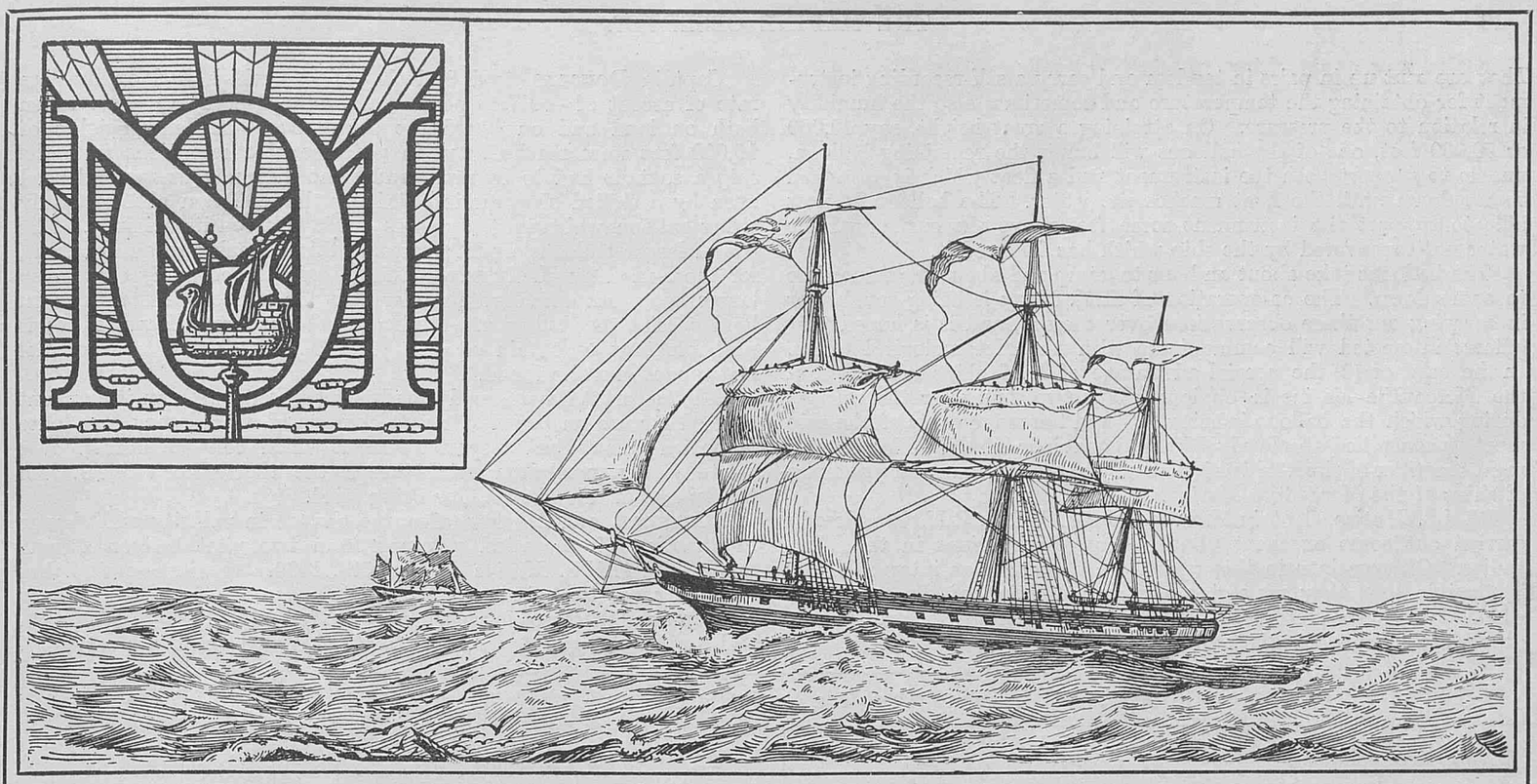


VOL. I. No. 2. THE MARINE OBSERVER. FEBRUARY 1924.

## INVESTIGATION OF THE UPPER AIR.

By Commander L. G. Garbett, R.N. (Retired),

Superintendent Naval Meteorological Services.

The systematic investigation of the upper air over the whole globe is a matter, not merely of interest to the scientific meteorologist, but also has immediate application in many spheres. With the rapid development of aircraft and scientific instruments of war, more definite information concerning wind currents is required. It should not be necessary to emphasise the importance to aerial navigation of an accurate knowledge of wind currents in the upper atmosphere nor the effect of atmospheric conditions on, for instance, high angle gun fire, as projectiles rising to a height of 25,000 feet, as they may well do fired from modern guns, must pass through layers of widely varying winds where the temperature may differ very considerably from the normal for each layer.

Our knowledge of atmospheric conditions over the land has been greatly extended in recent years, and systematic observations of upper winds up to considerable heights above the ground are carried out in this country and in several of the principal countries of the world, but the land area is only one-fifth of the globe, and there still remains the sea area over which comparatively few observations have been obtained.

From information obtained over the land we can say, generally speaking, that at the surface the wind blows at an angle of about two points with the isobars and from high pressure to low. With increase of height, the wind veers and increases in strength, and at about 1,500 feet blows along the isobars, and if a detailed pressure chart of the upper regions was available its strength could be estimated with considerable accuracy from the distance apart of the isobars.

The change will still further increase with height, but follows no general rule; in fact it might be said that the normal state of things is that which occurs at 1,500 feet, and the differences at low levels are due to the frictional effect of the earth's surface. At greater heights the variation of wind with height will be mainly controlled by the distribution of temperature in the horizontal, and no rule can be given which can be readily applied in any particular case. It will be seen from the preceding remarks that the variations of wind with height are much less regular than the variation of temperature with height. The latter can be estimated with considerable accuracy and falls off on the average 1° F. for every 300 feet in these latitudes.

The method of obtaining observations of the upper air over the land is a relatively simple one, and usually consists in following pilot balloons by means of theodolites. This can be done, either with one theodolite (in which case the rate of ascent is estimated); with two theodolites at the ends of a measured base, or by observations of a balloon with a tail attached, the angle subtended by the length of this tail being observed with a theodolite at fixed intervals.

At sea, however, these methods cannot be readily applied owing to the absence of a steady platform on which instruments can be fixed; consequently observation of the upper air over the ocean has not been developed to any appreciable extent, and our knowledge of the circulation of the atmosphere over large areas of ocean is extremely meagre.

America, France and Germany have carried out some such observations, probably the most interesting being those of M. Tesserenc de Bort (France), taken during his cruises in the Atlantic in the yacht *Otavia*, when he explored the winds of the Trade Regions. He found, both in the North and South Atlantic, that the Counter Trade Winds which had been predicted did actually exist and flowed in the opposite direction above the Trade Winds.

Two forms of observations have been proved to be practicable over the sea :—

(1) The observation of the track of a pilot balloon followed from a ship by means of a sextant and compass.

The balloon is of indiarubber and inflated by hydrogen and released from the ship. It travels upwards at the same time as it is being carried along in the horizontal stream of air in which it finds itself. Its rate of ascent depends upon its weight and its free lift, which must both be determined before the ascent begins—a usual rate of ascent is 500 feet per minute, so its height can be approximately known at any time by noting the number of minutes that have elapsed since the time of starting. The altitude and azimuth are obtained by means of a sextant and compass, and from data obtained in this way the velocity and direction of the horizontal current are found at any time.

(2) The other form of observation is that of sounding balloons.

These balloons are of larger size than those which are used as pilots.

x (5)21302 Wt 17839A—9195/P 88 1350 & 150 1/24 E & S

They are sent up in pairs in tandem and carry a self-recording instrument for obtaining the temperature and sometimes also the humidity in relation to the pressure. On attaining a great height, say 40,000 or 50,000 feet, one of the balloons will burst, the remaining balloon, unable to support both the instrument and a float which is attached comes down until the float reaches the water. The balloon is now able to support the instrument some feet above the surface of the water until recovered by the ship which has followed it.

The balloons take about an hour to go up and about the same time to come down. The co-operation of H.M. Navy is being sought for in carrying out these observations over the sea, and it is hoped that officers interested will communicate with the Meteorological Office. In the case of (2) the special advantage of H.M. ships over those of the Mercantile Marine is obvious. For two hours or thereabouts during which the balloon is being followed the movements of the ship must be controlled absolutely by the behaviour of the balloon; this means sacrifice of time, which is contrary to the fundamental principles of ships of the Mercantile Marine.

H.M.S. *Mutine*, Captain H. P. Douglas, C.M.G., R.N., has already carried out some excellent pilot balloon observations in the West Indies. Observations in this region are of particular interest, for it is possible that they may give a clear indication of the conditions which favour the formation of hurricanes perhaps before surface observations show any abnormality.

Captain Douglas used 90-inch balloons which had an average rate of ascent of 400 feet per minute, and observations were taken both on land and on board the ship. Over the land, heights of 16,000 feet were reached, but in the case of observations from the ship a sextant had to be used, and some difficulty was experienced even by a skilled observer in obtaining the elevation of the rapidly rising balloon, which in many cases quickly altered its azimuth. The use of larger balloons would overcome this difficulty to some extent, for those used by M. Tesserenc de Bort were certainly of a much larger type, but when we consider that for balloon observations on land special theodolites magnifying 20-fold are generally used, it is probable that to obtain equally great heights at sea, some special instrument must be found.

The Germans have already made experiments with an instrument devised for use on board ship. It consists of an ordinary theodolite to which is attached a special sextant which can be trained over the object, a pendulum weight keeps the theodolite vertical. An instrument of this kind is now being tried.

Figures 1 and 2 below give the change in velocity and change in direction of the wind obtained from two pilot balloon ascents made from H.M.S. *Mutine* on May 5th, 1923. It will be noted that in both cases the wind was light at the surface from a northerly direction and increases in velocity up to a height of 1,200 to 1,500 feet, and rapidly changes its direction to the eastward and south-eastward.

**Pilot Balloon Ascents Over the Sea, Old Harbour Bay, Jamaica, W.I.**

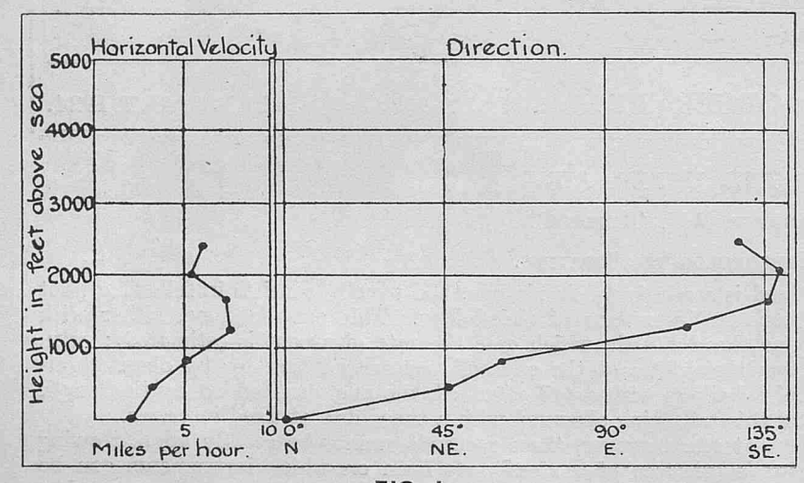



FIG. 1.

