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THE MARINE OBSERVER.

SEPTEMBER 1924.

SPECIAL OBSERVATION IN TROPICAL REVOLVING STORM AREAS.

DURING the last four years we have been enabled to track fairly completely many of these storms and to make daily synoptic charts of quite a number with the observations made by regular members of the Corps of Voluntary Marine Observers, by Commanders and Officers occasionally observing, and by observers ashore in many lands.

This has enabled us to illustrate the practical value of tested mercurial barometers for obtaining warning of the approach or formation of cyclones within the Tropics, by comparison with normals and the reciprocation of wireless weather reports in these regions.

We have now reached a stage where observation at sea and research ashore can probably do more to increase knowledge of these storms, but to do this we must consider the physical aspect. Captain D. BRUNT, late R.E., has therefore briefly discussed the theory of the origin of tropical revolving storms and this discussion plainly shows what we should look for.

As tropical storms always originate over the sea, observations of

conditions throughout the season in cyclone areas are necessary to establish origin.

In the month of September, hurricanes form in the tropical North Atlantic and, passing over the West Indies, recurve and sometimes reach the coast of Europe. Observations in and near such storms have taught us much, and marine observers are again invited to co-operate in recording everything of interest that they see in these storms and in the vicinity of them. All ships, whether they are on the list of regular observers or not, who do not keep the 4-hourly meteorological log, are asked to return their observations on Form 905 which was reproduced in the July number. These forms may be had upon application to any of the Marine Agents, and Captain BROWN, Harbour and Shipping Master at Bermuda, has very kindly undertaken to supply vessels calling at his port. The blue postcard should not be forgotten.

MARINE SUPERINTENDENT.

THE ORIGIN OF TROPICAL REVOLVING STORMS.

BY D. BRUNT, M.A., B.Sc., SUPERINTENDENT, ARMY METEOROLOGICAL SERVICES.

THE tropical revolving storm of low latitudes is a small but very intense area of low pressure in which the winds blow counter-clockwise in the Northern hemisphere, clockwise in the Southern hemisphere. The extent of these storms is relatively small by comparison with the travelling depression of mid-latitudes having a diameter of only 100 to 600 miles. If we come in from the outside, we find the wind increasing as we approach the centre, eventually reaching hurricane force within a narrow belt. Inside the belt of maximum wind is a circle of calm—the centre of the storm, a region whose diameter is from 10 to 14 miles.

It is not our intention here to enter into any great detail as to the habits of the tropical revolving storm, as these have been fully described elsewhere. Rather is it proposed to consider how the tropical storm comes into being, and what conditions are likely to be necessary for its continuance. In the course of such a discussion we shall possibly find that information is at present lacking with respect to some of the most fundamental phenomena.

When a tropical storm is represented on the synoptic chart, it appears as a centre of low pressure, with a wind circulation which is everywhere directed inward across the isobars at an angle which is on the average about 30° . Now pressure at a given place is a measure of

the amount of air above a square inch of the earth's surface at that place, and so it is clear that the existence of an area of low pressure implies the previous removal of a certain quantity of air from the column of atmosphere above that place. It must be removed horizontally out of the column, since moving some of the air in the column upward or downward would not in itself alter the total weight of the column. The question we must ask is "How did that removal of air take place?" If we can answer this apparently simple question then we shall have formed a satisfactory theory of the origin of the tropical revolving storm. A number of answers to this question have been put forward, but none of them have found universal acceptance. It is perhaps not out of place to recall that in the case of the depression of mid-latitude the same question arises, and that there is still greater difficulty in formulating a satisfactory answer to the question.

It will save repetition if for the moment we confine ourselves to the Northern hemisphere on which the winds in the tropical storm blow counter-clockwise around the centre.

Two possible answers to the question raised above will naturally occur to the reader, the first that the lost air has been got rid of by spreading outward horizontally from the centre along the surface of

the earth; the second that it has first gone upwards. It is not difficult, however, to convince oneself that the first answer is unsatisfactory. Air moving over the earth is deviated to the right on account of the rotation of the earth, and if air were drawn outward in all directions from a point, or rather from a small restricted area, then in the course of its movement this air, in consequence of its tendency always to swing to the right, would acquire a clockwise motion about the centre, and not the counter-clockwise motion we observe in the tropical storm. The first suggested answer to our question is therefore not satisfactory and must be abandoned.

We have therefore to fall back upon the second answer, that the air has first gone upward. We shall therefore examine some of the consequences of this suggestion, that the air has in the first place been removed upward and then got rid of horizontally at a higher level.

Now air will only move upward if it is forced to move upward. It can only be forced upward when it is lighter than the surrounding air, either through being warmer or through being moister than its surroundings. In the former case the place where the tropical storm eventually appears should be marked by a higher temperature than the surrounding region, while in the second case it should show greater humidity than the surrounding humidity. Observations of this nature are not numerous, though in some cases there appears to have been a definite rise in humidity as a prelude to the formation of the cyclone. It is to be hoped that in the near future the accumulation of data at sea may render it possible to formulate some rule as to the conditions of temperature and humidity which prevail in the initial stages of formation of the cyclone.

If now a huge bubble of air which is lighter than its surroundings begins to rise, there will be an inflow of air from all sides to replace it, and the deviating force due to the earth's rotation will cause the incoming air to swing round towards the right and so acquire a counter-clockwise rotation (in the Northern hemisphere). It is a simple exercise in algebra to show that in a cyclone produced in this way, the component velocity of the wind along the isobars should increase towards the centre in inverse proportion to the distance from the centre. But the inflow of air across the isobars would in itself increase rather than decrease the pressure at the centre and so there must be an outflow of air across the isobars at a higher level which more than compensates for the inflow of air at low levels. In the course of its ascent, the bubble of air will become partly mixed with its surroundings and the resulting mixture will also be lighter than the surrounding air, and so will tend to rise. We can thus see a possibility of the convergence of air toward a centre with the resulting counter-clockwise circulation of winds taking place at all levels up to the maximum height attained by the ascending air. If this process of ascent of air takes place in air which is originally at rest, or in a calm, the resulting cyclone will be stationary. But the ascent of air can take place equally readily in a moving current, and in this case the resulting cyclone will move with the current.

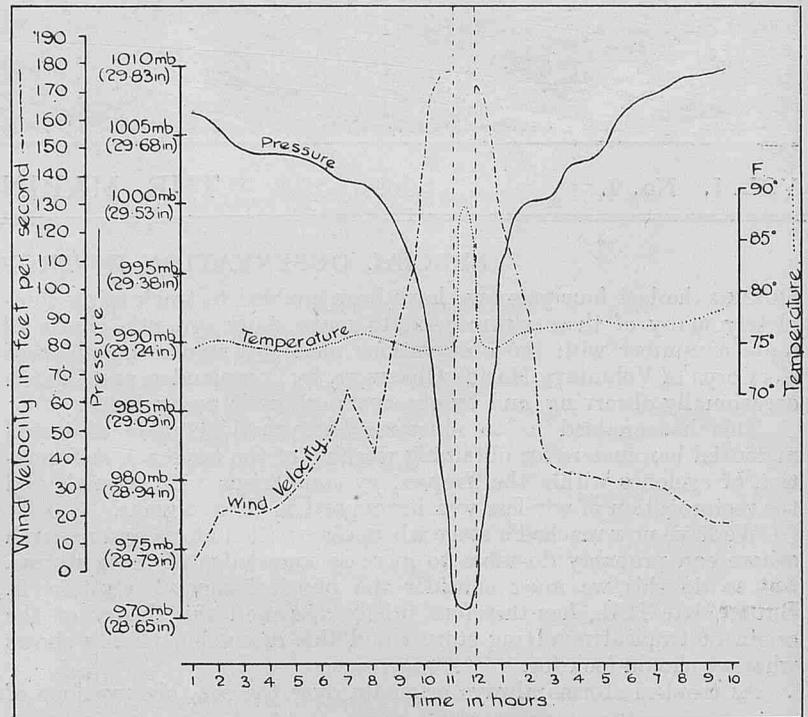
But there still remains the question of how the ascending air is to be removed horizontally. We can most easily conceive of this happening by its being discharged into a strong current at some higher level and so being carried away. For example, the convection or ascent of light air may take place through an easterly current passing upward into a westerly current above it.

This theory demands the existence of conditions which fortunately can be stated in a few simple words. To begin with, the cyclone could only form in a region where the air is very warm or very moist, and observations show that tropical cyclones occur usually in regions which are both warm and moist. A local increase of either temperature or of humidity, or of both, should be the earliest stage in the process of formation of the cyclone. Next there should be a change in wind direction at some level which will determine the extreme height of the cyclonic circulation. In the absence of this second condition the ascent of air should give rain, or possibly a thunderstorm, but not a tropical cyclone.

It will only be possible to decide whether the conditions outlined in the last paragraph actually hold, by the help of carefully made observations of temperature and humidity and of the motion of clouds at different levels. When such observations are available for a region in which a cyclone develops later, they will form a useful criterion for estimating the value of this or any other theory which may be put forward.

In such a system as we have supposed, the wind will increase as we approach the centre, but there will be a ring of maximum velocity

within which will be the zone of ascending air where the surface wind will usually be light. Even after the ascent of air has ceased, the core of low pressure will be protected against the encroachment of the surrounding air by the ring of maximum wind velocity. During the stage of early development of the storm, the rising air should give copious rainfall, but in the later stage, when the ascent of air has ceased, the centre of the storm may be rainless. It is not at present possible to say definitely whether this is in accordance with observations. What is required is the complete life history of one single storm. Again, during the early stages the core should be warmer than the surrounding region, while in the later stages, when the ascent of air has ceased, the core should be colder than the surrounding region. The observation of temperature within the storm would help to decide some of these questions. Unhappily, any person who finds himself under the influence of a tropical storm is not likely to have much time to devote to scientific observations, and it is a rare occurrence to find a fully developed storm passing over a fully equipped observatory, though such cases have been known to occur. One of the outstanding cases is that of the cyclone which passed over Manila on October 20th, 1882. The records of wind, temperature, and pressure, within this cyclone, are shown in the diagram. It will be noticed that there is a very marked increase in the temperature in the central core of the storm and a clearly defined ring of maximum wind velocity surrounding the core.



Curves showing Wind, Pressure and Temperature observed in Manila Typhoon, October 20th, 1882.

From "Gaskugeln Anwendungen der Mechanischen Wärmetheorie," by Dr. R. Emden.

The theory outlined above may be regarded as a useful working hypothesis which will enable us to collate observations and it is probable that in the course of time, observations of temperature and humidity and of the direction of motion of clouds at different levels, will make it possible to determine the extent to which the theory is reliable.

There is, however, an alternative theory of the formation of tropical storms which must be mentioned. This is a theory first suggested by DOVE, that cyclonic whirls form at the boundary between opposing currents of air in much the same way that small whirls form between opposing currents in a mill pond. If a stream of water flows into a millpond, a series of small whirls form at the boundary between the stream and the still water of the pond. Similar reasoning has been applied by BRIGLOW, BJERKNES and others to the depression of middle latitudes. These writers consider that the depressions of middle latitudes form at the boundary separating a cold easterly current of polar origin from a warm westerly current of equatorial origin. Further, it is often possible to draw on a synoptic chart, lines which are sharp boundaries between warm and cold currents. A diagram

illustrating this will be reproduced in Chapter X. of "Wireless and Weather," October number.

If we apply this theory to the cyclone of the tropics, we must look to the boundary between the trade and the anti-trades to take the place of the boundary between opposing currents. This theory of the formation of tropical storms would appear to require that in the very earliest stages of their formation the boundary between trade and

anti-trade should descend to the surface of the sea or nearly to the surface. Thus, whereas the convection theory demands a change of wind direction at some fairly considerable height, the mill pond eddy theory demands a change of wind at or near the sea surface. Writers on this theory do not indicate clearly the mode in which the air is removed in order to produce the diminution of pressure.

BIOGRAPHICAL NOTES OF SOME LEADERS OF MARINE METEOROLOGY.

VI.—NAVIGATING-LIEUTENANT C. W. BAILLIE, R.N.

AFTER CAPTAIN TOYNBEE'S retirement in 1888 a successor to the post of Marine Superintendent was found in Nav. Lieut. C. W. BAILLIE, R.N., who came to the Marine Division as a temporary assistant in 1879 and had been appointed Assistant Marine Superintendent in 1882.

BAILLIE, who was the son of a master at Greenwich School, entered the Navy in 1859. He was made a navigating Sub-Lieutenant five years later, and in 1870 was promoted to Lieutenant. He was a first-class assistant surveyor, and in 1873 was made Director of Nautical Studies at the Imperial Naval College of Japan, a post he held until 1878, when he retired from the Navy and, returning to England the next year, was appointed assistant to TOYNBEE.

Under BAILLIE'S superintendence, the work of the Marine Division was carried on much on the same lines as during TOYNBEE'S time, and many of the publications issued from 1888 onwards were

the completion of investigations started by TOYNBEE. These publications included among others the "Meteorological Charts of the Ocean adjacent to Cape Guardafui," the "Red Sea Charts" and "Current Charts of the Atlantic, Pacific and Indian Oceans." One feature incorporated in these charts and introduced by BAILLIE, is perhaps worthy of mention, and that was the form of wind rose, showing the relative strength as well as the direction of the wind. About this time the method of plotting observations on charts instead of extracting them into data books was adopted in carrying out many of these investigations.

This method, although facilitating the work at the moment, has proved to be unfortunate from the point of view of the present day.

BAILLIE continued in office until his death from heart failure when on vacation at Broadstairs, June 24th, 1899.

VII.—CAPTAIN M. W. CAMPBELL HEPWORTH, C.B., R.D., R.N.R.

To fill the vacancy created by BAILLIE'S death, the Meteorological Committee once more turned to the corps of voluntary marine observers for a Marine Superintendent, and Captain M. W. CAMPBELL HEPWORTH was appointed.

CAMPBELL HEPWORTH, who was the son of the Rev. ROBERT HEPWORTH, B.A., was born at Cheltenham in 1849. He was educated at Bromsgrove School and entered the Mercantile Marine, serving in several companies during his career afloat, among them the Union S.S. Co., the Anglo-Australian Steam Navigation Co. (W. Milburn), and the Canadian-Australian R.M. Line (Burns, Philp & Co.).

He obtained command of the Union S.S. Co.'s *Danube* in 1882, and on transferring to the Anglo-Australian Line some two or three years later held command of the *Port Pirie*, *Port Adelaide*, *Port Denison*, *Port Victor*, *Port Albert* and *Port Melbourne*. His last command was Burns Philp's *Aorangi*, to which he was appointed in 1897.

HEPWORTH took a keen interest in observing for the Meteorological Office, contributing no fewer than 33 meteorological logs of which 19 were classed "Excellent," commencing in 1876 when he was 2nd Officer of the cable steamer *Hibernia*, and continuing until the time he left the sea, with but few breaks. During the latter part of his sea career, he contributed several papers on meteorological subjects to the Royal Society of New South Wales.

HEPWORTH, having expressed a desire to come ashore and take up meteorological work some two years previously, Captain WHARTON, the Hydrographer to the Navy, recommended him to the Meteorological Committee in 1899 for the position of Marine Superintendent, and he was recalled from his ship at Vancouver by cablegram, Messrs. Burns Philp releasing him at the end of the voyage at Sydney. He came to the Meteorological Office with the idea that information in a more generalised and practical form than the atlases of various parts of the ocean published by the Meteorological Office, and which were only occasionally issued free to observers as awards for excellent logs, should be published. In 1901, therefore, the first Monthly Meteorological Chart of the North Atlantic was published and issued gratis to observers on receipt of their logs. These charts, besides providing normals for a much traversed ocean, effected a means of communication between the Marine Superintendent and the observers afloat for the dissemination of general information and notices of particular phenomena.

Marine observation was increased by means of a form for two observations a day, kept by voluntary observers using the ship's instruments. These observers as well as log-keepers received the

meteorological charts. In 1906, after normals had been worked up from data in the Marine Division, a similar series of charts for the East Indian Seas was commenced.

In 1902, at the coronation of KING EDWARD VII, Captain HEPWORTH, as a senior Commander, R.N.R., was awarded the Companion of the Bath, later he was promoted to Captain on the retired list of the Royal Naval Reserve.

The progress made in Wireless Telegraphy and its adoption at sea developed while HEPWORTH was Marine Superintendent, and in June 1909 a scheme of weather reports by W/T from ships to the Meteorological Office was inaugurated. The scheme was confined to certain trans-Atlantic ships voluntarily co-operating with the office, the majority of which used the ship's instruments. The introduction of this scheme marks the opening up of a new field of activity in Marine Meteorology and one which, with the subsequent advance of wireless communication, has become to-day very important.

Following the loss of the *Titanic* in 1912, an International Conference on the safety of life at sea was convened in 1913 and HEPWORTH was appointed an expert assessor. The establishment of the International Ice Patrol Service as a result of that conference was a further step in the direction of the safe navigation of the western ocean.

The widening of the interests of Marine Meteorology is necessarily reflected in a smaller output of tangible results in the form of publication of atlases, etc. Probably the best known of HEPWORTH'S publications is the "Seaman's Handbook of Meteorology," published in 1915.

During the last years he was at the office he was engaged, at the instigation of the Board of Trade, on the preparation of a book on the distribution of ice in the Northern Hemisphere. Unfortunately he did not live to complete this work. Although past the retiring age and in failing health, he continued in harness during the war. Early in 1919 he contracted a chill, to which he succumbed on 25th February of that year. Of a genial and lovable disposition his death was deeply regretted by all with whom he had come into personal contact.

These notes are sufficient to indicate the great amount of work which has been done by seamen to improve human knowledge in Marine Meteorology and to promote safe and economical navigation, led by one of their number in England.

Acknowledgment is made to—

Nautical Magazine, 1899.



The Master of the *Aorangi*.

Captain M. W. Campbell Hepworth, C.B., R.D., R.N.R.

Marine Superintendent of the Meteorological Office, 1899—1919.

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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 Reports of regular Marine Observers.

Responsibility for statements rests with the Contributor.

BALL LIGHTNING.

EXTRACT FROM METEOROLOGICAL LOG OF S.S. *Orvieto*,
LIEUT.-COMMANDER A. L. OWENS, R.D., R.N.R., AUSTRALIA
TO LONDON.

1.18 p.m., 29th September, 1923.

"Latitude 35° 31' N., Longitude 21° 52' E. (approximate).

"Thunderbolt (ball lightning) burst about 200 yards before the starboard beam. Great vibration was felt and considerable flash was seen. What appeared to be smoke (perhaps spray) was seen for several seconds afterwards. It resembled in shape and appearance the spout of a whale."

PHOSPHORESCENCE.

EXTRACT FROM THE METEOROLOGICAL LOG OF C.S. *Stephan*,
COMMANDER G. CARLTON, O.B.E., R.N.R., ON PASSAGE, COLON
TO LONDON.

REMARKABLE PHOSPHORESCENCE OF SEA.

"30th September, 1923. 7 p.m. to 10.30 p.m. Latitude 46° 05' N.
Longitude 15° 05' W. to Latitude 46° 28' N. Longitude 14° 20' W.

"The sea was illuminated with little crest waves giving the appearance of a fresh or strong breeze disturbing the sea surface. Alongside the ship the sea had a thick creamy appearance as of white mud broken into uneven slabs. Occasionally an extra brilliant patch would seem to bubble up from the bottom of the sea, burst into vivid light and spread rapidly over the surface before gradually fading away. There was more phosphorescence to leeward than to windward."

EXTRACTS FROM THE METEOROLOGICAL LOG OF
S.S. "NORE," CAPTAIN H. W. RANDALL, R.D., R.N.R.,
ON PASSAGE COLOMBO TO LONDON.

DISCOLOURED WATER.

"2nd September, 1923. 9.30 p.m. After passing from under the lee of Sokotra Island, the wind and sea increased considerably—the stars were very brilliant but the horizon was not distinguishable. Suddenly the ship appeared to run into a bank of light fog—the sea becoming a milky white colour and at times a greenish colour not unlike shallow water. Looking over the ship's side, the ship's wash could not be seen and the sea, although it was blowing at the time force 5, did not appear to break.

"At 11.30 p.m. the moon rose and conditions rapidly became normal."

METEOR.

"3rd September, 1923. 11.05 p.m. Latitude 12° 43' N., Longitude 48° 23' E. Observed a very brilliant meteor passing from north-east, burning with a vivid blue light, which when bearing approximately east and 20° elevation was seen to split up into several smaller ones, a faint red flash was observed and practically simultaneously a light report was heard; it then disappeared. Estimated time from first sighting to disappearing, 3-5 seconds. Weather at the time, calm, no clouds, stars very brilliant."

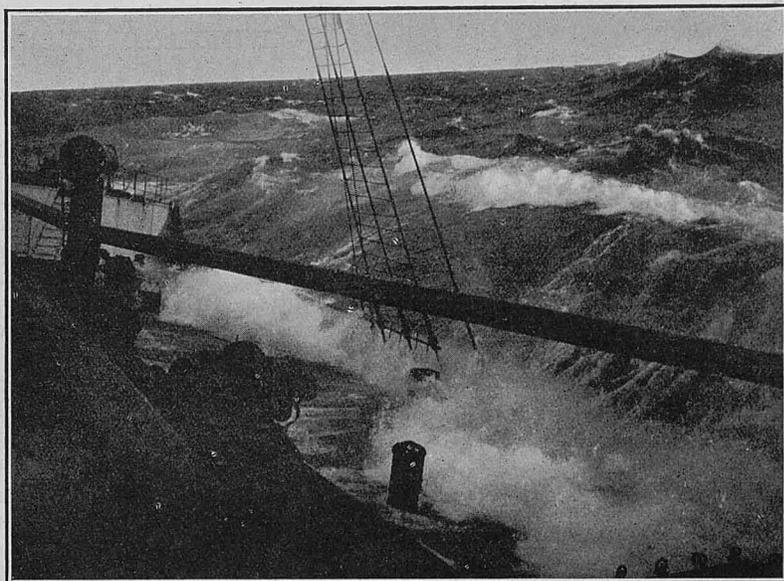
WEATHER IN THE TORRES STRAITS.

