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THE MARINE OBSERVER.

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SAIL.

To pass a large sailing ship close to at sea was always a fine sight—to-day it is a rare sight—but the Chief Officer of *El Uruguayo*, Mr. F. C. HAILSTONE photographed what they saw when they passed the four masted barque *Herzogin Cecilie* in the South East Trade last November and his photographs are re-produced overleaf.

Captain T. McNAMARA gives us some of his reflections.

What such a sight brings back—one can almost hear some of the older officers when they look at these photos of *Herzogin Cecilie* remarking upon the cut and set of her sails and her trim, the youngster on the fore royal yard, and even admitting that she is a very fine ship. But, they will say, she is not as fine a ship as "—" when I was in her in the nineties. And so it always was, that is the pride of ship which the sailing ship gave us. Ours was always the finest ship!

Here is what JOHN MASEFIELD says of my first ship in his poem the "Wanderer":—

Off Portland another voice spoke from the depths of the sea:—

"I once was the *Siren*, In Queenstown beside you of old.

Of all the world's beautiful ships we were surely the queens.

O would we were racing down Channel again as of old.

With skysail poles bending, the lee scuppers flashing with spray,
The leaning high canvas complaining and straining and dark
Dark with wings dipping, or spindrift: the lean shaving
shearing

Of the cutwaters heaving white water as high as the rail,
And the men at the tackles high-crying to board down the tacks.
But Fate smote my going asunder: I gallop no more
On the fenceless green foam-blossomed fields of the horses of
storm,

The speechless fish pasture within me: the lobsters' eyes peer
The darkness within me dim-gleaming with shine of the sea.
I once was the *Siren*: we two were the queens, you and I".

The Ship *Siren*, Captain MALCOLM MACLEAN, was sunk after being rammed by H.M.S. *Landrail* on July 11th, 1896, 25 miles S.S.W. of Portland Bill. That was the last of one of many such fine ships.

The disappearance of the square rigged foreign going sailing ship from the British Register has deprived the youth of to-day of one great means of the development of seamanlike resourcefulness and at the present time when education is being put within easier reach of all, there are many who are concerned as to future means of developing to a high pitch that practical resourcefulness in the sea officers of the future.

At such a time these photographs are of great interest. Life in such sailing ships made seamen and officers resourceful and produced master mariners who being individualists and natural leaders were not found wanting when put to the severest tests in 1914-1918 and who are now commanding Britain's finest ships and leading her incomparable Merchant Navy.

We were delighted to see the honour to our old friend Sir PHILIP DEVITT when His Majesty recently created him a Baronet in recognition of his fine service to training. There can be few fathers and sons who the Merchant Navy would sooner hail as old friends than Sir PHILIP and the late Sir THOMAS DEVITT on account of endeavour to give officers good training.

Whether trained in Devitt and Moore ships, a later generation at Pangbourne, or not, all will join us heartily in congratulating Sir PHILIP.

The only sail driven craft of our Merchant Navy now remaining in any numbers which have survived as commercially successful are the sprit sail barges of the Thames and Medway, splendid craft for their purpose.

In September we reproduced two photographs of *Shamrock V* specially rigged as a Bermuda Yawl during passage out to America. Of recent years much has been learned of stream lines and some of our ideas of the cut and set of sails have been modified and possibly there is no more striking example of this than the KING's racing cutter *Britannia*.

In the summer of 1893 as we steamed up Spithead homeward bound from the Cape to join the *Conway*, *Britannia* was racing rigged as a cutter with a gaff mainsail, then one of the fastest yachts of the day.

This season at the age of 38 years, under Bermuda rig, and with a reduced sail area, she sails faster, is more weatherly, and holds her own with the fastest modern British yachts. It is worth the while of all young officers who wish to be really successful in their profession to study the matter of stream lines.

Boat work and particularly boat work under sail is one of the finest things for youngsters. Our young officers in the great ships of to-day get little enough opportunity of taking charge. A youngster in charge of a boat away from the ship is thrown on his own resources, he learns to command by taking charge of his boat and boat's crew. Sailing a boat teaches him about nature's forces, gives him judgment and self reliance, two qualities most essential in our profession.

MARINE SUPERINTENDENT.

London,

July 13th, 1931.

THE MARINE OBSERVER'S LOG.

It is hoped that these pages will be filled each month with a selection of the contributions of Mariners in manuscript, or remarks from the Logs and Records of regular Marine Observers.

Responsibility for statements rests with the Contributor.

A RARE SIGHT!

These photographs of the 4-masted Barque *Herzogin Cecilie* are contributed by Mr. F. E. HAILSTONE, 1st Officer, S.S. *El Uruguayo*, Captain T. McNAMARA, Liverpool to Montevideo.

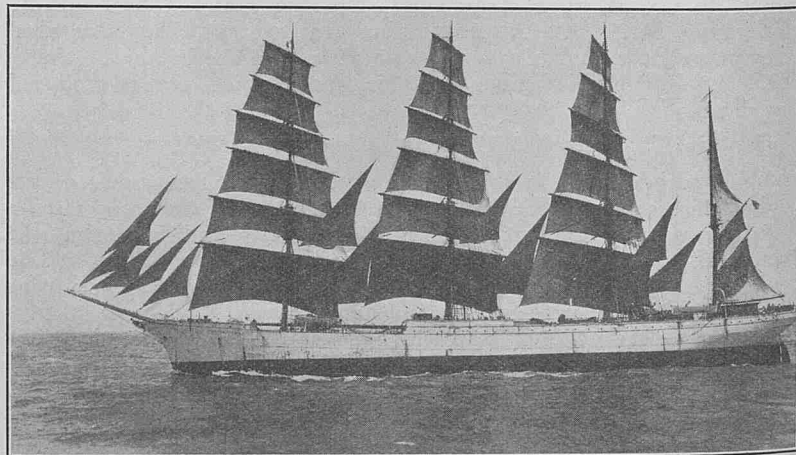
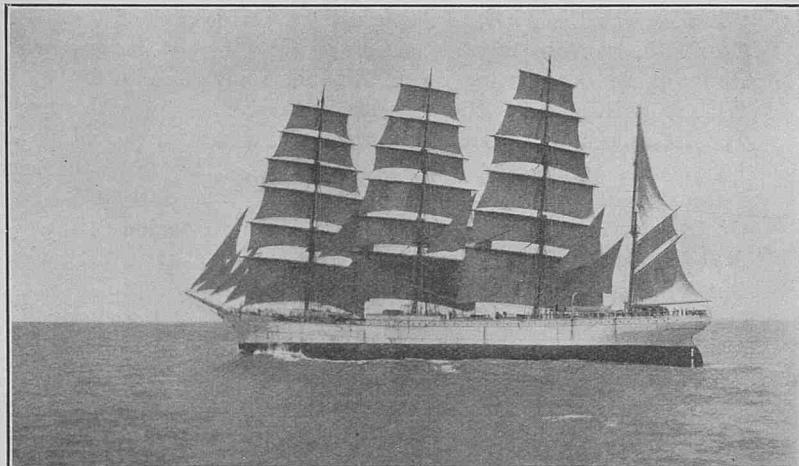
Captain McNAMARA remarks as follows:—

The Finnish four-masted barque *Herzogin Cecilie* of 2,583 Tons Nett Register was formerly a German Cadet Training Ship. She is now owned by Captain GUSTAF ERIKSON and employed in the Australian Wheat Trade under the Command of S. ERICKSEN, who is 27 years of age and the youngest master in the fleet.

Sailing in ballast from Mariehamn on September 9th, 1930, and arriving at Copenhagen on September 12th she left there for Australia on September 18th, 1930, and was spoken by the S.S. *El Uruguayo* in Latitude 9° 33' S., Longitude 33° 44' W. on November 1st, 1930, at 11.45 a.m. A.T.S. when the photographs were taken.

She was taking full advantage of the moderate South East Trades then blowing, being close hauled on the Port tack and making a speed of about nine knots.

She arrived at Port Lincoln, South Australia for orders on December 13th after a passage of 95 days from Mariehamn and 86 days from Elsinore, and subsequently arrived at Wallaroo on the 17th December, 1930, to load wheat.



Having loaded at Wallaroo she sailed for Queenstown on January 23rd, 1931, and arrived there on April 25th, 1931, after a passage of 92 days.

The *Herzogin Cecilie* on the passage home had a fairly good run of 40 days to Cape Horn and registered 360 miles in one day, during such time having registered $17\frac{1}{2}$ in one hour by log, and has now won the sailing ships race from Australia no less than six times within recent years.

It is the intention of the Owner to fit her for carrying 12 Passengers and they are also prepared to consider applications from British boys who wish to serve in a square rigged vessel.

So much has been said in the various Nautical Publications for and against sail training, with pens mightier than mine, that I hardly dare touch upon the subject, but that there is now no doubt that the best training for Officers is the Sailing Ship.

From a commercial standpoint the day of the sailing ship is over and no Owner can hope for subventions in any form, he must, therefore, devise an expedient to keep his ship employed and productive. With the present rate of freights and expenses this can only be achieved by running his ship uninsured and augmented by high premium Cadets.

For sail training to be a success, in the writer's opinion, it would be necessary to have running 9 or 10 Cadet Training Ships and sail-training made compulsory for all future Officers of the Merchant Navy.

Britain, as the first Maritime Nation of the World has led the way in maritime matters and has found this class of vessel is no longer necessary, and, no doubt, the Nations that are at present fostering sailing ships will do as we have done, and fall into line, as in the past.

Romance is but the commonplace of yesterday and as the setting sun leads to the twilight of a day which is done, so does the sailing ship sail into the horizon and dip to the memory of the past.

CURRENTS.

Between Sunda Strait and Ceylon.

THE following is an extract from the Meteorological Log of S.S. *Peshawur*, Captain A. E. McBRIDE, Brisbane to Colombo. Observer Mr. D. MEIKLE, 3rd Officer.

From a position with Engano Island Peak bearing 31° off the Sunda Strait in Latitude $5^\circ 54\frac{1}{2}'$ S., Longitude $101^\circ 56'$ E. being the ship's position at noon on 3rd November, 1930, to a position off Ceylon in Latitude $4^\circ 48\frac{1}{2}'$ N., Longitude $82^\circ 21'$ E. being the ship's position at noon on 8th November, the following currents were experienced from noon to noon each day:—

Noon 3rd to 4th Set 117° Drift 29 miles.
 Noon 4th to 5th Set 127° Drift 31 miles.
 Noon 5th to 6th Set 147° Drift 38 miles.
 Noon 6th to 7th Set 119° Drift 44 miles.
 Noon 7th to 8th Set 098° Drift 30 miles.

This gives a mean set of 122° 1.4 knots for 5 days 1 hour 19 minutes. In all cases the observations were excellent and the above may be considered quite reliable. This current is especially mentioned, as no apparent record of a similar current appears in the current charts.

NOTE.—It is intended to chart the currents in the Trade routes in the Arabian Sea, Persian Gulf, Bay of Bengal and that part of the Indian Ocean from Sunda Strait and the Coast of Sumatra to the region of the Fremantle-Colombo track already charted. It is hoped by the end of 1935 that these section charts in THE MARINE OBSERVER may be the means of producing a new Atlas of Currents for the whole Indian Ocean.

SOUTHERN OCEAN CURRENTS.

THE following is an extract from the Meteorological Record of S.S. *Southern King*, Captain W. WILLIAMS, South Georgia to Durban:—

November 26th to December 14th, 1930.

I have watched carefully the set and drift from South Georgia to Latitude $64^\circ 24'$ S., Longitude $47^\circ 46'$ E., and I am confident that the prevailing set and drift is E.S.E. about 15 to 21 miles per 24 hours. This is my third visit along this parallel to Bouvet Island, but from Bouvet Island to Longitude $47^\circ 46'$ E. this journey is my first visit.

When East of 40° East Longitude and South of $56^\circ 30'$ South Latitude, I have experienced the set and drift due South, about $1\frac{1}{2}$ to 2 knots, with Northerly wind.

But with winds from any direction I am almost certain that the currents in these localities are setting South averaging about 18 miles per 24 hours.

CURRENT RIPS.

West Coast of Africa.

THE following is an extract from the Meteorological Record of S.S. *Bampton Castle*, Captain J. S. JAMES, D.S.C., Cape Town to Liverpool. Observer, Mr. H. R. GRAHAM, 3rd Officer.

On November 23rd 1930, at 1440, proceeding on a 324° course at a speed of 9.2 knots parallel lines of disturbed water proceeding in a W.N.W. direction and reaching from horizon to horizon in a perfectly straight line were observed to the eastward approaching the ship at the rate of about 4 or 5 knots. At 1500 just prior to the first and most disturbed line of water reaching us the temperature of the sea water was taken and observed to be normal, i.e. 84° .

As the ship entered the first and most pronounced of the series of current rips the temperature was again taken and observed to have risen 2° above normal, i.e. from 84° to 86° , the sea was surprisingly rough and confused, each ripple being flecked with foam and striking the ship's side sufficiently hard to make an appreciable noise; no deviation from the course or effect in any form was felt aboard, however, and the disturbed line passed on its way taking about 12 minutes to pass our course.

When this had passed the temperature was taken and observed to have fallen to 83° , the time being 1520. A series of about half a dozen lines of less disturbed water were following each being parallel to the other and the first and each about one mile distant from the other. The phenomenon lasted until 1530.

Ship's position, Latitude $8^\circ 25'$ N., Longitude $15^\circ 22'$ W., Barometer 30.08 in., wind W. by S., force 1, weather fine and clear with Cu, amount 3. Temperature, air 86° F., sea 84° F., slight W. by S. sea, and slight S.S.E. swell.

PHOSPHORESCENCE.

Gulf of Oman.

THE following is an extract from the Meteorological Record of S.S. *British Consul*, Captain R. O. PUTT, Abadan to Suez. Observer, Mr. C. GALLEY.

On November 19th, 1930, 00.15 to 00.40 a.m. A.T.S. the whole sea was swept with short quick flashes of low candle power giving an appearance of rapid waves of light over the sea.

Condition:—Sky clear, sea calm, no moon, atmosphere very dark. Ship's Position, Latitude $25^\circ 57'$ N., Longitude $56^\circ 58'$ E.

AURORA BOREALIS.

Belle Isle Strait.

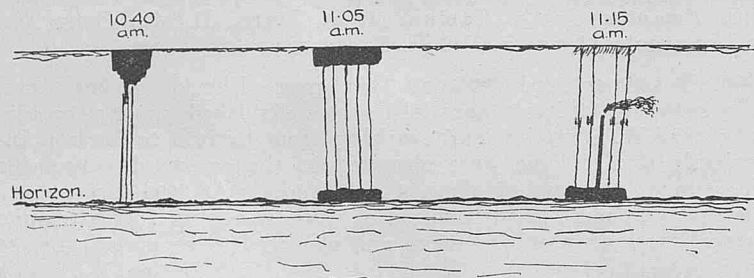
THE following is an extract from the Meteorological Record of S.S. *Ausonia*, Captain P. A. MURCHIE, R.D., R.N.R., Montreal to London. Observer, Mr. E. R. TAYLOR.

2nd November, 1930. At 2330 auroral arc formed bearing 052° through 360° to 288°, peak of arc bearing 360° at altitude of 18° followed 1 minute later by another and complete arc of 23½°. The display was draperies at western end, streaks (shooting) in centre and homogeneous to eastward, spectrum colours absent, but green very dominant. Stars were visible above, between and below arcs, and in "dark segment". No magnetic compass disturbance took place and no audibility. Moon and stars were particularly brilliant, visibility 9, sky Ci-St on horizon to S.W. amount one-tenth. Position of ship Latitude 51° N. Longitude 56° W.

MIRAGE.

Australian Coast.

THE following is an extract from the Meteorological Log of S.S. *Marella*, Captain A. DONALDSON, Melbourne to Sydney. Observer, Mr. A. G. W. THOMAS, 3rd Officer.



1st November, 1930, mirages seen when approaching Cape Everard. Course 058°.

10.20 a.m. Sighted what appeared to be fog bank.

10.40 a.m. Observed mirage of inverted steam vessel bearing 115°. Hull rather distorted, altitude 0° 30', and masts extending down to horizon. Vessel herself actually "hull down" when phenomenon first sighted.

11.05 a.m. Both steamer and her inverted reflection visible, masts and funnel appearing as five vertical lines connecting both.

11.15 a.m. Reflection faded, but masts and funnel extending to same altitude. We passed another vessel shortly after noon, on which this phenomenon was repeated. Big dips and lifts in horizon.

Position of ship at noon Latitude 38° 19' S., Longitude 150° 17' E. Course 058°, Wind N. by E.3. Temperature, air 65° dry bulb. Wet bulb 58.7°.

The above conditions obtained until sunset, ships and land taking most fantastic shapes. Although the temperature was not high, atmosphere was shimmering like hot air from funnel.

This night all coastal lights were sighted at least 10 miles outside their normal range.

On the 2nd November similar conditions accompanied us right up to Sydney Heads, beaches appearing as tall sand cliffs, and flat islands as vertical sided.

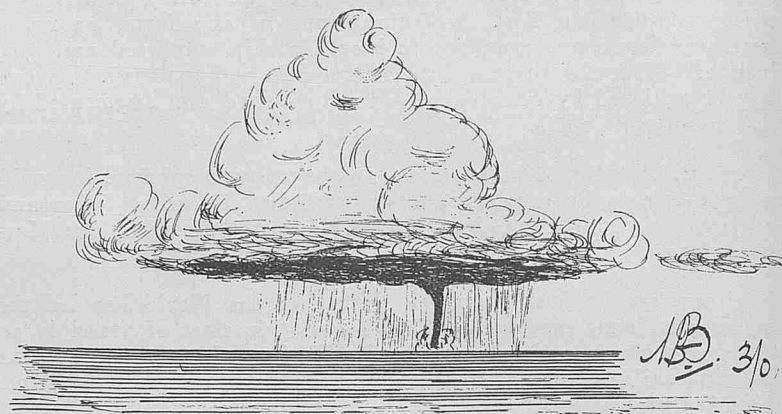
The fact that our smoke, and the smoke from passing vessels did not rise, but lay heavily upon the sea in sheets is another peculiarity.

WATERSPOUT.

Caribbean Sea.

THE following is an extract from the Meteorological Record of S.S. *Laguna*, Captain R. E. DUNN, O.B.E., Cristobal to Liverpool. Observer, Mr. W. BILLINGTON, 3rd Officer.

On November 21st, 1930, at 0.15 p.m. A.T.S. a waterspout was observed, formed below massed cumulo-nimbus to the eastward. The accompanying rough sketch gives an idea of how it appeared when first seen. The spout originated from the dark nimbus base, and terminated in heavy spray close to the horizon. Its angular height measured above the horizon was one degree and bearing S. 80°E. true. At 0.20 p.m. the column wavered and began to break up, shortening into the nimbus cloud and lengthening, spasmodically, towards the first point of contact with horizon, until 0.30 p.m., when it finally disappeared.



A remarkable feature of the phenomenon was the piled up, well defined, wool-pack cloud, surmounting an attenuated layer of dark nimbus. The sky below the formation and beyond the water spout showed dull with the appearance of light falling rain. No change was observed in the readings of instruments which seemed unaffected by the disturbance.

Ship's position, Latitude 14° 38' N., Longitude 71° 24' W. Wind E.N.E. 2, Cu and Cu-Nb. 3, light passing showers. Barometer steady, 1010.5 mb. Temperature 82°F.

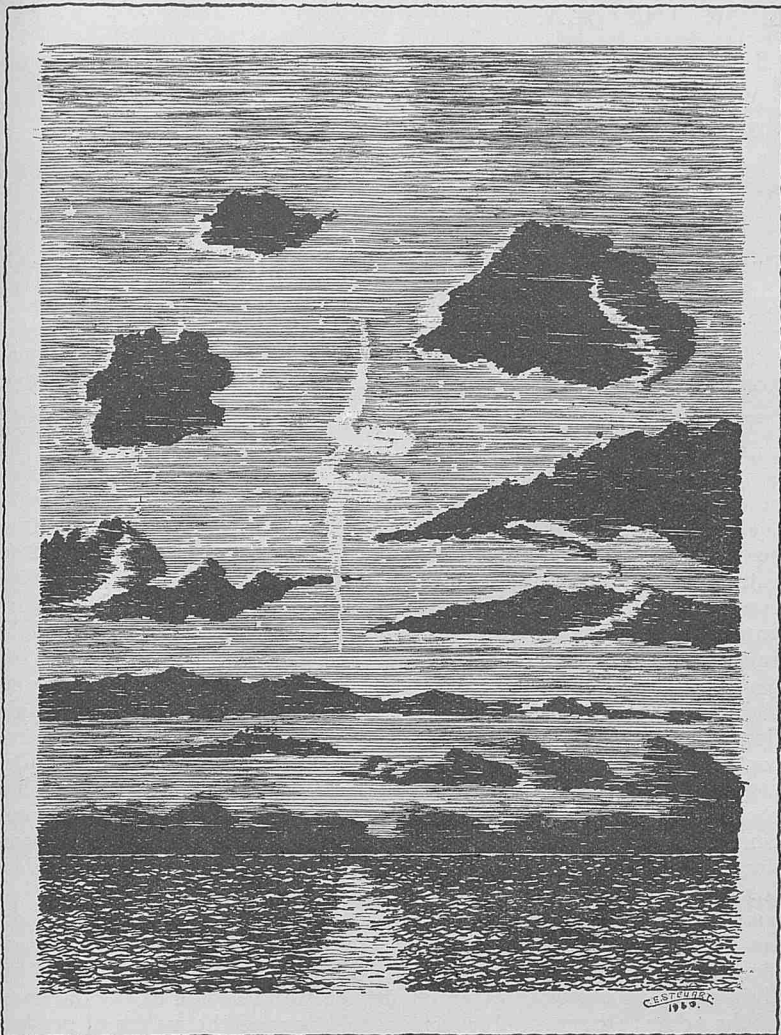
METEORIC SHOWER.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Transylvania*, Captain D. W. BONE, Moville to New York. Observers, Messrs. C. E. STEUART, 1st Officer, and I. CHAMBERLAIN, 3rd Officer.

On Monday 17th November, 1930, 0814 G.M.T. to 1014 G.M.T., there occurred a most spectacular meteoric shower, innumerable meteors shooting in all directions in a partly cloudy sky, those in the zenith being predominant, directed towards the Southern horizon.

At 0835 G.M.T. a stellar fragment of extraordinary size fused bearing 160° at an approximate altitude of 17°, and the effect was similar to that of a star-shell, lighting up the whole heavens with a brilliancy of magnesium intensity. The white core disappeared at an approximate altitude of 12°, leaving behind a broad, spiral, luminous trail of peculiar aspect, which remained suspended several minutes before gradually fading away. When viewed through powerful binoculars, the glowing particles could be clearly seen. The attached drawing shows the final appearance of the molten spiral. Ship's position at 10 hrs. G.M.T. Latitude 42° 42' N., Longitude 60° 44' W.



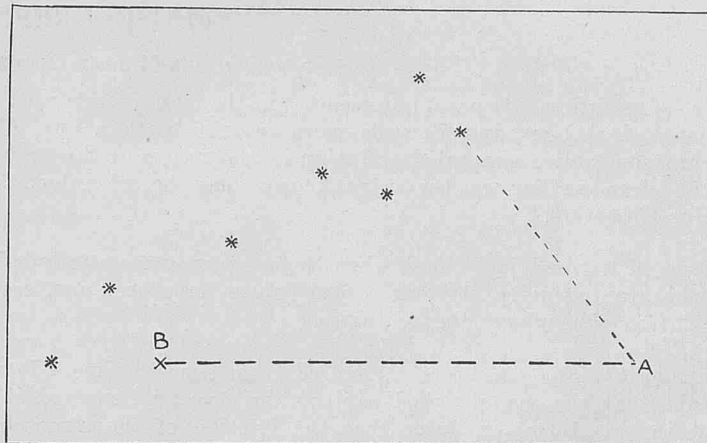
NOTE.—S.S. *Ausonia*, Captain P. A. MURCHIE, R.D., R.N.R., London to New York, Observer Lieut.-Commander E. R. TAYLOR, R.D., R.N.R., has reported that at 0500 G.M.T. on November 17th, "Shooting stars were very much in evidence". Position of ship, Latitude $51^{\circ} 44' N.$, Longitude $21^{\circ} 16' W.$ at 0600 G.M.T.

METEOR.

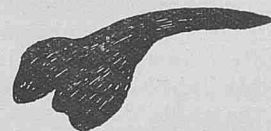
North Atlantic.

The following is an extract from the Meteorological Log of S.S. *Newfoundland*, Captain A. W. FOXWORTHY, St. Johns N.F. to Liverpool. Observer, Mr. R. F. HANDLEY, 2nd Officer.

November 17th, 1930, at 0215 G.M.T. 12.03 Ships Time the following observations took place in the presence of the Captain, the 2nd and extra 2nd officers. A meteor of extraordinary brilliance flashed across the sky from the described position.



The meteor commenced at the point A in line with the Pointers. It passed right across to Benetnasch but ended just this side of it at B. Its passage took 8 seconds and can only be described as being marvellous in colouring and brilliancy, resembling somewhat a powerful rocket let off at some huge firework display. After it had burst and shed seemingly hundreds of stars, the tail remained plainly visible for 13 minutes. For 4 minutes it retained almost its first brilliancy then spread out more in a shadow. After remaining in its original course for 8 minutes it gradually closed something like this





finally spreading over a larger area and working in between N. and E. in the constellation (Great Bear). About the time when the first brilliancy was lost a further but much smaller meteor shot out from the other side of Benetnasch. Quite a few shooting stars were observed during the watch all in the north and a bright patch (Aurora Borealis) in the North between 1.50 and 2.15 a.m. This observation is much more noteworthy than the one I have previously reported on October 22nd, 1928. (Published in MARINE OBSERVER, Vol. VI, No. 70.)

Ship's Position Latitude $52^{\circ} 53' N.$, Longitude $36^{\circ} 09' W.$ Sky cloudless, and stars twinkling unusually.

METEOR.

Mediterranean Sea.

The following is an extract from the Meteorological Record of S.S. *Tarantia*, Captain J. B. CAITHNESS, Liverpool to Bombay. Observer, Mr. J. M. CHERRY, 2nd Officer.

On November 15th, 1930, at 0203 G.M.T., observed a meteor of dazzling brilliancy, appearing from a point about 5° West of Rigel and travelling in a Westerly direction. Duration of flight three seconds. Very marked path which was seen for four minutes after disappearance of meteor, gradually changing in shape from straight line to the following shape  then to  and disappearing.

Ship's position, Latitude $36^{\circ} 34' N.$, Longitude $1^{\circ} 36' W.$

PHOSPHORESCENCE OF THE SEA.

PREPARED IN THE MARINE DIVISION BY H. T. SMITH, CLERICAL ASSISTANT.

The observation of phosphorescence in the sea is recorded in Meteorological Logs and Records more frequently than any other phenomenon, and a general description of the causes of this wonder of the deep as far as they are known may be of interest to Marine Observers.

Observed from ancient times, when its occurrence was attributed to supernatural agencies, its origin and causes have been matters of speculation throughout the centuries.

Various explanations were attempted from time to time. It was thought that the sea absorbed sunlight by day and emitted it by night in this form, or, later that the friction of the atmosphere against the water caused by the rotation of the earth effected an emission of light. It was not until the time of FRANKLIN (1750) who himself believed the sea water to be responsible, that the true explanation was found. During the years 1749-50, a small animalcule that emitted a blue light when disturbed was discovered by VIANNELLI and GUIXELLANI in the Mediterranean and subsequent investigation has proved that the animal life of the ocean is the origin of the phosphorescence of the seas.