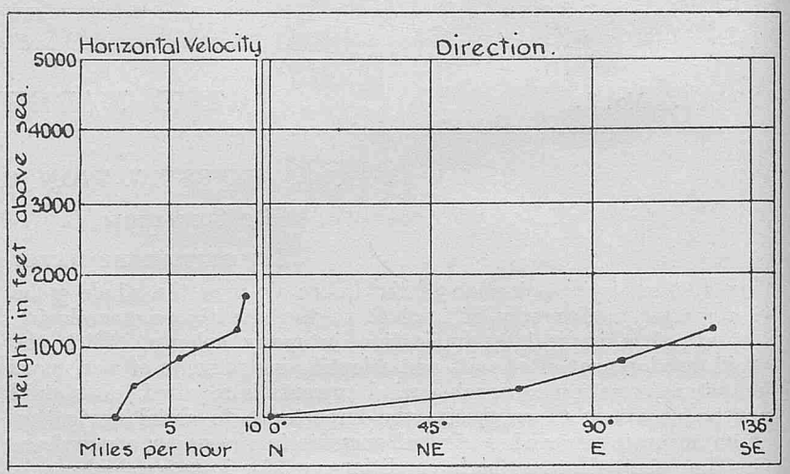



FIG. 2.

## BIOGRAPHICAL NOTES ON SOME LEADERS OF MARINE METEOROLOGY.

### II.—HENRY PIDDINGTON.

Henry Piddington, who was the second son of James Piddington, of Uckfield, was born in 1797. Little is known of his early days, except that he was trained for the sea and eventually had command of a ship probably trading in the East Indian and China Seas. His sea career was, however, fairly short, for in 1830 he took up the post of Curator of the Museum of Economic Geology in Calcutta and sub-secretary of the Asiatic Society of Bengal.

In 1838, Piddington's attention was drawn to the subject of tropical storms by the publication of Colonel Reid's book on the "Law of Storms" which demonstrated the theory put forward by William C. Redfield, a naval architect and journalist, of New York, that the West Indian Hurricanes "Were whirlwinds moving on curved tracks with considerable velocity." That Piddington had had intimate acquaintance with the effects of these storms is evident from the opening remarks of his first memoir on the subject, contributed to the Asiatic Society the following year. He says "Notices of Colonel Reid's 'Law of Storms' excited my attention, for the subject is one which awoke early associations, especially one instance in which, to the veering of a hurricane alone, I owed my safety from shipwreck after cutting away the mainmast of the vessel which I commanded."

In this memoir he explains how, after the tempest which occurred off Sandheads on the 2–6 June, 1839, he endeavoured to collect data with the idea of ascertaining some knowledge of the characteristics and behaviour of these dreaded storms of the Indian Seas.

Through the medium of the President of the Chamber of Commerce of Calcutta, he addressed a circular letter to the Captains of Merchant Ships who had been in the vicinity asking for extracts from their logs. Letters were also sent to the East India and China Association in London and the Chambers of Commerce in Liverpool and Bristol asking for their assistance.

He records that he received every assistance from Public Officers and generally from the captains of ships, although a few of the latter, not understanding the end for which he was working, received his request for information with scant courtesy. He was faced with many difficulties. For one thing the recording of instrumental observations in a hurricane, in those sailing ship days was almost an impossibility. Another difficulty which any observer who has tried to construct a synoptic chart will realise, was the impossibility of finding the error of the ships' barometers. He inserted a public request in the newspapers for ships who had contributed observations, to send him barometer readings at noon when in Calcutta in order that he might compare them with observations taken at the Surveyor General's office, but few captains acceded to his request. Piddington, however, persevered with his investigations, and in 1844 he collected his results and published them under the title of "Horn Book for the Law of Storms for the Indian and China Seas." Written in a practical seamanlike manner, this book was immediately adopted by seamen and the shipping world generally, and probably gained for its author the appointment of President of the Marine Court of Inquiry at

Calcutta. 1848 saw the publication of the famous "Sailors' Horn Book," an enlarged edition of the previous work. That Piddington's interest in this subject was devoted to the protection of the seafarer and the advancement of navigation is shown by his remarks in the preface to the Sailors' Horn Book, where he states: "I have thought in a word that the work might lose much of (I trust I may say) its national utility if written only for the state-rooms of science; and thus I have preferred to seat it at her cabin table—claiming only in this respect from those who might wish it otherwise, a moment's reflection on how large a class of our brother-sailors there is, and always must be, who, though worthy and most valuable men, have wanted the inestimable advantages of a good education; and might be repelled from the study by the sight of 'hard words' and the sound of scientific phrases, however familiar such may be to our ears."

The Sailors' Horn Book became for seamen the foremost practical textbook on tropical storms, a position it held for more than 30 years.

One interesting feature of this book which is worthy of mention, was the introduction in the first edition of the term *cyclone*, a name now universally adopted for these whirling storms.

PIDDINGTON died at Calcutta in 1858, having contributed a very practical guide to seamen for the navigation of what, in those days of sail, was indeed a very terrible menace.

Acknowledgment is made to the following:

National Dictionary of Biography.
Journal of the Asiatic Society of Bengal, 1839.

(To be continued.)

## COMPARISON OF TEMPERATURES IN PORTABLE AND FIXED SCREENS.

ON the back of the October, 1923, Meteorological Chart of the North Atlantic Ocean notes were given on the results obtained by comparing temperatures in a fixed and portable screen in the Cable Ship *Colonia*, Captain V. CAMPOS, O.B.E.

These dealt with a voyage made to Penang and the chief results obtained were shown in FIGURES A and B.

The fixed screen was situated "in the port wing of the navigation bridge, open towards in-board, but shut in fore and aft and out-board except for windows which were generally open when weather permitted.

"The portable screen was always kept on the weather side of the bridge in the shade and away from all boiler currents of hot air."

From FIGURE A it was found that the fixed screen showed a higher reading than the portable, with wind anywhere between the starboard quarter and the port bow by way of stern, and that allowing for one exceptional reading the fixed screen showed a lower reading than the portable, with wind anywhere between the port bow and starboard quarter by way of bow.

From FIGURE B it was found the time of day had practically no influence on the relationship of the temperatures in the fixed and portable screens with wind anywhere between port bow and starboard quarter by way of bow, but it had a great influence with other wind directions.

The *Colonia* has now sent in another series of observations made between August 14th and September 15th, 1923, on a voyage from London to Fox Bay (Nova Scotia), and return, *viá* Azores. The portable screen in this case was double louvred instead of single louvred as had been used in the Indian Ocean comparisons. (A single louvred screen, of the same dimensions and pattern is illustrated by FIGURE 9 in "Wireless and Weather" of this number.) The fixed screen was in the same position as on the previous voyage.

The observations were treated in the same manner as before, and FIGURES C and D show the result.

On this voyage it does not appear (from FIGURE C) that the wind direction has so much affect as was found on the previous voyage (FIGURE A). For each direction the fixed screen read about 0°·4 above the portable, except when the wind was astern, or on the port quarter (but in those directions the observations were few).

However, in constructing FIGURE D it was found that the same rule applied as before. The time of day had hardly any effect on the differences in the readings with the wind anywhere between the port bow and the starboard quarter by way of bow, but affected readings with other wind directions by nearly 2° between midnight and noon.

The exposure of the fixed screen in this ship is thus proved not to be good especially in the weather shelter.

If the windows have to be closed through stress of weather the exposure becomes bad. The fact that in the North Atlantic it was necessary to keep them closed more often than in the Indian Ocean probably accounts for the average difference being 0°·4 in FIGURE C while it is only 0°·2 in FIGURE A.

These trials have been of great value and have proved that more accurate observations of temperature can be made in steamships where constant and systematic care is possible with the use of a portable screen than with the old fixed screen. It is obvious that there are many occasions at sea when accurate temperatures cannot be obtained with any screen, and on such occasions if the observations are noted it would be of great assistance if a remark were added in the log.

Note by Mr. A. S. MUIR, 2nd Officer, Cable Steamship *Colonia*, Captain V. CAMPOS, O.B.E.

"During the last two voyages of *Colonia*, a portable screen containing wet and dry thermometers has been used in conjunction with the permanent screen which is situated in the port wing of the navigating bridge.

"The portable screen was placed always on the weather side of the bridge, screened from the sun and elevated from the deck.

"It may be thought that a great deal of trouble is entailed by moving the screen from side to side of the bridge, but after a few days one gets accustomed to this, and anyone who takes an interest in meteorological work will find it very little trouble. With the wind from aft, or nearly so, considerable difficulty may be experienced in finding a suitable position to place the screen. This naturally occurs when the heat from the stokeholes and engine room reaches the bridge, but in most ships a suitable place may be found on the boat deck, abaft the engine room, and protected from the sun by one of the lifeboats. With the wind ahead, a good plan is to have the screen fixed to the forward awning spar, where a good draught of air is assured."

## 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.

### WATERSPOUTS.

THE following extract is taken from the Meteorological Log of S.S. *Omar*, Captain G. L. SIMNER, London to Australia, Observer, Mr. N. SAVAGE, Second Officer.

"Waterspouts observed in Latitude 7° 26′ N., Longitude 76° 48′ E., at 0·20 p.m., 18th February 1923.

"The weather, before and after the incident, was beautiful and clear, with exceptional visibility. Wind, N.N.W., Force 3, the sea just rippled (about 2 by scale), with a slight indication of a swell from North. The upper clouds were Cirrus and Alto Stratus, and were moving from approximately E.N.E. at a dead slow pace, and only an occasional lower cloud (small ordinary Cumulus) in sight. The Cumulo Nimbus from which the 'Spouts' appeared came in sight to the eastward about 11.50 a.m. It was the ordinary type, very large, with the heavy black appearance, and apparently lying rather low.

"My attention was first attracted at about 0.15 p.m. by what appeared to be steam rising from the water in a direction 2 points on the starboard bow distant not more than 2 miles (course S. 81° E. 11 knots). On examining it through the binoculars, it had every appearance of an ordinary pan of water at boiling point, with steam rising therefrom. At this time the cloud had in no way altered its form. As we drew nearer to the disturbance it was observed to be circular, diameter being 20 or 25 feet, shaped like a very shallow bowl,

The steam or spray rising occasionally took a circular movement (left-handed), but it mostly just came up in any direction; its path was the same as that of the cloud (south-westerly), and speed, roughly, 1 to 3 knots.

"About 5 minutes after sighting, it was abeam approximately 1 mile distant, and it was then that the cloud extended short trunks; at first barely discernible, but gradually coming lower. There were three together at one time, but only the largest was clearly observed. It came down to a point about halfway between cloud and water, dense black colouring same as the cloud for a quarter way down, then thinning out until only the edges were visible, and it was in this portion that the water could be clearly seen moving in a right-handed manner, and upwards (cork screw fashion). The sea now was very disturbed, shedding off lots of fine spray, which rose to a height of about 20 feet, but between the top of this and the bottom of the shaft from the cloud, there was no perceptible connection. The trunks or spouts were reaching down and receding again in quite a rapid way, and their shapes were most fantastical, in one case resembling the track of an aeroplane looping the loop, and the disturbances in the water constantly shifting, new one beginning, old one dying away.

"It had now passed well away on the starboard quarter, and I cannot add more to this description, except that a kind of haze hung around the exhibition and later it appeared to develop into a heavy shower, and also that although the cloud was lying much lower than the average it was moving practically at right angles to the surface wind."

## ROLLERS.

THE following extract is taken from the Meteorological Log of Cable Ship *Britannia*, Captain H. G. E. WIGHTMAN, D.S.C., Observer Mr. H. LAWRENCE, Third Officer.

Notes on "Rollers" at St. Helena and Ascension Islands.

"During the vessel's stay at the above islands (February 7th to March 11th, 1923), opportunity was taken to note the conditions with regard to 'rollers.' These are huge 'tidal waves,' which can be seen at a considerable distance to the N.W., rolling towards the beach in a contrary direction to the prevailing wind, and eventually breaking on the foreshore with terrific violence, and occasionally with thunderous noise. With 'moderate' rollers landing was extremely difficult at either of the islands, and was not attempted except by native boats and crews. 'Heavy' rollers made landing impossible.