THE FOLLOWING REMARKS ON THE WEATHER IN THE TORRES STRAITS HAVE BEEN EXTRACTED FROM THE METEOROLOGICAL LOG OF H.M.S. *Fantome*, COMMANDER P. S. E. MAXWELL, R.N., COVERING THE PERIOD MAY TO SEPTEMBER, 1923:—

"The weather in the Torres Straits is generally considered to have been abnormally cold during the last few months; this is especially felt by the native pearl divers who find the water too cold for deep or continuous diving. They also state that they have great difficulty in seeing the pearl shell owing to the 'dirtiness' of the water this year, normally the water is clear except at times of Spring tides.

"The height of the barometer appears to be higher than for the same period last year; any rise above 30" (1016 mb) has been found to indicate an increase in the S.E. Trade to force 5 or 6."

A HIGH SEA.



PHOTOGRAPH OF A HIGH SEA TAKEN ON BOARD S.S. *Tredenham*,
CAPTAIN J. O. EVANS, BY MR. A. G. W. HOLE, 2ND OFFICER.

"A high sea caused by a gale experienced during the afternoon and evening of 5th August, 1922, off the coast of Western Australia.

"Time of photograph 4.35 p.m. Light, weak. Horizon slightly hazy.

"Latitude 30° 30' S. Longitude, 112° 30' E., 4 p.m. Wind W. (True), force 8. Barometer 1012.2 mbs. (29.89 ins.). Clouds, Cu/SW 4. 7/10 clouded. Sea W.8. Swell WSW 7. 5 p.m. Barometer 1013.2 mbs (29.92 ins.) but sea continuing to rise.

"Photograph from bridge deck, 23 feet above water line. Freeboard, 8 ft. 6 ins. to main deck. Vessel loaded. Photo of after well deck with seas right abeam."

UNUSUAL CURRENTS OFF WEST COAST OF AFRICA.

EXTRACT FROM THE METEOROLOGICAL LOG OF S.S. *Appam*, CAPTAIN H. A. YARDLEY, BOUND LAGOS TO LIVERPOOL.

"September 2nd and 3rd, 1923.

"Between Sekondi and Cape Three Points, current nil. Between Cape Three Points and Tabou in Latitude $4^{\circ} 25' N.$, Longitude $7^{\circ} 22' W.$ (via Swarton Corner) current nil. Round Cape Palmas, current East at first then S.E. 1 mile per hour, from Latitude $4^{\circ} 14' N.$, Longitude $7^{\circ} 30' W.$ to Mesurado."

Captain YARDLEY adds the following note.

"Meeting an Easterly current of $1\frac{1}{2}$ knots off Cape Palmas, it was most unusual not getting any current previous, that is, between Cape Three Points, Swarton Corner and Cape Palmas.

"The set to the Northward (of about 20 miles per day) from Cape Verde to Cape Barbas was very unusual and unexpected. A minor Northerly set has since been found until the present latitude $41^{\circ} N.$ on September 11th, 1923, which is unusual."

EARTHQUAKE SHOCK.

THE FOLLOWING IS A REPORT FROM CAPTAIN W. J. YOUNG, OF S.S. *Lady Brenda*.

"At 1320 G.M.T. on 29th September, 1923, in Latitude $52^{\circ} 10'$ North, Longitude $33^{\circ} 30'$ West, I experienced two severe earthquake shocks, one of thirty seconds duration and another of ten seconds with an interval between of thirty seconds.

"These shocks were of such a nature that they shook the vessel violently causing everybody who was asleep at the time to rush on deck immediately.

"My first impression was that we had struck some submerged wreckage and I sent out a wireless signal as follows: 'Fear that we have struck submerged wreckage Lat.—— Long.——.'

"The steamer *Manchester Brigade* which was in the vicinity at the time also experienced similar shocks and on receipt of my signal was in a position to understand what was happening. He reported later that the shocks had been very severe and caused his vessel to vibrate heavily."

WIRELESS AND WEATHER, AN AID TO NAVIGATION.

CHAPTER IX.

WIND AND SET AND DRIFT OF CURRENT.

THERE are a number of forces at work which produce currents in the ocean, some internal, others external.

Of the former, difference in temperature, specific gravity, defect due to evaporation or excess due to rain, rivers, etc., at different parts of the ocean, all contribute their quota, while pressure has effect. Of the latter, the rotation of the earth influences and controls currents from whatever cause they occur. Difference of atmospheric pressure has a twofold effect, one direct upon the surface of the waters transmitted to the depths but probably small in its contribution, the other indirect causing winds which by friction induce motion in the surface layers of the water.

CHARTS XLI and XLII show the general set of the main ocean currents in January and July, and if compared with CHARTS XXVI and XXVII, Pressure and Wind, CHAPTER VII, it will be seen that generally the circulation of the surface water is round the anticyclones and areas of mean low atmospheric pressure and before the prevailing wind. Evaporation is greatest near the centres of the great anticyclones and there is consequently high salinity there.

The experience of the navigator is sufficient to prove that the set and drift of current is often influenced by winds prevailing, or which have prevailed at different parts of the ocean especially so on coasts.

LORD KELVIN in his lecture on Navigation said "There are, in fact, certain currents of ten miles and upwards per day, due to wind (it may be wind in a distant part of the ocean) which the navigator cannot possibly know at the time he is affected by them," *Lecky's "Wrinkles," Ninth Edition, page 184.* When LORD KELVIN said this there was no means of long distance communication at sea. It is the purpose of this Chapter to suggest how wireless may be applied to fill that breach more fully than at present, having regard to the smallness of our knowledge.

In our researches during the last four years light was thrown upon the association of current with calm and wind or wind at a distance through an unexpected current reported near St. Pauls Rocks in the Equatorial Atlantic in May, 1921, by Captain J. B. HALL, of S.S. *Tudor Star*, and others. This investigation made it apparent, that the easterly or counter-current which was known to exist between the North and South Equatorial Currents setting to the Westward as continuations of the N.E. and S.E. Trade drifts (which easterly set

is usually found in April and May between Longitude $20^{\circ} W.$ and Longitude $30^{\circ} W.$ in about Latitude $4^{\circ} N.$) was associated with the Doldrums. It was fairly well established by observations dating many years back that when the Doldrums were south of their normal position in April and May the Easterly set was also found further south. Subsequent observation goes to support this deduction that the Easterly flowing current moves bodily North and South with the Doldrums during April and May. Hence a foreknowledge of the position of the Doldrums obtained from wireless reports of ships in them, on the route to the Brazils, may give ships approaching St. Pauls Rocks an idea of what current to expect.

In the open ocean in regions where passing atmospheric depressions cause changing winds, it has been found, by taking a large number of current observations with the winds experienced at the time, that the tendency of the surface water is to flow away from the wind inclining 45° to the right in the Northern Hemisphere, and the left in the Southern Hemisphere. According to EKMAN'S theory, between the surface and the depth to which the wind influences the horizontal movement of the water, the total flow is at right angles to the wind. This inclination to flow to the right in the Northern Hemisphere, and to the left in the Southern Hemisphere from the direction before the wind is due to the rotation of the earth about its axis. Near a coastline the wind may have the effect (with the rotation of the earth) of producing a defect or excess of water, which produces a pressure gradient within the water, causing a current to flow along the coast. This current due to pressure in the water will tend to increase the drift directly due to wind.

FIGURE 35 is compiled from observations made in the Eastern North Atlantic, where depressions passing, cause wind mainly from the West but from all points of the compass. The frequency of the direction of the current here is with the wind so to speak on its starboard quarter (the inclination is to the right).

FIGURE 36 is compiled from observations on the route Gibraltar to Port Said, along the North Coast of Africa, between the meridians of Greenwich and $10^{\circ} E$ where the current usually sets to the Eastward. It will be seen by these roses that frequently with Easterly winds the Easterly set and drift is reduced, while with Westerly winds it is frequently increased.

RELATION OF CURRENT TO WIND.

North Atlantic, Lat. 47° to 53° N. Long. 10° to 30° W.
Summer Months, 1909—1920.

If the wind arrow is slewed to fly with the wind, the frequency of current in any direction is given by the length of the arrow of the rose in that direction.

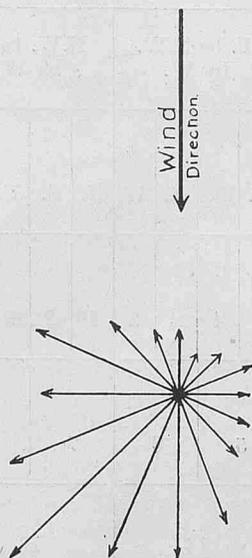


Fig. 35.

509 observations.

Frequency of set in relation to wind when the sea amount by scale is approximately the same as the wind force on the Beaufort scale.

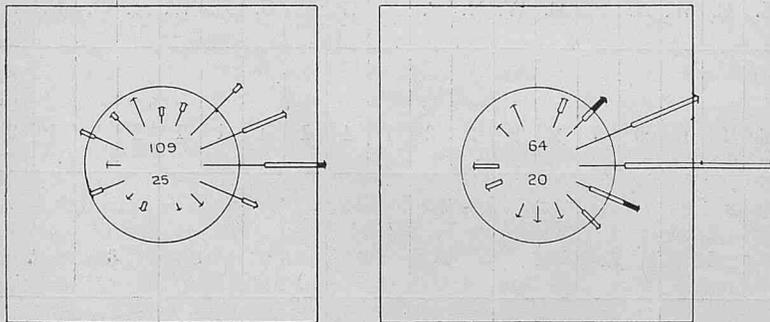
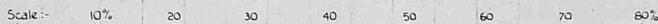
CURRENT ROSES.

On the route between Gibraltar and Port Said, Longitude 0° to 10° E.

April to September 1911 to 1914 and 1920 to 1922.

Winds from N.E. to S.E.

Winds from N.W. to S.W.



Arrows flow with current, length represents frequency, thickness strength
6-12 miles per day →, 13-24 miles per day ⇨, 25 miles per day or over ⇩
Distance from tail of arrow to circle represents 5% of all observations, see scale above
The figures in the centre indicate the number of observations and percentage frequency of current less than 5 miles per day.

Fig. 36.

It should be remembered that a liberal interpretation must be exercised in dealing with current data, for these are derived from the difference of dead reckoning position and observed position and many errors may creep in; with a large number of observations fairly accurate results may be arrived at.

With improved navigational instruments current observation has of recent years become more accurate as is proved by comparison of the set and drift logged by ships traversing the same route at about the same time. Experience goes to show that the interval for determining current by this method should not exceed a day, nor should it be less than say six hours, probably the best results are obtained when the current is determined between twilight, morning and evening, and evening and morning star fixes. For the purpose of including current observations in wireless weather reports the latter interval is most useful, these reports being best made in the late morning watch or forenoon after the standard time of observation. See Time Chart, page 11, January number.

In the article accompanying the Current charts for the Cape Route, Mr. DURST has endeavoured to associate set and drift with conditions prevailing at the time of observation in the vicinity of Cape Verde, and on the West Coast of Cape Colony, as well as working out the resultant arrows or normals and variations. As these

researches are continued we hope to be able to provide information which may assist the navigator in his efforts, aided by wireless communication, to obtain a foreknowledge of current to be expected on other routes. Meanwhile, we have worked up data for the month of September on the route from the Chops of the Channel to the West Coast of Portugal, in which region we have sufficient observations to make daily Weather Charts and where there are a comparatively large number of current observations logged.

Normals and Frequencies for September, on the route, Channel to Coast of Portugal.

CHART XLIII represents graphically statistical information compiled from currents logged during the years 1895 to 1916, and 1920 to 1923; by far the larger proportion of observations being in the latter period. The arrows show the resultant set and drift obtained by calculating the vector mean of all observations used, the middle position of which was between the parallels of Latitude bounding each grouping, these parallels are indicated by a pecked line on the chart.

As the observations were made by ships bound from or to the Irish Channel as well as the English Channel and the Mediterranean, African and South American ports, they cover a strip of the ocean some 90 miles in width from East to West. It should be remembered that the observations are not made in one spot, but are made over a distance. By grouping currents according to the position midway between the observation points (*i.e.*, the fixed positions at each end of the run over which the current was determined) if there are sufficient observations, the result will give a fairly accurate measurement of the normal set and drift at the centre of the area within which all observations used were taken. So that these arrows give the general set and drift of the surface water during the month of September, the figures above them denoting velocity in miles per day and those below the number of observations on which they are based. The roses to the left refer to the same strip of ocean as the arrows, between the parallels of Latitude pecked in; they are compiled from the same observations grouped in larger areas.

The upper figures indicate the number of observations on which the roses are based, while the lower figures indicate the number of observations of no current or less than six miles per day.

By these roses it is seen that the current sets in all directions but that it sets more frequently in certain directions, and that the drift also varies considerably. The navigator using this route desires to know which of these variations he may expect under conditions prevailing at the time of his passage.

Variations of Current associated with Wind.

The tables below are compiled from the same observations as the normal arrows and frequency roses given on CHART XLIII and from them are summarised the wind and current diagrams to the right on that chart.

These tables give the frequency of components of current per 10 observations with the wind from the different octants of the compass.

That is to say, that each current observation is resolved into two components North or South, and East or West, from which the navigator found the set and drift by traverse. These components are grouped according to the general direction of the wind during the period of observation. For instance, it is desired to know what the probabilities are regarding current along the route between Lat. 42° N. and Lat. 45° N. with an E.N.E. wind prevailing. The table shows that out of a total of 38 observations with the wind from N.E. to E. by N. the components of current were to the Northward in three cases in every ten, to the Southward in two cases in ten, to the Eastward one case in ten, and to the Westward in five cases in ten; while on five occasions in ten the current had only 5 miles per day or less, North or South component, and on four occasions in ten the current only had 5 miles per day or less, East or West component. From which it may be concluded that with an E.N.E. wind the current will probably set to the Westward and it is likely to have more northing than southing in it. It will be seen that under several octants of wind direction the components recorded show that the current may run in opposite directions with the wind from the same direction on different occasions, this is probably due to the fact that the conditions regarding wind were widely different previous to the times of observation. Therefore, a knowledge of the weather prevailing for a day or so before the time of passing may throw further light upon current to be expected and this may be obtained by Wireless Communication and making Weather Charts.

TABLE OF FREQUENCY OF COMPONENTS OF CURRENT PER 10 OBSERVATIONS WITH THE WIND FROM THE DIFFERENT OCTANTS OF THE COMPASS.

LATITUDE 45° N. TO 48° N.

Direction of wind.	N. to N.E. by N.				N.E. to E. by N.				E. to S.E. by E.				S.E. to S. by E.				S. to S.W. by S.				S.W. to W. by S.				W. to N.W. by W.				N.W. to N. by W.				Calms and Variables.											
Direction of Current Component -	N.	S.	E.	W.	N.	S.	E.	W.	N.	S.	E.	W.																																
Current Component greater than 5 m.p.d.	1	4	1	3	3	2	0	3	4	1	3	2	6	0	1	4	0	1	3	0	1	0	3	1	1	4	2	2	1	2	2	2	1	5	2	4								
Current Component 5 m.p.d. or less		5		6	5		7		5		5		4		5		9		7		9		6		5		6		7		6		4		4									
Total No. of Obs. -	13				23				10				9				10				7				14				18				14											

LATITUDE 42° N. TO 45° N.

Direction of wind.	N. to N.E. by N.				N.E. to E. by N.				E. to S.E. by E.				S.E. to S. by E.				S. to S.W. by S.				S.W. to W. by S.				W. to N.W. by W.				N.W. to N. by W.				Calms and Variables.											
Direction of Current Component -	N.	S.	E.	W.	N.	S.	E.	W.	N.	S.	E.	W.																																
Current Component greater than 5 m.p.d.	1	3	1	4	3	2	1	5	3	1	0	5	1	1	1	1	3	0	0	0	0	3	2	2	2	2	1	1	1	4	1	1	2	2	1	2								
Current Component 5 m.p.d. or less		6		5	5		4		6		5		8		8		7		10		7		6		6		8		5		8		6		7									
Total No. of Obs. -	33				38				12				7				6				6				10				12				13											

LATITUDE 40° N. TO 42° N.

Direction of wind.	N. to N.E. by N.				N.E. to E. by N.				E. to S.E. by E.				S.E. to S. by E.				S. to S.W. by S.				S.W. to W. by S.				W. to N.W. by W.				N.W. to N. by W.				Calms and Variables.											
Direction of Current Component -	N.	S.	E.	W.	N.	S.	E.	W.	N.	S.	E.	W.																																
Current Component greater than 5 m.p.d.	1	4	1	3	3	1	1	3	2	2	0	2	0	5	5	0	0	0	1	0	0	10	10	0	3	0	7	0	2	3	2	1	3	0	3	0								
Current Component 5 m.p.d. or less		5		6	6		6		6		8		5		5		10		9		0		0		7		3		5		7		7		7									
Total No. of Obs. -	31				7				4				2				7				1				6				17				3											

Weather Charts for Wind and Current Prediction.

Suppose that S.S. *Frankenfels*, Captain J. GARDINER, from London to Port Said having cleared Ushant and Tidal Waters in the forenoon of September 3rd, 1923, wishes to know what current she may expect across the Bay during the next 24 hours and off the Coast of Spain and Portugal during the following day; having received the British Weather Shipping Bulletin, the Eiffel Tower Report and 0700 G.M.T. ships' reports to the southward and westward, she could construct a chart on the lines suggested in CHAPTER III.

As our purpose is to deal in this instance with wind and current only and simplification is aimed at, only a selection of coast reports are used, and we omit ships' reports with the exception of those along our route ahead and sufficient to the westward for obtaining the general pressure distribution. The elements charted are cut down to a minimum; sea temperatures are plotted because they may form a clue to current.

In plotting the currents, the arrows are placed midway between positions *from* and *to*, and the initial letter of the observing ship's name is written abreast them for identification. The velocity of current is indicated by the figure representing the nearest $\frac{1}{4}$ knot up to one knot and the nearest half knot for velocities of $1\frac{1}{2}$ knots or more.

Result, CHART XLIV, which indicates that there is a depression north of *Marburn's* position, a small anti-cyclone over the English Channel, a large anti-cyclone probably centred SW of the Azores and low pressure over Spain and NW Africa.

The barometer tendencies reported indicate that the pressure distribution southward of about Lat. 48° N. is unlikely to change to any material extent and light airs and calms in the Bay of Biscay with light and moderate N to NE winds off the Coast of Portugal are likely to continue. Unfortunately there are no reports of current in the Bay of Biscay; we are therefore dependent upon what former experience tells us.

Referring to the Table of frequency of components of current with wind, we find that with calms and light airs between Latitude 45° N. and 48° N. out of 14 observations the current had northerly component in one case in ten, southerly component in five cases in ten, two of easterly in ten and four of westerly in ten, while in four cases in ten there was only 5 miles or less N. or S. components and the same proportion of E. or W. components of 5 miles or less.

Therefore a south-westerly current is probable. According to her log *Frankenfels* had calms and light airs until 9 a.m. on September 4th, 1923, when a light N.E. breeze came away and she experienced a set and drift of S. 39° W. 5 miles or approximately $\frac{1}{4}$ knot as charted on the Weather Chart for morning of September 4th, 1923. On September 3rd, 1923, with CHART XLIV, *Frankenfels*, knowing the probability of NE'y winds continuing on the west Coast of Portugal, would also, with the aid of the tables, expect a SW'y current from the northward of Finisterre to Latitude 40° N.

On September 4th, 1923, CHART XLV indicates very similar conditions of wind and pressure to that of the previous day in the vicinity of the Portuguese Coast, and *Frankenfels* now has the advantage of having reports of current experienced during the last 24 hours ahead from *Clan Ranald* and *Freienfels*, who report set and drift of WSW $\frac{1}{2}$ knot, and SSW 1 knot respectively. She now may predict with some degree of confidence that the current will be as she anticipated on September 3rd SW'y; also she may expect a velocity of up to 1 knot. CHART XLVI, morning of September 5th, 1923, shows that NE winds continued off the Coast of Portugal and that *Frankenfels* experienced the current which we would expect.

Wind and Current when "Hammonia" foundered.

The German S.S. *Hammonia*, Captain HOEFER, left Vigo for Gulf of Mexico ports on Friday, September 8th, 1922. According to a report published in Lloyd's List, the Captain stated that he encountered a strong NE gale that night and by 8 a.m. on September 9th, 1922, the ship was found to be making water.

S.O.S. signals were picked up by the steamships *Kinfauns Castle*, *Euclid*, *Soldier Prince*, *City of Valencia* and others at about 9.25 a.m. on September 9th, 1922.

In accordance with the way we have in the British Mercantile Service, of some 557 lives, 385 were rescued by *Kinfauns Castle*, 88 by *Euclid*, 61 by *Soldier Prince* and 7 by *City of Valencia*.

According to the Meteorological Log of R.M.S. *Kinfauns Castle* Captain E. W. DAY, from Cape Town to Southampton—gentle and

moderate northerly winds were experienced from September 4th in Latitude 16° N., and from noon on September 8th in Latitude 37° N. the wind freshened, backing a little to the West of North with sea rising.

The following remarks occur under date of September 9th, 1922:

"10.00 a.m. S.O.S. received from German, Hamburg-American Liner *Hammonia*; proceeding all speed to her assistance.

"Noon Lat. $41^{\circ} 56'$ N., Long. $10^{\circ} 53'$ W., D.R. sun obscured. Sighted and closed wreck.

"4.00 Observations (weather) neglected during height of rescue work, sea rising, swell increasing and general squally appearance, 100 souls still on board wreck.

"6.27 p.m. Captain, officers and volunteer crew taken off and no souls left on board.

"6.30. Wreck sank $41^{\circ} 22'$ N., $11^{\circ} 24'$ W."

Star observations showed wind drift of wreck to be SSW. 30 miles. According to Lloyd's List, Corunna Radio reported receiving a message from *Hammonia* requesting immediate help and timed 10.19 a.m. in which the position was given as Latitude $41^{\circ} 55'$ N. Longitude $10^{\circ} 50'$ W. which would, if the positions were observed fixes, make the drift S. 29° W. 38 miles in 8.2 hours, i.e., $4\frac{1}{2}$ knots. The loss of this ship was attributed to the coaling ports not being properly secured.

