M.O. 624

The Marine Observer

A quarterly journal of Maritime Meteorology

Volume XXVII No. 175

January, 1957

SIX SHILLINGS NET

THE
MARINE OBSERVER

A Quarterly Journal of Maritime Meteorology
prepared by the Marine Division of the
Meteorological Office

Vol. XXVII

1957

M.O. 624 AIR MINISTRY

THE MARINE OBSERVER

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

VOL. XXVII No. 175 JANUARY, 1957

TABLE OF PRINCIPAL CONTENTS

Letters to the Editor, and books for review, should be sent to the Editor, "The Marine Observer," Meteorological Office, Headstone Drive, Harrow, Middlesex

Published for the Meteorological Office by

HER MAJESTY'S STATIONERY OFFICE

To be Purchased from York House, Kingsway, LONDON, W.C.2, 423 Oxford Street, LONDON, W. 1, P.O. Box 569, LONDON, S.E.1, 13a Castle Street, EDINBURGH, 2, 109 St. Mary Street, CARDIFF, 39, King Street, MANCHESTER, 2, Tower Lane, BRISTOL, 1, 2 Edmund Street, BIRMINGHAM, 3, 80 Chichester Street, BELFAST, or from any bookseller

PRICE 6s. NET or £1 5s. 0d. per annum (including postage)

Editorial

In the October 1955 number of *The Marine Observer*, we referred in general terms to the International Geophysical Year (I.G.Y.) which begins in July this year and continues until the end of 1958. The reason this " year " is spread over a period of 18 months is merely in order to fit in with the period of sunspot maximum. The sun, being the centre of our system, intimately affects many physical features of our earth and its atmosphere, and sunspots bring important influences to bear which need investigation on a global scale.

A considerable amount of publicity has now been given to the I.G.Y. and most people are aware that its general object is to increase our scientific knowledge about the physics of this world in which we live and of the atmosphere that surrounds us. It is only by concerted international action that it is possible to make a global study of considerable magnitude, involving, as it does, so many sciences of which meteorology is not only one of the most important, but is so closely related to many of the other fields of study.

The observations to be taken at sea during the I.G.Y. will embrace meteorology, oceanography, magnetism, aurora, gravity and geology. Voluntary observers in British ships will be able to play their part in providing their usual meteorological observations, and the observations they send in of aurora and other phenomena during the year will also be of considerable value. The oceans occupy about three-quarters of the world's surface and the depths of considerable areas of them are greater in extent than the height of the highest mountain; these vast water areas have a profound influence upon the world's weather, and the importance of an adequate network of observations from them for the I.G.Y. programme is therefore obvious. For this reason we have largely devoted this number of *The Marine Observer* to the I.G.Y. programme so that voluntary observers aboard British ships can more readily appreciate the valuable part that they themselves can play in this ambitious international project.

Thanks to modern invention, it will also be practicable for the first time to carry out world-wide co-ordinated investigations into conditions in the stratosphere and ionosphere with the object of extending our knowledge a little concerning such items as ozone, cosmic rays and aurora, as well as the temperatures and winds at these great altitudes. It is considered that such knowledge will be of very great scientific value for various purposes. The most spectacular method of obtaining this information at very high altitudes will be by means of the small earth satellites carrying automatic instruments which can radio their observations to the earth, which the U.S.A. and U.S.S.R. authorities are preparing to launch.

There have been two international Polar Years in the past (1882–83 and 1932–33), but the scale of these was insignificant beside the ambitious project of this present I.G.Y., the cost of which has been estimated to be about £35,000,000. The United Kingdom contribution will cost something over £300,000.

Most international activities nowadays are co-ordinated by the United Nations Organisation. The Special Committee which is responsible for co-ordinating the I.G.Y. programme was appointed by the International Council of Scientific Unions, and the membership of this Committee is also composed of representatives of the International Astronomical Union, International Union of Geodesy and Geophysics, the International Scientific Radar Union, the International Union of Pure and Applied Physics, the International Union of Geography and the World Meteorological Organisation.

Only the last-named of these is a specialised agency of the United Nations; the others are non-governmental scientific organisations which are nevertheless affiliated to UNESCO. In each country a National Committee has been set up to co-ordinate the various I.G.Y. activities. In the United Kingdom this authority is the Royal Society. It is thus the scientists of the world with no political affinities who have inspired this immense undertaking and who have managed to persuade their governments that such an ambitious world-wide project is sufficiently worth while, for the benefit of mankind in general, to merit the expenditure of all this money. Here is an outstanding example of international co-operation.

The articles in this number concerning the various aspects of the I.G.Y. should convey to the reader a reasonably clear picture of the programme and an indication of some of its aims and objects. These were summarised at the second meeting of the special committee of the I.G.Y. (Rome, 1954) as follows:

"(A) The programmes of the International Geophysical Year should be selected with a view to solving specific planetary problems of the Earth. To achieve such solutions, the I.U.G.G. recognises that during the International Geophysical Year the regular scientific facilities of the world must be supplemented by additional observations suitably distributed in space and time, as needed for the solution of selected problems.

"(B) Problems requiring special attention during the International Geophysical Year should be selected according to the following criteria:

(*a*) Problems requiring concurrent synoptic observations at many points involving co-operative observations by many stations.

(*b*) Problems of branches of the geophysical sciences whose solutions will be aided by the availability of synoptic or other concentrated work during the International Geophysical Year in other geophysical sciences.

(*c*) Observations of all major geophysical phenomena in relatively inaccessible regions of the Earth that can be occupied during the International Geophysical Year because of the extraordinary effort during that interval, in order to augment our basic knowledge of the Earth and the solar and other influences acting upon it.

(*d*) Epochal observations of slowly varying terrestrial phenomena; to establish basic information for subsequent comparison at later epochs."

Voluntary observers aboard merchant ships will play a unique part in the I.G.Y. programme for they will have the distinction of being members of a select body of amateurs who are assisting the professional observers in providing essential meteorological information for the project. The observations they will be asked to make will be exactly the same as they make at present, but it is hoped that throughout the period of the I.G.Y. particular care will be taken to ensure accuracy and as much detail as possible. Detailed instructions will be issued to all voluntary observing ships during the spring of 1957.

A particular effort will be made by all meteorological services to recruit, as voluntary observing ships, all ships which are known to trade in the relatively unfrequented waters of the central South Atlantic, central Indian Ocean, central Pacific, Southern Ocean and in Arctic waters north of 60°N.

As stated earlier, the meteorological programme for the I.G.Y. is being coordinated by the World Meteorological Organisation. Each country which is responsible for the recruitment of observing ships has the duty of extracting the observations from the ships' meteorological logbooks and sending them to the Secretariat of that Organisation. Eventually these original observations will be used for compiling (in retrospect) very detailed synoptic maps of each hemisphere, from which it is hoped the meteorologists will be able to learn a lot more than they know at present about the processes of the weather. In the course of these studies there is no doubt that the surface observations will be correlated with observations in the upper atmosphere.

On behalf of the Director and staff of the Meteorological Office, we send New Year greetings to all readers of *The Marine Observer*, whether they be afloat or ashore.

MARINE SUPERINTENDENT.

THE MARINE OBSERVERS' LOG

January, February, March

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 manuscipts. Photographs or sketches are particularly desirable.

Responsibility for each observation rests with the contributor.

WHALE

West African waters

S.S. *Umtata*. Captain D. L. Weston. Las Palmas to Cape Town. Observer, Mr. R. A. Harris, 3rd Officer.

22nd February, 1956. At 1520 G.M.T. a disturbance was observed in the water on the starboard beam about 200 ft from the ship's side. This was caused by a whale of some 30 ft to 35 ft in length. It had a black back and its underside was of a pinkish colour. It swam alongside the ship for 15 min, gradually falling astern, until at 1535 it sheered off in a sw'ly direction. At times it was within 100 ft of the ship and it kept jumping out of the water and twisting its body around as it re-entered the water. It was believed to be a black fish, at some places known as a "killer fish". Temperatures: air 79°F, sea 75°. Wind NNW., force 1-2. Speed 14½ kt.

Position of ship: 08° 50'N., 16° 10'W.

Note. This observation was forwarded to the National Institute of Oceanography, who comment as follows:

"The photograph (opposite page 16) shows a rorqual (genus *Balænoptera*). It is probably a lesser rorqual (*B. acutorostrata*), which averages something like 30 ft in length, but might be a sei whale (*B. borealis*) which grows to a rather larger size."

TURTLES

Mexican waters

S.S. *Pacific Fortune*. Captain H. A. Shaw. Panama to Los Angeles. Observer, Mr. D. H. Campbell, 3rd Officer.

23rd February, 1956. Between 1700 and 1800 G.M.T. Passed between 40 and 50 turtles. The sea was rippled and there were large patches of what appeared to be plankton on the surface and also to a depth of 2 to 3 ft. The vessel was about 13 miles from the coast approaching Point San Telmo.

Position of ship: 18° 00'N., 103° 21'W.

Note. This observation was forwarded to Dr. H. W. Parker, Keeper of Zoology at the Natural History Museum, who comments as follows:

"The observation is of considerable interest, though I am afraid this is due to the fact that it raises doubts rather than resolves them. The region where *Pacific Fortune* saw this rather large number of turtles is one in which at least four species of turtle are known to occur, and is also close to a region where concentrations of turtles have been observed before.

"Great numbers of Pacific Ridleys were observed in deep water off the coast of Guerrero at the end of November, 1945 and it was thought that this was some kind of migratory aggregation associated with the breeding period. This species lays its eggs from mid-August onwards to the end of November.

"The observations of a similar phenomenon in February is unexpected. It is, of course, possible that another species of turtle is involved and that this has a different breeding period from the Ridleys. I am afraid there is no reliable information on the breeding periods of the other turtles of the eastern Pacific, but in other parts of the world all the species seem to go ashore to lay their eggs about the same time of the year. There is no reason to expect anything different on the western coast of Mexico.

"It seems more likely that the aggregation of turtles in large numbers is after all not a breeding phenomenon but can occur at other times of the year. One would expect that the carnivorous turtles, that is to say the loggerheads, hawkbills and leatherys, would tend to be attracted by fish shoals. They are not likely to be attracted by plankton as such but it is not unusual to find concentrations of pelagic fish associated with abundant plankton."

Central American waters

M.V. *Cingalese Prince*. Captain R. C. Proctor, O.B.E. Panama to Los Angeles. Observer, Mr. K. E. Maxwell, 4th Officer.

4th–6th February, 1956. Turtles were observed proceeding in a SE'ly direction, but it was noticed that, although the weather conditions were similar to those experienced during this vessel's last voyage, only about a quarter as many turtles were observed.

Positions of ship: At 0000 G.M.T., 4th, 12° 24'N., 78° 18'W.; at 1800, 6th, 10° 18'N., 88° 06'W.

Note. This observation was also sent to Dr. Parker, who comments as follows:

"The additional observations on turtles are much appreciated, and I hope that Captain Proctor will continue to keep an eye open so that we may get a regular series of observations to indicate whether there are, in fact, seasonal migrations and in what directions."

FLYING-FISH

South Pacific Ocean

M.V. *Cambridge*. Captain P. P. O. Harrison. Balboa to Auckland. Observer, the Master.

22nd January, 1956. A flying-fish was found on deck, its eyes had become detached and were lying alongside it; they were still connected with membrane. Each eye was, perhaps, ½ in. to ¾ in. in diameter. I did not see the fish but the carpenter said it was about 20 in. long. I have preserved the eyes, which to me appear enormous. The fish probably came aboard during heavy weather during the night.

Position of ship: 35° 15'S., 156° 25'W.

Note. Mr. N. B. Marshall of the Fish Section, British Museum (Natural History), comments as follows:

"The eyes of the flying-fish which came on board the M.V. *Cambridge* are just over 1 in. in diameter and I see that the length of the fish was 20 in. The diameter of the eyes of all flying-fish average from 6–8 per cent of their length (measured from the tip of the snout to the base of the tail fin). The largest known species of flying-fish grow to about 15 in. in length (as defined above) so that would make them nearly 20 in. in total length. The M.V. *Cambridge* specimen was presumably one of the larger species of the genus *Cypsilurus*."

DUST

South Atlantic Ocean

S.S. *Thaumastus*. Captain B. G. Stanley. Buenos Aires to Curaçao. Observer, Mr. B. Bowtell, 2nd Officer.

5th January, 1956. A film of fine dust was noticed on paintwork in the latter part of the day. Wind 050°, force 3–4.

Position of ship: 23° 15'S., 36° 40'W.

Note. This is an interesting observation to put on record. No suggestion can be made as to the origin of this dust. It will be noted that the wind was blowing from the open ocean.

ICE

Northern North Sea

M.V. *Marna*. Captain L. B. Anderson. Granton to Porsgrunn. Observer, Mr. J. Carnie, 2nd Officer.

18th February, 1956. Ice formed on the fore part of the vessel this morning because of spray freezing as it came on board. The ice gradually thickened as the voyage progressed. The shrouds which are normally 3 in. in diameter were increased to approximately 14 in. On 19th February, from about 1750 G.M.T. to 2100, brash-ice was encountered between the Naze of Norway and Ryvingen Lighthouse, which stretched from inshore to the southward, as far as the eye could see. The floes were of various sizes and up to 12 in. thick. Air temp. 31° F at 0900.

Position of ship at 0900 G.M.T., 18th: 57° 06'N., 02° 48'E.

Note. The observer asks if the conditions described in this observation are very unusual. In Norway Pilot, Part I, it is stated that harbours in the vicinity of Lindesnes (the Naze) are seldom icebound and those of the SE. coast of Norway further eastward, as far as Jonfruland (58° 52'N., 9° 36'E.) are only frozen during severe winters. As harbours and fjords may be frozen without there being much, if any, ice in the open sea in the vicinity, the presence of ice in the open sea on the scale indicated by the observation would appear to be most unusual. This is confirmed by the German ice atlas of the southern part of the Baltic, which includes the Kattegat and Skagerrak. For the worst ice period, February and the first half of March, the atlas indicates that, in very severe winters only, ice fringing the coast may be found immediately to the eastward of Ryvingen, but not westward of this island.

The ice accumulation aboard the ship also appears to be abnormal in this region, though we have no actual information about its frequency and intensity in this part of the North Sea.

CURRENT

Vicinity of Galapagos Islands

S.S. *Tongariro*. Captain R. Webster. Balboa to Auckland. Observers, the Master and Mr. N. M. Parry, 3rd Officer.

9th–11th March, 1956. After leaving Panama Bay, the normal SSE'ly set was experienced, but, contrary to both Admiralty and United States current charts, this continued until Wenman Island, off the Galapagos group, was abeam to star board on 9th March at 1925 G.M.T. After passing this island a very strong NE'ly set became apparent. Considerable changes in sea temperature have been recorded, most of which occurred just before passing Wenman. These appeared to be near the approximate demarcation between the SE. and NE. direction of set. Frequent current rips were observed throughout, but mainly on both edges of the NE'ly current. The maximum drift experienced was between 0015 stellar observations of 10th March and 0033 on 11th March, and amounted to 33 miles, setting 025°.

After crossing the equator in 93° 37'W. the SW'ly winds freshened and remained comparatively constant in force and direction until 11th March in 02° 37'S., 98° 38'W. As the wind backed to SSE. the expected and long overdue NW'ly set was encountered and the subsequent set and drift experienced on the remainder of the passage was consistent with Admiralty predictions.

Over the two-day period in question, the total drift amounted to 53·5 miles and the mean direction was found to differ considerably from previous voyages in this area. The above is thought worthy of note, particularly as, when on passage from C. Mala, to pass N. of the Galapagos group, it is intended to give the Rivadeneyra Shoal a wide berth.

Note. Examination of the current roses in our current atlas M.O. 435, *South Pacific Ocean Currents*, shows that on this route the predominant direction of current from Panama Bay to 84°W. in February to April is between WSW. and SSW. inclusive, but that sets in every other direction may be experienced at times. Thus SSE., while a possible direction, is not the normal one. From 84°W. to 92°W., northward of the Galapagos Islands, the majority of the currents set between NW. and SW. inclusive, but here also currents in any other direction may be experienced. Further westward, to 100°W., both N. and S. of the equator, the roses show that currents in almost every direction may occur though those with W'ly components markedly predominate. There is therefore nothing abnormal in the set of 25°, 33 miles, on 9th to 10th March, after passing Wenman Island, though such a set would not be found very frequently. No current chart can make predictions; it can only show the mean resultant flow of current, taking all observed sets into account, and the current rose, which gives all current directions and rates that have been observed in any region, with their relative frequency. The revised edition of the above atlas, now in course of preparation, will also contain a chart of predominant current, but in the region under consideration the predominant or most likely direction of current is easily seen by examination of the roses.

More or less sudden changes of sea temperature have been frequently observed in the region of the Galapagos Islands, both in the open ocean and near the islands.

PHOSPHORESCENCE

South Atlantic Ocean

M.V. *Dominion Monarch.* Captain L. J. Hopkins. Cape Town to Las Palmas. Observers, all navigating officers.

11th March, 1956, 2100 G.M.T. Phosphorescence in the form of numerous and widespread vivid flashes of light beneath the surface at varying depths was noticed during the hours of darkness. Sometimes only an occasional flash would be seen, at other times the sea would appear alive with flashes. Sea temp. 70°F.

Position of ship: 22° 12′S., 07° 51′E.

West African waters

M.V. *Port Pirie.* Captain G. G. Langford. London to Adelaide. Observers, Mr. M. J. Davies, 3rd Officer, and Mr. P. R. Ardley, 3rd Officer.

14th January, 1956. Between 2300 and 2400 G.M.T. very unusual phosphorescence was observed, consisting of numerous diamond-shaped pieces and extending some 50–100 yd from the ship. The sea was unusually calm, the stars being brightly reflected therein. There was no moon but distant lightning was observed during the whole period. Height of eye 50 ft. Barometer 1015·9 mb. Air temp. 65°F, sea 69°. No wind, waves or swell.

Position of ship: 22° 24′N., 17° 28′W.

15th January, 1956. Between 0210 and 0220 G.M.T., excessive phosphorescence observed. A shoal of porpoises was seen approaching the ship; they were visible by their phosphorescent tracks from a distance of about 400–800 yd. When they were alongside the ship it was even possible to determine the size of individual porpoises by the phosphorescence which glowed pale green around them. The weather was similar to the above observation.

Position of ship: 21° 39′N., 17° 34′W.

18th January, 1956. Between 0415 and 0500 G.M.T., excessive phosphorescence was observed concentrated with narrow bands up to 15 ft in width, lying along the direction of the wind but also dispersed over the rest of the sea around the ship. The phosphorescence was made up of individual pieces, lenticular in shape, up to about 9 in. in length and 6 in. across, apparently lying just beneath the surface of the sea. Barometer 1010 mb. Air temp. 76°F, sea 78°. Wind 150°, force 3. Waves 150°, height 5 ft approx.

Position of ship: 2° 15′S., 08° 05′W.

S.S. *Corrales.* Captain W. F. Young. Southampton to Cameroons. Observer, Mr. R. Box, 3rd Officer.

2nd March, 1956, 0000 G.M.T. Phosphorescence was very marked in bow wave and breaking wave crests. Porpoises swimming round the ship left vivid wakes which remained visible for some little time.

Some sea water collected in the canvas bucket, when examined in total darkness, revealed hundreds of pin-points of light in motionless suspension. A sample of this water was then examined in the light and showed small specks resembling breadcrumbs in size and colour.

After a time, the brightness of a nearly full moon destroyed the vividness of this phenomenon, and only occasional bright patches were seen. The wind at the time was moderate, N'ly. Air temp. 65·5°F, sea 66°.

Position of ship: 17° 34'N., 17° 26'W.

Gulf of Aden

M.V. *Bellerophon.* Captain H. H. Sanderson. Colombo to Suez. Observer, Mr. M. Nall, 3rd Officer.

18th February, 1956, 2000 G.M.T. Patches of phosphorescence were observed close to the ship; these formed very suddenly, starting at about 3 ft in diameter and rapidly growing to between 100 and 150 ft in diameter. Most of the patches were circular but occasional ones about ¼ mile away appeared rectangular in shape. The phenomenon continued for about 20 min and the closest patches illuminated the decks of the ship as with the intensity of a full moon.

Position of ship: 12° 11'N., 50° 50'E.

Arabian Sea

S.S. *Tribulus.* Captain J. M. Davidson. Mena al Ahmadi to Geelong.

4th March, 1956, 2100 G.M.T. Brilliant green phosphorescence was seen on the outer extremities of the ship's bow wave. The intensity was sufficient to illuminate the white paint on the bridge wings (30 ft above sea level) with a greenish light. No phosphorescence was seen in the wake or inner portions of the bow wave. When the phenomenon was first observed, the sea was calm; but later, with the onset of a force 1 breeze from E'N., flying-fish were also clearly illuminated. At 2130 the phenomenon ceased abruptly. The sky was clear throughout.

Position of ship: 20° 20'N., 64° 15'E.

North Pacific Ocean

S.S. *Loch Garth.* Captain G. S. Grant, R.D., R.N.R. Los Angeles to Panama. Observer, Mr. J. P. Crawford, 3rd Officer.

18th January, 1956, 0600 G.M.T. Small flashes of phosphorescence were observed at a distance of 150–200 yd all round the ship except the bow wave. During this time a repulsive smell was experienced which lasted for about 1½ hour steaming (24 miles).

Position of ship: 11° 32'N., 90° 13'W.

South Pacific Ocean

M.V. *Sussex.* Captain T. Alderman. Wellington to Balboa. Observer, Mr. D. L. Turner, 3rd Officer.

9th March, 1956, 0700 G.M.T. Throughout the night from twilight to twilight small brilliant balls of phosphorescence were observed to pass down the length of the ship at frequent intervals. Neither the bow wave nor wave crests (white horses) showed any sign of phosphorescence. The balls were approximately 6–9 in. in diameter, of a brilliant light green. Occasional balls appeared to explode and spread out to a diameter of approximately 2 ft. Air temp. 58°F, sea 62°.

Position of ship: 40° 27'S., 159° 52'W.

South Australian waters

M.V. *Port Pirie.* Captain G. G. Langford. London to Adelaide. Observer, Mr. P. R. Ardley, 3rd Officer.

9th February, 1956. Between 1815 and 2000 G.M.T. (0130–0315 S.M.T., 10th February). Ship passed through patches of phosphorescence in pieces 12–18 in.

long and 3 in. wide. These pieces were widely spaced and dispersed over a large area; they glowed very brightly and were visible up to about 200 yd. from the ship. They appeared to be lying just beneath the surface of the water. Sky overcast. No moon. Air temp. 62°F, sea 63°. Barometer 1014·6 mb, falling. Wind 240–260°, force 3–4. Slight sea and moderate sw'ly swell.

Position of ship: 37° 00′S., 109° 20′E.

On the following morning, 10th February, the sea and swell had abated considerably. Several small jellyfish were observed in the water just beneath the surface, and corresponding in shape and size to the pieces of phosphorescence observed during the previous night. They were the smooth variety with no "feelers" beneath them, transparent, with a small circular brownish patch at one end.

Note. This observation was forwarded to Dr. H. W. Parker, Keeper of Zoology at the Natural History Museum, who comments as follows:

"It seems more than likely that the animals were Salps and not what are usually known as jellyfish. There are some pelagic jelly-like Colonial Salps that may attain a considerable size. The Salps are common in the area mentioned; the most likely one being *Salpa Democratica*."

CYCLONE

Mozambique Channel

C.S. *Edward Wilshaw.* Captain R. W. Porter Reynolds. Cape Town to Mombasa. Observers, Messrs. A. Miller, W. Goodale, P. Clough, T. Archer.

28th January, 1956, 0600 G.M.T. Low of 997 mb now in position 21°S., 41°E., and reported to be likely to move NW. Wind of force 9 extending 100 miles from centre (W/T report). 1230, low of 991 mb now in position 21·4°S., 40·6°E., reported to be stationary or moving S. at 8 kt. Wind of force 9 extending 200 miles from centre (W/T report). At ship from 0000 to 1200 sky remains overcast, rain ceases, wind freshens from SE. to force 5–6. Rough sea and heavy swell from SE. At 1200 ship in position 24·5°S., 37°E. Course from 2000 on 27th to 1700 on 28th is 022° at 7¾ kt. Ship at noon is approximately 230 miles from storm centre, now established as moving S. at about 8 kt. At 1700 we alter course to 360° to maintain minimum distance of 200 miles from centre, which should pass us at about 0200 on 29th. From noon on 28th until 0900 on 29th the weather was as follows: cloudy, becoming less cloud; wind freshening from SE., force 5, veering slowly to SW., force 6–7 (this maximum force was reached at 0400); rough S'ly sea and heavy SE. swell. During this time the barometer fell slowly until 0400 when it ceased falling and remained steady for most of 29th.

From 0400 till 1200 ship now in position 21·5°S., 37·75°E., weather began to moderate slowly. Course from 0600 was 043° at 8½ kt. At 1200 the low of 992 mb was reported to be in position 23°S., 40°E. At 1600 on 29th the remaining traces of cyclone are heavy SE. swell and wind, still veering, now WSW., force 5, both gradually decreasing. From 1600 onwards the weather moderated rapidly, the barometer began to rise and the wind continued to veer very slowly to N. of W.

Note. The Director of the East African Meteorological Department comments on this observation as follows:

"The observations recorded by the *Edward Wilshaw* are very consistent with the estimated position and movement of the cyclone. The ship passed about 200 miles W. of the centre at about 0400 G.M.T. on 29th January. The ship at this time was moving N. and the cyclone S. The sequence of weather reported by the ship is quite normal."

RAPID WEATHER CHANGE

Bay of Fundy

S.S. *Rialto.* Captain H. Greenhill. St. John, N.B., to Aberdeen. Observer, Mr. D. J. Pengelly, 3rd Officer.

Before we sailed from St. John, N.B., on 16th March, 1956, at 1300 G.M.T. we learned by W/T that a deepening depression had passed over the New York area;

it was estimated to be the worst for March since 1879. There were no indications at St. John; the barometer was 1028 mb, sea smooth, swell negligible. The air temperature was 22°F, and only a few scattered fair-weather Cu clouds could be seen. As soon as we sailed the barometer started to fall rapidly and continued to do so until 0600 the next morning.

At 1600 (16th) visibility was good but the barometer had fallen to 1022 mb, wind increased slightly from ENE., force 3, and St covered the whole visible sky. From then wind began to increase and at 1720 it was blowing force 8, with gusts to force 9. It commenced to snow at 1810, and by then the sea had built up considerably. We were shipping seas and spray overall continuously, and because of the cold it was not long before the wheelhouse windows and, in fact, the whole of the ship was encased in a layer of ice. The snow landed on the ship and was, in turn, turned into ice by spray. By midnight the barometer was 994 mb and we were nearing the southern tip of Nova Scotia, the wind was E'ly, force 9, and the snow unabated. We put about at 0045 because by then we were losing the shelter that Nova Scotia had afforded us. The swell was deepening and we were labouring very heavily. We hove to as soon as we were once again under the lee of the land, and by 0400 the wind had gradually backed to NE., force 10–11, and the barometer was 981 mb. At 0600 the barometer had ceased to fall (lowest pressure 979 mb) and the wind had backed further to N'E. When daylight arrived it was estimated that the ice was 7 in. thick on the exposed weather side of rigging, masts, etc. Visibility since snow commenced was nil until 1300 when snow ceased. Between 1710 and 1745 the wind backed still further to NW. and decreased to force 4, with the barometer 999 mb and rising. We resumed course.

Position of ship: off St. John, N.B.

Note. This is a good illustration of the speed with which a ship can become iced-up on deck when wind, weather and temperature combine to provide suitable conditions. If these conditions last for very long, and if the ship happens to be a bit tender, very serious consequences can result.

WATERSPOUT

North Atlantic Ocean

S.S. *Umtali*. Captain F. E. J. O'Hea. London to Las Palmas. Observer, Mr. G. M. Cozens, 2nd Officer.

4th March, 1956, 1830 G.M.T. A V-shaped projection was observed at the base of a Cb and by 1831 was clearly recognisable as a waterspout, very solid and white. Its direction of rotation could not be observed since it was too far from the ship, neither could any disturbance be seen on the sea surface. By 1832 it had doubled its original length but was still some 800–1,000 ft above the surface. It continued to lengthen whilst becoming progressively more transparent until its final disappearance at 1835. At no time did the waterspout actually appear to come into contact with the sea surface. Cloud: 3/8 Cb and Ac, 7/8 total, base of Cb 2,000 ft. Wind NE., 5 kt. Barometer 1021·5 mb. Air temp. 67°F, wet bulb 61·5°, sea 64·5°.

Position of ship: 36° 24'N., 12° 45'W.

S.S. *Rembrandt*. Captain M. W. Siddle. Liverpool to Cuba. Observer, Mr. J. Parsloe, 2nd Officer.

5th March, 1956, 1800 G.M.T. One waterspout funnel was observed to hang from a mammatocumulus cloud towards W. but retreated into the cloud without contacting the sea. Near to it an area of water was agitated, and water rose up to the cloud having the appearance of smoke rising from the embers of a large bonfire. The cloud was at an estimated height of 300 ft and the phenomenon persisted until lost to view astern, about 10 min. No rotation was apparent, and the horizon could be seen through the " smoke " which appeared to swirl about in the wind (see drawing opposite page 16). Wind WSW., force 4, decreasing as rain clouds moved away.

Position of ship: 33° 25′N., 45° 30′W.

Scorpanto Strait

M.V. *British Consul*. Captain J. H. Nelson. Izmir to Port Said. Observers, the Master and Mr. G. Reid, 3rd Officer.

7th January, 1956. At 0730 G.M.T. the ship ran into a heavy thunderstorm with occasional squalls of wind, force 8. During the heaviest squalls visibility was reduced to nil. At 0810 the wind eased and became unsteady until at 0812 it steadied from W., force 5. At 0815 a waterspout suddenly appeared through the rain fine on the starboard bow and approaching rapidly. The ship passed through the centre of the disturbance, which was about 1,000 yd in external diameter and with an eye of about 400 yd. The wind was anticlockwise, force 10 to 12, causing much spray and giving the sea a milky appearance. The funnel cloud descended to 100 ft from the sea from what was probably a large Cb whose base was at about 200 ft. The phenomenon lasted for about 6 min before disappearing into the rain on the port quarter.

The barometer at 0800 was falling slightly, but when the vessel passed through the storm the barometer fell suddenly from 1009·7 mb to 1000·2 mb (the latter reading from the barograph trace) and then rose again to 1009·5 mb.

Position of ship: 35° 48′N., 27° 42′E.

Note. This is an interesting observation as it is extremely unusual to have a report from a ship which has passed directly under a waterspout.

LINE SQUALL

North Atlantic Ocean

M.V. *Daleby*. Captain F. D. Lloyd. North Shields to New Orleans. Observer, Mr. K. Barnett, 2nd Officer.

11th February, 1956, 2000 G.M.T. A very distinct " roll " of Cb cloud was observed between 230° and 340° moving in a SE'ly direction. Ahead of the cloud was Ac at a high level and fragments of Sc. The wind was 210°, 20 kt, with light rain showers, barometer steady at 1010·1 mb, dry bulb 76°F and wet bulb 74·8°. As the cloud passed over the ship at 2010, the wind increased suddenly, giving 50–60 kt gusts before veering rapidly to 310° at 2015; this was accompanied by torrential rain which reduced visibility to half a cable. Between 2025 and 2040 the rain eased and the wind gradually diminished to 310°, 20 kt, barometer 1012·4 mb, dry bulb 67°, wet bulb 64·8°. At the front of the squall a waterspout appeared to be forming, but the characteristic funnel from the base of the cloud was absent. Instead there appeared to be only a circular patch of broken water about 15–20 ft in diameter revolving anticlockwise with spray forming round the disturbance to a maximum height of 30 ft before being lost in the heavy rain. The vessel passed within a quarter of a cable of this undeveloped waterspout and the rotation was very distinct; although no estimate could be made of the speed, the spout itself appeared to be travelling in a SE. direction at the same rate as the line squall.

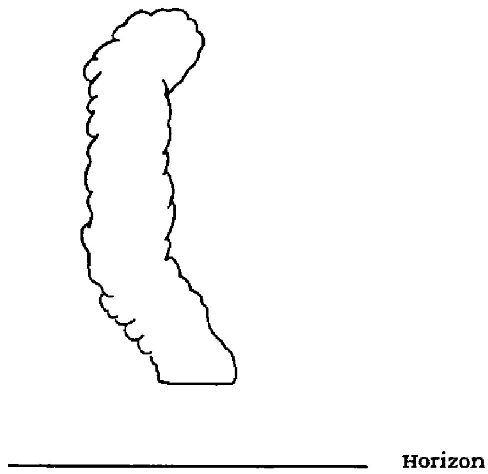
Position of ship: 27° 59′N., 77° 20′W.

CLOUD

South Pacific Ocean

M.V. *Wanstead*. Captain I. W. Jackson. Panama to Wellington. Observer, Mr. R. Arnott, 3rd Officer.

9th February, 1956, 0310 G.M.T. A peculiar type of towering cumulus cloud was observed. The cloud was very narrow throughout its height and resembled a chimney stack, with a slight bend at about two-fifths of the way up. The edges of the cloud were well defined, but the top was somewhat ragged. The height of the base was estimated to be at about 4,000 ft and its vertical development approximately 6,000 ft. Air temp. 78·0°F. Barometer 1014·5 mb.



Position of ship: 26° 58′S., 132° 21′W.

FROST SMOKE

North Atlantic Ocean

S.S. *Bassano.* Captain J. Etches. Middlesbrough to New York.

18th February, 1956, 1300 G.M.T. Before this position was reached, frost smoke was observed to the S. and W. of the ship, while to the N. the sea was perfectly clear. The line of demarcation ran approximately 285°–105° and was well defined in both directions. At the time of observation, the wind was N′E., 8 kt, dry bulb temperature 32°F, wet bulb 30°. On passing into the area of sea smoke, the sea temperature rose from 41° to 64°. Barometer steady at 1013 mb.

Position of ship: 41° 28′N., 62° 28′W.

S.S. *Inishowen Head.* Captain H. N. Clarke. Dublin to Baltimore. Observer, Mr. S. Thompson, 2nd Officer.

22nd–23rd February, 1956. Frost smoke was observed on both days and photographs were taken by Mr. McDowell, 3rd Officer, and Mr. Purdy, 2nd Engineer Officer.

Position of ship: at 1200, 22nd, 36° 48′N., 67° 30′W.; at 1200, 23rd, 36° 48′N., 71° 54′W.

Note. One of the photographs is reproduced (see opposite page 16). The condition necessary for the formation of frost smoke, a considerable excess of sea temperature over air temperature, was present in a marked degree as the ship was crossing the Gulf Stream on these two days. At the successive six-hourly observations the excess of sea over air temperature, at first 15°F, increased until it reached 35° at 1800 on 23rd February, the lowest air temperature of the two days, 37°, then occurring simultaneously with the highest sea temperature, 72°.

SCINTILLATION

Arabian Sea

S.S. *Muristan.* Captain E. E. Dunn. Aden to Duqm, Persian Gulf. Observers, the Master and Mr. M. A. J. Greenham, 3rd Officer.

12th March, 1956. The star Arcturus was observed to rise a little after 1700 G.M.T., its colour being bright red. As the star ascended to an altitude of about 6° or 8°, the colour gradually changed to bright orange and then to steel blue. At an altitude of about 10° strong scintillation set in accompanied by colour changes. These went in a cycle, starting with red and gradually changing to green and then blue, then repeating itself, the duration of each cycle being about 1 sec. This continued until the star reached an altitude of about 20°. The star then developed a very dull blue appearance which faded gradually until the star was almost invisible. When it was thought that the star might become completely invisible, there was a steel-blue flash and very strong scintillation became apparent, lasting for about 10 min. The scintillation became less pronounced as the star's altitude increased to about 25° or 30°, by which time it had regained its normal appearance. The whole phenomenon lasted for about two hours. During this period other stars to the eastward were observed to be scintillating excessively but without colour change.

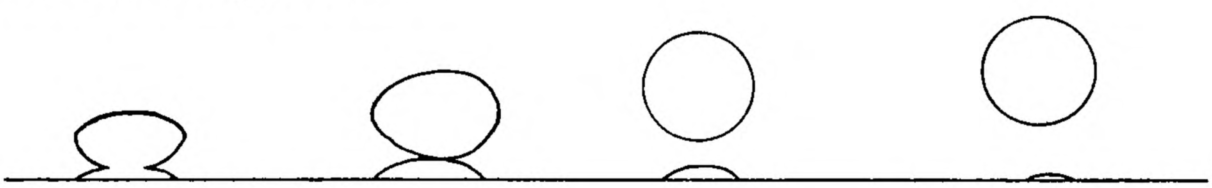
Approx. position of ship: 13° 45′N., 48° 50′E.

Note. This is a very interesting observation. The most unusual features are the appearances of the star with a steady colour, steel blue or dull blue, at altitudes of about 8° and 20°, as these colours bear no relation to the normal colour of the star, which may be described as orange-yellow. It is not stated whether the observation was made with the unaided eye or with binoculars. Scintillating star colours are not often seen so clearly without optical aid, though the changes of brightness are easily seen. Another unusual scintillation observation will be found on page 16 of the January 1956 number of this journal.

ABNORMAL REFRACTION

English Channel

M.V. *Timaru Star*. Captain H. W. McNeil. London to Curaçao. Observer, Mr. N. Johnson, 3rd Officer.



(1) (2) (3) (4)

4th January, 1956. While proceeding down the English Channel at 0800 G.M.T., shortly after sunrise, the sun was observed to have a distorted appearance (sketch 1). By 0810 while the sun continued to rise a false " sun " began to set. Two minutes later there was a distinct gap between the true sun and the false and by 0814 the false sun was no longer visible. In the area of the rising true sun the sky was clear and a bright orange in colour. A phenomenon similar to sketch 2 was observed at sunset on the same day.

Position of ship: 50° 05′N., 02° 04′W.

Western Approach to Irish Sea

S.S. *Explorer*. Captain W. S. Eustance. Brownsville to Manchester. Observer, Mr. J. A. Billington, 2nd Officer.

(1) (2) (3)

8th January, 1956, 1320 G.M.T. A vessel's masts and funnel were sighted to windward at an estimated distance of 14 miles, appearing as in sketch 1. After 4 min the ship was identified as a " Liberty " type and appeared as in sketch 2. Three minutes later she assumed a normal appearance, but land at bearing 046°, which was taken to be Cape Clear, appeared as in sketch 3, at estimated distance 22 miles. The apparent height of the under-surface of the land above the horizon was 43′, measured by sextant. Cloud 6/8 Cu, Nb, As, Ac.

Position of ship at 1200: 51° 00′N., 10° 12′W.