"Throughout the stay at St. Helena, 'heavy' rollers were experienced only once (February 8th), but during the stay at Ascension, especially on February 22nd and 23rd, the 'heavy' variety were often experienced, at which time the ship rolled heavily at her anchorage. They approached with very short warning and seemed to be heaviest when the off shore breeze was fresh. No meteorological data or observations could be connected with the phenomena, although from members of the E.T.C. staff stationed on the Island, they confirm the previous observations which stated the rollers were heaviest at full and change of moon. This was also noticed by the *Britannia* on February 16th, when 'double' rollers were heavy, the moon one day old. It was regretted that the observations were over so short a period."

NOTE.—The rollers at Ascension and St. Helena are probably caused by gales beyond the regions of the Trades in the North and South Atlantic. Though the full and change of the moon may often coincide with rollers, we have no evidence that these are connected, and probably observers who have noted the coincidence were influenced in their deductions by statements which have appeared in old Sailing Directions.

## WILLIE-WILLIE.

ON February 26th, 27th and 28th, 1923, Motor Ship *Kangaroo*, Captain H. C. NORRIS, Carnarvon (W. Australia) to Surabaya (Java), encountered a cyclone in Latitude 16° S., Longitude 113° E. Early in the storm, her telemotor steering gear was out of action, and at 10 p.m. on the 26th her hand steering gear carried away. The wind reached force 10 at 8 a.m. on 27th and blew from the south-eastward and eastward with that force for 24 hours, mountainous seas being reported and frequent squalls, with hurricane force, during which time the barometer was almost steady at 984 mb. The storm then passed away to westward.

S.S. *Minderoo*, Captain E. RICHARDSON, had left Broome (W. Australia) at 2.30 a.m. on the 25th, when she reported "Vivid lightning from W. to N.W. Hot sultry weather. Barometer falling steadily. Ugly threatening weather." At 6.10 a.m. she received a wireless weather report to say there was a *Willie-Willie* on N.W. Coast. Her barometer was still falling and she turned round and made for Broome.

## LARGE DROP IN SEA SURFACE TEMPERATURE.

ON February 11th, 1923, S.S. *Megantic*, Captain G. BERRY, West Indies to New York, reports a drop of 24° F. in the sea surface temperature in 2 hours run.

The figures are as follows :—

| Time. | Position. | | Air Temperature. | Sea Temperature. |
|---|---|---|---|---|
| 8 a.m. | Latitude 35° 31′ N. | Longitude 75° 07′ W. | 65° | 72° |
| 9.05 a.m. | ,, 35° 48′ N. | ,, 74° 59′ W. | 55° | 57° |
| 10 a.m. | ,, 36° 02′ N. | ,, 74° 54′ W. | 53° | 48° |

## SQUALL AND VAPOUR CURTAIN.

The following is taken from Form 911 of S.S. *Mesaba*, Captain F. H. CLARET, London to New York :—

"February 18th, 1923, 8 a.m. position, Latitude, 41° 19′ N., Longitude 54° 46′ W.

"9 a.m. observed heavy masses of black cloud rising S.W., W. and N.W.

"9.30 a.m. observed squall line travelling rapidly N.W., causing pillar of water vapour to rise from the sea forming a sort of drapery curtain, and forming a dense fog cloud.

"9.45 a.m. heavy wind and rain squall, and wind came away from N.N.W. Barometer rose and wind veered steadily to N.E. and fell light."

## SURFACE AND SUB-SURFACE CURRENT.

THE following observation made by the Cable Ship *Norseman*, Captain H. O. BARTER, is interesting :—

"February 13th to 28th, 1923, whilst working in the vicinity of Latitude 9° 30′ S., Longitude 34° 55′ W., observed surface current to set in the general direction N.W. about ¾ knot, and a very good estimate of undertow put its direction at N. 25° E. strong."

## EXCEPTIONAL VISIBILITY.

ON February 7th, 1923, M.S. *Loch Katrine*, Captain G. P. MATTHEWS, observed Volcana de Safa, Mexico (14,000 feet high) at a distance of 106 miles.

## TIDE RIPS.

S.S. *Mongolian Prince*, Captain J. ALLOWAY, Vancouver to Panama, reports as follows :—

"February 7th, 1923, 8 p.m., position, Latitude 8° 18′ N., Longitude 84° 25′ W.

"February 8th, 8 a.m., position, Latitude 7° 30′ N., Longitude 82° 30′ W.

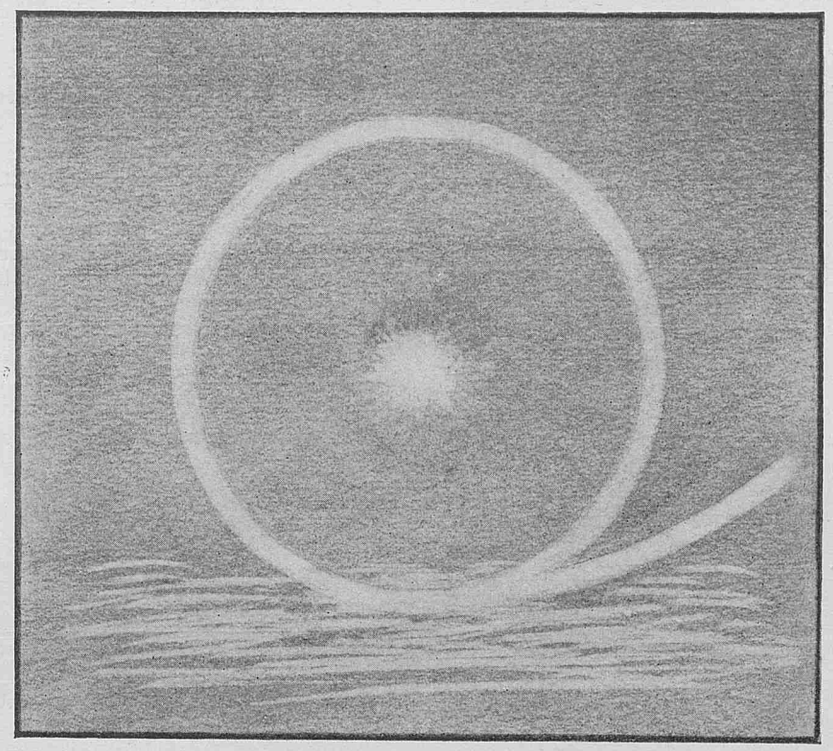
"Observed several apparent Tide rips.

"At 10 p.m. the vessel sheered 2 points in one of these.

"The current between Latitude 10° 43′ N., Longitude 88° 24′ W., and Latitude 8° 54′ N., Longitude 85° 40′ W. was S. 85° W. 36 miles, and between the latter position and Latitude 7° 13′ N., Longitude 81° 53′ W. was S. 69° E. 9 miles."

## LUNAR HALO.

THE following was contributed with the Meteorological Log of S.S. *Port Hunter*, Captain S. C. COTTELL, observer, Mr. C. R. TOWNSEND, 3rd Officer, London to Australia.



"The above sketch represents the Lunar Halo and arc of contact as observed on the night of February 28th, 1923, in Latitude 16° 16′ S., Longitude 89° 43′ E. (approx.). The complete circle was of 22½° radius and showed as a plain white ring, as also did the arc which was only visible for a very short period. The point of contact, although of greater luminosity, was indistinct on account of cirrus clouds covering that position of the circle."

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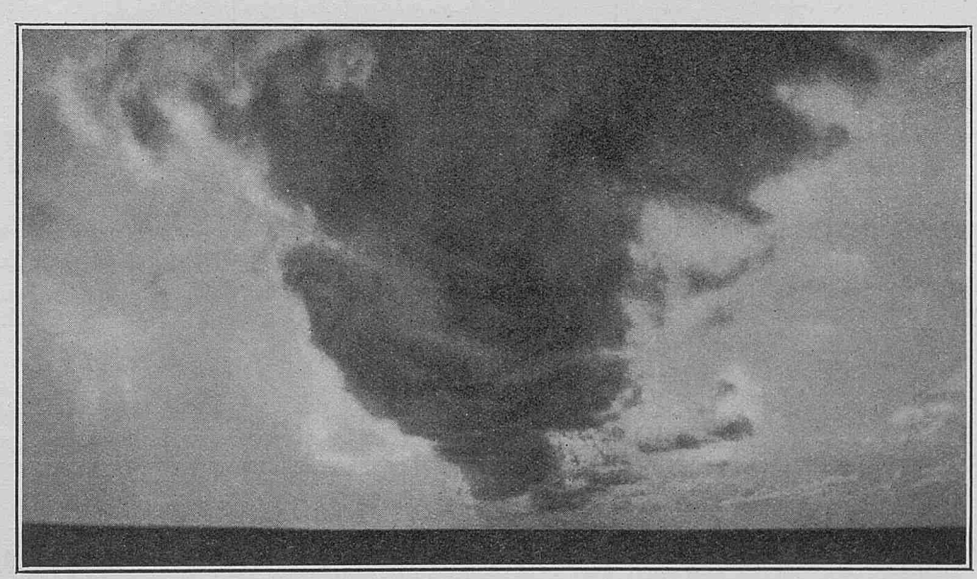
## LINE SQUALL CLOUD.



Photograph taken from S.S. *Arracan*, Captain W. Y. HAMILTON, Port Said to Marseilles, by Mr. A. L. Rowlands, Second officer, at noon on May 10th, 1922, in Latitude 35° 46′ N., Longitude 21° 17′ E.

"This black band of cloud stretched right across the sky from horizon to horizon, the rest of the sky being comparatively clear."

At 9.45 a.m., S.S. *Mantua*, Captain W. H. P. SWENY, C.B.E., R.D., R.N.R., Port Said to Marseilles, reported "Heavy squall containing lightning, hail and rain; weather cleared again soon after," in Latitude 35° 55′ N., Longitude 21° 07′ E.

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## WIRELESS AND WEATHER. AN AID TO NAVIGATION.

### CHAPTER II.

### THE BAROMETER. ABSOLUTE PRESSURE.

THE isobar is the fundamental feature of the weather chart, and since an isobar is a line drawn through places which have equal barometric pressure, it is necessary that all barometer readings used for drawing isobars should be reduced to one datum.

*Only corrected barometer readings should be transmitted by wireless telegraphy.*

*If the barometer reading is not corrected, it is better not to send it by W/T at all,* for an incorrect reading may be very misleading if plotted on a chart.

The datum for which atmospheric pressure is required is that of sea level at a temperature of 32° F. in latitude 45°.

The Marine Mercurial barometer is the most satisfactory instrument for measuring atmospheric pressure at sea.

**Mercurial Barometer readings** should be corrected for—

(1) Height above sea level, because with height pressure is reduced.

(2) Temperature, because mercury expands with heat and contracts with cold.

(3) Gravity, because due to flattening of the earth at the poles the weight is greater at the poles than at the equator, and so the height of a column of mercury required to balance the atmospheric pressure in different latitudes will vary. We use the parallel halfway between the pole and the equator, *i.e.*, Latitude 45°.

**Aneroid Barometer readings** are only corrected for index error and height because difference of gravity does not affect the measurement by these instruments and they are compensated for temperature. The Aneroid is not very reliable for measuring absolute pressure but its deficiencies have been somewhat exaggerated. If constant precautions are taken it may give sufficiently accurate readings for wireless weather work in Middle and High Latitudes. It is not sufficiently constant for comparing with normals in Low Latitudes for the purpose of obtaining warning of tropical revolving storms.

*Be sure to ascertain the Index Error of the Barometer before sailing.*

### To Correct a Mercurial Barometer.

Graduated in Inches.