CHART XLVII, morning of September 8th, 1922, indicates a large anti-cyclone centred west of Ireland and extending southward to the Azores, and a depression over Spain and N.W. Africa. With this pressure distribution, the tendencies of the barometer reported at Lisbon, Corunna and the three ships west of the Portuguese Coast, all bound to the northward, indicate a deepening of the depression which will cause a freshening of the Portuguese trade.

The Portuguese trade, an extension of the NE. trade very similar to the Cape South-Easter which continues into the SE. Trade, is due to lowering of pressure over the Spanish and African land caused by heating in the summer.

CHART XLVIII, morning of September 9th, 1922, indicates that the depression over Spain has deepened and the gradient in the vicinity of *Hammonia's* track from Vigo is approximately consistent with a fresh gale from NE.

With a N. to NE. wind prevailing, from our table we would expect the current to set to the southward of west. Unfortunately, no currents were logged in this vicinity on September 8th and 9th, 1922, the sky being cloudy and overcast.

On September 10th, 1922, S.S. *Nore* experienced a current of S. by W. $\frac{1}{2}$ knot between Latitude 39° N. and Latitude 42° N. near the 10th meridian, and it will be seen by CHART XLIX that NE'y winds were still prevailing. This current had more southing than would be expected by averages.

These examples have been intentionally selected when wind conditions were fairly settled in a quarter for which averages have been obtained from a fair number of observations.

They are intended only to illustrate the additional advantage of including current data in routine weather reports. Usually ships on meeting courses exchange reports of currents experienced without giving synchronous data of wind and weather, so that the currents observed cannot be associated systematically with the wind prevailing over a region as indicated by pressure distribution generally, and observation at certain points.

Even without the normals and frequencies of variations in current which we hope to produce in time for the main ocean routes, if reports are made systematically as suggested in Ships' Weather Signals, January Number, page 12, navigators may be able not only to obtain a better idea of current to be expected, but they may be able to assist in finding explanations of causes.

Not only should a liberal interpretation be given to current data but it is necessary to be very guarded in prediction.

Ascertainment of Set and Drift of Current.

The drift ascribed to *Hammonia* during the time her engines were stopped, and she was helpless before foundering, would be due to three causes: current, wind, and error in position. In the circumstances the latter may have been considerable.

She had a heavy list which it would appear from photographs taken on board *Kinfauns Castle* probably did not decrease, but might have even increased the hold of the wind upon her, which, notwithstanding increased draught due to list as well as water in the hull, would be conducive to wind drift.

It would be interesting to know exactly to what extent the leewardly drift of a vessel stopped broad-side to wind for a certain interval of time would exceed the leeway measured in distance when the same ship steams at speed with the true wind abeam.

The drifts of derelicts must be accepted with caution as a gauge to set and drift of current; but if waterlogged and nearly awash reliable results may be obtained. For example, the Court of Inquiry which investigated the stranding and loss of S.S. *Tuscan Prince* on February 15th, 1923, on Village Island, Barkley Sound, British Columbia, accepted as corroborating other evidence of abnormal velocity of current, the drift of the waterlogged and burning *Niko* which had caught fire and had been abandoned. The *Niko* drifted in a waterlogged state 56 miles in 22 hours, or at an average speed of $2\frac{1}{2}$ knots. She was seen to pass Village Island by the shipwrecked crew of the *Tuscan Prince*. *Tuscan Prince's* D.R. differed 50 miles with the position of stranding. On this occasion no less than four steamers stranded within a few miles of each other on the same date, there being a southerly gale with heavy snow.

A good deal has been done in tracing surface currents by drift bottles, but even if the drift bottle is properly ballasted this method has its disadvantages. The course of a drift bottle may be very variable and, therefore, the distance and time between the position of release and place of recovery may not give the velocity. The drift, even if the bottle is submerged, so that it cannot hold wind, will only represent that at the surface. There may be a skim of surface current entirely different to that a few feet down. Experience of this was gained in the Boarding service during the Great War when the difference of effect of currents was sometimes shown by the behaviour of the boarding boat to the ship herself in calm weather.

Though the difference between observed and D.R. position at the end of a ship's run may be subject to errors of observation, bad steering,

error in allowance for leeway, error in measurement of speed through the water, it is the best method at our disposal of which observations in any number are available, for the set and drift so obtained represents on the average the horizontal movement of the water at about half the draught of ships. It, therefore, cannot be too strongly urged that Commanders will give every encouragement to logging set and drift whenever reliable fixes are obtained and the D.R. can be worked with accuracy.

By nature of their work cable ships are particularly well able to make current observation and fine work has been done in this connection by several, amongst which may be mentioned C.S. *Colonia*, Commander V. CAMPOS, O.B.E., R.N.R.; C.S. *Stephan*, Commander G. CARLTON, O.B.E., R.N.R.

These ships not only are able to observe the surface set and drift when on passage, laying cable and during repair work, but they get some estimates of sub-surface currents by the pranks played by the cable as it is paid out; they also obtain deep sea temperatures.

Sub-surface currents are ascertained by the use of current metres but the use of these is generally confined to H.M. Survey ships and special research vessels.

Data from every source are necessary to supply normals and frequencies with which to provide improved charts for use in conjunction with Wireless Weather signals and for the purpose of scientific research generally.

The regular Voluntary Observing Fleet is to be congratulated much upon the very marked improvement effected in current observations since the appeal made upon the Monthly Ocean charts in 1920 when we endeavoured to say exactly what was required.

(To be continued.)

WEATHER SIGNALS.

I.—SHIPS' WIRELESS WEATHER SIGNALS.

SUPPLEMENTARY TO PAGE 12, JANUARY NUMBER.

TO COME INTO FORCE AUGUST 15TH, 1924.

THE main groups of the code used by a limited number of ships for reporting to the Meteorological Office having been internationalised, the following Decode is published for the information of ships who are able to intercept these reports.

The reports are addressed to *Weather London* (Meteorological Office, London) and to *Government Observer, Washington, D.C.* (United States' Weather Bureau). Those addressed to *Weather London* are made to Devizes W/T Station, call sign GKU, on a wave-length of 2,100 metres (c.w.). Those addressed to *Government Observer, Washington, D.C.*, are made to any of the following U.S. Navy radio stations at Bar Harbour, Me., call sign NBD., New York, N.Y., call sign NAH., Norfolk, Va., call sign NAM., or Charleston, S.C., call sign NAO, on a wave-length of 2,400 metres (c.w.). The respective transmissions take place as soon as possible after observation time.

Observations made between the 100-fathom line, British Isles, and 40° W. Longitude are reported to *Weather London*.

Observations made between Longitude 40° W. and a line, Belle Isle—Virgin Rocks—Sable Island—Cape Hatteras are reported to *Government Observer, Washington, D.C.*

The times of observation are :—

European land 0100, 0700, 1300 and 1800 Civil G.M.T.

American land 0100, Civil G.M.T. = 8 p.m. 75th Meridian Time.

and 1300, Civil G.M.T. = 8 a.m. 75th Meridian Time.

Ships at Sea from the 100-Fathom Line British Isles to 40° W. Longitude.
0700 and 1800 Civil G.M.T.

Ships at Sea from Longitude 40° W. to a Line Belle Isle—Virgin Rocks—Sable Island—Cape Hatteras.

0100 and 1300 Civil G.M.T.

ADDITIONAL reports may be made to *Weather London* eastward of Longitude 40° W., containing observations made at 0100 and 1300 Civil G.M.T.

A message consisting of figures addressed to *Weather London* or *Government Observer, Washington D.C.*, may be decoded as follows :—

As the first four groups are international, these groups, in weather reports transmitted by wireless telegraphy to weather offices of maritime countries by ships of all nations, may usually be decoded in the same manner.

Rule up a form, a sample of which is given opposite, and write the groups of figures and words, in the order received, in the spaces.

To save space, the groups of figures and their meanings have been inserted in the sample form, in *italics*.

Example :—The following message intercepted : *Weather London 41458 30807 24162 11404 09111 21542 67104 68691.*

These figures having been written in the appropriate spaces, errors made in transmission may be checked by adding together the figures in each *column* of the first four groups, *neglecting the tens*. If the message has been correctly transmitted, the sums of the columns will agree with the corresponding figures of Group 5. If the sums differ, write down (under the original figures in Group 5) the numbers which must be *added* to make them agree.

NOTE.—In all adjustments of check figures, tens and carrying figures must be disregarded entirely; thus for purposes of the check system $9 + 4 = 3$, not 13.

Next add together the figures in each group 1 to 5, separately (neglecting tens). These sums should agree with the figures from left to right in Group 6. If they differ, write down (under the original figures in Group 6) the numbers which must be *added* to make them agree.

Group 5 now indicates the *columns* in which there are errors with the numbers to be added to the figures which are in error.

Group 6 indicates the *groups* in which these errors occur.

In the example given we find that 0 in the second column of Group 2 should be 3, and that 4 in the third column of Group 4 should be 8.

DECODE FORM.

Code.	Code Figures.					Distinguishing Letter.	Number of Group.	Name of Element and how to decode the Figures.	Message decoded.
	Column Numbers.								
	1	2	3	4	5				
International Weather.	4	*	*	*	*	P	1	Addressed to " "	
	*	1	*	*	*	Q		Day of Week, Table XLIII.	Wednesday.
	*	*	4	5	*	LL		Name of Latitude and Longitude, Table XI, Feb. No.	North and West.
	*	*	*	*	8	L		Latitude, degrees.	45°.
	3	0	*	*	*	ll	2	Latitude, approx. minutes (multiply code fig. by 6).	48'.
	*	*	8	*	*	l		Longitude, degrees.	33°.
	*	*	*	0	7	GG		Longitude, approx. minutes (multiply code fig. by 6).	48'.
	2	4	*	*	*	BB	3	Civil Greenwich Time to nearest hour.	07.
	*	*	1	6	*	DD		Barometer, prefix 9 or 10 to code figures and, if desired, convert to inches, p. 23, February No.	1024mb.
	*	*	*	*	2	F		Wind direction true, Table IV, January No.	South.
	1	1	*	*	*	WW	4	Wind force, Table XLIV.	2.
	*	*	0	*	*	V		Present weather, Table II, January No.	No change, Cloudy.
*	*	*	0	*	K	Visibility. Table III " "		Very good.	
*	*	*	*	4	d	Swell. Table XXIII, March No.		Slight.	
Check.	0	*	*	*	*	x	5	Swell—direction from, Table XII, February No.	South.
	*	9	*	*	*	x		Sum of Column 1, less tens.	
	*	⁺³ *	1	*	*	x		Sum of Column 2, less tens.	
	*	*	⁺⁴ *	1	*	x		Sum of Column 3, less tens.	Check corrected.
	*	*	*	*	1	x		Sum of Column 4, less tens.	
	2	*	*	*	*	y	6	Sum of Column 5, less tens.	
	*	1	*	*	*	y		Sum of Group 1, less tens.	
	*	⁺³ *	5	*	*	y		Sum of Group 2, less tens.	
	*	*	*	4	*	y		Sum of Group 3, less tens.	Check corrected.
	*	*	*	⁺⁴ *	2	y		Sum of Group 4, less tens.	
British M.O. Weather.	6	*	*	*	*	C	7	Sum of Group 5, less tens.	
	*	7	*	*	*	N		Cloud predominating, Table XVIII, March No.	Strato-cumulus.
	*	*	1	*	*	W		Cloud amount, Table XLV.	Seven-tenths.
	*	*	*	0	*	U		Past weather, Table X, February No.	Cloudy.
	*	*	*	*	4	y	8	Unusual phenomena, Table XLVI.	None.
	6	8	*	*	*	TT		Sum of Group 7, less tens.	Group correct by check.
	*	*	6	9	*	tt		Air temperature, degrees.	68° F.
	*	*	*	*	1	y		Sea temperature, degrees.	69° F.
							Sum of Group 8, less tens.	An error in this group.	
							Space for word if wind force greater than 9.		

The message now reads — Wednesday, Latitude 45° 48' N., Longitude 33° 48' W., Civil G.M.T. 07 hours, Barometer 1024mb, Wind south force 2, Cloudy weather, Visibility very good, slight swell from south (column check corrected) (Group check corrected), Cloud St.-cu, amount $\frac{7}{10}$ ths; past weather, cloudy; No unusual phenomena; (Group correct by check) Air temperature 68° F., Sea temperature 69° F. (An error in group).

In the remaining Groups of the message a *double* check is not provided, but the fifth figure in each group will represent the sum of the first four figures, neglecting tens, and if it does not agree it will

be known that one or more figures are in error.

The message is next decoded by means of the Tables and Instructions given on the Decode Form.

Decode Tables for W/T Weather Reports from Ships at Sea.
Not already included in Weather Signals in previous Numbers.

Table XLIII.
 P.—Day of Week.

Code Figure.	
1	= Sunday.
2	= Monday.
3	= Tuesday.
4	= Wednesday.
5	= Thursday.
6	= Friday.
7	= Saturday.

Table XLIV.
 F.—Wind Force.

Code Figure.	Beaufort Number.
0	= Calm - Nought.
1	= Light airs - One.
2	= Light breeze - Two.
3	= Gentle breeze - Three.
4	= Moderate breeze - Four.
5	= Fresh breeze - Five.
6	= Strong breeze - Six.
7	= Moderate gale (half a gale) - Seven.
8	= Fresh gale - Eight.
9	= Strong gale and above - Nine.

When force 10, 11 or 12, word ten, eleven, or twelve is added at the end of the message.

Table XLV.
 N.—Cloud Amount.

Code Figure.	
0	= No cloud.
1	= Sky 1/10th covered.
2	= „ 2/10ths „
3	= „ 3/10ths „
4	= „ 4/10ths „
5	= „ half „
6	= „ 6/10ths „
7	= „ 7/10ths „
8	= „ 8/10ths „
9	= „ 9/10ths „
*0	= „ overcast.

* Usually weather reported by Table II, January number, will indicate which 0 applies here.

Table XLVI.
 U.—Unusual Phenomena.

Code Figure.	
0	= None of the following remarks appropriate.
1	= Appearances indicate that a tropical storm has formed.
2	= Appearances indicate that a tropical storm is forming.
3	= Heavy squalls during last three hours.
4	= Squally weather.
5	= Barometer <i>falling</i> very rapidly (more than 2 millibars an hour).
6	= Barometer <i>rising</i> very rapidly (more than 2 millibars an hour).
7	= Wind has <i>increased</i> decidedly during the last hour.
8	= Wind has <i>decreased</i> <i>decidedly</i> during the last hour.
9	= Unusually red sunset (or sunrise).

II.—WIRELESS WEATHER BULLETINS.

SOUTH WEST AFRICA.

Walvis Bay W/T Station, approximate Latitude 22° 58' S, Longitude 14° 30' E, call sign VNV broadcasts information concerning local meteorological conditions at 1300 and 2000 G.M.T. on a wave length of 600 metres (spark).

PORTUGUESE EAST AFRICA.

Lourenço Marques W/T Station, approximate Latitude 25° 58' S., Longitude 32° 36' E., call sign CRZ, broadcasts a report of weather conditions at 0800 and 1900 G.M.T. (following the time signal) on a wavelength of 600 metres (spark).

SOUTH AFRICA.

The following stations transmit daily, except Sundays, a report in plain language, forecasting the weather along the whole of the coast of the Union of South Africa :—

W/T Station.	Call Sign.	Latitude, Longitude.	Time. (G.M.T.)	Wavelength. (Metres.)
		(Approx.)		
Capetown -	VNC	34° 09' S 18° 19' E	1115	600 (spark).
Durban -	VND	29° 49' S 31° 01' E	1100	600 „
Port Elizabeth -	VNQ	33° 57' S 25° 35' E	1130	600 „

In addition, Durban W/T Station, transmits daily, except Sundays, at 1100 G.M.T. a report of the weather conditions at the Port of Durban.

INDIAN OCEAN.
MAURITIUS.

Mauritius W/T Station, approximate Latitude 20° 10' S., Longitude 57° 35' E., call sign BZG, broadcasts a weather report (*en clair*), from the observatory at 1600 G.M.T. on a wavelength of 600 metres (spark).

CHINA SEA.
FRENCH INDO-CHINA.

Kien-an W/T Station, approximate Latitude 20° 48' N., Longitude 106° 37' E., call sign HVB, transmits weather bulletins in code at 0300 and 1330 G.M.T. on a wave length of 1,200 metres (spark). The bulletins contain the observations of 2300 G.M.T. taken at the following stations :—

Station.	Position (approx.)	
	Lat.	Long.
Fu-lien -	20° 49' N.	106° 47' E.
Tien-sha -	16° 08' N.	108° 18' E.
Cape St. James -	10° 20' N.	107° 05' E.
Kwang-chau-wan -	21° 00' N.	110° 36' E.

Form of message :—one seven-figure group for each station is transmitted in the order given above.

1st 3 figures give the corrected barometer reading in millimetres and tenths, the initial 7 being omitted. (See Table V, p. 28, February number, for conversion to mbs. and ins.).

4th and 5th figures give the wind direction true. (See Table IV, p. 15, January number).

6th figure gives the wind force by Beaufort scale, forces 9 and above sent as 9.

7th figure gives the state of the sea and swell. (See Table XXI, p. 45, March number).

The 7th figure is not transmitted for Kwang-chau-wan.

Note.—When the observations of a station are missing a group of ciphers is transmitted in lieu.

The following W/T stations transmit the weather report issued by Fu Lien Meteorological Observatory (Haifong).

Times of transmission 0300 and 1330 G.M.T., normal wave-length 600 metres, except where otherwise stated.

W/T Station.	Position (approx.).		Call Sign.	—
	Latitude.	Longitude.		
Hanoi - - -	21° 04' N.	105° 54' E.	HVA	0230 G.M.T. only. 1800 metres, wave length.
Fort Bayard -	21° 13' N.	110° 23' E.	HVH	
Tourane - - -	16° 07' N.	108° 13' E.	HVI	
Mitho - - -	10° 21' N.	106° 21' E.	HVM	
Pulo Condore -	8° 44' N.	106° 36' E.	HVO	
Fu Kok - - -	10° 18' N.	103° 58' E.	HVP	

WIRELESS STORM SIGNALS.

INDIAN OCEAN.

MADAGASCAR.

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 HYH.

Majunga: Latitude 15° 43' S., Longitude 46° 20' E., Call Sign HYE.

Diego Suarez: Latitude 12° 15' S., Longitude 49° 23' E., Call Sign HYD.

The warning telegram originating at the observatory at Antananarivo will be sent out at the even hours (except between 2100 and 0300) during the probable continuance of the cyclone in the zone within range of the stations, alternately by Zaudzi and Majunga stations in the case of a cyclone affecting the region to the north-west of Madagascar or the Mozambique Channel, and alternately by the Zaudzi and Diego Suarez stations in the case of a cyclone affecting the regions to the north-east and east of Madagascar.

This telegram will be preceded and followed by the warning signal — . . . — repeated at short intervals. If the warning signal only is sent out it will indicate that there is reason to expect the passage of a cyclone, in the absence of precise information.

During the whole of this service the Zaudzi, Majunga and Diego Suarez stations will remain on the watch, outside the regular hours of working, during the first quarter of each hour, except between 2115 and 0300 G.M.T.

CHINA SEA.

FRENCH INDO-CHINA.

Kien-an W/T Station, call sign HVB, broadcasts storm and typhoon warnings during the typhoon season, in code, immediately after the weather bulletins at 0300 and 1330 G.M.T. on a wave length of 1,200 metres spark.

Form of message :—

Typhoon LLLLD₁D₁K or Coup de Vent D₁D₁Q.

followed by the control number of the previous group given in full.

Code :—

LL = Latitude (given in whole degrees) of the centre of the typhoon.

ll = Longitude ditto.

D₁D₁ = Forecast of the direction the typhoon (or storm) is likely to travel. See Table IV, p. 15, January number, with the following additions :—

- 51—in formation.
- 52—Two centres.
- 53—Direction unknown.
- 54—Stationary, or very slow.
- 56—Turning.
- 58—Filling up.

K = Radius and force.

- 1—± 120 miles; intensity unknown.
- 2—± 120 miles; intensity violent.
- 3—± 60 miles; intensity unknown.
- 4—± 60 miles; intensity violent.
- 5—Increasing.
- 6—± 30 miles; intensity unknown.
- 7—± 30 miles; intensity violent.
- 8—Exceptional velocity.
- 9—Continental depression.
- 0—Position unknown.

Q = Area threatened.

- 1—Coast of Anam.
- 2—Gulf of Tongking and Swatow.
- 3—Formosa channel.
- 4—Formosa to Yangtse.
- 5—Yangtse to Shantung.
- 6—Gulf of Pechili to Gulf of Yalu.
- 7—Sea of Japan.
- 8—North of Hokkaido.
- 9—East coast of Japan.
- 0—South of Kyushu.

Warnings are also broadcasted at times other than that given in the schedule.

The remaining W/T stations of French Indo-China, shown opposite, broadcast storm and typhoon warnings when necessary, on request, and at 0300 and 1330 G.M.T., immediately after the weather bulletins.

The normal wave length used is 600 metres, except in the case of Fort Bayard, where a wave length of 1,800 metres is used.

III.—VISUAL STORM WARNINGS.

INDIAN OCEAN.

MAURITIUS.

During the cyclone season, from 1st November to 15th May, annually, a storm signal is hoisted daily, except Sundays and public holidays, at the Port office at Port Louis, to indicate the weather conditions prevailing in the vicinity of Mauritius. The 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 cone the information refers to the area within a circle with a radius of 300 miles.

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

Flag W is hoisted at the yardarm from 1300 to 1400.

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-westward.
- K. The cyclonic storm is moving westward, northward of Mauritius.
- L. The cyclonic storm is moving eastward, southward of Mauritius.

The above signals are made when bad weather is approaching, and it is not safe for any vessel to proceed to sea.

When bad weather is approaching and precautions are necessary in the harbour, the cyclone signals are made.

Cyclone Signals.—On the approach of bad weather, the following signals are made to vessels in the harbour and roadstead from the flagstaff of the Port office, at the head of the harbour, and repeated from Fort George.

Day Signals.

- A white flag, with blue horizontal stripes and ball above, at the Port office, repeated at Fort George, and accompanied by a gun. 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 Outer anchorage ought to proceed to sea.
- A red flag, with a ball above. Vessels in the port are to strike lower yards and topmasts. Vessels at the Outer anchorage to go to sea.