Western Mediterranean Sea

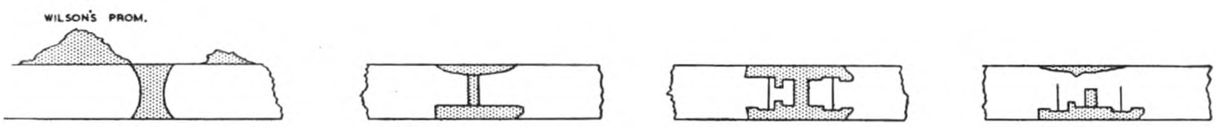
S.S. *Paparoa*. Captain J. Guyler. Port Said to Liverpool. Observers, the Master and Mr. M. J. Charlesworth, 2nd Officer.

15th March, 1956. At 1400 G.M.T. abnormal refraction was observed. The horizon was distorted and appeared as low undulating hills, while to S. the sea appeared to climb mountains. A tanker bearing NNW. appeared as a flat-iron collier without any superstructure. As the observer's height of eye decreased the superstructure of the tanker appeared and increased. As distance decreased the superstructure again increased. Two vessels ahead appeared like two tall lighthouses without any bases. As the observer's height of eye decreased the hulls of these two vessels appeared.

Position of ship: 37° 01'N., 04° 43'E.

Bass Strait

S.S. *Jason*. Captain D. W. Stroud. Fremantle to Sydney. Observer, Mr. D. A. McCaffrey, 3rd Officer.



(1) (2) (3) (4)

8th January, 1956. Between Cape Otway and Wilson's Promontory abnormal refraction was experienced, particularly during the forenoon watch when a double horizon was visible through 360°. When approaching Wilson's Promontory at 1150 ship's time two vertically parallel lines appeared between the two horizons, bearing 080°(T). By 1200 these two lines appeared bent in the middle (sketch 1). Twelve minutes later the shape of a hull and funnel on the lower horizon, the funnel being produced to join with a smudge on the upper horizon (sketch 2). The clarity of the phenomenon gradually increased until at 1222 a perfect inverted image was visible above what could now be seen to be a coasting steamer of about 2,000 tons (sketch 3). At the time of maximum effect, when the ship was about 6 miles off, the inverted image was perfectly clear in every detail. Soon after the phenomenon gradually dissipated until at 1225 the inverted image was barely visible (sketch 4). Wind 090°, 10 kt, no cloud. Air temp. 68·9°F, wet bulb 64·2°, sea 61°.

Position of ship at 1200: 39° 08'S., 145° 25'E.

RED AND GREEN FLASHES AT SUNSET

North Atlantic Ocean

M.V. *Cambridge*. Captain P. P. O. Harrison. Curaçao to Balboa. Observers, the Master and Mr. D. Moran, Chief Officer.

10th May, 1956. The sun emerged from a bank of Sc; there was little to indicate its presence except some faint pink rays. As it emerged there was a brilliant red flash. The sun was then half a diameter from its lower limb to the horizon. It had a very red appearance as it continued to descend. When the upper limb was half a diameter from the horizon, and partly obscured by cloud, a green flash occurred at either side of the sun that was visible. The sun set at 1911½ S.M.T. There was considerable mirage effect as the last of the sun disappeared.

Barometer 1033·8 mb. Air temp. 60°F, wet bulb 54°, dewpoint 48°. Wind NE., 5 kt. Cloud Cu, Sc, Ac and Cs. Sky almost completely covered except in the immediate vicinity of the setting sun.

Position of ship: 35° 48'N., 43° 32'W.

Note. A similar observation from M.V. *Cambridge* was published on pages 15 and 16 of the January 1956 number of this journal, to which a note was appended. We now have four observations of the red flash seen on the emergence of the sun's lower limb from behind a cloud edge near the horizon, all being made by M.V. *Cambridge* with the exception of the first one, which was seen by M.V. *Coptic*. This was published on page 144 of the July 1953 number.

GREEN FLASH

South Atlantic Ocean

M.V. *Drina*. Captain F. J. Swallow. Las Palmas to Buenos Aires. Observer, Mr. W. M. Wheatley, Chief Officer.

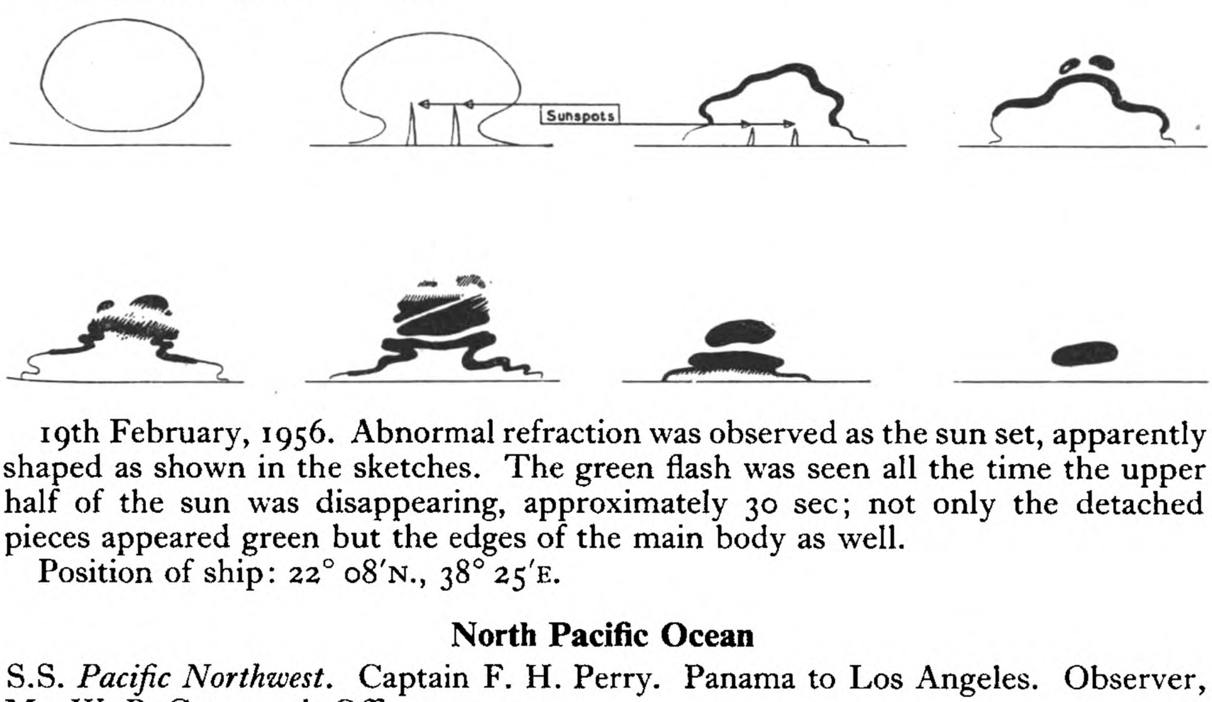
28th January, 1956. At sunset the sun, when half a diameter above the horizon, became lemon-coloured, although the shape remained normal. The final visible segment of the sun turned to a vivid electric blue. Visibility excellent. The sky after sunset was colourful with great clarity of cloud shapes and colours. Cloud 3/8 Cu and Ac.

Position of ship: 18° 28′s., 38° 28′w.

Note. The name of this phenomenon at sunset or sunrise is the " green flash ", green being the colour most usually seen. It would not be practicable to name it according to the colour observed, as these comprise various shades of green and blue, also purple or violet. We have had more observations of blue, purple or violet flashes in recent years. While these colours are admittedly much less frequently seen than various shades of green, it does appear that they are not as rare as was formerly supposed; a probable explanation of this is that more observers are now watching for the phenomenon.

Red Sea

M.V. *Gloucester*. Captain D. A. G. Dickens, R.N.R. Jeddah to Suez. Observer, Mr. R. E. Baker, Chief Officer.



19th February, 1956. Abnormal refraction was observed as the sun set, apparently shaped as shown in the sketches. The green flash was seen all the time the upper half of the sun was disappearing, approximately 30 sec; not only the detached pieces appeared green but the edges of the main body as well.

Position of ship: 22° 08′N., 38° 25′E.

North Pacific Ocean

S.S. *Pacific Northwest*. Captain F. H. Perry. Panama to Los Angeles. Observer, Mr. W. P. Crone, 4th Officer.

29th January, 1956. Half a minute before setting at bearing 262° Venus appeared to turn bright red, becoming orange again just before setting. At the moment of setting at 0345 G.M.T. there was an emerald green flash of 1 sec duration. This observation was made with the aid of binoculars. Cloud 2/8.

Position of ship: 24° 55′N., 112° 44′W.

UNUSUAL VISIBILITY

English Channel

M.V. *Daleby*. Captain F. D. Lloyd. North Shields to New Orleans. Observer, Mr. K. Barnett, 2nd Officer.

29th January, 1956. At 0034 G.M.T. the light of *Owers* light-vessel was observed bearing 271° at a distance of 28·6 miles (position by Decca Navigator). The extreme range for this light for our height of eye was 15·5 miles. The original position at which the light was raised was later confirmed by visual bearings using the Nab Tower light and *Owers* light-vessel light. The Nab Tower was first sighted at a range of 23·4 miles, which was 4·9 miles outside the extreme range. It would have been in sight earlier, but was not apparent because it was nearly in line with *Owers* light-vessel. Both lights were observed at 0221 when intermittent light drizzle set in. Air temp. 51°F, wet bulb 50°. Wind 200°, 12 kt. Slight sea, short SSW'ly swell. Barometer 1019·1 mb. Fog patches from NNW. to SE. (through E.) of position at 0034. Broken St and Ns.

Position of ship: 50° 37′N., 0° 04′E.

CORONA

North Pacific Ocean

M.V. *Cingalese Prince*. Captain R. C. Proctor, O.B.E. San Francisco to Manila. Observer, Mr. J. I. Newton, 2nd Officer.

26th February, 1956, 1820 G.M.T. As a formation of Ac in bands passed over the moon, a brilliant display of lunar corona was observed as brightly coloured complete concentric circles, with the moon in the centre. The circles were blue-white, orange, violet, green, yellow and red, in that order. The diameter of the corona was 4°. The altitude of the moon's lower limb was 22° and the phenomenon lasted for approximately 5 min, although in the following half-hour parts of the corona, less vividly coloured, were observed. Cu and Sc cloud were also present at the time. Sky 5/8 cloud. Barometer 1008·8 mb.

Position of ship: 20° 50′N., 177° 39′E.

AURORA

Pentland Firth

M.V. *Sacramento*. Captain H. Grunnill. Middlesbrough to Norfolk.

13th March, 1956, 2345 G.M.T. In the Pentland Firth, off Stroma Island, the Northern Lights were observed, bearing approximately 330°, vessel steering 280°. The phenomenon had a " streaky " effect, like searchlight beams, alternately brightening and fading at frequent intervals, and lasted for about 5 min.

North Atlantic Ocean

S.S. *Nova Scotia*. Captain J. E. Wilson, O.B.E. Liverpool to Halifax.

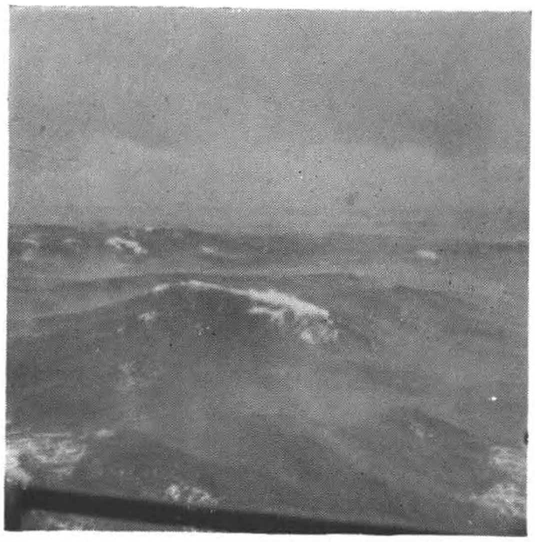
2nd–3rd March, 1956. Auroral observations made as follows: At 0030 G.M.T. moderate glow to N. At 0100 bright arc observed, altitude 25°, length in azimuth 80°. At 0345 bright rays emanated from arc. At 0415 most S'ly bearing of arc 270° and extending to 050°. At 0450 reduced to moderate glow. At 0540 glow weaker but flaming. At 0650 observation ceased owing to cloud to NW. and moonlight.

Position of ship at 0001: 46° 13′N., 54° 46′W.

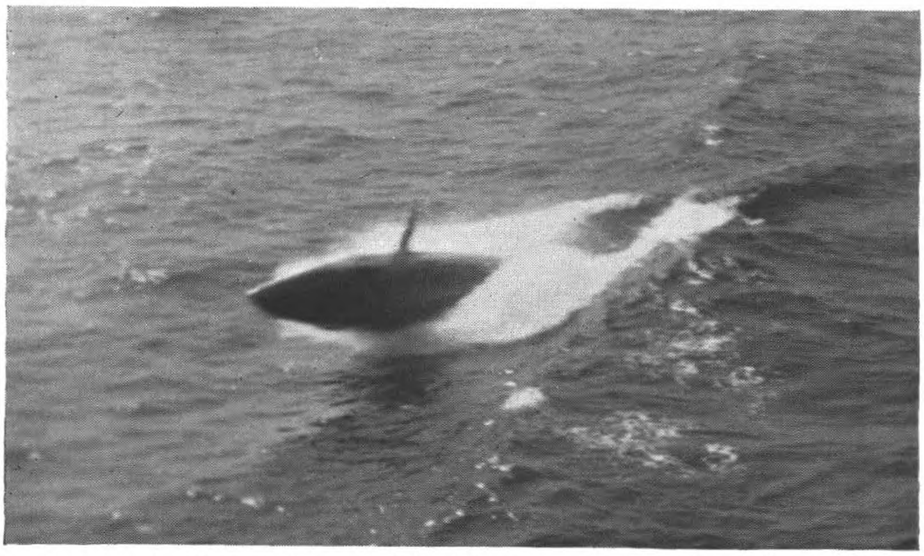
S.S. *Bassano*. Captain J. Etches. Baltimore to Newcastle.

11th–12th March, 1956. On successive nights splendid displays of aurora were to be seen in the northern sky, especially about 0100 G.M.T. on 12th March. The weather at the time was fine and cool with a variable sky about 3/8 clouded, a fresh WSW. breeze and low barometer beginning to rise. The display consisted of impressive curtain effects in the NW., which quickly spread across the sky from W. to ENE. Then an arc of apparently intense white light spread completely over the ship from the ENE. horizon to the SW., lighting the ship and surrounding sea as though bathed in moonlight. The curtain effect now spread until three-quarters of the visible sky was covered by the flashing whitish light. Then in the NE. the white

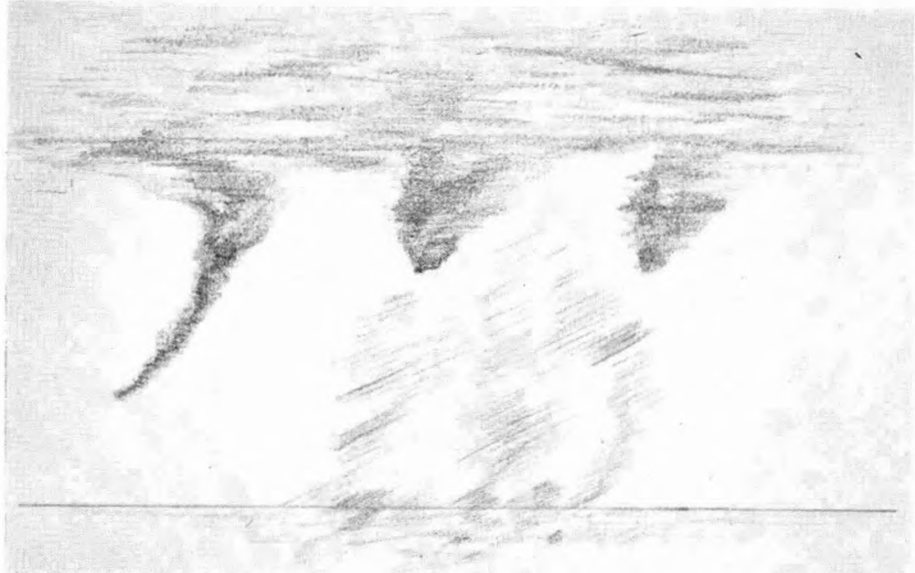
(*Opposite page 16*)



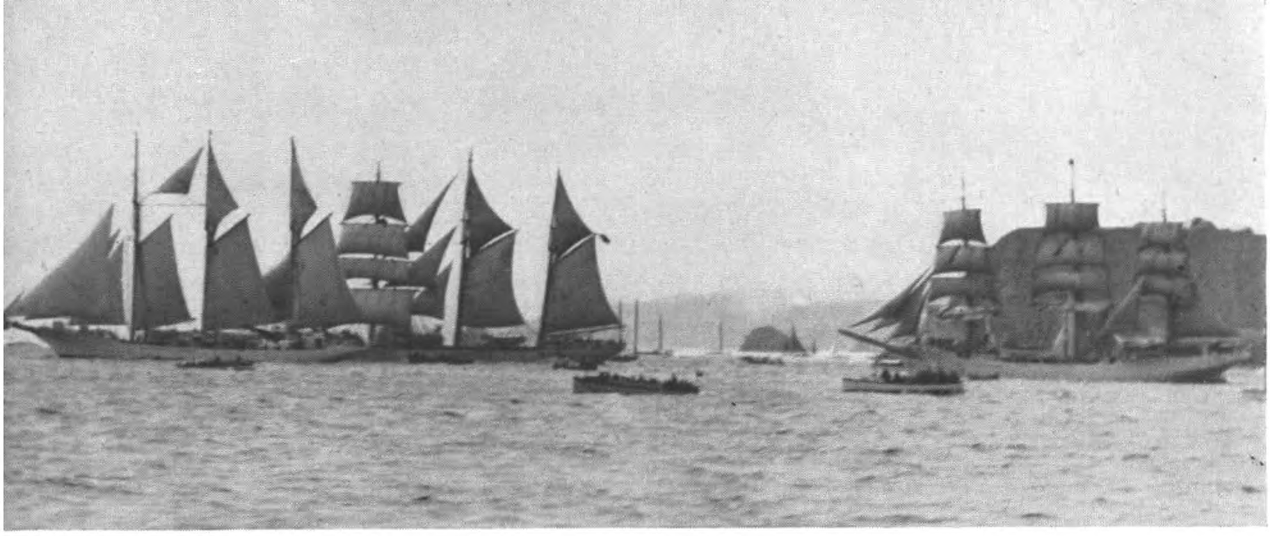
Photograph of frost smoke observed from S.S. *Imshowen Head* (see page 12).



otograph of a whale observed from S.S. *Umtata*, in 08 50′N., 16 10′W. (see page 4).



Drawing of waterspout seen from S.S. *Rembrandt*, in 33 25′N., 45° 30′W. (see page 10).



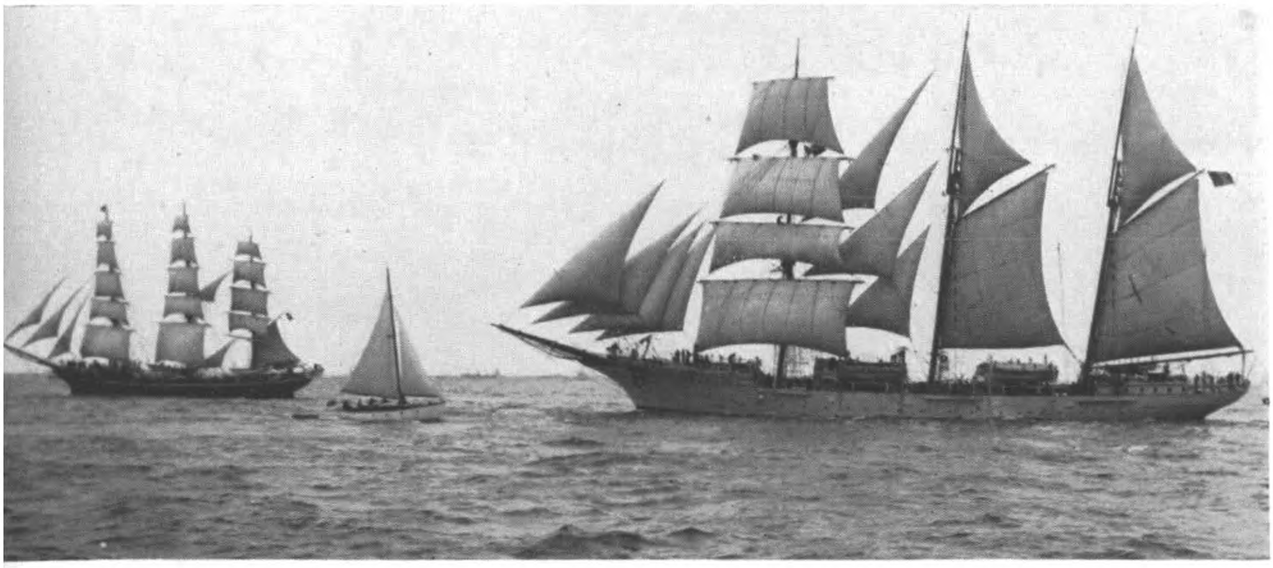
Mercator (Belgium)

and

Sorlandet (Norway)

Photo by R. J. Miller

The Danish vessel *Georg Stages.* *Photo by R. J. Miller*



Georg Stages

and

Mercator.

Photo by R. J. Miller

Ships assembling for the Torbay-Lisbon Race (June 1956)

light took on a slight pinkish shade and within a few minutes became a very noticeable reddish-brown in colour. This part of the sky after about a quarter of an hour was obscured by a heavy cumulus cloud and on clearing the light had again become white.

Position of ship: between 53°N., 31°W., and 56°N., 22°W.

South Indian Ocean

M.V. *Melbourne Star*. Captain G. Aldridge. Cape Town to Adelaide.

24th January, 1956, at 0130 ship's time (1930 G.M.T., 23rd January). A conspicuous single arc from 150° to 220° with highest point (altitude 25½° by sextant) bearing 180° was observed. The display lasted for 30 min and consisted of the arc with marked dark segment and pulsating rays extending approximately 24° above the horizon.

Position of ship: 42° 10'S., 105° 00'E.

Bass Strait

M.V. *Port Pirie*. Captain G. G. Langford. Observers, Mr. M. J. Davies, Junior 3rd Officer, and Mr. M. Haslan, Apprentice.

25th February, 1956, 1020–1035 G.M.T. Aurora australis was observed, at first in SE. then gradually spreading to W. It extended from the zenith to about 10° above the horizon and took the form of four wide rays separated by narrower white streaks. These streaks radiated from the zenith like spokes of a wheel. The bands were red or deep red near the zenith and pink at lower altitudes. Near the bases of the bands and streaks, at about 10° altitude, some patches coloured blue, green and yellow were seen. The aurora was brightest at 1025, 5 min after it was first seen. There was bright moonlight during the observation.

Position of ship: 40° 00'S., 145° 28'E.

26th February, 1956. Observer, Mr. P. R. Ardley, 3rd Officer. Between 1510 and 1600 G.M.T. aurora was observed extending from SE. to W. The predominant colour was a bright yellow-green radiating in vertical streaks of light from 5° above the horizon to approximately 20° altitude. The brilliance fluctuated, brightest initially and then fading to isolated patches of brilliance over the whole arc.

Position of ship: 40° 43'S., 145° 42'E.

S.S. *Hyrcania*. Captain E. W. V. Garrett. Mena al Ahmadi to Geelong. Observers, the Master, Mr. J. Callan, 3rd Officer, Mr. J. P. Keenan, Radio Officer.

3rd March, 1956. At 1130 G.M.T., aurora australis commenced as a glow to S. and at 1140 isolated rays not unlike searchlights appeared. These rays became more intense and extended in length until gradually a shooting arc, azimuth 135°–225°, altitude 30°, was formed. At 1215 a faint little patch appeared to SE. of the arc and between the shooting rays, took on a light greenish colour until finally the rays merged into a continuous glow. This phenomenon was clearly visible until at 1245 the moon rose and the aurora faded.

Position of ship: 38° 58'S., 143° 04'E.

METEOR

North Atlantic Ocean

S.S. *Ceramic*. Captain F. A. Smith. London to Trinidad. Observers, Mr. D. R. Pochin, 3rd Officer, and Mr. P. G. Box.

9th March, 1956, 0010 G.M.T. A meteor of exceptional brilliance was observed. It first appeared to NW. of Orion's Belt and, increasing slightly in altitude, passed above Sirius, when it attained its maximum brilliance, approximately half as bright again as Venus. Having passed Sirius it began to fall and fade, its trail now breaking into small patches of light of short duration. The meteor had disappeared before reaching a position above Suhail. At the time of its maximum brilliance the body was flame-yellow in colour with a definite green central spot.

Position of ship: 30° 32′N., 41° 56′W.

Caribbean Sea

M.V. *Essequibo*. Captain J. Allason-Jones. Cartagena to Kingston, Jamaica.

13th March, 1956, 0900 G.M.T. A meteor was observed, bearing SW. at an altitude of 25°. It was much brighter than any planet, with an unsteady white light, of a maximum diameter of ½° when abeam. Several large pieces appeared to break off during its passage across the sky, and it disappeared in cloud when bearing SE. at an altitude of 10°.

Position of ship: 10° 19′N., 75° 35′W.

Old Time Marine Observers' Log

The following interesting observations of ice are taken from logbooks in the possession of the Marine Division.

Ship *Loch Rannoch*, of Glasgow. Captain D. C. Davidson. Melbourne to London.

16th February, 1893, at 1240 a.m. in 51° 10′S., 49° 20′W. A very large iceberg loomed up through the clouds and haze nearly right ahead and very close. Before it could be cleared with the helm hard up the foreyard and fore topsail yards caught, carrying away and breaking the foreyard in two and damaging the topsail yards. Then the main yard caught and broke in two places. Then the mizen topgallant yard caught and broke in three pieces. I should think the berg could not be less than 400 to 500 feet high and about a mile long. The temperature of the water, the height of the dry and damp bulbs had been observed at midnight and did not show any signs of ice being so near.

Further remarks are given at the beginning of the book:

Collided with a huge iceberg doing considerable damage to yards, etc. The hull not touching so far as I am aware—at least the vessel is not making any water. The temperature of the sea and air, having been taken as usual at midnight (or shortly after), did not show any change from the former observations, to lead us to believe that we were in the immediate vicinity of such a huge mountain of ice. Owing to the clouds and haze hanging over it, it did not appear until we were very close to it, the ship going about 5 knots and the Chief Officer in charge of the deck. When the day broke there were many bergs or ice mountains all round the ship and the ship had to be carefully handled in her disabled state to clear them. Noon position by observation, 51° 12′S., 47° 36′W.

17th February. When day broke we were still surrounded with what appeared to be a solid wall of ice, from 200 to 500 feet high, and some of the bergs seemed to be several miles in length. The greater part of them appeared to be perpendicular on the sides and flat on the top, quite level from end to end. Others had a jagged appearance as if they had parted from the main body. No observation for position this day.

18th February. Blowing hard from south-westward all night. Having a difficult job to keep clear of the ice under the little canvas we could set in our crippled state. At daylight I went to the masthead and saw a small opening to the north-west and decided to run for it. On nearing it I found immense bergs as far as the eye could reach and miles of floating ice which led me to believe that we were nearing the outer edge. Many of the bergs now appeared to be getting top-heavy and were gradually canting over. Some had canted over and showed the part that had been in the water worn quite smooth. Others again seemed to have broken in two pieces, the freshly broken ends having a bluish colour. Some had water rushing down the sides as if they were melting on the top. One I saw had doubled over and had a large brown rock embedded in it. The bergs had now assumed all sorts of shapes and seemed to be the remains of much larger ones. By sunset of this evening no bergs were to be seen ahead from the masthead. It is not possible to give an accurate estimate of the number we saw. I counted 37 separate bergs at one time, but the horizon was obscured by mountains of ice as far as the eye could reach from the topgallant yard.

Whilst we were amongst the ice I frequently tested the temperature of the water and did not find the temperature vary more than half a degree, even when close to leeward of a large berg and going through the floating pieces of ice. The temperature of the air altered very little all the time, the sea was of a greenish colour. The instruments were carefully attended to and all data recorded may be relied on as correct.

The position of the last berg seen at 6.30 p.m. on 18th February was 49° 13′S., 45° 08′W., by careful dead reckoning.

From the first berg seen to the last one the distance in a direct line was about 200 miles.

Barque *Loch Katrine*. Captain W. Anderson. Melbourne to English Channel.

16th September, 1901. 3 a.m., passed a large berg. At 6 a.m. tacked to NW., as icebergs, extending from E. round to S., were so numerous and of such tremendous size that there was no clear way for the ship to go through. There were seven large bergs near and all round us, two of which were of great height. Among them were two low flat floes covering a great area. The position when we tacked was 51°03′S., 127° 18′W. At 9.13 p.m. whales going to S. We have passed no ice since noon.

The Meteorological Office and the International Geophysical Year

By Sir Graham Sutton, C.B.E., D.Sc., F.R.S.

(Director of the Meteorological Office)

The International Geophysical Year, which begins in July 1957, is the greatest co-operative effort of science yet attempted. All the large-scale aspects of our planet will be subjected to close scrutiny, and even the sun and the moon will not be omitted. International co-operation is familiar in meteorology, and it is therefore natural that the science of the atmosphere plays a leading part in this great enterprise.

The two previous "international years", in 1882-83 and 1932-33, were "polar years", that is, they were devoted to the scientific opening up of the Arctic. Meteorologists contributed greatly to these projects, but in the present scheme their aim is considerably more ambitious. It is no less than the determination of the motion of the atmosphere over the whole globe, the so-called general circulation.

The earliest hint of a quasi-regularity in the motion of the air over the surface of the earth seems to have come in the seventeenth century with the discovery of the trade winds. Naturally, this was entirely the work of seamen, such as William Dampier, who managed to make some excellent meteorological and oceanographic observations while carrying on his profession of buccaneer. Hadley gave his famous dynamical explanation of the trades in the next century. Maury, an American naval officer, laid the foundations of our present systematic world-wide service of maritime meteorology when he began his life work of collecting observations of winds and ocean currents by distributing special logbooks to captains, and it was undoubtedly his example which led to the international meteorological conference of maritime nations at Brussels in 1853. The next outstanding event in solving the riddle of the general circulation was undoubtedly the discovery of the stratosphere by Teisserenc de Bort and Assmann at the beginning of the present century, and finally the recognition, in recent years, of the jet stream near the tropopause makes up the picture as we know it today.

But the picture is still far from complete. The problem of the general circulation is, broadly, that of explaining the details of the working of the atmospheric engine, to trace the transformations of energy from the sun's rays to the winds. Up to now much of this work has had to be theoretical, because of the lack of observations, especially in the upper air. Regular soundings by radio-sondes and radar wind-finders have been plentiful only since the war. Yet clearly we cannot expect to understand global motion from surface observations only, and if we do not know the general circulation in fair detail we cannot hope to make significant progress in long-range forecasting.

The meteorological scheme for the I.G.Y. is based on regular upper-air soundings and surface observations along selected meridians. Established upper-air stations are being asked to make two radio-sonde soundings and four radar-wind ascents daily, with an enhanced effort on special days. The Meteorological Office will contribute to this work by utilising its ocean weather ships and some 15 upper-air stations, in the United Kingdom, the Mediterranean and the Middle East. To understand how the atmospheric engine works, however, we must have data regarding its energy input and for this reason special highly accurate measurements of radiation are being made at a number of stations. The movements of ozone in the upper air give valuable clues to the circulation, and regular observations will be made for this purpose.

The collection and publication (in the form of " micro-opaque cards ") of the vast amount of data that will result from this great world-wide effort is being undertaken by the World Meteorological Organisation. The results will provide basic material for research for many years to come, and it is far too early to hazard even a guess as to what will ultimately emerge when the theoreticians have had an opportunity to sift and analyse the records. At this stage we must all endeavour to see that the observational part of the enterprise does not fall short of the hopes of the organisers. It is for this reason that I appeal to our good friends in the Merchant Navy and in the ocean weather ships, who must be conscious of the great tradition that they inherit in this matter, to support us wholeheartedly in this most rewarding of enterprises.

The International Geophysical Year

By H. C. SHELLARD, B.SC.
(Marine Division, Meteorological Office)

A number of articles have already appeared describing the events leading up to the decision to hold an International Geophysical Year in July 1957 to December 1958, giving details of the programmes in each field of study and providing information about the practical steps for carrying them out. Among these several [1, 2, 3] have been freely used as the basis for this general account in which, however, those aspects of the I.G.Y. programmes which are of maritime interest have been emphasised and to some extent expanded.

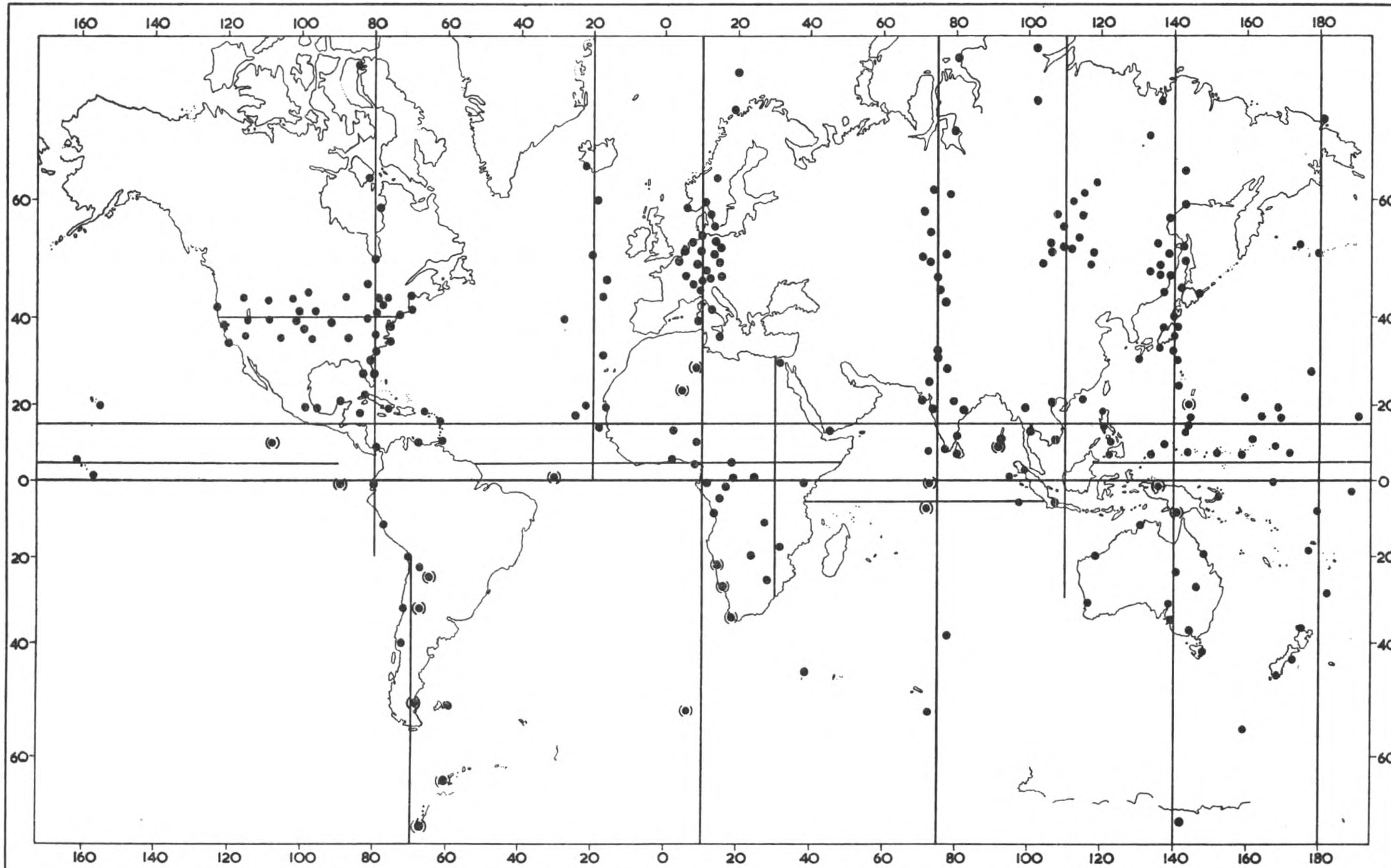
The importance of geophysical data from relatively remote areas of the earth was first recognised in the last century and special stations to obtain such data were set up in Arctic regions during the first International Polar Year in 1882-83. Fifty years later, in 1932-33, the second International Polar Year was held and the programme again concentrated on observations from the Arctic, but on that occasion it included ionospheric observations in addition to the meteorological, magnetic and auroral observations made previously. In 1950 it was suggested that there should be a third International Polar Year in view of the rapid technical and theoretical progress in the study of the earth's atmosphere made since 1933. The International Council of Scientific Unions proposed a much more comprehensive scheme, however, and appointed a Special International Committee to co-ordinate programmes on a world-wide basis for what has now become known as the International Geophysical Year (the I.G.Y.).

The period to be covered, 1st July, 1957, to 31st December, 1958, was chosen as coinciding with a period of sunspot maximum, the second International Polar Year having coincided with a sunspot minimum. The area to be covered includes all latitudes, but special emphasis is laid on the Arctic, Antarctic and equatorial regions. The main fields of study are meteorology, geomagnetism, aurora and airglow, cosmic rays, solar observations, the determination of latitudes and longitudes, ionospheric observations, glaciology, oceanography, seismology, gravity and rocket exploration of the high atmosphere. The programmes of work recommended by the Special International Committee are based on proposals made by about 40 participating nations and on the recommendations of various international scientific organisations, including the World Meteorological Organisation. Most of the countries concerned have set up a national committee to co-ordinate their activities under the various headings during the I.G.Y. The United Kingdom national committee under the Royal Society includes Sir Graham Sutton, Director of the Meteorological Office, as national correspondent for meteorology.

The Special International Committee has designated certain places and areas from which special observations are needed during the I.G.Y. to provide an adequate general coverage. These include the Arctic and Antarctic, the tropics and sub-tropics and certain ocean islands. Special importance has also been attached to the meridians, from pole to pole, of 80°W., 10°E. and 140°E. and to a number of shorter sections of other meridians and zone lines for the purpose of obtaining meteorological vertical cross-sections (see map on page 22). A plan has been evolved for a special concentration of effort on certain days which have been called World Days. Regular World Days, selected in advance, occur three or four times each month, and include days coinciding with eclipses and meteor showers, days of new moon, etc. Special World Days or Intervals will be announced at short notice when it is considered that a significant geomagnetic disturbance is likely to commence within the next 24 hours. World Meteorological Intervals are periods of 10 consecutive days in each quarter, including the solstice or equinox day, the first of these being a trial period, 21st–30th June, 1957. Arrangements are being made for the collection, exchange and publication of the data which will be obtained.

