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# The Marine Observer



Volume XVIII    No. 142

OCTOBER, 1948

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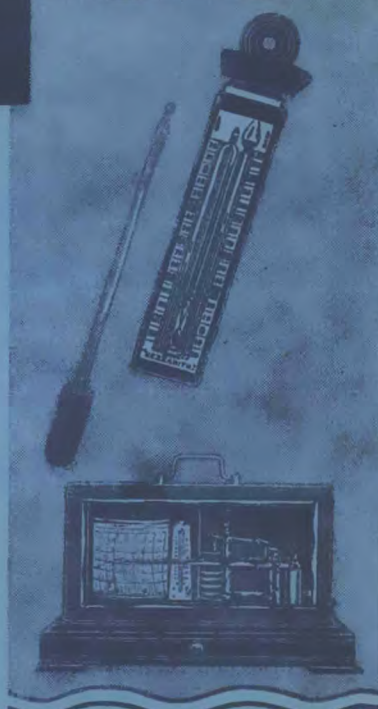
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# THE MARINE OBSERVER

A Quarterly Journal of Maritime Meteorology

prepared by the

Marine Branch of the Meteorological Office

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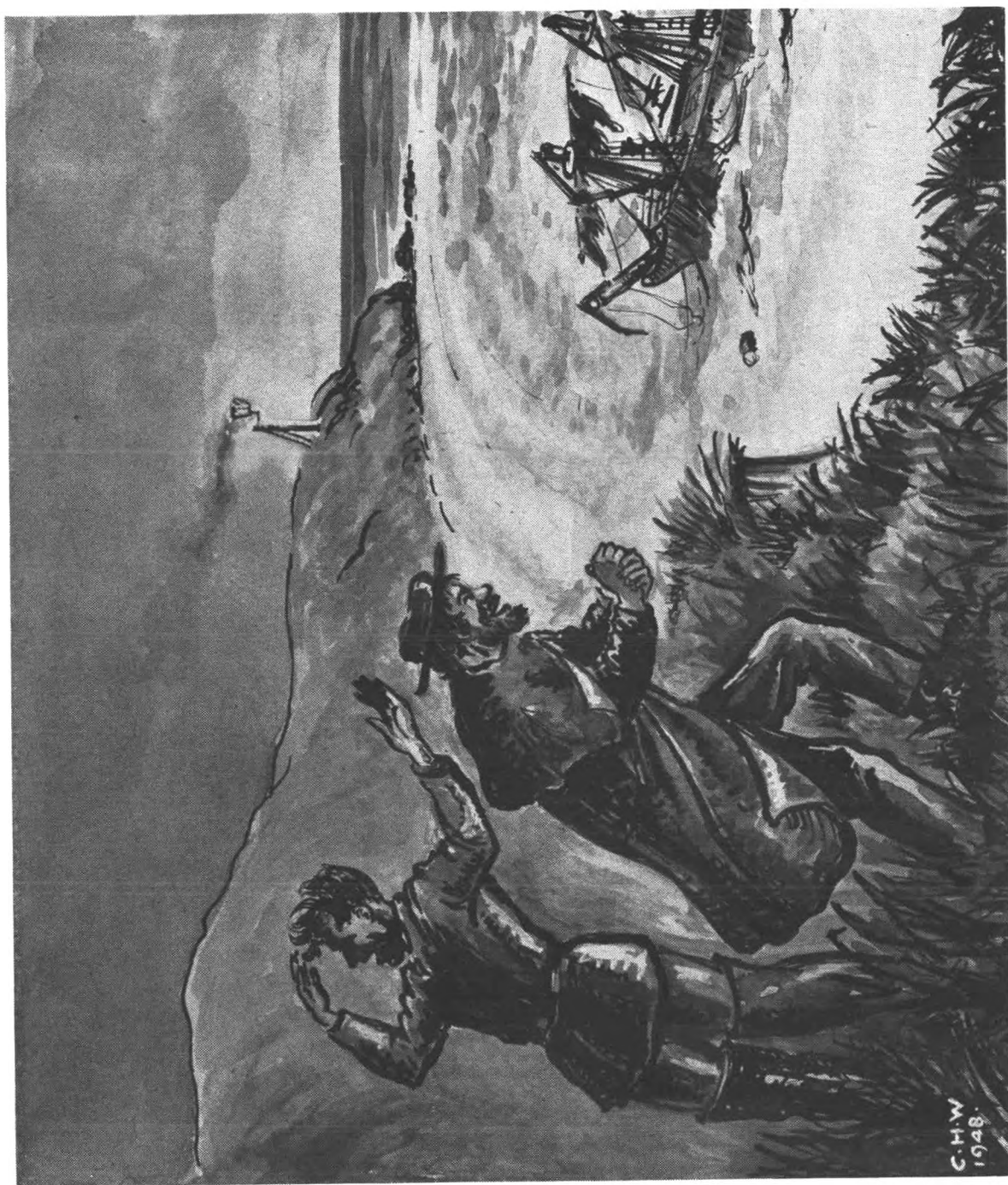
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## EDITORIAL

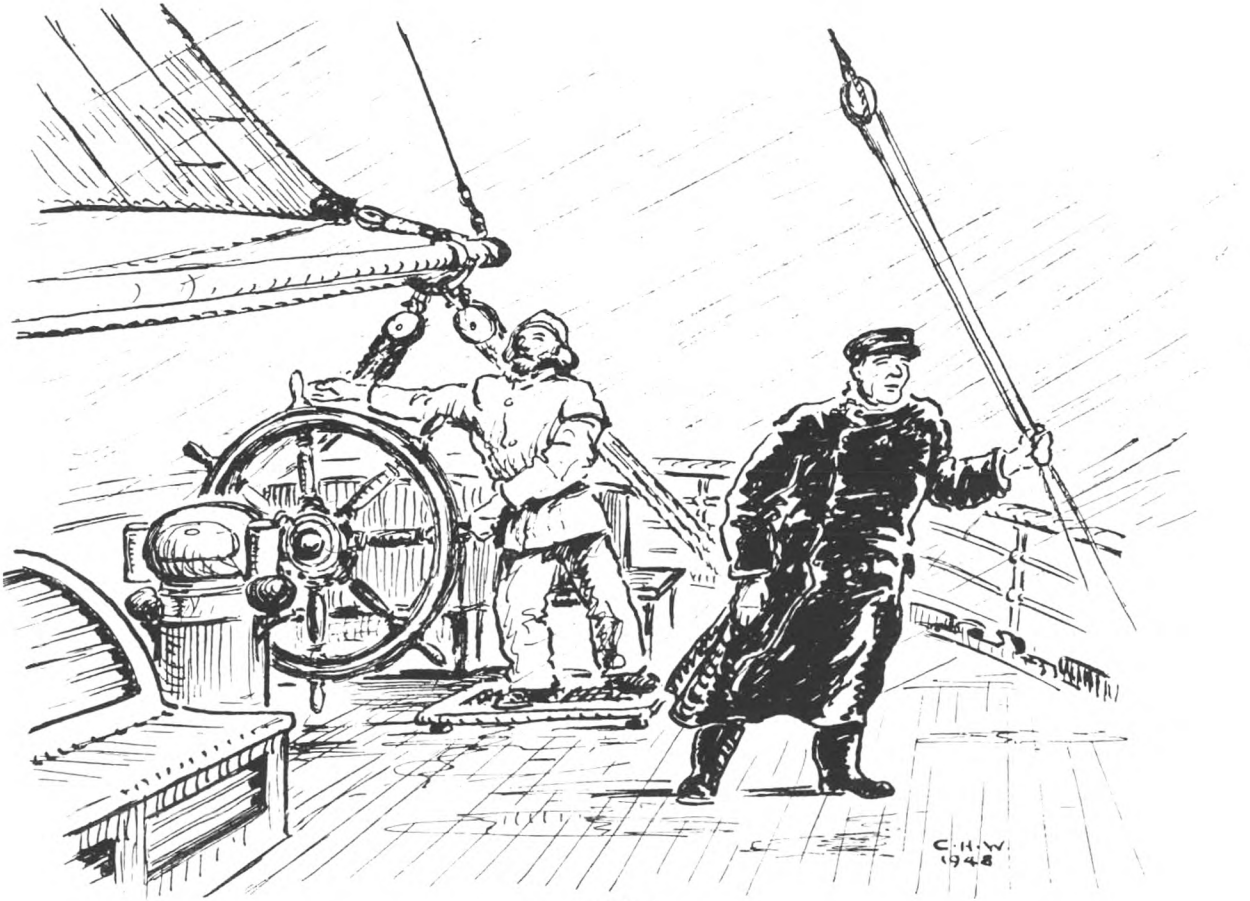
Thinking of safety at sea, one's mind somewhat naturally goes back to the past and considers the improvements that have taken place with the passage of time. Although the sea still holds in store certain perils for the mariner, these are very much less than they were in the time of our forefathers. Romantic and picturesque days those were undoubtedly—days of the graceful sailing ship—when much of the world lay beyond our ken. Many lands lay ready to be discovered by the venturesome mariner. But for the seaman, in general, life was hard, uncomfortable, penurious and dangerous. A panorama of pirates, corsairs and buccaneers passes before our eyes; they no longer exist, except on the unchanging China coast. Wreckers lured unsuspecting mariners to destruction with false shore lights with the object of looting the wreck. Lifeboats were crude and ill-equipped, lighthouses infrequent or non-existent, navigational instruments and charts inefficient, added to which the mariner had to depend upon sails for his motive power and he had no published information about the weather; he had to rely entirely upon his own skill as a seaman as he “went about his lawful occasions.” Press gangs, “bucko” mates, boarding house keepers, and their Shanghai methods, scurvy and yellow fever, wretched food and conditions aboard the ships, all fade behind the curtain of the past, together with the sailing ship. Despite the many handicaps, however, it was in those hard old days that Britain's greatness was built up, and it is fitting that we should remember with gratitude the fine seamen who contributed so much towards that greatness, in spite of their crude facilities and the discomfort and dangers which confronted them.

Famous incidents in the history of safety or disaster at sea come to mind—Grace Darling and her famous rescue, the sinking of the *Birkenhead*, the mysterious case of the *Marie Celeste*, the escape of the *Calliope* from Samoa in a hurricane, the *Titanic* disaster, the voyage of the *Trevesa's* lifeboat, and more recently, the cases of the *Vestris*, the *Marro Castle* and the *Atlantique*. In the 1914–18 and 1939–45 wars, the number of sinkings of ships and heroic deeds at sea became too numerous to record, but in keeping with the old saying that “It's an ill wind . . .” each war brings many improvements and new inventions in matters concerning safety at sea.

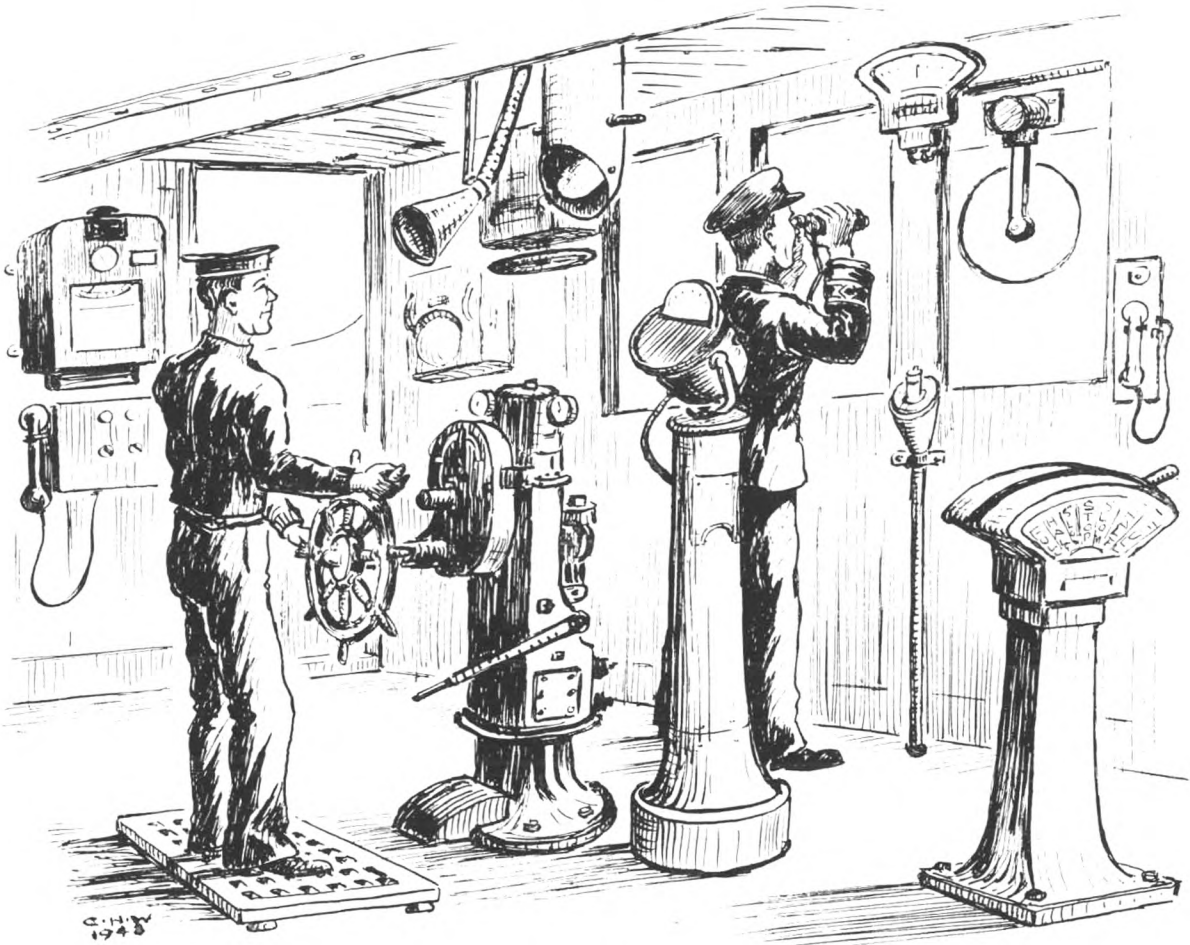
All seamen remember with particular gratitude Samuel Plimsoll who, in 1876, despite enormous opposition, managed to get the loadline bill through Parliament. In 1900, Marconi, with his invention of wireless telegraphy, placed in the hands of the seaman what is probably the greatest of all aids to safety at sea.

About 1850, the examination for Masters and Mates was introduced—an event which, despite the pain and sorrow that it has caused to countless would-be Master Mariners—was nevertheless a notable contribution towards safety at sea. Lloyds' Coffee House, dating from 1688, the forerunner of the great marine insurance organisation, together with the various classification societies, have all contributed in one way or another to safety at sea, be it of life, ship or cargo.

In 1914, as a result of the *Titanic* disaster, the first International Safety at Sea Conference was held in London, but its convention was never ratified because of the 1914–18 war. The present Convention for Safety of Life at Sea which has been ratified by practically all maritime countries, evolved



Then



and now



from a conference which took place—also in London—in 1929. In the spring of this year, the third International Conference on Safety at Sea was held at the Institute of Civil Engineers in London, and the 1929 Convention was entirely revised and brought up to date. Thirty nations attended this conference, at which Sir John Anderson was elected Chairman, and Admiral Farley (Chief of the U.S. Coastguard Service) Vice-Chairman.

The writer had the honour of attending this conference as an official observer for the International Meteorological Organisation. The atmosphere of the conference was cordial and the results reflected the earnest desire of all concerned to ensure safety for those who go down to the sea in ships. Lessons learnt during the recent war, coupled with the scientific advances made in the interval since the 1929 Convention, have done much to raise safety standards, and the provisions of the new convention which evolved from this conference, contain many notable improvements. Among the many subjects considered by the conference were :

Standards of construction of ships.

Strength of materials.

Stability.

Life-saving appliances aboard ships.

Modernisation of rule of the road at sea, and its international application.

Radio telegraphy and telephony.

Electronic aids to navigation.

The work of the International Ice Patrol was also discussed. The meteorological provisions of the new convention are contained in two regulations which are reproduced on page 234.

The new convention will not come into force until 1st January, 1951.

In these modern days, the mariner has much to be thankful for—large and relatively comfortable power-driven ships (with the ability to go astern when needed), good food, efficient lifeboats and life-saving appliances, reliable and powerful shore lights, accurate charts, electric lighting, electronic or mechanical sounding devices, a universal “rule of the road,” efficient compasses (be they magnetic or gyro), radio telegraphy, the direction finder, and finally, radar. Many of these are merely aids to navigation, it is true, and the mariner still has every need to be seamanlike and vigilant—but his task has been considerably eased.

Of his old enemies we have seen how many have faded away, but one, in particular, remains. The weather has not changed much through the ages, and today it remains the chief enemy of shipping. Damaged cargo is largely due to rain, sweat, mildew or spray, perhaps combined with inefficient ventilation. Collisions chiefly occur in low visibility, and strandings are frequently due to the same cause, combined with the vagaries of surface currents. Lost propellers, straining of the ship's hull, damaged steering gear, and foundering, are all directly or indirectly due to bad weather. Tropical cyclones and gales in the temperate zones occur with their usual regularity ; see the account of a China Sea Typhoon in the *Marine Observer's Log* of this number. Finally, there is the question of ice—whether a ship is beset in an ice field, hits a berg, or is in danger of capsizing, owing to an accumulation of frozen spray upon her decks—all these dangers are concerned with the weather.

We cannot do much about changing the weather, but meteorologists all

over the world have done, and can do, much to assist the mariner, in warning him of impending storms, fogs, or ice, and in providing him with statistics as to the weather and ocean currents, and probable ice areas. And the seaman, by observing the weather, and sending in regular radio weather messages, helps the meteorologist and thereby assists himself.

The meteorologist's contribution to safety at sea dates from the year 1853, when, owing to the persistence of M. F. Maury (an American naval officer), the first International Meteorological Conference was held in Brussels. The object of this conference was to interest the ship-owning countries in the collection of meteorological observations from ships at sea, for the eventual benefit of shipping. Maury had in mind the commercial value of this information to sailing ships. The British Meteorological Office was formed in 1854, as a department of the Board of Trade, and the visual storm-warning signal for shipping was instituted in that year. We have advanced very considerably since those days, and thanks to radio, weather bulletins for shipping have become commonplace and their accuracy improves year by year.

Talking of safety at sea, and of the North Atlantic Ice Patrol, we had two interesting visitors to the London Docks recently—the U.S. Coastguard Cutter *Campbell* and the Coastguard Training Ship *Eagle*—a three-masted barque, formerly the German *Horst Wessel*. I had the pleasure of visiting both ships and was impressed with the cleanliness aboard and the courtesy and obviously good discipline of the ship's company. The *Campbell* has done duty as an ice patrol vessel and as an Ocean Weather Ship in the North Atlantic, and is permanently fitted up as such. While not wishing to enter into the sailing ship controversy, as I gazed aloft and studied the intricacies of the running rigging of the *Eagle*, I was struck with the thought that a boy who received even a year's training in such a vessel could hardly fail to be a sailor man—alert and vigilant—and proud of his ship.

On this page will be found the names of four captains of Voluntary Observing Ships to whom the Director of the Meteorological Office has decided to make a special presentation in recognition of their long period of excellent service as voluntary observers of the weather at sea. We warmly congratulate the recipients of this well-deserved award.

MARINE SUPERINTENDENT.

### SPECIAL LONG-SERVICE AWARDS TO MARINE OBSERVERS

The Director of the British Meteorological Office has decided to introduce a special award to voluntary marine observers in recognition of long and meritorious service.

Four Captains, all of whom have co-operated with the Meteorological Office for fifteen years or more, are to be presented with such an award during the year 1948. Their names are as follows :

Commodore W. G. Higgs, O.B.E.—Port Line, Ltd.

Captain J. E. Wilson, O.B.E.—Furness Line.

Captain W. H. Downing, O.B.E.—Manchester Liners, Ltd.

Captain R. P. Galer, C.B.E., R.D., R.N.R.—Clan Line.

The award will take the form of a suitably inscribed barograph and the Director has expressed a desire to make the presentation personally.





## OCTOBER, NOVEMBER AND DECEMBER

*The Marine Observer's Log* is a quarterly record of the more unusual and significant observations made by mariners.

The observations are derived from the logbooks of marine observers and from individual manuscripts. Photographs or sketches are particularly desirable.

Responsibility for each observation rests with the contributor.

### TYPHOON

#### South China Sea

The following account was received from the Director of the Royal Observatory, Hong Kong.

Times throughout are Hong Kong Summer Time (G.M.T. + 9).

This storm was first located about 150 miles west of Guam on 1st October, 1947. It moved steadily WNW at 10 knots, crossing N. Luzon on 6th.

A Manila press report describes the destruction :

“ Manila, October 7th.

“ Northern Luzon's rich Cagayan Valley was underwater today and thousands were homeless in the wake of the typhoon which oldsters called one of the most severe storms in their memory.

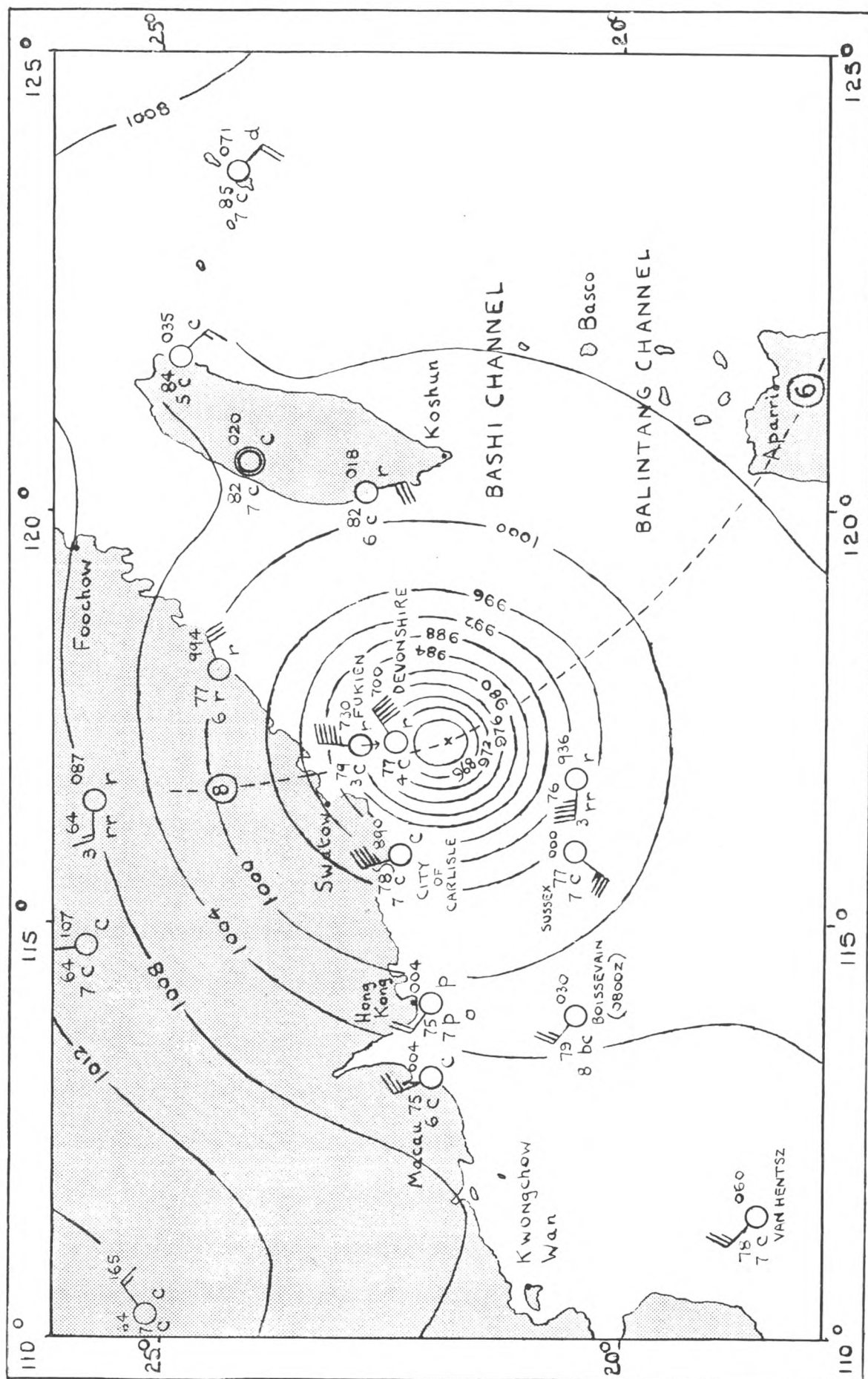
“ A news editor, who flew abroad a Philippines plane over the affected area this morning, said the town of Aparri was the scene of chaos, with small boats strewn over the streets. Great damage from wind and water was apparent, but the plane was unable to land owing to the flooded runway and high winds.

“ At Laoang on the north-west coast, 500 houses were reported destroyed and streets were under water to a depth of five to ten feet. Airfield installations were wrecked. Laoang's Mayor has sent an urgent message to the Government to bring food and emergency shelter.

“ At Tuguegarao, 210 miles north of Manila, Cagayan River was rolling in a muddy wall across rice fields bearing a cargo of dead animals, uprooted trees and native houses. The town itself, however, was unscathed except for temporary structures erected to house Government buildings wrecked in the war.

“ All the three points were isolated from the rest of the Philippines. Baguio, 125 miles south-west of Tuguegarao, reported its road links with the coast closed by multiple landslides and its 25,000 people without water and light.

“ Five have been reported dead to date in areas merely on the fringes of the storm.



Synoptic Chart for 0600 G.M.T. on 7th October, 1947. The pecked line indicates the track of the centre, the daily positions at 0000 G.M.T. being shown by the date circles. The true position of the *Fukien* is indicated by an arrow.



"A Philippines Airlines pilot returned from Baguio said that Camp John Hay, American post there, was without lights and water."

After moving into the China Sea the storm, which had lost none of its fury, began to curve towards the north; although for a time Hong Kong was threatened, the centre finally entered the coast near Swatow, where it caused great damage and numerous casualties.

Several ships attempting to steam northwards towards the Formosa Channel could make no headway against the raging seas and some were badly damaged or disabled. Two ships passed directly through the eye of the storm—S.S. *City of Carlisle* at 1930 hrs. on 7th (position  $22^{\circ} 40' N.$ ,  $116^{\circ} 30' E.$ ) and S.S. *Fukien* at 1800 hrs. on 7th (position  $22^{\circ} 18' N.$ ,  $117^{\circ} 00' E.$ ).

Captain J. H. Forbes, of *Fukien*, writes:

"The following is an account of the typhoon experienced by S.S. *Fukien* while on a passage from Hong Kong to Shanghai on 7th October, 1947.

"*Fukien* left Hong Kong on the 6th October at 1200 hours and proceeded on the usual course along the South China Coast. The weather for the first twelve hours was wind N  $\times$  E force 5, moderate sea and heavy SE'ly swell, indicating the presence of a typhoon in that direction as reported by Hong Kong Observatory.

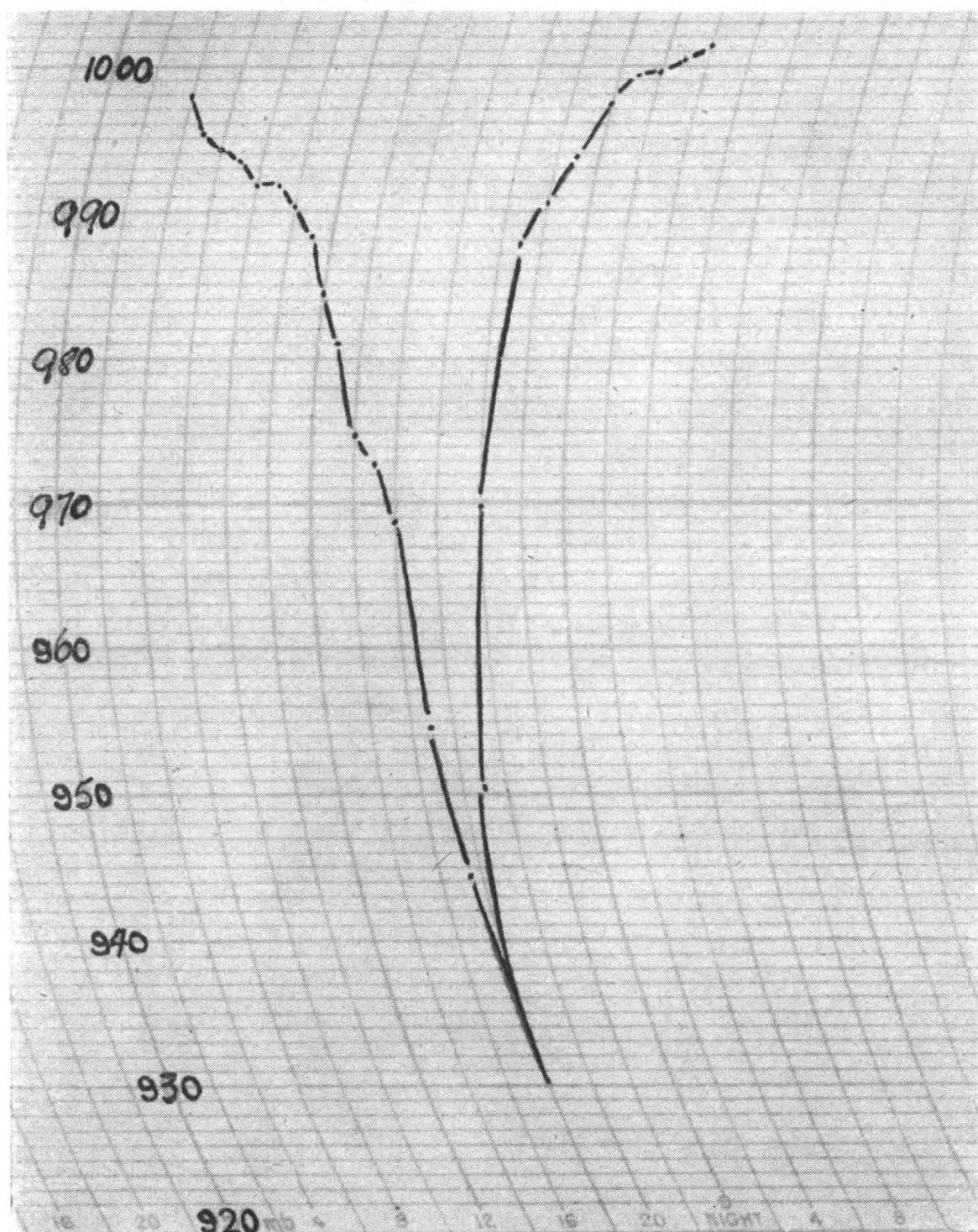
"Taking into account the late time of year and the expected track of the typhoon it was deemed safe to proceed and allow it to pass to the southward. When, however, at 0700 hours on the 7th in the vicinity of Breaker Point the wind was NNE force 8 and the barometer had fallen to 29.34 in. (993.5 mb.) the vessel was unable to proceed and had to be hove to. Reports from Pratas Island still indicated the typhoon as passing well south of ship's position. At 1400 hours the wind was NNE force 11 with very heavy squalls and continuous heavy rain, barometer 28.79 in. (974.9 mb.). With these indications it became evident that the vessel was in the track of the storm and would have to remain hove to until it passed.

"The wind remained NNE but the squalls increased in violence and frequency until at about 1745, when the sky appeared to brighten to the south-eastward, they eased off and finally at 1750 hours a calm prevailed. The barometer went down very rapidly from 1730 hours when it read 27.89 in. (944.4 mb.) to 1800 hours when the reading was 27.47 in. (930.2 mb.), the lowest during the storm.

"While in the 'central calm' the sea was highly confused and appeared to be running in all directions and breaking in pyramidal forms, the sky overhead had brightened but remained overcast and although the rain had ceased the visibility was still very poor. Many hundreds of birds landed on the ship, the majority being swallows, although other varieties were seen, including heron, but very few sea birds appeared to be amongst them. They all were thoroughly exhausted and many died on board, the remainder being carried away again by the storm.

"The calm lasted for 30 minutes and then the wind came away from the SW with equal intensity and the barometer rose steadily. By 2300 hours the reading was 29.35 in. (993.9 mb.) and with the wind SW force 9, sea and swell moderating, the vessel resumed her voyage. Owing to the uncertainty of the ship's position and the danger of having been drawn inshore by the

It is gratifying to note the number of ships which are shown on the weather map.—Ed.



S.S. *Fukien*—Pressures plotted from hourly observations, 7th October, 1947

typhoon the course was set for the middle of the Formosa Straits until daylight, when a fix was obtained. It was found that during the time the vessel was hove to she had drifted approximately 25 miles to the southward and had experienced no indraught.

“ The behaviour of the ship during the storm was surprisingly good, for although she lay about six points off the wind and would not come up any more, she took no heavy seas on board but rolled and pitched very heavily.



Her condition was ideal for bad weather as she was 3 ft. off her marks and had 12 ft. freeboard.

"The S.S. *Fukien* is a ship of 3,278 gross tons with a speed of twelve knots, built in 1945."

The ship is equipped with a new Kew marine type barometer which has since been checked at the Royal Observatory, Hong Kong.

Log of S.S. *Fukien* from 0400 hours 7th October, 1947, to 0400 hours 8th October, 1947.

Mr. E. C. V. Sharples, 2nd Officer.

Date	Time G.M.T. + 9h.	Latitude	Longitude	Wind	Force	Temp. °F.	Barometer Corrected mb.
7.10.47	0400	22° 50' N.	116° 33' E.	NNE	6-7	79° F.	997.9
7.10.47	0500			NNE	7	78	995.2
7.10.47	0600			NNE	7	77	994.2
7.10.47	0700			NNE	8	77	993.5
7.10.47	0800	23° 02' N.	116° 50' E.	NNE	9	79	991.9
7.10.47	0900			NNE	9	79	991.9
7.10.47	1000			NNE	9	79	990.2
7.10.47	1100			NNE	10	78	988.1
7.10.47	1200	22° 30' N.	116° 54' E.	NE × N	9	79	984.4
7.10.47	1300			NE × N	10	79	981.0
7.10.47	1400			NNE	11	79	974.9
7.10.47	1500			NNE	11	79	972.9
7.10.47	1600			NE	11	79	968.8
7.10.47	1700			NE × N	12	79	954.6
7.10.47	1730			NE × N	12	79	944.4
7.10.47	1800	22° 18' N.	117° 00' E.	Airs		80	930.2
7.10.47	1900			SW	10	80	950.2
7.10.47	2000			WSW	12	78	960.8
7.10.47	2100			SW	9	77	987.8
7.10.47	2200			SW	9	77	990.5
7.10.47	2300			SW	9	76	993.9
7.10.47	0000	22° 00' N.	117° 06' E.	SW	8	76	997.3
8.10.47	0100			SSW	7	76	999.3
8.10.47	0200			SSW	6	77	999.6
8.10.47	0300			SSW	5-6	78	1000.3
8.10.47	0400	22° 15' N.	117° 31' E.	S × W	5	78	1001.3

## CURRENTS

### Off South-east Coast of Ceylon

The following observations of strong current have been received from H.M.S. *Norfolk*, Navigating Officer, Lieutenant-Commander B. N. Mellis, R.N. The positions were all obtained by land fixes.