NOTE.—The signals are respectively confirmed by a gun from Fort George. Vessels are required to answer the above by hoisting their national ensign at the main.

Night Signal.

- One blue light at the Port office repeated at Fort George, and accompanied by a gun. Vessels at the Outer anchorage to proceed to sea forthwith, and vessels in the port to make every preparation for bad weather.

MADAGASCAR.

Signals indicating the localities threatened by a cyclone are exhibited at the following ports: Tamatave, Andovoranto, Vatomandri, Mahanoro Mananjari, Farafangana, Fort Dauphin, Tuléar, Ambohibé, Morondava, Maintirano, Namela, Majunga, Analalava, Nosi Bé, Diego Suarez, Vohemar, Maroantsetra, Dzauzi, and St. Mary.

The signals, which are made from a flagstaff by a black cylinder and black cones, are as undermentioned:—

Signal.	Locality threatened.
Cylinder above 2 cones points upwards	Between Diego and Antalaha.
Cylinder between 2 cones points upwards	Between Antalaha and St. Mary.
Cylinder below 2 cones points upwards	Between St. Mary and Vatomandri.
Cylinder above 2 cones points downwards	Between Vatomandri and Mananjari.
Cylinder between 2 cones points downwards	Between Mananjari and Farafangana.
Cylinder below 2 cones points downwards	Between Farafangana and Fort Dauphin.
Cylinder below 2 cones, the upper cone point downwards, the lower, point upwards.	Between Diego and Nosi Bé.
Cylinder above cone point upwards	Between Nosi Bé and Majunga.
Cylinder below cone point upwards	Between Majunga and Maintirano.
Cylinder above cone point downwards	Between Maintirano and Morondava.
Cylinder below cone point downwards	Between Morondava and Tuléar.
Cylinder above 2 cones, the upper cone point downwards, the lower, point upwards.	Between Tuléar and Fort Dauphin.

Special Notices regarding Personnel.

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

Commander G. ff. H. Lloyd, R.D., R.N.R. (Retd.).

Captain LLOYD is retiring from the post of Port Meteorological Officer at Liverpool to take up the appointment of Assistant Marine Superintendent of the Coast Lines, Ltd.

Marine observers will join with the Marine Division in good wishes to Captain LLOYD for success in his new post.

Ocean Currents.
JANUARY.

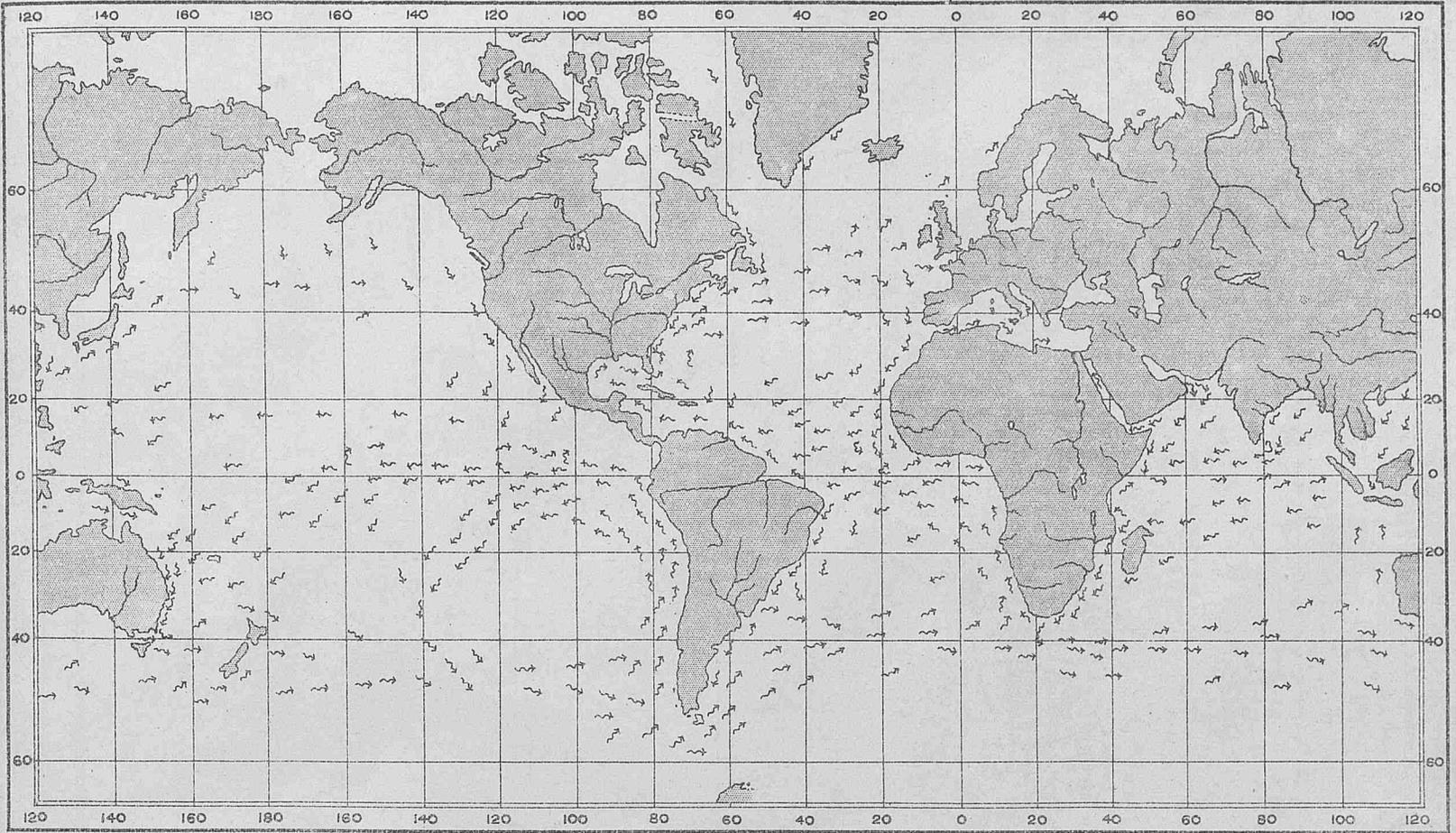


Chart XLI—"WIRELESS AND WEATHER."

Ocean Currents.
JULY.



Chart XLII—"WIRELESS AND WEATHER."

Currents on Route Channel to Coast of Portugal Normal Arrows and Frequency Roses for the month of September, Observations 1895 to 1916, and 1920 to 1923.

Explanation of Current roses.
 Arrows flow with the current,
 length represents frequency,
 thickness strength.
 6-12 miles per day
 13-24 " " "
 25 and over " " "
 Distance from tail of arrow
 to circle represents 5%
 Scale 0 10% 20% 30%

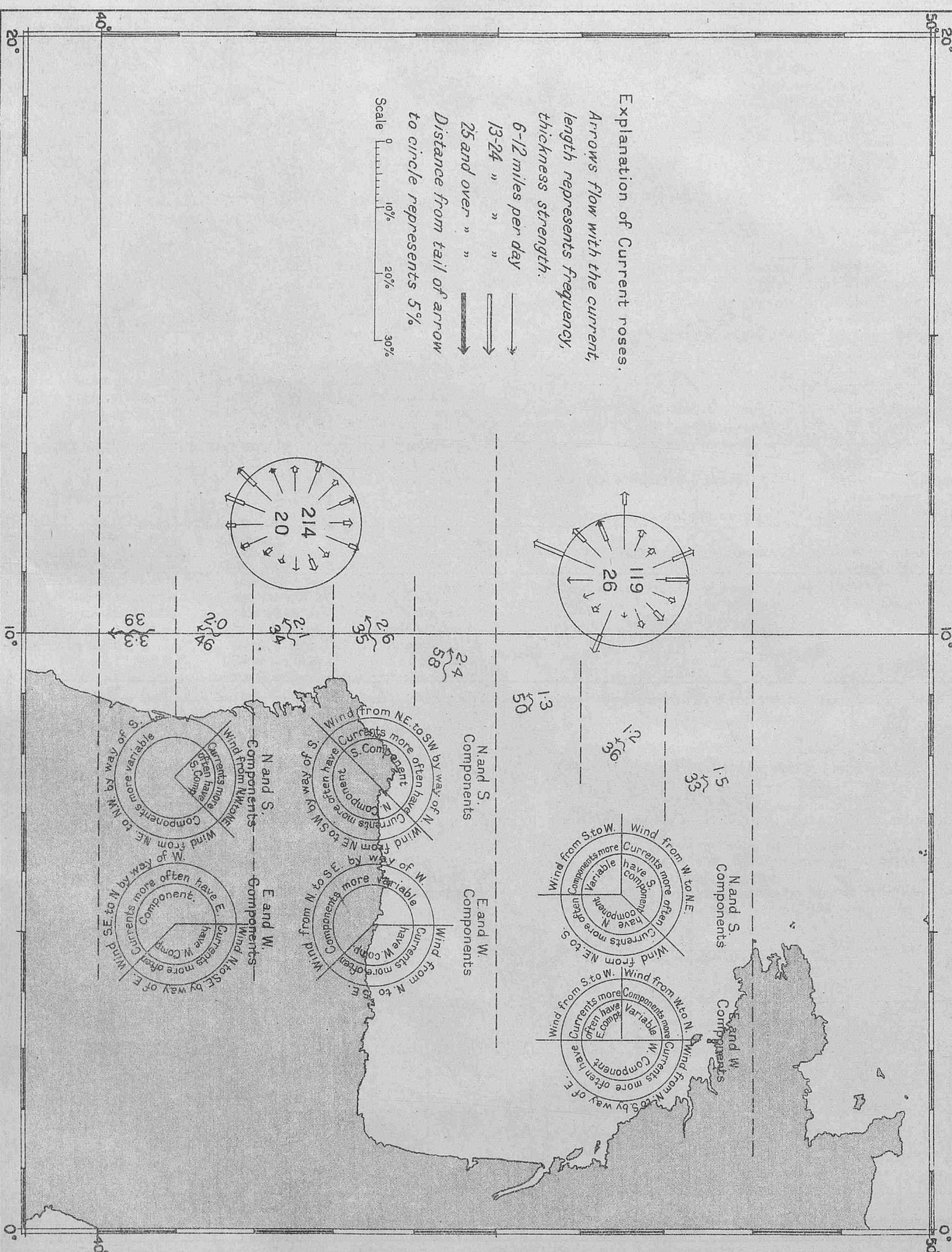
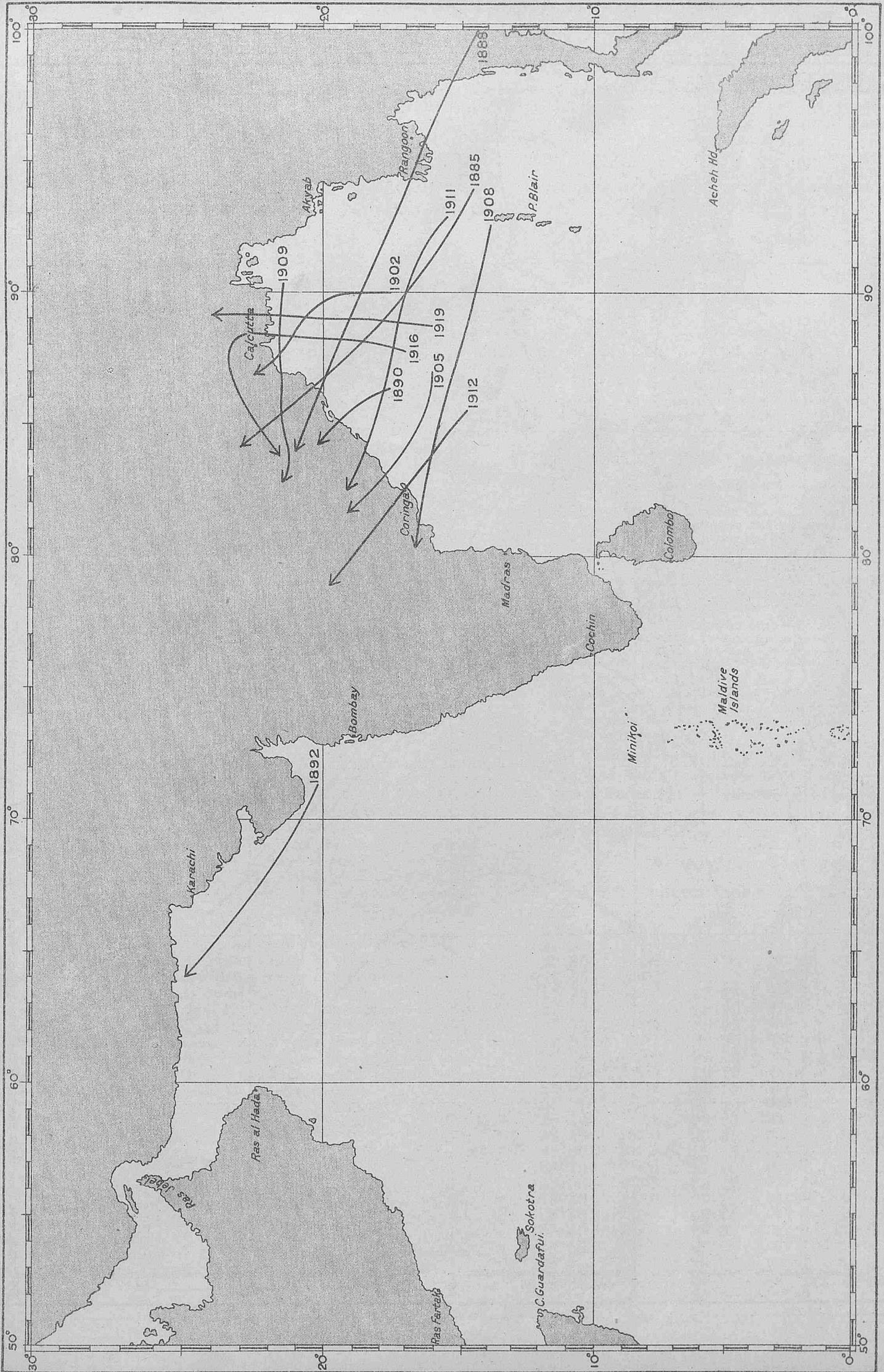


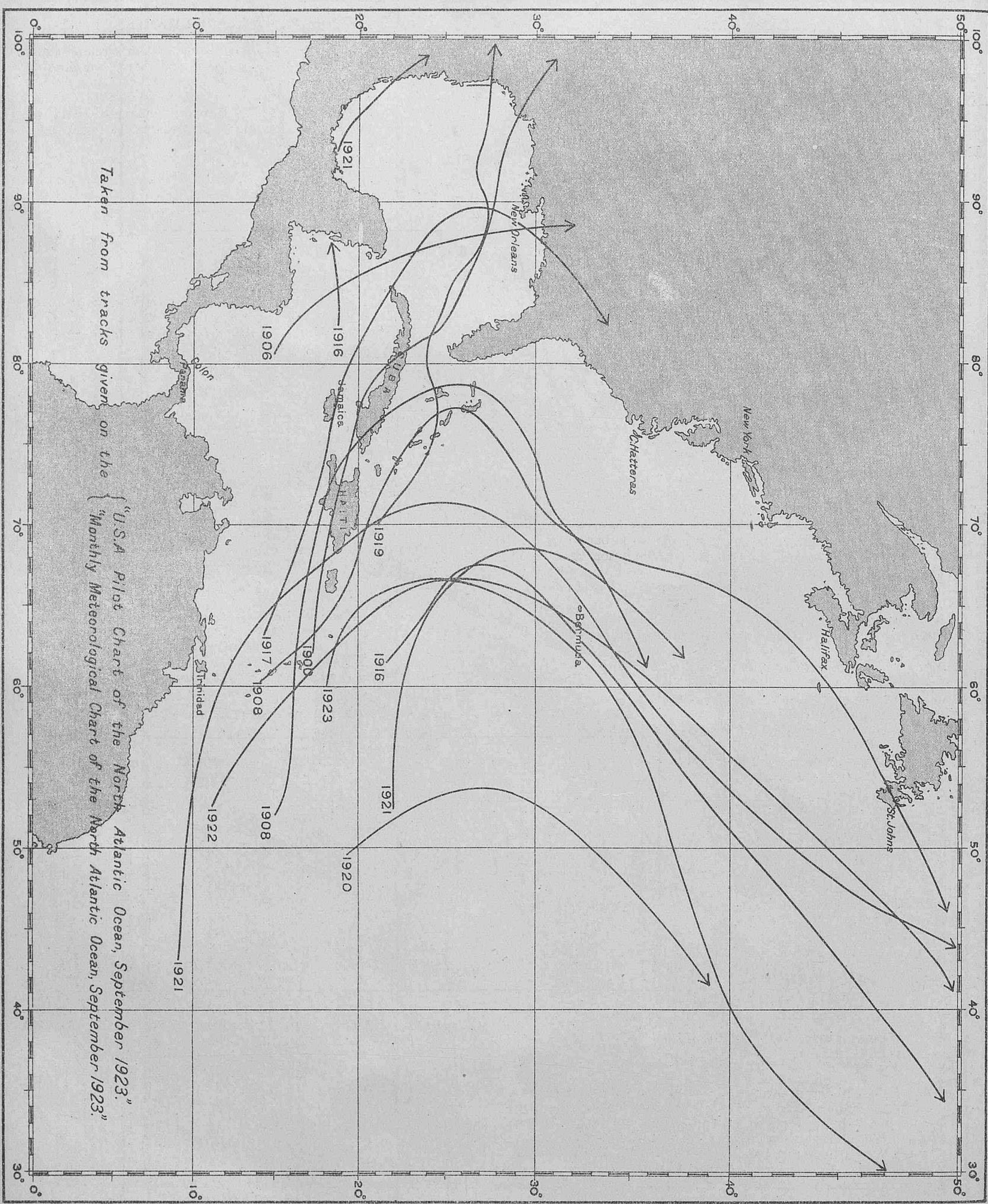
Chart XLIII—"WIRELESS AND WEATHER."

CYCLONE TRACKS OF THE ARABIAN SEA AND BAY OF BENGAL.



Tracks of cyclones which have occurred in the Arabian Sea and Bay of Bengal during the month of September. The year is indicated by the figures at commencement of track.
 Taken from "Hurricanes & Tropical Revolving Storms" (M.O. 220; 1922), and "U.S.A. Pilot Chart of the Indian Ocean," for September 1923.

TRACKS OF WEST INDIAN HURRICANES.



Taken from tracks given on the "U.S.A. Pilot Chart of the North Atlantic Ocean, September 1923." and "Monthly Meteorological Chart of the North Atlantic Ocean, September 1923."

Tracks of Hurricanes which have occurred in the West Indies during the month of September. The year is indicated by the figures at the commencement of track.

NOTICES.

IMPORTANT.

With a view to promoting the interest and usefulness of this Journal, Marine Observers are requested to send in when possible accounts of interesting experiences, remarks upon special phenomena observed, and matters of interest, especially those which affect navigation.

A page for additional remarks will be found at the end of the Meteorological Log, or these can be made separately in manuscript.

Photographs, sketches and weather charts will be most welcome.

CURRENT OBSERVATION.

It is very desirable that good current data should be recorded. Spaces are provided for current experienced throughout the day and for current determined at shorter intervals in Meteorological Logs, while Form 911 (late 121) provides for either or both.

Generally the difference between the *Dead Reckoning Position* at noon, reckoned from previous noon, and the *observed position* has been accepted as attributable to a single current for the whole 24 hours.

It is necessary to make careful distinction between *Dead Reckoning Position* and *Estimated Position*, the former being the position as reckoned from the last fix by courses steered and distances run, corrected for all known errors and disturbances *except* current. When a fix cannot be obtained, an estimation for current (when one is known generally to exist) is sometimes applied to the D.R.; the result may then be conveniently termed the *Estimated Position*.

If this estimated position is given in the Meteorological Log or Form 911 (late 121), it should be clearly stated, otherwise it may be misleading.

Currents of varying velocity and direction may be experienced along the track made in 24 hours; therefore, when reliable fixes such as by Stellar observations at twilight are obtained, the current should be determined for the intervals, and all should be checked with the noon to noon result. Each of these currents determined at shorter intervals than 24 hours should be entered in the Meteorological Log in the appropriate column, and the time and latitude and longitude of each observation position should be given in the latitude and longitude columns. The times given on Form 911 (late 121) indicate the interval. The period of short interval currents should usually not be less than, say, six hours. The best interval is probably from twilight to twilight.

It is desirable that whenever possible two methods of ascertaining the distance run through the water should be used, as recent investigation goes to show that with one means of measuring the speed the inclination has been to credit the ship. When possible it is recommended that both patent log and revolutions should be used.

For working out the set and drift of current the position *from* as well as the position *to* must always be *fixes*. Some observers have used an *estimated position from*, which makes the set and drift false. The same remarks apply to course allowances for set; the latter are naturally necessary to make an *estimated course*.

Vacancy for a Port Meteorological Officer.

The post of Port Meteorological Officer at Liverpool will shortly be vacant.

British born members of the Corps of Regular Voluntary Marine Observers to the British Meteorological Office, Air Ministry, London, who desire to apply for this post, and who hold not less qualifications than a certificate of competency as Master, should write immediately for particulars to the Director of the Meteorological Office, Air Ministry, Kingsway, London, W.C.2.

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 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.

THE BAROMETER.

Before barometer readings are compared with the normal isobars shown on the Meteorological Ocean Charts, transmitted by W/T or plotted on Weather Charts, mercurial barometers should be corrected for height, gravity, temperature and index error, for which tables are given on pp. 80 to 83 and 84 to 86 of the Marine Observer's Handbook. A table for converting inches to millibars is also given below.

Aneroids require to be corrected for height and index error only. They should be frequently compared, as the mechanism is liable to get out of adjustment without detection.

Readings of the barometer should be entered in the Meteorological Log as read—i.e., uncorrected—and the attached thermometer should also be recorded. A column is now also given for the corrected reading, and it will be of great assistance if this is also completed.

While a difference from the pressure values shown on the charts does not necessarily mean unusual weather, when there is a divergence the mariner should be on the alert, particularly within cyclone regions.