The meteorological programme

The main objective of the meteorological programme is the investigation of the large-scale processes of the general circulation of the atmosphere, including all forms of energy exchange, the influence of surface features and studies of radiation and ozone distribution. To this end it is proposed to increase the number of upper-air observing stations so that vertical cross-sections of the atmosphere may be prepared for major portions of the three meridian lines already mentioned and also for sections of the meridians 30°E. (between 30°N. and 30°S.), 75°E., 110°E., 180°W., 20°W. and the zone lines 5°S., the equator, 5°N., 15°N., 40°N. (in North America) and one through the Andes. The Atlantic ocean weather stations I, J and K will make an important contribution to the northern hemisphere meridional section at 20°W. British ocean weather ships will operate at all three stations and also at station A during the I.G.Y., sharing the duties with the ocean weather ships of other European countries. The ocean weather ships of non-European countries, i.e. the United States, Canada and Japan, operating in the Western Atlantic and the Pacific Oceans, will also make their contributions to the programme. The exploration of the upper air will also be extended to higher levels than usual. The present daily routine aboard the British ocean weather ships and at almost all of the 15 aerological stations maintained by the Meteorological Office in the United Kingdom, Mediterranean and Middle East, consists of two radio-sonde ascents and either two or four radar wind soundings to heights of at least 50 millibars (about 64,000 feet). This will continue on ordinary days during the I.G.Y., except that in one of the combined temperature-wind soundings a larger balloon will be used to attain a height of



Chains of meteorological observing stations for the International Geophysical Year.
(Proposed stations are in brackets.)

10 millibars (about 100,000 feet) when possible. During World Meteorological Intervals it is hoped to make four combined temperature-wind soundings daily, using large balloons at the three ocean weather stations near 20°W. and also at three aerological stations in the United Kingdom. Similar arrangements will be made by other countries operating upper-air stations. It had been hoped that it would be possible to secure additional upper-air soundings in the Southern Ocean during the I.G.Y. by arranging with whaling companies for meteorologists and the necessary equipment to be taken aboard their factory ships. It now appears, however, that there are so many administrative difficulties involved that the project must be abandoned.

Another recommendation of the Special Committee is that additional stations, preferably upper-air stations, should make measurements of solar and terrestrial radiation. In addition to maintaining the current programme at five stations in the United Kingdom, the Meteorological Office proposes that observations will be made at Malta, Aden and Port Stanley (Falkland Islands) by aircraft of the meteorological research flight, and also aboard the British ocean weather ships. It is believed that it will be possible to make satisfactory measurements on these ships of the total radiation on a horizontal surface provided that the reading is taken when the ship is within 5° of the vertical.

Other recommendations concern the determination of the earth's albedo (the proportion of the sun's radiation that is reflected back to space) at astronomical observatories by measuring the earth radiation reflected by the moon; the measurement of atmospheric ozone in specified areas; observation of upper winds by nephoscope in areas where upper-wind measurements are scarce; and accurate observations of cloud and cloud amount especially at sea. Arising from this last item it is intended to make cloud measurements as accurately as possible at ocean weather stations and it is hoped that merchant ships will also achieve a high standard in this respect.

Consideration has been given to the possibility of improving the network of observations from merchant ships during the I.G.Y. in those oceanic areas which are sparsely frequented. The scientific value of the observations which will be obtained from the network of stations on the Antarctic continent and on many islands in that area will be seriously reduced unless observations can be obtained from the little frequented region to the northward, especially between 35° and 55°S. Similarly it is important that observations be obtained from every possible ship in the central portions of the South Atlantic, Pacific and Indian Oceans and in the North Atlantic north of 60°N. It is hoped that it will be possible for Port Meteorological Officers of all maritime countries to visit all ships sailing from their ports into these unfrequented seas with a view to obtaining the co-operation of their masters and officers in making observations in some way while they are in the areas concerned.

The World Meteorological Organisation is making arrangements to ensure that all I.G.Y. meteorological data become readily available to all in a standard form, and for this purpose is to establish an I.G.Y. Meteorological Data Centre. There will be four standard forms, one for surface synoptic observations from land stations, one for similar reports from ships and the other two for upper-air observations. Observers aboard ship will record their observations in their meteorological logbooks as usual, and they will be copied on to the I.G.Y. forms at the Meteorological Office. Meteorological services will send their main I.G.Y. observations to the Data Centre on these forms, which will then be catalogued and reproduced on micro-opaque cards. The marine observations will include those of all ships which normally supply weather reports, so that in the case of the British Meteorological Office, which receives reports from nearly 28 per cent of the total voluntary observing ships in the world, the task will be a considerable one.

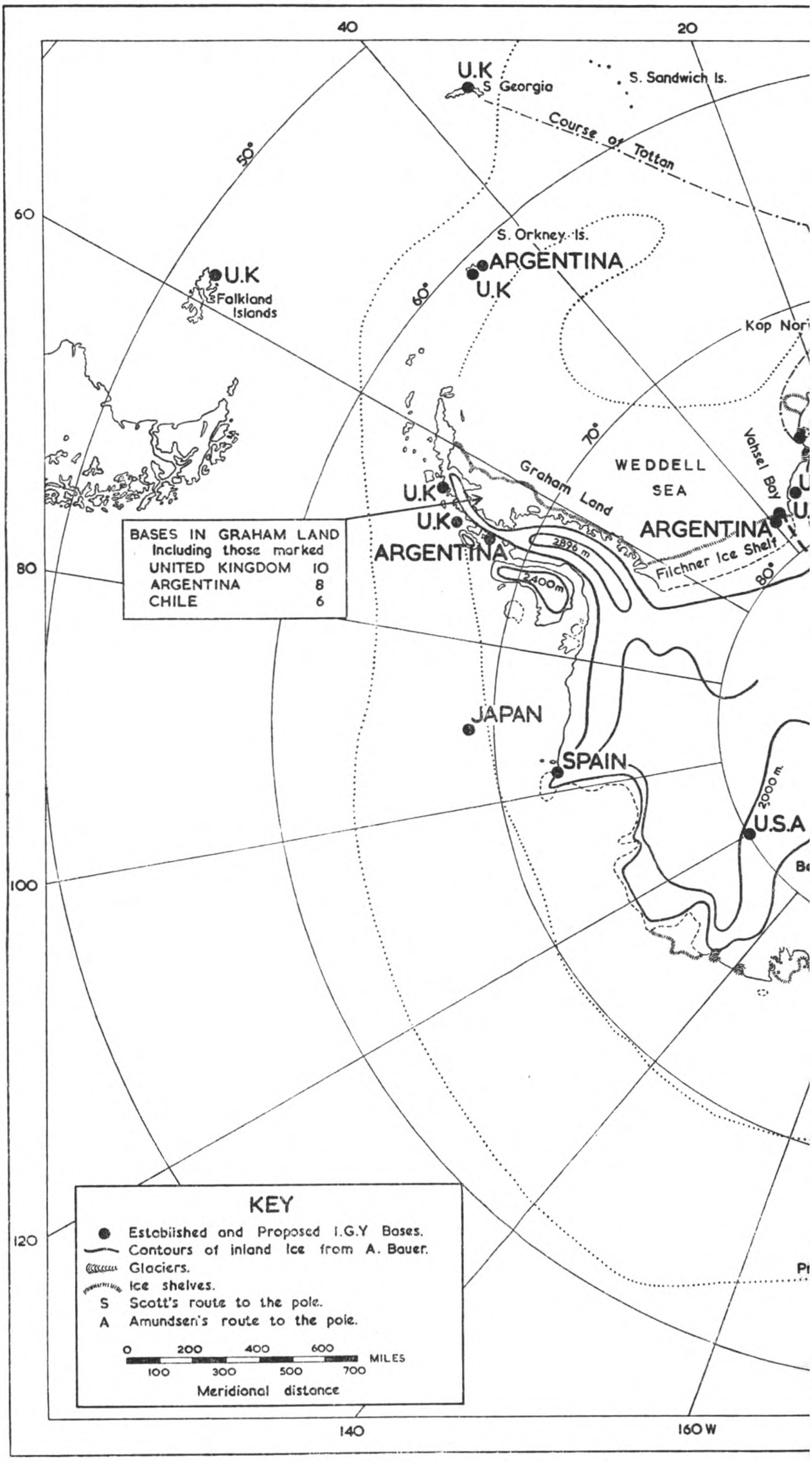
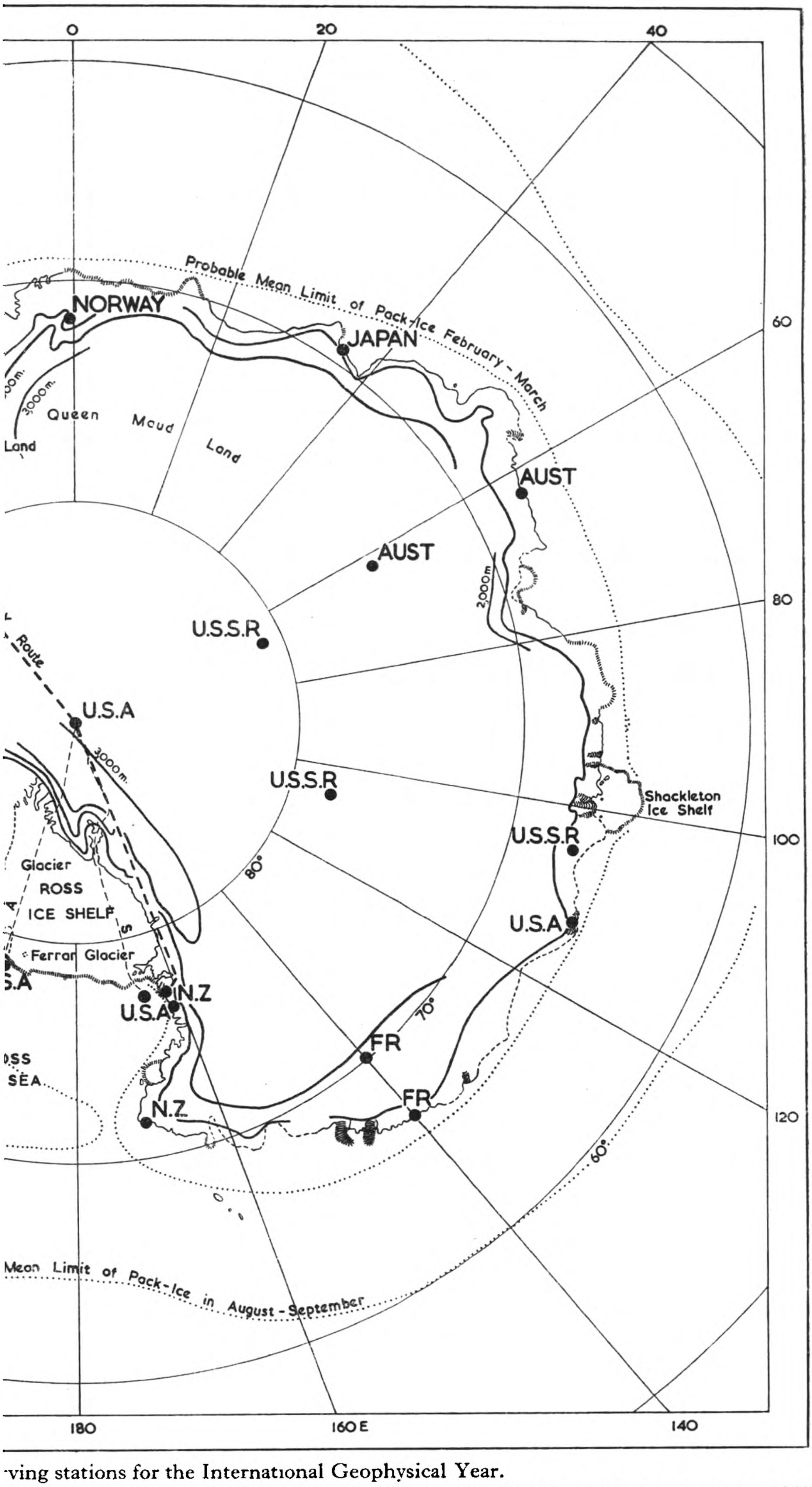


Chart of the Antarctic region, showing meteorologica



-ving stations for the International Geophysical Year.

Based on maps in *Discovery* (April 1956) and *Weather* (September 1956)

Notes on some other programmes of the International Geophysical Year

IONOSPHERIC OBSERVATIONS. Those concerned with the use of long-distance navigational aids for ships or aircraft will be aware of the practical importance of the reflecting layers of the ionosphere. Radio engineers can predict for a given layer the maximum usable frequency for satisfactory reception, because this depends on the concentration of electrons, which varies through the sunspot cycle but is affected also by ionospheric drift and by the occurrence of solar flares. These predictions are not considered sufficiently accurate, however, and a widespread programme of ionospheric observations will be operated during the I.G.Y. in order to obtain more data for the study of the causes of radio fade-outs, etc.

GEOMAGNETISM. Here the chief problems for study are those relating to magnetic storms, which are known to have their origin in events on the sun. Slow variations in the earth's magnetic field also occur, however, due to changes of some kind in the earth itself, and it is important in the interests of accurate navigation both at sea and in the air that a world-wide survey of the earth's magnetic field should be made about every 25 years.

OCEANOGRAPHY. The main items for study are the water circulation of the oceans and short and long-period changes of sea level throughout the world. It is hoped to obtain a better understanding of the sea-to-air energy exchange, the recent warming of the Arctic and its effects on the fishing industry and the unexpected changes in sea level which may cause coastal flooding. The ocean weather ships will collaborate in making oceanographic observations.

GLACIOLOGY. Among the problems to be considered are the characteristics and behaviour of glaciers, variations in which provide evidence of climatic trend, and estimation of the total volume of glacial ice, which should yield more accurate information on rates of change of sea level and indicate whether the present rate of rise, if continued, is likely to cause serious problems in certain areas.

SPECIAL ANTARCTIC WORK. To complete this account of the preparations for the I.G.Y. some reference must be made to the special effort being made in the Antarctic. Apart from the permanent bases already set up in the Falkland Islands Dependencies and elsewhere, special stations are to be set up in Antarctica by at least 10 different countries. The United Kingdom contribution includes the Royal Society Expedition to Coats Land, which will make observations contributing to most of the I.G.Y. programmes and will include routine upper-air soundings, radiation measurements and auroral, geomagnetic and ionospheric observations. The advance party has started a limited programme and will be joined by the main party early in 1957. The Commonwealth Trans-Antarctic Expedition is also expected to make a valuable contribution and its advance party will carry out surface observations at their main base in the Weddell Sea area until 1957.

OBSERVATIONS IN THE HIGH ATMOSPHERE. The United States plans to launch about 36 large rockets and a considerable number of smaller ones to explore the upper atmosphere during the I.G.Y. It is expected to obtain information on outer atmospheric densities, accurate measurements of the earth's equatorial radius and oblateness and of intercontinental distances, observations of solar ultraviolet radiation and measurements of the intensities of cosmic and other radiations reaching the outer atmosphere. Smaller rocket programmes are being planned by France and the United Kingdom. Reference must also be made to the plans of the United States and of the U.S.S.R. to launch small satellites. These are expected to circle the globe at a height of some 300 miles and automatically transmit information back to the earth.

REFERENCES

1 ABSALOM, H. W. L. International Geophysical Year. *Met. Mag.*, London, **85**, pp. 33-38 (1956).

2 M.O. Discussion. International Geophysical Year. Opener, R. F. M. Hay. *Met. Mag.*, London, **85**, pp. 142-149 (1956).

[3] VAN MIEGHEM, J. International Geophysical Year, 1957-58. Part I, *W.M.O. Bulletin*, **4**, pp. 6-9; Part II, *W.M.O. Bulletin*, **4**, pp. 52-59 (1955).

Voyage of Trans-Antarctic Expedition's Advance Party To the Antarctic

By V. E. FUCHS, M.A., PH.D.
(Leader of the Trans-Antarctic Expedition)

On 15th November, 1955, the advance party of the Trans-Antarctic Expedition sailed on board the M.V. *Theron* from London via St. Vincent, Montevideo and South Georgia to the Weddell Sea. Her task was to penetrate as far south as possible and to establish an advance party of eight men ashore who would be responsible for the building of the base and later for reconnaissance of the early stages of the inland route for the continental crossing.

After leaving South Georgia on 20th December, the ship entered the pack-ice on the 23rd and made some 300 miles progress in the first two days. A change of wind then altered the situation by closing all the leads of open water. For the next month a continual battle was waged with the ice. For many days all hands were digging away the snow and ice which was built up from time to time against the hull by pressure, and frequently explosives were used to crack floes 12 feet or 15 feet thick, or to ease the ship off ice on which she had become jammed.

Final release was obtained when the expedition's Auster aircraft was able to fly from a pool of enclosed water and reconnoitre the ice conditions for some 75 miles to the north. This flight showed that there was an area of more broken pack-ice to the north-west of the ship's position and it was by this route that we finally escaped to the open sea.

About the same time H.M.S. *Protector* was approaching the northern edge of the pack-ice with the object of making helicopter reconnaissance flights to discover a suitable escape route for the *Theron*. One of the helicopters, in fact, made contact with the ship when she was still 50 miles inside the pack-ice.

That evening we joined *Protector* in the open sea and, after entertainment on board, set a course east-north-eastward along the pack-ice edge. Next day the *Theron* once more entered the pack and shortly afterwards reached the ice cliffs of the Antarctic mainland. Turning south a fast passage was made to Halley Bay (lat. 75° 30's., 26° 36'w.) where the Royal Society Expedition base is situated. While at Halley Bay, a number of inland reconnaissance flights were made, after which the course was continued southward past the Dawson-Lambton Glacier and Cape Vahsel, where much heavier sea-ice was again encountered, to Vahsel Bay at the very head of the Weddell Sea.

After air reconnaissance an unloading point and base site (lat. 77° 59's., 37° 10'w.), on the Filchner Ice-shelf, were selected on 30th January, 1956. In spite of a storm which drove the ship from her moorings for 24 hours and left five men stranded ashore, the unloading of some 350 tons of stores was completed by 6th February. At the same time numerous flights were made over the surrounding terrain and a range of mountains was discovered about 100 miles south-east of the base. These mountains were observed to extend over a distance of about 100 miles in a general north-east to south-west direction but their full extent was not observed.

On 7th February, owing to the freezing of the open water (air temperature −3°F), it was decided that the ship should leave, although this was ten days earlier than had been intended.

The eight men left under the command of K. V. Blaiklock have since been building the main base hut and making reconnaissance journeys in preparation for the arrival of the main party, on board the M.V. *Magga Dan* in January, 1957.

Voyage of Royal Society's Advance Party to the Antarctic

By D. W. S. LIMBERT

(Mr. Limbert, formerly in the Marine Division of the Meteorological Office, is the meteorologist with the Royal Society's advance party)

On 22nd November, 1955, M.V. *Tottan*, a Norwegian sealing vessel of 540 tons gross, set sail from Southampton carrying the advance party of the Royal Society's Antarctic Expedition for the International Geophysical Year. Five weeks later, on 29th December, the first ice was encountered on the fringe of the Weddell Sea in lat. 62°s., long. 28°w. Between the two dates the 10 members of the party, led by Surgeon Lt.-Commander Dalgliesh, R.N., had visited Las Palmas, Rio de Janeiro and the whaling stations at South Georgia. On entering the Weddell Sea, however, they were about to encounter conditions known only to whalers—mainly during the 1920s and 1930s—and to the various expeditions to that region.

The main task of the expedition was to establish a scientific base for the International Geophysical Year commencing in 1957. The site of the base was to be as near to Vahsel Bay (78°s., 35°w.) as possible, and in any case not further north than 75°s. (see map on pages 24 to 25). The Weddell Sea is bounded in the west by the Graham Land peninsula and in the east by the coast of the main Antarctic land mass, about which little is known other than the information brought back by Shackleton in 1916 after his ship, *Endurance*, had been crushed in the ice and sunk; by Filchner in the *Deutschland* in 1912; and by the British-Norwegian-Swedish expedition at Maudheim (71° 03′s., 10° 56′w.) between the years 1949 and 1952. In 1955 the Argentine Government established a meteorological station at General Belgrano, 50 miles west of Vahsel Bay, and recharted part of the coastline south of 75°s. in their ice-breaker, *General San Martin*.

The ice of the Weddell Sea has gained notoriety by the sinking of the *Endurance*, and the old pack-ice, much hummocked with many signs of pressure ridging, is often 10 feet or more thick and not to be treated lightly. The currents follow the coast in a clockwise manner and result in a long tongue of ice streaming out of the sea in an east-north-easterly direction into the South Atlantic ocean, whilst a comparatively warm tongue of water penetrates down the coast (or ice edge) of Coats Land. Thus any ship caught in the ice south of 65°s. will tend to drift towards the centre of the Weddell Sea in a south-westerly direction, and finds herself in a position that is potentially extremely dangerous—a greater possibility of pressure-ice and fewer ice leads. To minimise difficulties the safest and most feasible course into the Weddell Sea is, from South Georgia, south-eastward past the South Sandwich Islands towards Kap Norwegia. This is exactly the track followed by the master of the *Tottan*, Captain Leif Jakobsen. Any temptation to enter the heavy Weddell pack-ice towards the south via a promising lead was resisted, and on several occasions the heading was altered towards the east to avoid such pack-ice.

For two days the ship dodged, rammed or nudged its way south-eastward through the winter sea-ice of 1955 (between 2 and 6 feet thick) until late on 31st December at about 68½°s., 14½°w. she entered open water with very little drifting ice. From then on, apart for temporary checks, it was open water all the way to 76°s. During the passage through the ice there was always one of the officers in the crow's nest directing the course and speed by telephone to the bridge; this method of navigation proved most effective and meant that the speed of the ship was never reduced unnecessarily nor time lost by following a false lead, at least not until the ship entered the old hard Weddell pack-ice south of 76°s. where a spotter aircraft would have been the answer to many of the navigational problems. In general the rule was to head towards the dark " water sky " and to avoid going in the direction of bright " ice blink ". These two phenomena caused by the different reflecting surfaces show up astonishingly well when there is an overcast sky, and are of great help to navigators.

The two-hourly spells in the crow's nest were not envied by any of the members of the expedition, though the 2nd Mate's golden yellow seal-skin suit was a source of much admiration.

It was on 3rd January, 1956, that the really heavy Weddell pack-ice was encountered. For three days the ship had been following a coastal lead but the fast-ice ahead and the shallow waters forced the ship to enter deeper into the pack-ice. The ice here was in some cases over 20 feet thick with an abundance of leads. Around noon, however, the captain stopped the ship for an hour or two in a small pool because the ice was becoming closer and heavier. He had no intention of being caught in the ice and to wait to see what happened to the ice leads was advisable. The worst fears were realised as the reversal of the very light wind from south-east to north-west was enough to start closing the leads, and the three carefree hours spent hunting seal while we waited nearly resulted in a trapped *Tottan*. Three times the vessel got stuck as we retraced our track, to be freed only by the arduous and hand-blistering task of chopping and poling ice away from the ship's side aft. All pretence of cautious easing through ice was abandoned and the ship was kept at "full ahead". It was an uncomfortable night for the expedition members allegedly sleeping in the forecastle.

Thwarted in our efforts to reach Vahsel Bay, a landing site was sought elsewhere. Two promising landings in narrow ice creeks were found but the interior was part of the much crevassed Dawson-Lambton Glacier and as such unsuitable for our purpose and safety. Another attempt to reach Vahsel Bay was made on 5th January, but once more ice conditions were unsuitable with unbroken sea-ice ahead. Bearing in mind that the scientific station has to be relieved each year for three years, the only thing to do was to head north.

On the morning of 6th January the *Tottan* made fast alongside snow-covered bay-ice protruding about 2–3 feet above the water-line. The bay-ice was enclosed by a semicircle of ice walls 50–100 feet high that was breached in the south-east by a gentle snow-ice slope leading on to the main plateau. This was selected as the site of the scientific base 75° 31′S., 26° 36′W.

Throughout the whole voyage the meteorologist of the party, whenever possible, kept a log of the weather, and in the Weddell Sea once or twice attempted a weather analysis of the synoptic reports of the Falkland Islands and Dependencies. In addition, a detailed log of ice conditions was kept in chart form, which in some cases necessitated a little map-making and readjustment of the coastline! The details have still to be checked, but it is worth noting that the 1st Mate had a terrible shock when one of his sun fixes placed the *Tottan* about 10 miles inland!* It would appear that quite a large part of the ice front in the region of Coats Land has vanished over the last few years. As evidence of the break-up of this part of the "coast" one could see numerous large tabular bergs, many of which were grounded. They may or may not be the remains of the Stancomb-Wills Promontory which the Argentines reported missing early in 1955 and which was confirmed by the *Tottan* this year. In the neighbourhood where this ice promontory had stood, soundings of approximately 30 fathoms were recorded. On another occasion, when cruising off the Dawson-Lambton Glacier, depths of only 6 fathoms were found.

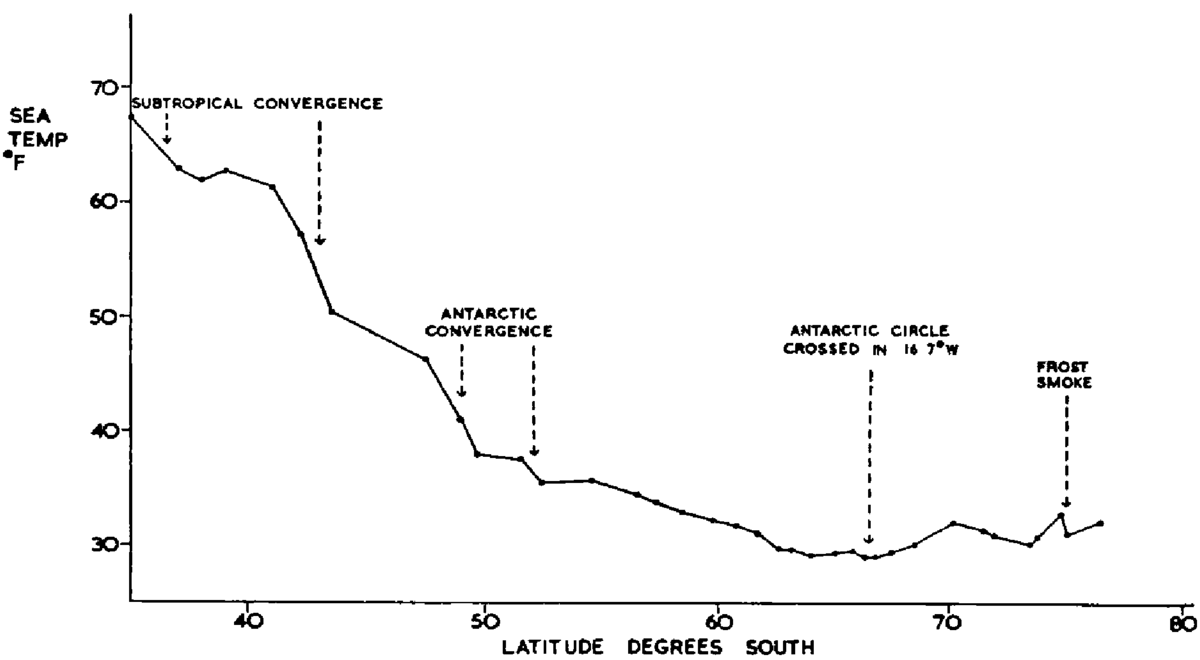
From the sea temperature and ice records it would appear that there is a rough correlation between the pack-ice coverage and the sea temperatures. Indications are that at 31°F there may be a few bergy bits, growlers, or a solitary berg, but on the whole nothing to hinder careful navigation. At 30°F the pack-ice coverage varied between 2/10 and 6/10 but was usually about 3/10. At 29·5°F the coverage was between 5/10 and 7/10, often with much thicker and heavier ice. Below 29°F close pack-ice of 8/10 to 9/10 coverage was encountered. No temperatures of

**Note.* This may have been due to abnormal refraction. Captain Cook once found the horizon leapt up by nearly a whole degree while he was observing.

28°F were recorded but it is generally accepted that at such a temperature the sea is completely frozen. In one sheltered bay frazil crystals were forming at a temperature of 29·9°F.

Frost smoke was experienced once, on the night of 2nd–3rd January. For some time low stratus had been seen spreading from the south. The base was lowering rapidly and between 2300 G.M.T. and 0000 G.M.T. on the 3rd the air temperature fell from 29·8°F to 27·5°F. Ten minutes later the ship was in freezing fog with a temperature of 24°F at bridge level. The sea temperature was 31°F having dropped 2° from 33°F at 2300 G.M.T. This latter temperature was checked several times and is in the belief of the writer quite exceptional for these waters. At the deck rail, 9 feet above the water-line, the air temperature was 25°F. This gave a lapse rate of approximately $\frac{3}{8}$°F per foot. Hard rime was deposited on the ship's rigging and structure but was not enough to cause inconvenience.

Throughout the voyage from England to the Antarctic the sea temperatures were always of interest, though the meteorologist and his canvas bucket were a constant source of amusement and derision. After 35°S. there was a sharp drop in the sea temperatures from 67·5°F to 62°F and later from 61°F to 50°F at lat. 44°S. These drops are due to the subtropical convergence. Between 48·5°S. and 52°S. there were more sharp temperature declines, from 46°F to 38°F and from 37·5°F to 35·5°F. They are shown in the accompanying graph.



Variation of sea temperature with latitude.

The meteorologist found that reading the barometer required great patience and a certain amount of reiteration when the ship was pitching or rolling badly. The roll was sometimes as much as 30° either way, but it says much for the seaworthiness of the *Tottan* that little sea was shipped. Wave observations were always a headache, especially the period of following seas.

Marine life played a great part in relieving boredom in the tropics, and until we reached South Georgia where the expedition members really felt that the real work was due to begin. A school of porpoise was a most welcome diversion during these tropical days, and fascinating to watch as they cavorted beneath the bow. Although the track of the ship was through recognised whaling grounds the number of whales seen were very few until the later days in the Weddell Sea, when both killer and small fin whales surfaced close to the *Tottan*. This scarcity was surprising because twice the ship passed through large areas of whale food—plankton at 42°S. and krill at 60°S. Isolated penguins were seen but the bay in which the *Tottan* anchored, together with the next bay, was crowded with young Emperor penguins, still wearing their grey coats. Preliminary estimates make this rookery the largest in the world, only five others being known. The number of birds here has been put as high as 5,000.

The scarcity of whales was confirmed by the whalers at South Georgia, who now have to hunt farther and longer than before. The primary reason for the poor season has been the weather; a succession of depressions have crossed the whaling grounds on a more northerly track than usual. The forecaster at Grytviken, South Georgia, explains this as the result of the prolonged life of an anticyclone on or near Graham Land and in the west Weddell Sea. If so, this is unusual because the Weddell Sea is generally assumed to be an area of comparative low pressure into which many of the South American and Graham Land depressions are absorbed, thus leaving an anticyclonic influence over the middle fifties.

These are but a few random jottings from a voyage full of interest and a splendid prelude to the main task of establishing a scientific base in the Antarctic. This year there are only three scientists, the major task being constructional. Major Watson, a radio expert, will measure atmospheric noise. Dr. Stanley Evans will photograph the aurora australis using an all-sky camera, and will also measure the ozone content of the upper atmosphere using a Dobson spectrophotometer. The writer, as meteorologist, will prepare a way for a much more comprehensive programme in 1957, and at the same time share part of the glaciological programme with Major Watson. The leader of the party, besides being the base doctor, will undoubtedly be engaged in the observation of Emperor penguins.

Since we arrived at our destination the temperature has been up to 37°F, and with the clear skies and calm weather the heat has been almost unbearable—not at all polar!

Note. Later messages received from Mr. Limbert give the following data for the base:

	Feb.	Mar.	Apr.	May	June	July	Aug.
Mean (°F)	+14	+0.5	−4	—	—	—	—
Maximum (°F)	+27	+18	+20	+4	+16	+23	+6
Minimum (°F)	−12	−32	−37	−57	−51	−44	−59
Wind:							
Maximum Beaufort Force	—	—	9	6/7	10/11	8/9	9/10

The sea-ice which formed in late March broke up later and then re-formed.

Ice in the Weddell Sea

By J. M. WORDIE, C.B.E.

(Mr. Wordie, who is Master of St. John's College, Cambridge, has taken part in ten polar expeditions and is a recognised authority on sea-ice.)

The decision to establish a British base on Coats Land, or at the head of the Weddell Sea itself, for the period of the International Geophysical Year, involved discussions not only on the possibility of there being a suitable base site, but more particularly on the ease or otherwise of approaching that region on account of the pack-ice for which the Weddell Sea was once so notorious. There was still some doubt in certain quarters and no complete agreement that Coats Land was not in reality difficult of approach, and a decision on whether to put down a base or not was not reached till August 1955, after lengthy discussions had taken place.

As regards the base site, this had to be left to be decided when the region was actually visited. It was known, however, that Shackleton in the *Endurance* had reported that he had seen a landing place at what he called Glacier Bay on the coast between 75° and 76°s. latitude.

Entry to the Weddell Sea and approach to the coast has in fact proved to be a case of " Give a dog an ill name and you may as well hang him ".

The experiences of Dr. Bruce's expedition in the *Scotia* in 1903 and in 1904 were not encouraging but it has to be remembered that she was a low-powered ship and that her ice navigation does not make a fair standard for comparison. The voyages of the *Deutschland* in 1911 and of the *Endurance* in 1914 did not give the appearance of any regular and dependable route into the coastal ice cliffs. Such was the impression immediately after the return of Shackleton's expedition in the *Endurance*.

Soon, however, ideas began to change. Comparisons were being made between the Antarctic ice and the Arctic pack. These in the end had completely swung over opinion some years ago about the Coats Land pack-ice. The change began in the middle twenties when there were proposals for an expedition to this part of the Antarctic with the idea of crossing the continent. These trans-continental ambitions were revived again in 1932 when H. G. Watkins, after his return from his successful Greenland expedition, put forward plans to cross the Antarctic. On both these occasions the problem of the Coats Land pack-ice was studied and the conclusion reached that the " ice tongue " would be passed through without undue difficulty.

The tongue of pack-ice across the mouth of the Sea has been known for some considerable time. On Shackleton's *Endurance* expedition it was easily penetrated, much more so in fact than would have been the case had Shackleton attempted to cross the great belt of pack-ice off north-east Greenland. It has to be borne in mind also that Shackleton's *Endurance*, like the *Scotia*, was not a highly powered ship and could not compare in this respect with modern Arctic sealers, which can break through ice of great thickness.

The second, and more important, question was not, however, whether the ice tongue across the mouth of the Sea could be penetrated but whether the open water along the coastal ice cliffs, found in January 1915, would be found on other occasions as well.

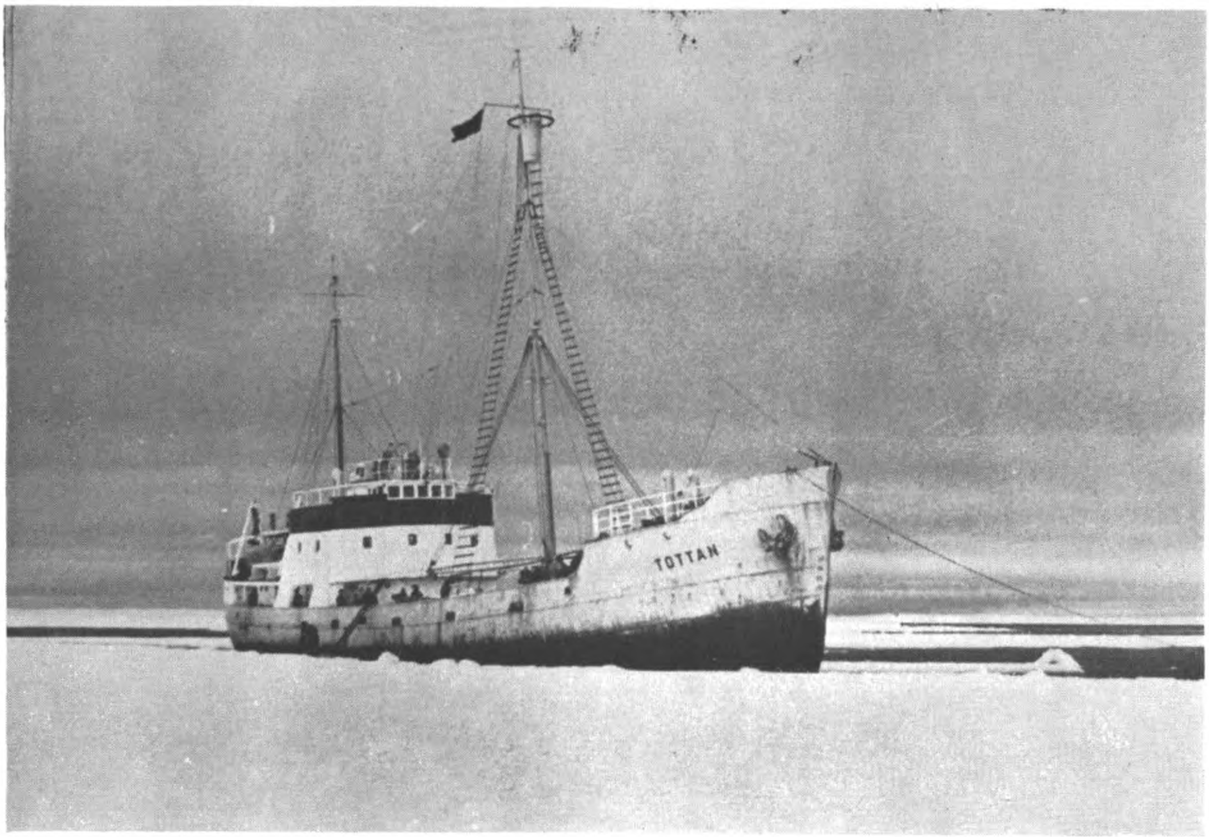
Probably the deciding factor was the flights made by the Swedish airman, Von Essen, in December 1951 and January 1952. Von Essen reported that he saw a great open-water area, as far as the eye could see, off the west coast of Coats Land. The view was finally taken by those responsible that the sea could be entered along this open-water stretch. Von Essen's reports therefore were of very great importance as regards the second question. Those who talked with him were convinced that open coastal water of wide extent, as in Shackleton's day, was a regular feature.

This forecast of an open coastal channel was also held by Dr. H. U. Sverdrup, the head of the Norwegian Polar Institute, who was not only intimately acquainted with the powers of Norwegian sealers in pack-ice in general, but also had himself visited the Antarctic at Queen Maud Land immediately east of Coats Land.

The experiences in January 1956 have borne out that forecast. The voyage of the *Tottan* in January is shown diagrammatically on page 24. She met the pack about 64°s. and was through it in 68°s. As the season advances the tongue of pack-ice shrinks. This was the conclusion formulated in *Discovery Reports*, Vol. 19, Cambridge, 1940, pp. 285 *sqq*. There is little doubt that conditions between South Georgia and Coats Land have been well known for many years to whalers; and my own recollection is that when Shackleton went south from South Georgia in December 1914 he was following a route recommended by the whalers of that date.

