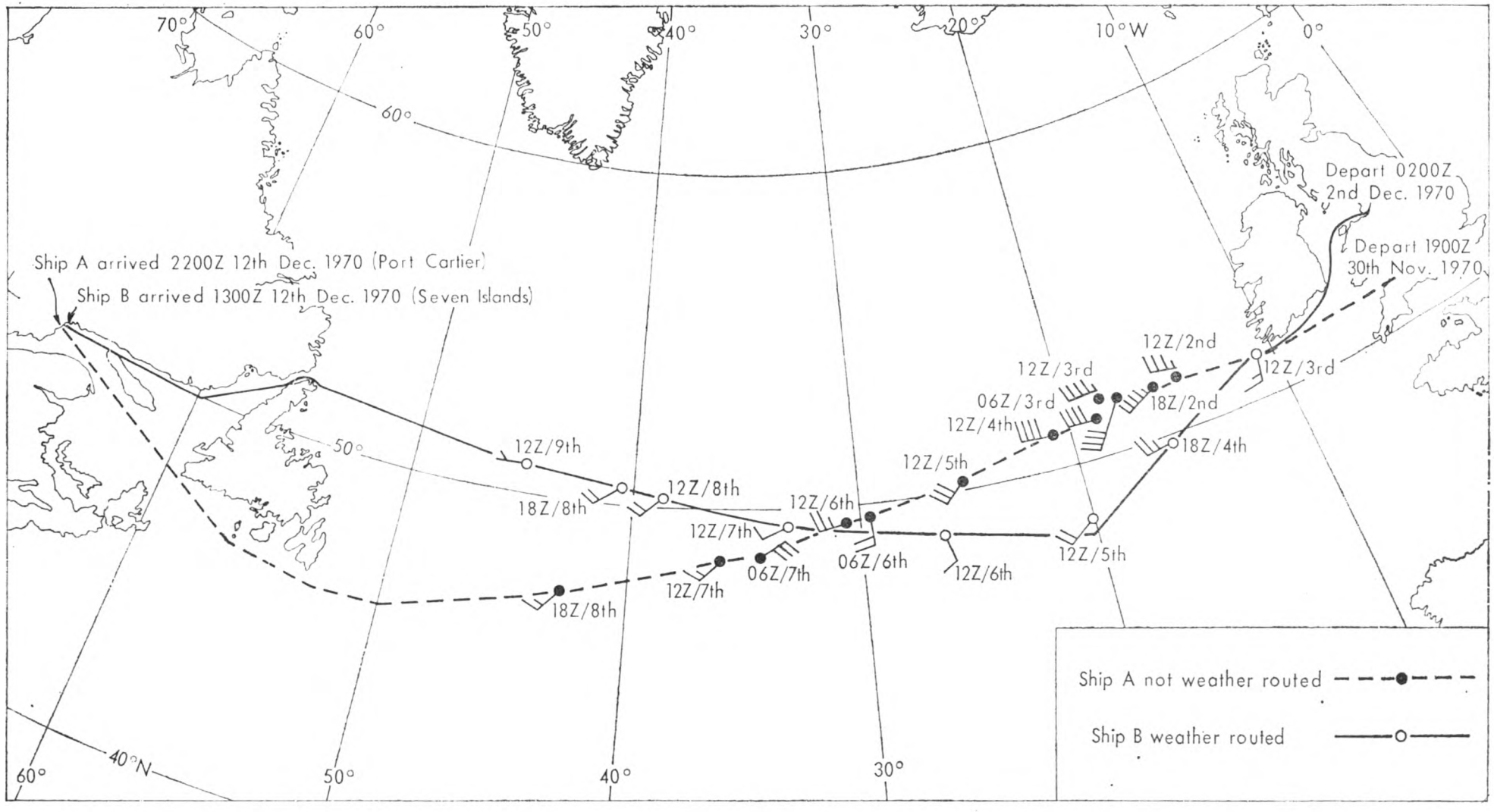


Fig. 1. Routes followed by the two vessels.

Not always can the Weather Routeing Section claim to be so successful in time-saving, but results show that most ships which are weather routed arrive at their destination earlier than, or at least as soon as they would have done had they followed the masters' chosen courses and on by far the greatest number of occasions they have sailed through less disturbed weather and seas.

NOTES ON ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM JANUARY TO MARCH 1971

JANUARY

A belt of unusually low pressure persisted through the month from off Newfoundland, east-north-east across the Atlantic then north-east through the Norwegian Sea into the Barents and Kara Seas. As a result cold north-easterly winds prevailed over the northern part of the Barents Sea, over the Greenland Sea and over sea areas off eastern North America where the main excesses occurred, especially in the Greenland Sea. Relatively mild south-westerly winds prevailed over the sea areas around north-west Europe, resulting in a general ice deficit in this region.

Canadian Arctic Archipelago, Foxe Basin, Baffin Bay, Hudson Bay and Strait. As usual, the whole region remained covered by close pack-ice or fast ice.

Davis Strait, Labrador Sea, Grand Banks, River and Gulf of St. Lawrence. Cold winds from a northerly point affected the region for most of the month, resulting in air and sea temperatures falling to a little below normal. Ice conditions were near normal or slightly excessive over the northern areas and slightly deficient in the southern areas.

Greenland Sea and Barents Sea. The main excess occurred in this region. Cold north-easterly winds persisted and, as a result, air temperatures fell to 5 degC below normal in some parts of the Greenland Sea and 7 degC below normal over some northern parts of the Barents Sea. To the north-east of Iceland the edge of close pack-ice was located about 130 miles beyond normal, to the north-east of Jan Mayen 150–200 miles beyond, and near Bear Island the edge was about 80 miles south-west of its average position. Over the southern part of the Barents Sea the cold north-easterlies were replaced toward the end of the month by relatively mild south-westerly winds, resulting in air temperatures, previously 10 degC below, rising to 4 degC above normal. The ice situation here was near normal.

White Sea, Baltic and North Sea. Warm winds from the south-west quadrant prevailed over the whole region and, as a result, air temperatures everywhere were well above average; over the White Sea the positive anomaly was about 10 degC. In this area the south-westerlies were sufficiently strong to open up wide polynyas off windward coasts. In the White Sea and Baltic there was less ice than normal. At this time there is usually a little new ice on the German and Dutch North Sea coasts but at the end of this month this area was ice-free.

FEBRUARY

The mean monthly pressure pattern indicated a low pressure area to the south-west of Iceland and a ridge of high pressure over Greenland; the resultant winds were from a northerly point over areas of west longitude and from a southerly point over areas to the east of the Greenwich meridian. As a consequence the main ice excesses were located over the former areas while the eastern areas were generally deficient in ice.

Table 1. Icebergs sighted by aircraft and merchant ships within latitudes 40°N–65°N and longitudes 40°W–65°W

(This does not include growlers or radar echoes)

Limits of Latitude and Longitude		Degrees North and West												
		66	64	62	60	58	56	54	52	50	48	46	44	42
Number of bergs reported south of limit	Jan.	> 13	> 13	> 10	> 4	0	0	0	0	0	0	0	0	0
	Feb.	> 68	> 68	> 68	> 68	> 68	> 68	> 68	53	1	0	0	0	0
	Mar.	> 32	> 32	> 24	> 15	> 15	> 15	> 15	> 15	> 9	> 5	0	0	0
	Total	> 113	> 113	> 102	> 87	> 83	> 83	> 83	> 68	> 10	> 5	0	0	0
Number of bergs reported east of limit	Jan.	> 13	> 13	> 13	> 13	> 13	> 13	> 13	> 10	> 9	> 6	2	2	2
	Feb.	> 68	> 68	> 68	> 68	> 68	> 68	> 68	> 64	45	1	0	0	0
	Mar.	> 32	> 32	> 32	> 32	> 32	> 32	> 32	> 31	> 20	> 12	0	0	0
	Total	> 113	> 113	> 113	> 113	> 113	> 113	> 113	> 105	> 74	> 19	2	2	2
Extreme southern limit	Jan.	59° 00′N, 46° 54′W on 15.1.71												
	Feb.	48° 43′N, 47° 15′W on 25.2.71												
	Mar.	47° 10′N, 47° 16′W on 8.3.71												
Extreme eastern limit	Jan.	60° 00′N, 40° 00′W on 3.1.71												
	Feb.	48° 43′N, 47° 15′W on 25.2.71												
	Mar.	47° 52′N, 46° 20′W on 7.3.71												

> ('greater than') has been inserted where there is some doubt as to the actual number of icebergs at some of the sightings, but the true value is probably greater than the value given.
Extreme limits during the 3-month period are underlined.

Canadian Arctic Archipelago, Foxe Basin, Baffin Bay, Hudson Bay and Strait. Apart from short-lived shore and flaw leads these areas remained covered by close pack-ice or fast ice.

Davis Strait, Labrador Sea and Grand Banks. Moderate north to north-west winds prevailed and temperatures fell to around 8 degC below normal in the north and 5 degC below in the south. The edge of close pack thus made a considerable advance and by the end of the month lay from 62½°N on the coast of Greenland westwards to 57°W where it curved south-west and later south-east through 60°N, 60°W, continuing south-eastwards to 51°N, 49°W. At this point it recurved westwards to approach the east coast of Newfoundland near Conception Bay and then turned north-west to lie parallel to the coast, at some 5–10 miles in the offing, before eventually closing it at the western entrance to White Bay. Off south-west Greenland the edge was about 240 miles south of normal; in the south, though the southern limit was close to normal, the eastern edge was about 60 miles east of its normal position.

South Newfoundland, River and Gulf of St. Lawrence. Winds were light and variable, resulting in near average temperatures and a normal ice distribution. Open water existed on the north-eastern side of the Cabot Strait and in a belt 10–30 miles wide along the west coast of Newfoundland, terminating at St. John Bay; otherwise, apart from some small open-water areas in the lee of some islands, the area was covered by close pack-ice which extended through the Cabot Strait and along the south-east coast of Cape Breton Island as far as the vicinity of Madame Island.

Greenland Sea and South-east Greenland. Winds from a northerly point prevailed for most of the month but were replaced latterly over the area north of 65°N by southerlies in the far north and easterlies closer to Iceland. In the far north, beyond 75°N, air temperatures recovered from about 7 degC below to 6 degC above normal. The ice edge lay from north-west Spitsbergen south-westward to 75°N, 5°W where it turned eastwards to pass through 74°N, 5°E before recurving south-westwards through the Denmark Strait at about 40 miles from Straumnes. It then meandered south-westward and later south-south-westwards enclosing a belt of close pack-ice about 30 to 50 miles wide along the south-east coast of Greenland. The edge continued south-south-west to 58½°N, 42½°W before curving north-west and later east at 60°N to meet the coast near Cape Farewell. Over the whole area there was more ice than normal.

Barents Sea and White Sea. In the north, cold south-easterly winds were replaced by mild south-westerlies and air temperatures rose to as much as 6 degC above average, while in the south south-easterlies replaced south-westerly winds resulting in considerable cooling; in the White Sea the air temperature fell from around 3 degC above to 10 degC below normal. The excess in the north was thus removed and by the end of the month a deficit occurred especially in the east where the edge was located about 100 miles north of its normal position.

In contrast, a deficit was cancelled in the south as the cooling in this area restored the ice situation to near normal. The west coast of Spitsbergen was enclosed by a 20-mile-wide belt of close pack-ice, the seaward edge continuing south-south-east to Bear Island where it turned east-north-eastwards to 76°N, 50°E. Here it turned southward to 70°N where it recurved south-westwards to temporarily close the coast at Mys Kanin Nos before continuing south-west to meet the coast of Kol'skiy Poluostrov near Pulon'ga, enclosing Mezenskiy Zaliv and the White Sea.

Baltic. Westerly winds gave way to cold easterlies resulting in air temperatures falling from 5 degC above to 7 degC below normal in the Gulf of Bothnia, with a little less cooling elsewhere. This gulf was covered by new ice and, further north, close pack-ice with some coastal fast ice, apart from an area of open water in the central southern part. The Gulfs of Finland and Riga were covered by new ice and some close pack-ice, while the Baltic Sea was ice-free apart from some fast ice in sheltered coastal waterways. Over the whole area there was generally less ice than normal.

Kattegat and North Sea. Once again mild westerly winds were replaced by cold south-easterlies and, though temperatures fell to normal, no ice was reported in these areas. There is normally a little ice in places in the Kattegat and along the German and Dutch North Sea coasts at this time.

March

Depression tracks from the main low pressure area near Newfoundland extended north-eastwards to pass south of Iceland and either continued north-eastwards into the Barents Sea or turned south-east into the southern Baltic. The main high pressure centre was located near north Greenland with a ridge extending southwards along the length of Greenland and another into central Canada. As a consequence of this pattern, winds were variable over areas to the east of Greenland and here temperatures and ice conditions returned to near normal, while over most areas of west longitude winds from a northerly point maintained a generally excessive ice condition.

Canadian Arctic Archipelago, Foxe Basin, Baffin Bay, Hudson Bay and Strait. The first signs of spring break-up were observed by satellite this month. In the west a wide lead opened up in Amundsen Gulf while at the head of Baffin Bay the North Water was easily observed. Flaw and shore leads, especially on the eastern sides of the more southerly areas, became wider. However, apart from those relatively small open-water areas, the whole region, as normal, was covered by close pack or fast ice.

Davis Strait, Labrador Sea and Grand Banks. Moderate north-easterly winds prevailed over the greater part of the area though in the extreme south these winds backed to westerly around the Newfoundland low pressure area. In the north air temperatures were a little below average and here ice conditions were generally excessive, whereas in the south temperatures were near average and there was a small ice deficit. The ice edge on the Greenland side of the Davis Strait retreated to Egedesminde and the southern edge off Newfoundland retreated northward to 50½°N, otherwise the edge lay close to the February position. In the Davis Strait the edge was about 50 miles south-east of normal and in the south, although the eastward edge was 100 miles east of normal, the southern edge was 150 miles northward of its average position.

Off south-west Greenland a belt of close pack-ice rounded Cape Farewell and extended westwards to Julianehaab. Outside of this belt, the edge of open pack-ice reached southwards to almost 59°N and north-westwards, in a belt 50 miles wide, itself 50 miles off shore, to 62½°N, 52°W. There was a slight excess in this region.

South Newfoundland, River and Gulf of St. Lawrence. Relatively mild Atlantic air circulating around the Newfoundland low affected these areas throughout the month, resulting in above-average air and sea temperatures and, as a consequence, less ice than normal. In the south an area of close pack-ice linked Prince Edward Island to the Magdalen Islands and continued eastwards, as open pack-ice, to the north-west coast of Cape Breton Island. From here a narrow belt of very open pack-ice extended south-eastwards through the middle of the Cabot Strait to 46½°N, 59°W. Close pack-ice from the Labrador Sea bridged the Strait of Belle Isle; otherwise the river up to Quebec and the Gulf were ice-free.

Greenland Sea and South-east Greenland. North-easterly winds predominated and air temperatures fell to about 2 degC below normal. In the far north, although the ice edge between Spitsbergen and the Greenwich meridian retreated about 70 miles, the bulge at about 74°N advanced eastwards to 8°E, about 200 miles east of normal. From Jan Mayen south-westwards to Cape Farewell the edge lay close to the February position. Once again, therefore, there was an ice excess over the region, especially north of the Denmark Strait.

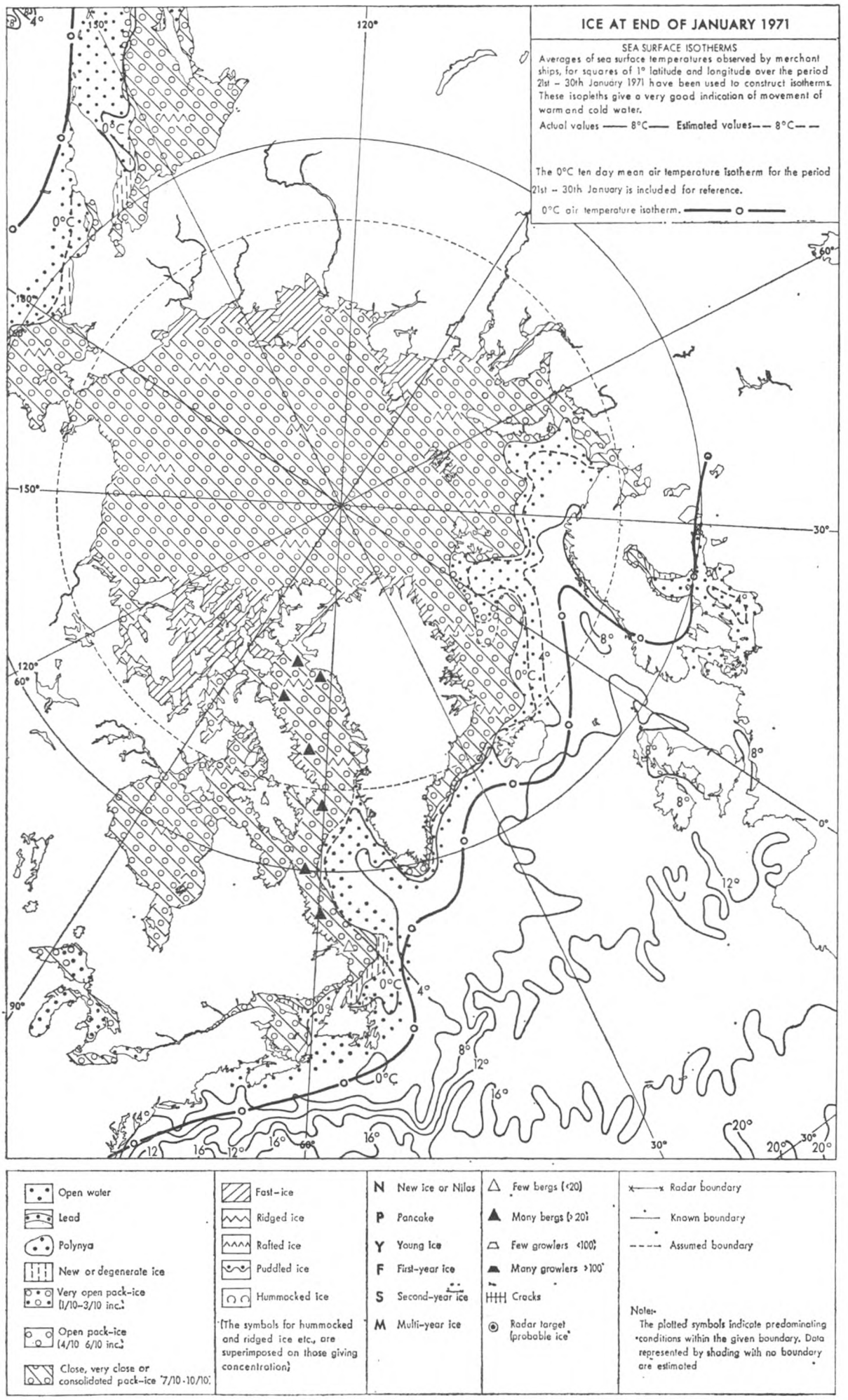
Table 2. Baltic Ice Summary: January–March 1971

No ice was reported at the following stations during the period: Goteborg, Visby, Kiel, Flensburg, Aarhus, Copenhagen, Oslo, Kristiansandfjord.

