

*Cmdr. Marine Office*

M.O. 546

# The Marine Observer

*A quarterly journal of Maritime  
Meteorology*



Volume XXI    No. 154

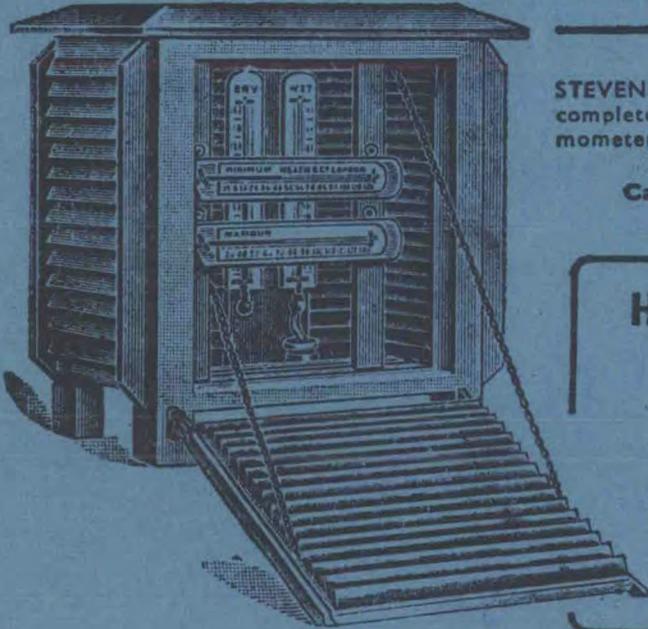
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# THE MARINE OBSERVER

A Quarterly Journal of Maritime Meteorology

prepared by the

Marine Branch of the Meteorological Office

VOL. XXI

No. 154

OCTOBER, 1951

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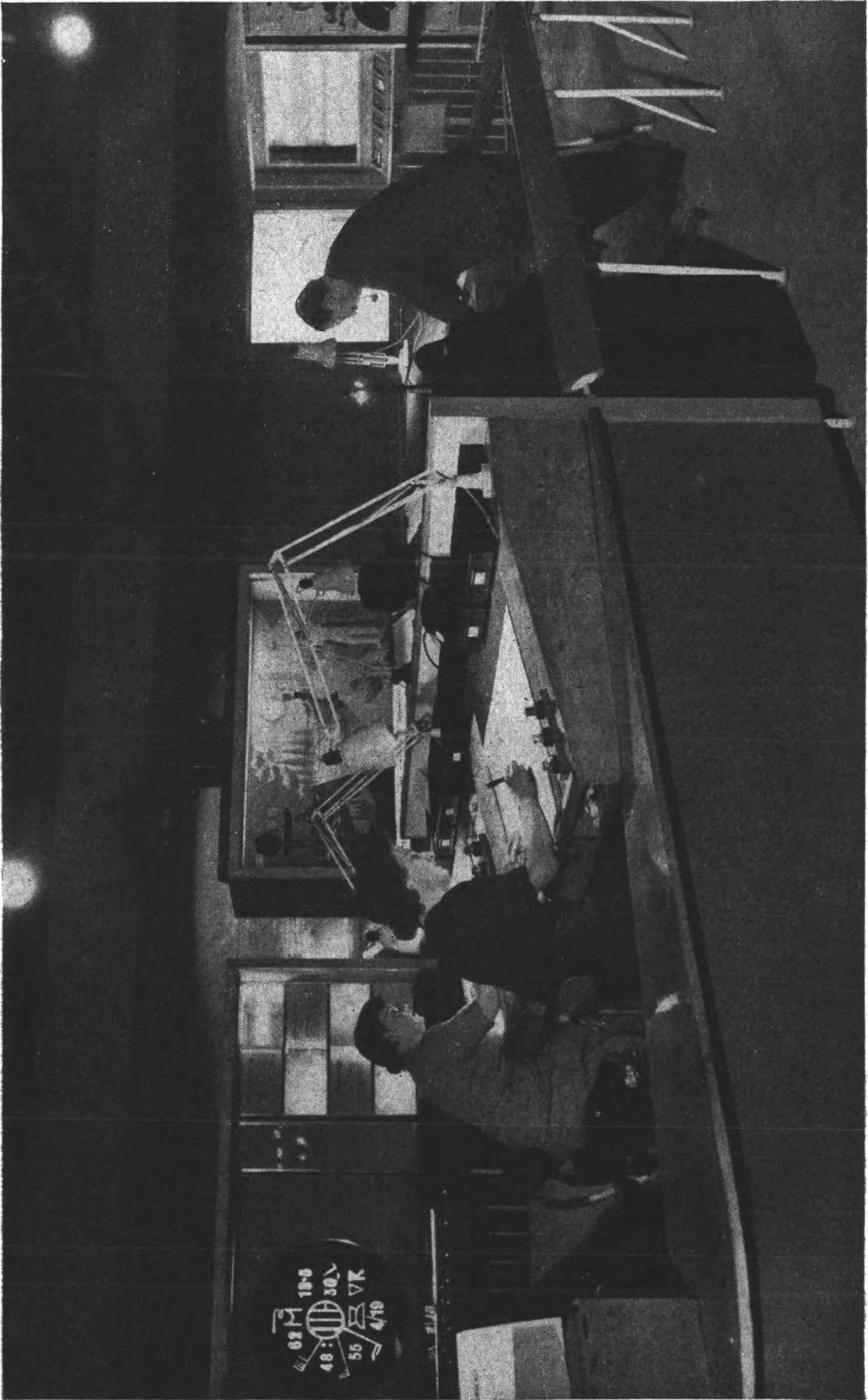
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**FORECASTING UNIT AT THE DOME OF DISCOVERY**

## EDITORIAL

To the mariner it is gratifying to note how many of the exhibits in the Dome of Discovery at the Festival of Britain Exhibition illustrate the great part that the sea and shipping plays in the life of this "tight little island". And it is not only in the Dome of Discovery that material of a maritime nature is displayed, for there is a large and comprehensive exhibit devoted entirely to Shipping and there are also a number of marine exhibits in the Transport section.

Britain has much to be proud of in her maritime achievements, not only in ship-building, ship-owning and in the general operation of ships, but also in voyages of discovery, in maritime research, and perhaps most of all in the personal skill of her seamen. All these points are brought out in the exhibition, but one rather wonders why, in view of the fact that the exhibition is largely for the purpose of interesting foreign visitors in British achievements, the description of the various items is not printed in some language other than English.

In the Dome of Discovery the professional seaman will find much to interest him, and not only that of a direct maritime nature, for there are many exhibits of such subjects as astronomy, meteorology, oceanography and exploration which are indirectly applied to his profession. In that section of the exhibition entitled "The Seas", the ancient and modern aspects of navigation, oceanography, hydrography, and shipping in general, are dealt with in a graphic manner. British maritime history is largely exemplified in the person of Captain Cook and his ship *Endeavour*, and there are some most interesting logbooks of his voyages as well as other relics. The controversial figure of Captain Bligh of the *Bounty* also figures quite prominently, and there is a logbook of the East India Company of the mid-seventeenth century. A seaman's "Grammar" of 1679 is open at a meteorological page which defines winds of various strengths, including the "hurricane".

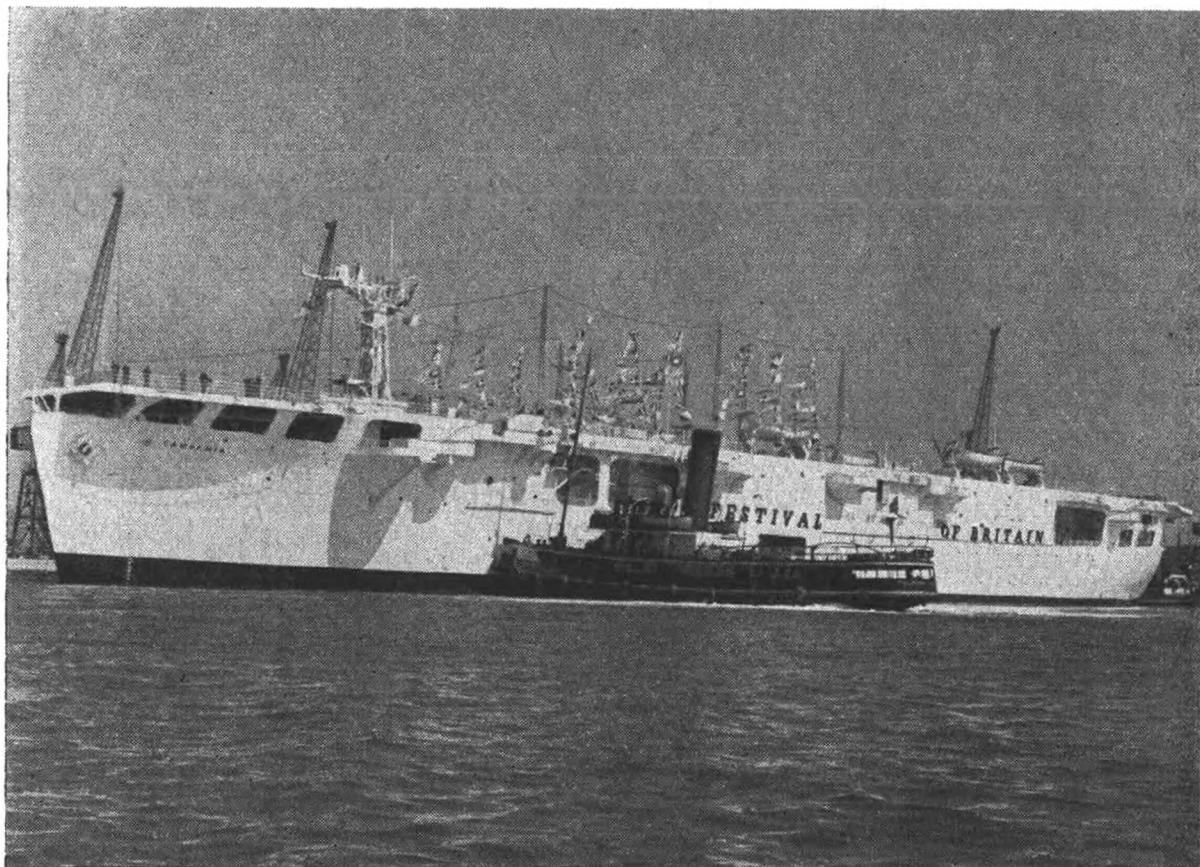
Oceanography is perhaps the most comprehensive of the marine exhibits, embracing as it does whales, plankton, typical fish living at various depths in the ocean, the generation of ocean waves, and the general work of research ships from *Challenger* to *Discovery II*.

Exhibits of navigational interest are found in various sections of the exhibition and vary from ancient charts to electronic aids such as Decca and Radar. Perhaps the most intriguing exhibit in the whole exhibition is that of the solar system, which shows against a pitch black background the movements of the sun and the various planets and their satellites, so arranged that the model performs in one minute what the solar system does in a year.

The realm of meteorology is comprehensively covered, and as one wanders round the various sections of the exhibition the important role that this "study of the atmosphere" plays in our lives is brought home again and again. From the ionised layers of the upper atmosphere and their practical influence upon the path of radio waves to modern forecasting technique and the application of climatological data to our daily lives, a fascinating meteorological panorama is brought before us. The great contribution that merchant shipping makes in providing information about the weather in the oceanic three-quarters of the globe is by no means lost sight of.

A special section of the exhibition is devoted to the whole subject of meteorology. A tempest prognosticator of the 1851 Exhibition—a delightful

Victorian creation covered with brass “baubles”—whose operation depends upon the activities of live leeches in glass jars together with a copy of a weather map of that date, give an historical introduction. Illuminated wall-maps show the ramifications of the modern weather reporting system—ranging from ships in the Atlantic to stations in Eastern Europe—and how the data concerned are used in building up a weather forecast. Other maps and drawings show simplified weather systems and illustrate the practical use to which climatological data is put for industry, research and other purposes. Instruments on view range from the simple thermometer screen to the Radio-sonde and (“Sferics”) Thunderstorm Detector. Maritime meteorology has a section all to itself, which includes an illuminated map showing the position of British Selected Ships on a given day, a model of an Ocean Weather Ship, and several photographs.



F.S. *Campania*

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The Festival Ship *Campania*, formerly an aircraft carrier, has visited ten of Britain's major ports during the summer. The display on board was similar to the South Bank Exhibition in miniature, there being room for 2,500 visitors at any one time

Completing the meteorological picture there is a “live” forecasting unit at work. To charm the eye of the susceptible male visitor, two elegant and attractive young *meteorologistes* plot on a chart for the attendant forecaster the current weather of European and North Atlantic areas, including reports from Selected Ships and Weather Ships in the Atlantic. The observations come in direct to the exhibition by teleprinter from Dunstable. The visitor

can discuss details of the weather map with the forecaster, and for a modest sum a souvenir weather map with the day's forecast, prepared and reproduced in full view of the visitors, can be bought. The number of ships shown on the map is not usually very great, for it extends only out to about 15°W and weather messages from ships, by the time they reach the exhibition, tend to be a bit late to show on the souvenir map, which has to be printed early each day. On the main map, however, from which the forecast is made, the visitor will find that the North Atlantic is quite well covered with ship reports, and there is little doubt that the forecaster will confirm how vital these are for the compilation of the forecast. Quite a few ships' officers have in fact discussed these questions with the forecaster at the exhibition.

As one watches the deft hand of the plotter as she transfers a mass of figures from a teleprinter message to a symbolic form on the map, and the facile way she moves from station to station, plotting observations that were only made an hour or so before, one realises how much the meteorologist depends upon speedy communications and international co-operation.

The world-wide nature of maritime meteorology is illustrated again in the polar section of the exhibition where there is a model of a modern Antarctic weather station. Alongside this exhibit is a map of the Antarctic, illustrating the enormous value to the meteorologist in that area of radio weather messages from shipping.

#### MARINE SUPERINTENDENT.

*Note.*—The Festival of Britain Exhibition closed on 30th September. This editorial was written while the exhibition was still open and when its closing date was uncertain.

#### SPECIAL LONG-SERVICE AWARDS TO MARINE OBSERVERS

It has recently been the practice of the Director to make a special award each year to certain voluntary marine observers for long and meritorious work at sea on behalf of the Meteorological Office. This year the Director has been pleased to make this special award to the following captains:

Captain R. D. ECKFORD (Pacific Steam Navigation Co.). A voluntary observer since 1924. Of 69 logs submitted, 59 have been classed excellent.

Captain W. J. FITZGERALD (Cunard Steamship Co. Ltd.). Since 1920 we have received 81 logs from him of which 52 have been classed excellent.

Captain C. R. PILCHER (New Zealand Shipping Co. Ltd.). First commenced to observe in 1923. Has submitted 29 logs, of which 22 have been classed excellent.

Captain H. G. WHITTLE (Royal Mail Lines Ltd.). Has been observing for us since 1920. A total of 41 logs have been received, 18 of which have been classed excellent.

The award will, as in past years, be in the form of a suitably inscribed barograph.

We congratulate these captains on this recognition of their voluntary work over many years. They will be personally notified of the award and of the arrangements which will be made for its presentation. EDITOR.

# The Marine Observers' Log



**OCTOBER, NOVEMBER AND DECEMBER**

*The Marine Observers' Log* is a quarterly record of the most 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.

## **TIDE RIP**

### **Indian Ocean**

M.V. *Devonshire*. Captain A. Beharrel. Liverpool to Hong Kong. Observer, Mr. P. L. Armstrong, 2nd Officer.

23rd November, 1950, 1330 L.T. With Dondra Head Lighthouse bearing  $360^\circ$ , distance 6 miles, a strong tide rip, extending to the horizon on the southern side and to close inshore on the northern side, was observed. The general line of the tide rip was  $120^\circ/300^\circ$  and the course of the ship was  $090^\circ$ . The ship's head swung to starboard and the speed dropped from 16 to 13.5 knots when passing through the rip. A strong S'yly set was also encountered. All positions were obtained by reliable shore bearings.

Position of ship:  $5^\circ 49'N$ ,  $80^\circ 36'E$ .

## **LINE OF DEMARCATION**

### **Gulf of Panama**

M.V. *Rangitata*. Captain G. Kinnell, O.B.E. Balbao to Cape Mala. Observer, Mr. G. Pool, 3rd Officer.

16th December, 1950, 1627 G.M.T. The vessel crossed a well-defined line running approximately N/S separating water of different colours. Westward of this line the water was a pale muddy colour and quite smooth, whereas to the east it was deep blue and broken by small wavelets. Echo sounding gave a depth of 54 fathoms, the sea temperature being constant at  $81^\circ F$ . Between 1630 and 1715, numerous pronounced current rips were observed running in a general N/S direction. Each of these rips held a large collection of driftwood, branches of trees, etc., whereas the intervening patches of water were free from flotsam of any kind.

From 1406, when Bona Island Lighthouse bore  $279^\circ(T)$  at 4.2 miles, until 1803 when Cape Mala Lighthouse bore  $285^\circ$  at 12.4 miles, the vessel experienced a current setting  $180^\circ$  at 0.9 knots. Wind NW force 3; air temp.  $81^\circ$ . Course  $195^\circ$ , speed 17 knots.

Position of ship:  $7^\circ 56'N$ ,  $79^\circ 41'W$ .

## Indian Ocean

M.V. *Clan Macdougall*. Captain P. MacMillian. Mombasa to Fremantle. Observer, Mr. J. R. Molyneux, 2nd Officer.

5th October, 1950, 0500 G.M.T. The vessel passed through a pronounced line of current demarcation stretching from horizon to horizon in a SSE/NNW direction and causing the ship to sheer to starboard. The sea temperature rose from 60°F to 65° across the line and 8 miles farther east read 66°. The wind was 190° force 2 with a moderate SSW swell. Course 088°.

Position of ship: 32° 09'S, 106° 29'E.

## DISTURBED WATER

### North Atlantic Ocean

R.R.S. *William Scoresby*. Captain A. F. Macfie, O.B.E.; R.N.R. Freetown to Plymouth. Observer, Mr. M. R. B. Hawkins.

4th November, 1950, 1515 G.M.T. A line of disturbed water about 5 miles in length and 50 yards in width was observed lying in a direction approximately parallel to the ship's course. It progressed bodily to the NE and on crossing the ship's course was seen to consist of small white-topped wavelets such as are found in strong tidal waters. No current of any strength was felt during the day's steaming, and the sea was smooth with a low SW'ly swell. Course 298°. Speed 8 knots.

Position of ship: 10° 18'N, 16° 36'W.

## DISCOLOURED WATER

### South Atlantic Ocean

S.S. *Waimana*. Captain C. L. Carroll, D.S.C., R.D., R.N.R. Liverpool to Durban. Observer, Mr. J. B. Hunt, 3rd Officer.

22nd October, 1950, 0800 G.M.T. A line of discoloured water was observed running 120°/300°. It was about 30 ft. in width, mixed brown in colour, and stretched, as far as could be discerned, about two miles. Moderate sea and swell. Wind 140° force 5; air temp. 63°F; sea temp. 65°.

Position of ship: 17° 03'S, 3° 58'E.

M.V. *Port Pirie*. Captain F. W. Bailey, M.B.E. Las Palmas to Capetown. Observer, the Master.

22nd November, 1950, 1615 G.M.T. Silvery streaks were observed in the water, appearing to consist of quantities of silver sand borne by the current. The main area covered about one square mile and lay in a N/S direction.

Position of ship: 15° 26'S, 2° 38'E.

*Note.*—This observation was brought to the notice of the P.M.O. at Cape Town; who stated that on the 20th November at about 0000 he had felt tremors, as from an earthquake. It is suggested that there may have been some connection between the two phenomena.—(Mr. W. A. Wakefield, 3rd Officer.)

### Arabian Sea

M.V. *British Escort*. Captain H. H. Burke. Abadan to Suez. Observers, Mr. R. W. Clarke, 3rd Officer and Mr. K. D. Curtis, 2nd Officer.

26th October, 1950, 0900 G.M.T. Patches of reddish-brown water were observed extending over a large area from the coastline. The wind was light to moderate SSW and the sea was calm. Air temp. 83°F; wet bulb 75°; sea 83°. Course 180°, speed 11 knots.

Position of ship: 22° 30'N, 59° 53'E.

### PHOSPHORESCENCE

#### Off the west coast of Africa

S.S. *Scholar*. Captain D. Wolstenholme. Lobito Bay to Durban. Observer, Mr. D. Bloom, 2nd Officer.

11th December, 1950, 0000 to 0300 G.M.T. Patches of phosphorescence of varying luminosity were seen during this period. Some of the patches were observed at quite appreciable distances from the vessel, gradually growing brighter as they were approached more closely. The areas themselves were not large, seldom exceeding 20 ft. in diameter. During the previous two hours the sea temperature had dropped from 74°F to 65°. The wind was SW force 2. Air temp. 66°.

Mid position of ship: 16° 30'S, 11° 24'E.

### TROPICAL STORM

#### Gulf of Tehuantepec

S.S. *Corrientes*. Captain W. Anderson. Panama to Los Angeles. Observers, Mr. R. MacAuley, Ch. Officer, Mr. J. H. Stark, 2nd Officer, and Mr. D. B. Kangwell, 3rd Officer.

3rd October, 1950, 1800 G.M.T. Position: 13° 44'N, 92° 32'W. Wind SSW force 4. Dry 77°F, wet 76°, sea 83°. Barometer 1009.4 mb., unsteady.

1900: Sky overcast with low St. Wind variable W'ly, force 3, decreasing. Sea confused.

2200: Wind SSW force 6, increasing. Barometer 1006.0, beginning to fall rapidly. Heavy confused sea and swell. Continuous heavy rain.

2300: Wind W'S force 11. Barometer falling rapidly. Heavy confused sea and swell. Torrential rain. Visibility near zero.

0001: Wind W'ly force 10. Barometer 999.8 having fallen 7 mb. in the previous three hours. Dry 74°, wet 74°, sea 83°. Torrential rain, visibility near zero.

0020: Position: 14° 00'N, 93° 21'W. Wind decreased to light variable. Heavy confused sea and swell.  $\frac{1}{8}$  blue sky visible, moving NE'ly. Barometer rising rapidly.

0045: Wind hauled to NNE and increased to force 10. Sky again overcast with torrential rain squalls.

0100: Wind NE force 10. Barometer 1000.0, dry 72°, wet 72°, sea 83°.

0140: Wind NE force 10. Barometer 1005.0, rising rapidly.

0400: Wind NNE force 6. Barometer 1008.0, dry 76°. Barometer rising less rapidly. Squally.

0600: Position: 14° 20'N, 94° 00'W. Wind NNE force 6, decreasing. Barometer 1008.2, dry 76°.

The wind backed during the next four hours to W'N, force 5, with occasional torrential rain squalls with the wind reaching force 8.

*Note.*—Tropical storms visit this coast occasionally, chiefly in the autumn but also in summer. They are sometimes severe. These storms are known locally as "Cordonazo de San Francisco" from the festival of St. Francis on October 4th. As a rule, the diameters of these storms are less than those of the majority of Atlantic hurricanes, and they are sometimes as little as 50 miles across, or less. Occasionally a storm of much greater dimensions occurs on the west coast of Mexico; that of August 1899, had a diameter of 500 miles.

## TYPHOON

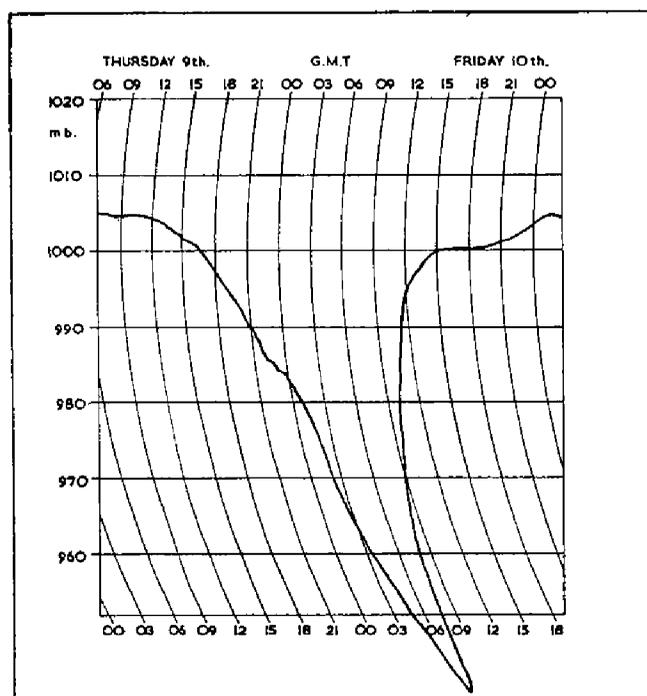
### Pacific Ocean

*M.V. Cingalese Prince.* Captain J. D. Fraser. Kuri to Hong Kong. Observer, Mr. K. Slapp, 3rd Officer.

9th November, 1950. Noon position  $25^{\circ} 26'N$ ,  $127^{\circ} 08'E$ . The wind having blown steadily from NE for 24 hours came quickly round to E and increased from force 3 to 6. The weather was overcast and frequent heavy rain squalls began. Course  $228^{\circ}(T)$ . By midnight, heavy continuous rain reduced visibility and the steadily increasing wind was blowing from E'N. Bar. 1001.0 mb. Temperature  $77^{\circ}F$ . From midnight the barometer began to fall rapidly and the wind increased from force 6 to 10. The seas were turbulent and mountainous with thick spindrift. The vessel was hove to.

4 a.m. on the 10th (1930 G.M.T. on the 9th). Bar. 994.3 mb. Temperature  $77^{\circ}$ .

8 a.m. Bar. 983.3 mb. Temperature  $76^{\circ}$ . Wind had increased to maximum of force 12, estimated 130 to 140 knots and maintained this velocity.



Noon. Bar. 959.0 mb. No change in weather conditions.

1 p.m. Bar. 953.0 mb.

2 p.m. Bar. 947.0 mb.

2.30 p.m. (0600 G.M.T.). Bar. 942.0 mb. Vessel passed into centre of typhoon "Clara". Up to ten minutes before the wind had maintained full hurricane force.

In the storm centre there was comparatively little wind but there were confused, mountainous seas. The vessel was brought up to  $140^{\circ}$  and hove to. The sky was overcast with slight rain.

2.45 p.m. In the short space of 15 minutes the wind came round from NE through N to NW and steadily increased in force as the centre moved along its track.

4 p.m. (0730 G.M.T.), Bar. 948.8 mb. rising rapidly. Temperature  $76^{\circ}$ . Wind over force 12. Heavy continuous rain.

5 p.m. Bar. 967.0 mb.

8 p.m. Bar. 992.0 mb. Wind W'ly force 10.

10 p.m. Bar. 997.2 mb. Wind W'ly force 8.

Midnight on the 10th. Wind W force 6, good visibility. Passing showers, rough sea.

The barograph trace gives a good indication of the steep gradients producing the phenomenal winds. It was noted that in the centre the cloud layer was moving in an E'ly direction and gave a good indication as to the future change of wind direction although a comparative calm was being experienced.

## TWIN CYCLONE

### Mozambique Channel

T.S.S. *Clan Campbell*. Captain J. McCrone. Beira to Mombasa. Observer, the Master.

23rd December, 1950. We sailed from Beira at 2330 G.M.T. At 1200 on the 24th, a cyclone warning was received from Beira radio which stated that a storm centred at  $12^{\circ}\text{S}$ ,  $41^{\circ}\text{E}$ , pressure 1003 mb., was moving to the W at 8 knots and weakening.

During the 25th the barograph kept at about 1015 mb. and the diurnal range was normal, but the wind had been freshening from ESE to E'S all night and at 0700 it was decided to unship the ventilators fore and aft and generally make the ship snug. At 0900 the barograph began to fall, reaching 1015 mb. at 1600, when the wind was E'S, force 7, and the temperature  $80^{\circ}\text{F}$ . The sky had been rather overcast all afternoon and there was an increasingly heavy swell from the north. At about 1700, however, the barograph began to rise slightly and the sky cleared to a point where it was possible to see moonlight through the clouds. There was also a distinct lull in the wind force, the direction remaining steady at about E'S. At 1940, course was altered to  $360^{\circ}(\text{T})$ , and a radio message was received from Mozambique which stated that a tropical cyclone, apparently divided into two cells, existed in the Mozambique Channel. One centre was said to be in  $17^{\circ}\text{S}$ ,  $41^{\circ}\text{E}$ , and the second in  $10^{\circ}\text{S}$ ,  $42^{\circ}\text{E}$ . Pressure at the southern centre was 1000 mb. and at the northern 1003 mb. The ship at this time was in  $15^{\circ} 15'\text{S}$ ,  $42^{\circ} 10'\text{E}$  and therefore by all accounts between the trouble points.

At 2000 it became evident that we were much closer to the northern centre than we had estimated from the last radio message. From 2100, the barograph plunged downwards and the wind increased, first to a full gale then to storm force, until by 2300 it was blowing a hurricane. Visibility became nil and a towering swell was coming down on the ship from the north. Between 2330 and 0030 on the 26th, pandemonium broke loose. The wind was

screaming and howling and the surface of the ocean was being torn up by the wind and hurled across the vessel. All that could be seen from the bridge was towering combers with huge rolling tops in the rays of the foremast light. The wind was still E'S but the dangerous sea was coming down ahead. Then quite suddenly at 0030 the wind dropped, the sky cleared and the moon came out. The roar of the storm could be heard from all quarters, but the ship was in a calm with a huge sea all around. Myriads of insects came on board as did numerous sea birds. The latter seemed quite exhausted and died in a very short time. At daylight (0200) the wind began to puff from WNW and the noise of the storm could be heard coming along from that direction. From this time until 1700 we experienced the same story in reverse. During the height of this phase, fish resembling sardines were being picked up by the wind and smashed against the plate glass windows of the wheelhouse, so violently as to be disembowelled. The barograph began to rise as fast as it dropped in the first place, so that by 0730 the first lull came and by 1030 the weather was quiet enough to proceed at full speed.

At the beginning of the storm, in co-operation with the Chief Engineer, a speed was searched for in revolutions, which would give the ship steerage with as little headway as possible. The ship was loaded with 4,000 tons of copper and 1,000 tons of general cargo and her draft was 23 ft. forward and 24 ft. aft. Revolutions for 10 knots proved successful and throughout the storm the ship faced up to the weather perfectly and sustained only very superficial damage about the decks.

## WATERSPOUTS

### Mediterranean Sea

S.S. *Matheran*. Captain H. E. MacGregor. London to Port Said. Observers, the Master and Mr. R. F. Holland, 3rd Officer.

17th October, 1950, 0950 G.M.T. A bank of large Cu extended from E through S to SW. A large waterspout, extending from the cloud base to the sea, was observed to the SSE until a rain squall, advancing from the E and moving slowly across the horizon, engulfed it. Three further spouts about 5° apart, the last one bearing due S, were observed and as the rain squall passed each spout in turn disappeared. Air temp., 73°; wet bulb 68°; wind E'N force 2; barometer 1022.9 mb.

Position of ship: 35° 36'N, 17° 12'E.

M.V. *Kenilworth Castle*. Captain L. H. Farrow. Alexandria to Barcelona. Observer, Mr. D. B. Ross, 3rd Officer.

4th December, 1950, 0600 G.M.T. Numerous waterspouts were observed, one of which passed within a few feet of the ship. Some were as much as 50 ft. in diameter and as many as six were seen at one time. The cloud consisted of 7/8 Cu, Cb and Fb, from which the spouts descended to the sea with very strong spiral winds in the vicinity and water rising from the sea surface. Some light to moderate rain showers had occurred previously.

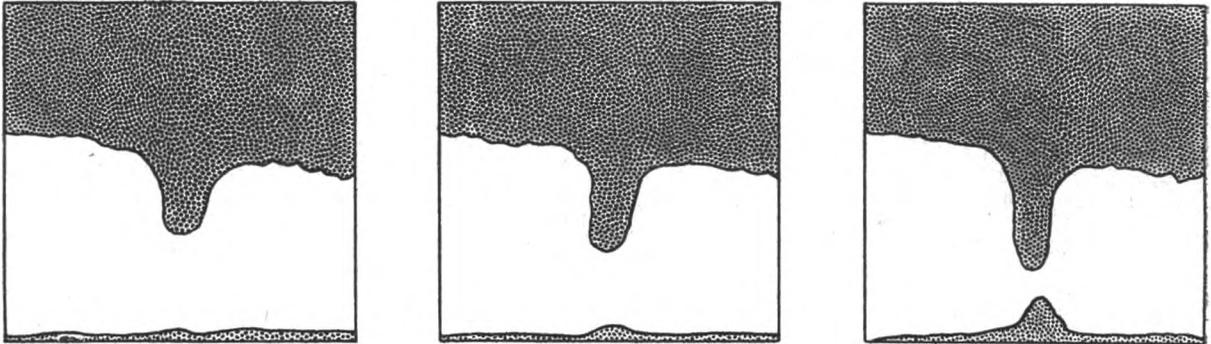
Wind 280° force 3; barometer 1011.7 mb; air temp., 66°F; wet bulb 63°.

Position of ship: 31° 14'N, 29° 36'E.

## Indian Ocean

S.S. *Empire Martaban*. Captain E. Pleasance. Lourenço Marques to Aden. Observer, Mr. W. Mottram, Chief Officer.

21st October, 1950. From the base of a massive Cb, about four miles on the starboard beam, a broad, pointed tongue of cloud slowly reached downwards. After about four minutes the tongue reached two-thirds of the way down from the cloud base to the sea, which appeared to be raising a rather thinner tongue to meet it. The upper tongue was perfectly straight and vertical.



After being almost in contact for two minutes the lower tongue subsided while the upper tongue appeared to be withdrawn into the cloud. From the first appearance of the upper tongue to its re-absorbence into the cloud a period of twelve minutes had elapsed.

The sky was  $\frac{7}{8}$  covered with Cu and Cb, base 2,500 ft. There was no wind and the sea was glassy with a very slight NE'y swell.

Position of ship:  $10^{\circ} 15'S, 42^{\circ} 51'E$ .

## MIRAGE

### West Coast of Africa

S.S. *Clan Chattan*. Captain E. N. Stone. Liverpool to Dakar. Observer, Mr. R. S. Schooling, 3rd Officer.

27th October, 1950, 1110 G.M.T. Land was observed 4 points on the port bow, course  $179^{\circ}(T)$  and then gradually appeared between  $134^{\circ}$  and  $100^{\circ}$ . It appeared as a clear and distinct coastline to the naked eye, showing sand-dunes and odd clumps of what appeared to be either bushes or trees. At the same time two fishing trawlers were sighted on the same bearing, both appearing to be two or three times their normal size. The phenomenon was apparently some 6 to 7 miles away.

At 1120, the coastline split up into sections, changed shape somewhat and then faded away, leaving only the two trawlers which were hardly distinguishable to the naked eye. During this time the Echo Sounder recorded no bottom. The land on the  $134^{\circ}$  bearing was measured from the chart as some 91 miles away and that on the  $100^{\circ}$  bearing as some 87 miles. The weather at the time was cloudy with  $\frac{6}{8}$  Cu and Ac. Air temp.,  $76^{\circ}F$ ; wet bulb,  $71^{\circ}$ ; sea  $73^{\circ}$ .

Position of ship:  $20^{\circ} 30'N, 17^{\circ} 45'W$ .

## ABNORMAL REFRACTION

### Entering English Channel

M.V. *Brittany*. Captain H. A. Wright. Kingston to London. Observer, Mr. B. A. Wood, 3rd Officer.

15th October, 1950, 1800 G.M.T. The visibility was exceptional under a uniform layer of St. The loom of Lizard Head light was seen clearly at 52 miles, the range of the light being 21 miles. The wind was SSW force 3. Air temp., 56°F; sea, 58°.

Position of ship: 48° 48'N, 5° 38'W.

### Red Sea

M.V. *Sutherland*. Captain R. W. Nicolson. Suez to Aden. Observers, the Master and Mr. G. Galloway, 2nd Officer.

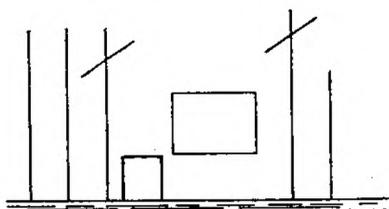


Fig. 1

6th December, 1950, 1035 G.M.T. Five masts and two funnels were seen on the horizon, bearing 170°. (See Fig. 1.) Ten minutes later only one very broad funnel was seen and the two yard arms as shown in fig. 1 were no longer apparent. What appeared to be the forecastle head was observed forming a ridiculous angle with the foremast (see fig. 2). Shortly after this



Fig. 2

the hull came into sight and the vessel was seen to be of the "goalposter" type. It was estimated that the vessel was first seen at a distance of over 30 miles. Air temp., 75°F; wet bulb, 61°; sea, 78°. Wind 060° force 2.

Position of ship: 26° 30'N, 34° 48'E.

### North Pacific Ocean

S.S. *Lake Manitou*. Captain C. F. Atree. San Pedro to Moji.

10th-20th December, 1950. In 33° 30'N between 175°W and 145°E, it was found that the sun sights were not agreeing at all well with the morning and evening star sights.

In all cases the stars put the vessel to the south and east of the sun positions by from 5 to 12 miles. All sights were carefully taken, on apparently good horizons, by two observers. Stars all crossed well with the exception of Polaris, which at times gave a latitude about 5 miles, always to the north, of the cross by other stars.

From this it would seem that excessive refraction was being encountered during the day, at twilight, or at both times. (By the time the vessel made the landfall in  $140^{\circ}\text{E}$  sights were agreeing again, so it was not possible to tell for sure which was the more correct.)

*Note.* It is unfortunate that no meteorological observations are available as this makes it impossible for us to investigate whether the difference between the sights was really due to refraction, as suggested, or to some other cause. The large extent of the ocean covered and the length of time to which the observations refer would make it seem unlikely that conditions of abnormal refraction persisted throughout.

Such conditions would have been more likely to occur just before the landfall was made, since the warm waters of the Kuro Shio would then be traversed. However, at this period it is stated that the moon and star sights were in agreement again.

## SETTING OF THE PLANET JUPITER

### Gulf of Mannar

S.S. *Sirsa*. Captain N. Maguire. Rangoon to Cochin. Observer, Mr. J. Richardson.

3rd December, 1950, 1755 G.M.T. Jupiter on setting showed a red spot on the side nearest to the horizon. The spot was visible through binoculars and telescope but not to the naked eye. The sky was clear in the vicinity and the phenomenon was visible from the time that the planet was  $20'$  above the horizon.