1. From 0913 G.M.T. on October 29th, 1947, in lat. 06° 06' N., long. 81° 33' E. to 1204, on the same day, in lat. 06° 20' N., long. 81° 48' E., a current setting 227°, at the rate of 86 miles per day.

2. From 1204 G.M.T. on October 29th, 1947, in the above position, to 2146, on the same day, in lat. 07° 47½' N., long. 81° 46' E., a current setting southerly, parallel to the coast, at the rate of 103 miles per day.

3. From 2146 G.M.T. on October 29th, 1947, in the above position, to 0215 on October 30th, in lat. 08° 32' N., long. 81° 23' E., a current setting 152°, at the rate of 106 miles per day.

*Note.*—The region immediately east and south of Ceylon is noted for strong currents, especially from June to December inclusive, when currents exceeding 3 knots may be experienced. The exceptionally strong currents reported above are of interest since two of them exceed the strongest recorded in this region in the period 1910 to 1934. This current, given in M.O.392, *Indian Ocean Currents*, was observed by S.S. *Arracan* on August 9th, 1923. The set was  $62^{\circ}$  and the rate 93 miles per day.

## TIDAL STREAMS

### Bay of Bengal

The following is an extract from the Meteorological Record of M.V. *British Endurance*. Captain W. Watkin-Thomas, O.B.E., D.S.C. Abadan to Rangoon. Observer, Mr. S. H. Falconer, 2nd Officer.

30th October, 1947. Strong set experienced in Preparis South Channel between lat.  $14^{\circ} 24'N.$ , long.  $93^{\circ} 18'E.$  and lat.  $14^{\circ} 39'N.$ , long.  $93^{\circ} 40'E.$ , positions obtained by shore bearings. Vessel steering course  $066^{\circ}$  (T), weather cloudy and clear, wind NE force 3-4, sea light, sea temperature normal. Current set  $021^{\circ}$  at 2.7 knots. Further observations impossible due to failing light.

## TIDE RIP

### Atlantic Ocean

The following is an extract from the Meteorological Record of S.S. *Polar Chief*. Captain J. J. Smith. Caracas Bay to South Georgia. Observer, Mr. A. W. Aitken, 3rd Officer.

16th October, 1947, 1220 G.M.T. Very strong tide barrier running E and W. To the southward the tide set to the east, and to the northward tide set to the west. The rip was so strong that the vessel was swung round  $20^{\circ}$  off her original course. The colour of the water to the north was greenish-blue, to the south, dark blue.

Position of Ship : Latitude  $7^{\circ} 14'N.$ , Longitude  $50^{\circ} 28'W.$

## DOLDRUM SQUALLS

### Indian Ocean

The following is an extract from the Meteorological Record of S.S. *Deebank*. Captain B. Rivett. Fremantle to Colombo. Observer, Mr. I. A. McKay, 3rd Officer.

6th December, 1947, 1220 G.M.T. An arch squall was seen forming west of the vessel. It appeared very heavy and dark with numerous water-spouts attempting to form but never eventuating. Ten minutes later it passed over with very heavy rain and gusty wind. At 1250 G.M.T. rain ceased, wind eased off and patches of lighter sky were seen again. Weather conditions during the squall : Visibility nil. Wind WSW, 5. Barometer 1009.7 mb., steady. Temperature : dry bulb  $81^{\circ}F.$ , wet bulb  $76^{\circ}$ .

Position of Ship : Latitude  $0^{\circ} 30'N.$ , Longitude  $84^{\circ} 40'E.$

At 1655 G.M.T. another squall similar to the above was seen approaching. Rain commenced at 1700 and ceased at 1705, but was not heavy, wind shifted

to NW, 6 while it rained. Weather conditions : Cloudy and fine. Wind WSW, 4. Barometer 1011.3 mb., rising. Temperature : dry bulb 82°F., wet bulb 77°.

Position of Ship : Latitude 1° 00'N., Longitude 84° 20'E. Course 320°. Speed 10.5 knots.

## LINE SQUALL

### Red Sea

The following is an extract from the Meteorological Record of S.S. *Franconia*. Captain C. I. Thompson. Liverpool to Bombay. Observer, Mr. P. F. Drake, Senior 3rd Officer.

29th November, 1947, 1020 G.M.T. A heavy squall was observed to be rapidly approaching, consisting of two separate arches of cloud with a very definite line of demarcation between them. The following observations were taken :

Time G.M.T.	Air Temp. °F.	Corrected Barometer mb.	Wind Dir. and Force	Cloud type	Cloud amount
Squall approaching	81	1010.9	NW <sub>3</sub>	Cu, Cb	8
1020	77	—	SE <sub>7</sub>	Cb, Nb	10
1027	—	Heavy rain began to fall.			—
1032	—	1007.4	—	—	—
1042	—	Rain stopped and began to moderate weather.			—
1048	—	1007.7	—	Cb, Nb	9
1050	74	—	—	Cloudy	7
1100	73	1007.8	SE <sub>5</sub>	Overcast with steady rain.	—
1115	74	1008.1	SE <sub>5</sub>	Overcast with light rain.	—
1220	77	1008.0	SE <sub>4</sub>	Cloudy	7

Weather remained in this latter state for several hours.

Position of Ship : Latitude 24° 06'N., Longitude 36° 13'E.

*Note.*—Between October and April there are two fairly definite opposing air currents in the Red Sea, a NNW wind in the north and a SSE wind in the south. This was evidently a frontal phenomenon at the meeting of these two currents.

## WATERSPOUTS

### Pacific Ocean

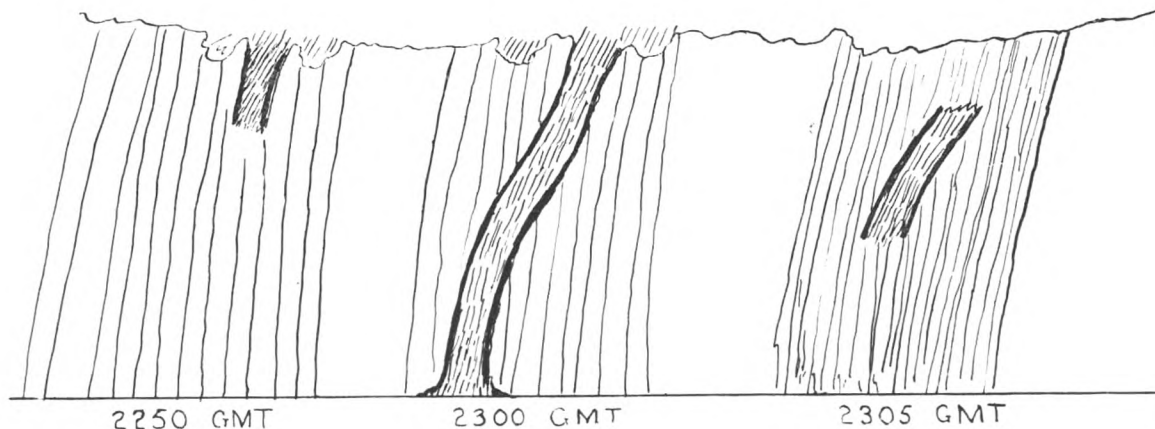
The following is an extract from the Meteorological Record of M.V. *Waipawa*. Captain W. G. West. Liverpool to Auckland, via Panama. Observer, Mr. R. Hamilton, 2nd Officer.

6th November, 1947, 2250 G.M.T. A heavy rain squall was observed about 6 miles distant, in front of which, descending from heavy Cb cloud, was a waterspout forming. At 2300, the spout had formed and appeared straight or slightly angled for about 200 ft., then took a decided bend to the left and continued to the sea surface. The outer edges were very distinct but not the centre. At about 2305 the top and bottom started to disperse leaving the middle suspended in mid-air. At 2310 it had completely disappeared. The heavy rain squall passed about a mile astern of the ship.



Weather at time : Barometer 1017.5 mb., falling slowly. Temperature : air 74°F., wet bulb 69°, sea 76°. Wind SE, 4. Partly cloudy.

Position of Ship : Latitude 17° 17'S., Longitude 115° 37'W. Course 237½°. Speed 15.8 knots.



### Pacific Ocean

The following is an extract from the Meteorological Record of M.V. *Priam*. Captain L. W. Kersley. Balbao to San Francisco. Observers, Mr. J. Webster, 3rd Officer, and Mr. R. A. Hansell, 2nd Officer.

25th December, 1947, 2047 G.M.T. Observed 3 waterspouts bearing 253° 9 miles, estimated to be travelling approx. 300° at 17 knots. These waterspouts consisted of one large spout of an estimated diameter of 100 ft. and two or three other spouts which broke and reformed frequently.

The duration of the large spout was 28 minutes, the others from about 10 to 15 minutes. Weather at time : Temperature, air 81°F., wet bulb 76°. Wind SE x E, 2. Sea SE'ly 1. Swell W'ly 1. Clouds, Cu, Cb and Cs.

Position of Ship : Latitude 17° 20'N., Longitude 102° 16'W.

Course 301°. Speed 17 knots.

### Red Sea

The following is an extract from the Meteorological Record of M.V. *Paringa*. Captain C. E. Pollitt. Aden to Suez. Observer, Mr. G. P. Blyth, 3rd Officer.

31st December, 1947, approx. 0545 G.M.T. A small area of disturbed water was observed off the starboard bow, just ahead of a rain squall. It appeared to be moving slowly in a SSE'ly direction leaving behind a wake similar (except in length) to that made by a high speed launch. As the ship came nearly abeam of the disturbance, it was seen to be a waterspout. The actual spout was only visible for about 3 minutes, and the disturbance for between 5 and 8 minutes. The top of the spout was apparently joined to a thin film of Sc at approx. 1,000 ft. Cb (at about 2,000 ft.) above and behind that. The whole phenomenon was very small and although the ship passed about half a mile off the spout, no effect was felt.

Position of Ship : Latitude 23° 00'N., Longitude 37° 04'E.

### **Mediterranean Sea**

The following is an extract from the Meteorological Record of S.S. *Clan Brodie*. Captain B. Vernon-Browne. Port Said to London. Observer, Mr. E. J. E. Owen, 3rd Officer.

25th October, 1947, 0810 G.M.T. Vessel passed waterspout approximately  $\frac{3}{4}$  mile SW. When first observed the funnel went straight up and down, but after a few minutes bent over towards S. It was about 40–50 ft. in diameter and 300–400 ft. high. The top disappeared into the edge of nimbostratus cloud. There was precipitation which seemed to be moving slightly to SE and obscured a vessel in its path. This lessened when the spout broke up and finally disappeared. The phenomenon lasted for twenty minutes and many rain squalls were in the vicinity at the time. Weather conditions: Barometer 1008.6 mb. Air temperature 66°F. Wind W force 4. Sea moderate.

Position of Ship: Latitude 37° 06'N., Longitude 4° 42'E.

### **PHOSPHORESCENCE**

#### **Equatorial Waters, East Pacific Ocean**

The following is an extract from the Meteorological Record of M.V. *Port Macquarie*. Captain E. E. Roswell. London to New Zealand via Panama. Observer, Mr. H. J. Thompson, 3rd Officer.

8th December, 1947, 0700 G.M.T. Vessel passed through a band of vivid phosphorescence which gave the water a milky-white appearance. It was approx. 100 ft. wide and had sharply defined limits. It ran in a WNW to ESE direction and extended as far as was visible. Moderate SSW breeze and moderate sea. Overcast, fine and clear, dark night. Barometer 1010.2 mb.

Position of Ship: Latitude 0° 21'N., Longitude 91° 53'W. Course 239°. Speed 16 knots.

#### **Off Coast of French West Africa**

The following is an extract from the Meteorological Record of M.V. *Roslin Castle*. Captain H. L. Holland. Capetown to Liverpool. Observer, Mr. R. H. Hudson, 3rd Officer.

16th October, 1947, 2230 G.M.T. Encountered a large area of abnormal phosphorescence, giving the sea an appearance of being almost white. It lasted about 10 minutes, during which time the vessel covered approximately  $2\frac{1}{2}$  miles.

Position of Ship: Latitude 14° 53'N., Longitude 17° 38'W. Course 000°. Speed 16.5 knots.

#### **South Pacific Ocean**

The following is an extract from the Meteorological Record of M.V. *Australia Star*. Captain T. Williams. Lyttelton to Panama. Observer, Mr. L. Tessier, 3rd Officer.

21st December, 1947, 1200 G.M.T. Phosphorescence was very noticeable and abundant, throwing off a dull glow visible for about one mile. The vessel passed through patches which appeared to be made up of numerous

oblong shapes about 2 ft.  $\times$  6 in. which did not break up or suggest any sign of life.

Position of Ship : Latitude  $42^{\circ} 08'S.$ , Longitude  $174^{\circ} 04'W.$

## DISCOLOURED WATER

### Indian Ocean

The following is an extract from the Meteorological Record of M.V. *New Zealand Star*. Captain G. Owen, O.B.E. Australia to Cape Town. Observer Mr. D. J. Thomas, 3rd Officer.

12th November, 1947, 0850 G.M.T. Bearing due N at a distance of approximately 1 mile, observed two patches of discoloured water about 1 mile in length and  $\frac{1}{4}$  mile in width. The water was a dark greenish-brown.

Position of Ship : Latitude  $36^{\circ} 02\frac{1}{2}'S.$ , Longitude  $65^{\circ} 32'E.$  Course  $270^{\circ}$ .

## ABNORMAL REFRACTION

### Red Sea

The following is an extract from the Meteorological Record of S.S. *Lancashire*. Captain H. Kerbyson. Suez to Aden. Observer, Mr. J. C. Priest, 3rd Officer.

5th December, 1947, throughout daylight hours. Abnormal refraction was experienced and although the area is noted for such conditions its intensity was far above normal. At about 0902 G.M.T. visual bearings were obtained of J. Asotribe, a 7,270 ft. peak of the Elba mountains, 85 miles away. About two hours later Jebel Taribah (8,000 ft.) was observed at 98 miles. Cross bearings of these peaks were obtained and were found to be only 2 to 3 miles to the eastward when checked with sun and stellar observations. These conditions continued for about 20 minutes after sunset. Similar conditions were not noticeable on the E coast of the Red Sea, mountains of 8,000 ft. and at about the same distance were not visible.

Position of Ship at 0902 G.M.T. Latitude  $22^{\circ} 35'N.$ , Longitude  $37^{\circ} 23'E.$

## LUNAR HALO

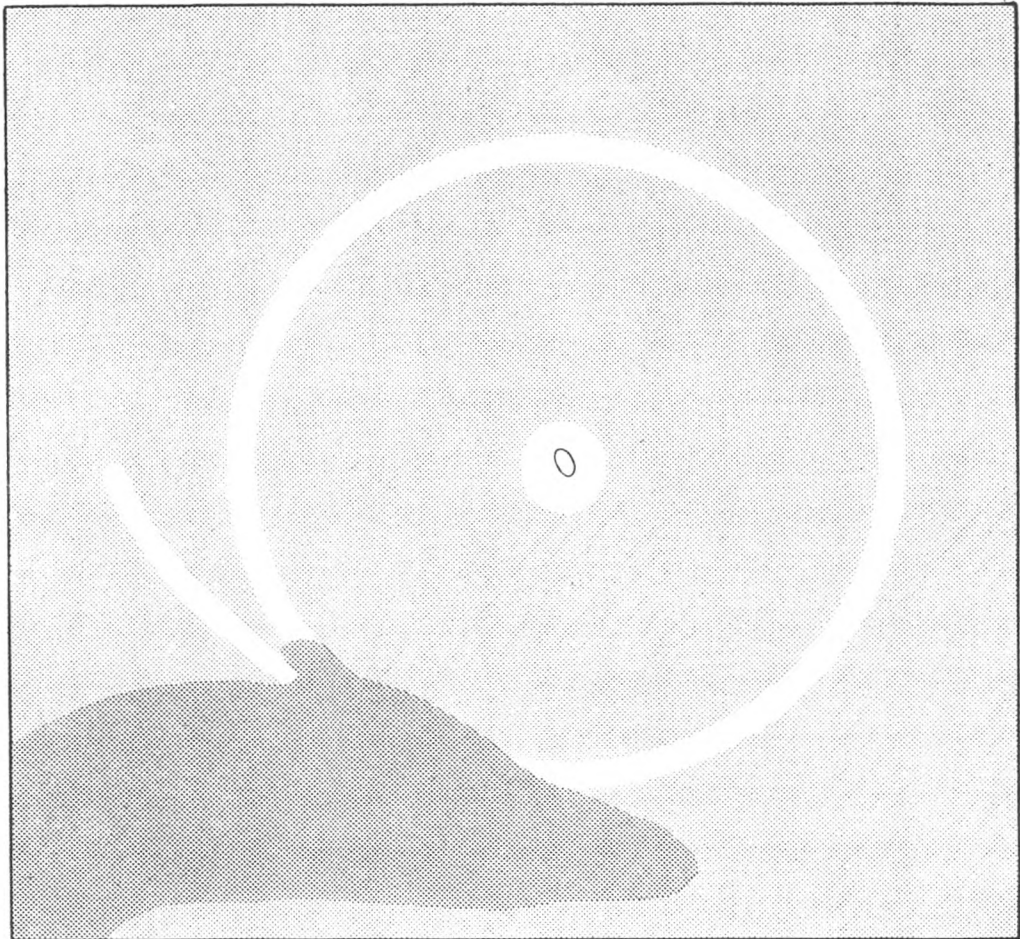
### Pacific Ocean

The following is an extract from the Meteorological Record of M.V. *Port Chalmers*. Captain E. J. Syvret. Wellington, N.Z., to Balboa. Observer Mr. M. L. Mitchell, 4th Officer.

22nd November, 1947, approximately 0730 G.M.T. (1130 A.T.S. on 21st). A lunar halo was observed. The altitude of the moon was  $28\frac{1}{2}^{\circ}$ , and the halo had a radius of  $24^{\circ}$  and was just over  $1^{\circ}$  in thickness. There was a very slight mist and a certain amount of cirrus cloud around the halo. The moon had a very bright bluish green area with radius  $\frac{3}{4}^{\circ}$  around it and this in turn had a distinctly red tinge at its edges. At the bottom left hand part, an arc joined the halo, but thick altocumulus covered the point of contact. Temperature, air  $70^{\circ}F.$ , wet bulb  $68^{\circ}$ . The halo was very bright for about half an hour but the arc was only visible for about ten minutes.

Position of Ship : Latitude  $30^{\circ} 10'S.$  Longitude  $126^{\circ} 12'W.$

*Note.*—The arc observed was part of the lower arc of contact, which is less frequently seen than the upper arc of contact. The appearances close round

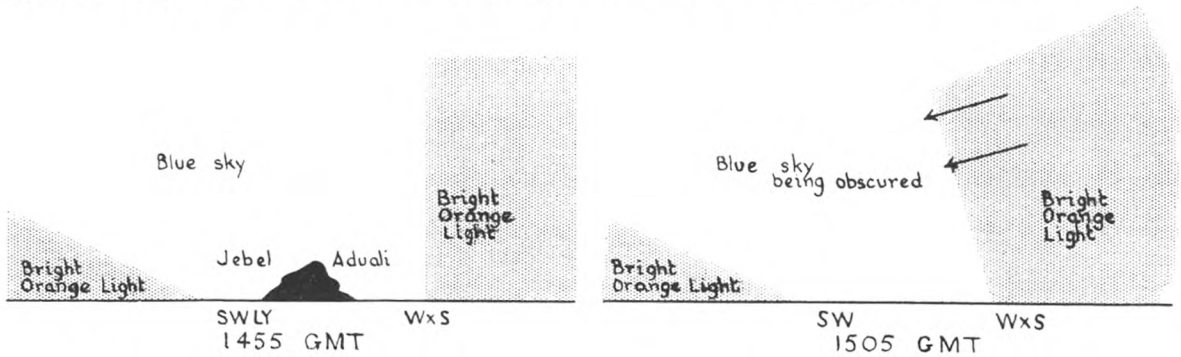


the moon were the inner part of a corona, known as the aureole. This was probably produced by the water-drops of the mist present at the time.

### SUNSET PHENOMENON Red Sea

THE following is an extract from the Meteorological Record of S.S. *Pipiriki*. Captain R. G. Rees. Aden to Suez. Observer, Mr. J. Laidlow, 4th Officer.

11th November, 1947, 1440 G.M.T. (sunset). At about 1450 the sunset glow broke up, leaving blue sky from horizon to zenith in the sector between  $W \times S$  and SW. On the  $W \times S$  bearing, the division between bright orange glow and blue sky was at right angles to the horizon, whereas on the SW bearing the orange glow was at an angle of  $20^\circ$  to the horizon. This condition prevailed for about 15 minutes, when the orange glow in the  $W \times S$  direction gradually covered the blue sky and joined the orange light in the SW, which



had remained stationary. When the phenomenon was at its best, the summit of Jebel Aduali could be seen between the two sections of orange light.

Position of Ship : Latitude  $13^{\circ} 20'N.$ , Longitude  $43^{\circ} 06'E.$

*Note.*—The most probable explanation of this phenomenon is that the blue sector was formed by the shadow of some inland mountain or plateau below which the sun had sunk.

## AURORAE

### Australian Waters

The following is an extract from the Meteorological Record of S.S. *Leicester*. Captain H. D. Horwood, R.D., R.N.R. Port Pirie to Geelong. Observer, Mr. J. T. Andrews, 3rd Officer.

9th November, 1947, 2300 G.M.T. Aurora was observed forming rapidly to the southward. Within a few minutes it became beams of light slightly fan-shaped, white with the tops tinged with violet, very clear cut and distinct. The beams did not flicker and the highest one reached an altitude of  $41^{\circ}$ , the whole fan bearing from  $156^{\circ}$  to  $241^{\circ}$  (T.). By 2320 the aurora had commenced to fade and by 2325 disappeared completely, leaving a faint white glow in a very clear sky.

Position of Ship : Latitude  $38^{\circ} 12'S.$ , Longitude  $140^{\circ} 40'E.$

### North Atlantic Ocean

The following is an extract from the Meteorological Record of M.V. *Chinese Prince*. Captain C. J. P. Martin. Liverpool to Halifax. Observer, Mr. H. Jennings, 2nd Officer.

3rd October, 1947, 0320 to 0330 G.M.T. Aurora lasted for about one hour but was brightest from 0320 to 0330. It covered an arc of approximately  $100^{\circ}$  from  $046^{\circ}$  to  $306^{\circ}$  across the northern sky, with a maximum altitude of about  $30^{\circ}$ . Several bright greenish-white, vertical rays of light were seen between the arc and the horizon. Cloud Cu  $3/10$  at 5,000 ft.

Position of Ship : Latitude  $46^{\circ} 00'N.$ , Longitude  $50^{\circ} 01'W.$  Course  $261^{\circ}$ . Speed 15 knots.

*Note.*—M.V. *Sydney Star* reported aurora on 3rd October in New Zealand waters, approximate position lat.  $41^{\circ} 40'S.$  long.  $178^{\circ} 01'E.$  “ at 0830 G.M.T. auroral display faint red from horizon to about  $20^{\circ}$  altitude. At 0900 display faded.”

## COMET 1947n

Observations of this comet, with many interesting details, have been received from 33 ships, the names of which are given below. For reasons of space it is not possible to give the actual observations from each ship, many of which covered a period of several nights.

The comet was first seen in the twilight after sunset on 8th December, 1947, in South Africa. The brightness of the head was about equal to that of the planet Venus, which was in the same region of the sky. The comet was the brightest that has appeared since the comet of 1910, and was seen by so many persons at about the same time that no one could be named as



having discovered it. From this first night the comet faded rapidly. The first observing ship to see it, from which an observation has been received, was M.V. *Orari* at 1200 G.M.T. on 9th December, quickly followed by S.S. *Ormonde* and M.V. *Durham* at 1225 and 1300 respectively on same night, M.V. *Durham* gave the magnitude of the head on this night as equal to the star Rigel, which is of magnitude 0.34. Thereafter the fading seems to have been rapid, the magnitude on 11th December being given by S.S. *Clan MacNeil* as 3. After this, the ship's reports of its brightness are rather conflicting. Some indicated a steady decrease of brightness; on the other hand the magnitude was given as 3 by S.S. *Benedict* on 16th December and by S.S. *Empire Halladale* on 17th December. The last observing ship to see the comet, from which an observation has been received, was S.S. *Benedict* at 2000 on 20th December. We learn from astronomical sources that the magnitude fell to 8.0 on 29th December, i.e. well below naked eye visibility, and to about 10.0 on 10th January, 1948.

The comet was never seen in the latitude of the British Isles. At the end of December it was a few degrees above horizon in these latitudes, but was then much too faint to be detected in twilight.

The tail was visible in South Africa over a length of about  $20^\circ$ , and a number of the ship's observations give it as from  $10^\circ$  to  $15^\circ$  on various nights. The end of a comet's tail fades off very gradually, and the length visible at any time depends very much on the transparency of the air and presence or absence of some degree of twilight or moonlight. Many comet's tails decrease gradually in brightness away from the head. A peculiarity of Comet 1947n was that the tail was bright for a few degrees from the head, then decreased suddenly, the rest of the tail being much fainter. This accounts for the apparent discrepancy between some of the observations, a short tail and a long tail having in some cases been reported by different ships on the same night.

The list of ships which reported the comet is as follows :

S.S. <i>Asturias</i>	M.V. <i>Jessmore</i>	M.V. <i>Silverteak</i>
S.S. <i>Benedict</i>	M.V. <i>Kenilworth Castle</i>	M.V. <i>Stirling Castle</i>
M.V. <i>British Piper</i>	S.S. <i>Kent</i>	M.V. <i>Stirlingshire</i>
M.V. <i>City of Chester</i>	M.V. <i>Malayan Prince</i>	S.S. <i>Strathmore</i>
S.S. <i>Clan Brodie</i>	S.S. <i>Masimpur</i>	M.V. <i>Sutherland</i>
S.S. <i>Clan Chisholm</i>	M.V. <i>Orari</i>	S.S. <i>Swainby</i>
S.S. <i>Clan MacNeil</i>	S.S. <i>Ormonde</i>	M.V. <i>Taranaki</i>
M.V. <i>Darro</i>	M.V. <i>Port Hobart</i>	S.S. <i>Tongariro</i>
M.V. <i>Durham</i>	M.V. <i>Port Macquarie</i>	S.S. <i>Tweed</i>
S.S. <i>Empire Halladale</i>	M.V. <i>San Velino</i>	S.S. <i>Umtata</i>
M.V. <i>Glenbank</i>	S.S. <i>Shahjehan</i>	
M.V. <i>Inverbank</i>	M.V. <i>Silversandal</i>	

## GEMINID METEOR SHOWER

### Mediterranean Sea

The following is an extract from the Meteorological Record of M.V. *Dunnottar Castle*. Captain J. Trayner. Port Said to Southampton. Observer, Mr. N. E. Upham, 4th Officer.

11th to 14th December, 1947. During the night. Numerous meteors were observed, radiating chiefly from the constellation of Gemini.

Position of Ship at midnight :	Latitude N.	Longitude E.
11th	32° 06'	25° 20'
12th	33° 23'	21° 22'
13th	35° 29'	15° 42'
14th	37° 09'	11° 33'

Meteors were also observed on the nights of 15th, 16th and 17th in fewer numbers.

Other ships reported this meteor shower in N. Atlantic Ocean :

S.S. *Southern Opal*. 9th December. Latitude 31° 36'N., Longitude 36° 18'W., and on 13th December, Latitude 23° 52'N., Longitude 53° 03'W. at 0600 G.M.T. "Numerous shooting stars."

M.V. *Roxburgh Castle*. 13th to 14th December. 2200 to 0200 G.M.T. Position at midnight Latitude 40° 20'N., Longitude 43° 03'W. "Number of small meteors travelling E to W."

In N. Pacific Ocean :

M.V. *Silverwalnut*. 14th December, approximate Latitude 30° 40'N., Longitude 170° 00'E. "Numerous shooting stars and two fireballs seen between 1200 and 1600 G.M.T."

In S. Pacific Ocean :

M.V. *Port Macquarie*. 12th December, Latitude 13° 54'S., Longitude 114° 00'W. "Meteor showers were observed during hours of darkness."

## METEORS

### Arabian Sea

The following is an extract from the Meteorological Record of S.S. *Empress of Scotland*. Captain J. W. Thomas. Aden to Colombo. Observer, Mr. G. E. Warburton, 4th Officer.

12th November, 1947, 2204 G.M.T. Observed a brilliant white meteor directly overhead, in the vicinity of the Pleiades, travelling S through 17°. Duration of flight approximately 8 seconds, but it left a trail covering the entire path of flight which was visible until about six minutes afterwards. The sky was cloudless, no moon and excellent visibility.

Position of Ship : Latitude 10° 39'N., Longitude 58° 24' E.

### Atlantic Equatorial Waters

The following is an extract from the Meteorological Record of S.S. *John Holt*. Captain A. Kennedy. Dakar to Takoradi. Observer, Mr. A. Meredith, Chief Engineer.

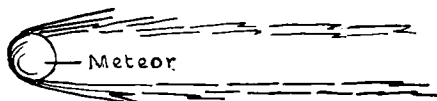
28th December, 1947, 0815 G.M.T. A vapour trail of large meteor was seen for a period of 10 minutes. It was about 2° wide, bearing 270° at an approximate altitude of 50° which ended at approximately 15°. As there was about 5/10 Cu at the time, the actual meteor was not seen.

Position of Ship : Latitude 05° 26' N., Longitude 10° 00'W.

### Caribbean Sea

The following is an extract from the Meteorological Record of M.V. *Priam*. Captain L. W. Kersley. Savanah to Cristobal. Observer, Mr. J. Webster, 3rd Officer.

21st December, 1947, 0423 G.M.T. Observed brilliant meteor (1st mag.). Passage from approximately  $210^{\circ}$  at altitude  $21\frac{1}{2}^{\circ}$  to  $180^{\circ}$  at altitude  $10^{\circ}$  when it disappeared behind a heavy roll of cloud. Duration of visible passage 3 secs. Meteor appeared to travel at a relatively low speed compared with the usual "shooting star". During flight it remained visible when passing behind Cs and some Ac and Cu cloud. It had a brilliant but not very



extensive trail which was in two sections, from the top and bottom of the meteor. There was no trail in the vortex directly behind the meteor. Cloud : Cu forming heavy roll line squall, Ac and Cs (haze).

Position of Ship : Latitude  $10^{\circ} 55\frac{1}{2}'\text{N.}$ , Longitude  $79^{\circ} 08'\text{W.}$

#### Off Cape Tenez, Mediterranean Sea

The following is an extract from the Meteorological Record of M.V. *Cheshire*, Captain F. C. Brooks. Algiers to Liverpool. Observer, Mr. R. D. Fielder, Senior 3rd Officer.

18th November, 1947, 1827 G.M.T. Observed an extremely brilliant meteor at altitude of about  $20^{\circ}$ , travelling from E to W and falling slowly. It was followed by a second one, slightly less bright. The two were separated by about  $1^{\circ}$  to  $2^{\circ}$  and they left an extremely bright trail which persisted for about two minutes.

Approximate position of Ship : Latitude  $36^{\circ} 45'\text{N.}$ , Longitude  $1^{\circ} 15'\text{E.}$

#### Pacific Ocean

The following is an extract from the Meteorological Record of M.V. *Waipawa*, Captain W. G. West. Liverpool to Auckland via Panama. Observer, Mr. G. Watkins, 3rd Officer.

10th November, 1947, 0605 G.M.T. Observed a very bright meteor moving at moderate speed and almost parallel to the horizon. It was first seen when ship was lit up by a brilliant white flash and was moving at approximately  $35^{\circ}$  altitude, bearing  $000^{\circ}$ . Duration of flight  $1\frac{1}{2}$  secs., and it disappeared bearing  $340^{\circ}$ . The sky was clear and the trail was visible for approximately one minute after the meteor had disappeared. The trail seemed to be slightly dispersed as if by upper air currents before its disappearance.

Position of Ship : Latitude  $26^{\circ} 59'\text{S.}$ , Longitude  $134^{\circ} 30'\text{W.}$

## DUNSTABLE—HEADQUARTERS OF THE BRITISH FORECASTING SERVICE

BY E. G. BILHAM, DEPUTY DIRECTOR OF THE METEOROLOGICAL OFFICE

The little Bedfordshire town of Dunstable has a long history, standing as it does at the point of intersection of two of the main roads constructed by the Roman occupiers of Great Britain, Watling Street and the Icknield Way. Gliding enthusiasts know it as the Headquarters of the London Gliding Club, and visitors to the Whipsnade Zoo perhaps think of it mainly as the near neighbour of Whipsnade on the same ridge of the Chilterns. But I think it is true to say that, since the ban on the issue of weather forecasts was lifted at the end of the war, Dunstable has become increasingly known to the public generally as the location of the Central Forecasting Office of the Meteorological Office (C.F.O.).

We have occasionally had the pleasure of welcoming as visitors to Dunstable shipmasters and officers who participate in the scheme of voluntary co-operation under which selected ships furnish weather reports by radio telegraphy. The immense value of these reports has been well described by Mr. T. H. Kirk in recent articles published in the *Marine Observer*. Their value is appreciated in every forecasting office throughout the world, but nowhere more than at the Central Forecasting Office, which has very special responsibilities not only to the Royal Air Force, civil aviation, shipping, industry and the general public, but also to the weather services of other countries. The force of this statement will become more apparent when we get down to details, as we shall presently, of the organisation and functions of C.F.O.

The best way to learn what goes on at C.F.O. is to visit the Office, and we should welcome more visits from those who contribute observations. But the probability is that only a small fraction of the hundreds of co-operating shipmasters and officers will ever find an opportunity of seeing the organisation for themselves. A written description is much less satisfactory but I will try to meet the Editor's request for one, with the aid of some photographs. I can think of no better method than to trace the progress of a typical coded report, from the time it is sent off by W/T from a co-operating ship, somewhere, we will suppose, in the eastern North Atlantic.

### The Teleprinter Room

The message is, as readers will all know, addressed to "WEATHER WIRE LONDON" and the ship's radio officer disposes of it by calling Portishead Radio. Immediately after reception the message is passed to Burnham-on-Sea, close to Portishead, and from there the message is transmitted on a direct teleprinter line to C.F.O. The first room we should look into at C.F.O. is therefore the teleprinter room. The Burnham teleprinter is one out of a large number of similar machines arranged in rows, each labelled with the name of the place to which it is connected.