That being so, the term phosphorescence is in itself misleading since it implies a connexion with the substance "phosphorus," but as this substance is deadly poisonous to any living tissue, it follows that the production of this light has nothing to do with the oxidation of phosphorus and the word "luminescence" has been suggested by several investigators as being a better description.

This capability to produce light is present in many of the organisms that inhabit the deep, from the minute microscopic forms of life, bacteria and the unicellular animalculæ, to many forms of deep sea fish. According to "Depths of the Ocean" (Sir JOHN MURRAY and Dr. J. HJORT), except for some species of fish living in the abysmal depths of the ocean, it is generally associated with the free-swimming organisms found between the surface and 500 metres (273 fathoms) depth and in particular in those forms inhabiting Tropical waters. The means of production vary throughout the different zoological groups. In the lowest forms of life, the one cell animals (Protozoa, Protophyta, &c.) the light emanates from groups of points distributed over the protoplasm. In higher orders, specialised organs and glands for the production of this light appear, some being equipped with lenses and reflectors giving them the appearance of an eye. In other forms still, a mucous is secreted which becomes luminous in contact with the sea water, making as it were a luminous cloud in the water.

M. GIGLIOLI of Italy has classed the light emitted by individual organisms in three types

- (a) a diffused milky light.
- (b) luminous points, sparkling and inconsistent.
- (c) luminous discs, dull fixed lights.

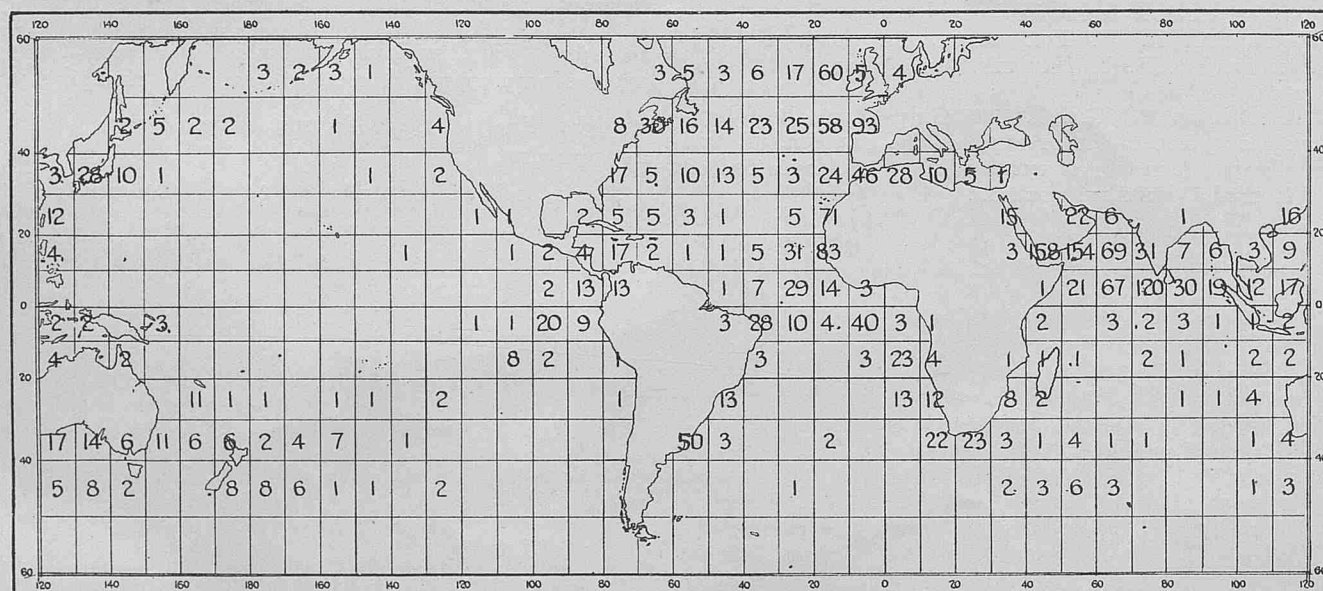
But in a display of phosphorescence at sea, it is probable that all three types will occur simultaneously in many instances, owing to the varying species of animals contributing to it.

The colour of phosphorescent light varies with different animal groups and ranges through white, silver, green, blue, lilac and red.

The method of production has been shown to be a chemical one, being the slow oxidation of one or more substances secreted by the living animal. In the case of the one cell animals it is thought to be simply part of the chemistry of living. In the same way, as in the human body for instance, chemical energy is transformed into heat, so in the case of these organisms, chemical energy is transformed into radiant energy, such a transformation being essential for the continued existence of the animal. The result is the production of purely radiant energy, for it is a peculiarity of phosphorescent light in all its forms that it is *cold* light, no heat being generated in the process. Under these circumstances, the giving off of phosphorescent light is not under the control of the individual. But in more highly developed forms, the light would seem to be under some sort of nerve control, its emission only occurring in response to definite stimulation and then only under certain conditions. G. H. PARKER has shown that in a species "Renilla" which is brilliantly phosphorescent when stimulated at night, there is no response to stimulation during daylight. The complexity of the light producing organs does not increase in accordance with the depth at which the animal lives, some of the surface forms having more complex organs than those living at greater depths; nor do all organisms living at any particular depth possess this property. It would seem therefore that the light is not of necessity given off for the illumination of the darkness of the ocean, otherwise all species would possess the means of producing it and phosphorescence possibly has a variety of uses. Another peculiarity is the way in which stimulation is communicated from one individual to another in the case of animals living joined together in colonies, the whole colony lighting up almost simultaneously.

The use of this luminescence to the creatures producing it, can only be surmised. It has been suggested that in some cases it forms a lure, attracting other organisms upon which the animal preys, in others it may constitute a recognition mark for the purposes of mating. Again the sudden flashing of light may be a protective weapon against enemies or where the luminous clouds are secreted, a

Figure 1.—Number of observations of phosphorescence in each 10° square reported during the period 1920-1930 by ships observing for the Meteorological Office.



means of distracting the enemy while the animal escapes. In the deep sea forms it may be a means of illuminating the darkness of the ocean depths. The fact that in some of the higher forms it is produced by highly specialised organs functioning under nerve control would seem to indicate that phosphorescence does serve some definite purpose. In the processes of evolution possibly the phosphorescent light which in the first instance was simply part of the chemistry of living, has been developed where it could serve some useful purpose. Where no such purpose could be served the power of producing it has been lost.

It seems feasible that the production of large displays of phosphorescence, such as are frequently seen at sea, may be influenced by variations in the environment of the animal life, and that possibly variations in ocean currents, sea temperature and salinity may be factors affecting its occurrence. Sir JOHN MURRAY and Dr. HJORT hold the view that the great surface drift currents are responsible for many forced migrations of surface life away from their natural habitat. Salt water seems to be essential to the phenomenon, phosphorescence never having been observed in fresh water animals.

Since 1920 an index of phenomena reported in Meteorological Logs and Records has been kept in the Marine Division so that it has been possible to examine in some detail the distribution of the occurrence of phosphorescence as reported by Marine Observers.

During the eleven years 1920-1930 some 2,200 observations of phosphorescence have been recorded and FIGURE 1 shows the distribution of these reports in 10° Squares (10° Latitude by 10° Longitude).

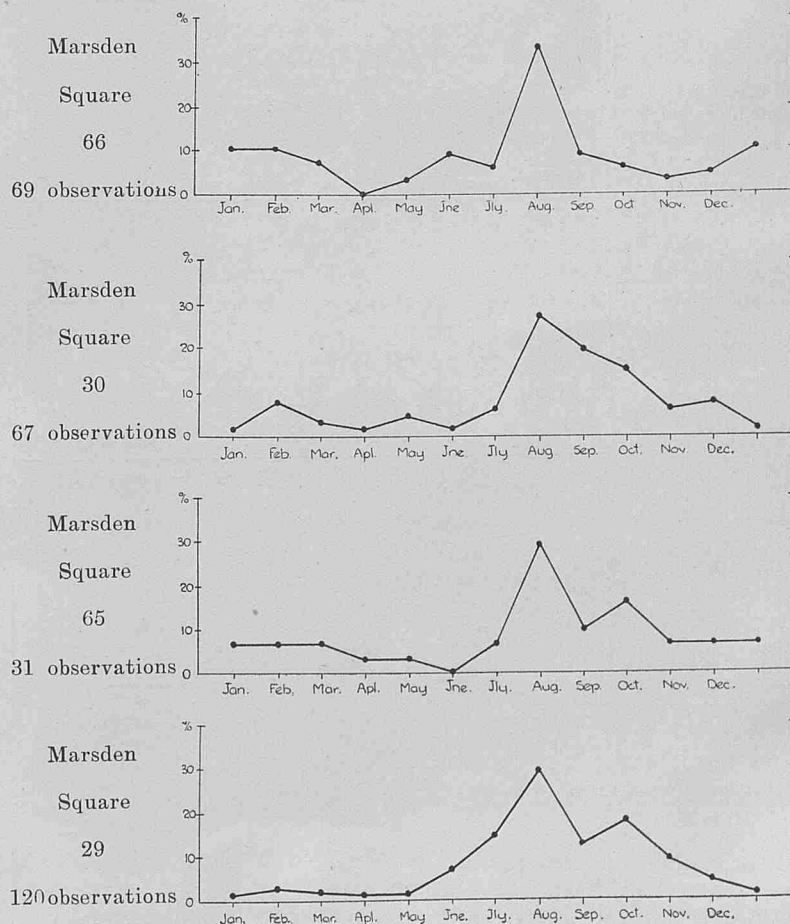
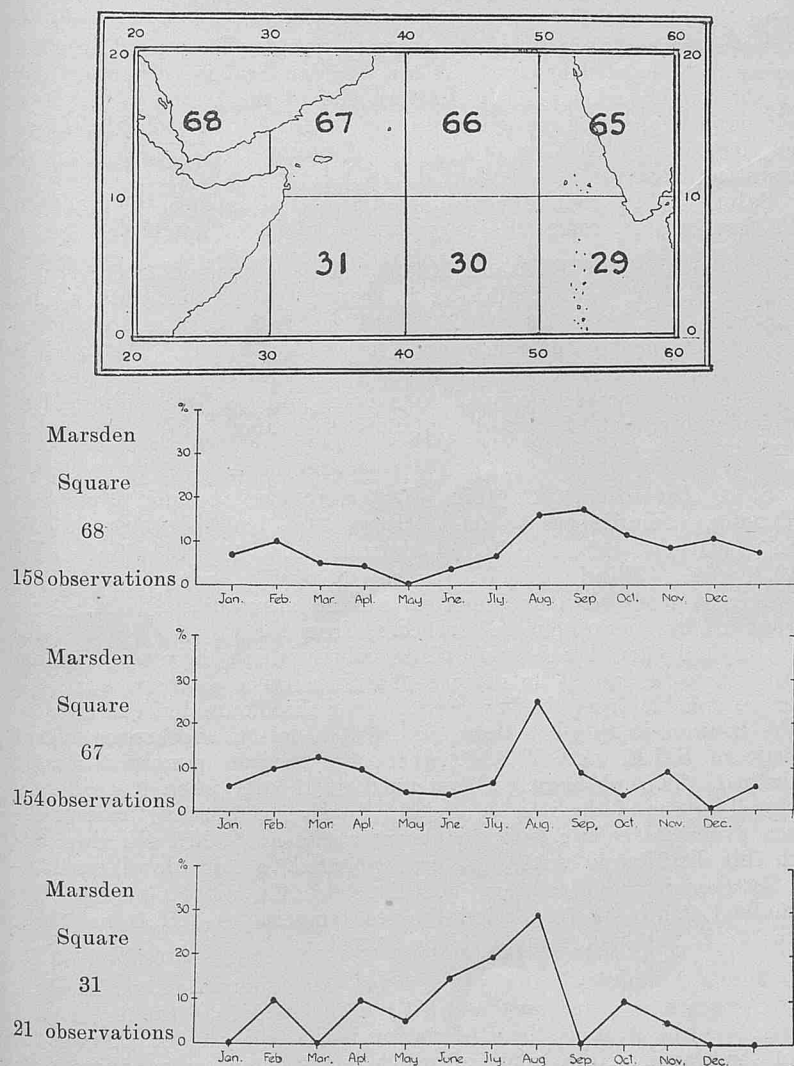
It should be borne in mind that the observations are of necessity grouped along the steamship tracks and a blank square does not necessarily imply that phosphorescence does not occur in that locality. Also the fact that there are more observing ships on any particular route may affect the number of reports, but since the observing fleet has been kept fairly constant both in number and distribution, during the last eleven years, the chart does give some idea of the dis-

tribution and frequency of occurrence. It will be seen that while phosphorescence may occur in all parts of the ocean, its most frequent occurrence is in the warmer tropical seas and in particular in the Arabian Sea. It is also fairly frequent on the Trans-North Atlantic Tracks and generally on the borders of the Atlantic Ocean. Indeed, it seems generally to be more confined to the sides of the oceans; even where it is of fairly frequent occurrence, there is a marked dropping off in the numbers of observations reported, in mid-ocean.

The observations in the Arabian Sea have been analysed in more detail and FIGURE 2 shows the percentage of the number of observations, in each Marsden 10° Square shown at the top of the figure, reported each month. The maximum frequency occurs in August in every square except Square 68 where the percentage of frequency is high for both August and September. The variations in sea temperature over the Arabian sea are slight throughout the year and it would appear that the East Coast Current is probably the most important factor in producing the frequent occurrence of phosphorescence in this region in the S.W. Monsoon season. An examination of the "Charts of Currents for the Trade Routes off the S. and E. coasts of Africa and Westward of Mauritius," published in this year's MARINE OBSERVER shows that during the S.W. Monsoon season this current flowing up the East Coast of Africa greatly increases in strength and it is probable that this strong current carries with it a large amount of the plankton of the waters adjacent to the East African coast and deposits them in the Arabian Sea in the neighbourhood of Sokotra. Similarly in the Eastern Arabian Sea, the current flowing down the West Coast of India attains its maximum strength in August and probably brings down a considerable amount of animal life with it.

The number of reports of phosphorescence in August for different years varies considerably ranging from 49 in 1925 to only 1 in 1924. The number of observations of current available for August for individual years are insufficient to make any comparison of the strength of the current year by year, so that it is not possible to say how much this variation in the occurrence of phosphorescence is connected with variations in the strength of the current.

Figure 2.—Arabian Sea.

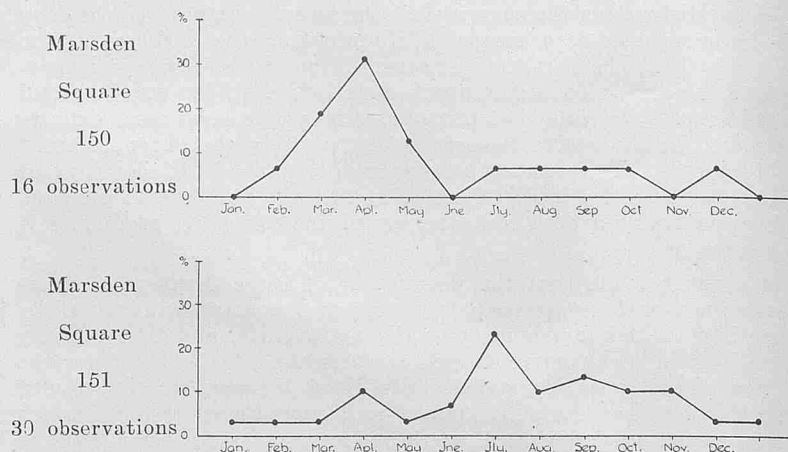
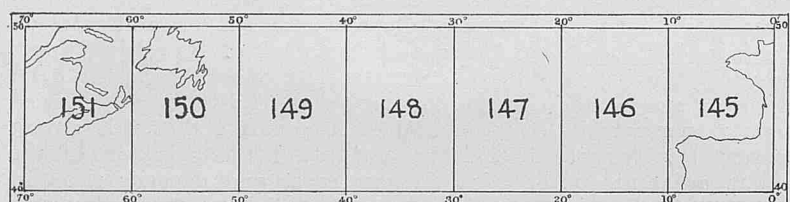


Graphs showing percentage of observations of phosphorescence reported each month for the Marsden 10° squares shown above.

The observations of phosphorescence in the North Atlantic in the Marsden Squares 145 to 151 have been analysed in the same way, with the result shown in FIGURE 3.

Here, no consistent marked maximum for a particular month throughout the area is shown, but a maximum occurs in the spring on the western side and in the late summer and autumn on the Eastern side while in mid ocean its monthly frequency of occurrence is more or less uniform. This again would appear to fit in with the times when the great drift current of the Atlantic is at its strongest. The Gulf Stream attains its maximum strength in the spring and early summer and doubtless carries with it much of the minute floating animal life of the tropical waters of its origin and these are drifted across with the North Atlantic Drift current to reach the Eastern side later in the summer and autumn.

Figure 3.—Trans North Atlantic.



Graphs showing percentage of observations of phosphorescence reported each month for the Marsden 10° squares shown above.

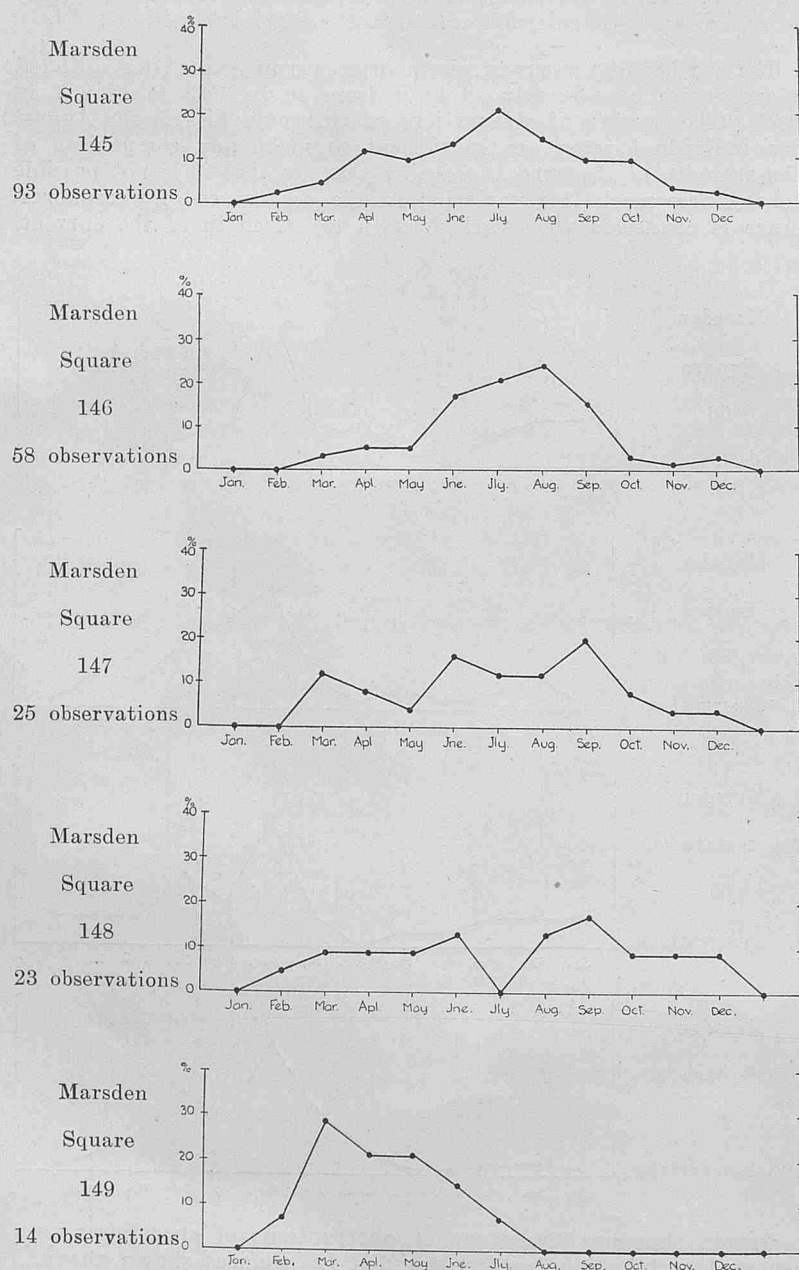
How far the variation in the frequency of the occurrence of phosphorescence is caused by biological conditions is not known, but it is recognised that oceanographical and meteorological conditions must play some part in the distribution and behaviour of the animal life of the ocean. The above figures cannot be taken to be conclusive, but they would seem to support the view that ocean currents are responsible for large migrations of animal life and are therefore one of the factors governing the frequency with which phosphorescence is produced at least as regards the large and remarkable displays so often recorded in Meteorological Logs and Records.

Many accounts of displays of phosphorescence, often extending over the surface of the ocean as far as the eye can see, have been received in the Marine Division. Several of the more interesting ones have already been published from time to time in this Journal, in the Marine Observer's Log. One form that is very frequently met with, is the "white" or "milky water" which is often so intense as to outshine the light of the stars overhead. This peculiar effect seems to be located generally in the Arabian Sea, more particularly in the neighbourhood of the Eastern end of the Island of Sokotra, although it has been met with in other oceans. It is probably caused by some of the most minute forms of animal life, which exist in countless myriads and emit a diffused light. A species known as "Salpæ" which swim about in colonies and often form the plankton of these waters, contribute very largely to its occurrence.

Approaching the East end of Sokotra at 8 p.m. on 12th August, 1928, S.S. *Rhexenor*, Captain I. L. STOUT, reports that until 4 a.m. the next morning "the whole of the sea from horizon to horizon became frequently covered with a milky appearance. Although a sea and swell of force 6 and a wind of S.W. force 7 was the weather at the time, the sea dropped to a calm and the swell diminished considerably, yet the wind remained the same, whilst the vessel was in these patches".

S.S. *Laomedon*, Captain J. HATFIELD, bound Suez to Penang, records that on "July 31st, 1929, 20.00 A.T.S. in Latitude 12° 22' N., Longitude 56° 28' E., Barometer 29.77 in., Wind S.S.W. force 6, with rough sea and swell; at 19.00 when darkness set in, the ship appeared to be surrounded by a luminous halo reflected from the water. By 20.00 the water had turned a greyish white colour which, however, did not appear to be caused by surface phosphorescence as there was little or no sparkle from the bow wave. This discolouration extended to the horizon in all directions giving it a misty appearance except between S.S.E. and W.S.W. where the horizon remained clearly defined. This phenomenon continued until 21.50 when it gradually closed in round the ship again and finally disappeared leaving the sea a normal colour with no phosphorescence. While the ship was in this discoloured water, the sea appeared to calm down considerably though the wind remained force 6. The air temperature remained steady at 79° F. but the sea temperature fell from 78° F. to 76° F. but had risen to 79° by 23.00 hrs."

The apparent calming of a rough sea during extensive phosphorescence is a feature frequently mentioned in accounts of such displays and possibly the explanation is that the presence of myriads of these animalculæ, many of which secrete mucous to adjust their



specific gravity in order to keep afloat, has a similar effect to pouring oil on the sea. On the other hand the glare of the light might cause the sea to appear calm when actually there is no change, but marine observers are quite definite that there is actually less sea disturbance.

The second type mentioned, consisting of sparkling and pulsating points of light is also of frequent occurrence and would seem to be caused by species of a higher order possessing light organs under the control of the animal or by species that respond to some stimulation outside of themselves.

The following is an extract from the Meteorological Report of S.S. *Koranna*, Captain J. A. MORDUE, Port Sudan to Bushire.

"On May 30th, 1926, about 1 a.m. when standing to N'd. between Quoin Is. and Larak Is. in about Latitude $26^{\circ} 40'$ N., Longitude $56^{\circ} 33'$ E., passed through a phenomenal, scintillating, phosphorescent belt of water. It was first sighted as a line of phosphorescent water stretching across the horizon ahead from East to West. As the ship approached the area, it presented a curious, scintillating effect. On passing through it, it was found to be a belt about $\frac{1}{2}$ a mile in width extending to the horizon in an East and West direction. The effect at close quarters was as though thousands of powerful beams of light directed upwards from under water, each illuminating a patch of some twenty to thirty square yards of sea surface, were being switched on and off alternately, independently of each other. If any one of these patches were watched, the intervals of light and darkness were found to be of surprising regularity about 1 to $1\frac{1}{2}$ seconds.

The belt gradually receded astern and the display continued until it was lost over the horizon to the Southward. There was a moderate, Westerly breeze blowing at the time, with a clear sky, whilst the gentle ripples and small wavelets gave the surface of the sea sufficient movement to enhance the most startlingly bizarre effect of phosphorescence I have ever witnessed."

S.S. *Clan Morrison*, Captain W. M. PORTERFIELD, bound Cape Verde Islands to Cape Town encountered unusual patches of phosphorescence at 9.55 p.m. on June 11th, 1929, in Latitude $21^{\circ} 00'$ S., Longitude $7^{\circ} 10'$ E.

"The phosphorescence flashed at almost regular intervals giving that nearest the ship, the appearance of brilliant flashing buoys while that farthest away appeared as a weak form of sheet lightning flashing on the water surface."

An interesting example which appears to have been caused by the spreading of the light throughout groups of microscopic animals living in colonies was observed by S.S. *Stockwell*, Captain W. SMITH, Calcutta to Suez who reported that "on May 10th, 1928, 10 p.m. A.T.S. in Latitude $10^{\circ} 43'$ N., Longitude $59^{\circ} 24'$ E.. Observed an interesting phenomenon in the form of brilliant phosphorescent patches. I record this mainly for the remarkable way in which they formed and spread. Originating apparently each from a small particle hardly visible and spreading rapidly from this as a centre, and on attaining a limited extent as quickly dispersed.

"It appeared as if the small particles had exploded and spread in the manner described. I was at first inclined to think that they were caused by shoals of small fish, but as the ship passed through a number of patches I was able to ascertain that this was not the case. They were remarkably brilliant and the water affected covered a wide area. This lasted from 5 to 7 minutes, when the sea surface resumed a normal appearance."

The occurrence of the dull fixed light type of phosphorescence is also not uncommon.

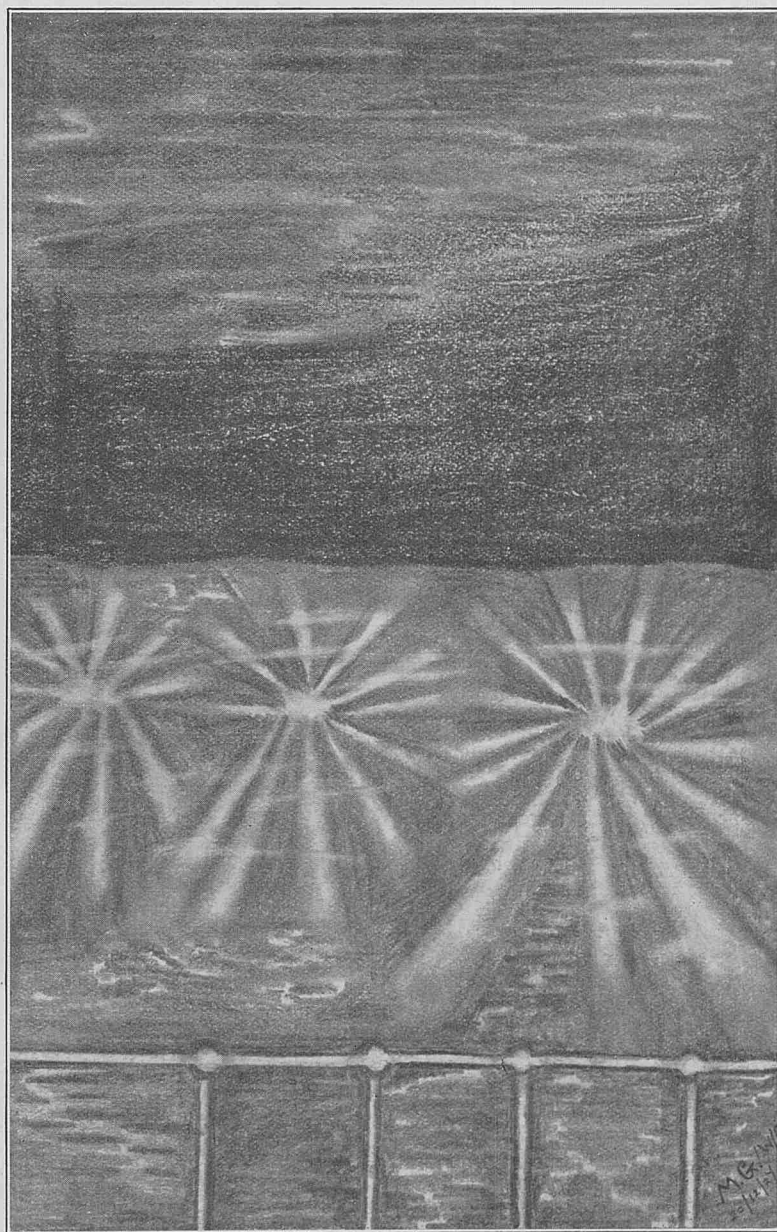
S.S. *Mantua*, Captain W. H. SWENY, C.B.E., R.D., R.N.R., reported that on August 22nd, 1920, at 0.10 a.m. in Latitude 17° N., Longitude 66° E. "remarkable phosphorescence in water was observed having the appearance of lights in open boats".