Position of ship:  $7^{\circ} 40'\text{N}$ ,  $77^{\circ} 47'\text{E}$ .

*Note.* When abnormal refraction is present the light of stars or planets near the horizon tends to be elongated into a short spectrum with the red nearest the horizon and the green and blue farthest from the horizon. Many varieties of phenomena result, especially in the case of the bright planets Jupiter and Venus; these are more often seen with binoculars than with unaided vision. At times the planet may appear double, one red and one green, or the colour of the planet may change from red to green. In cases of extreme refraction the planet may be seen to "swim" about with a lateral motion, accompanied by changes of colour, usually from red to green, with momentary returns to the normal colour of the planet. The green flash of sunrise or sunset is an example of the same thing; the uppermost green image of the sun's limb is visible for a fraction of a second after the rest of the sun has set.

## RAINBOW

### North Atlantic Ocean

M.V. *San Velino*. Captain J. B. Macarthy, O.B.E. Panama to Liverpool. Observer, Mr. G. G. B. Putt, 2nd Officer.

21st October, 1950, 1615 G.M.T. An extremely bright rainbow was observed bearing NE. All the colours of the spectrum were visible, the red on the outside being predominant. The top of the bow was only  $3^{\circ}$  above the horizon and the ends of the arc subtended an angle of about  $30^{\circ}$ . The width of the bow was about  $2^{\circ}$  and where the ends reached the horizon the red appeared to spread out considerably. Precipitation was in sight and the altitude of the sun was  $39^{\circ}$  bearing SSW. Air temp.,  $75^{\circ}\text{F}$ . Cloud  $5/8$  Cb,  $2/8$  Ac.

Position of ship:  $34^{\circ} 25'\text{N}$ ,  $43^{\circ} 20'\text{W}$ .

## RAINBOW AND WHITE ARC

### Off the coast of Florida

M.V. *Laguna*. Captain R. D. S. Eckford. Nassau to Havana. Observer, Mr. P. A. A. James, 3rd Officer.

31st October, 1950, 1330 G.M.T. Off Mollasses Reef an arc of a rainbow was observed extending from right to left for approximately a quarter of a



semi-circle. At the same time a white arc intersected the other as shown in the accompanying sketch.

*Note.* This is an unusual and interesting observation and no explanation can be given of the cause of the white bow intersecting the primary rainbow.

## LUNAR RAINBOW

### New Zealand Waters

T.E.V. *Hinemoa*. Observer, Mr. R. L. Sutton, 2nd Officer.

22nd November, 1950, 1435 G.M.T. Against a background of black clouds a bright double lunar rainbow was observed. It was particularly intense at sea level, the brightness decreasing towards the top of the arc of the rainbow. The sky was clear over the land to the westward and the moon was very bright. The arcs were about  $5^\circ$  apart and the overall dimensions for the brighter centre rainbow were—altitude about  $35^\circ$  and azimuth about  $40^\circ$ . Colour was not evident either with the naked eye or through binoculars. The weather was cloudy with occasional violent squalls, with visibility fair except in the squalls.

Position of ship:  $42^\circ 50'S$ ,  $173^\circ 38'E$ .

*Note.* This is an interesting observation, since the secondary bow, when the moon is the source of light, is not often bright enough to be seen.

## LUNAR CORONA

### Indian Ocean

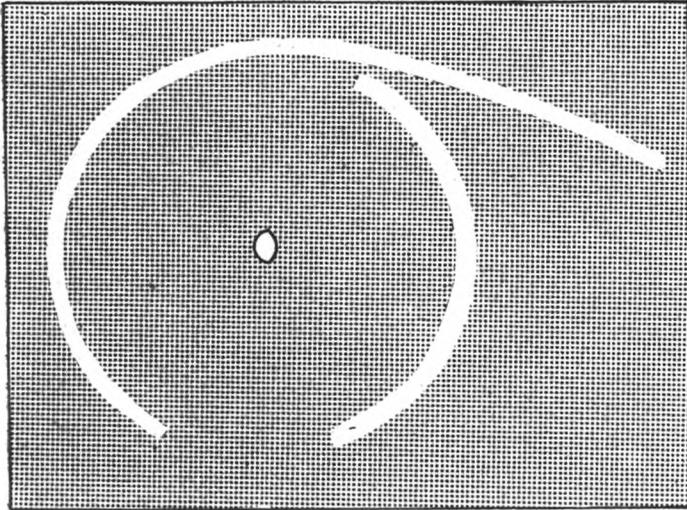
S.S. *Fort Spokane*. Captain A. G. Cuthill. Fremantle to Durban. Observer, Mr. D. A. Davies.

23rd October, 1950, 1630 G.M.T. A clear corona was observed in which colours were distinctly visible in the order yellowish, violet, green and red, outwards from the aureole. At 1635 a second green ring was seen bordering the above and then the whole phenomenon disappeared. High Cc surrounded the moon.

Approximate measurements: radius of aureole  $0^\circ 50'$ ; width of each coloured ring  $0^\circ 20'$ ; moon bearing  $020^\circ$  altitude  $60^\circ$ , age 12 days.

Position of ship:  $30^\circ 00'S$ ,  $70^\circ 20'E$ .

## LUNAR HALOS



### Mediterranean Sea

M.V. *Tresillian*. Captain J. C. Bate, O.B.E. Liverpool to Port Said. Observer, Mr. V. O. Wise, 2nd Officer.

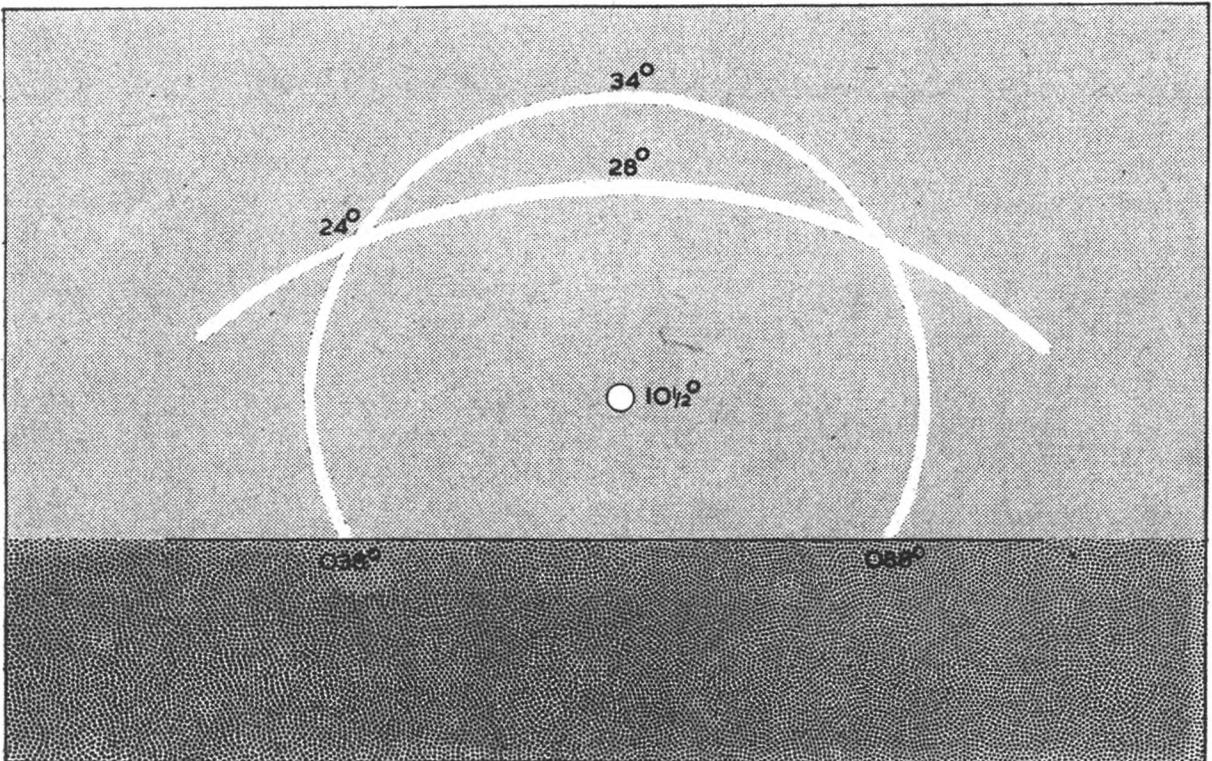
1st October, 1950, 0030 G.M.T. A lunar halo of radius  $24^\circ$  was observed high in the sky, centred on a gibbous moon. The sky was on the whole apparently clear with  $2/8$  Cc to the N. The halo, which persisted for some 20 minutes, was incomplete to the S as shown in the sketch.

Position of ship:  $36^\circ 18'N$ ,  $3^\circ 00'W$ .

Note. A part of the upper arc of contact to the halo was also observed, as shown in the sketch.

### South China Sea

M.V. *Silveroak*. Captain T. S. Morgan, O.B.E. Singapore to Manila. Observer, Mr. J. Martyn, Sen. 2nd Officer.



4th October, 1950. A white lunar bow and halo were observed. The bow was seen from 1635 to 1650 and the halo from 1635 to 1815, becoming very faint latterly. The altitudes and bearings were as indicated in the sketch. The sky was  $2/8$  clouded with dense Ci "mares' tails" and Cs. Visibility was excellent.

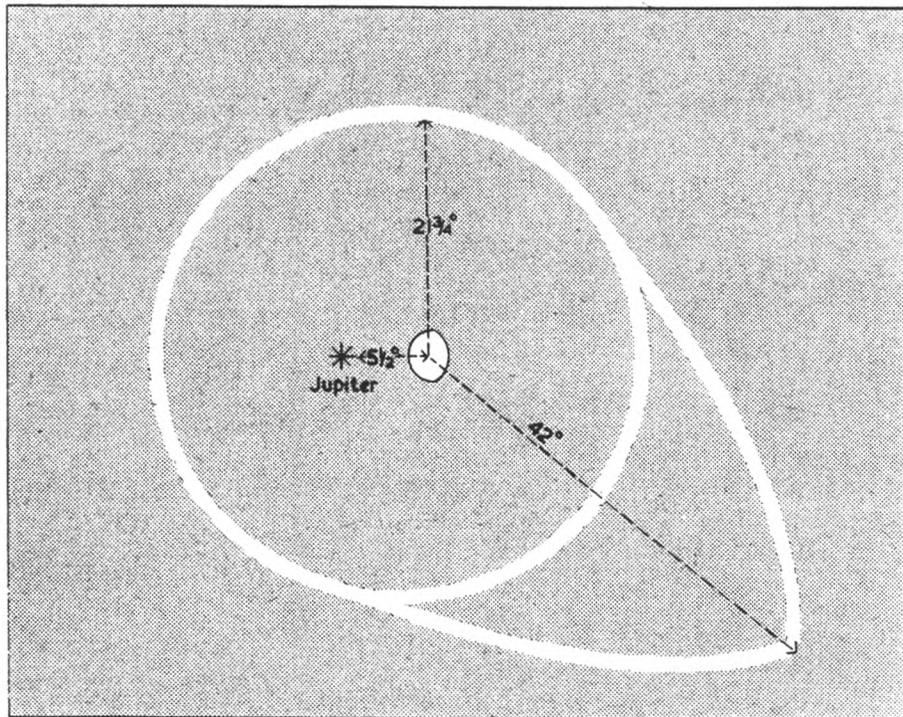
Position of ship:  $7^\circ 50'N$ ,  $109^\circ 19'E$ .

*Note.* This is a very interesting observation since the arc shown crossing the  $22^\circ$  halo is not one of the known halo phenomena. The only one known to cross the halo is the mock moon (or sun) ring, otherwise known as the parhelic circle, the characteristic of which is that it is parallel to the horizon and at the same altitude as the moon (or sun), through which it accordingly passes.

### South Pacific Ocean

M.V. *Rakaia*. Captain A. I. Robertson, R.D., A.D.C., R.N.R. Auckland to Balboa. Observer, Mr. D. E. Moran, 3rd Officer.

20th October, 1950, 2005 A.T.S. (Zone +8). A lunar halo of radius  $21\frac{3}{4}^\circ$  appeared as a plain white ring. At 2040, two arcs, meeting as in the sketch,



appeared and were visible for about 12 minutes. At 2220 an area around the moon appeared green, tinged with orange red. The halo was visible until 2235. Cloud  $4/8$  Ci.

Position of ship:  $24^\circ 12'S$ ,  $122^\circ 21'W$ .

*Note.* This is an interesting observation; the two arcs shown outside the ordinary lunar halo do not form part of halo phenomena as at present known.

### GREEN FLASH

#### South Pacific Ocean

M.V. *Rakaia*. Captain A. I. Robertson, R.D., A.D.C., R.N.R. Auckland to Balboa. Observer, Mr. M. D. Ward, 4th Officer.

13th October, 1950, 1823 A.T.S. The sun set with a brilliant green flash of duration  $1\frac{1}{2}$  seconds. Air temp.,  $60^\circ F$ ; wet bulb,  $57^\circ$ ; sea temp.  $62^\circ$ . No cloud.

Position of ship:  $36^\circ 35'S$ ,  $174^\circ 55'W$ .

## Indian Ocean

S.S. *Fort Spokane*. Captain A. G. Cuthill. Fremantle to Durban. Observers, Mr. H. Swift, Chief Officer, and Mr. D. A. Davies, 3rd Officer.

25th October, 1950, 1435 G.M.T. One and a half seconds after the sun's upper limb had disappeared below the horizon, a green flash was observed which lasted for 4 seconds. To the observers it looked like a green occulting light flaring up on the horizon. The cloud consisted of  $\frac{3}{8}$  Ci and Cs.

Position of ship:  $29^{\circ} 58'S$ ,  $62^{\circ} 18'E$ .

*Note.* There are two distinct phenomena grouped under the name of "Green Flash", at sunrise or sunset. In that more commonly observed, the last small segment of the sun itself turns green as it disappears below the horizon. The observation of M.V. *Rakaia* is of this type. The observation of S.S. *Fort Spokane* is one of the other kind, when just after the sun has finally set, a flash of green light, or actual rays of green light, are seen to shoot up into the sky from the place where the sun has just disappeared. Sometimes an appearance as if a rapidly rotating green searchlight is seen.

This second type of green flash is much rarer than the first kind, judging from the very few observations of it to be found in back numbers of the *Marine Observer*. The observation of S.S. *Fort Spokane* is also interesting for its implication that the light was of considerable brightness.

## AURORA

### Gulf of St. Lawrence

T.E.V. *Beavercove*. Captain D. Parsons. London to Montreal. Observer, Mr. J. E. Morris, 4th Officer.

17th October, 1950, 0130 G.M.T. Aurora was observed in the form of distinct arcs, apparently geometrically perfect and resembling a series of rainbows. The lowest arc extended from horizon to horizon between  $280^{\circ}(T)$  and  $060^{\circ}$  and was about  $4^{\circ}$  in width, reaching an altitude of  $41\frac{3}{4}^{\circ}$  at its apex. Two similar arcs curved through altitudes of about  $50^{\circ}$  and  $75^{\circ}$  but both faded before reaching the horizon. Between these two arcs lay Cu cloud backed by waves of greenish-yellow light. The arcs were the colour of moonbeams, the lowest and most distinct being of the greatest intensity. The phenomenon was visible and constant for about 25 minutes after which it gradually faded into shapeless form. Other displays of aurora continued until about 0330, the sky at the time being only  $\frac{3}{8}$  clouded. Visibility was excellent and no magnetic disturbance or radio interference was noted.

Position of ship:  $50^{\circ} 04'N$ ,  $59^{\circ} 46'W$ .

## METEORS

### Indian Ocean

M.V. *British Escort*. Captain H. H. Burke. Mauritius to Abadan. Observer, Mr. R. W. Clarke, 3rd Officer.

3rd October, 1950, 1918 G.M.T. A bright meteor appeared bearing  $320^{\circ}$  altitude  $45^{\circ}$ , near Alpheratz, travelling in a direction towards Deneb where it disappeared bearing  $300^{\circ}$  altitude  $25^{\circ}$ . The head was a brilliant white, of similar magnitude to Venus, and the trail, which was blue-green with showers of red particles, was visible for several seconds after the disappearance

of the head. The duration of flight was about 3 seconds. The visibility was 10-15 miles.

Position of ship:  $8^{\circ} 50'S$ ,  $58^{\circ} 58'E$ .

M.V. *Worcestershire*. Captain F. C. Brooks. Liverpool to Rangoon. Observer, Mr. A. M. Maclean, 2nd Officer.

7th October, 1950, 2335 G.M.T. A meteor appeared beside  $\epsilon$  Persei and travelled to Capella, leaving a serpentine trail. The flight lasted for about 8 seconds and the trail was visible for a further 2 minutes. The brilliancy exceeded that of the full moon. The sky was cloudless.

Position of ship:  $12^{\circ} 05'N$ ,  $50^{\circ} 35'E$ .

#### Gulf of Aden

M.V. *Glenartney*. Captain C. J. Tyler. Colombo to Aden. Observer, Mr. H. M. Macfarlane, 3rd Officer.

31st December, 1950, 1717 G.M.T. A very bright white meteor was seen to fall from approximately  $15^{\circ}$  to  $5^{\circ}$  altitude on a bearing of  $255^{\circ}$ . It first appeared bearing about  $3^{\circ}$  south of Jupiter and fell at an angle of  $20^{\circ}$  from the vertical, leaving a bright white trail.

Position of ship:  $12^{\circ} 21'N$ ,  $48^{\circ} 55'E$ .

#### BOOKS RECEIVED FOR REVIEW

*Klima und Wetter der Fischereigebiete Island*. By Dr. Martin Rodewald.  $8\frac{1}{4} \times 5\frac{3}{4}$  in. pp. 95. *Illus.* Meteorologisches Amt für Nordwest deutschland. Hamburg, 1951. 4 DM.

This little book deals with the climate and weather of the Iceland fisheries, grouped in four regions:

- I. North-west Iceland (Gammelloch).
- II. North-east Iceland (Langanes-Flach).
- III. South-west Iceland (Selvogs-Bank).
- IV. South-east Iceland (Horna-Tief, etc.).

The first part of the book deals with the climate of these districts, while the second part discusses the weather from the synoptic viewpoint.

In the first part the effects of the various ocean currents round Iceland (the warm Irminger current, the cold East Greenland current, the cold East Iceland current) on various meteorological factors are discussed. Other questions examined are climatic changes and the onset of ice, fog and rain, pressure and winds, the temperature of the air and its changes, cloud and precipitation, the influence of the island on the wind field, and the main weather features and cyclone paths.

In the section "Climate Variation and Ice Occurrence" the author states that a strong drift of polar ice towards the north west edge of Iceland occurs during and after prolonged spells of stormy *north to west* winds, and consequently careful navigation is necessary when entering fog patches with such winds in this area.

This view regarding the cause of the drift of ice is not in agreement with the views expressed in Admiralty publication "Investigation into Reasons for Extension of Icefield from Greenland to Northern and Eastern Coasts of Iceland", but north-west winds over the fishing grounds do occur in some instances when a "south-westerly" pressure gradient exists between

Greenland and Iceland. The criterion stated by Dr. Rodewald must be one factor in the occurrence of ice in the Iceland fishing grounds. The author also mentions the general trend in the last few decades to a régime of less severe ice in the Iceland area. In the second part various synoptic situations are examined and discussed. A considerable number of rules, 29 in all, are given as an aid in interpreting the synoptic map.

There are two appendices; in the first are discussed the weather situations at the times of shipwrecks on the south-east coast of Iceland, while the second deals with the stormy weather of 1949 in North-west European waters.

H. J.

P. R. B.

*Echo Sounding at Sea.* By H. Galway. 8vo.  $8\frac{3}{4}$  in.  $\times$   $5\frac{1}{2}$  in. pp. ix + 299. *Illus.* Sir Isaac Pitman & Sons, Ltd., London. First Edition, 1951. 35s.

It is a long way from the deep sea lead, and indeed from that faithful servant the hand sounding machine, to the modern echo sounding apparatus, and there is no doubt that the inventors and manufacturers of the "echo sounder" have done a great service to the mariner. There are few seamen who have not cold and uncomfortable memories of the sounding machine and the tedious job of getting an efficient line of soundings in relatively deep water while the master waits impatiently on the bridge. The luxury of "echo sounding" with its constant readiness and continuous record of soundings is as obvious as is the disadvantage that it cannot indicate the nature of the bottom. The echo sounding apparatus is however, fittingly an aid to navigation, and the prudent navigator still needs to supplement its readings with an "armed" lead at times.

In view of the wide use of the echo sounding apparatus today in passenger and cargo ships, in trawlers and research ships, a comprehensive book upon the subject is very desirable. Mr. Galway is obviously an expert in echo sounding and his book gives much technical detail about the composition, performance, installation, and maintenance of the apparatus manufactured by two British firms—Marconi and Marine Instruments.

The first two chapters discuss the theory of sound waves and their practical application to echo sounding. An indirect meteorological effect upon performance in respect of temperature and currents, and the analogy between the laws of reflection and refraction in water and in air are among the items which are discussed. It is, perhaps, rather surprising that the author doesn't say much about "phantom" echoes or the controversy about echoes being obtained from shoals of fish or other marine organisms, or from water layers of varying density, although he does mention the fact that the quality of echoes is to some extent related to the wave length of the transmission.

The second chapter includes some general remarks about the principle of sound-wave generation by the piezo-electric properties of quartz, and also the magnetostriction effect of nickel and nickel alloys. The importance of choosing the best site for the oscillator to suit a particular design of ship is treated at length in Chapter III.

The remaining four chapters are devoted to technical details concerning particular types of apparatus and their maintenance, as well as instructions for "fault finding". There are a number of detailed drawings and diagrams which probably account for the relatively high cost of the book.

C. E. N. F.

# DEEP SEA PROSPECTING

BY M. N. HILL, M.A.

(Department of Geodesy and Geophysics, Cambridge University)

## Introduction

During August, 1949, three scientists from the Department of Geodesy and Geophysics at Cambridge were given the opportunity by the Director of the Meteorological Office of undertaking some deep water experiments in the Ocean Weather Ship *Weather Explorer* (Fig. 1) on one of her routine trips to Ocean Weather Station JIG, about 300 miles west of the North coast of

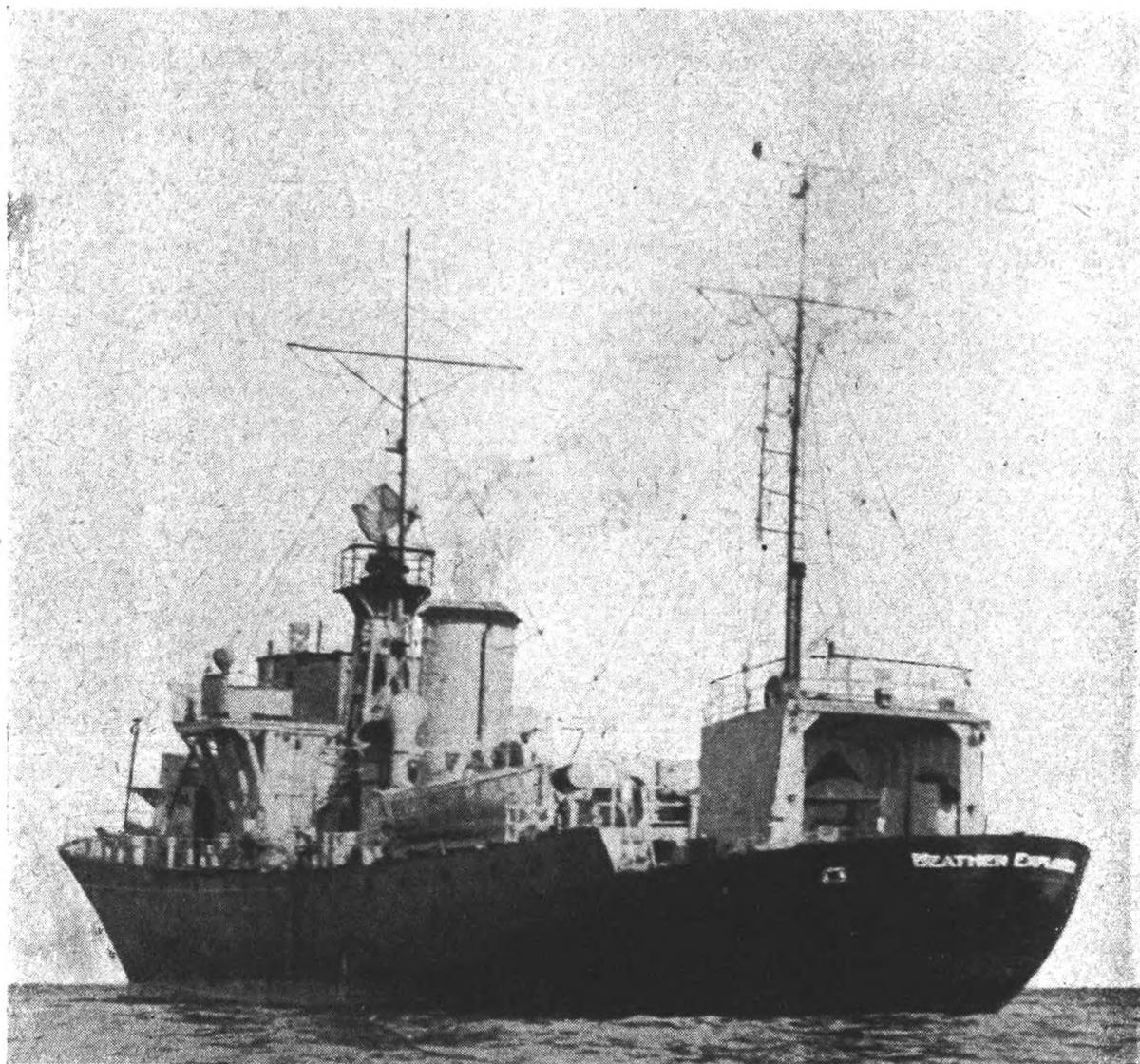


Fig. 1

O.W.S. *Weather Explorer*

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Ireland. The purpose of the experiments was to determine the thickness of the muds and ooze and of any other rock layers which might lie below the sea bed in this area. Information of this type is of great interest since it assists in finding the fundamental differences between the structure of the Earth's crust below oceans and that below continents. It also helps in solving the intriguing problems concerning the possibilities of lost continents lying below the deep sea.

The reason why on some parts of the Earth the crust lies 5 miles above sea level while on others it is 6 miles below is still obscure. At first sight one might suppose that the rocks forming the Earth's crust were strong enough to support the great mountain ranges or hold down the ocean deeps. It has been shown, however, that this is untrue and that while locally the strength exists to support the odd mountain it certainly is not great enough to maintain the Earth's crust as one rigid shell surrounding the fluid core. This means that the rocks of the crust are floating as separate blocks in the fluid, a fact which was demonstrated during the ice ages by the land which lay under an enormous thickness and weight of ice being made to float at a much deeper level than nowadays. We can therefore explain the difference between oceans and continents by supposing that the rocks lying deep below the oceans are of denser material than those under the continents and that consequently they float deeper in the fluid of the core. This theory has already some support from scientific results, but it awaits confirmation by more extensive experiments.

Another feature of the oceans on which information is required is whether or not beneath the muds and ooze at present being deposited (which to a large extent consist of the shells of minute sea animals) there are rocks which have, at some geological time, been exposed as land masses but which have since sunk many miles below the sea. It is believed nowadays by many scientists that it will eventually be shown that the deep oceans have been permanent features of the Earth's surface. Until, however, there are more experimental results there will remain a body of opinion which will believe that the continents have drifted apart, or that the mythical continent of Atlantis was a reality.

On account of the great depths involved these problems concerning the oceans cannot be solved by direct methods such as, for example, sinking boreholes into the sea bed and thus obtaining samples of rocks which can be examined by geologists. For this reason indirect methods of prospecting, known as geophysical methods, are the only approach. With these methods it is possible to measure the depths to rock layers lying deep in the Earth below the scientist and his apparatus, and also to find certain characteristics of these rocks such as their hardness or their heaviness. Prospecting of this type has been extensively used on continents in regions where the surface rocks do not provide adequate information concerning the deep structure, and where the sinking of boreholes would be too costly or impracticable because of the great depths involved. At sea, however, on account of the technical difficulties in working from a ship and on account of the expense of organising expeditions, very little has been achieved.

For the experiments described below the geophysical method known as seismic refraction shooting was used. With this method sound waves developed by an explosion enter the surface of the Earth where they are bent or reflected as they meet the various layers of the crust in such a way that after a small, yet measurable, time they return to the surface. These time measurements allow the determination of the speed of sound in the various rock layers, and thus indications as to their nature. (The speed of sound in the materials of the Earth's crust varies from about 1 mile/second in muds and clays to about 6 miles/second in old tough rocks.) The method also allows the distances between the layers and the surface of the Earth to be obtained.

Seismic refraction shooting is well known in its continental application, but at sea it represents a new departure in prospecting methods. For this reason these experiments were of considerable technical interest, the apparatus never having been tried out before.

### Method

In seismic refraction shooting, explosions are fired near to the surface of the sea and the sounds produced by the explosions are picked up by hydrophones hanging in the sea at various distances away. The loudest sound received by a hydrophone from an explosion at a distance is the direct sound transmitted through the water, but, if there is sufficient sensitivity other sounds can also be detected some of which arrive in advance of the direct sound. The less intense sounds arrive by paths which may lie deep below the sea bed, and it is by the measurement of the times at which they arrive that it is possible to calculate the speed of sound in a particular layer, and also the depth to that layer.

For these experiments standard naval depth charges were generously provided by the Admiralty and these were dropped from chutes which were fitted to the *Weather Explorer* for the voyage. The depth charges were all set to fire at their maximum depth in order that the ship should not have to steam at an excessive speed while dropping them.

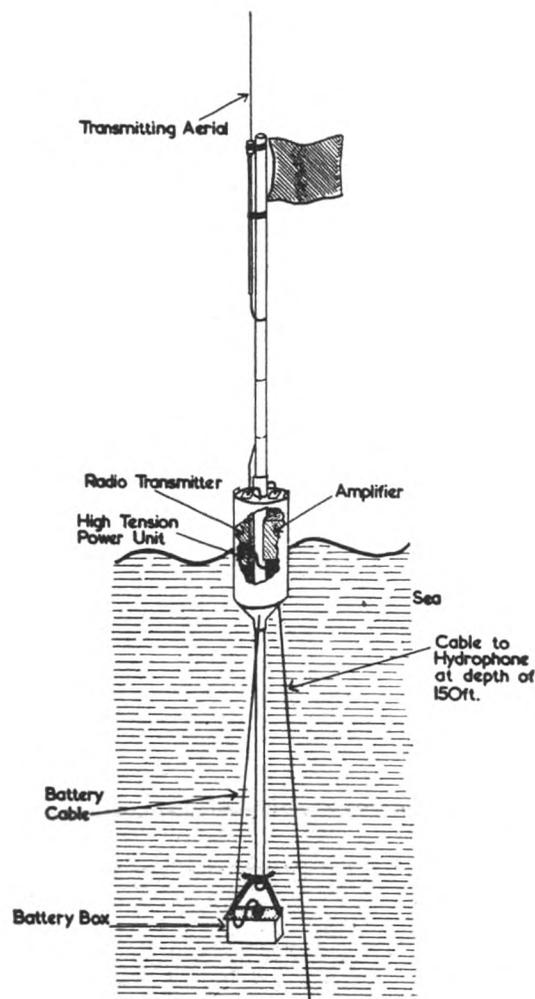


Fig. 2  
Diagram showing the construction of a Sono-Radio Buoy

It is necessary with this method that the sound receivers should be some distance away from the explosions. In our experiments this distance was between the limits of 6 miles and 20 miles, and it was therefore impracticable to have the hydrophones connected to the ship by electric cables. For this reason four Sono-Radio buoys were constructed below which, at a depth of 150 ft., the hydrophones were suspended. The buoys were positioned at various distances from the ship and contained amplifiers and radio transmitters which broadcast the sounds received on the hydrophones back to radio receivers in the ship. A diagram showing the construction of one of the buoys may be seen in Fig. 2. Each buoy had its own radio frequency channel and its own radio receiver in the ship in order that the signals should be kept separate from one another. The sounds received by radio were recorded on moving photographic paper for subsequent analysis. Fig. 3 shows diagrammatically some of the paths by which the sound can travel from the explosion to the hydrophones, and the general positioning of the ship, depth charge, and buoys.

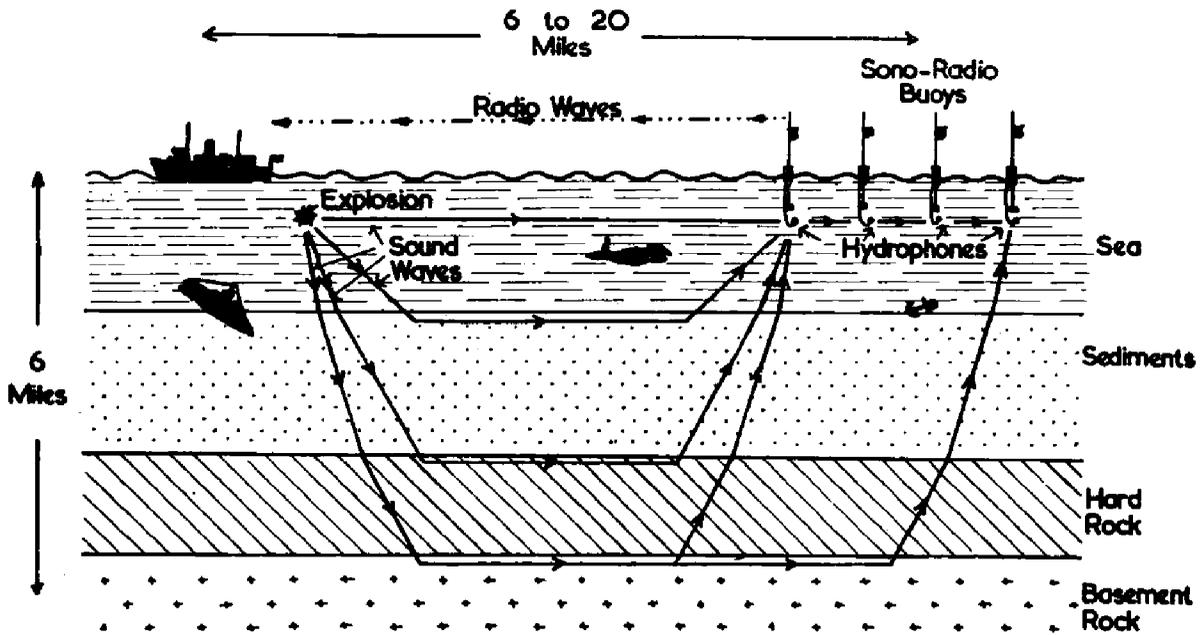


Fig. 3

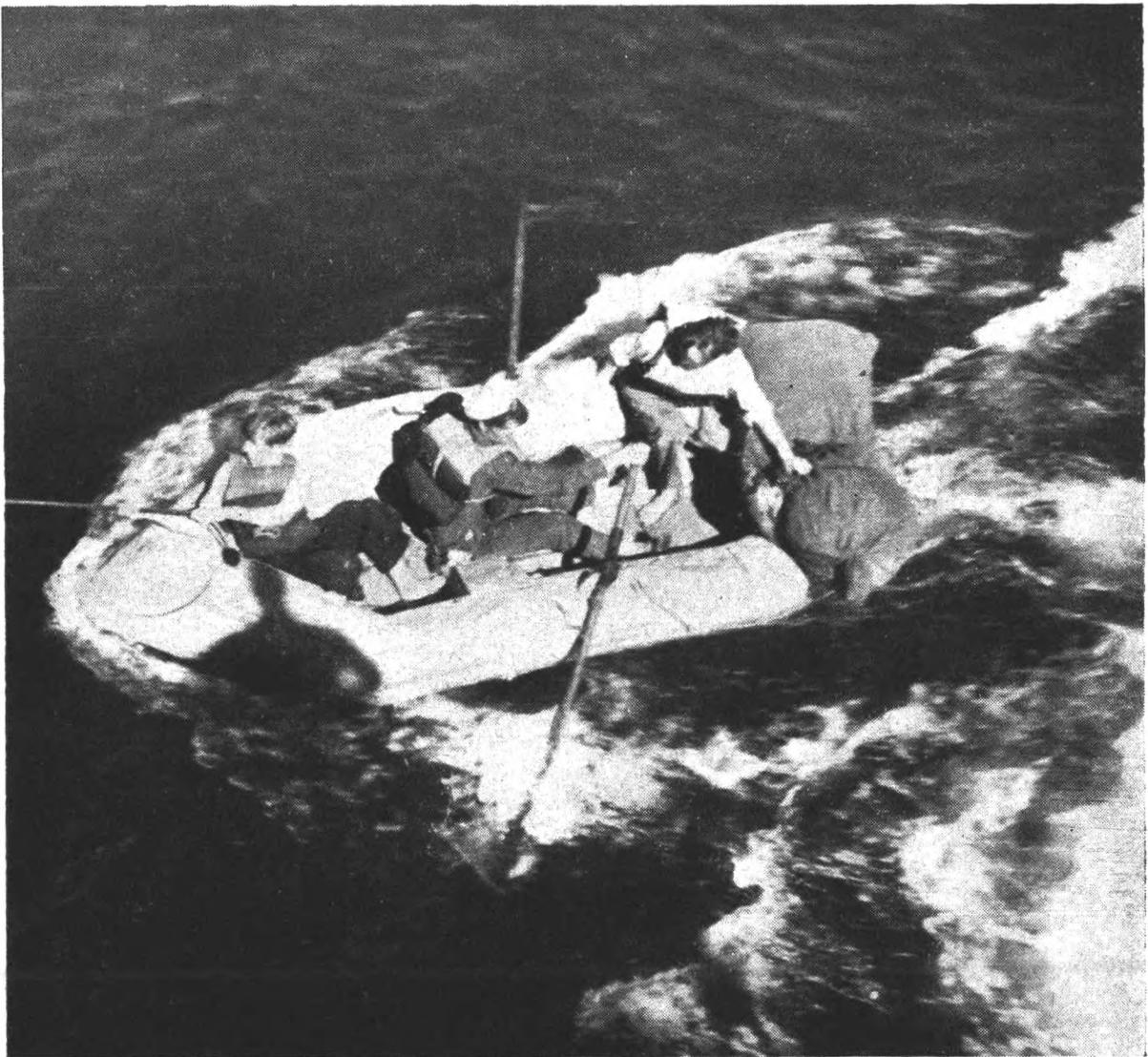
Diagram showing positions of ship, sono-radio buoys and depth charge for seismic shooting. The various paths by which the sound waves can travel to the hydrophones from the explosion are indicated. This diagram is schematic and similar paths to those shown to the closest hydrophone exist for all hydrophones

In order to obtain the maximum detail of the structure of the sea bed it was necessary on occasions to fire five depth charges at different distances from the buoys. These were dropped without stopping the ship between shots and at separations from one another of about 3 miles, the closest shot being 6 miles from the nearest buoy and 9 miles from the farthest.