Station	January									February									March								
	Length of Season		Ice Days			Navigation Conditions			Accumulated Degree Days	Length of Season		Ice Days			Navigation Conditions			Accumulated Degree Days	Length of Season		Ice Days			Navigation Conditions			Accumulated Degree Days
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Leningrad	1	31	29	25	0	5	22	0	274	1	28	28	23	2	9	19	0	530	1	31	31	31	0	3	28	0	677
Riga	1	13	10	4	0	5	0	0	135	10	28	10	5	0	5	0	0	202	1	31	18	17	0	10	8	0	294
Pyarnu	1	31	26	26	0	0	26	0	134	1	28	28	28	0	0	28	0	233	1	31	31	31	0	0	31	0	363
Viborg	1	31	29	29	0	1	28	0	—	1	28	28	28	0	0	9	19	—	1	31	31	31	0	0	0	31	—
Klaipeda	6	21	11	0	0	8	0	0	66	10	23	12	0	2	8	0	0	82	2	22	14	0	0	13	0	0	130
Ventspils	0	0	0	0	0	0	0	0	—	10	28	4	0	0	0	0	0	—	1	31	14	0	0	3	0	0	—
Tallin	0	0	0	0	0	0	0	0	—	23	28	6	0	0	6	0	0	—	1	31	31	0	25	0	31	0	—
Helsinki	1	31	22	5	0	11	0	0	183	8	28	21	8	0	15	4	0	380	1	31	31	31	0	0	31	0	529
Mariehamn ..	0	0	0	0	0	0	0	0	87	0	0	0	0	0	0	0	0	183	2	31	27	20	2	23	0	0	303
W. Norrskar ..	6	31	4	0	0	0	0	0	—	2	28	15	0	4	6	4	0	—	1	31	31	2	18	8	23	0	—
Turku	1	31	12	5	0	8	0	0	161	1	28	17	3	0	9	0	0	317	1	31	31	31	0	11	20	0	457
Mantyluoto ..	5	31	21	0	0	7	12	0	—	1	28	18	0	0	8	5	0	—	1	28	28	25	0	3	25	0	—
Vaasa	1	31	31	31	0	0	31	0	285	1	28	28	28	0	0	27	1	512	1	31	31	31	0	0	31	0	703
Oulu	1	31	31	31	0	0	31	0	508	1	28	28	28	0	0	28	0	807	1	31	31	31	0	0	31	0	1092
Roytaa	1	31	31	5	23	2	29	0	—	1	28	28	27	0	0	28	0	—	1	31	31	31	0	0	31	0	—
Lulea	1	31	31	31	0	0	31	0	661	1	28	28	27	0	0	28	0	956	1	31	31	31	0	0	31	0	1248
Bredskar	2	31	21	2	0	19	0	0	—	1	28	21	9	0	15	6	0	—	1	31	31	8	0	23	8	0	—
Alnosund	1	31	24	8	0	24	0	0	200	1	28	20	10	0	18	0	0	295	1	31	31	30	0	30	1	0	413
Stockholm ..	1	31	31	10	0	10	0	0	103	1	28	28	0	0	0	0	0	150	1	31	31	22	3	27	4	0	208
Kalmar	2	7	6	2	0	6	0	0	70	0	0	0	0	0	0	0	0	57	1	24	24	0	19	24	0	0	89
Skellefteå	1	31	31	22	3	5	23	0	—	1	28	25	24	0	6	19	0	—	1	31	31	31	0	0	31	0	—
Tönning	5	22	18	5	8	11	0	5	—	0	0	0	0	0	0	0	0	—	3	5	3	1	0	1	0	0	—
Husum	5	19	15	4	5	13	0	0	—	0	0	0	0	0	0	0	0	—	4	5	2	0	0	0	0	0	—
Emden	5	17	13	0	0	13	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Lübeck	5	15	11	0	0	5	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Gluckstad	5	21	17	0	2	17	0	0	—	0	0	0	0	0	0	0	0	—	5	5	1	0	0	0	0	0	—
Bremerhaven ..	5	10	6	3	0	6	0	0	—	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—
Stettin	4	31	19	12	0	19	0	0	—	1	1	1	0	0	1	0	0	—	3	7	5	0	0	5	0	0	—
Gdansk	13	13	1	0	0	0	0	0	—	0	0	0	0	0	0	0	0	—	4	5	2	0	0	0	0	0	—

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

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


ICE AT END OF JANUARY 1971
SEA SURFACE ISOTHERMS
Averages of sea surface temperatures observed by merchant ships, for squares of 1° latitude and longitude over the period 21st – 30th January 1971 have been used to construct isotherms. These isopleths give a very good indication of movement of warm and cold water.
Actual values —— 8°C —— Estimated values—— 8°C——
The 0°C ten day mean air temperature isotherm for the period 21st – 30th January is included for reference.
0°C air temperature isotherm.
Open water
Lead
Polynya
New or degenerate ice
Very open pack-ice (1/10–3/10 inc.)
Open pack-ice (4/10 6/10 inc.)
Close, very close or consolidated pack-ice (7/10-10/10)
Fast-ice
Ridged ice
Rafted ice
Puddled ice
Hummocked ice
(The symbols for hummocked and ridged ice etc., are superimposed on those giving concentration)
N New ice or Nilas
P Pancake
Y Young ice
F First-year ice
S Second-year ice
M Multi-year ice
Few bergs (<20)
Many bergs (>20)
Few growlers <100)
Many growlers >100
Cracks
Radar target (probable ice)
Radar boundary
Known boundary
Assumed boundary
Notes-
The plotted symbols indicate predominating conditions within the given boundary. Data represented by shading with no boundary are estimated

Barents Sea, White Sea and Baltic. Due to the cyclonic activity over the whole region winds were variable throughout the month and air temperature slowly returned to near normal. The belt of close pack-ice on the west coast of Spitsbergen increased to become 40 miles wide, otherwise the ice edge lay close to the position described for February as far as 76°N, 50°E. Here it briefly turned northwards to 77°N before continuing eastwards to the northern tip of Novaya Zemlya. In the south-east a large area of close pack-ice was bounded by a line from 68°N, 41°E, north-east to 70°N, 50°E, then north and later north-north-east to 75½°N on the west coast of Novaya Zemlya. The area north-eastward of a line from this point to 76°N, 50°E contained very open pack-ice. Within the south-eastern area of close pack-ice there were more broken ice conditions in the approaches to Arkhangel'sk, around Poluostrov Kanin and along the coast eastward of Mys Russkiy Zavarot. In the north-west, near Bear Island, ice conditions were excessive, but in the north-east the ice edge had retreated as far as 150 miles back from normal; in the south-east the ice situation was near normal.

In the Baltic, fast-ice enclosed all coasts of the Gulfs of Bothnia and Finland. In the former, close pack-ice covered the remaining area at the head of the gulf, while in the south of this gulf the concentration of ice cover gradually decreased from close pack in the west to open water in the east. Belts of close pack-ice filled the central portions of the Gulfs of Finland and Riga. The Baltic Sea and areas further west were ice-free apart from a narrow belt of fast-ice along the east coast of Sweden southward to 56°N. In the Gulf of Bothnia ice conditions were a little excessive whereas in the Baltic Sea there was a slight deficit.

R. M. S.

Note. The notes in this article are based on information plotted on ice charts similar to the map shown opposite but on a much larger scale (39 in × 27 in). These charts are published at ten-day intervals and are available at the price of reproduction on application to the Director-General, Meteorological Office (Met.O.10a, D.W.R.), London Road, Bracknell, Berks. Alternatively, they may be seen at any Port Meteorological Office or Merchant Navy Agency. Up-to-date ice charts are broadcast daily by facsimile.

AUSTRALIAN EXCELLENCE AWARDS

(From the Director of Meteorology, Commonwealth Bureau of Meteorology, Australia)

The following ships and ships' officers were selected to receive Excellence Awards for 1969:

SHIP AWARDS

m.v. *Dongara*, Western Australian State Shipping Service
m.v. *Rona*, Colonial Sugar Refining Co. Ltd.
m.v. *Stentor*, Ocean Fleets Ltd.

PERSONAL AWARDS

Captain J. Plant	m.v. *Cathay*, Eastern & Australian S.S. Co. Ltd.
Mr. M. Hayter	Radio Operator, s.s. *Arafura*, Eastern & Australian S.S. Co. Ltd.
Mr. E. Rowlands	3rd Officer, m.v. *Empress of Australia*, Australian National Line
Mr. A. Colquhoun	Radio Operator, m.v. *Rosie D.*, Nauru Pacific Shipping Line
Mr. P. J. Weaver	2nd Officer, m.v. *Rosie D.*, Nauru Pacific Shipping Line
Mr. R. M. H. Syvrat	3rd Officer, m.v. *Chakrata*, British India S.N. Co. Ltd.
Captain E. Brown	m.v. *Dongara*, Western Australian State Shipping Service
Mr. B. Dunscombe	Radio Operator, m.v. *Dongara*, Western Australian State Shipping Service
Mr. J. S. Wallis	2nd Officer, m.v. *Triadic*, British Phosphate Commissioners

INDIAN EXCELLENT AWARDS

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

During the year ended 31st March 1970 the Indian Voluntary Observing Fleet (consisting of 49 Selected, 94 Supplementary and 6 Auxiliary ships) rendered commendable service to the Meteorological Department, and to world meteorology in general, by recording and transmitting valuable meteorological observations purely on a voluntary basis. During the year 1,858 logs consisting of 20,857 meteorological observations were received in the Department from ships.

The weather observations recorded and transmitted by these ships were of great value in the day-to-day forecasting work of the Department and, in particular, for issuing warnings to ships. The Department wishes to convey its thanks to all Captains and Officers of the Voluntary Observing Fleet and the respective shipowners who have co-operated during the year.

As in the past, the log sheets received from these ships have been scrutinized and an annual assessment made in respect of accuracy of observations recorded (making due allowance for the number of days at sea by individual ships). Consideration was also given to the transmission of observations and to the general upkeep of meteorological instruments on board. On the basis of these assessments, the work of the following ships, in order of merit, has been adjudged the best for the year 1969–70:

Name of Vessel	Owner
State of Haryana	Shipping Corporation of India Ltd.
Sirdhana ..	British India S.N. Co. Ltd.
Kampala ..	British India S.N. Co. Ltd.
Karanja	British India S.N. Co. Ltd.
Vishva Maya ..	Shipping Corporation of India Ltd.
Jalapankhi ..	Scindia S.N. Co. Ltd.
Bahadur ..	Asiatic S.N. Co. Ltd.
Rajula	British India S.N. Co. Ltd.
Mozaffari ..	Mogul Line Ltd.
Vishva Vijaya ..	Shipping Corporation of India Ltd.
Jalavihar ..	Scindia S.N. Co. Ltd.
Indian Security ..	India S.S. Co. Ltd.

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

Desh Bandhu	*Jalapalaka*	*State of Orissa*
Dumra	*Mohammedi*	*Vishva Prem*
Jag Laxmi	*State of Kerala*	*Vishva Sudha*
Jagat Neta	*State of Kutch*	*Vishva Usha*
Jalagovind	*State of Madhya Pradesh*	*Vishva Vibhuti*
Jalakendra		

Book Review

Swatchways and Little Ships, by Maurice Griffiths. $8\frac{3}{4} \times 5\frac{3}{4}$ in, pp. 192, *illus.* George Allen & Unwin Ltd., Park Lane, Hemel Hempstead, Herts., 1971. Price: £2.75.

This book is an account of some of the yachting experiences of a man who is as well known as the designer of several shoal-draught yachts as he is as the editor, until lately, of *Yachting Monthly*. It takes us through his sailing career from the young novice who learnt to sail "at the best of all schools—a boat of one's own",

when most yachts were gaff-rigged cutters with long bow-sprits and few had auxiliary motors, to the present-day accomplished yacht designer.

Most of the cruising yarns refer to the author's happy sailing grounds—the East Anglian coast and estuaries from the Thames to Lowestoft, with their off-lying banks, channels and swatchways (the shallow channels running across sandbanks). He cruised these waters in a great variety of little ships, in lee-board barges, in shallow-draught smacks, in yachts with deep-keels, with bilge keels or with centre-boards. Occasionally the scene is changed to other regions—across the North Sea for a breezy return from the Dutch coast, or along the length of the east coast in the war years (under steam in trawlers), an aborted attempt at the Fastnet Race with Conor O'Brien in *Saoirse* and to the other side of the Atlantic during the 1937 America's Cup series.

With this experience the author was admirably qualified to enter the field of design where he has become a successful designer of shoal-draught yachts, the best known of those being the 'Eventide' range. His design of larger cruising yachts is developed around two main considerations, namely, the ability to sit upright on the mud (when required so to do) and, through a long ballast-keel, the ability to 'sail herself'—the latter being of prime importance to the single- or short-handed cruising man.

The book is so well written and illustrated that it will be of interest to a great variety of readers, but its main appeal will be to the yachtsman. The novice will glean considerable instruction on lee-bowing the tide, on working the tides, on lying-to in the lee of sand-banks in rough weather, on tacking long-keel yachts and many other aspects of little-ship seamanship. The experienced yachtsman will find special interest in the discussions of the merits of the various types of shoal-draught yachts, while the self-retired 'armchair sailor' will derive much pleasure from the interesting and sometimes amusing yarns. It may also appeal to the big-ship mariner who may well be surprised at the skill which some little-ship men display in handling their yachts in confined waters under adverse conditions.

R. M. S.

Personalities

OBITUARY.—We regret to record the death of CAPTAIN A. STARMER, Commodore of Manchester Liners, who died at sea five days after leaving England on the maiden voyage of the Company's latest container ship, the *Manchester Quest*.

Albert Starmer first went to sea as an apprentice with Manchester Liners in 1928 and obtained his 2nd Mate's Certificate in 1933 and was appointed 3rd Officer of the *Manchester Hero*. Promotion to Chief Officer came in July 1942 and he obtained his first command in 1945 when he was appointed Master of the *Manchester Trader*. Since then he has acquired a long list of 'firsts'. In 1952 he took the first small ship, the *Manchester Pioneer*, up the Great Lakes; in 1955 he commanded the first English vessel to sail into Chicago; in 1959 he took the first of the big ships, the *Manchester City*, up the Great Lakes and in the same year he was the first Master to enter Lake Superior and get to the head of the Lakes. Truly a pioneer of the now very successful Great Lakes trade.

At the outbreak of World War II Captain Starmer served on convoy duty in the Atlantic and Indian Oceans. He also carried out mine-laying off the coast of Iceland.

Captain Starmer forwarded his first meteorological logbook in 1937 and in 21 years of observing had forwarded 49 logbooks; he received an Excellent Award in 1963.

We extend our sincere sympathy to his widow and two children.

E. R. P.

Fleet Lists

GREAT BRITAIN (Information dated 31.3.71)

The following is a list of British ships which have been equipped with instruments and which voluntarily co-operate with the Marine Division of the Meteorological Office.

The names of the Captains, Observing Officers and Senior Radio Officers are given as ascertained from the last written returns received. The date of receipt of the last return received is given in the second column; an asterisk indicates a new recruitment who has not yet sent in a logbook

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

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

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

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

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

Selected Ships

Name of Vessel	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Achilles	15.3.71	D. R. Hayward	R. J. Parham, B. M. Thorne, T. P. Dodkins	W. S. Young	Ocean Fleets Ltd.
Act 1	11.3.71	K. B. James	C. N. Bates, W. A. MacRitchie, P. W. Hutchinson	J. Maulkin	Associated Container Transportation Ltd.
Act 2	*	D. McPhail	J. S. Pottinger, J. Brett, A. S. Frost	D. Owen	Associated Container Transportation Ltd.
Adelaide Star	29.5.70	G. Ferriday	J. M. Luxton, J. Rendle, T. Wilson	W. Wade	Blue Star Line Ltd.
Adventurer	7.8.70	A. Moreton, M.B.E.	J. Northam, J. Maddison, D. Farrel	P. C. Bigwood	T. & J. Harrison Ltd.
Advocate	*	J. F. Ashbridge	F. Garfit, S. Halleem	J. Stringfellow	Hain-Nourse Ltd.
Afghanistan	5.10.70	H. A. Tinwell		H. Morgan	Common Bros. Ltd.
Ajax	7.12.70	J. Fisher	P. R. N. Richmond, K. J. Owen, N. F. Smith	B. L. Drake	Ocean Fleets Ltd.
Akaroa	28.8.70	B. A. Hills	P. C. Fry, P. R. Ginzler, D. A. Kett	B. McGovern	Shaw Savill & Albion Co. Ltd.
Alaric	26.10.70	T. R. Barton			Shaw Savill & Albion Co. Ltd.
Albright Explorer	29.6.70	J. Wood	R. Phillips	W. M. P. Edmunds	James Fisher & Sons Ltd.
Albright Pioneer	4.12.70	J. Wood	J. S. Northcott, J. B. Ricketts, J. S. Jones, H. Towers	W. D. Brown	James Fisher & Sons Ltd.
Alert	10.2.70	J. P. Ruddock, O.B.E.			Post Office
Alinda	28.7.69	D. Cooper	D. F. Cammish, D. B. Travis, G. O. Okaroh	A. Bevan	Shell Tankers (U.K.) Ltd.
Amalric	5.5.69	P. K. Murchison	M. I. C. Kempston, D. Arnoll, R. Bayliss, R. Hodgkinson	B. A. Montrose	Shaw Savill & Albion Co. Ltd.
Amarna	29.12.70	R. D. Leckie	S. Venner, J. McCormack, R. Hodgkinson, I. McAllister	J. Lamb	Moss Hutchison Line Ltd.
Amastra	21.8.70	T. G. Wormald			Shell Tankers (U.K.) Ltd.
Amoria	30.9.70	A. L. Dales	R. J. Payn, G. D. Hall		Shell Tankers (U.K.) Ltd.
Anadara	17.9.70	H. I. Jones	J. L. Ross, H. J. Tibbs, R. I. Ward	J. M. Pass	Shell Tankers (U.K.) Ltd.
Andes	20.12.70	J. Fox	B. M. Watmore, M. Dale, J. Ramsey	J. Hands	Royal Mail Lines Ltd.
Annuity	6.1.71	D. G. Munro	J. A. Campbell, I. L. Clemson		F. T. Everard & Sons Ltd.
Antilochus	*	F. J. Squires	A. B. Thomas, D. J. Hill, W. Fleming	R. D. Cause	Ocean Fleets Ltd.
Antrim	12.3.71	J. F. Holder	R. G. E. Lawrence, F. E. Spicer, A. Goble	A. S. Gorbold	Avenue S.S. Co. Ltd.