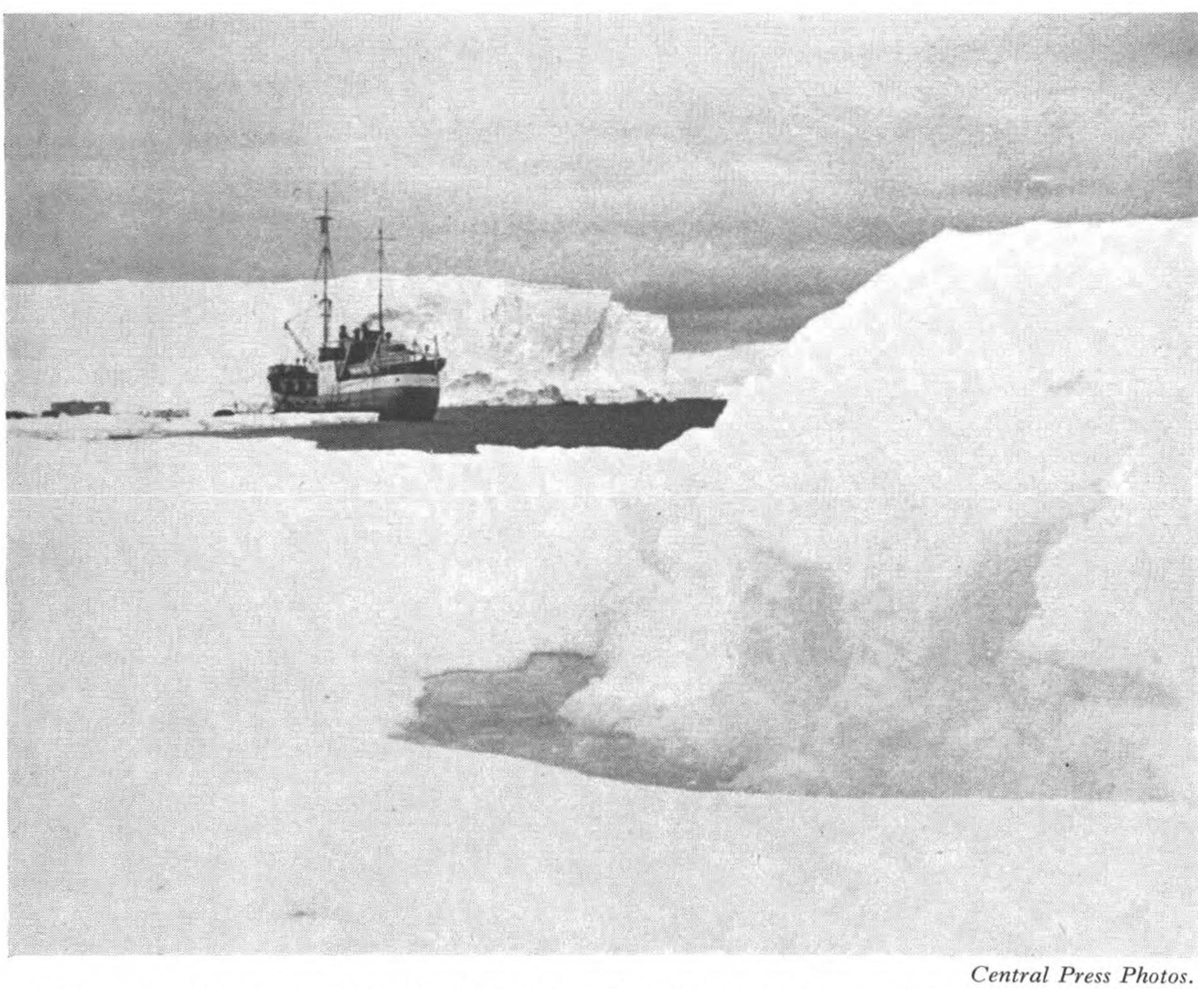
As regards the base site, it was hoped that this might have been at the innermost part of the Weddell Sea, but failing that it was to be placed on the ice shelf on Coats Land, south of 75°. After more than one reconnaissance landing the place finally selected for the Royal Society base was at 75° 31′s., 26° 36′w. It has since been named Halley Bay. At the ice-shelf itself, on which the base is situated, a feature that seems to point to constancy year after year is the existence of Emperor penguin rookeries not only at Halley Bay but also at at least one bay further south.

(Opposite page 32)



Central Press Photos.

Tottan, before leaving the base on her homeward journey.



Central Press Photos.

The sealer *Tottan*, in which the Royal Society's Advance Party sailed to the Antarctic, unloading stores at Coats Land.

Keystone

Presentation of barographs on board H.Q.S. *Wellington* on 16th September, 1956. Left to right, Sir Graham Sutton, Director of the Meteorological Office, Captain L. W. Fulcher and Captain F. Lougheed (New Zealand Shipping Co.), Captain D. M. MacLean (Cunard Line) and Captain P. H. Potter (Bibby Line).

Central Press Photos.

Members of the Royal Society's expedition at work on the 130 ft hut in which they will live during their time in the Antarctic.

These rookeries must be a regular feature in order to satisfy the peculiar nesting habits of these birds, which involve the parents in regular movement from place to place year after year. The rookeries would cease to exist if the local conditions altered appreciably. This, however, was a matter which only became known after the visits in January 1956.

The question which still awaits solution at Halley Bay is the depth of the ice-shelf on which the base is placed and the distance down before solid rock is reached. At present this is quite unknown, but it is hoped that an answer will be obtained this coming season and that it will be satisfactory as far as the security of the base site is concerned.

Another question to which a partial answer will be found this coming season is the approximate date each year on which the ice tongue becomes penetrable, and also the date on which open water can be expected on the southern side of the tongue. The general impression is that the tongue can be penetrated from about the beginning of December each year, but this question will not be fully answered until more voyages have been made. It may turn out to be as important as the belief that open coastal water is a constant yearly feature.

Oceanography in the International Geophysical Year

By G. E. R. Deacon, C.B.E., F.R.S.
(National Institute of Oceanography)

Although the initiative for the International Geophysical Year came from scientists who are primarily interested in meteorology, geo-magnetism, geo-electricity and ionospheric physics, and from a wider circle interested in Antarctic exploration, it soon became evident that the programme would not be complete without simultaneous measurements and studies of the oceans. Interaction between the sea and the atmosphere plays a major part in atmospheric as well as oceanic circulation, so that the physics of the air and oceans and their general circulations have much in common. There is also evidence that there are sea-level disturbances coupled with barometric and magnetic phenomena in the atmosphere, and the background of electric current fields in the oceans, now used to study water movement, depends on events in the upper atmosphere. The main plans are to obtain an understanding of sea-level changes of both long and short periods and their relationships to other phenomena in the ocean and atmosphere, and to learn more about the water movements in the oceans, both at great depths and near the surface.

Mean sea level

The study of changes in mean sea level is important to engineers and scientists if only because of the need to know more about changes in susceptibility of coastal areas to flooding, and to gain more precise understanding of water exchanges between land, sea and air. Although the rise of sea-level is usually small, the cost of raising protective works is so great that the engineering problem has serious implications. More knowledge of the world-wide circulation of water between oceans, atmosphere and continents has an important bearing on many aspects of oceanography, meteorology and hydrology. Slow changes in the height of land relative to the sea are generally attributed to subsidence or emergence of the land, but the sea itself may change, melting of the polar ice-caps being one much discussed possibility. The common use of mean sea level as a datum is a further reason for closer investigation of its variations.

Changes in the seasonal and annual balances of rainfall, evaporation, temperature, ice-melting, freezing and snow cover, winds, atmospheric pressure, and ocean currents must each be considered as a possible cause of sea-level changes, and there is also some seasonal and annual variation due to the long-period tidal components. Recent studies by United States scientists have shown that the seasonal changes in most parts of the world are about what would be expected from the seasonal changes in volume of the water, due to the seasonal variations in its temperature and salinity, but there are larger changes in monsoon regions. The annual range of mean monthly values varies from a few centimetres at some island stations in the tropics to as much as 165 cm in the Bay of Bengal. Very little is known about changes in mean sea level in the Antarctic ocean. Averaging all the available data, the level of the surface of the oceans, taking northern and southern hemispheres together, is 3 cm lower in the northern spring than in the northern autumn. Studies of climate and weather require the confirmation of this figure and estimates of the balance between snow, ice, water and water vapour. Dr. Munk, who has been very active in accounting for the prevailing ocean currents in terms of the prevailing winds, had emphasised that much of the empirical guidance we shall need, to understand significant departures from the mean circulation of water in the oceans, will have to come from observations of seasonal variations in sea level.

The annual variations are another story. Measurements at den Helder from 1832 to 1912 showed fluctuations which once or twice amounted to 0·45 feet, with a gradual trend of about 0·5 feet in 80 years. In the south of England the rise of sea level is believed to be somewhat greater, and on part of the coast of Scotland, between Dundee and Aberdeen, there seems to be no change. The year to year fluctuations, like the seasonal fluctuations, probably depend on varying balances between the meteorological and climatic influences, but the long trends may be due as much to subsidence and rising of the land, due to changes in the earth's crust, as to changes in the volume of the water.

The sea-level observations that will be made during the I.G.Y. have a bearing on these problems. Tide gauges will be installed in 60 or more new stations in addition to ports at which regular recordings are made. Many of the new measurements will be made on oceanic islands and in regions where information is most needed for the theoretical and practical study of tides as well as changes in mean sea level. Monthly means of sea level will be computed from measurements of hourly heights over each month with allowance for incomplete tidal periods. The mean values will be printed and circulated to potential users as soon as possible.

Long waves

There are many kinds of surface oscillations in the oceans longer than ordinary waves and shorter than the main tidal periods. On an ocean coast pounded by surf from distant storms it will generally be found that the water from the breaking waves runs farther up the beach every two and a half minutes or so. This periodic movement is probably related with what W. H. Munk has aptly called " surf beats ", oscillations of two to five minutes period associated with groups of high and low waves in the incoming swell. M. J. Tucker, using a wave recorder installed 1,000 yards from the coast of Cornwall, found a good correlation between the long waves and groups of high waves which had passed the recorder four to five minutes earlier, this being the time required for the group of high waves to travel from the recorder to the beach plus that required for the long wave to travel out from the beach to the recorder. He has shown that they are particularly noticeable when ocean swell is reaching the coast from a distant wind area, the rhythmic succession of groups of high and low waves being a feature of such swell. The surf beats may be a contributory cause of resonance effects known as " range action " in certain harbours. The energy may also come from partial deflections of a tidal stream, or the natural oscillations in coastal areas associated with onshore and offshore movements caused by the wind, and it may be derived from long waves generated by winds and pressure disturbances near the coast or at a distance.

We know little about the propagation of long waves in deep water. Observations at Bermuda, a relatively small island in deep water, indicate that the elevation of the sea surface during the passage of a hurricane is due primarily to the reduced atmospheric pressure, the water level rising by an amount which corresponds to the reduction in air pressure, but Japanese scientists, studying coastal oscillations in relation to cyclonic storms sweeping down the Pacific coast of Japan, are convinced that there is some mechanism which produces long waves propagated radially from the centre of disturbance. In shallow water and where the sea room is restricted by coasts, the wind effects can be greater than the simple water barometer effect and there are more striking changes in water level. The disturbances range from minor surges in which the water flows and ebbs several feet in as many minutes, to the great storm surges which raise the water level many feet above the predicted tidal level for several hours and cause catastrophic flooding in coastal areas.

The depth of water and rate of travel of the meteorological disturbance are important since the depth of water determines the rate of travel of a long wave and more energy is communicated to the wave if the area of strong wind or barometric gradient moves along with the wave at this critical speed: in a mean depth of 50 fathoms the storm must move at 60 knots and in 25 fathoms at 42 knots. Minor surges sufficient to cause some confusion and damage among the small craft lying in or near the beach can be caused by very small changes in wind or atmospheric pressure if these happen to travel at just the right speed. There are often local names for such surges; for example, " boar " at Plymouth, " run " or " sitch " in the River Yealm and the dangerous " sea bear " on the Baltic coast of Germany. When a storm approaches a coast there will always be some depth or bottom slope where the conditions for resonance occur, and the growth of the wave depends on how long the synchronism lasts. Coasts fronted with a wide shelf or lagoon whose depth causes resonance with the usual rate of travel of storms across the area are particularly susceptible.

The giant surges which cause most of the coastal flooding have peaks which look like the tides themselves, the major part of the rise in level usually lasting two or three hours. Others, less intense, may cause a rise in the height of several successive tides. They occur in shallow shelf seas and can usually be shown to be due to surges from the open ocean intensified by the effect of winds and atmospheric pressure gradients over the shallow water. Experience and theoretical studies have shown that fortunately they are less likely to occur at high water than at lower states of the tide. Storm surges are now the subject of intensive study in many countries, and the researches being undertaken involve comprehensive study of the generation and propagation of all forms of long-wave activity and meteorological disturbances of the tides. The theoretical work is difficult because of the complex interaction between the forces at the surface and the bottom and the effect of the earth's rotation.

Although much of the interest to-day lies in the effects of meteorological disturbances, countries such as Japan and some Pacific islands are equally threatened by waves resulting from seismic disturbances of the sea bed. These seismic surges are frequently called " tsunamis ", the Japanese name for a tidal wave. They may be scarcely noticeable in deep water, but as they slow down in shallow water approaching a coast they gain considerably in height and do much damage. The first sign of their approach is an unusual lowering of water level, and this is followed by a rush of water sufficient to carry boats and debris far inland.

During the I.G.Y. continuous records will be made at 30 or more stations based on islands in the Atlantic and Pacific oceans and at suitable positions round the continental margins. It is not likely that every day's record will be examined in detail, but to secure a representative network of measurement of waves from the most informative meteorological and seismic disturbances the instruments must be kept in continuous operation. So far as we know the long waves are capable of travelling great distances without much attenuation, and the study of their generation and propagation should prove a very rewarding subject for international collaboration.

Water circulation in the oceans

The transition from collection and observation to measurement and correlation in both biological and physical oceanography has exposed a remarkable lack of understanding of all water movements in the oceans. Thanks to the painstaking work of marine observers, especially during the past 100 years, we have good charts of the monthly average surface current in all parts of the ocean regularly traversed by ships, but know little about the day-to-day changes. Much theoretical and experimental work must be done, as well as survey, before we can relate the growth and changes in a current to the onset and variations of wind, or use the vast wealth of meteorological data to explain and possibly predict seasonal and other changes. Our knowledge and understanding of the deep-water movements is still less, though we know they must influence the surface currents, and the large amounts of heat and nutrient salts which they transport must have an important effect on the physics and biology of the ocean. We cannot tell a navigator how much the special wind conditions he finds will modify the average current, nor can we help the fisheries scientist to explain unusual water conditions on a fishing ground.

The solution of these problems can be furthered by international networks of observations, and three main objectives are planned for the I.G.Y. The first, called the polar front survey, aims at providing more detailed information about the balance between arctic and temperate currents in the Atlantic and Pacific oceans, and the second is a more general programme to see what changes have taken place in the physical and chemical properties of the water at all depths in the main ocean basins during the past 25 to 30 years, and to provide a good basis for a further comparison after another such interval. The third problem is to test the reliability of new methods for measuring water velocities and transport in the subsurface and deep layers of the ocean, using several ships in selected areas to learn as much as possible about the variability of the currents and to decide on a plan for the years to come. U.S.S.R. has an ambitious programme for studying the oceanography of the Antarctic Ocean and will be helped by France, Argentina and Chile. There is no United Kingdom work there because we first want to make the best use of the *Discovery* data and collections and to practise the new deep-current measuring techniques.

Some 50 ships will be making I.G.Y. observations, most of them being research vessels regularly employed on fishery research, and since the authorities running them are interested as much in the biology as the physics of the oceans, no opportunity will be lost of combining biological observations with the geophysics or of applying new advances to fishery research.

The United Kingdom contribution

With the help of local authorities two sea-level and long-wave recording stations will be maintained on the west coast of the United Kingdom, and two on the coast of Africa. The Falkland Islands Government will help to maintain two more, at South Georgia and the Argentine Islands. The English and Scottish fishery research vessels will be making important contributions to the study of water circulation. The R.R.S. *Discovery II* will be making observations along a line from the Arctic ice edge to the equator in mid-summer and mid-winter, and will be collaborating with vessels from the U.S.A., and possibly Norway, in an intensive programme of deep-current measurements.

Aurora Observations During the International Geophysical Year

An article by Mr. J. Paton on Aurora Borealis was published in the July 1953 number of this journal. Mr. Paton is Reader in the Department of Natural Philosophy at Edinburgh University, Director of the Aurora and Zodiacal Light Section of the British Astronomical Association, and Correspondent for the Aurora and

Airglow Section of the programme of the British National Committee for the International Geophysical Year. The main purpose of the article was to give information about the special Aurora Survey which Mr. Paton had instituted and to ask for the co-operation of ships in making observations. It also provided our readers with a summary of our present knowledge of this phenomenon.

The Aurora Survey was designed to promote an intensive study of the occurrence of aurorae in time and place, and of auroral forms, during a period of about 12 years from 1953 to 1964, thus covering the whole of one cycle of solar activity, the average duration of which is 11 years. The area of the survey is the whole of the British Isles and the waters surrounding them, the North Atlantic Ocean, Iceland and Greenland. Organised observations over such a wide area have not hitherto been made and an important point about this survey is that observations of the non-occurrence of aurorae at any particular place and time are just as important as those of its occurrence.

Mr. Paton has been able to establish a close network of observers on land, from Greenland to the English Channel, and, in addition, crews of night-flying aircraft of the R.A.F., B.O.A.C. and B.E.A. keep watch for aurorae and make nightly records. It is obvious, however, that the nightly survey would be far from complete if the co-operation of a number of ships on passages between Great Britain and Canada and the United States were not secured. The response to Mr. Paton's appeal has, unfortunately, been poor, as regards the number of ships which have volunteered to use the special observing forms which he has prepared. The ships that have responded have, however, sent in excellent observations for which Mr. Paton has on several occasions expressed his thanks and appreciation. A further request for these observations was made in the note headed " Observation of Aurora " in the July 1955 number of this journal, but this produced no significant increase in the number of ships reporting on the special forms.

The period of the forthcoming I.G.Y. was arranged to approximate to that of the maximum of solar activity during the present cycle. This maximum was expected to be in the latter part of 1957 or in 1958, but the increase of activity since the time of the minimum phase of the cycle, which occurred about the middle of 1954, has been unusually rapid. Solar observers now predict that the maximum may occur as early as March 1957 or, alternatively, that if it occurs later it may be one of extraordinary intensity. As auroral frequency reaches its maximum about the time of maximum solar activity there will be many aurorae to observe during the years 1957 and 1958. Also, since aurorae at this stage frequently exhibit their more active forms, often with rapid movement and fine colours, there should be many magnificent displays, especially if the solar activity reaches an unusual degree of intensity. In view of this and of the fact that the Aurora Survey will form an important part of the British contribution to the I.G.Y., an earnest appeal is made to all selected or supplementary ships on the North Atlantic routes to co-operate by making auroral observations and recording them on the special forms, which may be obtained either from a Port Meteorological Officer or directly from the Marine Division at Harrow.

The minimum requirements in filling up the form are simple entries for each night, whether cloudy or not, stating whether aurora is or is not seen and the time of the observation. The observation and recording thus need not take more than a few minutes each night. If, however, the observer is able and willing to do so, details of the displays would be of great interest. For this purpose instructions are given on the back of the forms, detailing the different forms that aurorae can take and showing how the observation of different forms, or of changes of form, can be recorded quite shortly. Such observations, accurately timed, give information of great value for an investigation now being made into the relations between aurora and other terrestrial effects of solar activity.

An important feature of an auroral observation is the measurement by sextant, if conditions are suitable, of the altitude of the apex of the lower part of the auroral arc or of any other clear-cut lower edge the aurora may show. Such an altitude need only be correct to the nearest degree. From such an observation the place at which the arc or other feature would be in the zenith at the time of the observation can be determined.

Sketches, if made, can be done on the form or on paper attached to it. The forms should be enclosed in the ship's meteorological logbook when this is returned.

It is clear that ships' observing officers are interested in observing aurorae, since we have always had, and are continuing to receive, many excellent observations of this phenomenon from all parts of the world where it is visible. These are entered in the logbooks and are often accompanied by sketches. During times of minimum solar activity, when aurorae are infrequent, all these are published in *The Marine Observer*. As aurorae become more frequent, as many as possible of the most interesting observations are published, with sketches if these are sent, but limitations of space prevent the publication of all observations received. As every observation of aurora received by us in any logbook is sent on to Mr. Paton it may not be clear why ships in the North Atlantic area are being asked to record observations on the special forms in addition. The answer is that the logbook observations do not provide a nightly record. On the form something is put down for every night, the letter X denoting that aurora is observed, the letter O denoting that aurora is not visible although the sky is clear, while ? is put for nights that are cloudy or where moonlight, etc., prevent a definite decision about the presence or absence of aurora. Every observation, whether it shows the occurrence of aurora or not, is plotted on charts in Edinburgh.

Mr. Paton has recently written that with the I.G.Y. almost upon us he is still urgently in need of observers to assist in achieving the aim of recording every auroral occurrence visible in the region from North Greenland to the English Channel. It is confidently hoped that ships on the North Atlantic routes will co-operate by making the small extra effort necessary to fill in the nightly record on the special forms, even if this is only continued during the years 1957 and 1958.

The remainder of this note constitutes a separate special appeal to all ships in low latitudes, including tropical and equatorial ones. There is every chance that a tropical aurora will occur during the approaching period of sunspot maximum, since at such a time aurora occasionally moves far from its normal zones and may be seen in low latitudes, even close to the equator. Aurora has been observed, for example, at Bombay and Singapore. While the occurrence of these unusual aurorae is known we have little or no record of the forms they assume, since they have never been adequately observed. This is mainly because people in tropical countries are quite unfamiliar with aurora and so do not recognise it when it does appear once in a while.

The intensive observations planned for higher latitudes, the Aurora Survey, will be incomplete without details of these rare tropical aurorae and ships' observers who may see any unusual luminosity in the sky in low latitudes will provide information of the utmost value by recording the form, and changes of form, of the luminosity, together with the observed times. No special recording sheets are necessary for this; the observations should be entered in the Additional Remarks pages of the meteorological logbook in the usual way. Any observer who will do this can feel that he is giving information that has never before been available and which is therefore of the greatest importance. E. W. B.

Sail Training-Ship International Race; 1956

Notes on the handicapping

By Commander C. H. WILLIAMS, R.D., R.N.R.

The 22 vessels in the Torbay-Lisbon sailing race were of widely different rigs and size; from the 16-ton yawl *Artica II* to the 2,208-ton barque *Sagres*. For the purpose of allotting time allowances to the various ships they were divided into two classes; those of under 100 tons and those of 100 tons and over. Time allowances for the smaller class were worked out by a formula on which the Royal Ocean Racing Club bases its rating rules.

The same method of rating could also be applied to some of the slightly over 100-ton vessels, the large yawls and cutters of usual yacht design and rig; but obviously the rating formula was never intended to deal with large square-rigged ships and very big schooners.

It was therefore decided by the race committee to set up a sub-committee to work out time allowances for these larger vessels. This sub-committee was composed of three experienced members of the Royal Ocean Racing Club and two professional seamen holding " square-rig " master's certificates.

The vessels to be considered were three full-rigged ships, one barque, two barquentines and three schooners; all large three-masted vessels. Where the information was available such factors as length, draft, beam, moulded depth, block coefficient and sail area were taken into consideration.

Obviously, the direction and force of the winds to be experienced over the course would be the biggest single and overriding factor. The kind of weather that would suit one type of sailing vessel would not necessarily suit another. Little information was available as to the performance under sail of these large vessels, nor of any time allowances previously applied to them, if indeed there had ever been any. As one newspaper had it, it was " like working out handicaps in a race for all the animals in the zoo ".

In order to get some idea of the probable time the different vessels would be likely to take on the passage, the sub-committee decided to assume certain wind directions and forces on the three stages of the voyage. These were: (*a*) Torbay-Ushant, wind WSW., force 4 veering; (*b*) Ushant-Finisterre, wind NW., force 3; and (*c*) Portuguese coast, wind N., force 5.

The five members of the sub-committee produced independent estimates which agreed fairly well, and the mean of these times was taken as the basis for allotting time allowances to the vessels. The estimated times that would be taken on the voyage under the above wind conditions ranged from about six days for the fastest and most weatherly craft to eight days or so for some of the others. All estimates agreed that the three-masted schooner yacht *Creole* should be scratch ship. She is a fine vessel, big enough to carry sail in strong winds and to stand the rough seas on an ocean passage. In the event she was only beaten by the Turkish yawl *Ruyam* in the large class with a time of 5 days 20 hours 46 minutes; and the Argentine cutter *Juana*, the scratch boat in the small class, with a time of 5 days 19 hours 28 minutes. The *Creole* took 5 days 23 hours 30 minutes.

The winner, the ketch *Moyana*, was 6 days 8 hours 3 minutes on the voyage, her time allowance of 25 hours 41 minutes giving her the victory with a corrected time of 5 days 6 hours 22 minutes.

Presentation of Barographs

On 16th September, 1956, aboard the *Wellington*, which is the headquarters ship of the Honourable Company of Master Mariners, Sir Graham Sutton, Director of the Meteorological Office, presented barographs to four masters of British voluntary observing ships for consistently good meteorological work during a period of more than 15 years (see photograph opposite page 33). The recipients of these awards (see the October 1956 number of *The Marine Observer*) were Captain L. W. Fulcher and Captain F. Lougheed of the New Zealand Shipping Company, Captain D. M. MacLean of the Cunard Line and Captain P. H. Potter of the Bibby Line.

This is the first time since these annual awards were instituted in 1948 that four recipients have been able to receive this award together—such are the vicissitudes of the shipping industry.

The presentations were witnessed by a number of the members of the Honourable Company and representatives of the shipping companies concerned and of the Meteorological Office were also present. Before the presentations visitors were entertained to tea by the Honourable Company.

Sir Graham was introduced by Captain Elvish, Senior Warden, in the unavoidable absence of Sir Frederick Bowhill, the Deputy Master.

In making the presentations, Sir Graham expressed, on behalf of all meteorologists, warm appreciation for the continued good work carried out by voluntary observers aboard British merchant ships which formed such a high proportion of the merchant ships of various nationalities which take part in this work. From the North Atlantic area such observations, combined with those from the ocean weather ships, were absolutely essential to meteorologists in this country. This was particularly true now that meteorology showed signs of becoming a more exact science and now that "numerical" methods of forecasting were being used; and one needed not only surface but also upper-air observations for this purpose, but these last-named could, of course, only be supplied by the weather ships.

Sir Graham pointed out that all three companies had had a long association with the Meteorological Office, the Cunard Line since 1868, the New Zealand Shipping Company since 1876 and the Bibby Line since 1879. The total number of these awards which had been received since 1948 by masters of the New Zealand Shipping Company and Cunard Line is 10 and 7 respectively. Captain Potter is the first master of a Bibby liner who has received one of these awards.

C. E. N. F.

RADAR PROPAGATION REPORTS

It is by now well known that radar performance is affected by the weather. Why this is so, and the sort of radar performance to be expected under given weather conditions, is, in general terms, understood, but our knowledge of the subject remains far from complete. Further, no simple and reliable method of predicting propagation conditions has yet been evolved, and in certain parts of the world information about the propagation conditions normally to be expected is still scanty.

As a sound basis for future progress a reliable world-wide set of ships' observations of propagation conditions is required; these must cover all seasons, and all types of weather conditions. It is for the purpose of building up such a body of observations that radar propagation reports are rendered by selected ships. The Meteorological Office passes these reports to the Naval Weather Service, where they are studied, and filed for future use; much interesting and useful information is derived from them.

The ultimate aim of this collection of data is two-fold: firstly the establishment of some correlation between radar performance and easily observed meteorological elements which could form the basis of a simple practical method of estimating and forecasting radar performance; secondly the production of an atlas describing normal propagation conditions over the oceans season by season, and the variations in them which may reasonably be expected. The achievement of these aims would benefit all users of radar at sea, and be of especial value in many naval operations.

The reports rendered by selected ships are, in general, clear and unambiguous, but the following points should be borne in mind when filling in the forms:

(*a*) Whenever possible ship's position should be given in latitude and longitude.

(*b*) The figure required in the column "Normal range of working" is the range at which the target in question, or a similar one, is normally detected.

(*c*) If the target is first detected at the maximum range of the set this should be stated in the "Remarks" column.

(*d*) If the echo appears when the set is already switched on this should be stated in the " Remarks " column.

(*e*) A description of the target adds greatly to the value of a report, e.g. size of a ship, nature and height of land, etc.

These instructions are being incorporated in the next reprint of ships' meteorological logs.

It is hoped that selected ships will continue to co-operate in rendering these valuable reports and thereby help to ensure the most efficient use of ship-borne radar in the future.

SHORT-WAVE RADIO FADE-OUTS

During the last few months several reports of radio disturbances in the Atlantic Ocean have been recorded in the meteorological logbooks of selected ships. The following is a summary of detailed reports which were forwarded to the Post Office Engineering Department, who found them of great interest and confirmed that in each case similar disturbances were reported by radio receiving stations in Europe and elsewhere.

On 15th March, 1956, at 1625 G.M.T. in 33° 53'N., 47° 48'W., the *Baron Glenconner* reported complete short-wave fade-out lasting until 1708. The *Baron Inverclyde* in 34° 25'N., 46° 23'W., at the same time, had a similar experience.

On 29th March, 1956, at 1800 G.M.T., in 51° 48'N., 38° 54'W., the *Cairnavon* reported a radio fade-out in an east-west direction, which lasted until 2100 G.M.T. on 30th March, the ship then being in 49° 45'N., 42° 57'W., i.e. some 197 miles south-west of the first position.

On 30th May, 1956, between 0934 and 0950 G.M.T., in 16° 30'S., 03° 30'E., the *Umtata* experienced a complete radio fade-out, whilst between 0755 and 0819 G.M.T. the next day when in 21° 00'S., 07° 30'E., another radio fade-out was experienced.

Mr. G. O. Evans, of the Radio Branch of the Post Office Engineering Department, has sent us the following notes. It is hoped that any ship experiencing these radio fade-outs will have details entered in the Additional Remarks pages of the meteorological logbook.

" In general, there are two types of radio disturbances, and it is thought that the following details may be of interest.

" Sudden radio fade-outs, occurring during daylight and lasting from a few minutes to more than an hour and often called Dellinger fade-outs, are due to sudden ionospheric disturbances (S.I.D.s) caused by intense ultra-violet radiation emitted from solar flares which are frequently associated with large sunspots. If this intense ultra-violet radiation reaches the earth it increases the density of ionization in the lower layers of the ionosphere, and this results in a considerable increase in the absorption of high-frequency radio waves whose paths lie wholly or partly within the daylight hemisphere. The effect of this increase in absorption is a sudden fade-out on radio circuits traversing the daylight hemisphere.

" These sudden Dellinger fade-outs are frequently, but not invariably, followed, after an interval of 18–36 hours, by ionospheric " storms " lasting for several days. These storms are believed to be caused by charged particles which leave the sun at the same time as the ultra-violet radiation but with much slower speeds. When these particles reach the earth they are directed by the earth's magnetic field into the auroral zones surrounding the north and south magnetic poles, causing disturbances in the relatively stable upper layers of the ionosphere in these areas. These disturbances result in a reduction in the value of the highest radio frequency that can be reflected by the ionosphere. Consequently these ionospheric storms often necessitate a change to a lower operating frequency, particularly on circuits whose paths pass near to or through the auroral zones (e.g. North Atlantic and east-west circuits). Radio disturbances due to ionospheric storms are more serious during the hours of darkness since at these times the normal optimum working frequency (O.W.F.) is at its lowest value and any further reduction due to a storm may take the O.W.F. below the lowest available frequency for a particular circuit.

"The frequency of occurrence of large sunspots, solar flares and Dellinger fade-outs has been increasing since the sunspot minimum conditions in April 1954. At present an average of eight severe Dellinger fade-outs are reported each month, and this number is expected to continue to increase during the next year as we pass through a maximum of the sunspot cycle. Although the number of ionospheric storms due to solar flares will also continue to increase during the next year the number of resulting radio disturbances will not necessarily increase in proportion. This is due to the fact that normal optimum working frequencies will also continue to increase as we approach sunspot maximum conditions, so that only during the more severe ionospheric storms will the O.W.F. be reduced below the lowest available frequency.

"The fade-outs recorded on 15th March and on 30th and 31st May were of the sudden Dellinger type, each lasting about half an hour and coinciding with solar flares. The east-west radio disturbance during the period 29th to 31st March was due to an ionospheric storm following a solar flare and partial Dellinger fade-out recorded at 0830 G.M.T. on 28th March.

"We would be pleased to receive copies of any future extracts from ships' logbooks concerning radio fade-outs."

ROYAL NAVAL BIRDWATCHING SOCIETY

Sea Birds, Lists and Descriptions

The following has been received from the Royal Naval Birdwatching Society:

Lists of sea birds likely to be seen on the following routes together with details for their identification are now available from Commander C. E. Smith, R.N., H.M.S. *Ceres*, Wetherby, Yorkshire.

List 1. United Kingdom to Port Said
List 2. Port Said to Aden
List 3. Aden to Kuwait
List 4. Aden to New Zealand

Price, post free: any one list 1s. 3d., two lists 2s. 3d., three lists 3s., four lists 3s. 6d.

Special Sea Reporting Sheets for reporting any birds seen will be supplied free on request to purchasers of the above lists, or anyone else interested in the observation and reporting of birds at sea.

Book Reviews

Pioneers of the Seven Seas, by Alan Villiers. $8\frac{3}{4}$ in. × $5\frac{1}{2}$ in. pp. 220. *Illus.* Routledge & Kegan Paul, 1956. 16s.

This book is basically a history of shipping from very earliest records up to the present date. It is difficult to think of anybody better qualified than Alan Villiers to write about such a subject. Not only is he a master mariner who has owned and commanded his own square-rigged sailing ship, has sailed during lengthy voyages in Arab dhows and Grand Banks fishing schooners, and on whaling expeditions, but he is also a trustee of the National Maritime Museum and Vice-President of the Society for Nautical Research. He also has the gift of writing in an entertaining and vivid manner.

In this relatively small book he manages to give us a remarkably vivid history of ships and seamen from the Egyptian ships of about 3000 B.C., pictures of which can now be seen on temples, up to the ships of today, such as the passenger steamer *United States* and the ice-breaker *Magga Dan.*

When reading this book, one's first impression is of the great contribution to our knowledge of the oceans which the Spanish and Portuguese pioneers Magellan, da Gama and Columbus made. It was not till the early part of the sixteenth century that the first British explorer of the sea really comes into the picture in the person of Drake. From that date onward it seems that the names of the British voyagers are outstanding and " the noblest of them all " is Cook.

But, as the author shows us, it is not only the seamen who are the pioneers. He devotes several chapters to the work of the engineering and shipbuilding pioneers and other " backroom boys " who, despite much " die-hard " opposition, have done so much to improve the comfort and efficiency of ships since the advent of mechanical propulsion. The author shows that there is as much romance and adventure in the shipbuilding and allied trades as there is in the operation of ships and in the voyages of discovery.

An outline of the scope covered by the book is perhaps well illustrated by the titles of some of its 20 chapters: " Ferdinand Magellan, and the Opening of the Pacific ", " The Wonderful Great Eastern ", " The Atlantic Ferry ", " The Story of Tankers ", " The Mysterious Dr. Diesel " and " The Whalers ". In a chapter " The Human Side " Samuel Plimsoll and Havelock Wilson find a rightful place of honour.

As a square-rigged master mariner himself, the author does not overlook the important part that meteorology has necessarily played in the history of shipping, particularly in the days of the sailing ship. Nor does he overlook the fact that weather is still a very important item as far as a seaman is concerned. For example, he mentions the use of radar for looking out for sudden rain storms " which would damage perishable cargoes being discharged in a port of Australia ".

The book is illustrated with some excellent photographs, and some interesting diagrams and drawings of sailing ships.

Altogether it is an admirable little book at a reasonable price. C. E. N. F.

Admiralty Manual of Navigation, Vol. I, 1954. $9\frac{3}{4}$ in. × $6\frac{1}{4}$ in. pp. x + 536. H.M. Stationery Office. 20s.

This volume completes the revision of the three-volume 1938 edition. As stated in the preface it is a practical guide for executive officers covering the syllabus laid down for examination in navigation and pilotage for the rank of Lieutenant, but omitting the study of a nautical astronomy and meteorology.

The revision includes two chapters on radio aids to navigation covering the subject of hyperbolic position-fixing systems with useful information on the capabilities and limitations of radar and radar navigational techniques. This important subject is very well explained and illustrated so that even to the non-technically minded it can be easily understood. Every navigating officer will be glad of the useful advice on radar technique on which there is so much confusion of thought at the present time.

Elementary meteorology, synoptic charts and weather forecasting previously included in Vol. I are now to be found in Vol. II. A new chapter on navigation and ice, including advice on the use of radar in or near ice and the reporting of ice is a useful addition.

The book contains nearly 300 diagrams and illustrations, many of which are in colour. Although written primarily for the executive officer of the Royal Navy it contains much essential knowledge for the Merchant Navy deck officer, who will find it a most useful textbook for the M.O.T. examinations and a practical reference book on many problems of his work at sea. A. D. W.

Observational Errors, by E. W. Anderson and J. B. Parker. $9\frac{3}{4}$ in. × 6 in. pp. 28. *Illus.* John Murray Ltd., for the Institute of Navigation, London, 1956. 5s.

This is the first of a series of monographs to be prepared for and published by the Institute of Navigation on subjects allied to navigation. It is written primarily for navigators and presents in a simple way only the more elementary concepts of the theory of errors and their practical application. Most of the examples given in the text are naturally taken from the field of navigation, but in his preface the President of the Institute points out that the substance of the monograph is applicable to all who have to deal with observations which are subject to error. Certainly for the general reader with little mathematical or statistical knowledge this booklet will provide a useful introduction, the aim of the authors having been to provide the practical man with the small amount of knowledge he requires to take advantage of statistical methods.

The first chapter deals with the three types of error—systematic errors, random errors and faults—and how they may be combined, and with the representation of errors on a chart. It is very clearly written and easily followed, although the statement on page 7 that two rectangular errors combine to make a triangular error and three to make a roughly Gaussian error is not very obvious and perhaps deserves a brief explanation. Errors are referred to throughout in terms of the 50 per cent error in preference to the standard deviation on the grounds that the practical man may with experience be able to estimate the 50 per cent error of an observation. The term " probable error ", by which the 50 per cent error is commonly known and referred to in many statistical textbooks, particularly the older ones, is, however, not used.

Chapter 2 deals with observations, most of the examples being based on position-finding. It explains how the various types of error may be reduced and how to proceed when the information derived from two different sources is inconsistent.

Chapter 3 describes the methods and terminology of statistics and is included for the benefit of those who may have to deal with professional statisticians. It briefly introduces such terms as correlation coefficient and analysis of variance, describes the method of grouping observations and deciding on the type of distribution and indicates the statistics in terms of which the different types of distribution can be expressed. Finally the concept of confidence limits is discussed.

The monograph concludes with a short index of statistical terms and a list of statistical textbooks and tables, with brief comments on each, which are recommended as a basis for further study.