### Account of Operations

August was chosen for the month of these experiments since it is essential (not from the point of view of the scientific personnel) that the work should be undertaken in good weather. Apart from some rough seas on the way out to relieve the *Weather Recorder* which resulted in our being a day late in reaching station, the weather was kindly disposed towards us. (On one day just before the *Weather Watcher* relieved us the sea was sufficiently calm to allow pleasure boating and racing in the air/sea rescue dinghies. In the racing the Cambridge boat did not excel, although at least it finished the course. The course was of considerable interest since it was constantly lengthening on account of the relative drift of the ship and the marker buoy. This meant that the slower one rowed the farther one had to row, a fact which added an additional incentive to completing the course as soon as possible.)

Early in the month a member of the crew became ill and treatment by radio inadequate since diagnosis from ashore was not possible. This resulted



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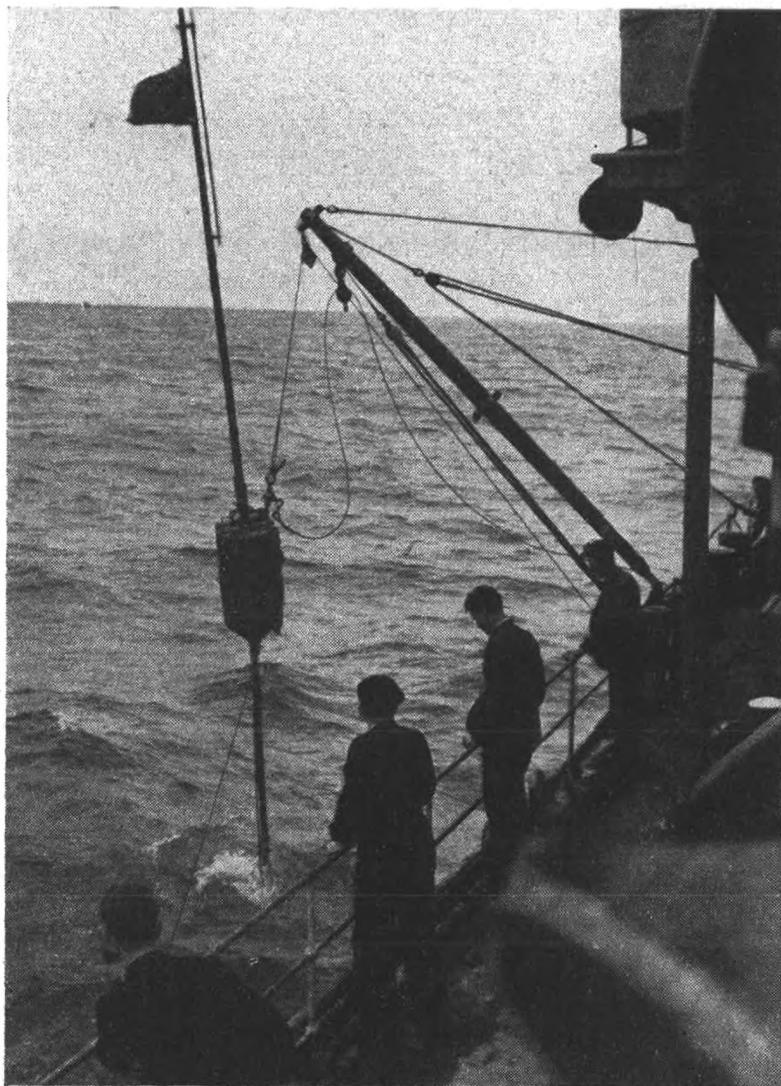
Fig. 4

One of the "bodies" dropped by a training aircraft after rescue by an air/sea rescue crew from *Weather Explorer*

in a passage at full speed to Londonderry and then back on to station. The ill man quickly recovered ashore and met the ship as she came alongside in Greenock at the end of the month.

Twice during the month we were entertained by visits from Lancaster aircraft on training flights from St. Eval in Cornwall, and these provided most welcome parcels containing the previous days' papers and air/sea rescue exercises in recovering them. Fig. 4 shows a photograph of one of the "bodies" after rescue by the crew of a dinghy. There was also, of course, the routine business of the ship including the meteorological observations and the passing of information concerning positions and weather to the numerous civil aircraft on transatlantic passage.

The seismic refraction shooting was confined to those days when the weather was particularly fine since launching and recovering the buoys in anything except calm weather would possibly have resulted in their being damaged. The procedure adopted for this work was to lay the four buoys at intervals of three-quarters of a mile and then to work up the ship's speed



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Fig. 5

A sono-radio buoy being recovered by *Weather Explorer*

to about 9 knots. This speed was maintained until the last charge was dropped when the ship steamed slowly back to recover the drifting buoys, which were, in spite of an absence of four hours or more at distances up to 20 miles, always found without difficulty. Fig. 5 shows one of the buoys being recovered.

The charges took approximately 100 seconds to reach their firing depth after being dropped, and during this time interval the radio receivers were finally tuned and the last adjustments to the recording apparatus made. Seventy-five seconds after the drop the recorder was switched on, and thereafter the whole process, including the timing, was automatic. The explosion depth was such that there was no "plume", although the ship was heavily shaken. After the explosion there was a pause of several seconds before the sounds began to arrive at the hydrophones under the Sono-Radio buoys, but from the moment of the first arrival and for the following 30 seconds sound pulses representing different paths through the sea and sea bed were continually being received. When the sounds ceased arriving the recorder was switched off and the photographic records developed and inspected while the ship steamed on to the next position 3 miles farther away.

### **The Results of the Experiments**

Fig. 6 shows the results of one day's investigations. These results were in good agreement with those obtained on other occasions at different positions around the station. The depth of the sea along the 20 mile line was approximately 1,300 fathoms. This is less than the average for the deep Atlantic, which is about 2,000 fathoms. In this area the sediments (a term which includes all the muds, ooze and clays which are formed by debris sinking from the sea) are some 9,000 ft. thick, and within this thickness no signs of sudden changes in composition were detected. It is, however, possible that if we could have inspected a core passing through this 9,000 ft. that we should have been able to locate changes which are not apparent when sound is transmitted through them. Without further evidence we must, however, conclude that this great thickness consists of an unbroken sequence of deep-sea deposits. This conclusion is well supported by the slowness of the speed of sound in this layer.

In recent years many cores have been obtained from the muds and ooze of the sea bed in deep water of lengths as great as 50 ft., and these have permitted, by various means, estimates to be obtained of the rate at which these sediments are collecting at the present day. The conclusions of several different methods are not far apart and it appears that the thickness of deep sea sediments will increase by one inch in about 2,500 years. This newly deposited sediment would be of soup-like consistency and would contain much water which would be squeezed out as new layers were deposited above. It has been calculated that one inch of solid matter without water would take about 18,000 years to collect. At this rate 9,000 ft. of sediments would take about 2,000 million years to collect, a time which according to several reliable estimates approximates to the age of the Earth. This estimate of the age of the ocean in the region where the experiments were carried out involves the assumption that in the distant past the ocean sediments were collecting at a rate not far different from that of the present time, and this

assumption is hazardous. However, even if our estimate was in excess of the true figure by a factor of four times it would still mean that the ocean dated from a time when only the most primitive forms of life existed, while allowing an error as great as ten times would mean that no warm-blooded animals existed on the Earth when the sea first covered this area.

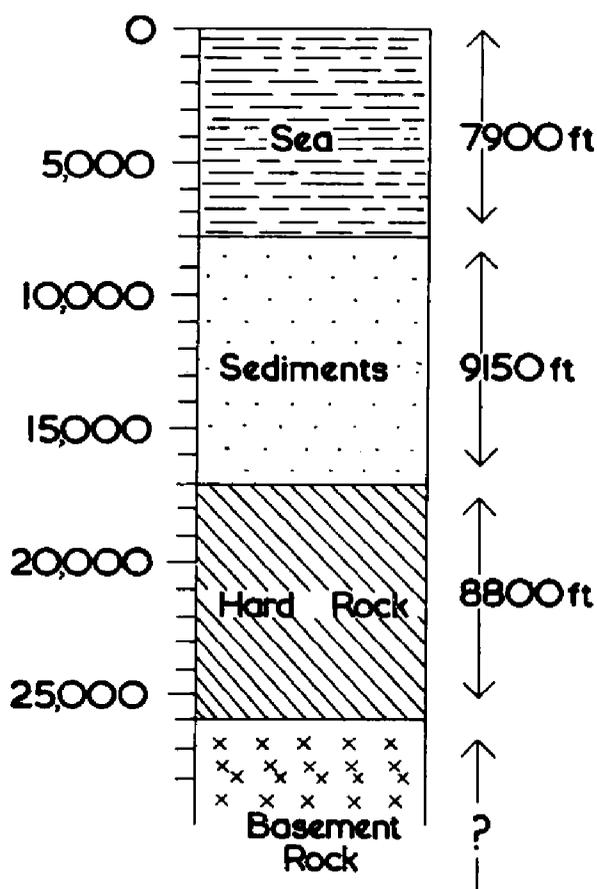


Fig. 6

The thicknesses in feet of the sea and the various layers located below the sea bed

The "Hard Rock" layer which lies below the sediments is solid and tough in constitution and cannot, as the information given by the sediments would confirm, date from a time within the last few hundred million years. We cannot be certain of its origin however since the speed of sound in it is similar to known igneous rocks (that is rocks which have been extruded in a hot molten condition from the Earth's interior) and also to old sedimentary rocks (that is rocks which time will produce from the the material deposited on the bottom of lakes or shallow seas close to continents). If it represents the latter then we must postulate the existence of a continent close at hand which sank deep into the sea some hundreds or possibly thousands of millions of years ago. If on the other hand it represents igneous rock it might

well have been extruded to cover the bed of the already existing sea.

The "Basement Rock", which was the deepest layer concerning which we obtained information, is almost certainly igneous in nature since the speed with which it transmits sound would be exceptionally high even for the oldest sedimentary rocks, and it is possible that it forms a continuous layer with a heavy rock which lies even deeper below the continents and which transmits sound at the same speed. We could not locate the bottom of this layer but it must be at least 15,000 ft. thick.

What then have these experiments contributed towards the solution of the fundamental problems mentioned in the Introduction? We have shown that at least in this area of the Atlantic the ocean was most probably formed during the early days of the Earth's history and that since then there has never been land in this area. Secondly we have provided confirmatory evidence that the main structural difference between continents and oceans may lie in the heavier rocks providing a greater proportion of the Earth's crust under the oceans than under the continents. Lastly these experiments have shown that this technique of prospecting is capable of providing considerable detail of the structure of the sea bed such as cannot be obtained by any other means. The success of the method justifies its extensive use in exploring the oceans of the world and thus providing us with interesting details of the past history of the Earth's crust, and why it is that we are so fortunate as to have continents and oceans rather than a smooth Earth covered uniformly with a thousand or more fathoms of water.

In conclusion we must acknowledge our gratitude to Cdr. H. R. Wilkinson and his crew of the O.W.S. *Weather Explorer* for the fine help they provided on the voyage and for the friendly way in which we were received, to the Meteorological Office and particularly Cdr. C. E. N. Frankcom for their support of the project, and finally to the Admiralty for the provision of depth charges and for the loan of other equipment.

#### FUTURE ARTICLES

The following is a selection of the articles which it is intended to publish in future numbers of *The Marine Observer*.

- "Forecasting for the D-Day Landings", by C. K. M. Douglas.
- "Applications of Radar to Navigation", by Captain A. W. Ford.
- "Errors of Aneroid Barometers", by H. Jameson.
- "Comparisons of Intake and Bucket Methods of Measuring Sea-surface Temperatures", by T. H. Kirk and A. H. Gordon.
- "Bird Observations in Ocean Weather Ships in 1950", by M. L. Romer.
- "A Proposed Classification of Phosphorescence", by E. W. Barlow.
- "Earthquakes at St. Kitts and Nevis", by J. C. W. Wickham.

## A POLAR EXHIBITION ON BOARD THE *DISCOVERY*

Included in the spate of exhibitions in London in this Festival year 1951, is one that is bound to have an appeal to both landsmen and seamen. It is the exhibition on board the Royal Research Ship *Discovery*, Captain Scott's old ship, moored in the Thames alongside Pilgrim Pier at the Victoria Embankment, in King's Reach.

The object is to show an outline of "50 years of British Antarctic Exploration", from 1901 to 1951, and this has been tastefully done in the limited space available in the ship. The exhibits are arranged in chronological order showing the dates and the titles of the expeditions, and the names of the leaders. There are charts showing the sea and land areas explored, photographs, paintings, models and some actual tents and sledges, etc., of the various British expeditions to the Far South undertaken during this half century.

It is interesting to see on the charts displayed, the great addition which has been made since 1901 to the geography of the Antarctic continent. The Admiralty South Polar chart of that year showed very little detail of the coast except in the Weddell Sea and the Ross Sea area. The present day chart shows the outline of much of the continent, including the routes to the Pole taken by Amundsen and Scott. In bringing this about, British explorers have played a great part. Pride of place in the exhibition is given to the voyage of Captain R. F. Scott, Royal Navy, in this same old ship *Discovery*, in 1901-04. There are many excellent photographs of that venture, and some of the beautiful water colour sketches made by Doctor Wilson. There is also the actual rough sketch chart with notes in his handwriting which Captain Scott used on his second expedition in 1910-13, when briefing his sledging parties before the famous march to the South Pole.

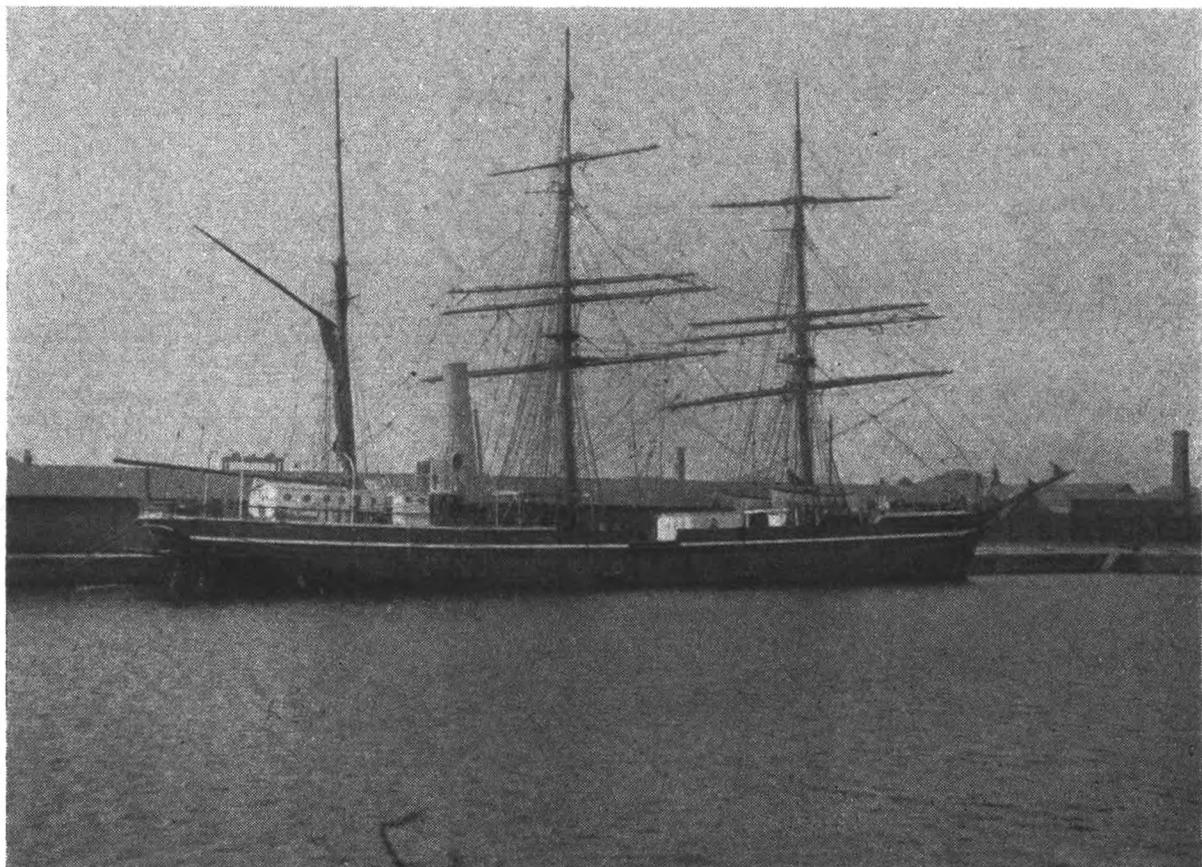
As systematic meteorological observations are always an important part of all Polar exploration, a portion of the exhibition is devoted to this subject, and a selection of instruments and equipment has been loaned to the ship by the Meteorological Office. These include the normal set of instruments as issued to Observing Ships, and also certain equipment of the kind used ashore in the Antarctic Meteorological stations.

Some of the former, such as the Mercurial Barometer, and the Thermometer Screen it has been possible to hang in much the same manner as in an ordinary observing ship. The other items of meteorological equipment, as used ashore, cannot of course be displayed in their normal settings, so a cabin has been allocated for their layout with notes on the various instruments. In this cabin are fitted the indicating dials worked electrically from the wind vane and the cup anemometer which are rigged aloft on the mainmast.

During the *Discovery's* active career meteorological logs were kept on her voyages in 1901-04 (Captain Scott) 1925-27 (Captain Stenhouse) and 1929-31 (Captain Davis and Captain Mackenzie). *Discovery* herself was not used on Captain Scott's last expedition (1910-13) for he sailed in the Barque *Terra Nova*, and it is of interest that Mr. G. C. Simpson—later Sir George Simpson, Director of the Meteorological Office from 1920-38—was the meteorologist during this expedition. A photograph of the *Terra Nova* is shown opposite.

The logbooks covering all the Antarctic voyages of the *Discovery* and logbooks kept during the voyage of the *Terra Nova* are in the archives of the Marine Branch of the Meteorological Office at Harrow. According to a note

made at the beginning of the *Terra Nova's* logbook during her voyage from U.K. to New Zealand, the officer who made and recorded the 4 a.m. observation and the remarks during the middle watch was Lieut. H. R. Bowers, R.I.M., who accompanied Scott to the Pole and died with him.



Photograph by Miss Peary]

Auxiliary Barque *Terra Nova*

[Royal Geographical Society

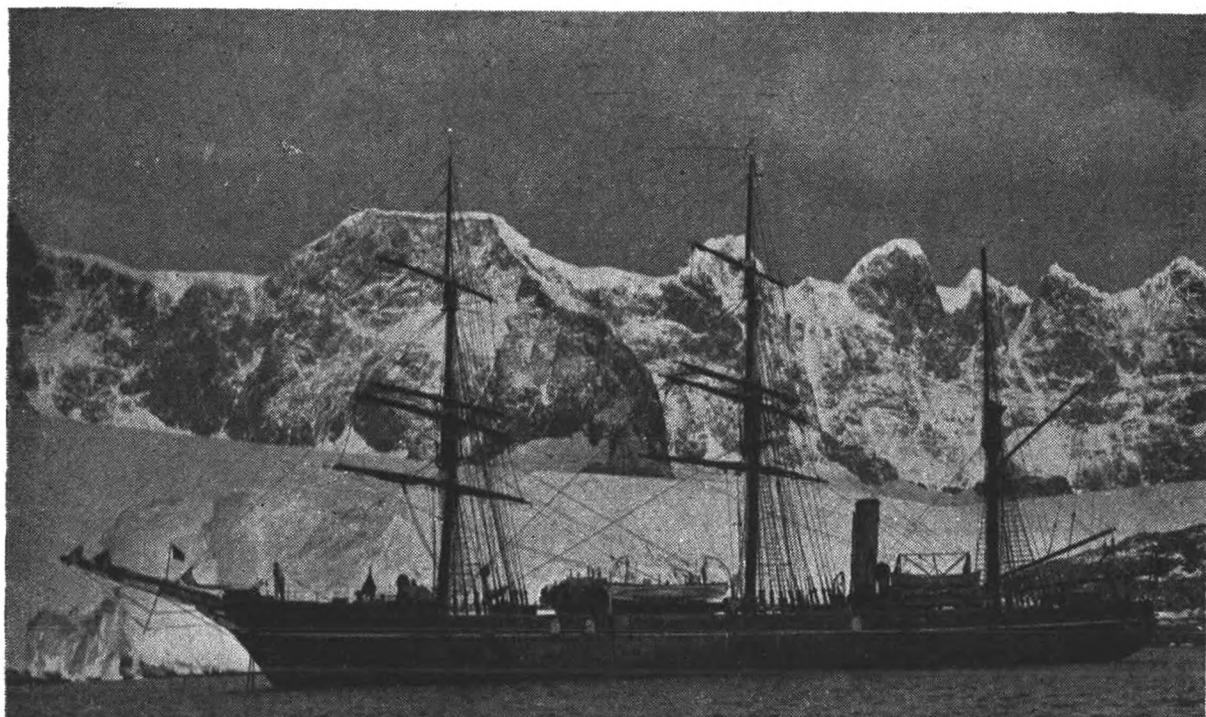
The observations from the *Terra Nova's* logbook made during her voyages between New Zealand and the Antarctic from 30th November, 1910, to 12th February, 1913, were printed in the official publication *British Antarctic Expedition, 1910-1913*. In the Preface to this book, Sir George Simpson comments as follows:

“ In addition to the land stations, the *Terra Nova*, on her three voyages between New Zealand and McMurdo Sound, added a large amount of meteorological information. The logs kept on these three voyages have been printed in full, and they are logs of which the observers may well be proud. I am particularly glad that these logs should be printed, for they deserve much more attention than I have been able to give them. They are a mine of information and will well repay investigation ”.

Other scientific work is outlined, such as the Oceanographic work and Whaling Research done by the “ Discovery ” Committee, and the exploration and other duties carried out by the Falkland Islands Dependencies Survey.

Displayed in one of the cabins is a variety of the gear used in oceanographical research work; apparatus for sampling and analysing sea water and for preserving specimens of deep sea animal and plant life. Photographs, charts and graphs show the extent of the oceanographic work done in the *Discovery* while on this work in the Graham Land and Weddell Sea areas in 1926-27.

The photograph of the ship shows her at anchor at Port Lockroy, off Graham Land, in 1927.



[Central Press Photos Ltd.]

R.R.S. *Discovery*

Photograph taken at Port Lockroy, Graham Land, 1927

In 1929–31 the *Discovery* was again in the far South with the Douglas Mawson Expedition. This was the ship's last voyage and she has been in the London River ever since.

As is well known, the *Discovery* is now owned by the Boy Scouts Association, and she is manned by lads of the Thames Sea Scouts.

C. H. W.

### RETIREMENT OF DR. H. JAMESON

Dr. Harold Jameson retired from the Meteorological Office on 31st May, 1951, after serving 11 years in the Marine Branch.

Born on 3rd June, 1887, in Hartlepool, he was educated at Argyle House School in Sunderland whence he proceeded to Armstrong College (Durham University) in Newcastle-on-Tyne. He graduated in 1907 with an Honours degree in Mathematics after which he did postgraduate work in Physics until 1910. In that year he competed for and obtained the post of Assistant Astronomer in the Royal Observatory, Edinburgh, where he remained until 1913, when he was appointed 2nd Assistant in Colombo Observatory, Ceylon. His duties here consisted of the administration and organisation of the Meteorological Service, Ceylon, and in addition included the astronomical work of the Observatory. In 1924 he was promoted 1st Assistant and on the retirement of Dr. A. J. Bamford in 1932 became Director of the Observatory. At the outbreak of the first world war Dr. Jameson was mobilised with the Ceylon Engineer Volunteers and in 1917–19 served with the Royal Engineers (Signals) in France.

He retired from the Colonial Service towards the end of 1939 and returned to England. During his service in Ceylon he received first his M.Sc. and later his D.Sc. degree for published papers on the Climatology of Ceylon. These papers covered a wide field, particularly concerning the rainfall in the island.



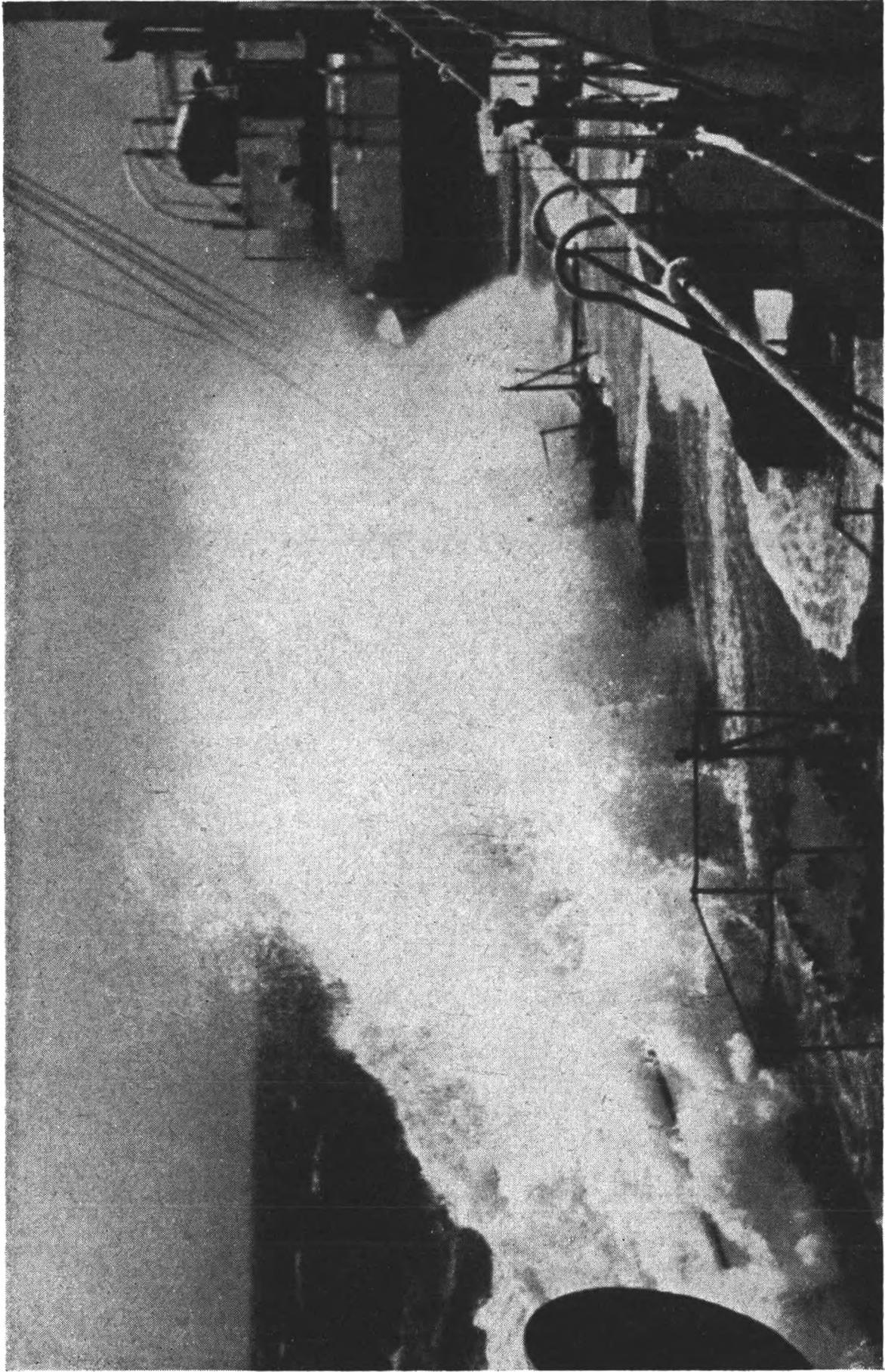
Dr. Harold Jameson, D.Sc.

Dr. Jameson's arrival back in England coincided closely with the outbreak of the late war and he was not left long in retirement, for in February 1940, he volunteered for service with the Meteorological Office and was posted to the Marine Branch which had then taken up its war-time location at Stonehouse, Glos. Dr. Jameson came to the Branch at a time when incessant calls were being made for the solution of marine meteorological problems. With his great experience of handling and working up statistical data his services were invaluable in producing Meteorological Atlases covering all oceans of the world, which work entailed the analysis of over 5,000,000 sets of observations, including all meteorological elements. While at Stonehouse Dr. Jameson also did service in the Home Guard. On the return of the Branch to London in 1945 he continued his service and has carried out research work which includes the investigation of diurnal variation of barometric pressure within tropical seas and within the Mediterranean Sea, and the diurnal variation of fog at sea and the relation between wind and pressure gradient over the oceans.

Of a very retiring and kindly disposition Dr. Jameson took a keen interest in the junior staff of the Branch, and was at all times ready to assist them in their study of meteorology and many are indebted to him for his patient help in this respect.

In bidding farewell to Jamey, as he was affectionately known, we wish him good health and happiness in a well-earned retirement.

J. H.



[Photograph by N. A. Hurst

THE FIRST MONSOON

One of the photographs shown at The Seafarers' Education Service Exhibition "Spare Time at Sea."

## SPARE TIME AT SEA

### Seafarers' Education Service Exhibition

Most seamen nowadays are familiar with the Seafarers' Education Service and the good work which it does for those who "go down to the sea in ships". This organisation, whose headquarters is at Selwyn House, London, is a non-profit-making and voluntary society, and in addition to providing educational services for seamen has an admirable library service to which most British ship-owners subscribe.

Through the courtesy of the Master of the Honourable Company of Master Mariners, the Society held its annual conference in 1951 aboard the *Wellington*, which is moored alongside the Thames Embankment, and the occasion marked the opening of the Society's exhibition "Spare Time At Sea" which was also held aboard the ship.

Empire Day was appropriately chosen for this occasion, for there is no doubt that it is largely due to the work of generations of British seamen that the British Empire developed as it did.

In the course of the conference the Director, Dr. Hope, emphasised the wide scope of the Seafarers' Education Service, the enormous number of subjects covered by its curriculum, and the fine work done by its voluntary helpers and teachers who number over a thousand. The modern seaman showed an astonishing variety of subjects in which he is interested, which included during the year in question such items as meteorology, ropework, unarmed combat, taxidermy, tropical fish, Regency furniture, and the breeding of budgerigars!

The Society, bearing in mind the importance to this country of the mercantile marine, was anxious to do all that it could, not only to raise the general standard of education among seamen, but to widen their interests, make their life at sea as interesting and attractive as possible, and keep them fit in mind as well as in body. Dr. Hope added that during the year in question libraries have been supplied to some 1,500 ships and exchanged every few months.

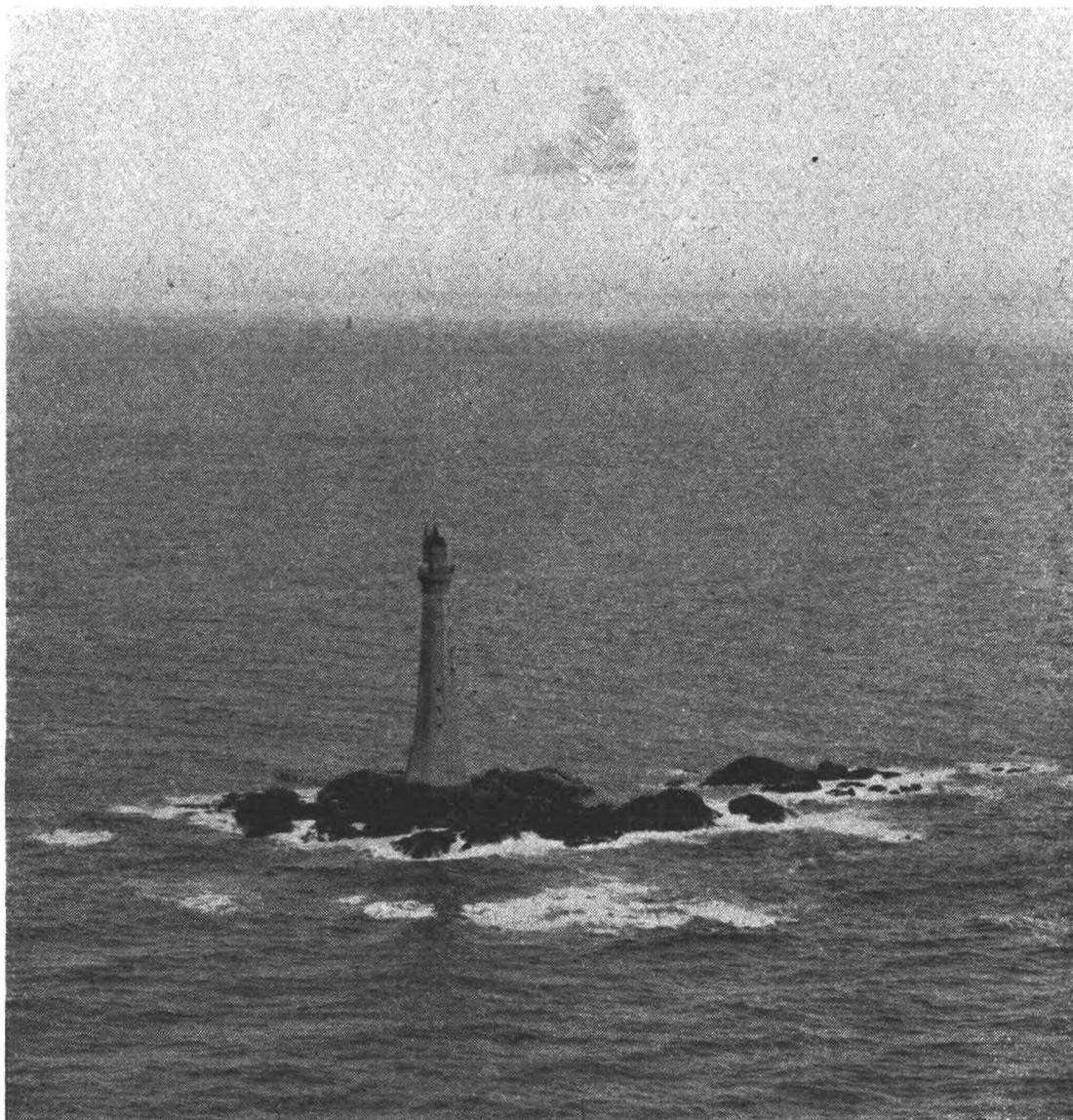
The Exhibition was opened by Mrs. Wurtzburg, wife of the President of the Chamber of Shipping, whose husband was unfortunately unable to attend owing to sickness. The variety and excellence of the exhibits showed how usefully and artistically he who wishes to do so can spend his spare time at sea. The drawings and paintings, both in oils and water colour, numbering about fifty, were mostly of marine subjects but included such items as "A Buckingham Village" and "Aldenham Reservoir". Other material on exhibit varied from ship models (in and out of bottles!) to ash trays, and included woven scarves, tapestry, wool rugs, carvings in wood and ivory, furniture, and many quite excellent photographs. Among the ship models was a beautifully made one of Captain Bligh's ship, the *Bounty*, and there was also one of the Ocean Weather Ship *Weather Watcher* made by an able seaman aboard that ship.

Thinking about this question of spare time at sea, it is perhaps not inappropriate to mention the interest and practical value to be acquired from a study of meteorology, combined, perhaps, with a little of the allied subject of oceanography. A specialised spare time study of such problems as humidity

change under various conditions at sea, or of rainfall, for example, would be a fascinating study, and of real practical scientific value if carried out conscientiously and exactly. Oceanographical studies are, of course, not so easy nowadays as they were in the sailing ship days, when quite a few ship-masters used to collect specimens of marine life. Even today, however, we can make quite a study of ocean currents and occasional observations of deep sea marine life.