M.V. *Glenamoy*, Captain C. E. HOMAN, reported that on July 16th, 1928, under Lee of Sokotra Island in Latitude $13^{\circ} 11\frac{1}{2}'$ N., Longitude $53^{\circ} 51'$ E. "vessel passed through a brilliant streak of phosphorescence, composed of large globules in small groups, and singly. Single globules were radiating a greenish light for a considerable radius."

Perhaps, however, the most remarkable and most inexplicable forms of phosphorescent display are phosphorescent bands and phosphorescent wheels. Several accounts of the occurrence of this interesting phenomenon have been received in recent years and have been published in the appropriate Marine Observers Log.

As an example of phosphorescent bands the report of S.S. *Pareora*, Captain J. O. EVANS, bound Durban to Falmouth, may be quoted. "On December 29th, 1929, in position with Cape Verde Light bearing S. by E. distant 12 miles, ship's time 7.45 p.m. (2005 G.M.T.), ship passed through a remarkably phosphorescent area, consisting of perfectly straight and parallel bands lying in an East and West direction. The bands varied in width from about 20 ft. to about 60 ft. and extended as far as could be seen towards the land and for about two to three miles seaward of vessel. These bands were met with at irregular intervals, until 8.20 p.m. ship's time, when the phenomenon entirely disappeared. Temperature of the sea 71° F. The temperature of sea surface had fallen considerably since Noon when 76° F. was recorded.

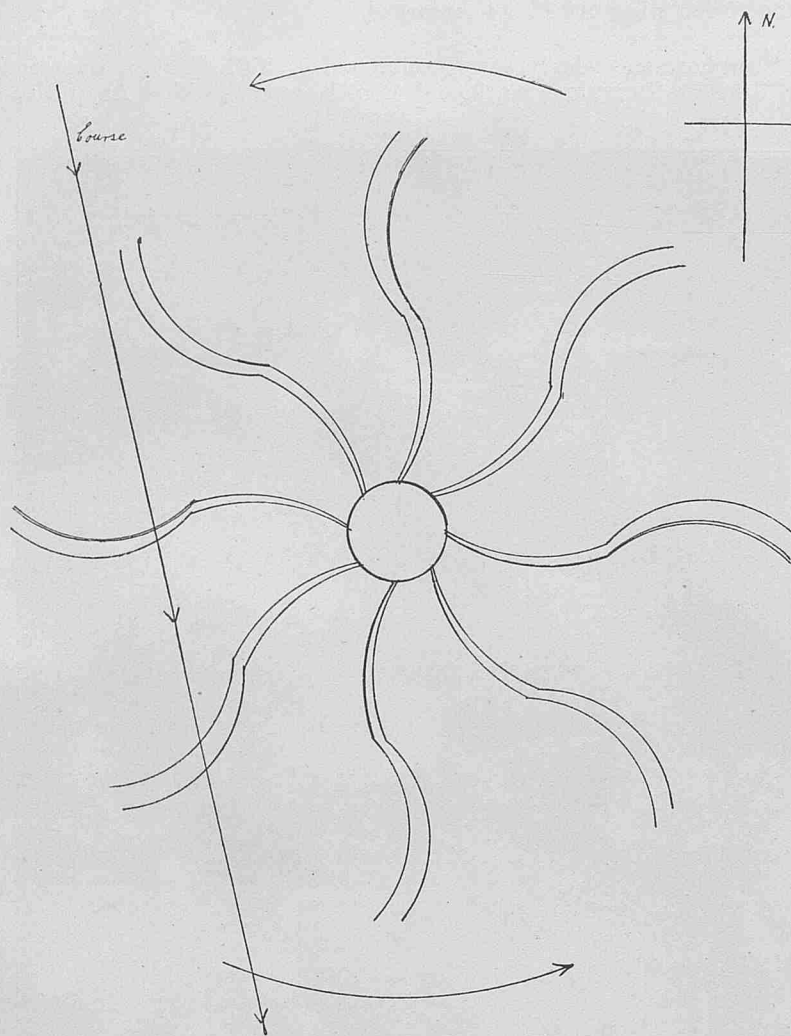
Phosphorescent wheels were encountered by S.S. *Arracan*, Captain S. SINCLAIR DUNCAN, when bound from Rangoon to West Australia.



"19th December, 1927, at 2 a.m. A.T.S., in Latitude $14^{\circ} 23'$ N., Longitude $96^{\circ} 03'$ E., approx., vessel was passing through small clusters of phosphorescent light which gave the appearance of occulting lights on the sea surface. Gradually these clusters of light expanded into bars and commenced to revolve in an anti-clockwise direction, and appeared to pass the bridge, from where

they were observed at the rate of one every half-second. This phenomenon was in the form of a catharine wheel, the hub of which could be observed plainly about two hundred yards to the westward of ship's course. At 2.05 a.m. the phosphorescent light failed, and then became brighter, and on this occasion the spokes or beams of light revolved in the opposite direction, i.e. clockwise. At 2.10 a.m. the light faded again, and once more brightened to revolve as on the first occasion, i.e. anti-clockwise. At 2.15 a.m. this phenomenon disappeared. On each occasion the hub of the catharine wheel was visible clearly to the westward of ship. Wind N.E., force 3. Barometer, corrected, 1011.0 mbs. Temperature, air 79° F. Sea Temperature 80° F. Sky cloudless. Sea, N.E., slight. Sketch by M. GOODMAN, Wireless Operator, has been exaggerated in order to show the three phenomena."

In the same locality, S.S. *Talma*, Captain R. W. HOCKING, R.D., R.N.R., bound Calcutta to the Far East also experienced a similar display in the same month two years later.



At 1845 G.M.T., 28th December, 1929, when in Latitude 14° 15' N., Longitude 96° 41' E., the vessel entered what appeared to be an area of unusual phosphorescent disturbance.

"At first what appeared like small globules of phosphorescence rising from below and breaking at the surface were observed, later these gradually assumed an appearance almost like flashes of

lightning under the water, which rapidly formed into regular beams, curved as curved spokes of wheel might be and of a width at the ship of about 30 feet, and revolving rapidly from right to left, at the rate of two a second, timed as the beams passed the bridge, around a distant centre which could not actually be seen clearly but appeared to be about five miles off. This centre passed ahead of the ship being first observed on the port beam and from there drawing slowly ahead of and across the bows of the ship fading gradually till on the starboard bow when the whole phenomenon finally disappeared. For a short period when the centre was on the port bow the beams appeared revolving in the opposite direction, this latter phase was not clearly marked as the beams had already begun to fade at that time. The beams could clearly be followed on both sides of the ship though the illumination was much greater on the side nearest the centre of revolution (port), their brilliance on that side being dazzling; the whole phenomenon lasting 15 minutes.

"The vessel at the time was in 50 fathoms of water over a bottom composed mostly of fine sand and mud with shingle here and there, the compass remained entirely unaffected and no difference was noticed in the steering. The weather at the time being cloudless and calm with smooth sea and steady barometer.

"It was later reported from the engine room that at this time the revolutions dropped considerably and the main engines were straining. As this straining of the engines appeared to me to point to the possibility of marine volcanic disturbance, I considered it advisable to send out a wireless warning to all ships and stations."

No satisfactory explanation can be found to account for these wonderful productions of phosphorescent light. The minute animal and plant life that goes to make up the plankton on the seas, drifts at the mercy of the movement of the water and where the surface of the sea is streaked with bands of current or tide, the distribution of the plankton will probably also tend to be in streaks or bands.

It is mentioned in *Talma's* report that a straining of the engines took place at the same time as the phosphorescent wheel was observed which pointed to the possibility of marine volcanic disturbance. It is possibly a coincidence that these two phenomena occurred at the same time.

The curvature of the rays of light and their convergence to a centre may be due to perspective displacement and the clear demarcation of the bands accentuated by refraction. The pulsation of phosphorescent light at regular intervals is noted in other forms of phosphorescence as for instance that experienced by S.S. *Koranna* and *Glan Morrison* quoted earlier, and if this pulsation occurred in bands or streaks it would tend to produce the effect of rotation of the light. The causes which operate to effect simultaneous production of phosphorescent light over large stretches of the ocean are not known. It has been suggested by Captain CARPENTER ("Nature Studies for Ocean Voyages" by Captain Sir DAVID WILSON BARKER, Kt., and Captain CARPENTER) that these simultaneous flashes may be a sort of combined satisfying movement of the tiny organisms emitting phosphorescent light following out some natural law of which at present we have no knowledge. He quotes in support of this explanation, the simultaneous movements of individuals in the flight of a flock of starlings, the whirling of flocks of rooks in great circles, and the sudden madness that may temporarily seize a herd of cattle.

These are of course only surmises and any details of such displays that members of the Corps of Voluntary Marine Observers can give us which may help to point the way to a solution of the problem of phosphorescent wheels will always be welcome.

FOG IN THE SOUTH ATLANTIC AND VICINITY OF THE WEST COAST OF SOUTH AMERICA.

PREPARED IN THE MARINE DIVISION BY H. KEETON, PRINCIPAL CLERICAL ASSISTANT.

The following notes relate to the charts of percentage frequency of fog in the South Atlantic and the vicinity of the West Coast of South America, which have appeared monthly in this Journal during the present year. The information given on these charts is derived from sea observations taken in British ships, and it should be remembered that the frequency of coastal fog, and fog in narrow waters, may be quite different from that over the open ocean.

An examination of the charts discloses features of interest, which show how the occurrence of fog may be closely associated with the existence of the great stream currents of the oceans and their influence on sea surface temperatures.

The first noticeable feature of the charts is the general absence of reported fog between the Equator and Latitude 30° S., with the marked exception of an area off the coast of Ecuador and Peru between Lat. 5° and 15° S. Here in each month of the year except July and October fog exists with varying frequency the maximum occurring in February when it reaches 8 per cent.

It seems that the action of the persistent South East trade wind in this region has a tendency to draw surface water away from the Ecuador and Peruvian Coast, with the result that the deep colder water rises to the surface, producing the conditions which are most favourable for the formation of sea fog, that is the passage of warm air over cooler water.

The charts show that similar areas of fog exist down the West coast of South America as far South as Lat. 40° S. throughout the year; and these are no doubt due to the action of the Peru or Humboldt current, which flowing strongly northward, carries comparatively cool water far up this coast.

Similar isolated areas of fog also occur throughout the year off the South West coast of Africa, between Mossamedes and Cape Town, where the northerly flowing Benguela current and the steady South East trade wind combine to produce the same effect as off the West coast of South America.

In the South Atlantic, South of Lat. 30° S., the lines of fog frequency show many irregularities, but generally the frequency of fog increases as we proceed Southward, and is higher in mid-ocean than over regions of the same latitude bordering the coasts of Africa and South America.

The foggiest months appear to be in November and December when the line of 20 per cent. frequency extends as far North as Lat. 40° S. The line of 20 per cent. does not appear at all in the area covered by these charts during the months April to July and September. There is an area of 20 per cent. fog shown on the chart for August between Lat. 45° and 50° S., Long. 5° W. and 10° E., but the number of observations is very small, consequently the percentages cannot be regarded as true values.

June to September are the least foggy months, and during this period there are only a few isolated patches down South where the frequency of fog exceeds 10 per cent.

Between the Falkland Islands and the River Plate, the influence of the North flowing Falklands current can be traced, by the presence of isolated patches and strips of relatively high fog frequency; and here again similar causes operate as on the West coast, that is a Northward flow of cold water into areas where the air temperature is higher.

SOUTHERN ICE REPORTS.

During the Years 1929 and 1930.

November.

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1929	2	45° 48' S.	50° 00' E.	1 berg	Large about 10 miles West of Apostles. Very irregular shape.	Aux. Bq. <i>Discovery</i>
	4	46° 20' S.	52° 09' E.	1 berg	Large to Northward of East Island	do.
	4	46° 28' S.	52° 08' E.	1 berg	Small apparently aground on South side of E. Island ..	do.
	5	46° 43' S.	54° 00' E.	1 berg	Both very much water worn	do.
	5	46° 44' S.	54° 09' E.	1 large and 1 small berg	Berg about 80 feet high, 400 feet long, irregular ..	do.
	30	53° 25' S.	156° 08' E.	1 Berg and 5 bergy bits	Small irregular	do.
	22	Cape Possession Hoseas on Is.		Several bergs		R.R.S. <i>William Scoresby</i> .
	23	62° 50' S.	60° 40' W.	2 bergs	1 large weathered tabular, 150 feet high, 1 moderate 80 feet high.	do.
	23	Half Area of Deception Is.	Whalers' Cove	Floe ice	Rotten	do.
	17	Inside entrance to (Neptune's Bellows)	Deception Is.	Floe ice	About 3 square miles in area, closely packed and heavily snow covered.	do.
	17	Port Foster,	Deception Is.	Fast ice	Covering about half area of Port Foster to the North ward of a line East and West.	do.
	18	Whalers' Bay,	Deception Is.	Loose pack and brash ice	8 a.m., Bay full of loose pack and brash ice. 12 noon, Ice drifted clear of bay towards Neptune's Bellows.	do.
	21	62° 50' S.	60° 30' W.	1 berg	Small tabular	do.
	22	Trinity Island.		1 berg	Moderate, tabular, stranded	do.
	21	62° 48' S.	50° 55' W.	1 berg	Small tabular	do.
	17	63° 08' S.	58° 48' W.	1 berg	Large tabular	do.
	22	63° 17' S.	59° 20' W.	20 bergs, many growlers	Moderate tabular and Irregular	do.
		Vicinity				
	21	63° 11' S.	59° 13' W.	6 bergs	3 tabular moderate, 3 weathered, irregular, small ..	do.
		Vicinity				
	21	63° 00' S.	59° 00' W.	7 bergs	2 tabular (1 large, 1 small), 5 irregular	do.
	15	62° 28' S.	58° 21' W.	1 berg	Moderate, pinnacled	do.
	15	62° 20' S.	58° 12' W.	1 berg	Tabular, moderate	do.

SOUTHERN ICE REPORTS (continued)

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1929	15	62° 14' S.	58° 06' W.	Many fragments .. .. .	.. .. .	R.R.S. <i>William Scoresby</i> .
	14	Off S.W. Side of	King George Is.	Fragments of glaciers .. .. .	.. .. .	do.
	14	62° 18' S.	57° 56' W.	1 berg	Moderate, irregular, estimated to be 400 feet long, 150 feet high.	do.
	16	62° 45' S.	57° 55' W.	1 berg	Moderate, tabular, tilted	do.
	16	From 62° 51' S.	57° 47' W.	8 bergs	Sighted within a distance of about 5 miles on either side of a line between the two positions.	do.
		to 62° 59' S.	57° 28' W.			
	15	62° 40' S.	57° 43' W.	Fragments .. .. .	.. .. .	do.
	16	From 62° 59' S.	57° 28' W.	26 bergs	Various sizes and shapes. All with the exception of two, lying to S.W. of a line between these two positions and within 10 miles of line.	do.
		to 63° 10' S.	57° 16' W.			
	14	62° 10' S.	57° 20' W.	1 berg	Moderate, irregular, pinnacled; estimated to be ½ mile long and 150 feet high, one side discoloured.	do.
	28	From 58° 00' S.	22° 25' W.	Bergs .. .. .	.. .. .	S.S. <i>Svalder</i>
		to 53° 00' S.	23° 30' W.			
	28	56° 00' S.	22° 30' W.	Bergs	5 miles long, 100 to 150 feet high	do.
	25-28	58° 00' S.	22° 25' W.	Pack ice .. .. .	.. .. .	do.
	23 to 25	55° 00' S.	20° 00' W.	Bergs .. .. .	.. .. .	do.
		58° 00' S.	22° 25' W.			
	20 to 23	50° 40' S.	9° 00' W.	Bergs .. .. .	.. .. .	do.
		55° 00' S.	20° 00' W.			
	20	55° 40' S.	9° 00' W.	Barrier of bergs	65 bergs counted during the conditions of a 3 mile visibility.	do.
	19 to 20	48° 50' S.	5° 40' W.	Bergs .. .. .	.. .. .	do.
		50° 40' S.	9° 00' W.			
1930	13	53° 40' S.	40° 02' W.	1 berg	Tabular, but much weathered. About 90 feet high, 400 feet long.	R.R.S. <i>Discovery II</i> .
	12	Shag Rocks		6 bergs	Within 12 miles of the rocks. Four between 3 and 7 miles to Westward of which one was tabular and the other three rounded and weathered, though appearing to be still very sound. All were about the same size, averaging 150 feet by 1000 feet. Two large tabular bergs lay about 12 miles S.E. of the Rocks, one being about 3000 feet long and the other 1000, and about 110 feet high. Very well preserved appearance.	do.
	10	54° 09' S.	39° 34' W.	1 berg	Much weathered, about 50 feet high, 100 feet long	do.
	10	54° 02' S.	39° 06' W.	1 berg	Both bergs very similar, tabular and level. 100 feet high and 1000 feet long.	do.
	10	54° 08' S.	39° 07' W.	1 berg	Much weathered and water-worn. On one end a square flat-topped tower, deeply crevassed and rifted, middle part awash, and other end crescent shaped and low, about 70 feet high, 400 ft. long.	do.
	10	54° 13' S.	39° 04' W.	1 berg	Much pinnacled, weathered and breaking down, about 80 feet high, 600 feet long. Surrounded by brash.	do.
	28	55° 47' S.	38° 58' W.	1 berg	Large and tabular	do.
	28	55° 35' S.	38° 44' W.	1 berg	Smooth and ribbed in typical 'bottle greeny' manner, about 1½ feet high, 50 feet long.	do.
	10	54° 16' S.	38° 42' W.	Berg, bottle-green	Tabular and very level and new looking, with clear cut face. About 110 feet high and 3000 feet long.	do.
	10	54° 15' S.	38° 42' W.	1 berg	About 110 feet high and 1200 feet long	do.
	10	54° 11' S.	38° 40' W.	1 berg	Three in a group, tabular but weathered, all about same size (average 600 feet by 100 feet). All tilted to Southward, and showing on Northern sides, old water lines. Two of moderate size, peaked and much weathered.	do.
	10	3' -5' W.S.W. of Willis Is.		5 bergs	Small and weathered	do.
	28	55° 22' S.	38° 17' W.	1 berg	Small, about 30 feet high, 100 feet long, stained and much weathered. Rotten appearance.	do.
	14	53° 51' S.	38° 16' W.	1 berg	Low and much weathered, about 30 feet high, 200 feet long.	do.
	17	52° 35' S.	38° 16' W.	1 berg	20 miles North of Bird Is. Bergs in a group—one about 200 feet by 1000 feet, two others moderate size. All much weathered.	do.
	14	53° 41' S.	38° 00' W.	3 bergs	Tabular, level and well preserved, about 130 feet high, 10-0 feet long.	do.
	27	55° 16' S.	37° 50' W.	1 berg	7 miles North of Craigie Pt. Much weathered and water-worn, evidently capsized, about 90 feet high, 700 feet long.	do.
	14	53° 51' S.	37° 44' W.	1 berg	Square in plan and tabular, but tilted to about 30° from horizontal. Weathered down one side about 100 feet high, 250 feet long.	do.
	18	52° 47' S.	37° 43' W.	1 berg	Tabular and level, about 100 feet high, 1000 feet long..	do.
	29	55° 07' S.	37° 42' W.	1 berg	Tabular and weathered. One side breaking down about 90 feet high, 700 feet long.	do.
	29	55° 05' S.	37° 38' W.	1 berg	All weathered. Grounded in mouth of Bay	do.
	29	King Haakon Bay		3 bergs	Grounded within 3 miles of the cape. Three moderate size, originally tabular.	do.
	29	Cape Paradin		8 bergs	Moderate sized and much weathered	do.
	27	55° 13' S.	37° 20' W.	1 berg	Small and weathered	do.
	27	55° 04' S.	37° 20' W.	1 berg	Grounded about 4 miles off the coast at intervals of about 6 miles. Two tabular and large, about 1500 feet long and 1000 feet high, and one moderate size, high peaked berg. All old and weathered.	do.
	26	Between Disappointment and Novosilki Bay		3 bergs	Tabular and square, with low foot running out round three sides, about 200 feet high, 800 feet long.	do.
	26	12' S.W. of Cape Disappointment		1 berg	Weathered, peaked and much broken down, about 120 feet high, 1000 feet long.	do.
	26	17' South of Cape Disappointment		1 berg	Within a 15 mile radius. Three very large tabular bergs, each more than a mile in length. Two of them about 100 feet high, the third about 180 feet, sloping down from both ends to about 100 feet amidships. The other ten were all of moderate size, rounded, peaked and weathered, and evenly distributed around position.	do.
	26	55° 32' S.	35° 57' W.	13 bergs	Tabular and much weathered and crumbling, about 90 feet high, 300 feet long.	do.
	18	52° 48' S.	35° 55' W.	1 berg	Distant and indistinct, but apparently tabular and very large, about 400 feet long.	do.
	19	52° 58' S.	35° 51' W.	1 berg	Within a 4 mile radius. Two large jagged, rounded and weathered, and two very old tabular bergs, weathered all round into a series of deep caves.	do.
	18	52° 45' S.	35° 48' W.	4 bergs	Within a 10 mile radius. One large, about 1500 feet by 180 feet, evidently originally tabular having flat topped centre, but much weathered and crumbling. Remainder all small and much broken down, mainly to Southward.	do.
	26	55° 45' S.	35° 33' W.	7 bergs	Large and tabular	do.
	26	55° 39' S.	35° 26' W.	1 berg	Weathered and irregular	do.
	26	55° 37' S.	35° 25' W.	1 berg	Within a 10 mile radius. One old tabular berg, remainder peaked and rounded and much weathered	do.
	25	54° 56' S.	35° 17' W.	5 bergs	Between these positions passed many small bergs, bergy bits, pieces of heavy floe ice and fragments.	do.
	24	54° 26' S.	35° 09' W.	Bergs, bergy bits, fragments and brash ..	Foggy after this throughout morning.	do.

SOUTHERN ICE REPORTS (continued)

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1930	2 to 3	From 53° 30' S. to 53° 41' S.	34° 44' W. 35° 01' W.	Heavy loose pack and bergs	From first position, came up to edge of very heavy loose pack, and entered it, pushing through it to the S.W'd throughout the night, and clearing it in second position. This ice was the heaviest the vessel encountered on the voyage, and consisted of very thick and heavy floes, large and small, and despite the fact that the ice was quite loose in body, on occasions it was only possible to make a few yards headway in half an hour, with the engines going at full power. Visibility was poor through the night and it was impossible to fix the N.W'ly and S.E'ly limits of the belt. About a dozen large icebergs were passed close to; and the pack was full of small bergs, growlers and hummocks. In parts the ice was rafted and hummocked to a height of 15 or 20 feet. Two small bottle-green bergs were observed, and one large weathered berg about 250 feet high was of a uniform pale blue colour.	R.R.S. <i>Discovery II.</i>
	25	Clerke	Rocks	5 bergs	Within a 10 mile radius of rocks, mainly to the S'd. Three medium size, two small, all much weathered and rugged.	do.
	24	54° 33' S.	34° 44' W.	Bergs, bergy bits, fragments and brash ..	Between these positions passed many small bergs, bergy bits, pieces of heavy floe ice and fragments. Foggy after this throughout morning.	do.
	2	53° 27' S.	34° 41' W.	3 bergs	Within a 5 mile radius. One of moderate size, tabular but weathered, two small.	do.
	23	54° 01' S.	34° 33' W.	4 bergs	One large and tabular (about 1500 feet by 160 feet) other three moderate size, low, weathered and rugged. Within a 10 mile radius.	do.
	2	53° 20' S.	34° 22' W.	1 berg	Tabular with ridged upper surface and irregular height, being low at ends, about 80 high, 1500 feet long.	do.
	25	54° 57' S.	34° 16' W.	1 berg	Irregular and much weathered, about 60 feet high, 300 feet long.	do.
	2	53° 17' S.	34° 15' W.	1 berg	Irregular and much weathered. About 100 feet high, 600 feet long. Main body bluish white, small annex hump dirty brown colour (morainic appearance).	do.
	22	53° 54' S.	34° 13' W.	3 bergs	Passed about this position. Large, but detailed observations impossible.	do.
	2	53° 14' S.	34° 10' W.	2 bergs	Tabular, level and of new appearance. One large tabular berg 10 miles to Southward.	do.
	22	53° 47' S.	33° 52' W.	6 bergs	Within a 10 mile radius. Four large and tabular, three of them being much water-worn and caverned; average (1000 feet by 150 feet). Two moderate size and rugged.	do.
	22	53° 42' S.	33° 49' W.	1 berg	Square, tabular and well preserved. About 160 feet high, 2500 feet long. Length measured by stop watch. Numerous narrow vertical rifts in berg, sealed at both ends.	do.
	2	53° 02' S.	33° 40' W.	1 berg	Large and tabular. About 3 mile long.. .. .	do.
	22	53° 41' S.	33° 28' W.	5 bergs	One large and tabular; three moderate size and rugged, and one small, peaked and much weathered. Within a 10 mile radius.	do.
	24	45° 08' S.	33° 21' W.	11 bergs	11 bergs in a line about 5 miles long, extending roughly N. and S. One large low weathered tabular, about 1500 feet by 80 feet, remainder small or moderate size, rugged, rounded and weathered. Generally foggy all day.	do.
	2	52° 44' S.	32° 25' W.	1 berg	Large and tabular	do.
	2	52° 42' S.	31° 28' W.	3 bergs	Within a 4 mile radius. All large, over 1000 feet long and tabular. Sea littered with growlers and brash.	do.
	2	52° 43' S.	31° 11' W.	1 berg	Tabular and level, but weathered, about 120 feet high, 600 feet long.	do.
	1	From 53° 35' S. to 53° 07' S.	30° 08' W. 30° 55' W.	.. .. .	An ice free stretch was traversed when many fragments of drift ice were again encountered.	do.
	1	About 53° 40' S.	29° 03' W.	.. .. .	A stream of very heavy ice was met. Stream ran N.E. and S.W. and consisted of broken up, rafted and hummocked old pressure pack. After an hour negotiating it, the vessel was again in fairly open water, studded with fragments of floes.	do.
	1	From 54° 40' S. to about 53° 40' S.	28° 39' W. 30° 03' W.	.. .. .	On a generally N.W'ly course, the sea in every direction was thickly dotted with detached floes; here and there compact enough to form streams. Floes consisted of hard ice bases with several feet of semi-glaciated snow on top and heavy floes were sufficiently numerous to necessitate a tortuous course being steered.	do.
	1	From 54° 57' S. to 54° 40' S.	28° 00' W. 28° 39' W.	Heavy drift ice and floes	On various courses, passed through many narrow streams of heavy drift ice, consisting of a loose collection of broken floes. Between the streams, clear water was generally found, though studded here and there with detached floes.	do.