H. C. S.

Personalities

RETIREMENT.—CAPTAIN R. E. DUNN, O.B.E., retired in August 1956 from the post of Humber Area Merchant Navy Agent for the Meteorological Office.

Robert Dunn went to sea in September 1890 at the early age of nine with his father who was master of Gracie Beazley's ship *M. E. Watson.* The round voyage to Australia took 16 months, during which the elder Dunn died and was buried at sea. Young Robert went back to school, and just before his 14th birthday commenced his sea career proper with Messrs. Gillison & Chadwick of Liverpool in their *Tythonus.* He remained in sail until he passed for master in 1903, when he joined the Ellerman & Papayanni Line for a short while. In 1906 he commenced his long association with the Pacific Steam Navigation Company, which terminated in 1942 on his reaching the age limit.

During the First World War, Captain Dunn was Navigating Lieutenant of the *Orcoma*, a ship of his own company which had been taken over by the Admiralty for service in the 10th Cruiser Squadron on the northern patrol between Scotland and Greenland. For this service he received the O.B.E. and was mentioned in despatches.

Command in the Pacific Steam Navigation Company came in 1923 when he was appointed to the *Bogota.* In the ensuing years he commanded several vessels, his last being the *Oropesa.* During the Second World War he was appointed Commodore of Convoys from Bermuda and Halifax, and was commended for this service.

Captain Dunn's association with the Meteorological Office goes back to 1924 when we received his first meteorological logbook. Records came regularly from all the subsequent ships in which he served, up to the outbreak of the Second World War, when all meteorological records at sea stopped.

In 1946, when voluntary observers aboard British ships resumed their peacetime activity, Captain Dunn took over the position of our agent in the Humber area. In this capacity he became well known and respected among voluntary observing ships using Hull and nearby ports. His special care in latter years has been the recruitment and encouragement of deep-sea trawlers, and in spite of the loss of a leg through ill-health two years ago, he continued to do this work successfully until the date he retired.

We wish him health and happiness in the future. L. B. P.

RETIREMENT.—CAPTAIN G. KINNELL, O.B.E., Commodore Master of the combined fleets of the New Zealand Shipping Company and the Federal Line, retired recently after 45 years at sea, over 30 of which were in command.

Born in London in 1893, Gilbert Kinnell joined the New Zealand Shipping Company in 1911 after two years in H.M.S. *Worcester.* He passed for 2nd Mate in 1914 and was appointed 4th Officer in that year. Eleven years later, on 28th August, 1925, he was given his first command, the *Piako.*

In the Second World War Captain Kinnell was in command of the *Otaio* when she was bombed in the King George Dock, London, and in 1941 he was torpedoed and sunk in the North Atlantic whilst outward bound in the same ship.

He was awarded the O.B.E. in 1946 and is a member of the Honourable Company of Master Mariners.

By his retirement the Meteorological Office loses one of its oldest voluntary marine observers, for it was in 1915 that his first meteorological logbook was received in the Marine Division. Since then, in 24 years, we have had 66 returns from him, a large proportion of which have been classed "Excellent". In 1950 he was awarded a special award of a barograph for long and zealous voluntary service for the Meteorological Office.

We wish him health and happiness in his retirement.

L. B. P.

RETIREMENT.—CAPTAIN J. WHITEHOUSE, Commodore Master of the Pacific Steam Navigation Company, retired from the sea after 44 years' service on 31st August, 1956, when he brought his command the *Reina del Pacifico* into Liverpool.

Born in Liverpool in 1894, the son of a Booth Line shipmaster, John Whitehouse served his time in the sailing vessels of T. A. Shute of Liverpool. Passing for 2nd Mate in 1916, he joined the Pacific Steam Navigation Company as 3rd Officer of the *Galicia.* Whilst outward bound from London to Valparaiso on his second voyage in this ship she was sunk by enemy action off Torquay without loss of life.

Captain Whitehouse was appointed to his first command, the *Loriga,* in 1939. He joined the *Reina del Pacifico* in 1945 and served in her until his retirement, except for a short break while she was being reconverted to peace-time use, when he commanded the *Salaverry.* He was appointed an O.B.E. in the 1956 New Year Honours List.

Captain Whitehouse's first meteorological logbook was received in the Marine Division in 1922, when he was in the *Oriana.* In all he was a voluntary observer for 13 years, during which we received 19 returns from him.

We wish him health and happiness in his retirement. L. B. P.

OBITUARY.—With regret we record the death of CAPTAIN W. G. HIGGS, O.B.E., who died suddenly whilst on holiday at Portishead, on Monday, 3rd September, 1956, aged 70 years.

Captain Higgs began his sea-going career in sail, serving four and a half years in the full-rigged ship *Celtic Monarch*, owned by R. Hughes Jones & Co., Ltd., Liverpool. He then became 2nd Mate of the *Bay of Biscay*, another full-rigged ship of T. Beynon & Co., Newport.

In September 1907 he joined the Tyser Line, one of the constituents of the Port Line, and obtained his first command in 1919. In 1948 he was appointed Commodore of the Port Line and commissioned the *Port Brisbane* on her maiden voyage. During this time the *Port Brisbane* was honoured by a visit from Her Majesty Queen Elizabeth (now the Queen Mother) and Princess Margaret. Captain Higgs retired from active service in 1949.

During his long sea-going career Captain Higgs rendered valuable service as a voluntary marine observer for many years. We received his first meteorological logbook in 1910 when he was in the *Niwaru*, and since then the meteorological logbooks of the ships in which he served have always been of the highest quality. In recognition of this work the Director of the Meteorological Office presented to him a Special Long-Service Award in the form of a suitably inscribed barograph in 1948.

J. C. M.

ERRATUM

In the October 1956 number of *The Marine Observer*, page 224, the westward limit of the charts of the western South Pacific in the Indian Ocean should read 98°E., instead of 98°W.

Notices to Marine Observers

B.B.C. Weather Bulletins

Since the end of British Summer Time on 7th October, 1956, the time of the 1200 Sunday broadcast of the weather bulleting for shipping has been changed to 1155 in order to avoid the silence period. All other times of bulletins for shipping broadcast by the Light Programme of the B.B.C. remain as previously stated in *The Marine Observer* and Admiralty List of Radio Signals.

Hong Kong May Broadcast Storm Warnings to Shipping

The provision of weather information and storm warnings through short-wave voice broadcasts from Hong Kong to ships which do not carry radio operators is now being investigated, states the Director of the Royal Observatory, Hong Kong, Dr. I. E. M. Watts.

Publication of *Meteorology for Mariners*

It is expected that a new book entitled *Meteorology for Mariners* will be published by the Stationery Office early in January 1957. This book has been written in the Marine Division of the Meteorological Office especially for the masters and officers of merchant ships, but it should also prove useful to yachtsmen and to anybody else who is interested in weather at sea. The authors have endeavoured to " present the elementary theory of marine meteorology in a simple and straightforward manner for the benefit of those who go down to the sea in ships, and to show how a knowledge of that subject can be applied practically to the duties of a ship's officer ".

Fleet Lists

GREAT BRITAIN

The following is a list of British ships voluntarily co-operating with the Marine Division of the Meteorological Office.

The names of the Captains, Observing Officers and Senior Radio Officers are given as ascertained from the last written returns received. The date of receipt of the last return received is given in the 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.

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	Owner/Managers
Abraham Larsen	GKZB		O. Vestrum	L. Lauritzen	P. Ioland	Union Whaling Co.
Accra	GJSW	7 6.56	C. D. Simpson, O.B.E.	—. Leales, C. F. Williams, G. Greene, J. Pearson	J. Stuart	Elder Dempster Lines, Ltd.
Adelaide Star	GKPB	11.9.56	O. C. Roberts, C.B.E.	J. A. D. Risk, C. Denny, A. V. Watt	W. Gibb	Blue Star Line, Ltd.
Aden	GJMN	20.6 56	W. T. Banks	D. J. King, P. B. Jackson, A. K. Ewing	W. Hargreaves	P. & O. Steam Navigation Co.
Afghanistan	GNYB	11.6.56	A. N. Henderson	J. Cummins, D. M. Foster, A. Bashford	D. M. Foster	F. C. Strick & Co., Ltd.
Ajana	GKVY	15.8.56	F. W. Mould	J. M. Hunter, J. T. Duhig, M. R. Coates	G. Ashurst	Trinder Anderson & Co.
Ajax	GJXM	7 8.56	K. G. Coslett	J. B. Hughes, D. H. Thomas, D. Astell	A. Walker	A. Holt & Co.
Albistan	MABT	27.8.56	R. Mace	E. C. Cross, P. E. Thompson, J. Brown	S. Gracie	F. C. Strick & Co., Ltd.
Alcantara	GLQR	16.5.56	D. R. Miller	P. Foster, T. Farquharson, J. McCaughrean	R. E. Hammond	Royal Mail Lines, Ltd.
Alsatia	MABL	10.5.56	J. Chapman, R.D., Capt. R.N.R. (Retd.)	R. E. Hills, P. Gadsden, M. Doyle	J. Mockler	Cunard Steamship Co., Ltd.
Amakura	MCPN	22.3.56	S. Armitage	D. Andrew, T. Jones, C. Eckersley	R. Bankes	Booker Bros. McConnell & Co., Ltd.
Andes	GQCV	19.9.56	C. E. Mason	J. Hunt, N. Lloyd, J. Wisden, I. Farqueson, A. Macgregor	H. Polkinghorne	Royal Mail Lines, Ltd.
Andria	GDWM	5 7.56	W. E. Warwick	R. E. Hills, J. Wilson-Smith, L. J. Stewart	D. Byrne	Cunard Steamship Co., Ltd.
Apapa	MACE	10.8.56	C. H. Sweeny	W. E. Christie, J. Woodend, S. J. Tehan	G. Gillings	Elder Dempster Lines, Ltd.
Arabia	GLKF	7 8.56	W. B. Tanner, R.D., Capt. R.N.R. (Retd.)	G. A. Newcombe, R. A. Woodall, B. Coates	T. Sandham	Cunard Steamship Co., Ltd.
Arabistan	GCKK	14.6 56	R. B. Arthur, M.B.E.	F. W. Bush, J. R. Goudie, W. B. Taylor	A. Murray	F. C. Strick & Co., Ltd.
Araby	GMZL	9.8 56	F. J. Swallow	J. Chester, P. Sykes, J. Merson, K. Og	A. Whittaker	Royal Mail Lines, Ltd.
Arakaka	GDVN	7 8 56	J. A. Carter	J. L. Anczykowski, F. Sanchez, R. A. Hammond	S Heilbron	Booker Bros. McConnell & Co., Ltd.
Argentina Star	GTKF	22.5.56	E. R. Pearce, O.B.E.	R. Moreland, M. B. Foster, J. Rawding	—. Cragg	Blue Star Line, Ltd.
Ariguani	GMBL	24 5 56	R. W. Lundy, O.B.E., R D., Lt.-Cdr. R.N.R. (Retd.)	D. J. Ely, N. Abbott, G. Penny	H. Roderick	Elders & Fyffes, Ltd.

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Managers
Armagh	GQGG	13.6.56	M. R. Foster	J. Cole, I. Cameron, J. Johnston	J. Barkinshaw	Avenue Shipping Co.
Arundel Castle	GCZL	12.5.56	D. D. MacKenzie	R. Grice, D. France, B. Fry, —. Harker	G. Kilminster	Union Castle Mail S.S. Co., Ltd.
Ascania	GKNJ	27.8.56	E. A. Divers, O.B.E., R.D., Capt. R.N.R.	R. Howard, D. A. Williams, R. MacDowell	C. Pennington	Cunard Steamship Co., Ltd.
Ashburton	GNJN	16.7.56	C. Parry	J. K. Bryon, H. Jones, R. Toye	C. L. Roberts	Trinder Anderson & Co.
Asia	GLJV	8.8.56	F. E. Patchett	J. Cosnett, H. L. Smith, D. W. Wilford	J. S. Marshall	Cunard Steamship Co., Ltd.
Assyria	GGKX	21.8.56	J. G. Bradley, R.D., Capt. R.N.R.	B. V. Mercer, F. N. Sergent, D. A. Davies, J. Turner	B. A. Long	Cunard Steamship Co., Ltd.
Asturias	GLQS	6.3.56	J. Smith, R.D., Capt. R.N.R. (Retd.)	J. Wilson, R. M. Box, R. J. Bland, P. M. Atkinson	R. Farrell	Royal Mail Lines, Ltd.
Athelfoam	GMFN	3.1.56	C. R. J. Roberts	J. O'Sullivan, A. MacDonald, P. McKinney	P. J. Broudair	Athel Line, Ltd.
Athenic	GBLS	14.9.56	L. H. Edmeads	J. D. Haberfield, J. O. Williams, P. K. Murchison, M. Brew	H. S. Knight	Shaw, Savill & Albion Co., Ltd.
Athlone Castle	GYTK	28.1.56	C. C. Page	P. Jackson, G. Stockley, R. Hinkley	J. Summers	Union Castle Mail S.S. Co., Ltd.
Aureol	GMGJ	1.2.56	W. Munt	D. Capstick, P. Myers	F. W. J. Broomfield	Elder Dempster Lines, Ltd.
Australia Star	GYCS	14.6.56	J. A. Hoppé	G. C. Williams, J. Jermyn, E. G. Bee	L. Cooper	Blue Star Line, Ltd.
Australind	GJKF	25.4.56	R. Willcocks	B. D. Diggle, C. R. Naylor, D. N. Brooks	R. J. Hubbard	Trinder Anderson & Co.
Avistone	GBSV	21.6.56	J. W. Cromarty	S. O. Nazar, J. H. Lillico, R. C. Skellorn	L. R. Bradley	Purvis Shipping Co., Ltd.
Avonmoor	GFGL	12.4.56	J. A. Barton	J. R. Jenkins, R. R. Jordan, R. Thompson	A. Aitchison	Walter Runciman & Co., Ltd.
Balaena	GLDG	13.5.54	P. Uirik	R. Christoffersen, —. Bentyen, A. Anderson	J. Dahl	Hector Whaling, Ltd.
Balantia	GBNM	8.3.56	J. L. Perkins	T. D. Lilley, D. Knights, H. Nixon	J. Egerton	Royal Mail Lines, Ltd.
Baron Elphinstone	GCCD	7.5.56	T. D. Drysdale	J. R. Day, J. Stevens, C. Lunn	J. Marnell	H. Hogarth & Sons
Baron Glenconner	GTQK	13.7.56	T. R. Reid	I. S. Graham, J. W. Cameron, H. Bayson	T. R. Collins	H. Hogarth & Sons
Baron Maclay	GKXW	3.12.55	J. Reid	T. H. MacDonald, J. H. Thomas, H. Bryson	J. Lee	H. Hogarth & Sons
Baron Murray	GIFB	24.4.56	J. Pearson	T. B. MacLeod, H. A. Whitfield, C. Reese	L. Hampson	H. Hogarth & Sons
Barrister	MSFR	21.6.56	A. Wolstenholme	M. Watson, J. Bean, L. G. Bennett	M. C. O'Callaghan	T. & J. Harrison, Ltd.
Baskerville	GSDN	13.2.56	G. Blacklock	M. Martin, P. Pelts, J. J. Aitkin	G. Stacey	Runciman (London), Ltd.
Bassano	GNXK	16.8.56	C. H. Tutty	T. G. Marshall, B. Nicolle, F. Barns	A. Leary	Ellerman's Wilson Line, Ltd.
Beaverburn	MAGB	3.4.56	W. J. P. Roberts	I. M. Smith, J. Brooks, G. C. Gamblin	G. Adamson	Canadian Pacific S.S., Ltd.
Beaverford	MQJG	22.4.55	J. Soame	R. J. Baddock, M. Organ, C. R. Worthington, D. Roberts	B. Johnson	Canadian Pacific S.S., Ltd.
Beaverglen	GBCP	26.4.56	J. Soame	A. G. Hopper, P. Roberts, J. Wyllie, M. H. Scott	P. Bowler	Canadian Pacific S.S., Ltd.
Beaverlake	GBCQ	5.2 54	N. W. Duck, D.S.C., R.D., Capt. R.N.R. (Retd.)	C. Hutchinson, G. Palmer, J. Whaling, M. Scott	A. E. S. Thompson	Canadian Pacific S.S., Ltd.
Beaverlodge	MAGJ	6.9.56	L. H. Johnston, M.B.E.	A. C. Matthews, R. Dickenson, W. Cannell	J. S. Macpherson	Canadian Pacific S.S., Ltd.
Bellerophon	GGCM	24.7.56	H. H. Sanderson	W. Owen-Thomas, M. L. Miller, A. Donnan	J. G. Williams	A. Holt & Co., Ltd.
Bennevis	MAGG	9.7.56	R. Griffiths	T. Fyfe, G. R. Bannerman, I. R. Ansell	W. Paterson	W. Thomson & Co.
Benvannock	GCQR	3.9.56	A. N. Hirst	D. Shore, J. Barney, I. Ramsay	E. Fitzgerald	Ben Line Steamers, Ltd.
Biscoe	GDCW	24.9.56	S. K. Williams	A. J. Gibbs, E. Reed, R. O. Jones	M. Sherifon	Hector Whaling, Ltd.
Bransfield	GDRK	4.5.54	M. Paulsen	A. G. Giblin	T. Salveson	Hector Whaling, Ltd.
Brasil Star	GTLF	12.7.56	G. E. Barnard	I. W. Hay, R. Middleton, J. R. Massey, E. W. S. Gill	A. C. Webb	Blue Star Line, Ltd.

Bravo	GLDZ	12 6 56	A. K. Skelton	A. J. Collard, D. W. Cawkwell, F. M. Martin	K. Webster	Ellerman's Wilson Line, Ltd.
Brisbane Star	GZCJ	20 6.56	S. Foulkes	F. Goulson, E. Thomas, A. H. Pickford, P. W. Hutchinson	D. Turner	Blue Star Line, Ltd.
Bristol City	GUAY	15.8.56	F. W. Harris	C. Harfoot, A. Ashton, C. Hace	A. Chappel	Charles Hill & Sons
Britannic	GDXF	17.9.56	A. B. Fasting, R.D., Capt. R.N.R. (Retd.)	W. Smith, D. Lee, J. Cooper	J. Kidson	Cunard Steamship Co., Ltd.
British Consul	GXXT	2.6 56	A. D. R. MacDonald	A. S. Flint, R. G. Twist, J. C. Blackburn	R. T. Nankervis	British Tanker Co., Ltd.
British Endeavour	GFCN	1.8.56	G. P. Barton	K. V. Meacock, B. Sexton, M. J. Bates	J. D. Connor	British Tanker Co., Ltd.
British Escort	GORB	30.5.56	J. Mason	R. Dinsmore, A. McAllan, J. Raeper	R. Clayton	British Tanker Co., Ltd.
British General	GCDJ	10.5.56	G. C. Dobson	T. N. Griffiths, D. Lister, M. Burrows	B. Lawton	British Tanker Co., Ltd.
British Marquis	GWVL	16.7.56	E. L. Mitchinson	A. E. Sainty, W. Bishop Lagget, D. S. Brown	A. P. Oliver	British Tanker Co., Ltd.
British Patience	GUFF	5.2.56	R. Phillips, R.D., Lt.-Cdr. R.N.R. (Retd.)	T. M. Carrick, C. G. Jones, R. J. Young	M. Newcombe	British Tanker Co., Ltd.
British Piper	GDNN	26.3.56	M. Hutchinson	G. Lambert, J. Edge, G. Simons	W. E. Holbrook	British Tanker Co., Ltd.
British Resource	GFCD	9.7 56	S. Bruce	D. G. Inwood, T. Evans, A. P. M. Davis	J. Nicholson	British Tanker Co., Ltd.
British Sailor	GSBQ	27.8.56	H. I. McMichael, O.B.E.	J. F. Surman, J. G. Harrison, G. H. Smith	P. Kenrick	British Tanker Co., Ltd.
British Splendour	GCJT	15.6.56	H. G. Jeary	A. Gill, F. Bolingbroke, F. Weeks, J. Huntingdon	J. Nicholson	British Tanker Co., Ltd.
British Union	GCLZ	7.6.56	C. W. Ellis	R. Bolger, G. Willis, D. Starbuck	B. T. S. Watson	British Tanker Co., Ltd.
British Yeoman	GFFK		A. Lawson			British Tanker Co., Ltd.
Brittany	GMZS	18.9.56	C. C. Dingle	T. B. Casey, J. A. Martin, R. W. Clarke	P. Mahoney	Royal Mail Lines, Ltd.
Brockleymoor	GDWP	22.10.56	D. J. Nicholas	T. J. Graham, D. Nicholas	F. Williams	Walter Runciman & Co., Ltd.
Cairnavon	GPJN	27.8.56	H. E. Bragg	K. A. Murray, G. Holland, K. Rainforth	D. Cook	Cairns, Noble & Co.
Cairndhu	GPBB	20 8.56	J. W. Scott	N. Shell, J. Barton, J. Richardson	P. Mangan	Cairns, Noble & Co.
Cairnesk	GMKR	28.2.56	J. Hogg	I. B. Gault, C. D. Sutherland, D. Golightly	W. Greaves	Cairns, Noble & Co.
Cairngowan	GNZZ	22.10 55	I. G. Foster	A. R. Fairley, J. Lobban, A. Stanton	E. Johnston	Cairns, Noble & Co.
Calchas	GMSS	25.6.56	D. R. Jones	K. MacDonald, W. A. P. Everitt, J. Cotter	D. M. Hughes	A. Holt & Co.
Caledonia	GCKR	9.3.56	—. Blair	D. Barclay, T. A. Patience, A. McKelvie	I. McConnel	Anchor Line, Ltd.
Calgaria	MAJB		J. H. Clinton	A. McGugan, D. A. Campbell, P. J. Telford	P. J. Brouder	Donaldson Line, Ltd.
Cambridge	MMBF	24 5.56	P. P. O. Harrison	D. Moran, P. W. Bower, R. F. D. Pook, N. McNish	E. Barley	Federal Steam Navigation Co., Ltd.
Canton	GDDT	12.4.56	J. C. W. Last, O.B.E.	K. S. Maclean, A. J. Arrowsmith, P. J. Clark, G. J. Jones	N. Fontaine	P. & O. Steam Navigation Co.
Cape Clear	GCKN	26.5.56	P. Farmborough	D. Cormack, G. V. Mackie, D. Cameron	J. M. Baker	Lyle Shipping Co., Ltd.
Cape Grafton	MAIF	17.5 56	C. A. Jones	N. Robertson, N. Fraser, J. White	E. Gregson	Lyle Shipping Co., Ltd.
Capetown Castle	GKGM	16.6.56	J. Trayner	T. McDowell, R. Marchment, R. Marsh-Feiley	R. Brew	Union Castle Mail S.S. Co., Ltd.
Captain Cook	GLBX	26.6.56	A. Bankier	C. Sheppard, N. Dalziel, A. Eadie	L. W. Hooper	Donaldson Bros. & Black, Ltd.
Carinthia	GVEQ		A. MacKellar, R.D., Capt. R.N.R. (Retd.)	A. J. Foster, G. E. Smith, K. T. Jones, J. Parry	R. N. Shaw	Cunard Steamship Co., Ltd.
Carnarvon Castle	GJSL	23.12.55	W. S. Byles, R.D., Capt. R.N.R.	J. A. Hopkinson, P. N. Rippon, B. R. Webb	H. G. Liggins	Union Castle Mail S.S. Co., Ltd.
Caronia	GYKS	25.6 56	G. H. Morris	D. J. Swinnerton, L. W. C. Rump, P. A. Seymour, W. M. Smith	I. G. W. MacDonald	Cunard Steamship Co., Ltd.
Carthage	GRNX	1.8.56	E. F. Ferraby	H. C. N. Hyde, P. Kennard, M. Hardie	—. Arthurs	P. & O. Steam Navigation Co.
Caslon	MCJR	22.3.56	J. M. Cherry	D. J. Powell, R. G. Goodfellow, P. R. Robinson	T. Growther	Runciman (London), Ltd.
Cavina	GKFV	6.9.56	J. Kinsley	O. N. D. Selwood, D. Howell, D. Ely	W. McHugh	Elders & Fyffes, Ltd.
Caxton	GCDX	14.4.56	C. M. Mortimere	C. McCleod, J. Woods, G. Moss	W. P. M. Edmunds	Runciman (London), Ltd.
Ceramic	GFLM	2.2.56	F. A. Smith	I. K. McIntosh, D. G. Model, B. Smith, —. McLennan	—. Waterhouse	Shaw, Savill & Albion Co., Ltd.
Chantala	GQMR	20.8.56	L. W. Smith	B. J. Biddick, A. Matthews, M. R. Stubbington	R. D. Dingley	British India Steam Nav. Co., Ltd.

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Managers
Chepman	GFVR	27.8.56	F. J. Hamilton	M. St. Clair-Miller, J. W. Peck, E. S. Peers	P. F. Prime	Runciman (London) Ltd.
Cheshire	GLXV	7.8.56	A. N. Williamson	J. F. Code, R. Weir, R. B. Calvert	G. Talbot	Bibby Bros. & Co.
Chindwara	GFRT	21.8.56	B. A. Rogers, D.S.C., R.D., Cdr. R.N.R.	J. A. Stanton, T. Bogie, A. T. Wulloch	J. Downey	British India Steam Nav. Co., Ltd.
Cilicia	GDGL	23.7.56	R. Blake	A. McKendrick, W. A. Cowan, J. Kane	H. Milligan	Anchor Line, Ltd.
Cingalese Prince	GFRC	29.5.56	R. C. Proctor, O.B.E.	D. Milburn, J. F. Newton, K. E. Maxwell	K. McQuire	Prince Line, Ltd.
City of Barcelona	GTKR	3.9.55	A. N. Fry	J. A. Cucksey, A. A. C. Mason, C. I. Free	A. M. Adams	Ellerman Lines, Ltd.
City of Birmingham	GZLR	26.7.56	E. M. Robertson	T. M. Dickson, R. Bellhouse, I. Bernard	J. D. Clutton	Ellerman Lines, Ltd.
City of Brisbane	GDLM	14.6.56	E. G. Chapman	A. K. Comrie, F. W. Brand, W. M. Fieldhouse, A. M. Bowman	F. E. L. Hall	Ellerman Lines, Ltd.
City of Bristol	GCPN	6.8.55	W. A. Owen	C. H. Long, R. I. MacNab, I. G. Lumley, L. R. Jones	E. Fitzgerald	Ellerman Lines, Ltd.
City of Cape Town	GBBQ	14.9 56	A. Deaton	J. E. Christian, K. C. Powell, T. Mallory	D. R. Green	Ellerman Lines, Ltd.
City of Carlisle	GBJK	4.9.56	E. M. Jenkins	J. B. Waugh, W. Fleming, C. Ogg	F. E. L. Boyak	Ellerman Lines, Ltd.
City of Chester	MAHN	9.8.56	A. L. Beckett	J. S. Nuttall, G. Stewart, J. G. Hill, J. Knight	C. K. Cotching	Ellerman Lines, Ltd.
City of Delhi	GLBW	6.12.55	W. S. Lowe	R. Bailey, W. Fleming	W. Sharp	Ellerman Lines, Ltd.
City of Derby	GFWC	6.6.56	W. McCulloch	D. Turner, A. G. Willa, M. J. Swift	A. J. Griffiths	Ellerman Lines, Ltd.
City of Durham	GBJM	7.9.56	D. Hamilton	D. S. Taylor, F. C. O'Neill, G. A. Pratley	D. E. Gudgeon	Ellerman Lines, Ltd.
City of Edinburgh	GNGC	4.5.56	P. Byrhes	R. Frame, K. L. Murray, R. Fletcher, R. Birch	I. Morgan	Ellerman Lines, Ltd.
City of Evansville	GJNF	17.9.56	R. S. Steel	G. H. Salter, J. K. Ashby, W. S. Coutts	B. W. Evans	Ellerman Lines, Ltd.
City of Johannesburg	GBKW	26.5.56	W. J. Merchant	P. Collin, A. M. Oxberry, M. J. Cole	M. McL. Riley	Ellerman Lines, Ltd.
City of Khartoum	GBZC	23.7.56	T. G. Mathias	R. B. Perry, J. Petter, A. Evans	J. F. Doocey	Ellerman Lines, Ltd.
City of Lichfield	GCXL	4.6.56	G. R. Jackson	C. M. R. Cook, —. Staines, J. Graines	I. Fox	Ellerman Lines, Ltd.
City of Lille	GSLN	12.5.54	H. Mackie	F. W. More, D. Wright, G. H. Watkins	A. T. Murray	Ellerman Lines, Ltd.
City of Liverpool	GZJX	6.3.56	F. M. Wormsley	P. Thornton, —. Heywood, A. S. Conyers	—. Peat	Ellerman Lines, Ltd.
City of Lyons	GMCN	25.6.56	W. Howel	T. R. H. Lane, J. Kinley, D. W. Asquith	E. D. McMahon	Ellerman Lines, Ltd.
City of Manchester	GXLD	20.7.56	W. A. Hannah, O.B.E.	B. J. Lewis, P. H. Soones, S. G. Hider	A. J. Duggan	Ellerman Lines, Ltd.
City of New York	GLYQ	4.7.55	A. M. Westlake	B. J. Lewis, P. Boyle, P. A. Embley	J. Herron	Hall Line, Ltd.
City of Pretoria	GBLN	6.9.56	A. G. Freeman	C. J. P. Rogel, I. McBeath, P. E. Pope, W. A. Browne	K. G. Arthur	Ellermans & Bucknall S.S. Co., Ltd.
City of Swansea	GBZT	13.8.56	J. Vizer	D. Steward, R. Clark, D. Cullen, R. Purkiss	J. Hinds	Ellerman Lines, Ltd.
City of Sydney	GSFM	21.8.56	E. H. D. Routledge	D. W. Platten, L. R. Keith	A. H. A'Hearne	Ellerman Lines, Ltd.
Clan Brodie	GKPD	10.9.56	A. V. Gordon	M. Bolton, A. Crawford, A. D. Munro	D. Rae	Cayzer Irvine & Co., Ltd.
Clan Buchanan	GKNM	13.4.56	R. T. Booth	R. Escolme, J. Butness, D. Morris	J. H. Roberts	Cayzer Irvine & Co., Ltd.
Clan Campbell	GDZK	3.5 56	H. C. Simpson, O.B.E.	R. K. Wilson, P. Kent, C. B. Walgate, R. A. Robertson	R. F. Cole	Cayzer Irvine & Co., Ltd.
Clan Chattan	GFBX	4 6.56	J. McCrone	J. Currie, I. S. A. Rendell, K. Barr	E. Shillabeer	Cayzer Irvine & Co., Ltd.
Clan Chisholm	GFBY	3.5.56	W. R. Woodriffe	G. A. Berry, J. Ibester, G. E. Mitchell, D. Tooms	J. W. S. Wilson	Cayzer Irvine & Co., Ltd.
Clan Davidson	MAWU	9.4.56	T. A. Watkinson	T. Graham, R. Simmons, J. Sutherland	G. D. Ainsley	Cayzer Irvine & Co., Ltd.
Clan Forbes	GPGB	28.4.56	I. C. Scott	H. S. Guthrie, R. Snape, C. L. Lea-Swain, W. L. Lindsay	P. H. Cottrill	Cayzer Irvine & Co., Ltd.
Clan Macaulay	GZCS	2.8.56	A. G. MacPherson	L. O'Keefe, F. King, C. Gowans	C. Haggerty	Cayzer Irvine & Co., Ltd.
Clan MacDonald	GCPG	30.7.56	A. J. Hogg	M. N. Ure, G. Johnson, M. C. Banbury, N. D. MacGregor	G. Martyn	Cayzer Irvine & Co., Ltd.

Clan MacDougall	GFBQ	4.7.56	P. MacMillan	A. Mair, A. R. MacIntyre, C. Lamaletie, M. Fowkes	C. E. C. Crewe	Cayzer Irvine & Co., Ltd.
Clan MacKinnon	GKLX	22.8.56	R. N. Mayo	O. T. Ross, J. Campbell, P. J. Morrison	G. Norton	Cayzer Irvine & Co., Ltd.
Clan MacLaren	GSSC	25.6.56	V. Green	B. H. Bowen, I. H. Ward, E. Taylor, M. B. Ayles	R. W. Moore	Cayzer Irvine & Co., Ltd.
Clan Maclay	GSTV	12.6.56	S. S. Davidson	J. D. W. Chapple, C. Stonehouse, A. F. Aspin, A. H. Tompson	D. Paterson	Cayzer Irvine & Co., Ltd.
Clan MacLean	GWSX	18.7.56	H. Whitehead	K. H. Dann, H. S. Catterall, J. M. Brackenridge	T. Martin	Cayzer Irvine & Co., Ltd.
Clan Macrae	MAHP	16.7.56	H. Lockyer	B. J. Johnson, G. Anderson, S. Shaw	D. W. Powell	Cayzer Irvine & Co., Ltd.
Clan MacTavish	GUBB	22.8 56	E. Gough, O.B.E.	I. M. Shearer, E. V. Inch, I. Dalziel, R. A. Green	W. Ellmers	Cayzer Irvine & Co., Ltd.
Clan Robertson	GRQQ	9.4.56	H. J. Anchor, O.B.E., R.D., Capt. R.N.R. (Retd.)	J. A. Brown, G. Reid, J. L. Harris, J. Patterson	A. Hadden	Cayzer Irvine & Co., Ltd.
Clan Shaw	GBYW	11.8.55	L. C. Higgins, M.B.E.	J. T. Messenger, L. Hamer, J. G. Smith	G. H. Hudd	Cayzer Irvine & Co., Ltd.
Clan Sutherland	GFWZ	9.8.56	F. H. Turton	P. A. Macuiven, A. M. Miller	W. Gay	Cayzer Irvine & Co., Ltd.
Clan Urquhart	GFBK	27.8.56	C. M. Powell, M.B.E.	B. Middleton, M. Silvers, T. R. Halliday	T. Jones	Cayzer Irvine & Co., Ltd.
Clydebank	GKLM	14.3.55	F. Hale	W. C. Stoddard, R. Spedding, H. R. Hall	E. B. Maquire	Andrew Weir & Co., Ltd.
Condesa	MAHU	31.5.56	A. McEwan	A. Millie, V. Owen, A. de Couray-Ellis	A. Davy	Furness-Houlder Argentine Lines, Ltd.
Consuelo	GCGQ	8.11.55	G. Goodman	R. K. Youngman, N. O. Cook, B. Yale	C. Cain	Ellerman's Wilson Line, Ltd.
Corfu	GRNW	6.6.56	C. K. Fox	I. N. H. Davies, A. Merrick, J. A. G. Jones	B. C. McCorry	P. & O. Steam Navigation Co.
Corinaldo	GMKP	24 3.56	R. McNie	W. G. Cullen, N. C. Halden, A. Dougall	A. Cox	Donaldson Bros. & Black, Ltd.
Corinthic	GZYL	29.5.56	A. C. Jones	G. Broom, P. Hogg, R. Frisby, A. B. Dann	—. Lilles	Shaw, Savill & Albion Co., Ltd.
Corrales	GSJL	6 9.56	T. C. Crane	G. Wallis, D. Beighton, C. M. Bell, R. Box	D. Oliver	Elders & Fyffes, Ltd.
Cotopaxi	GQNX	30 11.55	J. D. Richards	D. J. Bishop, R. D. O'Driscoll, E. Gowland	M. M. Garbett	Pacific Steam Navigation Co.
Cretic	GTFP		V. H. Vizer	W. A. Murison, W. A. Siddal, K. Mudd	H. Berson	Shaw, Savill & Albion Co., Ltd.
Crofter	MNGX	11.7.56	E. B. Stephens	G. Lovell, H. Sutcliffe, R. Maywell	F. Gething	T. & J. Harrison, Ltd.
Cumberland	GPPY	20.1.56	A. E. Williams	G. Lowery, J. T. Varney, P. G. R. Rankin	R. Oliver	Federal Steam Navigation Co., Ltd.
Cuzco	GKPF	27.9.56	R. D. S. Eckford	R. M. Attwater, P. Guerrier, G. D. Pattison	V. Dalton	Pacific Steam Navigation Co.
Daleby	MFBV	29.5.56	F. D. Lloyd	K. Barnett, E. H. Williams, D. Rogers	M. R. Carney	Ropner Shipping Co., Ltd.
Darro	MAID	19.7.56	W. S. Thomas	R. R. Thompson, R. J. Kistler, P. R. Brown, J. A. Lebrecht, J. G. Russell	H. Littlecot	Royal Mail Lines, Ltd.
Debrett	GRPR	10.3.56	C. E. Legg	W. L. Murphy, P. L. Brecknell, I. W. Waller	J. James	Blue Star Line, Ltd.
Deerpool	GKDY	9.8.56	R. Anderson	A. C. Duncan, D. Small, W. Clarke	J. M. Barry	Sir R. Ropner & Co., Ltd.
Delphic	MBLQ	15.8.56	C. L. Carroll, D.S.C., R.D., Lt.-Cdr. R.N.R. (Retd.)	R. Fulford-Dobson, B. Bloxham, J. Bakewell	P. W. Booth	Shaw, Savill & Albion Co., Ltd.
Deseado	MAIH	30.5.56	R. C. S. Woolley, R.D., Cdr. R.N.R. (Retd.)	C. Earl, A. Hawkins, J. Shepherd	G. Adamson	Royal Mail Lines, Ltd.
Devis	GFKT	3.9.56	W. T. Pitcher	R. J. Webb, W. J. Neill, D. Smaller	P. R. Kelly	Lamport & Holt Line, Ltd.
Devon	GDRF	25.6.56	J. E. Bury	J. Thorpe, L. Bridges, P. Ireland	C. Francis	Federal Steam Navigation Co., Ltd.
Devonshire	GTTV	20.4.56	H. Kerbyson	—. Ashton, R. Pitts, G. H. Draysey	A. Jones	Bibby Bros. & Co.
Dilwara	GYQV	19.9.56	M. C. Williams	R. J. Elston, R. A. Norman, I. K. Bowerman, R. B. Coates	S. J. Taylor, M.B.E.	British India Steam Nav. Co., Ltd.
Discovery II	GWVM	1.12.55	H. D. L'Estrange, D.S.C., R.D., Cdr. R.N.R.	R. W. Major, R. M. Frederick, I. R. Norrington	—. Miller	National Institute of Oceanography
Dominion Monarch	GRGG	19.7.56	K. G. Fisher	M. Thornton, C. Tucker, G. Pallet	F. V. Harford	Shaw, Savill & Albion Co., Ltd.
Dorset	GZFQ	11.6.56	K. Barnett	W.D.F. Cooper, T. M. Bosworth, M. Wood	E. H. Caley	Federal Steam Navigation Co., Ltd.
Drina	MAIL	2.8.56	A. Barff	C. C. Cowley, J. McDermott, W. M. Wheatley, J. Russell	W. B. Charlton	Royal Mail Lines, Ltd.
Duke of Athens	GMYS	27.7.56	L. W. Loose	E. W. Rickard, R. Fellowes, S. Vass	J. I. Waddell	Trent Maritime Co., Ltd.