C. E. N. F.

## LIGHTHOUSES OF THE BRITISH ISLES



*[Crown Copyright Reserved]*

### SKERRYVORE LIGHTHOUSE

Skerryvore is one of a group of half tide rocks in the southern approaches to the Minches, about nine miles SSW of the island of Tiree. The lighthouse is a grey granite tower 158 ft. high and shows a white flashing light every 20 seconds. It is also equipped with an explosive fog signal

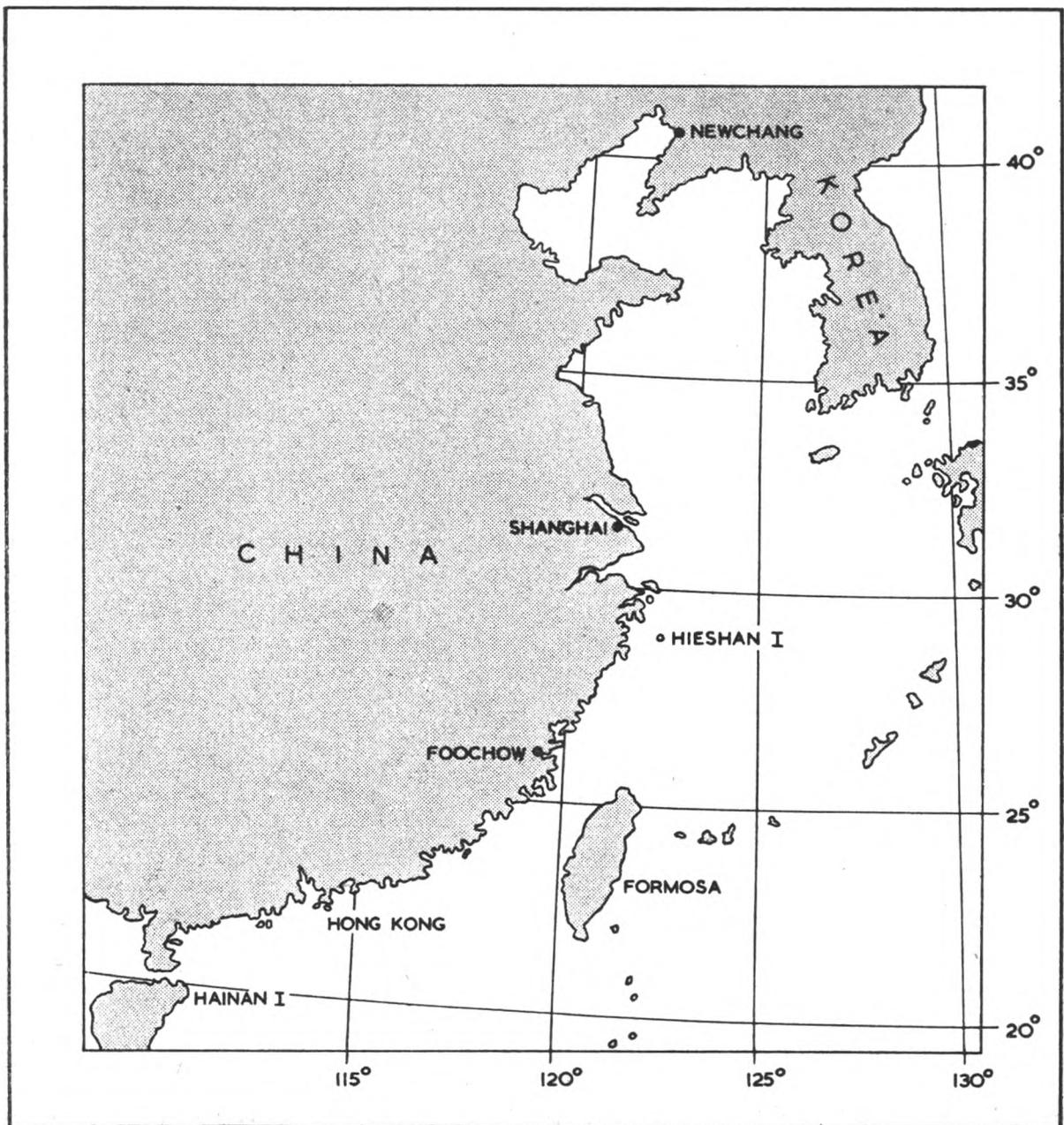
## EXPERIENCES OF TYPHOONS ON THE CHINA COAST

BY CAPTAIN J. R. RADLEY

(Port Meteorological Officer, Southampton.)

To anyone who has not actually experienced a tropical storm at close quarters, and even many seamen have spent a lifetime at sea without doing so, the wind force is difficult to imagine. A North Atlantic gale bears no comparison for sheer wind velocity.

I was unfortunate enough, or perhaps I should say fortunate enough after the event, to experience three typhoons in one month during my first year on the China coast. A large percentage of the world's tropical storms occur in the Pacific and each season one section or another of the China Sea comes



in for more than its share. From the China coasters' point of view, the worst area lies between Hong Kong and Hieshan Island, a distance of approximately 600 miles, and although the area to the south of Hong Kong down to Hainan Island also suffers badly, this area is not so frequented by coasting vessels, and it is this smaller type of vessel which suffers most, although perhaps

better able to seek shelter than the larger vessel. Shanghai and the area to the north is much less visited, due I think, to the fact that in these latitudes the typhoon has usually recurved and will be travelling away from the coastline, unless it has been travelling overland, in which case it tends to fill up quickly. Hong Kong itself suffers badly, and few years pass without a typhoon passing close to, if not directly over, the island, and extensive damage has been done to shipping in the harbour on many occasions.

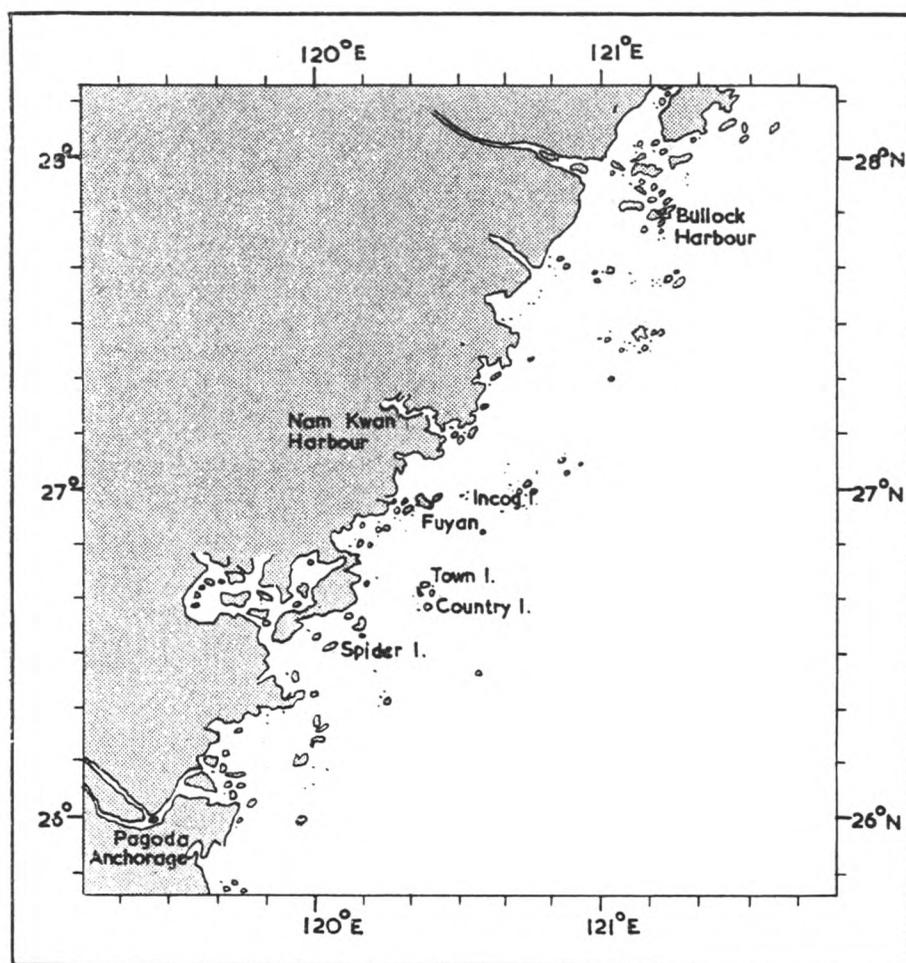
The worst typhoon I experienced during six years in these waters occurred towards the middle of August 1931, when I was serving as 2nd Officer in the S.S. *Newchwang* of the China Navigation Company, trading between Hong Kong and Newchwang, a port in the extreme north of China. On this occasion we were on a passage from Hong Kong to Shanghai, calling at Foochow to discharge a small quantity of general cargo. At Hong Kong we had been delayed for some 24 hours on the fringe of a typhoon which had unexpectedly recurved, so we were anxious not to lose any more time as we wanted to reach Shanghai on scheduled time, this being our home port and therefore holding most interest for the majority of us on board. Our stay at Foochow was only a matter of a few hours and although the weather was not too promising, a typhoon being reported some 600 miles to the east, we had few serious misgivings on that account as during that season of the year there is invariably a typhoon of some intensity or other developing.

We left Pagoda Anchorage, Foochow, in the forenoon. Spider Island Light was cleared by 4 p.m. and a course set for Incog Island which we expected to reach about dusk, it being the custom to keep to the inshore passage during daylight hours and go further outside at night except perhaps during full moon periods. Soon after passing Spider Island it was apparent however, that the typhoon would cross the coastline in the vicinity of Hieshan Island and it seemed advisable to make an anchorage before darkness set in. The best anchorage ahead of us was Bullock Harbour, but besides being much too far away to reach before dark, was too close to the expected path of the storm to be comfortable. The next best to the southward was Nam Kwan Harbour which is landlocked from all directions, but even this anchorage was too far away to make before dark and manœuvring in these unfrequented harbours is made more difficult by the presence of numerous fish-traps, which consist of a framework of heavy bamboos lashed together with thick ropes made from bamboo fibre, which are difficult to see at any time, and can cause much damage to propellers.

To seek shelter seemed desirable, as riding out a typhoon at sea in a ship of small tonnage is most uncomfortable to say the least, and as by this time the weather had begun to deteriorate, the wind being NE with frequent gusts and a steadily falling barometer, it was decided to anchor to the southward of Fu Yan. This is an island about 15 miles south of Nam Kwan Harbour, with a highest point of 1,700 ft. and a depth of water of 8 fathoms fairly close to, thus offering moderately good shelter. We could wait here for the typhoon to pass to the northward before proceeding. This we did, dropping two anchors with seven shackles on the port anchor and six shackles on the starboard anchor, and prepared for an uncomfortable night to say the least.

The wind was by this time about NE force five with stronger gusts, and, as the centre approached, the wind increased in force and the gusts became more frequent; later the rain commenced, causing the visibility to decrease rapidly,

which had been one of the factors which made it essential to make an anchorage in good time. The swell was less noticeable now as there was a considerable sea running by this time which became confused, being from a different direction to that of the original swell which had been about SE. The really severe period of the storm lasted about six to seven hours, the wind blowing four hours from the NE, followed by a lull of about twenty minutes, and almost immediately afterwards by a sudden resumption of wind of terrific force from the SE lasting about three hours.



The cessation of the storm seemed to occur fairly quickly. It appeared that the vortex passed almost directly over the ship, perhaps a little to the southward, but the central calm area was observed, when the wind dropped away completely and the clouds seemed to be breaking, but the atmosphere then was hazy and visibility very low.

I had been reading the mercurial barometer throughout the night at short intervals and it dropped steadily to about 28.50 inches, then as the centre approached it began to fall very quickly, so quickly in fact that in the few minutes preceding the passing of the centre over the ship, it was difficult to take a reading. The lowest reading was 27.77 inches (940.3 millibars) at the centre of the storm, after which it immediately commenced to rise, rapidly at first and then slowly but steadily. The wind, which had dropped suddenly, after a few minutes resumed with hurricane force from the SE, but not with the same terrifying intensity of the NE wind during the first period.

During the height of the storm we had been using our engines at varying speeds to ease the strain on the cables. This is a practice of which I am not in favour as a rule, but I must admit that on this occasion no shipmaster would have been content to lie to his anchors alone with any confidence. We were later informed from reliable sources that the wind reached a force of 165 m.p.h. in this typhoon, and I have no doubt that this was no exaggeration as on other occasions whilst at Hong Kong when typhoons struck the Island, a wind force of 130 m.p.h. was recorded on each occasion, and both were incomparable to the terrific wind force now experienced.

The centre of the storm had passed over the ship at about 8 a.m. and about 11 a.m. the weather began to moderate. The visibility continued to be very poor and it was not until 3 p.m. that land became visible and we could obtain a fix. The soundings had remained at about 8 fathoms throughout, so gave very little assistance, and our position was eventually found by bearings of a group of islands to seawards including Town Island and Country Island. This position showed that in spite of two anchors and maximum cable, also steaming into the storm, we had dragged our anchors  $12\frac{1}{2}$  miles in WSW'ly direction, actually parallel to the coastline and back down our own course line. It was apparent from this that only the NE wind had caused us to drag, thus confirming that the wind during the second period, after the passing of the centre, had not the velocity of the wind during the first period.

The damage sustained was surprisingly little, and very little heavy water was shipped but during the height of the storm the air seemed to be a sheet of water, rain and spray being indistinguishable. In these ships there is a permanent wooden covering over the bridge and deckhouses in place of awnings, and most of these were carried away, also canvas boat covers and similar gear, but that was the extent of the damage. A vessel belonging to Jardine Matheson was lost with all hands in this typhoon in an estimated position within a few miles of our anchorage, so we considered ourselves fortunate in getting off so lightly.

Some five years later, in 1936, at about the same time of the year, when in command of a Preventive Cruiser of the Chinese Maritime Customs, we just managed to make an anchorage in Hong Kong harbour, having run up from Hainan Island, before a typhoon struck the Island. I chose the anchorage to the north of Stonecutters Island as being the most suitable and used two anchors with a spread of  $60^\circ$ . A careful watch was kept on the cables in case of the anchors dragging, and the temptation to use the main engines was resisted, the ship riding out the typhoon successfully. It is my opinion that, unless practically compelled to, it is better not to use the engines as the anchors are then likely to be disturbed and before long you have little or no idea where the cables are leading.

The wind force on this occasion reached a maximum of 130 m.p.h. The main danger was from vessels dragging their anchors and likely to foul other vessels, as during a typhoon so many craft of varying size seek shelter in the anchorages around Hong Kong. Even in sheltered waters such as these anchorages, the amount of sea set up by a wind of hurricane force is difficult to imagine unless actually experienced.

We had two very narrow escapes on this occasion, once from a large

four masted barque, the *Shenandoah*, which drifted past only a few feet away, and later when a Chinese river steamer did the same thing, finishing up practically on top of an oil jetty, which on account of the abnormal height of the tide was actually under water. The tide reached a height of 15 ft. above normal high water and one ship, the *Hydrangea*, was left high and dry on the south side of Stonecutters Island some 100 yds. up the beach. She was an ex-naval sloop which had been sailing for some years under the Chinese flag and had been at anchor in the harbour waiting to be broken up. I believe this was carried out where she lay.

The following year, in September 1937, Hong Kong suffered from one of the worst typhoons ever experienced in that port, gusts of over 165 m.p.h. being recorded and numerous ships being driven ashore, including two of over 15,000 tons; the probable loss of life was in the region of ten thousand.

### INSTITUTE OF NAVIGATION

At a meeting of the Institute of Navigation on 18th May, an interesting and unusual talk on EARLY CHARTS AND THE ORIGIN OF THE COMPASS ROSE was given by E. G. R. Taylor (Emeritus Professor of Geography, London). Professor Taylor is a woman, and although at the beginning of her talk she styled herself as an "armchair" navigator and one who became seasick at the thought of crossing in the Gosport Ferry, in her lecture she displayed a very profound knowledge of navigation, ships and seamen and, indeed, of human nature.

She described how the very early compass roses originated in the Mediterranean and were directly related to wind directions. The earliest and most primitive rose had only four points and later the northern European maritime countries introduced the quadrantal and inter-cardinal points. She pointed out that the star design which even today is embodied in the "true" compass rose on an Admiralty chart was always a feature of the compass, for the ancients imagined that the lodestone (compass needle) depended for its north-seeking properties upon some powerful sympathy or affinity with the pole star (lode-star or lead star).

The lecturer also showed that the rather decorative way of indicating magnetic north, which is still shown on those Admiralty charts which depict the magnetic and true compass rose, dates from a very early form of compass rose as was drawn on the ancient sheepskin charts of about 1200 A.D.

The mariners of northern European countries referred to the inter-cardinal compass headings in such terms as "Nord-nord-est" (Norman-French) for NNE as early as 1250, while in the Mediterranean they were still using the rather complicated and lengthy "wind" names for compass direction, such as "Greco towards Tramontana" for NNE.

Professor Taylor reminded her audience that the word "compass" related to circle or circuit of the horizon, and referred to a "Mediterranean Pilot" of 1250 A.D. entitled "The Compasso for Navigation" which was so called because it discussed the circuit of the whole Mediterranean Sea. The chart which accompanied this book was called a "Compass Chart".

In the course of her lecture, Professor Taylor went into very interesting details of navigational practice of the Middle Ages, particularly in the

Mediterranean area, and discussed early charts, sailing directions, and even the magnetic variation of 1200 A.D.

The lecture made one realise what an adventure it was to go to sea in those superstitious days, and how courageous were the mediæval seamen and how dependent were they upon winds and weather. One wonders how weather bulletins and forecasts would have benefited them. When one studies the ancient Portulan chart with its network of rhumb lines, one is rather struck with its similarity to the modern Consol or Loran chart. C. E. N. F.

## ROYAL METEOROLOGICAL SOCIETY

### Presidential address by Sir Robert Watson-Watt

Sir Robert Watson-Watt, F.R.S., delivered his Presidential Address on the subject "Meteorology and Aviation" before the meeting of the Society held on 16th May, 1951.

Sir Robert discussed the history of the Airmet broadcasts in the first part of his address. He gave a summary of the development of these broadcasts and of their cancellation a year ago following the re-allocation of the frequency used for them at the Copenhagen international broadcasting conference of 1948. He emphasized that the Airmet broadcasts though arranged initially for the use of aviators had come to be widely used by many other members of the community. He was strongly of the opinion that the five-minute B.B.C. broadcasts of Meteorological Office forecasts were no substitute for Airmet with its intimate contact with the actual forecaster, and he urged the introduction of revised Airmet broadcasts designed to serve all interests.

In the second part of his address, Sir Robert dealt with the provision made by the Government for the satisfaction of the meteorological requirements of the community. He gave an outline, based on the Annual Reports, of the incorporation of the Meteorological Office in the Air Ministry, and said he considered that a public review of the position of the Office as part of the Air Ministry was needed because the present organisation tended to give undue priority to aviation requirements.

The improvement in meteorological knowledge from which the whole community benefited had been very largely produced by the demands of aviation, but more attention should now be paid to the needs of other industries. The slogan "Meteorology in the Service of Production" should be the guide. He also urged the installation in Britain of automatic telephone weather information services such as are to be found in U.S.A. and on the continent of Europe.

The President also suggested that the Society should set up "Interest Groups" for the discussion of the particular meteorological requirements of the interest in question.

Sir Robert said, in concluding, that the views he had expressed were entirely his own, and that he had not consulted the Director of the Meteorological Office or other Fellows of the Society in the preparation of his address.



*[Photograph by J. S. Grassick*

**NORTH ATLANTIC WINTER**

One of the photographs shown at the Seafarers' Education Service Exhibition " Spare Time at Sea "

## LOGBOOKS

BY LT.-CDR. L.B. PHILPOTT, D.S.C., R.D., R.N.R.

(Nautical Officer, Marine Branch, Meteorological Office.)

A study of logbooks received from Selected Ships during the past six months has revealed that there are some errors which are common to many, and it is hoped that a few remarks on these may help officers to make and record their observations with no more effort (and perhaps even less) than before and with a greater degree of precision. Time will thus be saved both on the high seas and at the Marine Branch, Harrow. These remarks are intended to help and encourage, not to criticise. We, who are seamen ourselves, can remember how harmful and exasperating can be carping criticism from ashore, criticism which often defeats its own object.

Let us first remember that there are over five hundred Selected Ships and the mistakes few, so that only an occasional ship will have made more than one. The majority will have made none, but it is a rare officer who cannot profit by the mistakes of others, and we make no apology for "running through" the logbook at present supplied, column by column.

Little comment is necessary when dealing with the first three sections, though some ships, whilst recording the observations at the required Greenwich Time have used a ship's date against it. In some longitudes it is, of course, impossible to make this error but elsewhere it can be done, and when done it is sometimes difficult to spot. Only two ships have been found "guilty" of this error but the point needs watching as it may have an effect on the construction of synoptic charts for investigation, particularly in regions where observations are sparse.

Very few ships have recorded the height above sea level of their barometer cistern. We always like to check the corrected barometer reading before putting it on permanent record in case the Gold Slide has not been set correctly. To do this we must, of course, know the height of the cistern. We can make a rough estimate of this from the record sent in by the Port Meteorological Officer or Agent the last time he visited your ship, but as the height varies considerably in the course of a voyage, such an estimate can be little more than a guess. Unfortunately the "model" log, printed on pages viii and ix of the Fair Logbook, itself shows no height, a fault which will be remedied in the forthcoming revised logbook.

Many ships are still wrestling with the problem of trying to squeeze a full description of the barometric tendency into a column only 8/10 in. wide. Recently we had two ships whose observers had gallantly drawn little pictures of their barograph trace in every such space. These painstaking officers could have saved themselves much time and trouble by recording the appropriate code figure (as promulgated in an addendum to the *Marine Observer's Guide*, dated 28th March, 1950). Nevertheless we appreciated their efforts to give us the fullest possible information.

Very few ships read their thermometers to a greater degree of accuracy than the nearest degree. A very few logs have come in with readings to the nearest half degree but they are seldom taken to a higher degree of accuracy. The difficulties of reading thermometers in a portable screen are well appreciated here. You have been asked to place the screen on the weather side, clear of obstruction and, for preference, slung from an awning spar or ridge

rope. Thus it will be far from rigid and, as the thermometers must not themselves be directly exposed to the elements, you yourself will have to face the wind when reading them. Thus the luckless observing officer on a stormy night of a winter passage round Cape Horn, hampered by oilskins and sou'wester, with one hand steadying the screen whilst the other shines a torch and with nothing to steady him against the roll of the ship, may be excused if he tells himself "That's good enough, this time". Nevertheless it is a rough passage indeed which has no fine weather somewhere, and this reading of temperatures is really important. Let us take a simple example. Suppose the correct readings of the dry and wet bulbs are  $40.4^{\circ}\text{F}$  and  $37.6^{\circ}\text{F}$  respectively, then the dew point will be  $33^{\circ}\text{F}$ . Had these two thermometers been read to the nearest degree only, they would have been recorded as  $40^{\circ}\text{F}$ . and  $38^{\circ}\text{F}$  respectively, giving a dew point of  $35^{\circ}\text{F}$ . Whether it be for assessing the possibility of fog or for the purpose of deciding how or when to ventilate a cargo, the observation of dew point has an immediate value to the ship, apart from its value to the meteorologist ashore.

In a few logbooks, happily not many, it is obvious that the wrong table has been used in computing the dew point. In the *Marine Observer's Guide* Table XVIII (A) is for use with the Stevenson Screen and Table XVIII (B) for use with the aspirated psychrometer. For many temperatures and depressions of the wet bulb the results are the same in both tables but with large depressions the discrepancy may be considerable. It will readily be seen that the dew point should be computed only from the table appropriate to the instruments in the ship.

In a logbook received a short while ago, blank spaces in the wet bulb and dew point columns were poetically explained in the space for additional remarks by the following "Ode to a dried up well—a Humi-ditty".

*Wet bulb temp. I try to read  
But water is the cambric's need.  
"Wet" and "dry" I can't compare  
Because the "aqua" is not there.  
Dew point temp. cannot be seen  
For want of care to Stephie's screen.  
Wick and muslin loudly moan  
For water, water, not ozone!*

Will principal observing officers please note ?

In taking sea temperatures it sometimes happens that a ship changes over from bucket to engine room intake, e.g. where the bucket is holed or lost and until it is repaired or a new one made. Many ships, in such a case, have omitted to record when the change has taken place. It is sometimes thought that there is little difference between the intake and the bucket temperatures, but we recently received as an addition to a logbook, a typewritten sheet on which were recorded 41 simultaneous bucket and intake temperatures taken over a period of three months and in two oceans. In no case did the two thermometers read the same and one day the difference was as much as  $10^{\circ}$ .

It will be a good ship indeed which describes all her weather in the few simple letters known collectively as the Beaufort notation; and yet every meteorological phenomenon can be thus broadly described, whilst the finer points can be amplified in the remarks column. But these columns sometimes cause doubt because they clash with recorded observations of other elements. The most widespread discrepancy has been found between the

weather in Beaufort notation and the total amount of cloud, especially with regard to the use of letter o. This should only be used when the sky is completely covered with one uniform layer of thick or heavy cloud. Thus a sky may be 8/8 clouded and still not be o. So many observers have used few letters other than b, bc, c and o and we do commend everyone to a closer study of the table in the logbook and page 39 of *The Marine Observer's Handbook*. In this connection also let us remember that "gloom" is, meteorologically speaking at any rate, quite dead and that its former symbol g now means gale. Likewise there are no more "showers of rain" under a single letter, p now meaning simply "Showers of . . ." and needing another letter to complete it.

A discrepancy between Beaufort notation and the visibility by scale has also frequently been noticed. There are very few ships which have not at some time or other logged z with a visibility of 98 or even more. This error is most common in the Red Sea or off the West Coast of Africa in an easterly wind. When the horizon is muzzy because of sand or dust particles, the temptation to log z is great, but this should not be done if the visibility is more than one mile. The symbol z<sub>0</sub> will cover other short visibilities up to five miles, while below half a mile the letters f or F should be used. This is shown on page v of the Fair Logbook. These letters and descriptions are used for short visibilities no matter what the cause, e.g. visibility less than 50 yds. is described as dense fog with code figure 90 and Beaufort Letter F whether it is caused by wet fog, forest fires, or sandstorms, etc. The Chief Officer or boatswain with his paint pots will, no doubt, be able to describe adequately the amount and quality of the sand which is being deposited on the superstructure and a timely note in the remarks column is always helpful. In scrutinising these logs we sometimes think that there is a tendency to overestimate the visibility. Assuredly the man on the spot can be the only judge of the prevailing visibility but we cannot help doubting the accuracy of the figures when we read that you have had the same visibility in a North Atlantic drizzle as you had on fair cloudless days in the tropics. If at any time the Beaufort notation and the visibility seem to clash a timely note in the remarks column will set our minds at ease.

Very few errors have been suspected in the cloud observations, though sometimes we have thought that these were incomplete. For instance we have often had precipitation reported with no precipitation cloud recorded. On the other hand we have read of skies heavily clouded with the ugliest and most threatening types without any precipitation following. Here again the remarks column can be a great help in clarifying the situation.

It is recorded that "ships may omit the observation for significant cloud at their discretion", and, perhaps wisely, most have done so. As the years go on we anticipate that, with the development of air travel and the need for a greater knowledge of the upper atmosphere, these data will be of greater value, and we are grateful to the pioneers who have undertaken the extra work involved in making this tricky observation. There are bound to be mistakes when starting anything new and unhappily fully half of the observations for significant cloud have had to be discarded. Once again we commend the attention of observers to the *Marine Observer's Guide* where details are given in the section headed "Code Tables". From this it will be seen that in all cases where only one layer of cloud is present, that layer, provided it is

below 20,000 ft, is the significant cloud. There can be two layers of significant cloud, but only if the upper layer covers more than half the sky. Cloud above 20,000 ft is never significant in the present sense, whilst the lowest layer (if below 20,000 ft) always is. Putting it very broadly we could say that significant cloud is any cloud which would worry an airman.

Wave observations have, in general, been good and consistent and it is encouraging to notice that officers have forborne to guess, rightly preferring the blank space to the doubtful observation. In the old days when sea and swell were reported separately both were invariably recorded. Nowadays it is seldom that both lines, under the heading "waves" are used. The period and height of a low swell on which a large sea is superimposed will often be difficult to judge, but in many cases we think the direction at least could be ascertained.

The Remarks column is and probably always will be the Cinderella of all the columns. Its potentialities are great and yet the use to which it is put is so small. Many observations need a word or two of plain language to complete their usefulness, whilst the change of conditions between the observations is often of as great value as the observations themselves. Very few ships have recorded the things which a seaman notices such as changes of wind and sea, time and duration of precipitation, appearance and disappearance of clouds, etc. Apart from purely meteorological information it helps if a bare navigational record is also kept, together with a record of the servicing of instruments, accidents, changes, etc., whilst the pages for additional remarks may contain anything of interest for scientific research. Whatever you send in, be it zoology, astronomy, oceanography or ornithology, it is forwarded to the appropriate body for examination and comment.

Current observations have been given by all too few ships, though these are observations which will ultimately be of great use to seamen. We can never have too many such observations, and the more we have the greater will be the accuracy of future issues of the various current atlases. One beautifully kept logbook came to hand a few weeks ago with, on the current page, a statement that no current observations had been made because the ship had only been sailing in seas where current data were adequate. Observers please note, there are no such seas. Another ship recorded that "no unusual currents have been experienced". Nevertheless we would have been glad to have had her observations, however usual. If only unusual currents are recorded, the result will be to give an entirely false picture of conditions as regards surface currents.

We believe that some ships do not make current observations because of their speed. It is, of course, perfectly true that in 24 hours a fast ship may experience two or more different currents giving a resultant that may differ widely from its constituents, but if those ships could give short period currents, e.g. "stars" to "stars" they would be helping greatly. The same is, of course, true for any ship, for apart from the known inaccuracies of the noon position, the distance covered between the observations is a factor to be reckoned with in assessing the value of an observation. The ideal observation is made when the ship is stopped and we are grateful to the few ships which have made the fullest use of engine room breakdowns for this purpose. In passing it may be remarked how often a true position, as opposed to the time-honoured sun-run-meridian altitude is obtainable in full daylight. The

moon and Venus can often be faithful allies, whilst occasionally during, say a Western Ocean or Cape Horn winter passage, when the sun is weak the navigator may be lucky enough to get a "cross" from the sun and Jupiter.

Many ships have entered up a half dozen or so current observations for the beginning of a voyage and then left it at that. These cases often make us think that the principal observing officer has put off the writing up of the fair log to the last moment and then has not had time to finish it. We hardly like to remind officers of the desirability of writing up the book daily if possible, whilst the observations are still fresh in the observer's memory.

In conclusion, just a few words about the "mechanics" of the logbook. We are always at great pains to keep faithful records of all our observing captains, officers and radio officers. We feel that sometimes these records must be inadequate because of incomplete entries regarding the changes of officers, with dates, names and full initials on the first page. We feel the desirability of giving credit where credit is due and of not leaving out anyone who has helped. The dates when officers change have sometimes been deduced from the body of the log, for instance date of arrival at a home port, even a change of handwriting in the book has sometimes given us a clue but it would clear up any such problems if principal observing officers would enter up all such dates and names. Should you ever come out to the Marine Branch at Harrow, and we are always pleased to see you and to show you what becomes of your observations, we shall take pleasure in showing you your personal card, complete as far as your records have allowed, no matter how long ago you made your first voluntary observation. It always gives a nice tidy look to the logbook too, if it is signed by the captain and principal observing officer before it comes to us.

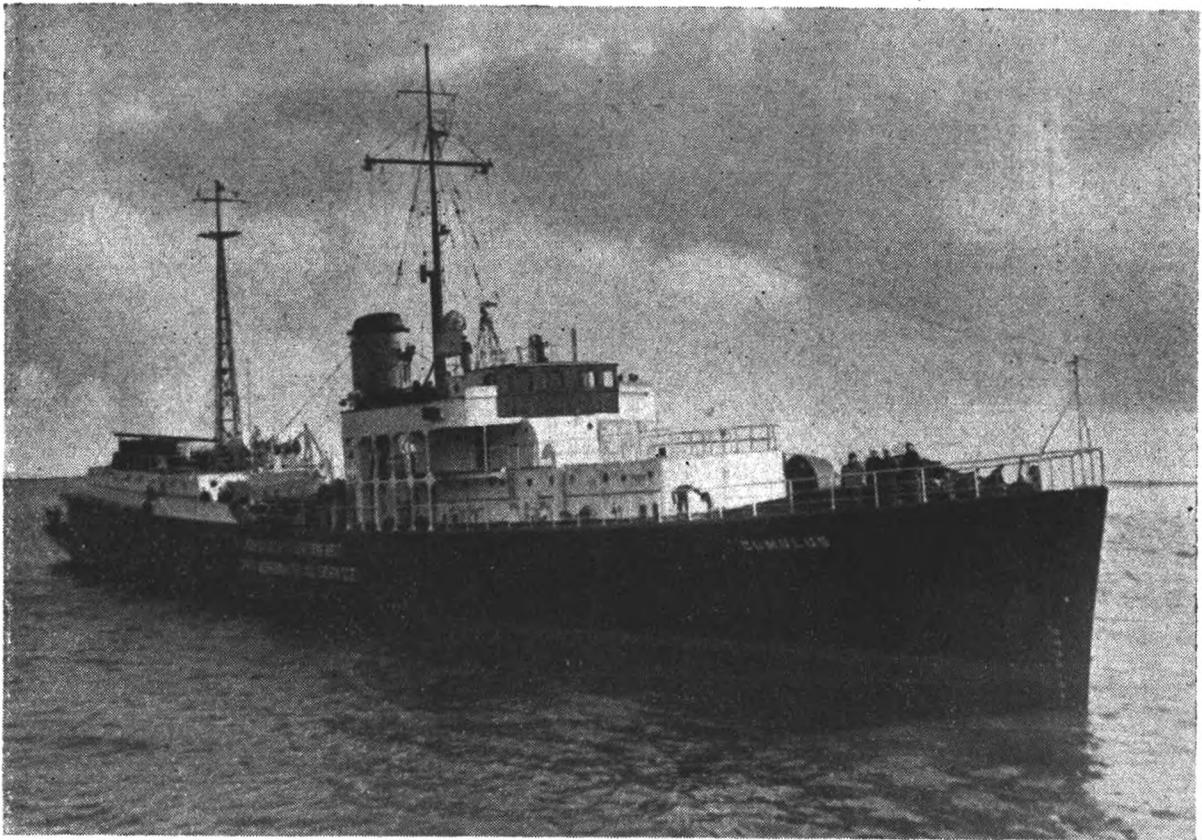
As regards the actual periods of the observations we notice that a few ships have excused themselves from observing on the ground that the radio officer has been off watch, or that they have been out of touch with other ships or a specified coast station or, in one case, that they were in the area covered by the coastal weather forecast, i.e. North Atlantic east of  $15^{\circ}\text{W}$ . Selected ships' observations are used for two separate and distinct purposes. In addition to the wireless message which will form part of a forecast message, all observations are recorded in the Marine Branch, later to be incorporated into a climatic atlas or other work. For this purpose it is in the loneliest oceans, where wireless traffic may be at a minimum, that the observations are the most valuable because they are few. When in coastal areas, it may be your observation which will give the key to a dangerous meteorological development and be instrumental in timely warning being given to other ships and coastal communities where life and property may be threatened. So humanity will be your debtor if you will go on observing at synoptic hours as long as the safety of your own ship permits.

## THE NETHERLANDS WEATHER SHIPS

BY P. VAN DER TUUK ADRIANI

(Secretary of the Netherlands Weather Ship Committee.)

At the second Weather Ship Conference held in London in Spring, 1949, a new scheme for the system of Ocean Station Vessels was decided upon. Belgium, with whom the Netherlands operated the former station KING withdrew from active participation at that station, thus ending the close and pleasant collaboration between these countries in this matter. The Netherlands were assigned the task of collaborating with the French Government in the operation of the new station KING, and with the British Government in the operation of the new station JIG; furthermore, to participate in the maintenance of station ABLE with one ship, together with the United States' ships.



Netherlands Ocean Weather Ship *Cumulus*

On account of the present collaboration with the United Kingdom at Station JIG, it might be of interest to readers of *The Marine Observer* if some details are given about the Netherlands Weather Ships. The Netherlands Weather Ship *Cumulus* appeared for the first time at station JIG, on April 15th, 1950. This ship is of the frigate-type and a former convoy leader of the U.S. Navy. She served during the last war for the protection of the North Atlantic convoys, but it is hardly possible to recognise her now, because nearly everything above the main deck has been stripped off to fit her out for her more peaceful job. A new superstructure was fitted, carefully designed to meet the requirements of all departments working on board. The interior has undergone a rather thorough revision as well, and much has been done for the comfort of the ship's company.

The other ship, the *Cirrus*, of exactly the same type, has been reconstructed as well. In fact, the *Cirrus* is the ship that ran the former station KING together with the Belgian Weather Ship. She was fitted out for that service in the summer of 1947, but only in a very provisional way.

The newly refitted *Cumulus* started her service on the French station KING, on 28th January, 1950. Although the ships have met with very rough weather during the course of their duties, they have behaved well, and it seems that they are suitable for their job.

### **Administration**

The Netherlands Weather Ships come under the control of the Civil Aviation Administration of the Ministry of Transport and Waterworks who are assisted by an advisory committee. All parties concerned are represented on that Committee; the Royal Netherlands Meteorological Institute which runs the Meteorological and Oceanographic service on board, the Telecommunications and Air Traffic Control Division of the Civil Aviation Administration which runs the communications service on board, and a financial expert. The Chairman of the Committee, a former Naval Officer, is an expert in nautical matters. The actual operation of the ships, however, is done for the Government by a private Steamship Company. This system proved to be the most economical solution.

As regards the more technical aspects of the Netherlands Ocean Weather Ships, the following details might be of interest:

### **Meteorology**

The Royal Netherlands Meteorological Institute at De Bilt in the province of Utrecht is responsible for the meteorological work on board the Ocean Weather Ships *Cirrus* and *Cumulus*. The meteorological observers who make the observations aboard those ships (normally 1 chief meteorological officer and 9 observers) form part of a section of employees of the Institute, who in turn are employed either making upper air observations at De Bilt or surface and upper air observations aboard a Weather Ship. For this reason the meteorological outfit of both Weather Ships is identical to that at De Bilt.

Radio-sondes are released 2 or 4 times a day (2 at the stations KING and ABLE, 4 at the station JIG). Observations are made of pressure, temperature, humidity, wind direction and wind speed in the upper air. The instruments in use to indicate pressure, temperature and humidity by audio-frequencies at constant wave lengths are British made radio-sondes. The audio-frequencies are recorded automatically by using a frequency meter and a Brown recorder. This way of recording has proved to be very successful, especially since the result of the observations can be derived from the recorder-trace within a relatively short time of 2 hours. The determination of the wind direction and wind speed is made simultaneously with the above-mentioned measurements. The radio-sonde balloon is provided with a radar target whose position is determined by radar equipment, so that it is possible to make observations of upper air winds in cloudy weather. These upper air wind observations by radar are also made at intermediate hours.

Observations on surface weather are made hourly, but only those observations which are made at the three-hourly synoptic times are actually transmitted by radio.

The upper-air observations together with the synoptic observations of surface weather are sent by radio to the shore stations responsible for the inclusion of those observations in international broadcasts.

Weather maps are drawn daily aboard the ships by using coded analyses received by radio from shore authorities. Forecasts made at De Bilt of the weather and upper air winds at the station are transmitted to the Weather Ships, so that full information about the weather is always available for other ships and airplanes.

### **Oceanography**

Besides the meteorological outfit, the *Cumulus* and the *Cirrus* are equipped for oceanographic work. There is an oceanographic deck-laboratory, a small electrically driven winch and a spar which enables oceanographic instruments to be let down and kept well off the ship's side. Next year there will be installed a deep sea oceanographic winch, with a davit, for lowering instruments down to 6,000 metres depth.

### **Radio**

The responsibility for the installation and maintenance of all the radio equipment on board the ships, as well as the manning of the radio and radar department (i.e. chief radio officer, 6 radio officers, and 3 radio/radar technicians) rests with the Telecommunications and Air Traffic Control Division of the Civil Aviation Administration.