Tables. I. II. III.

| Temperature Correction. | | | | | Height Correction. | | | | | Gravity Correction. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature of attached Thermometer. | Inches. | | | | Height. | Temperature of Air. | | | | Latitude. | |
| | 28·0 | 29·0 | 30·0 | 31·0 | Ft. | 20° | 40° | 60° | 80° | | |
| °F. | Ins. | Ins. | Ins. | Ins. | | Ins. | Ins. | Ins. | Ins. | ° | Ins. |
| 20 | +·022 | +·023 | +·024 | +·024 | 10 | +·012 | +·011 | +·011 | +·010 | | |
| 25 | +·009 | +·010 | +·010 | +·010 | 15 | +·018 | +·017 | +·017 | +·016 | 0 | —·078 |
| 30 | —·003 | —·004 | —·004 | —·004 | 20 | +·023 | +·023 | +·022 | +·021 | 10 | —·073 |
| 35 | —·016 | —·017 | —·017 | —·018 | 25 | +·029 | +·029 | +·027 | +·026 | 20 | —·060 |
| 40 | —·029 | —·030 | —·031 | —·032 | 30 | +·035 | +·034 | +·032 | +·031 | 25 | —·050 |
| 45 | —·042 | —·043 | —·045 | —·046 | 35 | +·041 | +·040 | +·038 | +·037 | 30 | —·039 |
| 50 | —·054 | —·056 | —·058 | —·060 | 40 | +·047 | +·045 | +·043 | +·042 | 35 | —·027 |
| 55 | —·067 | —·069 | —·072 | —·074 | 45 | +·053 | +·051 | +·049 | +·047 | 40 | —·013 |
| 60 | —·080 | —·082 | —·085 | —·088 | 50 | +·059 | +·056 | +·054 | +·052 | 45 | ±·000 |
| 65 | —·092 | —·095 | —·099 | —·102 | 55 | +·065 | +·062 | +·060 | +·057 | 50 | +·013 |
| 70 | —·105 | —·109 | —·112 | —·116 | 60 | +·071 | +·068 | +·065 | +·062 | 55 | +·027 |
| 75 | —·117 | —·122 | —·126 | —·130 | 65 | +·077 | +·074 | +·071 | +·068 | 60 | +·039 |
| 80 | —·130 | —·135 | —·139 | —·144 | 70 | +·083 | +·079 | +·076 | +·073 | 65 | +·050 |
| 85 | —·143 | —·148 | —·153 | —·158 | 75 | +·089 | +·085 | +·082 | +·078 | 70 | +·060 |
| 90 | —·155 | —·161 | —·166 | —·172 | 80 | +·094 | +·091 | +·087 | +·083 | | |
| | | | | | 85 | +·100 | +·097 | +·093 | +·089 | | |

*Example.*

In Latitude 51° N. barometer reads 30·240 at a height of 36 feet above sea level. The attached thermometer reads 58° F., and the index error is + ·005.

| | | |
|---|---|---|
| Uncorrected reading | 30·240 | inches. |
| Index error | + ·005 | ,, |
| | 30·245 | ,, |
| *Temperature correction for 58° F. | — ·080 | ,, |
| | 30·165 | ,, |
| *Height correction for 36 feet at air temperature of 58° F. | + ·039 | ,, |
| | 30·204 | ,, |
| *Gravity correction in Latitude 51° N. | + ·014 | ,, |
| | 30·218 | ,, |
| | or 30·22 | ,, |

* When the temperature, height or latitude is not exactly given in the tables the correction is obtained by interpolation.

### Graduated in Millibars.

The standard temperature of the barometer is given on the Kew Certificate pasted on the inside of its packing case; it should also be engraved on the instrument itself.

### Table of Correction for Gravity.

(Corrections to be applied to the standard temperature.)

| Latitude of Ship | 0° | 10° | 20° | 25° | 30° | 35° |
|---|---|---|---|---|---|---|
| Correction (degrees absolute) | —15·0 | —14·0 | —11·5 | — 9·5 | — 7·5 | — 5·0 |

| Latitude of Ship | 40° | 45° | 50° | 55° | 60° |
|---|---|---|---|---|---|
| Correction (degrees absolute) | — 2·5 | 0·0 | + 2·5 | + 5·0 | + 7·5 |

*Example.*

| | | |
|---|---|---|
| Standard temperature of barometer | | 284°·2 a |
| Ship's latitude 52° N., correction | + | 3°·5 a |
| | | 287°·7 a |
| Divide height of barometer in feet above sea level by 5 and add— | | |
| Thus barometer 42 feet ÷ 5 | + | 8°·4 a |
| Adjusted fiducial temperature | | 296°·1 a |
| Subtract observed temperature of attached thermometer at time of observation | − | 289°·0 a |
| | + | 7°·1 a |
| Divide by 6 | + | 1·2 |
| Call the result millibars and add it to, or subtract it from the observed reading of the barometer according to its sign— | | |
| Observed barometric reading | | 1017·1 mb. |
| Correction as above | + | 1·2 mb. |
| Corrected barometric reading | | 1018·3 mb. |

Broadly, this method is a dodge whereby the index error, temperature, height and gravity are applied. For full particulars, *see* the Marine Observer's Handbook, 3rd Edition.

## To obtain the Index Error of a Barometer.

### Mercurial Barometer graduated in Inches.

The ship's instrument must be compared with a standard barometer, the index error of which is known.

Hang the instrument, of which the index error is required, up side by side with the standard and leave for half an hour so that they may settle.

Read both barometers and correct both readings as explained; the difference between the corrected readings (no index error having been applied to the ship's instrument) will be the index error of the ship's barometer + if too low — if too high.

### Mercurial Barometer Graduated in Millibars.

These instruments as at present lent to ships by the Meteorological Office have the index error combined in the corrections explained above; should the index error be found by reliable comparison to have materially changed, the matter should be reported to the Meteorological Office or Agent.

### Aneroid Barometers.

Hang a mercurial barometer, the index error of which is known, up side by side with the aneroid and allow to settle. Read both instruments, correct the reading of the mercurial barometer as described, but apply no correction whatever to the reading of the aneroid; the difference between these readings will be the index error and correction for height above sea level combined for the aneroid. The height of the instruments must not be changed. This procedure should be frequently repeated as the index errors of some aneroids vary from time to time.

### Facilities for Barometric Comparison.

Standard barometers are kept at the Marine Division, Meteorological Office, Air Ministry, Kingsway, London, W.C.2, the Port Meteorological Office, Dock Office, Liverpool, and at all important Observatories. The barometers of telegraphic weather reporting stations in all parts of the world are sufficiently accurate for the purpose of ascertaining the index error of ships' barometers.

When possible the Port Meteorological Officer or Agent boards ships on the list of regular observers to the Meteorological Office, and compares the barometer, but all wishing to derive full benefit from wireless weather reports should make their own comparisons as well as completing and sending in the blue post-card, Form 913, regularly. A further check may sometimes be made at sea by using Coast Weather Reports.

*Example.*

Suppose a ship is doubtful of the index error of her barometer and she happens to be within 10 miles of Holyhead at 7 a.m. G.M.T. when the wind is light. The barometer reading is noted and corrections applied. On receipt of the morning weather bulletin, described in Weather Signals, the approximate correct pressure at her position at 7 a.m. will be known and the difference with that observed should be the index error.

## Table IV.—Conversion of Millibars to Inches.

Equivalent in Mercury Inches at 32°, and Latitude 45° of Millibars.

| Mb. | In. | Mb. | In. | Mb. | In. | Mb. | In. | Mb. | In. | Mb. | In. | Mb. | In. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 925 | 27·32 | 940 | 27·76 | 960 | 28·35 | 980 | 28·94 | 1000 | 29·53 | 1020 | 30·12 | 1040 | 30·71 |
| 926 | 27·35 | 941 | 27·79 | 961 | 28·38 | 981 | 28·97 | 1001 | 29·56 | 1021 | 30·15 | 1041 | 30·74 |
| 927 | 27·38 | 942 | 27·82 | 962 | 28·41 | 982 | 29·00 | 1002 | 29·59 | 1022 | 30·18 | 1042 | 30·77 |
| 928 | 27·41 | 943 | 27·85 | 963 | 28·44 | 983 | 29·03 | 1003 | 29·62 | 1023 | 30·21 | 1043 | 30·80 |
| 929 | 27·44 | 944 | 27·88 | 964 | 28·47 | 984 | 29·06 | 1004 | 29·65 | 1024 | 30·24 | 1044 | 30·83 |
| 930 | 27·46 | 945 | 27·91 | 965 | 28·50 | 985 | 29·09 | 1005 | 29·68 | 1025 | 30·27 | 1045 | 30·86 |
| 931 | 27·49 | 946 | 27·94 | 966 | 28·53 | 986 | 29·12 | 1006 | 29·71 | 1026 | 30·30 | 1046 | 30·89 |
| 932 | 27·52 | 947 | 27·97 | 967 | 28·56 | 987 | 29·15 | 1007 | 29·74 | 1027 | 30·33 | 1047 | 30·92 |
| 933 | 27·55 | 948 | 28·00 | 968 | 28·59 | 988 | 29·18 | 1008 | 29·77 | 1028 | 30·36 | 1048 | 30·95 |
| 934 | 27·58 | 949 | 28·03 | 969 | 28·62 | 989 | 29·21 | 1009 | 29·80 | 1029 | 30·39 | 1049 | 30·98 |
| 935 | 27·61 | 950 | 28·05 | 970 | 28·65 | 990 | 29·24 | 1010 | 29·83 | 1030 | 30·42 | 1050 | 31·01 |
| 936 | 27·64 | 951 | 28·08 | 971 | 28·67 | 991 | 29·26 | 1011 | 29·86 | 1031 | 30·45 | 1051 | 31·04 |
| 937 | 27·67 | 952 | 28·11 | 972 | 28·70 | 992 | 29·29 | 1012 | 29·89 | 1032 | 30·48 | 1052 | 31·07 |
| 938 | 27·70 | 953 | 28·14 | 973 | 28·73 | 993 | 29·32 | 1013 | 29·92 | 1033 | 30·51 | 1053 | 31·10 |
| 939 | 27·73 | 954 | 28·17 | 974 | 28·76 | 994 | 29·35 | 1014 | 29·94 | 1034 | 30·53 | 1054 | 31·13 |
| | | 955 | 28·20 | 975 | 28·79 | 995 | 29·38 | 1015 | 29·97 | 1035 | 30·56 | | |
| | | 956 | 28·23 | 976 | 28·82 | 996 | 29·41 | 1016 | 30·00 | 1036 | 30·59 | | |
| | | 957 | 28·26 | 977 | 28·85 | 997 | 29·44 | 1017 | 30·03 | 1037 | 30·62 | | |
| | | 958 | 28·29 | 978 | 28·88 | 998 | 29·47 | 1018 | 30·06 | 1038 | 30·65 | | |
| | | 959 | 28·32 | 979 | 28·91 | 999 | 29·50 | 1019 | 30·09 | 1039 | 30·68 | | |

Such a comparison is only a check. If the wind is not light it should not be used, for gradient might cause error.

### Conversion of Millibars to Inches.

It must be clearly understood that if two mercurial barometers, one graduated in inches and the other in millibars, are read at the same place and time, the uncorrected readings will differ. It is only when each reading has been reduced to the same datum that they will agree; the reason being that an inch barometer corrected for index error reads true at 28°·6 F. at sea level in Latitude 45°, while a millibar barometer reads true at its standard temperature, about 285°a (54° F.) at sea level in Latitude 45°. Therefore, before converting the reading of a millibar barometer to inches, or *vice versâ*, by the Table, correct it.

### Simplified Method of Correcting Mercurial Barometers.

A slide which will greatly simplify the correction of the barometer* has been invented; it has been tried and used with success by a few vessels on the list of regular observers, and it is hoped that when certain modifications found necessary have been applied it may be adopted more generally.

### Barometer Tendency,

or Change in the Barometer.