It is strongly urged that Marine Observers, whether using Official or Ship's Barometers, for W/T reports, Meteorological Logs or Forms 911, will complete and send in the Blue Post Card, at least once every voyage, so that an effectual check may be kept on the index error.

CONVERSION TABLE.

To Convert Inches into Millibars.

Inch.	mb.	Inch.	mb.	Inch.	mb.
27.50	931.2	28.65	970.2	29.85	1,010.8
27.55	932.9	28.70	971.9	29.90	1,012.5
27.60	934.6	28.75	973.6	29.95	1,014.2
27.65	936.3	28.80	975.3	30.00	1,015.9
27.70	938.0	28.85	976.9	30.05	1,017.6
27.75	939.7	28.90	978.6	30.10	1,019.3
27.80	941.4	28.95	980.3	30.15	1,021.0
27.85	943.1	29.00	982.0	30.20	1,022.7
27.90	944.8	29.05	983.7	30.25	1,024.4
27.95	946.5	29.10	985.4	30.30	1,026.1
28.00	948.2	29.15	987.1	30.35	1,027.7
28.05	949.9	29.20	988.8	30.40	1,029.4
28.10	951.6	29.25	990.5	30.45	1,031.1
28.15	953.2	29.30	992.2	30.50	1,032.8
28.20	954.9	29.35	993.9	30.55	1,034.5
28.25	956.6	29.40	995.6	30.60	1,036.2
28.30	958.3	29.45	997.3	30.65	1,037.9
28.35	960.0	29.50	999.0	30.70	1,039.6
28.40	961.7	29.55	1,000.7	30.75	1,041.3
28.45	963.4	29.60	1,002.4	30.80	1,043.0
28.50	965.1	29.65	1,004.0	30.85	1,044.7
28.55	966.8	29.70	1,005.7	30.90	1,046.4
28.60	968.5	29.75	1,007.4	30.95	1,048.1
		29.80	1,009.1		

ICE CHART.

WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE

- (C) From 1st September to 31st January, inclusive.
- (G) From opening of 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 front page of Ice Chart published with April Marine Observer.

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.

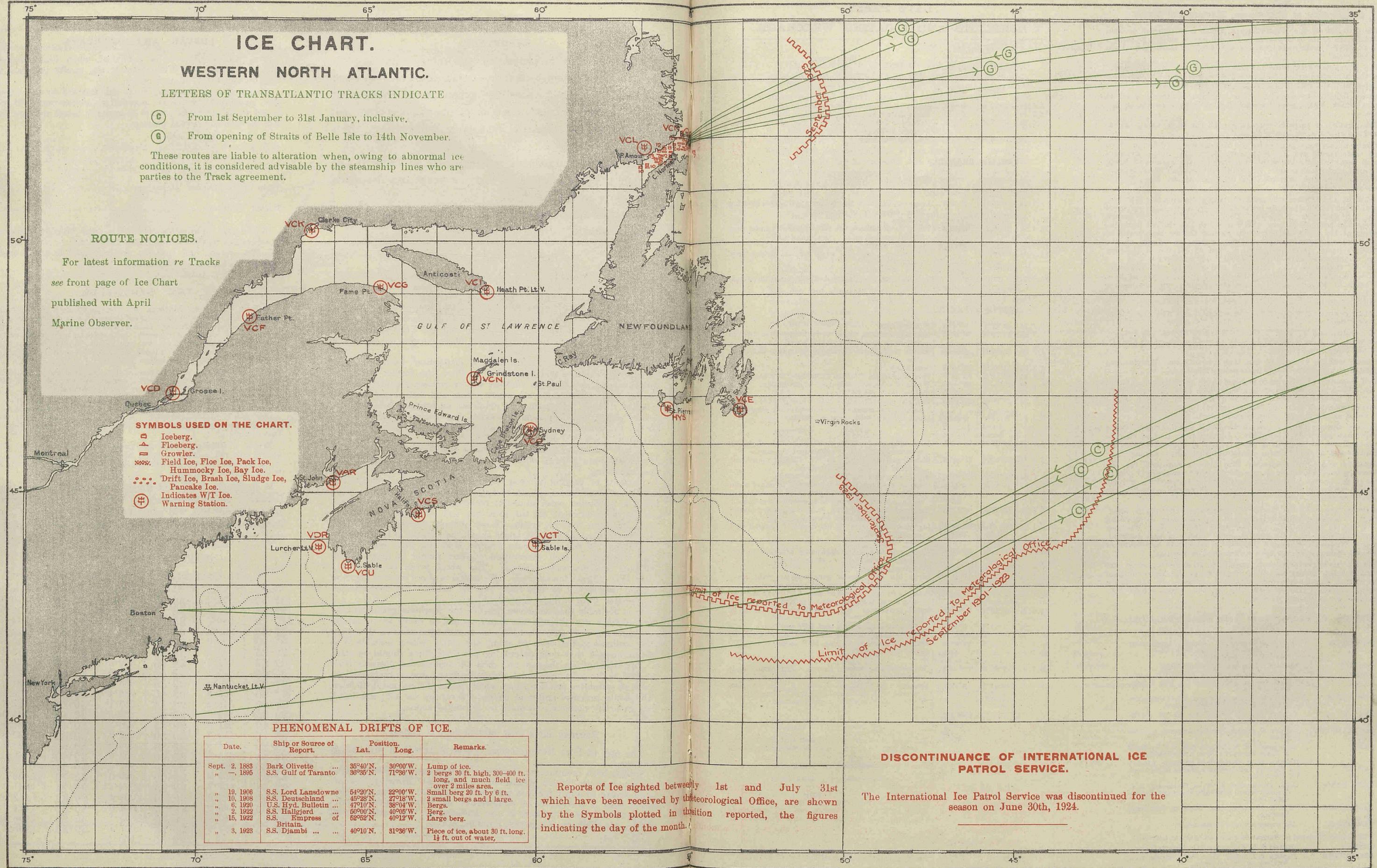
PHENOMENAL DRIFTS OF ICE.

Date.	Ship or Source of Report.	Position.		Remarks.
		Lat.	Long.	
Sept. 2, 1883	Bark Olivette ...	35°40'N.	30°00'W.	Lump of ice.
" - , 1895	S.S. Gulf of Taranto ...	30°35'N.	71°38'W.	2 bergs 30 ft. high, 300-400 ft. long, and much field ice over 2 miles area.
" 19, 1906	S.S. Lord Lansdowne ...	54°20'N.	22°00'W.	Small berg 20 ft. by 6 ft.
" 10, 1908	S.S. Deutschland ...	45°28'N.	27°18'W.	2 small bergs and 1 large.
" 6, 1920	U.S. Hyd. Bulletin ...	47°10'N.	38°04'W.	Bergs.
" 2, 1922	S.S. Halljerd ...	50°00'N.	40°05'W.	Berg.
" 15, 1922	S.S. Empress of Britain ...	52°52'N.	40°12'W.	Large berg.
" 3, 1923	S.S. Djambi ...	40°10'N.	31°36'W.	Piece of ice, about 30 ft. long, 1½ ft. out of water.

Reports of Ice sighted between 1st and July 31st which have been received by the Meteorological Office, are shown by the Symbols plotted in this position reported, the figures indicating the day of the month.

DISCONTINUANCE OF INTERNATIONAL ICE PATROL SERVICE.

The International Ice Patrol Service was discontinued for the season on June 30th, 1924.



Co-operation of Shipowners, Masters and Mates.

The Director of the Meteorological Office is authorised to lend tested Instruments to Captains of British-owned ships who undertake to make 4 hourly observations and keep Meteorological Logs for the Office.

The instruments supplied for this purpose are one barometer, four thermometers with screen, two hydrometers and in some cases a Barograph and rain gauge is added to the equipment.

Tested instruments are also lent to a number of British Atlantic Liners which make special coded W/T weather reports to the Office.

The number of ships co-operating with the M.O. using official tested instruments on loan is limited.

Vessels observing regularly for the Meteorological Office to which office instruments are not lent, keep Form 911, Ships Meteorological Report, using the ship's instruments, the barometer being compared with Standards. The number of ships regularly contributing approved forms of all descriptions to the Marine Division is limited to 500.

Captains and Officers who wish to co-operate with the Meteorological Office should apply by letter to The Director, Meteorological Office, Air Ministry, Kingsway, London, W.C.2; or in person between the hours of 10 a.m. and 4 p.m., to the Marine Superintendent at the same address or to any of the gentlemen whose names and addresses are given below acting as agents at the respective ports. A waiting list is kept of the names of ships whose commanders have offered to regularly co-operate.

Marine Observers (i.e., Captains and Officers who regularly observe for the Meteorological Office) will greatly assist if they will send in Meteorological Logs immediately on completion through the Port Meteorological Officer or Agent, at the same time notifying him of any possible instrumental defects.

Defective instruments will then be replaced and new Log Books, etc., provided.

In London and at base ports where there is not an Agency, notification of defects should be sent to headquarters on arrival, with the Meteorological Log.

Vessels making voyages of less than two months' duration are requested to retain their logs until nearly filled up.

W/T Registers and Forms 911 should in all cases be sent directly to the Meteorological Office, London. The Port Meteorological Officer at Liverpool and the Visiting Officer in London board vessels co-operating with the Meteorological Office, and the agents visit ships at their ports when circumstances permit.

Postage abroad incurred on behalf of the Meteorological Office in returning logs will be refunded. Postage from British Empire ports need not be prepaid, if the envelope is marked O.H.M.S., and addressed to the Director, Meteorological Office, London.

Captains and Officers whether they observe regularly for the Meteorological Office or not are urged to report exceptional phenomena in air or sea. Reports of weather experienced in or near Tropical Cyclones or hurricanes, also abnormal currents are specially desired.

Masters who wish to assist in developing the rapid interchange of Meteorological information and Weather Forecasting at sea can do so by using the standard form of W/T Weather Report suggested in "Weather Signals," given in this Journal, January Number. For this purpose a mercurial barometer of which the index error has been ascertained is essential.

The Marine Observer is sent monthly to all ships regularly contributing Logs, Forms and W/T Registers to the Meteorological Office. It is hoped that each ship will preserve all her copies. Personal copies of Numbers are sent to those whose special contributions are published in them.

Marine Agencies and Port Meteorological Officers.

LIVERPOOL	..	(Port Meteorological Office) Commander G. H. Lloyd, R.D., R.N.R., Dock Office. Telephone No.: Bank 3359.
CARDIFF	..	Captain T. Johnston, Technical College.
LEITH	..	Captains G. Black and C. G. Bonner, V.C., D.S.O., Leith Salvage and Towing Co., Ltd., 2, Commercial Street.
THE CLYDE	..	Captain M. Corrance, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow.
HULL	..	Captain Geo. B. Sturdy, c/o Mr. W. Hakes, Commercial Road.
SOUTHAMPTON	..	Captain D. Forbes, Nautical Academy, 1, Albion Place.
TYNE	..	Commander E. S. Macleod, R.D., R.N.R., Board of Trade Surveyor's Office, North Shields.
DUBLIN	..	Captain M. H. Clarke, Chief Surveyor, Ministry of Industry and Commerce, Marine Department, 27, Eden Quay.
HONG KONG	..	Lieut.-Commander P. W. S. Henderson, R.N., Superintendent, Admiralty Chart and Chronometer Depot.
VANCOUVER	..	T. S. H. Shearman, Esq., Room 40, Post Office Building.
AUSTRALIA	..	The Commonwealth Meteorologist.

The Deputy Directors of Navigation act as sub-agents as follows :-

SYDNEY	..	Captain G. D. Williams, D.S.O., Customs House.
MELBOURNE	..	Captain L. J. Bolger, Electricity Commissioners Building, 22, William Street.
FREEMANTLE	..	Captain J. J. Airey, Dalgety's Buildings.

LATE PRESS.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
NORTH SEA.			
3.7.24	53°32'N.	5°05'E.	One conical buoy and two others.
12.7.24	57°45'N.	2°01'W.	Motor drifter <i>Friendship BF 464</i> on fire.
16.7.24	56°58'N.	7°08'E.	Upturned boat, about 20 ft. long, bottom painted green, and topsides black.
20.7.24	51°50'N.	1°34'E.	Floating wreckage.
ENGLISH CHANNEL.			
4.7.24	Casquets N. by E. $\frac{1}{2}$ E. distance $6\frac{1}{2}$ m.	bearing	Square spar 25 ft. in length.
9.7.24	50°13'N.	1°00'W.	Large object, shape resembling a cylindrical mooring buoy, dangerous to small craft.
10.7.24	50°49'N.	0°57'E.	Wreckage.
12.7.24	50°23'N.	0°40'W.	Large metal pontoon life raft, apparently some time in water.
19.7.24	50°27'N.	1°40 $\frac{1}{2}$ 'W.	Spar buoy, adrift.
21.7.24	Shambles bearing N.W. $\frac{1}{2}$ W. mag. $3\frac{1}{2}$ m.	Lt. - V.	Can shaped, black and white vertical striped buoy, marked 4.
26.7.24	2 miles N. of Casquets.		Vessel's mast, standing on end, dangerous to navigation.
NORTH ATLANTIC.			
1.7.24	43°47'N.	9°07'W.	Floating spar.
1.7.24	44°32'N.	36°20'W.	Floating derelict, about 60 ft. long. Port foreside projecting about 12 ft. out of water.
1.7.24	51°56'N.	6°54'W.	Sailing yacht, <i>Siren</i> abandoned, dangerous to navigation.
3.7.24	41°25'N.	43°18'W.	Spar buoy.
3.7.24	43°12'N.	66°32'W.	Spar, apparently attached submerged wreckage.
4.7.24	13°—'N.	65°—'W.	Wreck of schooner, dangerous to navigation.
5.7.24	40°37'N.	62°20'W.	Red gas buoy <i>No. 19</i> , adrift.
5.7.24	31°20'N.	13°26'W.	Drifting can buoy, rusty with white patches on end, covered with marine growth underneath, dangerous.
6.7.24	Winter Shoal bearing 40° 8 m.	Quarter Lt. - V.	Large life raft, with no name visible.
6.7.24	36°27'N.	73°26'W.	Mast projecting about about 4 ft. out of water, apparently attached to submerged wreckage.
6.7.24	37°40'N.	74°21'W.	Passed spar projecting 6 ft. out of water, apparently attached to submerged wreckage.
9.7.24	51°15'N.	14°04'W.	Light buoy, showing 15 ft. above water.
9.7.24	36°38'N.	75°09'W.	Piece of wreckage projecting about 4 ft. out of water which looked like a stern post of small vessel, and was apparently attached to submerged wreckage.
10.7.24	46°53'N.	23°57'W.	Large cylindrical mooring buoy, rusty heavy marine growth, letters <i>Savo</i> in white near ring.
13.7.24	2 m. S. of Sombrero Reef, Florida		Log about 30 ft. long, 14 ins. diameter, covered with marine growth.
16.7.24	40°12'N.	68°51'W.	Spar projecting 2 ft., apparently attached to submerged wreckage.
17.7.24	50°41'N.	5°12'W.	Submerged wreckage.
18.7.24	46°06'N.	11°51'W.	Large can buoy, lower part covered with heavy growth of weed, dangerous to navigation.
20.7.24	49°05'N.	6°40'W.	Staff, 12 ft. high with code flags <i>KW</i> flying and two black buoys floating, attached to staff.
21.7.24	55°48'N.	10°41'W.	Large cylindrical body covered with barnacles on bottom.
24.7.24	51°36'N.	3°03'W.	Red spherical buoy with staff cage and flag.
24.7.24	49°50'N.	10°40'W.	Red round buoy, floating about 3 ft. out of water.
25.7.24	52°45'N.	12°20'W.	Floating derelict 40 ft. long, 20 ft. wide.
25.7.24	4 m. 294° from Oversay Lt.		Passed derelict buoy.
26.7.24	41°55'N.	10°46'W.	Derelict sailing vessel, <i>Governor Parr</i> , completely waterlogged and dismantled, no life on board.
26.7.24	49°47'N.	9°10'W.	Floating spar about 45 ft. long, 2 ft. in diameter, covered with shells and sea growth, dangerous.
MEDITERRANEAN.			
10.7.24	36°21'N.	13°45'E.	Italian S.S. <i>Ofanto</i> .
10.7.24	36°30'N.	2°36'W.	Red buoy surmounted by a staff with red flag and black ball in centre, letter <i>M</i> , word <i>telegraph</i> in white letters.
17.7.24	38°—'N.	1°—'E.	Wreckage not identified.
GULF OF MEXICO.			
3.7.24	24°36'N.	83°20'W.	Part of lower mast, about 40 ft. long.
8.7.24	18°31'N.	85°38'W.	Wreck of 4 masted schooner, fore and main masts standing, hull showing a freeboard of about 10 ft.
NORTH PACIFIC.			
4.7.24	20 m. S. of Umaitilla Reef Lt.-V.		Black spar, projecting about 2 ft. out of water.

LIST OF VOLUNTARY OBSERVING SHIPS.

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 reports received, are given with the date and description of last log, register or report 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 reports 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.

Unless otherwise stated, vessels on the following list are s.s.

M.L. = Equipped with tested Instruments for keeping Meteorological Log.

W.T. = Equipped with tested Instruments for making coded W/T reports to the Meteorological Office, London.

No. = Keeps Ship's Meteorological Report Form 911 with ship's instruments.

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

The numbers which appear before the names of ships equipped for making coded W/T reports to the Meteorological Office, London, are used for the purpose of identification when the observations are re-transmitted in synoptic messages by Wireless or Cable.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Aba</i> ...	Hughes, J. ...	W. J. Dodd ...	No.	Elder Dempster ...	Form 911 2.5.24 to 6.6.24 ...	12.6.24.
<i>Abinsi</i> ...	Wright, J. B. ...	V. Baddeley ...	"	Elder Dempster ...	" 12.12.23 to 18.1.24 ...	25.1.24.
<i>Actor</i> ...	Haylett, E. ...	G. Kent ...	"	Harrison ...	" 19.1.24 to 7.3.24 ...	1.4.24.
<i>Adda</i> ...	Toft ...	G. R. Langmaid ...	"	Elder Dempster ...	" ...	"
50 <i>Adriatic</i> ...	Beadnell, F. E., Hickson, V. W. ...	J. Collins, A. W. C. Robinson, J. Farrell.	W.T.	White Star ...	W.T. Reg. 11.6.24 to 14.6.24 ... Form 911 24.6.24 to 12.7.24 ... 24.5.24 to 15.6.24 ...	19.6.24. 15.7.24. 18.6.24.
<i>Agapenor</i> ...	Ramsay, J. ...	J. P. Makepeace ...	No.	A. Holt ...	" 4.5.24 to 23.5.24 ...	17.6.24.
<i>Alban</i> ...	Whayman, W. R. ...	R. Griffiths ...	"	Booth ...	" 21.2.24 to 15.4.24 ...	22.4.24.
<i>Albania</i> ...	Gibbons, G., R.D., Commr., R.N.R.	C. B. Osborne ...	"	Cunard ...	" 16.5.24 to 9.6.24 ...	13.6.24.
<i>Algerian Prince</i> ...	Rowlands, D. ...	G. Potts ...	"	Prince ...	" 8.4.24 to 21.4.24 ...	23.4.24.
<i>Alipore</i> ...	Gordon, L. M., R.D., Commr., R.N.R.	H. D. Case ...	"	P. and O. ...	" 24.4.24 to 15.6.24 ...	14.7.24.
<i>Almanzora</i> ...	Mackenzie, G. A. ...	H. Chamberlain ...	"	R.M.S.P. ...	" 15.2.24 to 3.4.24 ...	8.4.24.
<i>Alondra</i> ...	Pope, G. F. ...	H. Peters ...	"	Yeoward ...	" 15.6.24 to 5.7.24 ...	14.7.24.
<i>Ampetco</i> ...	Verstichelen, A. ...	R. Janssen ...	"	American Petroleum ...	" 21.2.24 to 13.4.24 ...	14.5.24.
<i>Anglia</i> ...	Sorge, P. ...	W. H. Hughes ...	C.C.	L.M. & S. Rly.	Telegraphic Report 11.4.24 ...	11.4.24.
<i>Antiochus</i> ...	Sprott, E. J. ...	J. J. Daniel ...	No.	A. Holt ...	Form 911 22.1.24 to 16.4.24 ...	23.4.24.
<i>Appam</i> ...	Yardley, H. A. ...	" ...	M.L.	Elder Dempster ...	Met. Log. 23.1.24 to 22.6.24 ...	8.7.24.
30 <i>Aquitania</i> ...	Millsom, H., Charles, Sir J. T., W., K.B.E., C.B., R.D., Commadore, R.N.R.	J. L. Croasdale, P. O. Davis, J. Locke.	W.T.	Cunard ...	W.T. Reg. 3.6.24 to 23.6.24 ... 27.4.24 to 12.5.24 ...	26.6.24. 16.5.24.
<i>Arafura</i> ...	Gordon, A. S. ...	H. Jeans ...	No.	Eastern and Australian	Form 911 9.2.24 to 1.5.24 ...	30.6.24.
<i>Arana</i> ...	Moir, A. G. ...	R. Jones ...	"	R.M.S.P. ...	" ...	"
<i>Armada Castle</i> ...	George, J., O.B.E.	L. G. May ...	"	Union Castle ...	Form 911 30.5.24 to 16.6.24 ...	8.7.24.
<i>Arracan</i> ...	Willis, M. ...	R. MacInnes, H. Poole, D. Trame, A. Olding.	M.L.	P. Henderson ...	Met. Log. 26.1.24 to 24.4.24 ...	5.5.24.
<i>Arundel</i> ...	Short, H. ...	Mr. Hill ...	C.C.	Southern Rly.	Telegraphic Report 15.7.24 ...	15.7.24.
<i>Arundel Castle</i> ...	Hague, J. W., Capt., R.N.R.	G. Blaiklock, C. Williams, C. Keen.	M.L.	Union Castle ...	Met. Log. 21.12.23 to 20.4.24 ...	8.5.24.
<i>Assyria</i> ...	Erskine, R. ...	J. Hamilton ...	No.	Anchor ...	Form 911 6.6.24 to 1.7.24 ...	7.7.24.
<i>Astronomer</i> ...	Booth, W. M. ...	E. S. Machon, W. Weatherall, J. Jackson.	M.L.	Harrison ...	Met. Log. 20.3.24 to 10.6.24 ...	19.6.24.
<i>Athenic</i> ...	Jones, J. L. ...	W. Hill ...	No.	White Star ...	Form 911 2.5.24 to 16.5.24 ...	10.6.24.
<i>Atsuta Maru</i> ...	Saito, B. ...	S. Mizogucki ...	"	Nippon Yusen Kaisha	" 27.5.24 to 29.6.24 ...	1.7.24.
<i>Auditor</i> ...	Owen, W. F. ...	" ...	"	Harrison ...	" ...	"
<i>Auldmuir</i> ...	Ramsay, J. D. ...	P. D. Thompson ...	"	Glen & Co. ...	Form 911 21.6.24 to 2.7.24 ...	7.7.24.
<i>Ausonia</i> ...	Brown, F. G., R.D., Capt., R.N.R.	R. O. Young ...	"	Cunard ...	" 19.6.24 to 7.7.24 ...	14.7.24.
<i>Author</i> ...	Kinlock, R. ...	A. Goddard ...	"	Harrison ...	" 29.8.23 to 7.10.23 ...	12.10.23.
<i>Ballena</i> ...	Pape, E. R. ...	W. Webster ...	"	P.S.N. Co. ...	" 19.9.23 to 11.10.23 ...	15.10.23.
51 <i>Baltic</i> ...	Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R.	E. S. Bell, E. A. A. Crowley, J. Law.	W.T.	White Star ...	W.T. Reg. 8.6.24 to 29.6.24 ... Form 911 8.6.24 to 29.6.24 ...	1.7.24. 1.7.24.
<i>Bambra</i> ...	Wyles, W. S. ...	H. W. Norris, F. Humble, J. E. Turner, P. Bolton.	M.L.	State Service, Australia	Met. Log. 8.6.23 to 14.10.23 ...	11.12.23.
<i>Bampton Castle</i> ...	Swiney, W. A. ...	F. Norfolk, L. C. Chapman, H. A. Deller, E. Crocker, C. B. Hoggan.	"	Union Castle ...	" 21.2.23 to 3.5.23 ... 2.9.23 to 9.12.23 ...	28.1.24.
<i>Banbury Castle</i> ...	" ...	C. C. Page ...	No.	" ...	" ...	"
<i>Banffshire</i> ...	Wynne, R. H. ...	L. W. Evans ...	"	Turnbull Martin ...	Form 911 8.4.24 to 29.4.24 ...	2.6.24.
<i>Barambah</i> ...	Mayne, W. ...	T. Swann ...	"	Commonwealth Govt.	" 4.8.23 to 5.9.23 ...	16.10.23.
<i>Baron Cuvador</i> ...	Baillie, T. ...	A. Campbell ...	"	Hogarth & Sons ...	" 16.1.24 to 28.1.24 ...	11.3.24.
<i>Beaufort</i> ...	Knowles, C. H., D.S.O., Commr., R.N.	H. L. Wheeler ...	M.L.	His Majesty's Ship ...	Met. Log. 31.7.22 to 3.10.22 ...	10.10.22.
<i>Belgenland</i> ...	Bradshaw, J. ...	C. J. Murray, J. M. Appleby, W. E. Hesketh.	"	Red Star ...	" 21.9.23 to 21.4.24 ...	27.5.24.
<i>Bellai, Ketch</i> ...	Algarsson, G. ...	J. B. Hewson ...	No.	Algarsson Expedition, 1924.	" ...	"