The Technical Committee of the 2nd Ocean Station Vessel Conference made a detailed examination of the technical aspects of Ocean Station operation. One of the major items discussed was the communications equipment. Although realising that, owing to limitations of space, not all the desirable watches could be maintained, the committee deemed such equipment indispensable as would ensure all safety, distress and emergency calls and related traffic being efficiently dealt with, normal mobile communications with aircraft being provided, and contact with shore stations being maintained.

The radio equipment of the Netherlands vessels *Cirrus* and *Cumulus*, consisting of 10 transmitters and 11 receivers, covering M.F., H.F. and V.H.F. frequency bands, 2 direction finders, 1 radio-beacon, 1 Loran receiver, and 2 radar sets (microwave surface radar and air search radar), completely satisfies the above requirements with regard to the duties of the ships as ocean weather ships, and moreover provides them with the best possible aids when navigating as ordinary ships.

A continuous listening watch is maintained on the international distress frequency (500 kc/s). The aeronautical calling wave (6,210 kc/s), the international V.H.F. emergency frequency (121.5 mc/s), and the appropriate North Atlantic route frequencies are also guarded. These facilities, together with the microwave surface radar, sufficiently guarantee that the ships can successfully play their role when partaking in any search and rescue or distress action that might occur.

Communications with aircraft, which are established on request by the aircraft themselves, or in consultation with the Air Traffic Control Centre in which area the ships are situated, are carried out on the normal I.C.A.O. North Atlantic route frequencies, or on V.H.F. (118.1 mc/s).

Besides this provision of communication facilities, the Netherlands Weather Ships are also able to provide navigational aid to any aircraft or ship if required. A radio beacon working on medium frequency transmits continuously, and bearings may be given on request by means of a medium frequency direction finder. A valuable help also for providing an accurate bearing and distance from the Weather Ship is the air search radar installation on board the ships.

For communicating with shore, the ships maintain a fixed schedule with the appropriate shore station, using this channel for passing meteorological observations, and for the exchange of any other messages between ship and shore.

Among aids the Weather Ships use for their own benefit, radar takes a prominent place. Surface radar furthers safe navigation when the vessels are steaming towards the station or returning homewards during bad visibility.

To keep within the assigned square and to determine their positions when on station, the ships, besides using normal astronomical navigation means, are able to use the Consol beacons of Lugo, Stavanger, Bushmills, and Ploneis, whereas the Loran receiver renders it possible to utilise the emissions of the stations of the Standard NE Loran Chain.

### ASSOCIATION OF NAVIGATION SCHOOLS

The Annual General Meeting for 1951 of this Association was held at the School of Navigation, Warsash, Southampton, on 31st May, 1951. The Principal Examiner of Masters and Mates provided the Conference with some statistics about the percentage of passes obtained by candidates in the examinations in 1949 and 1950, as follows:

	1949		1950	
	CANDIDATES	PASSED	CANDIDATES	PASSED
MASTER	549	73%	532	79%
1ST MATE	817	75%	818	78%
2ND MATE	952	78%	1281	75%*

(\*55 Candidates gained 90% marks or over)

Commenting upon the quality of the work done by candidates, he said that in the previous year candidates generally showed good knowledge of their bookwork but the weakness was largely in the practical work they should have picked up at sea. Lack of observation was a common failure; it was surprising how many candidates had failed to note the most elementary details about their own ship.

As has been suggested before in *The Marine Observer*, it does seem possible that if a young officer takes an interest in such matters as observing the weather, he will thereby train himself unwittingly, perhaps, to be observant in other things. For example, if he has a trained eye for looking to windward for shifts of the wind, it is reasonable to suppose that this would help him to train his eye to look round the ship, and quickly appreciate things that are wrong, as well as to notice details of the vessel's construction, etc.

The Principal Examiner remarked upon the encouraging increase in the number of ratings from the lower deck who had been successful during the year in obtaining their 2nd Mates Certificate. This had risen from 53 in

1938 to 129 in 1950, and showed that by taking advantage of the correspondence courses now being run by the Nautical Schools, there was no reason why any Ordinary Seaman should not eventually become a Master Mariner.

The Principal Examiner mentioned a meteorological "howler" in which a candidate described the cause of lightning as follows:

"When two clouds come together, generally 'curius' clouds, the ice crystals which are all the time rising and falling in the two clouds are clashed together. This sudden clashing causes a discharge of electricity known as lightning; the noise which is heard after, known as thunder, is caused by the ice crystals falling against the bottom of the cloud."

Discussing the question of seamanship, he mentioned that one Examiner had deplored the ignorance of the present generation of seamen of most elementary sea terms. Signals was a subject in which most candidates showed weakness. Experience in convoy work during the last war showed how important it was that ships' officers should be efficient at signalling. In peace-time, in the event of a breakdown of the radio, or of rescue work developing, efficient visual signalling may well be the means of saving life or property, or at least of passing important information.

Mention was made of the encouraging degree of interest shown nowadays by officers in such subjects as D.F. and radar and in electronic aids to navigation generally. Finally, the Principal Examiner drew attention to the fact that particulars of the new examination syllabus will shortly be available from H.M. Stationery Office.

C. E. N. F.

## ACROSS DEEP WATERS

At the invitation of the Canadian Pacific Steamship Company, the writer had the pleasure recently of attending a private showing of the documentary film "Across Deep Waters"—a pictorial record of a voyage of one of the C.P.R. "Beaver" ships from London to Montreal.

The film which is for public exhibition was well produced, and showed something of the background of the cargo the vessel carried and of British trade with Canada in general. One sees the vessel being loaded in London Docks, the crew signing on, details of sailing procedure, and some admirable glimpses of day to day life aboard the ship during the voyage to Montreal via Belle Isle.

The vessel is a "Selected Ship", and the film shows during the course of the voyage the officers making their meteorological observations—taking sea-water temperature, reading the barograph and hygrometer, entering up the readings in the logbook, and the message being transmitted by radio. The commentator mentions the importance of this voluntary meteorological work, and then there is a sequence showing the Master discussing a gale warning with the officer on watch. Later the effect of a gale upon the ship is shown in a very good sequence, the filming of which was largely done by some of the ship's officers.

It is gratifying to note that the voluntary work which ships' officers do at sea is thus recognised and brought before the public in this pictorial manner.

C. E. N. F.

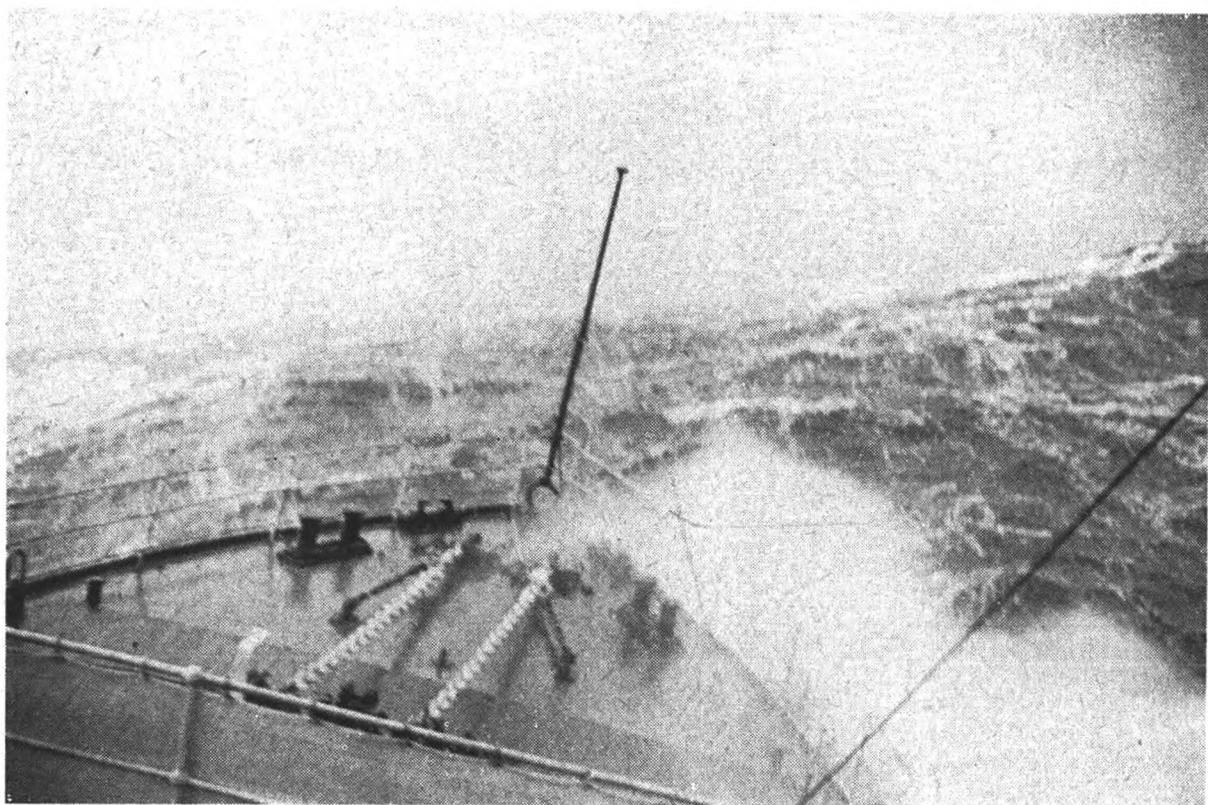
## OCEAN WEATHER SHIPS

The following extracts from a report from a Radio Overseer of a Weather Ship may be of interest, as it seems to rather well illustrate the way in which Radio Officers at various stations generally assist one another:

“ At 2000 GMT on the 6th May, we were asked to contact Portishead Radio for courtesy traffic and we were given a signal from the Naval Station at Argentia in Newfoundland and asked to repeat it to O.W.S. ABLE. This was done and ABLE in turn retransmitted our reply to Argentia.

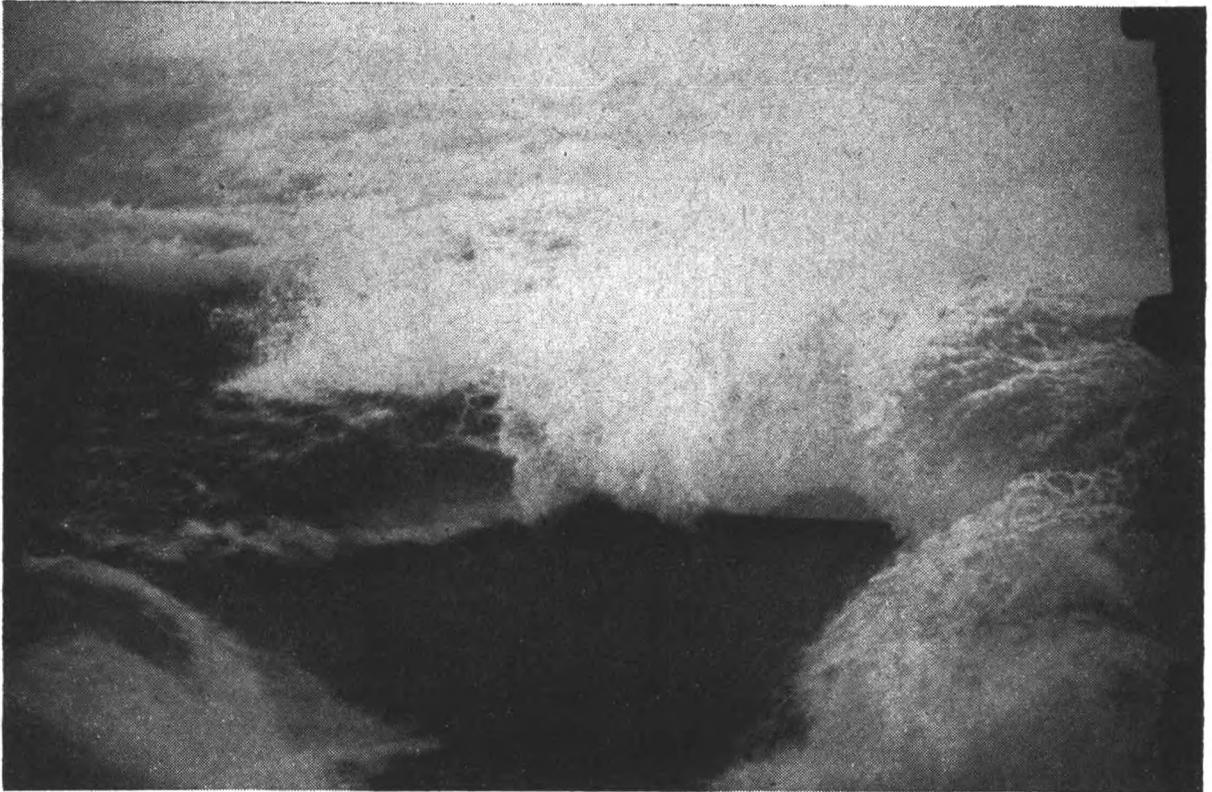
“ On the 17th May, we were asked by Reykjavik to get in touch with the S.S. *Empress of Scotland* and get her position, course and speed. It took us about two hours to raise her on 500 kc/s but we eventually got the information and passed it back to Iceland on H.F. Some of the *Empress of Scotland's* H.F. frequencies were also tried but no contact was established.

“ An instance of co-operation between Weather Ships occurred during the voyage when the merchant vessel *Bassano* wanted to pass us her Obs for retransmission to Portishead Radio. Being unable to raise us on 500 kc/s she called O.W.S. CHARLIE who in turn called O.W.S. ABLE; eventually ABLE received the Obs and passed them to us on M.F.”



[Photograph by D. Phillips

*Weather Explorer* steaming into a gale  
23rd December, 1949, at Ocean Weather Station ITEM, wind force 10



[Photograph by D. Phillips

Waves breaking over stern of *Weather Explorer*  
23rd December, 1949, at Ocean Weather Station ITEM, wind force 9, waves 35 ft.

## PERSONNEL

**RETIREMENT.**—CAPTAIN A. R. OSBURN retired from the sea after serving 44 years afloat, when the *Atlantis* docked in Southampton in March 1951.

Captain Osburn joined the Royal Mail Steam Packet Company, after obtaining his Master's Certificate, in July 1915 as fourth officer of the *Araguaya* remaining in that ship throughout the war years and reaching the rank of second officer.

After passing through the usual grades Captain Osburn's first command was the *Araby* in 1939 and he subsequently commanded several of his company's ships throughout the 1939-45 war amongst them being the *Palma* which was lost by enemy action.

Captain Osburn joined the *Atlantis* in July 1949 and remained in that ship until his retirement, after nearly 36 years with the Royal Mail Lines.

Our first record of Captain Osburn as a voluntary observer was in 1932 when on M.V. *Deseado*. In 1950 he was awarded a University Atlas as an "Excellent Award."

We wish him health and happiness in his retirement.

J. R. R.

## SOUTHERN ICE REPORTS During the Year 1950

**OCTOBER**  
No ice reports received

## NOVEMBER

DATE	POSITION		DESCRIPTION
	LAT.	LONG.	
<i>S.V. John Biscoe</i>			
24	62 45S	58 24W	Field ice and bergs. Heavy pack with isolated tabular bergs. Isolated bergs.
28	62 00S	55 24W	
	60 50S	51 42W	

## DECEMBER

DATE	POSITION		DESCRIPTION	DATE	POSITION		DESCRIPTION
	LAT.	LONG.			LAT.	LONG.	
<i>S.S. Southern Harvester</i>				<i>S.S. Southern Garden</i>			
1	55 35S	24 09W	4 bergs.	24	54 45S	14 00W	Fairly long berg about 70 ft. high.
2	58 00S	18 30W	3 bergs.	25	55 58S	15 40W	Two tabular bergs, mod. length, 70 ft. high.
3	58 45S	17 50W	4 bergs.		55 58S	15 40W	Isolated bergs and growlers.
	58 27S	17 00W	6 bergs.	26	56 20S	16 49W	1 growler, 1 brash.
	58 25S	17 00W	9 bergs.		57 24S	17 50W	Frequent tabular bergs
4	58 30S	16 49W	5 bergs.		58 00S	19 30W	Numerous small bergs and growlers. Bergs 50-100 ft. high.
	57 00S	14 26W	2 bergs.	27	58 35S	18 40W	Frequent low bergs.
	56 28S	13 12W	4 bergs.		59 32S	18 00W	Numerous tabular bergs and growlers. Pack met with in 59° 05'S. 4 ft. high 50 miles long.
6	58 04S	09 38W	4 bergs.	30	60 30S	17 30W	Frequent bergs and growlers. Low pack and mush extending NE-SW 20 miles to south.
	57 50S	09 10W	6 bergs.	<i>M.V. Biscoe</i>			
7	58 05S	09 32W	Several bergs.	22	56 50S	162 00W	Pinnacled bergs 1,200 ft. x 100 ft. high.
	57 40S	07 53W	4 bergs.	23	58 42S	171 43W	Berg, 1,500 ft. x 400 ft. high.
	57 45S	07 40W	10 bergs.	26	62 02S	170 00E	Berg, 2,000 ft. x 90 ft. high.
8	57 46S	06 26W	8 bergs.		61 50S	169 10E	Berg, 3 miles x 150 ft. high.
	57 59S	06 17W	1 berg.	26	62 45S	165 30E	Flat topped berg, 2 miles x 60 ft. high.
9	57 44S	05 00W	3 bergs.	27	62 50S	164 00E	Field ice, brash and pack.
	57 17S	03 58W	12 bergs.	27	63 10S	162 40E	Field ice interspersed with bergs.
	56 58S	03 19W	2 bergs.	28	63 20S	161 50E	3 bergs.
11	55 48S	00 44W	3 bergs.	<i>S.V. John Biscoe</i>			
	55 58S	00 05E	23 bergs.	8	60 28S	44 28W	Isolated bergs and moderate pack, height 2-5 ft. Brash lying NE-SW to E of course.
12	56 19S	02 35E	37 bergs.				
14	56 26S	04 07E	12 bergs.				
	56 44S	02 21E	3 bergs.				
15	56 37S	02 12E	16 bergs.				
	56 00S	00 07E	5 bergs.				
20	58 26S	10 08W	6 bergs.				
21	58 53S	11 17W	Several bergs.				
	59 05S	11 00W	Several bergs and growlers.				
	59 11S	11 11W	Several bergs and loose pack ice.				
22	58 56S	12 11W	Several bergs and growlers.				
	58 52S	12 44W	Several bergs.				
23	59 15S	17 45W	Several bergs and growlers.				
	59 46S	18 11W	Several bergs and growlers.				
27	59 46S	18 11W	Several bergs and growlers.				
28	59 38S	17 02W	Numerous bergs and growlers.				
29	59 35S	16 22W	Loose pack ice. Numerous bergs.				
30	59 50S	15 39W	Numerous bergs and growlers.				
31	59 35S	15 26W	Several bergs.				
	59 45S	15 17W	Numerous bergs and loose pack.				
<i>S.S. Southern Venturer</i>							
4	52 09S	36 10W	Small bergs.				
5	52 54S	36 48W	Several medium sized bergs and growlers.				
10	55 30S	27 40W	Numerous bergs and growlers.				
	56 25S	23 25W	Numerous bergs.				
12	60 00S	21 38W	Strips of loose pack ice lying N-S.				

Reports of ice for October, November and December previous to 1950 will be found in *The Marine Observer*, Vol. XX, No. 150, page 241.

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## ERRATUM

July, 1951, *The Marine Observer*, page 158. The note beneath the report of a tropical storm by M.V. *Levernbank* should read as follows:  
“ This observation has been referred to the Director of the Australian Meteorological Service.”

## 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 returns received. The date of receipt of the last return received is given in the third 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 Captain, 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.

### Selected Ships

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Accra</i>	GJSW	21.11.50	A. G. Baptiste, O.B.E.	D. S. Upton, N. Pryce, R. S. Elliott	J. A. Stuart	Elder Dempster Lines, Ltd.
<i>Afghanistan</i>	GNYB	17.4.51	W. A. Chappell	R. B. Arthur, S. W. Jones, J. Cummings	J. Nolan	F. C. Strick & Co., Ltd.
<i>African Queen</i>	ZBCY		A. Noble	W. H. Eardley		Colonial Development Corporation.
<i>Ajana</i>	GKVV		F. W. Mould			Trinder Anderson & Co.
<i>Ajax</i>	GJXM	27.1.51	P. A. Hanney	P. Hopper, S. Barbour, K. Barnett, H. Bowers, D. S. Moreby	A. H. Kirkby	A. Holt & Co.
<i>Alcantara</i>	GLQR	1.5.50	H. D. Hooper, O.B.E.	R. B. Dales, L. L. Hunter, M. V. Keen	R. E. Hammond	Royal Mail Lines, Ltd.
<i>Alcyone Fortune</i>	MAQC	14.3.51	G. E. Milne	L. J. Paul, J. L. Paine, K. Bouic	T. Hopwood	Alcyone Shipping Finance Co. Ltd.
<i>Amakura</i>	MCFN	17.2.51	A. J. Carter	R. G. Halliday, T. Jones, J. Donaldson	I. R. Davies	Booker Bros., McConnell & Co., Ltd.
<i>Amastra</i>	GYDD	4.4.51	L. E. Clayton	R. Hedley, C. Close, R. J. Bizzey	R. Lacy	Anglo-Saxon Petroleum Co., Ltd.
<i>Amersham</i>	GNTQ	27.2.51	A. Spence	T. Brand, E. T. Ward, J. Frain	A. Bateman	Thompson S.S. Co., Ltd.
<i>Andes</i>	GQCV	25.6.51	G. A. Bannister	R. D. Jones, L. Black, W. Wheatley, F. M. Dickenson, E. Sugden		
<i>Apapa</i>	MACE	2.6.51	J. J. Smith	M. Foster, P. J. Finan, D. F. Thompson	W. Smith	Royal Mail Lines, Ltd.
<i>Arabia</i>	GLKF	8.7.50	J. Chapman, R.D., R.N.R.	K. D. A. Lamb, K. T. Jones, P. Brush	R. F. Barrett	Elder Dempster Lines, Ltd.
<i>Arabistan</i>	GCKK	29.5.51	J. E. Cooke	D. Calvert, T. Dumont, A. Norris	B. A. Long	Cunard Steamship Co., Ltd.
<i>Araby</i>	GMZL	29.8.50	T. W. Bolland	K. Finlayson, G. A. Wright, M. G. Boyd	P. Hannon	F. C. Strick & Co., Ltd.
<i>Arakaka</i>	GDEV	30.3.51	A. A. Gerrard	H. Adler, A. H. Harley, K. W. Leadbetter	T. Welch	Royal Mail Lines, Ltd.
<i>Argentina Star</i>	GTKF	18.5.51	E. R. Pearce, O.B.E.	A. G. Smith, M. J. Slessor, H. Hewson	B. Cato	Booker Bros., McConnell & Co., Ltd.
<i>Argyll</i>	GBWB	16.4.51	J. Dodds	A. W. Fielding, H. Bielby, L. Lumley	J. McBride	Blue Star Line, Ltd.
<i>Ariguani</i>	GMBL	31.10.50	G. S. Gracie	G. K. Whitehead, P. Furnival, D. Morris	J. Davies	B. J. Sutherland & Co., Ltd.
<i>Armada</i>	GMCR	22.3.51	E. J. Ridout	W. L. Babbs, J. Baxter, G. C. Elvidge	A. N. Taylor	Elders & Fyffes, Ltd.
<i>Arundel Castle</i>	GCZL	14.3.51	J. Trayner	R. T. Jacques, J. C. Macpherson, H. J. Norman	E. W. Harle	Trinder, Anderson & Co.
<i>Ascania</i>	GKNI	20.3.51	A. MacKellar, R.D., R.N.R.	M. T. Dodds, A. G. Broster, D. S. Lomax	E. Pitt	Union Castle Mail S.S. Co., Ltd.
<i>Ashburton</i>	GNJN	7.12.50	R. Willcocks	J. Stenhouse, H. T. O. Fuller	H. Milligan	Cunard Steamship Co., Ltd.
					B. L. McCoy	Trinder Anderson & Co.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
Asia ..	GLJV	19.6.51	W. B. Tanner, R.D., A.D.C., R.N.R.	N. Jones, R. Manson, A. H. West, — Nightingale	J. Marshall ..	Cunard Steamship Co., Ltd.
Asyria ..	GKXX	30.1.51	F. Watts, R.D., R.N.R.	L. Portet, J. Dormer, H. P. Williams	R. Farrell ..	Cunard Steamship Co., Ltd.
Asturias ..	GLQS	16.1.50	B. C. Dodds, O.B.E.	P. Sykes, J. Ackroyd, A. Edwards	W. Bradbury ..	Royal Mail Lines, Ltd.
Athelchief ..	GCRG	4.1.50	J. H. Flockhart ..	R. V. Parkiss, N. Jones, A. Green		Tankers, Ltd.
Athelregent ..	GQWL		J. A. Russell	R. Nicholson, R. McGregor, W. H. Buckle		
Athentic ..	GBLS	7.2.51	B. Forbes-Moffatt	J. Webster, P. G. Clifford, J. Tierney	A. Williams ..	Athel Line, Ltd.
Athlone Castle ..	GYTK	10.5.51	C. C. Page ..	J. Pither, F. J. Pigeon, J. Fellow	H. Knight ..	Shaw Savill & Albion Co., Ltd.
Atlantis ..	GLTM	30.3.51	A. R. Osburn	M. Mortimer, N. Lawson, J. Kavanagh, J. P. Campbell	J. H. Summers ..	Union Castle Mail S.S. Co., Ltd.
Auricula ..	GKPV	29.6.51	A. Thompson	R. L. Wood, R. S. Smith, D. J. Armitage	H. Matthews ..	Royal Mail Lines, Ltd.
Australia Star ..	GYCS	19.6.50	G. M. Duff, G.M.	K. C. Crompton, T. H. Ireland, M. R. Harry	H. D. Bray ..	Anglo-Saxon Petroleum Co., Ltd.
Australind ..	GJKF	21.12.50	J. F. Wood	D. Ewan, J. H. C. Looker, M. Campbell	L. Cooper ..	Blue Star Line, Ltd.
Avonstone ..	GBSV	27.2.51	— Niblett ..	F. Foster, W. Mottram	R. Brown ..	Trinder Anderson & Co.
Avondene ..	MAWG	24.5.51	F. Moorcroft	W. T. Williams, D. G. Powell, C. D. Arthur	R. Charlton ..	Purvis Shipping Co., Ltd.
Balanta ..	GBNM	30.6.51	H. Davies ..	W. A. Tresidder, C. C. Cowley, J. H. Evans	D. Gillow ..	Dene Shipping Co., Ltd.
Baltara ..	GTXM	4.1.49	G. E. Thomas	E. E. R. Roberts, R. E. G. Simmons, — Davies, — Morgan	K. G. Arthur ..	Royal Mail Lines, Ltd.
Baron Elphinstone ..	GCCD	20.4.51	S. Williams	S. Pendlington, A. Campbell, J. Rennie..	C. James ..	United Baltic Corporation, Ltd.
Baron Fairlie ..	GLCY		T. R. Reid ..	J. E. Gordon	C. Clifford ..	H. Hogarth & Sons
Baron MacLay ..	GKXX	8.6.51	J. Reid ..	J. S. Cameron, J. W. Cameron, W. O'Neill, A. Obtulowicz, W. Stevens		H. Hogarth & Sons
Bassano ..	GNXX	28.12.50	C. H. Tutty	A. Robinson, C. R. Tutty, C. Walker, J. F. O'Rourke	J. Hopkins ..	H. Hogarth & Sons
Beaverburn ..	MAGB	4.4.51	A. Kennedy	G. W. R. Graves, S. Fieldhouse, W. C. Halliday, T. T. Hercus, G. Morgan	W. Richardson ..	Ellerman's Wilson Line, Ltd.
Beavercove ..	GNLX	22.2.51		T. E. Morris, R. Jones, F. Surtees	T. Ainsworth ..	Canadian Pacific S.S., Ltd.
Beaverdell ..	GBBS	2.6.51	D. Parsons, R.D., Cdr., R.N.R.	W. E. Williams, G. Palmer, R. M. Stewart, P. R. Robinson, H. Kins	A. R. Porter ..	Canadian Pacific S.S., Ltd.
Beaverford ..	MQJG	8.7.50	L. C. Barry	E. R. Conneron, J. Gallagher, J. Edwards	L. Norton ..	Canadian Pacific S.S., Ltd.
Beaverglen ..	GBCP	1.3.51	W. R. Thorburn	— Walgate, R. Savage, J. P. Jones, P. Ainswood	W. L. Poingdestre ..	Canadian Pacific S.S., Ltd.
Beaverlake ..	GBCQ	14.2.51	C. L. de H. Bell, D.S.C., R.D., Capt., R.N.R.	— Sargent, R.N., Lt.-Cdr. (Retd.), L. E. MacDowell, J. Waling, M. H. Scott	S. Caughey ..	Canadian Pacific S.S., Ltd.
Beckenham ..	GCGK	18.1.50	D. Cameron	G. T. Sharpe, W. Gibson, M. G. King ..	A. F. S. Thompson ..	Canadian Pacific S.S., Ltd.
Benarty ..	GCZZ	14.3.51	T. Sutherland	A. King, B. Stark, L. Chandler	R. W. T. Camp ..	Warts, Watts & Co., Ltd.
Bendoran ..	GCJN	28.11.50	H. F. Masson	I. L. Forsyth, W. Watson, J. Wisden	R. Dixon ..	W. Thomson & Co.
Bennahor ..	GDDV	25.4.51	J. P. Robertson	H. C. Chafer, G. R. Bannerman, B. B. Erskine	J. E. Kemp ..	W. Thomson & Co.
Bennavis ..	MAGG	5.7.51	T. McI. Blaikie	A. Hall, J. Forbes, M. Mathie	P. V. Richmond ..	W. Thomson & Co.
Bennamoach ..	GCDZ	21.6.51	A. M. Robertson	N. J. Mackie, R. G. Faulkner, J. Ritchie, J. Brown	A. Pagan ..	W. Thomson & Co.
Benvrachie ..	GBTZ	11.7.51	J. C. Allen ..	A. I. King, I. Welsh, G. Roger	E. Carruthers ..	W. Thomson & Co.
Benzoyvis ..	MYPW	14.2.51	K. Hardie ..	W. W. Creber, E. H. Booth, T. Ross	J. L. Wells ..	W. Thomson & Co.
Bisege ..	GDCW	14.3.51	W. Orrell ..	D. Mackinnon, J. W. Cook, B. Mullan..	D. Milne ..	W. Thomson & Co.
					F. Jacovides ..	Hector Tankers, Ltd.

West Dock Steam Fishing Co., Ltd.

Boyn-ton Wyke	GBZV	15. 11. 50	G. Glixby	R. G. Taylor, B. Macphail, T. Ripley,	T. Murdock	Blue Star Line, Ltd.
Brasil Star	GTLF	14. 11. 50	G. C. Barnard	J. B. Hall	R. Newton	Ellerman's Wilson Line, Ltd.
Bravo	GLDZ	21. 12. 50	F. Mason	A. Lewin, W. Bowie, J. Harris, A. H. White	R. G. Thomson	Blue Star Line, Ltd.
Brisbane Star	GZCJ		S. Foulkes		J. Sheppard	Charles Hill & Sons
Bristol City	GUAY		A. L. Webb, O.B.E.	C. Lofthouse, D. M. Wilton, W. G. Coggins	I. R. S. Kidson	Cunard Steamship Co., Ltd.
Britannic	GDXF	1. 1. 51	R. Sell, R.D., R.N.R.	G. K. Westerman, B. O'Brien, G. L. Mitchell, — MacAlister	C. R. Currier	British Tanker Co., Ltd.
British Colonel	GFDB	7. 3. 51	W. F. Beddison	L. Ashburn, T. Skuse, J. McMillien	R. G. Lamb	British Tanker Co., Ltd.
British Endeavour	GFCN	23. 2. 51	H. J. Were	R. G. Lamb, M. Boyd	A. E. Adams	British Tanker Co., Ltd.
British Endurance	MLZM	29. 12. 47	R. T. C. Wright	J. Candlish, I. Colville, E. Powell	C. Henry	British Tanker Co., Ltd.
British Escort	GCRB	1. 3. 51	H. H. Burke	R. G. Dunn, D. McFarlane, R. W. Clarke, K. D. Curtis	J. Kennedy	British Tanker Co., Ltd.
British Lancer	MAGS	13. 4. 51	A. Fielding	W. Mills, C. Byrne, E. Glover	A. C. Martin	British Tanker Co., Ltd.
British Marquis	GWVL	31. 10. 50	C. W. Wall	R. L. Ramsay, J. Clarke, D. W. Banks	J. Martin	British Tanker Co., Ltd.
British Patience	GUFF	2. 6. 50	W. Jackson	R. D. Smithsons, F. Darby, D. Pengelly	H. W. J. Cooper	British Tanker Co., Ltd.
British Pilot	GCOF	4. 7. 51	J. H. Nelson	B. N. Jarvis, W. J. Sayer, J. M. Ferrer	L. Trestail	British Tanker Co., Ltd.
British Piper	GDNN	25. 4. 50	J. P. M. Samson	J. Picken, B. H. Moore, G. R. Gray	F. G. Rimmington	British Tanker Co., Ltd.
British Power	GZGG	15. 10. 48	K. M. Mitchell	A. Fraser, P. F. Mason, E. C. Ford	A. V. Couser	British Tanker Co., Ltd.
British Resource	GFGD	20. 3. 51	J. C. Lea, O.B.E.	J. Hunter, R. I. S. Elder, P. D. Fitchew	R. M. McWhiter	British Tanker Co., Ltd.
British Statesman	GJNR	21. 12. 50	A. H. Newby	G. Symons, J. A. Lamb, J. Archibald	P. Mahoney	Royal Mail Lines, Ltd.
British Statesman	GJNR	21. 12. 50	A. H. Newby	G. Symons, J. A. Lamb, J. Archibald	— Crawford	Walter Runciman & Co., Ltd.
British Stordfish	GCQV	13. 4. 51	G. T. Clarke	C. D. Brown, A. G. Tantram, E. J. Glover	I. Pryor	Lampport & Holt Line, Ltd.
Brittany	GCQV	14. 11. 50	G. M. Fletcher	C. D. Ratcliff, J. T. Bland, B. A. Wood, A. H. Brooke	W. P. Greaves	Cairns, Noble & Co.
Brockleymoor	GDWP	29. 5. 51	D. J. Jones	J. K. Venus, W. Pattison, J. R. Jenkins	E. Johnston	Cairns, Noble & Co.
Byron	GNFL	26. 7. 50	J. Byrne	M. F. Fair, D. Harrall, T. Flack	T. W. Lawson	Cairns, Noble & Co., Ltd.
Carnarvon	GPJN	24. 5. 51	J. W. Scott	C. Sutherland, G. H. Percy, S. R. Bell	S. J. D. Taylor	Anchor Line, Ltd.
Cairnesk	GMRK	25. 4. 51	I. G. Foster	J. Hogg, W. Gordon, A. Farley	M. J. Murphy	Peninsular & Oriental Steam Navigation Co.
Carnwallona	GQKM	5. 9. 50	G. R. Norvell	N. E. Forth, R. R. Campbell, D. Prudham, J. Lobban	West African Fisheries Research Institute	Union Castle Mail S.S. Co., Ltd.
Caledonia	GCKR	5. 9. 50	E. J. Stormont, M.B.E.	T. L. Langlands, T. Thompson, — Kirk	J. Gilbert	Lytle Shipping Co., Ltd.
Cameronia	GDXS	19. 6. 51	A. C. Johnston	P. B. Young	P. Macarthy	R. Chapman & Son
Canton	GDDT		G. Stable	T. A. Sargent, P. G. Pattinson, H. L. Fisher, A. K. Langley, F. M. O'Connell	W. Brown	Union Castle Mail S.S. Co., Ltd.
Cape St. Mary			J. A. Robson		G. M. Parsons	Cunard Steamship Co., Ltd.
Capetown Castle	GKGM	20. 4. 51	J. McReynolds, D.S.C.	E. Holden, J. Buckland, G. John	W. H. Chick	Peninsular & Oriental Steam Navigation Co.
Cape York	GCZS	27. 1. 51	J. S. Binnie	R. Davison, R. Couth, S. Liddle	C. Cornish	Runciman (London), Ltd.
Carlton	GIFE	20. 4. 49	K. Wardale	A. Dodd, W. A. Morriss, A. A. Abdullah	E. A. Loft	Elders & Fyffes, Ltd.
Carnarvon Castle	GJSL	17. 1. 51	J. F. Oakley	T. B. Schmidt, A. Backhouse, P. Muir	A. Austin	Runciman (London), Ltd.
Caronia	GYKS	18. 5. 51	R. G. Thelwell, O.B.E., Cmdr., R.D., R.N.R.	I. Bryce, R. T. Ibbotson, J. A. P. Matthews	H. V. Littlecot	Shaw Savill & Albion Co., Ltd.
Carithage	GRNX	12. 8. 50	E. R. Bodley, D.S.O.	D. Parsons, R. A. Gibbons, B. B. Jones	— Patterson	Houlder Bros & Co., Ltd.
Caston	MCJR	6. 3. 51	J. M. Cherry	P. F. Carnochan, J. I. Aitken, F. J. Hamilton	J. L. Banks	Bibby Bros. & Co.
Caovina	GKVF	27. 4. 51	T. H. Bull	G. L. Foster, T. H. Payne, N. Abbot, A. E. T. Hunter		
Caxton	GCDX	13. 4. 51	R. J. Laungley	P. B. Kelman, J. G. Wilson, — Thompson		
Ceramic	GFLM	20. 2. 51	A. V. Richardson	W. L. Woods, T. de M. Ogier, D. Aberdeen, L. M. Howells		
Cerinthus	GCRM	8. 7. 50	J. F. Auld	— Welch, M. Hart, — Denyer		
Cheshire	GLXV	1. 6. 51	P. H. Potter	J. Young, J. R. Longrigg, H. Traynor		