In the Laws of Storms, one of the first things experience shows us, is that the barometer falls in a ship hove to in the fore part of a travelling depression, and that when the trough passes and the ship remains stationary in the after part of a travelling depression the barometer rises. We also learn that a ship in the fore part of a travelling depression, steering in the same direction as the depression but at greater speed, will usually have a rising barometer and so on.

In short, the observation of barometer tendency is so well understood by seamen that it is necessary here only to make suggestions for uniformity of method in observation for reporting change of the barometer by wireless telegraphy.

In all well ordered ships the barometer is logged at the end of each watch and in unsettled weather it is also noted every two hours, or may be hourly.

By established custom there are, therefore, frequent recorded readings of the barometer from which to ascertain its change.

It is a simple matter with these records to ascertain the change of the barometer for a definite period at any time.

The period established by International agreement for ascertaining the tendency of the barometer at telegraphic weather reporting stations is three hours before the fixed times of observation.

If the same period is used at sea uniformity can be obtained in reports by use of the International Weather Telegraphy Barometer Tendency Table given is Ships' Wireless Weather Signals in our January number.

For example, at 0700 G.M.T. when the barometer is read for reporting the absolute pressure, if the difference in the uncorrected readings at 0400 G.M.T. and 0700 G.M.T. is +·03 inch the tendency will be "Rising slowly."

When the barometer tendency is reported the course and speed made during the last three hours should be given also, for the reasons we have learnt in the Laws of Storms which will be even more apparent when we make weather charts and attempt to forecast from them.

In wireless weather work, we should think of what other ships would like to know.

If a barograph is carried the tendency may be obtained from the trace; for observation of barometer tendency this instrument is most convenient.

* *See* page 19, Marine Observer's Handbook, 3rd Edition.

### The Thermometer.

To predict visibility we want to know the temperature of the surface over which the wind blows and the temperature of the winds themselves; also their humidity.

Though to observe temperatures at first sight may seem a simple matter, precautions are essential, particularly in steamships. Until air temperatures are accurately obtained we cannot measure the humidity.

If the thermometers used are not officially tested instruments bearing the National Physical Laboratory mark they should be compared with a standard instrument and the index error noted and applied to all readings. For descriptions of thermometers *see* Marine Observer's Handbook, 3rd Edition.

### To observe the Sea Surface Temperature.

The water sample should be drawn from over-side, forward of all discharges. In high speed ships this operation has been rendered comparatively easy by using a canvas bucket, cylindrical in shape, with the bottom ballasted with sand, a false bottom being sewn in above the ballast to keep it in place.

### To observe the Air Temperature.

The temperature of the air has been measured at sea in the past by placing the thermometer in a louvred screen fixed in one place. This had the disadvantage that the screen was as often as not to leeward of the funnel, boiler casings and other sources of artificial heat, so that the temperature observed was not the true temperature of the free air.

FIGURE 9 shows a portable screen which has been tried by several regular observing ships and the temperatures obtained have proved to be more accurate than those obtained in fixed screens.

Whatever pattern of screen is used it should be placed to windward some minutes before the thermometers are read.

## CHAPTER III.

### Weather Charting and Forecasting.

To show some advantages which may be gained by W/T communication at sea we will first consider the observations recorded in the Meteorological log of R.M.S. *Ormuz*, Commander E. P. CAMERON, R.D., R.N.R., on the morning of Sunday, February 25th, 1923, when on passage from Gibraltar to Plymouth, and see what can be gleaned from them alone. Then we will suppose that she intercepted Wireless Weather Reports which gave her observations of a number of Coast Stations and ships at a distance, show how a simple weather chart may be constructed and what it tells us.

*Ormuz* left Gibraltar at 6 p.m. on February 23rd, wind westerly, a moderate gale which backed to W.S.W. at midnight, when the barometer was 1012 mb. (29·89 in.), sky overcast with passing showers. During the morning watch the wind veered to the N.W. and the barometer rose slowly. At noon in Latitude 37° 38′ N., Longitude 9° 11′ W. the barometer was 1018 mb. (30·06 in.) wind force 6, blue sky. After rounding Cape St. Vincent the swell was very heavy from N.W.; later there were two distinct swells from N.W. and West and the wind dropped to force 4. The barometer continued to rise until at midnight on February 24th it read 1023 mb. (30·21 in.), when the wind backed to west again, force 5, and the barometer fell very slowly. At 8 a.m. on February 25th in Latitude 41° 43′ N., Longitude 9° 16′ W., the wind was S.W., force 5, barometer 1021 mb. (30·15 in.), swell confused N.W. and North decreasing, sky overcast.

Now the moderate westerly gale with slight backing of wind at midnight on February 23rd, possibly indicated a depression passing far to the northward. The heavy N.W. swell experienced when clear of Cape St. Vincent some time later and the veering of the wind to N.W. supports this; so that *Ormuz* would have evidence of past bad weather over her intended route.

The backing of the wind to west at midnight on February 24th with slow fall of the barometer as the ship steamed to the northward, and further backing of the wind at 8 a.m. on February 25th, would lead Captain Cameron to expect the approach of another depression from the Atlantic; but his own observations alone could not give him an idea of the extent, intensity or probable movements of this depression.

Let us see what Wireless Weather Reports charted, tell us of these and how the weather which *Ormuz* may expect will be affected by them.

Different ships different long splices; in some ships reports may be decoded on the bridge, in others in the Wireless Office. Whatever the procedure is it will be convenient to the navigator if weather reports are always written out in the same concise form, and the following is recommended.

**Coast Weather Reports—0700 G.M.T. February, 25th, 1923.**

| Station. | Barometer tendency. | Weather. | Visibility. | Barometer. | Wind. | |
|---|---|---|---|---|---|---|
| | | | | | Direction. | Force. |
| Wick | Steady | Continuous light rain | Very good | 1002<br>29·59 | S.S.E. | 5 |
| Malin Head | Steady | Overcast | Moderate | 993<br>29·32 | S.E. | 4 |
| Holyhead | Steady | Continuous heavy rain | Poor | 997<br>29·44 | S.S.E. | 3 |
| Scilly | Rising slowly | Blue sky | Very good | 1001<br>29·56 | N.W. by W. | 2 |
| Jersey | Rising | Rain | Good | 1002<br>29·59 | W. | 3 |
| Dungeness | Rising slowly | Blue sky | Good | 999<br>29·50 | N.E. | 2 |
| Yarmouth | Rising slowly | Continuous light rain | Thin fog or mist | 1001<br>29·56 | E. by N. | 1 |
| Tynemouth | Steady | Continuous light rain | Moderate | 1001<br>29·56 | S.S.E. | 3 |

**Ships' Reports—0700 G.M.T., February 25th, 1923.**

| Ship. | Lat. | Long. | Bar. | Wind. | | Weather. | Course. | Speed. | Bar. Tendency. | Current. | From | | To | | Temp. | | Swell. | Past Weather. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dir'n. | Force | | | | | | Lat. | Long. | Lat. | Long. | Air | Sea. | | |
| *Ormuz* | 41° 43′N. | 9° 16′W. | 1021<br>30·15 | S.W. | 5 | Overcast | N.10°E. | 14 | Falling slowly. | — | | | | | 56° | 54° | W. Heavy | Overcast. |
| *Michigan* | 49° 43′N. | 13° 36′W. | 1000<br>29·53 | S.W. | 8 | Overcast | S.88°W. | 7½ | Falling | — | | | | | 51° | 50° | S.W., very heavy. | Rain. |
| *La Paz* | 40° 35′N. | 21° 31′W. | 1013<br>29·92 | S.S.W. | 6 | Overcast, damp. | S.27°W. | 6½ | Steady | — | | | | | 61° | 55° | N.W. Heavy. | Cloudy, damp. |
| *Berengaria* | 48° 42′N. | 19° 36′W. | 995<br>29·38 | S.W. | 7 | Overcast | N.72°E. | 24 | Falling slowly. | — | | | | | 53° | 56° | Confd. | Cloudy. |
| *Montcalm* | 54° 46′N. | 12° 00′W. | 989<br>29·21 | S.W. | 6 | Cloudy | — | — | — | — | | | | | 48° | 48° | S.W. Mod. | Cloudy. |
| *Edinburgh Castle.* | 43° 50′N. | 9° 27′W. | 1015<br>29·97 | W.S.W. | 6 | Passing showers, squally. | S.30°W. | 15½ | Rising | — | | | | | 54°·5 | 54° | W.S.W., heavy. | Rain. |

## Making Weather Charts of Pressure, Wind and Weather.

Over a portion of a small scale chart for the part of the world the ship is in, pin a piece of tracing paper, or better still use a suitable outline chart.

Meteorologists use maps on the conical projection because these have less distortion, but for the purpose of the navigator a Mercator chart is preferable.

Take CHART I. as an example. At the position of a few suitably disposed coast stations, with a protractor, lay off wind arrows, each feather representing one of the Beaufort scale; the arrows fly with the wind, their heads indicate position. Abreast these stations write the barometer in millibars or inches (both are given here for the convenience of all concerned) the tendency of the barometer, the weather indicated by the letters of the Beaufort Notation, and the visibility indicated thus: Vis. V. G. Vis. Poor, and so on.

Plot the position of the reporting ships, and draw wind arrows, heads at positions. Write the name of the ship reporting, the barometer, weather, course and speed and barometric tendency. Sea and air temperatures are also written under the name of the reporting ships, but in this case we will omit temperatures, &c., in order to make the chart as simple and clear as possible. In later examples it will be shown how much more can be done if these are plotted and used also.

Next, pick out the lowest barometer reading plotted on the chart and facing the wind, to the right, with soft pencil, write LOW; also pick out the highest barometer reading on your chart and facing the wind, to the left write HIGH. When this has been done, if there is a well defined weather system, it will be seen that the wind arrows give a general indication of how the wind is circulating at the surface.

In this case it is quite evident that *Montcalm* is in a depression, and the wind arrows of all ships shown and stations northward from Holyhead conform to the circulation of the fore part of a cyclonic depression. The wind arrows at Scilly, Jersey and Dungeness appear to differ from the main circulation and these must be carefully examined. It will be noted that the N.E. wind at Dungeness is blowing nearly athwart that at Tynemouth and in a direction nearly opposite to that at Jersey. It will also be seen that the barometer at Dungeness is lower than at Jersey, Scilly and Tynemouth, although these stations are not so far from the main LOW.

Clearly some other influence to the wind circulation is indicated and BUYS BALLOT'S Law shows us that there must be another Low somewhere S.E. of Dungeness; this we indicate by the letter L. In practice we should continue on the same chart, but in order that what has been already written may be quite clear to the reader we use CHART II. The wind circulation, as now indicated upon CHART I., will give us a very good idea of the trend of the isobars for the wind blows along isobars inclined towards the Low.

Therefore, *remember Buys Ballot's Law*, for it helps us greatly, especially at sea, away from the land and local causes. Ashore the wind may not conform so nearly to this Law.

The lowest barometer recorded at *Montcalm's* position is 989 (29·21). For practical purposes at sea isobars drawn for every four mbs. (·12 of an inch) will be convenient, stepped from 1,000 mb. (29·53 in.).

Thus the lowest proved isobar of this stepping on this chart will be 992, but it is evident with the knowledge of experience that there are actually isobars of lower value to the N.W. It will, therefore, be convenient to dot in the 988 (29·18) isobar passing close to the N.W. of *Montcalm's* position.

The 992 isobar is lightly drawn in passing west of Malin Head and N.W. of *Berengaria*, the S Easterly wind at Malin Head will guide us in its S.S.E. trend past that station, and *Montcalm* and *Berengaria's* barometers and winds make us curve it rather abruptly over N.W. Ireland to the S.W., thus passing through places which are estimated to have the same barometric pressure. We are guided in drawing the 996 (29·41) isobar by the barometers and winds at Wick, Malin Head, Holyhead, *Michigan* and *Berengaria*, but to draw the 1,000 isobar is not quite such a simple matter.