Araluen	15.3.71	F. J. Adams	P. Thackstone, P. Thomas, S. Bence	G. Gleeson	Trinder Anderson & Co. Ltd.
Aranda	8.3.71	G. Heywood	D. J. Stansbury, D. Stewart-Taylor, T. Noonan, A. Webber	J. Mennell	Shaw Savill & Albion Co. Ltd.
Arawa	18.1.71	W. Murison			Shaw Savill & Albion Co. Ltd.
Argentina Star	28.10.70	H. W. McNeil	R. E. T. Sneeden, P. F. Jepson, J. Wilson, —. Thomson	C. J. Beckett	Blue Star Line Ltd.
Argyllshire	12.5.70	H. T. D. Lockyer	A. H. Fussell, J. Isbester, A. Ching	W. Saville	Clan Line Steamers Ltd.
Armadale	15.3.71	R. J. Ogilvy	G. Mortimer, E. G. Marshall, R. P. Culligan, A. D. Goble	D. J. Whitaker	Trinder Anderson & Co. Ltd.
Armanistan	4.1.71	F. W. A. Filcek	S. N. Paulus, C. E. J. Simmons, G. A. Turner	N. E. Scott	Frank C. Strick & Co. Ltd.
Asprella	19.10.70	J. Forsyth	I. N. Conabeare, H. R. Hallet, M. R. Dixon, G. C. Oji	M. Kennedy	Shell Tankers (U.K.) Ltd.
Astyanax	30.3.71	L. H. Pound	T. W. Boyd, R. C. Middleton, A. D. S. Sinnema	D. H. Storar	Ocean Fleets Ltd.
Athelchief	30.7.70	S. Hill	R. Ridge, T. Cheney, K. Greendale	W. S. Healy	Athel Line Ltd.
Athelcrest	26.3.71	R. Gray	C. Stockdale	R. Bromham	Athel Line Ltd.
Atlantic Causeway	29.12.70	G. Buckley	M. Ramsay, C. R. L. Rankin, D. J. Hampson, H. V. Anguish		Cunard-Brocklebank Ltd.
Atlantic Conveyer	24.3.71	B. L. O'Brien	G. M. Grainger, R. G. Livingstone, C. Allport	M. G. MacLean	Cunard-Brocklebank Ltd.
Auckland Star	12.1.71	P. W. Hunt	K. F. Connel, P. Daniels, E. G. J. Wilson	W. J. Redfern	Blue Star Line Ltd.
Aureol	2.11.70	R. G. Williams	R. Grant, I. Valentine, B. E. M. Thomas, J. Hannath	J. C. Noonan	Ocean Fleets Ltd.
Australia Star	30.11.70	R. Brownbill	J. Latka, R. Young, W. Horgan	J. P. Stephenson	Blue Star Line Ltd.
Australind	3.12.70	N. Luck	K. J. Higgs, A. Murray, H. Mann	D. N. Barlow	Trinder Anderson & Co. Ltd.
Author	16.7.70	G. A. Cain	M. J. Hardcastle, J. R. Willan, B. R. Cox	J. Nicolson	T. & J. Harrison Ltd.
Baharistan	26.2.71	M. H. Wilson	D. P. Ploughman, D. P. Hawkins, D. E. Walshe	J. H. Fitzgerald	Frank C. Strick & Co. Ltd.
Baltic Sun	13.8.70	C. E. Thomson	G. S. Brazendale, J. Parker, G. Poppe, P. Green	R. G. Woof	United Baltic Corporation Ltd.
Baltistan	14.12.70	N. Wray	D. W. Parke, A. C. McCulloch		Frank C. Strick & Co. Ltd.
Bamburgh Castle	29.6.70	D. A. B. Walker	K. Wilcox, R. Murdy, D. Newham, J. W. Smith	P. A. Ryan	W. A. Souter & Co. Ltd.
Bankura	11.1.71	G. B. Thompson	G. D. Wood, J. W. A. Tanner, R. Dunne	L. V. O'Sullivan	British India S.N. Co. Ltd.
Baron Cawdor	1.10.70	A. M. Fraser	T. R. K. Walker, T. L. Kemp, J. Peterson, R. S. Duncan	J. Thomson	Scottish Ship Management Ltd.
Baron Renfrew	*	J. Tattersall	M. Pickup, R. Duncan, I. Teale	D. Hynd	Scottish Ship Management Ltd.
Barrister	19.10.70	F. H. Curry			T. & J. Harrison Ltd.
Beaverelm	15.3.71	D. L. Burt	P. Baxter, J. Findlay, R. Horth, I. H. Mathieson	J. Godfrey	Canadian Pacific Steamships Ltd.
Beaverfir	15.2.71	M. H. Scott	R. S. Bradbury, M. S. W. Humphrey, J. Moynet	J. G. Adams	Canadian Pacific Steamships Ltd.
Beaverpine	30.3.71	T. Parker	P. C. M. Adair	J. W. Barrie	Canadian Pacific Steamships Ltd.
Beechbank	*	J. A. Appleby	T. D. Faithful, F. Hunter, C. J. W. Armstrong		Bank Line Ltd.
Beechwood	19.3.71	J. G. Cunningham			John I. Jacobs & Co. Ltd.
Bellnes	*	J. G. Stewart	S. Larcombe, R. McCleery, R. Harper	V. Ring	Tenax S.S. Co. Ltd.
Benalbanach	7.1.71	D. S. Sinclair	A. Skelton, D. A. Graham, M. D. McDonald	C. A. Page	Ben Line Steamers Ltd.
Benalligin	15.3.71	T. Fyfe	W. E. Van Geyzel, D. Robinson, W. D. Rutland	S. Latham	Ben Line Steamers Ltd.
Benarmin	18.12.70	J. C. Allan	J. N. Nash, H. B. Blain, J. Furey	J. W. Kenny	Ben Line Steamers Ltd.
Benarty	29.12.70	A. Sinclair	A. I. MacFeate, D. C. MacDonald, B. D. Jones	A. D. Delaney	Ben Line Steamers Ltd.
Benattow	27.11.70	A. S. Hamilton	I. M. Lindsay, P. C. Thompson, D. F. Machin	J. Kwiatkowski	Ben Line Steamers Ltd.
Bencairn	3.3.71	R. McPhee	C. M. Legg, I. Greig, I. Aitchison	D. C. Simon	Ben Line Steamers Ltd.
Bencleuch	15.3.71	R. Dick	T. Wills, S. W. Macdonald, C. S. Mackay	J. J. Daly	Ben Line Steamers Ltd.
Bencruachan	7.12.70	K. H. Hardie	R. H. Lewis, R. G. N. Aiken, A. H. Macklin	R. Sadler	Ben Line Steamers Ltd.
Benhope	11.2.71	G. Reid	A. A. McCulloch, W. M. Kay, R. Cawthorne	G. W. Dickson	Ben Line Steamers Ltd.
Benkitlan	6.1.71	M. P. Tennant	M. E. Harris, D. M. McCallum, J. M. Groat	J. D. Hearne	Ben Line Steamers Ltd.
Benlawers	16.2.71	W. D. Cowie	R. I. Roberts, D. J. Nesbit, W. Sinclair	H. E. Brookfield	Ben Line Steamers Ltd.
Benledi	*	O. Tucker	A. H. Glen, P. G. Edgar, W. J. Lindsay	H. B. Hughes	Ben Line Steamers Ltd.
Benlomond	13.1.71	C. Donnelly	P. A. Smith, R. Arkless, C. R. Aitchison	P. Mannion	Ben Line Steamers Ltd.
Benreoch	22.3.71	A. D. Hay	D. W. Ross, D. I. Leece, P. I. Ewart	J. Gilhooly	Ben Line Steamers Ltd.
Benrinnes	3.3.71	J. G. Adamson	G. L. MacLean, J. D. Lewthwaite, C. Mitchell	W. Parkinson	Ben Line Steamers Ltd.
Benstac	11.2.71	R. S. Lumsden	C. A. Swanson, I. Fleming, J. McPhail	W. Paterson	Ben Line Steamers Ltd.
Benvalla	19.3.71	R. Griffiths	R. A. Dewar, A. A. Davidson, A. F. Walker	F. Paterson	Ben Line Steamers Ltd.
Benvannoch	11.2.71	T. P. Barr	D. R. Breckenridge, D. M. Staff, T. Haxell	J. B. Duncan	Ben Line Steamers Ltd.
Bernard	30.3.71	J. Souter	J. G. Prebble, T. Meagher, P. Harris	R. D. Dingley	Booth S.S. Co. Ltd.
Bhamo	12.3.71	J. Banna	N. G. Price, J. Geddie	R. McMilan	Ocean Fleets Ltd.
Bombala	22.12.70	D. A. C. Windle	G. I. Goodanew, M. D. Cotsford, D. Everett, R. M. Speller	M. A. Seymour	British India S.N. Co. Ltd.
Boniface	30.10.70	E. D. Spooner	D. E. Picking, —. Roy, —. Meagher		Booth S.S. Co. Ltd.

Selected Ships (*contd.*)

Name of Vessel	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Booker Vanguard	26.3.70	E. J. Jones	F. Chandler, C. H. J. Allister, P. McManus	A. P. Moss	Booker Line Ltd.
Booker Venture	29.12.70	J. A. Carter	G. R. Calderbank, A. H. West, R. L. Radburn, E. Puddifer	A. Forbes	Booker Line Ltd.
Border Castle	3.11.70	H. Smallwood	C. Frederiksen, G. Phillips	P. Whelan	Common Bros. Ltd.
Border Shepherd	12.8.70	C. Salt	J. Weatherston, I. W. Williams, A. Y. Purvis	B. J. McLoughlin	Common Bros. Ltd.
Botany Bay	3.3.71	M. Champneys	D. J. Walker, J. K. Blackburn, P. J. R. Manson	R. B. Redhead	Container Fleets Ltd.
Brandon Priory	24.3.71	P. Saunders	C. Clark, J. Bailey, E. Trotter	C. Raper	Warwick Tankers Ltd.
Bransfield	•	T. Woodfield	N. Hill, J. P. Morgan, C. R. Elliott, B. D. Cramond	H. M. O'Gorman	British Antarctic Survey
Brasil Star	29.5.70	H. W. McNeil	P. Tann, D. J. Wadley, P. Hutchings	O. O'Shaughnessy	Blue Star Line Ltd.
British Ambassador	18.9.69	R. E. Bell	C. T. Brandon, A. R. Stewart, M. Hood, D. McElroy	R. Bradsell	B.P. Tanker Co. Ltd.
British Bombardier	4.11.70	J. H. Jones	R. H. Fletcher, R. C. Rickman, D. C. N. Jones, J. C. Scott	R. Southall	B.P. Tanker Co. Ltd.
British Confidence	22.3.71	P. Edmondson	M. J. Davis, R. V. McGeoch, I. Plummer	M. R. Trant	B.P. Tanker Co. Ltd.
British Freedom	20.12.70	C. A. Byrne	J. R. Murray, K. R. Hindmarch, S. E. Walker	P. Whelan	B.P. Tanker Co. Ltd.
British Fulmar	15.2.71	J. B. Wharrie	D. McGrail, N. Groves, D. A. Coleman	A. Taylor	B.P. Tanker Co. Ltd.
British Hero	22.3.71	M. Y. Marrs	J. H. Wright		B.P. Tanker Co. Ltd.
British Kiwi	10.3.71	F. A. Frost	R. C. Morgan, R. F. Adams, J. D. Shelley	D. E. Dale	B.P. Tanker Co. Ltd.
British Oak	29.1.71	C. Herbert	G. G. Bull, G. A. Jones, A. C. Burns, M. I. Keiller	C. S. Tod	B.P. Tanker Co. Ltd.
British Sailor	15.1.71	J. Forrest	I. T. Anderson, M. J. Searle, R. Hirons	D. C. Noble	B.P. Tanker Co. Ltd.
British Splendour	23.11.70	W. P. Budge	G. Roberts, J. A. Buchanan, R. A. Morris	P. H. Wales	B.P. Tanker Co. Ltd.
British Trust	8.9.70	B. Keer	M. Saunders, D. R. Roberts, R. N. Gardener	R. V. Kellett	B.P. Tanker Co. Ltd.
Buccleuch	16.11.70	W. Alexander	K. Kohli, R. Morris, J. A. Smeeton, R. R. Williams	I. C. G. Hare	Hain-Nourse Ltd.
Bulimba	17.6.70	F. A. Stokes	J. H. Clark, A. G. Yeats, P. Venvell	P. A. Bowen	British India S.N. Co. Ltd.
C.P. Ambassador	•	A. White	I. Matheson, R. Triggs, R. North	P. Korowski	Canadian Pacific Steamships Ltd.
C.P. Voyageur	•	P. Roberts	D. A. MacMahom, A. McGrail		Canadian Pacific Steamships Ltd.
Calchas	15.3.71	C. V. Windsor	R. G. J. Wiltshire, A. E. Longbottom, G. F. Goonwardene	I. H. Pearce	Ocean Fleets Ltd.
Caledonia Star	5.11.70	A. H. White	R. J. P. Knowles, R. Tonge, W. Williams, R. Shore	D. Donohoe	Blue Star Line Ltd.
Camito	11.2.71	A. Thomson	B. Watmore, C. Simmonds, S. Jones	G. A. Sutherland	Elders & Fyffes Ltd.
Canadian Star	15.3.71	D. Newlin	R. J. P. Knowles, J. Turner, P. Holtby, T. C. Black	D. F. O'Halloran	Blue Star Line Ltd.
Canberra Star	30.3.71	M. R. Bremberg	J. Fair, D. E. Norman, R. Shore		Blue Star Line Ltd.
Cannanore	13.11.70	C. B. Cooke	A. W. Robinson, I. Woollard, R. J. Ross	A. S. Frew	P. & O. Lines Management Ltd.
Canopic	15.3.71	C. A. S. Borthwick	A. Greenhalgh, B. R. Smith, R. Sands	R. J. Dixie	Shaw Savill & Albion Co. Ltd.
Canterbury Star	6.8.70	N. Johnson	M. T. Barwell, R. Guy, J. Lock, M. Rowley	D. C. Smith	Blue Star Line Ltd.
Cape Clear	30.12.70	J. Tattersall	A. S. Macmillan, J. W. M. King, R. G. Wiggins	P. A. Murray	Lyle Shipping Co. Ltd.
Cape Franklin	26.8.70	C. G. Mallett	P. Richardson, W. Anderson, F. R. Lanfear, J. Malcolm	B. Breslin	Lyle Shipping Co. Ltd.
Cape Howe	14.8.70	A. Mackinlay, O.B.E.	L. M. Hocking, A. Macleod, A. Weir, P. V. Flynn, A. R. Neil	D. W. Humble	Lyle Shipping Co. Ltd.
Cape Nelson	30.12.70	A. Milne	J. S. Johnstone, P. C. Mackay		Lyle Shipping Co. Ltd.
Cape Sable	30.3.71	J. Macnab	A. Weir, B. W. Lawson, D. Betts	W. Macleod	Lyle Shipping Co. Ltd.
Cape Wrath	31.12.70	T. C. D. Hogg	D. D. Taylor, M. Murray, D. Brannan	E. Miller	Lyle Shipping Co. Ltd.
Cape York	30.3.71	J. A. Roberts	R. S. Duncan, J. A. T. Melville, L. M. Hocking	C. Houston	Lyle Shipping Co. Ltd.
Cardiff City	4.5.70	D. B. Jack	G. T. Parker, D. Wootton, B. R. Hopper, J. Gordon	A. Little	Sir Wm. Reardon Smith & Sons Ltd.
Cardiganshire	20.11.70	D. M. Belk	W. R. C. Butler, A. R. Gerrard, J. W. P. Kemp	P. D. Barker	Ocean Fleets Ltd.
Carmania	7.12.70	V. K. Arbuckle	G. R. E. Yeatman, R. Dootson, P. J. Bingley, J. Nicholson	P. Y. Wright	Cunard S.S. Co. Ltd.
Carrel	•	K. Millar	W. R. Donaldson, J. Joyce, D. Macintyre	R. B. Woods	Jardine Matheson & Co. Ltd.
Carrigan Head	29.12.70	N. W. G. Walsh		E. F. Dalton	G. Heyn & Sons Ltd.
Cedric	29.12.70	J. G. Street	T. B. Miller, I. Park, R. Mallam	J. MacFarland	Shaw Savill & Albion Co. Ltd.

Ceramic	18.1.71	R. G. E. Grant	T. C. Holmes, D. Allen, G. P. Colebrook	F. E. Page, M.B.E.	Shaw Savill & Albion Co. Ltd.
Chakla	10.12.70	P. H. Bidmead			British India S.N. Co. Ltd.
Cherrywood	13.4.70	W. C. Lewis			John I. Jacobs & Co. Ltd.
Cheviot	15.3.71	J. Conn	G. R. Parker, G. D. Sandercock	P. Worcester	Bamburgh Shipping Co. Ltd.
Chindwara	11.12.70	P. M. Pitcairn	J. S. W. Dyson, H. Blaik, D. P. Hall, G. L. Pettinger	D. P. Hammond	British India S.N. Co. Ltd.
Cirolana	•	A. E. Binnington	A. R. G. Everett	N. Volland	Dept. of Agriculture & Fisheries for Scotland
City of Bedford	15.3.71	D. Brown	R. Owens, J. M. Dodworth, R. G. Hornshaw	J. J. McKenna	Ellerman Lines Ltd.
City of Birmingham	15.3.71	J. Sapp	M. G. Robson, R. M. Herring, T. R. Page	N. R. Beggs	Ellerman Lines Ltd.
City of Canberra	19.12.68	T. H. Morgan	N. C. Hall, M. J. P. Fagan, J. M. Waller	M. R. W. Sheehy	Ellerman Lines Ltd.
City of Cape Town	18.1.71	R. Frame	C. S. Collings, P. Soones, B. Borland	A. W. T. Camp	Ellerman Lines Ltd.
City of Chester	4.12.70	J. L. Blanch	D. Birley, R. V. Nock, P. Pennelier		Ellerman Lines Ltd.
City of Colombo	•	J. Owen	A. W. G. Hammond, W. E. Wright, J. Peddie	H. R. Bassford	Ellerman Lines Ltd.
City of Eastbourne	22.12.70	D. B. Williams	K. R. Luther, H. Owen, M. MacLeod, I. C. Dorse	W. O'Keefe	Ellerman Lines Ltd.
City of Exeter	5.11.70	R. S. Steel	A. Thorpe, T. Grimes, —. Lumbley, R. A. Shopland	J. S. Agnew	Ellerman Lines Ltd.
City of Guildford	9.12.70	T. Mallory, B.E.M.	J. Harrison, —. Nayes, B. F. Keith, C. K. Nelson		Ellerman Lines Ltd.
City of Karachi	4.11.70	L. W. Roberts	P. A. Statham, P. G. Weldon, N. C. Hall	D. Anderson	Ellerman Lines Ltd.
City of Leeds	20.12.70	M. W. Hartley	G. E. Shearer, J. A. MacLeod, G. D. Taylor	P. J. McGill	Ellerman Lines Ltd.
City of Liverpool	•	H. Swinney	E. Betts, R. Purkiss, W. D. Dick	J. Buchanan	Ellerman Lines Ltd.
City of Manchester	30.11.70	M. Graham			Ellerman Lines Ltd.
City of London	•	N. A. Perry	R. Meikle, T. Webster	F. McLachlan	Ellerman Lines Ltd.
City of Ottawa	3.4.70	M. Graham	N. C. Hall, R. G. S. Halanen, R. M. Layton	M. B. Murphy	Ellerman Lines Ltd.
City of Oxford	29.10.70	J. S. Grant	S. R. Poole, T. Seeman, P. Parham	J. Brierley	Ellerman Lines Ltd.
City of St. Albans	1.9.70	A. G. Hine	J. Fraser, M. J. Fagan, S. Mortimer	M. Woodhouse	Ellerman Lines Ltd.
City of Wellington	13.7.70	G. H. Salter	J. T. Bennett, T. F. Weale, E. R. Finch	C. M. Crook	Ellerman Lines Ltd.
Clan Alpine	23.12.70	N. F. Stewart	J. N. Gartside, I. F. B. Currie, N. M. Butterfield	D. A. P. Galbraith	Clan Line Steamers Ltd.
Clan Grant	15.2.71	H. M. Walden	P. M. J. O'Sullivan, W. Davidson, G. McLaren	H. MacKay	Clan Line Steamers Ltd.
Clan Macdougall	13.8.70	G. S. Rowland	F. de Gersigny, H. Edwards, C. S. Marman	—. Campbell	Clan Line Steamers Ltd.
Clan Macgillivray	7.8.70	A. Crawford	W. A. Brown, B. Spiller, G. B. Charleson	W. Latus	Clan Line Steamers Ltd.
Clan Macgregor	15.3.71	F. J. Pye	T. R. Mercer, A. A. Melia, J. C. Fairclough	J. K. Paterson	Clan Line Steamers Ltd.
Clan Macilwraith	30.11.70	S. J. Cresswell	J. S. Price, W. F. Sutherland, E. Martin	G. McGarrigle	Clan Line Steamers Ltd.
Clan Macindoe	29.10.70	T. H. Graham	D. T. King, P. J. MacArthur, C. Bunyan	R. Caine	Clan Line Steamers Ltd.
Clan Macinnes	•	E. L. Besley	F. Leonards, D. Lewis, J. A. Kemp	—. Hubbard	Clan Line Steamers Ltd.
Clan Macintyre	•	T. Halliday	I. Scott, A. Hill, J. B. Woombell	D. K. Gilman	Clan Line Steamers Ltd.
Clan Maciver	•	J. G. Smith	P. G. Listard, N. F. Coombes, G. N. Nduto	F. Fawcett	Clan Line Steamers Ltd.
Clan Maclaren	15.3.71	J. K. Currie	C. R. Finch, G. W. Burgoyne, S. M. Gledmill	G. Richards	Clan Line Steamers Ltd.
Clan Maclay	8.3.71	S. Hagan	J. R. Shaw	C. Davidson	Clan Line Steamers Ltd.
Clan Maclean	1.12.69	P. J. Rose	G. D. Mobbs, C. J. Green		Clan Line Steamers Ltd.
Clan Maclennan	20.11.70	F. W. Moss	B. M. J. Gates, P. G. Lusted, P. C. Howard	T. C. Willis	Clan Line Steamers Ltd.
Clan Macleod	15.10.70	T. Coats	D. O. Reed, R. Flint, P. A. Crabtree	R. Lyon	Clan Line Steamers Ltd.
Clan Macnab	9.10.70	H. J. Thorn	H. D. Koppmann, W. A. Asi, R. A. Milne	W. Saville	Clan Line Steamers Ltd.
Clan Macnair	24.10.70	T. R. Kendra	A. M. H. Mohamed, J. Hill-Brown, W. G. Wilson	M. Macdonald	Clan Line Steamers Ltd.
Clan Mactavish	11.2.71	W. J. Howson			Clan Line Steamers Ltd.
Clan Malcolm	24.8.70	R. M. Bessant	R. G. Head, A. Flenley, E. Drylie	W. L. Herdman	Clan Line Steamers Ltd.
Clan Matheson	23.6.70	J. G. Smith			Clan Line Steamers Ltd.
Clan Menzies	29.10.70	T. L. Kirby	R. N. Gebbie, R. R. Cawdery, S. Catton, J. Ivey	E. I. Kelly	Clan Line Steamers Ltd.
Clan Ramsay	30.3.71	E. J. E. Owen	G. W. Menzies, P. Austin, I. W. Ferguson	H. F. Guthries	Clan Line Steamers Ltd.
Clan Ranald	•	A. Mair	D. J. Brunskill, M. A. T. McMillan, C. E. Finch		Clan Line Steamers Ltd.
Clan Robertson	25.11.70	R. Harber	J. Henderson, M. A. T. McMillan, C. C. Burge	G. MacDonald	Clan Line Steamers Ltd.
Clan Ross	30.3.71	D. H. Macmillan	D. H. Worrin, S. H. Gledhill, M. J. Gardner	M. G. Snell	Clan Line Steamers Ltd.
Clan Sutherland	18.1.71	A. M. Kennedy	J. T. Arlow, A. J. Blackburn, C. W. Gowans, P. Rugg	J. Sandison	Clan Line Steamers Ltd.
Clarkeden	30.3.71	A. McF. Allan	R. L. Holroyd, J. E. B. Taylor	P. Brennan	J. & J. Denholm Ltd.
Clione	28.4.69	M. R. Sutcliffe	A. R. G. Everett, A. Button		Ministry of Agriculture, Fisheries & Food
Clytoneus	7.1.71	L. Henshall	J. McPherson, W. Jemson, A. McKenzie, W. D. Howell	A. W. Jones	Ocean Fleets Ltd.
Collin	•	D. Gibbons	A. Halidge, P. Cawthorne	D. Brooks	Jardine Matheson & Co. Ltd.