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Managers
Dunedin Star	GKKT	30.7.56	J. D. W. Davies	O. J. Edwards, D. J. Robertson, J. Hutton	J. Bulmer	Blue Star Line, Ltd.
Dunera	GBBR	23.4.56	A. A. Kay	D. Matthews, P. Davis, H. B. Chambers	T. F. Holden	British India Steam Nav. Co., Ltd.
Durango	MAIM	26.6.56	F. A. C. Thacker	P. C. T. Davies, I. V. Berry, R. Fairley, G. Rogers	E. A. C. Franklin	Royal Mail Lines, Ltd.
Durban Castle	GPGP	3 9.56	J. E. R. Wilford, R.D , Cdr. R.N.R. (Retd.)	J. C. A. Drake, W. Kirkbride, F. J. Pigeon	J. Drover	Union Castle Mail S.S. Co., Ltd.
Durham	GWWK	10.9.56	A. Hocken	C. B. Treleaven, G. Bevis, D. Hannah, J. Needam	P. Dickson	Federal Steam Navigation Co., Ltd.
Edenfield	GFJF	4.9.56	J. F. Blaikie	C. P. Douglas, J. Hayes, G. Bell	A. H. Arthurs	Hunting & Son, Ltd.
Edinburgh Castle	GOHN	10.8.56	R. A. D. Cambridge, D.S.C., R.D., Cdr. R.N.R.	I. R. Mason, —. Spencer, —. Wearing	J. Hodgson	Union Castle Mail S.S. Co., Ltd.
Egidia	GJZD	6.2.56	D. Barclay	R. Watt, J. McLarty, —. Stockley	F. Blyth	Anchor Line, Ltd.
Elysia	GJZK	12.3.56	A. J. F. Colquhoun, M.B.E.	W. B. Sawyers, A. T. McKendrich, A. J. Dickie, M. McLaren	A. R. Prole	Anchor Line, Ltd.
Empire Clyde	GDXS	2.3.56	A. C. Johnston	B. Douglas, T. McCutcheon, K. Muir	W. Thompson	Anchor Line, Ltd.
Empire Fowey	GMFW	5.6.56	W. T. C. Lethbridge	B. Latham, P. Love, D. White, B. Thompson	W. Dawson	P. & O. Steam Navigation Co.
Empire Ken	GKZJ	23.6.56	H. E. Sang	B. Challis, G. Gulson, J. Thwaites, T. Bleddyn	T. Winslow	Royal Mail Lines, Ltd.
Empire Orwell	GRCB	19.6.56	J. D. Birch, D.S.C., R.D., Cdr. R.N.R. (Retd.)	D. Hughes, —. Le Vine, T. McCarthy	A. Shippam	Orient Steam Navigation Co., Ltd.
Empire Star	GCDP	25.6.56	F. N. Johnson, M.B.E.	D. McWhan, R. M. Burns, G. Grisford	J. Nesbit	Blue Star Line, Ltd.
Empress of Britain	GUCH		C. L. de H. Bell, D.S.C., R.D., Cdr. R.N.R. (Retd.)	J. A. Griffin, J. Richardson, M. Lester	C. H. Roberts	Canadian Pacific S.S., Ltd.
Empress of France	GNTV	24.9.56	C. L. de H. Bell, D.S.C., R.D., Cdr. R.N.R. (Retd.)	J. Bryan, R. Davies, M. Scott	T. Shannon	Canadian Pacific S.S., Ltd.
Empress of Scotland	GMLV	28.1.56	J. P. Dobson, D.S.C., R.D., Capt. R.N.R.	G. Coton, R. Elliot, R. Dickinson, N. Walker	B. Campbell	Canadian Pacific S.S., Ltd.
Endeavour	ZMSH		H. Kirkwood, O.B.E., D.S.C., Actg. Capt. R.N.	D. Schofield, G. Poole		New Zealand Government
English Star	MFSS	3.4.56	L. Vernon, M.B.E.	C. R. Worthington, H. A. Sproul-cran, D. G. McNeil	H. B. Smith	Blue Star Line, Ltd.
Essequibo	GKPK	26.7 56	J. Allason-Jones	D. H. McCree, W. G. Henderson, N. R. Slacke, A. S. Milward	P. Snaith	Royal Mail Lines, Ltd.
Essex	GMML	14.6 56	A. C. Davies	P. J. Sedgwick, B. M. Leek, J. Cosker, P. N. Jeanes	R. Baker	Federal Steam Navigation Co., Ltd
Essex Trader	GCMS	5.9.56	R. E. Bennett	E. Atkinson, K. Staniszewski, J. I. Sharp	T. W. Elliot	Trader Navigation Co., Ltd.
Esso Cambridge	GRWJ	17.5.56	R. Drummond	J. M. Phillips, T. Thain, J. Wilson, J. Cottan, D. J. Davies		Esso Transportation Co., Ltd.
Esso Canterbury	GQZF	10.8.56	J. W. Smith	P. O'Connor, S. R. Arthur, S. Moffitt	B. Blake	Esso Transportation Co., Ltd.
Esso Exeter	GSTS	3.5.56	R. M. Kerr	G. Thomas, I. Petnie, V. Donovan	J. Clarke	Esso Transportation Co., Ltd.
Esso Glasgow	GTXC	24.8.56	W. Brians	R. G. Allen, N. MacLean, R. Phillips	C. Turner	Esso Transportation Co., Ltd.
Esso Manchester	GWCD	17.8.56	E. Orr	M. Backhouse, D. G. Boothroyde, R. Mitchell	N. Grice	Esso Transportation Co., Ltd.
Eucadia	GJZL	12.1.56	W. MacVicar, M B.E.	J. S. Watson, F. M. Dare, A. Johnston	D. Sproat	Anchor Line, Ltd.
Eumaeus	MRWT	27.9.56	H. C. Large	J. G. R. Taylor, R. Dodge, J. C. Creer	P. Dodge	A. Holt & Co.
Explorer	GYJX	22.8.56	W. S. Eustance	W. L. Ashton, G. F. Smith, C. Harkiness	T. O. Looney	T. & J. Harrison, Ltd.
Factor	GPZV	27.8.55	R. Williams	R. Bell, R. H. Douglas, J. G. Morris	N. Davitt	T. & J. Harrison, Ltd.

Fanad Head	GNQQ	21.8.56	J. Alexander	L. B. Fleming, T. A. F. Austin, E. McIntosh, A. W. Burns	J. Lyons	G. Heyn & Sons, Ltd.
Flamenco	GCBV	9.8 56	T. H. McGill	A. G. Corbet, E. J. Pepper, C. Taylor	J. Sherwood	Pacific Steam Navigation Co.
Franconia	GBRQ	10.8.56	D. N. MacLean, D.S.C., R.D., Capt. R.N.R. (Retd.)	T. H. Boyd, R. J. Hardman, A. J. Hutcheson, D. Lee, J. B. Clemenson, A. Hurtley	F. P. Bishop	Cunard Steamship Co., Ltd.
Fremantle Star	MQFT	16.9.55	C. R. Horton, D.S.C.	J. A. F. Jenkins, C. Smeaton, C. T. Whitaker, R. Moreland, G. Marsh	M. J. Sheeman	Blue Star Line, Ltd.
Fresno City	GBYD	16.4.56	J. Cox	J. Ford, S. P. W. White	P. Hammond	Sir William Reardon Smith & Sons, Ltd.
Gallic	GFNC		A. G. Gorham	D. C. Woodall, J. Seck, R. Mortimer	F. Chan	Moller's, Ltd.
Garvelpark	GKSV	24.9.56	W. Tawse	A. Galbraith, A. Rogers, A. Scott	D. Bissell	Messrs. J. & J. Denholm, Ltd.
Geelong Star	GNWF	23.7.56	J. S. Crowe	G. Stubbings, M. Squibbs, P. Gilks	C. Gaffney	Blue Star Line, Ltd.
Glenartney	GBLG	4.9.56	A. S. Wood	J. R. Eaton, M. J. Glover, G. Templeton	B. I. Chamberlin	Glen Line, Ltd.
Glenbank	GKLC	25.2.56	H. A. Carver	J. Bain, H. J. Pope, J. P. Morgan	T. J. Hayes	Andrew Weir & Co., Ltd.
Glenorchy	GBLL	22 8.56	R. A. Hanney	W. Hopkins, C. M. F. Hill, J. Pilling, J. D. Williams	A. H. Hill	Glen Line, Ltd.
Gloucester	MANK	10.3.56	D. A. G. Dickens, Lt R.N.R.	D. Blackman, L. Howell, J. Piner	A. Wake	Federal Steam Navigation Co., Ltd.
Gloucester City	GKJS	23.7.56	S. G. Smith, O.B.E.	L. T. Williams, J. R. Campbell, C. J. Harfoot	—. Brett	Chas. Hill & Sons
Golfito	GBYL	19.9.56	T. H. Bull	N. Thomas, E. A. Whitehouse, T. C. Millings	P. J. Kelly	Elders & Fyffes, Ltd.
Gothic	MAUQ	15.8.56	L. J. Hopkins	T. J. Oliver, R. O. Guille, P. Griffin	B. McGovern	Shaw, Savill & Albion Co., Ltd.
Graig	MFDS	25 6 56	S. Glynn-Woods	D. J. Owen, W. Abramowieg, K. Krutaines	E. H. Grover	Idwal Williams
Granford	MQGC	17.9.56	H. Garrett	L. Taylor, F. J. Tinsley, E. Wellburn	A. Watcham	Goulandris Bros., Ltd.
Great City	GBYS	6.6.56	D. Beynon	J. Attwood, G. E. Ellerby, P. J. Harry	R. R. Caldwell	Sir William Reardon Smith & Sons, Ltd.
Grelmarion	MAHQ	13.7.56	L. M. Davies	D. Oates, J. Dixon, T. Jackson	J. Broomhall	Cardigan Shipping Co., Ltd.
Haparangi	GJYX	28.4.56	D. Chadwick	B. Pusey, T. Rowland, W. Hooley	E. Graham	New Zealand Shipping Co., Ltd.
Hartington	GFCZ	13.8.56	H. Small	A. Slade, M. J. Clark, A. Dumas	S. Patterson	J. & C. Harrison, Ltd.
Hauraki	GJLV	15.2.55	R. G. Hollingdale	J. Stringfellow, P. Fletcher, P. Lay, I. F. Smith	K. Higham	New Zealand Shipping Co., Ltd.
Hector	GDNK	5 6.56	G. R. Chetham	—. Pisher, W. E. Roberts, P. A. Rothery	D. W. Rae	A. Holt & Co.
Helenus	GBTM	22.5.56	F. N. Fisher	J. Leggitt, C. A. Hales, F. Howarth, M. L. Robinson	D. L. Colley	A. Holt & Co.
Helicina	GKBC	5.9.56	D. E. Jones	J. R. Saunders, A. C. Watson, C. Stancroom, G. Brown	N. A. Gilchrist	Anglo-Saxon Petroleum Co., Ltd.
Hertford	GKNW	29 3.56	N. A. Thomas	J. Laidlaw, D. Burdett, D. Mitchell, J. Waples	H. Hare	Federal Steam Co., Ltd.
Highland Brigade	GLKN	4.5.56	T. Powell	R. R. New, A. Heather, P. Shephard, P. Hunter	T. Desboro, M.B.E.	Royal Mail Lines, Ltd
Highland Chieftain	GCTY	24.7.56	P. M. Burrell	A. Stevens, R. E. Forrester, T. Parks, J. Escolure	W. Rollason	Royal Mail Lines, Ltd.
Highland Monarch	GMZF	13.4.56	C. E. Mason	R. Byles, J. Salt, D. Henderson, P. Williams	F. R. Dunk	Royal Mail Lines, Ltd.
Highland Princess	GFMN	31.8.56	H. A. Wright	G. Moat, R. Brockbank, S. Philips	F. Goodall	Royal Mail Lines, Ltd.
Hilary	GQVM	23.4.56	J. H. Stoker	G. Calvert, D. J. Taylor, J. B. Burke	A. Newcombe	Booth S.S. Co., Ltd.
Hildebrand	GKTK	22.6.55	J. Whayman, D.S.C., R.D., Capt. R.N.R.	G. Potts, J. Kerr, F. Cavendish	D. Douglas	Booth S.S. Co., Ltd.
Himalaya	GBDK	27.8.56	R. G. Freeman	N. D. Smith, P. R. P. Bishop, H. F. Hossel	J. F. Clarke	P. & O. Steam Navigation Co.
Hinakura	GDVS	15.10.55	N. L. Warren	R. A. Wilson, J. Massow, R. L. Mann	G. Miller	New Zealand Shipping Co., Ltd.
Hororata	MANZ	18.6.56	H. R. M. Smith	B. Whybrow, W. J. Hooley, O. B. Embleton	W. G. Thomas	New Zealand Shipping Co., Ltd.
Hubert	GSBF	28.5 56	J. Whayman, D.S.C., R.D., Capt. R.N.R.	B. C. D. Franklin, G. W. Walker, D. Panagakis	F. Fitzgerald	Booth S.S. Co., Ltd.
Huntingdon	GFCT	29.8.56	P. S. Calcutt	M. Carrell, B. Baggot, P. Plumley	T. N. Green	Federal Steam Navigation Co., Ltd.

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Hurunui	GJZF	19.6.56	F. Power	D. E. Smith, C. Masson, G. Silver, A. Smith	A. Sadler	New Zealand Shipping Co., Ltd.
Hyrcania	MADE	14.5.56	E. W. V. Garrett	R. S. Walker, N. Parkington, J. Callan	J. Keeman	Baltic Trading Co., Ltd.
Imperial Star	GIAC	1.10.56	G. C. Goudie	P. J. Ellett, G. Miles, W. Blennerfeld, D. Booth	D. Whitehead	Blue Star Line, Ltd.
Inishowen Head	KAOC	28.3.56	H. N. Clarke	S. Thompson, D. J. McDowell, E. L. Seaton	A. E. Adams	G. Heyn & Sons, Ltd.
Interpreter	GPZY	28.9.56	W. Weatherall	D. Sowden, E. Ashdown, J. Kaighen	J. G. Jones	T. & J. Harrison, Ltd.
Inverbank	GKML	11.1.55	R. A. Lorrains	D. S. Hoskins, J. F. Campbell, C. Strachan	V. R. Rowe	Andrew Weir & Co., Ltd.
Ivernia	GTKX	11.9.56	J. W. Caunce, R.D., Cdr. R.N.R. (Retd.)	P. M. R. Bingham, T. P. Jones, V. Charles	F. Brown	Cunard Steamship Co., Ltd.
Ixion	MLLB	19.7.56	R. Blakey	A.T. Moody, W.B. Bannerman, P.M. Davis	W. W. Beebee	A. Holt & Co.
Jamaica Producer	VPLM	20.9.56	T. A. Kidd	M. S. Middleton, I. Irving, M. Balcher	J. Stripp	Kaye Son & Co., Ltd.
Jason	GBMW	28.8.56	D. W. Stroud	J. W. Niblock, H. J. Bowers, T. H. Leggatt	I. T. Davies	A. Holt & Co.
John Biscoe	VPNE					Government of the Falkland Islands
John Holt	GNFD	20.9.56	W. R. Atkinson	L. W. Rothwell, J. C. Jones, W. Jones	W. R. Hughes	Guinea Gulf Line, Ltd.
Journalist	MSFQ	23.6.56	T. G. Holden	J. O. Dickenson, R. Robinson, —. Dodds		T. & J. Harrison, Ltd.
Kenilworth Castle	MQLP	14.3.56	J. A. Aplin	R. W. Smith, H. Burless, J. Cutcliffe, G. C. Ceaze	D. Gillow	Union Castle Mail S.S. Co., Ltd.
Kenuta	GCBW	1.3.56	T. J. Naylor	A. Menzies, —. Turner, R. Dewsnap	I. W. Dick	Pacific Steam Navigation Co.
King Robert	MAON	21.3.56	G. F. Smith, O.B.E.	T. Harcus, A. Dixon, G. Boyle	R. Green	King Line, Ltd.
King William	GNVF	7.8.56	J. C. Davies	V. McCarthy, W. Moss, H. A. Banks	D. Gray	King Line, Ltd.
Kohistan	GSFZ	23 5.56	T. Shields	J. E. Parker, N. Wray, G. Keen	S. Dorran	F. C. Strick & Co., Ltd.
Koyan	GKST	22.5.56	R. W. H. Aitken	W. H. Ross, M. F. M. Fair, G. B. Wootton	A. N. Gilbert	Henderson & Co.
Lalande	GNFL	30.6.56	L. A. Ankers	M. P. Roberts, P. V. des Landes, R. W. Ramsay	J. B. Christian	Lamport & Holt Line, Ltd.
Lanarkshire	GCTC	21.6.56	R. B. Lindsley	P. A. Smith, J. Baxter, J. A. Russell	R. Richardson	Turnbull Martin & Co., Ltd.
Langton Grange	MAOT	13.7.56	J. R. Faulkner	D. W. Luff, N. Foot, N. Roberts	D. L. Fomm	Houlder Bros. & Co., Ltd.
Lassell	GFND	28.1.56	J. King	J. Sampson, A. Corlett, E. Minshull	J. Brown	Lamport & Holt Line, Ltd.
Laurentia	GNDY	29.8.56	T. S. Graham	T. Scott, W. G. Cullen, W. Spowart	D. Murray	Donaldson Bros. & Black, Ltd.
Levernbank	GLPZ	25.2.56	R. A. Leach	J. Rigby, T. E. Alexander, P. J. Elder	G. J. Kelly	Andrew Weir & Co., Ltd.
Limerick	GNLF	27.7.56	R. F. Hellings	W. D. Garvey, H. G. Chafer, P. Johnson, M. Dawson	R. Bronham	Birt, Potter & Hughes
Linguist	GQBC	18.4.56	W. Weatherall	T. A. Butler, G. A. Caine, D. Lawrence	J. A. Duignan	T. & J. Harrison, Ltd.
Lismoria	GNKJ	26.6.56	J. L. McQueen	W. McKean, R. Allen, J. Henrickson	J. Limpitlaw	Donaldson Line, Ltd.
Livorno	GPWF	28.3.56	A. Hinchliffe	G. Reed, M. Robinson, W. Young	P. R. Roper	Ellerman's Wilson Line, Ltd.
Loch Avon	GMZT	24.4.56	G. M. Fletcher	R. J. Luke, N. Wardle, M. G. Martin	J. Greenlagh	Royal Mail Lines, Ltd.
Loch Garth	GMZY	25.7.56	G. S. Grant, R.D., Cdr. R.N.R. (Retd.)	J. A. Philip, A. Pickering, J. Crawford	F. Page	Royal Mail Lines, Ltd.
Loch Ryan	MAOZ	13.2.56	T. Stevens	M. Keen, M. Jones, R. Holford, J. Barton	L. C. Francis	Royal Mail Lines, Ltd.
London Pride	GKTJ	2.3.56	W. Bingham	D. P. Prince, A. Murgatroyd, J. Corcoran	P. B. Killeen	London Overseas Freighters, Ltd.
Lotorium	GBLP	13.1.56	N. Clarke	A. Rossouw, D. H. White, B. Lloyd	B. I. D. Mellors	Anglo-Saxon Petroleum Co., Ltd.
Macharda	GKKF	27.4.56	H. F. Scoins	W. Lloyd-Williams, J. J. Redden, R. C. Main, N. C. Humphries	G. Stone	T. & J. Brocklebank, Ltd.
Magdapur	GBJX	23.4.56	H. G. Allan, M.B.E.	G. R. Lucas, J. C. Long, G. R. Riley, C. D. Croall	D. C. Brown	T. & J. Brocklebank, Ltd.
Mahanada	GOFM	16.2.56	J. B. Newman	A. J. Bassi, P. F. Blackburn, W. G. M. Coles	T. Williams	T. & J. Brocklebank, Ltd

Mahout	GDZN	12.3.56	T. C. Eddy	J. H. Moore, J. Pattison, J. E. Millichap, W. R. Rance	J. Guthrie	T. & J. Brocklebank, Ltd.
Mahseer	GZSV	22.8.56	A. Hill, O.B.E.	J. S. Saxty, —. Woolfendon, M. C. Tait, T. Poole	—. Smith	T. & J. Brocklebank, Ltd.
Makalla	GOFN	4.9.56	H. Simpson	M. T. L. Woodcroft, A. P. Briggs, E. L. Jackson	C. Watson	T. & J. Brocklebank, Ltd.
Maihar	GSCL	3 3.56	J. Clarke	W. H. Clifford Hicks, D. Moore, J. Hanbridge	J. Davis	T. & J. Brocklebank, Ltd.
Malancha	GZRD	23.7.56	J. G. Nuttall	P. Margeson, W. Adam, D. R. Bond	H. K. Wrigley	T. & J. Brocklebank, Ltd.
Malayan Prince	GNSQ	30.7.56	G. G. Rich, M.B.E.	M. A. Greig, R. C. Redman, D. C. Burgess	D. Briggs	Prince Line, Ltd.
Manchester City	GBBP	6.4.56	W. Hine, R.D., Lt.-Cdr. R.N.R. (Retd.)	E. Weekes, M. Barnes, P. Saunders, P. B. Webster, A. W. M. Adlam	J. Kane	Manchester Liners, Ltd.
Manchester Explorer	GNBK	18.8.56	W. E. G. Oliver	J. Baker, P. Webster, L. Fletcher	T. G. Jones	Manchester Liners, Ltd.
Manchester Mariner	GSPD	14.5.56	W. E. Quirk, R.D., Cdr. R.N.R.	K. Lehepuu, G. R. Thompson, K. W. Rourke	P. B. McNab	Manchester Liners, Ltd.
Manchester Merchant	MGZQ	15.5.56	W. H. Downing	D. W. Whitworth, P. N. Fielding, J. S. Watson	A. T. S. Broadbent	Manchester Liners, Ltd.
Manchester Pioneer	GNVG	24.3.56	A. Starmier	G. B. Hannaford, P. Cullen, M. Barnes	J. Buchanan	Manchester Liners, Ltd.
Manchester Port	GYNF	23.4.56	J. L. McLaren	A. H. Swan, A. Cowell, R. Dale	M. Doran	Manchester Liners, Ltd.
Manchester Progress	GPGD	21.1.55	M. Bewley	J. C. Elliot, E. Askew, J. Hancock	J. Sterry	Manchester Liners, Ltd.
Manchester Prospector	GQKV	28.8.56	E. Lewis	J. Tillingworth, J. Law, P. Jones	W. B. MacPherson	Manchester Liners, Ltd.
Manchester Regiment	GBRD	27.7.56	F. Downing	A. O. Copeland, J. E. Askew, J. T. Bird	L. McDonald	Manchester Liners, Ltd.
Manchester Shipper	MAPC	23.4.56	H. Hancock	N. T. Storr, A. Adlam, P. N. Fielding, A. Morris	W. Critchley	Manchester Liners, Ltd.
Manchester Spinner	GNVB	9.12.55	F. L. Osbourne	P. Cresswell, M. J. Butler, D. Millard	J. Reid	Manchester Liners, Ltd.
Manchester Trader	GMWG	21.3.56	W. E. Quirk, R.D., Cdr. R.N.R.	W. Boye, W. Anderson, J. A. McKay	B. E. Bewley	Manchester Liners, Ltd.
Manchester Vanguard	MWMN		W. E. Quirk, R.D., Cdr. R.N.R.	A. O. Copeland, —. Tester, N. W. Cockshoot	D. Spooner	Manchester Liners, Ltd.
Manchester Venture	GVDL		J. E. Jones	J. McKay, H. Evans, J. M. Rushworth	E. Gill	Manchester Liners, Ltd.
Mandasor	GBNY	26.4 56	E. L. Jones	D. F. Barratt, H. F. Newell, P. Gunson	B. Beecham	T. & J. Brocklebank, Ltd.
Manistee	GRXC	29.5.56	F. J. Barber	L. N. Gray, K. Leslie, J. Beatson	L. Varmen	Elders & Fyffes, Ltd.
Maplecove	GNLX	4.6.56	N. C. H. Scallan, R.D., Cdr. R.N.R.	R. Elliott, N. Saddington, P. C. Lovell-Smith	J. Franklin	Canadian Pacific S.S., Ltd.
Mapledell	GBBS	21.4.56	N. W. Duck, D.S.C., R.D., Capt. R.N.R.	C. D. Ward, D. Roberts, J. Richardson	W. Cumming	Canadian Pacific S.S., Ltd.
Marabank	GCCP	14.8.56	T. S. Robertson	E. H. Travers, R. F. Hamilton, D. C. Quinlan	J. D. Grennan	Andrew Weir & Co., Ltd.
Marengo	GLFW	31.8.56	S. Bennett	A. Parker, T. Connor, P. Willingham	M. Beirne	Ellerman's Wilson Line, Ltd.
Markhor	GTFZ	29.7.55	H. F. Scoins	D. D. Barlow, J. S. Munro	B. R. Banks	T. & J. Brocklebank, Ltd.
Martand	GTGG	14.4.56	H. Fosbrooke	P. W. Colville, R. Roberts, J. Mc.K. Coles	A. Halstead	T. & J. Brocklebank, Ltd.
Martita	GNQT	28.2.56	W. G. C. Alexander	J. R. Crane, W. S. Dockeray, D. Clifford	T. Herliny	Kaye Son & Co., Ltd.
Mataroa	GCSV	12.6.56	R. G. James, R.D., Capt. R.N.R.	L. Mounsey, B. Hinderwell, D. C. Andrews, I. Connell	E. L. Boyce	Shaw, Savill & Albion Co., Ltd.
Matheran	GOFQ	10.8.56	H. E. MacGregor	A. C. Stallard, P. Owen, O. Pritchard, T. Foilkes	J. Sheppard	T. & J. Brocklebank, Ltd.
Matina	GSZX	24.5.56	W. G. Lock	A. Booth, G. C. Wallis, H. E. Beyer, R. H. E. Evans	A. C. Knight	Elders & Fyffes, Ltd.
Mauretania	GTTM	28.8.56	C. S. Williams	P. N. Bonney, D. J. MacManus, H. Dove, L. Portet, P. King	A. Connock	Cunard Steamship Co., Ltd.
Media	GSWR	27.8.56	J. Crosbie-Dawson, D.S.C., R.D., Cdr. R.N.R.	H. L. Burn, R. Ogilvy, J. W. S. Dunn	A. F. Crosby	Cunard Steamship Co., Ltd.
Melbourne Star	GDFZ	29.5 56	G. Aldridge	A. Kinghorn, J. Collins, J. Rodgers	D. Fisher	Blue Star Line, Ltd.
Middlesex	MPBK	3.11.55	T. J. Alderman	C. P. Jones, I. Slater, R. E. Donald	E. Barley	Federal Steam Navigation Co., Ltd

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Managers
Monarch	GBDF	11.9.56	J. P. F. Betson	I. J. L. Lang, P. V. Flynn, D. Aldford	T. Tilly	H.M. Postmaster General
Muristan	MABB	26.6.56	E. E. Dunn	E. Cairns, J. F. Ockleford, M. A. J. Greenham	R. B. Barrie	F. C. Strick & Co., Ltd.
Myrtlebank	GLQB	17.7.56	L. W. Thorne	D. Campbell, G. D. Scott, A. Patterson	F. E. Anderson	Andrew Weir & Co., Ltd.
Napier Star	MAPN	23.7.56	R. H. Stark	G. C. Jones, D. L. Burt, P. J. Tindale, —. Gault, —. Stringer	—. O'Regan	Blue Star Line, Ltd.
Naticina	GIGH	20.8.56	J. A. McGherrie	W. T. Simson, D. A. Laidler, J. G. Wall	E. Cookson	Anglo-Saxon Petroleum Co., Ltd.
Nestor	GNZG	9.7.56	E. W. Studley	W. D. Clark, A. J. Forster, J. W. Rodgers, E. L. Stubbings	H. Roberts	A. Holt & Co.
New Australia	GZKD	2 8.56	J. W. Hart	D. Ede, J. Talbot, B. Roberts, —. Warricker, C. Wood, A. C. Read	W. Miller	Shaw, Savill & Albion Co., Ltd.
New York City	GYDD		A. L. Webb, O.B.E.	A. N. Couch, D. A. Braid, N. B. Roles	A. J. Brooks	Charles Hill & Sons
New Zealand Star	GYCR	13.6.56	E. N. Rhodes	R. Parker, M. Parsons, P. Hunt	T. Morrison	Blue Star Line, Ltd.
Newfoundland	GNMC	3.4.56	J. K. Kenyon	K. L. Row, J. Moore, K. Swinburne	T. Cahill	Furness Withy & Co., Ltd.
Norfolk	MMBD	6.7.56	W. J. T. Stevens	M. Field, A. Aston, A. Cripps, J. D. Hellings	J. Bilton	Federal Steam Navigation Co., Ltd.
Nordic	GDJC	12.6.56	F. S. Thornton, O.B.E.	E. Humphries, P. Tebbutt, R. M. Gardner	R. Drake	Prince Lines, Ltd.
Norseman	GBVS	29.10.55	R. E. Small	P. A. J. Edwards, W. R. Henderson, P. A. Shaw	J. Soper	Cable & Wireless, Ltd.
Nottingham	GCNC	11.6.56	J. James	P. Egan, E. Cooper, G. Caulfield, D. Marris	A. Harris	Federal Steam Navigation Co., Ltd.
Nova Scotia	GNNK	24.8.56	J. E. Wilson, O.B.E.	A. C. Wales, J. G. Smith, J. D. Ransome	W. C. Brock	Furness Withy & Co., Ltd.
Novelist	GMLG	29.5.56	R. H. Longster	R. J. Turnbull, F. Curry, J. Adamson	A. Moloney	T. & J. Harrison, Ltd.
Obuasi	GMLQ	23.7.56	J. A. Brook	S. Carside, R. A. Smith, G. Kendrick, F. W. Kitching	G. Barlow	Elder Dempster Lines, Ltd.
Oilfield	GNMN	11.9.56	W. H. Lawson	F. M. Cummings, B. W. Simpson, A. McPhee	P. Shine	Hunting & Son, Ltd.
Orari	GJKX	29.8.56	J. R. M. Ramsey	R. Michael, E. L. Hubbard, J. W. Stilkler	D. E. A. Watts	New Zealand Shipping Co., Ltd.
Orcades	MABA	11.6.56	A. C. G. Hawker, C.B.E.	E. H. T. Pickles, G. McGuffie, N. I. Collett	F. Miller	Orient Steam Navigation Co., Ltd.
Orion	GYKL	3.7.56	J. C. Stratford	G. Calvert, J. W. Spiers, G. B. Whitehead	F. Harrop	Orient Steam Navigation Co., Ltd.
Oronsay	GCNB	10.5.56	S. S. Burnnand	G. Munson, G. Woods, E. Robinson	R. Oakley	Orient Steam Navigation Co., Ltd.
Orontes	GBXM	12.6.56	A. E. Coles, R.D., Capt. R N.R.	D. Fraser-Storey, D. Steff, D. Gaffney	M. Palmer	Orient Steam Navigation Co., Ltd.
Orsova	GNDL	4.9.56	C. K. Blake, O.B.E.	J. M. B. Wells, R. Ellingham, B. Pickering, J. L. Chapman	P. Parish	Orient Steam Navigation Co., Ltd.
Otaki	GPBV	31.5.56	J. D. Bennett	S. Youngman, B. S. Smith, E. Norman	R. Heath	New Zealand Shipping Co., Ltd.
Otranto	GFKV	30.7.56	R. W. Roberts, O.B.E., D.S.C.	J. B. Jones, T. U. Caulder, N. Lawson	W. Clarke	Orient Steam Navigation Co., Ltd.
Pacific Fortune	GBFM	10.9.56	H. A. Shaw	A. Adams, A. Bruce-Smith, H. S. Jones	R. Thomas	Furness Withy & Co., Ltd.
Pacific Northwest	GQCP	20.8.56	F. H. Perry	P. Crone, R. Morris, A. Seabrook	H. Harris	Furness Withy & Co., Ltd.
Pacific Reliance	GMJK	18.2.56	P. F. Owens	J. Lee, D. J. Ball, D. G. Fuller	W. J. Jennings	Furness Withy & Co., Ltd.
Pacific Unity	GUAN	9.11.55	A. H. Cooke	E. Woods, D. Garside, N. Zavos	F. O'Shea	Furness Withy & Co., Ltd.
Pacuare	GCNX	31.7.56	R. H. Evans	D. W. Howell, C. Gilbert, J. Bull	T. Parker	Elders & Fyffes, Ltd.
Pampas	GCDL	1.3.56	L. T. Peterson	G. S. Vale, J. L. Frain, J. A. G. Arnott, W. M. Wheatley	A. Duggan	Royal Mail Lines, Ltd.
Papanui	GDJW	18.1.56	H. A. Owen	J. S. Thorpe, J. R. Gair, D. Hyde	P. C. Callender	New Zealand Shipping Co., Ltd.
Paparoa	GBCZ	19.4.56	J. D. Guyler	P. B. Butcher, A. A. Faulkner, I. M. Charlesworth, J. Hunter	I. Warr	New Zealand Shipping Co., Ltd.

Paraguay	MAQS	16.12.55	W. J. Phillips	B. M. Rowley, I. Parks, R. F. Dalgliesh	J. Talbot	Royal Mail Lines, Ltd.
Paraguay Star	GTNC	18.4.56	R. White, D.S.C.	I. Hay, M. J. Slessor, M. Moore, P. A. Stephens, R. Gibb	J. MacDonald	Blue Star Line, Ltd.
Pardo	GMNZ	3.8.55	W. Williams	R. E. Fairley, F. W. Chapman, C. B. Lambert	M. B. Wood	Royal Mail Lines, Ltd.
Parima	GCLQ	28.4.56	T. Fraser, D.S.C., R.D., Cdr. R.N.R.	R. Sly, J. Cox, T. P. Davies	T. O'Shea	Royal Mail Lines, Ltd.
Parthia	GSWQ	21.8.56	S. A. Jones, R.D., Cdr. R.N.R. (Retd.)	R. P. Wakefield, T. A. Nicholson, W. M. Douglass	A. O'Sullivan	Cunard Steamship Co., Ltd.
Patagonia Star	GQGT	10.4.56	E. Jermyn	J. Law, G. Kellock, B. Temperton	J. Nolan	Lamport & Holt Line, Ltd.
Perim	GCCB	14.4.56	L. Porter	—. Barnett, —. Simmons, —. De Sausmarez	R. Cahill	P. & O. Steam Navigation Co.
Perthshire	GYWK	19.9.56	T. N. Soane	J. W. Bennett, E. A. Prothero, B. King	J. Pattie	Turnbull Martin & Co., Ltd.
Pilcomayo	GBZX	12.7.56	G. Medlycott	C. Bush, D. Guiness, J. Cox	E. Fitzgerald	Royal Mail Lines, Ltd.
Pipiriki	GDRQ	25.5.56	S. R. Harding	B. R. B. Blood, B. J. C. Jones, R. S. Hales, B. D. Allen	T. Orlog	New Zealand Shipping Co., Ltd.
Pizarro	GQNY	14.8.56	P. L. Hockey	F. Nuttall, D. J. Houghton, C. Farnworth, —. Pearson	G. L. Jones	Pacific Steam Navigation Co.
Planter	GZSS	9.3 56	F. Hill	G. T. Wade, J. W. Chatfield, F. Robinson	F. Rutter	T. & J. Harrison, Ltd.
Port Adelaide	MGCG	17 4 56	W. B. Craig	M. J. Foden, D. A. Burgess, J. G. Whyte	P. J. Keily	Port Line, Ltd.
Port Auckland	GWRB	7.8.56	E. J. Syvret, O.B.E.	T. J. S. Whitehead, A. D. Braithwaite, J. C. Boyle	J. Skinner	Port Line, Ltd.
Port Brisbane	GWRC	15.8.56	F. W. Bailey, M.B.E.	R. Wilson, B. P. Cullum, D. J. Dixon	D. Don	Port Line, Ltd.
Port Dunedin	GLCJ	17.7.56	W. M. Clough	A. A. Gough, D. E. Bowden, G. H. Boswell	T. A. Cameron	Port Line, Ltd.
Port Hardy	GOFG	14.10.55	P. H. Potter, O.B.E.	V. J. Gatis, A. Ditchfield, J. W. Cushion	—. Mallett	Bibby Line, Ltd.
Port Hobart	GKGC	7.6.56	F. J. Lavers	R. W. Leslie-Makeig, P. Beattie, R. G. Asplet	D. Dooling	Port Line, Ltd.
Port Jackson	GZKR	24.4.56	P. S. Ball	P. A. Evans, B. Skrimshire	T. G. Thomson	Port Line, Ltd.
Port Lincoln	GFZK	28.5.56	E. J. Arnold	D. J. Turner, J. H. Lloyd-Davies, A. C. Marriage	J. W. Hunter	Port Line, Ltd.
Port Macquarie	MAQY	26.7.56	J. S. Moate	A. E. Hoggarth, C. A. Lancaster, B. M. Le Levre	G. Clarke	Port Line, Ltd.
Port Napier	GPKD	26.5.56	C. R. Townsend	G. W. Norris, G. L. Danton, E. Walshaw	T. Hargreave	Port Line, Ltd.
Port Phillip	MAQZ	12.3.56	L. Copeland	B. P. Cullum, T. Carnie, G. E. Brandon	R. Roberts	Port Line, Ltd.
Port Pirie	GLVQ	28 5.56	G. G. Langford	P. R. Ardley, D. Evans, M. Davis	A. Hudson	Port Line, Ltd.
Port Townsville	MGCV	5.6.56	L. J. Skailes	J. M. Evans, R. Komol, W. P. Russell	P. Wiggins	Port Line, Ltd.
Port Victor	MSWK	24.4.56	J. A. Fairbairn	J. C. Naylor, J. Hart, K. W. Jayne	J. McMillan	Port Line, Ltd.
Port Vindex	MAUW	8.8.56	E. E. Roswell	C. S. Liley, M. M. Shaw, J. Hitchmough	R. C. Crompton	Port Line, Ltd.
Port Wellington	GDNJ	20.7.56	E. W. R. Young	M. L. Coombs, R. C. Case-Green, L. J. Brown	J. B. French	Port Line, Ltd.
Port Wyndham	GYCW	10.5.56	L. W. Cady	M. F. Norris, B. Dunlop-Jones, L. K. Peggram	J. C. Coutts	Port Line, Ltd.
Portland Star	GZSY	31.7.56	R. S. Hopper, D.S.C., Lt.-Cdr. R.N. (Retd.)	P. J. Harris, H. K. Dyer, G. Waddell	P. Madden	Blue Star Line, Ltd.
Potaro	GNLJ	12.7 56	W. Tennent	J. C. Derby, J. Flood, J. D. Wilson	G. S. Britton	Royal Mail Lines, Ltd.
Potosi	GPQL	4.4.56	D. W. Hutchinson	R. B. Grant, G. McC. Hunter, K. L. Crowther, W. J. Campbell	C. H. Weeks	Pacific Steam Navigation Co.
Powell	GKJL	1.8 56	D. Cornwell	L. C. Fuke, R. Wilson, D. Allan	D. Jenkins	Hector Whaling, Ltd.
Pretoria Castle	GOAE	3.7.56	G. H. Mayhew	A. D. Foulkes, B. Oram, R. E. Bestel	P. Williams	Union Castle Mail S.S. Co., Ltd
Princess Waimai	OJNS		B. M. Cwillong	D. Mulville, J. Gizowski		Dr. B. M. Cwillong
Prospector	GJMS	2.8 56	W. Lawton	H. Traynor, R. W. Eastaugh, J. Adams	W. Blacklaws	T. & J. Harrison, Ltd.
Rakaia	GFGW	27.4.56	C. P. Robinson	E. J. Carr, D. J. Newman, D. T. Jamison	J. Broome	New Zealand Shipping Co., Ltd.
Ramore Head	MAXX	23 5.56	W. A. Haddock, O.B.E.	W. B. Niblock, E. G. Davey, R. Harris	F. Murrant	G. Heyn & Sons, Ltd.