Reports of Ice previous to November, 1929, will be found in the Marine Observer, Vol. VI, No. 71, p. 250.

WEATHER SIGNALS.

I.—SHIPS' WIRELESS WEATHER SIGNALS.

Urgent Meteorological reports should be made at any time. Any ship at any time encountering a tropical revolving storm should report to all ships and the appropriate station, continuing to report at intervals of three hours so long as the ship remains under the influence of the storm.

Ships experiencing gales in which the wind reaches Force 10 or above in the Beaufort Scale should inform all ships within range.

Ships encountering Ice or other navigational dangers should report immediately to all ships and the appropriate station; see instructions for Danger to Navigation Signals for all ships, pages 31 and 32, Vol. VIII, No. 85.

For full particulars of "Selected Ships" Routine Meteorological Reports with Schedule for Communication, see pages 16 to 19, Vol. VIII, No. 85.

See List of W/T Stations detailed to receive reports from **A Selected Ships** with particulars up to date below, also on Chart XII.

In parts of the world where such stations and particulars are not given, British **A Selected Ships** should make their reports to **CQ**

on 2100 metres (143 kc/s) as stated on page 18 Vol. VIII, No. 85 (January, 1931, MARINE OBSERVER).

B Selected Ships broadcast their report to C.Q. on 600 m. spark, and these may be intercepted by the stations ringed in on Chart XII. In making these reports to C.Q. "B Selected Ships" should make special endeavour to ensure that the report is received at these shore stations. With a view to assisting Meteorological Services who have provided information and to ensuring that routine reports from all "Selected Ships" within range of certain coast stations may be received by those services a list of stations specially detailed to receive reports from "B Selected Ships" is also given on pages 240 and 241. The procedure given on pages 16 to 19, Vol. VIII, No. 85, should be adhered to as far as possible.

According to agreement reached by the International Meteorological Conference, 1929, all arrangements for the co-operation of shipping in Voluntary Marine Meteorological work are to be made through the Meteorological Services of the different countries in which the ships are registered, in accordance with the agreed upon International plan for all parts of the World, following the International Convention for Safety of Life at Sea, 1929.

WIRELESS STATIONS DETAILED TO RECEIVE ROUTINE CODED WEATHER REPORTS FROM "A SELECTED SHIPS."

Request for Information.

THE ATTENTION OF METEOROLOGICAL SERVICES IS INVITED TO THE INVITATION GIVEN ON PAGE 16 OF VOL. VIII, NO. 85, JANUARY MARINE OBSERVER.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
North Atlantic and North Sea.	Portishead.	Lat. 51° 28' 41" N. Long. 2° 47' 30" W.	GPU.	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. and North of Latitude 38° N., but not within 300 miles of station. (see Chart XII.)	Weather London.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	Control system. "Selected Ships" chosen to report in given order notified by station daily at 2230, 0330, and 1030 G.M.T. Roll call thus—Weather begins—Call signs of chosen "Selected Ships"—Weather ends.
	Chatham Mass., Sayville N.Y. or West Palm Beach.	Lat. 41° 42' N. Long. 70° 00' W. Lat. 40° 42' N. Long. 73° 06' W. Lat. 26° 42' N. Long. 80° 02' W.	WCC. WSL. WMR.	}	142.9 kc/s. (2098 metres).	North Atlantic West of Longitude 40° W.	Observer Washington.	Weather only. First four groups of observations taken at 0000 and 1200 G.M.T. only required.	No control. All British "A Selected Ships" within area to address their 0000 and 1200 G.M.T. observations to Observer Washington and their 1800 G.M.T. observations to CQ in accordance with schedule.
	Horta, Azores.	Lat. 38° 32' N. Long. 28° 38' W.	CTH.		125 kc/s. (2400 metres).	North Atlantic South of Latitude 38° N. and East of Longitude 40° W.	Radio Horta.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule.

(Continued.)

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WIRELESS STATIONS DETAILED TO INTERCEPT ROUTINE CODED WEATHER REPORTS FROM
"B SELECTED SHIPS."

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteoro- logical Centre desiring information.	Information desired.	Notes.
North Atlantic.	Horta, Azores.	Lat. 38° 32' N. Long. 28° 38' W.	CTH.	Radio Horta	Weather only, up to 7 groups, preferably No. 3 Supplementary Groups.	
South Atlantic.	Salinas	Lat. 0° 35' 00" S. Long. 47° 18' 45" W.	PPL.	Meteoro Rio.	Weather only, including supplementary groups.	
	S. Luiz	Lat. 2° 31' 48" S. Long. 44° 16' 51" W.	PXM.			
	Fortaleza	Lat. 3° 46' 21" S. Long. 38° 32' 26" W.	PPC.			
	Natal	Lat. 5° 46' 41" S. Long. 35° 18' 24" W.	PXN.			
	F. Noronha	Lat. 3° 50' 24" S. Long. 32° 24' 48" W.	PXF.			
	Olinda	Lat. 8° 00' 35" S. Long. 34° 51' 00" W.	PP0.			
	Amaralina	Lat. 13° 00' 12" S. Long. 38° 30' 45" W.	PPA.			
	Abralhos	Lat. 17° 57' 30" S. Long. 38° 41' 05" W.	PXH.			
	Victoria	Lat. 20° 10' 00" S. Long. 40° 17' 46" W.	PPT.			
	Rio	Lat. 22° 53' 42" S. Long. 43° 13' 24" W.	PPR.			
	Santos	Lat. 23° 56' 27" S. Long. 46° 19' 28" W.	PPS.			
	Florianopolis.	Lat. 27° 36' 00" S. Long. 48° 30' 18" W.	PPF.			
	Juncão	Lat. 32° 04' 00" S. Long. 52° 07' 00" W.	PPS.			
Indian Ocean.	Calcutta.	Lat. 22° 33' 31" N. Long. 88° 20' 16" E.	VWC.	Weather.	Weather only up to 6 groups, No. 6 Supplement- ary Groups preferred.	
	Rangoon.	Lat. 16° 45' 57" N. Long. 96° 11' 51" E.	VTR.			
	Madras.	Lat. 12° 59' 17" N. Long. 80° 10' 56" E.	VWM.			
	Bombay.	Lat. 19° 04' 55" N. Long. 72° 49' 54" E.	VWB.			
	Karachi.	Lat. 24° 51' 05" N. Long. 67° 02' 32" E.	VWK.			
	Matara.	Lat. 6° 01' 07" N. Long. 80° 35' 39" E.	GZP.			
	Mauritius.	Lat. 20° 23' S. Long. 57° 35' E.	VRS.	Observatory Mauritius.	Weather 4 universal groups and first of No. 6 Supplementary Groups.	

WIRELESS STATIONS DETAILED TO INTERCEPT ROUTINE CODED WEATHER REPORTS FROM
"B SELECTED SHIPS."

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteoro- logical Centre desiring information.	Information desired.	Notes.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12' 39" N. Long. 114° 15' 19" E.	VPS.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	
South Pacific.	Auckland.	Lat. 36° 50' 36" S. Long. 174° 46' 08" E.	ZLD.	Weather Wellington.	Weather only, up to 7 groups.	Apia, Rarotonga and Chatham Is- land relay to New Zealand. Raro- tonga keeps watch 0630 to 1330 G.M.T. Chatham Island 0430 to 1230 G.M.T. Re- mainder cover schedule. Reports desired through nearest station when "B Selected Ships" are within 1,000 miles of New Zealand.
	Wellington.	Lat. 41° 16' 26" S. Long. 174° 01' 00" E.	ZLW.			
	Awarua.	Lat. 46° 30' 27" S. Long. 168° 22' 21" E.	ZLB.			
	Chatham Island.	Lat. 43° 57' 02" S. Long. 176° 31' 04" W.	ZLC.			
	Rarotonga.	Lat. 21° 11' 54" S. Long. 159° 48' 51" W.	ZKR.			
	Apia.	Lat. 13° 15' 17" S. Long. 170° 49' 42" W.	ZMA.			

II.—WIRELESS WEATHER SIGNALS. WIRELESS WEATHER BULLETINS.

SOUTH-WEST AFRICA, UNION OF SOUTH AFRICA, AND PORTUGUESE EAST AFRICA.

(Spark and C.W. Issues.)

REPORTS of weather conditions at 0630 G.M.T. at South African ports are broadcast daily by Coast W/T Stations, mostly in Code.*

Details of Reports.

1. Transmitting station... **Walvis Bay** (Latitude 22° 58' S.; Longitude 14° 30' E., approx.).

Call signal ... **ZSV.**

Messages directed to ... **CQ.**

Wave length ... **630 m. I.C.W.**

Times of transmission:

0850 G.M.T. (observations at following stations at 0630 G.M.T.).*

1230 G.M.T. (forecast for coast in plain language).**

1955 G.M.T. (forecast for coast in plain language).**

2. Observation stations, 0850 report:

Indicator		Position (approx.)	
Letters.	Station.	Lat. S.	Long. E.
ZSC	Capetown...	33° 56'	18° 29'
ZST	Port Nolloth ...	29° 14'	16° 51'
ZSV	Walvis Bay ...	22° 58'	14° 30'
CRU	Mossamedes ...	15° 12'	12° 09'
CRR	Loanda ...	8° 49'	13° 13'

1. Transmitting station... **Capetown** (Latitude 34° 09' S.; Longitude 18° 19' E., approx.).

Call signal ... **ZSC.**

Messages directed to ... **CQ.**

Wave length ... **625 m. I.C.W.**

Times of transmission:—

0830 G.M.T. (observations at following stations at 0630 G.M.T.).*

1220 G.M.T. (forecast for coasts in plain language).**

2. Observation stations, 0830 report:—

Indicator		Position (approx.)	
Letters.	Station.	Lat. S.	Long. E.
ZSA	East London ...	33° 02'	27° 55'
ZSQ	Port Elizabeth ...	33° 59'	25° 37'
ZSM	Mossel Bay ...	34° 11'	22° 09'
ZSC	Capetown ...	33° 56'	18° 29'
ZST	Port Nolloth ...	29° 14'	16° 51'
ZSV	Walvis Bay ...	22° 58'	14° 30'

1. Transmitting station... **Port Elizabeth** (Latitude 33° 57' S.; Longitude 25° 35' E. approx.).

Call signal ... **ZSQ.**

Messages directed to ... **CQ.**

Wave length ... **600 m. spk.**

Times of transmission:—

0820 G.M.T. (observations at following stations at 0630 G.M.T.).*

1250 G.M.T. (forecast for coasts in plain language).**

2. Observation stations, 0820 report:—

Indicator		Position (approx.)	
Letters.	Station.	Lat. S.	Long. E.
ZSD	Durban ...	29° 52'	31° 03'
ZSA	East London ...	33° 02'	27° 55'
ZSQ	Port Elizabeth ...	33° 59'	25° 37'
ZSM	Mossel Bay ...	34° 11'	22° 09'
ZSC	Capetown ...	33° 56'	18° 29'

1. Transmitting station... **Durban** (Latitude 29° 56' S.; Longitude 30° 59' E. approx.).

Call signal ... **ZSD.**

Messages directed to ... **CQ.**

Wave length ... **625 m. I.C.W.**

Times of transmission:—

0810 G.M.T. (observations at following stations at 0630 G.M.T.).*

1205 G.M.T. (forecast for coasts in plain language).**

2. Observation stations, 0810 report:—

Indicator		Position (approx.)	
Letters.	Station.	Lat. S.	Long. E.
CQA	Beira ...	19° 50'	34° 51'
CQE	Lourenço Marques ...	25° 58'	32° 36'
ZSD	Durban ...	29° 52'	31° 03'
ZSA	East London ...	33° 02'	27° 55'
ZSQ	Port Elizabeth ...	33° 59'	25° 37'

1. Transmitting station... **Lourenço Marques**, (Latitude 25° 58' S.; Longitude 32° 36' E. approx.).

Call signal ... **CQE.**

Messages directed to ... **CQ.**

Wave length ... **600 m. spk.**

Time of transmission:—

0800 G.M.T. (observations at following stations at 0630 G.M.T.).*

2. Observation stations, 0800 report:—

Indicator		Position (approx.)	
Letters.	Station.	Lat. S.	Long. E.
ZSA	East London ...	33° 02'	27° 55'
ZSD	Durban ...	29° 52'	31° 03'
CQE	Lourenço Marques ...	25° 58'	32° 36'
CQA	Beira ...	19° 50'	34° 51'
CQF	Mozambique ...	15° 02'	40° 45'

1. Transmitting station... **Mozambique** (Latitude 15° 02' S.; Longitude 40° 45' E. approx.).

Call signal ... **CQF.**

Messages directed to ... **CQ.**

Wave length ... **600 m. spk.**

Time of transmission:—

0900 G.M.T. (observations at following stations at 0630 G.M.T.).*

2. Observation stations 0900 report:—

Indicator		Position (approx.)	
Letters.	Station.	Lat. S.	Long. E.
CQF	Mozambique ...	15° 02'	40° 45'
CQA	Beira ...	19° 50'	34° 51'
CQE	Lourenço Marques ...	25° 58'	32° 36'

Madagascar.

Spark Issues.

The following W/T Stations transmit weather reports in code* taken at 0400 G.M.T. at the undermentioned stations:—

W/T Station.	Call Sign.	Time of Transmission.	Observation Stations.	Positions (approx.)	
				Lat. S.	Long. E.
Majunga ...	FIO	0500 G.M.T.	Helleville (Nossi Bé)	13° 24'	48° 17'
			Zaudzi ...	12° 47'	45° 16'
			Diégo Suarez ...	12° 15'	49° 23'
			Majunga ...	15° 43'	46° 20'
Diégo Suarez ...	FIL	0430 "	Helleville (Nossi Bé)	13° 24'	48° 17'
			Diégo Suarez ...	12° 15'	49° 23'
Tamatave ...	FIS	0415 "	St. Mary ...	17° 00'	49° 54'
			Tamatave ...	18° 09'	49° 20'
Tulear ...	FIT	0445 "	Tulear ...	23° 21'	43° 46'

Ships can obtain on request any weather information in the possession of the above stations.

* The code used is not the International Ships' Wireless Weather Code referred to in "Wireless Weather Signals from the Shore," page 36, Vol. VIII, No. 86, February Marine Observer.

** Sundays and holidays excepted.

WIRELESS STORM WARNINGS.

Madagascar.

(Spark Issues.)

CYCLONE warnings are broadcast when necessary by the following stations on a wave length of 600 metres (spark), in each case:—

Zaudzi (Mayotta I.): Latitude 12° 47' S., Longitude 45° 16' E., Call Sign **FIM**.

Majunga: Latitude 15° 43' S., Longitude 46° 20' E., Call Sign **FIO**., Times of transmission, 0500, 1630 G.M.T.

Diégo Suarez: Latitude 12° 15' S., Longitude 49° 23' E., Call Sign **FIL**., Times of transmission, 0430, 1600 G.M.T.

Tamatave: Latitude 18° 08' S., Longitude 49° 26' E., Call Sign **FIS**., Times of transmission, 0415, 1615 G.M.T.

Tulear: Approx. Latitude 23° 21' S., Longitude 43° 40' E., Call Sign **FIT**., Times of transmission 0445, 1645 G.M.T.

The warning, originating from the observatory at Antananarivo, will be broadcast at every even hour during the probable passage of the cyclone when within the range of the W/T stations, by Majunga W/T station and Tulear W/T station, alternately, in the case of a cyclone affecting the Mozambique Channel, and alternately by Diégo Suarez and Tamatave W/T stations in the case of a cyclone affecting the area north-east and east of Madagascar.

The warning will be preceded by the Safety Signal **TTT** (— — —) repeated ten times at short intervals on full power. The warning will be broadcast one minute after the Safety Signal, and will be repeated three times at intervals of ten minutes.

If the Safety Signal *only* is broadcast it will indicate, in the absence of precise information, that there is reason to expect the passage of a cyclone.

During the whole period of this service Diégo Suarez, Tamatave and Tulear W/T stations will remain permanently on watch.

Mauritius.

Spark Issues.

Mauritius W/T station, call sign **VRS**, broadcasts, during the cyclone season (1st November to 15th May), on a wavelength of 600 metres spark, at irregular intervals, or on request, to all ships when it is known that a cyclone is in existence, the latest weather information *immediately* this information is received at the W/T station from Mauritius Observatory. The message is transmitted *en clair* in English giving as far as is known the position of the cyclone, with the direction and rate of its movement, also the weather conditions at Mauritius.

Requests from ships for further information will be forwarded at once to the Observatory.

Continuous watch will be kept at the W/T station.

III. WIRELESS TIME SIGNALS.

Union of South Africa.

I.C.W. Issue.

TIME signals actuated automatically from the Royal Observatory at the Cape by direct land line are broadcast by **Cape Town W/T station**, call sign **ZSC**, Latitude 34° 09' S., Longitude 18° 19' E. (approx.), on a wavelength of 625 metres (I.C.W.).

The time signals are broadcast according to the New International System of W/T time signals and the procedure is as follows:—

G.M.T.

h.	m.	s.	h.	m.	s.	
20	56	05	to	20	56	50
						repeated 5 times at 10 second intervals.
	57	00	„	57	50	repeated 10 times at 5 second intervals.
	57	55	„	58	00	{ 55 56 57 58 59 60 Time Signal.
	58	08	„	58	10	{
	58	18	„	58	20	{
	58	28	„	58	30	{
	58	38	„	58	40	{
	58	48	„	58	50	{
	58	55	„	59	00	{ 55 56 57 58 59 60 Time Signal.
	59	06	„	59	10	{
	59	16	„	59	20	{
	59	26	„	59	30	{
	59	36	„	59	40	{
	59	46	„	59	50	{
20	59	55	„	21	00	00 { 55 56 57 58 59 60 Time Signal.

Portuguese East Africa.

Spark and C.W. Issues.

DELAGOIA BAY.—LOURENÇO MARQUES. W/T time signals are transmitted automatically by means of the pendulum clock at Campos Rodrigues Observatory.

The transmission of the signals is made simultaneously by **Ponta Vermelha W/T station**, Lat., 25° 58' 05" S., Long., 32° 35' 39" E., call sign **CQE**, wave length 600 metres (spk.) and **Polana W/T station**, Lat., 25° 57' 40" S., Long., 32° 35' 59" E., call sign **CRAP** wave length 2,400 metres, C.W., and the new International system of W/T time signals is used.

The transmitting times are:—

G.M.T.

From	h.	m.	s.	to	h.	m.	s.
	7	57	00		8	00	00
„	18	57	00	„	19	00	00

The procedure as regards each series of signals is as follows:—

G.M.T.						Signal.						
h.	m.	s.	h.	m.	s.							
7	57	00	to	7	57							
18	57	00	to	18	57							
						Pre-venção. Sinais feitos à mão (Prepare. Time signal coming).						
57	55	„	58	00	{	55	56	57	58	59	60	Time signal.
58	08	„	58	10		•	•	•	•	•	•	
58	18	„	58	20		•	•	•	•	•	•	
58	28	„	58	30		•	•	•	•	•	•	
58	38	„	58	40		•	•	•	•	•	•	
58	48	„	58	50		•	•	•	•	•	•	
58	55	„	59	00	{	55	56	57	58	59	60	Time signal.
59	06	„	59	10		•	•	•	•	•	•	
59	16	„	59	20		•	•	•	•	•	•	
59	26	„	59	30		•	•	•	•	•	•	
59	36	„	59	40		•	•	•	•	•	•	
59	46	„	59	50		•	•	•	•	•	•	
7	59	55	8	00	{	55	56	57	58	59	60	Time signal.
18	59	55	19	00		•	•	•	•	•	•	

Note.—The error of the Observatory clock is stated never to exceed a few hundredths of a second.



Cyclone appears likely to pass eastward of the island.

Cyclone, which had already passed in a northerly direction, appears to have recurved, and is again approaching the island, travelling from N.W. to S.E.

Barometer rising; all danger over.

Mauritius.

Storm Signals.

DURING the cyclone season, from 1st November to 15th May, annually, a storm signal is hoisted daily, between 1 p.m. and 2 p.m., at the Port office at Port Louis, to indicate the weather conditions prevailing in the *vicinity* of Mauritius. The storm signal consists of four International Code flags and a cone.

The upper flag refers to the quadrant from east to north.
The second " " " north to west.
The third " " " west to south.
The fourth " " " south to east.

(The flags are placed vertically.)

When the signal is headed by a ball the information refers to the area within a circle with a radius of 300 miles.

When the answering pennant is hoisted below the fourth flag it indicates that no information has been received, and that the signal refers to the previous day.

Signification of Flags.

- A. There are no indications of disturbed weather.
- B. Weather is unsettled, but there are no indications of a cyclonic storm.
- C. Weather is unsettled, and may lead to the formation of a cyclonic storm.
- D. There are indications that a cyclonic storm is forming.
- E. There is distinct evidence of the existence of a cyclonic storm.
- F. The disturbed weather is apparently due to an extra tropical storm to the southward, "Southerly buster."
- G. The weather is clearing, but the sea may still be heavy.
- H. The cyclonic storm is moving south-westward.
- I. The cyclonic storm is moving southward.
- J. The cyclonic storm is moving south-eastward.
- K. The cyclonic storm is moving westward, northward of Mauritius.
- L. The cyclonic storm is moving eastward, southward of Mauritius.
- M. Strong trades which may be followed by cyclonic storm in next few days.
- N. Heavy swell may be encountered, indications of cyclonic storm beyond 300 mile limit.
- O. Heavy swell may be encountered, indications of cyclonic storm beyond 300 mile limit travelling on S.W. track.
- P. Heavy swell may be encountered, indications of cyclonic storm beyond 300 mile limit travelling on S. track.
- Q. Heavy swell may be encountered, indications of cyclonic storm beyond 300 mile limit travelling on S.E. track.
- Z. No information available.

Local Storm Signals.

When bad weather is approaching and precautions are not immediately necessary in the harbour, the following International Storm signals are made to vessels in the harbour and roadstead from the flagstaff of the Port office, Port Louis, at the head of the harbour.

Signal. Signification: Gale probably commencing at



North-West.



South-West.



North-East.



South-East.

When bad weather is approaching and precautions are necessary in the harbour, the following cyclone signals are made to vessels in the harbour and roadstead from the flagstaff of the Port office, Port Louis, at the head of the harbour.

Signal.

By Day.

Meaning.



Send down top-gallant yards and prepare for bad weather. The masters of all ships and vessels in this port are required immediately to repair on board their respective vessels, and half the crew should be kept on board; vessels at the Light Buoy ought to proceed to sea.

Vessels in the port are to strike lower yards and topmasts.

Vessels are required to answer the signals by hoisting their national ensign at the main.

Signal.

By Night.

Meaning.



Vessels at the Light Buoy to proceed to sea forthwith, and vessels in the port to make every preparation for bad weather.



Blue



Red



Black.

NOTE.—Plates produced by Lithographic process, including Charts and other large diagrams, will be found in each number after "Weather Signals."

Special Notices Regarding Personnel.

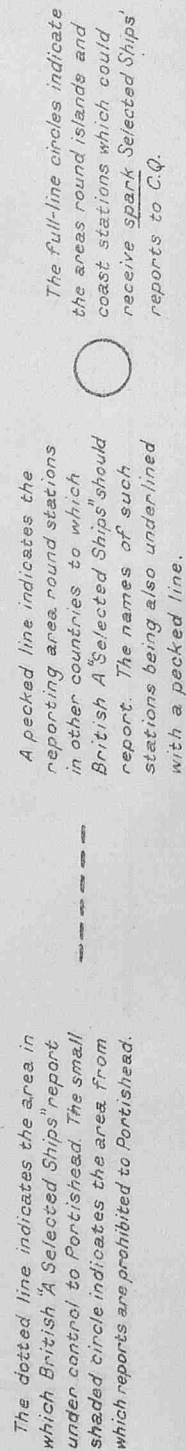
The Marine Superintendent will be glad to receive information of special distinctions gained and retirements, &c., of Marine Observers.

CAPTAIN E. G. DIGGLE, R.D., R.N.R.

Captain E. G. DIGGLE, Commodore of the Cunard Fleet and Master of the R.M.S. *Aquitania* has retired from active service afloat.

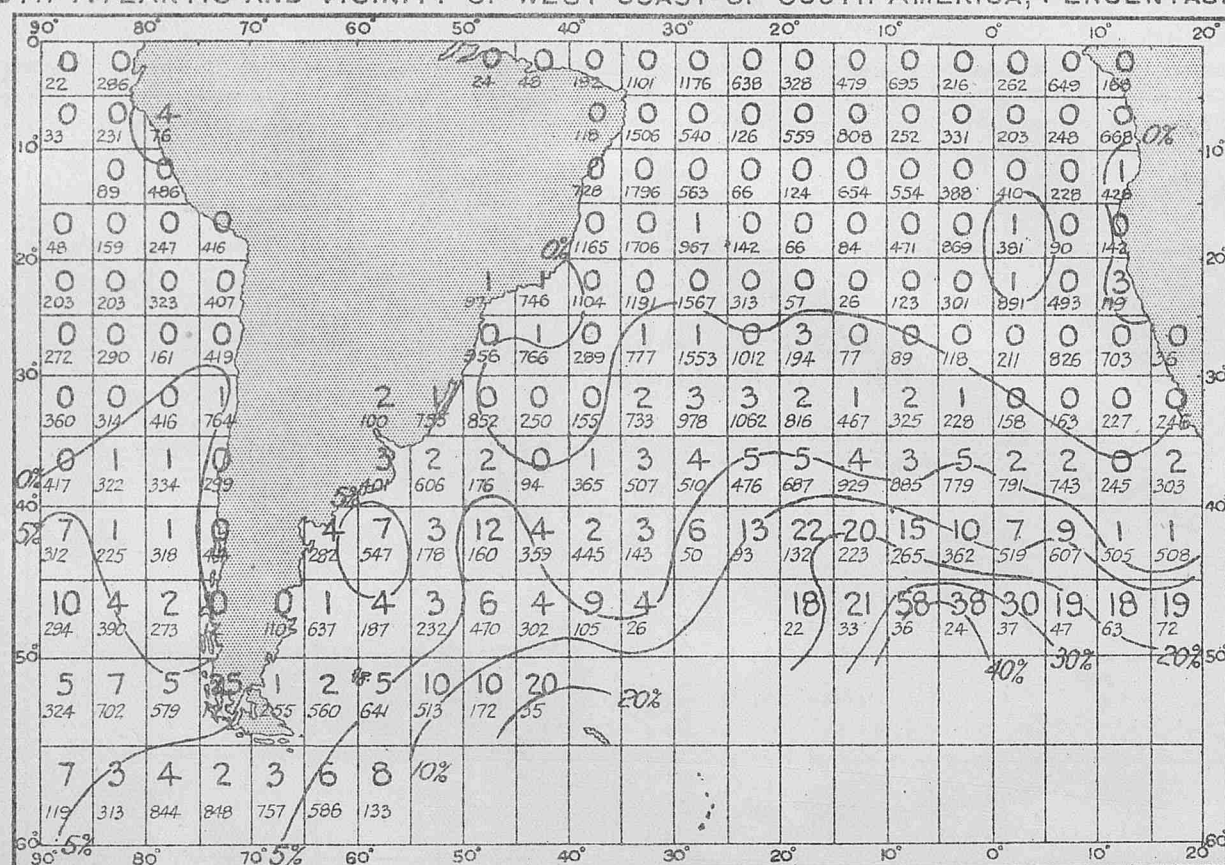
Joining the Cunard Company as a junior officer in 1896 he obtained his first command the *Cypria* in 1910. Since then he has commanded a number of vessels of the Cunard Fleet including *Ausonia*, *Saxonia*, *Carpathia*, *Caronia*, *Carinthia*, *Berengaria*, *Mauretania* and *Aquitania*.