Selected Ships (*contd.*)

Name of Vessel	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Colorado Star	22.3.71	R. Burns			Blue Star Line Ltd.
Conon Forest	6.3.70	H. Munro	M. K. MacLeod, D. Murray	I. D. Muir	J. & J. Denholm Ltd.
Constance Bowater	5.10.70	P. C. Byrne	P. A. Bloomer, P. Bagley, R. Silverwood	A. Anderson	Cayzer Irvine & Co. Ltd.
Corella	3.2.70	W. Craig	R. A. Aldred		Ministry of Agriculture, Fisheries & Food
Cotopaxi	13.1.71	L. W. Cooper, O.B.E.	T. E. Knowles, P. Brown, P. Quayle	J. V. Davis	Pacific S.N. Co. Ltd.
Cotswold	20.10.70	G. Marshall, O.B.E.	I. Nanayakkara, F. Brady, M. Robinson, R. M. Exelby	E. Artingstoll	Hain-Nourse Ltd.
Coventry City	10.7.70	J. J. Butterworth	P. S. Bytheway, J. R. Taylor, B. Lightfoot	R. A. Waller	Bibby Line Ltd.
Craigallian	11.8.70	W. C. Taylor	D. H. Thompson, I. MacDonald, I. Henderson	M. Keane	Scottish Ore Carriers Ltd.
Cretic	23.9.70	S. C. Carr	T. S. Royden, A. T. Turner, T. R. Noonan	F. M. Walsh	Shaw Savill & Albion Co. Ltd.
Crinan	15.3.71	A. V. Mackay	D. N. Macnair, A. Dunn, G. Watt	R. J. Lawrence	J. & J. Denholm Ltd.
Crofter	15.2.71	B. W. Jones	R. Pennock, F. G. Bissett, D. A. Wickens	I. J. Benfield	T. & J. Harrison Ltd.
Crystal Diamond	30.3.71	G. H. Griffiths	C. E. Houghton, M. G. Dale, E. J. Winsor	T. O'Brien	Sugar Line Ltd.
Crystal Gem	1.12.70	B. E. Evans	R. D. Mearns, W. Brothers, B. D. Jones	B. M. McArthur	Sugar Line Ltd.
Crystal Sapphire	19.3.71	D. Patrickson	C. Griffiths, I. Rollo, D. Watson	J. Donald	Sugar Line Ltd.
Cumberland	9.12.70	C. P. Robinson	T. W. Carnduff, R. Bayliss, R. W. W. Baldwin	R. Comrie	Federal S.N. Co. Ltd.
Cyclops	11.12.70	H. Davies	D. Small, R. S. Wylie, C. Manton, E. A. Owen	G. E. Clark	Ocean Fleets Ltd.
Cymric	19.3.71	D. A. Statham	N. R. Cresswell, P. Fry, R. Watkins, D. Sully	J. J. Cameron	Shaw Savill & Albion Co. Ltd.
Daghestan	10.12.70	G. T. Sharpe	T. R. Nicholls, J. Gyte		Common Bros. Ltd.
Dalesman	10.12.70	W. L. Ashton	P. McParlin, A. Littlewood	D. Daly	T. & J. Harrison Ltd.
Dalhanna	15.2.71	I. A. M. Haddow	J. Crane, D. A. Taylor, A. Miller-Main	D. Cooper	Hunting & Sons Ltd.
Dart America	•	E. Irish	D. Flower, R. Griffiths, A. Payne	R. Dunn	Tynedale Shipping Co. Ltd.
Delphic	8.3.71	I. S. McEwan	T. M. Smith	P. Arnold	Shaw Savill & Albion Co. Ltd.
Derwent	26.10.70	R. Phillips	S. V. Simms, G. B. Panes, M. J. Ratcliffe	J. Mathers	Royal Mail Lines Ltd.
Deucalion	22.9.70	E. L. Stubbings	M. G. Fennell, R. B. Stephens, N. W. Partridge	D. P. Stoker	Ocean Fleets Ltd.
Devon	23.3.71	J. Reid	C. D. H. Marryat, W. Marshall, A. J. Taylor-Gray	P. Arkley	Federal S.N. Co. Ltd.
Devon City	2.11.70	J. Cann	P. M. Baverstock, J. R. Francis, A. T. H. Crowther	J. Henry	Sir Wm. Reardon Smith & Son Ltd.
Discovery	20.12.70	G. H. Selby-Smith	M. A. Harding, M. Bradley, B. A. Chapman	R. Constantine	Natural Environment Research Council
Discovery Bay	12.3.71	M. Ryan	S. Keeble, J. Thorpe, R. Wightman	I. Smith	Container Fleets Ltd.
Donegal	8.3.71	E. J. Ridout	E. J. Dunk, A. Wood, M. Doyle	L. Taylor	Trinder Anderson & Co. Ltd.
Dorset	18.1.71	P. Lay	J. G. Martin, R. Dowse, P. Donaldson	C. Hughes	Federal S.N. Co. Ltd.
Duhallow	26.10.70	J. O. Spence	S. A. Hunter, A. E. Kitchingham, I. Smith, M. F. Berne	F. G. McPhail	Hain-Nourse Ltd.
Dukesgarth	24.8.70	N. Richardson	R. Finlayson, H. O. L. Phillips, C. Groves	J. Delaney	Cory Maritime Ltd.
Dunadd	30.3.71	J. I. Rhodes	R. N. Morgan, J. Downie, A. Macaulay	G. J. Freeman	J. & J. Denholm Ltd.
Duncraig	8.10.70	A. J. MacDonald	B. G. Frieze, G. D. Hopkin	R. J. MacDonald	J. & J. Denholm Ltd.
Dunstanburgh Castle	17.11.70	P. S. Gardner	J. M. Bullard, K. E. Greest, B. G. Longley		W. A. Souter & Co. Ltd.
Edenmore	30.3.71	J. T. Sheffield, M.B.E.	M. R. Greenwood, C. J. Redman, D. A. Boffey	L. K. Dillon	Furness Withy Co. Ltd.
Edinburgh Castle	29.1.71	P. St Q. Beadon	R. M. Potter, N. Smith, R. Coleman, N. Salm	—. Sharpe	Union-Castle Mail S.S. Co. Ltd.
Edward Wilshaw	11.6.68	N. H. Smith	R. M. Keyzor, K. Brammer, A. F. Wilson	J. Otley	Cable & Wireless Ltd.
Egton	19.8.70	S. Jackson	M. A. Balaam, S. Stone, W. Howard	K. Kirtley	Roland & Marwood S.S. Co. Ltd.
Elizabeth Bowater	11.2.71	K. Morton	N. G. Precious, J. S. Wise, C. S. Crawford	J. L. Spanner	Cayzer Irvine & Co. Ltd.
El Lobo	•	R. Knowles	R. Baker, J. H. Russell	P. Simpson	Bowring S.S. Co. Ltd.
Elmbank	25.8.69	B. J. Peterson	W. R. Langworthy, P. Wallace, J. L. Bailey	W. A. Thompson	Bank Line Ltd.
Empire Star	25.3.71	I. F. Tait	J. H. Mockett, F. Jackson, J. Daymond	J. Barfield	Lamport & Holt Line Ltd.
Empress of Canada	24.9.70	R. Walgate	D. A. MacMahon, P. C. H. Adair		Canadian Pacific Steamships Ltd.
Encounter Bay	17.11.70	R. A. Wilson	J. R. Penson, J. H. Hutson, D. R. Embery	J. Bilton	Container Fleets Ltd.

English Star	26.8.70	C. P. Leighton	A. Orford, I. L. Moist, E. C. Smith	M. Downes	Blue Star Line Ltd.
Erawan	*	R. B. Smith	K. Strudwick, R. Kenrick, N. J. Alexander	Z. Marr	John Swire & Sons Ltd.
Essex	3.3.71	J. F. Milner	D. B. Truscott, D. Winter, P. Middleton, A. Fulton	C. McCann	Federal S.N. Co. Ltd.
Esso Hampshire	30.11.70	G. F. Barnes	R. W. Langford, D. I. McIntosh, R. A. Jenkins	I. Morgan	Esso Petroleum Co. Ltd.
Esso Pembrokeshire	29.1.71	F. Stubbs	G. F. Thomas, F. W. Ling, R. M. Ashworth	A. Humphreys	Esso Petroleum Co. Ltd.
Esso Warwickshire	17.9.70	H. Johnson	A. D. Stuart, D. W. Wale, D. G. Bryan		Esso Petroleum Co. Ltd.
Eucadia	15.3.71	A. J. F. Colquhoun, M.B.E.	B. J. Penington, G. Robson, I. Swann	R. F. Gaul	Walter Runciman & Co. Ltd.
Explorer (m.v.)	15.10.70	G. W. McGuiness	M. J. J. Williamson, R. Taylor, J. F. Clapham, R. Maxwell	D. Murphy	T. & J. Harrison Ltd.
Explorer (F.R.S.)	2.10.70	A. A. Baxter	J. G. Brown	J. Steven	Dept. of Agriculture & Fisheries for Scotland
Farsistan	22.10.70	D. R. Carden	F. P. Scallan, J. Ridout, M. J. McKelvey	W. Williams	Frank C. Strick & Co. Ltd.
Finnamore Meadow	22.3.71	J. A. McCulloch	P. G. I. Rodger's-Gray, G. Knight, D. L. Thomas	D. Vale	Mavroleon Bros. Ltd.
Firbank	2.9.70	F. C. Abell	E. R. Bruce, P. Ewen, T. Bowers, C. J. Grierson	W. D. Mullan	Bank Line Ltd.
Flinders Bay	*	G. A. Gibbons	P. Devenport, D. E. Spencer, R. T. Woods	R. Parkinson	Container Fleets Ltd.
Flintshire	30.11.70	M. G. Thomas	J. L. Wilson, J. W. Niblock, W. P. Ruddock, G. E. Ainsley	R. J. Ashworth	Ocean Fleets Ltd.
Floristan	12.3.71	L. Liddle	A. E. Greenwood, M. A. Wedgery, I. F. Stewart	F. K. McNally	Frank C. Strick & Co. Ltd.
Foreland	13.10.70	J. L. Downie	P. J. Tehan, C. D. Bishop-Laggett, J. Gittings	R. Smyth	Shipping & Coal Co. Ltd.
Forthfield	4.5.70	A. Harrison	I. McDonald, T. Armstrong, G. E. Lowry		Hunting & Son Ltd.
Fourah Bay	15.3.71	W. E. Humphreys	J. P. Murphy, H. G. S. Davies, D. Elliott	M. R. Palmer	Ocean Fleets Ltd.
Franconia	7.12.70	P. Jackson	C. Briggs	F. Brown	Cunard S.S. Co. Ltd.
Fremantle Star	5.1.71	J. D. Peake	N. Marshall, P. Lipscombe	H. L. Harris	Blue Star Line Ltd.
Galway	28.8.70	J. D. Blake	D. Ilsley, J. L. Mitchell, H. Mathews	J. McDonnell	Trinder Anderson & Co. Ltd.
Geestbay	15.2.71	P. Groves	R. J. Francis, K. M. R. Skinner, R. A. Cole	R. B. Geale	Geest Industries Ltd.
Geestcape	7.1.71	D. G. Powell	I. McLoughlin, K. Pearson, R. A. Cole, M. Macleod	J. Conway	Geest Industries Ltd.
Geesthaven	30.3.71	A. Macneil	K. Slade, M. Talbot	D. H. Letcher	Geest Industries Ltd.
Geestport	23.3.71	D. N. Boon	G. Gough, M. Talbot, M. C. Hollinrake, A. W. Breach	J. C. Conway	Geest Industries Ltd.
Georgina V. Everard	15.3.71	L. Andersen		A. R. Humphries	F. T. Everard & Sons Ltd.
Gladys Bowater	11.2.71	J. B. Caley	S. Randall	J. Cardownie	Cayzer Irvine & Co. Ltd.
Glenalmond	11.12.70	I. R. Atkinson	J. P. W. Ryder, W. B. Thomas, A. M. Whyte, I. D. Jackson	J. V. Morgan	Ocean Fleets Ltd.
Glenbeg	22.3.71	D. K. Dunlop, R.D.	S. P. C. Saverimutto, K.N. Maxwell, J. P. H. Fisher	J. P. R. Binding	Ocean Fleets Ltd.
Glenfalloch	4.1.71	P. H. Edwards	J. C. Bromfield, P. J. Duff, G. A. Ridout	W. W. Beebee	Ocean Fleets Ltd.
Glenfinlas	6.1.71	G. W. Povey	J. M. Zipperlen, J. C. Goble	C. W. Knibb	Ocean Fleets Ltd.
Glenfruin	29.1.71	P. J. Broomfield, R.D.	H. A. A. Masri, E. I. Grant, M. G. Brown	D. Wood	Ocean Fleets Ltd.
Glenlyon	3.3.71	J. A. Dougall, R.D.	P. R. O. Brewer, M. R. Foster, J. C. R. Jones	W. E. Grayson	Ocean Fleets Ltd.
Glenmoor	13.11.70	W. Yeaman	R. M. Logan, H. D. Warmbath, W. L. McDougall	B. Dodd	Walter Runciman & Co. Ltd.
Glenogle	29.1.71	N. D. B. Martin	A. I. Hale, R. C. McClelland, W. E. L. Godsell	D. Sibley	Ocean Fleets Ltd.
Glenroy	17.12.70	W. J. S. Eynon	I. I. Kazi, H. B. Gobey, D. J. Pluck, C. McCurdy	P. Weldon	Ocean Fleets Ltd.
Gloxinia	10.8.70	L. Hopper	R. Medley, J. Wright, K. J. Campbell	R. J. Ware	Stag Line Ltd.
Golfito	3.3.71	E. Whitehouse	W. A. Gundry, J. C. W. Barney, P. O. Sully, S. Mallory	J. Masterman	Elders & Fyffes Ltd.
Good Hope Castle	24.3.71	I. W. Bennet			Union-Castle Mail S.S. Co. Ltd.
Gorjistan	23.12.70	J. E. B. Belt	K. H. Gear, C. A. Baker, E. D. J. Brown	R. Milner	Frank C. Strick & Co. Ltd.
Gothland	30.3.71	J. A. Williamson	P. McGurk, J. Craig	S. Rathie	Currie Line Ltd.
Governor	29.12.69	R. B. Simmons	P. J. Sayer, A. E. Hicks, O. M. Owen	G. West	T. & J. Harrison Ltd.
Hadra	11.1.71	R. Hayward-Wills	A. Cumpstey, C. D. Atkinson, N. B. Woodhouse, A. Hawkins	A. O'Sullivan	Shell Tankers (U.K.) Ltd.
Halifax City	21.9.70	K. D. Miller	C. O. Thomas, D. Makin	H. Roderick	Bristol City Line Ltd.
Hanetia	*	H. J. Third	C. J. Selfe, D. Hodson, A. J. Eastham	R. Wallington	Shell Tankers (U.K.) Ltd.
Haparangi	3.8.70	G. W. McCathie, R.D.	J. A. Henderson, J. J. G. Allen, B. Dyke, G. W. Adkin	C. Hughes	New Zealand Shipping Co. Ltd.
Hauraki	8.3.71	J. D. Hellings	D. J. Strange, T. E. McLaren, K. Everitt, J. H. Read	W. R. Parsons	New Zealand Shipping Co. Ltd.
Hazelmoor	15.2.71	M. A. Dean	D. Ilderton, J. A. G. Lowe, M. J. Martin	C. F. Morris	Walter Runciman & Co. Ltd.
Hector	27.11.70	A. Mackenzie	J. Griffiths, M. Wilks, P. Watt	W. C. A. Phillips	Ocean Fleets Ltd.
Hector Heron	13.3.70	A. G. Allson	D. Fellowes, A. Terras, A. J. Stewart, F. D. Hugo	F. E. D. Barritt	Hector Whaling Ltd.

Selected Ships (*contd.*)

Name of Vessel	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Helenus	15.3.71	W. R. Willis	J. B. Lloyd, H. A. C. Ross, P. L. G. Wolledge	J. B. Carr	Ocean Fleets Ltd.
Helisoma	28.8.70	B. Bowtell	K. A. G. Biscoe, R. Newnham, T. M. Logan, J. Dalby	P. J. Kelly	Shell Tankers (U.K.) Ltd.
Hemifusus	15.12.70	W. B. Cairns	L. H. McBain, R. W. Briggs, B. G. Calderwood	R. Halpin	Shell Tankers (U.K.) Ltd.
Hemimactra	15.3.71	J. Campkin	D. A. Platt, B. Dawson, J. E. C. Hewitt, M. C. Blight	A. M. L. Kershaw	Shell Tankers (U.K.) Ltd.
Hertford	30.3.71	J. M. Burn	H. M. Close, J. W. Gill, R. T. Vincent, G. W. Adkin	A. Rose	Federal S.N. Co. Ltd.
Himalaya	27.2.70	J. W. Terry	M. R. Winn, D. N. Kean, M. Derrick, M. Douglas		P. & O. Lines Management Ltd.
Hinakura	20.11.70	I. Y. Batley	D. Shelton, B. R. Baggot, P. Alexander, M. Austin	W. F. Law	New Zealand Shipping Co. Ltd.
Hinea	18.6.70	J. Paterson	A. R. Evans, I. Bole, W. Thomas, W. Niblett	A. Kershaw	Shell Tankers (U.K.) Ltd.
Historian	15.2.71	R. P. Jones	D. B. Cox, R. J. Smith, D. J. Lycett	H. G. Sparkes	T. & J. Harrison Ltd.
Horomya	23.3.70	R. A. Blackaby	R. W. M. Van Burken, B. G. Calderwood, J. F. R. Read	P. V. O'Neill	Shell Tankers (U.K.) Ltd.
Howra	16.3.70	C. R. S. Monk	G. J. Taylor, J. Appadurai, P. J. Whitehead	M. J. W. Higgins	British India S.N. Co. Ltd.
Hudson Trader	*	—. Taylor	A. Gordon, D. Sutherland, —. Collier	D. Griffith	Hudson S.S. Co. Ltd.
Humilaria	30.9.70	W. Thomas	I. Coulman, A. Charlesworth, M. Blight, J. Johnston		Shell Tankers (U.K.) Ltd.
Huntingdon	15.2.71	D. E. Moran	M. Austin, M. Eglon, P. Scarrott	B. T. F. Adkin	Federal S.N. Co. Ltd.
Hurunui	16.7.70	S. G. Robinson	A. R. Davidson, W. A. F. Killackey, P. Cowdell, J. C. Blattman	C. J. Elliott	New Zealand Shipping Co. Ltd.
Hyala	10.12.70	J. G. Cormack	K. J. Sprowles, M. Thompson, M. E. Schollar	J. Dunne	Shell Tankers (U.K.) Ltd.
Iberic	10.11.70	J. Gunning	G. Matthews, S. Durrant, J. Hunter, R. Bourne	M. Anderson	Shaw Savill & Albion Co. Ltd.
Icenic	28.10.70	G. V. Conolly	R. J. Knight, R. A. Wooding	P. J. Kelly	Shaw Savill & Albion Co. Ltd.
Illyric	1.1.71	A. Stevens	J. G. Bradley, P. Tozer, D. J. Howitt	H. A. Sirett	Shaw Savill & Albion Co. Ltd.
Imperial Star	15.3.71	E. J. Jones	J. M. Rendle, B. Truran, K. Finigan, J. Sawyer	R. Knott	Blue Star Line Ltd.
Inishowen Head	31.3.71	R. A. Maxwell	F. P. Gunning, P. J. Sherriff, C. R. Dorren		G. Heyn & Sons Ltd.
Inverbank	7.8.68	B. J. Peterson	J. Leesmoffat, W. J. Garnett	C. J. Randall	Bank Line Ltd.
Ionic	27.11.70	C. R. Downes	M. I. C. Kempston, W. Lockie, K. Fuge	J. Butler	Shaw Savill & Albion Co. Ltd.
Ixion	27.11.70	A. S. Thompson	K. F. Vickery, R. MacLeod, C. O. Clowes	A. G. Thomson	Ocean Fleets Ltd.
Jamaica Planter	1.12.70	D. Trickey	E. J. Warwick, K. Gordon, A. Barker	R. F. Collins	Kaye Son & Co. Ltd.
Jamaica Producer	20.12.70	G. A. Foulds	G. W. H. Tennant, J. Twiselton, K. Johnstone	I. MacDonald	Kaye Son & Co. Ltd.
Jason	15.3.71	J. C. Liptrot	D. W. Bunyan, N. R. Moon, J. A. Calvin	J. B. Sergeant	Ocean Fleets Ltd.
Jelunga	15.12.69	H. C. Walker	A. D. Donald, P. E. Howells, R. S. Kelkar	D. J. Glenne	British India S.N. Co. Ltd.
Jervis Bay	11.2.71	B. N. Hinderwell	P. G. Wilson, C. R. Short, J. W. Welch	E. R. C. Lamb	Container Fleets Ltd.
John Biscoe	27.5.70	M. J. Cole	C. R. Elliott, J. P. Morton, A. R. Binder	H. M. O'Gorman	British Antarctic Survey
John Murray	25.9.70	A. Justen	B. A. Chapman, M. J. Coventry, C. M. Wilton		Natural Environment Research Council
Jumna	29.12.70	L. J. Annett	N. Muhsin, J. Solley, J. Sharp	C. M. Airey	Hain-Nourse Ltd.
Juwara	2.4.70	F. Bell	R. A. Gammie, J. H. Clark, A. Henley, R. Aldrick	A. Bickford	British India S.N. Co. Ltd.
Karaghistan	19.10.70	L. Lumley	R. W. Madden, G. S. Oakley, K. K. Sood	J. R. Stokes	Frank C. Strick & Co. Ltd.
Kenuta	19.1.70	A. S. MacLean	P. Quayle, S. Chapman, H. G. N. Lloyd, A. Shaw, P. C. Barmby	D. R. Dunning	Pacific S.N. Co. Ltd.
King Alexander	*	R. A. G. Simmons, R.D.	J. S. Price, R. T. Flemington	J. McLaren	Cayzer Irvine & Co. Ltd.
King Arthur	19.10.70	L. H. A. Bainton		J. N. Wright	Cayzer Irvine & Co. Ltd.
King George	16.11.70	P. S. Eckford	I. MacAlpine, S. Ondondo	J. N. Duckworth	Cayzer Irvine & Co. Ltd.
King Malcolm	13.11.70	S. M. Grant	G. W. Menzies, I. Peel, P. McMillan	M. A. Lomax	Cayzer Irvine & Co. Ltd.
Kinnaird Castle	9.12.70	J. S. Catterall	R. M. Thomas, P. G. Atkinson, B. F. Fountain	C. E. G. Pratt	Union-Castle Mail S.S. Co. Ltd.
Kohinur	*	J. Sellars	S. A. Syed, —. Quigley		Hain-Nourse Ltd.
Kohistan	13.7.70	J. Brown	D. Gordon, D. Golightly, P. Sweeney	M. F. Lavan	Frank C. Strick & Co. Ltd.
Laganbank	27.11.70	L. E. Steers	M. J. Stevens, A. M. Smaldon, R. A. Curtis	N. M. Mackay	Bank Line Ltd.
Laksa	13.1.71	W. G. Ross			Chr. Salvesen & Co. Ltd.