It is evident that the 1,000 isobar passes South, to the westward of Wick and Tynemouth, but Buys Ballot's Law forbids that we take it close to the eastward of Dungeness. Here the wind direction conforms to an isobar running in a S. Westerly direction, and as the 1,000 isobar cannot pass from the N.E. past Dungeness to the westward it must trend to the eastward somewhere between Tynemouth and Dungeness. We therefore dot it in round the L already marked and curve it to the northward to pass close west of Dungeness, thence Jersey, Scilly and *Michigan* will be our guide.

Next we rough in the 1,020 (30·12) isobar with *Ormuz* as our guide. *La Paz* and *Edinburgh Castle* guide us in placing the 1,016 (30·00) isobar. The 1,012 (29·89), 1,008 (29·77) and 1,004 (29·65) isobars are roughly spaced between.

When the isobars which it is possible to draw with the observations available are roughed in, using pencil and indiarubber we improve them, making them close together where the wind is strong and wider apart where it is light, so that their spacing will roughly show the gradient. In doing this we must be careful not to smooth out too much curves which may indicate secondaries, but remember that we only have observations at widely separated points from which we want to obtain a general idea of pressure distribution.

Our weather chart is now complete and from it we draw the following inference :—

> A large cyclonic depression centred N.W. of *Montcalm's* position is causing S. Westerly strong winds to fresh gales from Latitude 40° N. over the Eastern North Atlantic as far north as Latitude 57°, with a secondary depression extending S. Eastward centred S.E. of Dungeness, causing variable winds over the English Channel.
>
> From the chart we learn that as *Ormuz* proceeds on her course, her weather will be influenced more by the depression. She would note that the barometer was rising or rising slowly at the three stations on the coasts of the English Channel indicating an eastward movement of the secondary.
>
> The steady barometer reported at stations northward from Holyhead gives no indication of the approach to that area of the main depression. *Michigan's* falling barometer is to be expected on her course to the westward as she approached the trough whether the depression is stationary or travelling in an easterly direction.
>
> *Berengaria's* slow falling barometer on a N. 72° E. course steaming 24 knots with a moderate gale from S.W. requires careful examination. If the depression is stationary and is neither deepening nor filling up as *Berengaria* steams eastward at high speed, the barometer would rise slowly. If the depression is deepening and stationary, *Berengaria*, in advance of the trough steaming fast to the eastward would experience a falling or steady barometer; or if the depression was maintaining the same barometric gradient and travelling eastward faster than *Berengaria* her barometer would fall.

The chart shows that secondaries have formed. Many of the severest gales in the Eastern North Altantic and over the British coasts have been caused by secondaries forming to the southward of main depressions, westward of Ireland. Now with the indications that our chart gives, we see that this main depression is probably nearly stationary, and *Berengaria's* observations indicate that barometric pressure is reducing at a point eastward of the trough and south of the centre, which probably indicates the forming of a secondary, or, if not, the steepening of the barometric gradient in the main depression itself. Either would cause violent winds.

*Ormuz* therefore forecasts a heavy south-west gale in the Bay of Biscay.

According to the Meteorological Log, the wind commenced to freshen at 2·5 p.m. when Cape Villano was abeam. *Ormuz* was near the 7 a.m. latitude of *Edinburgh Castle* at about 6 p.m. when her barometer had fallen to 1,012 (29·89) approximate, showing that pressure had reduced at this position since the morning reports by about 3 mb. (·09 in.), thus adding to our expectation of a steepening gradient. With the morning chart we can almost see what is happening, for there surely must be a depression deepening and stationary to the N.W., may be it is deepening and travelling on a converging course to our own, or it may be travelling eastward without material change of gradient.

By 4 a.m. the wind increased to a heavy S.W. gale force 10, with squalls and misty rain, the ship labouring heavily to a precipitous sea.

*Monday, February 26th*, 1923.

Next morning, when reports have been received, Chart III. is made in the same manner. From it we see that there were good grounds for thinking that a secondary was forming in the vicinity of Latitude 50° N., Longitude 20° W., for the cyclone now centred some 100 miles to the westward of Valencia was probably developed from a secondary.

With the barometer falling very rapidly at Valencia, Malin Head and Holyhead, representing a very rapid reduction of pressure in a line N.E. from the centre, while it is falling quickly (less rapidly) at stations on either side of the line of bearing, the cyclone may be expected to travel N. Eastward as indicated by the arrow drawn upon the chart.

*Ormuz* therefore expects the gale to continue from the westward for a time along her route to Plymouth; as the cyclone passes away to the N.E. the wind may be expected to moderate. By the time the evening routine reports are received, *Ormuz* will be at Plymouth or bound up Channel, and her officers being fully occupied with the navigation of the ship in crowded narrow waters may, instead of making charts and their own forecast, prefer the forecasts made at the Meteorological Office for coastal areas which are broadcast along with the station reports. The reports of visibility at the stations will also be useful.

Even if weather charts are not made as a matter of routine, it is essential that the navigator should be conversant with the method of construction, because this will enable him better to understand forecasts issued from Weather Offices and may often enable him to visualise the general conditions over an area from Wireless Weather Reports which it may not be convenient to chart.

The writer happened to be at Avonmouth on March 1st, 1923, and, hearing that S.S. *Banffshire* (5,061 tons, gross), Captain R. H. Wynne, outward bound from Liverpool had put in through stress of weather, visited the ship. It appears that *Banffshire* had encountered the worst of the gale on February 26th, when about 30 miles S.W. of the Scillys. There being mountainous seas and squalls of hurricane force she ran up the Bristol Channel for shelter. Asked if any Wireless Weather Reports had been received, copies were produced. Upon inspection these were found to be the Western Seaboard Forecast Messages. Asked if any figures had been taken in, the operator stated that their meaning not being known they had not been recorded.

It was explained that these figures would have given the actual observations of certain Coast Stations, which, together with ship's reports, would have shown the approach of bad weather. *Banffshire* is now a regular observer and Captain Wynne has supplied some convincing proof of the value of Wireless Weather work at sea, including experiences in the Southern Ocean in which he co-operated with a sailing ship as well as a number of steamers. This is but one of many experiences that swell the ranks of converts.

(To be continued.)

# WEATHER SIGNALS.

## FRANCE.

## II.—WIRELESS WEATHER BULLETINS.

### "International Collective Reports."

**Paris (Eiffel Tower W/T Station),** approximate Latitude 48° 51′ N., Longitude 2° 18′ E., call sign FL, transmits weather messages at 0400, 1005, 1600 and 2100 G.M.T. The wavelength used for these messages is 7,300 metres continuous wave, *with the exception of the* 1005 *G.M.T. transmission when a wavelength of* 2,600 *metres* (*spark*) *is used.*

The messages commence with the letters O.N.M. (Office National Météorologique) and are divided into four parts.

**Part I.** commences with "Météo Europe" and contains observations from stations in Europe and North Africa (list below).

**Part II.** commences with "Navires" and contains observations taken on board ships in the Atlantic.

**Part III.** commences with "Météo Amérique" and contains observations of stations (list herewith) in the United States and Canada, &c.

**Part IV.** follows the message "Météo Amérique" and gives observations from American ships in the Western N. Atlantic.

**At 0400 G.M.T.** Parts I. and II. (containing observations of 0100 G.M.T.) are transmitted.

**At 1005 G.M.T.** Part I. (containing observations of 0700 G.M.T.) Part II., Part III. (containing observations of 0100 G.M.T.), and Part IV. are transmitted.

NOTE:—Wavelength used for this issue, 2,600 metres (Spark).

**At 1600 G.M.T.** Parts I. and II. (containing observations of 1300 G M T.) are transmitted.

**At 2100 G.M.T.** Parts I. and II. (containing observations of 1800 G.M.T.) are transmitted.

### List of Observation Stations in Part I.

| Indicator Figures. | Station. | Approximate Position. Latitude. | Longitude. |
|---|---|---|---|
| 01 | Paris | 48° 56′ N. | 2° 23′ E. |
| 02 | Madrid | 40° 25′ N. | 3° 43′ W. |
| 03 | Vienna | 48° 13′ N. | 16° 22′ E. |
| 04 | Stockholm | 59° 17′ N. | 18° 03′ E. |
| 05 | Lerwick | 60° 09′ N. | 1° 08′ W. |
| 06 | Lyons | 45° 45′ N. | 4° 49′ E. |
| 07 | San Fernando | 36° 27′ N. | 6° 13′ W. |
| 08 | Munich | 48° 09′ N. | 11° 33′ E. |
| 09 | Haparanda | 65° 52′ N. | 24° 03′ E. |
| 10 | Thorshavn | 62° 00 N. | 6° 47′ W. |
| 11 | Brest | 48° 23′ N. | 4° 27′ W. |
| 12 | Algiers | 36° 43′ N. | 3° 03′. E. |
| 13 | Warsaw | 52° 14′ N. | 21° 07′ E. |
| 14 | Brönno | 65° 29′ N. | 12° 02′ E. |
| 15 | Renfrew | 55° 52′ N. | 4° 24′ W. |
| 16 | Bucharest | 44° 27′ N. | 26° 05′ E. |
| 17 | Tunis | 36° 46′ N. | 10° 06′ E. |
| 18 | Prague | 50° 05′ N. | 14° 26′ E. |
| 19 | Ingoy | 71° 04′ N. | 24° 09′ E. |
| 20 | Seydisfjord | 65° 10′ N. | 13° 52′ W. |
| 21 | Kosice | 48° 43′ N. | 21° 16′ E. |
| 22 | Genoa | 44° 23′ N. | 8° 55′ E. |
| 23 | Lemberg | 43° 50′ N. | 24° 00′ E. |
| 24 | Copenhagen | 55° 40′ N. | 12° 35′ E. |
| 25 | Perpignan | 42° 43′ N. | 2° 53′ E. |
| 26 | Lister | 58° 10′ N. | 6° 35′ E. |
| 27 | Corunna | 43° 23′ N. | 8° 25′ W. |
| 28 | Ancona | 43° 37′ N. | 13° 31′ E. |
| 29 | Helsingfors | 60° 08′ N. | 25° 01′ E. |
| 30 | Mahon | 39° 54′ N. | 4° 18′ E. |
| 31 | Budapest | 47° 29′ N. | 19° 03′ E. |
| 32 | Holyhead | 53° 18′ N. | 4° 39′ W. |
| 33 | Zurich | 47° 22′ N. | 8° 34′ E. |
| 34 | Utrecht (de Bilt) | 52° 05′ N. | 5° 07′ E. |
| 35 | Rome | 41° 54′ N. | 12° 27′ E. |
| 36 | London | 51° 21′ N. | 0° 07′ W. |
| 37 | Hamburg | 53° 33′ N. | 10° 00′ E. |
| 38 | Bordeaux | 44° 50′ N. | 0° 31′ W. |
| 39 | Brussels | 50° 52′ N. | 4° 21′ E. |
| 40 | Valencia | 51° 57′ N. | 10° 13′ W. |
| 41 | Rabat | 34° 02′ N. | 6° 46′ W. |
| 42 | Lisbon | 38° 41′ N. | 9° 10′ W. |
| 43 | Horta | 38° 32′ N. | 28° 38′ W. |
| 44 | Messina | 38° 12′ N. | 15° 33′ E. |
| 45 | Reykjavik | 64° 08′ N. | 21° 53′ W. |
| 46 | Helwan | 29° 55′ N. | 31° 12′ E. |
| 47 | Oran | 35° 44′ N. | 0° 41′ W. |
| 48 | Cassel | 51° 19′ N. | 9° 31′ E. |
| 49 | Malta | 35° 53′ N. | 14° 27′ E. |
| 50 | Constantinople | 41° 08′ N. | 29° 02′ E. |
| 51 | Taranto | 40° 28′ N. | 17° 15′ E. |
| 52 | Sofia | 42° 45′ N. | 23° 15′ E. |
| 53 | Bizerta | 37° 16′ N. | 9° 48′ E. |
| 54 | Tripoli | 32° 27′ N. | 12° 27′ E. |
| 55 | Agadir | 30° 26′ N. | 9° 32′ W. |
| 56 | Athens | 37° 57′ N. | 23° 43′ E. |
| 57 | Funchal | 38° 07′ N. | 13° 22′ W. |
| 58 | Tangier | 35° 42′ N. | 5° 55′ W. |
| 59 | Belgrade | 44° 47′ N. | 20° 26′ E. |
| 60 | Pertusato | 41° 22′ N. | 9° 11′ E. |
| 61 | Florence | 43° 47′ N. | 11° 14′ E. |
| 62 | Corfu | 39° 37′ N. | 19° 55′ E. |
| 63 | Magdeburg | 52° 09′ N. | 11° 38′ E. |
| 64 | Barcelona | 41° 23′ N. | 2° 09′ E. |
| 65 | Moscow | 55° 42′ N. | 37° 39′ E. |
| 66 | Der-er-Zoor | 35° 20′ N. | 40° 11′ E. |
| 67 | Limasol | 34° 21′ N. | 33° 04′ E. |
| 68 | Malin Head | 55° 23′ N. | 7° 25′ W. |
| 69 | Valladolid | 41° 39′ N. | 4° 43′ W. |
| 70 | Petrograd | 59° 58′ N. | 30° 26′ E. |
| 71 | Sebastopol | 44° 34′ N. | 33° 28′ E. |
| 72 | Khania | 35° 28′ N. | 24° 02′ E. |
| 73 | Jan Mayen | 70° 59′ N. | 8° 19′ W. |
| 74 | Cordova | 37° 51′ N. | 4° 52′ W. |
| 75 | Orenburg | 51° 47′ N. | 55° 12′ E. |
| 76 | Venice | 45° 26′ N. | 12° 18′ E. |
| 77 | Damascus | 33° 31′ N. | 36° 14′ E. |
| 78 | Mygbugten | 73° 30′ N. | 21° 30′ W. |
| 79 | Muslimié | 36° 27′ N. | 37° 08′ E. |
| 80 | Vaigatch | 69° 43′ N. | 59° 48′ E. |
| 81 | Quade Hook (Spitzbergen) | 78° 57′ N. | 11° 42′ E. |
| 82 | Astrakhan | 46° 15′ N. | 48° 04′ E. |
| 83 | Omsk | 55° 05′ N. | 73° 30′ E. |
| 84 | Kiev | 50° 27′ N. | 30° 34′ E. |
| 85 | Port Etienne | 20° 37′ N. | 17° 04′ W. |