Ignoring the other machines for the moment, we notice that the indicator light of the Burnham instrument has flashed up showing that a message is coming. The machine starts to emit the peculiar metallic clicking noise characteristic of teleprinters and the message begins to appear in typescript on the paper which is slowly unwound from a roll at the back of the machine. Figure by figure, as the Burnham operator types on his keyboard more than

# METEOROLOGICAL OFFICE CENTRAL FORECASTING STATION ORGANIZATION OF TRAFFIC

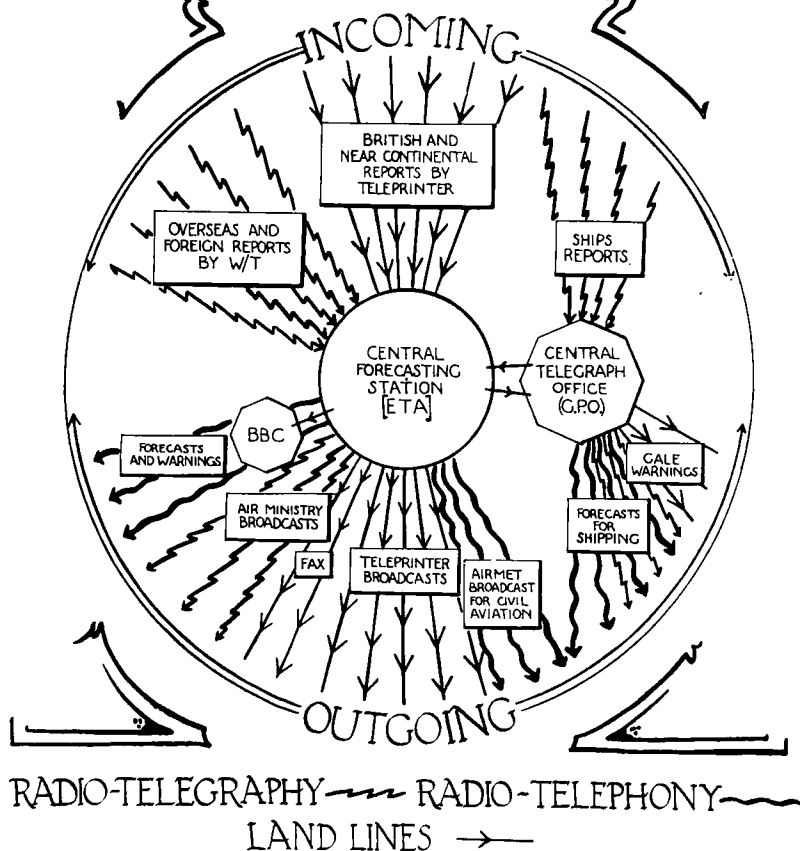


Fig. 1.—Traffic Channels for the collection and distribution of Information at C.F.O.

Teleprinter, wireless telegraphy and wireless telephony channels are indicated by straight lines, zig-zag lines and wavy lines respectively.

FAX is an installation for the direct transmission of weather charts in facsimile by land-line (not at present in operation).

a hundred miles away, the message is reproduced here at Dunstable, an impressive example, surely, of modern technical achievement.

As soon as the message is completed an operator tears it from the roll and drops it on to a continuously moving conveyor belt which whisks it away to some destination which we will discover presently. While we are in this room we will pause for a few minutes, however, to look at some of the other



machines. Here we are at the focus of the Meteorological Teleprinter System, the network of land lines which handles the bulk of the enormous weather signal traffic for the British Isles and certain parts of Europe. The place names on the machines give an idea of the range of the system. Many of them are names of R.A.F. Group Headquarters, such as Abingdon, Inverness and Pitreavie, or of important civil aviation centres such as London Airport, Prestwick and Liverpool (Speke). If we could follow any one of these lines to its place of origin we should find that it terminates on a switchboard, from which subsidiary lines give connection to numerous other stations, each provided with a teleprinter. These stations are local forecasting units established primarily to meet the needs of the Royal Air Force and civil aviation.

Other teleprinter lines from C.F.O. run to such places as the Admiralty, the Air Ministry (Victory House), the B.B.C. news room, the Central Telegraph Office, etc. Another important group of machines represent land-line channels of communication with Continental centres, Paris, Brussels, Utrecht, the Headquarters of the British Air Forces of Occupation in Germany, and the United States Overseas centre at Frankfurt.

In the middle of the room are two main switchboards, through which any or all of the outgoing lines can be connected to an automatic transmitter. By this means a ship's report or any other message can be broadcast at high speed to all stations in the network, or to any required selection of them. To see how it works, we first watch an assistant who sits at a sort of dummy



Fig. 2.—Teleprinter Room at C.F.O.

On these machines hourly coded weather reports from about 400 stations in the United Kingdom and adjacent continental areas are received within eight minutes of the hour of observation.

teleprinter on which she happens at the moment to be typing out a gale warning. This machine converts the message into a series of punched holes on a long paper tape. When this tape is fed into the "auto-head" it automatically broadcasts the message, which reappears on all the teleprinters at the outstations in its original typed form.

The outstation forecasting centres act also as observing stations and transmit coded reports every hour. These reports come in on the appropriate machines at C.F.O., but each of these machines is fitted with a device called a "reperforator," so that the typed and perforated versions are received simultaneously. By this time-saving procedure the reports from scores of stations can be broadcast in a few minutes. There are two broadcasting units, one of which provides the service for all stations while the other gives a special service of additional reports to main centres.

### **The Communications Room**

We may now see what has happened to the Burnham message which we saw put on to the conveyor belt. Following the belt along we reach the Communications room, where the message (in duplicate) is taken charge of by the "Scrutineer." Having automatically timed and dated it with a time-stamping machine, she passes one copy through a hatch to the Forecast Room next door, and hands the other copy to a little group of assistants who are busy compiling messages to be broadcast by W/T and by teleprinter. Here it is copied into the "SHIPS" sections of the collective messages for transmission by the Air Ministry station G.F.A., and the high-power Rugby transmitter G.B.R., and also passed for broadcasting by teleprinter, after checking to ensure that it is not a repetition of a message already received.

### **The Wireless Department**

Outward conveyor belts carry the collective messages to the teleprinter and W/T transmitting positions. The W/T transmitting procedure is very much the same as that used in the teleprinter room; the message being first punched on a tape, the use of which in this case does not increase the speed of transmission but ensures uniformity both in the speed and the quality of the Morse signals.

The transmissions from G.F.A. and also from Rugby R.G.B. are nearly continuous throughout the twenty-four hours, there being only such breaks as are necessary for the purpose of transmitter maintenance. Although the signals in both cases are "keyed" from C.F.O. the amount of apparatus to be seen is surprisingly small. Only a punching machine, an auto-head and a monitoring receiver are involved in each case. The signals originated in the auto-heads at C.F.O. pass by land lines to the actual transmitting stations where they are amplified and put "on the air." At Rugby itself, where the G.B.R. aerials are supported on lattice towers nearly as high as the Empire State Building at New York, the equipment is of course much more impressive.

The Rugby transmissions include the Atlantic Weather Bulletin twice daily at 0930 and 2130 as well as the Intercontinental retransmissions of European data and ships reports from the north-eastern Atlantic. It is possible for the report we have been watching to be included in both these transmissions. In either case the immense power of G.B.R. backed by



Fig. 3.—Wireless Reception Room at C.F.O.

simultaneous transmission on short waves gives the report a practically world-wide dissemination.

While in the wireless department we must not omit to see the equipment for maintaining contact with the British Ocean Weather stations. The apparatus is installed in a corner of the reception cabin, and is no more pretentious in appearance than that of the other transmitting positions. The only difference is that the auto-head is replaced by a Morse key, as the signals to the ships are all sent by hand. The traffic includes not only the normal coded reports from the ships, giving surface data every three hours and upper air data every six hours, but also any messages in either direction relating to movements, casualties or other non-routing matters. On an occasion such as that of the Christmas broadcast, when the B.B.C. commentator met with an unfortunate mishap, or 11th January, 1948, when O.W.S. *Weather Recorder* rescued the crew of a Norwegian steamer off Islay, the non-routine traffic may be quite heavy.

### The Forecast Room

Let us now see what has been happening to the copy of the original message which was passed into the Forecast Room. In contrast with the teleprinter and wireless departments, where there is constant background of mechanical noise, the Forecast Room is a peaceful place. Here the reports are plotted on the charts as fast as they come in, and we see at once how vital the ships' observations are. At C.F.O. the senior forecaster on duty has the responsibility of establishing the basic synoptic analyses, and framing prognostic analyses for twenty-four hours ahead, every six hours. These analyses,



Fig. 4.—In the Forecast Room at C.F.O.  
Right, Mr. C. K. M. Douglas, O.B.E., left, Mr. J. Harding

which are included in the teleprinter and W/T broadcasts, form the basis of the whole British forecasting service, and the reputation of the service depends on their reliability. A glance at the working charts shows that the land areas are filled with well-spaced observing stations. But the analysis must be extended over the broad spaces of the oceans as well, and here we are dependent on the reports from ships. The Ocean Weather Stations and Meteorological Reconnaissance flights are tremendously important, but they do not suffice by themselves to show the distribution of weather systems and fronts in sufficient detail. Nothing is more helpful to the forecaster than to see a good sprinkling of ships' observations over these ocean areas, enabling him to locate the positions of fronts, etc., with confidence.

The plotting is done rapidly and expertly by trained assistants. Charts on several different scales are used for the surface representation and on the other side of the room more charts are plotted to show the upper air conditions at various levels. The surface analysis begins with the roughing in of the main isobars. The analyst then decides the positions of fronts by a careful study of the plotted reports, taking into account the positions shown on previous charts in the series, and then completes the drawing of the isobars in conformity with the frontal structure. From time to time the lines may have to be modified, as further reports come in. (A late ship's report from a key position in the Atlantic may profoundly affect the analysis over a wide area.)

All the forecasts broadcast by the B.B.C. or published in the national newspapers are drafted here, as are also the gale warnings for shipping and weather warnings of various kinds for a great variety of purposes. Three forecasters are kept very busy in the Forecast Room, and there is also the Airmet forecaster sitting at the microphone in a "silence cabinet" broadcasting detailed commentaries hour by hour for the benefit of aviation personnel and of anyone else who cares to tune to 1224 metres. For the Airmet forecaster special large scale charts are plotted every hour so that he may have the very latest information in front of him at the microphone. The Airmet service operates from 8 a.m. to 6 p.m. in winter, 7 a.m. to 10 p.m. in summer.

Such is Dunstable. This brief word picture is incomplete, because we have seen nothing of certain things which visitors are always interested in,—for example the printing works, and the "Sferic" equipment for locating thunderstorms a thousand miles away. But I hope readers have been able to see in their mind's eye a busy and modern organisation planned to handle great numbers of weather reports with expedition and despatch, and to build up from them the best forecasts possible in the existing state of knowledge.



## THE ANTARCTIC PACK-ICE

BY H. F. P. HERDMAN, M.SC., *Discovery* INVESTIGATIONS

For a large part of every year Antarctica is surrounded by a belt of pack-ice which at its winter maximum varies in width from 100 to 1,000 miles, and the presence or absence of this immense body of ice is the most important factor in making any approach to the continent or in planning any work in the Southern Ocean. Local observations of pack-ice have been made by all expeditions since the first circumnavigation of the Antarctic Continent by Captain James Cook, R.N., in 1772-75, but little had been done to study the wider aspects of the distribution of pack-ice around Antarctica until the advent of pelagic whaling in these waters, some fifteen or sixteen years ago.

Extensive research into the life history of the whale in Antarctic waters was begun by the *Discovery* Committee in 1925 and although in the earlier years the oceanographical work involved was mainly confined to the Atlantic sector, it was gradually extended to include observations planned on a circumpolar basis. During the next fourteen years the Royal Research Ships *Discovery* (1925-27), *Discovery II* (1929-39) and *William Scoresby* (1926-38) obtained, in the course of their many cruises, much valuable information on the distribution of pack-ice. The data were mainly from the spring, summer and autumn months, but valuable information on winter conditions was obtained during a circumpolar cruise of the *Discovery II* in the winter of 1932 and from a series of winter cruises in the Atlantic sector, by the same ship, in 1938.

The distribution of pack-ice in the summer months was also being studied by the whalers and the results of their observations on the whaling grounds, between 1929 and 1934, were published by Hansen<sup>1</sup> in the latter year; these observations, however, covered only the area between the meridians of 40°W. and 110°E. Hansen then compiled an atlas of ice limits<sup>2</sup> around Antarctica in the summer months, but for the areas outside the regular whaling grounds the limits shown are probably very tentative.

The observations made by the *Discovery* Committee's ships between 1925 and 1939 were used as the basis of a paper on the limits of the Antarctic pack-ice which was published in the *Discovery Reports* in 1940<sup>3</sup>. This paper incorporated much of Hansen's data from whaling sources—data which in certain areas far outnumbered those of our own ships, but our observations were more widely distributed in time and space. Miscellaneous sources provided a small number of additional observations which helped to fill some of the gaps.

### Seasonal distribution of pack-ice

The northern limit of pack-ice around Antarctica is reached in late winter and early spring, remaining fairly constant from July to October. In November a slight retreat towards the south occurs but the general break-up does not begin much before December. Once started, however, the break-up is fairly rapid and the southern limit usually is reached in February or March, although in certain years parts of the coasts of Antarctica have been clear of pack-ice in late January. In mid-January, 1938, for instance, the *Discovery II* saw no signs of pack-ice off the coast of Adélie Land. In the Pacific sector, at any rate between the meridians of 75° and 140°W, no ship has been able to



*Reproduced by courtesy of 'Discovery' Committee*  
Fig. 1.—New ice forming in  $70^{\circ}\text{S.}, 04^{\circ}\text{E.}$ , 5th March, 1939

penetrate to the land, and it is virtually certain that the eastern coast of Graham Land is never free of ice. Elsewhere it is likely that most parts of the Antarctic coastline are free from pack-ice from time to time in the late summer.

### **Formation of pack-ice**

Before considering in more detail the advance and retreat of the ice-edge—and therefore of the main body of pack—it would perhaps be advisable to consider the way in which pack-ice forms. In late March and early April a wide belt of cold surface water, with a temperature of less than  $-1^{\circ}\text{C}.$ , surrounds Antarctica, and with still conditions and low air temperatures rapid freezing of the sea takes place. If still conditions persisted for any length of time a solid sheet of ice would soon form but in the open ocean still conditions for any appreciable time are the exception and although there may be a temporary absence of wind in high latitudes there is usually an underlying swell. Consequently, instead of a solid sheet of ice, the first appearance of pack-ice is usually in the form of small pancakes, only a few inches in diameter. The addition of snow and the rocking motion imparted by wind and sea causes these pancakes to grow rapidly and as winter comes on, with lower temperatures and more precipitation, the pancakes soon grow into large floes.

### **Advance and retreat of the pack-ice**

Once the general freeze-up has begun the advance of the ice-edge towards the north is rapid, especially in the Atlantic sector where the influence of the cold surface water from the Weddell Sea extends far north throughout the year. By June the ice-edge is some 700 miles north of Antarctica in the Atlantic sector but off Adélie Land the advance is not more than 300 miles and north of the South Shetland Islands the sea is just beginning to freeze over. In the Pacific sector, where a break-up does not appear to occur in summer, the advance is also slight. The rate of advance now slows down and the northern limit is reached in September or October, with a maximum in the Atlantic sector, near the South Sandwich Islands. Here, the ice-edge now lies in about latitude  $54^{\circ}$ – $55^{\circ}\text{S}.$ , a distance of 900–1,000 miles from the Continent, but whether this area is completely covered by pack-ice must remain a matter of conjecture until long-range reconnaissance by air can be carried out in winter. However, in view of the very low surface temperatures which prevail far north of Antarctica, prior to the general freeze-up, it is improbable that any area of measurable size remains free from ice.

The break-up or retreat of the pack-ice is best shown by a map. Fig. 2, which is based mainly on observations from the *Discovery* Committee's ships, shows the apparent mean position of the ice-edge around Antarctica for each month from September till March. But it must be remembered that for any given date the latitude of the ice-edge varies considerably from year to year and that the mean positions shown here are very much an average. It should also be noted that, however sharp the actual line of demarcation may be, the ice-edge is seldom the even line shown in the diagram. When it has been possible for our ships to follow the edge of the pack over any distance it has been found that the edge follows a winding course, with deep indentations and large promontories. Only a slight retreat occurs in November but by the end of December, especially in the Atlantic sector, a large area has

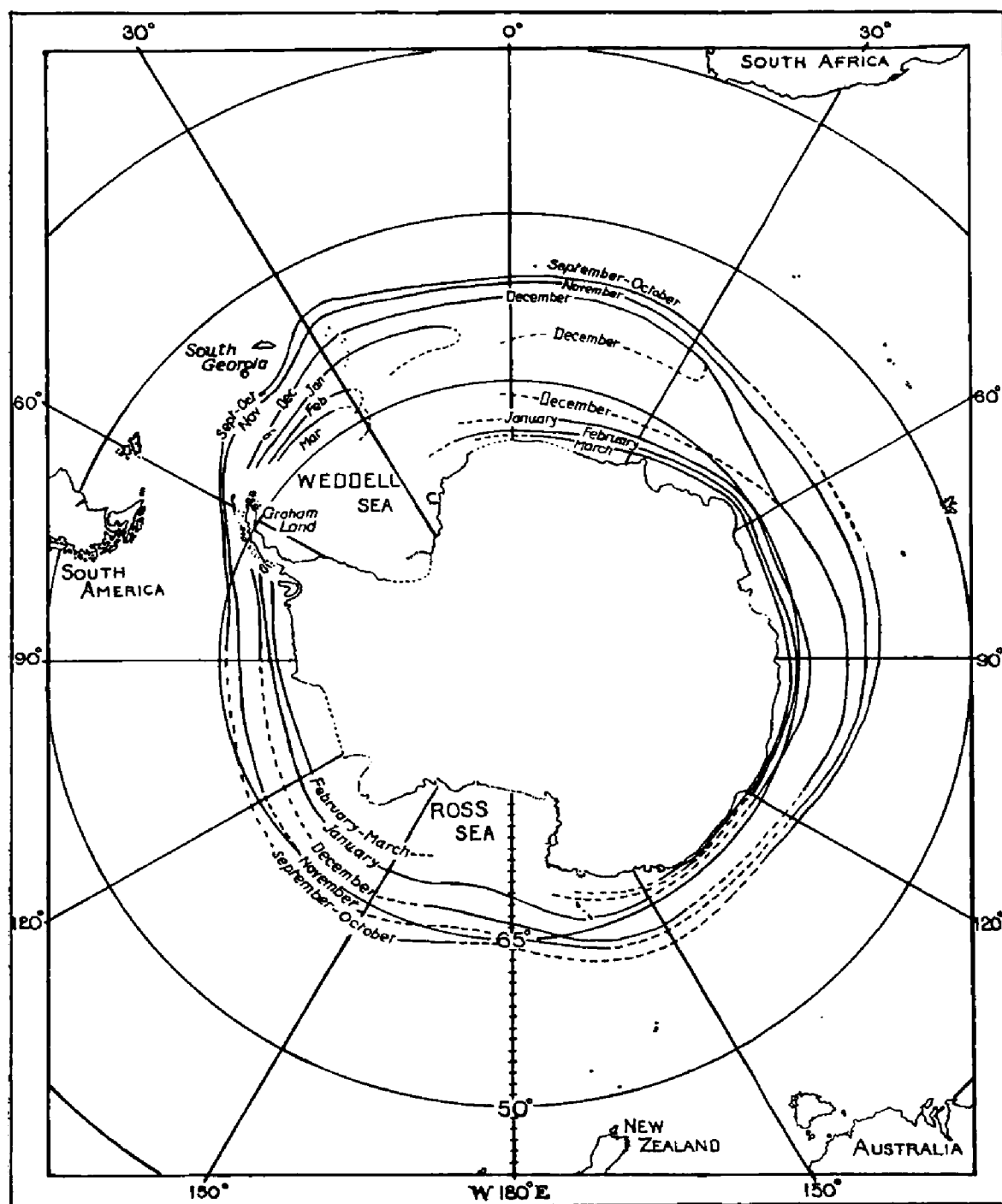


Fig. 2

been cleared of ice. In most sectors the break-up continues at an even rate, but in the Atlantic sector the influence of the cold Weddell current is sufficient to maintain in December a tongue of pack-ice as far east as the meridian of  $30^{\circ}\text{E.}$ , at which time clear water usually is found to the south. In the succeeding months this tongue melts and gradually retreats towards Graham Land but owing to the very heavy nature of pack-ice of Weddell Sea origin it is probable that in some years this tongue does not completely disappear. For the same reason, that is to say, the heavy nature of the pack, it is difficult to obtain observations by ship to the south and west of this tongue in early summer and any width given for this belt of ice must be very approximate.

On the eastern side of the Weddell Sea, however, the *Endurance* pushed through a belt of ice 600 miles wide to find open water off Coats Land, in latitude  $72^{\circ}\text{S.}$ , in January, 1915. Again this appears to be a problem for which long-range air reconnaissance offers a possible solution.

The diagram (Fig. 2) shows only the northern edge of the pack-ice but it has been known for many years that in mid to late summer there is open water south of the pack-ice which stretches across the mouth of the Ross Sea. Early in January, 1936, when bound to the south, the *Discovery II* found this belt to be 400 miles wide on the 180th meridian, there being clear water from the latitude of  $73\frac{1}{2}^{\circ}\text{S.}$  to the Ross Ice Barrier. On her return to the north fourteen days later the *Discovery II* found that the width of the belt was reduced to 150 miles.

### **Conditions at the ice-edge**

There is considerable variation in the type of ice found at the edge of the pack, depending not only on the season but on the locality. In spring and summer the edge commonly consists of brash and small floes and the outer fringe of the main pack is more open. In the late autumn or winter the ice-edge is usually formed of ice scum or sludge ice, merging gradually into pancake ice and the larger floes. These conditions, however, vary considerably with the locality. For instance, in the eastern Pacific sector, where the pack-ice always lies south of the region of westerly winds, there is little seasonal movement and the floes are much more tightly packed.

In the Atlantic sector, the pack stretches far north in winter and lies well within the influence of the westerly winds. Here, the relatively warmer winds and the persistent swell can disperse the scum, and even new pancake ice, over a considerable distance, and in the winter of 1938 the *Discovery II* observed an apparent retreat of the ice-edge of about 100 miles between July and August. In September the edge had returned to its former position.

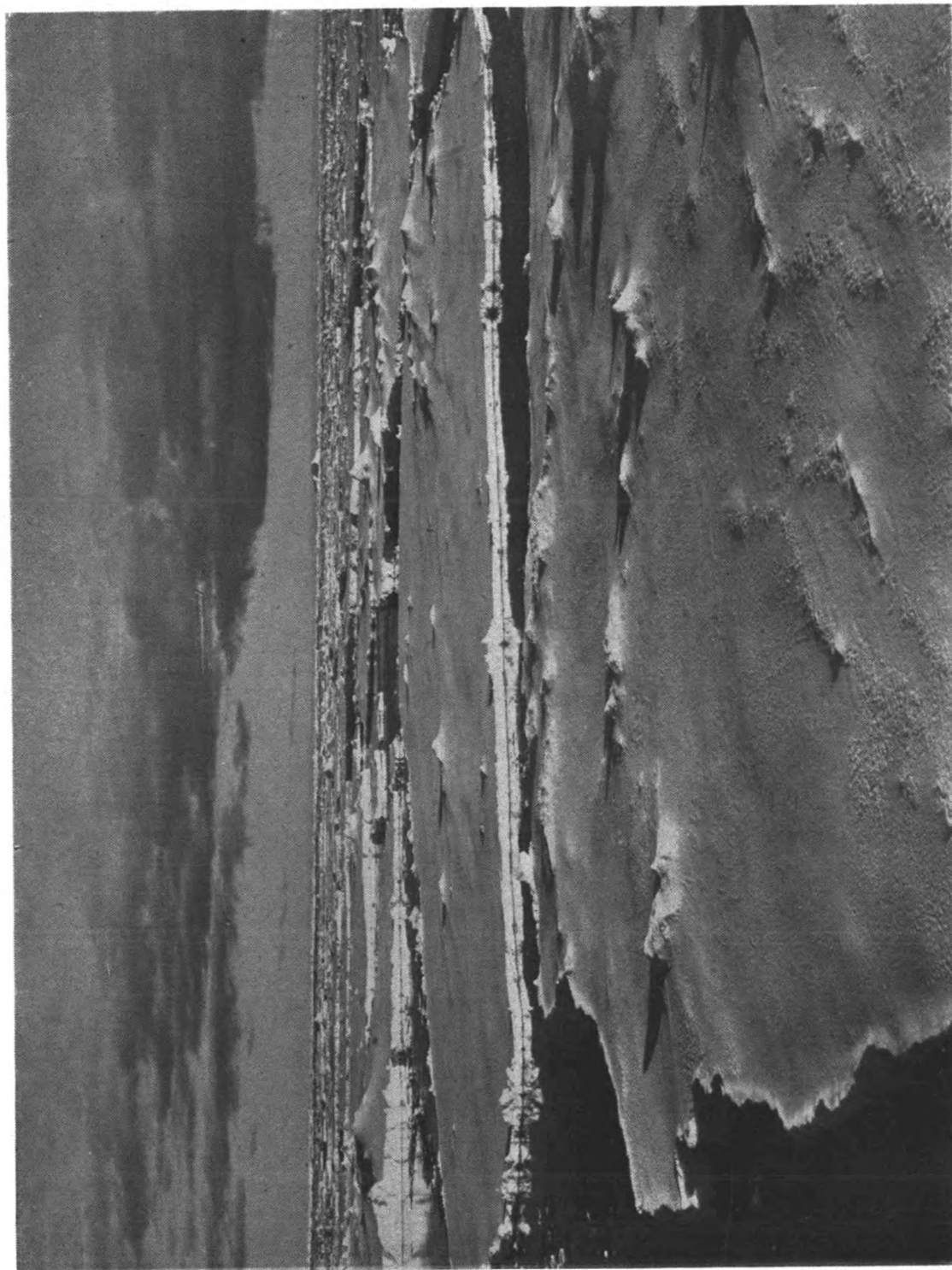
A factor which has not yet been considered and which has perhaps the greatest effect not only on conditions at the ice-edge but on the movement or drift of the main body of ice is the presence or absence of a surface current.

### **Surface currents and the movement of pack-ice**

The predominant influence on the movement or drift of pack-ice is the wind; not so much, perhaps, from the direct effect on the floes but from the influence of the surface currents set up by the prevailing winds. Local variations do occur but the general direction of movement of pack-ice would appear to be that of the surface current. These currents have been described in detail by Deacon<sup>4</sup>, but briefly it may be stated here that the principal movements of the Antarctic surface water are towards the east in latitudes north of  $65^{\circ}\text{S.}$ , towards the west farther south and a general northward movement, stronger in some areas than others. These movements have two chief causes, the prevailing winds and the influence of the cold Antarctic climate on the density distribution. The general effect is that in the low temperatures of winter the pack will tend to bind closely round the continent while in summer the warmer climate will facilitate its dispersal towards the north.

Apart from any question of movement the extent or distribution of pack-ice around Antarctica would appear to be closely related to the range of the surface current flowing westwards round the coasts of the Continent and some





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Fig. 3. Very heavy and impenetrable pack-ice in  $69^{\circ} 49\frac{1}{2}'\text{S.}$ ,  $101^{\circ} 15\frac{1}{2}'\text{W.}$ , in the Bellingshausen Sea. Farthest south reached by R.R.S. *Discovery II*, 6th January, 1931. Note hard ice sky

description of the East Wind Drift, as this current is called, is necessary. Surrounding Antarctica at all times of year, in the region of the westerly winds, is the West Wind Drift and between the southern limit of this—in approximately  $65^{\circ}\text{S}$ .—and the Continent is a drift in the opposite direction which is practically circumpolar, being interrupted only by Graham Land. It is found again in the Bellingshausen Sea, to the west of Graham Land, but its movements are slight and variable. Observations by the *Belgica*, when she was beset in the ice here in 1898–99, show that despite a considerable easterly movement at times, the resultant drift was to the west at the rate of 0.9 miles a day. These variable conditions probably have a big effect in promoting the stagnant ice conditions common to this sector and the lack of a definite movement in the surface current may account for the fact that the pack here does not appear to break away in summer.

Farther to the west in the Pacific sector, the easterly drift remains south of  $70^{\circ}\text{S}$ ., but north of the Ross Sea it expands to a much wider range. In the Ross Sea itself the current sets westward along the barrier, northward along the shores of Victoria Land and then to the north-west between Oates Land and the Balleny Islands. The *Aurora* drifted in this direction when imprisoned in the pack in 1915–16, at a daily rate of 2.8 miles in the main direction of movement.<sup>5</sup> The westerly current has been observed off



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Fig. 4. Heavy pack-ice in the Ross Sea. Height of floes above water is about 10 ft.

King George V Land and Adélie Land, and there is little doubt that it continues along the whole of the Antarctic coast south of Australia. It must, however, be confined to a narrow coastal strip since in this sector the Antarctic coast reaches almost to the region of the westerly winds. Farther west, observations by the *Gauss* showed that the current was still confined to a narrow belt, and between  $60^{\circ}$  and  $70^{\circ}$ E. the *Discovery* observed a westerly drift of 12–13 miles a day. Off Kemp and Enderby Lands the extent of the drift increases but the daily rate is reduced to 7 miles. South of Cape Town the coasts of Antarctica lie in about the latitude of  $70^{\circ}$ S. and the boundary of the west flowing current spreads to the north, but in general the eastern part of the Atlantic sector appears to be one of irregular water movements.

Approaching the Weddell Sea the East Wind Drift follows the coastline and in the sea itself is deflected to the north and north-east by Graham Land and the Scotia Arc, eventually joining the northward movement from the Weddell Sea and finally returning eastwards as a cold surface current.

The drifts of the *Deutschland* in 1912 and the *Endurance* in 1915–16 give a good indication of the movements of the Weddell Sea surface water. The loss of the latter ship, which was beset much nearer the Graham Land coast, can perhaps be attributed to the great resistance offered by this coast to the pack-ice moving westward. Evidence of this pressure in pack of Weddell origin has been noted in ice which has drifted as far as the South Sandwich Islands.

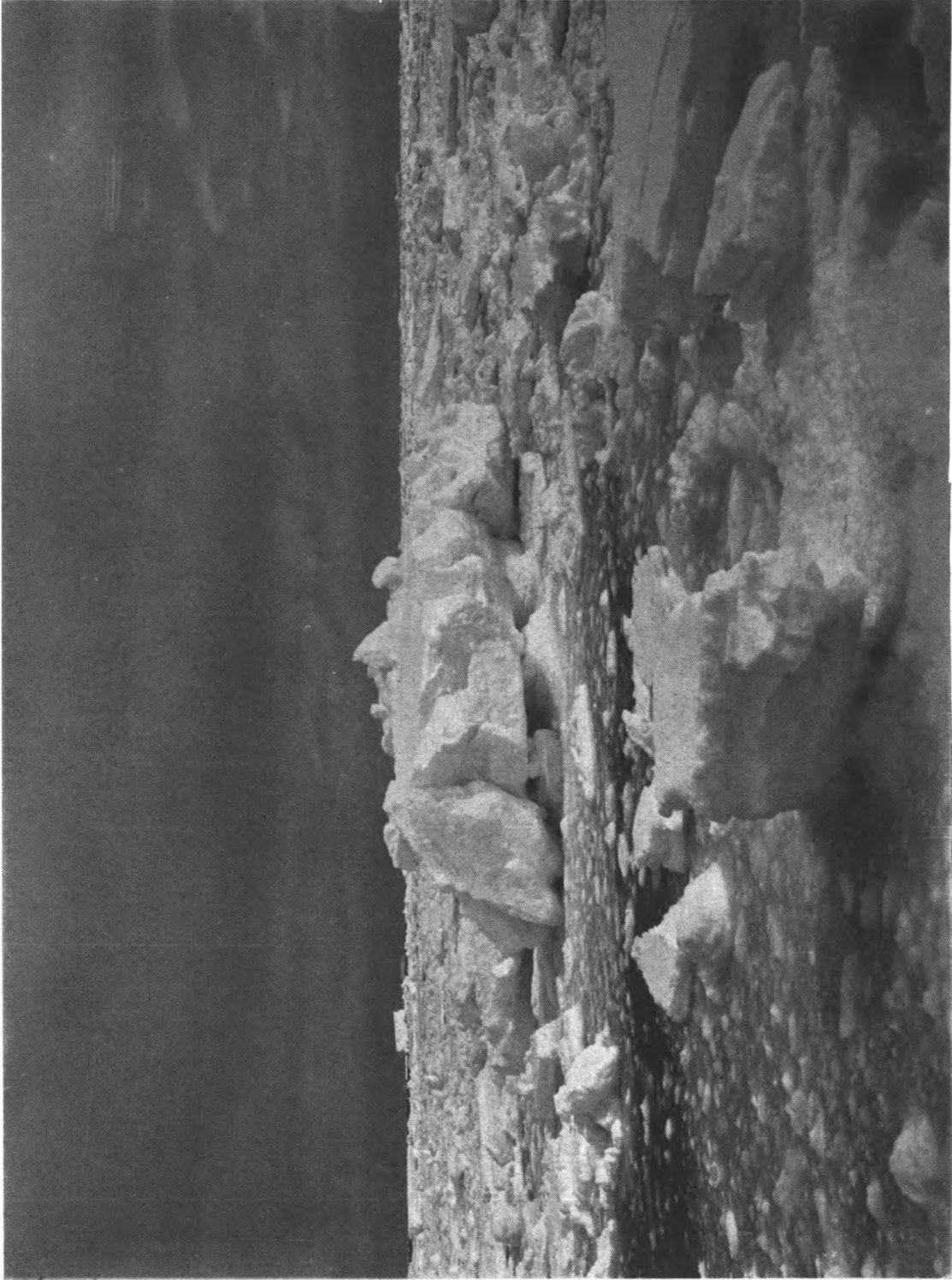
Observations made by the *Deutschland* have been interpreted by Brennecke<sup>6</sup> to show that the movement of the pack-ice was caused solely by the wind. This statement has been queried by Wordie<sup>7</sup> and does not appear to be supported by our more recent work in this area.

Comparison of the range of the East Wind Drift and the winter limit of pack-ice is of considerable interest. Where the current is confined to a narrow strip so is the belt of pack-ice narrow and in the Atlantic sector, where the Weddell Sea current (which has its origin in the East Wind Drift) extends far to the north and east, the limit of pack-ice closely approximates to the northern boundary of this current.

Such information as we possess also points to a connection between ice-limits and the range of the northward moving currents.

### Warning of the proximity of ice

So far no mention has been made of the signs by which a ship steaming southwards can be warned of the proximity of pack-ice. In clear weather "ice-blink" in the sky will denote the presence of pack-ice, often at a considerable distance, and although there are seasonal variations a marked change in the bird life usually occurs some distance north of the ice-edge; for instance, the snow petrel (*Pagodroma nivea*) never ranges farther than 100 miles from the pack. Fine weather at, or near, the edge of the pack is not, however, a very common occurrence and as an all-weather warning the almost certain sign of the proximity of pack-ice is the abrupt drop of about  $1^{\circ}$  or  $1.5^{\circ}$ C. in the surface temperature which usually occurs about 10–20 miles north of the ice-edge. The amount of this drop varies but little throughout the year though the surface temperatures in summer naturally are higher than those which obtain in winter. In the latter season the drop will be from  $0^{\circ}$  or  $-0.5^{\circ}$ C. to  $-1.5^{\circ}$ C. or even lower.