Landwade	*	N. Waiter	R. G. Laurenson, W. Locker, D. Rattray	R. Mortimer	W. J. Tatem Ltd.
Laurentic	29.12.70	J. L. Stobbs	R. G. Hodgkinson, D. M. Cole, C. P. Stockings, L. M. White	C. R. Brown	Shaw Savill & Co. Ltd.
Lindisfarne	30.1.70	J. Dunn	A. Stobbs, K. E. Greest, G. D. Sandercock	C. W. Lomax	W. A. Souter & Co. Ltd.
Lombardy	27.11.70	F. G. Boize	C. D. Bryant, I. Middleton, R. Brinkworthy, P. Quayle	N. A. Lawrence	Royal Mail Lines Ltd.
Longstone	24.7.70	R. Charlton	R. M. S. Barrett, J. Walker, K. Raisbeck, P. Hardy	J. Cooper	W. A. Souter and Co. Ltd.
Lord Strathcona	10.11.70	M. B. Shuker	D. M. Shaw, R. J. Triggs, P. G. Davis, A. G. Moat	J. E. Duguemin	Canadian Pacific (Bermuda) Ltd.
Lossiebank	*	R. W. Gunn	R. J. B. Collinson, W. B. Geddes, R. J. Jenks	P. E. Bowler	Bank Line Ltd.
Mabel Warwick	26.2.71	L. F. Slevin	M. R. Stevens, A. M. Proctor	P. G. Chadwick	Houlder Bros. Co. Ltd.
Macharda	23.11.70	G. W. Sinclair	P. W. Ings, D. J. A. Scroggie, W. A. Pritchard	D. W. Spencer	Cunard-Brocklebank Ltd.
Mahout	11.2.71	S. Baxter	M. J. Patton, M. R. N. James, H. Evans	A. D. Marsden	Cunard-Brocklebank Ltd.
Mahronda	8.7.70	A. G. M. Ward	A. R. Fryatt, A. MacVean, L. W. Crump, M. St. E. Cardew	N. L. H. Cresdee	Cunard S.S. Co. Ltd.
Mahseer	30.9.70	D. A. M. O'Byrne	J. P. Collins, D. A. Evans, J. D. Cook	G. A. King	Cunard-Brocklebank Ltd.
Malancha	17.3.71	J. H. Moore	P. M. Sumpton, R. C. Winlo, M. H. Wild, T. Frankish	N. H. Prince	Cunard-Brocklebank Ltd.
Manapouri	15.3.71	J. D. Guyler	D. J. Goodwin, A. H. Aston, P. N. J. Cowdell	W. F. Shepherd	New Zealand Shipping Co. Ltd.
Manchester Challenge	25.1.71	N. Cockshoot			Manchester Liners Ltd.
Manchester City	19.1.70	A. Starmer	D. R. Llewellyn, L. Street, P. Cullen, D. Smith	D. Hodgson	Manchester Liners Ltd.
Manchester Concorde	8.3.71	A. Cookson	M. Broadhead	W. E. Hamsen	Manchester Liners Ltd.
Manchester Courage	14.8.70	D. G. Thomas	G. Hughes-Jones, R. Webb, A. McKay	C. R. Bisby	Manchester Liners Ltd.
Manchester Merit	*	T. B. Hancock	K. Whittaker, M. Sebborn, G. Shadbolt	P. A. Byrne	Manchester Liners Ltd.
Manchester Port	30.3.71	O. N. D. Selwood	M. J. O'Malley, R. J. Young, D. Perry	J. A. L. MacDonald	Manchester Liners Ltd.
Manchester Progress	15.3.71	P. D. Cullen	T. P. Mather, J. Baker, D. Smith, O. N. D. Selwood	J. C. Percival	Manchester Liners Ltd.
Manchester Quest	24.4.69	J. Rushworth	P. Walden, G. Hughes-Jones, J. Hannaford	G. McCaffery	Manchester Liners Ltd.
Manchester Renown	24.9.70	J. Watson	P. Derbyshire, K. Lehepuu, A. D. L. Scotland	W. F. Stirling	Manchester Liners Ltd.
Manipur	*	A. M. Thomson	C. J. Woolhouse, C. J. Burtinshaw		Cunard-Brocklebank Ltd.
Marabank	16.10.69	L. W. Thorne	W. M. Marshall, W. B. Geddes, R. Kent	F. Rook	Bank Line Ltd.
Maron	16.10.70	J. W. Hutchinson	R. P. Le Coultre, A. S. Jackson	C. Hodgson	Ocean Fleets Ltd.
Mataura	30.3.71	K. Barnett, R.D.	J. H. Read, H. C. Hynard, G. K. Hawkes	R. McManamon	New Zealand Shipping Co. Ltd.
Mawana	30.3.71	J. J. Redden	R. C. Bragg, B. C. Gouldthorpe, G. F. Kay	S. H. Bolton	Cunard-Brocklebank Ltd.
Media	20.11.70	J. B. Mort	R. M. Garrett, J. T. West, G. M. Grainger	T. D. Tims	Cunard-Brocklebank Ltd.
Medic	*	H. O. V. Anderson	J. Gower, P. Tozer, J. S. Meralls	E. A. Rogers	Shaw Savill & Albion Co. Ltd.
Megantic	15.2.71	W. J. Stanger	R. I. Bennett, W. P. K. Basham, B. D. Fraser	R. L. Baker	Shaw Savill & Albion Co. Ltd.
Melbourne Star	11.1.71	H. Dyer			Blue Star Line Ltd.
Menestheus	20.12.70	D. Campbell	J. R. K. Corrin, S. A. McClure, J. B. Hughes, W. Stobie	M. S. McLaren	Ocean Fleets Ltd.
Mercury	17.1.68	P. B. Henderson			Cable & Wireless Ltd.
Miranda	31.3.71	R. K. N. Emden, D.S.C.	G. Atkinson, T. St. J. Stafford	E. Torpay	Dept. of Trade & Industry
Mitra	25.3.71	D. Doyle	D. T. Kirkwood, M. Ayech, A. J. Andrews	D. Glasson	Shell Tankers (U.K.) Ltd.
Monksgarth	*	J. Sharp	A. Mohamed, I. Donaldson, G. Timotay	M. Lindsay	Cory Maritime Ltd.
Montreal City	24.8.70	M. J. Winter	J. W. Rogers, D. Flower, A. E. Burton, M. S. Taylor	J. T. Moody	Bristol City Line Ltd.
Moreton Bay	7.1.71	M. J. Heron	A. R. Jarvis, L. E. Howell, C. J. C. Johnston	A. Titley	Container Fleets Ltd.
Mystic	17.12.70	C. Ratcliff	L. A. S. Cooper, D. J. Mossman, I. Farquarson	A. G. Doyle	Furness Withy & Co. Ltd.
Nardana	15.3.71	D. E. P. Colley	P. P. Simkins, C. M. Fox, M. Rodrigues, D. McAlpine	W. R. Organ	British India S.N. Co. Ltd.
Neleus	18.1.71	B. Hill	J. M. D. Perry, H. Beaton	R. Dobson	Ocean Fleets Ltd
Nevasa	1.12.70	F. A. J. Downer, D.S.C., R.D.	J. A. H. Cartlidge, E. G. Milne, M. L. Bechley, D. E. Knight	W. C. G. Sturgess	British India S.N. Co. Ltd.
Newcastle Star	30.3.71	P. Davies	A. K. Brown, R. Walter	A. Leeder	Blue Star Line Ltd.
Newfoundland	28.9.70	C. W. Alison	N. C. E. Spencer, E. Hoyle, T. A. Willars, R. Newall	M. Hill	Furness Withy & Co. Ltd.
New Zealand Star	29.12.70	J. G. Reeve	N. W. Martin, J. Harris, J. Abel	G. T. Bruce	Blue Star Line Ltd.
Nicolas Bowater	10.11.70	P. R. Kent	M. F. L. d'Esqagnac, I. McKendrick, M. Barrett	B. Willcox	Cayzer Irvine & Co. Ltd.
Nigaristan	*	S. A. Booker	J. Scallan, M. Mathews		Frank C. Strick & Co. Ltd.
Nina Bowater	22.2.71	R. P. Royan	R. H. Day, C. H. Vickers, D. O. Tourell	J. R. Tomlinson	Cayzer Irvine & Co. Ltd.
Norse Viking	11.3.71	J. E. Roddam	G. Hindmarch, C. Williams, M. B. Bradley, T. F. Jones	S. J. Rushton	Sir R. Ropner & Co. Ltd.
Northern Star	11.1.71	M. Larrive	C. D. Marshall, B. D. Ellis, P. Garlick, V. H. Ridges	J. Stewart	Shaw Savill & Albion Co. Ltd.
Northumberland	21.10.70	R. G. Hollingdale	D. A. Fyson, A. J. Ward, M. L. Martin, D. H. Moorhouse	G. M. Turner	Federal S.N. Co. Ltd.
Nottingham	17.3.71	A. Britain	R. R. Walker, M. J. Sutherland, M. J. Stopford	R. Bush	New Zealand Shipping Co. Ltd.

Selected Ships (*contd.*)

Name of Vessel	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Nova Scotia	18.8.70	J. Chester	P. Weldon, E. M. Bowen, J. Ramsay	D. O'Halloran	Furness Withy & Co. Ltd.
Nurmahal	15.2.71	J. Murray	P. C. May, R. C. Avenin	J. A. Borrett	Hain-Nourse Ltd.
Obuasi	25.9.70	D. Howe	P. B. Nyong, D. M. Savage	C. R. Bolton	Ocean Fleets Ltd.
Orcades	11.1.71	P. C. Reed	R. S. Holt, P. Harris, N. H. Lampe		P. & O. Lines Management Ltd.
Orcoma	15.2.71	A. Lang	M. D. Edwards, J. S. Smith, W. Jenkins	W. A. Rance	Furness Withy & Co. Ltd.
Orestes	3.12.70	J. O. Jones	A. M. Healey, G. K. Thompson	P. J. Robertson	Ocean Fleets Ltd.
Orita	9.9.70	T. F. J. Leddra	P. Barnet, P. A. Chadwick, H. M. Cogan	C. Gamwell	Pacific S.N. Co. Ltd.
Oronsay	20.12.70	M. A. Trenfield			P. & O. Lines Management Ltd.
Orotava Bridge	14.12.70	W. Backhouse	D. M. C. Allan, P. E. Coulson, D. A. Ley, W. F. Forbes	T. J. Bousfield	Ore Carriers Ltd.
Oroya	16.2.71	H. J. Pirie	I. J. Hart, M. Fenwick, M. D. G. Lee	H. Holderidge	Furness Withy & Co. Ltd.
Orsino	26.2.71	F. Drewery	W. Stockton, G. Cooper, M. Gardiner	J. Blake	Hellyer Bros. Ltd.
Orsova	26.10.70	E. V. Harris, R.D.			P. & O. Lines Management Ltd.
Otaio	27.11.70	R. B. Hood	R. J. Fraser, A. J. Davies, A. W. Noble, C. M. Turner		New Zealand Shipping Co. Ltd.
Otaki	9.3.71	J. H. B. Weston	R. B. Hughes, I. Thompson, P. T. Clegg, J. C. Fields	C. Madders	New Zealand Shipping Co. Ltd.
Pacific Exporter	26.8.70	J. Ferres	S. McCollin, N. Hindmarch, J. S. McKechnie	E. J. D. Banner	Furness Withy & Co. Ltd.
Pando Cape	19.3.71	J. W. Bonner	R. H. Rees, P. C. Hornett, C. Godderidge	T. I. Turpie	P. & O. Lines Management Ltd.
Pando Cove	23.12.70	E. A. Mortleman-Lewis, R.D.	B. Larcombe, K. B. P. Robertson, G. W. Renshaw	C. D. Sampson	P. & O. Lines Management Ltd.
Pando Head	27.10.70	R. Bullock-Webster	A. R. A. Wilson, J. B. Fairgrieve, W. F. Dick	D. J. Atkinson	P. & O. Lines Management Ltd.
Pando Point	12.3.71	I. M. Adie	R. C. Hart, M. J. Derrick, P. J. Cooper	G. R. Latham	P. & O. Lines Management Ltd.
Pando Sound	26.2.71	R. F. Underwood	R. P. Bass, M. Beavington, H. E. P. Durell	S. R. Wheeldon	P. & O. Lines Management Ltd.
Pando Strait	25.3.71	D. A. Hansing	P. W. Pickford, M. H. Hall-Thompson, I. C. Stutt	M. Taylor	P. & O. Lines Management Ltd.
Partula	•	A. W. Aitken	C. J. Rogers, B. Stewart, M. F. Childs	M. Forran	Shell Tankers (U.K.) Ltd.
Patonga	3.12.70	G. J. Savage	K. M. Vlasto, P. Lockyer, M. P. Carr	R. H. K. Hewlett	P. & O. Lines Management Ltd.
Patroclus	15.3.71	D. H. Stewart, R.D.	J. L. R. Saverimutto, S. F. Garside, J. B. Pepper	W. E. Rutter	Ocean Fleets Ltd.
Pegu	21.9.70	M. Sheridan	D. M. Lucey, M. S. Brown	D. D. Morris	Ocean Fleets Ltd.
Peisander	16.11.70	W. F. Rockett	B. D. Noble, P. Lloyd-Jones	A. White	Ocean Fleets Ltd.
Peleus	30.3.71	H. O. Williams	R. Moore, A. Bridson, A. Sambrook	W. Britton	Ocean Fleets Ltd.
Pembrokeshire	11.2.71	S. R. Arnold	D. A. Kehl, C. M. Lundy, M. J. Hindley	E. E. Milburn	Glen Line Ltd.
Pendennis Castle	20.12.70	J. Smythe, D.S.C., R.D.	B. J. Goldsworthy, J. D. Peake, D. S. Thompson	R. L. Whittaker	Union Castle Mail S.S. Co. Ltd.
Pennyworth	23.12.70	A. Mathison			R. S. Dalgliesh Ltd.
Perseus	15.10.70	S. E. Allerton	B. D. Pollock, P. F. Brannigan, D. L. Smith, A. B. Lathddin	J. Gallego	Ocean Fleets Ltd.
Phemius	26.3.71	T. W. Willows	H. S. Stuart, I. A. Russell, K. A. Browne	R. Buckles	Ocean Fleets Ltd.
Photinia	30.9.70	R. Reekie	P. T. Oldfield, E. A. Lamb, E. Hutchinson, N. Farrer	A. Dunbar	Stag Line Ltd.
Phyllis Bowater	20.7.70	T. D. Young	I. Lawrence, J. A. Kemp, J. J. Weston	J. R. Tomlinson	Cayzer Irvine & Co. Ltd.
Piako	13.1.71	G. W. McCathie, R.D.	R. T. White, N. J. Horobin, D. R. Lewis, C. J. M. Bosworth	D. Tudor-Cole	New Zealand Shipping Co. Ltd.
Pizarro	15.3.71	R. K. C. Thomas	D. Bridgman, I. C. McLean, J. H. W. Bletsoe	M. J. Sullivan	Pacific S.N. Co. Ltd.
Plagiola	10.11.70	E. H. Phillips	H. A. Johnson, D. S. Fuller, J. B. Edwards, D. B. Travis	C. R. Banks	Shell Tankers (U.K.) Ltd.
Platidia	6.3.70	J. A. Potts	C. Rogers, D. B. Travis, G. Caldecott	B. McDonach	Shell Tankers (U.K.) Ltd.
Port Adelaide	18.3.71	E. R. Jenkins	A. J. L. Morgan, R. A. Harvey, J. Hinchliffe	P. F. Wheeler	Blue Star Port Lines Ltd.
Port Auckland	29.5.70	G. Carling	A. I. R. May, D. A. Brown, R. G. Brooks, W. J. Corbett	W. Bradbury	Blue Star Port Lines Ltd.
Port Brisbane	31.3.71	R. A. Wight	B. C. Grant, J. Lewis, B. G. Appleby	T. J. Courtenay-Kirkpatrick	Blue Star Port Lines Ltd.
Port Burnie	22.3.71	J. Hart	D. F. John, R. W. S. Barnes, G. Lawtey	E. Pollard	Blue Star Port Lines Ltd.
Port Caroline	7.8.70	R. A. Holmes	R. A. Harvey, P. M. Upton	H. B. Hughes	Blue Star Port Lines Ltd.