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Benalder</i> ...	Cole, J. H., D.S.C....	A. K. Watson ...	No.	Ben Line ...	Form 911 17.5.24 to 29.5.24 ...	15.7.24.
<i>Benedict</i> ...	Aspinall, W. ...	H. R. Mackay, K. S. Monro ...	"	Booth ...	" 17.6.23 to 13.8.23 ...	27.8.23.
<i>Bengloe</i> ...	McCorquodale, A. ...	G. M. Duff ...	"	Ben Line ...	" 4.5.24 to 29.5.24 ...	12.6.24.
31 <i>Berengaria</i> ...	Irvine, W. R. D., R.D. Capt., R.N.R.	G. H. Jones, R. F. Bovey, W. C. A. Robson.	W.T.	Cunard ...	W.T. Reg. 25.5.24 to 9.6.24 ... " 15.6.24 to 1.7.24 ...	13.6.24. 5.7.24.
<i>Bernini</i> ...	Evans, W. ...	H. L. Rudd ...	No.	Lampport & Holt ...	Form 911 16.1.24 to 1.5.24 ...	28.5.24.
<i>Berrima</i> ...	Hussey Cooper, E. M., R.D., Commr., R.N.R.	C. C. Smith, F. W. Walsh ...	"	P. & O. Branch ...	" 16.5.24 to 8.6.24 ...	15.7.24.
<i>Bolingbroke</i> ...	Aikman, E. ...	W. P. Phillips, J. Mackenzie, A. H. Piggott, R. Hodder.	M.L.	Canadian Pacific ...	Met. Log. 31.10.23 to 26.5.24...	2.7.24.
<i>Borda</i> ...	Holland, R. ...	...	No.	P. & O. Branch ...	Form 911 18.10.23 to 24.2.24...	29.2.24.
<i>Bothwell</i> ...	Dott, J. F. ...	K. Hutchings ...	No.	Canadian Pacific ...	" 17.5.24 to 29.5.24 ...	3.6.24.
<i>Brandon</i> ...	Freer, A., R.D., Commr., R.N.R.	J. Mackenzie ...	"	" ...	" 21.10.23 to 20.11.23	27.11.23.
<i>Brecon</i> ...	McDonald, J. ...	N. B. Glennie, W. W. J. Evans, W. J. P. Roberts.	M.L.	" ...	Met. Log. 20.9.23 to 6.5.24 ...	8.5.24.
<i>Brenda</i> ...	Murdoch, R. G. ...	...	...	Scottish Fishery Board ...	...	...
<i>Brighton</i> ...	Hill, A. ...	Mr. Munton ...	C.C.	Southern Railway ...	Telegraphic Report 29.6.24 ...	29.6.24.
<i>British Engineer</i> ...	Piper, H. C. ...	A. Campbell ...	No.	British Tankers ...	Form 911 20.5.24 to 18.6.24 ...	20.6.24.
<i>British Lantern</i> ...	Taylor, R. J. ...	C. O. Tucker ...	"	" ...	" 28.2.24 to 23.4.24 ...	5.5.24.
<i>Browning</i> ...	Comorton, C. A. ...	G. F. V. Peck ...	"	Lampport & Holt ...	" 26.4.24 to 23.5.24 ...	27.5.24.
<i>Bruyere</i> ...	Heasley, W. S. ...	A. G. Kennedy ...	"	" ...	" 25.4.24 to 30.6.24 ...	17.7.24.
<i>Cabotia</i> ...	Lawson, P. ...	T. G. Menzies ...	No.	Anchor Donaldson ...	Form 911 14.6.24 to 24.6.24 ...	8.7.24.
<i>Cambria C.S.</i> ...	Wightman, H. G. E., D.S.C.	E. N. L. Staples ...	M.L.	Eastern Tel. Co. ...	Met. Log. 1.12.23 to 28.3.24 ...	23.4.24.
<i>Cambria</i> ...	...	V. S. Phillips ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report 4.7.24 ...	4.7.24.
<i>Camito</i> ...	Sudamore, J. H. H., D. S. C., R. D., Commr., R.N.R.	D. A. Jack, R. M. Cossantine, S. Borrie.	M.L.	Elders & Fyfes ...	Met. Log. 2.3.24 to 28.6.24 ...	2.7.24.
<i>Canada</i> ...	Jones, T. ...	F. W. Laws ...	No.	White Star-Dominion ...	Form 911 14.6.24 to 5.7.24 ...	8.7.24.
<i>Canadian Inventor</i> ...	Roberts, R. P. ...	S. M. Holinden ...	"	Canadian Govt. Mer- chant Marine.	" 16.12.23 to 6.2.24 ...	24.3.24.
<i>Canadian Scottish</i> ...	Harris, G. W. ...	S. Fieldhouse ...	"	" ...	" 22.12.23 to 26.2.24 ...	21.5.24.
<i>Canadian Skir- misher.</i> ...	Millar, W. H. ...	J. Moller... ..	"	" ...	" 17.5.24 to 19.6.24 ...	24.6.24.
<i>Canadian Winner</i> ...	Hocking, N. P. ...	R. D. Ranns ...	"	" ...	" 31.3.24 to 19.5.24 ...	18.6.24.
<i>Carlow Castle</i> ...	...	R. C. Longman ...	"	Union Castle ...	...	...
35 <i>Carmania</i> ...	McNeil, S. G. S., R.D., Capt., R.N.R.	A. T. Hamer, L. R. Allen, P. J. Robinson.	W.T.	Cunard ...	W.T. Reg. 16.5.24 to 3.6.24 ... Form 911 16.5.24 to 4.6.24 ...	10.6.24. 10.6.24.
34 <i>Caronia</i> ...	Diggle, E. G., R.D., Capt., R.N.R.	D. W. Sorrell, J. A. Quarrie, E. R. Taylor.	W.T.	Cunard ...	W.T. Reg. 30.5.24 to 18.6.24 ... " 25.6.24 to 11.7.24 ...	20.6.24. 14.7.24.
<i>Cassandra</i> ...	Mitchell, W. E. ...	G. M. Sime ...	No.	Anchor Donaldson ...	Form 911 1.5.24 to 25.5.24 ...	27.5.24.
52 <i>Cedric</i> ...	Marshall, W., D.S.O., R.D., Capt., R.N.R.	A. E. Weller, J. A. Heenan, A. E. Harvey.	W.T.	White Star ...	W.T. Reg. 2.6.24 to 21.6.24 ... Form 911 1.6.24 to 21.6.24 ...	24.6.24. 24.6.24.
53 <i>Celtic</i> ...	Holme, A. ...	R. S. Walker, G. T. Kavanagh, D. W. Chamberlain.	W.T.	" ...	W.T. Reg. 16.6.24 to 5.7.24 ... Form 911 15.6.24 to 5.7.24 ...	8.7.24. 8.7.24.
<i>Ceramic</i> ...	Symons, J. ...	H. Williams ...	No.	" ...	" 27.1.24 to 21.5.24 ...	26.5.24.
<i>Changsha</i> ...	Frame, A. M. ...	...	M.L.	Yuill & Co. ...	" 26.5.23 to 30.9.23 ...	23.1.24.
<i>Charon</i> ...	Sturrock, — ...	...	No.	Dalgety & Co. ...	...	...
<i>Chignecto</i> ...	Green, J. ...	A. F. Walker ...	"	R.M.S.P. Co. ...	Form 911 19.1.24 to 26.2.24 ...	7.4.24.
<i>China</i> ...	King, A. M., D.S.C.	E. Cox Walker ...	"	P. & O. ...	" 9.4.24 to 20.5.24 ...	26.5.24.
<i>Chindwara</i> ...	Le Bas, — ...	T. Mather ...	"	British India ...	" 24.4.24 to 23.5.24 ...	1.7.24.
<i>Chindwin</i> ...	Esslemont, C. ...	J. Walker, J. Summers, W. Wilson, A. McCallum.	M.L.	P. Henderson ...	Met. Log. 12.1.24 to 27.3.24 ...	4.4.24.
<i>Chinkua</i> ...	Byers, G. ...	Mr. Cook, Mr. Wherny ...	No.	China Nav. Co. ...	" 26.7.23 to 8.12.23 ...	24.4.24.
<i>City of Alexandria</i> ...	Bedford, G. B. ...	T. C. Higgins ...	No.	Ellerman ...	...	...
<i>City of Baroda</i> ...	...	A. V. Radcliffe, R. J. Wittou, A. B. Carson.	M.L.	" ...	Met. Log. 20.6.23 to 15.9.23 ...	4.10.23.
<i>City of Batavia</i> ...	Spencer, H. ...	B. Moloney ...	No.	" ...	Form 911 23.1.24 to 22.2.24 ...	26.2.24.
<i>City of Benares</i> ...	Macdonald, K., O.B.E.	A. A. Fullerton ...	"	" ...	" 6.2.24 to 7.3.24 ...	14.3.24.
<i>City of Brisbane</i> ...	Pine, R. ...	W. Robinson ...	"	" ...	" 23.11.23 to 14.12.23	12.2.24.
<i>City of Canterbury</i> ...	Bremner, D. M. ...	A. M. Hamilton ...	"	" ...	" 3.12.23 to 12.3.24 ...	7.4.24.
<i>City of Chester</i> ...	Teague, R. E. ...	F. C. Wilson, ...	M.L.	" ...	Met. Log. 22.12.23 to 4.4.24 ...	8.4.24.
<i>City of Dunkirk</i> ...	Seaborne, F. O. ...	W. Leadbeater ...	No.	" ...	Form 911 21.9.23 to 4.10.23 ...	17.10.23.
<i>City of London</i> ...	Martin, D. ...	C. Inglis ...	"	" ...	" 3.4.24 to 29.4.24 ...	8.5.24.
<i>City of Marseilles</i> ...	Brown, G. ...	G. M. Womersley ...	"	" ...	" 23.2.24 to 12.3.24 ...	17.3.24.
<i>City of Newcastle</i> ...	Oliver, R. E., D.S.C.	C. Paton ...	"	" ...	" 26.9.23 to 22.10.23...	31.10.23.
<i>City of Rangoon</i> ...	Williams, T. L. ...	W. Ibbotson, S. L. Hoare, T. A. Dexter.	M.L.	" ...	Met. Log. 25.4.23 to 9.8.23 ...	16.8.23.
<i>City of Valencia</i> ...	Williamson, W. A., R.D., Lieut.- Commr. R.N.R.	J. J. McTigue ...	No.	" ...	Form 911 27.1.24 to 3.4.24 ...	7.4.24.
<i>City of Yokohama</i> ...	Jinks, J. W. ...	B. Moloney ...	"	" ...	" 18.5.24 to 1.6.24 ...	12.6.24.
<i>Clan Buchanan</i> ...	George, L. S. ...	P. G. de Gruchy ...	"	Clan ...	" 11.10.23 to 10.1.24...	14.1.24.
<i>Clan Lindsay</i> ...	Baker, C. W. ...	S. J. Shennan ...	"	" ...	" 17.5.24 to 27.5.24 ...	30.5.24.
<i>Clan Macbeth</i> ...	Young, A. H., R.D., Lieut.-Commr., R.N.R.	D. S. Rae, S. T. Strange, L. L. Davis.	"	" ...	" 8.5.24 to 23.5.24 ...	4.6.24.
<i>Clan Macgillivray</i> ...	West, W. F. ...	P. G. de Gruchy ...	"	" ...	" 25.4.24 to 22.5.24 ...	3.6.24.
<i>Clan Macindoe</i> ...	Miller, W. ...	G. H. Johnson ...	"	" ...	" 9.4.24 to 6.5.24 ...	3.6.24.
<i>Clan Mackellar</i> ...	Cowie, J. G. ...	C. W. Banbury, W. S. Simpson	"	" ...	" 1.4.24 to 13.4.24 ...	5.5.24.
<i>Clan Mackenzie</i> ...	Young, G. ...	W. G. Arthur, J. M. Lorimer	"	" ...	" 10.5.24 to 10.6.24 ...	12.6.24.
<i>Clan Mackinnon</i> ...	Thomson, W. ...	V. Wilson, W. S. Holden, T. Kay.	M.L.	" ...	Met. Log. 6.9.23 to 24.2.24 ...	27.2.24.
<i>Clan Macnaughton</i> ...	Gray, J. N. ...	A. G. Storkey, F. Burnes ...	No.	" ...	Form 911 19.1.24 to 24.2.24 ...	26.2.24.
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	P. H. Aydon, J. H. Mellor, J. Maedougall.	M.L.	" ...	Met. Log. 26.5.23 to 21.11.23...	17.1.24.
<i>Clan Macvicar</i> ...	Phillips, G. P. ...	L. S. Murrin ...	No.	" ...	Form 911 14.5.24 to 11.6.24 ...	13.6.24.
<i>Clan Malcolm</i> ...	Higgins, C. J. ...	T. G. Young, A. Cameron ...	M.L.	" ...	Met. Log. 22.12.24 to 31.3.24...	3.4.24.
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	D. A. Evans ...	No.	" ...	Form 911 14.5.24 to 8.6.24 ...	1.7.24.
<i>Clan Murdoch</i> ...	Pagan, J. C. ...	R. E. Owen ...	"	" ...	" 10.6.24 to 10.7.24 ...	14.7.24.
<i>Clan Ranald</i> ...	Henderson, C. W. ...	P. J. Green ...	"	" ...	" 8.12.23 to 22.1.24 ...	28.1.24.
<i>Clan Ross</i> ...	Christian, W. G. M.	S. M. Werrey Easterbrook ...	"	" ...	" 3.8.23 to 8.10.23 ...	19.10.23.
<i>Clan Stclair</i> ...	Nell, G. A. ...	F. B. Parker ...	"	" ...	" 7.6.24 to 19.6.24 ...	30.6.24.
<i>Clan Urquhart</i> ...	Sharpland, C. C. ...	R. H. Law ...	"	" ...	" 9.2.24 to 23.4.24 ...	9.5.24.
<i>Colonia, C.S.</i> ...	Campos, V., O.B.E., R.N.R.	S. A. Garnham, A. S. Muir, W. E. Allen, S. Hall.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 27.10.23 to 22.11.23	26.11.23.
<i>Colonia</i> ...	Barrow, R. K. ...	A. V. Jones ...	No.	Harrison ...	Form 911 15.9.23 to 29.11.23...	20.12.23.
<i>Colonian</i> ...	Gittins, R. P. ...	J. Crangle ...	"	Leyland ...	" 30.5.24 to 25.6.24 ...	2.7.24.