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Chinditara</i> ..	GFRT		B. A. Rogers, D.S.C., R.D., Cdr. R.N.R.	— Anderson, — Watcher, — Ady, — Beaumont, — Crone		British India Steam Navigation Co., Ltd.
<i>Chitral</i> ..	GLKN	6.2.51	G. C. Forrest, R.D., Cmde., R.N.R.	J. Henderson, H. Toms, S. McInnes	L. D. Waterhouse	Peninsular & Oriental Steam Navigation Co.
<i>Cilicia</i> ..	GDGL	6.1.51	J. L. Gibson	R. Murphy, T. Sax, H. E. Jennings, K. Slapp	M. O'Donnell	Anchor Line, Ltd.
<i>Cingalese Prince</i> ..	GFRC	13.2.51	J. D. Fraser	W. E. James, R. Fielding, R. E. Greenwood	S. A. Rawlinson	Prince Line, Ltd.
<i>City of Barcelona</i> ..	GTKR	8.12.50	N. Groundwater	A. G. Hine, D. R. Townson, J. A. Buchanan	G. M. Cubbings	Ellerman Lines, Ltd.
<i>City of Bristol</i> ..	GCPN	7.12.50	T. F. Symons	D. Wardlaw, D. L. Kinley, — Ramage	D. Laing	Ellerman Lines, Ltd.
<i>City of Calcutta</i> ..	GLYX	13.4.51	M. L. Hernan, M.B.E.	W. J. Lee, M. B. Perry, D. R. Townson	D. Cross	Ellerman Lines, Ltd.
<i>City of Cape Town</i> ..	GBBQ	7.7.51	W. R. Pinchbeck	R. A. Jones, J. Terris, D. A. Williams, W. McMillan	A. L. Pews	Ellerman Lines, Ltd.
<i>City of Carlisle</i> ..	GBJK	29.5.51	W. A. Hannah, O.B.E.	P. Appleton, V. W. Pinnington, N. Paskin	F. Dobbie	Ellerman & Bucknall S.S. Co., Ltd.
<i>City of Chester</i> ..	MAHN	8.7.50	E. M. Robertson	J. P. Mason-Price, N. A. C. Smith, R. A. Reid	J. Moran	Ellerman Lines, Ltd.
<i>City of Delhi</i> ..	GLBW	6.2.51	D. C. Hamilton	P. Turner, — Clark, G. W. White	M. F. Page	Ellerman Lines, Ltd.
<i>City of Derby</i> ..	GFWC	13.6.51	G. J. Law, O.B.E.	N. F. Ayers, D. S. Taylor, A. I. Crossland, J. Cowper	— Dean	Ellerman Lines, Ltd.
<i>City of Durham</i> ..	GBJM	9.7.51	H. G. Williams, O.B.E.	— Heywood, K. Jones, A. R. Quigley	H. Wilson	Ellerman Lines, Ltd.
<i>City of Evansville</i> ..	GJNF	28.11.50	A. M. Westlake	R. B. May, J. A. Irvine, J. Owen	J. Arnold	Ellerman Lines, Ltd.
<i>City of Johannesburg</i> ..	GBKW	1.1.51	W. H. Matheson, O.B.E.	B. Walker, I. McDermid, T. R. Phunn,	A. R. Henderson	Ellerman Lines, Ltd.
<i>City of Khartoum</i> ..	GBZC	14.6.50	J. A. Kinley	D. W. Asquith, W. H. Holden, J. A. Buchanan	J. Lord	Ellermans Lines, Ltd.
<i>City of Lille</i> ..	GSLN	14.11.50	W. A. Owen	P. R. Skelton, B. Jones, L. H. King	R. Smith	Ellerman Lines, Ltd.
<i>City of Lyons</i> ..	GMCN	24.2.51	G. A. Ring	W. Dick, I. S. McGregor, — Faulkner,	W. Thompson	Ellerman Lines, Ltd.
<i>City of New York</i> ..	GLYQ		S. L. Hoare, O.B.E.	— McTigue		Hall Line, Ltd.
<i>City of Paris</i> ..	GFQM	1.5.51	H. Percival, O.B.E., R.D., Cmde., R.N.R.	J. R. Marking, I. McBeth, A. G. Smith, D. Lightly	B. J. Holyoake	Ellerman Lines, Ltd.
<i>City of Pretoria</i> ..	GBLN	18.6.51	A. G. Freeman	A. N. Fry, F. B. Cocking, A. K. Earl		Ellerman & Bucknall S.S. Co., Ltd.
<i>City of Swansea</i> ..	GBZT	17.3.50	F. J. H. T. Vizer	B. Walker, J. Blanch, E. E. Cooper	I. Booth	Ellerman Lines, Ltd.
<i>City of Sydney</i> ..	GSFM	24.8.49	H. Johnson	H. Lewis, E. R. Crossley, T. Kerr	W. Bateman	Ellerman Lines, Ltd.
<i>City of Windsor</i> ..	GJYR	10.5.51	T. L. Vaughan	J. Jones, S. F. Nicholson, K. A. Kerr, I. A. W. Williamson	H. D. Smythe	Ellerman Lines, Ltd.
<i>Clan Brodie</i> ..	GKPD	28.3.50	B. Vernon-Browne	S. W. Brown, T. N. Geesin, J. M. Brackenridge	W. C. Huyton	Ellerman & Bucknall S.S. Co., Ltd.
<i>Clan Buchanan</i> ..	GKNM	1.7.50	J. Forster	J. Stormont, W. L. Muir, W. H. J. Dilks	W. M. Morrison	Cayzer Irvine & Co., Ltd.
<i>Clan Campbell</i> ..	GDZK	20.2.51	J. McCrone	E. H. Cox, G. A. Berry, A. P. Sweeney	J. H. Wright	Cayzer, Irvine & Co., Ltd.
<i>Clan Chaitan</i> ..	GFBX	7.7.51	A. G. McPherson	C. A. Thomas, D. R. Godfrey, S. J. Bedford	R. F. Cole	Cayzer Irvine & Co., Ltd.
<i>Clan Chisholm</i> ..	GFBY	6.2.51	R. B. Linsley	H. Lockyer, I. W. Bennett, J. N. Pearce	E. Shillabeer	Cayzer Irvine & Co., Ltd.
<i>Clan Davidson</i> ..	MAWU	3.10.50	E. Stone	D. de Vall, J. S. Cumming, J. S. Catteral	R. J. Dent	Cayzer Irvine & Co., Ltd.
<i>Clan Forbes</i> ..	GPGB	25.1.51	W. R. Woodriffe	S. K. Young, J. Arnot, G. Sann.	W. G. Peddie	Cayzer Irvine & Co., Ltd.
<i>Clan Macaulay</i> ..	GZCS	12.7.49	A. G. Storkey	A. M. Banks, A. M. Vaughan, J. Walker	J. Ormerod	Cayzer Irvine & Co., Ltd.
<i>Clan MacDonald</i> ..	GCPG	17.1.51	H. Cater		G. Martyn	Cayzer Irvine & Co., Ltd.

<i>Clan MacDougall</i>	GFBQ	27.1.51	P. MacMillan	S. R. J. Woods, D.S.C., R.D., Cdr., R.N.R., —, Morton, A. A. Elston	C. E. C. Crew	Cayzer Irvine & Co., Ltd.
<i>Clan MacKinnon</i>	GK LX	19.1.51	S. S. Davidson	G. Spiller, F. Reid	R. W. Moore	Cayzer Irvine & Co., Ltd.
<i>Clan MacLaren</i>	GSSC	17.1.51	A. Redford, Capt., R.N.R.	A. L. Pitts, D. Richards, K. Morton	— Brooks	Cayzer Irvine & Co., Ltd.
<i>Clan MacNair</i>	GFNK	13.6.51	J. P. Dumphy	R. Shattock, V. S. Davidson, J. Campbell	T. Hunter	Cayzer Irvine & Co., Ltd.
<i>Clan MacNeil</i>	GFWP	13.4.51	J. West	G. Rowland, B. Edwards, J. Halton	R. D. Pringle	Cayzer Irvine & Co., Ltd.
<i>Clan Macrae</i>	MAHP	14.11.50	E. Coulthart	M. Lewis, T. Aitchison, D. S. M. Tosh	W. A. Ellmers	Cayzer Irvine & Co., Ltd.
<i>Clan MacTavish</i>	GUBB		A. MacIntyre	G. B. Owen, S. M. Grant, G. A. Dubery, R. Cook	G. H. Hudd	Cayzer Irvine & Co., Ltd.
<i>Clan Shaw</i>	GBYW	25.6.51	R. P. Galer, C.B.E., R.D., Capt., R.N.R.	A. J. R. Tyrrell, A. M. Kennedy, W. Siles, J. Adair	A. E. McIntyre	Cayzer Irvine & Co., Ltd.
<i>Clan Sutherland</i>	GFWZ		H. J. Anchor, O.B.E., A.D.C., R.D., R.N.R.	L. W. Gibbins, N. F. Wray-Cook, S. M. Grant	G. Wrighton	Cayzer Irvine & Co., Ltd.
<i>Clan Urquhart</i>	GFBK	31.5.51	T. W. Inman, O.B.E.	W. Graham, I. M. Shearer, P. Leslie	C. G. Murphy	Sir R. Ropner & Co., Ltd.
<i>Clearpool</i>	MAHQ	16.4.51	J. E. Allen	G. Ratcliffe, J. Forrest, D. Parker	A. Etheridge	Andrew Weir & Co., Ltd.
<i>Clydebank</i>	GKLM	3.7.51	I. E. Allen	M. Fender, H. K. Stevens, C. V. Sawyer	T. Riordan	Blue Star Line, Ltd.
<i>Columbia Star</i>	GQGT	18.5.51	D. J. Stratta	L. Graham	T. McNamara	Andrew Weir & Co., Ltd.
<i>Comiebank</i>	GKLJ	6.2.51	J. Townsley	J. Donald, W. Ellarby, J. P. Edminson	T. Goodman	Furness-Houlder Argentine Lines, Ltd.
<i>Condesa</i>	MAHU	6.6.51	H. Heal	R. Tinnmouth, G. Boothby, E. White	J. T. Macdonald	Ellerman's Wilson Line, Ltd.
<i>Consuelo</i>	GCGQ	28.12.50	H. Greenhill	D. J. C. Martin, R. Ball, P. Ramsay	J. W. Soulsby	Shaw Savill & Albion Co., Ltd.
<i>Corfu</i>	GRNW	8.3.51	E. F. Ferraby	— Richardson, D. I. Parsons, J. R. Neale, C. C. Vickers	W. Vaughan	Eiders & Fyffes, Ltd.
<i>Corinthic</i>	GZYL	14.3.51	G. M. Robertson, D.S.C.	R. Frisby, F. Packman, P. Harikness, D. M. Mortimer	J. Crowley	Donaldson Bros. & Black, Ltd.
<i>Corrales</i>	GSIL		W. J. Dodd	D. C. Jones, C. Abbott, J. Hallinan	P. Goulden	T. & J. Harrison
<i>Corrientes</i>	GFPT	1.5.51	G. Anderson	R. S. Aitken, H. Letch, J. H. Stark	T. Laing	Federal Steam Navigation Co., Ltd.
<i>Couglern</i>	MAHZ	21.3.51	G. Robison	C. Hardy, A. Jones, J. Buchanan	D. Swindon	Booth S.S. Co., Ltd.
<i>Craftsman</i>	GPZT	17.4.50	W. F. O'Neill	W. E. Williams, W. C. Stoddart, F. L. Steele	M. Carney	Pacific Steam Navigation Co.
<i>Cumberland</i>	GPYP	13.4.51	J. S. Oxnard	— Fulcher, G. Wotton, — Hughes, A. Sewell	D. J. Barnes	Ropner Shipping Co., Ltd.
<i>Cuthbert</i>	GFNW	23.6.49	J. Whayman, D.S.C., R.D., R.N.R.	T. E. Williams, D.S.C., R.D., Lt.-Cdr., R.N.R., D. J. Taylor, A. Niblock	—	Sir William Reardon Smith & Sons, Ltd.
<i>Cuzco Daley</i>	GKPF	13.6.51	R. Eckford	J. Nicholson, E. J. Middleton, A. Oates, E. H. Williams, H. Lee	H. Heenay	Royal Mail Lines, Ltd.
<i>Dallas City</i>	MFVY	6.2.51	J. Kenney	E. Thomas, D. Baker, P. Bartlett	W. Miller	Lampport & Holt Line, Ltd.
	GCLS		C. E. Exton		E. T. Williams	Andrew Weir & Co., Ltd.
<i>Darro</i>	MAID	16.5.51	T. Powell	W. Kennedy, S. Gibson, K. Bolland	W. Dowds	Lampport & Holt Line, Ltd.
<i>Debrett</i>	GRPR	18.10.50	W. Gillespie	H. M. Bunker, I. Pritchard, H. T. Cunliffe	J. Brown	Lampport & Holt Line, Ltd.
<i>Deebank</i>	GTDB	20.2.51	C. H. Churhill	H. J. Allan, C. B. Loads, P. Grimanes	W. J. Read	Donaldson Bros. & Black, Ltd.
<i>Deerpool</i>	GKDY		W. C. Blake	T. C. Jagger, W. J. Neill, J. G. Roberts	— Powell	Lampport & Holt Line, Ltd.
<i>Defoe</i>	GNWF	1.5.51	H. Pratt	K. Maguire, W. J. Neill, J. M. Cox, C. T. Metcalfe, A. J. M. Cox	G. A. Heapy	Glen Line, Ltd.
<i>Delane</i>	MMNW	24.5.51	J. S. Macmillan	S. B. Ewing, A. T. Johnston, S. C. Macdonald	E. W. Divers	McCowen & Cross, Ltd.
<i>Delitian</i>	GJSQ	23.4.51	A. W. Mitchell	G. West, R. W. Garcia	A. Hudson	McCowen & Cross, Ltd.
<i>Delius</i>	GZSY	6.2.51	— Brown	— Davidson, — Ireland, — Jackson	I. S. Humphrey	Royal Mail Lines, Ltd.
<i>Denbighshire</i>	GQGW	28.12.50	N. Bellwood	D. S. Kingsland, A. Monaghan		
<i>Derryclare</i>	GCKN	14.3.51	J. Robinson	W. McLean, F. Saunders, G. Patterson		
<i>Derryhent</i>	MAIF	29.5.51	P. Burrell	J. Green, J. Cresswell, P. C. T. Davies, W. M. Morton		
<i>Deseado</i>	MAIH	13.6.51				

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Devis</i> .. .. .	GFKT	9.7.48	T. J. Sweeny .. .. .	T. E. Cribben, A. L. Baines, R. H. Baldwin .. .. .	J. Care .. .. .	Lampport & Holt Line, Ltd.
<i>Devon</i> .. .. .	GDRF	21.12.50	A. Hocken .. .. .	G. Naylor, J. Weston, J. D. Hellings .. .. .	J. Tomlinson .. .. .	Federal Steam Navigation Co., Ltd.
<i>Devonshire</i> .. .. .	GTTV	17.1.51	A. Beharrel .. .. .	J. W. MacKinlay, G. D. Atkinson, J. J. Mullins .. .. .	G. Talbot .. .. .	Bibby Bros. & Co.
<i>Ditwara</i> .. .. .	GYQV	10.7.51	F. L. Sampson, D.S.C. .. .. .	H. B. Cray, E. C. Plowman, R. B. Coates .. .. .	S. J. Taylor .. .. .	British India Steam Navigation Co. Ltd.
<i>Discovery II</i> .. .. .	GWVM	24.5.51	J. F. Blackburn, D.S.O., Cdr., R.N. .. .. .	B. Q. Dunham, G. H. Selby-Smith, P. A. Masters .. .. .	J. B. Totten .. .. .	National Institute of Oceanography
<i>Dominion Monarch</i> .. .. .	GRGG	27.4.51	Sir Henry Gordon, K.B., D.S.C. .. .. .	S. Wilde, J. Theakston, J. Hurst, H. Riding, R.D., Lt.-Cdr., R.N.R., J. Bakevell, A. Baber .. .. .	J. A. McAsgill .. .. .	Shaw Savill & Albion Co., Ltd.
<i>Doretian</i> .. .. .	GJTL	14.3.51	D. MacQueen .. .. .	A. J. Dougal, W. H. Squair, A. W. T. Arnott .. .. .	T. W. Moody .. .. .	Donaldson Bros. & Black, Ltd.
<i>Doris Climies</i> .. .. .	MSLB	1.7.50	A. MacVicar .. .. .	J. B. Whyte, K. M. Hamilton, .. .. . Eelloo .. .. .	H. A. Reynolds .. .. .	Clumies Shipping Co.
<i>Dorset</i> .. .. .	GZFO	30.3.51	A. E. Williams .. .. .	P. F. Fletcher, J. Burn, P. A. Davison .. .. .	J. Chatter .. .. .	Federal Steam Navigation Co., Ltd.
<i>Drina</i> .. .. .	MAIL	15.11.50	D. R. Miller .. .. .	J. Fox, J. G. Street, A. Nottage .. .. .	A. Humphries .. .. .	Royal Mail Lines, Ltd.
<i>Dromore</i> .. .. .	GDSF	20.9.49	J. R. Moreby .. .. .	J. McCool, S. N. Coe, R. W. Keene .. .. .	R. H. Heard .. .. .	Furness Withy & Co., Ltd.
<i>Dryden</i> .. .. .	MOFT	30.1.51	D. C. Roberts .. .. .	K. Quirk, D. S. Leicester, J. Pritchard .. .. .	P. Thompson .. .. .	Lampport & Holt Line, Ltd.
<i>Duke of Athens</i> .. .. .	GMYS	10.5.51	J. C. Lomas, A.I.N.A. .. .. .	T. Owen, N. Beattie, D. M. Stewart .. .. .	E. J. O'Connor .. .. .	Trent Maritime Co., Ltd.
<i>Dunedin Star</i> .. .. .	GKKT	.. .. .	J. C. W. Davies .. .. .	R. R. Elliott, A. N. Duell, G. J. Stanley .. .. .	A. McCartney .. .. .	Blue Star Line, Ltd.
<i>Dunera</i> .. .. .	GBBR	20.3.50	A. A. Kay .. .. .	F. Hills, C. R. S. Monk, L. D. Conway .. .. .	.. .. .	British India Steam Navigation Co., Ltd.
<i>Dunkery Beacon</i> .. .. .	GUFS	14.11.49	L. E. Thomas .. .. .	J. D. B. Wylie, A. J. Hawkes, D. W. Hobday .. .. .	A. B. Ewart .. .. .	Phs. Van Ommeren (London), Ltd.
<i>Dunster Grange</i> .. .. .	GCSD	29.5.51	R. S. Grigg, O.B.E. .. .. .	P. J. Walper, .. .. . Wills, D. M. Smith, V. J. Owen .. .. .	T. D. Sullivan .. .. .	Houlder Bros. & Co., Ltd.
<i>Durango</i> .. .. .	MAIM	16.3.51	P. M. Burrell .. .. .	J. Postill, R. Sly, L. L. Hunter .. .. .	H. Davies .. .. .	Royal Mail Lines, Ltd.
<i>Durban Castle</i> .. .. .	GPGP	21.11.50	B. W. B. Lloyd .. .. .	C. Lorrains, .. .. . Cutcliffe, .. .. . Becket, D. Clubb .. .. .	H. A. Liggins .. .. .	Union Castle Mail S.S. Co., Ltd.
<i>Durenda</i> .. .. .	GFSL	21.11.50	A. H. Usher .. .. .	H. R. Smith, D. A. C. Windle, G. A. Hankins .. .. .	T. Welsh .. .. .	British India Steam Navigation Co., Ltd.
<i>Durhan</i> .. .. .	GWWK	8.5.50	R. J. Dunning .. .. .	B. Applegate, J. T. Pettie, J. Sims, D. Hilliard .. .. .	C. Robinson .. .. .	Federal Steam Navigation Co., Ltd.
<i>Edinburgh Castle</i> .. .. .	GOHN	20.4.51	T. W. McAllen .. .. .	D. Evans, G. E. Smith, T. P. Paine .. .. .	J. Hodgson .. .. .	Union Castle Mail S.S. Co., Ltd.
<i>Egida</i> .. .. .	GJZD	21.12.50	R. S. Paton .. .. .	W. B. Sawers, W. Hallum, R. Watt, R. M. Sinclair .. .. .	R. Hartley .. .. .	Anchor Line, Ltd.
<i>El Gallo</i> .. .. .	MAIP	16.4.51	S. J. Watts .. .. .	J. S. Andrews, W. P. Hanrahan .. .. .	E. G. Rees .. .. .	C. T. Bowring & Co., Ltd.
<i>Elyssia</i> .. .. .	GJZK	12.1.51	D. Barclay .. .. .	J. McLarty, J. T. Donald, A. McKendrick, N. M. Fletcher .. .. .	W. H. Hier .. .. .	Anchor Line, Ltd.
<i>Empire Fowey</i> .. .. .	GMFW	30.3.51	D. G. Bailey .. .. .	P. Hewett, D. W. Lightbody, J. Howe, J. Houghton .. .. .	P. Maloney .. .. .	Peninsular & Oriental Steam Navigation Co.
<i>Empire Halladale</i> .. .. .	GPVQ	31.5.51	R. Blake .. .. .	H. A. Cameron, W. Marshall, W. M. Niven .. .. .	J. N. Cragg .. .. .	Anchor Line, Ltd.
<i>Empire Orwell</i> .. .. .	GRCB	21.2.51	A. C. G. Hawker, C.B.E., R.D., R.N.R. .. .. .	D. M. Kinloch, J. B. Crichton, P. Byers .. .. .	A. C. Shipman .. .. .	Orient Steam Navigation Co., Ltd.
<i>Empire Patrai</i> .. .. .	GDKL	5.8.49	C. L. Thomas .. .. .	M. Urminsky .. .. .	G. R. Stuart .. .. .	Fenton S.S. Co., Ltd.
<i>Empire Pride</i> .. .. .	MAJB	24.7.50	W. Peate, D.S.C. .. .. .	J. Priest, R. Hammond, J. Beckett .. .. .	A. Mallett .. .. .	Bibby Bros. & Co.

<i>Empire Star</i> ..	GCDD	28.10.49	G. E. Barnard	T. Hender, M. R. Bremberg, J. Edwards, P. Ellett	H. Smith	Blue Star Line Ltd.
<i>Empire Viceroy</i> ..	MAJN	6.4.51	J. B. S. Bland	A. M. Brockwell, C. D. Mason, J. W. Abbott	W. Clarke	Pandelis Shipping Co., Ltd.
<i>Empress of Australia</i>	GFSB	21.12.50	C. E. Duggan, R.D., R.N.R.	F. Donnelly, F. Parker, P. A. T. Har- greaves	T. C. Mann	Canadian Pacific S.S., Ltd.
<i>Empress of Canada</i> ..	GSVR	23.2.51	J. P. Dobson, D.S.C., R.D., R.N.R.	H. Towers, I. Murray, P. Beerling	J. M. Butterworth	Canadian Pacific S.S., Ltd.
<i>Empress of France</i> ..	GNTV	9.6.51	B. B. Grant, R.D., R.N.R.	L. E. McDowell, R. Savage, J. C. Moffat, F. Surtees, I. Murray, D. Jeavons	E. Murphy	Canadian Pacific S.S., Ltd.
<i>Empress of Scotland</i> ..	GMLV	6.6.51	E. A. Shergold	J. Mackay, J. Richardson, J. Walker	J. Campbell	Canadian Pacific S.S., Ltd.
<i>Erodona</i> ..	GZLQ	24.2.51	J. E. Gill	W. A. G. Curphey, J. Albert, J. Owles, J. G. Evans	J. Martin	Anglo-Saxon Petroleum Co., Ltd.
<i>Eros</i> ..	GYSB	23.4.51	R. C. Vigurs	S. Lunn, C. P. Turquand, J. A. Mills	P. McEwan	Steamship Eros, Ltd.
<i>Esperance Bay</i> ..	GSMP	10.5.51	T. V. Roberts, R.D., Capt., R.N.R.	G. S. Sheldon, R. G. Mossop, —, Mc- Kenzie, J. K. Wyles, —, Le Strange	M. J. Sheehan	Shaw, Savill & Albion Co., Ltd.
<i>Essex Trader</i> ..	GCMS	12.1.51	D. G. Evans	D. A. Owen, E. H. Miles, D. Harris	R. Jones	Trader Navigation Co., Ltd.
<i>Esso Glasgow</i> ..	GTXC	20.10.50	W. L. Everson	E. Shields, F. Lord, E. Shelton-Jones	P. J. Everett	Esso Transportation Co., Ltd.
<i>Esso Plymouth</i> ..	GYYX	4.4.51	E. Orr	A. Hughes, T. Hartley, P. Matrocks	D. Diver	Esso Transportation Co., Ltd.
<i>Eucadia</i> ..	GIZL		D. Morrison, O.B.E.	R. Crawford, D. McLeod, R. L. Richards, C. Boyle	D. Sproat	Anchor Line, Ltd.
<i>Explorer</i> ..	GXJX	21.6.51	J. L. Curle	W. C. Johnston, R. J. Abbott, E. Sherlock	P. J. Keily	T. & J. Harrison
<i>Fanad Head</i> ..	GNQQ	14.11.50	W. A. Haddock, O.B.E.	J. McCauley, W. R. Nelson, R. W. Crawford	H. Haskayne	G. Heyn & Sons Ltd Pacific Steam Navigation Co., Ltd.
<i>Fiamenco</i> ..	GCBV	6.1.51	P. L. Hockey	A. B. Powell, R. J. B. Lewis, R. Spalton	W. S. Money	Shaw, Savill & Albion Co., Ltd.
<i>Fordsdale</i> ..	GSMW		T. H. Davies	H. G. B. Moss, J. L. Harrison, G. Main, A. Sparks	J. L. Blanchard	Cunard Steamship Co., Ltd.
<i>Franconia</i> ..	GBRQ	1.7.50	D. M. Maclean	J. S. Rowe, P. S. Taylor, R. D. Hammond	D. C. Edmunds	Sir William Reardon Smith & Sons, Ltd.
<i>Fresno City</i> ..	GBYD	28.12.50	W. V. Doughty	T. W. D. John, G. Groves, J. Robiliard	J. W. Ellis	Headlam & Son
<i>Fylingdale</i> ..	GKSR	7.12.50	R. Coultas	W. W. Gatenby, W. T. Feather, N. Jameson	M. H. Whitehead	T. & J. Harrison
<i>Geologist</i> ..	GJMR	19.6.50	A. E. Jackson	D. V. Jones, J. Coleman, A. K. Jones	N. Ryan	Cunard Steamship Co., Ltd.
<i>Georgic</i> ..	GRLJ	20.2.51	W. M. Stuart, O.B.E.	H. Carmichael, F. Watts, A. Leyland	F. Devlin	A. Holt & Co.
<i>Glaucus</i> ..	G DYZ	28.11.50	C. F. Lock	E. M. Groves, J. R. Jones, P. H. Benson, D. Robinson	J. F. Wilson	Glen Line, Ltd.
<i>Glenartney</i> ..	GBLG	15.6.51	C. J. Tyler	J. Webster, A. W. Spivey, H. M. Mac- Farlane	H. S. Roberts	Andrew Weir & Co., Ltd.
<i>Glenbank</i> ..	GKLC	28.6.51	J. B. Mitchell	L. O. Moody, C. A. Brown, M. W. Filton	L. A. Tebbutt	Glen Line, Ltd.
<i>Glenorchy</i> ..	GBLL	22.8.50	P. Cross	—, Hansell, D. Vossor	T. Herbert	Federal Steamship Navigation Co., Ltd.
<i>Gloucester</i> ..	MANK	8.5.50	N. L. Warren	F. C. Taylor, G. W. Wotton, J. Marshall	R. W. Smith	Elders & Fyffes, Ltd.
<i>Golfito</i> ..	GBYL	21.11.50	S. A. Sapsworth	R. A. Laycock, R. L. Leech, P. N. Mace	G. Crighton	Shaw, Savill & Albion Co., Ltd.
<i>Gothic</i> ..	MAUQ		W. J. Williams	I. M. Macfarlane, —, Tomson, J. Stewart	L. Raynor	New Zealand Shipping Co., Ltd.
<i>Gracia</i> ..	MANN	14.9.50	J. McInnes	W. Stoodly, A. R. Simpson, T. J. Dresh	R. Read	J. & C. Harrison, Ltd.
<i>Granford</i> ..	MQGC	14.3.51	E. C. J. Morgan	J. R. Ramsay, C. E. Burrell, —, Slocum, —, Salwood	—, Flood	Anglo-Saxon Petroleum Co., Ltd.
<i>Haparangi</i> ..	GJYX		R. G. Rees	R. A. Brock, A. H. Barber, J. R. Wood- field, W. R. Moore	G. Whitiker	T. & J. Harrison
<i>Harmatris</i> ..	GTWP	18.6.51	A. R. Phelps	J. Morrison, B. L. Oliver, J. B. Walker	F. W. Greaves	Bibby Bros. & Co.
<i>Helicina</i> ..	GKBC	17.1.51	J. B. Richie	C. Arden, H. Lawton, H. Jones	J. Desborough	Royal Mail Lines, Ltd.
<i>Herdsman</i> ..	GPZX	1.11.50	W. A. Short, O.B.E.	B. Pennington, J. Hughes, K. Allen		
<i>Herefordshire</i> ..	GOFG	18.8.50	G. W. Dobson, R.D., R.N.R.	D. W. Buckle, J. L. Perkins, J. Holt		
<i>Highland Brigade</i> ..	GJKN	6.7.51	A. N. Anderson			

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Highland Chieftain</i> ..	GCTY	22.5.50	W. H. Grimshaw, O.B.E.	M. Wardle, R. M. Box, R. D. H. Manley, J. M. C. McLaughlin, C. J. S. Morris	W. Rolonson	Royal Mail Lines, Ltd.
<i>Highland Monarch</i> ..	GMZF	16.9.50	H. G. Whittle, O.B.E.	E. Card, K. Kistler, J. Rutter, J. R. Manley	F. Dunk	Royal Mail Lines, Ltd.
<i>Highland Princess</i> ..	GFMN	24.5.51	W. H. Roberts	C. Wightman, C. J. Gulliford, R. Williams, R. E. Fairley	F. G. Goodall	Royal Mail Lines, Ltd.
<i>Hilary</i> ..	GQVM	29.5.51	J. W. Binns, O.B.E.	W. Spowart, T. W. McMullan, L. W. Crump	T. Tyman	Booth S.S. Co., Ltd.
<i>Himalaya</i> ..	MCDY	29.5.51	H. C. C. Forsyth, R.D., Cmde., R.N.R.	G. M. McClean, G. C. Barrett, D. H. Armstrong, J. P. Crichton, R. E. J. Fox, R. A. Game	F. E. Ash	Peninsular & Oriental Steam Navigation Co.
<i>Hinabura</i> ..	GDVS	7.7.51	E. A. J. Williams	R. S. Hales, S. Robinson, P. A. Ogden, J. M. Stephens	J. Delvin	New Zealand Shipping Co., Ltd.
<i>Hororata</i> ..	MANZ	28.12.50	E. H. Hopkins	F. Taylor, W. Peto, E. Cooper, D. Newman	D. E. Hodding	New Zealand Shipping Co., Ltd.
<i>Huntingdon</i> ..	GFCT	25.1.51	— Fulcher	— Dickens, J. J. M. Stratton, K. J. Field, D. Jones	A. Wallace	Federal Steam Navigation Co., Ltd.
<i>Harumi</i> ..	GJZF	17.1.51	H. E. Reilly, R.D., R.N.R.	F. Taylor, T. Rowland, J. Milner	C. Braithwaite	New Zealand Shipping Co., Ltd.
<i>Hycenia</i> ..	MADE		— Sarrett			Baltic Trading Co., Ltd.
<i>Imperial Star</i> ..	GIAC		G. C. Goudie	G. A. Hunt, M. T. Slessor, J. Nolan	W. H. Jones	Blue Star Line, Ltd.
<i>Imshoven Head</i> ..	MAOC	7.5.51	R. A. Ferguson	W. H. Campbell, E. McIntosh, P. Percival	M. P. Ward	G. Heyn & Sons, Ltd.
<i>Interpreter</i> ..	GPZY		H. Coates	W. Eustace, R. J. Turnbull, I. Mitchell		T. & J. Harrison
<i>Inverbank</i> ..	GKML	14.3.51	L. W. Thorne	R. S. Mortimer, R. D. Williams, G. T. Brown	P. C. Kelly	Andrew Weir & Co., Ltd.
<i>Yamaica Producer</i> ..	VPLM	15.11.50	G. E. M. Jenkins	B. Noble, J. A. Whitehouse, C. P. Grady, A. L. Gwynne-Harrison	P. Graham	Kaye Son & Co., Ltd.
<i>Jersey City</i> ..	GIGA	2.8.50	D. W. Butcher	D. B. Thomas, J. Vaughan, T. Turner	H. Christianson	Sir Wm. Reardon Smith & Son, Ltd.
<i>Jessmore</i> ..	MAOF	6.2.51	C. G. Killick	J. Sims, D. R. G. Taylor, R. W. Liley, P. Warne	R. Deakin	Furness Withy & Co., Ltd.
<i>John Biscoe</i> ..	VPNE	27.7.50	W. Johnston	W. R. Atkinson, A. Farrel, G. Jones	— Guthrie	Government of the Falkland Islands.
<i>John Holt</i> ..	GNFD	31.10.50	J. Shaw	G. S. Gunn, S. Beer, J. Watson	L. Laval	John Holt Line, Ltd.
<i>Kaikoura</i> ..	GZPZ	11.6.51	N. Fraser	J. Farrell, J. B. Ricketts, F. Le Messurier	A. Leeder	Trinder Anderson & Co.
<i>Kaipahi</i> ..	GQGI	24.4.50	T. M. Fenwick	J. B. McGowan, N. Stirzaker, E. Miller	R. M. Evans	Trinder Anderson & Co.
<i>Kaipara</i> ..	GZPY	6.1.51	J. T. Windus	T. G. Wilson, J. Jackson, G. B. Charleson, P. Johnson	A. Clegg	Trinder Anderson & Co.
<i>Kattuna</i> ..	GQGG	7.12.50	G. Clampitt		G. G. Kneath	Union Castle Mail S.S. Co., Ltd.
<i>Kenilworth Castle</i> ..	MQLP	1.1.51	L. H. Farrow	R. Dugdale, J. C. Edwards, P. A. Sharp	R. Heath	Federal Steam Navigation Co., Ltd.
<i>Kent</i> ..	GPDC	18.7.50	J. Moncreiff	S. Lambbrick, J. Collins, D. Moran, J. North		
<i>Kenuta</i> ..	GCBW	29.6.51	J. D. Richards	J. Butterworth, F. Leicester, E. J. Pepper, P. A. James	I. S. Geddes	Pacific Steam Navigation Co.
<i>King Robert</i> ..	MAON	21.3.51	G. Craze	G. Dando, P. W. Kidd, A. D. Ferras	C. Cowen	King Line, Ltd.
<i>King William</i> ..	GNVF	20.2.51	A. B. Drever	J. C. Davies, T. Fairclough, D. Evans	A. McInnes	King Line, Ltd.
<i>Kingston Onyx</i> ..	MILFP		A. N. Cornish			Kingston Steam Trawling Co., Ltd.
<i>Kohistan</i> ..	GSEZ	17.1.51	A. R. Henderson	G. H. Byrne, C. O. Jones, A. Woodward	D. Chapman	F. C. Strick & Co., Ltd.
<i>Laguna</i> ..	GJKC	20.2.51	R. D. S. Eckford	R. H. Scaiff, C. Pringle	J. F. Cullen	Pacific Steam Navigation Co.
<i>Lambrook</i> ..	MAOS	4.4.50	H. F. McInnes	J. Orr, R. G. C. Gibson	J. J. Brennan	Galbraith Pembroke & Co., Ltd.
<i>Lanarkshire</i> ..	GCTC	18.8.50	A. R. Cossar	G. Spiller, G. H. Marshall, A. D. Rumble, G. V. Davies	G. J. Ingram	Turnbull Martin & Co., Ltd.
<i>Lancashire</i> ..	GLZC	15.5.50	N. F. Fitch	R. R. Hagley, D. C. Monteith, W. O. Thomas	A. Jones	Bibby Bros. & Co.



NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Maitina</i>	GSZX	21.12.50	H. Roberts, O.B.E.	W.F. Young, E. Whitehouse, —, Greenhalgh	D. Knight	Elders & Fyffes, Ltd.
<i>Mauretania</i>	GTTM	9.1.51	C. Ivan Thompson	M. B. Cox, —, Joyner, J. P. Ward, G. R. Carter	F. Clarke	Cunard Steamship Co., Ltd.
<i>Media</i>	GSWR	17.4.51	G. H. Morris	R. G. Hunt, G. W. Edwards, J. G. Parry	E. P. Bishop	Cunard Steamship Co., Ltd.
<i>Melbourne Star</i>	GDFZ	6.2.51	F. N. Riley, D.S.O.	H. Tompsett, G. Seager, S. Buchanan, W. Boone	J. Clarke	Blue Star Line, Ltd.
<i>Millais</i>	MAPH	13.4.51	A. R. Bibby, O.B.E.	B. Salisbury, J. L. Roberts, D. S. Sapp	V. Slevin	Lampport & Holt Line, Ltd.
<i>Mirror</i>	GDFL	25.4.51	J. G. West	J. S. Deane, G. W. Heron, W. G. Goodale	N. R. Iden	Cable & Wireless, Ltd.
<i>Monarch</i>	GDBF	5.4.51	J. P. F. Betson	—, Bates, J. Ruddock, A. Gillespie, R. A. Evans, —, Chisholm	D. Rendell	H.M. Postmaster General
<i>Mooltan</i>	GFBC	8.6.51	J. M. Peter	D. Aikman, L. H. Kelleit, M. Penney, —, Simmonds	J. Ormiston	Peninsular & Oriental Steam Navigation Co.
<i>Moveria</i>	GKYW	7.12.50	J. Jack	G. E. Waddell, J. Young, J. J. McCormick	H. D. Robinson	Donaldson Bros. & Black, Ltd.
<i>Mulbera</i>	GFTM	12.1.51	E. G. Baines	P. Middleton	—, Phillips	British India Steam Navigation Co., Ltd.
<i>Myrtlebank</i>	GLQB	27.2.51	R. J. Owen	C. T. Lewis, A. Tavendale, A. Szinczak	F. McGuinness	Andrew Weir & Co., Ltd.
<i>Napier Star</i>	MAPN	30.3.51	M. B. M. Tallack, O.B.E.	E. Harvey, C. G. Sneaton, D. G. Mallinger	G. Evans	Blue Star Line, Ltd.
<i>Naticina</i>	GIGH	29.11.50	F. Mansfield	J. D. Dyson, A. Douglass, B. Bagler, J. Thompson, A. Batey	J. W. Starrs	Anglo-Saxon Petroleum Co., Ltd.
<i>Neera</i>	MQTG	3.5.51	R. G. Green	J. Boadle, —, Smith, —, Booth	G. Leach	Anglo-Saxon Petroleum Co., Ltd.
<i>New Australia</i>	GZKD	24.1.51	D. Aitchison	W. Newport, C. Tucker, P. K. Murchison	—, Chick	Shaw, Savill & Albion Co., Ltd.
<i>New Zealand Star</i>	GZCR	17.4.51	E. N. Rhodes	W. Pitcher, A. R. Robinson, M. M. Jolly	A. B. Ewart	Blue Star Line, Ltd.
<i>Newfoundland</i>	GNMC	17.1.51	C. H. Kenyon	T. B. Stewart, J. T. Sheffield, E. W. Foxworthy	T. Cahill	Furness Withy & Co., Ltd.
<i>Nordic</i>	GDJC	9.1.51	E. G. Jones	P. R. Edwards, K. L. Rowe, R. N. P. Johnston	T. D. Bailey	Prince Line, Ltd.
<i>Norfolk</i>	GILV	14.11.50	B. Evans	—, Heron, A. P. Harrington, J. R. Witchell	F. Wilman	Federal Steam Navigation Co., Ltd.
<i>Norwegian</i>	GDMC	16.5.51	A. L. Hunter	J. A. Reid, I. Hunter, J. Short	W. Hammer	Donaldson Bros. & Black, Ltd.
<i>Nottingham</i>	GCNC	28.11.50	H. D. Horwood, R.D., Cdr., R.N.R.	F. T. Worster, B. Linklater, I. Cubitt	J. Heath	Federal Steam Navigation Co., Ltd.
<i>Nova Scotia</i>	GNNK	14.3.51	J. L. Anson, O.B.E.	J. D. P. Williamson, R. Heys, R. Martin	W. C. Brock	Furness Withy & Co., Ltd.
<i>Novelist</i>	GMLG	3.3.51	T. E. Steel	L. J. Sharman, G. B. Roberts, J. W. Embleton	J. J. Sheehy	T. & J. Harrison
<i>Orari</i>	GJKX	21.11.50	F. Loughheed	J. Crewdson, A. A. Faulkner, W. Dawes	C. Robinson	New Zealand Shipping Co., Ltd.
<i>Orcades</i>	MABA	4.7.51	I. E. G. Goldsworthy, R.D., R.N.R.	J. D. Birch, D.S.C., R.N.R., E. V. Harris, R.D., Lt.-Cdr., R.N.R., R. F. Underwood, R. Fletcher, F. B. Woolley, E. H. Kidd, P. Watts	F. W. Miller	Orient Steam Navigation Co., Ltd.
<i>Orion</i>	GYKL	15.5.50	N. A. Whinfield	M. R. Wilmshurst, P. Leighton, D. P. Blois	T. H. Shannon	Orient Steam Navigation Co., Ltd.
<i>Ormonde</i>	GLYC	6.6.51	A. E. Coles, R.D., Cdr., R.N.R.	—, Edgecombe, J. K. Thornton, R. J. Brittain, J. S. Gregson, D. Ward, A. J. Field	R. Oakley	Orient Steam Navigation Co., Ltd.
<i>Oronsay</i>	TKMZ		T. L. Shurrock, O.B.E.	R. W. Roberts, D.S.C., O.B.E., J. C. Stratford, A. M. Murray, L. A. Finch, O. F. W. Pitts, J. English, W. H. Benjamin	N. A. Boon	Orient Steam Navigation Co., Ltd.
<i>Orontes</i>	GBXM	3.8.50	S. S. Bernard, O.B.E.	G. Grandage, D.S.C., R.D., Cdr., R.N.R., W. B. Thomson, D. E. Hayes, L. Kingswood, J. Hughes, A. Harris	F. Murphy	Orient Steam Navigation Co., Ltd.

<i>Otranto</i> ..	6. 6. 51	R. J. Galpin, R.D., Cdr., R.N.R.	E. Riddlesdell, R.D., Lt.-Cdr., R.N.R., C. S. Thomas, J. W. Terry, G. McGowan, J. A. Benseive, J. B. Crichton, —, Pinky, O.B.E., R.D., Cdr., R.N.R., J. Coyle, A. H. Linden, C. A. Hollingshead, —, Dawson	C. J. Seaton ..	Orient Steam Navigation Co., Ltd.
<i>Pacific Exporter</i> ..	19. 3. 51	G. Brown ..	J. Coyle, A. H. Linden, C. A. Hollingshead, —, Dawson	H. A. Clark ..	Furness Withy & Co., Ltd.
<i>Pacific Fortune</i> ..	22. 2. 51	F. H. Perry	P. J. Williamson, G. K. Whithy, R. G. G. Bonney, A. C. Farrar-Hare	I. R. M. Thomas	Furness Withy & Co., Ltd.
<i>Pacific Importer</i> ..	18. 8. 50	B. M. Collard	G. Cook, A. H. Linden, E. H. Gregson	W. Britton ..	Furness Withy & Co., Ltd.
<i>Pacific Liberty</i> ..	7. 2. 51	W. F. Swann	R. Coyle, N. R. Land, C. G. Stiff	W. Britton ..	Furness Withy & Co., Ltd.
<i>Pacific Nomad</i> ..	1. 8. 50	W. Hutchison	J. Tye, J. T. Cameron, P. Cable	A. Adamson ..	Furness Withy & Co., Ltd.
<i>Pacific Stronghold</i> ..	28. 6. 51	A. Cooke ..	E. Hall, J. Cockburn, P. Frodsham, K. MacAlister	E. Graham ..	Furness Withy & Co., Ltd.
<i>Pacific Unity</i> ..	14. 11. 50	E. A. Kemp	B. Estill, A. A. Drake, W. E. Thomas	A. E. Trim ..	Furness Withy & Co., Ltd.
<i>Palana</i> ..	6. 3. 50	F. R. Spurr	—, Savage, —, Trower, G. E. Harris	H. Olding ..	Peninsular & Oriental Steam Navigation Co.
<i>Palomares</i> ..	15. 11. 50	D. J. Thomas, M.B.E.	D. A. Dickenson, W. H. Munday, A. Mannings	M. F. Conroy	MacAndrews & Co., Ltd.
<i>Pampas</i> ..	24. 5. 51	R. C. S. Wooley, R.D., R.N.R.	H. Riley, J. A. Martin, B. Sugden	J. Tuck ..	Royal Mail Lines, Ltd.
<i>Papanui</i> ..	1. 3. 51	D. Chadwick	B. E. Crust, M. R. Forcer, H. Sladen, J. Chin	P. Roberts ..	New Zealand Shipping Co., Ltd.
<i>Paparoa</i> ..	14. 3. 51	N. A. Thomas	J. D. Cubitt, F. I. Christall, M. J. Blake, R. G. Hollingdale	A. B. Mowat	New Zealand Shipping Co., Ltd.
<i>Paraguay</i> ..	31. 1. 50	H. V. Todd, R.D., Cdr., R.N.R.	A. R. Evans, R. H. Greenall, V. A. Sutton	P. Goulden ..	Royal Mail Lines, Ltd.
<i>Pardo</i> ..	24. 5. 51	T. W. Stevens, R.D., Capt., R.N.R.	M. B. Wingate, E. J. O'Keefe, R. Collin, G. Dudley	F. Hayes ..	Royal Mail Lines, Ltd.
<i>Parima</i> ..	21. 3. 49	H. E. Sang	G. A. Gibbons, J. C. Derby, A. H. Whittle	N. H. Crocker	Royal Mail Lines, Ltd.
<i>Paranga</i> ..	12. 8. 50	H. P. Mallet	M. Waghorn, A. R. Howard, —, Shipp	B. S. Magennis	P. & O. Steam Navigation Co.
<i>Paritha</i> ..	4. 8. 50	I. W. Caunce, R.D., R.N.R.	R. Jones, J. A. Davies, G. H. Griffiths	A. O'Sullivan	Cunard Steamship Co., Ltd.
<i>Perrin</i> ..	21. 12. 50	W. Paice ..	F. P. Irons, N. G. Jenner, C. W. Lyon, P. W. Bull	F. Groves ..	P. & O. Steam Navigation Co.
<i>Pertshire</i> ..	30. 6. 51	A. J. Hogg ..	A. Young, M. P. R. Turner, G. W. Sharp, G. Wilson	F. J. C. Bray	Turnbull Martin & Co., Ltd.
<i>Philomel</i> ..	18. 10. 50	H. M. Selmer	A. H. Tobin, H. T. Lentin, J. Chapman	T. Milnes ..	General Steam Navigation Co., Ltd.
<i>Philosopher</i> ..	13. 10. 50	T. Winstanley	J. W. Kent, J. Nash, R. A. Patmore	W. C. Doyle	T. & J. Harrison
<i>Pilcomayo</i> ..	15. 5. 50	F. A. C. Thacker	L. W. Green, J. M. Ashworth, G. D. Phillippe	E. Jones	Royal Mail Lines, Ltd.
<i>Pipiriki</i> ..	7. 7. 51	H. R. M. Smith	J. C. Davidson, R. G. Blakey, J. Marshall	D. Compton-James	New Zealand Shipping Co., Ltd.
<i>Polar Maid</i> ..	18. 5. 51	J. W. Ross ..	J. W. Mundy	J. MacKinnon	Chr. Salvesen & Co.
<i>Port Adelaide</i> ..	..	C. R. Townshend	—, Dingle, J. A. Ashburner, L. G. Garnham, T. C. Clarke	J. S. Skinner	Port Line, Ltd.
<i>Port Auckland</i> ..	8. 6. 51	J. G. Lewis, O.B.E.	W. M. Clough, R. A. Holmes, V. A. Hunt, K. Jayne	J. Griffiths ..	Port Line, Ltd.
<i>Port Brisbane</i> ..	8. 8. 50	H. Steele, O.B.E.	F. Gorman, P. Smith	E. G. Gunner	Port Line, Ltd.
<i>Port Chalmers</i> ..	14. 6. 50	P. H. Pedrick	R. C. Webb, G. G. Gilling, E. R. Jenkins, C. Milne	—, Brook ..	Port Line, Ltd.
<i>Port Hobart</i> ..	9. 5. 50	L. Copeland	J. Porter, —, Dalton, A. Wardell	R. C. Crompton	Port Line, Ltd.
<i>Port Jackson</i> ..	29. 5. 51	P. S. Ball ..	W. L. Robson, D. J. Batterbee, M. McKeith	P. J. McKeon	Port Line, Ltd.
<i>Port Lincoln</i> ..	10. 1. 51	G. G. Langford ..	H. J. Thompson, V. G. K. Webster, R. Shircore	R. Robertson	Port Line, Ltd.
<i>Port Macquarie</i> ..	4. 4. 51	L. J. Skaites	B. St. J. Smith, W. V. Lusted, J. Sharp	B. McGovern	Port Line, Ltd.
<i>Port Napier</i> ..	..	G. W. Hazelwood	S. D. A. Pritchard	..	Port Line, Ltd.
<i>Port Phillip</i> ..	12. 1. 51	J. G. Lewis, O.B.E.	T. G. Ward, —, Kensett, T. A. Fairbairn	..	Port Line, Ltd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Port Pirie</i>	GLVQ	3.5.51	F. W. Bailey, M.B.E.	F. Fairbairn, H. R. Long, — Lancaster	W. Miller	Port Line, Ltd.
<i>Port Vindex</i>	MAUW	29.5.51	H. H. Smith, O.B.E.	L. W. Cady, D. N. Robinson, G. Ballinger, J. R. King	F. Sharman	Port Line Ltd.
<i>Port Wellington</i>	GDNJ	31.10.50	E. J. Syvret	C. A. Rhodes, I. H. Stewart, G. G. Mooney	J. B. French	Port Line Ltd.
<i>Port Wyndham</i>	GYCW	25.6.51	E. E. Roswell	C. M. Walkins, B. B. Skrimishire, J. F. Lester	J. N. Coultis	Port Line, Ltd.
<i>Potaro</i>	GNLJ	24.5.51	E. N. Giller	F. W. Williams, J. F. Scates, E. D. Long	G. O'Callaghan	Royal Mail Lines, Ltd.
<i>Powell</i>	GKJL	25.6.51	D. Cornwell	R. Cardno, J. W. Stewart	J. Murphy	United Whalers, Ltd.
<i>Pretoria Castle</i>	GOAE	2.5.50	R. Wren, D.S.O.	J. Kitching, J. Thom, P. Rousseau	H. Oliver, M.B.E.	Union Castle Mail S.S. Co., Ltd.
<i>Radley</i>	GZZG	28.11.50	C. J. Forster	H. G. Strickland, D. A. Barfoot, J. D. Todd	P. Probert	Stephens, Sutton, Ltd.
<i>Rakata</i>	GFGW		A. I. Robertson, A.D.C., R.D., R.N.R.	D. E. Moran, T. S. Wadie, M. D. Ward	R. Wilson	New Zealand Shipping Co., Ltd.
<i>Ramore Head</i>	MAXX	18.8.50	E. W. Black	E. G. Davey, I. A. Piggott, D. N. Pierce	B. P. Lewis	G. Heyn & Sons, Ltd.
<i>Ranchi</i>	GLKW	24.1.51	A. G. Jenkins	— Woodroge, R. Lowther, P. Saunders, E. C. Jones, D. J. Masson	R. V. Gregory	P. & O. Steam Navigation Co.
<i>Rangitane</i>	GDBV	2.3.51	T. L. Maltby	F. S. Angus, P. Busby, T. Hughes, D. Gaskell	C. Lambe	New Zealand Shipping Co., Ltd.
<i>Rangitata</i>	GSZN	30.3.51	G. Kinnell, O.B.E.	D. Brittain, A. Elliott, G. Pool, J. M. Mead, T. Wadie	J. Grant	New Zealand Shipping Co., Ltd.
<i>Rangitiki</i>	GSXW	13.6.51	A. E. Lettington, O.B.E., D.F.C.	I. Christall, S. Simpson, I. Batley	J. Poyner	New Zealand Shipping Co., Ltd.
<i>Rangitoto</i>	GLMV	27.1.51	C. R. Plicher	G. Bevis, J. Holley, A. Jenkins, D. Hellings, P. Mather	E. R. Saunders	New Zealand Shipping Co., Ltd.
<i>Regent Hawak</i>	GMND	6.6.51	G. H. Hobson	R. Armstrong, Z. Wojewodzki, L. S. Ziembicki	R. W. Jones	Regent Petroleum Tankship Co., Ltd.
<i>Reina del Pacifico</i>	GMPS	29.6.50	I. Whitehouse	A. Lang, J. Lewis, L. Whitaker	I. Butler	Pacific Steam Navigation Co.
<i>Repton</i>	GPFL	29.5.51	D. Cowrie	T. Moncreff, A. Nuttall, B. A. Large	H. Mooney	Galbraith, Pembroke & Co., Ltd.
<i>Rhodesia Star</i>	GUAX	21.11.50	G. L. Evans, O.B.E.	E. W. Jenkins, R. Bayley, R. B. Escreet	C. I. Roe	Blue Star Line, Ltd.
<i>Rialto</i>	GBLV	14.3.51	E. Tyler	N. Cook, T. Fugill, C. T. Lawson, H. K. Thompson	G. Shilson	Ellerman's Wilson Line, Ltd.
<i>Richmond Castle</i>	GCSP	19.6.51	J. P. Aplin	A. J. McCardle, P. Pollard, G. D. Attwood, L. Haslett	W. A. Plater	Union-Castle Mail S.S. Co., Ltd.
<i>Ripplingham Grange</i>	GIGP	1.7.50	R. Owen, O.B.E.	R. Brooks, J. H. Taylor, — Zabel	R. G. J. Alton	Houlder Bros. & Co., Ltd.
<i>Rochester Castle</i>	GZQF	25.4.49	T. H. Whately	J. Taylor, R. G. Patterson, D. Campbell	P. Master	Union-Castle Mail S.S. Co., Ltd.
<i>Roslin Castle</i>	GYIZ	25.7.50	F. R. Pope	R. J. Miller, D. D. Lawton	I. Tuck	Union-Castle Mail S.S. Co., Ltd.
<i>Rouallan Castle</i>	GDFT	10.5.51	A. E. F. Payne	R. H. Hudson, J. M. Shelgar, D. Witty	H. Dunning	Union-Castle Mail S.S. Co., Ltd.
<i>Roxburgh Castle</i>	GBGS	8.3.51	J. D. B. Fisher	J. Kerr, F. J. Pye, M.B.E., S. K. Smith	— Power	Union-Castle Mail S.S. Co., Ltd.
<i>Royal Star</i>	MARJ	15.6.51	G. Aldridge	F. C. T. Wood, D. G. Knight, M. R. Bremberg, J. W. Poole	C. L. Carpenter	Blue Star Line, Ltd.
<i>Ruahine</i>	GKSY		A. I. Robertson, R. D., A.D.C., Capt., R.N.R.	R. J. Scott, G. Leith	R. J. C. Holmes	New Zealand Shipping Co., Ltd.
<i>Ruysdael</i>	MAQP	31.10.50	J. Burns	F. Johnson, W. White, M.F.H. Taylor	J. P. Carter	Bolton S.S. Co., Ltd.
<i>Sacramento</i>	GKCN	14.3.51	L. Abbey	J. L. Downie, G. B. Manson, W. McKean	W. Docherty	Ellerman Wilson Line, Ltd.
<i>St. Zeno</i>	MQMJ		T. S. Graham	R. B. Bryant, J. Bruce, F. Hyland	A. Hill	T. Hamling & Co., Ltd.
<i>Salacia</i>	GZRN	24.5.51	A. Lyall	W. P. Duguid, J. Galstone, E. Gowland	J. Slater	Donaldson Bros. & Black, Ltd.
<i>Salamanca</i>	GLSG	7.12.50	J. E. Evans, R.D., R.N.R.			Pacific Steam Navigation Co.
<i>Salaverry</i>	GBLQ	11.1.50				Pacific Steam Navigation Co.



NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Stirling Castle</i>	GYPX	5.9.50	W. A. Pace, O.B.E.	R. Highly, W. Gray, P. Walker	P. P. Williams	Union Castle Mail S.S. Co., Ltd.
<i>Stirlingshire</i>	GCQD	20.4.51	E. W. Jenkins	T. R. Halliday, J. Caley, G. M. Silvers	N. J. Braddon	Turnbull, Martin & Co., Ltd.
<i>Strathaird</i>	GRSX	13.4.51	H. S. Allan, R.D., Cmdr., R.N.R.	— West, — Knowles, K. Walker, G. Makin, D. J. Knight, A. W. Pickering	J. F. Clarke	P. & O. Steam Navigation Co.
<i>Stratheden</i>	GDGT	8.9.50	S. W. S. Dickson	— Mayne, — Vickers, A. T. Savage, B. B. Jones, G. V. Holmes, — Williams	H. S. Horn	P. & O. Steam Navigation Co.
<i>Strathmore</i>	GYMS	1.3.51	C. E. Pollitt	I. M. Sinclair, J. P. McArthur, B. D. H. Thompson, S. Mordant, C. B. Thompson, D. A. Hansing	J. P. Carey	P. & O. Steam Navigation Co.
<i>Strathnaver</i>	GRPZ	25.4.51	J. C. Mellonie	D. T. Bolas, E. Aikman, D. Fanthorpe	A. Miller	P. & O. Steam Navigation Co.
<i>Struan</i>	MASI	24.5.51	M. Polson	G. Reid, S. Sutherland, A. H. Davies	W. Hayes	Chr. Salvesen & Co.
<i>Stufoak</i>	GQQS	3.10.50	F. Pover	B. E. Applegate, P. J. Field, M. J. Byrd	H. Hare	Federal Steam Navigation Co., Ltd.
<i>Suncrest</i>	GNWW	11.6.51	L. J. Hunter	A. Oakeshott, N. Munce, — Vernoeux	— Nicholson	Crest Shipping Co., Ltd.
<i>Sussex</i>	MAEF		R. Loughheed			Federal Steam Navigation Co., Ltd.
<i>Sutherland</i>	GBYG	3.5.51	R. W. Nicolson	J. N. Garrett, G. Galloway, R. B. Hudson	S. Morgan	B. J. Sutherland & Co., Ltd.
<i>Swainby</i>	GPFS	25.4.51	R. D. Sparling	P. Henderson, T. Hastings, P. Dyer	S. R. Johns	Sir R. Ronner & Co., Ltd.
<i>Sydney Star</i>	MKSM	8.7.50	G. P. McDonald, O.B.E.	R. H. R. Jones, F. A. Ball, J. C. Mackintosh	J. McConnell	Blue Star Line, Ltd.
<i>Tamaroa</i>	GFWX	13.6.51	T. F. McCraith	J. G. Beck, D. G. Ede, J. Carroll, J. F. Mason, D. MacAskill	D. MacRae	Shaw, Savill & Albion Co., Ltd.
<i>Tamale</i>	GCBF	6.6.51	W. Munt	H. Butler, C. B. Powell, — Hall, — Craig	F. Broomfield	Elder Dempster Lines, Ltd.
<i>Tarkwa</i>	MASU	4.10.50	G. D. Simpson	W. L. Lohian, G. Cooke, R. Martin	G. I. Gillling	Elder Dempster Lines, Ltd.
<i>Tasso</i>	GLMR	14.11.50	— Goodman	A. T. Jardine, J. E. Wray, G. Mitchell	D. Withers	Ellerman's Wilson Line, Ltd.
<i>Tectus</i>	GBMJ	29.5.51	K. J. Morris	C. L. Fiddler, A. C. Watson, T. H. Potts, P. Leobell	J. M. Murphy	Anglo-Saxon Petroleum Co., Ltd.
<i>Tekeo</i>	GIFQ	7.12.50	J. D. Bennett	A. S. Collins, E. J. Newing, P. B. Eccles	T. Herbert	New Zealand Shipping Co., Ltd.
<i>Telemachus</i>	GBLB	24.5.51	L. F. Webster	J. Dunlop, R. Brett, A. M. Blackburn	N. B. Martin	A. Holt & Co.
<i>Teviot</i>	MASX	15.6.51	J. T. Peterson	V. Gordon, N. J. Oliver, R. Byles	D. A. Evans	Royal Mail Lines, Ltd.
<i>Thamesfield</i>	GDBG	27.1.51	M. H. Hooker	J. Blakie, J. A. M. Haddow, J. Horsbough	S. O'Driscoll	Hunting & Son, Ltd.
<i>Thaitonus</i>	GBMT	18.6.51	T. W. A. Webster	R. A. Moorhouse, P. S. L. Nobes, P. J. E. Marshall	P. J. Cottrill	Anglo-Saxon Petroleum Co., Ltd.
<i>Timaru Star</i>	GKKM		C. Watson	H. R. Tompsett		Blue Star Line, Ltd.
<i>Tinto</i>	GBYT	13.4.51	S. H. Bennett, M.B.E.	C. Everingham, D. M. Smee	A. A. Harrison	Ellerman's Wilson Line, Ltd.
<i>Tongarivo</i>	GLFZ	8.6.51	T. J. Alderman	R. Merry, N. Collett, J. Bone	R. Heath	New Zealand Shipping Co., Ltd.
<i>Torr Head</i>	GZPW	13.10.50	M. Kennedy	T. Templeton, J. McCormick, F. Sadlier	G. Penketh	G. Heyn & Sons, Ltd.
<i>Tregenna</i>	GBPM	13.6.51	C. Lloyd Collings, O.B.E.	N. Berry, D. M. Curror, A. Downs	C. Kelly	Hain S.S. Co., Ltd.
<i>Treleavan</i>	GBPQ	13.7.51	S. K. Hawken	J. E. Maiden, W. O. Boon, B. R. Welbury	I. W. Hart	Hain Steamship Co., Ltd.
<i>Trebyon</i>	GBPP	20.2.51	F. J. Cornish, M.B.E.	H. Gravel, P. Haggarty, J. M. Downard	T. H. Murrin	Hain Steamship Co., Ltd.
<i>Tresilian</i>	GCKP	28.12.50	J. C. Bate, O.B.E.	J. Williams, B. Martin, V. Wise	J. Jenkinson	P. & O. Steam Navigation Co.
<i>Trevaivor</i>	GCKG	22.8.50	A. Goodlad	T. I. Smith, D. Fife, T. Youdan	— Tyrer	Hain Steamship Co., Ltd.
<i>Tribesman</i>	GBNZ	28.12.50	J. W. F. Wallis	D. V. Jones, J. Cubbin, H. Bennet	S. Pepper	T. & J. Harrison
<i>Tribulus</i>	GFJS	21.3.51	H. Sangster	P. Marking	J. Colley	Anglo-Saxon Petroleum Co., Ltd.
<i>Tronda</i>	MMLX	24.4.50	A. Goodlad	R. Tompkins, J. Johnson		Chr. Salvesen & Co.
<i>Tweed</i>	GBRP	14.11.50	G. S. Grant, R.D., Cdr., R.N.R.	R. M. Tysoe, W. B. Baxter, J. P. L. Thornhill	M. Healy	Royal Mail Lines, Ltd.
<i>Twickenham</i>	GNDC	31.5.51	J. A. Tully	H. Blair, J. Porteous, J. C. Taylor	J. T. Berrie	Watts, Watts & Co., Ltd.
<i>Umtali</i>	GYWB	12.1.51	F. E. J. O'Hea	D. J. Estrange, J. Lang, J. H. Butcher, F. Bush	S. Hewitt	Bullard, King & Co., Ltd.
<i>Umtata</i>	GDQF	13.9.50	P. Rewell	J. Thorn, E. Le Vine, E. Bicknell, G. T. Gibson, J. Brocklesbury	— Claret	Bullard, King & Co., Ltd.

<i>Umzinto</i>	..	GIFQ	3.10.50	R. Harber	E. Bicknell, J. H. Beavan, D. Banks	J. S. Sprunt	Bullard, King & Co., Ltd.
<i>Vancouver City</i>	..	GIGT	7.5.51	M. D. Louttit, O.B.E.	A. B. Parkhouse, J. B. Cuckow, E. J. Thompson	R. Butcher	Sir Wm. Reardon Smith & Sons, Ltd.
<i>Vandalia</i>	..	GCRQ	24.5.51	G. S. Evans	J. C. Nicholson, A. W. Hoyle, J. B.	S. Fitzpatrick	Cunard Steamship Co., Ltd.
<i>Vardulia</i>	..	GCFW	23.1.50	A. N. Sargent, O.B.E., R.D., R.N.R.	Clemerson, —, Blackman, P. King	..	Cunard Steamship Co., Ltd.
<i>Vestra</i>	..	MNNB	31.10.50	D. S. Archibald	R. A. Johnston	..	J. T. Salvesen & Co.
<i>Volo</i>	..	GPCJ	4.5.51	A. Merrill	J. Weatherston, S. Wilkinson, —	..	Ellerman's Wilson Line, Ltd.
<i>Waimana</i>	..	MATW	14.11.50	C. L. Carroll, D.S.C., R.D., R.N.R.	A. C. D. Masters, J. Scott, J. B. Hunt, K. D. Billinghamurst	..	Shaw, Savill & Albion Co., Ltd.
<i>Waipawa</i>	..	GWXQ	4.4.51	G. Campbell	J. Carroll, A. Stephenson, H. M. Hignett, A. Cripps	..	Shaw, Savill & Albion Co., Ltd.
<i>Wairangi</i>	..	MATX	6.2.51	H. C. Smith	C. W. Sandall, C. Laddington	..	Shaw, Savill & Albion Co., Ltd.
<i>Waivera</i>	..	GBJB	8.12.50	L. J. Hopkins	P. M. Williams, D. H. Clarke, C. Tucker	..	Shaw, Savill & Albion Co., Ltd.
<i>Wakus Bay</i>	..	GKBZ	3.10.50	H. Gentles	J. Marshall	..	Sir R. Ropner & Co., Ltd.
<i>Wanstead</i>	..	GFLS	2.3.51	D. G. Martin	I. Jackson, R. G. Charlton, N. Atkinson, D. Stokoe	..	Watts, Watts & Co., Ltd.
<i>Warkworth</i>	..	MALF	6.6.51	C. N. Woerner, O.B.E.	G. B. Bell, T. E. Wilson, D. Poppiswell	..	R. S. Dalgleish, Ltd.
<i>Warwick Castle</i>	..	GRRJ	16.2.51	I. Trayner	R. Taylor, P. E. Eckford, N. E. Upham	..	Union-Castle Mail S. S. Co., Ltd.
<i>Wendover</i>	..	GFML	9.6.51	F. W. Grist	P. Ravinsson, E. Peirce, D. Griffin	..	Watts, Watts & Co., Ltd.
<i>Winchester Castle</i>	..	GTPZ	29.6.50	H. A. Deller	J. R. Brooks, R. Lofes, B. Braithewaite, T. F. Morgan	..	Union-Castle Mail S. S. Co., Ltd.
<i>Worcestershire</i>	..	GFZM	..	F. C. Brooks	R. L. Hagley, A. M. McLean, R. G. Lovegrove, R. Phillips	..	Bibby Bros. & Co.
<i>Yona</i>	..	GLPN	..	S. Thompson	J. Thomson, M. Treparosic, J. Moffat	..	Henderson & Co.
<i>Zealandic</i>	..	MAGJ	..	P. F. Owens	P. H. Jowett, I. Sladen, P. G. Jenkins, D. Anderson	..	Rio Cape Line, Ltd.

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
* <i>Queen of Bermuda</i> ..	GZKF		L. F. Banyard, O.B.E. ..	N. E. James .. .. .	H. Stennett .. ..	Furness, Withy & Co., Ltd.
<i>Conway, H.M.S.</i> ..	—	13.4.51	E. Hewitt, R.D., Capt. R.N.R. ..	The Senior Cadets .. ..	—	—
Pangbourne Nautical College	—	14.11.50	H. C. Skinner, O.B.E., Cdr. R.N. ..	The Senior Cadets .. ..	—	—
<i>Worcester, H.M.S.</i> ..	—	31.3.51	G. C. Steele, V.C., Cdr. R.N. (Retd.) .. ..	The Senior Cadets .. ..	—	—

\* This ship has been recruited by the Bermuda Meteorological Service.

## Supplementary Ships

NAME OF VESSEL	CALL SIGN	LAST RETURN RECEIVED	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/MANAGERS
<i>Albis</i>	GSYV		J. Slater	G. Bloomfield, R. Bakies, —, Harrison ..		S. G. Embricos, Ltd.
<i>Bellerby</i>	MQJF		F. Yate	W. McMorland, J. A. Duck, D. E. Buckley	F. D. Musson	Ropner Shipping Co., Ltd.
<i>British Duke</i>	GYSW	27. 4. 51	H. J. McMichael	V. Rixham, W. Anderson, M. Richardson	N. O'Loughlin	British Tanker Co., Ltd.
<i>Cedarpool</i>	MAHG		D. Barrow	S. Hider, M. Arnold, J. Branscombe ..		Sir R. Ropner & Co., Ltd.
<i>City of Khos</i>	GKXB		A. S. Horan			Ellerman Lines, Ltd.
<i>Clan Alpine</i>	GIFP		G. Vernon-Greene			Cayzer, Irvine & Co., Ltd.
<i>Clan Lamont</i>	GTTD		J. E. Townrow	J. Freestone, J. L. Easton, J. C. Duncan ..	D. D. Munro	Cayzer, Irvine & Co., Ltd.
<i>Clan MacBrayne</i>	MAQA		W. H. Dalley	J. Howe, J. Sutherland, B. Thompson ..	J. P. Burke	Walter Runciman & Co., Ltd.
<i>Coptic</i>	GEND		E. Sainsbury			A. Holt & Co.
<i>Dartmoor</i>	GFQT		I. O. Roberts	C. G. Watterson, P. Hewitt	W. D. Atkinson	Andrew Weir & Co., Ltd.
<i>Diomed</i>	GQYR		R. Singleton	K. Davis, I. Evans, —, Arduis ..		MacAndrews & Co., Ltd.
<i>Eastbank</i>	GFKR		R. Smith			Prince Line, Ltd.
<i>Empire Dove</i>	GCMZ		W. G. Marks			British India Steam Navigation Co., Ltd.
<i>Empire Medway</i>	GSMV	18. 6. 51	H. A. Shaw			
<i>Empire Trooper</i>	GLXJ		R. H. A. Bond, O.B.E.	P. A. Chubb, T. Kurek, P. Trace ..	J. Readon	
<i>Empire Windrush</i>						
<i>Folda</i>	GYSF		I. Wilson, O.B.E.			New Zealand Shipping Co., Ltd.
<i>Greenland</i>	MLFR		E. Tulloch			Chr. Salvesen & Co.
<i>Harpaton</i>	GCLJ		C. F. McDonald	A. Millar, J. Thompson, J. Borthwick ..	D. W. Crearie	Currie Line, Ltd.
<i>Hestone</i>	GFEX	28. 11. 50	G. Jones	J. T. Baker, G. D. Brown, R. Skinner ..	E. John	J. & C. Harrison & Co., Ltd.
<i>Hollybank</i>	GUGJ		M. J. Lewis	G. Robinson, J. McMaster, D. W. Thomas	M. Phelon	Houston Line (London), Ltd.
<i>Lesterstire</i>	MANY		A. J. Whiston			Andrew Weir & Co., Ltd.
	GDBL		R. Cumming, D.S.C.			British India Steam Navigation Co., Ltd.
<i>Llangibby Castle</i>	GPLV	30. 3. 51	D. D. Mackenzie	— Underdown, J. Howson, St. Q. Beadon, D. J. Jones, R. Olden ..	J. Eager	Union-Castle Mail S.S. Co., Ltd.
<i>Maple Hill</i>	MANE		S. Cheek	E. E. Ellard		P. B. Pandelis, Ltd.
<i>Markab</i>	GCVT	20. 5. 49	R. Chapman	A. Stuart, W. Russell ..	W. Brown	Phocean Ship Agency, Ltd.
<i>Medasa</i>	GFDZ		R. Brignall	W. Brown ..		British India Steam Navigation Co., Ltd.
<i>Mulberry Hill</i>	MAKQ		J. Campbell			Counties Ship Management Co., Ltd.
<i>Noritha</i>	GDQK		J. R. Petrie			Anglo-Saxon Petroleum Co., Ltd.
<i>Pebbles</i>	GYTN		R. Thwaites			B. J. Sutherland & Co., Ltd.
<i>Port Alma</i>	GSTN		D. F. Morgan			Port Line, Ltd.
<i>Port Fairy</i>	GSTP	5. 7. 51	J. A. Fairbairn	M. Rushan, E. Newstead, W. M. G. Lloyd	F. Harrop	Port Line, Ltd.
<i>Port Victor</i>	MSWK		E. T. N. Lawrey			Port Line, Ltd.
<i>Red Crusader</i>	GTRP		R. Nash			E. D. W. Lawford
<i>Red Knight</i>	MBQT		J. Tomlinson			E. D. W. Lawford
<i>Red Lancer</i>	MKTP		E. Littler			E. D. W. Lawford
<i>Red Rose</i>	MEMX		J. McKernan			E. D. W. Lawford
<i>Scotia</i>	GPYM		E. A. Bruce	J. Craig ..		Scottish Home Dept. (Fishery Division)
<i>Stankeld</i>	GZQQ		I. McAlpine	H. Decalour, B. Willis, T. Cummings ..	S. Kirkwood	J. A. Billmeir & Co., Ltd.
<i>Tarantia</i>	GIGS		A. J. F. Colquhoun	J. C. Ross, H. A. Cameron		Anchor Line, Ltd.
<i>Trettsick</i>	GBRP		M. E. Sadler	J. Dalgliesh, D. R. Jenkins, D. T. Best ..	B. Cannell	Hain Steamship Co., Ltd.
<i>Treowlas</i>	MATL		W. T. Evans	A. Millar, D. C. Penburthy, —, Foster ..		Hain Steamship Co., Ltd.
<i>Woodland</i>	MTCT		C. M. Webster			Currie Line, Ltd.

## FLEET LIST (Australia) VOLUNTARY OBSERVING SHIPS

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

NAME OF VESSEL	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	OWNERS/AGENTS
<i>Selected Ships:</i>				
<i>Canara</i> ..	W. Bird, O.B.E.	T. Woodward, J. D. Campbell, C. C. Springall	P. A. Stuart ..	British India Steam Nav. Co.
<i>Chitra</i> ..	J. D. Woods ..	C. Allerton, H. S. Strawbridge, W. L. Hillcoat ..	R. C. Whiting ..	British India Steam Nav. Co.
<i>Idomenus</i> ..	J. L. Johnston ..	W. A. Clark, G. D. F. Cruickshank, P. S. Lombard, G. Moncks ..	A. N. Williams ..	A. Holt & Co.
<i>Koolinda</i> ..	J. S. Airey ..	J. Paulsen, J. Palfreyman, R. Seaward ..	H. White ..	Western Australian State Steamships
<i>Koomilya</i> ..	F. W. Roberts ..	C. Stewart, R. Sicklin, G. Steinbeck ..	F. Mackie ..	McIlwraith, McEacharn, Ltd.
<i>Koorringa</i> ..	F. McLean ..	A. D. Hanson, V. Bovell, J. A. Grey ..	R. M. Rees ..	McIlwraith, McEacharn, Ltd.
<i>Louana</i> ..	L. Fry ..	C. A. Blow, T. H. Millidge, J. K. Saint ..	J. Bell ..	Melbourne Steamship Co., Ltd.
<i>Nellora</i> ..	T. Mills ..	A. Johnston, G. Champion, G. Cleveland, K. Skinner ..	J. Dennison ..	Eastern & Australian S.S. Co., Ltd.
<i>Orestes</i> ..	F. J. Cockburn ..	A. Surtees, G. Kitching, R. Denning, A. P. Beckett ..	J. F. Audsley ..	A. Holt & Co.
<i>River Burnett</i> ..	L. G. Ramsay ..	R. Campbell, H. W. Robinson, T. Beckinsale ..	G. Harper ..	Australian Shipping Board
<i>River Clarence</i> ..	W. W. Fish ..	A. T. Lake, I. K. S. Adam, S. F. Dockwell ..	M. Pearson ..	Australian Shipping Board
<i>River Mitta</i> ..	A. Knight ..	G. Davies, K. Clarence, W. Wiggins ..	M. Hayter ..	British Phosphate Commission
<i>Triadic</i> ..	A. Rhoades ..	J. P. Milton, W. L. Harbord, W. B. Jeavons ..	J. Ward ..	British Phosphate Commission
<i>Trienza</i> ..	P. Richardson ..	D. Nelson, D. Robb, K. Oliver ..	R. G. Neale ..	British Phosphate Commission
<i>Triona</i> ..	C. L. Evans ..	P. W. Thompson, S. E. B. Harris, B. J. Robertson ..	C. Palmer ..	Huddart, Parker, Ltd.
<i>Wanganella</i> ..	—	H. A. Jeffrey, K. W. Dunlop, E. Webb ..		A. Holt & Co.
<i>Supplementary Ships</i>				Australian Shipping Board
<i>Dromed</i> ..	A. M. Caird ..			Western Australian State Steamship
<i>Derrigo</i> ..				
<i>Kybra</i> ..				