Port Chalmers	17.4.70	R. A. Wight	F. E. Beer, R. Wallace, B. J. Hayball	P. King	Blue Star Port Lines Ltd.
Port Launceston	15.3.71	M. L. Coombs	R. Brooks, J. Jones, M. Davis, R. Clifford	P. Henderson	Blue Star Port Lines Ltd.
Port Lincoln	28.9.70	N. R. Sinclair	C. N. Bates, R. B. Lloyd, C. Clark	P. G. Taylor	Blue Star Port Lines Ltd.
Port Lyttelton	27.8.70	G. D. B. Thomas	D. Weston, D. Ross, A. Mackellar, D. J. Fisher	P. Brayton	Blue Star Port Lines Ltd.
Port Nelson	5.11.70	J. R. dit-Leschery	S. H. Hurry, C. D. Vallance, N. B. Bamford	W. Brereton	Blue Star Port Lines Ltd.
Port Nicholson	11.3.71	R. H. Finch	W. Kipling, B. Chapman, R. A. Cunningham, P. J. Henley	R. Sexton	Blue Star Port Lines Ltd.
Port Pirie	30.11.70	J. G. Whyte	C. F. Wood, M. Read, G. Sutherland	A. M. Worthington	Blue Star Port Lines Ltd.
Port Sydney	3.9.70	A. M. Downes	H. G. Evans, B. Langman, W. May	A. Hudson	Blue Star Port Lines Ltd.
Port Townsville	7.8.70	E. R. Jenkins	R. D. T. Poole, T. A. Kershaw, T. Paton	N. E. R. Kelly	Blue Star Port Lines Ltd.
Port Victor	6.1.71	D. L. Campbell	D. L. Beveridge, P. M. More, A. M. Watt, D. James	E. D. Halnett	Blue Star Port Lines Ltd.
Port Vindex	7.12.70	A. J. L. Smith	R. D. Theobald, D. G. J. Atkinson, B. Money	J. A. Foreman	Blue Star Port Lines Ltd.
Port Wellington	15.3.71	V. A. Hunt	I. F. Gosden, J. R. Collins, G. W. Hay, R. Lowry	S. Murphy	Blue Star Port Lines Ltd.
Potosi	22.2.71	D. J. Houghton	C. G. G. Hawken, A. J. Saunders	F. J. Curran	Pacific S.N. Co. Ltd.
Priam	15.3.71	R. Webb	D. McLaren, R. Fitzpatrick	A. Brown	Ocean Fleets Ltd.
Prometheus	30.3.71	F. N. Curphey	B. J. Kay, J. F. Pilling, J. E. McGregor	E. O. Roberts	Ocean Fleets Ltd.
Protesilaus	20.12.70	R. G. Rippon	M. S. Browning, P. G. Taylor	R. A. Knight	Ocean Fleets Ltd.
Pyrrhus	30.12.70	A. G. Surtees	G. D. Warren, N. Y. C. Daniel, Y. G. Lai	H. N. Pollard	Ocean Fleets Ltd.
Queen Elizabeth 2	28.9.70	W. J. Law, R.D.	R. K. Sturge, G. Ferguson, J. R. D. Hall	D. H. Butterworth	Cunard S.S. Co Ltd.
Queensgarth	15.3.71	J. P. Waldock	J. Jackson, C. Reynolds, M. Winn, R. B. Milsom	C. K. Thornalley	Cory Maritime Ltd.
Queensland Star	22.6.70	D. S. Gilmour	J. Mockett, D. McNeil	I. S. Taylor	Blue Star Line Ltd.
Rakaia	2.10.70	A. Dorkins	R. Walker, P. Grimes, G. F. Everitt	R. S. Cavie	New Zealand Shipping Co. Ltd.
Rapallo	3.11.70	F. Metham	J. M. Jarratt, S. L. Moorby, D. E. Stevenson, B. Woods	M. F. Leemey	Ellerman's Wilson Line Ltd.
Raphael	4.12.70	E. D. Spooner	J. Hanley, J. Webber	G. Tyrell	Lamport & Holt Line Ltd.
Redcar	26.10.70	B. A. Lillivick	S. P. Coate, J. Coombe, T. Moodie, W. E. Barnes	B. Holness	Bolton Steam Shipping Co. Ltd.
Registan	27.11.70	R. Hodgson	D. F. Gates, J. W. Wightman, B. Vaughan	L. J. K. Kidd	Frank C. Strick & Co. Ltd.
Ribblehead	15.3.71	B. Lillivick	C. R. Ingham, M. A. Gater, J. Buddles, W. Barnes	R. Mortimer	Bolton Steam Shipping Co. Ltd.
Richmond Castle	17.9.70	H. Landless	R. Bigwood, J. M. Jones	G. O. Pople	Union-Castle Mail S.S. Co. Ltd.
Rievaulx	16.10.70	M. W. Siddle	C. R. Ingham, D. Fullwood, S. Spelman	S. Moss	Bolton Steam Shipping Co. Ltd.
Ripon	15.3.71	J. Parsloe	R. H. Jenkins, J. Cooper, S. P. Tilbury, M. Pitick	W. E. Hayes	Bolton Steam Shipping Co. Ltd.
Roland	30.7.70	W. A. Sparks	W. G. Wood, J. A. Woodward, V. A. Taylor, C. G. Waltersen	P. J. Hall	Lamport & Holt Line Ltd.
Romney	15.3.71	N. L. Mylchreest	G. C. Stonehouse, D. J. Jones, M. Southby	C. S. Currie	Lamport & Holt Line Ltd.
Ronsard	15.3.71	J. I. Jones, D.S.O., D.S.C.	C. Bufton, J. K. Schofield, P. J. C. Boistelle, D.S.C.	R. Prole	Lamport & Holt Line Ltd.
Roonagh Head	30.3.71	F. R. N. Best	J. McAllister, J. Bryans, D. Gillies	B. P. Kennedy	G. Heyn & Sons Ltd.
Rosemary Everard	16.11.70	W. G. Hunt	R. Davies, P. A. Brush		F. T. Everard & Sons Ltd.
Ross Orion	31.3.71	E. Thundercliffe	R. R. N. Laing	R. R. N. Laing	Ross Trawlers Ltd.
Rothesay Castle	2.10.70	G. S. Cochrane	A. Greenalgh, S. K. Watson, T. Petch		Union-Castle Mail S.S. Co. Ltd.
Rowallan Castle	25.9.70	M. P. R. Turner	A. A. Blakely, G. Jackson, J. Wallbridge, R. Belcourt	N. C. Ellis	Union-Castle Mail S.S. Co. Ltd.
Runswick	31.7.70	W. Watson	J. W. Thomson, F. T. Chapman, C. Bamford	N. S. Reeve	Headlam & Son Ltd.
St. Margaret	4.12.70	A. W. Millie	J. Preston, J. Cranston	J. McColl	Houlder Bros. & Co. Ltd.
St. Merriel	2.11.70	C. G. Wells			Houlder Bros. & Co. Ltd.
Sagamore	19.3.71	R. J. Coyle	—. Cooper, E. H. Dillen, C. R. Jenkins, T. H. Taylor	A. Leary	Furness Withy & Co. Ltd.
Salmela	13.11.69	C. J. Nicholson	G. Richard, I. F. Fair, L. Miles, C. Flockhart	P. Curson	Chr. Salvesen & Co. Ltd.
Santona	9.3.70	E. L. Seaton	D. N. Barr, M. B. Connor, A. G. Soppitt	A. P. G. Gray	G. Heyn & Sons Ltd.
Serbistan	22.10.70	D. Calvert	R. A. Atkinson, A. W. Jones	T. D. Ogbourne	Frank C. Strick & Co. Ltd.
Serenia	25.3.71	P. J. Blackshaw	R. Walton, K. Fenwick, A. E. Winskell	A. O'Neill	Shell Tankers (U.K.) Ltd.
Shahristan	11.2.71	W. H. D. Marker	W. I. Skinner, S. T. S. Household, G. Phillips	N. Samuel	Frank C. Strick & Co. Ltd.
Sheaf Crest	29.7.70	J. W. Dunn	T. I. Drever, R. L. Andrews, R. D. Mountney	W. E. Myles	W. A. Souter & Co. Ltd.
Sheaf Tyne	19.11.70	H. Dishman	J. R. Smith, T. E. Wilson, B. Denley	M. J. Ennis	W. A. Souter & Co. Ltd.
Shropshire	27.11.70	J. D. Routledge	W. D. Folley	K. McKay	Bibby Line Ltd.
Silksworth	7.1.71	N. Storey	A. G. K. Hamilton, R. Stephenson, F. Mordey, U. Easby	V. J. Lovie	R. S. Dalgliesh Ltd.
Silverbeach	4.1.71	P. J. Cornelius	D. R. Weaver, M. McDonald, N. F. Liddell	M. Adams	Silver Line Ltd.
Silversand	19.3.71	P. L. Hopkins	R. G. Robinson, I. J. Proctor, B. Wright		Silver Line Ltd.
Silversea	15.3.71	N. Tuddenham	D. Brennan, V. Isidoro, T. Wright	D. M. McDonald	Silver Line Ltd.
Silvershore	20.12.70	R. Safe	D. I. Vipond, J. Bates, D. Mustarde, H. N. Lawson	M. Mooney	Silver Line Ltd.

Selected Ships (*contd.*)

Name of Vessel	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Sir William Hardy	1.1.71	J. A. Whittleton		A. W. Stephen	Ministry of Technology
Somerset	11.12.70	W. F. T. Dan	N. S. Williams, S. Leuty, P. J. Zealley, W. Phimister	S. Brown	Federal S.N. Co. Ltd.
Southern Cross	26.3.71	W. M. Wheatley			Shaw Savill & Albion Co. Ltd.
Star Acadia	29.1.71	T. Hall	K. Wind, A. MacVicar, J. Sommerville	W. P. McGwan	Anchor Line Ltd.
Star Pinewood	*	W. H. Wolfe	A. Patterson, D. Blagg	R. Hunter	Wm. France Fenwick & Co. Ltd.
Starworth	17.12.70	A. Hurst	G. Winter, T. Kent	J. Murphy	R. S. Dalgliesh Ltd.
Stephano	20.4.70	J. Smith		P. D. Price	Bowring S.S. Co. Ltd.
Strathardle	13.1.71	J. Clifford	P. St. J. Jarvis, G. G. Lee, N. A. F. Rowe	R. Kennington	P. & O. Lines Management Ltd.
Strathbrora	12.3.71	D. P. Blois	M. E. Skipper, R. C. Matthew, S. A. Jackson	R. Barradell	P. & O. Lines Management Ltd.
Strathconon	11.2.71	D. J. Harrison	D. N. Keane, J. R. P. Tadman, D. M. Willis	J. K. Cochrane	P. & O. Lines Management Ltd.
Suevic	15.3.71	R. D. Jones	R. J. S. Squirrell, W. Downing, R. Lescombe	D. Yeo	Shaw Savill & Albion Co. Ltd.
Sugar Crystal	22.2.71	P. Sutcliffe	J. F. Allen, W. Cowan, S. Phillips	R. P. Skuse	Sugar Line Ltd.
Sugar Exporter	26.3.71	W. Shirreff	P. M. Wilmot, M. Murphy, A. Bartlett	B. Milliken	Sugar Line Ltd.
Sugar Importer	26.2.71	R. M. Pitts	H. I. Byrne, E. Gannon, W. Elliott, M. G. Stratton	J. G. Adams	Sugar Line Ltd.
Sugar Producer	10.11.70	N. S. Lancaster	P. M. Wilmot, T. A. Smith, J. C. E. Stuart	P. Hogan	Sugar Line Ltd.
Sugar Transporter	11.2.71	A. F. Lunn	I. M. Tait, D. L. Thomson, I. C. Gravatt	G. G. Graham	Sugar Line Ltd.
Sunek	28.10.70	R. G. C. Roberts	C. Carson-Weedon, D. Angel, R. Galea	J. Lee	John Kilgour & Co. Ltd.
Sussex	29.1.71	N. L. Warren	R. A. Carver, C. J. Roberts, M. B. Turner, C. P. Wise	R. J. Harris	Federal S.N. Co. Ltd.
Sylvan Arrow	8.8.69	C. Perry	R. Newnham, T. D. McArthur, R. J. Harvey, P. D. Kelly	A. Young	Mobil Shipping Co. Ltd.
Tactician	3.9.70	R. H. K. Ledger	J. S. Blakeley, C. A. Carew, J. M. Newby	F. P. Lawton	T. & J. Harrison Ltd.
Tamworth	15.2.71	G. S. Frank	C. W. Allison, M. Thorley, P. G. Sims, W. Bond	E. Callicott	R. S. Dalgliesh Ltd.
Tantallon Castle	5.8.70	T. Roberts	P. G. Lusted, M. J. Meyer	J. W. Gray	Union-Castle Mail S.S. Co. Ltd.
Tasmania Star	22.12.70	L. Allsford	R. Kendrick, M. Hall, L. de Lezameta, R. Aitken	R. Greaves	Blue Star Line Ltd.
Taupo	15.3.71	F. C. Taylor	A. D. Evans, R. C. Anderson, B. O'Dea	K. D. Wilson	New Zealand Shipping Co. Ltd.
Tekoa	23.11.70	T. F. J. Alderman, R.D.	E. C. M. Bishop, R. A. Jewnham, G. Maciver	J. E. Hocking	New Zealand Shipping Co. Ltd.
Telamon	26.3.71	B. M. Ketchen	I. W. Gibson, J. M. Hughes, K. T. Millar, A. R. Homer	D. McQueen	Ocean Fleets Ltd.
Temple Arch	18.3.71	D. L. Innes	J. C. Gibson, P. Dyson, A. L. Davie	M. Bird	Scottish Ship Management Ltd.
Teviotbank	18.6.70	C. S. Howe	T. D. Faithfull, I. Tew	R. M. S. Booth	Bank Line Ltd.
Texaco Brussels	15.1.70	H. Bennet	P. R. Igglesden, E. R. Hayes, J. Guthrie	J. Shand	Texaco Overseas Tankship (U.K.) Ltd.
Texaco Durham	10.11.70	J. Walker	R. C. Cottall, A. J. C. Metcalfe	G. Rutherford	Texaco Overseas Tankship (U.K.) Ltd.
Texaco Gloucester	15.5.70	I. McVicar	R. Watson, R. A. Russell, A. J. C. Metcalfe, G. Hay	M. B. Ryan	Texaco Overseas Tankship (U.K.) Ltd.
Texaco Pembroke	22.7.70	L. R. Simpson	W. Brackenridge, J. Elliott, S. Wozniak, P. J. Langdon	R. M. Botteley	Texaco Overseas Tankship (U.K.) Ltd.
Texaco Saigon	9.7.68	R. G. A. Barnes	R. A. Russell, J. Campbell, R. R. Brooks	G. Cockburn	Texaco Overseas Tankship (U.K.) Ltd.
Theseus	25.3.71	R. L. Brett	P. Roberts, R. Simons, P. Brown, D. Worsnop	D. P. Wood	Ocean Fleets Ltd.
Tongariro	10.3.71	H. J. D. Sladen	J. W. Murt, M. F. Keat, J. B. F. Hill	L. H. Sutton	New Zealand Shipping Co. Ltd.
Toronto City	13.2.70	D. Hine	M. Begg, J. Jewell, H. Owen	J. W. Ranson	Bibby Line Ltd.
Torr Head	29.1.70	E. G. Davey	J. Gaul, N. C. Stark, H. Thompson, J. McAllister	M. Thomas	G. Heyn & Sons Ltd.
Trebartha	12.3.71	W. H. Whitaker	D. Pascoe, M. J. Ball, H. A. S. Gillogley	J. Ritchie	Hain-Nourse Ltd.
Trecarne	29.12.70	C. Double	W. Venning, J. R. D. Peterkin, —. Robinson	C. K. Thornalley	Hain-Nourse Ltd.
Trefusis	18.12.70	W. F. Perkins	F. Brady, A. Murry, A. J. Bettles	R. H. Boatman	Hain-Nourse Ltd.
Tremeadow	26.10.70	F. Newell, M.B.E.	T. E. Clark, R. Stephenson, T. Raddings, C. Flanagan	F. McLoghlin	Hain-Nourse Ltd.
Treneglos	28.9.70	A. V. Rowles	K. N. Metcalfe, J. N. Cracknell, C. J. Price	J. P. Doherty	Hain-Nourse Ltd.

Trevalgan	22.2.71	J. V. Wallace	D. Carsey, M. F. Fawcett, M. Carter	B. Bicknell	Hain-Nourse Ltd.
Trevaylor	30.3.71	C. Thorpe	B. Purvis, R. Cape, C. J. Price		Hain-Nourse Ltd.
Trewidden	17.3.71	R. C. Lister	I. L. Roberts, A. J. Bettles, A. N. Tannock	C. G. MacAulay	Hain-Nourse Ltd.
Trinculo	14.12.70	E. V. Piper	R. D. Clarke, N. W. Shepherd, G. Nish, P. D. Haworth	R. G. H. Tyrer	Bowring S.S. Co. Ltd.
Turakina	24.11.70	B. Austin-Smith	M. Austin, A. D. G. Bell, M. H. Lawrence, P. G. Wright	G. D. Lawrence	New Zealand Shipping Co. Ltd.
Turkistan	9.11.70	M. Robinson	J. A. Suter, B. G. Peck, W. J. S. Burr, M. C. J. Jewell	G. W. Shaw	Frank C. Strick & Co. Ltd.
Uganda	8.10.70	R. Baker	A. M. Fisher, R. A. Hardman, C. A. H. Blake, J. Craig	G. M. Robinson	British India S.N. Co. Ltd.
Vancouver Forest	*	I. C. Campbell	D. MacDonald, A. Dorwart, S. P. Gorford	I. S. Murray	J. & J. Denholm Ltd.
Venassa	18.3.71	C. C. Waugh	A. M. Hoare, J. Moore, P. R. Jackson	S. G. Suttie	Shell Tankers (U.K.) Ltd.
Victore	30.11.70	C. Newson	T. S. Hobot, A. Gillie, E. Yon	P. Stanway	Mavroleon Bros. Ltd.
Victoria City	*	O. G. T. Lindsey	W. Phillan, D. Moffat, J. Porteus	S. Whitmore	Sir Wm. Reardon Smith & Sons Ltd.
Volvatella	4.2.71	A. L. Dales	T. F. Porter, R. Bridgewood, D. R. Cooper	M. B. Ryan	Shell Tankers (U.K.) Ltd.
Wanliu	12.1.67	J. W. G. Wilby	J. N. Bolton, J. Milward, D. R. Parkinson	Tang Yuen	China Navigation Co. Ltd.
Warwickshire	17.11.70	A. Hudson	I. T. Davies, S. R. Dyer, M. R. Robbins	T. H. Phillips	Bibby Line Ltd.
Welsh City	15.3.71	J. D. Lloyd	P. M. Asquith, L. M. Hayler, M. C. Hurst	S. G. Elliston	Sir Wm. Reardon Smith & Sons Ltd.
Welsh Herald	15.2.71	A. C. H. Allerston	R. G. A. Newcombe, I. D. Jones, T. H. Quirk	H. Foster	Welsh Ore Carriers Ltd.
Westminster Bridge	12.3.70	M. G. King	R. F. A. Kendrick, K. Anderson, K. Appleton	R. Bateman	Britain S.S. Co. Ltd.
Westmorland	29.12.70	J. A. North	D. G. Beckett, M. A. Hill, D. S. MacDonald, L. J. Hesketh	M. J. Morrall	New Zealand Shipping Co. Ltd.
Windsor Castle	11.1.71	R. Wright			Union-Castle Mail S.S. Co. Ltd.
Woosung	10.11.70	M. H. A. Swift	J. J. Milton, D. W. Latter, C. J. Langford, D. H. Norcott	Mak Wai Man	China Navigation Co. Ltd.
Yewbank	14.12.70	B. J. Peterson	R. W. Boatwright, D. C. Boyter, A. D. S. Dodds	K. H. Sellar	Bank Line Ltd.
Zaphon	15.7.70	M. Leguen de Lacroix	B. D. Snazell, D. Caldow, I. Dixon-Patterson	F. H. Dixon	Shell Tankers (U.K.) Ltd.