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Managers
Rangitane	CDBV	10.3.56	R. G. Rees	T. J. Metcalf, J. Peattie, G. Clarke, J. Evans, J. North	W. J. Jones	New Zealand Shipping Co., Ltd.
Rangitata	GSZN	16.8.56	E. Hopkins	N. G. Niblock, J. Hunt, G. Dick	—. Sheppard	New Zealand Shipping Co., Ltd.
Rangitiki	GSXW	12.5.56	A. E. Lettington, O.B.E., D.F.C.	D. W. Handley, T. Excell, W. E. Gale, J. Norrington	F. Fowler	New Zealand Shipping Co., Ltd.
Rangitoto	GLMV	28.6.56	C. R. Pilcher, O.B.E.	T. Gibson, A. Finch, J. Gair, R. Barton	G. Parker	New Zealand Shipping Co., Ltd.
Rathlin Head	GRDB	31.7.56	E. C. Rea	W. Greig, S. Dunwoody, D. John, C. E. Pringle	E. Heywood	G. Heyn & Sons, Ltd.
Regent Hawk	GMND	24.9.56	G. Hobson	J. Beard, R. Peters, N. Baird	R. W. Jones	Regent Petroleum Tankship Co., Ltd.
Regent Royal	GRPN	16.4.56	R. Armstrong	J. D. Pollock, J. A. Cresswell, R. Peters	J. A. Jackson	Regent Petroleum Tankship Co., Ltd.
Reina del Mar	GTYN		G. H. Rice	H. Cuncliffe, R. Turner, —. Vaughan	J. Butler	Pacific Steam Navigation Co.
Reina del Pacifico	GMPS	11.6.56	J. Whitehouse	A. C. Gordon, T. Wilcockson, P. Potts, J. Turner	T. Tynan	Pacific Steam Navigation Co.
Retriever	MRWY	31.8.56	J. G. West	D. Silwood, P. Watts, M. Simmons	D. Fitzsimmons	Cable & Wireless, Ltd.
Reynolds	CQNC	19.6.56	J. Burns	D. Parry, G. Leith, R. Cook	J. L. Black	Bolton Steam Shipping Co., Ltd.
Rhodesia Star	GUAX	20.7.56	H. Wylie	T. S. Thornton, A. J. Chivers, D. E. Sayle	P. Middleton	Blue Star Line, Ltd.
Rialto	GBLV	31.8.56	H. Greenhill	H. Blagdon, —. Pengelly, —. Bradley	J. Bradley	Ellerman's Wilson Line, Ltd.
Richmond Castle	GCSP	25.7.56	W. C. J. Swift	M. Oates, I. R. N. Mason, P. Stead	P. E. Mahon	Union Castle Mail S.S. Co., Ltd.
Rippingham Grange	GIGP	8.3.56	R. Owen	P. Hector, M. H. L. Jenkins, E. Evans	V. Ash	Houlder Bros. & Co., Ltd.
Rochester Castle	GZQF	24.7.56	D. W. Sowden	P. Pollard, J. Mattocks, D. Bird	A. J. Smith	Union Castle Mail S.S. Co., Ltd.
Roonagh Head	GNTN	10.5.56	E. W. Black, O.B.E.	F. R. N. Best, P. Ellis, W. R. Nelson	B. P. Lewis	G. Heyn & Sons, Ltd.
Roscommon	GZPY	28.11.55	L. J. Ridout	L. W. Davies, J. Chambers	B. P. Lewis	
Roslin Castle	GYJZ	23.4.56	C. E. Lorains	G. Wood, R. Kerr, P. S. R. Truman	W. J. Hawksworth	Union Castle Mail S.S. Co., Ltd.
Rowallan Castle	GDFT	17.9.56	G. Stephenson	J. Barry, —. Baines, —. Harding	D. Davies	Union Castle Mail S.S. Co., Ltd.
Roxburgh Castle	GBGS	22.8.56	C. W. Armstrong, R.D., Cdr. R.N.R.	G. Beaumont, R. Patterson, G. Wood	T. W. Lindsay	Union Castle Mail S.S. Co., Ltd.
Ruahine	GKSY	3.9.56	F. Lougheed	R. Shannon, M. Pinner, P. Holloway, O. Springett	J. Heath	New Zealand Shipping Co., Ltd.
Runic	GGCS	10.3.56	C. W. Sendall	R. Hind, J. K. Wyles, T. Hicks	A. McMurray	Shaw, Savill & Albion Co., Ltd.
Sacramento	GKCN	27.6.56	H. Grunnill	P. J. Bishop, H. Edward, J. Green	C. V. Child	Ellerman's Wilson Line, Ltd.
Saint John	GRBT	19.9.56	I. Ellis	J. Whitfield, C. P. Leighton, R. B. Green	J. E. Conway	South American Saint Line, Ltd.
Salacia	GZRN	23.6.56	C. M. Clark	D. G. Hall, I. McFarlane, A. Menzies	W. MacKay	Donaldson Bros. & Black, Ltd.
Salamanca	GLSG	22.12.53	P. L. Hockey	E. J. Pepper, G. R. Dewsnap, R. B. Bryant	B. E. Bewley	Pacific Steam Navigation Co.
Salaverry	GBLQ	29.8.56	J. Evans	C. Rowntree, J. K. Spencer, G. B. Swan	W. Read	Pacific Steam Navigation Co.
Salinas	GLLK	2.8.56	A. G. Litherland	C. A. Hilton, P. Barry, P. L. Whittaker	G. A. Ferrand	Pacific Steam Navigation Co.
Salween	GFFN	26.1.56	W. D. E. Campbell	A. H. S. Gray, G. Armstrong, J. Cowrie, J. McKenzie	S. Law	P. Henderson & Co.
San Felix	GFJZ	20.6.56	J. S. Munday	C. A. Grunson, T. Hickin, M. T. Lewis	R. Jones	Eagle Oil & Shipping Co., Ltd.
San Velino	GCNY	4.9.56	G. A. H. Knott, O.B.E.	K. Bramley, J. D. Tomlinson, N. H. Chandler	H. Ployford	Eagle Oil & Shipping Co., Ltd.
San Veronico	MASQ	18.5.56	G. Harris	M. D. Allen, R. Davis, M. A. Yarrow	J. Hogan	Eagle Oil & Shipping Co., Ltd.
San Vulfrano	MASR	25.9.56	T. B. Wright	P. W. Hodges, J. F. B. Ridout, A. W. Aitken	D. J. Brown	Eagle Oil & Shipping Co., Ltd.
Sansu	GQQN	7.8.56	F. St. H. Webber	J. M. Chaplin, P. H. F. Pole	E. Smith	Elder Dempster Lines, Ltd.
Santander	GBNR	27.3.56	F. J. Leicester	J. T. Bruce, P. Staples, A. G. Corbet	J. Whitfield	Pacific Steam Navigation Co.
Sarmiento	MARW	1.6.56	A. B. Powell	J. Shepherd, W. Bolitho, W. Jenkins	R. Walsh	Pacific Steam Navigation Co.
Saxon Star	MARX	1.8.56	C. A. Holleyoak	K. Morris, T. Cree	T. Jones	Blue Star Line, Ltd.

Saxonia	GSJS	4.9.56	W. T. Fitzgerald, R.D., Capt. R.N.R. (Retd.)	P. J. R. Lawley, G. Buckley, P. Walton, D. J. Wilford	A. Farman	Cunard Steamship Co., Ltd.
Scottish Eagle	MMVX	15.2.56	R. R. Baxter	M. W. Scott, J. J. Grigor, J. Lyon	H. Arnold	Scottish Tankers, Ltd.
Scythia	GDYP	23.6.56	J. D. Armstrong, D.S.C., R.D., Lt.-Cdr. R.N.R. (Retd.)	D. Atkinson, P. Miller, D. Howell, J. C. Nicholson, F. Pollitt	S. W. Brown, M.B.E.	Cunard Steamship Co., Ltd.
Seattle Star	MMNW	18.4 56	J. McInnes	E. Blake, D. Newlin, I. Thompson	W. Long	Blue Star Line, Ltd.
Selector	MARZ	28.6.56	T. W. Kent	E. D. Ashdown, B. W. Jones, D. E. Lawrence	C. O'Callaghan	T. & J. Harrison, Ltd.
Settler	GTTX	7.6.56	H. G. Skelly	D. V. Jones, W. Lawson-Smith, M. S. Dixon	M. Kenny	T. & J. Harrison, Ltd.
Shackleton	GVDC		N. R. Brown	T. Woodfield, A. Kerr, T. Flack	A. Irving	Falkland Islands Dependencies Survey
Sir William Hardy	GSZY		J. Munro	S. Ribee, M. Slater		Torry Research Station
Sneaton	GDBS	25.6.56	W. Armstrong	E. Wilson, T. Ellerby, W. R. Atkinson	I. Fahy	Headlam & Son
Socotra	MASC	2.3.56	L. H. Howard, R.D., Lt.-Cdr. R.N.R. (Retd.)	D. Dormon, H. O. Cribb, M. J. Borland	H. Williams	P. & O. Steam Navigation Co.
Somersby	GRLK	10.8.56	J. Kenny	P. Robinson, R. Halliday, P. Palfreman	G. Greenfield	Ropner Shipping Co., Ltd.
South Africa Star	GUAU	25.9.56	R. M. T. Jones	D. Murray, D. Tranter, D. MacKillop	A. Francis	Blue Star Line, Ltd.
Southern Cross	GSWW	21.8.56	Sir D. Aitchison, K.C.V.O.	J. Glyde, B. Charlton, W. W. Newport, I. P. N. Cameron, I. Tommy, N. Case-Green	H. Matthews	Shaw, Savill & Albion Co., Ltd.
Southern Garden	MASF	10.5.56	W. Spence	G. Sinclair, R. D. Frysendorf, J. D. Thomson	J. Smethurst	Chr. Salvesen & Co.
Southern Harvester	GFZJ	19.4.56	L. Bartho	W. Christoffersen, F. Johansen	A. R. Turnbull	Chr. Salvesen & Co.
Southern Opal	MASG	10.5.56	A. F. Baikie	W. Ross, J. K. Maver, T. G. Boyle	T. Johnson	Chr. Salvesen & Co.
Southern Satellite	GTNR	19.4.56	W. Swanson	A. Brown, W. Simpson, P. Whitecross	E. C. Taylor	Chr. Salvesen & Co.
Southern Venturer	GNNM	25.4.56	H. Myhre	K. Snekkestad, A. Harkness, O. Vikklander	—. MacNorran	Chr. Salvesen & Co.
Specialist	GCYF	29.3.56	L. J. Sharman, R.D., Cdr. R.N.R.	T. F. Maddox, J. B. Mitchell, A. A. Dunn	P. Goulden	T. & J. Harrison, Ltd.
Stirlingshire	GCQD	17.9.56	E. W. Jenkin	A. G. Cruikshank, D. M. Geddes, R. G. Turner	W. Holmes	Turnbull Martin & Co., Ltd.
Strathaird	GRSX	9.8.56	R. J. F. Paice	G. J. Dobbin, T. A. M. Lincoln, J. F. Bannister, W. Nicol, W. E. N. Dwelly	A. Horne	P. & O. Steam Navigation Co.
Stratheden	GDGT	26.7.56	K. A. H. Cummins	T. W. Stevens, R. A. Game, P. T. Black, J. B. Newman, R. E. Webb	P. Maloney	P. & O. Steam Navigation Co.
Strathmore	GYMS	3.4.56	A. G. Jenkins	J. W. Slee, J. Houghton, B. Lowther, J. Shaw, C. Sabine	J. P. Carey	P. & O. Steam Navigation Co.
Strathnaver	GRPZ	7.9.56	G. A. Wild	R. Hubbard, D. Neal, L. H. Kellet, J. Cobb	M. J. Murphy	P. & O. Steam Navigation Co.
Struan	MASJ	9.1.56	M. Polson	J. MacLean, L. Lawrence, W. Mason	P. Curson	Chr. Salvesen & Co.
Suffolk	GQQS	20.3.56	H. C. R. Dell	P. E. Robertson, P. Plaistowe, R. B. Hood, P. Field	R. Waters	Federal Steam Navigation Co., Ltd.
Surrey	MMSQ		H. J. D. Scaden	M. F. Henson, J. Masson, M. Wood	A. Titley	Federal Steam Navigation Co., Ltd.
Sussex	MAEF	12.4.56	T. Alderman	D. Turner, J. Baxter, I. Pears	D. James	Federal Steam Navigation Co., Ltd.
Sydney Star	MKSM	11.9.56	G. L. Evans	R. Crookall, M. A. MacMillan, J. E. L. Kirkman	T. M. Winney	Blue Star Line, Ltd.
Tabaristan	GZDR	31.7.56	F. W. Bowley	C. A. Patterson, J. Deering, W. Kane	C. J. Kelly	F. C. Strick & Co., Ltd.
Tagelus	GBMG	16.7.56	A. S. M. Jamieson	D. G. Whiteley, R. Tinmouth, J. A. Legg	D. W. Cross	Anglo-Saxon Petroleum Co., Ltd.
Tamaroa	GFWX	6.6.56	B. Forbes-Moffatt	W. Lynam, J. Richmond, B. Roberts, A. McIntosh	D. MacRae	Shaw, Savill & Albion Co., Ltd.
Tamele	GCBF	14.6.56	W. Rowlands	F. R. Drury, R. C. Matthews	M. Coady	Elder Dempster Lines, Ltd.
Tantallon Castle	MQWN	14.6.56	N. M. Lloyd, R.D., Cdr. R.N.R.	N. M. Lloyd, J. L. White, T. Jones	V. A. Bennett	Union Castle Mail S.S. Co., Ltd
Tarkwa	MASU	7.6.56	R. W. Philip	D. Corner, R. B. M. Fawcett, A. A. Munro	W. P. Cameron	Elder Dempster Lines, Ltd.

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owners/Managers
Tasmania Star	GKPC	3.9.56	R. White, D.S.C.	D. A. Stevens, P. G. Entwhistle, I. B. Owen	C. V. James	Blue Star Line, Ltd.
Tectus	GBMJ	17.11.55	D. Curtis-Lewis	R. E. Jacklin, G. A. Ramsden, G. S. Smith	W. Hennay	Anglo-Saxon Petroleum Co., Ltd.
Tekoa	GJFQ	2.6.56	F. Williamson	D. Standing, J. D. Cubitt, J. Reid	A. Titley	New Zealand Shipping Co., Ltd.
Telemachus	GBLB	30.7.56	A. Lane	A. G. Bole, R. G. Southern, J. Johnstone	F. M. Shannon	A. Holt & Co.
Tenagodus	GDLZ	11.7.56	C. A. Milligan, M.B.E.	J. Sydenham, D. C. Hamlyn, W. J. McPherson	C. Bourne	Anglo-Saxon Petroleum Co., Ltd.
Tetela	GMPN	28.10.55	G. M. Roberts, M.B.E.	A. Blackburn, N. W. Thomas, D. Hamilton	M. Riley	Elders & Fyffes, Ltd.
Teviot	MASX	28.6.55	W. A. Kennedy	D. J. Walker, A. N. Brook, G. B. Chamberlain	R. W. Morden	Royal Mail Lines, Ltd.
Thaumastus	GDTS	10.9.56	G. A. C. Nelson	M. E. Bodiam, G. Anderson, R. H. Wills	B. Draisey	Anglo-Saxon Petroleum Co., Ltd.
Theliconus	GBMT	30.8.56	J. W. Barnsley	J. B. Morris, T. Norris, B. R. Whittle	W. S. Stobo	Anglo-Saxon Petorleum Co., Ltd.
Timaru Star	GKKM	27.4.56	H. W. McNeil	N. Johnson, I. Tait, D. McKerrow	T. Firth	Blue Star Line, Ltd.
Tinto	GBYT	2.3.56	S. H. Bennett, M.B.E.	J. A. Green, P. Ramsay	G. S. Dunn	Ellerman's Wilson Line, Ltd.
Tongariro	GLFZ	17.7.56	R. Webster	N. M. Parry, G. D. Hudson, J. H. Agnew, A. P. Harrington	P. Moor	New Zealand Shipping Co., Ltd.
Torr Head	GZPW	19.9.56	E. C. Rea	T. McI. Hamill, A. J. Quail, J. Bothwell	J. McKinnon	G. Heyn & Sons, Ltd.
Tregenna	GBPM	19.9.56	W. F. Denyer	J. L. Hazell, E. Stewart, R. S. Cowden	F. Coward	Hain S.S. Co., Ltd.
Trelevan	GBPQ	12.4.56	J. Cornish	D. K. Ball, C. D. Abbott, B. C. Lee	G. R. E. Warder	Hain S.S. Co., Ltd.
Trelyon	GBPP	18.4.56	W. T. Evans	H. Winter, A. Downs, A. A. Kelley	K. Beelby	Hain S.S. Co., Ltd.
Tribesman	GBNZ	11.9.56	J. F. W. Wallis	A. G. Nicholson, S. Lloid, W. C. Johnston	J. Watt	T. & J. Harrison, Ltd.
Tribulus	GFJS	2.8.56	J. M. Davidson	D. Chittenden, R. K. Kerley, J. D. T. Price	W. J. McGrath	Anglo-Saxon Petroleum Co., Ltd.
Trochiscus	GFKB	24.5.56	R. C. Swainston	R. Clucas, W. Kerr, J. Forsyth	A. C. Hamblin	Shell Tankers, Ltd.
Tweed	GBRP	25.6.56	—. Meldrum	—. Boyd, D. Stratton, J. Diaper, A. Acason	E. English	Royal Mail Lines, Ltd.
Twickenham	GNDC	20.7.56	D. G. Martin	D. Dickson, D. N. Allan, A. Cameron	J. S. Bishop	Watts Watts & Co., Ltd.
Tyrone	GZPZ	29.8.56	N. Fraser	J. G. C. Campbell, B. P. Telfer, P. J. MacPherson	L. A. E. Lavel	Trinder, Anderson & Co.
Umtali	GYWB	6.9.56	F. E. J. O'Hea	C. M. Cozens, D. L'Estrange, N. W. Duncan, V. J. Shanahan	S. Hewitt	Bullard King & Co., Ltd.
Umtata	GDQF	24.7.56	D. L. Weston	J. H. Szablowski, R. A. Harris, N. J. Parker	J. Molloy	Bullard King & Co., Ltd.
Velletia	MGGD	12.7.56	J. Nettleship	W. P. Bilton, J. Palmer, R. M. Watt, W. G. McNaughton, B. L. Cater	W. J. Beattie	Anglo-Saxon Petroleum Co., Ltd.
Vestra	MNNB	11.12.54	D. S. Archibald	K. B. Singer, D. C. White	D. C. White	J. T. Salvesen & Co.
Volo	GPCJ	5.9.56	L. R. Stilwell	H. Brelby, A. Robertson, G. Forward	G. Bart	Ellerman's Wilson Line, Ltd.
Waipawa	GWXQ	17.8.56	A. S. D'Arcy Masters	A. S. G. L'Estrange, P. H. Carden, O. D. H. Fuller	J. J. Hayes	Shaw, Savill & Albion Co., Ltd.
Wairangi	MATX	7.6.56	J. L. Stobbs, R.D., Lt.-Cdr. R.N.R.	B. A. Hills, R. J. McVittie, I. S. M. Condie	J. Taylor	Shaw, Savill & Albion Co., Ltd.
Waiwera	GBJB	4.6.56	R. A. Barns	T. T. Salmon, D. Williams, H. P. M. Lawrence, A. Thompson	J. Downie	Shaw, Savill & Albion Co., Ltd.
Walvis Bay	GKBZ	8.8.56	A. Donald, O.B.E.	W. E. Campbell, J. Clements, M. R. Filkins	J. R. Martin	Sir R. Ropner & Co., Ltd.
Wanstead	GFLS	24.9.56	A. J. Cox	J. Lough, R. H. Hall-Soloman, R. Arnott	W. H. Carmichael	Watts, Watts & Co., Ltd.
Warkworth	MALF	21.8.56	N. Thompson, M.B.E.	C. Harron, G. B. Bell, W. Childerstone	D. Farthing	Watergate Steam Shipping Co., Ltd.
Wendover	GFML	10.5.56	W. Donald	M. King, J. L. Thompson, A. El-Pharoany	J. McParlin	Watts, Watts & Co., Ltd.

Westmeath	GQGJ	25 5 56	T. G. Wilson	D. L. King, V. Cox, J. McWilliams	J. Blake	New Zealand Shipping Co., Ltd.
Winchester Castle	GTPZ	11.6.56	G. W. B. Lloyd	A. J. Chalmers, W. Curd, A. Sutherland	E. H. Pitt	Union Castle Mail S.S. Co., Ltd.
Windsor	GPQG	21.6.56	J. D. Smith	T. D. Willey, J. Rekner, P. Perschky, C. R. Truman	W. De la Coure	Watts, Watts & Co., Ltd.
Woodford	GFMM	2.6.56	J. Cormack	P. Northway, R. Choshim, A. Burton, A. Ferguson	D. Carr	Watts, Watts & Co., Ltd.
Woolwich	GRWC	17.9.56	D. Cameron	D. Wells, J. Lewis, M. Court	J. E. Miller	Watts, Watts & Co., Ltd.
Worcestershire	GFZM	7.3 56	F. C. Brooks	R. W. Barton, R.N.R., R. M. Bessant, D. Downard	W. G. Fletcher	Bibby Bros. & Co.
Yoma	GLPN	27.8.56	K. Marsh	A. Payne, J. P. Morgan	J. Brown	P. Henderson & Co.

Supplementary Ships

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Managers
Alert	GCBM	7.5.56	R. H. J. Wallis	R. M. Turnbull, D. M. Curror, G. MacLagan	A. Prest	H.M. Postmaster General
Apollo	MSFM	11.4.56	G. V. Barnes	W. Kays, H. G. Mowatt, B. Middleton, J. C. Elliot	W. Kays	Bristol Steam Navigation Co., Ltd.
Ariel	GMDY	16.7.56	C. M. G. Evans	E. J. Evans, D. C. Chisholm, A. C. H. Childs	E. Robinson	H.M. Postmaster General
Begonia	GBRM	19.4.56	R. Reekie	J. M. Oliver, J. B. Barker, M. Johnson	J. E. B. Sams	Joseph Robinson & Sons
Bellerby	MQJF	30.7.56	E. Dunn	A. H. Ross, F. B. Jones, D. B. Millar	D. P. Hulme	Ropner Shipping Co., Ltd.
Blairclova	GLLG	24.11.55	J. MacVean	J. E. Halliday, M. Gilmour, A. McAdam	E. Yard	Geo. Nisbet & Co.
British Bugler	GKFZ	29.8.56	C. V. Harrison	G. B. Sinclair, K. Jackson	F. Kirk	British Tanker Co., Ltd.
Cape Breton	GLXG	3.4.56	J. Smith	L. C. Pilling, M. E. Guy, P. B. Robier	H. M. Bean	C. T. Bowring & Co., Ltd.
Cape Howe	GCYP	3.5.56	A. M. Fraser	A. C. Hunter, I. Welsh, A. McPhail	—. Humble	Lyle Shipping Co., Ltd.
Cara	GSZJ		A. MacKay	I. Skinner, A. Livingstone, G. Cowan	I. Hart	Glen & Co., Ltd.
Carlo	GQKL					Ellermans Wilson Line, Ltd.
Circassia	GZMD	25.5.56	J. McG. Brown	J. Ballantyne, B. Walford, R. M. Sinclair	J. MacDonald	Anchor Line, Ltd.
Clan Alpine	GIFF	3.9.56	T. O. Marr	I. A. W. Williamson, J. L. Daniel, R. R. Cawdrey	C. J. Ritchie	Cayzer Irvine & Co., Ltd.
Clan Lamont	GTTD	10.5.56	J. E. Townrow	A. A. Graham, R. W. D. Kenyon, A. W. MacKenzie	R. G. Davies	Cayzer Irvine & Co., Ltd.
Clan MacBrayne	MAQA	9 4.56	C. A. Thomas	J. MacNiven, D. M. Geddes, D. Grant	D. Munroe	Cayzer Irvine & Co., Ltd.
Dartmoor	CFQT	30.7.56	L. G. Welch	G. C. Laing, A. Coaster, R. J. Phillips	M. Van Schalkwyck	Walter Runciman & Co., Ltd.
Devon City	MBKL	6.9.56	J. Sloan	J. B. Cuckow, G. A. Thompson, D. Cobley	E. McGirr	Sir William Reardon Smith & Sons, Ltd.
Eastern City	GBRB	3.9.56	W. H. Marshall	T. H. White, C. Davison, L. F. Judd	W. D. Pittenorigh	Sir William Reardon Smith & Sons, Ltd.
Edward Wilshaw	MBMP	26.3.56	R. W. Porter-Reynolds	A. Miller, T. Archer, G. Goodale, P. Clough	G. O'Brien	Cable & Wireless, Ltd.
Fry Hill	MAKS	3.3.55	C. Dalziel	J. Naisbitt, B. Ward, N. Nicholas, D. Greaves	D. T. Greaves	Counties Ship Management Co., Ltd.
Greathope	GJBF		R. Cook	R. Pickering, T. Burke, C. Sheales		E. R. Newbiggin S.S. Co., Ltd.
Greenbatt	MSGG	6.9.56	—. Smith	—. Taylor, J. C. E. Brown, —. Hajmal	C. Hans	Newbiggin S.S. Co., Ltd.
Harpalion	GFFX	24.7.56	G. Jones	T. S. W. Davies, W. R. Vickers, D. S. Christie	P. F. Spencer	J. & C. Harrison & Co., Ltd.
Hesione	GUGJ	8.3.56	F. D. Bonney, M.B.E.	B. Middleton, G. Rowland, J. Denyer	H. Burnitt	Houston Line (London), Ltd.
Hudson Deep	MPCR	5.6.56	J. Gibbons, D.S.C.	M. Smith, J. Cunningham, A. Foroham	J. P. McKernan	Hudson S.S. Co., Ltd.
Hudson Firth	GDKM	17.9.56	A. Crosby	M. R. Uminski, J. A. Lea, M. L. MacNair	C. H. Evans	Hudson S.S. Co., Ltd.
Leicestershire	GDBL	28.5.56	E. D. Brand	R. Humphreys, J. W. Waldie, J. Routledge	F. W. Greaves	British India Steam Nav. Co., Ltd
Letchworth	MAOV	10.3.56	J. E. S. Newby	K. Brammer, D. V. Duncanson, S. Hardy	S. G. L. Rice	R. S. Dalgleish, Ltd.
Loch Gowan	MMJT	20.6.56	E. N. Giller, M.B.E.	G. N. Rouse, L. Fenner, M. H. Hobbs	P. Hemery	Royal Mail Lines, Ltd.
Lingula	GKOT	12.1.56	J. L. Williams	W. Phillips, R. J. Bennett, M. Bruce	G. Harding	Anglo-Saxon Petroleum Co., Ltd.
Marie Louise Mackay	GDNP	1.11.55	C. F. Hunter	L. R. Denny, H. Goodbody, W. Nimmo, L. Cook, M. S. Bailey	E. Mathias	Commercial Cable Co.
Markab	GCVT	21.7.55	C. Christensen	M. Rosie, J. Phillis, J. Toet	D. A. Styles	Phocean Ship Agency, Ltd.
Marna	MLPK	17.3.56	L. B. Anderson	J. Carnie, W. G. Morrison		Chr. Salvesen & Co.
Mathura	GCXQ		J. P. Jackson	J. Dunn, T. J. Hamilton, S. Baxter	R. Goodman	T. & J. Brocklebank, Ltd.
Menastone	GUFA	9.4 56	S. Sheasby	A. Todd, W. Thomas, P. Sunsmore	J. Devitt	Messrs. Stone & Rolfe, Ltd.
Meta	MPWB	19.12.55	A. D. McNab	R. G. Laurenson, M. McColl, J. Chisholm	D. MacFarlane	Glen & Co., Ltd.

Supplementary Ships—Contd.

Name of Vessel	Call Sign	Last Return Received	Captain	Observing Officers	Senior Radio Officer	Owner/Managers
Milo	GQDP	28.6.56	E. H. Taylor	P. J. Wright, W. R. Kays, B. Middleton		Bristol Steam Navigation Co., Ltd.
Mirror	GDFL	14.8.56	T. A. Vickers, Capt. R.N.Z.N.R. (Retd.)	E. J. Reilly, M. Bonds, C. C. S. Budgeon	C. Rolfe	Cable & Wireless, Ltd.
Mulberry Hill	MAKQ	28.3.56	S. H. Mallett	L. Fraser, B. Wood, D. A. McBain	F. Ross	Counties Ship Management Co., Ltd.
Narva	GQFP	19.7.56	R. S. MacLachlan	A. T. Clark, A. MacIntyre, A. Tweddle	R. Rowe	Glen & Co., Ltd.
Nicania	GIGJ	6.1.56	J. Carr	L. F. Money, B. R. Alderton, B. S. Holroyd	C. R. McAnerney	Anglo-Saxon Petroleum Co., Ltd.
Northia	GDQK	3.4.56	A. Mackay	M. A. Cooper, I. G. C. Wildish, J. Dagleas	T. M. Sherrif	Anglo-Saxon Petroleum Co., Ltd.
Port Fairy	GSTP	16.2.56	W. M. Clough	D. A. Church, R. C. W. Marr, W. R. C. Petter	E. Loft	Port Line, Ltd.
Ramsay	GPSW	5.6.56	J. J. Grugan	D. A. Kiddell, G. C. Murray, D. Fullwood	D. W. Chapman	Bolton Steam Shipping Co., Ltd.
Rembrandt	GPFD	21.4.56	M. V. Siddle	J. Parsloe, G. H. Phillips, R. Grubb	J. Broom Hall	Bolton Steam Shipping Co., Ltd.
Rookwood	GPSN	3.5.56	A. Dover	T. H. Curry, F. Louern, T. Waugh, W. Gilmore-Ellis, D. Parsons	J. Moss	Wm. France, Fenwick & Co., Ltd.
Royal Emblem	GDSC	10.5.55	H. Morgan	K. B. Jewell, M. Martin	F. Petch	Hall Bros.
Runa	GFSW	15.10.55	T. Henry, O.B.E.	W. Taylor, A. McIntyre	A. Corless	Glen & Co., Ltd.
Sheldrake	GJLT		C. C. Reynolds	C. I. H. Greaves, J. Stowe, B. Murr	C. Norris	General Steam Navigation Co., Ltd.
Shuna	MMGC		J. Loose	K. Wilson-Ballantyne	—. Quin	Glen & Co., Ltd.
Table Bay	MFTV	28.12.55	G. E. Miles	J. Kelly, I. J. Buchanan	M. J. Maundrell	Lyle Shipping Co., Ltd.
Tarantia	GIGS	23.6.56	R. S. Paton	T. Patience, J. Henderson, R. Porter	A. Macpherson	Anchor Line, Ltd.
Tempo	GKWZ	2.8.56	H. Grewar	—. Rae, —. Sisterson, —. Hardy	J. Jenkins	Pelton S.S. Co., Ltd.
Thelma	MBKK	23.9.54	T. A. W. Fairweather	J. A. G. McColl, J. D. McIntosh, D. MacDonald	K. Hicks	Glen Co., Ltd.
Trelissick	GBPR	2.7.56	F. G. Bolton	J. Darby, P. P. Sandercock, P. L. White	J. Weston	Hain S.S. Co., Ltd.
Trevelyan	MATE	27.8.56	H. Gravell	H. A. Manby, D. C. Penberthy, G. A. Laycock	J. Vaughan	Hain S.S. Co., Ltd.
Trevince	MATH	22 3.56	B. George	E. F. Boyd, J. P. C. Forster, N. A. Carrivick	W. Blacklaw	Hain S.S. Co., Ltd.
Treworlas	MATL	10.3.56	W. H. Whitaker	A. V. Rowles, A. O. Jones, D. P. Mitchell	G. B. Holyoake	Hain S.S. Co., Ltd.
Tronda	MMLX	15.10.51	R. J. Sinclair	R. Angus, K. Chow		Chr. Salvesen & Co.
Truro	GJTQ	16.8.56	F. Firth	G. H. Potter, J. A. Squire, R. A. Jones	F. Petch	Ellerman's Wilson Line, Ltd.
Tynemouth	MVYY		W. L. Pattison	J. Barrass, F. Wright, J. Ayre		Burnett S.S. Co., Ltd.
Uganda	GFRQ	26.7.56	D. W. Speirs, G.M., R.D., Cdr. R.N.R.	S. A. Turk, C. K. Taylor, —. Tulloch	—. Soulsby	British India Steam Nav. Co., Ltd.
Warwick Castle	GRRJ	18.2.56	J. D. B. Fisher	D. P. Daley, R. Dibble, P. Pollard	P. Thomas	Union Castle Mail S.S. Co., Ltd.
Woodcock	MABR		W. Maybee	J. C. Crowden, C. H. Cooper		General Steam Navigation Co., Ltd.
Yarmouth Trader	GUAP	11.7.56	R. A. Goodings	G. G. Callender, D. E. Kerrigan		Great Yarmouth Shipping Co., Ltd.
Zealand	MSNN		W. C. Cross	J. K. Liston, A. Loveday, J. Neill	W. Jones	Currie Line, Ltd.

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
Actuality	GPPF	D. O'Leary	F. T. Everard & Sons, Ltd.
Amsterdam	MFBP	C. R. Baxter, D.S.C.	British Transport Commission
**Angelo*	GQFY	J. K. Marrow	Ellerman's Wilson Line, Ltd.
**Apollo*	MSFM	C. V. Barnes	Bristol Steam Navigation Co., Ltd.
Ariosto	GKPW	W. C. Gill	Ellerman's Wilson Line, Ltd.
**Atlantic Coast*	GWSY	J. O. Rowland, M.B.E.	Coast Lines, Ltd.
Barra Head	MPQZ	D. MacDonald	A. F. Henry & MacGregor, Ltd.
**Belvina*	MLZF	W. Fisher	London & Edinburgh Shipping Co., Ltd.
British Coast	GWQX	P. A. Johnson	Coast Lines, Ltd.
**British Scout*	GJKD	W. Burford	British Tanker Co., Ltd.
Caledonian Coast	GKXF	J. Beckett	Coast Lines, Ltd.
Cambria	GBKT	R. H. Lord, R.D., Lt.-Cdr. R.N.R. (Retd.)	British Transport Commission
Cato	GUAK	L. Jenkins	Bristol Steam Navigation Co., Ltd.
Cicero	GRTD	E. Tyler	Ellerman's Wilson Line, Ltd.
Clupea	GOAJ	J. Jappy	Fishery Board for Scotland
Corfen	GDJX	A. Metcalf	Wm. Cory & Son, Ltd.
Corfleet	GWTD	A. G. Waller	Wm. Cory & Son, Ltd.
Cormain	MAHT	J. T. Collin	Wm. Cory & Son, Ltd.
Cormead	GDBX	E. Allen	Wm. Cory & Son, Ltd.
Cormist	GDVT	R. J. Barrow	Wm. Cory & Son, Ltd.
Cormoat	GLKV	R. B. Armstrong	Wm. Cory & Son, Ltd.
Cormull	MAHS	F. Hansen	Wm. Cory & Son, Ltd.
Corncrake	MJKL	J. M. B. Clark	Moss Hutchison Line, Ltd.
Crane	MMCS	—. Clarke	Moss Hutchison Line, Ltd.
Drake	MMYC	W. Lockhart	General Steam Navigation Co., Ltd.
**Dryburg*	GNYD	G. Simpson	George Gibson & Co., Ltd.
Duke of Argyll	GNVX	J. Abram	British Transport Commission
Duke of Lancaster	GCPQ	J. I. Irwin, R.D., Cdr. R.N.R. (Retd.)	British Transport Commission
Empire Doric	MAVQ	W. Close	Atlantic Steam Navigation Co., Ltd.
Empire Gaelic	MAVR	T. Morgan	Atlantic Steam Navigation Co., Ltd.
Explorer	MRCZ	W. Eustace	Scottish Home Department
Falcon	MNXL	S. W. Develin	General Steam Navigation Co., Ltd.
Fountains Abbey	MSGT	F. W. Wooler	Associated Humber Lines
Fulham X	MADV	D. Battle	Central Electricity Authority
Golden Dawn	MLZV	A. Adamson, M.B.E., R.D., Sk.-Lt. R.N.R.	A. Adamson, M.B.E.
**Gothland*	MJMS	H. Anderson	Currie Line, Ltd.
Great Western	GWRD	H. H. Cooney	British Transport Commission
Grebe	MAEY	J. S. Lickis	General Steam Navigation Co., Ltd.
Greyfriars	MLQN	D. Hunt	E. R. Newbigin, Ltd.
Guernsey Coast		F. C. Lucas	Coast Lines, Ltd.
Harrogate	MNDB	J. M. Walters	Associated Humber Lines
Hibernia	MBMT	E. A. Horspool	British Transport Commission
Hibernian Coast	GKXC	G. Mearns	Coast Lines, Ltd.
Isle of Guernsey	GQYJ	C. E. Hatchley	British Transport Commission
Isle of Jersey	GRBQ	R. A. Large	British Transport Commission
Isle of Sark	GTSR	H. G. Le Huquet	British Transport Commission
Jersey Coast	MKDL	H. G. Keilit	Coast Lines, Ltd.
Jura	MARU	L. J. Blanche	Admiral Shipping Co., Ltd.
Loch Seaforth		J. Smith	David MacBrayne, Ltd.
London Merchant	MBRZ	W. Fisher	London Scottish Lines, Ltd.
Maidstone	MNQV	G. R. Gill	British Transport Commission
Malmo	GQCN	J. A. Etches	Ellerman's Wilson Line, Ltd.
Marine Craft Unit (R.A.F.) No. 1102		J. R. Radley	Royal Air Force
**Melrose*	MCFD	J. Murray	Geo. Gibson & Co., Ltd.
Melrose Abbey	GSYW	J. Blackburn	Associated Humber Lines
†*Meta*	MPWB	A. D. McNab	Clydesdale Shipowners Co., Ltd.
**Milo*	GQDP	H. E. Lawson	Bristol Steam Navigation Co., Ltd.
Minna	GKPS	T. Mather	Fishery Board for Scotland
†*Narva*	GQFP	J. McLaughlan	Glen & Co. (Scottish Navigation Co., Ltd.)
Ocean Coast	GYMP	J. D. Mercer	Coast Lines, Ltd.
**Pluto*	GUAB	F. Dudgeon	Bristol Steam Navigation Co., Ltd.
Peregrine	GIGM	A. E. Guest	General Steam Navigation Co., Ltd.
Princess Maud	GWRT	E. A. Bradshaw	British Transport Commission
**Rattray Head*	GCBR	G. Gay	A. F. Henry & McGregor, Ltd.
Ringdove	GRKK	E. C. Painter, D.S.C.	General Steam Navigation Co., Ltd.
**Rollo*	GSFG	S. Stokes	Ellerman's Wilson Line, Ltd.
Runa	GFSW	—. Gilfilaan	Clydesdale Shipowners Co., Ltd.
St. Clement	GRGM	L. Mainland	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
St. Helier	GLBT	G. Cartwright	British Transport Commission
St. Julien	GLBV	B. Newton	British Transport Commission
St. Magnus	GFYK	W. McKay	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
St. Ninian	GJBB	A. M. Dundas	N. of Scotland & Ork. & Shet. S.N. Co., Ltd.
Selby	MLFT	F. Drury	Associated Humber Lines
Silvio	GSVC	W. White	Ellerman's Wilson Line, Ltd.
Slieve Bawn	MQCC	A. Robertson	British Transport Commission
Slieve Bearnagh	MLNL	E. H. Ashton	British Transport Commission
Slieve Bloom	MQDD	I. Griffiths	British Transport Commission

Marid Ships—*contd.*

NAME OF VESSEL	CALL SIGN	CAPTAIN	OWNERS/MANAGERS
Slieve League ..	MQCM	R. Roberts	British Transport Commission
Slieve More	MQBM	G. J. Butterworth ..	British Railways (L.M. Region)
Southern Coast ..	MASD	D. Mercer	Coast Lines, Ltd.
Suffolk Coast ..	MMVC	J. Coxon	Tyne Tees Shipping Co., Ltd.
Teano	GSTY	D. Stokes	Ellerman's Wilson Line, Ltd.
†*Thelma*	MBKX	F. Fairweather ..	Glen & Co., Ltd.
Vienna	GTBR	A. Pearson Button ..	British Railways (Eastern Region)
**Whitby Abbey* ..	MSGV	H. M. Collier	Associated Humber Lines
†*Yarmouth Trader* ..	GUAP	R. A. Goodings ..	Great Yarmouth Shipping Co., Ltd.