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Fig. 5. Old and rafted pack-ice of Weddell Sea origin encountered in  $54^{\circ}\text{S.}$ ,  $30^{\circ}\text{W.}$ , near South Georgia, on  
1st November, 1930

## Research in the future

Long range air reconnaissance and a much more comprehensive knowledge of meteorological conditions are vitally necessary to future research on the distribution of pack-ice, and the recent establishment of meteorological stations in the Dependencies of the Falkland Islands and at other places around Antarctica is the first step in the achievement of this aim. Air reconnaissance in summer during the recent American Expedition led by Rear-Admiral Byrd has shown the possibilities of this line of research and their flights over the pack-ice in the little-known Pacific sector may throw some light on the conditions here. To be of real value, however, air reconnaissance must also be capable of providing observations in winter.

Many more observations on surface temperature are required from all sectors, to provide more accurate information on the northward moving currents and it is to be hoped that further information on the significance of the Antarctic Convergence can be obtained. This convergence can be described simply as the point where the northward flowing cold Antarctic surface water sinks below the less dense sub-Antarctic water; it is continuous around Antarctica and it seems fairly certain that it must be related to the northern limit of pack-ice.

When all this information is available it may then be possible to make a reasonably accurate forecast of ice conditions throughout the year.

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## THE WORK OF A WEATHER SHIP

BY A. SIMPSON, 2ND OFFICER, O.W.S. *Weather Watcher*

For some months now the two Ocean Stations allocated to Britain under the International Ocean Weather Ship Scheme have been constantly manned, by four ships. The service is now well under way and functioning smoothly and, we hope, satisfactorily.

These first months, however, have not been in more senses than one, quite "plane sailing." Most of us were sailing in small ships for the first time, quite a number actually making their first voyage to sea. The crews had been recruited from the Merchant Navy and from all three services, fifty men in all, with a variety of background and experience, cramped together





Leub

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The launching of a balloon carrying a radio sonde and a radar reflector, from an Ocean Weather Ship



in a small ship and sent out into the North Atlantic to stay there for a month. It was inevitable that we should have our troubles before we could be moulded into a workable team, and we did, but on the whole these were very much less than might have been expected under the circumstances. Seasickness, for example, among those who had not been to sea before, and in many cases among those who had, was overcome remarkably quickly. Those of us who had experienced the North Atlantic winter in other ships were amazed at the seaworthiness and performance of these little ex-corvettes, extremely lively and uncomfortable in heavy weather but remarkably dry and riding like a bird the highest and most ferocious of seas.

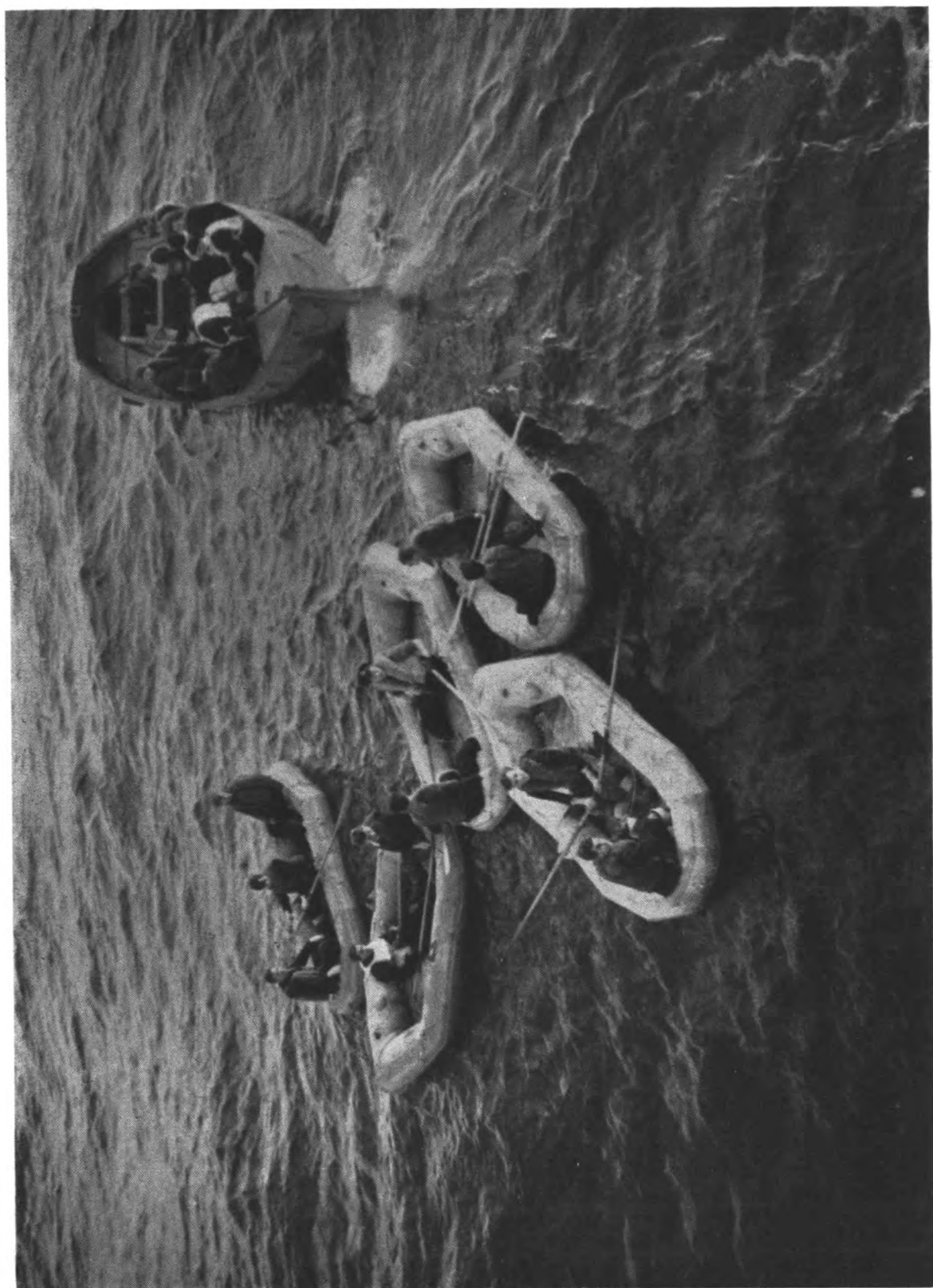
The two British stations are "I" (ITEM) in Latitude  $60^{\circ}$  N., Longitude  $20^{\circ}$  W. and "J" (JIG) in Latitude  $53^{\circ} 50'$  N., Longitude  $18^{\circ} 40'$  W. Twenty-one days are spent at a time on station and three days allowed for each passage outward and homeward. A complete voyage therefore lasts twenty-seven days and fifteen days are allowed in port between each voyage.

The main function of the ships is to take radio sonde readings of the upper air every six hours. The radio sonde has been introduced in comparatively recent years and is still being developed. The instrument used on board consists of a transmitter modulated by an audio frequency oscillator. One at a time, by means of a windmill switch, three variable inductions are introduced into this circuit, these being controlled by three meteorological elements, one each for pressure, temperature and humidity. The signal given out thus takes the form of a sequence of three notes. When received it is matched on a cathode ray tube with a signal given by an oscillator on the ship and frequencies corresponding to pressure, temperature and humidity are obtained. Thus the temperature and humidity of the upper air are obtained with reference to pressure during the flight of the instrument which is usually up to about 50,000 ft. The radio sonde is carried by a balloon about 7 ft. in diameter when filled with hydrogen, a radar reflector also being attached to the balloon.

The whole apparatus is prepared in a special filling compartment at the after end of the ship and has to be launched from the extremely small deck space available at the stern, the operation requiring, especially in a high wind, considerable skill and practice. On occasions, after completing the work involved in preparing the balloon and instrument, the balloon has burst on launching or the transmitter has dipped into the sea before being borne aloft. The meteorological staff, however, may well be congratulated that this is a rare occurrence. During its flight the balloon is followed by radar and its position constantly plotted, thus giving the speed and direction of the upper winds.

Three-hourly surface observations are also made, synoptic charts are drawn up and a constant watch kept on the weather. Radar is used to determine cloud base and height and sometimes also to determine the position of fronts in the vicinity of the ship. Results of all observations are passed to the central forecasting office at Dunstable with which the ships are in constant communication. Upper air information, including winds at various heights, cloud base, freezing level, etc., is passed to aircraft on the transatlantic route.

The radar fitted is Naval type 277P which gives azimuth, elevation and range of targets up to a maximum range of 150,000 yards under normal working conditions. Besides being used for meteorological purposes it



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Motor lifeboat and rubber dinghies carried aboard Ocean Weather Ships for Air/Sea rescue

affords a valuable aid to navigation, both in the normal navigation of the ships and for the benefit of transatlantic aircraft. The aircraft are picked up and followed on the radar screen while within range of the ship. Bearing and range can be passed to the pilot enabling him to check his position; an accurate ground speed and course can also be given.

Other navigational aids afforded to aircraft are, a medium frequency radio beacon which transmits the station call sign for a period every twenty minutes, and a responder beacon (Eureka) which can be used to give bearing and range of the ship to aircraft fitted with the complementary receiver (Rebecca). A reciprocal bearing of the aircraft from the ship obtained by V.H/F or M/F direction finder can be used to check the bearing obtained by either of these beacons.

In order that the fullest use may be made of the above navigational aids to aircraft it is necessary that the ship's position be determined accurately at any instant. The two stations are within Loran and Consol coverage and these radio aids to navigation are used in addition to the usual astronomical fixes.

Various suggestions for maintaining position on station have been put forward. It has been found, however, that if the ship's position is determined by sextant observation whenever possible and checked at intervals throughout each watch by Loran and Consol, maintaining position under moderate weather conditions presents no great problem. In extremely heavy weather, however, it is not always possible to keep the ship heading in the desired direction and to keep the ship in the vicinity of station becomes a more difficult task.

The ships are propelled by triple expansion, four cylinder, reciprocating engines which are ideally suited to the frequent steaming at slow speeds necessary to maintain station.

Air sea rescue is also an important duty of the ships. A variety of rescue equipment is carried, including rubber dinghies and two wireless-equipped motor lifeboats. A constant watch is kept on the transatlantic aircraft frequencies and on the international distress frequency. Should an aircraft have the misfortune to be required to ditch in the North Atlantic, the pilot can home on the nearest ship by means of the radio beacon which would transmit continuously for this purpose. Again, radar would be used to follow the aircraft's approach and, if necessary, the ship would steam towards the aircraft. Surface weather conditions, particularly state of sea, would be passed to the pilot by radio telephone; with a heavy sea or swell running, a flare path could be laid to mark the best direction of approach. The ship's officers have been trained in aircraft ditching procedure, and it is hoped that we would be able to give the pilot valuable assistance in bringing his aircraft on to the water with as little damage as possible. Thereafter, rescue work would be carried out with boats or dinghies.

The ships are of course available for any type of rescue work and, in fact, the rescue of the crew of a merchant ship which was driven ashore in bad weather has already been successfully carried out by one of the ships.

It is becoming increasingly apparent that the ships may prove useful to various other organizations interested in the scientific study of the sea. At present, two of the ships are provided with apparatus by which oceanographical observations are made, and by which a constant watch is kept on

the marine life existing in that part of the North Atlantic in which the ships are stationed, for the benefit of the research laboratories of the Ministry of Agriculture and Fisheries. We who sail in the ships are very keen to help in such work, for all oceanographical interests. The programme of this work is arranged internationally.

In spite of the size of the ships and conditions which must necessarily mean periods of discomfort, life on board can be very happy indeed. A spirit of comradeship and co-operation has grown up which benefits the work of the ships and the welfare of those on board to a great extent. During off duty hours at sea there is no lack of entertainment, including various competitive games between the messes. There are times when the job is not an easy one, but if by our efforts the work of the Meteorological Office and the safety of civil aviation is benefited, then indeed we are rewarded and we have reason to be proud of our Service.

## SHIPS' OBSERVATIONS AND THE CLIMATOLOGIST

### Part II. The Representation of Observations by Isopleths

BY H. JAMESON, D.SC.

One of the most effective methods of displaying climatological information for maritime areas, and indeed also for land areas, is to plot *isopleths* on charts of the region for which information is desired. An isopleth is a line on a chart passing through all the points at which the value of any particular meteorological factor is the same. Isopleths are analogous to the contour lines, on a topographical map, from which the height at any point can be deduced. Examples of isopleths are *isobars*, which join those points at which the pressure at a particular time is the same ; *isotherms*, which join points showing the same temperature ; *isonephs* (cloud) and *isohyets* (rainfall).

To draw these isopleths, values of the meteorological factor concerned are plotted on a chart, at the points to which they refer. Lines are then drawn through all the points which are estimated by interpolation to have the same value. This process is repeated for a suitable number of values, for example, if we are considering the monthly mean air temperatures for a particular month, we might draw the isotherms for  $80^{\circ}$ ,  $78^{\circ}$ ,  $76^{\circ}$ ,  $74^{\circ}$ , and so on, by steps of  $2^{\circ}\text{F}$ . If we are considering fog frequency in a particular month, we might choose the isopleths for 0, 2, 5, 10, 20 per cent, and thence by steps of 10.

The information generally shown on marine climatological charts by isopleths includes such data as mean air and mean sea surface temperatures, the mean difference between air and sea surface temperatures, percentage frequency of precipitation, percentage frequency of winds of gale force, mean cloud amount, etc.

The percentage frequency of, say, precipitation is the ratio, expressed as a percentage, of the number of cases in which precipitation has been reported to the total number of observations of the occurrence or non-occurrence of this factor, at any point or in any sufficiently small area. For example, along the 10 per cent isohyet, 10 per cent of all observations in the past have included the occurrence of precipitation of some kind, and it is therefore reasonable to expect that in future, in the small areas centred on this isohyet,

for the month or season to which the data refer, the chance of precipitation at any time will still be 1 in 10.

This statement makes two assumptions, the first, that the area to which it refers is not undergoing appreciable climatic changes, and the second, that we know nothing relevant about the weather at the time for which we require the probability of rain. If, at any particular time, we know from weather reports that a barometric low is moving towards a point on the 10 per cent isohyet, the chance of rain in the immediate future is considerably greater than 1 in 10, while, conversely, if that place is in an anticyclone area, the chance of rain is considerably less. However, in the long run, taking fair and foul weather together, we should still expect 1 in 10 observations to give precipitation. Such information may be very useful where it is required to plan operations so far ahead that the ordinary weather forecasts are not available.

Besides percentage frequencies, isopleths of other meteorological factors, such as extreme and mean values of temperature, pressure, etc., are also drawn. It may be asked why mean values are given on meteorological charts, when what is really of most interest to the mariner, or to anyone else using the charts for practical purposes, is not the mean, but the most frequent value (known to statisticians as the *mode*) which is not necessarily the same.

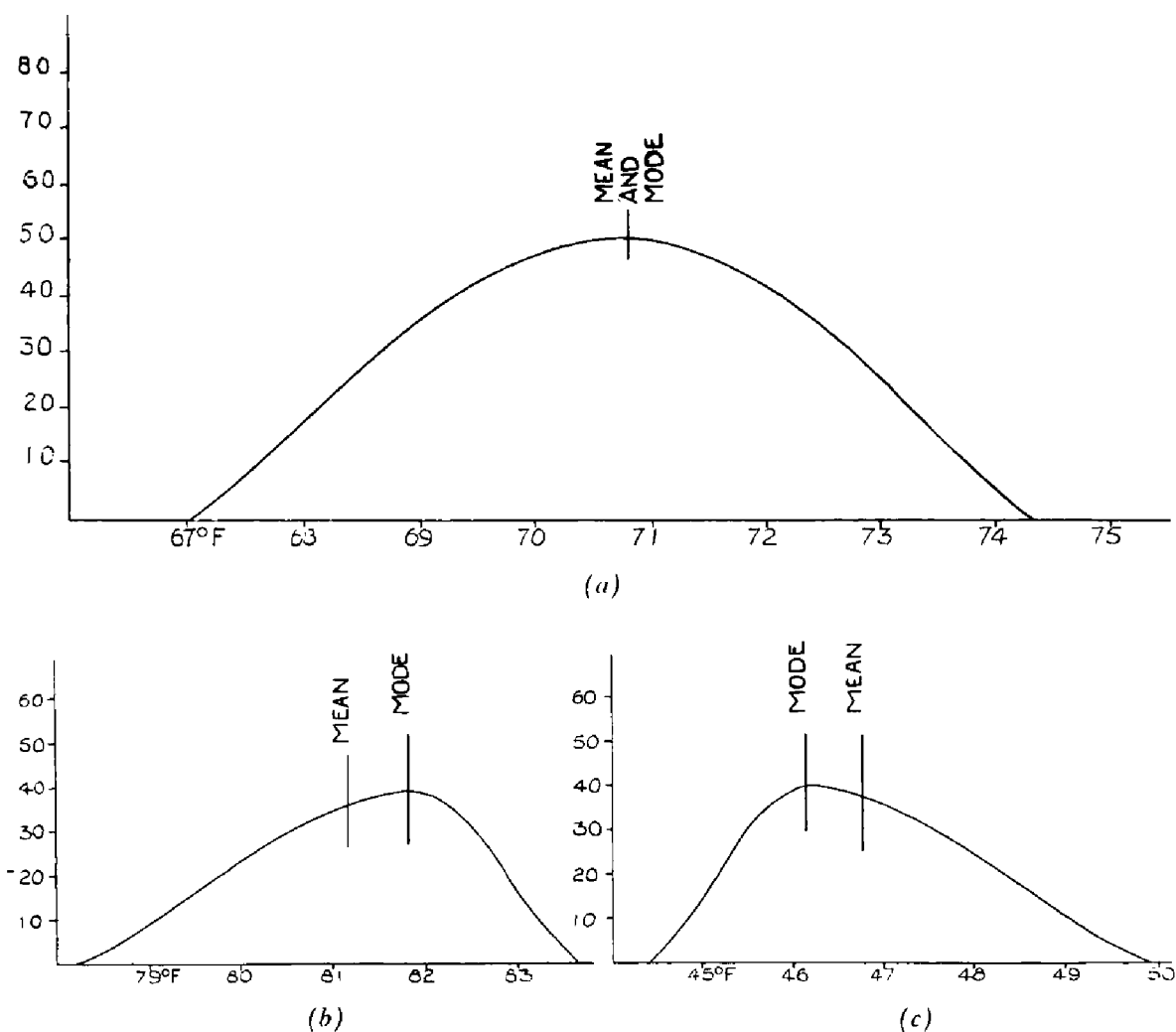


Fig. 1

Let us sort out all the observations of, say, air temperature taken in a particular month, for a given area, and, for land observations, at the same hour of the day—in short, all observations taken under practically the same general conditions except one, the current weather, which is therefore the only variable factor. (In the case of marine observations, the diurnal variation of air temperature is so small that we may for this purpose ignore the condition that observations should be taken at the same time of day.) We now count the number of observations of each temperature, or within each range of temperature, say  $80.5^{\circ}$ – $79.6^{\circ}$ ,  $79.5^{\circ}$ – $78.6^{\circ}$ , and so on. These numbers are then plotted as ordinates against the temperatures, or the mid-points of the temperature range, as abscissae, and a curve drawn as smoothly as possible through these points. Such curves are known as frequency curves. It will be found, in the case of mean temperatures and mean pressures, and, in fact, for most (though not for all) mean values, that the curves obtained are similar in shape to one of the curves (a), (b), (c) of Fig. 1. (a) is symmetrical, (b) and (c) are *skew*.

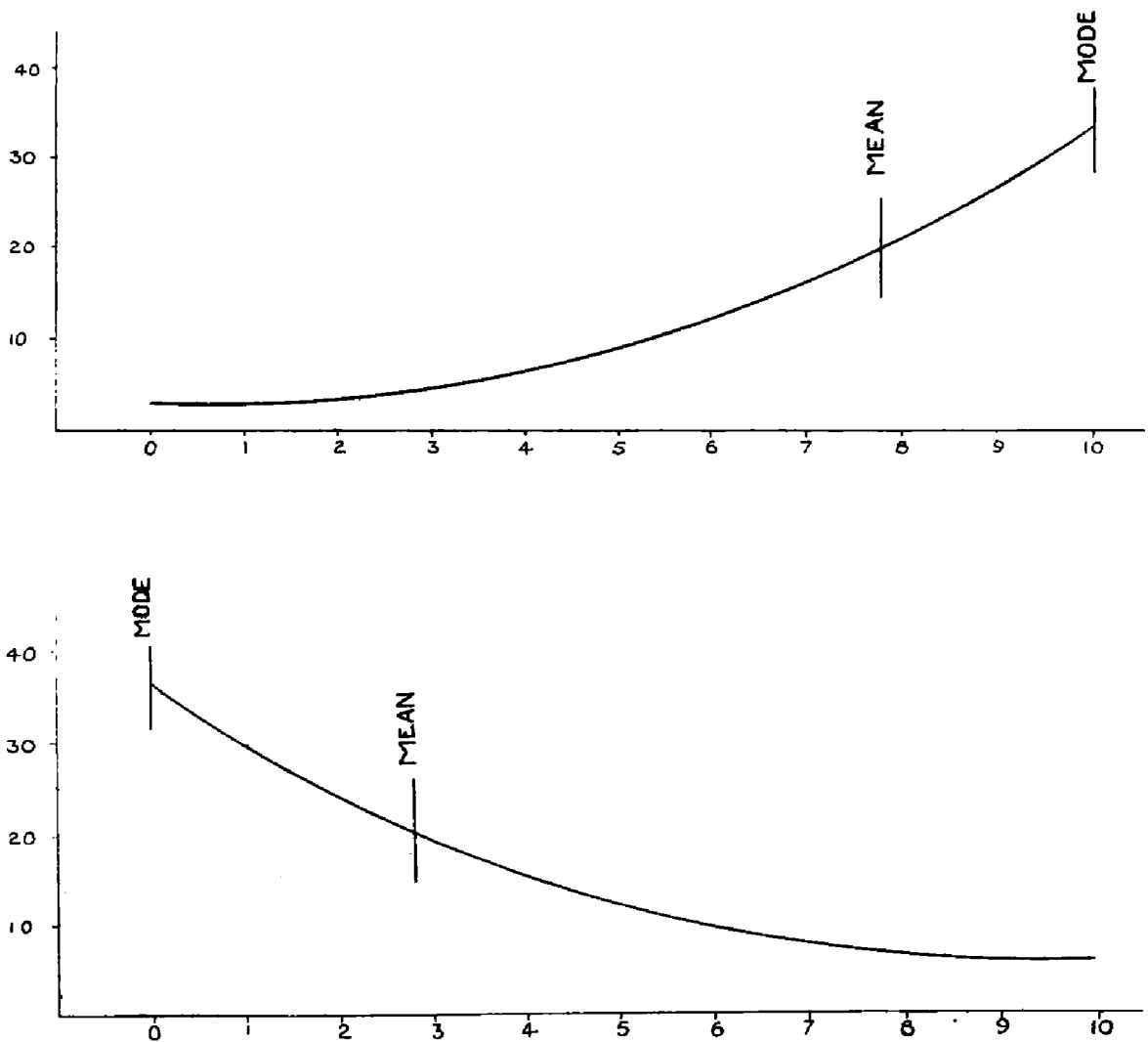


Fig. 2  
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The mode is that value of the temperature at which the curve reaches its maximum value. In the case of (a), the values of the mean and the mode are the same. For (b) the mean is less than the mode, and for (c) it is greater. When, however, the curves are only slightly skew, that is, when they deviate only a little from symmetry, there is not a great difference between the values of the mean and the mode. The mean is easily computed, especially if such a method as the Hollerith system of punched cards is used, while the time needed to plot frequency curves is very much greater. For practical purposes, the mean can usually be accepted as giving a reasonable approximation to the most probable value.

There are, however, meteorological factors which do not give frequency curves of the types shown in Fig. 1. One of these factors is cloud amount, and yet mean cloud amount is frequently computed and shown on meteorological charts. Frequency curves for cloud amount are often of one of the types shown in Fig. 2, in which the most probable value is either 10 tenths—an overcast sky, or 0, 1, or perhaps 2 tenths—a clear or almost cloudless sky, and the curve falls steadily to the other end of the scale, or, in some cases, even rises again as it approaches that position. In such cases the mean value is not even an approximation to the most probable value, but is one that has a relatively small chance of occurrence. Isoneph of mean cloud amount, however, are of value as giving an indication, in a convenient form, of the relative probabilities of heavily clouded skies. The greater the mean cloud amount, the greater the probability of finding heavily clouded or overcast skies.

## FURTHER NOTES ON THE NEW INTERNATIONAL METEOROLOGICAL CODE (WASHINGTON, 1947)

(To be introduced on 1st January, 1949)

An article on the New International Meteorological Code (Washington, 1947) appeared in the April number of the *Marine Observer*. These additional notes are intended to acquaint Observers with some minor amendments to the code that have since been received.

### Changes of Notation

Most of the amendments are simply changes of symbols entailed by the adoption of certain general rules. One of these rules is that throughout the whole range of meteorological symbols, direction, indicated in points, will in future be denoted by a capital letter. Small letters will be retained for denoting direction in tens of degrees. We have therefore the following changes :

Course of ship :  $D_s$  replaces  $d_s$

Bearing of ice limit :  $D_i$  replaces  $d_i$

Other changes are :

- (a) Kind of ice :  $c_2$  replaces  $C_2$ . The use of  $c_2$  instead of  $C_2$  reduces the risk of confusion with  $C$  which, of course, denotes the type of Significant Cloud.

- (b) Observers will note when they receive the revised *Marine Observers' Guide* (M.O.477) and the logbooks (Forms 911) that  $h_b h_b$  has been printed in error for  $h_s h_s$  (Height of Significant Cloud base).
- (c) It should be noted that when coding the direction from which the surface wind is blowing (dd) the direction as measured is thrown to the nearest ten degrees, e.g.  $124^\circ$  is coded as 12 and  $126^\circ$  as 13. In the case of half-way values, the higher ten-degree value should be coded, e.g.  $125^\circ$  is coded as 13.
- (d) The revised *Marine Observers' Guide* (M.O. 477) gives details of the "International Analysis Code for Shipping" and refers to this code throughout by the abbreviation "MANAL." This same code may also be referred to as I.A.C. (FLEET).

### Changes of Procedure

A slight change has been made in the value to be reported for  $d_w d_w$  (direction from which the waves come) on those occasions when the direction is indeterminate. The new procedure is as follows :

- 49 should be reported if the height of the confused sea is 15 ft or less whereas 99 should be used when the height of the confused sea is estimated to be greater than 15 ft. The amendment thus enables an indication of height to be given.

The table for  $H_w$  should be headed "Mean Maximum height" of waves instead of just "Mean height." This change is made to emphasise the fact that in practice it is the large waves that are observed, the small waves being neglected.

### Final Form of Code

The final form of message after these changes is as follows :  
 YQL<sub>a</sub>L<sub>a</sub>L<sub>a</sub> L<sub>o</sub>L<sub>o</sub>L<sub>o</sub>GG Nddff VVwwW PPPTT N<sub>h</sub>C<sub>1</sub>hC<sub>M</sub>C<sub>H</sub> D<sub>s</sub>v<sub>s</sub>app  
 (8N<sub>s</sub>Ch<sub>s</sub>h<sub>s</sub>) (9S<sub>p</sub>S<sub>p</sub>S<sub>p</sub>S<sub>p</sub>) 0T<sub>s</sub>T<sub>s</sub>T<sub>d</sub>T<sub>d</sub> 1d<sub>w</sub>d<sub>w</sub>P<sub>w</sub>H<sub>w</sub> ICE c<sub>2</sub>KD<sub>i</sub>re

The last observation in the old code will be that for 1800 G.M.T. on the 31st December, 1948. The next observation that for 0000 G.M.T. on the 1st January, 1949, will be in the new code.

### NOTE ON CURRENT DETERMINATION IN 60°N. 20°W. (STATION "ITEM")

BY MR. A. SIMPSON, 2ND OFFICER, O.W.S. *Weather Watcher*

While stationed at "Item" during our previous voyages it was apparent that we were experiencing a current, rather variable in strength, but more or less constant in direction.

This direction is actually rather contrary to that which we expected to experience at "Item" situated as it is on the northern edge of the north-east going North Atlantic Drift, which carries the waters of the Gulf Stream to the British Isles, and in a position where the north-east going stream tends to turn more to the northward.

On our first day on station this voyage we had light winds and a smooth sea, and as it was forecast that this weather would hold for some time, it was

decided to make a current observation by dropping a dan buoy and following its drift.

A dan was rigged, fitted with a  $\frac{1}{2}$ -cwt. sinker, a nylon mesh radar target and a large yellow flag. A bucket was lashed to it to act as a drogue on the water. The dan was dropped in the afternoon and allowed to drift until the following morning when it was picked up. It was in the water a total of twenty hours during which time it drifted twenty-four miles to the south-east. Light winds varying in direction were experienced in the twenty hours, and it was considered that their effect on the drift was negligible.

A similar observation was made during the second week on station when it appeared that weather conditions were again favourable. The dan was rigged as before but without the radar target as these were in short supply and the previous one had been damaged whilst being taken aboard. Also it was found that, with almost continuous daylight, it was a simple matter to keep the buoy within visual range throughout the period.

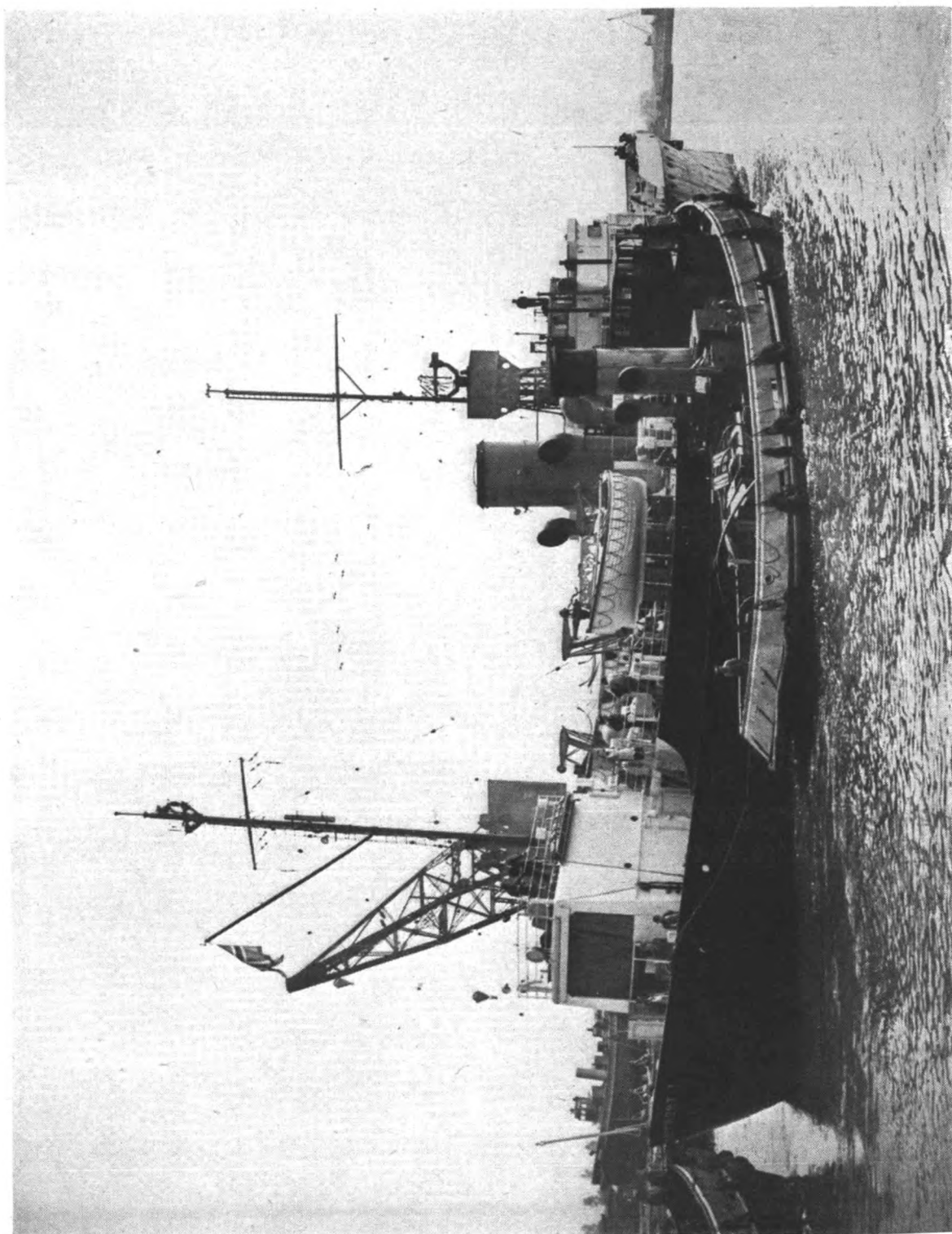
Again the buoy was dropped in the afternoon, unfortunately, however, in the evening an easterly gale was forecast and with wind freshening it was decided to abandon the attempt. The dan was picked up after six hours in the water. It was found that it had drifted a distance of three miles in an east-south-east direction. A light south-easterly wind was blowing during this time and the buoy had drifted against it at a speed of half a knot.

There was no opportunity for another observation during the voyage. We had, however, confirmed the results obtained previously by estimation of the ship's drift while on station and we are satisfied that a south-easterly current, at least at the present time, exists in Latitude  $60^{\circ}\text{N.}$ , Longitude  $20^{\circ}\text{W.}$

### OCEAN WEATHER STATION "M"

Under the Ocean Weather Ship scheme for the North Atlantic instituted by the International Civil Aviation Organisation, Great Britain accepted sole responsibility for two stations, "I" and "J," and joint responsibility with Norway and Sweden for one other, Station "M" ( $66^{\circ} 00'\text{N.}$ ,  $02^{\circ} 00'\text{E.}$ ) situated between Iceland and the coast of Norway. Great Britain provided the two ships, former naval corvettes of the "Flower" class, and converted them for use as weather ships at H.M. Chatham Dockyard. The ships *Polarfront I* (formerly *Saxifrage*) and *Polarfront II* (formerly *Bryony*) are run by the Norwegian Government.

The photograph on page 225 shows the *Polarfront I* leaving Chatham Naval Docks on the 22nd May, 1948.



*Photo : Sport and General Press Agency*  
*The Polarfront I leaving Chatham Naval Docks, 22nd May, 1948*

### ADMIRAL FITZROY'S CLOCK

During the war the Meteorological Office received an interesting memento of its first Director, Admiral Fitzroy (1855-1865), in the form of a clock which was presented to Admiral Fitzroy by the Minister of Marine and Colonies of France.