Supplementary Ships

Name of Vessel	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Aaro	31.3.70	W. White	D. M. Risby, J. M. Jarratt, P. Hudson, D. J. C. Martin	F. H. Nichols	Ellerman's Wilson Line Ltd.
Apollo	15.3.71	G. V. Barnes	W. R. Kays, L. G. Rock, J. S. Earl, E. Foley		Bristol S.N. Co. Ltd.
Arcadian	26.11.70	C. R. Kilby	K. Steven, S. A. Sorrell	B. Holdsworth	Ellerman Lines Ltd.
Baltic Vanguard	*	J. C. Collins	B. A. Cushing, D. Hammond, D. Burns	J. Newman	United Baltic Co. Ltd.
Baltic Venture	*	R. Kreamer	H. J. Speaght, I. Chester	P. Fensome	United Baltic Co. Ltd.
Bendoran	28.11.69	R. L. Bruce	N. M. Wight, J. Fleming, D. O'Neil	J. Cullen	Ben Line Steamers Ltd.
Benmacdhui	11.2.71	D. Wright	B. Lee, J. H. Martin, K. Kennedy	B. Wilkinson	Ben Line Steamers Ltd.
Boston York	*	J. C. Collins	B. A. Cushing, D. Hammond, D. Burns	J. Newman	Boston Deep Sea Fisheries Ltd.
British Chivalry	6.1.70	G. Barber			B.P. Tanker Co. Ltd.
British Destiny	27.4.70	J. Beattie	D. Pack, D. A. Smith, P. A. O'Donovan	R. Quinn	B.P. Tanker Co. Ltd.
British Energy	19.3.71	J. B. Hunter	W. E. Nergaard, M. A. Brown, W. J. Brennan, H. Skeath, P. C. Townley	K. Hawkins	B.P. Tanker Co. Ltd.
British Mallard	*	S. J. Hunter	T. L. Hall, L. T. Minor, B. Pyburn	M. Wadsworth	B.P. Tanker Co. Ltd.
British Patrol	1.5.70	D. O. W. Jones	A. R. Edwards, J. McCloud, R. S. Walker	J. H. Kell	B.P. Tanker Co. Ltd.
British Reliance	20.4.70	D. G. Buckley	P. W. Wilson, R. Gray, D. H. Snowdon	J. O. Walsh	B.P. Tanker Co. Ltd.
British Robin	20.4.70	J. W. Strachan	A. de Ste. Croix, P. J. F. Williams	E. Farrelly	B.P. Tanker Co. Ltd.
Camellia	25.9.69	W. R. Hunter	J. C. Gemmeken, G. W. Robinson, I. Blower, S. D. Hyland	E. Conlon	J. Robinson & Sons Ltd.
Echo	22.3.71	J. L. Jenkins	E. H. Jones, M. D. Coles, K. P. Slade, L. G. Rock		Bristol S.N. Co. Ltd.
Esso Lancashire	26.2.70	F. Verbist	R. W. Gunns, J. W. Hughes, J. M. Pratt, R. G. Whitford	G. Walsh	Esso Petroleum Co. Ltd.
Esso Westminster	26.9.69	G. Eunson	A. M. Kehoe, A. E. L. Sargeant, J. G. Bean	D. A. L. Sutherland	Esso Petroleum Co. Ltd.
Ethel Everard	5.8.70	H. O. Roberts	D. G. Green		F. T. Everard & Sons Ltd.
Joseph Conrad	29.9.70	B. Taylor	J. S. Hallam	J. S. Hallam	Newington Trawlers Ltd.
Kirkella	9.11.70	R. Chatterton	W. M. Davies	W. M. Davies	J. Marr & Sons Ltd.
Lady Parkes	30.12.70	P. E. Craven	C. Sheen	C. Sheen	St. Andrew's Steam Fishing Co. Ltd.
Lord Nelson	29.7.70	N. E. Longthorp	G. W. Taylor	G. W. Taylor	Hellyer Bros. Ltd.
Mangla	30.11.70	D. H. Morris	J. Holloway, J. Rieldyk	I. A. Hamilton	Cunard-Brocklebank Ltd.
Marbella	26.3.71	R. Boughen	G. R. Smith	G. R. Smith	J. Marr & Sons Ltd.
Maretta	13.3.69	S. Christy	J. Hind	J. Hind	J. Marr & Sons Ltd.
Methane Princess	29.1.71	R. S. Murchie	A. R. Lamb, A. J. Andrews, R. L. Cheshire, M. A. Byrne	T. B. Bayley	Shell Tankers (U.K.) Ltd.
Methane Progress	29.1.71	A. M. Andrews		A. J. Almond	Shell Tankers (U.K.) Ltd.
Mobil Acme	14.8.69	J. Miller	D. A. M. Williams, R. G. Barker, D. R. Porter, R. B. Walker	K. Walsh	Mobil Shipping Co. Ltd.
Mobil Endurance	20.4.70	J. Pawlowicz	I. M. Davison, R. Day, J. McGurk, C. J. G. Harker	R. C. Earle	Mobil Shipping Co. Ltd.
Mobil Energy	15.6.70	A. M. Marsden			Mobil Shipping Co. Ltd.
Mobil Pegasus	*	J. Millar	J. C. Cole, K. J. Beverley, J. Dunham. A. Hughes	M. A. Place	Mobil Shipping Co. Ltd.
Northella	12.3.71	L. Fewster	R. Baillie	R. Baillie	J. Marr & Sons Ltd.
Northern Reward	7.9.70	W. Harris	S. B. Barr	S. B. Barr	Northern Trawlers Ltd.
Ross Implacable	26.3.71	G. Whur	A. Ramsay	A. Ramsay	Ross Trawlers Ltd.
St. Jason	26.3.71	T. Doyle	K. C. Stone	K. C. Stone	T. Hamling & Co. Ltd.
St. Jasper	9.11.70	E. J. Johnson	A. Ball	R. T. Murphy	T. Hamling & Co. Ltd.
Streambank	13.11.70	H. Barber	C. M. R. Irish, H. MacDonald		Bank Line Ltd.
Tarbaristan	23.3.70	P. W. A. Filcek	P. C. J. Edgecombe, R. W. Lorains, M. J. Sterland	E. Marks	Frank C. Strick & Co. Ltd.
Tolsta	8.10.68	G. Barrie	J. Liddle		Chr. Salveson & Co. Ltd.
Tudor Prince	20.12.70	B. Ditchburn	G. Crowe, A. C. Collop, R. Kinnier, J. Rogers	C. Wortham	Prince Line 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	Trawler Owner/Manager
G. Baxter	F. R. Hailstones	R. Irvin & Sons Ltd.
A. T. Blenkin	R. T. Murphy	T. Hamling & Co. Ltd.
W. Brettell	K. Harrison	Newington Trawlers Ltd.
L. Brown	C. Bird	Boyd Line Ltd.
M. Clark	C. Hodder	Hellyer Bros. Ltd.
P. Crane	P. R. Hickson	Northern Trawlers Ltd.
R. Cross	A. S. Wittlin	Northern Trawlers Ltd.
G. Drewery	J. Blake	Hellyer Bros. Ltd.
D. Grewar	A. J. Nettleship	Hellyer Bros. Ltd.
C. Hamling	M. Harland	Boyd Line Ltd.
B. Hardcastle	M. E. Morrow	Firth Steam Trawling Co. Ltd.
F. Howden	M. R. Read	Ross Trawlers Ltd.
J. W. Humphrey	H. G. Pask	T. Hamling & Co. Ltd.
B. McCall	J. L. Thorpe	British United Trawlers
F. Myers	J. Brickwood	Hudson Bros. Trawlers Ltd.
R. Pepper	P. R. Hickson	Northern Trawlers Ltd.
J. W. Russell	W. Brown	Hellyer Bros. Ltd.
T. Sawyers	G. A. Osborne	Firth Steam Trawling Co. Ltd.
P. Skipworth	H. G. Pask	T. Hamling & Co. Ltd.
D. Spivey	C. Y. Chan	Hellyer Bros. Ltd.
E. Thundercliffe	C. Bird	Boyd Line Ltd.
D. Whiting	G. Duffield	Hudson Bros. Trawlers Ltd.

Light-vessels

Name of Vessel	Masters
Bar	A. Woodhall, A. C. Ryan
Dowsing	A. S. Richards, R. Halfnight
East Goodwin	B. E. Nobes, F. J. Shilling
Galloper	E. L. Jaeger, E. Marsden
Humber	F. W. Grice, S. F. Goose
Longstone (Lt. Ho.)	D. G. Sythes
Newarp	G. A. Harris, L. R. Long
North Carr	J. Leask, T. H. Henderson
Royal Sovereign	B. R. Woolnough, G. Davies
St. Gowan	M. F. Roche, S. R. Manning
Seven Stones	A. W. Allum, W. Johnson
Shambles	H. Price, R. W. Goddard
Shipwash	J. Goldsmith, F. D. Gayton
South Rock	D. Hawkins, S. E. Griffin
Smith's Knoll	F. Harrison, F. George
Varne	B. W. Mead, J. Seller

'Marid' Ships

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

Name of Vessel	Captain	Owner/Manager
**Ashington*	M. A. Hartley	Stephenson Clarke Ltd.
Avalon	W. Bramhill	British Railways Board
Bardic Ferry	C. H. Hughey	Atlantic S.N. Co. Ltd.
**Brenda*	J. Henderson	Dept. of Agriculture & Fisheries for Scotland
**Caesarea*	B. A. Caws	British Railways Board
Cambria	W. J. Roberts	British Railways Board
**Cerdic Ferry*	C. Tanner	Atlantic S.N. Co. Ltd.
Claymore	D. Gunn	David MacBrayne Ltd.
Clupea	J. Jappy	Dept. of Agriculture & Fisheries for Scotland
**Corbank*	F. H. Lamming	Wm. Cory & Sons Ltd.
Corbrae	P. Dobson	Wm. Cory & Sons Ltd.
**Corkbrook*	—. Simpson	Comben Longstaff & Co. Ltd.
Darlington	H. Boyes	Associated Humber Lines Ltd.
Doric Ferry	R. Hockings	Atlantic S.N. Co. Ltd.
Dorset Coast	D. Anderson	Coast Lines Ltd.
Duke of Argyll	L. C. Mills	British Railways Board
Duke of Lancaster	C. D. Cush	British Railways Board.
Duke of Rothesay	D. O. Griffiths	British Railways Board
Eileen M	C. Chougan	Metcalf Motor Coasters Ltd.
Elwick Bay	W. G. Dennison	Elwick Shipping Co.
Ettrick	G. Patience	G. Gibson & Co. Ltd.
Fallowfield	R. Saunders	Coast Lines Ltd.
Ferryhill	J. Innes	Aberdeen Coal & Shipping Co. Ltd.
Fingal	R. McEachern	Northern Lighthouse Board
Hamble	M. Bagshaw	Shell-Mex & B.P. Ltd.
Harrogate	J. R. Rowlands	British Railways Board
**Hebrides*	J. C. Hodgson	David MacBrayne Ltd.
**Helmsdale*	A. F. Ross	Northern Trading Co. Ltd.
**Hesperus*	D. MacCorquodale	Northern Lighthouse Board
Hibernia	R. Roberts	British Railways Board
Innisfallen	J. Sydenham	British & Irish Steam Packet Co. Ltd.
Ionic Ferry	W. Close	Atlantic S.N. Co. Ltd.
Isle of Ely	O. W. Jones	British Railways Board
Lairdsglen	A. Palmer	Burns & Laird Lines Ltd.
Loch Carron	—. Gray	David MacBrayne Ltd.
Loch Dunvegan	A. C. Mathieson	David MacBrayne Ltd.
**Loch Seaforth*	J. Smith	David MacBrayne Ltd.
Navigator	R. D. Yell	Decca Navigator Co. Ltd.
**Oreosa*	J. Jacques	Houlder Bros. Ltd.
Penelope Everard	W. Mackinnon	F. T. Everard & Sons Ltd.
Pentland	A. Wallace	Currie Line Ltd.
**Pharos*	C. Campbell	Northern Lighthouse Board
**Plover*	J. A. Everett	General S.N. Co. Ltd.
Pointer	—. Sanders	Burns & Laird Lines Ltd.
**Pole Star*	F. Davidson	Northern Lighthouse Board
**St. Clair*	J. Fullerton	North of Scotland Shipping Co. Ltd.
St. David	D. O. Griffiths	British Railways Board
St. George	S. E. Dale	British Railways Board
**St. Patrick*	N. Deadman	British Railways Board
**Sarnia*	H. Walker	British Railways Board
**Scotia*	J. G. Brown	Dept. of Agriculture & Fisheries for Scotland
**Selby*	P. Baker	British Railways Board
Slieve Bawn	A. Robertson	British Railways Board
Slieve Bearnagh	J. Peters	British Railways Board
Slieve Donard	R. Howell	British Railways Board
Spartan Prince	H. D. Davies	Coast Lines Ltd.
Spero	A. T. Jardine	Ellerman's Wilson Line Ltd.
**Spray*	J. Andrews	Ellis & McHardy Ltd.
Stormont	E. Knight	Belfast S.S. Co. Ltd.
Torquay	G. Proctor	J. D. Davidson Ltd.
Ulster Queen	W. W. Lucas	Belfast S.S. Co. Ltd.
W. J. H. Wood	D. Battle	Stephenson Clarke Ltd.
**Warwickbrook*	R. Bilton	Comben Longstaff & Co. Ltd.
Westminsterbrook	J. H. Shaw	Comben Longstaff & Co. Ltd.
William J. Everard	T. L. Vaughan	F. T. Everard & Sons Ltd.

*These ships report wind and weather.

BRITISH COMMONWEALTH

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

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

AUSTRALIA (Information dated 31.3.71)

Name of Vessel	Owner/Manager
Selected Ships:	
Abel Tasman	H. C. Sleigh Ltd.
Al Mahrosa	Sheiks of Kuwait
Andros	Australia-West Pacific Line
Arafura	Eastern & Australian S.S. Co. Ltd.
Ariake	Eastern & Australian S.S. Co. Ltd.
Australasia	Austasia Line Ltd.
Bamora	British India S.N. Co. Ltd.
Barpeta	British India S.N. Co. Ltd.
Bogong	Associated S.S. Pty. Ltd.
B.P. Endeavour	B.P. Tankers Co. Ltd.
B.P. Enterprise	B.P. Tankers Co. Ltd.
Cape Don	Dept. of Shipping & Transport, Australia
Cape Pillar	Dept. of Shipping & Transport, Australia
Carpentaria	British India S.N. Co. Ltd.
Cathay	Eastern & Australian S.S. Co. Ltd.
Centaur	Ocean Fleets Ltd.
Chakdina	British India S.N. Co. Ltd.
Chakrata	British India S.N. Co. Ltd.
Chitral	Eastern & Australian S.S. Co. Ltd.
Cleveden	Lynn Elders
Clutha Oceanic	Clutha Development Pty. Ltd.
Coral Chief	China Navigation Co. Ltd.
Delamere	Western Australian State Shipping Service
Delos	Australia-West Pacific Line
Dongara	Western Australian State Shipping Service
Dorrigo	Western Australian State Shipping Service
Dulverton	Western Australian State Shipping Service
Eigamoiya	Nauru Pacific Shipping Line
Empress of Australia	Australian National Line
Gauvacore	Maritime Fruit Carriers Pty. Ltd.
Halifax Star	Blue Star Line Ltd.
Hobart Star	Blue Star Line Ltd.
Iron Cavalier	Broken Hill Pty. Co. Ltd.
Iron Derby	Broken Hill Pty. Co. Ltd.
Iron Flinders	Broken Hill Pty. Co. Ltd.
Iron Kimberley	Broken Hill Pty. Co. Ltd.
Iron Yampi	Broken Hill Pty. Co. Ltd.
Island Chief	China Navigation Co. Ltd.
Juna	British India S.N. Co. Ltd.
Kabbarli	Western Australian State Shipping Service
Kangaroo	Western Australian State Shipping Service
Kanimbla	Associated S.S. Pty. Ltd.
Koolama	Western Australian State Shipping Service
Kooringa	Associated S.S. Pty. Ltd.
Lemnos	Australia-West Pacific Line
Manoora	Associated S.S. Pty. Ltd.
Matthew Flinders	Flinders Shipping Co. Pty. Ltd.
Milos	Australia-West Pacific Line
Moana Raoi	British Administration of the Gilbert & Ellice Islands
Mundoora	Associated S.S. Pty. Ltd.
Nimos	Australia-West Pacific Line
Ore Regent	Clutha Development Pty. Ltd.
Papuan Chief	China Navigation Co. Ltd.
Port Albany	Port Line Ltd.
Port Huon	Port Line Ltd.
Port Melbourne	Port Line Ltd.
Port Montreal	Port Line Ltd.
Port New Plymouth	Port Line Ltd.
Port St. Lawrence	Port Line Ltd.
Rhexenor	Ocean Fleets Ltd.
Rona	Colonial Sugar Refining Co. Ltd.
Rosie D.	Nauru Pacific Shipping Line
Safia	Karlander (Papua) Pty. Ltd.
Samos	Australia-West Pacific Line
Stentor	Ocean Fleets Ltd.
Sletholm	Karlander (Papua) Pty. Ltd.
Tairea	British India S.N. Co. Ltd.
Taiyuan	China Navigation Co. Ltd.
Tanda	British India S.N. Co. Ltd.
Teesta	British India S.N. Co. Ltd.
Thorsorient	Norse Orient Line
Townsville Star	Blue Star Line Ltd.
Triadic	British Phosphate Commissioners
Tri-Ellis	British Phosphate Commissioners
Troubridge	Adelaide S.S. Co. Ltd.
Tsingtao	China Navigation Co. Ltd.
Warina	British India S.N. Co. Ltd.
Wongala	Tucker Shipping Pty. Ltd.
Supplementary Ships:	
Bass Trader	Australian National Line
Seafoy II	Canadian Superior (Aust.) Ltd.

CANADA (Information dated 15.3.71)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
Alert	Government of Canada
Arcadia	P. & O. Lines Management Ltd.
A. T. Cameron	Government of Canada
Baffin	Government of Canada
Baron Forbes	H. Hogarth & Sons Ltd.
Binsnes	Tenax S.S. Co. Ltd.
Bluenose	Canadian National Railways
Bridgepool	Sir R. Ropner & Co. Ltd.
Camsell	Government of Canada
Canberra	P. & O. Lines Management Ltd.
Chebucto	Government of Canada
Cornish City	Sir Wm. Reardon Smith & Sons Ltd.
Dawson	Government of Canada
Derbyshire	Bibby Line Ltd.
d'Iberville	Government of Canada
Frank H. Brown	White Pass & Yukon Ltd.
G. B. Reed	Government of Canada
Gulf Canada	Gulf Oil Ltd.
H 1060	Kent Line Ltd.
H 1070	Kent Line Ltd.
H. R. MacMillan	Canadian Pacific S.S. Ltd.
Hudson	Government of Canada
Iberia	P. & O. Lines Management Ltd.
Imperial Bedford	Imperial Oil Ltd.
Imperial Acadia	Imperial Oil Ltd.
Imperial Ottawa	Imperial Oil Ltd.
Imperial Quebec	Imperial Oil Ltd.
Imperial St. Lawrence	Imperial Oil Ltd.
Irving Glen	Kent Line Ltd.
Irvingstream	Kent Line Ltd.
Ixia	Stag Lines Ltd.
John A. Macdonald	Government of Canada
John Cabot	Government of Canada
J. V. Clyne	Canadian Pacific S.S. Ltd.
Kapuskasing	Government of Canada
Labrador	Government of Canada
Limnos	Government of Canada
Louis S. St. Laurent	Government of Canada
Martin Karlsen	Government of Canada
Montcalm	Government of Canada
N. B. McLean	Government of Canada
Nego Anne	Wallem & Co. A/S
Norman McLeod Rogers	Government of Canada
North Breeze	Manners Navigation Co. Ltd.
Northern Shell	Shell Canada Ltd.
N. R. Crump	MacMillan & Clyne Ltd.
Oriana	P. & O. Lines Management Ltd.
Porte Dauphine	Government of Canada
Quebec	Messabec Ltd.
Queen of Prince Rupert	British Columbia Ferry Authority
Silvercape	Silver Line Ltd.
Silvercove	Silver Line Ltd.
Sir Humphrey Gilbert	Government of Canada
Texada	Wingate International Shipping Co.
Thomas Carleton	Government of Canada
Thor I	Thor Dahl A/S
Thorshope	Thor Dahl A/S
Thorsriver	Thor Dahl A/S
Thorstream	Thor Dahl A/S
Thorswave	Thor Dahl A/S
W. C. Van Horne	Canadian Pacific S.S. Ltd.
Wheat King	Upper Lakes Shipping Co. Ltd.
Supplementary Ships:	
Anna Bakke	Knut Knutsen O.A.S.
Astrid Bakke	Knut Knutsen O.A.S.
Bonneville	A. F. Klaveness & Co. A/S
Bougainville	A. F. Klaveness & Co. A/S
Broxville	A. F. Klaveness & Co. A/S
Emerillon	Shell Canada Ltd.
Gosforth	Burnett Steamship Ltd.
Kanangoora	Transatlantic Steamship Co. Ltd., Goteborg
Maxwell	Government of Canada
Princess of Acadia	Canadian Pacific S.S. Ltd.
William Carson	Canadian National Railways

Auxiliary Ships:

Canada has 50 ocean-going Auxiliary Ships and 51 Auxiliary Ships operating on the Great Lakes.

INDIA (Information dated 1.3.71)

NAME OF VESSEL	OWNER/MANAGER
Selected Ships:	
Andamans	Shipping Corporation of India Ltd.
Dumra	British India S.N. Co. Ltd.
Dwarka	British India S.N. Co. Ltd.
Indian Exporter	India S.S. Co. Ltd.
Indian Merchant	India S.S. Co. Ltd.
Indian Pioneer	India S.S. Co. Ltd.
Indian Reliance	India S.S. Co. Ltd.
Indian Renown	India S.S. Co. Ltd.
Indian Security	India S.S. Co. Ltd.
Indian Shipper	India S.S. Co. Ltd.
Indian Success	India S.S. Co. Ltd.
Indian Trader	India S.S. Co. Ltd.
Jaladhanya	Scindia S.N. Co. Ltd.
Jaladharma	Scindia S.N. Co. Ltd.
Jaladhruv	Scindia S.N. Co. Ltd.
Jaladuhita	Scindia S.N. Co. Ltd.
Jalaganga	Scindia S.N. Co. Ltd.
Jalagouri	Scindia S.N. Co. Ltd.
Jalajawahar	Scindia S.N. Co. Ltd.
Jalakrishna	Scindia S.N. Co. Ltd.
Jalapalak	Scindia S.N. Co. Ltd.
Jalazad	Scindia S.N. Co. Ltd.
Kampala	British India S.N. Co. Ltd.
Karanja	British India S.N. Co. Ltd.
Mahavikram	South East Asia Shipping Co. Ltd.
Mohammedi	Mogul Line Ltd.
Mozaffari	Mogul Line Ltd.
Nicobar	Shipping Corporation of India Ltd.
Rajula	British India S.N. Co. Ltd.
Saudi	Mogul Line Ltd.
Sirdhana	British India S.N. Co. Ltd.
State of Assam	Shipping Corporation of India Ltd.
State of Bihar	Shipping Corporation of India Ltd.
State of Bombay	Shipping Corporation of India Ltd.
State of Gujarat	Shipping Corporation of India Ltd.
State of Kutch	Shipping Corporation of India Ltd.
State of Haryana	Shipping Corporation of India Ltd.
State of Madras	Shipping Corporation of India Ltd.
State of Maharashtra	Shipping Corporation of India Ltd.
State of Orissa	Shipping Corporation of India Ltd.
State of Tr. Cochin	Shipping Corporation of India Ltd.
State of Uttar Pradesh	Shipping Corporation of India Ltd.
Vishva Prabha	Shipping Corporation of India Ltd.
Vishva Sudha	Shipping Corporation of India Ltd.
Supplementary Ships:	
APJ Akash	Apeejay Line Ltd.
APJ Ambika	Apeejay Line Ltd.
APJ Sushma	Apeejay Line Ltd.
Bande Nawaz	Hind Agencies Ltd.
Bellary	Shipping Corporation of India Ltd.
Chanakya Jayanti	Jayanti Shipping Co. Ltd.
Damodar Mondovi	Damodar Bulk Carriers Ltd.
Damodar Zuari	Damodar Bulk Carriers Ltd.
Desh Bandhu	Shipping Corporation of India Ltd.
Ghandi Jayanti	Jayanti Shipping Co. Ltd.
Indian Industry	India S.S. Co. Ltd.
Indian Resolve	India S.S. Co. Ltd.
Indian Resource	India S.S. Co. Ltd.
Indian Splendour	India S.S. Co. Ltd.
Indian Strength	India S.S. Co. Ltd.
Indian Tradition	India S.S. Co. Ltd.
Indian Tribune	India S.S. Co. Ltd.
Indian Triumph	India S.S. Co. Ltd.
Indian Trust	India S.S. Co. Ltd.
Jag Kisan	Great Eastern Shipping Co. Ltd.
Jag Laxmi	Great Eastern Shipping Co. Ltd.
Jag Manek	Great Eastern Shipping Co. Ltd.
Jag Ratna	Great Eastern Shipping Co. Ltd.
Jag Shanti	Great Eastern Shipping Co. Ltd.
Jag Vijay	Great Eastern Shipping Co. Ltd.
Jagat Neta	Great Eastern Shipping Co. Ltd.
Jaladharati	Scindia S.N. Co. Ltd.
Jaladhir	Scindia S.N. Co. Ltd.
Jaladurga	Scindia S.N. Co. Ltd.
Jaladuta	Scindia S.N. Co. Ltd.
Jalagirija	Scindia S.N. Co. Ltd.
Jalagomati	Scindia S.N. Co. Ltd.
Jalagopal	Scindia S.N. Co. Ltd.
Jalajyoti	Scindia S.N. Co. Ltd.
Jalakala	Scindia S.N. Co. Ltd.
Jalakanta	Scindia S.N. Co. Ltd.
Jalakendra	Scindia S.N. Co. Ltd.
Jalakirti	Scindia S.N. Co. Ltd.
Jalamani	Scindia S.N. Co. Ltd.
Jalapankhi	Scindia S.N. Co. Ltd.