Captain DIGGLE has been a member of the Voluntary Corps of Marine Observers since 1920, who join with the Marine Division in wishing him long life and happiness in retirement.



NOVEMBER

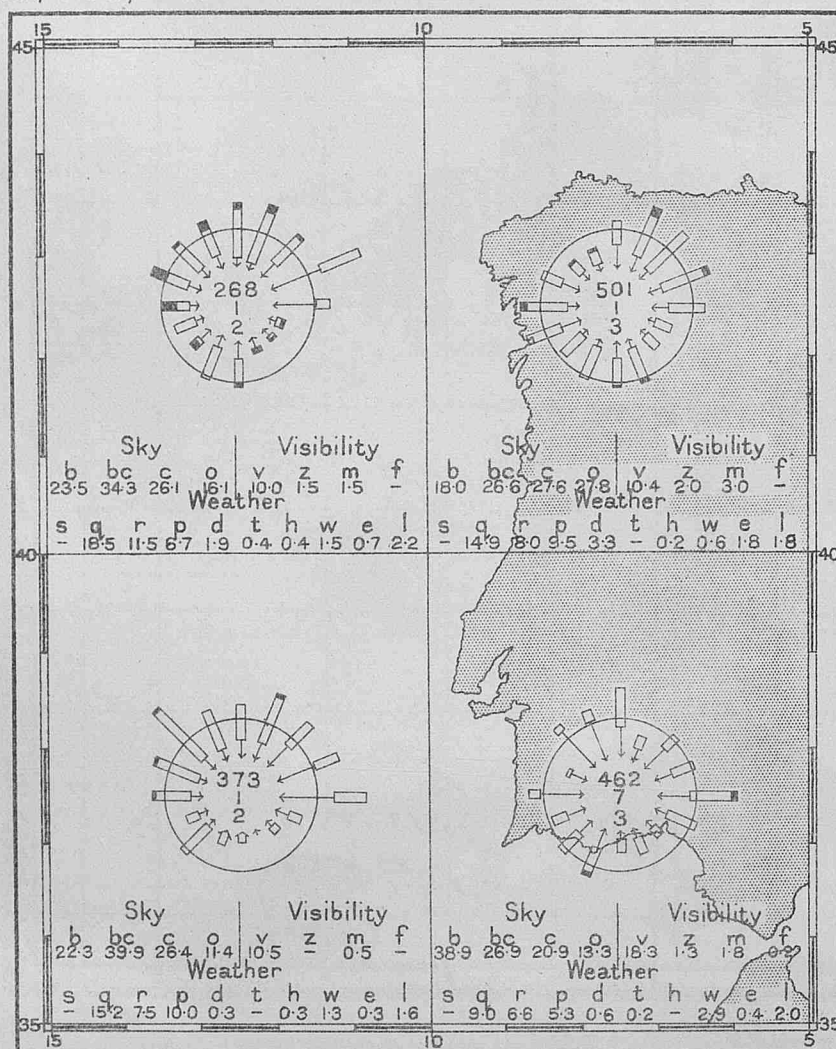
FOG IN THE SOUTH ATLANTIC AND VICINITY OF WEST COAST OF SOUTH AMERICA, PERCENTAGE FREQUENCY.



The upper figures in the 5° squares give the percentage frequency of occasions upon which Fog was logged, the lower figures the total number of observations. Lines are drawn for 0, 5, 10 and 20%. The chart is compiled from observations from British Ships for the period 1855 to 1899.

NOVEMBER

WIND, FOG, MIST AND WEATHER FOR THE REGION OFF THE COAST OF PORTUGAL.



EXPLANATION.

The Wind roses are drawn from Sea observations within the 5° squares.

Arrows fly with the wind, length represents frequency, thickness strength.

Gales. Moderate. Light.
8-12 4-7 1-3

Distance from head of arrow to circle represents 5%.

Scale: 0 10 20%

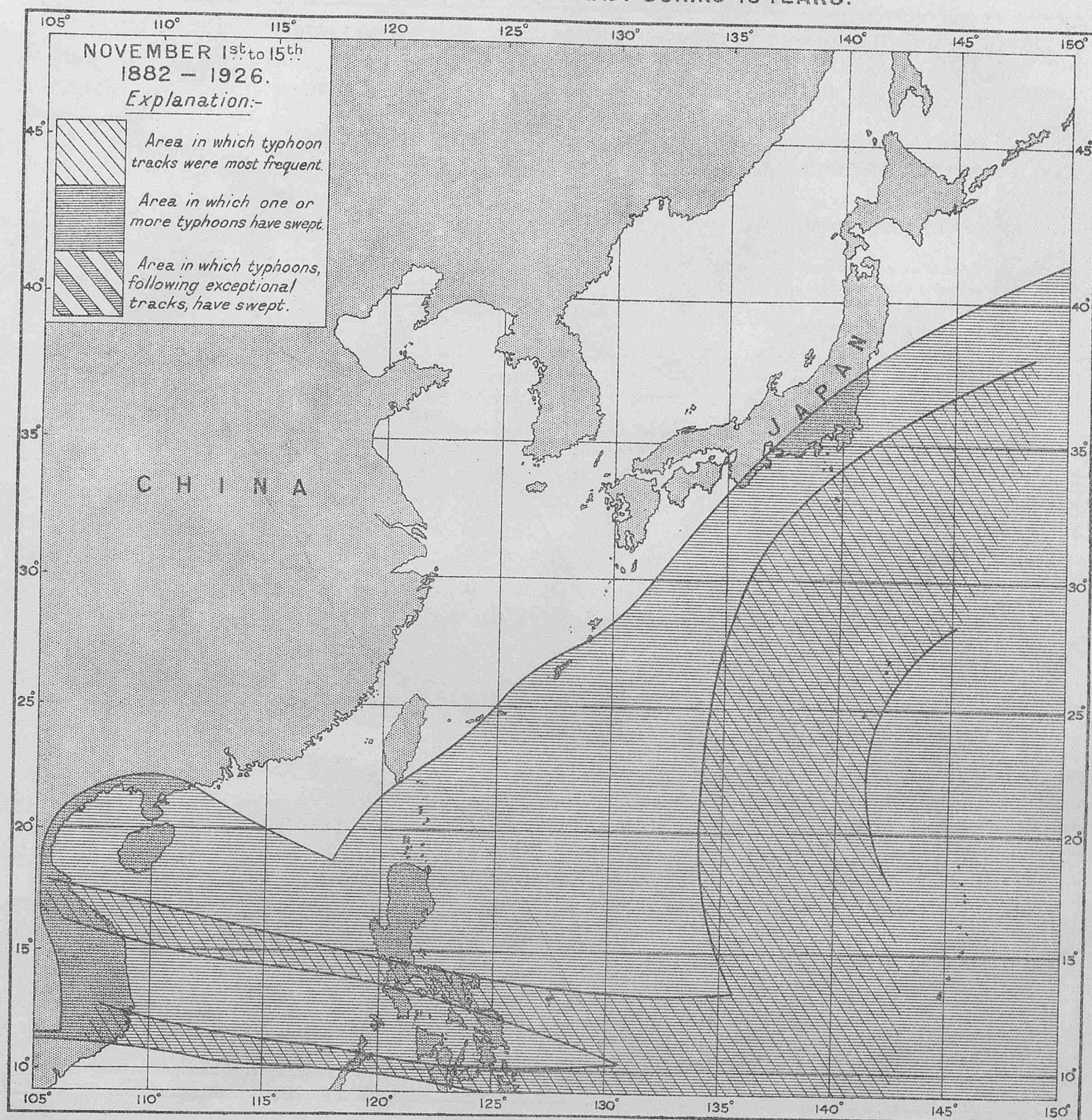
The upper figure in the centre of the rose gives total number of observations, the middle figure the percentage frequency of calms and the lower figure the percentage frequency of variable winds.

The percentage frequency of types of weather are shown in the lower half of each 5° square by the figures beneath each of the letters of the Beaufort weather notation.

For example, in the 5° square Latitude 40° to 45° N. Longitude 5° to 10° W. b was logged 18 times in every 100 observations while r was logged 8 times.

Compiled from observations of British Ships received since the adoption of the Hollerith system of extraction, covering the years 1921-1928.

TYPHOONS IN THE FAR EAST DURING 45 YEARS.



NOVEMBER—Two charts: *Total observations of Typhoons for month - 65.*

Chart I—November 1st to 15th

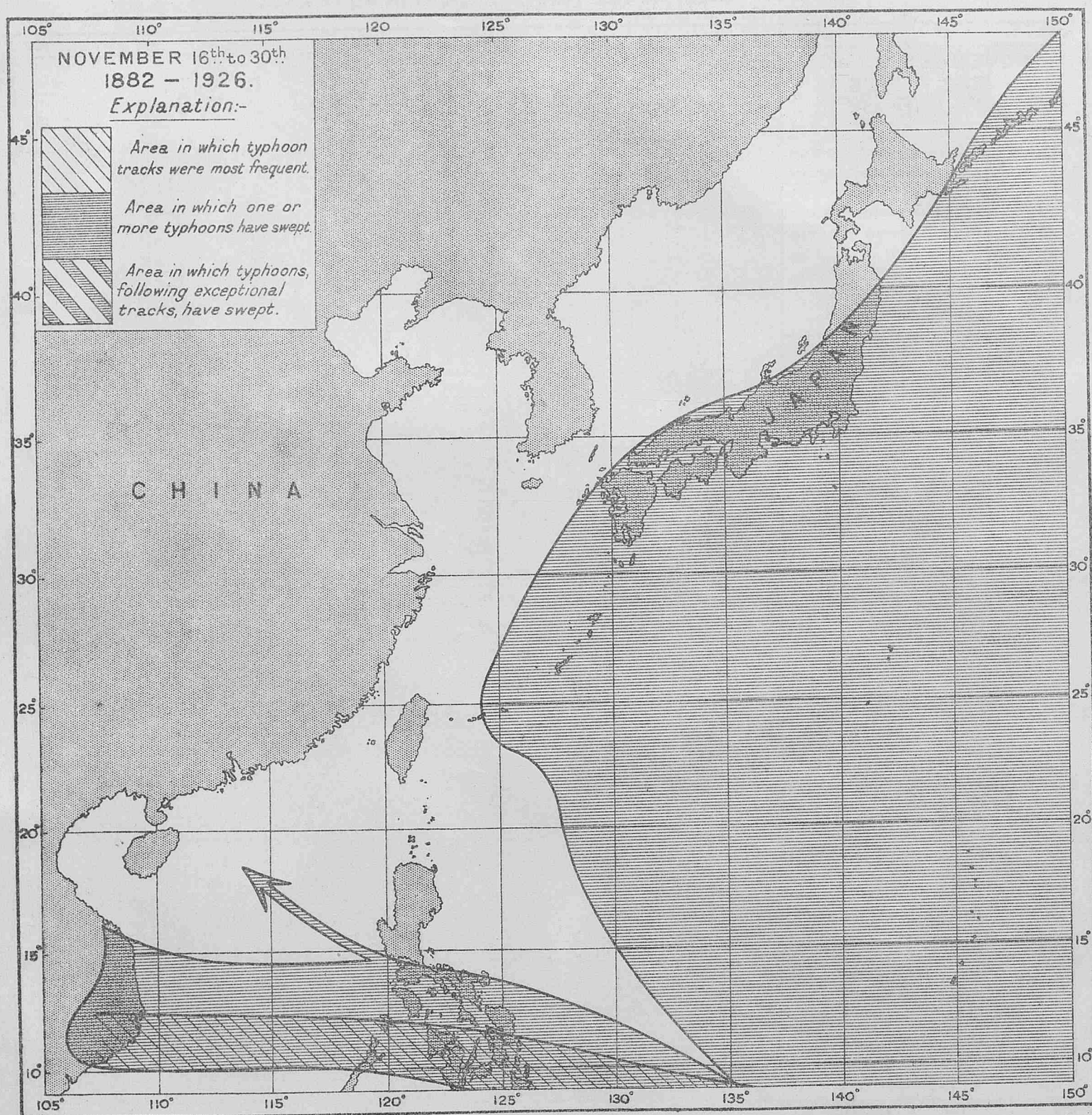
The coast of China and adjacent sea continue clear, as also the sea of Japan. But by an unaccountable phenomenon the danger zone shifts again nearer the East of Japan and Formosa; extends once more over the Riu-Kiu Islands and the S. Sea of China, between Latitude 20° & 10° N. over the Gulf of Tonking, Hainan and all the Philippine Islands as far as Mindanao.

Three principal tracks. One of these is followed by typhoons turning N.E. between Lat. 20° near the Balintang Channel and Lat. 25°, along the 135° & 140° meridian of Long. E. The two other tracks cross the South China Sea. The first from the South of Luzon to the neighbourhood of Tourane. The other from North of Mindanao and Palawan to the coast.

Starting point: Some from Guam but more frequently from Yap and Mindanao. The winter monsoon blows on the Chinese coast, fairly stiffly at times.

(From "Atlas of the Typhoons of the China Seas 1882 to 1926" by the Rev. P.E. Gherzi S.J., Director Zi-ka-wei Observatory, near Shanghai China.)
Published by The Hydrographic Institute of the Royal Marine Genoa.

TYPHOONS IN THE FAR EAST DURING 45 YEARS.



NOVEMBER - Two charts: Total observations of Typhoons for month - 65.

Chart II - November 16th to 30th

The Coast of China and the Northern Annam coast, with the Gulf of Tonking and Hainan suddenly become completely clear. Also a wide wedge shaped area extending over Formosa, the Bashee and Balintang Channels and all the North of Luzon.

In the North, on the other hand, the danger zone advances West a little towards the eastern portion of the East China Sea, over Kiushiu, the centre of Honshiu and the Kurile islands. The reason for this is perhaps that the Continental highs descend as far as Formosa and Luzon. (Isobars of 764 mm. and 762 mm.). While over the N.E. of Japan the isobar of 764 mm. and that of 762 mm. are deflected Westwards owing to the depression over the Aleutian Islands.

One important track in the South of the South China Sea between Lat. 13° & 10° N, starting S.W. of Yap across the southern Vizayas (Calamianes) islands.

The monsoon blows with great force along the Chinese coast with violent gusts following the passage of the continental depressions, especially near Shantung.

(From "Atlas of the Typhoons of the China Seas 1882 to 1926" by the Rev. P.E. Gherzi S.J., Director Zi-ka-wei Observatory, near Shanghai China.)
Published by The Hydrographic Institute of the Royal Marine Genoa

NOTICES.

INFORMATION REQUIRED.

Observations of Currents in the Persian Gulf, Northern portion of the Arabian Sea, Bay of Bengal and in the region of Sumatra, made during the years 1910 to 1931 are now being tabulated for constructing the charts which will be published in the Marine Observer next year.

Commanders of ships who have recorded observations of currents in these waters during these years who have not already returned them to the Meteorological Office will render assistance by doing so as soon as possible.

It will be convenient if the observations can be returned in a form ruled as under:—

Current logged on board S.S.

Captain

Address

<u>From.</u>		<u>To.</u>		Position.				Set Direction True.	Drift Nautical Miles.	Wind.		Remarks.
				<u>From.</u>		<u>To.</u>				Dir. (True.)	Force.	
Date.	Time.	Date.	Time.	Latitude.	Longitude.	Latitude.	Longitude.					

We certify that the above observations of set and drift of current are reliable, the Dead Reckoning having been carefully kept, and the observed Positions fixed accurately.

Signature of Master.

Signature of Navigating Officer.

Commanders who have had long experience in navigating these waters can also greatly assist in this investigation by sending in remarks on their general experiences of the currents and by calling attention to peculiarities of current concerning which information may not now be published.

It is many years since the currents in these regions were charted and it may be many years before they are again charted. Now is the time to send in information, which has not already been returned to the Meteorological Office.

DESPATCH OF INFORMATION REQUIRED IMMEDIATELY FOR THE CONDUCT OF THE WORK AT SEA.

Shipowners, Marine Superintendents and all concerned in the despatch of mails to Ships abroad are asked to kindly facilitate the despatch and delivery of postal matter received at their offices from the Meteorological Office and Air Ministry Publication Depot to their Ships abroad.

This matter addressed to the Commanders of Ships contains information which is required for the Conduct of Marine Meteorological Work at Sea and is most effective if received by the Commanders at the earliest possible date.

Much of the information referred to is published in the Marine Observer and is of a seasonal nature. This journal also contains advice to Regular Observing Ships which enables them to perform voluntary service by Wireless Communication for the benefit of all shipping.

POSTAL ARRANGEMENTS.

THE MARINE OBSERVER is published, when circumstances permit, on the first Wednesday of the month previous to that to which the number refers.

If captains of observing ships will forward to the Meteorological Office the particulars required hereunder, endeavour will be made as far as mails permit to post the latest number for use on their homeward passage.

S.S..... Captain.....

Port of Call.....

Date of Homeward Departure.....

Postal Address.....

When this information is not given THE MARINE OBSERVER is addressed to the Commanding Officer, s.s., c/o the owners, and captains are requested to make their own arrangements for forwarding.

ICE CHART.

WESTERN NORTH ATLANTIC. LETTERS OF TRANSATLANTIC TRACKS INDICATE.

NOTE.—In case of necessity owing to extreme southerly drift of ice, operative dates will be fixed for Track A.

- (C) From 1st July to 10th April, inclusive.
- (F) From 16th May to Opening of Belle Isle route and to 30th November when not using the Belle Isle route.
- (E) Westbound, on approaching Cape Race steer a course to pass 10 miles S. of Cape Race.
- (E) Eastbound, steer from position 25 miles S. of Cape Race.
- (G) From the opening of the Straits of Belle Isle to 14th November.

These routes are liable to alteration when, owing to abnormal ice conditions, it is considered advisable by the steamship lines who are parties to the Track agreement.

ROUTE NOTICES.

For latest information re Tracks see pages 87-88 of Vol. VIII, No. 88, April, 1931, Number, and Notice of Changes on the Ice Chart in May, 1931 number.

SYMBOLS USED ON THE CHART

- ▣ Iceberg.
- △ Floeberg.
- ▢ Growler.
- Field Ice, Floe Ice, Pack Ice, Hummocky Ice, Bay Ice.
- Drift Ice, Brash Ice, Sludge Ice, Pancake Ice.
- ⊕ Indicates W/T Ice Warning Station.

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat. Long.	Remarks.
Nov. 7, 1922	Cape Race W/T Stn.	47°38'N. 40°04'W.	Berg and growlers.

No reports of Ice, sighted during the month of September, 1931. have been received at the Meteorological Office.

CO-OPERATION OF SHIPOWNERS, MASTERS AND MATES.

Captains and officers who wish to co-operate regularly with the Meteorological Office should apply to the appropriate Port Meteorological Officers or Agents, a list of these gentlemen with addresses is given below. A general description of Marine Meteorological Work, including the particulars desired from intending Marine Observers, is given in Chapter I of *THE MARINE OBSERVER'S HANDBOOK*, 5TH EDITION, which may be obtained from H.M. Stationery Office direct, or through any booksellers, price 2s. 6d.

The names of vessels regularly observing for the Meteorological Office, London, together with their Commanders and Observing Officers, are given monthly in *THE MARINE OBSERVER*, which may be obtained from H.M. Stationery Office, price 2s., 2s. 2d. post free.

The Captains and Officers of regular observing ships constitute the Corps of Voluntary Marine Observers. For certain branches of this work tested instruments are lent to the Captains of British ships registered at ports in Great Britain. A certain number of Regular Observing ships are detailed as "Selected Ships" for the purpose of the World Wide Scheme of Routine Ships' Wireless Weather Telegraphy Reporting. These "Selected Ships" are indicated monthly in the "Fleet List" in *THE MARINE OBSERVER* by a number.

To decode "Selected Ships" reports the pamphlet M.O. 329, price 3d. may be obtained from H.M. Stationery Office.

Only ships registered at Ports in Great Britain will, in future, be included in the Meteorological Office, London, "Fleet List."

Marine Observers are asked to send in their Meteorological Log through the appropriate Port Meteorological Officer or Agent (accompanied by Form 138 in the case of "Selected Ships") at intervals of not more than six months. The Meteorological Record Form 911 (accompanied by Form 138 in the case of "Selected Ships") should be posted direct to the Meteorological Office, London, at the end of each voyage.

When sending in the Meteorological Log or Record, Regular Observing ships will render great assistance if they will notify the Port Meteorological Officer or Agent of their requirements.

The Port Meteorological Officers and Agents inspect official instruments at regular intervals, replacing those which are defective.

Where ships' instruments are found by comparison to be reliable they may be used for the work of "Selected Ships." A reliable mercurial barometer is essential as part of the equipment of a "Selected Ship."

A copy of *THE MARINE OBSERVER* is sent monthly to the Captain of every observing ship for the information and guidance of the officers doing this work. He is also supplied with *THE MARINE OBSERVER'S HANDBOOK* and such charts and atlases as are considered necessary as Meteorological equipment for *The Work of a Regular Observing ship in a particular trade.*

WIRELESS AND WEATHER AN AID TO NAVIGATION, published by H.M. Stationery Office, which affords information and guidance for the practical application of Marine Meteorology to Navigation, may be purchased through any bookseller, price 5s.

Returns made by Regular Observing ships are acknowledged monthly in *THE MARINE OBSERVER*, and a list of those Commanders and Officers who have performed specially fine work is published yearly in *THE MARINE OBSERVER* and Excellent Awards are made to them.

The work done by Regular Observing Ships in making written returns, and by "Selected Ships" in broadcasting routine information by W/T, together with "Weather Shipping" Bulletins broadcast from the shore, conforming with the recommendations of the International Convention of Safety of Life at Sea, 1929, provide the necessary information for the use of all shipping. Thus by shipowners encouraging the specialist work in those of their ships whose names appear in *THE MARINE OBSERVER*, this Voluntary Work under the supervision of the Meteorological Office provides a service to all shipping at minimum cost to the National funds.

Shipowners are asked to facilitate the forwarding of postal matter from the Air Ministry addressed to the Captains of their ships.

NAUTICAL OFFICERS AND AGENTS OF THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE, AIR MINISTRY.

LONDON ...	Captain L. A. BROOKE SMITH, R.D., R.N.R., Marine Superintendent. Commander J. HENNESSY, R.D., R.N.R., Senior Nautical Assistant. Room 319, Adastral House, Kingsway, W.C.2. (Telephone No.: Holborn 3434 Extension 421). Nearest station Temple, District Railway.
THAMES ...	Lieut. C. H. WILLIAMS, R.N.R., Port Meteorological Officer, P.L.A. Building, King George V Dock (south side), London, E.16. (Telephone No.: Albert Docks 2659. Telegraphic Address: Barometric Aldock, London).
MERSEY ...	Commander M. CRESSWELL, R.N.R., Port Meteorological Officer, Dock Office, Liverpool. (Telephone No.: Bank 8959. Telegraphic Address: Meteorite, Liverpool).

Agents.

BELFAST ...	Captain J. MCINTYRE, Harbour Master, Harbour Office. (Telephone No.: Belfast 4090).
BRISTOL CHANNEL	Captain T. JOHNSTON, Technical College, Cathays Park, Cardiff. (Telephone No.: Cardiff 6813).
CLYDE ...	Mr. ROBERT CLEARY, Master Mariner, The Clutha Stevedoring Co., Ltd., Princes Dock, Glasgow. (Telephone No.: 513 Ibrox).
FREMANTLE ... W. Australia.	Captain J. J. AIREY, Deputy Director of Naviga- tion, Customs House. (Telephone No.: B 1391).

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description
	Latitude.	Longitude.	
BALTIC.			
11.9.31	55°15'N.	13°20'E.	Drifting wreck.
NORTH SEA.			
11.9.31	2 m. W. by N. (mag.) from Outer Dowsing Light Vessel.	}	Floating tree, 40 ft. long : dangerous to navigation.
13.9.31	52°22'N.			3°56'E.
15.9.31	53°15'N.	1°11'E.	Heavy tree about 40 ft. long : dangerous to navigation.
18.9.31	52°34'N.	4°06'E.	Black conical buoy, dangerous to navigation.
ENGLISH CHANNEL.			
4.9.31	50°13'N.	1°15'W.	Floating spar, about 35 ft. long and 2 ft. diameter.
5.9.31	50°54'N.	1°24'E.	Spar attached to submerged wreckage.
18.9.31	49°43'N.	2°38'W.	Drifting mooring buoy.
20.9.31	50°18'N.	0°45'W.	Mast seems to hang on to wreck, top broken.
27.9.31	48°49'N.	4°37'W.	Red conical buoy.
BRISTOL CHANNEL.			
21.9.31	4 m. S.W. (mag.) from Mumbles Lt. Ho.	}	Waterlogged ship's lifeboat, painted grey, name mutilated.
MEDITERRANEAN.			
15.9.31	42°54'N.	4°29'E.	Piece of wood 30 metres long, dangerous to navigation.
NORTH ATLANTIC.			
1.9.31	37°24'N.	73°54'W.	Spar about 30 ft. long and 1 ft. in diameter, awash.
2.9.31	48°55'N.	14°20'W.	Drifting buoy.
3.9.31	45°43'N.	41°56'W.	Large spherical buoy.
4.9.31	45°24'N.	7°35'W.	Floating spar, dangerous to navigation.
4.9.31	49°10'N.	17°15'W.	Large base of buoy with small part of superstructure remaining : dangerous to navigation.
5.9.31	50°30'N.	5°25'W.	Wreck, apparently masts and rigging of a wrecked yacht.
7.9.31	43°21'N.	9°09'W.	Large log about 30 ft. long : danger to navigation.
8.9.31	34°11'N.	73°06'W.	Short heavy spar with a piece of wire attached.
10.9.31	40°01'N.	73°58'W.	Small white boat.
13.9.31	20°07'N.	70°01'W.	Large tree trunk about 80 ft. long, 5 ft. in diameter, with roots and branches showing out of water.
13.9.31	48°15'N.	5°23'W.	Buoy marked <i>Brest</i> : light extinguished.
14.9.31	40°15'N.	71°23'W.	Part of a raft consisting of heavy logs, partly submerged.
18.9.31	49°54'N.	11°20'W.	Large log covered with marine growth : dangerous to navigation.
21.9.31	48°17'N.	5°18'W.	White buoy with white light adrift.
22.9.31	48°19'N.	5°20'W.	Drifting red conical buoy with iron framework and light not burning.
25.9.31	48°12'N.	5°47'W.	Floating black buoy—dangerous to navigation.
GULF OF MEXICO.			
3.9.31	22°29'N.	88°01'W.	Heavy timbers about 50 ft. long.

Agents (contd.).