On his appointment as Director, one of Admiral Fitzroy's first steps was to organise a system of storm warnings for ships. In doing this he was taking advantage of the recently introduced electric telegraph, prior to which such a system of warnings was, of course, impossible. Admiral Fitzroy decided to share the advantage of his warning system with the French, and he made arrangements for the warnings to be telegraphed to Paris, whence they were distributed for the benefit of the French Navy, merchant navy and fishing fleets. It was in recognition of the services thus rendered that the French Government presented Admiral Fitzroy with the clock which forms the subject of this note.

The clock is a beautiful specimen of the travelling clocks of that period, and its general appearance can be seen from Fig. 1. The movement is contained in a gilt case standing  $7\frac{1}{2}$  in. high, with bevelled glass panels forming the sides, and bearing richly chased steel figures on the corner columns. In addition to the ordinary dial, the clock has subsidiary dials showing the day of the week, day of the month and month of the year. It also has an alarm and repeater mechanism which strikes the last hour and quarter on pressing a stud on the top of the clock case.

The glass plate which forms the top of the case is engraved with the following inscription :

“ Offert par le Ministre de la Marine et des Colonies au Vice-Admiral Robert Fitzroy, Esq., Chief of the meteorological department of the Board of Trade, pour services rendus à la Marine Impériale, 1864.”

This beautiful and historic clock was bequeathed to the Meteorological Office by a daughter of the Admiral, Miss Laura Fitzroy, who died in 1943. It forms a treasured memento of a great man, who was not only the first Director of the Meteorological Office, but whose energy was in large measure responsible for its formation



Fig. 1



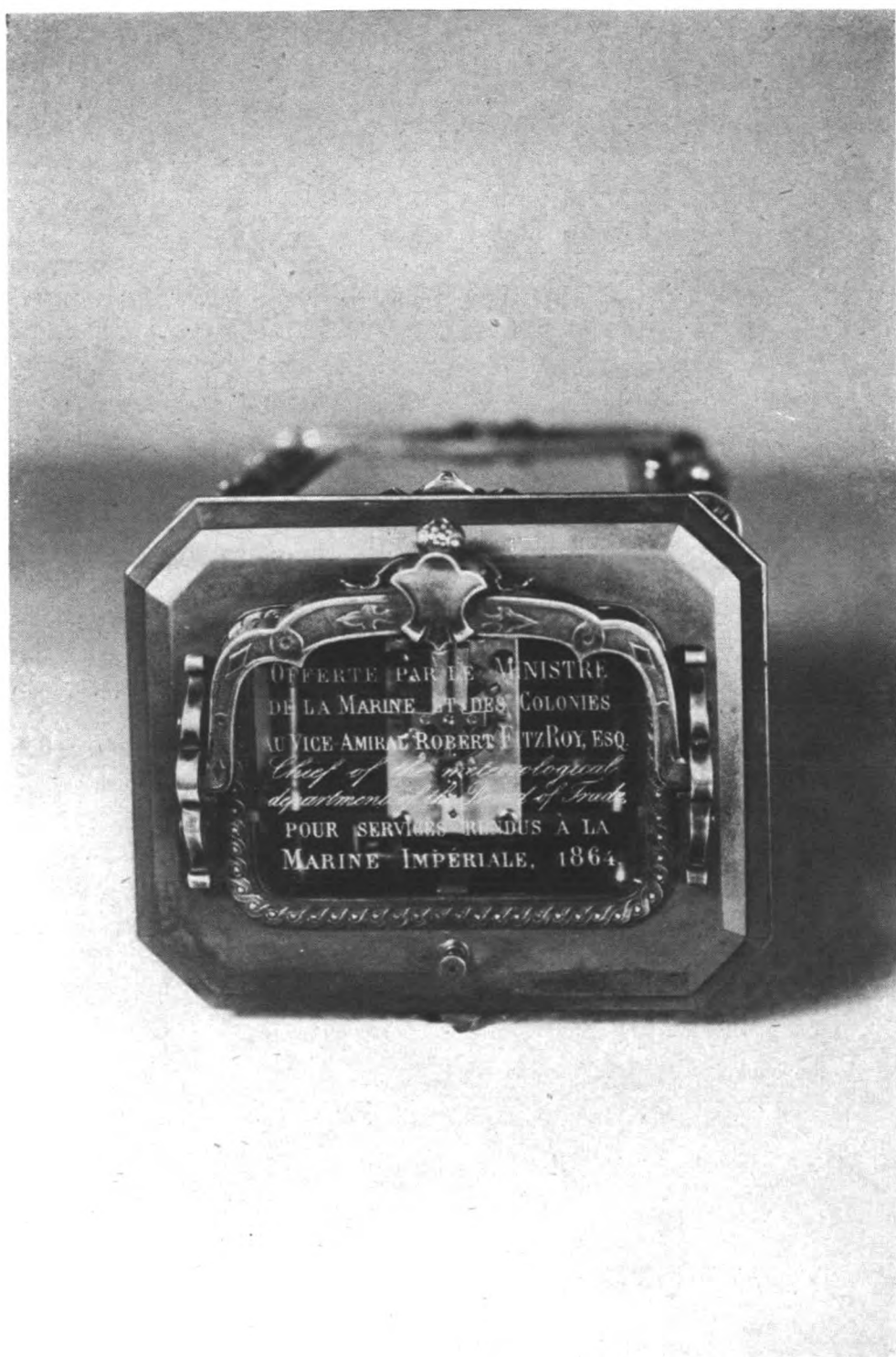


Fig. 2

## PERSONNEL

AWARD.—The Marine Branch joins with marine observers in congratulating CAPTAIN ALFRED THOMAS CHURCH, Master R.M.S. *Newfoundland*, Johnston Warren Lines, Ltd., on being awarded the O.B.E. in the King's Birthday honours list.

J. H.

OBITUARY.—It is with regret that we record the death, which occurred in May last, of COMMODORE SIR CHARLES MATHESON, D.S.O., R.D., R.N.R., late Commodore of the Orient Line from 1933 to 1938. He was born in 1876.

After serving his apprenticeship in sail, Charles Matheson joined the steam shipline of Messrs. Strick & Co., and a year later joined the Atlantic Transport Line, in which company he engaged in trooping voyages to the Cape during the South African war.

He joined the Orient Line as 4th Officer, and in 1907 was given leave to do his year's training as an R.N.R. officer, part of which time he served in H.M.S. *Bedford* on the China station.

In 1908 he was 2nd officer of the *Orontes*, and was promoted to Chief Officer in 1910. During the 1914-18 war he served with the Royal Navy, part of the time in "Q" ships, and was awarded the D.S.O. for his services. After the war he returned to the Orient Line in 1919, and was appointed to command of the *Orontes*. He commanded in turn several other ships of the company, being senior captain in 1933 and promoted to Commodore R.N.R. in the same year.

In 1937 Commodore Matheson received the honour of a knighthood.

C. H. W.

## SOCIETY OF MARINE ARTISTS

### Prize offered for the best marine painting

Mr. E. H. Watts, the well-known shipowner and prominent lay-member of the Society of Marine Artists, has offered a prize of £50 for the best picture in any medium displayed at the Society's Annual Exhibition and depicting officers or seamen of any rank (including lighthousemen) actually at work. Further details may be obtained from the Secretary, Society of Marine Artists, 8 Clarges Street, Piccadilly, London, W. 1.

The award of the Watts' Prize will be made by the selection jury of the Society.

The third annual exhibition will be held at Guildhall in November next by the courtesy of the Library Committee of the Corporation of London.

# SOUTHERN ICE REPORTS

## During the Years 1945 and 1946—November

YEAR	DAY	POSITION		DESCRIPTION	REMARKS	NAME OF SHIP REPORTING
		LATITUDE	LONGITUDE			
1946	15	50 58S	35 08E	Berg.	Large; first berg reported by catchers. First berg sighted by <i>Balaena</i> . Large; 15 to 20 miles SW of ship. Ice became more plentiful after 1200 G.M.T. in 51° 08'S., 33° 10'E., but still spaced 10 to 20 miles apart. One large berg 8 miles to SW had a flat top, all others having irregular contours. Catcher vessel <i>Terge I</i> reported edge of pack at 2100 G.M.T.	<i>Balaena</i> .
	16	49 40S 50 20S From 51 00S To 52 00S	31 40E 32 33E 34 00E 35 00E	do. do. Bergs.		
				Field-ice.		
	17	56 15S From 53 00S To 55 00S	40 20E 38 00E 42 00E	Bergs.	Very isolated bergs and bergy bits, all with irregular contours, seldom within 10 miles of each other. One small berg 100 ft. long passing close to ship at 1630 G.M.T. had 5 penguins on it—the first we have seen. Much drift-ice, pancake-shaped ice, small bits and larger fields several miles in length. At time the pack seems fast to S. No bergs.	
	18	From 55 06S To 55 06S	42 50E 43 20E	Drift-ice.	Only small amounts of drift-ice. No bergs. None in E. of area. Some in evening in SW. Large berg in SW.	
	19	55 00S 55 30S	44 30E 46 10E	do.	Much drift-ice (pancake-ice, small pieces and minor fields about half mile in extent) second half of day.	
	21	From 56 15S To 56 50S	47 08E 47 08E	Drift-ice.	One large berg a few miles S of ship. No ice seen from ship but aircraft on ice reco. met edge of congested drift-ice approx. 45 miles ESE of ship. The ice edge continued E for 15 miles farther then turned NF.	
	22	56 48S 55 50S	47 08E 48 56E	Berg. Drift-ice.	One low flat-topped berg. Small amounts drift-ice, mainly in small pieces. A few big bergs. No other ice seen to-day.	
	23	56 00S	50 00E	Berg and drift-ice.	Encountered much drift-ice and a few bergs from this point eastward.	
	24	From 55 44S To 56 14S	51 20E 53 25E	Bergs.	Aircraft spotted pack at 0300 G.M.T. 62 miles S of ship.	
	25	57 35S	53 48E	Bergs and drift-ice.	Few small bergs. Much drift-ice (pancake ice) all day.	
		56 18S	52 48E	Pack.	Isolated bergs and small patches of drift-ice. Some drift-ice and a few bergs.	
	26	56 56S	55 45E	Bergs and drift-ice.	do.	
	27	57 15S	57 30E	do.	do.	
	28	57 45S	59 15E	do.	do.	
	29	58 15S	61 30E	do.	do.	
	30	58 39S	63 48E	do.	Some drift-ice and a few bergs, including 2 tabular bergs.	

# December

YEAR	DAY	POSITION		DESCRIPTION	REMARKS	NAME OF SHIP REPORTING
		LATITUDE	LONGITUDE			
1945	3	56 22S	35 33W	Bergs.	Bergs of various sizes were passed during the 24 hours.	<i>Southern Venture.</i>
	4	56 43S	33 24W	Bergs and pack.	Few bergs. Encountered loose strips at first, ice getting heavier as we proceed S. No signs of opening.	
	5	55 03S	33 20W	Bergs, growlers and pack.	Several bergs and growlers. Pack running NE.	
	6	55 19S	33 00W	do.	do.	
	7	54 12S	32 00W	Bergs, loose ice and pack.	Several bergs. Passed through loose ice lying N of pack.	
	8	53 40S	31 11W	do.	Several bergs. Passed through loose ice lying N of pack. Running W along pack.	
	9	53 39S	29 22W	Bergs, growlers and pack.	Several bergs and growlers. Main pack running SE.	
	10	54 46S	27 58W	Bergs, loose ice and pack.	Few bergs. Pack still running SE. Some loose ice.	
	11	54 54S	27 29W	Bergs, growlers, loose ice and pack.	Few bergs and growlers, and some loose ice. Pack running SE.	
	12	55 00S	27 24W	do.	do.	
	13	55 28S	27 01W	do.	do.	
	14	55 58S	26 18W	Bergs, growlers and pack.	Few bergs and several growlers. Pack to W and S.	
	15	56 58S	23 21W	do.	do.	
	17	56 36S	24 34W	do.	do.	
	18	56 27S	25 58W	do.	Few bergs and growlers. Loose strips of heavy pack.	
	19	56 30S	25 47W	do.	do.	
	20	56 25S	25 30W	do.	do.	
	21	55 26S	25 20W	do.	do.	
	22	55 43S	25 47W	do.	Very few bergs. Several growlers. Loose strips of pack.	
	23	55 44S	25 50W	do.	do.	
	24	55 15S	26 39W	Bergs.	Visibility poor. Passed several bergs.	
	25	53 56S	29 50W	do.	Thick fog. Several bergs on Radar.	
	26	54 27S	31 27W	Bergs and pack.	Passed 2 large bergs approx. 1 mile long. Pack running SSW.	
	27	55 26S	34 10W	Bergs, growlers and pack.	Running SSW along pack. Passed several bergs and growlers.	
	28	57 11S	36 23W	Bergs and pack.	Pack running WSW, passed through several strips. Several bergs.	
	29	58 33S	40 03W	Bergs, growlers and pack.	Many bergs and several growlers. Pack to S. and W.	
	30	59 00S	41 07W	do	Few bergs and several growlers. Heavy pack to S.	
	31	59 46S	42 23W	Bergs and pack.	Few bergs and some scattered strips of pack.	

# December

YEAR	DAY	POSITION		DESCRIPTION	REMARKS	NAME OF SHIP REPORTING
		LATITUDE	LONGITUDE			
1945	21	52 50S	30 07W	Pack and bergs.	The pack extended from Sandwich Islands to position given. Various sized bergs were intermingled with the pack, and several were moving independently in clear water. Pack bearing SSE about 5-6 miles off.	<i>Empire Venture.</i>
	22	53 11S	29 27W	do.	do.	
	23	53 24S	29 58W	do.	do.	
	24	53 45S	30 40W	do.	do.	
	25	54 11S	30 53W	do.	do.	
	26	54 32S	30 48W	do.	do.	
	27	54 40S	29 16W	do.	do.	
	28	54 49S	28 12W	do.	do.	
	29	54 56S	26 59W	do.	do.	
	30	55 37S	25 36W	do.	do.	
1946	1	59 30S	65 57E	Bergs and drift-ice.	Some drift-ice and a few bergs including few tabular.	<i>Balaena.</i>
	2	59 54S	66 48E	do.	Some drift-ice and a few bergs including few tabular (small amounts of ice only).	
	3	60 57S	66 51E	do.	do.	
	4	59 36S	66 48E	do.	Much drift-ice, mainly small chunky bits, and some bergs, mainly tabular.	
	5	60 09S	68 00E	do.	Many bergs, mainly large tabular. Some small chunks of drift-ice.	
	6	60 36S	69 12E	Bergs.	Many tabular bergs, little other ice.	
	7	59 30S	71 30E	do.	do.	
	8	57 03S	75 54E	do.	Isolated tabular bergs. No other ice.	
	9	55 21S	80 18E	do.	One large tabular berg. No other ice.	
	10	55 18S	81 24E	do.	do.	
	11	55 24S	81 42E	do.	Same berg as yesterday seen once.	
	12	56 18S	82 06E	do.	One tabular berg.	
	13	57 12S	83 15E	do.	Many tabular bergs. A little small chunky ice.	
	14	57 33S	83 30E	do.	Several tabular bergs. No other ice.	
	15	57 54S	83 18E	do.	Many tabular bergs, including one high pinnacle or tower on the end of a berg apparently 300-400 ft. high. A little chunky drift-ice.	
	16	57 21S	83 30E	do.	A number of tabular bergs, mostly large. One berg broke in two during day, and left some small drift-ice as debris.	
	17	56 45S	83 12E	do.	Several tabular bergs. No other ice.	
	18	56 30S	82 57E	do.	do.	
	19	57 03S	82 57E	do.	Many tabular and one other small berg. No other ice.	
	20	57 24S	83 18E	Bergs and drift-ice.	Many bergs, great majority tabular. 65 bergs counted in view at one time. A little drift-ice (berg bits).	

YEAR	DAY	POSITION		DESCRIPTION	REMARKS	NAME OF SHIP REPORTING
		LATITUDE	LONGITUDE			
	21	57 51S	83 27E	Bergs and bergy bits.	Numerous bergs of all sizes and shapes, quite a number consisting of tilted snow-fields evidently half turned over. Some bergs also show dirty marks of earth or gravel, presumably from having touched bottom on Bawgare Bank. 81 bergs counted in view at 0600 G.M.T., besides innumerable small, bergy bits.	
	22	58 00S	83 09E	do.	Numerous bergs and bergy bits.	
	23	57 51S	82 03E	do.	Fewer bergs than in recent days, both tabular and other types. No other ice.	
	24	57 30S	81 21E	Bergs.	Several bergs, tabular and other. No other ice.	
	25	57 42S	81 24E	do.	do.	
	26	57 48S	81 09E	do.	Fog obstructed vision. Radar detected one big berg within 3 miles of ship. Also one small bergy bit seen.	
	27	57 48S	81 00E	do.	Many bergs and bergy bits, all shapes. No other ice.	
	28	58 51S	81 15E	do.	do.	
	29	59 21S	81 48E	do.	do.	
	30	59 42S	82 42E	Drift-ice.	Catcher vessels operating SE of Wh/F report extensive fields of drift-ice, with good openings, about 12 miles from Wh/F. Edge of field orientated N : S.	
		59 35S	82 57E	Bergs and drift-ice.	Many bergs and drift-ice with good openings (pancake-ice)	
	31	59 33S	83 03E	do.	do.	

October, November and December 1947 : No reports received.  
 Reports of ice previous to October, November and December, 1947, will be found in *The Marine Observer*, Vol. XVII, No. 138, p. 106.



# INTERNATIONAL CONVENTION OF SAFETY OF LIFE AT SEA (1948)

## Chapter V. Safety of Navigation

### Regulation 3

#### Information Required in Danger Messages

The following information is desired in danger messages, the time in all cases being Greenwich Mean Time :

- (a) Ice, Derelicts, and other Direct Dangers to Navigation.
  - (i) the kind of ice, derelict or danger observed ;
  - (ii) The last position of the ice, derelict or danger when last observed ;
  - (iii) the time and date when the observation was made.
- (b) Tropical Storms (Hurricanes in the West Indies, Typhoons in the China Sea, Cyclones in Indian waters, and storms of a similar nature in other regions).
  - (i) A statement that a Tropical Storm has been encountered. This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical storm exists in his neighbourhood.
  - (ii) Meteorological Information. Each shipmaster should add to his warning message as much of the following meteorological information as he finds practicable :
    - the Greenwich Mean Time, date and position of the ship when the observations were taken ;
    - barometric pressure (stating millibars, inches, or millimetres, and whether corrected or uncorrected) ;
    - barometric tendency (the change in barometric pressure during the past three hours) ;
    - true wind direction ;
    - wind force (Beaufort scale) ;
    - state of the sea (smooth, moderate, rough, high) ;
    - swell (slight, moderate, heavy) and the true direction from which it comes. Period or length of swell (short, average, long) would also be of value ;
    - true course and speed of ship.
- (c) Subsequent Observations. When a master has reported a tropical or other dangerous storm, it is desirable, but not obligatory, that other observations be made and transmitted hourly, if practicable, but in any case at intervals of not more than three hours, so long as the ship remains under the influence of the storm.

#### Examples

##### Ice

TTT Ice. Large berg sighted in 4605 N., 4410 W., at 0800 G.M.T. May 15.

##### Derelict

TTT Derelict. Observed derelict almost submerged in 4006, N., 1243 W., at 1630 G.M.T. April 21.

##### Danger to Navigation

TTT Navigation. Alpha lightship not on station. 1800 G.M.T. January 3.

### **Tropical Storm**

TTT Storm. 0030 G.M.T. August 18. 2204 N., 11354 E. Barometer corrected 994 millibars, tendency down 6 millibars. Wind NW, force 9, heavy squalls. Heavy easterly swell. Course 067, 5 knots.

TTT Storm. Appearances indicate approach of hurricane. 1300 G.M.T. September 14. 2200 N., 7236 W. Barometer corrected 29.64 in., tendency down .015 in. Wind NE, force 8, frequent rain squalls. Course 035, 9 knots.

TTT Storm. Conditions indicate intense cyclone has formed. 0200 G.M.T. May 4. 1620 N., 9203 E. Barometer uncorrected 7533 millimetres, tendency down 5 millimetres. Wind S by W, force 5. Course 300, 8 knots.

TTT Storm. Typhoon to south-east. 0300 G.M.T. June 12. 1812 N., 12605 E. Barometer falling rapidly. Wind increasing from N.

### **Regulation 4**

#### **Meteorological Services**

- (a) The Contracting Governments undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation. Administrations shall encourage the use of instruments of a high degree of accuracy, and shall facilitate the checking of such instruments upon request.
- (b) In particular, the Contracting Governments undertake to co-operate in carrying out, as far as practicable, the following meteorological arrangements :
  - (i) To warn ships of gales, storms and tropical storms, both by the issue of radio messages and by the display of appropriate signals at coastal points.
  - (ii) To issue daily, by radio, weather bulletins suitable for shipping, containing data of existing weather and ice conditions, forecasts, and when practicable, sufficient additional information to enable simple weather charts to be prepared at sea.
  - (iii) To prepare and issue such publications as may be necessary for the efficient conduct of meteorological work at sea.
  - (iv) To arrange for selected ships to be equipped with tested instruments (such as a barometer, a barograph, a psychrometer, and suitable apparatus for measuring sea temperature) for use in this service, and to take meteorological observations at standard synoptic hours (at least four times daily whenever circumstances permit) and to encourage other ships to take observations in a modified form, particularly when in areas where shipping is sparse ; these ships to transmit their observations by radio for the benefit of the various official meteorological services, repeating the information for the benefit of ships in the vicinity. When in the vicinity of a tropical storm or of a suspected tropical storm, ships should be encouraged to take and transmit their observations at more frequent intervals whenever practicable, bearing in mind navigational preoccupations of ships' officers during storm conditions.
  - (v) To arrange for the reception and transmission by coast radio stations of weather messages from and to ships. Ships which are unable to communicate direct with shore shall be encouraged to

- relay their weather messages through ocean weather ships or through other ships which are in contact with shore.
- (vi) To encourage all masters to inform ships in the vicinity and also shore stations whenever they experience a wind speed of 50 knots or more (force 10 on the Beaufort scale).
  - (vii) To endeavour to obtain a uniform procedure in regard to the international meteorological services already specified, and, as far as is practicable, to conform to the recommendations made by the International Meteorological Organisation, to which the Contracting Governments may refer for study and advice any meteorological question which may arise in carrying out the present Convention.
- (c) The information provided for in this Regulation shall be furnished in form for transmission and transmitted in the order of priority prescribed by the Radio Regulations, and during transmission "to all stations" of meteorological information, forecasts and warnings, all ship stations must conform to the provisions of the Radio Regulations.
- (d) Forecasts, warnings, synoptic and other meteorological reports intended for ships shall be issued and disseminated by the national service in the best position to serve various zones and areas, in accordance with mutual arrangements made by the Contracting Governments concerned.

#### LIGHTHOUSES OF THE BRITISH ISLES



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##### EILEAN MORE, FLANNAN ISLES

The Flannan Isles, situated about 16 miles from the western side of Lewis, the northern island of the Hebrides, consist of several islets and rocks, forming three detached groups. A light ( $58^{\circ} 17' \text{N.}$ ,  $7^{\circ} 35' \text{W.}$ ) is shown at an elevation of 330 ft. from a white tower situated on Eilean More, the north-eastern and largest islet. The eider duck and other sea birds breed on this islet in great numbers.

# FLEET LIST (Great Britain)

## VOLUNTARY OBSERVING SHIPS

The following is a list of British ships, voluntarily co-operating with the Marine Branch of the Meteorological Office. The names of the Captains, Observing Officers, and Senior Radio Officers are given as ascertained from the last written return received. The date of receipt of the last return received is given in the sixth column.

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

The Port Meteorological Officers and Merchant Navy Agents at the ports 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. (See under Notices to Marine Observers.)

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 in a special list in the *Marine Observer*.

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

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

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS	LAST RETURN RECEIVED
<i>Acara</i> .. .. .	C. C. Cave .. .. .	G. Reed, P. W. Lillie, C. N. Morrison, G. Lightfoot .. .. .	J. A. Stuart .. .. .	Elder Dempster Lines, Ltd. .. .. .	20.12.47
<i>Admiral Sir John Larford</i> .. .. .	W. B. Hicks .. .. .	J. Linton, R. L. Cain, W. E. Wales .. .. .	F. Dibble .. .. .	Iago Steam Trawler Co., Ltd. .. .. .	7.7.48
<i>Afghanistan</i> .. .. .	S. L. Bashford .. .. .	I. McK. Jackson, D. L. Emery, C. M. Best .. .. .	P. G. Short, M.B.E. .. .. .	Strick Line, Ltd. .. .. .	21.7.48
<i>Ajax</i> .. .. .	C. H. Whitehouse, O.B.E. .. .. .	J. Tierney, J. Scott, D. Heynes .. .. .	J. W. Soulsby .. .. .	Ocean S.S. Co., Ltd. .. .. .	4.5.48
<i>Akaroa</i> .. .. .	W. J. Williams .. .. .	D. G. Roberts, R. Pengelly, C. Eastwood .. .. .	A. Attewell .. .. .	Shaw, Savill & Albion Co., Ltd. .. .. .	11.2.48
<i>Anastra</i> .. .. .	M. A. Neeves .. .. .	E. T. Ward, W. P. Tait .. .. .	W. C. Sheard .. .. .	Anglo-Saxon Petroleum Co., Ltd. .. .. .	19.7.48
<i>Ameritham</i> .. .. .	A. Spence .. .. .	F. M. Dickenson, D. Weston, D. M. Davis, E. Card .. .. .	W. Smith .. .. .	Thompson S.S. Co., Ltd. .. .. .	
<i>Andes</i> .. .. .	H. F. Way, Cdre., R.N.R. .. .. .	J. A. Jackson, L. H. Hayman, S. Moffitt, J. W. Baggott .. .. .	P. M. Booth .. .. .	Royal Mail Lines, Ltd. .. .. .	
<i>Apapa</i> .. .. .	J. J. Smith .. .. .	J. H. W. Locke, G. H. Griffiths, E. J. Harding .. .. .	S. W. Brown .. .. .	Elder Dempster Lines, Ltd. .. .. .	
<i>Aquitania</i> .. .. .	G. E. Cove .. .. .	R. Jones, D. H. Shinnin, E. E. Wilks .. .. .	B. H. Long .. .. .	Cunard White Star, Ltd. .. .. .	7.1.48
<i>Arabia</i> .. .. .	G. H. Morris .. .. .	H. B. Watkins, R. P. Ashe .. .. .	A. Huchin .. .. .	Cunard White Star, Ltd. .. .. .	6.5.48
<i>Arabistan</i> .. .. .	J. H. Metcalf .. .. .	K. M. Cutler, P. J. Robinson, R. Mortimer .. .. .	K. J. Roberts .. .. .	Strick Line, Ltd. .. .. .	18.3.48
<i>Araby</i> .. .. .	G. H. Taggart .. .. .	W. Boyle, S. Armitage, E. G. Price .. .. .	T. McBride .. .. .	Royal Mail Lines, Ltd. .. .. .	
<i>Arakaka</i> .. .. .	J. A. Carter .. .. .	K. White, D. G. Hastie, J. Allan .. .. .	D. K. Murdock .. .. .	Arakaka S.S. Co., Ltd. .. .. .	14.5.48
<i>Argentina Star</i> .. .. .	D. R. Macfarlane, O.B.E., D.S.O. .. .. .	J. Beatson, R. D. Philpott .. .. .	A. N. Taylor .. .. .	F. Leyland & Co., Ltd. .. .. .	21.6.48
<i>Argyll</i> .. .. .	J. Dodds .. .. .	C. A. V. Daly, N. Acon, N. Edwards .. .. .	Howarth .. .. .	B. J. Sutherland & Co., Ltd. .. .. .	14.7.48
<i>Arquani</i> .. .. .	S. Browne .. .. .	J. Taylor, M. Kenshal .. .. .	P. P. Williams .. .. .	Elders & Fyffes, Ltd. .. .. .	7.1.48
<i>Arcton</i> .. .. .	H. Coates .. .. .	J. B. Clemenson, J. Boyce, G. H. Drinkwater .. .. .	M. Kempe .. .. .	Charante S.S. Co., Ltd. .. .. .	13.12.47
<i>Arundel Castle</i> .. .. .	C. C. Page .. .. .	E. A. Irvine .. .. .		Union-Castle Mail S.S. Co., Ltd. .. .. .	
<i>Ascania</i> .. .. .	J. Quayle, R.D., R.N.R. .. .. .	F. Williams, G. H. Emerton, K. J. Colombo .. .. .	A. Banberry .. .. .	Cunard White Star, Ltd. .. .. .	17.10.47
<i>Asia</i> .. .. .	B. Harrison, R.D., R.N.R. .. .. .			Cunard White Star, Ltd. .. .. .	
<i>Asturias</i> .. .. .	J. W. Carr .. .. .			Royal Mail Line, Ltd. (Managers) .. .. .	18.3.48

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS	LAST RETURN RECEIVED
<i>Athelthief</i> ..	A. W. Pegg ..	W. H. Cook, J. P. Coffey, B. Jarrett ..	J. C. Robinson ..	Tankers, Ltd. ..	1. 6. 48
<i>Athedgent</i> ..	C. Ray ..	A. Sugden, C. Ferguson, W. Boyd, S. Barbour ..	J. D. Dempster ..	Athel Line, Ltd. ..	26. 2. 48
<i>Athenic</i> ..	D. Aithison ..	B. E. Maby, A. E. Smith, D. M. Mortimer, W. Foster ..	D. Haggart ..	Shaw, Savill & Albion Co., Ltd. ..	30. 4. 48
<i>Athlone Castle</i> ..	J. C. Brown, R.D., R.N.R. ..	J. R. Henderson, D. Lamb, C. E. Walker ..	R. S. Summers ..	Union-Castle Mail S.S. Co., Ltd. ..	1. 6. 48
<i>Atlantic</i> ..	W. Shannon ..	C. Crombie ..	W. Phelan ..	W. H. Cockerline & Co., Ltd. ..	2. 3. 48
<i>Auracula</i> ..	I. H. I. Hamling ..	R. Shaw, N. Douglas, A. Phillips ..	W. Rollason ..	Anglo-Saxon Petroleum Co., Ltd. ..	6. 1. 48
<i>Australia Star</i> ..	F. Williams, O.B.E., D.S.O. ..	D. Carstairs, L. Tessier, F. Ball ..	A. M. Reid ..	F. Leyland & Co., Ltd. ..	25. 2. 48
<i>Australind</i> ..	J. F. Woods ..	J. B. McCowen, J. Stevenson, M. A. Hawes ..	R. Lewis ..	Australind S.S. Co., Ltd. ..	13. 12. 47
<i>Balantia</i> ..	F. A. C. Thacker ..	R. Box, G. Fraser, R. Newbury ..	J. Spicer ..	United Baltic Co., Ltd. ..	20. 5. 48
<i>Balthara</i> ..	G. E. Thomas ..	S. Baylis ..	J. Hastie ..	Sir Eric Ohlson (Manager) ..	11. 5. 48
<i>Bariff Park</i> ..	E. Bursby ..	T. Burke, G. Dunn, R. Rutherford ..	J. Peacock ..	Barline Transport, Ltd. ..	20. 10. 47
<i>Barriama</i> ..	M. Fraser ..	W. Fleet, T. L. Harcus ..	W. MacLaren ..	Hogarth S.S. Co., Ltd. ..	28. 4. 48
<i>Baron Behaven</i> ..	M. Moore ..	G. J. McIntosh ..	J. Williamson ..	Bulk Storage Co., Ltd. ..	10. 12. 47
<i>Baron Napier</i> ..	J. H. Anderson ..	T. Scott, A. Brown, J. Buoka ..	T. J. Booker ..	Barberry's S.S. Co., Ltd. ..	4. 6. 48
<i>Bastinhal</i> ..	J. Hall ..	G. Baxter, J. R. Foster ..	J. A. McAskill ..	Ellerman's Wilson Line, Ltd. ..	1. 6. 48
<i>Batherville</i> ..	E. Pugh, O.B.E. ..	R. J. Lungley, W. McClean, G. Cunningham ..	L. Norton ..	British S.S. Co., Ltd. ..	11. 2. 48
<i>Bassano</i> ..	G. Hodgson ..	E. J. Beaumont, J. F. Tognola, N. O. Cook ..	W. Poingdestre ..	Canadian Pacific Railway Co. ..	17. 3. 48
<i>Beaconsfield</i> ..	A. E. W. Woodcock ..	E. Curling, A. Cox, J. Voiron ..	R. Burch ..	Canadian Pacific Railway Co. ..	10. 4. 48
<i>Beaverburn</i> ..	I. B. Smith, O.B.E. ..	T. F. Hercus, C. W. Croft, P. LePatourel ..	A. R. Humphries ..	Canadian Pacific Railway Co. ..	19. 7. 48
<i>Beavercone</i> ..	J. P. Dobson, D.S.C. ..	B. Q. Dunham, R. D. P. Gillett, G. Palmer ..	J. Brennan ..	Ben Line Steamers, Ltd. ..	18. 5. 48
<i>Beaverdell</i> ..	S. W. Keary, O.B.E. ..	L. E. McDowell, W. Williams, G. W. Savage ..	A. Saltwell ..	Ben Line Steamers, Ltd. ..	23. 7. 47
<i>Beaverford</i> ..	R. A. Leicester, O.B.E. ..	D. Wallace, E. R. Connorton, G. H. Devereau ..	I. M. Fraser ..	Ben Line Steamers, Ltd. ..	3. 1. 48
<i>Beaver Glen</i> ..	C. E. Duggan, R.D., R.N.R. ..	H. L. Kinns, D. Blois, D. J. Jeavons ..	J. L. Wells ..	Ben Line Steamers, Ltd. ..	4. 5. 48
<i>Beaverlake</i> ..	S. W. Keay ..	R. A. Jones, R. Rawlings, G. W. Bateman ..	H. MacLennan ..	Alexander S.S. Co., Ltd. ..	19. 5. 48
<i>Beckenham</i> ..	D. G. Martin ..	H. Blair, G. Brown, H. M. Fortune ..	J. J. Waddell ..	Rio Cape Line, Ltd. ..	16. 4. 47
<i>Benarty</i> ..	E. Massarilla ..	R. D. Robb ..	F. E. Smith ..	F. Leyland & Co., Ltd. ..	7. 5. 48
<i>Benborran</i> ..	J. Cringle ..	F. Hamilton ..	D. J. Eastwood ..	Ellerman's Wilson Line, Ltd. ..	
<i>Benledi</i> ..	A. P. Paterson ..	G. Spears, G. Miller ..	R. A. MacLeod ..	British Tanker Co., Ltd. ..	
<i>Bennoch</i> ..	I. B. Hastie ..	G. Pirie, C. Donnelly, K. R. Wilson ..	J. Sheeham ..		
<i>Benurachie</i> ..	W. C. Wilson ..	W. O. Atkinson, M. J. Peyton-Bruhl, A. Wallace, A. King ..			
<i>Bilbury</i> ..	A. Roche ..	A. Jones ..			
<i>Black Prince</i> ..	P. F. Owens ..	G. R. Sherlock, P. M. Giles, B. S. Biggs ..			
<i>Brasil Star</i> ..	G. Duff, G.M. ..	D. S. Gilmour, R. G. Taylor, A. S. Frier ..			
<i>Bravo</i> ..	E. Tyler ..	C. I. W. Fox, C. Everingham, J. H. Spandler ..			
<i>Brisbane Star</i> ..	F. N. Riley, D.S.O. ..	M. R. Brenburg, R. H. Stark, G. Munro, D. McPhail ..			
<i>Britannic</i> ..	C. I. Thompson ..	W. S. Jaeger ..			
<i>British Colonel</i> ..	E. L. Miller ..	R. Maybourn, E. W. Shingler, W. H. Thornton ..			
<i>British Commodore</i> ..	N. Pinkney ..				