INDIA (*contd.*)

Name of Vessel	Owner/Manager
Jalarajan	Scindia S.N. Co. Ltd.
Jalarashmi	Scindia S.N. Co. Ltd.
Jalaratna	Scindia S.N. Co. Ltd.
Jalaveera	Scindia S.N. Co. Ltd.
Jalavijay	Scindia S.N. Co. Ltd.
Jalavikram	Scindia S.N. Co. Ltd.
Jalavishnu	Scindia S.N. Co. Ltd.
Jawaharlal Nehru	Shipping Corporation of India Ltd.
Krishna Jayanti	Jayanti Shipping Co. Ltd.
Lok Sevak	Mogul Line Ltd.
Maha Raja	South East Asia Shipping Co. Ltd.
Rama Jayanti	Jayanti Shipping Co. Ltd.
Ranee	Asiatic S.N. Co. Ltd.
Ratna Manjushree	Ratnakar Shipping Co. Ltd.
Ratna Usha	Ratnakar Shipping Co. Ltd.
Sagar Sudha	Africana Shipping Co. Ltd.
Shompen	Shipping Corporation of India Ltd.
State of Andhra	Shipping Corporation of India Ltd.
State of Kerala	Shipping Corporation of India Ltd.
State of Madhya Pradesh	Shipping Corporation of India Ltd.
State of Mysore	Shipping Corporation of India Ltd.
State of Punjab	Shipping Corporation of India Ltd.
State of Rajasthan	Shipping Corporation of India Ltd.
State of West Bengal	Shipping Corporation of India Ltd.
Varuna Kanchan	Thakur S.S. Co. Ltd.
Vishva Bhakti	Shipping Corporation of India Ltd.
Vishva Bindu	Shipping Corporation of India Ltd.
Vishva Chetana	Shipping Corporation of India Ltd.
Vishva Jyoti	Shipping Corporation of India Ltd.
Vishva Kalyan	Shipping Corporation of India Ltd.
Vishva Kanti	Shipping Corporation of India Ltd.
Vishva Kaushal	Shipping Corporation of India Ltd.
Vishva Kirti	Shipping Corporation of India Ltd.
Vishva Kusum	Shipping Corporation of India Ltd.
Vishva Mahima	Shipping Corporation of India Ltd.
Vishva Mangal	Shipping Corporation of India Ltd.
Vishva Marg	Shipping Corporation of India Ltd.
Vishva Maya	Shipping Corporation of India Ltd.
Vishva Nidhi	Shipping Corporation of India Ltd.
Vishva Pratap	Shipping Corporation of India Ltd.
Vishva Prem	Shipping Corporation of India Ltd.
Vishva Sandesh	Shipping Corporation of India Ltd.
Vishva Shobha	Shipping Corporation of India Ltd.
Vishva Siddhi	Shipping Corporation of India Ltd.
Vishva Tilak	Shipping Corporation of India Ltd.
Vishva Tirth	Shipping Corporation of India Ltd.
Vishva Tej	Shipping Corporation of India Ltd.
Vishva Usha	Shipping Corporation of India Ltd.
Vishva Vandana	Shipping Corporation of India Ltd.
Vishva Vibhuti	Shipping Corporation of India Ltd.
Vishva Vijay	Shipping Corporation of India Ltd.
Vishva Vikas	Shipping Corporation of India Ltd.
Vishva Vinay	Shipping Corporation of India Ltd.
Vishva Vir	Shipping Corporation of India Ltd.

Auxiliary Ships:

India has 8 Auxiliary Ships.

NEW ZEALAND (Information dated 20.4.71)

Name of Vessel	Owner/Manager
Selected Ships:	
City of Auckland	Ellerman & Bucknall S.S. Co. Ltd.
Holmburn	Holm Shipping Co. Ltd.
James Cook	New Zealand Government
Kaimiro	Union S.S. Co. of New Zealand Ltd.
Kaitoa	Union S.S. Co. of New Zealand Ltd.
Kaitoke	Union S.S. Co. of New Zealand Ltd.
Kaituna	Union S.S. Co. of New Zealand Ltd.
Karamu	Union S.S. Co. of New Zealand Ltd.
Karepo	Union S.S. Co. of New Zealand Ltd.
Karetu	Union S.S. Co. of New Zealand Ltd.
Katea	Union S.S. Co. of New Zealand Ltd.
Kawaroa	Union S.S. Co. of New Zealand Ltd.
Kawatiri	Union S.S. Co. of New Zealand Ltd.
Kaweraw	Union S.S. Co. of New Zealand Ltd.
Koraki	Union S.S. Co. of New Zealand Ltd.
Koranui	Union S.S. Co. of New Zealand Ltd.
Kowhai	Union S.S. Co. of New Zealand Ltd.
Kurutai	Union S.S. Co. of New Zealand Ltd.
Maheno	Union S.S. Co. of New Zealand Ltd.
Maori	Union S.S. Co. of New Zealand Ltd.
Marama	Union S.S. Co. of New Zealand Ltd.
Moana Roa	New Zealand Government
Navua	Union S.S. Co. of New Zealand Ltd.
Ngahere	Union S.S. Co. of New Zealand Ltd.
Ngakuta	Union S.S. Co. of New Zealand Ltd.
Ngapara	Union S.S. Co. of New Zealand Ltd.
Ngatoro	Union S.S. Co. of New Zealand Ltd.
Sedco 135F	Shell B.P. Todd Oil Services Ltd.
Taranui	South Pacific S.S. Co. Ltd.
Tarawera	Union S.S. Co. of New Zealand Ltd.
Taveuni	Union S.S. Co. of New Zealand Ltd.
Tofua	Union S.S. Co. of New Zealand Ltd.
Valetta	British Phosphate Commissioners
Waikare	Union S.S. Co. of New Zealand Ltd.
Waimate	Union S.S. Co. of New Zealand Ltd.
Waimea	Union S.S. Co. of New Zealand Ltd.
Wellington Exporter	New Zealand Maritime Services Ltd.
Supplementary Ships	
Aotearoa	New Zealand Sea Transport Ltd.
Aramoana	New Zealand Government Railways Department
Aramui	New Zealand Government Railways Department
Hawea	Union S.S. Co. of New Zealand Ltd.

Auxiliary Ships:
New Zealand also has a fleet of 19 Auxiliary Ships currently reporting.

PAKISTAN (Information dated 1.1.71)

Name of Vessel	Call Sign
Selected Ships:	
Abasin	AQVO
Al-Husaini	AQAH
Al-Sayyada	AQAS
Anwarbaksh	AQAM
Bagh-e-Karachi	AQVM
Fatehabad	AQBM
Karim	AQVE
Mustali	AQLY
Ocean Endurance	AQBW
Safina-e-Arab	AQVA
Safina-e-Hujjaj	AQLW
Safina-e-Nusrat	AQLM
Shams	AQLN
Supplementary Ships:	
Dacca City	AQEQ
Iqbal Baksh	AQLE
Jehangirabad	AQEN
Karnaphuli	AQVP
Mohenjodoro	AQNC
Ocean Energy	AQVB
Sadaqat	AQVK
Surma	AQGL
Warsak	AQMW

Auxiliary Ships:
Pakistan has 26 Auxiliary Ships.

HONG KONG (Information dated 10.3.71)

Name of Vessel	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Anshun	R. J. Shipp	S. K. Toon, D. W. Latter, A. A. Edgar, G. A. Cooper	M. H. Leung	China Navigation Co. Ltd.
Cape St. Mary	Chan Hok-min	Kwok Yung-sing, Ngau Min-shing	Wong Kam-tim	Agriculture & Fisheries Dept., H.K. Govt.
Cardross	T. J. McDonough	A. P. Advani, M. R. Shelverton, Chan Kwong-yu	Chan Kun	Kian Hin Leong Enterprises Ltd.
Carl Offersen	R. Feldtmann	F. Poulsen, F. Nolte, E. Thomsen	R. F McAneney	Jebsen & Co.
Chengtu	M. J. Tidey	J. A. Derrick, A. M. Pritchard, K. Y. Li	F. M. Wai	China Navigation Co. Ltd.
Cree	P. L. Ballantyne	J. Cable, P. R. Nijhowne, A. R. Burns	Wong Kam-tak	Indo-China S.N. Co. Ltd.
Eastern Cape	J. R. Denney	T. R. Talk, A. W. Brannan, R. Winn	V. Trebartha	Indo-China S.N. Co. Ltd.
Eastern Cliff	G. T. Colbeck	N. C. E. Cook, M. J. Kearney, J. S. Irvine	V. Williams	Indo-China S.N. Co. Ltd.
Eastern Moon	A. H. Dalton	J. H. Pring, H. R. Crowther, Chan Po-chung	F. J. Bateman	Indo-China S.N. Co. Ltd.
Eastern Ranger	P. J. Sullivan	M. J. Sawyer, F. D. Holden, Wai Ping-Nam	D. M. Chalmers	Indo-China S.N. Co. Ltd.
Eastern Rover	G. C. Taylor	D. J. Rayner, J. W. Burton, I. F. Godber	M. Riley	Indo-China S.N. Co. Ltd.
Eastern Trade	J. G. Boyle	L. H. McLaughlin, L. K. Dhawan, J. A. Cameron	A. M. Mooney	Indo-China S.N. Co. Ltd.
Eredine	J. M. Parker	R. S. Newman, M. A. J. Dawes, P. A. Frewer, C. N. McKenzie	C. C. Tsang	China Navigation Co. Ltd.
Eriskay	M. T. Anderson	D. G. Falkner, A. J. R. McCann, J. W. Madeley	K. L. Chung	China Navigation Co. Ltd.
Foh Kim	D. W. Clark	K. S. Khambay, A. G. Paul, Lam Chau-Shui	Cheun Shing-Cheung	Lai Fook Kim Shipping Co. Ltd.
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Hyria	C. Hindess	C. Stewart, A. Hawkins, W. Cullum	D. Atkinson	Shell Bermuda (Overseas) Ltd.
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Kuala Lumpur	R. C. W. Gorman	G. E. Garrett, R. M. Post, G. B. Smith, A. Ford	C. K. Ng	China Navigation Co. Ltd.
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Manoloeverett	D. P. Lopez	G. M. Mendoza, G. Gaviola, S. Flores	T. Bullicer	Everett S.S. Corporation S/A
Ninghai	J. B. P. Blamey	D. W. Tucker, M. J. Hudson-Ansell, C. S. Moir	P. C. Choi	China Navigation Co. Ltd.
Pampa Argentina	P. Patane	J. Cannistraci, J. Lambias, H. Picasso	E. Fuks	Everett S.S. Corporation S/A
Shansi	G. Cornforth	T. S. Payne, W. H. Blake, R. P. Fairbrother	W. Chau	China Navigation Co. Ltd.
Six Stars	A. L. Carter	M. Williams, P. J. Reville, J. R. Peters	S. K. Li	China Navigation Co. Ltd.
Soochow	C. G. Cocksedge	J. Milward, G. Robins, W. S. Cheng	S. K. Chan	China Navigation Co. Ltd.
Star Aldebaran	A. A. Olander	S. O. B. Lindvall, J. S. Axelsson, I. T. Andersson	S. I. Jonsson	Everett S.S. Corporation S/A
Star Altair	H. B. Lundin	B. A. Tornqvist, L. K. A. Andersson, J. A. Stroberg	L. R. A. Petersson	Everett S.S. Corporation S/A
Star Antares	R. Fredriksson	Ola Berg, C. Magnusson, C. Larsson	R. Reslow	Everett S.S. Corporation S/A
Tai Lung Shan	C. J. Farren	Lee Pak-Kao, Sin Yan-Kwong, Lee Kui-Kwan	Sun Yung-Wing	Shun Cheong S.N. Co. Ltd.
Tai Poo Sek	R. A. Kent	Wong Kwong-Hung, R. S. Sahi, Lau Chi-Chiu	Leung Shu-Tong	Shun Cheong S.N. Co. Ltd.
Tai Poo Shan	W. M. Pearson	Q. A. R. Lloyd, Wong Tak-Choi, Wong Shu-Pan	Chuck Yuk-Loy	Shun Cheong S.N. Co. Ltd.
Tai Wah Shan	Ko Keng-Jen	Yu Chi-Tai, Lau Ming-Po, Yeung Tak-Ching	Wong Tsz-Ying	Shun Cheong S.N. Co. Ltd.
Taiwan	C. R. Humphry	S. L. Gilchrist, C. R. Finney, J. S. Lambourn, R. J. Platt	I. S. U	China Navigation Co. Ltd.

Hong Kong (*contd.*)

Name of Vessel	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Taiyuan	F. Cunningham ..	W. J. B. Hibberdine, T. C. Mordaunt, O. J. Savage, P. R. W. Oestreich	K. M. Leung	China Navigation Co. Ltd.
Thomaseverett ..	A. O. Asinas	A. Q. Lirio, A. B. Fernandez, T. G. Llido	L. R. Vincente	Everett S.S. Corporation S/A
Wenchow	B. G. D. Ward ..	J. Vaughan, N. Burling, W. M. Thomas	T. K. Keung	China Navigation Co. Ltd.
Yochow	J. N. Bolton	K. G. C. Troughton, K. G. Sutherland, J. S. Macleod	S. K. Tsui	China Navigation Co. Ltd.

SINGAPORE (Information dated 1.3.71)

Name of Vessel	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Bidor	Akop Bin Salim ..	Abdul Jalil B. Mohd.	Abd. Ghani B. Aloos ..	Straits S.S. Co. Ltd.
Golden City ..	J. E. Bromley.. ..	Abu Badjir, Jack Lingga, Chia Teck Chye, Wang Hock Hwee	Tan Cheng Lai	Guan Guan Shipping Ltd.
Golden Harbour ..	F. F. Campbell ..	R. K. Bansal, G. K. Yopie, M. I. Potrick, Mohd. Said B. Ahmad, Seow Kow Heng	Kuswara	Guan Guan Shipping Ltd.
Golden Lion ..	T. P. Wood	B. Kanwajia, Murbowo Ie Boon Tjoen, Henky Luntungan, Lim Yan Wah	Ang Soo Hock	Guan Guan Shipping Ltd.
Golden Spring ..	D. W. C. Boutcher ..	H. S. Dehia, Ridwan Malino, Lau Kay Hoe, Lim Teck Hiang, Nordin B. Mohd. Rais	Lee Peng Wah	Guan Guan Shipping Ltd.
Golden Summer ..	Louis Scott Keane ..	W. C. Coules, M. M. Damping, Tan Kim Seng, Neo Seow Hock, Foo Robin	Chan Kian Seng	Guan Guan Shipping Ltd.
Golden Tower ..	J. H. Longmire ..	J. M. Anggang, Patel Ramjibhai, Lim Eng Hiong, Ahmad Ibrahim	Lim Aik Tew	Guan Guan Shipping Ltd.
Golden Wonder ..	R. E. Morley	J. M. Mitchell, T. S. Theodorus, Foo See Aw, J. Schooling, Chua Part Lang	Edwin Tan Im Tiam ..	Guan Guan Shipping Ltd.
Katong	G. C. Carter	Fernandez, Neo Poh Soon	R. T. D'Cruz	Straits S.S. Co. Ltd.
Kemingau	J. H. Martin	R. Gomez, E. R. B. Menon	Pang Ting Kwai, N. O. Pereira	Straits S.S. Co. Ltd.
Kimanis	R. C. Barker	A. G. Ujra, Hou Hee Phat	P. V. Abraham	Straits S.S. Co. Ltd.
Klias	J. M. Mcnaughton ..	R. E. Dyason, W. J. Nair, Hasan B. Madon, Lim Soon Hoe	F. J. De Souza	Straits S.S. Co. Ltd.
Kunak	G. Coupar	Yang Chow Jang, Chew Choon Beng, Sree Kumar, Sadasiwan Premkumar	Yue Fook Wing, H. H. Mandviwalla	Straits S.S. Co. Ltd.
Neptune Agate ..	D. E. Blazey	Lim Ong Tong, Yap Hoon Kwee, Lim Meng Kiat, Tan Teng Seah, A. Faud Shukri	Wu Seong Fook	Neptune Orient Lines Ltd.
Neptune Amethyst	T. J. Graham.. ..	C. S. Roa, A. K. Sahni, A. Desker, Hong Kok Chuan, Long Yoke Hian	Micheal Goh	Neptune Orient Lines Ltd.
Neptune Aquamarine	J. S. Hill	M. A. Trollope, S. K. Menon, Md. Yusof Ahmad, Mokhtar Rohani, Goh Teck Hock, Lim Teck Yee	Yep Yam Choh	Neptune Orient Lines Ltd.
Neptune Topaz ..	H. Schiemann ..	Toh Kai Huat, Chong Chee Eng, S. M. Berry, Tan Teow Chin, Tan Tiang Wang	David Lange	Neptune Orient Lines Ltd.
Neptune Zircon ..	M. Nusser	J. Bellan, Chia Teng Hoe, Jerry Lau, Lee Kok Beng, Tan Kim Leong	Wong Fook Sun	Neptune Orient Lines Ltd.

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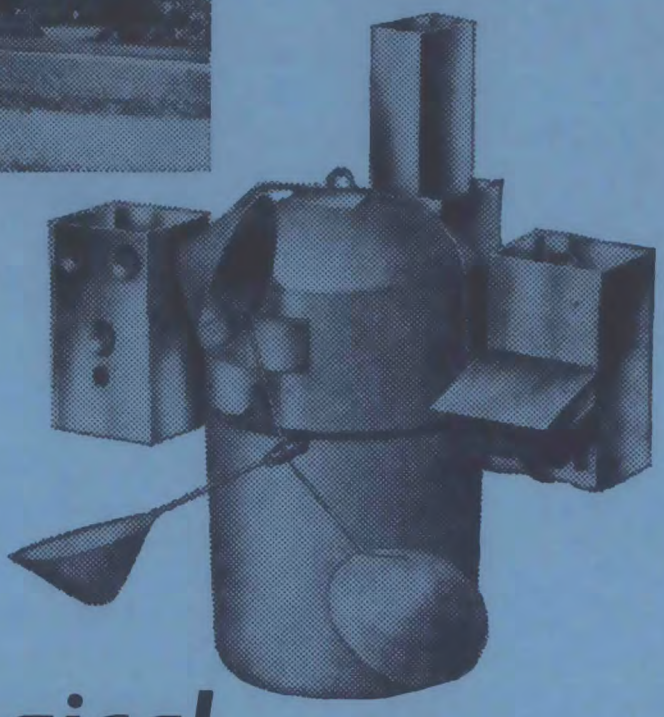

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