The *numbers* before the names of the stations are their code numbers.

### List of Observation Stations in Part III.

| Indicator Letters. | Station. | Approximate Position. Latitude. | Longitude. |
|---|---|---|---|
| J | St. John's, N.F. | 47° 34′ N. | 52° 42′ W. |
| S | Sydney, N.S. | 46° 10′ N. | 60° 10′ W. |
| FP | Father Point | 48° 31′ N. | 68° 19′ W. |
| PN | Parry Sound | 45° 20′ N. | 80° 00′ W. |
| WR | White River | 48° 30′ N. | 85° 10′ W. |
| WI | Winnipeg | 49° 50′ N. | 97° 10′ W. |
| LP | Le Pas | 53° 45′ N. | 101° 20′ W. |
| ED | Edmonton | 53° 40′ N. | 113° 20′ W. |
| T | Nantucket | 41° 14′ N. | 70° 07′ W. |
| WA | Washington | 39° 00′ N. | 77° 10′ W. |
| H | Battersea | 35° 14′ N. | 75° 32′ W. |
| C | Charleston | 32° 43′ N. | 79° 52′ W. |
| B | Bermuda | 32° 17′ N. | 64° 46′ W. |
| K | Key West | 24° 33′ N. | 81° 48′ W. |
| LR | Little Rock | 34° 45′ N. | 92° 20′ W. |
| JU | Juneau (Alaska) | 58° 21′ N. | 134° 20′ W. |
| NV | Nashville | 36° 10′ N. | 86° 50′ W. |
| V | Cleveland | 41° 30′ N. | 81° 40′ W. |
| CH | Chicago | 41° 50′ N. | 87° 45′ W. |
| DU | Duluth | 46° 40′ N. | 92° 20′ W. |
| HN | Huron | 44° 25′ N. | 98° 15′ W. |
| SLC | Salt Lake City | 40° 45′ N. | 111° 40′ W. |
| HL | Helena | 46° 10′ N. | 111° 50′ W. |

| Indicator Letters. | Station. | Approximate Position. Latitude. | Longitude. |
|---|---|---|---|
| DV | Denver | 39° 48 N. | 105° 05′ W. |
| RO | Roseburg | 43° 11′ N. | 123° 10′ W. |
| TAT | Tatoosh | 48° 23′ N. | 124° 44′ W. |
| SF | San Francisco | 37° 50′ N. | 122° 30′ W. |
| DI | San Diego | 32° 42′ N. | 117° 15′ W. |
| FW | Fort Worth | 32° 35′ N. | 97° 25′ W. |
| EP | El Paso | 31° 50′ N. | 106° 20′ W. |
| DH | Dutch Harbour (Alaska) | 53° 30′ N. | 166° 55′ W. |
| TN | Tanana (Alaska) | 66° 00′ N. | 151° 00′ W. |

The *letters* before the names of the observation stations are the code letters.

## Explanation of Code Figures used in Parts I, II, III, and IV.

### Part I.

Commences with the words "Météo Europe" followed by the *observation station indicator figures*, then *two groups* of five figures in each group.

**First Group.**

1st and 2nd figures = Barometer reading corrected in whole millimetres, the first seven being omitted. (To convert millimetres into millibars or inches *see* Table V.)
3rd and 4th figures = Wind direction true. (*See* Table IV., p. 15.)
5th figure = Wind force by Beaufort Scale (*see* p. 12. Forces 9 and above, coded as 9.)

**Second Group.**

1st figure = Amount of cloud and the general state of the weather at time of observation (Table VI.).
2nd and 3rd figures = Air temperature in whole degrees *Centigrade*, 50 being added to negative values. (To convert Centigrade temperature into Fahrenheit *see* Table VII.)
4th figure = Amount and characteristic of Barometer tendency (Table VIII.).
5th figure = Amount of rainfall for the preceding 24 hours (Table IX.), *0700 observations only*. At the other observation times in this part the *fifth figure* will indicate the weather in the interval since the preceding time of report (Table X.).

NOTE.—The number of station observations transmitted in Part I. is always less than 60. A suitable selection is made in a manner to ensure the best distribution.

### Part II.

Commences with the word "Navires" followed by three groups of five figures each, for each ship.

**First Group.**

1st figure = Day of the week, 1 = Sunday; 2 = Monday; 3 = Tuesday, &c. The day refers to G.M.T. and not to local time.
2nd figure = Quarter of the globe in which the ship is situated (Table XI.).
3rd, 4th and 5th figs. = Latitude in degrees and tenths, the tenths being obtained by dividing the number of minutes by 6, and neglecting the remainder.

**Second Group.**

1st 3 figures = Longitude in degrees and tenths, the tenths being obtained as for latitude.
4th and 5th figures = G.M.T. (Civil) of observation to nearest hour, 00–23 reckoned from midnight.

**Third Group.**

1st and 2nd figures = Barometer corrected to whole millimetres, the first 7 being omitted (to convert millimetres to inches, &c., *see* Table V.).
3rd and 4th figures = Direction of wind, true (*see* Table IV., p. 15).
5th figure = Wind force by Beaufort scale (forces 9 and above coded as 9. *See* p. 12).

### Part III.

Commences with the words *"Météo Amérique," and is sent at 1005 G.M.T. It contains the 0100 G.M.T. observations taken at a number of stations in the United States, Canada, Nova Scotia, &c., &c.†

**First Group :** Consists of four figures, in which the 1st and 2nd figures indicate the day of the month and the 3rd and 4th figures the hour of observation.
**Second Group :** Consists of one, two or three letters which indicate the observation station (*see* list).
**Third Group :** Consists of four figures, viz. :—
1st 2 figures = Barometer corrected to whole millimetres, the first 7 being omitted. (To convert millimetres to inches, &c., *see* Table V.)
3rd figure = Direction of wind, true (Table XII.).
4th figure = Wind force by Beaufort Scale (*see* p. 12. Forces 9 and above coded as 9).

Immediately after these observations, the message gives the names of the stations at which the centres of the highest and lowest barometric pressure are located and a group of figures giving information similar to that in the 3rd Group of this Part for each station.

Observations at Alaskan Stations are then similarly transmitted preceded by the four figure group giving date and time, G.M.T., of observation.

### Part IV.

Following the location of highest and lowest pressure in the "Météo Amérique" portion, observations from American ships in the Western N. Atlantic are repeated as follows† :—

The word "Navires" is again sent, followed by three five-figure groups and one four-figure group for each ship.

The three five-figure groups can be decoded in precisely the same manner by the method shown in Part II. "Navires."

The four-figure group will decode thus—

1st 3 figures = Temperature of the air in degrees and half degrees Centigrade (to convert temperatures to Fahrenheit, *see* Table VII.).
4th figure = Cloud amount and general state of the weather at the time observation. (Table XIII.)

Observations from stations, &c., which arrive too late for insertion in the scheduled transmissions are sent after Part IV.

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**Nantes–Basse Lande–W/T Station** approximate Latitude 47° 11′ N., Longitude 1° 42′ W., call sign UA broadcasts at 1230 G.M.T. the general meteorological situation in the N. Atlantic, together with a forecast, *en clair*. The wavelength used is 2800 metres (spark).

### Table V.

**To Convert Millimetres into Millibars and Inches.**

| Mm. | Mb. | In. | Mm. | Mb. | In. | Mm. | Mb. | In. |
|---|---|---|---|---|---|---|---|---|
| 695 | 926·6 | 27·37 | 743 | 990·6 | 29·25 | 759 | 1011·9 | 29·88 |
| 700 | 933·2 | 27·56 | 744 | 991·9 | 29·29 | 760 | 1013·2 | 29·92 |
| 705 | 939·9 | 27·76 | 745 | 993·2 | 29·33 | 761 | 1014·6 | 29·96 |
| 710 | 946·6 | 27·95 | 746 | 994·6 | 29·37 | 762 | 1015·9 | 30·00 |
| 715 | 953·2 | 28·15 | 747 | 995·9 | 29·41 | 763 | 1017·2 | 30·04 |
| 720 | 959·9 | 28·35 | 748 | 997·2 | 29·45 | 764 | 1018·6 | 30·08 |
| 725 | 966·6 | 28·54 | 749 | 998·6 | 29·49 | 765 | 1019·9 | 30·12 |
| 730 | 973·2 | 28·74 | 750 | 999·9 | 29·53 | 766 | 1021·2 | 30·16 |
| 735 | 979·9 | 28·94 | 751 | 1001·2 | 29·57 | 767 | 1022·6 | 30·20 |
| 736 | 981·2 | 28·98 | 752 | 1002·6 | 29·61 | 768 | 1023·9 | 30·24 |
| 737 | 982·6 | 29·02 | 753 | 1003·9 | 29·65 | 769 | 1025·2 | 30·28 |
| 738 | 983·9 | 29·06 | 754 | 1005·2 | 29·69 | 770 | 1026·6 | 30·32 |
| 739 | 985·2 | 29·10 | 755 | 1006·6 | 29·73 | 775 | 1033·2 | 30·51 |
| 740 | 986·6 | 29·13 | 756 | 1007·9 | 29·76 | 780 | 1039·9 | 30·71 |
| 741 | 987·9 | 29·17 | 757 | 1009·2 | 29·80 | 785 | 1046·6 | 30·91 |
| 742 | 989·2 | 29·21 | 758 | 1010·6 | 29·84 | | | |

* The prefix to this part may sometimes simply consist of the four-figure group giving the date and time of observation, viz., 1301 = 13th day 0100 G.M.T. observations, the stations code *letters* will, however, enable immediate identification to be made.