<i>British Endurance...</i>	W. Watkin-Thomas, O.B.E., D.S.C.	S. H. Falconer, A. D. Millar, P. C. Coyne	A. E. Adams	British Tanker Co., Ltd.	29.12.47
<i>British Energy</i>	I. G. Hill	E. Hornby, D. Mackinnon, F. Darby	F. J. O'Connor	British Tanker Co., Ltd.	10.4.48
<i>British Escort</i>	D. F. Ward	A. E. Marshall, H. Evans, P. S. Morgan	P. Charlton	British Tanker Co., Ltd.	22.4.48
<i>British Hussar</i>	T. J. Picken	J. A. Picken, W. R. Symon, D. H. Ferrett	C. O'Mahony	British Tanker Co., Ltd.	18.12.47
<i>British Lancer</i>	W. S. Vittle	H. Scott, A. Gordon, G. Lawson	J. Appleton	British Tanker Co., Ltd.	19.5.48
<i>British Marquis</i>	I. C. Lea, O.B.E.	F. W. Cuffey, C. Robson, J. McLeod	D. R. Small	British Tanker Co., Ltd.	2.4.48
<i>British Patience</i>	F. S. Hall	J. R. Lumby, N. Steadman, B. Peck	A. Noblett	British Tanker Co., Ltd.	7.7.48
<i>British Pilot</i>	R. O. Cash	H. D. Williams, A. F. Bowan, C. A. Patterson	A. E. Trim	British Tanker Co., Ltd.	10.5.48
<i>British Piper</i>	M. W. Good	A. Fraser, J. Jenks, A. Mitchell	W. Houghton	British Tanker Co., Ltd.	9.6.48
<i>British Power</i>	C. A. Colburn	A. L. Wheaton, J. A. MacLeod, W. Budge	K. Morris	British Tanker Co., Ltd.	10.4.48
<i>British Prestige</i>	J. H. Wilson	T. Giffard, D. Battel	C. W. Bayliss	British Tanker Co., Ltd.	2.10.47
<i>British Revolution</i>	J. Bolger	C. V. Harrison, J. B. Hunter, F. A. Lapper	G. Ferrand	British Tanker Co., Ltd.	29.12.47
<i>British Statesman</i>	W. P. Booth	J. Fox, W. Morton, A. N. Brook	N. W. Hodgson	Royal Mail Lines, Ltd.	26.2.48
<i>British Swordfish</i>	H. A. Wright	F. W. Gant, J. H. Looker	J. Adamson	Moor Line, Ltd.	14.5.48
<i>Brittany</i>	D. J. Jones	L. A. Sayers, Lt.-Cdr., R.N.R., W. T. Pitcher, D. H. Lear		Lampport & Holt Line, Ltd.	21.6.48
<i>Brockleymoor</i>	J. R.D., R.N.R.	A. Coratt	R. Young	Henrikson & Co.	
<i>Bronte</i>	E. Drinkall	T. D. Ridley, N. E. Forth, J. W. Cuthbertson	Johnson	Seddon Fishing Co., Ltd.	8.7.48
<i>Brontes</i>	G. Bull	J. S. Gordon, J. S. G. Christian, E. C. Jones, J. M. Donkin	J. A. Hamilton	Lampport & Holt Line, Ltd.	2.1.48
<i>Bulby</i>	J. W. Binns	J. A. Hamilton	R. N. Dixon	Hudson Bros. Trawlers, Ltd.	
<i>Byron</i>	A. Molineux	W. E. Woodall, R. N. Dixon		Hudson Bros. Trawlers, Ltd.	13.2.47
<i>Carnvalona</i>	G. Stable	G. O. Lambert, D. E. Cornack, I. Thomson	S. Gracie	Hudson Bros. Trawlers, Ltd.	
<i>Canton</i>		F. Tudor, R. Taylor, F. George	H. Butler	Cape York S.S. Co., Ltd.	14.6.48
<i>Cape Barfleur</i>	C. Agerscow	H. Butler		Union-Castle Mail S.S. Co., Ltd.	4.7.48
<i>Cape Gloucester</i>	W. E. Woodall	J. S. Kitching, W. S. Brown, T. Lofts	W. A. Brown	R. Chapman & Son	
<i>Cape Mariato</i>	R. A. Cook	T. Burke, F. Barber, E. Harvey	A. Morton	Union-Castle Mail S.S. Co., Ltd.	11.5.48
<i>Cape Trafalgar</i>	H. S. Todd	P. R. Holton, J. Wilson, F. Hamilton	E. F. Ware	Elders & Fyffes, Ltd.	21.6.48
<i>Cape York</i>		E. A. Muir	M. Ward	Barberry's S.S. Co., Ltd.	11.10.47
<i>Capetown Castle</i>	W. D. Roach	W. A. Arthur, W. V. Pike, J. D. Newbery	J. E. Unsworth	Monarch S.S. Co., Ltd.	22.11.47
<i>Caralla</i>	J. Crewdson	R. D. Fielder, P. Saunders, R. Sly	J. E. Wearmouth	Hadley S.S. Co., Ltd.	13.1.48
<i>Carlton</i>	K. Wardale	H. E. Jennings, P. J. Bretnall, P. B. Eccles	R. C. Whiting	Bibby Line, Ltd.	21.2.48
<i>Carnarvon Castle</i>	S. A. Sapsworth	W. L. Hillcoat, C. W. Allerton, J. Wills	W. E. G. Rickards	British India Steam Nav. Co., Ltd.	27.4.48
<i>Cavina</i>	J. M. Cherry	J. Ballantyne, G. Hamilton, D. Russell		Anchor Line, Ltd.	27.5.48
<i>Caxton</i>	J. H. Keir	R. G. Lewis, A. M. Bowman, J. B. Lister		Ellerman Hall Line, Ltd.	18.7.48
<i>Celtic Monarch</i>	I. F. Auld	R. J. Windsor, J. B. Somerville, I. W. Jackson	W. G. Allen	Ellerman City Line, Ltd.	13.2.48
<i>Cerintus</i>	F. C. Brooks	T. Lovell, I. McDermid, J. Henderson	D. O'Leary	Ellerman City Line, Ltd.	18.5.48
<i>Cheshire</i>	C. J. P. Martin	W. H. Wilson, E. G. A. Smith, F. E. Pollitt	D. C. Northcote	Ellerman Line, Ltd.	13.12.47
<i>Chinese Prince</i>	M. C. Williams	Redhead, W. E. Fletcher, A. H. Davey	D. R. Crombie	Ellerman Hall Line, Ltd.	15.6.48
<i>Chupra</i>	R. W. Smart	W. Taggart, J. Irvin, B. Pickering	P. J. McKeon	Ellerman & Bucknall S.S. Co., Ltd.	19.12.47
<i>Citicia</i>	E. M. Jenkins	K. B. James, R. M. Faulds, P. G. Thomas	J. A. Vallance	Ellerman Hall Line, Ltd.	23.6.48
<i>City of Barcelona</i>	E. Garner	F. Chisholm, D. J. Inglis, J. A. Potter	J. Appleton	Ellerman Line, Ltd.	21.9.47
<i>City of Bristol</i>		K. Dobson	J. J. Brennan	Ellerman & Bucknall S.S. Co., Ltd.	8.5.48
<i>City of Calcutta</i>	W. H. Matheson, O.B.E.	A. G. Willa, R. J. Tyrell, D. J. Lloyd		Ellerman Line, Ltd.	
<i>City of Canberra</i>	F. Tibbets				
<i>City of Capetown</i>	W. S. Coughlan, O.B.E.				
<i>City of Carlisle</i>	L. E. Smith, M.B.E.				
<i>City of Chester</i>	R. Longstaff, D.S.O.				
<i>City of Delhi</i>	A. M. Hamilton				
<i>City of Derby</i>	A. G. Melville				
<i>City of Dieppe</i>	E. G. Chapman				

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NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS	LAST RETURN RECEIVED
<i>City of Dundee</i> ..	T. H. Speakman	H. McL. Farquhar, D. S. Taylor, J. W. Terris	F. J. FitzGerald	Ellerman Line, Ltd.	20. 4. 48
<i>City of Durham</i> ..	J. I. Andrew	R. Miller, N. Groundwater, D. H. Wardlaw	G. S. Creighton	Ellerman City Line, Ltd.	12. 7. 48
<i>City of Exeter</i> ..	A. F. Goring	K. Dews, A. Fry, A. Ramsden	A. Lupton	Ellerman City Line, Ltd.	13. 12. 47
<i>City of Evansville</i> ..	G. A. Ring	J. Grinnell, A. Brocklebank, D. B. Roe	J. Schofield	Ellerman Line, Ltd.	17. 9. 47
<i>City of Hereford</i> ..	J. Armstrong-White	D. S. McQueen, B. Hooper, L. R. Keith, J. Stewart	J. Owens	Ellerman City Line, Ltd.	22. 7. 48
<i>City of Johannesburg</i> ..	D. L. Lloyd, Cmdr., O.B.E.	A. R. Tawton, H. Routledge, C. F. Haywood	A. R. Henderson	Ellerman Hall Line, Ltd.	7. 4. 48
<i>City of Khartoum</i> ..	J. A. Beynon	D. B. Martin, R. Frame, R. Wakefield	S. Gracie	Ellerman Hall Line, Ltd.	6. 5. 48
<i>City of Lille</i> ..	E. Scrymeour	R. B. May, H. M. Steele, G. S. Garnet	A. Julius	Ellerman Line, Ltd.	17. 3. 48
<i>City of Lyons</i> ..	H. Johnson	J. Morrison, A. R. Horam, R. Clark	J. Anderson	Ellerman City Line, Ltd.	25. 5. 48
<i>City of Pretoria</i> ..	T. F. Labey	T. C. Dickinson, P. Seiffert, K. Haslam	W. Lupton	Ellerman & Bucknall S.S. Ltd.	2. 3. 48
<i>City of Swansea</i> ..	G. Vickers	L. G. Powell, B. Walker, J. L. Blanch	R. Pickering	Ellerman Hall Line, Ltd.	27. 10. 47
<i>City of Sydney</i> ..	J. B. MacLaren	E. Bondfield, R. H. Bellhouse, E. Redshaw	Miller	Ellerman Hall Line, Ltd.	30. 6. 48
<i>City of Tokio</i> ..	W. A. Owen	M. Graham, T. Riggs, E. F. Brick	A. C. Macaulay	Ellerman Hall Line, Ltd.	2. 4. 48
<i>City of Windsor</i> ..	T. G. Mathias	E. J. E. Owen, W. Kendall, J. Baxter, P. Ingram	T. Jeffrey	Ellerman & Bucknall S.S. Co., Ltd.	8. 7. 48
<i>Clan Brodie</i> ..	B. Vernon-Brown	G. Hughes, F. King, G. Healy	W. Harper	Clan Line Steamers, Ltd.	16. 9. 47
<i>Clan Buchanan</i> ..	T. W. Inman, O.B.E.	D. Steele, J. Hay, P. Hodgman	R. F. Cole	Clan Line Steamers, Ltd.	20. 4. 48
<i>Clan Campbell</i> ..	J. A. Forster	J. W. Ward, F. Turton, D. R. Godfrey	J. Shillabeer	Clan Line Steamers, Ltd.	27. 10. 47
<i>Clan Chattan</i> ..	H. C. Simpson, O.B.E.	R. S. Russell, A. M. Vaughan, J. Sullivan	J. A. Gray	Clan Line Steamers, Ltd.	6. 9. 47
<i>Clan Chisholm</i> ..	I. H. Crellin	C. Stonehouse, J. West, W. J. Maltman	W. H. Saville	Clan Line Steamers, Ltd.	8. 6. 48
<i>Clan Forbes</i> ..	H. S. Pengelly	T. R. Halliday, C. G. Smeaton, C. M. Powell	R. G. Gooseman	Clan Line Steamers, Ltd.	20. 5. 48
<i>Clan Macaulay</i> ..	A. G. Storkey	J. P. Dunphy, J. Law, D. Milner, T. R. Parsons	G. Martyn	Clan Line Steamers, Ltd.	4. 10. 47
<i>Clan Macdonald</i> ..	H. Cater	G. Bagnall, J. C. Montgomery, R. C. Pearce	C. E. C. Crew	Clan Line Steamers, Ltd.	4. 7. 48
<i>Clan Macdougall</i> ..	R. P. Galer, C.B.E., R.D., R.N.R.	A. Mair, R. Helme, J. Duff	R. M. Moore	Clan Line Steamers, Ltd.	8. 2. 48
<i>Clan Maclaren</i> ..	W. R. Woodruffe	M. T. Morton, L. W. Gibbins, S. F. Nicholson	G. McCubbing	Clan Line Steamers, Ltd.	19. 2. 48
<i>Clan Macneil</i> ..	S. F. Carter	R. E. Haywood, J. Chapel	W. Wealthy	Clan Line Steamers, Ltd.	14. 7. 48
<i>Clan Macrae</i> ..	H. J. Anchor, O.B.E., R.D., Cdr., R.N.R.	M. N. Ure, W. C. Rodger, T. N. Geesin	A. F. MacIntyre	Bank Line, Ltd.	1. 6. 48
<i>Clan Macrae</i> ..	C. C. Parfitt	W. Fromant, L. B. Witheridge, H. Chambers	E. O'Neill	Northern Petroleum Tank S.S. Co., Ltd.	16. 7. 48
<i>Clan Macrae</i> ..	A. S. Reed	G. S. Barker	P. Dwyer	Anglo-American Oil Co., Ltd.	23. 10. 47
<i>Clan Macrae</i> ..	H. Vaughan-Jones	L. Tessier, A. G. Smith, B. Edginton	J. Lovelock	Charente S.S. Co., Ltd.	2. 4. 48
<i>Clan Macrae</i> ..	C. J. W. Jones	L. C. Smith, A. E. Hughes, F. Barber	W. E. Gilbert	Bank Line, Ltd.	16. 2. 48
<i>Clan Macrae</i> ..	R. L. Williams	E. D. Ashdown, D. O. Percy, D. P. Rennie	M. O'Riordan	Furness-Houlder Argentine Line, Ltd.	19. 2. 48
<i>Clan Macrae</i> ..	W. Williams	A. J. Whiston, R. Clark, S. J. East	W. M. Fryer	Shaw, Savill & Albion Co., Ltd.	14. 6. 48
<i>Clan Macrae</i> ..	W. Mendus	E. G. Roberts, R. F. Martin, A. Byers	M. McDougall		
<i>Clan Macrae</i> ..	R. Smiles, O.B.E.	F. Fletcher, J. Hunter, R. C. Neesham	K. K. Klosser		
<i>Clan Macrae</i> ..	F. Barnard, M.B.E.	J. H. Wilde, Woodridge, Clifford	B. Baxter		
<i>Clan Macrae</i> ..	G. M. Robertson, D.S.C.				

<i>Cornwall</i>	J. W. C. Pring	J. M. James, E. White, P. A. Ogden	J. D. Charter	Federal Steam Nav. Co., Ltd.	18.3.48
<i>Corrientes</i>	W. Anderson	J. Hendry, R. Allan, E. Knox	W. Docherty	Donaldson Line, Ltd.	1.7.48
<i>Coullgorm</i>	G. Robison	T. F. Tuomey, W. F. Kelly, J. Ridley	R. Andrews	Dornoch S.S. Co., Ltd.	13.1.48
<i>Custodian</i>	A. H. Thompson	C. S. S. Boam, A. P. Sandford	A. J. Long	Charente S.S. Co., Ltd.	22.4.47
<i>Dalesman</i>	H. W. Jones	A. T. Creer			
<i>Darro</i>	B. A. Gammon	J. M. Barber, R. Finch, W. Tressider, B. Harrison	N. Bradbury	Royal Mail Lines, Ltd.	8.6.48
<i>Deebank</i>	B. Rivett	D. Campbell, I. McKay, T. Ridgeway	J. Freeman	Bank Line, Ltd.	21.5.48
<i>Defoe</i>	W. C. Blake	W. Carlaw, J. Crowe, H. Smith	W. Auden	Lampo & Holt Line, Ltd.	14.6.48
<i>Delane</i>	T. Major			Lampo & Holt Line, Ltd.	
<i>Delitiam</i>	R. McNie	J. Rodger, J. Maclean, J. Wainwright	W. Lansdown	Donaldson Line, Ltd.	10.5.48
<i>Deilus</i>	H. W. Underhill	P. Johnson, W. Jones, R. Callaghan	R. Pryer	Lampo & Holt Line, Ltd.	4.6.48
<i>Denbighshire</i>	W. F. Dark	J. Main, W. S. Hargrave, E. G. Painter, L. Parsons	N. R. Taylor	Glen Line, Ltd.	8.7.48
<i>Derryclare</i>	G. Smith	A. M. Livingstone		McCowan & Gross, Ltd.	
<i>Desado</i>	B. C. Dodds, O.B.E.	J. H. Napper, W. B. Avison, J. Holt	A. W. Allen	Royal Mail Lines, Ltd.	6.9.47
<i>Devis</i>	T. Sweeney	P. Casey, H. Jones, B. J. O'Donnell	L. Brazill	Lampo & Holt Line, Ltd.	9.7.48
<i>Devon</i>	A. Hocken	J. M. Mead, C. J. Cordran, J. Bryant, J. Crewdson	A. Williams	Federal Steam Nav. Co., Ltd.	29.5.48
<i>Devonshire</i>	J. E. Cullen, O.B.E.	D. Hine, J. Farrow, B. McMannus	W. Fletcher	Bibby Line, Ltd.	10.12.47
<i>Dileara</i>	F. L. Sampson, D.S.C.	J. W. Walker, H. B. Cray, J. A. G. Bridgenan	S. J. Taylor	British India Steam Nav. Co., Ltd.	18.5.48
<i>Dorelian</i>	D. Macqueen	J. H. Stark, A. J. Dougall, A. T. Johnston	J. Cooper	Donaldson Line, Ltd.	22.5.48
<i>Doris Clunies</i>	J. G. Stevenson	J. B. Whyte, J. H. Crae, P. P. Bracewell	C. M. Hargreaves	Doris S. S. Co., Ltd.	4.5.48
<i>Drina</i>	G. N. Anderson	R. M. Tysoe, J. Rutter, J. Fulford	J. Read	Royal Mail Lines, Ltd.	22.5.48
<i>Dromore</i>	R. E. L. Holland			Johnston Warren Lines, Ltd.	
<i>Dryden</i>	C. L. Legg	K. Quirk, J. S. Peterkin, J. L. Radcliffe	S. J. Hardman	Lampo & Holt Line, Ltd.	17.7.47
<i>Duke of Athens</i>	I. G. Lomas, A.I.N.A.	J. Morris, L. Labistour, J. G. Perrin	D. R. Uglow	Trent Maritime Co., Ltd.	
<i>Dunster Grange</i>	R. S. Grigg	A. Gibbs, H. Neal, C. Mullings	J. Humphrey	Houlder Line, Ltd.	7.1.48
<i>Durango</i>	W. H. Roberts	J. G. Brennand, M. W. M. Weekes, M. J. Dean, J. M. Cree	J. G. F. Thomas	Royal Mail Line, Ltd.	9.6.48
<i>Durbin Castle</i>	C. G. Gorrige	I. M. Cairns, L. MacEwan	H. Liggins	Union-Castle Mail S.S. Co., Ltd.	14.6.48
<i>Durham</i>	R. J. Dunning	R. W. Merry, J. E. Bury, R. D. Parkin	E. R. Saunders	Federal Steam Nav. Co., Ltd.	26.1.48
<i>Eastern</i>	M. C. G. Stratford	W. S. Drew, C. D. Dykes, S. W. Mort	E. C. Bouel	Eastern & Australian S.S. Co., Ltd.	23.11.47
<i>El Gallo</i>	E. H. Richardson	T. Yates, J. S. Adamson	D. C. Howell	Lobitos Oilfields, Ltd.	16.4.48
<i>Empire Brent</i>	J. Cook	J. Short, A. McCallum, I. Proctor	L. Hooper	Donaldson Bros. & Black, Ltd.	7.4.48
<i>Empire Halladale</i>	E. Stormont, M.B.E.	G. Ramage, W. A. Brownlie, D. McLeod	D. Thompson, M.B.E.	Anchor Line, Ltd. (Managers)	1.7.48
<i>Empire Kinsman</i>	A. Richardson			Bullard, King & Co., Ltd. (Managers)	
<i>Empire Martat'an</i>	E. Longster	G. McGowan, D. B. Butler	T. M. Keddie	Bolton S.S. Co., Ltd. (Managers)	19.6.47
<i>Empire Pride</i>	E. D. Brand	R. V. Perkin, R. Hammond, A. Moore	T. Prenton	Bibby Line, Ltd. (Managers)	4.7.48
<i>Empire Star</i>	S. J. C. Phillips, C.B.E.	R. H. Hall-Solomon, Lt., R.N.R., J. T. Brown, F. P. McGuckin	A. Morris	F. Leyland & Co., Ltd.	30.4.48
<i>Empire Towy</i>	H. L. Papworth		R. Porter	Fenton S.S. Co., Ltd.	
<i>Empire Viceroy</i>	M. D. Mackenzie	D. L. Jardine, A. C. Cable, A. Purvis		Counties Ship Management Co., Ltd. (Managers)	4.11.47
<i>Empress of Australia</i>	B. B. Grant, R.D., Cdr., R.N.R.	G. Bateman, W. Phillips	W. Campbell	Canadian Pacific Railway Co.	26.5.48
<i>Empress of Canada</i>	E. A. Shergold	I. K. Bryce, J. A. N. Bezan, R. Robinson	I. M. Butterworth	Canadian Pacific Railway Co.	21.11.47
<i>Epsom</i>	R. D. Griffiths, O.B.E.	G. T. Sharpe, R. M. King, K. Austin	R. T. Jones	Briton S.S. Co., Ltd.	7.4.48
<i>Eros</i>	R. C. Vigers	V. Irving, C. P. Turquand, T. Lenton	P. McBride	Elders & Fyffes, Ltd. (Managers)	12.5.48
<i>Esperance Bay</i>	T. V. Roberts, R.D., Capt., R.N.R.				
<i>Essex Trader</i>	C. Arundell	D. T. Mouldley, K. Murray-Brown, D. Wright	P. Moloney	Aberdeen & Commonwealth Line, Ltd.	12.7.48
<i>Esso Glasgow</i>	C. G. B. Broughton, M.B.E.	H. P. Ellison, F. Stamps, R. Robson	A. B. Pilkington	Trader Nav. Co., Ltd.	
		J. Cooke, W. Brians, D. Colebrook	C. C. H. Weeks	Anglo-American Oil Co., Ltd.	8.3.48

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS	LAST RETURN RECEIVED
<i>Ettrickbank</i>	T. Watkins	F. Allen, R. Ledger, P. A. Leighton	W. A. Townley	Inver Transport & Trading Co., Ltd.	22.4.48
<i>Explorer</i>	W. Moore	W. L. Nelson	W. A. Townley	Charente S.S. Co., Ltd.	27.2.47
<i>Fanad Head</i>	E. W. Black	G. H. Griffiths, P. M. Ralston, S. Burley	W. A. Johnston	Ulster S.S. Co., Ltd.	2.3.48
<i>Fantee</i>	J. W. Andrew	J. M. Green	J. W. Leask	Elder Dempster Lines, Ltd.	2.3.48
<i>Fenia</i>	L. Robertson	A. Alexander, B. T. Tallack, G. Lowe	C. C. Wade	South Georgia Co., Ltd.	5.12.47
<i>Firuz</i>	S. Thompson	J. S. Drynan, J. W. Phimister		Anglo-Saxon Petroleum Co., Ltd.	24.6.48
<i>Finland</i>	A. Wilson, O.B.E.	J. F. Cooper, H. Watson		Currie Line, Ltd.	18.3.48
<i>Folda</i>	E. Tulloch	R. T. Welch, G. B. Moss, G. Lewis	H. S. Knight	South Georgia Co., Ltd.	2.2.48
<i>Fordsdale</i>	R. G. Ireland			Shaw, Savill & Albion Co., Ltd.	
<i>Fort Cadotte</i>	A. MacKellar, R.D.	J. S. Roe, K. Lamb, H. Hurlley	K. Alexander	Cunard White Star, Ltd. (Managers)	13.8.47
<i>Fort Caribou</i>	Capt., R.N.R.	M. O. Hamill, E. C. Leaver, M. E. D. Annett	V. P. Manahan	Goulandris Bros., Ltd. (Managers)	25.6.48
<i>Fort Musquarro</i>	W. T. Evans			Cunard White Star, Ltd. (Managers)	25.5.48
<i>Fort Nakasley</i>	J. Francis Drake, O.B.E., R.D., R.N.R.	M. Hehir, P. Jackson, J. C. Nicholson	M. J. Sheaham	J. & J. Denholm, Ltd. (Managers)	
<i>Fort Spokane</i>	A. Cromarty, O.B.E.	M. MacPhee, A. McFie-Allen, A. S. Kelly	J. F. Norwood		
<i>Fort Steele</i>	J. V. Locke, R.D., Cdr., R.N.R.	J. Farrow, M. V. Meardon, R. J. Ogilvy	F. MacLaughlin	Cunard White Star, Ltd. (Managers)	
<i>Geologist</i>	I. S. Binnie	L. Jamieson, K. Montgomery, J. Horne	W. Steele	Lyle S.S. Co., Ltd. (Managers)	29.5.48
<i>Geo. W. MacKnight</i>	W. L. Sawle	W. E. Hinde, L. Richardson, L. Broadbent	K. Johnson	Charente S.S. Co., Ltd.	4.8.47
<i>Georgic</i>	A. G. Robins	E. Tunnicliffe, F. Bridges, A. L. Searle	R. J. Wealthy	Anglo-American Oil Co.	19.7.48
<i>Glaucus</i>	H. Dixon	K. T. Jones, J. O. Springall, H. P. Williams	A. G. Hill	Cunard White Star, Ltd. (Managers)	31.12.47
<i>Glenarney</i>	W. T. Spencer	I. Lloyd-Jones, G. McInnes, P. Pratt	J. M. Lewis	Ocean S.S. Co., Ltd.	10.6.47
<i>Glenbark</i>	W. E. Coates	R. Webb, C. Lorimer, R. Pasmore	W. Colley	Glen Line, Ltd.	7.4.48
<i>Gloucester</i>	T. Fraser	M. Murphy, J. J. Reed, J. R. Roe	C. H. Ball	Bank Line, Ltd.	
	H. D. Horwood	P. Slocombe, D. Holley, E. Holland, D. Moran	R. J. Devin	Federal Steam Nav. Co., Ltd.	4.7.48
<i>Goth</i>	J. E. Bywater		A. Wright	Wyre Steam Trawling Co., Ltd.	10.4.48
<i>Gracia</i>	H. McLachlan			Donaldson Line, Ltd.	
<i>Granbond</i>	P. F. Ewart	H. Smallwood, A. V. James, D. A. Barfoot	H. A. Reynolds	Mediterranean & Atlantic Lines, Ltd.	16.2.48
<i>Gumean</i>	H. Coffey, R.D., R.N.R.	A. E. Pearson, T. Rylance, R. B. Daies	R. B. Read	United Africa Co., Ltd.	6.5.48
<i>Haparangi</i>	C. R. Pilcher, O.B.E.	J. T. Peattie, J. R. Ramsay, H. P. Lunn, E. B. Mallett	J. Matthews		23.6.48
<i>Helicina</i>	F. T. Vine	P. S. Sharer, G. E. Bennison	G. W. Evans	New Zealand S.S. Co., Ltd.	4.5.48
<i>Herdsmen</i>	W. A. Short	J. W. Embleton	E. Greaves	Anglo-Saxon Petroleum Co., Ltd.	
<i>Hersfordshire</i>	T. J. A. Thomson	J. W. Mackinley, M. C. Mills, W. O. Thomas	T. Desborough	Charente S.S. Co., Ltd.	14.6.48
<i>Highland Brigade</i>	H. D. Hooper, O.B.E.	R. M. Tysol		Bibby Line, Ltd.	
<i>Highland Chieftain</i>	G. A. Bannister	G. A. Wright, W. R. Brooks, M. Larrive, J. T. Price		Royal Mail Lines, Ltd.	21.7.48
<i>Highland Monarch</i>	D. A. Casey, C.B.E., D.S.O., D.S.C., R.D., Cmdr., R.N.R.	A. Ferguson, J. Perkins, R. Stirling, G. Lillie		Royal Mail Lines, Ltd.	19.5.48
<i>Higland Princess</i>	P. Cooper	N. L. Tapp, M. Wardle, B. Lambert, R. C. C. Frizell	F. R. Dunk	Royal Mail Lines, Ltd.	19.5.47
<i>Hilary</i>	A. Elliott, O.B.E.	A. S. Frith, M.B.E., P. J. Wahlberg, F. J. Forster	F. Goodall	Booth S.S. Co., Ltd.	30.6.48
<i>Hopecroft</i>	T. Georgeson	N. Hanson	J. Houghney	Clive S.S. Co., Ltd.	12.4.47
<i>Hopepeak</i>	G. Grindrod	C. E. Pain, J. C. Jackson, F. Rowe	W. Thomas	Hopecroft S.S. Co., Ltd.	8.4.48

<i>Hopetown</i>	..	F. H. Dufrenoy	..	G. I. Outen, W. D. Tullock, G. R. Ballard	C. J. Rees	..	New Zealand S.S. Co., Ltd.	..	26.5.48
<i>Hororata</i>	..	A. E. Taylor, R.D., Cdr., R.N.R.	..	E. W. Clubb, S. R. Harding, I. H. Hedley	C. L. Lambie	..	New Zealand S.S. Co., Ltd.	..	7.5.48
<i>Horsa</i>	..	D. Dickson	..	W. Urquhart, A. Wotherspoon	None carried	..	Currie Line, Ltd.	..	7.7.48
<i>Hubert</i>	..	H. Sepsworth, D.S.C.	..	S. W. Andrews	F. J. Murray	..	Booth Line, Ltd.	..	11.8.47
<i>Hurum</i>	..	F. Loughheed	..	J. Smythe, N. C. Stark, R. McKeague	W. Chalmers	..	New Zealand Shipping Co., Ltd.	..	20.4.48
<i>Inishowen Head</i>	..	G. A. Moore	..	S. Duncan, H. E. Hoyle	..	..	Ulster S.S. Co., Ltd.	..	..
<i>Inverbank</i>	..	A. M. Williamson	..	E. G. J. Roberts, W. E. Brett, F. Saunders, B. Musson	..	..	Bank Line, Ltd.	..	..
<i>Jamaica Producer</i>	..	P. D. Allen, O.B.E.	..	I. H. J. Frost, D. L. Beynon, T. Thomas	K. Hartley	..	Jamaica Banana Producers S.S. Co., Ltd.	..	22.4.48
<i>Jersey City</i>	..	J. M. Cox	..	S. N. Coe, D. G. Waters, K. Rowland	C. Codling	..	Reardon Smith Line, Ltd.	..	19.5.48
<i>Jessmore</i>	..	A. C. Bailey	..	W. Heatley, T. Miller, R. V. Cox	P. Mahony	..	Johnston Warren Lines, Ltd.	..	19.7.48
<i>John Biscoe</i>	..	A. F. MacFie, O.B.E., R.D., Lt.-Cdr., R.N.R.	..	W. L. Harrison, P. Bathurst, J. Spilman, R. Griffiths	J. O'Hare	..	Falkland Island Dependencies Govt.	..	..
<i>John Holt</i>	..	A. Kennedy	..	D. M. Steven, J. R. Suffern, F. LeMessurier	P. A. Senior	..	John Holt & Co. (Liverpool), Ltd.	..	26.4.48
<i>Kaipaki</i>	..	T. Fenwick	..	N. Fraser, D. Ewan, G. R. Thomson	F. Matthews	..	New Zealand S.S. Co., Ltd.	..	7.1.48
<i>Kaipara</i>	..	T. R. Windus	..	J. Blake, C. F. Turner, W. Howgego	S. H. Devereux	..	New Zealand S.S. Co., Ltd.	..	24.2.48
<i>Kaituna</i>	..	R. F. Hellings	..	R. H. Wakefield, R. J. F. Riley, D. E. Hsley	M. Garrett	..	New Zealand S.S. Co., Ltd.	..	21.1.48
<i>Kallada</i>	..	I. M. Reynolds	..	J. F. Thompson, P. F. Carnochan, J. Horne	M. S. M. Harding	..	J. Nourse, Ltd.	..	..
<i>Kelmscott</i>	..	R. E. Richardson	..	G. D. Atwood, J. Toogood, G. Beaumont, D. A. Davies	E. T. Lewis	..	Pachesham S.S. Co., Ltd.	..	3.9.47
<i>Kentworth Castle</i>	..	J. E. R. Wilford	..	D. L. Willmott, P. Kemp, C. Masson	A. C. Cockburn	..	Union-Castle Mail S.S. Co., Ltd.	..	16.2.48
<i>Kent</i>	..	E. H. Hopkins	..	H. Johansen, J. F. Jarvis	E. Dove	..	Federal Steam Nav. Co., Ltd.	..	4.5.48
<i>Ketos</i>	..	G. J. Gjertsen	..	G. Griffiths, W. Keith, P. Kidd	I. Murphy	..	United Whalers, Ltd.	..	..
<i>King Robert</i>	..	G. Craze	..	J. S. Gittings, J. C. Davies, A. J. Moore	W. Fielding	..	King Line, Ltd.	..	10.10.47
<i>King William</i>	..	A. B. Drever	..	A. R. Cornish	P. Kelly	..	King Line, Ltd.	..	12.7.48
<i>Kinston Pearl</i>	..	A. R. Cornish	..	W. G. Smith, A. Baird, J. Belt	W. Weaver	..	Kingston Steam Trawling Co., Ltd.	..	26.5.48
<i>Kohistan</i>	..	J. S. Smithson	..	N. McCrae, H. R. Machin, A. P. Watson	M. A. Calder	..	Shahristan S.S. Co., Ltd.	..	19.5.48
<i>Lacklan</i>	..	R. C. Skilborn	..	J. H. Allenby, W. P. Goldie, P. H. Grant	H. F. Morrison	..	Socrony-Vacuum Transport Co., Ltd.	..	11.3.48
<i>Lafuna</i>	..	H. F. McInnes	..	J. Orr, A. Sillars, R. F. Arnold	J. Heenay	..	Pacific Steam Nav. Co.	..	16.7.48
<i>Lambrook</i>	..	C. E. O'Byrne	..	J. S. Catterall, C. McCullach, D. Crawford	S. Gracey	..	Austin Friars S.S. Co., Ltd.	..	21.6.48
<i>Lancashire</i>	..	A. Kerbyson	..	J. C. Priest, W. H. Malley, J. W. Q.-K. Harwood	P. Budge	..	Scottish Shire Line, Ltd.	..	25.9.47
<i>Lassell</i>	..	D. Roberts	..	J. L. Roberts	A. Jones	..	Bibby Line, Ltd.	..	24.6.48
<i>Latia</i>	..	P. G. G. Dove	..	R. W. Lumsden, W. J. Erskine, G. A. Hubbard	W. E. Delamere	..	Lampport & Holt Lipe, Ltd.	..	..
<i>Leicester</i>	..	H. L. Lawson, R.D., R.N.R.	..	J. Andrews, A. Collins, R. Stewart-Scott	..	..	Anglo-Saxon Petroleum Co., Ltd.	..	7.4.48
<i>Leverbank</i>	..	D. Gillies	..	C. G. Watterson, C. R. Eaddy, D. A. Kiddell	P. Broome	..	Federal Steam Nav. Co., Ltd.	..	16.2.48
<i>Livorno</i>	..	E. S. Green	..	F. Methan, F. E. Barnes, G. Dineley	W. C. Doyle	..	Bank Line, Ltd.	..	26.2.48
<i>Llangibby Castle</i>	..	I. B. McReynolds, D.S.C.	..	W. J. Damerell, R. Wright, C. M. Hart	L. Bradshaw	..	Ellerman's Wilson Line, Ltd.	..	1.6.48
<i>Lloydcrest</i>	..	T. Walker	..	H. L. Halcrow, D. W. Verniers, A. H. Benson	J. Fager	..	Union-Castle Mail S.S. Co., Ltd.	..	1.1.48
<i>Lobos</i>	..	R. H. Sissons	..	R. T. Riley, P. H. Ray, J. Norman	M. Riley	..	Junecrest S.S. Co., Ltd.	..	..
<i>Loch Avon</i>	..	W. W. Lowe	..	W. M. Morton, G. E. Leech, D.S.C., J. V. Bradbury, J. M. Ashworth	N. P. Sherin	..	Pacific Steam Nav. Co.	..	15.1.48
<i>Loch Garth</i>	..	H. G. Whittle, O.B.E.	..	D. B. Keefe, E. A. E. Littlewood, J. G. Street, J. K. Cook	M. R. Littlejohn	..	Royal Mail Lines, Ltd.	..	18.3.48
<i>Loch Ruan</i>	..	W. H. Grimshaw	..	C. Hartley, N. F. Seaton, M. Dean, R. D. Stirling	J. W. Morgan	..	Royal Mail Lines, Ltd.	..	12.5.48
<i>Lochmontar</i>	..	H. H. Treweeks	..	G. B. Medleycott, J. E. Robson, Lt., R.N.R., P. Davies	D. Douglas	..	Royal Mail Lines, Ltd.	..	9.10.47
	..		..		J. Coutts	..	Royal Mail Lines, Ltd.	..	15.12.47