* These ships also send in non-instrumental weather messages when in the North Sea.
† Ships also on the supplementary list.

Trawlers and North Sea Traders

The following is a list of trawlers and North Sea traders voluntarily observing and reporting those elements of the weather which do not entail the use of any meteorological instruments.

NAME OF SHIP	CALL SIGN	SKIPPER	OWNERS/MANAGERS
Trawlers:			
Afridi	GFWX		Derwent Trawlers, Ltd.
Athenian . ..	GFWY		Onward Steam Fishing Co., Ltd.
Banquo . ..	MSWY		Hellyer Bros., Ltd.
Benvolio ..	MDPD		Northern Fishing Co.
Bradman ..	GMCC		Bunch Steam Fishing Co., Ltd.
Fezenta . .	GLGB		Onward Steam Fishing Co., Ltd.
Grimsby Town ..	GQNL		Consolidated Fisheries, Ltd.
Hargood	MGKK		Derwent Trawlers, Ltd.
Imperialist	GRGJ		Northern Fishing Co.
James Barrie ..	GBJF		Newington Steam Trawling Co., Ltd.
Kingston Emerald ..	NBSH		Kingston Steam Trawling Co., Ltd.
Lancer .. .	GCPC		Loyal Steam Fishing Co., Ltd.
Loch Levan ..	GCXM	W. Parkinson . ..	Loch Fishing Co. of Hull, Ltd.
Loch Oskaig ..	GZQX	E. Moore	Loch Fishing Co. of Hull, Ltd.
Lord Cunningham ..	GBKD		Lord Line, Ltd.
Macedonian ..	MGFC		Dominion Steam Fishing Co., Ltd.
Northern Jewel ..	GRNN		Northern Trawlers, Ltd.
Northern Line .			Northern Trawlers, Ltd.
Northern Wave .	GYZC		Northern Trawlers, Ltd.
Prince Philip ..	MBLD		St. Christopher Steam Fishing Co., Ltd.
Sardinian	MFZW		Sir Thomas Robinson & Son (Grimsby), Ltd.
Sabina	GZNJ	J. W. Tomlinson ..	Lionel C. Tomlinson
St. Alcuin	MGCW	G. Argument . ..	Thomas Hamling & Co., Ltd.
St. Amant .. .	GFUD	J. Meyers . .	Thomas Hamling & Co., Ltd.
St. Apollo	GBBZ	A. E. Fisher	Thomas Hamling & Co., Ltd.
St. Britwin	MFXJ	J. Dobson	Thomas Hamling & Co., Ltd.
St. Elston	GDDL	W. Parkinson	Thomas Hamling & Co., Ltd.
St. Keverne ..	GMDR		Thomas Hamling & Co., Ltd.
St. Nectan	GZJY		Thomas Hamling & Co., Ltd.
St. Wiston	GDDK		Thomas Hamling & Co., Ltd.
Serron	GQRX		Standard Steam Fishing Co., Ltd.
Stella Aquila ..	MWMZ		Derwent Trawlers, Ltd.
Stella Canopus ..	GKQR	J. Kersey	Charleson-Smith Trawlers, Ltd.
Stella Antares ..	GKCD		Derwent Trawlers, Ltd.
Stella Polaris ..	NAWW	G. Weir	Charleson-Smith Trawlers, Ltd.
Thracian	MQKL		Sir Thomas Robinson & Son (Grimsby), Ltd.
Vanessa	GPMN		Atlas Steam Fishing Co., Ltd.
Yardley	GJYT		Crampin Steam Fishing Co., Ltd.
North Sea traders:			
Folda	MLFR	A. Goodland	The South Georgia Co., Ltd.
Iberian Coast ..	GFDP	D. Collins	Tyne-Tees Shipping Co., Ltd.
Olivian Coast ..	MDRQ	E. Wilson	Tyne-Tees Shipping Co., Ltd.
Netherlands Coast ..	NQLK		Tyne-Tees Shipping Co., Ltd.
Scotia	GPYM	A. M. Finlayson ..	Scottish Home Office

Light-vessels

The following light-vessels voluntarily observe, record and/or report from coastal waters of Great Britain.

Name of Vessel	Masters
Bar	E. E. Abbott
Dowsing	J. R. Audley, S. R. Smith, D. A. Bacon
East Goodwin	W. A. Price, L. W. Ling, L. N. Hawkes
Galloper	E. G. Mullitt
Humber	S. A. Balle, W. S. Parish
Newarp	B. Hadden
Royal Sovereign	L. P. Dawson, S. G. Sharnan
St. Gowan	H. G. T. Morgan, V. J. Lake
Seven Stones	D. Appleby, J. H. Cooper
Shambles	C. N. Duff
Shipwash	J. L. Goldsmith
Skulmartin	D. Hawkins
Smith's Knoll	W. J. Hall, J. O'Neill

Training Establishments

The following is a list of Training Establishments which submit logbooks, kept by the cadets under training, to the Marine Division.

Establishment	Captain/Superintendent	Last Return Received
Conway, H.M.S.	E. Hewitt, R.D., Capt. R.N.R.	24.8.56
Pangbourne Nautical College	H. C. Skinner, O.B.E., Cdr. R.N.	2.8.56
Warsash, School of Navigation	G. W. Wakeford, Capt.	27.7.56
Worcester, H.M.S.	G. C. Steele, V.C., Capt. R.N.R.	8.8.56

Research Ships

The following research ships voluntarily observe, record and report during their voyages.

Name of Ship	Call Sign	Captain	Owners
**Discovery II*	GWVM	H. D. L'Estrange, D.S.C., R.D., Cdr. R.N.R.	National Institute of Oceanography
**Endeavour*	ZMSH	H. Kirkwood, O.B.E., D.S.C., Actg. Capt. R.N.	New Zealand Government
Ernest Holt	GFXD	H. J. Aldiss, R.D., Lt.-Cdr. R.N.R. (Retd.)	Ministry of Agriculture, Fisheries and Food
**Shackleton*	GVDC	N. R. Brown	Falkland Islands Dependencies Survey

* Ships also listed as selected ships.

AUSTRALIA

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

NAME OF VESSEL	CALL SIGN	OWNERS
Selected Ships:		
Asphalion	GZPZ	Alfred Holt & Co.
Bulolo	VJPD	Burns Philp & Co.
Canara	MAGZ	British India Steam Navigation Co.
Charon	GZJQ	Alfred Holt & Co.
Chupra	GDZV	British India Steam Navigation Co.
Duntroon	VIFB	Melbourne Steamship Co., Ltd.
Gorgon	MBKC	Alfred Holt & Co.
Idomeneus	GKYZ	Alfred Holt & Co.
Koolinda	VJFC	Western Australian State Steamships
Koomilya	VJNF	McIlwraith McEacheron, Ltd.
Kooraawatha	VLCW	McIlwraith McEacheron, Ltd.
Kooringa	VLKR	McIlwraith McEacheron, Ltd.
Malaita	VJYY	Burns Philp & Co.
Malekuta	VLWB	Burns Philp & Co.
Nellore	GBLZ	Eastern & Australian Steamship Co., Ltd.
Orestes	GFPQ	Alfred Holt & Co.
Romanic	GSLS	Shaw, Savill & Co.
Triadic	GDNM	British Phosphate Commission
Trienza	GJJZ	British Phosphate Commission
Triona	GDFT	British Phosphate Commission
Wangenella	VJPQ	Huddart Parker & Co., Ltd.
Westralia	VJNJ	Huddart Parker & Co., Ltd
Supplementary Ships:		
Brazilian Prince		Shaw, Savill & Co.
Dorrigo		Western Australian State Steamships
Dulverton	VJVJ	Western Australian State Steamships
English Prince		Shaw, Savill & Co.
Kabbarli		Western Australian State Steamships
Kybra	VJFN	Western Australian State Steamships

PAKISTAN

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

NAME OF SHIP	CALL SIGN	OWNERS
Al Hasan	AQAN	Muhammadi S.S. Co., Ltd.
Al Hussaini	AQAH	Muhammadi S.S. Co., Ltd.
Al Sayyada	AQAS	Muhammadi S.S. Co., Ltd.
Anwar Baksh	AQAM	United Oriental S.S. Co., Ltd.
Kader Baksh	AQBK	United Oriental S.S. Co., Ltd.
Maula Baksh	AQBP	United Oriental S.S. Co., Ltd.
Ocean Endurance	AQBW	Trans-Oceanic S.S. Co., Ltd.
Pakistan Prosperity	AQAZ	Karachi Steam Navigation Co., Ltd.
Safina-e-Arab	AQBI	Pan-Islamic S.S. Co., Ltd.
Safina-e-Nusrat	AQBV	Pan-Islamic S.S. Co., Ltd.

BERMUDA

The following is a list of observing ships voluntarily co-operating with the Meteorological Station, Bermuda.

Name of Vessel	Call Sign	Owners
Ocean Monarch	GJXD	Furness, Withy & Co., Ltd.
Queen of Bermuda	GZKF	Furness, Withy & Co., Ltd.

CANADA

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

Name of Vessel	Call Sign	Owners
Selected Ships:		
Arosa Sun		Arosa Lines (Canada), Ltd.
Bluenose		Minister of Transport
Canadian Challenger	VGSK	Canadian National (West Indies) Steamships, Ltd.
Canadian Constructor	VGBY	Canadian National (West Indies) Steamships, Ltd.
Canadian Cruiser	VGPZ	Canadian National (West Indies) Steamships, Ltd.
Cyrus Field	GKQC	Western Union Telegraph Company
d'Iberville	CGSM	Minister of Transport
Esso Knoxville	HPTK	Imperial Oil Shipping Co., Ltd.
Esso San Juan	HOJV	Imperial Oil Shipping Co., Ltd.
Fort Avalon	MBMC	Furness Withy & Co.
Fort Hamilton	GCSS	Furness Withy & Co.
Fort Hearne	VCGX	Hudson's Bay Company, Ltd.
Imperial Edmonton	VGSJ	Imperial Oil Shipping Co., Ltd.
Imperial Toronto	VGSG	Imperial Oil Shipping Co., Ltd.
Irvingbrook	HPBM	Kent Lines, Ltd.
Lakemba	VPKV	B.C. Ship Chartering Co., Ltd.
Lakonia	GCDB	Donaldson Lines, Ltd.
Lord Kelvin	GDMM	Western Union Telegraph Company
Pinnacles	VGGZ	Shell Canadian Tankers, Ltd.
Rupertsland	VDXX	Hudson's Bay Co., Ltd.
Sungleam	LJSQ	Saguenay Terminals, Ltd.
Sunjarv	VGVQ	Saguenay Terminals, Ltd.
Waihemo	ZMJO	Union Steamship Co. of New Zealand
Waikawa	ZMJI	Union Steamship Co. of New Zealand
Wairuna	ZMJT	Union Steamship Co. of New Zealand
Waitomo	ZMKO	Union Steamship Co. of New Zealand
Supplementary Ships:		
Anna Bakke	LHNK	Knutsen Line
Antrim	GRJL	Manz Line
Bougainville	LMSQ	Klaveness Line
Canadian Conqueror	VCPV	Canadian National (West Indies) Steamships, Ltd.
Canadian Highlander	VCPP	Canadian National (West Indies) Steamships, Ltd.
Canadian Leader	VCQC	Canadian National (West Indies) Steamships, Ltd.
Canadian Observer	VCNW	Canadian National (West Indies) Steamships, Ltd.
Canadian Victor	VCNX	Canadian National (West Indies) Steamships, Ltd.
City of Brooklyn	GZKT	Manz Line
Elisabeth Bakke	LJJX	Knutsen Line
Ellen Bakke	LDAA	Knutsen Line
Gjertrud Bakke	LJZK	Knutsen Line
Kristen Bakke		Knutsen Line
Paloma Hills	VGGX	Shell Canadian Tankers, Ltd.
Rincon Hills	VGGY	Shell Canadian Tankers, Ltd.
Sunnyville	LNQZ	Klaveness Line
Suva	VQWQ	Pacific Shipowners, Ltd.
Ventura	LAFS	Ditleve-Simonsen, Ltd.
Vigan	LAGQ	Ditleve-Simonsen, Ltd.

INDIA

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

Name of Vessel	Call Sign	Owners
Selected Ships:		
Alavi	VWBL	The Mogul Line, Ltd.
Bahadur	MAVH	Asiatic Steam Navigation Co., Ltd.
Bharatjal	VWXC	Bharat Line, Ltd.
Dara	GDTT	British India Steam Navigation Co., Ltd.
Daressa	GFSM	British India Steam Navigation Co., Ltd.
Dumra	GMLA	British India Steam Navigation Co., Ltd.
Dwarka	GCKS	British India Steam Navigation Co., Ltd.
Havildar	GLVK	Asiatic Steam Navigation Co., Ltd.
Indian Exporter	VWVW	India Steamship Co., Ltd.
Indian Merchant	VWVR	India Steamship Co., Ltd.
Indian Pioneer	VWVS	India Steamship Co., Ltd.
Indian Trader	VWVT	India Steamship Co., Ltd.
Islami	VWJC	The Mogul Line, Ltd.
Jaladuta	VWDJ	Scindia Steam Navigation Co., Ltd.
Jalaganga	VWJG	Scindia Steam Navigation Co., Ltd.
Jalaketu	VWWC	Scindia Steam Navigation Co., Ltd.
Jalakrishna	VWJM	Scindia Steam Navigation Co., Ltd.
Jalamanjari	VWWY	Scindia Steam Navigation Co., Ltd.
Jalaprakash	VWYD	Scindia Steam Navigation Co., Ltd.
Jalayamuna	VWJJ	Scindia Steam Navigation Co., Ltd.
Jehangir	VWBJ	The Mogul Line, Ltd.
Kampala	GCKX	British India Steam Navigation Co., Ltd.
Karanja	MACS	British India Steam Navigation Co , Ltd.
Mahadevi	GCRN	Asiatic Steam Navigation Co., Ltd.
Maharaja	GNBY	Asiatic Steam Navigation Co., Ltd.
Mohammedi	GCBS	The Mogul Line, Ltd.
Mozaffari	MACV	The Mogul Line, Ltd.
Nadir	GCDV	Asiatic Steam Navigation Co., Ltd.
Nurani	MAPS	Asiatic Steam Navigation Co., Ltd.
Rajula	GMSN	British India Steam Navigation Co., Ltd.
Risaldar	GLVL	Asiatic Steam Navigation Co., Ltd
Santhia	GFSN	British India Steam Navigation Co., Ltd.
Shahjehan	GPUX	Asiatic Steam Navigation Co., Ltd.
State of Bombay	VWWP	Scindia Steam Navigation Co., Ltd.
State of Madras	VWWN	Scindia Steam Navigation Co., Ltd.
State of Saurashtra	VWXY	Scindia Steam Navigation Co., Ltd.
Subadar	MADK	Asiatic Steam Navigation Co., Ltd.
Umaria	GMNS	British India Steam Navigation Co., Ltd.
Supplementary Ships:		
Amra	GNNX	British India Steam Navigation Co., Ltd
Bharatmitra	VWYX	Bharat Line, Ltd.
Bharatraja	VWXL	Bharat Line, Ltd.
Bharatrani	VWXM	Bharat Line, Ltd.
Bharatratna	VWZX	Bharat Line, Ltd.
Bharatveer	VWZY	Bharat Line, Ltd.
Bharatvijaya	VWZK	Bharat Line, Ltd.
Indian Commerce	VWZW	India Steamship Co., Ltd.
Indian Reliance	VWCJ	India Steamship Co., Ltd.
Indian Renown	VWCF	India Steamship Co., Ltd.
Indian Resolve	VWDN	India Steamship Co., Ltd.
Itaura	GMWW	Great Eastern Shipping Co., Ltd.
Jagrani	VWZF	Scindia Steam Navigation Co., Ltd.
Jalazad	VWDF	Scindia Steam Navigation Co., Ltd.
Jalajawahar	VWDD	Scindia Steam Navigation Co., Ltd.
Jalakendra	VWWB	Scindia Steam Navigation Co., Ltd.
Jalamayur	VWWX	Scindia Steam Navigation Co., Ltd.
Jalamohan	VWCX	Scindia Steam Navigation Co., Ltd.
Jalapadma	VWYN	Scindia Steam Navigation Co , Ltd.
Jalaprabha	VWXS	Scindia Steam Navigation Co., Ltd.
Jalaputra	VWBN	Scindia Steam Navigation Co., Ltd.
Jalarajendra	VWYP	Scindia Steam Navigation Co., Ltd.
Jalaratna	VWDS	Scindia Steam Navigation Co., Ltd.
Jalausha	VWWV	Scindia Steam Navigation Co., Ltd.
Jalavallabh	VWYM	Scindia Steam Navigation Co., Ltd.
Jalavihar	VWBQ	Scindia Steam Navigation Co., Ltd.
Jalavishnu	VWBS	Scindia Steam Navigation Co., Ltd.
Malika	GCSK	Asiatic Steam Navigation Co., Ltd.
Rizwani	VWBF	The Mogul Line, Ltd.
Saudi	GVKL	The Mogul Line, Ltd.
State of Andhra	VWBD	Scindia Steam Navigation Co., Ltd.
State of Travancore-Cochin	VWBX	Scindia Steam Navigation Co., Ltd.

HONG KONG

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 Operator
Anking	J. McKinlay	T. A. C. Taylor, G. W. Bryant, W. Cooper	Chin Fook On	China Navigation Co., Ltd.
Anshun	A. Naismith	J. F. O'Connor, W. M. Coates, K. D. Johnson	Li San Kau	China Navigation Co., Ltd.
Belinda	A. H. Bathurst	W. L. Shi, C. O. Wong, S. Luk	Kenneth Kheong	Shun Cheong Steam Navigation Co., Ltd.
Changsha	D. C. Sim	A. Harper, R. J. Carson, M. D. O'Keeffe	Kwan Hok Kwan	China Navigation Co., Ltd.
Changte	E. B. Beeham	J. W. Tinson, G. A. Cooper, F. Leechman	R. McNamara	China Navigation Co., Ltd.
Chengtu	R. E. Selwyn-Jones	W. J. Coburn, M. W. Lewis, J. M. Crockett	Wai Pun Un	China Navigation Co., Ltd.
Choy Sang	J. H. Thomas	C. M. Gibbs, W. M. Pearson, P. Ferrar	D. B. Cumming	Indo-China Steam Navigation Co., Ltd.
Chungking	W. E. Hargrave	D. W. R. Gash, P. Y. Lam, B. Ginley	Wu P. Chi Siang	China Navigation Co., Ltd.
Eastern Glory	W. J. Bartlett	S. R. Bridgeford, G. C. Taylor, D. J. Hooper	D. J. O'Moore	Indo-China Steam Navigation Co., Ltd.
Eastern Muse	W. T. Rochester	G. Kinley, C. J. Farren, D. Wilson	J. C. Middleton	Indo-China Steam Navigation Co., Ltd.
Eastern Queen	F. H. Main	J. G. Perrin, J. W. Nugent, R. C. Hoggard	R. O. Smith	Indo-China Steam Navigation Co., Ltd.
Eastern Saga	D. G. R. Kinnear	C. Preston, A. B. Weller, J. Chisholm, R. E. Strange	W. C. Walker	Indo-China Steam Navigation Co., Ltd.
Eastern Star	S. Schofield	R. K. Learoyd, B. O. Jensen, J. W. Kempster, J. S. Woodward	A. C. Martin	Indo-China Steam Navigation Co., Ltd.
Elbrenon	W. E. Roberts	Kuo Mou Lai, Chen Shyue Yeng	Chan Yu Tang	Tradeships, Ltd.
Elsbeth	W. Barrows	J. D. Chapman, O. Y. Wellington	C. M. Tsang	Shun Cheong Steam Navigation Co., Ltd.
Fengning	R. C. W. Gorman	J. R. Marking, F. Cunningham, R. V. Crowhurst	Tsang Pui Leung	China Navigation Co., Ltd.
Fengtien	G. P. Cope	J. M. Parker, D. Green, C. T. Lu	Yeung Wai Chiu	China Navigation Co., Ltd.
Foochow	J. Storey	A. Atkin, C. H. Shih, W. C. Chan	Leung Kan	China Navigation Co., Ltd.
Fukien	B. McLennan	A. H. McAuley, I. P. Lee, C. J. Wong	Leung Man Hin	China Navigation Co., Ltd.
Funing	P. Pilling	I. F. Robertson, P. W. Campbell, N. B. Manning	Choi Pong Cheung	China Navigation Co., Ltd.
Hai Hing	J. L. A. Nilsen	O. Saltvold, O. Eldrup, K. Amundsen	Y. H. Ip	Thoresen & Co., Ltd.
Hai Lee	J. Hansen	A. Skjørvestad, E. O. Kvalheim, J. Evensen	W. I. Chan	Thoresen & Co., Ltd.
Hai Meng	J. Eide	A. Øverland, F. Pettersen, T. Naess	K. T. Chan	Thoresen & Co., Ltd.
Hang Sang	W. E. Reeve	I. D. Patterson, J. E. Hanbidge, G. A. Angus	R. Prosser	Indo-China Steam Navigation Co., Ltd.
Hanyang	C. A. N. Baker	A. Bartley, J. Kiely, P. A. Blaney	Yue Shiu Ming	China Navigation Co., Ltd.
Heinrich Jessen	J. N. Holst	H. Fallesen, W. Kronenbitter, E. Kragelund	K. P. Wong	Jebsen & Co.
Helios	G. Hamre	O. H. Andersen, P. I. Boe, F. Rosendahl	Y. F. Ip	Thoresen & Co., Ltd.
Henrik	E. Nordendal	H. Yndestad, B. Aresvik, S. Hostad	T. K. Chiu	Thoresen & Co., Ltd.
Hermelin	T. Thorkildsen	M. Sandvik, P. Pedersen, P. Finne	K. Y. Lai	Thoresen & Co., Ltd.
Hermod	H. Kystvaag	K. Kristoffersen, A. Lerstang, H. Wold	C. P. Poon	Thoresen & Co., Ltd.
Hervar	E. Eliassen	R. Skarpnes, L. Andaas, P. Halten	W. K. Fung	Thoresen & Co., Ltd.
Hew Sang	E. M. Norman	P. J. Sullivan, W. F. Povey, Yeung Kok Ching	S. I. V. Yarrow	Indo-China Steam Navigation Co., Ltd.
Hin Sang	J. F. G. Fotheringham	P. Bush, R. N. Maund, J. F. Edmonds	Luk U. Cheong	Indo-China Steam Navigation Co., Ltd.
Hoi Houw	B. Maeland	M. Aarland, L. E. Drange, H. L. P. Aasmyhr	H. H. F. Fastingsen	Karsten Larssen & Co. (Hong Kong), Ltd.
Hoi Wong	O. A. Offedal	R. H. Økland, O. G. Espeseth, K. Hemnes	E. L. Moller	Karsten Larssen & Co. (Hong Kong), Ltd.
Hoi Ying	Kr. Munkejord	J. Ekrene, R. Lien		Karsten Larssen & Co. (Hong Kong), Ltd.
Hong Kong Trader	A. L. Marchant	Ko Keng Jen, Zee Chia Gee, Fung Bui	Wen Wing Hoo	Great Southern Steamship Co., Ltd.
Hop Sang	T. C. W. Warr	J. B. Bowman, E. E. Ewbank, B. G. Cox	D. Taylor	Indo-China Steam Navigation Co., Ltd.
Ho Sang	G. P. Parish	J. R. Simpson, R. Reedie, T. Y. Yuen	R. H. Buller	Indo-China Steam Navigation Co., Ltd.
Hunan	J. F. Follett	J. M. K. Kelly, J. Keates, C. Y. Zia	Tsang Kau	China Navigation Co., Ltd.
Hupeh	F. Kelly	C. E. Lingard, K. M. Nairn, S. M. Ho	Lo Kin Chek	China Navigation Co., Ltd.
Jacob Jebsen	R. A. D. Nielsen	G. Andersen, F. Kopp, Th. M. Hansen	L. Yung	Jebsen & Co.

Lao	A. E. Andersson	R. A. Ericsson, E. A. Lindholm	P. E. G. Wengelin	Everett Steamship Corporation
Lok Sang	R. G. G. Stanton	W. G. White, D. McCrudden, L. Kirk	H. Burgoyne	Indo-China Steam Navigation Co., Ltd.
Mui Hock	H. Benneche	O. A. Antonsen, K. Kleaboe	Chan Sui Yeung	Chin Seng Hong Shipping Co., Ltd.
Ocean Trader	J. L. Baines	John Hardisty, Lam Hoi, Chung Cheuk	Hung San	Great Southern Steamship Co., Ltd.
Pakhoi	J. W. E. Warrior	W. Davidson, J. M. Innes, R. A. Button	Lam Bun	China Navigation Co., Ltd.
Poyang	G. T. M. Ramsay	J. R. Suffren, G. S. R. Ormond, C. Tee	Leung Shu Fun	China Navigation Co., Ltd.
Produce	L. Hetland	L. Fagerland, A. N. Nilsen		Karsten Larssen & Co. (Hong Kong), Ltd.
Sangola	W. E. Davies	D. M. Gill, H. L. Them, A. K. Wilkinson	D. Dowie	Mackinnon, Mackenzie & Co. (Hong Kong), Ltd.
Shansi	W. J. Bunney	L. P. James, R. E. Brooks, D. Lyon	Cheung Chiu Ling	China Navigation Co., Ltd.
Soochow	W. Watson	A. W. K. Prosser, E. R. Jones, J. R. Kidd	Yeung Wai Ki	China Navigation Co., Ltd.
Star Alcyone	W. S. T. Rasmusson	K. G. T. Larsson, J. N. Jacobsen, P. E. A. Kindberg	B. A. I. Olsson	Everett Steamship Corporation
Star Betelgeuse	P. H. Zetterquist	O. C. G. Warfvinge, S. H. Soderlind, R. Krastine	P. G. Nilsson	Everett Steamship Corporation
Szechuen	J. W. Evans	G. Baxter, G. E. Bennett, J. C. Mark	Lau Wan Leung	China Navigation Co., Ltd.
Tai Chung Shan	D. O. Conway	H. C. N. Hyde, M. T. Chan, C. L. Ho	K. Y. Pun	Shun Cheong Steam Navigation Co., Ltd.
Taiping	N. L. Hall	R. A. Smith, N. J. McCabe, B. P. White	A. M. McGregor	Australia Oriental Line
Tai Poo An	E. C. Thomson	N. B. Hall, C. K. Woo, C. W. Lee	K. Lam	Shun Cheong Steam Navigation Co., Ltd.
Tai Poo Sek	R. W. E. Little	P. V. Pattison, F. K. Lin, Y. Leung	C. C. Tsin	Shun Cheong Steam Navigation Co., Ltd.
Taiyuan	Y. N. Campbell	R. N. Frappell, J. B. Aldiss, M. R. M. Seale	Tsin Pun Cheung	China Navigation Co., Ltd.
Tak Sang	M. I. Groundwater	J. Parish, A. W. Lloyd-Taylor, M. H. Major	W. I. Briggs	Indo-China Steam Navigation Co., Ltd.
Thai	A. G. A. Heinze	G. H. Drake, T. V. Hedenklint, B. I. Mansen	U. K. W. Mauritzson	Everett Steamship Corporation
Yochow	V. R. Woolfe	G. Gilroy, A. G. Agnew, F. C. Wong	Tong Sik Iu	China Navigation Co., Ltd.
Yunnan	A. J. Keddie	S. H. Liu, G. Cornforth, S. C. Tseng	Cheung Shau Wai	China Navigation Co., Ltd.

MALAYA

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

Name of Vessel	Call Sign	Captain	Observing Officers	Senior Radio Officer	Owners and Managers
Bentong	ZBNF	B. S. Sprenger	B. S. Roberts	D. Quinn	Straits Steamship Co., Ltd.
Benveg	GMWB	R. L. Bruce	R. A. Hayhow	S. G. Thompson	Ben Line Steamers, Ltd.
Bidor	ZBBZ	T. B. Hooper	R. G. Mallet	R. M. Fermandez	Straits Steamship Co., Ltd.
Islander	VSPS	F. C. Gray	F. C. Gray, A. H. Spears	P. L. Long	Boustead & Co., Ltd.
Kah Poh	ZBBJ	J. S. Robertson	J. S. Robertson		Ho Chiang Shipping Co., Ltd.
Kajang	VPQD	M. S. Wright	C. A. Church	J. Abrahams	Straits Steamship Co., Ltd.
Kampar	ZBNG		G. Coupar	A. E. Engineer	Straits Steamship Co., Ltd.
Katong	ZBNR	A. B. Durrent	A. M. Hatton	K. A. Menon	Straits Steamship Co., Ltd.
Kimanis	VSND	A. W. Richardson	J. S. Armitage, B. F. Rehse	K. M. Pillai, N. Bharathan	Straits Steamship Co., Ltd.
Larut	VPKO	R. C. Barker	V. W. Pinnington	P. A. Anderas	Straits Steamship Co., Ltd.
Manihine	ZTIA	D. R. Davies	D. R. Davies		Director, Fisheries Research Station
Marudu	VPQB	C. L. Brown	P. C. Smith	C. E. George, N. Kandasamy	Straits Steamship Co., Ltd.
Matang	VSPB	J. M. Harkness	T. O. Sullivan, G. Hunter	J. Sinclair	Straits Steamship Co., Ltd.
Perak	VSPJ	H. W. Wilkinson	H. R. Watson	K. C. Jones	Straits Steamship Co., Ltd.
Perlis	VSRA	D. Lloyd Jones	E. V. Bloomfield	N. Tham	Straits Steamship Co., Ltd.
Salong	VSYZ	R. E. Davies	R. E. Davies		Straits Steamship Co., Ltd.

NEW ZEALAND

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

Name of Vessel	Call Sign	Owners
Selected Ships:		
Kaimanawa	ZMGZ	Union Steam Ship Company of New Zealand, Ltd.
Kaitoke	ZMTZ	Union Steam Ship Company of New Zealand, Ltd.
Kaponga	ZMVE	Union Steam Ship Company of New Zealand, Ltd.
Karitane	ZMJX	Union Steam Ship Company of New Zealand, Ltd.
Kauri	ZMCV	Union Steam Ship Company of New Zealand, Ltd.
Kawaroa	ZMBX	Union Steam Ship Company of New Zealand, Ltd.
Kawatiri	ZMKX	Union Steam Ship Company of New Zealand, Ltd.
Kawerau	ZMFY	Union Steam Ship Company of New Zealand, Ltd.
Komata	ZMCX	Union Steam Ship Company of New Zealand, Ltd.
Kopua	ZMLZ	Union Steam Ship Company of New Zealand, Ltd.
Koromiko	ZMRT	Union Steam Ship Company of New Zealand, Ltd.
Kowhai	ZMQU	Union Steam Ship Company of New Zealand, Ltd.
Kurow	ZMFJ	Union Steam Ship Company of New Zealand, Ltd.
Kurutai	ZMQH	Union Steam Ship Company of New Zealand, Ltd.
Matua	ZMBN	Union Steam Ship Company of New Zealand, Ltd.
Maui Pomare	ZMMG	New Zealand Government
Monowai	ZMCD	Union Steam Ship Company of New Zealand, Ltd.
Navua		Union Steam Ship Company of New Zealand, Ltd.
Port Montreal	GRKJ	Port Line, Ltd.
Port Quebec	GWGQ	Port Line, Ltd.
Port Saint John	GBCZ	Port Line, Ltd.
Tofua	ZLMI	Union Steam Ship Company of New Zealand, Ltd.
Waimate	ZMDV	Union Steam Ship Company of New Zealand, Ltd.
Waimea	ZMRU	Union Steam Ship Company of New Zealand, Ltd.
Waipori	ZMFL	Union Steam Ship Company of New Zealand, Ltd.
Wairata	ZMBZ	Union Steam Ship Company of New Zealand, Ltd.
Wairimu	ZMVR	Union Steam Ship Company of New Zealand, Ltd.
Waitemata	ZMQW	Union Steam Ship Company of New Zealand, Ltd.
Supplementary Ships:		
Coromel		Jurie Shipping Co., Ltd.
Kaiapoi	ZMVD	Union Steam Ship Company of New Zealand, Ltd.
Kaitangata	ZMTJ	Union Steam Ship Company of New Zealand, Ltd.
Kaitawa	ZMVC	Union Steam Ship Company of New Zealand, Ltd.
Kaituna		Union Steam Ship Company of New Zealand, Ltd.
Konui	ZMVB	Union Steam Ship Company of New Zealand, Ltd.
Korowai	ZMKD	Union Steam Ship Company of New Zealand, Ltd.
Piri	ZMGM	Imperial Chemical Industries, Ltd.
Port Waikato	ZMJN	Holm & Company, Ltd.
Viti	VQWS	Tasman Steam Ship Company of New Zealand, Ltd.
Waiana	ZMDQ	Union Steam Ship Company of New Zealand, Ltd.
Waitaki	ZMLR	Union Steam Ship Company of New Zealand, Ltd.

SOUTH AFRICA

The following is a list of observing ships voluntarily co-operating with the South African Weather Bureau.

Name of Vessel	Call Sign	Owners
Abraham Larsen	GKZB	Union Whaling Co., Durban
Africana II	ZSVK	Division of Fisheries, Cape Town
Barrier	ZTCB	African Coasters, Ltd.
F. T. Bates	ZSWW	South African Railways and Harbours
Constantia	ZSRF	South African Marine Corporation, Cape Town
Dalia	ZSDV	South African Railways Ships, Johannesburg
Frances Repetto	ZSNB	
George Irvin	ZSGF	Friarage Steam Fishing Co., Ltd.
Hereto Coast	MQZK	
Matabele Coast	CKGD	Thesen's Steamship Co., Cape Town
Morgenster	ZSSJ	South African Marine Corporation, Cape Town
Tristania	ZSCW	Tristan Development Co., Cape Town
Vergelegen	ZSSN	South African Marine Corporation, Cape Town

WEST INDIES

The following observing ships voluntarily co-operate with the British Caribbean Meteorological Service.

Name of Vessel	Call Sign	Owners
Electra	MRYX	Cable & Wireless, Ltd.
West Indian	WRBR	Indo-China Steam Navigation Co., Ltd.

ABRIDGED LIST OF PUBLICATIONS OF THE METEOROLOGICAL OFFICE

Publications may be ordered from the bookshops of Her Majesty's Stationery Office at the addresses shown on the title page or through any bookseller

Cloud Forms. Definitions and descriptions, with photographs of clouds. (M.O. 233, 6th edition, 1949, reprinted 1953.) 2*s*. 6*d*. (2*s*. 8*d*.)

Handbook of Meteorological Instruments. Part I. Instruments for surface observations. (M.O.577.1956). 45*s*. (46*s*. 6*d*.)

Handbook of Weather Messages, Codes and Specifications. (M.O. 510.)

Part I. Transmission schedules and station index numbers. (2nd edition, 1955.) 6*s*. (6*s*. 4*d*.)

Part II. Codes and Specifications. (2nd edition, 1954.) 4*s*. 6*d*. (4*s*. 11*d*.)

Part III. Coding, decoding and plotting. (2nd edition, 1954.) 4*s*. 6*d*. (4*s*. 9*d*.)

(*Amendments issued as necessary and priced separately*)

Instructions for the Preparation of Weather Maps with tables of the specifications and symbols. (M.O. 515, 2nd edition, 1954.) 1*s*. 9*d*. (1*s*. 11*d*.)

International Meteorological Code adopted by the International Meteorological Organisation, Washington, 1947. **Decode for use of shipping,** incorporating the code for weather reports from and to ships and the analysis code for use of shipping. (M.O. 509, 3rd edition, 1955.) 1*s*. 6*d*. (1*s*. 8*d*.)

Marine Observer's Handbook. (M.O. 522, 7th edition, 1950, reprinted 1952.) 10*s*. 6*d*. (11*s*. 3*d*.)

Meteorological Handbook for Pilots and Navigators. (M.O. 448, 2nd edition, 1942, reprinted 1952.) 3*s*. 6*d*. (3*s*. 9*d*.)

Meteorology for Aviators. By R. C. Sutcliffe, Ph.D. (M.O. 432, 1940, reprinted 1953.) 10*s*. (10*s*. 11*d*.)

Meteorology for Mariners. (M.O. 593.) *In the Press.*

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 1953.) 4*s*. 6*d*. (4*s*. 9*d*.)

Weather Map. An introduction to weather forecasting. (M.O. 595.) *In the press*

Prices in brackets include postage

Printed in Great Britain under the authority of Her Majesty's Stationery Office by The Campfield Press, St. Albans, Herts.

18444. Wt. 10. K.12. 1/57. S.P. & S. G.9.8.8. S.O. Code No. 40-38-1-57