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Columbia</i> ...	Gemmell, W. ...	S. G. Taylor ...	No.	Anchor ...	Form 911 31.5.24 to 23.6.24 ...	26.6.24.
<i>Comino</i> ...	Nuttall, E. L. ...	A. McVicar ...	"	Furness Withy ...	" 7.3.24 to 13.4.24 ...	5.5.24.
<i>Cooee</i> ...	Festa, M. ...	C. Keen, D. C. Rees ...	"	Commonwealth Govt. ...	" 29.6.23 to 16.8.23 ...	8.10.23.
<i>Corinthic</i> ...	Hart, F. ...	W. T. Fitzgerald, M. Bennett, F. G. Rogers. ...	M.L.	White Star ...	Met. Log. 29.12.23 to 8.4.24 ...	12.5.24.
<i>Cornish City</i> ...	Bowen, T. S. ...	G. S. Dawes ...	No.	Reardon Smith ...	Form 911 8.1.24 to 16.2.24 ...	7.4.24.
<i>Cornwall</i> ...	Robertson, H. W. ...	W. W. Glover ...	"	Dowie, J., & Co. ...	" 5.3.24 to 12.4.24 ...	22.4.24.
<i>Crawford Castle</i> ...	Sinclair, G. ...	J. C. Brown ...	"	Union Castle ...	" 18.4.24 to 8.5.24 ...	10.6.24.
<i>Culebra</i> ...	Mackay, A. S. ...	... ..	"	R.M.S.P. Co. ...	... ..	...
<i>Cyclops</i> ...	Cosker, W. ...	R. W. Ellis ...	"	A. Holt ...	Form 911 29.4.24 to 26.5.24 ...	23.6.24.
<i>Dardanus</i> ...	Shaw, A. T. ...	... ..	No.	A. Holt ...	" 11.5.23 to 11.7.24 ...	17.7.24.
<i>Darian</i> ...	Masters, W. ...	G. F. Parkinson ...	"	Lyland ...	" 14.6.24 to 24.6.24 ...	5.5.24.
<i>Darro</i> ...	Smith, W. E., D.S.O., R.D., Capt., R.N.R. ...	E. H. Giller ...	"	R.M.S.P. Co. ...	" 6.4.24 to 30.5.24 ...	12.6.24.
<i>Daytonian</i> ...	Walker, C. J., D.S.O. ...	W. T. Godwin ...	"	Lyland ...	" 22.5.24 to 1.6.24 ...	19.6.24.
<i>Delta</i> ...	Brooks, C., D.S.O., R.D., Commr., R.N.R. ...	J. O. V. Young ...	"	P. & O. ...	" 3.5.24 to 12.6.24 ...	1.7.24.
<i>Demerara</i> ...	Hill, T. A. ...	A. Hambly ...	"	R.M.S.P. Co. ...	" 20.5.24 to 12.7.24 ...	14.7.24.
<i>Demosthenes</i> ...	Williams, W. J. ...	R. A. Alcock ...	"	Aberdeen ...	" 28.4.24 to 17.5.24 ...	10.6.24.
<i>Deseado</i> ...	Wakeman, E. C. ...	F. Collinson, W. Scott ...	"	R.M.S.P. Co. ...	" 20.4.24 to 15.6.24 ...	17.6.24.
<i>Desna</i> ...	Adam, C., R.D., Commr., R.N.R. ...	H. D. Jackman ...	"	" ...	" 3.5.24 to 28.6.24 ...	1.7.24.
<i>Deucation</i> ...	Findlay, J. ...	P. W. Savery, O. Thomas ...	"	A. Holt ...	" 17.5.24 to 5.6.24 ...	16.7.24.
<i>Devon</i> ...	Gardner, H. W. ...	A. Bell ...	"	New Zealand S.S. Co. ...	" 20.12.23 to 11.5.24 ...	4.6.24.
<i>Dieppe</i> ...	Marmery, S. ...	Mr. Parsons ...	C.C.	Southern Railway ...	Telegraphic Report. 17.7.24 ...	17.7.24.
<i>Diegby</i> ...	Chambers, F. W., D.S.C. ...	J. Pascoe, J. W. Murphy, W. P. Paterson. ...	M.L.	Furness Withy ...	Met. Log. 2.10.23 to 8.4.24 ...	22.4.24.
<i>Dimboola</i> ...	Roy, C. M. ...	G. N. Baker ...	No.	Melbourne S.S. Co. ...	Form 911 9.5.24 to 4.6.24 ...	7.7.24.
<i>Discoverer</i> ...	King, J. T. ...	J. Stanhope ...	"	Harrison ...	" 8.1.24 to 8.4.24 ...	14.4.24.
<i>Dogra</i> ...	Hartock, L. ...	E. C. Akers ...	"	Asiatic S.N. Co. ...	" 26.4.24 to 8.5.24 ...	10.6.24.
<i>Domala, M.V.</i> ...	Whittingham, W. E., O.B.E., R.D., Commr. R.N.R. ...	C. E. Merchant ...	"	British India ...	" 12.1.24 to 6.2.24 ...	18.3.24.
<i>Doric</i> ...	Davies, J. ...	A. Thompson ...	"	White Star ...	" 25.5.24 to 12.7.24 ...	15.7.24.
<i>Dorington Court</i> ...	Isaacs, W. A. ...	E. V. Quickenden ...	"	Haldin & Co. ...	" 3.5.24 to 27.5.24 ...	26.6.24.
<i>Dorsel</i> ...	Kettlewell, C. R. ...	... ..	M.L.	New Zealand S.S. Co. ...	... ..	...
<i>Dromore Castle</i> ...	Linklater, H. ...	S. S. Smith ...	No.	Union Castle ...	Form 911 20.3.24 to 9.4.24 ...	6.5.24.
<i>Dryden</i> ...	Knight, R. A. ...	G. D. Oldfield ...	"	Lamport & Holt ...	" 28.10.23 to 2.1.24 ...	18.2.24.
<i>Dundrum Castle</i> ...	Mumford, C. E. ...	H. Bunn ...	"	Union Castle ...	... ..	...
<i>Duendes</i> ...	Pape, E. R. ...	... ..	"	Pacific S.N. Co. ...	Form 911 18.4.24 to 8.5.24 ...	26.5.24.
<i>Duquesa</i> ...	Melville, A. ...	W. Schofield ...	"	Furness Withy ...	" 9.3.24 to 5.5.24 ...	14.5.24.
<i>Durenda</i> ...	Wilson, W. ...	W. Cruse, C. McFarlane ...	"	British India ...	" 17.2.24 to 11.3.24 ...	14.3.24.
<i>Eastern</i> ...	Laing, J. D. ...	J. W. Kavanagh, F. R. Miller, H. H. Litchfield. ...	M.L.	Eastern and Australian ...	Met. Log. 14.2.23 to 16.8.23 ...	8.10.23.
<i>Ebani</i> ...	Faill, — ...	W. McKeown ...	No.	Elder Dempster ...	... ..	...
<i>Edinburgh Castle</i> ...	Strong, H., R.D., Commr., R.N.R. ...	... ..	M.L.	Union Castle ...	Met. Log. 30.11.23 to 24.3.24 ...	14.4.24.
<i>Eemland</i> ...	Van Noppen, C. D. ...	T. Doorncoseh ...	No.	Holland Lloyd ...	Form 911 15.4.24 to 11.6.24 ...	15.7.24.
<i>Egori</i> ...	McDowall, J. ...	K. Redmore ...	"	Elder Dempster ...	" 25.11.23 to 10.12.23 ...	12.12.23.
<i>El Cordobes</i> ...	Noton, F. G. ...	N. H. Oldham ...	"	British & Argentine S.N. Co. ...	" 6.6.24 to 4.7.24 ...	8.7.24.
<i>Elmina</i> ...	Millson, H. F. ...	... ..	M.L.	Elder Dempster ...	Met. Log. 20.9.23 to 13.12.23 ...	4.3.24.
<i>El Paraguayo</i> ...	Ellis, F., D.C.M. ...	W. E. Williams ...	No.	Houlder Bros. ...	Form 911 16.3.24 to 9.5.24 ...	14.5.24.
<i>Elpenor</i> ...	Evans, D. L. ...	P. E. Wright, C. Mock ...	M.L.	A. Holt ...	Met. Log. 31.12.23 to 19.4.24 ...	24.4.24.
<i>Elysia</i> ...	Kinnaird, J. ...	A. Grant ...	No.	Anchor ...	Form 911 16.2.24 to 8.3.24 ...	1.4.24.
<i>Empress of Asia</i> ...	Douglas, L. D., R.D., Lt. - Commr., R.N.R. ...	F. C. Stratford, R. J. Hickey, M. Blyth. ...	M.L.	Canadian Pacific ...	Met. Log. 8.2.24 to 24.5.24 ...	20.6.24.
<i>Empress of Australia</i> ...	Robinson, S., C.B.E., R.D., Commr., R.N.R. ...	... ..	M.L.	" ...	" 1.6.23 to 9.3.24 ...	7.4.24.
<i>Empress of Canada</i> ...	Hoperaft, D. ...	... ..	"	" ...	... ..	...
<i>Empress of France</i> ...	Halley, A. J. ...	... ..	"	" ...	... ..	...
<i>Empress of Russia</i> ...	Robinson, S., C.B.E., R.D., Commr., R.N.R. ...	W. S. Halliday ...	M.L.	" ...	Met. Log. 4.1.24 to 22.5.24 ...	7.7.24.
<i>Empress of Scotland</i> ...	Griffiths, E. ...	R. V. Everett, A. S. Phillips, B. Grant. ...	M.L.	" ...	" 13.6.23 to 17.11.23 ...	21.11.23.
<i>Empress of Russia</i> ...	Hosken, A. J. ...	A. B. Smith, A. M. Barff, S. H. Blyth, J. P. Napier, C. S. Morris. R. H. Graham. ...	M.L.	" ...	" 27.12.23 to 20.4.24 ...	26.5.24.
<i>Empress of Scotland</i> ...	Gillies, J., C.B.E. ...	... ..	M.L.	His Majesty's Ship ...	... ..	...
<i>Endeavour</i> ...	Nares, J. D., D.S.O., Capt., R.N. ...	H. Exton Turner ...	M.L.	His Majesty's Ship ...	Met. Log. 23.10.23 to 19.2.24 ...	14.6.24.
<i>Essequibo</i> ...	Pearce, A. W. ...	G. Pattison ...	No.	R.M.S.P. Co. ...	Form 911 27.3.24 to 13.5.24 ...	26.5.24.
<i>Eumaeus</i> ...	Read, J. W. ...	E. R. Pritchard ...	"	A. Holt ...	" 30.4.24 to 15.6.24 ...	19.6.24.
<i>Euryptides</i> ...	Collins, P. J., O.B.E. ...	H. S. Cox, A. R. Payne, F. Fuller. ...	M.L.	Aberdeen ...	Met. Log. 4.1.24 to 27.4.24 ...	12.5.24.
<i>Eurybates</i> ...	Lloyd, R. ...	J. A. Havard ...	No.	A. Holt ...	Form 911 27.3.24 to 18.4.24 ...	6.5.24.
<i>Explorer</i> ...	Lamont, A. ...	Scientific Staff ...	M.L.	Scottish Fishery Board ...	Met. Log. 23.2.24 to 5.6.24 ...	23.6.24.
<i>Fitzroy</i> ...	Woodhouse, A. F. B., Lt.-Commr., R.N. ...	C. W. Sabine ...	M.L.	His Majesty's Ship ...	" 25.7.23 to 1.11.23 ...	10.11.23.
<i>Flandria</i> ...	Veldkamp, G. J. ...	W. G. Ton ...	No.	Holland Lloyd ...	Form 911 16.5.24 to 29.6.24 ...	7.7.24.
<i>Flinders</i> ...	Henderson, D. A., Lt.-Commr., R.N. ...	A. B. Foulston ...	M.L.	His Majesty's Ship ...	Met. Log. 25.7.23 to 1.11.23 ...	10.11.23.
<i>Francisco</i> ...	Wilkins, J., O.B.E. ...	A. Turpin ...	No.	Ellerman Wilson ...	Form 911 9.4.24 to 18.5.24 ...	21.5.24.
<i>Franco</i> ...	Gatley, E. ...	H. J. Prout ...	"	Royal Fleet Auxiliary ...	" 20.6.23 to 15.9.23 ...	27.11.23.
<i>Frankenfels</i> ...	Cartmer, G. E., O.B.E. ...	J. W. Allingham, J. H. A. Mackie, J. Garmory. ...	M.L.	India Office Shipping ...	Met. Log. 23.1.24 to 2.5.24 ...	8.5.24.
<i>Freienfels</i> ...	Cleugh, J. W. ...	C. F. Bennett, H. Wilson, R. Soper. ...	"	" " " ...	" 10.11.23 to 29.2.24 ...	10.3.24.
<i>Freya</i> ...	Angus, W. ...	... ..	"	Scottish Fishery Board ...	... ..	...
<i>Gallie</i> ...	Summers, F. F., R.D., Commr. R.N.R. ...	W. G. O. Jones ...	No.	White Star ...	" 11.4.24 to 24.5.24 ...	27.5.24.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log Register, or Report Contributed.	Date Received.
<i>Gallymore</i> ...	Ledsome, J. S. ...	N. Goubrough ...	No.	Furness Withy ...	Form 911 24.6.24 to 5.7.24 ...	11.7.24.
<i>Garoot</i> ...	Visser, C. W. ...	S. de Boo ...	"	Rotterdam Lloyd ...	" 21.5.24 to 3.6.24 ...	15.7.24.
<i>Garthgarry, Ship</i> ...	Roberts, D. ...	W. Wylie ...	M.L.	Marine Nav. Co. ...	Met. Log. 27.8.23 to 6.6.24 ...	24.6.24.
<i>Gascoyne</i> ...	Mills, A. ...	P. G. Collins ...	No.	Dalgety & Co. ...	Form 911 16.3.24 to 28.5.24 ...	15.7.24.
<i>Gebria</i> ...	Kolkman, J. M. ...	J. Aarents ...	"	Holland Lloyd ...	" 4.4.24 to 22.5.24 ...	26.5.24.
<i>Gladiator</i> ...	Ruffell, ...	D. H. Bryant, W. E. Shotton ...	"	Harrison ...	" 7.1.24 to 8.3.24 ...	12.3.24.
<i>Glenamoy, M.V.</i> ...	Angier, J. ...	L. C. Riggs ...	"	Glen Line ...	" 24.3.24 to 14.4.24 ...	27.5.24.
<i>Glenapp, M.V.</i> ...	Ingram, T. T. ...	F. Poate ...	"	" ...	" 28.4.24 to 7.5.24 ...	3.6.24.
<i>Glenluce, M.V.</i> ...	Kennett, W. H. ...	A. Hodd ...	"	" ...	" 16.4.24 to 15.6.24 ...	20.6.24.
<i>Gloucestershire</i> ...	Robin, E. ...	T. E. Field ...	"	Bibby ...	" 15.3.24 to 23.5.24 ...	26.5.24.
<i>Gorala</i> ...	D'Cruz, A. B. ...	A. R. H. Barton ...	"	British India ...	" 17.5.24 to 25.6.24 ...	2.7.24.
<i>Gorgon</i> ...	Hughes, J. W. ...	W. E. Crompton ...	"	Dalgety & Co. ...	" 2.5.24 to 16.5.24 ...	30.6.24.
<i>Gourko</i> ...	Montgomery, H. ...	...	M.L.	Ellerman Wilson ...	...	...
<i>Graciana</i> ...	Clark, J. ...	M. C. Turner, E. Minshull ...	"	Furness Withy ...	Met. Log. 15.12.22 to 31.8.23...	1.4.24.
<i>Haliartus</i> ...	Marsh, L. V. ...	W. H. Upton ...	No.	R. P. Houston ...	" 16.8.23 to 3.10.23 ...	20.11.23.
<i>Harmonides</i> ...	Hughes, W. J. ...	R. P. Davies ...	"	" ...	" 1.3.24 to 1.5.24 ...	29.5.24.
<i>Harmony, Auxy.</i> ...	Jackson, J. C. ...	A. W. Bush ...	"	Moravian Mission ...	" 15.11.23 o 3.12.23 ...	19.12.23.
<i>Hatarana</i> ...	Mardon, T. T. ...	J. L. Durkee, F. Wells, E. B. Heatly, E. C. McGuinness. ...	M.L.	British India ...	" 12.9.23 to 26.3.24 ...	22.4.24.
<i>Hauraki, M.V.</i> ...	Woodget, H. T. ...	...	No.	Union S.S. Co., N.Z. ...	Form 911 27.10.23 to 4.1.24 ...	11.2.24.
<i>Henry Holmes, C.S.</i> ...	Showman, A. C. ...	D. McLeish ...	"	W. I. & Panama Telegraph Co. ...	" 15.5.24 to 7.6.24 ...	2.7.24.
<i>Herald</i> ...	Bicker-Caarten, A. ...	E. Hislop Tucker ...	"	His Majesty's Ship ...	...	...
<i>Herald</i> ...	Harvey, J. R., Commr., R.N. ...	...	M.L.	...	...	...
<i>Herefordshire</i> ...	Stanley, W. ...	P. Flood, G. Whitworth, P. S. Cooper, H. Moore. ...	"	Bibby ...	Met. Log. 18.8.23 to 30.1.24 ...	22.2.24.
<i>Herschel</i> ...	Carey, W. J. ...	S. C. Smith ...	No.	Lampert & Holt ...	Form 911 8.3.24 to 12.5.24 ...	14.5.24.
<i>Hibernia</i> ...	Tanner ...	R. Woodall ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report. 18.7.24 ...	18.7.24.
<i>Highland Enterprise</i> ...	Pond, R. H. ...	D. R. S. Webster ...	No.	Nelson ...	Form 911 29.3.24 to 12.6.24 ...	8.7.24.
<i>Glen</i> ...	Jones, T. J. ...	H. H. Thomas ...	"	" ...	" 6.4.24 to 26.4.24 ...	20.5.24.
<i>Heather</i> ...	Powell, G. A. ...	G. Watson, R. Sinclair Davies, J. C. Morton. ...	M.L.	" ...	Met. Log. 23.12.22 to 22.3.23...	28.3.23.
<i>Laddie</i> ...	Alford, C. ...	G. L. Goodman ...	No.	" ...	Form 911 17.3.24 to 6.4.24 ...	6.6.24.
<i>Piper</i> ...	Collings, D. ...	A. S. Jones, J. S. Collins, J. H. Cables. ...	M.L.	" ...	Met. Log. 4.2.24 to 23.6.24 ...	2.7.24.
<i>Pride</i> ...	Robinson, R. H. ...	H. McKinnon, H. Devlin, R. R. Soanes. ...	"	" ...	" 18.1.24 to 19.3.24 ...	8.4.24.
<i>Rover</i> ...	Ashby Graves, F. ...	F. W. Harvey, S. G. King, F. Abbott. ...	"	" ...	" 30.11.23 to 15.4.24...	30.4.24.
<i>Warrior</i> ...	Brooke, W. ...	W. T. Breen ...	No.	" ...	Form 911 12.3.24 to 2.5.24 ...	8.5.24.
<i>Hildebrand</i> ...	Maddrell, J. ...	H. Welsh ...	"	Booth ...	" 19.3.24 to 1.5.24 ...	5.5.24.
<i>Hobsons Bay</i> ...	Kydd, O. J. ...	J. E. Williams, E. Bailie, O. J. Edwards. ...	M.L.	Commonwealth Govt. ...	Met. Log. 25.3.24 to 1.5.24 ...	14.7.24.
<i>Holbein</i> ...	Gough, W. A. ...	G. P. Kitto ...	W.T.	Lampert & Holt ...	Form 911 12.1.24 to 10.3.24 ...	17.3.24.
<i>54 Homeric</i> ...	Metcalfe, G. R., Lt.-Commr., R.N.R. ...	H. Clark, H. Yates, A. Griffiths. ...	"	White Star ...	W.T. Reg. 12.6.24 to 27.6.24 ...	5.7.24.
<i>Honorius</i> ...	Samuels, C. ...	J. E. Martin, W. G. Iddes ...	No.	R. P. Houston ...	Form 911 27.9.23 to 13.10.23 ...	16.10.23.
<i>Huanchaco</i> ...	Redyard, A. ...	H. G. Cruickshank, J. Aldhouse. ...	"	Pacific S.N. Co. ...	" 16.4.24 to 16.5.24 ...	20.5.24.
<i>Hubert</i> ...	Evans, T. G. ...	C. C. Beal ...	"	" ...	" 4.11.23 to 16.2.24 ...	5.3.24.
<i>Hurunui</i> ...	Burton Davies, J. ...	Mr. Oxnard, J. Carpenter, Mr. Newington. ...	M.L.	Booth ...	" 26.3.24 to 7.4.24 ...	28.4.24.
<i>Hurunui</i> ...	...	...	"	New Zealand S.S. Co. ...	Met. Log. 31.8.23 to 8.3.24 ...	15.3.24.
<i>Ibez</i> ...	Langdon, C. ...	...	C.C.	G.W. Railway ...	Telegraphic Report. 16.7.24 ...	16.7.24.
<i>Intaba</i> ...	Gibbins, W. A. ...	T. B. Littlechild ...	No.	Harrison ...	Form 911 3.6.24 to 17.6.24 ...	23.6.24.
<i>Intombi</i> ...	Worthington, B. ...	J. Richardson ...	"	" ...	" 22.2.24 to 23.3.24 ...	26.3.24.
<i>Ionic Star</i> ...	Wilson, G. ...	J. Sinclair ...	"	" ...	" 29.1.24 to 26.3.24 ...	29.3.24.
<i>Iroquois</i> ...	Tinson, C. W., O.B.E., Commr., R.N. ...	R. H. Lucy, C. R. Brent, G. A. R. J. Leslie, E. E. Addis, G. A. Gould ...	M.L.	Blue Star ...	Met. Log. 29.11.23 to 16.3.24...	28.4.24.
<i>Iroquois</i> ...	...	...	"	His Majesty's Ship ...	...	...
<i>Izion</i> ...	Baetens, F. ...	A. K. Sanderson ...	No.	A. Holt ...	Form 911 4.3.24 to 4.4.24 ...	14.4.24.
<i>John Pender, C.S.</i> ...	Gibson, L., M.B.E. ...	B. C. Farrow ...	No.	Eastern Tel. Co. ...	" 25.5.24 to 6.7.24 ...	15.7.24.
<i>Junin</i> ...	Benson, C. W. ...	R. D. Eckford ...	"	Pacific S.N. Co. ...	" 1.5.24 to 30.5.24 ...	3.6.24.
<i>Kaikoura</i> ...	Downton, M. ...	L. H. Whitfield, N. Anderson, J. Hopkins. ...	M.L.	New Zealand S.S. Co. ...	Met. Log. 17.9.23 to 31.3.24 ...	19.5.24.
<i>Kaisar-i-Hind</i> ...	Manley, G. ...	R. K. Lowry ...	No.	P. & O. ...	Form 911 15.5.24 to 15.6.24 ...	4.7.24.
<i>Kamo Maru</i> ...	Okano, Y. ...	F. Takaku ...	"	Nippon Yusen Kaisha ...	" 4.5.24 to 3.6.24 ...	12.6.24.
<i>Kangaroo</i> ...	Norris, H. C. ...	C. M. C. Clayton, R. J. Sinclair, F. Humble. ...	M.L.	State Service Australia ...	Met. Log. 6.11.23 to 19.2.24 ...	23.4.24.
<i>Karoo</i> ...	Robinson, T. ...	H. J. Perrett ...	No.	Ellerman Bucknall ...	Form 911 2.6.24 to 16.6.24 ...	25.6.24.
<i>Kashima Maru</i> ...	Shinomiyu, T. ...	M. Takada ...	"	Nippon Yusen Kaisha ...	" 2.1.24 to 9.2.24 ...	14.3.24.
<i>Kashmir</i> ...	Bartlett, E. B., O.B.E. ...	F. Hopkins ...	"	P. & O. ...	" 24.5.24 to 30.6.24 ...	3.7.24.
<i>Kellett</i> ...	Haselfoot, F. E. B., D.S.O., Commr., R.N. ...	E. H. B. Baker, W. C. Jenks ...	M.L.	His Majesty's Ship ...	Met. Log. 28.10.23 to 15.11.23	5.12.23.
<i>Kenilworth Castle</i> ...	Millard, L. A. ...	A. E. Denn, W. M. Tomkins ...	M.L.	Union Castle ...	" 28.12.23 to 28.4.24...	8.5.24.