HONG KONG, China.	Lieut. Commander G.B.R. RUDYERD-HELPMAN R.N., Superintendent, Admiralty Chart and Chronometer Depot, H.M. Dockyard. (Telephone No.: 108 Dockyard).
HUMBER ...	Captain A. M. BROWN, Ellerman Wilson Line Office, Hull. (Telephone No.: Central 2180).
FORTH ...	Captains C. G. BONNER, V.C., D.S.C., and D AITCHISON, Leith Salvage and Towage Co., Ltd., 2, Commercial Street, Leith.
SOUTHAMPTON	Mr. R. I. T. MCEWAN, Master Mariner, Gilchrist Navigation School, 5, Union Bank Chambers, 1, Bernard Street. (Telephone No. Southampton 4277).
SYDNEY, New South Wales.	Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation. Captain C. LINDBERGH. Customs House. (Telephone No.: B 6421).
TYNE ...	Captain J. J. MCEWAN, Marine School, South Shields.
VANCOUVER, British Columbia.	Mr. T. S. H. SHEARMAN, 61, Leigh Spencer Build- ing, 553, Granville Street. (Telephone No.: Seymour 3309).

FLEET LIST.

The following is a complete list of ships regularly contributing observations to the Meteorological Office.

The names of the Captains and Officers, as ascertained from logs and records received, are given with the date and description of last log, register or record received up to the time of going to press.

Marine Observers are requested to take this as complete and grateful acknowledgment for the work they have contributed, as it has been found necessary to reduce as far as possible the correspondence of the Marine Superintendent, which was largely composed of letters acknowledging logs and reports, in order that more time may be devoted to obtaining results from the data received.

Only in special cases will individual letters be sent.

Excellent awards will be made at the end of the financial year. The names of Commanders and Officers gaining these awards will be published in a special list in THE MARINE OBSERVER.

Ships not contributing logs or records within a reasonable period will automatically be removed from the list and the free issue of THE MARINE OBSERVER discontinued; it is, therefore, earnestly requested that changes of service, probable periods of lay up or transfer of Commanders may be notified whenever possible.

A waiting list is kept of the names of vessels whose Commanders have offered to regularly co-operate.

The number of voluntary observing ships is limited to a maximum total of 500.

Commanders are requested to point out any errors which may occur in the list.

Explanation of Abbreviations.

Unless otherwise stated, vessels on the following list are s.s.—M.V. indicates Motor Vessel; S.T. = Steam Trawler.

M.L. = Equipped with tested Instruments lent by the Meteorological Office for keeping Meteorological Logs.

W.T. = Equipped wholly or partly with tested Instruments lent by the Meteorological Office for reporting in code by W/T in the International Selected Ship system.

No. = No Meteorological Office instrumental equipment on board.

M = Ship's barometer *mercurial*.

A = Ship's barometer *aneroid*.

C.C. = Equipped with tested Instruments lent by the Meteorological Office for making Cross Channel Telegraphic Reports to Weather, London.

To indicate the nature of the wireless apparatus of Selected Ships—

†† preceding ship's name indicates fitted for long range continuous wave transmission and reception.

*† = Short range transmission and long range continuous wave reception.

** = Short range transmission and reception.

The numbers preceding the names of ships are for identification purposes, when observations are re-transmitted in synoptic messages by wireless or cable, and are not intended for use at sea.

Selected Ships.

Those ships in this list which have a number and symbols indicating W/T apparatus before their names are "Selected Ships" invited to make by W/T, reports of observations taken at arranged G.M. Times to "All Ships."

Name of Vessel	Captain.	Observing Officers.	Meteorological Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 18.9.31.	Date Received.
233 †† <i>Aba</i> , M.V. ...	Spence, T. ...	G. L. Donald, R. Cherry ...	W.T.	Elder Dempster ...	Forms 911 & 138 13.8.31 to 14.9.31	16.9.31
121 †† <i>Abinsi</i> ...	Sola, P. ...	J. J. Smith, G. Baker ...		" " ...	" " 5.8.31 to 11.9.31	14.9.31
122 †† <i>Acera</i> , M.V. ...	Shooter, J. C. ...	R. B. Ellis ...	W.T.-M.	" " ...	" " 1.7.31 to 4.8.31	6.8.31
155 *† <i>Achilles</i> ...	Cosker, W. ...	C. Broad, J. Simpson, J. S. Stratford.	M.L.	A. Holt " ...	Form 915 28.3.31 to 4.8.31 ...	10.8.31
055 *† <i>Actor</i> ...	Whyte, D. L. ...	G. Penston, E. Pearce, P. Harrow.	No. M.	Harrison ...	Forms 911 & 138 26.2.31 to 1.5.31	21.5.31
123 †† <i>Adda</i> , M.V. ...	Lawson, J. H. ...	N. E. Thomas, F. C. Langton	W.T.-M.	Elder Dempster ...	" " 20.8.31 to 31.8.31	10.9.31
050 †† <i>Adriatic</i> ...	Binks, J. W., R.D., Lt.-Commr., R.N.R.	G. T. Kavanagh, O. V. Lucas, J. Dennison.	W.T.	White Star ...	" " 24.8.31 to 13.9.31	15.9.31
090 *† <i>Aeneas</i> ...	Wallace, W. K. ...	A. McL. Pilcher ...	M.L.	A. Holt ...	Form 911 13.5.31 to 19.6.31 ...	20.6.31
166 *† <i>Agamemnon</i> ...	Beswick, W., D.S.C., Commr., R.N.R.	W. K. Hole ...	W.T.	" " ...	" " 9.8.31 to 22.8.31 ...	10.9.31
<i>Alban</i> ...	Evans, L. ...	J. G. Tippet ...	M.L.	Booth ...	" " 1.3.31 to 23.6.31 ...	6.7.31
127 *† <i>Albion Star</i> ...	Hall, J. B. ...	T. Gilchrist ...	No. M.	Blue Star ...	" " ...	"
080 †† <i>Alcantara</i> , M.V. ...	Wakeman, E. C. ...	W. W. Dovell, E. V. Scullard, R. C. Smith.	W.T.	R.M.S.P. ...	Forms 911 & 138 3.7.31 to 17.8.31	22.8.31
178 *† <i>Alipore</i> ...	Lyndon, E. P., R.D., Lt.-Commr., R.N.R.	J. P. McArthur ...	No. M.	P. & O. ...	Forms 911 12.7.31 to 24.7.31 ...	4.9.31
175 †† <i>Almanzora</i> ...	Hannam, F. S. ...	G. W. Martin ...	W.T.	R.M.S.P. ...	" " 13.6.31 to 28.7.31 ...	30.7.31
012 †† <i>Almeda Star</i> ...	Turner Russell, W. ...	H. Metcalf, E. Russell, C. L. Williams.	No. M.	Blue Star ...	Forms 911 & 138 12.7.31 to 26.8.31	1.9.31
<i>Alondra</i> ...	Scott, L. S. ...	E. W. Thomas, P. Hamilton	" A.	Yeoward ...	Form 911 2.8.31 to 22.8.31 ...	25.8.31
<i>Alynbank</i> ...	Robertson, J. ...	G. E. Beaton ...	" A.	A. Weir & Co. ...	" " 11.6.31 to 2.7.31 ...	13.8.31
103 †† <i>Andalucia Star</i> ...	Vernon, R. ...	W. Cumming, P. Clarke, H. Heggen.	" M.	Blue Star ...	Forms 911 & 138 28.6.31 to 11.8.31	15.8.31
<i>Antiochus</i> ...	Dougall, W. T. ...	C. F. Lock ...	" A.	A. Holt ...	" " 24.8.31 to 5.9.31 ...	11.9.31
209 †† <i>Aorangi</i> , M.V. ...	Spring-Brown, J. F. ...	E. Anderson, D. H. Richards, J. Billingham.	M.L.	Canadian-Australasian	Form 915 14.1.31 to 22.5.31 ...	4.8.31
120 †† <i>Apapa</i> , M.V. ...	Crawford, R. ...	J. Boyd, V. Feeney ...	W.T.-M.	Elder Dempster ...	Forms 911 & 138 16.7.31 to 15.8.31	20.8.31
029 †† <i>Appam</i> ...	Beith, A. ...	W. M. M. Hutchings, C. V. Evans, H. O. Forster.	W.T.	" " ...	" " 8.7.31 to 15.8.31	18.8.31
<i>Araby</i> ...	Lee, J., D.S.C. ...	H. Haigh ...	No. A.	MacIver ...	Form 911 7.6.31 to 21.8.31 ...	3.9.31
115 †† <i>Arandora Star</i> ...	Moulton, E. W. ...	T. Graham, F. Gudin, R. T. Hales.	" M.	Blue Star ...	Forms 911 & 138 1.8.31 to 4.9.31	5.9.31
278 *† <i>Architect</i> ...	Mowat, I. ...	G. Dewar ...	" M.	Harrison ...	Forms 911 & 138 20.4.31 to 19.6.31	28.6.31
293 *† <i>Ariguani</i> ...	Scudamore, J. H. H., D.S.C., R.D., Commr., R.N.R.	B. E. Druce, A. Crone, A. F. Moss.	M.L.	Elders & Fyfes ...	Form 915 4.5.31 to 1.9.31 ...	4.9.31
<i>Ariosto</i> ...	Biggins, R. L. ...	N. F. Hewetson, R. W. Holdsworth.	No. A.	Ellerman Wilson ...	Form 911 25.2.31 to 30.5.31 ...	9.6.31
144 †† <i>Arlanza</i> ...	Clarke, E., R.D., Commr., R.N.R.	S. A. Gammon, H. V. Todd, F. T. Brett.	W.T.	R.M.S.P. ...	Forms 911 & 138 1.8.31 to 14.9.31	16.9.31
091 †† <i>Armada Castle</i> ...	Whitfield, G. J. ...	W. Pace, C. Lloyd, A. H. Parry	M.L.	Union Castle ...	Form 915 6.12.30 to 26.4.31 ...	29.4.31
296 *† <i>Arracan</i> ...	Thomson, S. ...	G. Davidson, H. H. Brown, J. P. Anderson.	"	P. Henderson ...	" " 1.5.31 to 19.8.31 ...	8.9.31
<i>Arundel</i> ...	Shaw, B. ...	E. Hill ...	C.C.	Southern Rly. ...	Telegraphic Report 17.9.31...	17.9.31
095 †† <i>Arundel Castle</i> ...	Morton Betts, W. ...	G. L. Clarke, O. Pitts, H. Baty.	M.L.	Union Castle ...	Form 915 10.1.31 to 3.5.31...	14.5.31
280 *† <i>Astronomer</i> ...	Richards, J. ...	W. P. Baker ...	No. M.	Harrison ...	Form 911 12.1.31 to 24.5.31 ...	17.6.31

LIST OF VOLUNTARY OBSERVING SHIPS

iii

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line	Last Log, Register, or Record Contributed. Received up to 18.9.31.	Date Received.
027 *† <i>Clan Keith</i> ...	Waterhouse, J. ...	—Todman ...	W.T.	Clan ...	Form 911 4.4.31 to 4.7.31 ...	22.7.31
<i>Clan Kenneth</i> ...	Brown, R. H. ...	T. A. Pearson ...	No. A.	" ...	" 28.6.31 to 25.7.31 ...	1.8.31
<i>Clan Macalister</i> ...	Stenson, F. J., A.D.C., R.D., Capt., R.N.R.	T. M. Rees Davis ...	" A.	" ...	" 9.7.31 to 30.7.31 ...	1.9.31
<i>Clan MacBean</i> ...	Boag, J. ...	L. Thomson ...	" A.	" ...	" 25.4.31 to 18.5.31 ...	13.7.31
<i>Clan Macbeth</i> ...	Giles, H. J., R.D., R.N.R.	W. R. Woodriffe, L. W. Gibbins.	" A.	" ...	" 21.7.31 to 1.8.31 ...	17.8.31
<i>Clan Macfadyen</i> ...	Laird, C. ...	W. C. Dalzell ...	" A.	" ...	" 1.6.31 to 22.6.31 ...	31.8.31
<i>Clan Macfarlane</i> ...	Redford, L. F., Lt.-Commr., R.N.R.	W. H. Simpson ...	" A.	" ...	" 2.5.31 to 25.5.31 ...	22.7.31
<i>Clan Macgillivray</i> ...	Mackinlay, A. ...	S. R. J. Woods ...	" A.	" ...	" 6.7.31 to 27.7.31 ...	7.9.31
<i>Clan Macindoe</i> ...	Scott-Smith, H. E. G. O.B.E., R.D., Lt. Commr., R.N.R.	J. C. Dunphy ...	" A.	" ...	" 23.1.31 to 7.2.31 ...	7.3.31
<i>Clan Mackellar</i> ...	Lyall, A. B. ...	A. V. Howard ...	M.L.	" ...	Form 915 19.12.30 to 30.3.31 ...	4.5.31
001 *† <i>Clan Macphee</i> ...	Gourlay, J. B. ...	E. H. Stone, G. Drake, A. Pollock.	"	" ...	Forms 911 & 138 10.4.31 to 11.6.31 ...	15.6.31
004 *† <i>Clan MacNair</i> ...	Holman, W. G. ...	F. H. Petheridge A. Woodrow, J. Napier.	W.T.	" ...	Form 911 4.1.31 to 17.4.31 ...	21.4.31
<i>Clan Macquarrie</i> ...	West, W. F. ...	J. H. Thorpe ...	No. A.	" ...	Form 915 31.1.31 to 12.5.31 ...	1.6.31
002 *† <i>Clan Macwhirter</i> ...	Low, A. ...	M. J. Lewis, H. Whitehead, C. Rodger.	M.L.	" ...	" 17.4.31 to 13.8.31 ...	18.8.31
003 *† <i>Clan Malcolm</i> ...	George, L. S. ...	A. Lynch, H. Hind, S. Ewing	No. A.	" ...	" 19.8.31 to 14.9.31 ...	17.9.31
<i>Clan Morrison</i> ...	Porterfield, W. M., Lt.-Commr., R.N.R.	H. W. Peletier, A. G. Beynon, R. K. Phillips.	" A.	" ...	" 16.5.31 to 31.8.31 ...	3.9.31
<i>Clan Murdoch</i> ...	Wynne, R. H. ...	P. S. Evans ...	" A.	" ...	" 25.6.31 to 18.7.31 ...	27.8.31
<i>Clan Ranald</i> ...	Hawley, F. J. ...	H. C. Carter ...	" A.	" ...	" 15.7.31 to 3.8.31 ...	24.8.31
<i>Clan Ross</i> ...	Calderwood, W. ...	R. C. Steel ...	" A.	" ...	" 27.4.31 to 5.7.31 ...	9.7.31
<i>Clan Sinclair</i> ...	Cater, H. ...	D. McAllister ...	" A.	" ...	" 31.5.31 to 1.7.31 ...	6.7.31
017 *† <i>Colonial</i> ...	Baird, W. ...	W. Moore ...	" M.	Harrison ...	" 6.7.31 to 29.7.31 ...	22.8.31
298 *† <i>Comedian</i> ...	Cadogan, A. ...	F. M. Eales ...	" M.	" ...	Forms 911 & 138 20.5.31 to 24.6.31 ...	25.6.31
185 † <i>Comorin</i> ...	Cartwright, C. W. D.S.C.	R. E. Tucker ...	" M.	P. & O. ...	" 4.6.31 to 15.8.31 ...	25.8.31
198 *† <i>Contractor</i> ...	Harrauden, W. E. ...	" ...	" M.	Harrison ...	" 14.5.31 to 21.8.31 ...	10.9.31
049 *† <i>Coptic, M.V.</i> ...	Williams, G. ...	H. A. Hill, P. Saville, W. Burt.	W.F.	Shaw, Savill & Albion	"	"
100 *† <i>Cornwall</i> ...	Almond, J. G. ...	W. H. G. Timberlake ...	M.L.	Federal ...	Form 911 17.4.31 to 21.5.31 ...	28.5.31
006 † <i>Coronado</i> ...	Legge, A. W. ...	A. Orchard, A. Magill, G. Binks.	W.T.	Elders & Fyfes ...	Forms 911 & 138 21.7.31 to 23.8.31 ...	27.8.31
214 *† <i>Counsellor</i> ...	Jackson, J. ...	G. C. Heaton, W. A. Short, J. L. Curle.	No. M.	Harrison ...	" 31.5.31 to 2.9.31 ...	8.9.31
301 *† <i>Culebra</i> ...	Rathkings, E. C. Commr., R.N.R.	H. D. Hooper, T. Powell, R. J. Finch.	M.L.	R.M.S.P. Co. ...	Form 915 14.2.31 to 28.4.31 ...	5.5.31
285 *† <i>Custodian</i> ...	O'Connor, T. ...	W. F. O'Neill, W. H. Corlett, J. L. Williams.	No. M.	Harrison ...	Forms 911 & 138 2.4.31 to 16.6.31 ...	20.6.31
<i>Dakotian</i> ...	Atkinson, W. H. ...	R. J. S. Pope ...	" A.	Leyland ...	Form 911 10.11.30 to 17.12.30 ...	24.12.30
<i>Dardanus</i> ...	Christie, W. ...	J. S. Ogilvie ...	" A.	A. Holt ...	" 11.7.31 to 4.8.31 ...	12.8.31
<i>Darien</i> ...	Hannafor, W. ...	W. B. Vaughan ...	" A.	Leyland ...	" 20.7.31 to 13.9.31 ...	18.9.31
302 † <i>Dario</i> ...	Green, J. ...	W. Roberts, A. J. Barff	W.T.-M.	R.M.S.P. Co. ...	Forms 911 & 138 19.7.31 to 10.9.31 ...	18.9.31
<i>Davistan</i> ...	Trickey, J. ...	P. M. Ralston ...	No. A.	Leyland ...	Form 911 29.8.30 to 22.10.30 ...	28.10.30
303 † <i>Demerara</i> ...	Matthews, G. P. ...	E. N. Gillet, W. Lowe, J. Phillips.	W.T.-M.	R.M.S.P. Co. ...	Forms 911 & 138 21.6.31 to 13.8.31 ...	20.8.31
<i>Denis</i> ...	Harris, F. C. P. ...	A. W. Hanchett, J. H. Stoker	M.L.	Booth ...	" 6.5.31 to 21.5.31 ...	29.5.31
304 † <i>Desado</i> ...	Buret, J. ...	C. A. Steel ...	W.T.-M.	R.M.S.P. Co. ...	" 26.4.31 to 19.6.31 ...	22.6.31
117 † <i>Desna</i> ...	Huff, G. ...	G. L. Elliott, H. Lang ...	"	" ...	" 2.3.31 to 23.4.31 ...	14.5.31
252 *† <i>Devon</i> ...	Kinnell, G. ...	G. Chaplin, J. D. Marks, M. Willinott.	No. M.	Federal ...	" 7.4.31 to 14.7.31 ...	16.7.31
<i>Dieppe</i> ...	Lidbetter, W. ...	E. A. Biles ...	C.C.	Southern Railway ...	Telegraphic Report 18.9.31 ...	18.9.31
284 *† <i>Director</i> ...	Worthington, B. ...	M. G. O'Brien, A. M. Hughes, A. E. Rogers.	No. M.	Harrison ...	Forms 911 & 138 27.4.31 to 1.8.31 ...	8.8.31
138 *† <i>Discovery II, R.R.S.</i> ...	Carey, W. M., Commr., R.N.	R. A. B. Ardley ...	M.L.	Falkland Is. Govt. ...	" ...	"
<i>Dominia, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr., R.N.R.	W. E. Allen, A. S. Muir, W. F. Anderson.	"	Telegraph Construction & Maintenance.	Form 915 5.9.30 to 24.11.30 ...	6.12.30
<i>Dorelian</i> ...	Hugan, C. ...	J. A. Kendall ...	No. A.	Leyland ...	Form 911 20.3.31 to 25.5.31 ...	1.6.31
251 † <i>Doric</i> ...	Jackson, W. H. P. ...	T. Pratt, F. W. Laws, W. Farrell.	W.T.	White Star ...	Forms 911 & 138 3.8.31 to 21.8.31 ...	25.8.31
136 *† <i>Doric Star</i> ...	Mills, D. H. ...	—Anderson ...	No. M.	Blue Star ...	Form 911 & 138 16.7.31 to 4.9.31 ...	10.9.31
275 *† <i>Dramatist</i> ...	Meek, A. J. ...	G. H. Howard, I. W. Page ...	" M.	Harrison ...	" 21.8.31 to 15.9.31 ...	17.9.31
142 † <i>Duchess of Atholl</i> ...	McQueen, D. S. ...	G. Mowatt, C. D. Watt, E. Glennie.	W.T.-M.	Canadian Pacific ...	"	"
152 † <i>Duchess of Bedford</i> ...	Sibbons, H. ...	A. Mawsey, J. Stewart, J. Roche.	"	" ...	" 16.8.31 to 1.9.31 ...	5.9.31
151 † <i>Duchess of Richmond</i> ...	Freer, A., Capt., R.N.R.	W. A. Stanley ...	"	" ...	" 22.8.31 to 8.9.31 ...	11.9.31
143 † <i>Duchess of York</i> ...	Stuart, R. N., V.C., D.S.O., Commr., R.N.R.	D. Parsons, J. B. Saunders ...	"	" ...	" 26.7.31 to 2.9.31 ...	14.9.31
098 † <i>Dunbar Castle, M.V.</i> ...	Vincent, E. S., R.D., Commr., R.N.R.	J. Daziel, T. W. McAllen, P. G. MacIver.	W.T.	Union Castle ...	" 30.6.31 to 18.7.31 ...	21.7.31
<i>Dunluce Castle</i> ...	Hutchings, A. H. ...	A. C. M. Black ...	No. A.	" ...	Form 911 16.4.31 to 22.6.31 ...	27.6.31
<i>Dunrobin</i> ...	Ramsay, J. D. ...	" ...	" A.	Glen & Co. ...	" 1.6.31 to 29.6.31 ...	14.8.31
<i>Dunster Grange</i> ...	Wilson, G. F. ...	J. Allerton ...	" M.	Houlder ...	Forms 911 & 138 21.6.31 to 26.8.31 ...	29.8.31
102 *† <i>Duquesa</i> ...	Owen, R. ...	L. W. Palmer ...	" M.	Furness Withy ...	" 26.1.31 to 29.3.31 ...	22.8.31
215 *† <i>Durenda, M.V.</i> ...	Moon, J. ...	H. Stott ...	" M.	British India ...	" 11.6.31 to 5.7.31 ...	8.7.31
077 † <i>Edinburgh Castle</i> ...	Gilbert, E. F. ...	W. Aldous, R. Pembry ...	W.T.	Union Castle ...	Forms 911 & 138 27.6.31 to 16.8.31 ...	18.8.31
107 *† <i>El Argentino, M.V.</i> ...	Ellis, F., D.S.C. ...	W. Findlay, J. Burch, C. G. Adlard.	No. M.	Houlder ...	" 11.5.31 to 15.7.31 ...	13.8.31
009 *† <i>Elmworth, M.V.</i> ...	Dick, J. ...	J. M. Whyte ...	" M.	R. S. Dalgleish ...	" 28.6.31 to 20.8.31 ...	7.9.31
158 *† <i>Elpenor</i> ...	Wilson, R. J. ...	E. Roberts, J. Macfarlane, G. Rowlands.	M.L.	A. Holt ...	Form 915 14.3.31 to 7.7.31 ...	16.7.31
108 *† <i>Elstree Grange</i> ...	Williams, W. E. ...	P. A. Hawkesworth ...	No. M.	Houlder ...	Forms 911 & 138 15.5.31 to 9.8.31 ...	25.8.31
109 *† <i>El Paraguay</i> ...	Frost, C. R. ...	G. Fletcher, F. J. G. Rice, R. L. Aldridge.	" M.	" ...	" 15.6.31 to 6.8.31 ...	11.8.31
110 *† <i>El Uruguayo</i> ...	McNamara, T. ...	F. E. Hailstone ...	" M.	" ...	" 11.4.31 to 10.6.31 ...	16.6.31
088 *† <i>Empire Star</i> ...	Owen, G., R.D., Lt.-Commr., R.N.R.	" ...	M.L.	Blue Star ...	" ...	"
006 † <i>Empress of Australia</i> ...	Griffiths, E., Lt.-Commr., R.N.R.	A. Tippet, M. Williams, O. F. Pennington.	W.T.	Canadian Pacific ...	Forms 911 & 138 21.8.31 to 5.9.31 ...	8.9.31
154 † <i>Empress of Canada</i> ...	Hailey, A. J., Lt.-Commr., R.N.R.	G. O. Baugh, R. H. Foley, H. Kennedy.	M.L.	" ...	Form 915 28.3.31 to 8.7.31 ...	31.8.31