## 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 SHIP	CAPTAIN	OBSERVING OFFICERS	SENIOR RADIO OFFICER	SHIPPING COMPANY OR OPERATORS
<i>Anking</i> .. .. .	A. Taylor .. .. .	W. Davidson, J. D. de C. Veale, St. F. M. F. Haslett .. .. .	G. W. Moore .. .. .	China Navigation Co., Ltd.
<i>Anshun</i> .. .. .	J. McKinlay .. .. .	C. N. Stewart, J. R. Brett, D. S. Southey .. .. .	P. L. Liffitt .. .. .	China Navigation Co., Ltd.
<i>Beneduch</i> .. .. .	G. M. McGill .. .. .	J. R. Morrison, C. R. D. McLeod, J. S. Steele, E. O. E. R. Price .. .. .	J. W. Dick .. .. .	Ben Line, Ltd.
<i>Caroline Moller</i> .. .. .	W. J. Lang .. .. .	L. G. M. Warner, N. F. Andrade, Yuan King Lau .. .. .	P. N. Bhatt .. .. .	Mollers' (H.K.) Ltd.
<i>Chang Sha</i> .. .. .	C. P. Miller .. .. .	V. R. Woolfe, S. Fergusson, J. R. Young, P. Baxter .. .. .	G. W. Bourne .. .. .	China Navigation Co., Ltd.
<i>Choy Sang</i> .. .. .	J. F. G. Fotheringham .. .. .	F. H. Main, A. A. Watson, R. J. Cooper .. .. .	R. M. Legg .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Chun Sang</i> .. .. .	D. G. R. Kinnear .. .. .	E. M. Norman, D. N. Snashall, P. S. Sullivan .. .. .	P. J. Behan .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Glory</i> .. .. .	L. McRae .. .. .	T. J. Ashcroft, R. P. Farquhar, R. W. E. Little .. .. .	C. D. Evans .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Queen</i> .. .. .	D. G. Burleigh .. .. .	M. I. Groundwater, D. R. McFadzien, E. Jones, J. H. Jeffries .. .. .	D. Johnson .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Saga</i> .. .. .	S. Schofield .. .. .	C. Thomson, M. J. K. Crighton, G. J. Eastwood, A. F. Cameron .. .. .	R. E. Stewart .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Eastern Trader</i> .. .. .	J. L. Baines .. .. .	Tai Ai-Chun, Chin Kwo Chiang, Lo Shao Hsin .. .. .	Chang Min Sen .. .. .	Great Southern Steamship Co., Ltd.
<i>E Sang</i> .. .. .	J. Shiell .. .. .	J. H. Thomas, C. Przybylinski, T. Y. Yuan .. .. .	W. I. Briggs .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Fengting</i> .. .. .	F. N. Booth .. .. .	D. W. R. Gash, S. E. B. Harris, P. Bulatoff .. .. .	E. G. Inwood .. .. .	China Navigation Co., Ltd.
<i>Fengtien</i> .. .. .	F. Gibbs .. .. .	A. Harper, J. F. O'Connor, J. C. Mark .. .. .	R. A. Castro .. .. .	China Navigation Co., Ltd.
<i>Foochow</i> .. .. .	F. Kelly .. .. .	S. H. Liu, R. A. Button, A. P. Sokoloff .. .. .	P. S. Peryar .. .. .	China Navigation Co., Ltd.
<i>Fort Charlotte</i> .. .. .	D. C. R. Ralph, O.B.E., D.S.C. .. .. .	A. M. Telfer, T. J. Owen, W. P. Martinson .. .. .	H. G. W. Rankin .. .. .	Royal Fleet Auxiliary
<i>Fuhien</i> .. .. .	A. H. Finnie .. .. .	D. I. Robertson, R. Perry, C. F. Chen .. .. .	Leung Man Hin .. .. .	China Navigation Co., Ltd.
<i>Funing</i> .. .. .	J. Taylor .. .. .	M. D. B. Sweeney, D. L. Wilson, G. Young .. .. .	G. Whitehead .. .. .	China Navigation Co., Ltd.
<i>Green Ranger</i> .. .. .	E. Payne .. .. .	W. Rennie, A. D. Walters, W. Carr .. .. .	B. Rowan .. .. .	Royal Fleet Auxiliary
<i>Greystone Castle</i> .. .. .	L. Rowe .. .. .	A. Erskine, K. Rowe, P. B. Kelman, A. Gibbons .. .. .	D. G. Sims .. .. .	Mollers' (H.K.), Ltd.
<i>Hai Lee</i> .. .. .	J. Hansen .. .. .	T. Thorkildsen, Erling Tuftte, Marius Sandvik .. .. .	Ip Ki Tseng .. .. .	China Siam Line.
<i>Hai Meng</i> .. .. .	Walter Hannevig .. .. .	O. Schibsted, E. Tommervik .. .. .	Wong On Chung .. .. .	China Siam Line.
<i>Hang Sang</i> .. .. .	L. W. Harrison .. .. .	J. E. Williams, R. Griever, A. Nelson .. .. .	Lo Kin Chek .. .. .	Indo-China Navigation Co., Ltd.
<i>Hanyang</i> .. .. .	J. W. Evans .. .. .	P. Flory, F. W. Ridley, P. Y. Lam .. .. .	E. Bellard .. .. .	China Navigation Co., Ltd.
<i>Heinrich Jessen</i> .. .. .	R. D. Nielsen .. .. .	C. S. Jensen, J. N. Holst, Yeh Kiong Yi .. .. .	Lai Kwong .. .. .	Jebesen & Co.
<i>Hermelin</i> .. .. .	H. A. Johnsen .. .. .	Aake Andersen, A. Skjorvestad, Hans Berge .. .. .	Ho Hung Ki .. .. .	China Siam Line
<i>Hermod</i> .. .. .	Olaf Apold .. .. .	Johannes Eide, Robert Gronvold .. .. .	Ma Ping Leung .. .. .	Indo-China Steam Navigation Co., Ltd.
<i>Hew Sang</i> .. .. .	R. G. Stanton .. .. .	L. C. Cox, J. G. Perrin, M. T. G. Fish .. .. .		Indo-China Steam Navigation Co., Ltd.
<i>Hin Sang</i> .. .. .	G. W. F. Edwards .. .. .	W. E. Reeve, L. I. Ovsiannikoff, J. M. Taylor .. .. .		Indo-China Steam Navigation Co., Ltd.

<i>Hiram</i>	..	..	..	Guy Sundholm, H. Fredenborg	Chiu Tse Kong	China Siam Line
<i>Hoi Hwang</i>	..	..	..	K. Munkjord, O. Ofstedal, H. Kristoffersen	A. Jensen Takvam	Karsten Larsen & Co. (Hong Kong), Ltd.
<i>Hoi Wong</i>	..	..	..	B. Macland, A. Vespestad, M. Madsen	O. Torresdal	Karsten Larsen & Co. (Hong Kong), Ltd.
<i>Hunan</i>	..	..	..	W. J. Coburn, P. C. J. Cockburn, J. H. M. Twibill	Choi Pong Cheung	China Navigation Co., Ltd.
<i>Hupeh</i>	..	..	..	J. C. Christal, C. Stark, C. F. Chan	Tsang Kau	China Navigation Co., Ltd.
<i>Kweichang</i>	..	..	..	I. F. O'Dowd, S. W. Owen, L. C. Wang	Liu Yuk Kong	China Navigation Co., Ltd.
<i>Lok Sang</i>	..	..	..	T. C. W. Marr, I. Rowland-Jones, K. C. Yeung	J. E. Chew	Indo-China Steam Navigation Co., Ltd.
<i>Mui Ann</i>	..	..	..	H. Pettersen, T. Johnsen, H. Aashem	A. Ovlend	Chin Seng Hong Shipping Co., Ltd.
<i>Mui Heng</i>	..	..	..	Martin S. Severinsen, Egil Linge	Cheng Shan Wai	Chin Seng Hong Shipping Co., Ltd.
<i>Muncaster Castle</i>	..	..	..	E. W. Stubbs, C. R. Blair, H. Wilson, R. Crichton	A. G. Pearce	Mollers' (Hong Kong), Ltd.
<i>Pakhoi</i>	..	..	..	S. J. Yeandle, G. Baxter, T. C. Tsai	Leung Kan	China Navigation Co., Ltd.
<i>Poyang</i>	..	..	..	R. Tasker, A. Bartley, C. M. Li	Li San Kau	China Navigation Co., Ltd.
<i>Produce</i>	..	..	..	T. K. Kobiasen, H. Sivertsen, B. Nordhus	T. Solheim	Karsten Larsen & Co. (Hong Kong), Ltd.
<i>Sangola</i>	..	..	..	J. D. Sleight, J. M. Woolcock, J. R. D. McLeod	R. O. Smith	British India Steam Navigation Co., Ltd.
<i>Shansi</i>	..	..	..	J. F. Follett, E. Shakeshaft, C. W. Lau	Edward Toyit	China Navigation Co., Ltd.
<i>Shengkang</i>	..	..	..	C. A. N. Baker, D. J. Coombes, S. K. Chen	R. M. Inwood	China Navigation Co., Ltd.
<i>Shulong</i>	..	..	..	H. D'ath, E. Snowden, D. Harrison	W. Mathews	P. & O. Steam Navigation Co.
<i>Sinkiang</i>	..	..	..	P. H. Ward, I. Robinson, S. T. Sung	Chin Fook On	China Navigation Co., Ltd.
<i>Sirdhana</i>	..	..	..	D. C. Murison, R. I. Higgins, D. T. Brown	J. Orman	British India Steam Navigation Co., Ltd.
<i>Soochow</i>	..	..	..	B. M. McLennan, J. C. Anderson, S. N. Lai	R. R. Stevenson	China Navigation Co., Ltd.
<i>Szechuen</i>	..	..	..	J. Storey, W. T. Masters, V. A. Boutskoi	Tsang Pui Leung	China Navigation Co., Ltd.
<i>Tai Chung Shan</i>	..	..	..	S. F. Smith, S. C. Chan, H. J. Liu	S. I. Tong	Shun Cheong Steam Navigation Co.
<i>Taiyuan</i>	..	..	..	A. Watson, H. A. Ledebor, F. T. Quinn, R. J. Porter	D. F. MacDonald	China Navigation Co., Ltd.
<i>Tak Sang</i>	..	..	..	N. B. Hall, J. M. Marshall, K. Y. Feng	E. A. West	Indo-China Steam Navigation Co., Ltd.
<i>Thai</i>	..	..	..	E. V. E. Lieberaph, R. A. Frickson, K. A. Alebresson	T. G. Nilsson	Everett Steamship Corporation
<i>Tsinan</i>	..	..	..	A. O. Atkinson, J. Paton, C. K. Tao	Wai Pun Un	China Navigation Co., Ltd.
<i>Wing Sang</i>	..	..	..	G. Parish, W. E. McLackland, Keng Jen Ko	A. G. Lum	Indo-China Steam Navigation Co., Ltd.
<i>Wo Sang</i>	..	..	..	R. C. Traill, W. E. S. Cream, P. D. Coles	T. Ovens	Indo-China Steam Navigation Co., Ltd.
<i>Yochow</i>	..	..	..	E. W. Woodcock, R. D. A. Owen, K. W. Wu	Cheung Shing Cheung	China Navigation Co., Ltd.
<i>Yunnan</i>	..	..	..	G. A. Abbs, J. R. Suffren, Lai Wai	Tye Cho Chun	China Navigation Co., Ltd.

## FLEET LIST (India)

The following is a list of observing ships, voluntarily co-operating with the India Meteorological Department

NAME OF VESSEL	OWNERS
<b>Selected Ships:</b>	
<i>Alavi</i> .. .. .	Mogul Line, Ltd.
<i>Bahadur</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Chanda</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Dara</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Daressa</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Dumra</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Dwarka</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Englestan</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Havildar</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Islami</i> .. .. .	Mogul Line, Ltd.
<i>Jalazad</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jaladuta</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalaganga</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalamani</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalamanjari</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalaprakash</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalarashmi</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalaveera</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalayamuna</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jehangir</i> .. .. .	Mogul Line, Ltd.
<i>Kampala</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Karanja</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Khosrou</i> .. .. .	Mogul Line, Ltd.
<i>Maharaja</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Mahadevi</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Nadir</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Nurjehan</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Rajput</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Rajula</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Santhia</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Shahjehan</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Singu</i> .. .. .	Burma Oil Co., Ltd.
<i>Sirsa</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Subadar</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Tairea</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Warla</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Yenangyaung</i> .. .. .	Burma Oil Co., Ltd.
<b>Supplementary Ships:</b>	
<i>Akbar</i> .. .. .	Mogul Line, Ltd.
<i>Badarpur</i> .. .. .	Burma Oil Co., Ltd.
<i>Barala</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Begum</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Bharatjal</i> .. .. .	Bharat Line, Ltd.
<i>Bharat Rani</i> .. .. .	Bharat Line, Ltd.
<i>Itaura</i> .. .. .	British India Steam Navigation Co., Ltd.
<i>Jaladurga</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalagopal</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalajawahar</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalaketu</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalakrishna</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalamayur</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalaratna</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Jalavijaya</i> .. .. .	Scindia Steam Navigation Co., Ltd.
<i>Malika</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Masimpur</i> .. .. .	Burma Oil Co., Ltd.
<i>Nurani</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Risaldar</i> .. .. .	Asiatic Steam Navigation Co., Ltd.
<i>Rizwani</i> .. .. .	Mogul Line, Ltd.

## 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	OBSERVING OFFICER	RADIO OFFICER	OWNERS
<i>Selected Ships :</i>				
<i>Kaitoke</i>	A. F. Inman	G. R. Inkster	L. M. Harvey	Union S.S. Co., Ltd.
<i>Karitane</i>	C. W. Dovey	W. Weatherup	A. E. Whalley	Union S.S. Co., Ltd.
<i>Kauri</i>	J. Billingham	R. E. P. Williams	G. B. Blake	Union S.S. Co., Ltd.
<i>Koromata</i>	W. J. Hill	P. Nash	R. H. Willis	Union S.S. Co., Ltd.
<i>Kopua</i>	F. T. Chapman	I. G. Sykes	W. L. Lambie	Union S.S. Co., Ltd.
<i>Korowai</i>	R. Blampied, M.B.E.	L. J. Lynch	T. Roberts	Union S.S. Co., Ltd.
<i>Koromiko</i>	H. S. Collier	H. G. Harwood	W. Hawkins	Union S.S. Co., Ltd.
<i>Kurou</i>	F. W. Gibson	A. W. Hannam	R. G. Hart	Union S.S. Co., Ltd.
<i>Matua</i>	A. R. Russell	R. D. Bennett	H. A. Shields	Union S.S. Co., Ltd.
<i>Mauti Pomare</i>	L. C. Boulton	J. Hare	W. A. Taylor	Government of New Zealand
<i>Monowai</i>	G. B. Morgan, D.S.O.	K. D. Mitchell	J. G. Rea	Union S.S. Co., Ltd.
<i>Piri</i>	M. W. Monaghan	J. Drummond		I.C.I., Ltd.
<i>Port Waikato</i>	C. Keith	J. Flette	J. Anderson	Holm & Co.
<i>Waipori</i>	S. C. Angus	R. K. Brown	A. A. Lindsay	Union S.S. Co., Ltd.
<i>Wairata</i>	W. E. Jones	P. W. Callender	C. Ward	Union S.S. Co., Ltd.
<i>Wairimu</i>	C. Burgess	J. G. Waites	B. Sword	Union S.S. Co., Ltd.
<i>Waitaki</i>	E. F. Rainbow	R. G. Anderson		Union S.S. Co., Ltd.
<i>Waitemata</i>	D. M. Keith	J. A. Barbour		Union S.S. Co., Ltd.
<i>Supplementary Ships :</i>				
<i>James Cook</i>	A. Deed	E. G. Rapley	A. J. Jeans	H. C. S. Coasters
<i>Kaimiro</i>	D. C. Champion	H. A. Hodgkinson	E. A. Miller	Union S.S. Co., Ltd.
<i>Kakapo</i>	R. Ainsworth	E. G. Trousdale		Union S.S. Co., Ltd.
<i>Kamo</i>	A. W. Pert	S. Peterson		Union S.S. Co., Ltd.
<i>Karepo</i>	W. Kehoe	E. M. Bieneman		Union S.S. Co., Ltd.
<i>Kartigi</i>				Union S.S. Co., Ltd.
<i>Kiwitea</i>	G. M. Schofield	A. B. MacDonald	R. N. Dennis	Union S.S. Co., Ltd.
<i>Mamuka</i>	E. J. Johnston	H. J. Southworth	H. T. Fernandes	Chatham Fishing Co.
<i>Omana</i>	H. L. P. Brown	L. Lindsay		Union S.S. Co., Ltd.
<i>Viti</i>	F. A. Barrett			Tasman S.S. Co., Ltd.

## FLEET LIST (South Africa)

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

NAME OF SHIP	CAPTAIN	OBSERVING OFFICER	SENIOR RADIO OFFICER	SHIPPING COMPANY OR OPERATOR
<i>Africana II</i>	R. L. V. Shannon, O.B.E.	A. Thomas, D.S.C.	E. Grover	Department of Fisheries, Cape Town
<i>Aquila</i>	T. Y. Thompson	A. Harvey	R. Parker	South African Railways Ships, Cape Town
<i>Atoll</i>	R. Lewis	K. M. Botha	R. E. Star	South African Railways Ships, Cape Town
<i>Baltic Coast</i>	H. H. Coor	L. W. Coltham	F. P. Garnett	Thesen's Steamship Co., Cape Town
<i>Bokkeveld</i>	A. W. Jewiss	I. A. Clark	I. D. Flood	Arden Hall Steamship Co., Pretoria
<i>Constantia</i>	A. M. Barlow	P. A. T. Gordon	J. Stamp	South African Marine Corporation, Cape Town
<i>Damaraland</i>	N. Waiter	M. A. Hoffman		South African Lines, Ltd., Cape Town
<i>Empire Victory</i>				Union Whaling Co., Ltd.
<i>Gilia</i>	J. Lundberg			Irvin & Johnston, Ltd., Cape Town
<i>Kaapland</i>	C. B. Adkins	P. D. Aldworth	M. Hutchons	South African Lines, Cape Town
<i>Morgenster</i>	F. D. Wilkinson	H. M. Stephens	G. Adey	South African Marine Corporation, Cape Town
<i>Namaqualand</i>	B. Parnaby	C. B. O'Connor	P. Goggin	South African Lines, Cape Town
<i>Pequehea</i>		M. T. Scott		Tristan Exploration Co., Cape Town
<i>Vergelegen</i>	D. W. Thorpe	N. T. Casley	P. Boyd	South African Marine Corporation, Cape Town
South African Nautical College				
<i>General Botha</i>	G. V. Legassick, D.S.C., R.D., Cdr., R.N.R.	The Senior Cadets		

## 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
<b>Selected Ships</b>	
<i>Aorangi</i> .. .. .	Canadian Australasian Line.
<i>Canadian Challenger</i> .. .. .	"Canadian Challenger", Ltd. (Canadian National Steamships).
<i>Canadian Constructor</i> .. .. .	"Canadian Constructor", Ltd. (Canadian National Steamships).
<i>Canadian Cruiser</i> .. .. .	"Canadian Cruiser", Ltd. (Canadian National Steamships).
<i>Esso Knoxville</i> .. .. .	Imperial Oil, Ltd.
<i>Fort Amherst</i> .. .. .	Furness, Withy & Co.
<i>Fort Townshend</i> .. .. .	Furness, Withy & Co.
<i>Imperial Alberta</i> .. .. .	Imperial Oil, Ltd.
<i>Imperial Charlottetown</i> .. .. .	Imperial Oil, Ltd.
<i>Imperial Fredericton</i> .. .. .	Imperial Oil, Ltd.
<i>Imperial Quebec</i> .. .. .	Imperial Oil, Ltd.
<i>Imperial Toronto</i> .. .. .	Imperial Oil, Ltd.
<i>Imperial Winnipeg</i> .. .. .	Imperial Oil, Ltd.
<i>John S. Pillsbury</i> .. .. .	Upper Lakes and St. Lawrence Transportation Co. Ltd.
<i>Lady Nelson</i> .. .. .	"Lady Nelson", Ltd. (Canadian National Steamships).
<i>Lady Rodney</i> .. .. .	"Lady Rodney", Ltd. (Canadian National Steamships).
<i>Lake Manitou</i> .. .. .	Western Canada Steamship Co., Ltd.
<i>Lake Minnewanka</i> .. .. .	Western Canada Steamship Co., Ltd.
<i>Lake Pennask</i> .. .. .	Western Canada Steamship Co., Ltd.
<i>Lake Sicanous</i> .. .. .	Western Canada Steamship Co., Ltd.
<i>Lake Winnipeg</i> .. .. .	Western Canada Steamship Co., Ltd.
<i>Lakemba</i> .. .. .	B. C. Ship Chartering Co., Ltd.
<i>Ottawa Valley</i> .. .. .	Montreal, Australia, New Zealand Line, Ltd.
<i>Pinnacles</i> .. .. .	Deep-Sea Tankers, Ltd.
<i>Rupert Island</i> .. .. .	Hudson's Bay Co., Ltd.
<i>Tantara</i> .. .. .	Johnson Walton Steamships, 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.
<b>Lightships :</b>	
<i>Lurcher Lightship</i> .. .. .	Minister of Transport.
<i>Sambro Lightship</i> .. .. .	Minister of Transport.

## LIGHT VESSELS

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

NAME OF VESSEL	MASTERS
<i>Dowsing</i> .. .. .	J. R. Audley, S. R. Smith
<i>East Goodwin</i> .. .. .	A. Giblin, F. M. England, W. S. Parish
<i>Galloper</i> .. .. .	S. J. Vincent
<i>Humber</i> .. .. .	F. I. Butcher, L. A. Brett
<i>Newarp</i> .. .. .	T. J. Sales, W. J. Rogers
<i>Royal Sovereign</i> .. .. .	W. J. Sheaf
<i>Shiptwash</i> .. .. .	G. W. Broom, C. G. Isaac
<i>Smith's Knoll</i> .. .. .	W. J. Hall, J. W. R. Reeve, B. Hadden

## 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	CALL SIGN	CAPTAIN	OWNERS/MANAGERS
<i>Actuality</i>	GPPF	W. Conn	F. T. Everard & Sons, Ltd.
<i>Allurity</i>	MQFS	W. N. Fisher	F. T. Everard & Sons, Ltd.
<i>Amsterdam</i>	MFBP	C. R. Baxter, D.S.C.	British Railways (Eastern Region)
<i>Angelo</i>	GQFY	S. N. Stokes	Ellerman's Wilson Line, Ltd.
<i>Ariosto</i>	GKPW	J. R. Stilwell	Ellerman's Wilson Line, Ltd.
<i>Atlantic Coast</i>	GWSY	P. A. Johnson	Coast Lines, Ltd.
<i>Baltraff</i>	GTXN	F. S. J. Butcher, O.B.E.	United Baltic Corporation, Ltd.
<i>Barra Head</i>	MPQZ	G. Garden	A. F. Henry & MacGregor, Ltd.
<i>Belhaven</i>	MNXZ	P. L. Irvine	London & Edinburgh Shipping Co., Ltd.
<i>Belravock</i>	MKGJ	T. Wallace	London & Edinburgh Shipping Co., Ltd.
<i>Belvina</i>	MLZF	J. Philip	London & Edinburgh Shipping Co., Ltd.
<i>British Scout</i>	GJKD	R. S. Hughes	British Tanker Co., Ltd.
<i>Cambria</i>	GBKT	J. Hughes	British Railways (L.M. Region)
<i>Cantick Head</i>	GOBZ	Wm. Flett	A. F. Henry & MacGregor, Ltd.
<i>Clupea</i>	GOAJ	J. Jappy	Scottish Home Dept. (Fishery Division)
<i>Corfen</i>	GDJX	E. R. W. Allen	Wm. Cory & Son, Ltd.
<i>Corfleet</i>	GWTD	A. G. Waller	Wm. Cory & Son, Ltd.
<i>Corfoss</i>	MAHX	F. E. W. Farrant	Wm. Cory & Son, Ltd.
<i>Cormain</i>	MAHT	R. B. Armstrong	Wm. Cory & Son, Ltd.
<i>Cormead</i>	GDBX	T. Slack	Wm. Cory & Son, Ltd.
<i>Cormist</i>	GDVT	R. J. Barrow	Wm. Cory & Son, Ltd.
<i>Cormoat</i>	GLKV	J. U. Hansen	Wm. Cory & Son, Ltd.
<i>Cormull</i>	MAHS	E. S. Keene	Wm. Cory & Son, Ltd.
<i>Corncrake</i>	MJKL	R. Warren	General Steam Navigation Co., Ltd.
<i>Crane</i>	MMCS	S. E. Tomalins	General Steam Navigation Co., Ltd.
<i>Drake</i>	MMYC	W. Lockhart	General Steam Navigation Co., Ltd.
<i>Duke of Argyll</i>	GNVX	F. Adern, D.S.C.	British Railways (L.M. Region)
<i>Duke of Lancaster</i>	GCPQ	E. B. Serjeant	British Railways (L.M. Region)
<i>Duke of Rothesay</i>	GNVL	H. Thompson	British Railways (L.M. Region)
<i>Eildon</i>	MLZL	J. Little	G. Gibson & Co., Ltd.
<i>Empire Cedric</i>	GRSC	W. N. Johnson	Frank Bustard & Sons, Ltd.
<i>Empire Gaelic</i>	MAVR	H. T. Green	Frank Bustard & Sons, Ltd.
<i>Explorer</i>	MRCZ	G. B. McLaren	Scottish Home Dept. (Fishery Division)
<i>Falcon</i>	MNXL	S. W. Devlin	General Steam Navigation Co., Ltd.
<i>Fidra</i>	MKQQ	T. Henry	Glen & Co., Ltd.
<i>Golden Dawn</i>	GBGN	A. Adamson, M.B.E.	The Captain
<i>Grebe</i>	MAEY	E. C. Painter, D.S.C.	General Steam Navigation Co., Ltd.
<i>Guernsey Coast</i>	MANS	H. Keilit	British Channel Islands Shipping Co., Ltd.
<i>Harrowgate</i>	MNDB	F. E. Lovern	Associated Humber Lines
<i>Hibernia</i>	MBMT	R. Woodhall	British Railways (L.M. Region)
<i>Highwood</i>	MLQQ	J. Coupland	E. R. Newbigin, Ltd.
<i>Hindlea</i>	GWDQ	P. Cullen	Hindlea Shipping Co., Ltd.
<i>Horsa</i>	MPFJ	D. Dickson	Currie Line, Ltd.
<i>Isle of Guernsey</i>	GQYJ	F. E. Trout	British Railways (Southern Region)
<i>Isle of Jersey</i>	GRBQ	A. Light	British Railways (Southern Region)
<i>Isle of Sark</i>	GTSR	C. E. Durley	British Railways (Southern Region)
<i>London Merchant</i>	MBRZ	C. A. Piper	London Scottish Lines, Ltd.
<i>Malmö</i>	GQCN	A. D. Seath	Ellerman's Wilson Line, Ltd.
<i>Marine Craft Unit</i> (R.A.F.) No. 1102		Flt. Lt. Ambler	Royal Air Force, Calshot
<i>Melrose</i>	MCFD	G. Simpson	Geo. Gibson & Co., Ltd.
<i>Melrose Abbey</i>	GSYW	J. Laverack	Associated Humber Lines
<i>Minna</i>	GKPS	T. Mather	Scottish Home Dept. (Fisheries Division)
<i>Moray Coast</i>	MKDL	J. T. Williams	Coast Lines, Ltd.
<i>Ocean Coast</i>	GYMP	G. Mearns	Coast Lines, Ltd.
<i>Petrel</i>	MBGV	A. Pirch	General Steam Navigation Co., Ltd.
<i>Plover</i>	MLLV	A. L. Ward	General Steam Navigation Co., Ltd.
<i>Rora Head</i>	MKVB	A. F. Ramsay	N. of Scot. & Ork. & Shet. Steam Nav. Co., Ltd.
<i>Runa</i>	GFSW	J. Gilfillan	Glen & Co., Ltd.
<i>St. Clair</i>	MMFX	T. Gifford	N. of Scot. & Ork. & Shet. Steam Nav. Co., Ltd.
<i>St. Clement</i>	GRGM	W. J. Ramsay	N. of Scot. & Ork. & Shet. Steam Nav. Co., Ltd.
<i>St. Helier</i>	GLBT	R. Pitman, D.S.C.	British Railways (Western Region)
<i>St. Julien</i>	GLBV	L. J. Richardson	British Railways (Western Region)
<i>St. Magnus</i>	GIFY	W. G. Stout	N. of Scot. & Ork. & Shet. Steam Nav. Co., Ltd.
<i>St. Niman</i>	GJBB	A. M. Dundas	N. of Scot. & Ork. & Shet. Steam Nav. Co., Ltd.
<i>Salerno</i>	GSPW	D. B. Ramsbottom, D.S.C.	Ellerman's Wilson Line, Ltd.
<i>Seamew</i>	GBWY	E. C. Painter, D.S.C.	General Steam Navigation Co., Ltd.
<i>Selby</i>	MLFT	A. W. Johnson	Associated Humber Lines
<i>Slieve Bawn</i>	MQCC	J. Irwin	British Railways (L.M. Region)
<i>Slieve Bearnagh</i>	MLNL	A. E. Willmott, D.S.C.	British Railways (L.M. Region)
<i>Slieve Bloom</i>	MQDD	R. E. Sherwood, D.S.O.	British Railways (L.M. Region)
<i>Slieve Donard</i>	MQCQ	A. C. Borthwick	British Railways (L.M. Region)
<i>Slieve League</i>	MQCM	W. E. Meade	British Railways (L.M. Region)
<i>Slieve More</i>	MQBM	C. A. Winkle	British Railways (L.M. Region)
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<i>Thelma</i>	MBKK	F. Fairweather	Glen & Co., Ltd.
<i>Truro</i>	GJTQ	J. B. Dunkley	Ellerman's Wilson Line, Ltd.
<i>Vanellus</i>	GVDW	J. E. Green	British & Continental S.S. Co., Ltd.
<i>Vienna</i>	GTBR	A. P. Sutton	British Railways (Eastern Region)

## 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 are asked to kindly facilitate the despatch and delivery of mail received at their offices from the Meteorological Office and " Air Publications and Forms Stores ", to their ships abroad.

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

### " The Marine Observer "

Captains of observing ships are requested to ensure that all officers, who participate in the voluntary meteorological work carried out by the ship, have access to *The Marine Observer*.

### 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 Chapter 12, pages 96-98 of the *Marine Observer's Handbook*, Seventh 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 Admiralty Charts and Sailing Directions.

Marine observers will greatly assist by noting the conditions of ice, either drifting or fast, in the pages provided at the end of the logbook (Form 911), or on Form 912, which may be supplied to the captain of any British ship on application to a Port Meteorological Officer or Merchant Navy Agent.

Observing ships using the Trans-North Atlantic tracks are requested to record 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.

### Indicator " OBS " in Radio Weather Messages

The attention of marine observers and particularly of radio officers in Observing Ships is drawn to the necessity of strict adherence to the use of the indicator—" OBS "—preceding the telegraphic address to which the radio weather message is transmitted. Failure to comply with this regulation leads to considerable delay in the clearance of the weather messages.

## Address and Despatch of Radio Weather Messages

It will be much appreciated if the Masters of all Selected Ships will be good enough to draw the attention of their Radio Officers to the fact that radio weather messages should only be addressed as specified in Part IV of *The Marine Observer's Guide*, M.O. 477, 2nd Edition, 1951, or the *Admiralty List of Radio Signals*, Vol. III. Not only should the message have the address appropriate to the area in which the ship is located, but it should only be transmitted to the radio station or stations specified for the receipt of such messages in that area.

If radio weather messages are incorrectly addressed, or are transmitted to inappropriate radio stations, extra expense, confusion and often much correspondence between the authorities concerned, may arise.

### Atlantic Weather Bulletin for Shipping (Great Britain)

The following schedule (broadcast from Portishead Radio) replaces that printed on page xxv of the July 1951 *Marine Observer*. This revised schedule has been promulgated in Provisional Amendment 5/51 to *The Marine Observer's Guide*, and may be used to correct that printed on page 34 of *Decode for Use of Shipping* (second edition) M.O. 509.

PARTS	G.M.T.	OCTOBER, 1951 TO MARCH, 1952	
		Call Sign	Frequencies kc/s (Wavelengths)
I II III V VI	0930*	GKU 6	109 (2751)
		GKC 3	8210 (36.54)
		GKT 3	8220 (36.49)
		GKB 5	16440 (18.25)
		GKC 5	16885 (17.77)
	2130*	GKU 6	109 (2751)
		GKB 7	4280 (70.09)
		GKK	4995 (60.06)
		GKB 2	6300 (47.62)
		GKC 3	8210 (36.54)
IV	1130	GKU 6	109 (2751)
		GKC 4	12612 (23.79)
		GKT 4	12622 (23.76)
		GKB 5	16440 (18.25)
		GKC 6	22010 (13.63)

\*Preceded by navigational warnings

### Weatherdun Wire London

On and after 1st October, 1951, when sending radio weather messages to shore stations in the British Isles, Masters and Officers of Selected Ships are requested to use the telegraphic address *Weatherdun Wire London* instead of *Weather Wire London*. The reason for this is that messages addressed to *Weather Wire London* are liable to finish up at the Air Ministry in London, whereas the new word *Weatherdun* will ensure their delivery at Dunstable. The words *Wire London* are included in the message to ensure its transmission by teleprinter landline through the Central Telegraph Office in London for speedy delivery.

## 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.)

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**Bristol Channel**.—Mr. J. C. Matheson, Port Meteorological Officer, 2 Bute Crescent, Cardiff. (Telephone : Cardiff 4474.)

**Southampton**.—Captain J. R. Radley, Port Meteorological Officer, 19 Queen's Terrace, Southampton. (Telephone : Southampton 4295.)

**Clyde**.—Captain R. Reid, Port Meteorological Officer, 53 Bothwell Street, Glasgow. (Telephone : Glasgow Central 2558.)

### AGENTS

**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. (Telephone : Hull 36813.)

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

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### BRITISH EAST AFRICA

**Dar-es-Salaam**.—Meteorologist-in-Charge, Meteorological Department, Post Office Box 597. (Telephone : 2297.)

### BRITISH WEST AFRICA

**Accra**.—The Chief Meteorologist, Meteorological Office. (Telephone : Accra 672.)

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**Freetown.**—The Meteorologist, Meteorological Office, Lungi. (Telephone : Lungi, Ext. 8.)

**Lagos.**—The Chief Meteorologist, Meteorological Office, Ikeja. (Telephone : Lagos 1081, Ext. 1.)

#### CANADA

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

**Halifax.**—O.I.C. Dominion Public Weather Office, 728 Dominion Public Building, Halifax, N.S. (Telephone : 3-8314.)

**Saint John.**—Officer-in-Charge, The Observatory, Saint John, N.B. (Telephone : 3-3500.)

**Vancouver.**—Mr. R. F. Kennett, Room 401, Winch Building, Vancouver, B.C. (Telephone : MARine 4321.)

#### FIJI

**Suva.**—Observer-in-Charge, Meteorological Office, Lauthala Bay.

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W. B. Goodfellow, Marine Liaison Officer, Royal Observatory. (Telephone : 58038.)

#### INDIA

**Bombay.**—The Director, Regional Meteorological Centre, Colaba, Bombay, 5. (Telephone : 35378.)

**Calcutta.**—The Director, Regional Meteorological Centre, Alipore, Calcutta, 27. (Telephone : South 2782.)

**Madras.**—The Director, Regional Meteorological Centre, Nakshatra Bungla, College Road, Madras, 6. (Telephone : 8109.)

#### MALAYA

**Singapore.**—The Director, Malayan Meteorological Service, Sixth Floor, Fullerton Building. (Telephone : 7123.)

#### NEW ZEALAND

**Headquarters.**—The Director, Meteorological Office, Kelburn, Wellington, New Zealand. (Telephone : 44418.)

**Wellington.**—Marine Meteorological Officer, Post Office Box 72. (Telephone : 44-418, Ext. 930.)

**Auckland.**—Port Meteorological Officer, Meteorological Office, Mechanics Bay, Auckland. (Telephone : 49551.)

**Lyttleton.**—Officer-in-Charge, Meteorological Office, Wigram Aerodrome. (Telephone : 32-585.)

**Dunedin.**—Officer-in-Charge, Meteorological Office, Taieri Aerodrome, Dunedin. (Telephone : 21-666.)

#### PAKISTAN

**Chittagong.**—The Director, Regional Meteorological Centre, Diwan, Bazar. (Telephone : 202.)

**Karachi.**—The Director, Regional Meteorological Centre, Meteorological Office, Karachi Airport, Karachi. 11. (Telephone : 9280, 9281, 2894, 2895, 2896, Ext. 225.)

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Part II. Codes and specifications. 1948, reprinted 1951. 2s. 6d. (2s. 8d.)  
Part III. Coding, decoding and plotting. 1948, reprinted 1950. 2s. (2s. 2d.)

*(Amendments issued as necessary and priced separately.)*

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**International Meteorological Code** adopted by the International Meteorological Organisation, Washington, 1947. **Decode for the use of shipping**, incorporating the code for weather reports from and to ships and the analysis code for the use of shipping. M.O. 509, 2nd edition, 1950. 1s. (1s. 1½d.)

**Meteorological Handbook for Pilots and Navigators.** M.O. 448, 2nd edition, 1942, reprinted 1951. 3s. 6d. (3s. 8d.)

**A Short Course in Elementary Meteorology.** By W. H. Pick, B.Sc., F.C.P., F.Inst.P. M.O. 247, 5th edition, 1938, reprinted 1949. 2s. 6d. (2s. 9d.)

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