<i>Khiva</i> ...	Redhead, C. M., D.S.O., R.D., Capt., R.N.R. ...	I. Fraser, A. L. Hill, R. G. Freeman. ...	M.L.	P. & O. ...	" 28.3.24 to 6.7.24 ...	10.7.24.
<i>Khyber</i> ...	Pinckney, L. D., O.B.E. ...	N. B. S. Hewett ...	No.	" ...	Form 911 6.4.24 to 11.5.24 ...	14.5.24.
<i>Kia Ora</i> ...	Thurston, H. P. ...	A. E. Lockhart ...	"	Shaw Savill & Albion ...	" 18.3.24 to 2.5.24 ...	9.5.24.
<i>Kinderdijk</i> ...	Jochems, A. B. ...	A. Stenger ...	"	Holland America ...	" 27.3.24 to 3.5.24 ...	8.5.24.
<i>Kitano Maru</i> ...	Kamada, N. ...	R. Nakane ...	"	Nippon Yusen Kaisha ...	" 8.4.24 to 2.5.24 ...	11.6.24.
<i>Knight Companion</i> ...	Beale, H. E. ...	J. H. Brown, H. C. Skinnis ...	"	A. Holt ...	" 15.11.23 to 21.4.24...	30.4.24.
<i>Kovno</i> ...	Casson, D. H., R.D., Commr., R.N.R. ...	E. R. Massam, G. H. Duncan, I. Griffiths ...	M.L.	Ellerman Wilson ...	Met. Log. 5.5.23 to 27.11.23 ...	3.12.23.
<i>Kyogle</i> ...	Coalstad, C. ...	C. B. Odman, E. W. Hughes ...	No.	Commonwealth Light-house Service. ...	...	...
<i>Lady Brenda</i> ...	Young, W. J. ...	B. I. Brind ...	"	Dawson ...	Form 911 25.9.23 to 4.10.23 ...	13.10.23.
<i>Lady Denison Pender, C.S.</i> ...	West, G. W. ...	A. G. Watts ...	"	Eastern Tel. Co. ...	" 5.5.24 to 25.5.24 ...	24.6.24.
<i>Laquina</i> ...	Mander, F. ...	F. W. Parker ...	"	Pacific S.N. Co. ...	Form 911 22.3.24 to 14.4.24 ...	28.4.24.
<i>Lalande</i> ...	Bambra, W. A. ...	N. Webster ...	"	Lampert & Holt ...	" 25.5.24 to 21.6.24 ...	3.7.24.
<i>Lancashire</i> ...	Beckett, F. W. ...	T. L. Owen ...	"	Bibby ...	" 12.4.24 to 27.6.24 ...	7.7.24.
<i>Laomedon</i> ...	Smith, A. H. ...	A. J. Barclay ...	"	A. Holt ...	" 18.11.23 to 27.2.24...	4.3.24.
<i>La Paz, M.V.</i> ...	Ross, J. ...	R. Collister ...	"	Pacific S.N. Co. ...	" 6.4.24 to 8.5.24 ...	14.5.24.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
26 <i>Montrose</i> ...	Landy, E. ...	D. Loram ...	W.T.	Canadian Pacific ...	W.T. Reg. 31.5.24 to 20.6.24 ...	23.6.24.
20 <i>Montroyal</i> ...	Latta, R. G. ...	R. W. Jones, C. E. Duggan, E. V. Glennie, G. Marriott.	"	" " " ...	Form 911 31.5.24 to 20.6.24 ...	23.6.24.
<i>Morvada</i> ...	Mills, T. L., O.B.E., Lt.-Commr., R.N.R.	J. Norris, D. Louie, F. Dyson	M.L.	British India ...	W.T. Reg. 13.6.24 to 3.7.24 ...	5.7.24.
<i>Mulbera</i> ...	Steadman, W. R. ...	H. Vaughan ...	No.	British India ...	Met. Log. 14.6.24 to 2.7.24 ...	5.7.24.
<i>Musician</i> ...	Egerton, J. J. ...	O. Stanhope ...	"	Harrison ...	Form 911 1.6.24 to 3.7.24 ...	8.7.24.
<i>Nagara</i> ...	Turner, E. A. ...	C. K. Brown ...	"	R.M.S.P. Co. ...	" 5.4.23 to 17.6.23 ...	2.8.23.
<i>Napierian</i> ...	Kerruish, W. ...	T. Griffiths ...	"	Leyland ...	" 2.5.24 to 25.6.24 ...	30.6.24.
<i>Nardana</i> ...	Brown, H. ...	S. C. T. Smith ...	"	British India ...	" 14.2.24 to 26.2.24 ...	14.3.24.
<i>Nariva</i> ...	Buret, T. J. C. ...	J. E. Atkins, B. C. Dodds, S. H. Butler.	M.L.	R.M.S.P. Co. ...	Met. Log. 27.4.24 to 26.5.24 ...	11.7.24.
<i>Nascopie</i> ...	Smellie, T. F. ...	P. Lloyd, R. J. Summers, B. S. Mott.	M.L.	Hudson's Bay Co. ...	" 2.4.24 to 30.5.24 ...	4.6.24.
<i>Navarino</i> ...	Crichton, J. S. ...	J. Annam ...	No.	Glen & Co. ...	" 15.6.23 to 24.10.23 ...	31.10.23.
<i>Navasota</i> ...	Willan, F. G. L., R.D., Commr., R.N.R.	W. A. Delap ...	"	R.M.S.P. Co. ...	Form 911 13.12.23 to 12.1.24 ...	22.1.24.
<i>Nawab</i> ...	Smith, J. F. ...	A. F. Walker ...	"	Asiatic S.N. Co. ...	" 11.4.24 to 8.6.24 ...	18.6.24.
<i>Nebraska</i> ...	Collins, A. R. D., O.B.E., Lt.-Commr., R.N.R.	A. F. Walker ...	"	R.M.S.P. Co. ...	" 8.5.24 to 15.6.24 ...	8.7.24.
<i>Nellore</i> ...	Murray, F. S., R.D., Lt.-Commr., R.N.R.	G. Aspinall ...	"	P. & O. ...	" 15.3.24 to 21.4.24 ...	5.5.24.
<i>Nestor</i> ...	Owen, R. D., O.B.E.	O. V. Jones ...	"	A. Holt ...	" 9.4.24 to 27.5.24 ...	2.6.24.
<i>Nevasa</i> ...	Swanson, C. J. ...	E. C. T. West ...	"	British India ...	" 19.4.24 to 25.5.24 ...	15.7.24.
<i>Newby Hall</i> ...	Kendall, J. W. ...	B. J. Miles, C. H. Webb, T. A. Dexter.	M.L.	Ellerman ...	Met. Log. 12.10.23 to 21.12.23 ...	4.1.24.
<i>Niagara</i> ...	Rolls, J. T. ...	R. M. Scott, N. G. Buxton, O. C. Bray, R. B. Denniston.	M.L.	Canadian-Australian ...	" 4.7.23 to 24.1.24 ...	4.3.24.
<i>Ningchow</i> ...	Wilson, C. A. ...	R. A. Hannay ...	No.	A. Holt ...	" 6.10.23 to 28.2.24 ...	30.4.24.
<i>Nore</i> ...	Randall, H. W. R.D., Capt., R.N.R.	J. C. Ablewhite, R. W. Mackie, H. C. Shinn.	M.L.	P. & O. ...	Form 911 19.3.24 to 20.4.24 ...	20.5.24.
<i>Norman</i> ...	Morton Betts, W. ...	D. A. Hodgson ...	No.	Union Castle ...	Met. Log. 6.3.24 to 25.5.24 ...	29.5.24.
<i>Norna</i> ...	Wright, J. ...	... ..	"	Scottish Fishery Board ...	Form 911 13.4.24 to 1.5.24 ...	29.5.24.
<i>Norseman, C.S.</i> ...	Barter, H. O., R.D., Commr., R.N.R.	... ..	M.L.	Western Tel. Co. ...	Met. Log. 11.9.23 to 28.3.24 ...	7.7.24.
<i>Nortonian</i> ...	McCormick, J. ...	C. R. Stevens ...	No.	Leyland ...	" 20.4.24 to 22.5.24 ...	29.5.24.
<i>Nubian</i> ...	Watmough, T. M. ...	W. J. Wright ...	"	P. & O. ...	Form 911 25.4.24 to 11.5.24 ...	14.5.24.
<i>Nyanza</i> ...	Carpendale, F. W. J.	F. Aheir, C. H. Hand, F. Ardern.	M.L.	P. & O. ...	Met. Log. 11.2.24 to 6.5.24 ...	12.5.24.
<i>Oaklands Grange</i> ...	Rouledge, R. ...	E. A. Insley ...	No.	Houlder Bros. ...	Form 911 15.2.24 to 3.5.24 ...	16.5.24.
<i>Odland I.</i> ...	Williamsen ...	H. Svendgaard ...	"	Hannevig Bros. ...	" 19.12.23 to 2.1.24 ...	4.1.24.
<i>Ohio</i> ...	Lainson, W. H. ...	W. Paine, C. K. Brown, G. C. Clairmonte.	M.L.	R.M.S.P. Co. ...	Met. Log. 18.5.23 to 2.12.23 ...	13.12.23.
<i>Olympia</i> ...	Duncan, A. R. ...	D. R. Urquhart, G. Lynas, F. McIntyre.	M.L.	Anchor ...	" 12.1.24 to 23.3.24 ...	2.4.24.
57 <i>Olympic</i> ...	Howarth, F. B., Commr., R.N.R.	J. C. M. Boyce, C. W. Couch, C. J. Warltire.	W.T.	White Star ...	W.T. Reg. 5.6.24 to 19.6.24 ...	23.6.24.
<i>Onitsha</i> ...	Williams, T. E. ...	D. Rollo ...	No.	Elder Dempster ...	Form 911 26.6.24 to 10.7.24 ...	14.7.24.
<i>Oraonian</i> ...	Hoskins, W. ...	T. Miller ...	"	Leyland ...	Form 911 4.6.24 to 10.7.24 ...	14.7.24.
<i>Orari</i> ...	Robinson, F. W. ...	R. Newman, T. Breen, F. Long- heed, G. Lant, H. Farrant.	M.L.	New Zealand S.S. Co. ...	Met. Log. 22.11.23 to 11.5.24 ...	16.5.24.
<i>Orator</i> ...	Flynn, D. ...	J. C. Sinclair ...	No.	Harrison ...	Form 911 2.7.23 to 22.7.23 ...	22.8.23.
40 <i>Orbita</i> ...	Parker, W. H., C.B.E., R.D., Capt., R.N.R.	R. V. Rutley, O. S. Thomas, K. P. Alliston.	W.T.	R.M.S.P. Co. ...	W.T. Reg. 25.5.24 to 26.6.24 ...	30.6.24.
<i>Orcoma</i> ...	Pleignier, H. T. S. ...	G. B. Wardale, J. J. Buckley, C. H. Denton.	M.L.	Pacific S.N. Co. ...	Form 911 24.5.24 to 15.6.24 ...	18.6.24.
41 <i>Orduna</i> ...	Warner, G. E., R.D., Commr., R.N.R.	S. Robbins, J. Vivian, J. S. Wrake, A. A. Martin.	W.T.	R.M.S.P. Co. ...	Met. Log. 21.2.24 to 4.5.24 ...	8.5.24.
<i>Oriana</i> ...	Christian, G. H. ...	G. Pattison, Mason, G. F. Nicholson, Cruikshank.	M.L.	Pacific S.N. Co. ...	W.T. Reg. 27.6.24 to 13.7.24 ...	16.7.24.
<i>Orita</i> ...	Dominy, R. H., C.B.E., Commr., R.N.R.	H. S. Roberts, J. S. Ward- man.	M.L.	" " " ...	Form 911 22.6.24 to 13.7.24 ...	16.7.24.
<i>Ormonde</i> ...	Douglas, H. P., C.M.G., Capt., R.N.	A. M. Hughes ...	M.L.	His Majesty's Ship ...	Met. Log. 26.1.23 to 14.8.23 ...	18.8.23.
<i>Ormonde</i> ...	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	T. G. McGregor, N. Savage, F. J. L. Butler, F. Firmstone	M.L.	Orient ...	Met. Log. 26.12.23 to 2.6.24 ...	5.6.24.
<i>Ormuz</i> ...	James, L. V., D.S.C.	J. S. Metcalf, I. E. G. Goldsworthy, L. A. Keeble.	M.L.	" " " ...	Met. Log. 4.3.24 to 23.6.24 ...	10.7.24.
<i>Oroya</i> ...	Chittenden, A. ...	S. Lewis ...	No.	Pacific S.N. Co. ...	Met. Log. 2.3.24 to 15.6.24 ...	28.6.24.
<i>Orsova</i> ...	Matheson, C. G., D.S.O., R.D., Commr., R.N.R.	C. Fox, J. C. Jackson, C. V. Doddson, P. P. Murphy.	M.L.	Orient ...	Met. Log. 6.1.24 to 24.4.24 ...	30.4.24.
<i>Ortega</i> ...	Christian, C. H. ...	... ..	No.	Pacific S.N. Co. ...	Form 911 1.5.24 to 7.7.24 ...	15.7.24.
<i>Orviato</i> ...	Shellford, W. S., Lt.-Commr., R.N.R.	C. G. Thorne, A. J. Baxter, G. E. Martin, A. O. H. O'Brien, M. C. Lester.	M.L.	Orient ...	Met. Log. 3.2.24 to 20.5.24 ...	30.5.24.
<i>Osterley</i> ...	Coad, A. J., R.D., Commr., R.N.R.	A. E. Nicholls, F. G. Goodman, T. B. Grainger-Grieve, E. Hatch.	M.L.	" " " ...	Form 911 10.3.24 to 21.5.24 ...	30.5.24.
<i>Othello</i> ...	Pearson, Z. C. ...	E. G. H. Huddleston ...	No.	Ellerman Wilson ...	Met. Log. 30.3.24 to 2.7.24 ...	7.7.24.
<i>Obira</i> ...	Elford, H. E. ...	V. R. Bowling ...	"	Shaw, Savill & Albion ...	" 9.12.23 to 26.3.24 ...	7.4.24.
<i>Ovid</i> ...	Groom, A. E. B. ...	... ..	"	Shakespeare Shipping Co. ...	Form 911 23.5.24 to 12.7.24 ...	18.7.24.
<i>Pacific Shipper</i> , M.V.	Newman, G. ...	F. H. Perry ...	"	Furness Withy ...	" 24.11.23 to 13.12.23 ...	1.1.24.
<i>Pakeha</i> ...	Hartman, W. H. ...	W. L. P. Cox ...	"	Shaw, Savill & Albion ...	" ... ..	...
<i>Paparoa</i> ...	Ashworth, F. ...	E. H. Hopkins ...	"	New Zealand S.S. Co. ...	Form 911 23.12.23 to 2.2.24 ...	11.2.24.
<i>Paris</i> ...	Cook, C. L. ...	Mr. Biles ...	C.C.	Southern Ry. ...	" 25.3.24 to 10.5.24 ...	14.5.24.
<i>Patia</i> ...	Bostock, R. J. ...	W. McIlwain ...	No.	Elders & Fyffes ...	Telegraphic Report. 19.2.24 ...	19.2.24.
<i>Patrol, C.S.</i> ...	Bredenberg, F. ...	Gardiner, Albrecht, Morrell ...	M.L.	Eastern Extension (A. & C.) Telegraph Co. ...	Form 911 25.5.24 to 30.6.24 ...	4.7.24.
<i>Persic</i> ...	Davies, E. ...	N. E. Banks ...	No.	White Star ...	Met. Log. 1.7.23 to 14.9.23 ...	25.2.24.
<i>Peshawur</i> ...	Hester, C. W., R.D., Commr., R.N.R.	C. E. Arundel ...	M.L.	P. & O. ...	Form 911 12.5.24 to 23.6.24 ...	2.7.24.
<i>Philadelphun</i> ...	Baker, J. A. ...	G. W. B. Lloyd ...	No.	Leyland ...	Met. Log. 13.3.24 to 13.5.24 ...	19.5.24.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Teucer</i> ...	Hanney, T. W. ...	J. C. Norton ...	No.	A. Holt ...	Form 911 20.5.24 to 25.6.24 ...	1.7.24.
<i>Themistocles</i> ...	Jermyn, W. M. ...	R. H. Harrison ...	"	Aberdeen ...	" 8.11.23 to 5.3.24 ...	11.3.24.
<i>Theseus</i> ...	Batt, A. E. ...	J. R. Clement Evans ...	"	A. Holt ...	" 2.7.24 to 11.7.24 ...	17.7.24.
<i>Titan</i> ...	Ireland, T. R. ...	J. P. Williams, A. C. H. Jones D. J. Davies, C. Taylor.	M.L.	" ...	Met. Log. 2.11.23 to 8.3.24 ...	12.3.24.
<i>Tolmie</i> , S.F.Bqtne.	Stewart, J. C. ...	E. F. Collins R. E. Smith ...	No.	B. C. Mills, Tug and Barge Co.	Form 911 10.2.24 to 17.4.24 ...	3.6.24.
<i>Tottori Maru</i> ...	Mataukura, B. ...	K. H. Kubota ...	"	Nippon Yusen Kaisha	" 2.5.24 to 22.5.24 ...	23.6.24.
<i>Transmitter</i> , C.S.	Jones, Ll. T., M.B.E.	S. P. Sheldon ...	"	Eastern Tel. Co. ...	" 7.12.23 to 2.2.24 ...	18.2.24.
<i>Traveller</i> ...	Jones, E. W. ...	" ...	"	Harrison ...	" 4.8.23 to 8.10.23 ...	18.10.23.
<i>Tredenham</i> ...	Evans, J. O. ...	C. Warren ...	"	Hain S.S. Co. ...	" 5.6.24 to 23.6.24 ...	15.7.24.
<i>Trematon</i> ...	Hicks, F. H. ...	J. Christopher, D. Thomas, F. J. Webb.	M.L.	" ...	Met. Log. 28.8.22 to 30.3.23 ...	18.4.23.
<i>Tuscania</i> ...	Bone, D. W. ...	T. S. Nixon ...	No.	Anchor ...	Form 911 18.5.24 to 8.6.24 ...	13.6.24.
<i>Tyndareus</i> ...	Adcock, F. ...	D. L. Hoare ...	"	A. Holt ...	" 13.3.24 to 26.4.24 ...	3.6.24.
<i>Ulysses</i> ...	Hazeland, J. H. D. ...	W. J. Peard ...	"	A. Holt ...	Form 911 2.11.23 to 17.11.23 ...	11.12.23.
<i>Umtali</i> ...	Rogers, W. G. ...	W. H. Foster ...	"	Bullard King ...	" ...	"
<i>Valacia</i> ...	Doyle, M. ...	J. W. Counce ...	"	Cunard ...	" 5.6.24 to 12.6.24 ...	17.6.24.
<i>Valdura</i> ...	Mitchell, A. ...	J. Campbell, J. Anderson, A. M. S. Well.	M.L.	Gow Harrison ...	Met. Log. 21.9.23 to 10.12.23 ...	6.5.24.
<i>Valemore</i> ...	Griffiths, J. ...	H. Miller ...	No.	Furness Withy ...	Form 911 22.11.23 to 29.12.23 ...	30.12.23.
<i>Vardulia</i> ...	Townley, J. C. ...	J. E. Deans ...	"	Cunard ...	" 29.6.24 to 9.7.24 ...	18.7.24.
<i>Vasconia</i> ...	Inch, F. ...	W. P. Armour ...	"	" ...	" 14.5.24 to 18.6.24 ...	24.6.24.
<i>Vellavia</i> ...	Fear, E. T. C. ...	H. H. Kidwell ...	"	" ...	" 30.3.24 to 11.4.24 ...	22.4.24.
<i>Ventura de Lar-rinaga</i> .	Keay, W. S. ...	H. J. Kay ...	"	Larrinaga ...	" 7.5.24 to 3.7.24 ...	14.7.24.
<i>Verbania</i> ...	Hatcher, W. H. ...	J. G. Wiseman ...	"	Cunard ...	" 25.5.24 to 28.6.24 ...	30.6.24.
<i>Verentia</i> ...	Stafford, W., D.S.C., R.D., Lt.-Commr., R.N.R.	A. F. Watts ...	"	" ...	" 26.5.24 to 25.6.24 ...	5.7.24.
<i>Victoria</i> ...	Fisher, F. T. ...	J. Males, E. Peacock, J. Archer	M.L.	China-Australia ...	Met. Log. 29.3.23 to 29.8.23 ...	6.10.23.
<i>Vigilant</i> ...	Simpson, E. S. ...	" ...	"	Scottish Fishery Board	" ...	"
<i>Waioapu</i> ...	Brown, T. F. S. ...	B. S. Cave ...	No.	Canadian-Australasian	Form 911 12.4.24 to 21.5.24 ...	6.6.24.
<i>Walmer Castle</i> ...	Chave, Sir B., K.B.E.	C. Ayles ...	"	Union Castle ...	" 17.4.24 to 9.6.24 ...	10.6.24.
<i>Wangaratta</i> ...	Scutt, W. ...	T. W. Wordingham, M. Chant, K. M. Morrison.	M.L.	British India ...	Met. Log. 14.1.24 to 20.5.24 ...	27.5.24.
<i>Warfeld</i> ...	Steel, R. ...	E. V. Wilkinson ...	No.	" ...	Form 911 1.5.24 to 14.5.24 ...	29.5.24.
<i>War Nizam</i> ...	Putt, R. O. ...	E. R. Clark ...	"	British Tankers ...	" 31.3.24 to 19.5.24 ...	4.6.24.
<i>Welshman</i> ...	Rollerson, W. ...	W. A. Fletcher ...	"	White Star-Dominion	" 5.6.24 to 1.7.24 ...	5.7.24.
<i>Winifredian</i> ...	Harrocks, W. ...	A. R. Rose ...	"	Leyland ...	" 1.6.24 to 6.7.24 ...	14.7.24.
<i>Woodarra</i> ...	Reilly, J. V. ...	L. D. Graham, A. V. Fisher, L. C. Comber, J. Wallace.	M.L.	British India ...	Met. Log. 7.10.23 to 9.3.24 ...	26.3.24.
<i>Yorkshire</i> ...	Millson, G. C. ...	E. Jones ...	No.	Bibby ...	Form 911 3.5.24 to 7.7.24 ...	15.7.24.
<i>Zealand</i> ...	Thomas, A. J. ...	W. Jackman ...	No.	Red Star ...	Form 911 13.6.24 to 4.7.24 ...	7.7.24.
<i>Conway</i> , H.M.S.	Broadbent, H. W., R.D. Capt., R.N.R.	The Senior Cadets ...	Cadets' M.L.	" ...	Cadets' Met. Log. 20.1.24 to 29.3.24 ...	5.4.24.
<i>Pangbourne Nautical College</i> .	Tracy, A. F. G., Commr., R.N.	" ...	"	" ...	Cadets' Met. Log. 21.1.24 to 5.4.24 ...	10.4.24.
<i>Worcester</i> , H.M.S.	Sayer M. B., O.B.E., R.D., Capt., R.N.R.	" ...	"	" ...	Cadets' Met. Log. 25.1.24 to 12.4.24 ...	17.4.24.
<i>Abaco</i> ...	" ...	The Keepers ...	Lighthouse Register.	" ...	Lighthouse Register 1.7.23 to 1.1.24 ...	3.3.24.
<i>Cay Lobos</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.23 to 31.12.23 ...	3.3.24.
<i>Double Headed Shot</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.23 to 31.12.23 ...	3.3.24.
<i>Inagua</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.23 to 31.12.23 ...	3.3.24.
<i>Sombrero</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.23 to 31.12.23 ...	25.2.24.
<i>Watling Island</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.23 to 31.12.23 ...	3.3.24.
<i>Cape Pembroke</i> (Falkland Is.).	" ...	" ...	"	" ...	Lighthouse Register 1.8.23 to 31.12.23 ...	3.3.24.

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.	Date Received.
<i>Alban</i> ...	Whayman, W. R. ...	R. Griffiths ...	Booth ...	Water Samples ...	23.4.24.
<i>Hildebrand</i> ...	Maddrell, J. ...	A. Blacklock ...	" ...	" ...	10.5.24.
<i>Patia</i> ...	Bostock, R. J. ...	S. A. Sapsworth, P. D. Allen	Elder & Fyffes ...	" ...	1.5.24.
<i>Tortuguero</i> ...	Martin ...	H. H. Dunning ...	" ...	" ...	17.6.24.