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 18.9.31	Date Received.
061 † <i>Empress of France</i>	Turnbull, J., C.B.E., R.D., Capt., R.N.R.	E. Roberts, R. Newson, W. T. Brookes.	W.T.	Canadian Pacific ...	Forms 911 & 138 4.6.31 to 19.6.31	23.6.31
153 † <i>Empress of Japan</i>	Robinson, S., C.B.E., R.N.R.	R. Goss, R. Wolfenden, A. Le Maistre.	M.L.	" " ...	Form 915 7.8.30 to 13.1.31	16.2.31
<i>Eumaeus</i> ...	Hodgson, R. N. ...	W. G. Coxshall ...	No. A.	A. Holt ...	Form 911 5.7.31 to 29.7.31	24.8.31
<i>Euryades</i> ...	Ewan, W. B. ...	D. S. Bruce ...	" A.	" " ...	" 21.1.31 to 26.1.31	17.2.31
<i>Explorer</i> ...	Allan, J. ...	A. Stout ...	" A.	Scottish Fishery Bnd.	" 5.8.31 to 26.8.31	4.9.31
067 *† <i>Ferndale</i> ...	Beighton, J. N. ...	L. J. Hopkins, H. C. Hone ...	" M.	Aberdeen Common-wealth.	Forms 911 & 138 18.2.31 to 1.6.31	6.6.31
074 *† <i>Fordsdale</i> ...	Avern, J., Commr. R.N.R.	F. H. E. Vaughan ...	" M.	Aberdeen Common-wealth.	" " 18.7.31 to 25.8.31	8.9.31
030 † <i>Franconia</i> ...	Gibbons, G., R.D., Capt., R.N.R.	W. M. Stewart, W. B. Tanner, R. Pollitt.	W.T.	Cunard ...	" " 2.7.31 to 30.7.31	14.8.31
<i>Freya</i> ...	Lamont, A. ...	W. Pirrie ...	No. A.	Scottish Fishery Bnd.	Form 911 17.6.31 to 29.6.31	6.7.31
159 ** <i>Gascoyne</i> ...	Johnson, L. ...	J. S. Macbryde, C. O. Melson, W. Uttley.	M.L.	A. Holt & Co. ...	Form 915 12.2.31 to 3.7.31	31.8.31
125 *† <i>Glenamoy, M.V.</i> ...	Ings, W. J. ...	F. Laycock, L. Eccles, A. C. Radley.	"	Glen Line ...	" 2.2.31 to 8.5.31	16.5.31
126 *† <i>Glengarry, M.V.</i> ...	Angier, J. ...	J. Tyler, J. W. Leslie, S. W. Bell.	No. M.	" ...	Forms 911 & 138 29.3.31 to 10.4.31	14.4.31
<i>Glenluce, M.V.</i> ...	Kennett, W. H. ...	J. A. Evans ...	" A.	" ...	Form 911 4.2.31 to 3.6.31	7.7.31
<i>Glenworth</i> ...	Aitchison, D. M. ...	A. Bone ...	" A.	R. S. Dalglish	" 18.5.31 to 28.5.31	4.6.31
085 *† <i>Governor</i> ...	Windsor, G. R. ...	A. Watson, J. Stanhope ...	" M.	Harrison ...	Forms 911 & 138 25.6.31 to 23.8.31	27.8.31
111 *† <i>Hardwicke Grange</i>	Fowler, W. H. ...	W. L. Baker, A. W. Seybold, W. E. Ellis.	" M.	Houlder ...	" " 27.4.31 to 30.6.31	8.7.31
<i>Harmonides</i> ...	Elwell, F. R. ...	L. Pogson, J. C. Robertson, J. MacLeod.	" A.	K. P. Houston ...	Form 911 22.7.31 to 28.8.31	10.9.31
262 ** <i>Hauraki, M.V.</i> {	Norton, A. T. ...	D. W. Blacklaws, D. McLeish, H. A. Brockett.	M.L.	Union S.S. Co., N.Z. ...	Form 915 8.12.30 to 16.7.31	28.9.31
<i>Hermintus</i> ...	Hender, W. ...	F. W. Gilroy ...	No. A.	Aberdeen Common-wealth.	Form 911 6.3.31 to 12.4.31	18.4.31
253 *† <i>Hertford</i> ...	Roberts, T. V., R.D., Lt.-Commr., R.N.R.	Burton Davies, J. ...	M.L.	Federal ...	Form 915 14.2.31 to 24.6.31	6.7.31
<i>Hibernia</i> ...	Williams, E. R. ...	P. M. Devitt.	"	" ...	" ...	"
182 † <i>Highland Brigade</i>	Lloyd, H. ...	C. A. Marsh ...	O.C.	L.M. & S. Railway ...	Telegraphic Report 1.9.31	1.9.31
<i>Highland Chieftain, M.V.</i>	Robinson, R. H. ...	W. J. Presland ...	No. M.	Nelson ...	Forms 911 & 138 31.5.31 to 22.7.31	25.7.31
099 † <i>Highland Monarch, M.V.</i>	Ashby Graves, F. ...	W. Stephen, N. Hersee, C. Morgan.	" M.	" ...	" " 16.7.31 to 1.9.31	4.9.31
250 † <i>Highland Princess, M.V.</i>	Collins, D. ...	R. Polden ...	" M.	" ...	" " 27.6.31 to 19.8.31	26.8.31
<i>Hilary</i> ...	Jones, W. C. H., R.D., Commr., R.N.R.	I. Shearer ...	" M.	" ...	" " 21.5.31 to 6.7.31	20.7.31
079 *† <i>Hildebrand</i> ...	Buck, R. H., R.D., Capt., R.N.R.	" ...	M.L.	Booth ...	" ...	"
075 *† <i>Hobson's Bay</i> ...	Roberts, T. V., R.D., Lt.-Commr., R.N.R.	F. H. Good ...	W.T.	" ...	Forms 911 & 138 19.7.31 to 24.8.31	1.9.31
054 † <i>Homeric</i> ...	Bulman, J. B. ...	J. Worrall, C. C. Good, C. Carroll.	M.L.	Aberdeen Common-wealth.	Form 915 4.2.31 to 10.5.31	22.6.31
<i>Hubert</i> ...	Briscoe, W. ...	H. G. Morgan, M. Bennett, W. Poustie.	W.T.	White Star ...	Forms 911 & 138 6.8.31 to 10.9.31	14.9.31
261 *† <i>Huntingdon</i> ...	Field, H. G. B. ...	R. Parry, G. G. Westhorp, L. A. Sterling.	M.L.	Booth ...	Form 915 17.5.31 to 25.7.31	28.7.31
200 *† <i>Huntsman</i> ...	Russell, H. ...	P. S. Calcutt, H. F. Wilkinson, M. T. D. Walter.	W.T.	Federal ...	Forms 911 & 138 26.4.31 to 15.8.31	27.8.31
289 *† <i>Inanda</i> ...	Gibbings, W. H. ...	J. Richardson, A. Brimms, D. H. Goddard.	No. M.	Harrison ...	Form 911 4.7.31 to 24.7.31	18.8.31
<i>Ingoma</i> ...	Richardson, R. ...	D. C. Brown, R. L. Williams	" M.	" ...	Forms 911 & 138 22.6.31 to 25.7.31	29.7.31
160 *† <i>Ixion</i> ...	Stewart, J. A. ...	D. Douglas Kerr ...	" M.	" ...	" " 18.7.31 to 22.8.31	29.8.31
<i>Jamaica Merchant</i>	Rach, L. G., R.D., Lt.-Commr., R.N.R.	G. L. Oldrich, W. H. Deans, F. G. Brown.	M.L.	A. Holt ...	Form 915 9.10.30 to 18.3.31	29.5.31
072 ** <i>Jamaica Planter</i> ...	Towell, W. C. ...	R. C. Vigurs, B. W. Smith, D. T. Sharrock.	"	Jamaica Direct Fruit	" 10.6.31 to 21.8.31	3.9.31
<i>Jamaica Producer</i> ...	Allen, P. D. ...	R. D. Willson ...	W.T.	" " ...	Forms 911 & 138 30.6.31 to 31.7.31	5.8.31
<i>Jamaica Settler</i> ...	Rodick, J. M. ...	H. C. Braine ...	No. A.	" " ...	Form 911 18.6.31 to 29.6.31	24.7.31
<i>Javanese Prince, M.V.</i>	Smith, J. ...	H. Davies ...	" A.	" " ...	" 16.7.31 to 19.8.31	19.8.31
187 *† <i>Jeypore</i> ...	Harris, W. L. ...	C. E. Edney ...	" A.	Prince ...	" 21.5.31 to 5.7.31	18.7.31
<i>Kaisar-i-Hind</i> ...	Headlam, P. C., R.D., Commr. R.N.R.	A. G. Edwards ...	" M.	P. & O. ...	Forms 911 & 138 28.6.31 to 28.7.31	7.8.31
189 *† <i>Kalyan</i> ...	Cooper, C. P., O.B.E., R.D., Capt. R.N.R.	T. T. Ferguson, H. Flint, L. Irons.	" M.	" ...	" " 12.4.31 to 19.5.31	30.5.31
041 *† <i>Karamea, M.V.</i> ...	Kenworthy, — ...	M. G. Morris ...	" M.	" ...	" " 7.6.31 to 17.7.31	4.8.31
217 *† <i>Karapara</i> ...	White, R. W. ...	N. S. Milne, C. Sendall, H. M. Clark.	M.L.	Shaw, Savill & Albion	Form 915 4.3.31 to 11.6.31	22.6.31
236 *† <i>Karmala</i> ...	McBride, — ...	J. B. Walker, D. R. Mackenzie	No. M.	British India ...	Forms 911 & 138 12.6.31 to 6.7.31	17.8.31
190 *† <i>Kashgar</i> ...	Sudell, F., R.D., Commr., R.N.R.	A. Storr ...	" M.	P. & O. ...	Forms 911 & 138 4.5.31 to 7.8.31	11.8.31
191 *† <i>Kashmir</i> ...	Axford, R. G. ...	R. P. Eddy ...	" M.	" ...	Forms 911 & 138 6.6.31 to 12.7.31	20.8.31
114 † <i>Kenya</i> ...	Miller, A. C. ...	Cadets — ...	" M.	" ...	" " 16.7.31 to 20.8.31	14.9.31
218 *† <i>Khandalla</i> ...	Baird, S. K. ...	R. Lord, A. Ralph, H. Evans	" M.	British India ...	" " 27.2.31 to 10.4.31	4.5.31
286 *† <i>Kidderpore</i> ...	Wright, C. S., R.D., Commr., R.N.R.	W. Gordon Jones ...	" M.	P. & O. ...	" " 13.3.31 to 26.5.31	24.6.31
169 ** <i>Kwanchow</i> ...	Stringer, C. B. L. ...	R. H. Hand ...	" M.	" ...	" ...	"
147 † <i>Laconia</i> ...	Hawkes, W. R. D., Capt. R.N.R.	B. C. Finch, E. J. Cox ...	M.L.	China Nav. Co. ...	Form 915 26.11.30 to 1.5.31	29.6.31
<i>Lagarto, M.V.</i>	Kirkwood, J. H. ...	J. D. Archer, R. V. Youd, M. Boston.	W.T.	Cunard ...	Forms 911 & 138 10.8.31 to 30.8.31	3.9.31
<i>Laguna, M.V.</i>	Dunn, R. E., O.B.E., R.D., Capt. R.N.R.	F. Grant ...	No. A.	Pacific S.N. Co. ...	Form 911 16.5.31 to 2.6.31	5.6.31
193 *† <i>Lahore</i> ...	Hollow, J. H. ...	W. Billington ...	" A.	P. & O. ...	Forms 911 & 138 29.3.31 to 20.6.31	24.6.31
<i>Lalande</i> ...	Symons, P. ...	J. G. K. Gregory, F. Hull, S. R. Eva.	" M.	" ...	Form 911 30.1.30 to 24.2.31	4.3.31
036 † <i>Lancastria</i> ...	Murchie, P. A., R.D., Capt., R.N.R.	C. Legg ...	" A.	Lampart & Holt	Forms 911 & 138 20.4.31 to 8.5.31	12.5.31
<i>Laomedon</i> ...	Davidson, T. W. ...	J. S. Glendenning, S. Trooman, N. Kingscote.	W.T.	Cunard ...	Form 911 30.6.31 to 17.7.31	23.7.31

LIST OF VOLUNTARY OBSERVING SHIPS

v

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 18.9.31.	Date Received.
082 *† <i>La Paz</i> , M.V. ...	Morgan, D. R. ...	R. W. Hanson, J. Sutherland G. Pattison.	No. M.	Pacific S.N. Co. ...	Forms 911 & 138 15.3.31 to 13.4.31	16.4.31
134 †† <i>Laplace</i> ...	Hickman, V. G. ...	N. R. Perons ...	" A.	Lamport & Holt ...	Form 911 10.2.31 to 4.5.31...	11.5.31
134 †† <i>Lapland</i> ...	Harvey, H. ...	W. Jenkins, J. Williams, H. Patterson.	W.T.	Red Star ...	Forms 911 & 138 26.6.31 to 16.9.31	18.9.31
076 *† <i>Largs Bay</i> ...	Jermyn, W. M. ...	F. B. Marsden ...	No. M.	Aberdeen Common-wealth.	" " 14.12.30 to 21.2.31	30.4.31
112 *† <i>La Rosarina</i> ...	Webb, C. ...	W. S. Hamblin... ..	" M.	Houlder ...	" " 22.3.31 to 14.5.31	22.5.31
064 †† <i>Lassell</i> ...	Lindsay, J. ...	P. Casey ...	" A.	Lamport & Holt ...	Form 911 11.2.31 to 6.5.31...	14.5.31
064 †† <i>Laurentie</i> ...	Hume, R. ...	C. Cochrane, R. Crangle, R. Conway.	W.T.	White Star ...	Forms 911 & 138 18.8.31 to 4.9.31	7.9.31
083 *† <i>Lautaro</i> , M.V. ...	Kite, E. ...	J. Lloyd Jones ...	No. M.	Pacific S.N. Co. ...	" " 22.5.31 to 10.6.31	29.6.31
251 *† <i>Limetick</i> ...	Molyneux, P. L. ...	J. Trotter, N. A. Thomas ...	" M.	Federal... ..	" " 7.6.31 to 20.7.31	7.9.31
093 *† <i>Llandaf Castle</i> ...	Attwood, J. ...	J. M. Goode ...	W.T.	Union Castle ...	" " 19.6.31 to 24.8.31	27.8.31
097 †† <i>Llangibby Castle</i> , M.V.	Nicholl, D. ...	H. S. Warren ...	"	" " ...	" " 25.4.31 to 26.6.31	17.7.31
094 *† <i>Llandovery Castle</i>	Morgan, A. O., R.D., Commr., R.N.R.	T. C. Goldstone, F. R. Pope, R. C. J. Hatt.	M.L.	" " ...	Form 915 1.5.31 to 5.7.31 ...	27.7.31
216 *† <i>Llanstephan Castle</i>	Bickford, C. N. ...	J. B. Duncan, G. H. Pickering, S. Smith.	W.T.	" " ...	Forms 911 & 138 28.6.31 to 28.8.31	3.9.31
084 *† <i>Lobos</i> , M.V. ...	Leyne, R. W. ...	R. H. Sissons ...	No. M.	Pacific S.N. Co. ...	" " 21.4.31 to 10.8.31	14.8.31
<i>Lochgott</i> , M.V. ...	Lochgott, M.V. ...	Schlanbusch, O. V. ...	" A.	" " ...	" " 21.4.31 to 10.8.31	14.8.31
<i>Loch Katrine</i> ...	Cocks, A., D.S.C., R.D. Captain, R.N.R.	J. E. Pardoe Matthews ...	" A.	" " ...	Form 911 24.12.30 to 21.3.31 ...	27.3.31
<i>Lochmonar</i> , M.V. ...	Purvis, A. ...	F. G. Dawson, A. Yeatman	" A.	" " ...	" " 26.1.31 to 24.4.31 ...	7.5.31
137 *† <i>Logician</i> ...	Herschel, R. J. ...	T. Winstanley, E. L. Stockley	" M.	Harrison ...	Forms 911 & 138 8.2.31 to 14.5.31	19.6.31
<i>London Citizen</i> ...	Westgarth, W. A. ...	H. Richardson ...	" A.	Furness Withy ...	" " 19.7.31 to 19.8.31 ...	22.8.31
<i>London Exchange</i> ...	Griffiths, J. ...	C. T. V. Rixham ...	" A.	" " ...	" " 15.6.31 to 6.7.31 ...	8.7.31
008 *† <i>Loriga</i> , M.V. ...	Grant, F. H. ...	J. D. Richards, W. Horsfall...	" A.	Pacific S.N. Co. ...	Forms 911 & 138 28.8.31 to 16.9.31	18.9.31
<i>Losada</i> ...	Clapham, E. C. ...	D. W. Hutchinson ...	" M.	" " ...	" " ...	"
013 *† <i>Macharda</i> ...	Hanna, R. G. ...	C. Lindsay Miller, C. Parry, G. A. Jackson.	No. M.	Brocklebank ...	Forms 911 & 138 1.7.31 to 17.7.31	10.8.31
232 *† <i>Madura</i> ...	Wright, J. A. ...	A. Usher, E. Roberts, T. R. Jackson	" M.	British India... ..	" " 2.8.31 to 25.8.31	18.9.31
078 *† <i>Magician</i> ...	Bury, E. R. ...	W. E. Shotton J. Johnson ...	" M.	Harrison ...	" " 18.5.31 to 14.9.31	17.9.31
141 *† <i>Mahia</i> ...	Andrews, C. M. ...	G. Sangwin, M. P. Congdon, J. Jackson.	W.T.	Shaw, Savill & Albion	" " 1.3.31 to 15.6.31	22.6.31
140 *† <i>Mahratta</i> ...	Williams, E. R. ...	T. C. Eddy, H. F. Scoins, A. McPhee.	No. M.	Brocklebank ...	" " 11.6.31 to 3.7.31	27.7.31
014 *† <i>Mahronda</i> ...	Sharpe, G. ...	W. Le Brocq ...	" M.	" " ...	" " 16.4.31 to 20.5.31	5.6.31
015 *† <i>Mahsud</i> ...	Kershaw, R. W. ...	S. Richardson, J. R. Paisley	" M.	" " ...	" " 20.5.31 to 6.8.31	14.9.31
016 *† <i>Maidan</i> ...	Ison, W. A. ...	F. Moore, F. L. Attwood, L. E. Jeans.	" M.	" " ...	" " 26.2.31 to 8.5.31	12.5.31
042 *† <i>Maimoa</i> ...	Johnson, J. W. ...	A. Winton, E. Sainsbury, D. O. V. Pickersgill.	M.L.	Shaw, Savill & Albion	Form 915 18.1.31 to 15.5.31 ...	19.5.31
<i>Mainyo</i> ...	Anderson, C. ...	O. Jones ...	No. A.	Brocklebank ...	Form 911 7.5.31 to 12.8.31	9.9.31
018 *† <i>Makalla</i> ...	Maughan, J. W. ...	E. Williams ...	" M.	" " ...	Forms 911 & 138 4.1.31 to 1.4.31	7.4.31
225 ** <i>Makura</i> ...	Spring Brown, J. F. ...	A. P. Cousin, S. H. Crawford, A. H. Morgan.	M.L.	Canadian- Australasian	Form 915 24.12.30 to 12.4.31 ...	9.7.31
019 *† <i>Malakuta</i> ...	Martin, W. J. ...	H. Simpson ...	No. M.	Brocklebank ...	Forms 911 & 138 26.11.30 to 4.3.31	1.4.31
020 *† <i>Malancha</i> ...	Adamson, F. L. ...	R. Humble, J. H. Chadwick, M. Mackenzie.	" M.	" " ...	" " 6.6.31 to 6.7.31	4.8.31
219 *† <i>Maida</i> ...	Denne, G. H. A. ...	D. Lattin, K. Male, W. Hurst	" M.	British India ...	Form 138 2.6.31 to 9.7.31 ...	17.9.31
195 †† <i>Maloja</i> ...	Browning, J. B. ...	R. E. Baldwin - Wiseman, C. H. Hand, G. R. Peters.	" M.	P. & O. ...	Forms 911 & 138 29.4.31 to 12.6.31	15.6.31
196 †† <i>Malwa</i> ...	R.D., Commr. R.N.R. Townshend, W. P. ...	P. G. Lawrence... ..	" M.	" " ...	" " 26.4.31 to 18.6.31	25.6.31
053 *† <i>Manaar</i> ...	R.D., Capt. R.N.R. Thowless, E. ...	A. L. Harrop, J. Robinson, R. G. Widdon.	" M.	Brocklebank ...	" " 7.5.31 to 25.5.31	24.6.31
<i>Manchester Brigade</i>	Stott, C. H. ...	E. E. Bonnaud, J. Eccles, W. E. Hardman.	M.L.	Manchester Liners...	Form 915 14.3.31 to 1.8.31 ...	10.8.31
<i>Manchester Hero</i> ...	Mitchell, G. M. ...	R. O. Jones ...	No. M.	" " ...	Form 911 11.11.30 to 16.12.30 ...	1.1.31
028 †† <i>Mandala</i> ...	Kinnear, A. D. ...	W. E. F. Powell ...	" M.	British India... ..	Forms 911 & 138 24.3.31 to 12.6.31	16.6.31
146 *† <i>Mandasor</i> ...	Longhurst, J. H. ...	F. C. Madden, T. S. Cullen, J. Alexander.	" M.	Brocklebank ...	" " 15.6.31 to 15.7.31	21.7.31
220 *† <i>Manela</i> ...	Richardson, T. ...	W. F. Solly, T. M. Robertson, F. C. Conolly.	" M.	British India ...	" " 9.8.31 to 25.8.31	7.9.31
022 *† <i>Manipur</i> ...	Maples, S. H. ...	L. F. Dodson R. Penston, A. Hill.	" M.	Brocklebank ...	" " 4.7.31 to 16.7.31	10.8.31
221 *† <i>Manora</i> ...	Cochran, G. N. ...	W. Brawn, F. Scott, J. Toms	" M.	British India... ..	" " 21.6.31 to 19.7.31	5.8.31
177 *† <i>Mantola</i> ...	Hudson, H. T., R.D., Commr., R.N.R.	M. Sharp, S. Henderson, R. H. Ayres.	" M.	" " ...	" " 6.6.31 to 21.8.31	9.9.31
197 †† <i>Mantua</i> ...	James, D. F. ...	J. D. Homidge ...	W.T.-M.	P. & O. ...	" " 9.8.31 to 21.8.31	14.9.31
299 ** <i>Marella</i> ...	Hignett, R.D., Commr. R.N.R.	A. W. Blane, D. Pemberton, A. G. W. Thomas.	M.L.	Burns Philp ...	Form 915 31.12.30 to 28.5.31 ...	3.9.31
<i>Marengo</i> ...	Donaldson, A. ...	H. Bryan, G. W. Revell, W. L. Hepson, F. Brown, Sibree, J. S. ...	"	Ellerman Wilson ...	" " 21.10.30 to 16.3.31 ...	19.3.31
222 †† <i>Margha</i> ...	Aspinall, A. E. ...	C. Newton, J. E. Dobson.	W.T.	" " ...	" " 19.4.31 to 12.7.31 ...	16.7.31
104 *† <i>Marquesa</i> ...	Bean, A. ...	P. Wright, H. Watkins ...	No. M.	British India... ..	Forms 911 & 138 25.5.31 to 31.7.31	6.8.31
021 *† <i>Masula</i> ...	Hemmings, W. H. ...	J. Wetherall ...	" M.	Furness Houlder ...	" " 7.7.31 to 6.8.31	31.8.31
<i>Matakana</i> ...	Smiles, R. S. ...	J. E. Jones, H. O'Donahoe	" A.	British India ...	" " ...	"
044 †† <i>Mataroa</i> ...	Fitt, W. A. ...	J. G. Allen ...	M.L.	Shaw, Savill & Albion	Form 915 3.1.31 to 12.4.31 ...	18.4.31
023 *† <i>Matheran</i> ...	Gordon, H. ...	F. Eadon, H. A. Hill, F. C. Charney.	No. M.	" " ...	Forms 911 & 138 16.7.31 to 2.8.31	24.8.31
223 *† <i>Matiana</i> ...	Kershaw, W. A. R. ...	S. S. Slade, J. F. Butterworth, W. Cowrie.	" M.	Brocklebank ...	" " 30.8.31 to 10.9.31	19.9.31
024 *† <i>Matra</i> ...	Green, F. V. ...	L. A. Bunn, H. Dean, P. M. Wilson.	" M.	British India... ..	" " 30.3.31 to 17.6.31	30.6.31
032 †† <i>Mauretania</i> ...	Cornish, N. P. ...	C. Shaw, W. Robertson, J. G. Nuttall.	W.T.	Brocklebank ...	" " 2.8.31 to 7.9.31	9.9.31
<i>Mercian</i> ...	Peel, R. V., R.D., Capt., R.N.R.	R. H. C. Crawford, H. V. Clarke, G. Duguid.	No. A.	Cunard... ..	Form 911 14.3.31 to 26.5.31 ...	29.5.31
270 *† <i>Minderoo</i> ...	Manning, C. H. ...	F. P. Sheerbad ...	" M.	Leyland ...	" " 10.5.31 to 20.7.31	24.8.31
<i>Minna</i> ...	Macphedran W. J. ...	" " ...	" M.	Western Australian S.N. Co.	" " 18.8.31 to 14.9.31	18.9.31
068 †† <i>Minnetonka</i> ...	Mackenzie, G. G. ...	A. M. Campbell ...	" M.	Scottish Fishery Brd.	Forms 911 & 138 3.8.31 to 23.8.31	26.8.31
069 †† <i>Minnewaska</i> ...	Gates, T. F., C.B.E. ...	H. E. D. McCartney, W. S. Harrison, T. W. Pullan.	W.T.-M.	Atlantic Transport...	" " 17.8.31 to 5.9.31	8.9.31
<i>Mississippi</i> , M.V. ...	Claret, F. H., C.B.E., Commr., R.N.R.	E. Pengelly, D. Davies, F. Mummery.	No. A.	" " ...	Form 911 10.2.31 to 26.3.31 ...	2.4.31
224 *† <i>Modasa</i> ...	Finch, E. ...	A. C. Clay ...	" M.	British India ...	Forms 911 & 138 18.3.31 to 1.6.31...	6.6.31
194 †† <i>Moldavia</i> ...	Gilchrist, J. W. ...	W. Ascroft, H. C. Pearson	" M.	P. & O. ...	Forms 911 & 138 8.8.31 to 17.8.31	31.8.31
199 †† <i>Mongolia</i> ...	Allen, C. H. ...	T. E. Heath ...	" M.	" " ...	Form 915 22.1.31 to 9.5.31	4.8.31
260 †† <i>Monewai</i> ...	Rhodes, H. R. ...	H. Lee ...	M.L.	Union S.S. of N.Z. ...	" " ...	"
	Toten, A. T. ...	L. B. Elhert, T. W. Gibson, L. J. Drew.				