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS	LAST RETURN RECEIVED
<i>Lord Gladstone</i>	J. Abuelo	R. Mason, L. Gonroy-Finn, M. M. Osman, S. L. Edwards	W. Phelan	Norwood S.S. Co., Ltd.	2.3.48
<i>Lord Glenloran</i>	W. J. Leinster	I. Smyth, A. F. James, A. R. McMullen	R. Macleod	Ulster S.S. Co., Ltd.	12.3.48
<i>Lord O'Neill</i>	R. A. Ferguson	R. G. Pass, W. R. Nelson	C. A. Murphy	Ulster S.S. Co., Ltd.	11.12.47
<i>Loriga</i>	G. B. Wardle	W. E. Molloy, K. Thomas, A. Hudson	I. Sheen	Pacific Steam Nav. Co., Ltd.	2.12.47
<i>Lulworth Hill</i>	J. Reed	J. S. Henderson, R. W. Curd	R. Penrose	Dorset S.S. Co., Ltd.	4.2.48
<i>Luminous</i>	S. J. Smith	J. Billett		Aral S.S. Co., Ltd.	
<i>Machaton</i>	J. L. W. Johnston	D. H. Stewart, C. C. Reeder, J. R. Wells, A. C. Farquhar	A. Akhurst	Ocean S.S. Co., Ltd.	26.4.48
<i>Magarda</i>	R. A. Penstone	Kirkham, T. H. Wardle, L. J. S. Saxty	Brady	T. & J. Brocklebank, Ltd.	21.6.48
<i>Magdapor</i>	A. Hill, O.B.E.	S. Baxter, N. H. Embleton, A. Halcrow	E. Halton	T. & J. Brocklebank, Ltd.	19.5.48
<i>Mahanada</i>	J. W. B. Robertson, R.D., R.N.R.	E. A. Anderson, J. Brand, J. C. Long, P. Greenall	T. Williams	T. & J. Brocklebank, Ltd.	9.7.48
<i>Mahia</i>	J. W. Hart	A. Anderson, O. Pritchard, G. Sinclair	A. Roberts	Shaw, Savill & Albion Co., Ltd.	8.10.47
<i>Mahout</i>	T. C. Eddy	A. P. Briggs, J. W. Ross, D. Evans	D. Lloyd	T. & J. Brocklebank, Ltd.	16.2.48
<i>Mahoud</i>	R. Humble	M. H. Taylor, J. P. Pembroke, D. L. des Landes		T. & J. Brocklebank, Ltd.	12.5.48
<i>Manihar</i>	S. Broughton	F. J. Watts, J. P. Jackson, J. H. Moore	A. G. Lea	T. & J. Brocklebank, Ltd.	21.6.48
<i>Makalla</i>	J. B. Newman	J. P. Hackworth, H. Defty, D. Hay	I. Caddy	T. & J. Brocklebank, Ltd.	25.5.48
<i>Makaland</i>	J. Owen	D. S. Carter, W. Gibson, J. Kemp	R. Burton	T. & J. Brocklebank, Ltd.	22.4.48
<i>Malancha</i>	H. MacGregor	P. B. Eccles, H. W. Gates, J. R. Stephens	B. Laird	Rio Cape Line Ltd.	21.7.48
<i>Malayan Prince</i>	J. D. Fraser	I. S. Anderson		Ellerman's Wilson Line, Ltd.	18.3.48
<i>Malmo</i>	J. W. Calvert	W. P. Lowthian, W. Hine, M. Bewley, B. S. Roberts, R. Wadsworth		P. & O. Steam Nav. Co.	
<i>Maloja</i>	E. J. Parry	H. Nielsen, W. E. Quirk, J. E. Askew	W. H. Critchley	Manchester Liners, Ltd.	9.6.47
<i>Manchester City</i>	F. L. Osborne	F. Robinson, D. Thomas	H. C. Evans	Manchester Liners, Ltd.	8.6.48
<i>Manchester Commerce</i>	H. Hancock	A. Cookson, F. Lewis, N. Davis	T. Parker	Manchester Liners, Ltd.	2.2.48
<i>Manchester Division</i>	E. W. Espley	E. J. Eccles, J. L. McLaren, D. S. Millard	W. C. Critchley	Manchester Liners, Ltd.	4.6.48
<i>Manchester Port</i>	F. Downing	T. H. Lynn, F. Lewis, D. Heaton	J. Reid	Manchester Liners, Ltd.	11.12.47
<i>Manchester Progress</i>	W. H. Downing	A. C. Caird, M. E. Bewley, P. N. Fielding, D. L. Allison	E. Ambler	Manchester Liners, Ltd.	14.1.47
<i>Manchester Regiment</i>	F. D. Struss, O.B.E., D.S.C.	H. P. Ackertley, D. A. Morris, F. P. Attwood	A. C. Gavin	Manchester Liners, Ltd.	21.6.48
<i>Manchester Skipper</i>	I. Barclay	N. P. McLeod	B. Banks	T. & J. Brocklebank, Ltd.	7.4.48
<i>Manchester Trader</i>	E. W. Raper	S. B. Wade, A. Burton, R. H. Story	J. B. Anderson	Bank Line, Ltd.	
<i>Mandasor</i>	L. E. Jeans	M. G. Stevens, W. Forster, J. Bloomfield	G. Camm	Ellerman's Wilson Line, Ltd.	
<i>Maplebank</i>	N. P. McLeod	H. C. Coplin	I. Moss	"K" S.S. Co., Ltd.	14.5.48
<i>Marango</i>	D. B. Ramsbottom	I. A. MacLaren, J. Ritchie, R. N. Bonny	H. C. Coplin	Seddon Fishing Co., Ltd.	16.4.48
<i>Maray</i>	E. A. Prentice	R. J. Sinclair, W. Allen	G. M. Caddy	T. & J. Brocklebank, Ltd.	27.4.48
<i>Marinda</i>	A. Crewdson	D. Hughes, J. Cush, J. Benson	H. A. Reynolds	South Georgia Co., Ltd.	
<i>Markhor</i>	W. Hill, O.B.E.	H. Jones, J. Tiers, L. Mansell		Coolham S.S. Co., Ltd.	16.3.48
<i>Marna</i>	R. J. Hume	E. Watkins, E. McAulley, G. J. Kenyon	D. H. Butterworth	"K" S.S. Co., Ltd.	28.4.48
<i>Margutta</i>	F. C. Jennings	N. White, E. Prest, P. Parker	A. MacDonald	Shaw, Savill & Albion Co., Ltd.	
<i>Marsdale</i>	T. Fox-Lloyd	C. M. Williams	P. Neeson	T. & J. Brocklebank, Ltd.	
<i>Martland</i>	H. Bunn	H. Simpson, J. A. Miller, R. J. Riding			
<i>Martia</i>	S. Oswald				
<i>Mataroa</i>	A. B. Bannatyne, O.B.E.				
<i>Matheron</i>					

<i>Matina</i>	A. G. Jones	B. Hodges, T. C. Crane, C. S. Owen	H. Hinkles	Elders & Fyffes, Ltd.	11.5.48
<i>Mauretania</i>	R. B. G. Woollatt, R.D., Cdr., R.N.R.	G. R. Carter, G. D. Williams, G. L. Mitchell	F. Clark	Cunard White Star, Ltd.	20.7.48
<i>Media</i>	C. S. Williams	J. K. Finlay, A. D. Hunt, W. G. Smith	J. H. Clarke	Cunard White Star, Ltd.	22.7.48
<i>Mening</i>	D. C. Roberts	G. J. Piper, W. A. Sparks, L. A. Ankers	J. H. Gregor	Lampart & Holt Line, Ltd.	18.8.47
<i>Millais</i>	J. F. Byrne, O.B.E.	R. J. Sampson, J. Edgar, D. S. Leicester	A. Hutchinson	Lampart & Holt Line, Ltd.	5.12.47
<i>Mirror</i>	S. A. Gammon	R. E. Small, P. B. Henderson, C. E. Burrill	J. Crouch	Cable and Wireless, Ltd.	18.7.47
<i>Monarch</i>	I. P. F. Betson	K. H. Joy, A. Hoar, Black-Tuckwell	E. Robinson	Postmaster-General	25.6.47
<i>Moneria</i>	T. S. Graham	I. M. MacFarlane, G. E. Waddell, R. S. Hopkins	R. H. Hallam	Donaldson Line, Ltd.	22.4.48
<i>Mulbera</i>	M. Williams	A. J. Jarman, J. B. Purkis, T. R. E. Cundy	T. McMinin	British India Steam Nav. Co., Ltd.	21.6.48
<i>Murillo</i>	W. Gillespie	P. Leighton, K. M. Maguire, J. D. Brown	G. Adamson	Lampart & Holt Line, Ltd.	11.11.47
<i>Myrtlebank</i>	F. Hale	G. G. Hodgson, J. T. Duncan, F. J. Adamson	N. Kehoe	Bank Line, Ltd.	22.4.48
<i>Nab Wyke</i>	P. E. Bedford	B. Arnstad, E. Reed, J. Appleby	J. Adamson	Wyre Steam Trawling Co., Ltd.	7.7.48
<i>Nairbank</i>	C. S. Holbrooke	J. B. Kennedy, E. W. Jenkins, J. Bain	T. W. Murray	Union Cold Storage Co., Ltd.	29.8.47
<i>Napier Star</i>	E. N. Rhodes	P. Kendall	W. P. Parkinson	Anglo-Saxon Petroleum Co., Ltd.	13.2.48
<i>Naticina</i>	P. D. Seear	W. A. Clark, J. G. Wilson, W. S. Guthrie	L. Booth	Ocean S.S. Co., Ltd.	14.6.48
<i>Nestor</i>	E. W. Powell	Keene, J. B. Stewart, H. T. Sheffield	T. Cahill	Johnston Warren Lines, Ltd.	2.2.48
<i>Newfoundland</i>	A. T. Church, O.B.E.	A. G. Smith, R. Stewart, F. Wood	C. J. Carter	Federal Steam Nav. Co., Ltd.	22.3.48
<i>New Zealand Star</i>	G. Owen, O.B.E., R.D., Cdr., R.N.R.	R. S. Luly, D. Williamson, A. B. Moss	J. Heath	Donaldson Line, Ltd.	4.6.48
<i>Norfolk</i>	A. T. Robinson, R.D., Capt., R.N.R.	B. E. Crist, R. Webster, G. Wottan	J. Hassen	Charente S.S. Co., Ltd.	7.4.48
<i>Northumberland</i>	F. Longhead	H. Wyllie	W. C. Brock	Houlder Bros. & Co., Ltd. (Managers)	19.7.48
<i>Norwegian</i>	J. Pollock	A. Pearson, D. H. Lee, R. I. Heys	J. Whitehead	New Zealand S.S. Co., Ltd.	14.7.48
<i>Nova Scotia</i>	J. E. Wilson, O.B.E.	H. Skelly, W. G. Jackson, W. Grierson	R. Hardman	Pacific Steam Nav. Co., Ltd.	19.7.48
<i>Novelist</i>	T. E. Steel	R. J. Wilks, T. Shields, P. J. Leech	F. Wilman	Orient Steam Nav. Co., Ltd.	24.6.48
<i>Ocean Valley</i>	W. MacMellin	W. Peto, A. Mackenzie, J. Edmondson	W. McCormick	Norfolk & North American S.S. Co. Ltd.	11.5.48
<i>Orari</i>	F. Pover	J. Greenwood, J. Kelly, W. Singleton	J. R. Kidson	Furness, Withy & Co., Ltd.	21.6.48
<i>Orbita</i>	J. Sutherland	E. L. Sleeman	N. A. Boon	Furness, Withy & Co., Ltd.	22.4.48
<i>Orduna</i>	W. A. Hearle	W. E. Molloy, B. A. King, J. Bruce	R. Oakley	Shaw, Savill & Albion Co., Ltd.	23.4.48
<i>Orion</i>	C. Fox, C.B.E., L.M.	B. Noble, C. K. Knight, W. B. Thompson	A. F. Cory	P & O. Steam Nav. Co.	20.3.48
<i>Ormonde</i>	T. L. Shurrock, O.B.E.	C. F. Williams, A. M. Murray, D. K. Kinloch, Lt., R.N.R.	P. G. Everett	MacAndrews & Co., Ltd.	22.4.48
<i>Orontes</i>	M. E. Cogle, O.B.E.	M. J. Brown, J. Crosthwaite, Cameron	T. Keddle	Royal Mail Lines, Ltd.	22.11.47
<i>Pacific Enterprise</i>	J. H. King	E. Cunningham	F. Slater	Royal Mail Lines, Ltd.	15.7.48
<i>Pacific Importer</i>	E. V. Richards	W. E. Thomas, R. Hughes, S. G. Edwards	P. McCarthy	Royal Mail Lines, Ltd.	8.11.47
<i>Pacific Skipper</i>	F. H. Perry	D. R. Gibson, D. MacDonald, C. Howard	H. Olding	P & O. Steam Nav. Co.	16.1.48
<i>Pacific Stronghold</i>	H. C. Smith	E. Snaith, A. H. N. Pugh, A. R. Stephenson	J. Stone		
<i>Pakeha</i>	M. H. Atkinson, D.S.C.	C. A. Ellis, McKinley	A. R. Smith		
<i>Palacio</i>	F. R. Spurr	P. J. Passmore, M. A. Vickers, W. B. Frenfield	L. E. Rayner		
<i>Palana</i>	D. L. Thomas, M.B.E.	F. Szanage	C. R. Wyllie		
<i>Palomares</i>	T. Powell	C. D. Williams	D. Harney		
<i>Pampas</i>	B. Evans	G. R. Naylor, R. Sims, R. Tomlinson	W. Field		
<i>Papanui</i>	E. A. J. Williams	C. B. Hewett, H. A. Owen, G. J. Keyse	A. MacBeth		
<i>Paparoa</i>	H. V. Todd	D. E. Hogarth, G. A. Gibbons, E. A. Pearce			
<i>Paraguay</i>	R. N. Fletcher	M. Hawkins, C. G. M. Smith, S. D. Gibson			
<i>Pardo</i>	J. N. Duncan	R. C. Hunnisset			
<i>Parina</i>	C. E. Pollitt	G. P. Blyth, W. N. Eade, J. S. Anderson			
<i>Paringa</i>					



NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNER	LAST RETURN RECEIVED
<i>Parthia</i> ..	R. G. Thelwell, O.B.E., R.D., A.D.C., Capt., R.N.R.	P. Walton, P. A. Whorral, P. J. Muller... J. W. Brown, I. S. McColl, L. O. Thornton P. E. Hewitt, H. Toon, R. M. Parnell J. G. Smith, J. Brown, F. Sharps, M. Shillington	A. O. Sullivan R. Wilson F. Groves	Cunard White Star, Ltd. British & Burmese Steam Nav. Co., Ltd. P. & O. Steam Nav. Co.	6.5.48
<i>Pegu</i> ..	S. Thomson	D. P. Warren, P. Anthony, J. Egan	F. Rayner	Scottish Shire Line, Ltd.	30.6.48
<i>Perim</i> ..	R. G. Rees	M. J. Heron, E. Allan, J. Laidlaw	M. Coady	Royal Mail Lines, Ltd.	17.11.47
<i>Pertshire</i> ..	J. J. Wallis	J. L. Cule	L. Wittingdon	New Zealand S.S. Co., Ltd.	25.5.48
<i>Pilcomayo</i> ..	H. Leask	J. Gilman, E. Smith		Charente S.S. Co., Ltd.	
<i>Pipiriki</i> ..	E. T. W. Lawney	C. M. Watkins, P. A. N. Thomas, R. D. Harris	M. J. Sheeham	Polar Whaling Co., Ltd.	
<i>Planter</i> ..	D. G. H. Bradley	P. K. Hollings, J. Rose, H. S. Cran	E. G. Gunner	Port Line, Ltd.	8.7.48
<i>Polar Maid</i> ..	T. F. Kippins, O.B.E., D.S.C.	A. J. Braund, J. D. Aitchison, J. A. Ashburner		Port Line, Ltd.	29.12.47
<i>Port Chalmers</i> ..	F. W. Bailey, M.B.E.	D. M. MacKeith, C. Guest	B. Morley-Evans	Port Line, Ltd.	4.6.48
<i>Port Fairy</i> ..	H. H. Smith, O.B.E.	G. Garling, R. Silvester, D. Robinson	R. C. Crompton	Port Line, Ltd.	17.3.48
<i>Port Hobart</i> ..	E. Roswell	H. Thompson, T. S. Paton, P. M. Hudson	F. Griffiths	Port Line, Ltd.	18.2.48
<i>Port Jackson</i> ..	J. G. Lewis, O.B.E.	J. C. Howell, F. M. Barton, M. B. Pettigrew	H. J. Griffiths	Port Line, Ltd.	31.3.48
<i>Port Lincoln</i> ..	W. J. Enright, O.B.E., R.D., Capt., R.N.R.	H. F. Lunn, R. C. Matthews, A. S. Baird	P. Smyth	Port Line, Ltd.	5.3.48
<i>Port Macquarie</i> ..	W. G. Higgs, O.B.E., R.D., Cmdr., R.N.R.	J. M. Bedwell, D. Sinclair, K. Marshall.	W. Miller	Port Line, Ltd.	14.6.48
<i>Port Phillip</i> ..	H. Steele	P. G. Henneker, P. R. Lewis, C. P. Williams	J. S. Macpherson	Port Line, Ltd.	12.7.48
<i>Port Pirie</i> ..	S. J. G. Hill	R. D. Jones, R. R. Thompson, M. Sherwood	J. N. Coutts	Port Line, Ltd.	25.5.48
<i>Portarlington</i> ..	I. C. Brown, C.B.E.	I. Webster, R. A. Hansel, C. H. Jolly	R. R. Clarke	Royal Mail Lines, Ltd.	11.5.48
<i>Porter</i> ..	L. W. Kersley	A. Cochran, D. A. Dear, W. Byers	F. Fish	Union-Castle Mail S.S. Co., Ltd.	
<i>Pretoria Castle</i> ..	R. Owen	M. Holden, T. Gibbon, J. Budgell, A. Rollinson	E. Whitehead	Ocean S.S. Co., Ltd.	10.4.48
<i>Princess</i> ..	J. S. Oxnard		A. Lugar	Furness-Houlder Argentine Lines, Ltd.	29.5.48
<i>Rakata</i> ..	R. E. T. Tunbridge, D.S.C., R.D., A.D.C., R.N.R.			New Zealand S.S. Co., Ltd.	16.3.48
<i>Rangitoto</i> ..	G. Kinnell, O.B.E.	P. M. Busby, M. Drake, N. Etherton	P. J. Smyth	P. & O. Steam Nav. Co.	20.5.48
<i>Rearder</i> ..	R. F. Longster	G. W. Sigsworth, R. J. Abbott	W. Jacobson	New Zealand S.S. Co., Ltd.	22.6.48
<i>Red Charger</i> ..	R. Naah	C. Noble		Charente S.S. Co., Ltd.	
<i>Red Crusader</i> ..	B. Rogerson		R. Green	Iago Steam Trawler Co., Ltd.	
<i>Red Knight</i> ..	E. Litrer			Iago Steam Trawler Co., Ltd.	
<i>Red Lancer</i> ..	M. Wright			Iago Steam Trawler Co., Ltd.	
<i>Red Sword</i> ..	J. Tomlinson			Iago Steam Trawler Co., Ltd.	
<i>Regent Hawk</i> ..	J. Ward			Iago Steam Trawler Co., Ltd.	
<i>Reighton Wyke</i> ..	C. Whiting	F. S. Farrar, G. R. Arthur, D. O'Hara, G. Green	R. W. Jones	Trinidad Leaseholds, Ltd.	18.3.48
<i>Rembrandt</i> ..	I. J. Grugan	R. Thompson, T. J. Morgan, M. Barrett	R. Bell	West Dock Steam Fishing Co.	29.3.47
<i>Repton</i> ..	D. Cowrie	F. L. James, D. M. Muir, G. R. Watts	R. Marsden	Bolton S.S. Co., Ltd.	8.3.48
			W. Keogh	Basra S.S. Co., Ltd.	6.5.48

<i>Rhodesia Star</i>	C. H. Watson	K. P. Crompton	I. H. Burgess	Blue Star Line, Ltd.	3.2.47
<i>Richmond Castle</i>	I. A. Snowden	J. W. Lewin, W. Kilgour	R. White	Union-Castle Mail S.S. Co., Ltd.	6.1.48
<i>Richmond Hill</i>	M. O'Neill	S. Sloan, A. Shafy, L. Gellie	S. Godfrey	Putney Hill S.S. Co., Ltd.	22.4.48
<i>Richbeck Castle</i>	M. S. Hodson	J. A. Scott	A. Stanning	P. & O. Steam Nav. Co.	31.3.48
<i>Rmutaka</i>	W. Wilson, O.B.E.	B. Linklater, I. Cubitt, D. Dickens, T. Train	J. Connelly	Houlder Line, Ltd.	22.4.48
<i>Ripplingham Grange</i>	L. Bearbank	R. Tummouth, H. Butler, E. A. Prothero	R. Munro	Anglo-American Oil Co., Ltd.	9.7.48
<i>Robert F. Hand</i>	G. I. Instone, O.B.E.	J. Rattray, I. leCocq, T. Stoneman		Great Northern Fishing Co., Ltd.	
<i>Robert Hewett</i>	E. Elliot	H. Wilcock	K. N. G. Ashford	Union-Castle Mail S.S. Co., Ltd.	14.11.47
<i>Rochester Castle</i>	D. D. Mackenzie	P. G. Eckford, G. E. Matthews, E. H. Pickles	J. J. Smith	Andross S.S. Co., Ltd.	19.7.48
<i>Rochide</i>	H. L. Holland	S. K. Smith, W. R. Carr, T. Mayo	I. H. Hillyer	Union-Castle Mail S.S. Co., Ltd.	5.7.48
<i>Rodin Castle</i>	J. M. Rayner, R.D., Cdr.	J. K. Mumford, J. Houson, K. Grant	T. G. Hills	Union Cold Storage Co., Ltd.	8.6.48
<i>Roxburgh Castle</i>	R.N.R.	T. G. Hughes, L. Thompson, D. Brewster	J. Poyner	New Zealand S.S. Co., Ltd.	21.7.48
<i>Royal Star</i>	R. White, D.S.C.	I. Y. Batley, J. D. Guyler, J. Massey	J. Macfarlane	Currie Line, Ltd.	8.1.47
<i>Ruahine</i>	A. E. Lettington, D.F.C.	J. A. Williamson	H. Holdridge	Bolton S.S. Co., Ltd.	10.4.48
<i>Rutland</i>	W. Thom	A. Mathison, J. T. Hibbert	W. Parrat	Ellerman's Wilson Line, Ltd.	10.12.47
<i>Ruydael</i>	D. E. Norie	A. C. Dick, W. White, A. Wilkinson	D. L. Verity	West Hartlepool Steam Nav. Co., Ltd.	
<i>Sacramento</i>	J. Robinson, M.B.E.	D. L. Verity		Heward Trawlers, Ltd.	
<i>St. Crispin</i>	A. E. Hall	V. A. Buschini	A. G. Phillips	South American Saint Line, Ltd.	4.5.48
<i>St. Just</i>	V. A. Buschini	P. C. Spink	G. P. Hewitt	T. Hamling & Co., Ltd.	16.7.48
<i>St. Merriel</i>	J. H. Ellis	A. G. Phillips	J. M. Powell	Donaldson Line, Ltd.	
<i>St. Neetan</i>	A. Bankier	S. P. Fwing, C. Porteous, R. Anderson	P. E. Everett	Pacific Steam Nav. Co.	29.10.47
<i>St. Zeno</i>	D. W. Hutchinson	R. B. Bryant, W. P. Duguid, J. Owen	W. Bennett	Pacific Steam Nav. Co.	15.3.48
<i>Salacia</i>	A. G. Litherland	T. Hiatt, P. D. O'Driscoll, W. A. E. Johnston	H. MacKay	W. Thompson & Co.	22.7.48
<i>Salamanca</i>	J. Williams	A. Powell, R. Scaiff, L. H. Powell	P. Hale	Pacific Steam Nav. Co.	20.3.47
<i>Salmoner</i>	J. D. Wilson	J. T. Fyffe, J. Brown, E. H. Booth	E. P. Bishop	Cunard White Star, Ltd.	11.2.47
<i>Salmanco</i>	A. Lyall	C. Stewart, A. Long, E. Sleeman	R. H. Charlton	Eagle Oil & Shipping Co., Ltd.	22.1.48
<i>Samaria</i>	D. W. Sorrell	J. Ormerod, J. Hughes, W. Marshall	T. Barlow	Eagle Oil & Shipping Co., Ltd.	15.3.48
<i>San Adolfo</i>	E. J. Osborne, M.B.E.	D. L. Newton, J. H. Gay, C. F. Hudson	J. Clark	Eagle Oil & Shipping Co., Ltd.	19.5.48
<i>San Carlo</i>	M. A. Connell	M. M. Jones, Wright	C. L. Carpenter	Eagle Oil & Shipping Co., Ltd.	14.5.48
<i>San Felix</i>	I. B. Macarthy, O.B.E.	J. B. Hunter, R. B. McKenzie, B. S. Orange	I. W. Barry	Eagle Oil & Shipping Co., Ltd.	26.1.48
<i>San Valino</i>	H. C. Archer, O.B.E.	J. Dixon, J. Munday, W. D. Hepworth	W. Davitt	Pacific Steam Nav. Co.	12.7.48
<i>San Veronica</i>	R. M. Atkinson	J. J. Greener, R. Auric, R. Purvis	F. E. Jones		11.5.48
<i>San Vulfrano</i>	I. Thomson, O.B.E.	R. V. Hartley, H. Fortnam, G. Lawson	H. Moore	F. Leyland & Co., Ltd.	21.6.48
<i>Santander</i>	T. J. Naylor	H. Russell, J. E. Evans, D. T. Beamish	L. Varnen	Charante S.S. Co., Ltd.	27.10.47
<i>Sarmiento</i>	G. H. Rice	O. A. Baker, P. H. Ray, F. Nuttall	J. Lord	Charante S.S. Co., Ltd.	13.2.48
<i>Saxon Star</i>	D. J. Straeta	D. A. Van de Merwe, H. Tomsett, J. Reeve	R. Burrow	Silver Line, Ltd.	22.12.47
<i>Scholar</i>	D. Wolstenholm	K. P. Roberts	D. Hill	Silver Line, Ltd.	1.4.48
<i>Seythia</i>	R. Sell, Cdr.	D. R. Rosling, D. Johnson, C. Cooke	A. B. King	Silver Line, Ltd.	20.2.48
<i>Settler</i>	W. H. Slaughter	C. Rawlinson	J. Dunnert	Silver Line, Ltd.	18.2.48
<i>Settler</i>	R. F. Phillips	M. A. Patterson	M. G. Pearson	Rowland & Marwoods S.S. Co., Ltd.	8.3.48
<i>Silvercedar</i>	F. E. Godley	B. Stark, D. R. Tillstone, G. K. Harrison	H. Camp	P. & O. Steam Nav. Co.	21.2.48
<i>Silverguava</i>	J. Duncan	N. C. Jones, J. M. Evans, D. M. Lamont			
<i>Silveroak</i>	W. N. Tulloch	K. A. Wise, P. Whitaker, J. H. Crane			
<i>Silversandal</i>	E. Stark	J. McK. Batchen, P. Hildred, J. M. Beaumont			
<i>Silverteak</i>	C. J. Metcalf	C. A. Felgate, J. M. Evans, H. Rose			
<i>Silverwalnut</i>	J. H. Leask	W. J. Ross, G. G. Pegler, F. A. Ferguson			
<i>Sneaton</i>	W. Armstrong	E. Wilson, H. Williams, D. R. Crocker			
<i>Socotra</i>	C. F. Halliday	P. W. F. Holmes, F. W. M. Pearce, E. Cowan, E. Snowden			

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS	LAST RETURN RECEIVED
<i>Somerset</i> ..	P. S. Calcutt ..	R. Cramb, J. McNaughton, T. Johnstone ..	W. S. Hayes ..	Federal Steam Nav. Co., Ltd. ..	9.9.47
<i>Southern Collins</i> ..	D. Hunter ..	W. Scott, J. Jameson, E. G. Sutton ..	J. D. Todd ..	South Georgia Co., Ltd. ..	10.4.48
<i>Southern Garden</i> ..	W. J. Swanson ..	D. Wilson, J. Budge, A. Petrie ..	R. M. Corcoran ..	South Georgia Co., Ltd. ..	29.10.47
<i>Southern Opal</i> ..	J. O. Bowie ..	R. Jarrett, C. E. Dodds ..	D. V. McMurde ..	Socony-Vacuum Transportation Co., Ltd. ..	10.7.47
<i>Sovac</i> ..	H. Anthony ..	R. J. Abbott ..	W. Jacobson ..	Charente S.S. Co., Ltd. ..	10.11.47
<i>Speaker</i> ..	C. C. Heaton ..	J. Beam, C. Rawlinson ..	A. Rodger ..	Bibby Line, Ltd. ..	15.7.48
<i>Specialist</i> ..	L. F. Harriman ..	J. C. Priest, J. F. Carr, A. G. Thompson ..	N. Crossley ..	Stanhope S.S. Co., Ltd. ..	12.7.48
<i>Staffordshire</i> ..	P. H. Potter ..	R. Muir ..	J. M. Bannerman ..	Stanhope S.S. Co., Ltd. ..	10.7.48
<i>Stancourt</i> ..	F. H. Wainford ..	J. R. Sims, L. M. Davies, H. Brown ..	H. Oliver, M.B.E. ..	Union-Castle Mail S.S. Co., Ltd. ..	28.1.48
<i>Stanhall</i> ..	H. V. Wightman ..	E. L. Davies, R. S. Drew, L. B. Scott ..	P. Goss ..	Scottish Shire Line, Ltd. ..	20.4.48
<i>Stanthorpe</i> ..	R. G. Roberts ..	R. J. Taylor, R. Kerr, N. Deal ..	F. E. Ash ..	P. & O. Steam Nav. Co. ..	2.4.48
<i>Stirling Castle</i> ..	W. A. Pace, O.B.E. ..	A. S. Paethorpe-May, G. A. Winter, A. J. Rutherford ..	H. S. Horn ..	P. & O. Steam Nav. Co. ..	8.6.48
<i>Stirlingshire</i> ..	J. McCrone ..	M. H. D'aeth, R. L. Pigeon, J. Owen ..	G. Orniston ..	Federal Steam Nav. Co. ..	21.5.48
<i>Strathaird</i> ..	H. S. Allen, R.D., R.N.R. ..	J. W. Hamilton, R. M. Sinclair, M. H. Haggas ..	J. Turnham ..	Junecrest S.S. Co., Ltd. ..	6.2.48
<i>Stratheden</i> ..	S. W. S. Dickson ..	J. Wacker, N. Jenner, J. Wilson ..	J. McMahon ..	B. J. Sutherland & Co., Ltd. ..	2.4.48
<i>Strathnaver</i> ..	E. Lee ..	I. Davison, F. G. Bevis, P. Slocombe ..	R. L. Sinclair ..	Currie Line, Ltd. ..	31.3.48
<i>Suffolk</i> ..	H. E. Reilly, D.S.C., R.D., R.N.R. ..	T. L. Ison, J. E. Collins, P. Tate ..	T. I. Melville ..	Ropner S.S. Co., Ltd. ..	7.7.48
<i>Suncrest</i> ..	T. G. Barwell ..	A. L. Clemmet, R. Thwaites, R. Edgar ..	W. Hope ..	E. Leyland & Co., Ltd. ..	7.4.48
<i>Sutherland</i> ..	R. W. Nicolson ..	J. Pool, D. C. Thomas, A. Murray ..	P. J. Samfey ..	Charente S.S. Co., Ltd. ..	15.10.47
<i>Sutherland</i> ..	J. McClure ..	K. Jackson, R. Dunn, W. M. Fallon ..	F. Broomfield ..	Pacific Steam Nav. Co. ..	14.5.47
<i>Swainby</i> ..	J. E. Roddam ..	J. C. Davies, J. G. King, I. Mackintosh ..	L. Cottell ..	Shaw, Savill & Albion Co., Ltd. ..	2.4.48
<i>Sydney Star</i> ..	T. F. McDonald, O.B.E. ..	D. Bloom, D. A. Hancock ..	C. Forbes ..	Elder Dempster Lines, Ltd. ..	12.9.47
<i>Tactician</i> ..	A. Robertson ..	R. A. Mumford, D. I. Jones, J. Peters ..	L. Richardson ..	Ellerman's Wilson Line, Ltd. ..	26.2.47
<i>Talca</i> ..	A. Lyall ..	D. S. Thompson, P. J. Finan ..	D. E. Edmonds ..	Ocean S.S. Co., Ltd. ..	21.2.48
<i>Tamale</i> ..	C. H. Sweeney ..	T. de M. Ogier, N. E. Wood, C. C. D. Gough ..	J. C. Wilson ..	Royal Mail Lines, Ltd. ..	5.11.47
<i>Taranaki</i> ..	F. A. Smith ..	J. White, C. St. H. Webber, G. H. Griffiths, J. Fraser ..	G. Middleton ..	Northern Petroleum Tank S.S. Co. Ltd. ..	19.3.47
<i>Tarkwa</i> ..	W. C. Baxter ..	D. Martin, E. Laverack, P. Hudson ..	K. H. Brooks ..	Ellerman's Wilson Line, Ltd. ..	4.5.48
<i>Tasso</i> ..	H. Scarbrough ..	P. D. F. Cruickshank, R. H. Masters, R. P. S. Collins, E. Brown ..	G. Penketh ..	New Zealand S.S. Co., Ltd. ..	17.3.48
<i>Tekoura</i> ..	F. Sutton ..	R. J. Kistlen, T. A. Buckney ..	W. Butcher ..	Ulster S.S. Co., Ltd. ..	8.2.48
<i>Telamachus</i> ..	J. F. Webster ..	A. D. Lombard, H. Shaw, T. Shanks ..	D. Perks ..	Hain S.S. Co., Ltd. ..	24.6.48
<i>Teviot</i> ..	H. E. Sang ..	A. Ledger ..	I. Stewart ..	Hain S.S. Co., Ltd. ..	14.6.48
<i>Thamesfield</i> ..	D. A. Law ..	P. N. Jeans ..	W. Gardner ..	Charente S.S. Co., Ltd. ..	27.1.48
<i>Tinto</i> ..	S. H. Bennett, M.B.E. ..	J. Harper, A. Fee, D. D. Gault ..	F. Johnson ..	Royal Mail Lines, Ltd. ..	
<i>Tongatiro</i> ..	A. E. Williams ..	R. C. Clipson, R. Jameson, H. Davidson ..	W. H. Parkes ..	Britain S.S. Co., Ltd. ..	
<i>Torr Head</i> ..	M. Kennedy ..	C. Downes, W. R. Bulmer, E. L. Cussons ..			
<i>Toner Grange</i> ..	E. Fox ..	J. F. Males, R. B. Oliver, D. R. Jenkins ..			
<i>Tresillian</i> ..	M. G. Symons ..	W. Lawton, J. S. Jones, J. Adams ..			
<i>Trevaylor</i> ..	W. J. Spencer ..	I. W. Kavanagh, W. Bruce, J. C. Cotton ..			
<i>Tribesman</i> ..	A. Smart ..	D. A. Forrester, A. A. Walker, J. Kirby ..			
<i>Tweed</i> ..	C. E. Mason ..				
<i>Twitchenham</i> ..	W. D. Shields, O.B.E. ..				

<i>Umtata</i> ..	J. W. Miles ..	H. J. Thorn, H. K. Underwood, K. L. Carter ..	A. H. Coxhead ..	Bullard, King & Co. Ltd. ..	20.7.48
<i>Valacia</i> ..	W. L. P. Cox ..	J. D. Smythe, N. Jones, A. Hoyle ..	P. A. Hayes ..	Cunard White Star, Ltd. ..	13.12.47
<i>Vancouver City</i> ..	B. Carnaffon ..	F. English, M. J. Cleary, W. Rendall ..	A. C. Marshall ..	Reardon Smith Line, Ltd. ..	10.4.48
<i>Varadonia</i> ..	F. E. Pathe ..	O. F. Olson, J. Hughes, I. Stewart ..	W. C. G. Sturgess ..	Cunard White Star, Ltd. ..	14.6.48
<i>Vasconia</i> ..	G. S. Evans ..	R. H. Arnott, A. L. Davies, R. M. Graham ..	G. C. G. Reed ..	Cunard White Star, Ltd. ..	20.1.48
<i>Vestra</i> ..	D. S. Archibald ..	I. MacAlpine ..		J. T. Salvesen & Co. ..	
<i>Victrix</i> ..	E. Garnett ..	C. F. Lawrence ..		Henriksen & Co. ..	
<i>Vienma</i> ..	A. P. Sutton ..	E. Atkinson, J. A. Tully, W. B. Mardie ..	F. Howell ..	British Railways (Eastern Region) (Managers) ..	
<i>Vivien Louise</i> ..	G. McLeod ..	R. E. Garisch ..		British Oil Shipping Co. ..	28.12.47
<i>Volo</i> ..	A. Morrill ..	P. Shallicross, R. Massam, F. Johnson ..		Ellerman's Wilson Line, Ltd. ..	22.4.48
<i>Wainama</i> ..	T. T. Oliver ..	K. C. Davis, J. W. Paine, A. S. Masters ..	G. F. Cockledge ..	Shaw, Savill & Albion, Ltd. ..	28.1.48
<i>Wapawa</i> ..	W. G. West ..	G. Watkins, C. Carroll, R. Hamilton, A. Griffiths ..		Shaw, Savill & Albion, Ltd. ..	20.4.48
<i>Wairangi</i> ..	H. S. Cox ..	E. D. L. Harper, K. Hart, G. Lodge, D. Masson ..	W. Charlton ..	Shaw, Savill & Albion Co., Ltd. ..	7.3.48
<i>Waivera</i> ..	B. Forbes-Moffatt ..	J. G. Fairgrieve, J. L. Carroll, A. H. Baber ..	H. Jardine ..	Shaw, Savill & Albion Co., Ltd. ..	16.3.48
<i>Wanderer</i> ..	J. L. Curle ..	E. A. Clarke ..	G. Palmer ..	Charente S.S. Co., Ltd. ..	
<i>Warwick Castle</i> ..	J. Trayner ..	B. W. Mitton, A. M. McLean ..	Shaw ..	Union-Castle Mail S.S. Co., Ltd. ..	22.7.48
<i>Welshach</i> ..	I. Bywater ..	E. Holden ..		Wyre Steam Trawling Co., Ltd. ..	
<i>Winchester Castle</i> ..	L. P. Wilkie ..	A. Bruce ..	R. Brew ..	Union-Castle Mail S.S. Co., Ltd. ..	4.7.48
<i>Zett</i> ..	C. R. Hodder ..		T. Richardson ..	Elders & Fyffes, Ltd. ..	28.1.48
<i>Conway, H.M.S.</i> ..	T. M. Goddard, Capt., R.N.R. ..	The Senior Cadets ..	—	—	10.4.48
<i>Pangbourne Nautical College</i> ..	H. C. Skinner, O.B.E., Cdr. R.N. ..	The Senior Cadets ..	—	—	3.4.48
<i>Worcester, H.M.S.</i> ..	G. C. Steele, V.C., Capt., R.N.R. ..	The Senior Cadets ..	—	—	7.4.48

# FLEET LIST (New Zealand) VOLUNTARY OBSERVING SHIPS

The following is a list of observing ships, voluntarily co-operating with the Meteorological Service of New Zealand.

NAME OF VESSEL	CAPTAIN	OBSERVER	RADIO OFFICER	OWNERS
<i>Huia</i> ..	A. J. Matheson ..	B. R. Druce ..	G. M. Gormlie ..	Nobel (Australasia) Proprietary Ltd. ..
<i>Kaikorai</i> ..	G. S. Beaton ..	A. Mackay ..	B. G. Hart ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Kaitanga</i> ..	T. S. Nicol ..	E. W. Robb ..	L. M. Harvey ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Karetu</i> ..	W. E. Jones ..	D. H. Turnbull ..	A. E. Whalley ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Karitane</i> ..	G. Evans ..	J. C. Young ..	G. M. Throp ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Kauri</i> ..	A. T. Adam ..	E. Clark ..	W. A. Hawkins ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Komata</i> ..	F. Chapman ..	B. E. Avery ..	E. H. Ward ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Kopua</i> ..	A. F. Inman ..	E. R. Warner ..	W. A. Taylor ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Kuraw</i> ..	J. Holm ..	G. H. Edwards ..	A. J. Stanton ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Mamuka</i> ..	A. R. Russel ..	J. Hare ..		Capt. J. Holm and crew. ..
<i>Matua</i> ..	L. C. Boulton ..	E. F. Jenkins ..		Union S.S. Co. of New Zealand, Ltd. ..
<i>Maua Pomare</i> ..	H. S. Collier ..	A. Anderson ..		Government of New Zealand (Pacific Islands Admin.) ..
<i>Parir</i> ..	I. Keith ..	K. Mitchell ..		A. F. Watchlin. ..
<i>Port Waikato</i> ..	N. Worth ..	D. S. Brayshaw ..		Public Works Department. ..
<i>Rama</i> ..	W. Grey ..	J. K. West ..	J. G. Rea ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Waline</i> ..	C. Burgess ..	J. W. Keyworth ..	S. I. Waters ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Waipori</i> ..	F. W. Gibson ..		C. V. Hayes ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Waitaki</i> ..	W. Whitfield ..		E. L. Hulme ..	Union S.S. Co. of New Zealand, Ltd. ..
<i>Waitemata</i> ..	F. A. Barrett ..			Tasman S.S. Co. ..
<i>Whakahura</i> ..				

## FLEET LIST (Canada)

### VOLUNTARY OBSERVING SHIPS

The following is a list of observing ships voluntarily co-operating with the Meteorological Service of Canada.

NAME OF VESSEL	OWNERS
<i>Fort Amherst</i> .. .. .	Furness, Withy & Co.
<i>Fort Townsend</i> .. .. .	Furness, Withy & Co.
<i>Imperial Quebec</i> .. .. .	Imperial Oil, Ltd. (Marine Department).
<i>Imperial Toronto</i> .. .. .	Imperial Oil, Ltd. (Marine Department).
<i>Imperial Winnipeg</i> .. .. .	Imperial Oil, Ltd. (Marine Department).
<i>Lady Nelson</i> .. .. .	"Lady Nelson", Ltd. (Canadian National Steamships).
<i>Lady Rodney</i> .. .. .	"Lady Rodney", Ltd. (Canadian National Steamships).
<i>Victoria County</i> .. .. .	Acadia Overseas Freighters, Ltd.
<i>Waihemo</i> .. .. .	Canadian Union Line, Ltd.
<i>Waikawa</i> .. .. .	Canadian Union Line, Ltd.
<i>Wairuna</i> .. .. .	Canadian Union Line, Ltd.
<i>Waitomo</i> .. .. .	Canadian Union Line, Ltd.

## FLEET LIST (Hong Kong)

### VOLUNTARY OBSERVING SHIPS

The following is a list of observing ships, voluntarily co-operating with the Royal Observatory, Hong Kong.

NAME OF VESSEL	OWNERS
<i>Bris</i> .. .. .	China Siam Line.
<i>Caroline Moller</i> .. .. .	Moller's (Hong Kong), Ltd.
<i>Chak Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Choy Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Saga</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>E Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Fengtien</i> .. .. .	China Navigation Co., Ltd.
<i>Foochow</i> .. .. .	China Navigation Co., Ltd.
<i>Fuhsing</i> .. .. .	Chinese Maritime Customs.
<i>Fukien</i> .. .. .	China Navigation Co., Ltd.
<i>Hai Lee</i> .. .. .	China Siam Line.
<i>Hang Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Hanvang</i> .. .. .	China Navigation Co., Ltd.
<i>Hermelin</i> .. .. .	China Siam Line.
<i>Hin Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Hiram</i> .. .. .	China Siam Line.
<i>Hong Siang</i> .. .. .	Ho Hong Steamship Co., Ltd.
<i>Hunan</i> .. .. .	China Navigation Co., Ltd.
<i>Hunghsing</i> .. .. .	Chinese Maritime Customs.
<i>Hupei</i> .. .. .	China Navigation Co., Ltd.
<i>Junghsing</i> .. .. .	Chinese Maritime Customs.
<i>Kut Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Lot Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Mai Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Mei Shan</i> .. .. .	Standard-Vacuum Oil Co., New York.
<i>Nanchang</i> .. .. .	China Navigation Co., Ltd.
<i>Nellore</i> .. .. .	Eastern & Australian Steamship Co., Ltd.
<i>Newchwang</i> .. .. .	China Navigation Co., Ltd.
<i>Ninghai</i> .. .. .	China Navigation Co., Ltd.
<i>Pakhoi</i> .. .. .	China Navigation Co., Ltd.
<i>Poyang</i> .. .. .	China Navigation Co., Ltd.
<i>Shansi</i> .. .. .	Australian-Oriental Line, Ltd.
<i>Shengking</i> .. .. .	China Navigation Co., Ltd.
<i>Szechuen</i> .. .. .	China Navigation Co., Ltd.
<i>Tai Chung Shan</i> .. .. .	Shun Cheong Steam Navigation Co.
<i>Tai Ping</i> .. .. .	China Pacific Shipping & Trading Co.
<i>Tai Po Shan</i> .. .. .	Shun Cheong Steam Navigation Co.
<i>Tak Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Tehhsing</i> .. .. .	Chinese Maritime Customs.
<i>Wing Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Wo Sang</i> .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Yochow</i> .. .. .	China Navigation Co., Ltd.
<i>Yunhsing</i> .. .. .	Chinese Maritime Customs.

## MARID SHIPS

The following is a list of ships voluntarily observing and reporting 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	OWNERS
<i>Accrington</i> .. .. .	R. Good .. .. .	British Railways (Eastern Region).
<i>Actuality</i> .. .. .	J. Lewis .. .. .	F. T. Everard & Sons, Ltd.
<i>Adjutant</i> .. .. .	K. R. Nichols .. .. .	General Steam Nav. Co., Ltd.
<i>Alouette</i> .. .. .	L. G. Horsham .. .. .	General Steam Nav. Co., Ltd.
<i>Antwerp</i> .. .. .	R. V. Adams .. .. .	British Railways (Eastern Region).
<i>Ariosto</i> .. .. .	W. Hill .. .. .	Ellerman's Wilson Line, Ltd.
<i>Atlantic Coast</i> .. .. .	M. Fleming .. .. .	Coast Lines, Ltd.
<i>Baltraffic</i> .. .. .	F. Waldron .. .. .	Union Baltic Corporation, Ltd.
<i>Belhaven</i> .. .. .	R. L. Irvine .. .. .	London & Edinburgh S.S. Co., Ltd.
<i>Belravock</i> .. .. .	T. Wallace .. .. .	London & Edinburgh S.S. Co., Ltd.
<i>Belvina</i> .. .. .	J. Phillip .. .. .	London & Edinburgh S.S. Co., Ltd.
<i>Bury</i> .. .. .	J. L. Davison .. .. .	British Railways (Eastern Region).
<i>Cambria</i> .. .. .	A. Marsh .. .. .	British Railways (London Midland Region).
<i>Clyde Coast</i> .. .. .	G. Goldman .. .. .	Coast Lines, Ltd.
<i>Coldharbour</i> .. .. .	G. L. Hetherington .. .. .	Coastwise Colliers, Ltd.
<i>Coldridge</i> .. .. .		Coastwise Colliers, Ltd.
<i>Corfen</i> .. .. .	E. Allen .. .. .	Cory Colliers, Ltd.
<i>Corfleet</i> .. .. .	R. J. Barrow .. .. .	Cory Maritime, Ltd.
<i>Corfoss</i> .. .. .	A. Greiffenhagen, M.B.E. .. .. .	Cory Colliers, Ltd.
<i>Cormist</i> .. .. .	H. H. Horley .. .. .	Cory Colliers, Ltd.
<i>Cormoat</i> .. .. .	R. B. Armstrong .. .. .	Cory Colliers, Ltd.
<i>Crane</i> .. .. .	J. S. Lickis .. .. .	General Steam Nav. Co., Ltd.
<i>Denbigh Coast</i> .. .. .	E. C. Maddrell .. .. .	Coast Lines, Ltd.
<i>Drake</i> .. .. .	K. Carmalt .. .. .	General Steam Nav. Co., Ltd.
<i>Duke of Argyll</i> .. .. .	F. Ardern, D.S.C. .. .. .	British Railways (London Midland Region).
<i>Duke of Lancaster</i> .. .. .	J. Irwin, R.D., Cdr. R.N.R. .. .. .	British Railways (London Midland Region).
<i>Duke of Rothesay</i> .. .. .	H. Thompson .. .. .	British Railways (London Midland Region).
<i>Duke of York</i> .. .. .		British Railways (London Midland Region).
<i>Eastern Coast</i> .. .. .	R. E. Holt .. .. .	Coast Lines, Ltd.
<i>Eildon</i> .. .. .	W. Jeffrey .. .. .	G. Gibson & Co., Ltd.
<i>Explorer</i> .. .. .	J. Craig .. .. .	Scottish Home Department (Fishery Division)
<i>Falcon</i> .. .. .	Kelly .. .. .	General Steam Nav. Co., Ltd.
<i>Foreland</i> .. .. .		Currie Lines, Ltd.
<i>Goldfinch</i> .. .. .	W. Lockhart .. .. .	General Steam Nav. Co., Ltd.
<i>Granta</i> .. .. .	D. A. Hunter .. .. .	Granta S.S. Co., Ltd.
<i>Grebe</i> .. .. .	E. C. Painter, D.S.C. .. .. .	General Steam Nav. Co., Ltd.
<i>Guernsey Coast</i> .. .. .	F. Lucas, M.B.E. .. .. .	British Channel Islands S.S. Co., Ltd.
<i>Harrogate</i> .. .. .	C. H. Tully .. .. .	Wilson's & N.E. Railway S.S. Co., Ltd.
<i>Higawood</i> .. .. .	J. Coupland .. .. .	High Hook S.S. Co., Ltd.
<i>Hirondelle</i> .. .. .	R. Beattie, M.B.E. .. .. .	General Steam Nav. Co., Ltd.
<i>Isle of Guernsey</i> .. .. .	F. Front .. .. .	British Railways (Southern Region).
<i>Isle of Jersey</i> .. .. .	A. L. Light .. .. .	British Railways (Southern Region).
<i>Isle of Sark</i> .. .. .	C. E. Durley .. .. .	British Railways (Southern Region).
<i>Lairdsburn</i> .. .. .	J. McColl .. .. .	Burns & Laird Lines, Ltd.
<i>Lairdswood</i> .. .. .	I. McGuggan .. .. .	Burns & Laird Lines, Ltd.
<i>Lancashire Coast</i> .. .. .	J. B. Clarke .. .. .	Coast Lines, Ltd.
<i>Lapwing</i> .. .. .	K. R. Nicholls .. .. .	General Steam Nav. Co., Ltd.
<i>London Merchant</i> .. .. .	C. A. Piper .. .. .	London Scottish Lines.
<i>M.F.V. 1195</i> .. .. .	I. McCrae .. .. .	Scottish Home Department (Fishery Division).
<i>Mallard</i> .. .. .	H. Clayton .. .. .	General Steam Nav. Co., Ltd.
<i>Medway Coast</i> .. .. .	J. Richardson .. .. .	Coast Lines, Ltd.
<i>Melrose Abbey</i> .. .. .	J. Laverack .. .. .	Hull & Netherlands S.S. Co., Ltd.
<i>Mimma</i> .. .. .	T. Mather .. .. .	Scottish Home Department (Fishery Division).
<i>Moray Coast</i> .. .. .	D. Mercer .. .. .	Coast Lines, Ltd.
<i>Northern Coast</i> .. .. .		Coast Lines, Ltd.
<i>Ocean Coast</i> .. .. .	G. Mearns .. .. .	Coast Lines, Ltd.
<i>Otterhound</i> .. .. .	A. M. Kennedy .. .. .	Coastal Tankers, Ltd.
<i>Pass of Ballater</i> .. .. .	R. Reid .. .. .	Bulk Oil S.S. Co., Ltd.
<i>Persian Coast</i> .. .. .	T. Taylor .. .. .	Tyne, Tees S.S. Co., Ltd.
<i>Petrel</i> .. .. .	Kelly .. .. .	General Steam Nav. Co., Ltd.
<i>Plover</i> .. .. .	W. J. Tait .. .. .	General Steam Nav. Co., Ltd.
<i>Princess Maud</i> .. .. .	W. H. Hughes, D.S.C. .. .. .	British Railways (London Midland Region).
<i>Royal Daffodil</i> .. .. .	A. Paterson, D.S.C. .. .. .	General Steam Nav. Co., Ltd.
<i>St. Andrew</i> .. .. .		Fishguard & Rosslare Railway & Harbour Co.
<i>St. Julien</i> .. .. .	L. J. Richardson .. .. .	British Railways (Western Region).
<i>Salerno</i> .. .. .	J. B. Dunkley .. .. .	Ellerman's Wilson Line, Ltd.
<i>Scottish Co-operator</i> .. .. .	T. Robertson .. .. .	Scottish Co-operative Wholesale Society.
<i>Selby</i> .. .. .	A. W. Johnson .. .. .	Wilson's & N.E. Railway S.S. Co., Ltd.
<i>Slieve Bawn</i> .. .. .	J. Hughes .. .. .	British Railways (London Midland Region).
<i>Slieve Bearnagh</i> .. .. .	J. Irwin .. .. .	British Railways (London Midland Region).
<i>Slieve Bloom</i> .. .. .	F. G. J. Manning .. .. .	British Railways (London Midland Region).
<i>Slieve Donard</i> .. .. .	N. Lloyd-Williams .. .. .	British Railways (London Midland Region).
<i>Slieve League</i> .. .. .	V. S. Phillips .. .. .	British Railways (London Midland Region).
<i>Slieve More</i> .. .. .	R. Woodhall .. .. .	British Railways (London Midland Region).
<i>Smiling Morn</i> .. .. .	A. Adamson, M.B.E., Lt., .. .. .	
	R.N.R. .. .. .	The Captain.
<i>Southern Coast</i> .. .. .	W. Quirk .. .. .	Coast Lines, Ltd.
<i>Stork</i> .. .. .	C. Carr .. .. .	General Steam Nav. Co., Ltd.
<i>Supremity</i> .. .. .	S. F. Wilson .. .. .	F. T. Everard & Sons, Ltd.
<i>Tern</i> .. .. .	G. Thain .. .. .	General Steam Nav. Co., Ltd.
<i>Wandle</i> .. .. .	T. W. Corney, M.B.E. .. .. .	Wandsworth & District Gas Co.
<i>Welsh Coast</i> .. .. .	M. Fleming .. .. .	Coast Lines, Ltd.



## LIGHT VESSELS

The following Light Vessels voluntarily observe and report from coastal waters of Great Britain.

NAME OF VESSEL	MASTER
<i>East Goodwin</i> .. ..	A. Giblin
<i>Humber</i> .. ..	
<i>Newarp</i> .. ..	
<i>Royal Sovereign</i> .. ..	
<i>Shipwash</i> .. ..	H. L. Neale

## NOTICES TO MARINE OBSERVERS

### Postal Arrangements

The quarterly numbers of *The Marine Observer* are published on the last Wednesdays of December, March, June and September.

*The Marine Observer* is addressed to the Captain, S.S./M.V....., c/o the owners, and captains are requested to make their own arrangements for forwarding.

Shipowners, Marine Superintendents, and all concerned in the despatch of mails to ships abroad are asked to kindly facilitate the despatch and delivery of postal matter, received at their offices from the Meteorological Office and Air Publications and Forms Stores, to their ships abroad.

This matter, addressed to the captains of ships, contains information which is required for the conduct of meteorological work at sea, and is most effective if received by the captains at the earliest possible date.

Much of the information referred to is published in *The Marine Observer* and is of a seasonal nature. This journal also contains advice to observing ships which enables them to perform voluntary service by wireless communication for the benefit of all shipping.

### Ice Observation

Drifting ice, derelicts, and other floating dangers to navigation are reported by all means of communication at the disposal of the master.

See Appendix III, pages 106-108 of the *Marine Observer's Handbook*, Sixth Edition.

It is also desirable that more detailed information than can be given in a TTT wireless message should be available to the Meteorological Office for the purpose of research, and for the Admiralty Charts and Sailing Directions.

Marine observers will greatly assist by noting the conditions of ice, either drifting or fast.

For this purpose Form 912 is supplied direct to all observing ships plying in regions where ice may be encountered, and this form may be supplied to the captain of any British ship on application to a Port Meteorological Officer or Merchant Navy Agent.

Regular observing ships using the Trans-North Atlantic tracks are requested to send in these forms, not only when ice is encountered, but also

when they have passed through the ice region during the ice season without encountering ice. In this case a "nil" report should be returned, since it is desirable as far as possible, to determine when tracks have been clear of ice.

### **Return of Logbooks**

Owing to the need for strict economy in the use of paper, observing officers should endeavour to fill up their logbooks (Forms 911), before returning them to the appropriate Meteorological Service, except when insufficient space remains for the recording of observations during a further complete passage.

### **Great Britain**

#### **Transmission of Routine Wireless Weather Messages**

When in the reporting area "Great Britain" and transmitting weather messages through British shore stations, observing ships are requested, forthwith, to address their reports to "Weather Wire London" instead of to "Weather Telex Dunstable" as previously.

### **Hong Kong**

#### **Transmission of Routine Wireless Weather Messages**

When in the reporting area "Hong Kong" and unable to contact the detailed radio station Cape D'Aguilar (VPS), observing ships transmitting their messages via Singapore (GYL) are requested to address them to "Royal Observatory, Hong Kong."

### **Meteorological Services for Shipping**

Captains of British ships are requested to notify the Marine Branch of the Meteorological Office of areas in which meteorological services for shipping appear inadequate. Suggestions for the improvement of these services are always welcome.

## **TRANSMISSION OF WEATHER MESSAGES THROUGH DETAILED STATIONS**

When transmitting routine weather messages to Meteorological Services, observing ships are specially requested to transmit only through the radio stations detailed in Part II of the "Marine Observer's Guide."

When in a reporting area, messages should be transmitted *only through the radio stations appropriate to that area* (except when using Area Stations for short-wave transmissions).

Transmission of reports through stations other than those detailed, or through stations outside the appropriate reporting area may involve complications in the payment of telegraphic charges.

## THE NEW METEOROLOGICAL CODE (WASHINGTON, 1947)

Voluntary observing officers are reminded that a new meteorological reporting code, approved by the International Meteorological Organisation, will come into force all over the world on the 1st January, 1949.

An article on the code appeared on page 102 of the April, 1948, issue of *The Marine Observer*, and further notes will be found on page 222 of this number.

A "Special Replacement" to the *Marine Observers' Guide* (M.O. 477) and revised logbooks, Forms 911, incorporating the new code, will be issued to all voluntary observing ships in the near future.

## MARINE METEOROLOGY

### Co-operation of British Shipowners, Masters and Mates

Captains and officers of ships registered in Great Britain and Northern Ireland, who wish to co-operate regularly with the Meteorological Office, should apply to the appropriate Port Meteorological Officer or Agent.

In accordance with the International Convention for Safety of Life at Sea, the Meteorological Office arranges for a number of ships to record meteorological observations at specified hours, throughout their voyage, and to transmit coded observations, by wireless telegraphy, for the benefit of other ships and the various meteorological services.

Ships performing these voluntary duties are known as Observing Ships—the whole as the Voluntary Observing Fleet—and the captains and officers of these ships as the Corps of Voluntary Marine Observers.

The list of observing ships is published in *The Marine Observer*.

The quarterly *Marine Observer* is sent regularly to the captain of every observing ship, for the information and guidance of his observing and radio officers. The captains of observing ships are also supplied on request with charts and atlases, according to trade, as meteorological equipment.

To ensure the accuracy of data collected for the purpose of research and for weather forecasting, ashore and afloat, and to provide a pattern, which may be copied with advantage to all concerned for general use in merchant ships, sufficient tested instruments are lent by the Meteorological Office to the captains of observing ships.

Captains of observing ships are requested to return their Fair Logbooks (Form 911) when full, or when insufficient space remains for the recording of observations during a further complete passage, to the Meteorological Office.

Pages from the Coded Messages Record (Form 911A), when filled, or at the end of each voyage, should be detached, folded, and returned to the Meteorological Office.

The Port Meteorological Officers and Merchant Navy Agents inspect instruments quarterly, when possible, and they will replace, as necessary, any gear lent by the Meteorological Office. These officers will also check the accuracy of ships' barometers.

## GREAT BRITAIN—LOCAL WEATHER FORECASTS

Masters of ships and others interested in the movements of shipping and in the loading and discharging of cargo can obtain local weather forecasts from the forecast centre nearest to the port, free of charge.

The addresses and telephone numbers of the forecast centres nearest to the main ports of Great Britain are given below.

PORT	ADDRESS OF NEAREST FORECAST CENTRE	TELEPHONE NO.
Aberdeen	The Meteorological Officer, Dyce Airport, Aberdeenshire	Dyce 332. Ex. 70
Bristol	The Meteorological Officer, Bristol Airport, Whitchurch, Bristol	Bristol 26451. Ex. 22
Cardiff	The Senior Meteorological Officer, Overseas Aircraft Control, Royal Air Force, Eastern Avenue, Barnwood, Gloucester	Gloucester 4465/6/7. Ex. 110/1.
Dundee	The Senior Meteorological Officer, H.Q. No. 18 Group, Royal Air Force, Pitreavie Castle, Dunfermline, Fife	Edinburgh 20624, or Inverkeithing 264/5 or Dunfermline 1324. Ex. 118/9.
Falmouth	The Senior Meteorological Officer, H.Q. 19 Group, Royal Air Force, Mount Wise, Plymouth, Devon	Plymouth 61201 or 61101. Ex. 109/110.
Glasgow	The Meteorological Officer, Renfrew Airport, Renfrewshire	Renfrew 2352. Ex. 21/3.
Hartlepool	The Senior Meteorological Officer, Royal Air Force, Watnall, Nottingham	Nottingham 45731/5. Ex. 230/1.
Hull	The Senior Meteorological Officer, H.Q. No. 1 Group, Royal Air Force, Bawtry, Doncaster, Yorkshire	Bawtry 363/7. Ex. 6 and 100.
Inverness	The Senior Meteorological Officer, Royal Air Force, Raigmore, Inverness	Inverness 1853/8. Ex. 114/5/6/7.
Kirkwall	The Meteorological Officer, Hatston Airport, Orkneys	Kirkwall 421. Ex. 2.
Leith	The Senior Meteorological Officer, H.Q. No. 18 Group, Royal Air Force, Pitreavie Castle, Dunfermline, Fife	Edinburgh 20624, or Inverkeithing 264/5 or Dunfermline 1324. Ex. 118/9.
London	The Director, Meteorological Office, Air Ministry, Kingsway, London, W.C.2	Holborn 3434. Ex. 629.
Liverpool	The Senior Meteorological Officer, Speke Airport, Liverpool, 19	Garston 1240. Ex. 14.
Milford Haven	The Senior Meteorological Officer, H.Q. No. 19 Group, Royal Air Force, Mount Wise, Plymouth, Devon	Plymouth 61201 or 61101. Ex. 109/110.
Newcastle	The Senior Meteorological Officer, Royal Air Force, Watnall, Nottingham	Nottingham 45731. Ex. 230/1.
Plymouth	The Senior Meteorological Officer, H.Q. No. 19 Group, Royal Air Force, Mount Wise, Plymouth, Devon	Plymouth 61201 or 61101. Ex. 109/110.
Southampton	The Senior Meteorological Officer, Southampton Airport	Eastleigh 87222. Ex. 10.
Swansea	The Senior Meteorological Officer, Overseas Aircraft Control, Royal Air Force, Eastern Avenue, Barnwood, Gloucester	Gloucester 4465/6/7. Ex. 110/1.

## **NAUTICAL OFFICERS AND AGENTS OF THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE, GREAT BRITAIN**

Captains and observing officers of the Voluntary Corps of Marine Observers will always be welcomed at headquarters, where the Marine Superintendent will be pleased to show them how their observations are utilised in meteorological research and weather forecasting.

### **Headquarters**

Commander C. E. N. Frankcom, O.B.E., R.D., R.N.R., Marine Superintendent, Meteorological Office, Air Ministry, Headstone Drive, Harrow, Middlesex. (Telephone : Harrow 4331, Ext. 324.)

Commander J. Hennessy, R.D., R.N.R., Deputy Marine Superintendent. (Telephone : Harrow 4331, Ext. 323.)

### **Mersey**

Commander M. Cresswell, R.N.R., Port Meteorological Officer, Room 617, Royal Liver Building, Liverpool, 3. (Telephone : Central 6565.)

### **Thames**

Commander C. H. Williams, R.D., R.N.R., Port Meteorological Officer, Room 4, Ibex House, Minories, London, E.C.3. (Telephone : Royal 1721.)

## **AGENTS**

### **Bristol Channel**

Captain E. Hall, Room 120, Exchange, Mount Stuart Square, Cardiff Dock.

### **Clyde**

Captain W. W. Elliott, c/o Thomas Hastie & Son, 2-4 Tullis Street, Bridgeton, Glasgow. (Telephone : Bridgeton 3219.)

### **Forth**

Captain G. More, " Craigneuk ", Dechmont, West Lothian. (Telephone : Dechmont 19.)

### **Humber**

Captain R. E. Dunn, c/o Principal Officer, Ministry of Transport, Trinity House Yard, Hull.

### **Southampton**

Captain Sir Benjamin Chave, K.B.E., Royal Mail House, Southampton.

### **Tyne**

Captain F. B. West, Custom House Chambers, Quayside, Newcastle-on-Tyne. (Telephone : Newcastle 23203.)

## **OFFICERS OF THE METEOROLOGICAL SERVICE OF CANADA**

### **Headquarters**

Controller, Meteorological Division, Department of Transport, 315 Bloor Street W., Toronto, 5.

### **Halifax**

O.I.C. Dominion Public Weather Office, Room 111, 8 Harvey Street, Halifax, N.S. (Telephone : 3-8314.)

### **Saint John**

Mr. Francis N. Barnes, The Observatory, Saint John, N.B. (Telephone : 3-3500.)

### **Vancouver**

Mr. E. B. Shearman, 815 Bower Building, 543 Granville Street, Vancouver, B.C. (Telephone : PACific 3032.)