Name of Vessel.	Captain.	Observing Officers	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed Received up to 18.9.31.	Date Received.
148 †† <i>Montcalm</i>	Rothwell, A.	T. L. Gillette, A. Mackie	W.T.-M	Canadian Pacific ..	Forms 911 & 138 20.8.31 to 10.9.31	14.9.31
149 †† <i>Montclare</i>	Carr-Jones, D. J.	A. Watt, J. Sharples, J. Soames,	W.T.	" " "	" " 28.6.31 to 13.8.31	22.8.31
150 †† <i>Montrose</i>	Dott, J. F.	K. Hutchings, E. A. Shergold, L. L. Thornton.	"	" " "	" " 1.8.31 to 20.8.31 ...	24.8.31
164 †† <i>Mooltan</i>	Morton, A. J.	R. M. Richardson, J. L. Dunkley, A. D. Dennis.	No. M.	P. & O.	" " 31.5.31 to 3.9.31	17.9.31
228 †† <i>Mulbera</i>	Caffyn, F.	H. C. Martin, G. B. Adams ...	" M.	British India	" " 19.7.31 to 22.8.31	25.8.31
290 *† <i>Musician</i>	Bostock, O.	K. H. Davies, H. Philpott, S. H. Diamond.	" M.	Harrison	" " 9.5.31 to 26.7.31	28.7.31
073 *† <i>Nagara</i>	Cocks, A.	R. L. Matheson... ..	" M.	R.M.S.P. Co	Forms 911 & 138 7.6.31 to 30.7.31	7.8.31
201 †† <i>Naldera</i>	Harrison, R., D.S.O., R.D., Capt. R.N.R.	H. J. Mann, G. D. Copeland, L. J. Brown.	W.T.	P. & O.	Form 915 4.4.31 to 8.7.31 ...	14.7.31
227 *† <i>Nardana</i>	Reilly, J. V.	L. D. Macfadyen, H. Goater, H. Grace.	M.L.	British India	" " 25.4.31 to 21.8.31 ...	24.8.31
118 ** <i>Narenta</i>	Claydon, R.G., D.S.C.	J. Smith, C. K. Brown, M. A. Murch.	No. M.	R.M.S.P. Co.	Forms 911 & 138 15.5.31 to 12.8.31	19.8.31
202 †† <i>Narkunda</i>	Biggs, J. H., R.D. Commr., R.N.R.	C.H. Moulton, J. C. Davies,	" M.	P. & O.	" " 26.6.31 to 6.8.31 ...	8.8.31
<i>Navasota</i>	Miles, A. G.	F. G. Dawson, J. T. Pardoe, Matthews.	" A.	R.M.S.P. Co.	Form 911 5.7.31 to 27.8.31	2.9.31
305 *† <i>Nebraska</i>	Falconer, A. C.	H. D. Bowker, H. Collinson, P. R. Cooks.	" M.	" "	Forms 911 & 138 10.8.31 to 4.9.31	8.9.31
203 †† <i>Nellore</i>	Diamond, L. S.	J. F. M. Heddle, H. E. Skinner, M.B.	M.L.	E. & A. S.S. Co.	Form 915 1.5.31 to 27.7.31 ...	17.9.31
162 *† <i>Nestor</i>	Adcock, F.	Nuzum, J. W. Kavanagh, W. T. Harris, P. Elder, W. Pearse.	"	A. Holt	" " 4.1.31 to 8.5.31 ..	23.5.31
<i>Newfoundland</i>	Foxworthy, A. W.	R. F. Handley, E. Sainty, J. L. Macklin.	"	Furness Withy	" " 13.2.31 to 5.8.31 ...	12.8.31
210 ** <i>Niagara</i>	Hill, T. V.	G. H. Kime, D. A. Menlove L. P. Bourke.	"	Canadian-Australasian	" " 5.3.31 to 24.4.31 ...	2.8.31
<i>Ningchow</i>	Ewan, W. B.	E. Butler	No. A.	A. Holt... ..	Form 911 1.8.31 to 2.9.31 ...	17.9.31
256 *† <i>Norfolk</i>	Howell - Price, J., D.S.O., D.S.C.	G. C. Hocart, H. Cockerell, H. Dash.	M.L.	Federal	Form 915 4.4.31 to 11.7.31 ...	21.7.31
<i>Norna</i>	Angus, W.	T. R. Ness	No. A.	Scottish Fishery Brd	Form 911 6.8.31 to 1.9.31	14.9.31
297 *† <i>Northumberland</i>	Upton, H. L., D.S.C. R.D., Commr., R.N.R.	H. Rogers, G. B. Cathie, H. I. Phillips.	" M.	Federal... ..	Forms 911 & 138 24.4.31 to 9.8.31...	13.8.31
267 *† <i>Novara</i>	Dene, R. C.	N. W. Leach	" M.	P. & O.	" " 22.6.31 to 14.8.31 ...	5.9.31
<i>Nova Scotia</i>	Furieux, S. J.	J. E. Wilson, A. Hender, N. Forsythe.	M.L.	Furness Withy	Form 915 8.10.30 to 12.3.31 ...	20.3.31
230 *† <i>Nowshera</i>	Longhurst, J. H.	R. Burch, B. H. Bentall	No. M.	British India	Forms 911 & 138 18.1.31 to 29.1.31	11.5.31
231 *† <i>Nuddea</i>	Beeching, P. H.	D. A. Jones, W. Monk, W. G. Pitcher.	" M.	" "	" " 16.4.31 to 7.6.31 ...	13.7.31
243 *† <i>Opawa</i>	Robinson, F. W.	J. W. Pring	" M.	New Zealand S.S. Co.	" " " 25.5.31 ...	"
170 †† <i>Orama</i>	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	E. V. Bilger, W. Eliot, R. W. Roberts.	W.T.	Orient	Forms 911 & 138 25.5.31 to 25.8.31	3.9.31
<i>Orantan</i>	Gittings, R. P.	H. O. Quinn	No. A.	Leyland	Form 911 26.11.30 to 17.1.31 ...	29.1.31
011 †† <i>Orbita</i>	Ross, J.	J. S. Wardman	W.T.-M.	Pacific S.N. Co.	Forms 911 & 138 26.5.31 to 29.7.31	4.8.31
086 †† <i>Oreonia</i>	Benson, E. W.	W. J. Rutter, G. H. Pilling.	"	" " " "	" " 10.3.31 to 18.5.31...	28.5.31
087 †† <i>Orduna</i>	Ridyard, A., O.B.E....	T. J. Naylor, R. F. A. Cox, E. B. James.	"	" " " "	" " 10.1.31 to 23.3.31	2.4.31
258 *† <i>Oregon Star</i>	Lewis, G.	E. T. Blaxland	No. M.	Blue Star	" " " "	"
171 †† <i>Orford</i>	Owens, A. L., Commr. R.D., R.N.R.	B. W. Gorman, B. H. Jones, C. H. Denton.	" M.	Orient	Forms 911 & 138 17.2.30 to 16.5.31	9.5.31
174 †† <i>Ormonde</i>	James, L. V., D.S.C.	T. L. Shurrock, N. Smith, C. Blake.	W.T.	" " " "	" " 29.3.31 to 1.7.31	9.7.31
172 †† <i>Oronsay</i>	Cameron, E. P. R.D., Commr., R.N.R.	E. M. Mackay, D. Madeley	"	" " " "	" " 3.5.31 to 25.5.31	4.6.31
173 †† <i>Orontes</i>	O'Sullivan, F. R.	J. M. Swanson ..	No. M.	" " " "	" " 19.5.31 to 7.6.31	13.6.31
105 †† <i>Orsova</i>	Thorne, G. G., R.D. Commr., R.N.R.	R. B. Stannard	W.T.	" " " "	" " 27.4.31 to 26.6.31	5.8.31
<i>Otaki</i>	Maitby, T. L.	A. V. Pearce, N. Baddeley, J. H. Underwood.	M.L.	New Zealand S.S. Co.	Form 915 31.8.30 to 6.2.31 ...	17.2.31
156 †† <i>Otranto</i>	Staunton, H. G., C.B.E. R. D. Commr., R.N.R.	A. E. Coles	W.T.-M.	Orient	" " " "	"
287 *† <i>Pacific Enterprise</i> , M.V.	Newman, G. W. A....	C. G. White	M.L.	Furness Withy ...	Form 911 9.4.31 to 1.7.31 ...	16.7.31
279 *† <i>Pacific Exporter</i>	Holland, C. E., R.D., Commr., R.N.R.	A. L. Knapp	W.T.	" " " "	Forms 911 & 138 13.3.31 to 4.6.31	8.6.31
<i>Pacific Shipper</i> , M.V.	Goodwin, J.	S. Porter	No. A.	" " " "	Form 911 24.2.31 to 28.5.31 ...	2.6.31
<i>Panacea</i>	Barlow, F. P.	L. A. Sayers, S. Adams	M.L.	Booth ... " " "	Form 915 9.2.31 to 16.7.31	29.7.31
<i>Paris</i>	Hill, A.	T. Mahoney	C.C.	Southern Ry.	Telegraphic Report. 20.8.31 ...	20.8.31
<i>Patia</i>	Sapsworth, S. A.	R. O. Laycock, R. S. Howlett.	No. A.	Elders & Fyfes	Form 911 23.7.31 to 22.8.31 ...	26.8.31
<i>Patrician</i>	Low, J.	W. E. Williams... ..	" M.	Harrison	" " " " " "	"
<i>Paisander</i>	Findlay, J.	C. T. Morgan	" A.	A. Holt... ..	Form 911 3.2.31 to 23.4.31 ...	12.5.31
058 †† <i>Penrland</i>	Making, V. L.	J. Mackie, C. Otterson, J. Cross	W.T.	Red Star	Forms 911 & 138 2.8.31 to 22.8.31	24.8.31
204 *† <i>Peshavair</i>	McBryde, A. M.	D. Meikle, J. T. Sheffield, T. E. Wrigley.	M.L.	P. & O.	Form 915 1.2.31 to 16.6.31 ...	24.6.31
238 *† <i>Plako</i>	Aslin, E. P. C.	A. D. Wilson, A. W. Marshall R. H. Carter.	No. M	New Zealand S.S. Co.	Forms 911 & 138 11.6.31 to 30.7.31	13.8.31
039 *† <i>Planter</i>	Packe, M. G.	W. S. Eustance, J. J. Devereux, W. H. Slaughter.	"	Harrison	Forms 911 & 138 2.6.31 to 2.8.31	13.8.31
040 *† <i>Port Adelaide</i>	Williams, R.	F. W. Elger	W.T.	Commonwealth & Dominion.	" " " " " "	"
255 *† <i>Port Alma</i>	Hayter, S. W....	G. Dean	M.L.	" " " " " "	" " " " " "	"
128 *† " <i>Auckland</i>	Kippins, T.	R. Forrest, A. Brown, E. Mickleburgh.	"	" " " " " "	Form 915 14.1.31 to 16.5.31 ...	27.5.31
268 *† " <i>Bowen</i>	Brown, A. H.	F. R. Gorman	"	" " " " " "	Form 911 3.1.31 to 28.4.31...	5.5.31
129 *† " <i>Campbell</i>	Gregory, S. E. A.	J. C. Goddard, N. M. Muzzell, C. Midwinter.	"	" " " " " "	Form 915 8.3.31 to 18.7.31 ...	23.7.31
136 *† " <i>Caroline</i>	Hearn, G. W....	V. G. Battle, E. W. R. Young, R. E. Garner.	"	" " " " " "	" " 16.12.30 to 23.4.31 ...	1.5.31
131 *† " <i>Darwin</i>	Hudson, J. J.	K. D. Morgan, W. R. Johnson, L. C. Asser.	"	" " " " " "	" " 5.5.31 to 27.8.31 ...	11.9.31
132 ** " <i>Denison</i>	Hall, G. S.	A. G. Newbury, R. A. Holloway, H. Duckling.	"	" " " " " "	" " 23.4.31 to 26.8.31 ...	3.9.31

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Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log. Register, or Record Contributed. Received up to 18.9.31.	Date Received.
133 *† Port Dunedin, M.V.	Mason, W. S., D.S.C.	H. M. Post, C. A. Hodson, R. W. Chamberlain.	M.L.	Commonwealth and Dominion.	Form 915, 15.5.31 to 1.9.31 ...	7.9.31
176 *† Fremantle, M.V.	Gilling, W. ...	A. Naismith ...	No. A.	" " "	Form 911 6.6.31 to 12.7.31 ...	26.8.31
135 *† Gisborne, M.V.	Higgs, W. G. ...	G. T. C. Harris, C. R. Townsend, P. A. Munday.	M.L.	" " "	Form 615 13.3.31 to 20.5.31 ...	27.5.31
106 *† Wellington ...	Jones, C. N. ...	W. B. Hopkins ...	No. A.	" " "	Form 911 6.4.31 to 13.7.31 ...	26.8.31
163 *† Princesa ...	Friend, A. B. ...	F. Poulson, E. Loughed, O. Sheard.	" M.	Houlder " ...	Forms 911 & 138 5.7.31 to 10.9.31	14.9.31
163 *† Proteus ...	Holden, W. R. F. ...	J. Cooper, J. Holden, H. N. Hardie.	M.L.	A. Holt ...	Form 915 10.12.30 to 9.5.31 ...	31.8.31
Pyrrhus ...	Wilkinson, T. G. ...	J. C. Podmore ...	No. A.	" ...	Form 911 9.6.31 to 27.7.31 ...	28.7.31
205 †† Rajputana ...	Jask, H. M. ...	G. A. Wild, D. Buckley, H. V. Williamson.	" M.	P. & O. ...	Form 911 & 138 22.2.31 to 28.5.31	8.6.31
063 *† Rancher ...	McCullum, J. ...	G. Harvey, C. F. Minshall, A. L. Lewis.	" M.	Harrison ...	" " 30.4.31 to 3.6.31	6.6.31
228 †† Ranchi ...	Hartley, J. W. ...	T. A. Sergeant, H. E. Holt ...	" M.	P. & O. ...	" " 8.8.31 to 27.8.31	29.8.31
236 †† Rangitane M.V. ...	Holland, E. ...	A. Brown, R. C. Aldridge, C. J. P. Guille.	M.L.	New Zealand S.S. Co.	Form 915 13.2.31 to 28.5.31 ...	2.6.31
257 †† Rangitana M.V. ...	Hunter, J. L. B. ...	J. Oxnard, D. Chadwick, S. Leggett.	W.T.-M.	" " "	Forms 911 & 138 17.1.31 to 29.4.31	16.5.31
240 †† Rangitiki M.V. ...	Barnett, H. ...	H. Hill, L. F. Maccouronne, C. Crutenden.	"	" " "	" " 13.4.31 to 21.7.31	28.7.31
207 †† Ranpura ...	Furlong, G. H. S. ...	G. M. MacLean, R. A. Perry	No. M.	P. & O. ...	" " 18.4.31 to 21.7.31	28.7.31
071 †† Rawalpindi ...	Stringer, O.B.E., R.D., Commr., R.N.R.	H. J. M. Perry, F. G. Davies, D. West.	W.T.-M.	" ...	" " 8.6.31 to 19.8.31	22.8.31
247 *† Recorder ...	Egerton, J. J. ...	G. Morrice ...	No. M.	Harrison ...	" " 24.1.31 to 30.4.31	8.5.31
306 *† Reina del Pacifico, M.V.	Roberts, E. ...	W. A. Hearle, R. Bridson, J. K. Campbell.	" M.	Pacific S.N. Co. ...	" " 23.6.31 to 12.8.31	19.8.31
239 *† Remuera ...	Wilde, H. J. ...	A. J. Angell, J. R. Vincent, H. N. Lawson.	M.L.	New Zealand S.S. Co.	Form 915 13.3.31 to 26.6.31 ...	4.7.31
Rhexenor ...	Stout, G. L. ...	J. S. Parry ...	No. A.	A. Holt... ..	Form 911 1.6.31 to 26.6.31... ..	11.8.31
Rhodesian Trans- port.	Bowen, A. C. ...	H. S. Butler ...	" A.	Houlder Bros. ...	" " 5.4.31 to 5.7.31 ...	20.7.31
Ripley Castle ...	Goodacre, R. W. ...	J. A. Ferguson ...	" A.	Union Castle ...	" " 10.3.31 to 31.3.31 ...	8.4.31
Ross, S.T. ...	Johnson, H. ...	" ...	" A.	W. Grant & Sons ...	" " 3.1.31 to 29.8.31 ...	1.9.31
Rother ...	Woodhead, T. H. ...	T. V. Robinson ...	" A.	Goole Steam Shipping ...	Form 911 7.8.31 to 29.8.31 ...	1.9.31
241 *† Rotorua ...	Lamb, C. B. ...	L. W. Fulcher, K. L. Jones, J. G. Gould.	M.L.	New Zealand S.S. Co.	Form 915 3.4.31 to 22.7.31 ...	29.7.31
062 *† Royal Star... ..	Walsh, W. ...	A. F. Day, J. Hoggin ...	"	Blue Star ...	Forms 911 & 138 16.12.30 to 10.3.31	18.3.31
246 *† Ruahine ...	Maltby, T. L. ...	A. Hocken, R. Warren, L. Mercer.	W.T.	New Zealand S.S. Co.	" " 7.5.31 to 22.8.31	24.8.31
St. Helier ...	Pitman, R. ...	A. C. Ricketts ...	C.C.	G.W. Railway ...	Telegraphic Report 28.8.31 ...	28.8.31
St. Julien ...	Richardson, L. ...	A. E. Ricketts, H. D. Freeman.	"	" " ...	" " 17.9.31 ...	17.9.31
St. Minver, S.T. ...	Hatton, A. ...	" ...	No. A.	Crampton Steam Fishing Co. ...	" " ...	"
St. Patrick ...	" ...	F. E. Martin ...	C.C.	G. W. Railway ...	Telegraphic Report 15.9.31 ...	15.9.31
038 †† Samaria ...	Malin, R. G., Lt.-Commr., R.N.R.	A. MacKellar, F. G. Watts, J. A. Myles.	W.T.	Cunard ...	Forms 911 & 138 1.8.31 to 22.8.31...	26.8.31
Saxon ...	Jackson, C. R. ...	A. H. D. Cambridge ...	No. A.	Union Castle ...	Form 911 10.4.31 to 1.6.31... ..	9.6.31
291 *† Scholar ...	Peterkin, A. G. ...	J. Richardson, A. Robertson	" M.	Harrison ...	Forms 911 & 138 20.3.31 to 24.5.31	2.6.31
033 †† Seythia ...	O'Neill, J. ...	W. H. Hughes ...	C.O.	L.M. & S. Railway ...	Telegraphic Report 18.9.31	18.9.31
211 *† Shropshire, M.V. ...	Oram, B. B., R.D., Commr., R.N.R.	F. P. Collins, A. Bridgewater, H. L. Pryse.	W.T.	Cunard ...	Forms 911 & 138 27.7.31 to 13.9.31	16.9.31
Silksworth ...	English, G. L. ...	C. F. Hicks, E. W. Jefferies, D. Hetherington.	"	Bibby ...	Form 915 18.4.31 to 27.6.31 ...	1.7.31
277 *† Spero ...	Blacklock, G. ...	F. J. Mullett ...	No. A.	R. S. Dalgleish ...	Form 911 1.8.31 to 15.8.31 ...	24.8.31
Stephen ...	" ...	C. Edgecombe ...	" A.	Federal ...	" " ...	"
259 *† Surrey ...	Montgomery, H. ...	H. W. Vickers, A. Kirk	M.L.	Ellerman Wilson ...	Form 915 3.1.31 to 21.3.31... ..	27.3.31
Sylvafield, M.V.	Jones, W. C. H., R.D., Commr., R.N.R.	J. Whayman, G. H. Daniels	"	Booth ...	" " 25.1.31 to 3.6.31 ...	17.6.31
Tacoma City ...	Lettington, A. E. ...	R. Rees, D. J. Murray, — Lock, — MacRillican.	"	Federal... ..	" " 24.11.30 to 7.4.31 ...	15.4.31
229 *† Tactician ...	MacDonald, W. ...	J. Johnson ...	No. A.	Hunting & Son ...	Form 911 8.7.31 to 15.8.31 ...	22.8.31
045 †† Talnu ...	Paul, H. ...	H. Small ...	" A.	Reardon Smith ...	" " ...	"
081 *† Talroa ...	Trinick, F., O.B.E. ...	E. P. Simmons ...	" M.	Harrison ...	" " ...	"
234 *† Talma ...	McIntosh, A. ...	G. A. Harvey, E. Baker, A. G. Collins.	M.L.	Shaw, Savill & Albion	Form 915 30.1.31 to 15.5.31 ...	25.5.31
046 †† Tamaroa ...	Christie, D. ...	M.H. Vincent, T.G. Hardy, R. Potter.	W.T.-M.	British India ...	Forms 911 26.12.30 to 3.5.31 ...	8.6.31
264 *† Tarda ...	Harley, G. J. ...	L. R. Bull, R. R. Roseman, F. Lutyan.	"	Shaw, Savill & Albion	Forms 911 & 138 18.5.31 to 7.6.31...	13.6.31
165 *† Tantalus, M.V. ...	Hartman, W. H. ...	R. Lloyd-Harry, G. C. Smith, B. M. Dun.	M.L.	E. & A. S.S. Co. ...	Form 915 28.2.31 to 28.5.31 ...	23.7.31
047 *† Taranaki, M.V. ...	Pilcher, E. T., Lt.-Commr., R.N.R.	A. C. H. Jones, J. J. Daniell, W. C. Angus.	"	A. Holt ...	" " 2.2.31 to 4.6.31 ...	25.6.31
Tarantia ...	Melling, C. F. ...	R. K. Bolton, R. Bitmead, S. P. Wallis.	M.L.	Shaw, Savill & Albion	Form 915 11.4.31 to 7.7.31 ...	14.7.31
Tasmania ...	Wood, C., D.S.C.	J. M. Cherry ...	No. A.	Anchor ...	Form 911 24.6.31 to 15.7.31 ...	5.8.31
Tetrestas ...	Caithness, J. B. ...	R. J. Coffey ...	" A.	New Zealand S.S. Co. ...	" " 2.12.30 to 2.5.31 ...	8.5.31
Telamon ...	Williams, J. V. ...	F. Stott ...	" A.	A. Holt & Co. ...	" " 18.3.31 to 6.6.31 ...	10.6.31
Tetela ...	Wilkinson, W. H. ...	G. Edge ...	" A.	A. Holt ...	" " 26.10.30 to 23.11.30 ...	10.12.30
Teucer ...	Brown, R. ...	E. K. Horrocks, J. D. Pater- son, J. W. Tone.	" A.	Elders & Fyffes ...	" " 27.7.31 to 29.8.31 ...	4.9.31
048 †† Themistocles ...	Brice, E. H. ...	C. C. L'Estrange ...	W.T. M.	A. Holt ...	" " 26.4.31 to 15.8.31 ...	24.8.31
007 *† Thistlelglen ...	Davies, J. ...	" ...	"	Aberdeen Common- wealth.	" " ...	"
235 *† Tilava ...	Young, A. D. ...	" ...	"	Allan Black & Co. ...	Form 915 12.2.31 to 14.5.31 ...	18.5.31
168 *† Tinhow ...	Whitfield, G.A., O.B.E.	S. B. Davis, H. B. Meek, G. L. Hetherington.	M.L.	British India... ..	Form 911 28.6.31 to 22.8.31 ...	14.9.31
161 *† Titan ...	Coleborn, E. ...	E. Cullerne, F. Haigh, J. W. Walker.	No. M.	A. Weir & Co. ...	Forms 911 & 138 12.4.30 to 5.7.31	17.8.31
244 *† Tongariro ...	Scobie, A. ...	G. W. Seth, P. Aydon, C. H. Smith.	"	A. Holt ...	Form 915 27.10.30 to 24.3.31 ...	2.4.31
	Elford, W. J. ...	F. B. Smith, A. K. Sanderson, J. Gould.	M.L.	New Zealand S.S. Co.	" " 22.2.31 to 17.6.31 ...	24.6.31

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 18.9.31.	Date Received
025 †† <i>Transylvania</i> ...	Bone, D. W. ...	A. Middleton J. A. Lefevre, T. Greene.	W.T.	Anchor ...	Forms 911 & 138 20.6.31 to 10.7.31	13.7.31
288 *† <i>Traveller</i> ...	Barrow, W. T. C. ...	R. Ledger ...	No. M.	Harrison ...	" " 4.6.30 to 14.8.31	24.8.31
<i>Trecarrell</i> ...	Old, E. G. ...	W. E. McEwan, G. A. Solly	" A.	Hain S.S. Co. ...	Form 911 26.3.31 to 29.4.31	19.5.31
242 *† <i>Trematon</i> ...	Cundy, F. ...	J. Jenkyn, C. M. Quick, T. M. Meakin.	M.L.	" " ...	" " ...	"
119 *† <i>Trojan Star</i> ...	Griffin, G. A. ...	A. Emerson, L. S. Hassell ...	No. M.	Blue Star ...	Forms 911 & 138 14.6.31 to 30.8.31	4.9.31
245 *† <i>Turakina</i> ...	Laird J. ...	A. Weatherall E. G. Williams J. Reeve.	" M.	New Zealand S.S. Co.	" " 4.3.31 to 12.6.31	17.6.31
276 †† <i>Tuscania</i> ...	Rome, W. B. ...	D. Blair, G. Noble, E. Richardson.	W.T.	Anchor... ..	" " 16.8.31 to 8.9.31	10.9.31
167 *† <i>Tyndareus</i> ...	McClure, W ...	J. R. C. Evans. W. F. Lockheed, E. B. Sandon.	M.L.	A. Holt ...	Form 915 23.12.30 to 25.5.31	4.7.31
<i>Uffington Court</i> ...	Clarke, E. J ...	T. Glover ...	No. A.	Haldin & Co. ...	Form 911 25.3.31 to 8.6.31	23.6.31
113 *† <i>Upwey Grange, M.V.</i>	Goodrick, H. P. ...	A. Bradbury, G. T. Hurst, P. J. Walker.	" M.	Houlder ...	Forms 911 & 138 8.6.31 to 12.8.31	18.8.31
292 †† <i>Viceroy of India</i> ...	Thornton, E. J. R.D., Capt., R.N.R.	W. R. B. Noall, C. S. Cooke	" M.	P. & O. ...	" " 2.8.31 to 25.8.31...	5.9.31
<i>Vigilant</i> ...	Simpson, E. S. S ...	J. Wilson ...	" A.	Scottish Fishery Brd.	Form 911 1.8.31 to 25.8.31	2.9.31
206 ** <i>Waioapu</i> ...	Hender, W. H. ...	J. E. Warwick D. Williams, A. H. Dunnings.	" M.	Union S.S. Co. of N.Z.	" 16.11.30 to 10.12.30	28.1.31
263 ** <i>Wairuna</i> ...	Stewart, A. R. ...	J. E. Warwick D. Williams, A. H. Dunnings.	M.L.	" "	Form 915 18.2.31 to 23.6.31	3.9.31
<i>Warfield</i> ...	Steele, R. ...	J. Gunning ...	No. A.	" "	Form 911 7.6.31 to 17.6.31	20.7.31
005 †† <i>Warwick Castle</i> ...	Owens, G. ...	P. Clissold ...	W.T.	Union Castle "	Forms 911 & 138 6.6.31 to 26.7.31	28.7.31
060 †† <i>Westernland</i> ...	Trant, A. W. V., O.B.E.	C. A. Clark, J. L. McLaren, G. P. Boyle.	"	Red Star ...	" " 16.8.31 to 5.9.31	7.9.31
<i>William Scoresby, R.R.S.</i>	Irving, J. J. C., Lt.-Commr., R.N.	W. A. Ellison L. C. Hill, C. A. Millward.	M.L.	Falkland Islands Government.	Form 915 17.11.30 to 1.4.31	8.6.31
208 †† <i>Winchester Castle M.V.</i>	Gardner, G. F., O.B.E., Lt.-Commr., R.N.R.	G. F. Moon, A. G. Parey ...	W.T.	Union Castle ...	Forms 911 & 138 4.7.31 to 22.8.31	25.8.31
096 †† <i>Windsor Castle</i> ...	Chave, Sir B., K.B.E.	E. H. Dixey, J. L. Goatley, J. Trayner	M.L.	" " ...	Form 915 20.9.31 to 15.3.31	30.3.31
<i>Worthing</i> ...	Marmery, S. ...	C. Munton, E. Balcombe ...	C.C.	Southern Railway ...	Telegraphic Report 17.9.31	17.9.31
043 ** <i>Zealandic, M.V.</i> ...	Elford, H. C. ...	P. Horwood, J. Thompson, B. Morris.	W.T.	Shaw, Savill & Albion	Forms 911 & 138 16.4.31 to 9.7.31	13.7.31
<i>Zent</i> ...	Moore, J. A. ...	W. Pearce ...	No. A.	Elders & Fyffes ...	Form 911 16.6.31 to 14.7.31	17.7.31
<i>Conway, H.M.S.</i> ...	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets ...	Cadets' M.L.	" " " "	Cadets' Met. Log. 3.5.31 to 24.7.31	1.8.31
<i>Pangbourne Nautical College</i>	Tracy, A. F. G., Commr., R.N.	" " " "	"	" " " "	Cadets' Met. Log. 26.4.31 to 23.7.31	28.7.31
<i>Worcester, H.M.S.</i>	Steele, G. C., V.C., Lieut.-Commr., R.N.	" " " "	"	" " " "	Cadets' Met. Log. 8.5.31 to 29.7.31	4.8.31
<i>Abaco</i> ...	" " " "	The Keepers ...	Lighthouse Register.	" " " "	Lighthouse Register 1.7.30 to 31.12.30	22.5.31
<i>Cay Lobos</i> ...	" " " "	" " " "	"	" " " "	Lighthouse Register 1.1.31 to 30.6.31	10.8.31
<i>Double Headed Shot</i> ...	" " " "	" " " "	"	" " " "	Lighthouse Register 1.1.31 to 30.6.31	10.8.31
<i>Inagua</i> ...	" " " "	" " " "	"	" " " "	Lighthouse Register 15.8.30 to 22.2.31	22.5.31
<i>Sombrero</i> ...	" " " "	" " " "	"	" " " "	Lighthouse Register 1.1.31 to 30.6.31	4.8.31
<i>Watling Island</i> ...	" " " "	" " " "	"	" " " "	Lighthouse Register 1.1.31 to 30.6.31	10.8.31
<i>Cape Pembroke (Falkland Is.)</i>	" " " "	" " " "	"	" " " "	Lighthouse Register 1.1.31 to 30.6.31	13.8.31

LIST OF SHIPS CO-OPERATING THROUGH THE METEOROLOGICAL OFFICE WITH THE MINISTRY OF AGRICULTURE AND FISHERIES (FISHERIES LABORATORY, LOWESTOFT) IN THE COLLECTION OF WATER SAMPLES, ETC.

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., received up to 31.8.31.	Date Received.
<i>Darian</i> ...	Hannaford, W. ...	W. R. Vaughan ...	Leyland	Water Samples ...	4.7.31
<i>Darro</i> ...	Green, J. ...	J. M. Phillips ...	R.M.S.P. Co. ...	" " ...	12.6.31
<i>Davision</i> ...	Thomas, R. ...	F. Steventon ...	Leyland	" " ...	7.8.31
<i>Dorelian</i> ...	Hughan, C. ...	F. R. Hatton ...	" " ...	" " ...	8.6.31
<i>Hildebrand</i> ...	Buck, R. H., R.D., Capt.	W. H. Cross ...	Booth ...	" " ...	2.7.31
<i>Mercian</i> ...	Hughan, C. ...	W. Parry ...	Leyland	" " ...	7.10.30
<i>Nevisian</i> ...	McCormick, J. ...	T. J. Jones ...	"	Water Samples ...	24.4.31

November, M.O., 1931.