† These observations are sent out in the first instance from the Annapolis W/T Station, U.S.A., call sign NSS to the Lyons W/T Station, France, call sign YN, at 0530, G.M.T. on a wavelength of 17,145 metres (c.w.). The explanation of the code used will be published in the April number of this Journal.

### Table VI.

**Abridged International Weather Telegraphy Present Weather Scale.**

| | |
|---|---|
| 0—Cloud amount 0–5. | 5—Rain. |
| 1—Cloud amount 6–10. | 6—Snow or Hail and Snow. |
| 2—Fog or mist. | 7—Sleet or Rain and Snow. |
| 3—Passing showers. | 8—Hail or Rain and Hail. |
| 4—Drizzle. | 9—Thunderstorm. |

### Table VII.

**To Convert Centigrade Temperatures into Fahrenheit.**

| Cent.* | Fahr. | Cent. | Fahr. | Cent. | Fahr. | Cent. | Fahr. |
|---|---|---|---|---|---|---|---|
| 50 | 32 | 0 | 32 | 10 | 50 | 21 | 70 |
| 51 | 30 | 1 | 34 | 11 | 52 | 22 | 72 |
| 52 | 28 | 2 | 36 | 12 | 54 | 23 | 73 |
| 53 | 27 | 3 | 37 | 13 | 55 | 24 | 75 |
| 54 | 25 | 4 | 39 | 14 | 57 | 25 | 77 |
| 55 | 23 | 5 | 41 | 15 | 59 | 26 | 79 |
| 56 | 21 | 6 | 43 | 16 | 61 | 27 | 81 |
| 57 | 19 | 7 | 45 | 17 | 63 | 28 | 82 |
| 58 | 18 | 8 | 46 | 18 | 64 | 29 | 84 |
| 59 | 16 | 9 | 48 | 19 | 66 | 30 | 86 |
| | | | | 20 | 68 | | |

### Table VIII.

**Tendency of Barometer Table—French Reports.**

| | | | | | |
|---|---|---|---|---|---|
| 0 | Barometer steady. (The barometer has not fallen or risen more than ½ mm. in 3 hours.) | | | | |
| 1 | Do. | rising slowly. | The barometer has risen | ½ to 1½ mm. | (0·7–2·0 mb.) in last 3 hours |
| 2 | Do. | rising. | Do. | do. 1½ to 3½ mm. | (2·0–4·7 mb.) do. |
| 3 | Do. | rising quickly. | Do. | do. 3½ to 6 mm. | (4·7–8·0 mb.) do. |
| 4 | Do. | rising very rapidly. | Do. | do. over 6 mm. | (8·0 mb.) do. |
| 5 | Do. | falling slowly. | Do. | has fallen ½ to 1½ mm. | (0·7–2·0 mb.) do. |
| 6 | Do. | falling. | Do. | do. 1½ to 3½ mm. | (2·0–4·7 mb.) do. |
| 7 | Do. | falling quickly. | Do. | do. 3½ to 6 mm. | (4·7–8·0 mb.) do. |
| 8 | Do. | falling very rapidly. | Do. | do. over 6 mm. | (8·0 mb.) do. |

### Table IX.

**International Weather Telegraphy—Rainfall in past 24 Hours.**

| | |
|---|---|
| 0—No rain. | 5—11–15 mm. |
| 1—Trace or 0·1 mm. | 6—16–20 mm. |
| 2—0·2–2 mm. | 7—21–30 mm. |
| 3—3–5 mm. | 8—31–50 mm. |
| 4—6–10 mm. | 9—above 50 mm. |

### Table X.

**International Weather Telegraphy Past Weather Scale.**

| | |
|---|---|
| Without precipitation | 0 = Fair or fine (b or bc). |
| | 1 = Cloudy. |
| | 2 = Overcast continuously. |
| | 3 = Fog or mist |
| | 4 = Thick fog. |
| Precipitation | 5 = Passing showers. |
| | 6 = Rain or drizzle. |
| | 7 = Snow or sleet. |
| | 8 = Hail or rain and hail. |
| | 9 = Thunderstorm. |

### Table XI.

**International Weather Telegraphy—Quarter of the Globe, Table.**

| Code No. | Lat. | Long. | |
|---|---|---|---|
| 1 | N. | W. | Barometer in millibars. |
| 2 | N. | E. | |
| 3 | S. | W. | |
| 4 | S. | E. | |
| 5 | N. | W. | Barometer in millimetres. |
| 6 | N. | E. | |
| 7 | S. | W. | |
| 8 | S. | E. | |

* 50 is added to the amount to indicate minus temperatures Centigrade.

### Table XII.

**One-Figure Compass Table.**

**International Weather Telegraphy—Wind Direction Table.**

| | |
|---|---|
| 0 = Calm | 5 = S.W. |
| 1 = N.E. | 6 = W. |
| 2 = E. | 7 = N.W. |
| 3 = S.E. | 8 = N. |
| 4 = S. | |

### Table XIII.

**Present Weather Scale—American Ship's Reports.**

| Code Figure. | Explanation. | Code Figure. | Explanation. |
|---|---|---|---|
| 0 = Sky clear | = b. | 5 = Rain | = r |
| 1 = ,, ¼ clouded | = b | 6 = Snow | = s |
| 2 = ,, ½ clouded | = bc | 7 = Mist | = m |
| 3 = ,, ¾ clouded | = c | 8 = Fog | = f |
| 4 = ,, Overcast | = o | 9 = Thunderstorm | = tl |

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## FRANCE.

### Wireless Storm Signals.

Eiffel Tower W/T Station broadcasts wireless storm signals when the forecasts indicate that the wind force is likely to exceed force 7 on the Beaufort scale, immediately after the weather messages transmitted at 0220, 0820, 1420 and 1920 G.M.T. on a wavelength of 2600 metres spark.

The signals refer to the following French coastal areas :—

" Manche " —The Channel.

" Bretagne " —Entrance to English Channel, South Coast of Brittany and the Northern part of the Bay of Biscay.

" Ocean " —From the Loire to the Spanish Frontier, including the central and Southern part of the Bay of Biscay.

" Roussillon " —Spanish Frontier to Faraman.

" Provence " —From Faraman to the Italian Frontier, including Corsica.

" Méditerranée —French coasts in the Mediterranean, only used when one message suffices for the combined areas " Roussillon " and " Provence."

**Form of Message.**

The signal is sent *en clair*. It commences with the name of the day of the week and the duration for which the warning is valid, followed by the word " Tempête " and the probable direction from which the gale may be expected.

*Example of Message.*

" Jeudi 15 heures Manche tempête N.W. Bretagne, Ocean tempête S.W. Méditerranée tempête S.W."

*Explanation.*

Storms or gales are predicted (or will continue) from now until 1500 to-morrow in the areas and from the directions mentioned.

The following stations transmit storm signals concerning the areas " Manche," " Bretagne " and " Ocean " :—

**Cherbourg** approximate Latitude 49° 37′ N., Longitude 1° 36′ W., call sign FUC;

**Brest** approximate Latitude 48° 22′ N., Longitude 4° 34′ W., call sign FUE;

**Lorient** approximate Latitude 47° 44′ N., Longitude 3° 21′ W., call sign FUN;

**Rochefort** approximate Latitude 45° 55′ N., Longitude 0° 57′ W., call sign FUR;

whilst

**Porquerolles** approximate Latitude 42° 59′ N., Longitude 6° 12′ E., call sign FUQ; and

**Ajaccio** approximate Latitude 41° 55′ N., Longitude 8° 46′ E., call sign FUI;

transmit storm signals concerning the areas " Roussillon " and " Provence " (or Méditerranée).

These six stations transmit the signal on the 600 metre wavelength as soon as it is received by land line or from Eiffel Tower. The International Safety Signal — — — (TTT) is first sent out, and

is followed a minute later by the storm signal which is repeated three times at intervals of ten minutes.

When the time of sending falls outside a single operator watch on board ship the message is repeated at the commencement of the succeeding watch.

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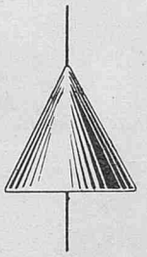
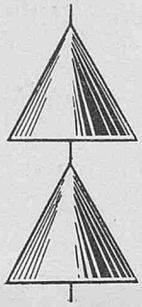
## FRANCE.

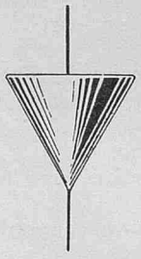
### III.—Visual Storm Warnings.



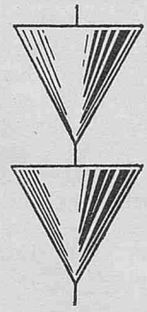
Hoisted when a gale is probable from N.W.



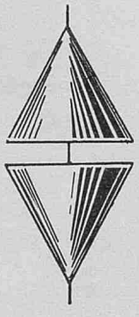
Hoisted when a gale is probable from N.E.



Hoisted when a gale is probable from S.W.



Hoisted when a gale is probable from S.E.



Hoisted when gales of hurricane force are probable.

Storm signals are hoisted at the semaphore stations and port offices on the coasts of France. When any of the above signals are made, a gale is probable from the quarter indicated by the signal used, within a distance of about 50 miles of the place where the signal is hoisted.

The signals remain hoisted 48 hours from the time of receiving notice from the Ministry of Marine.

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## Special Notices regarding Personnel.

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

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## OBITUARY.

The death of Commander William Caius Crutchley, R.N.R., is noted with regret.

Captain Crutchley was a very keen Marine Observer from 1878 to 1893. He contributed 37 meteorological logs of which 30 were classed "Excellent."

Commencing his sea life as an apprentice in the Barque *Alwynton*, chartered by the Orient Line, he later served for a time as Able Seaman in Wigram's Blackwall Ship *Essex*, Captain J. S. Attwood, and finished his "time" in the Barque *Lord Nelson*. He was 2nd mate of the famous ship *Lord of the Isles*, reputed to have been the first iron tea clipper, and the tea clipper *Omba*.

Joining the old Union Line as 3rd officer in July, 1870, he served in the *Roman*, *Danube*, *Natal*, *Basuto*, *Syria*, *African*, *Basuto* again, and then back to the *Roman*.

In the *Roman*, as a junior officer, he had been under Captains Warleigh and Vyvyan, afterwards Sir George Vyvyan, K.C.M.G., Deputy Master of Trinity House; he was Chief officer in that ship with Captain A. W. Brooke Smith. Captain Crutchley's first command was the *African;* he was next appointed to the *American*, but this appointment was cancelled and he went in command of the *Trojan*.

On her outward passage the *American* broke her shaft and sank, all hands being saved, though part of her company were picked up by a ship in which they were shipwrecked a second time. Captain Mclain Wait, who commanded the ill-fated *American*, was afterwards Marine Superintendent of the Union Line and her Chief officer, Mr. Campbell Hepworth, was later Captain Campbell Hepworth, C.B., R.D., R.N.R., Marine Superintendent of the Meteorological Office.

Captain Crutchley commanded the *Mexican* on her second voyage, then the crack ship of the company, a beautiful three-masted steamer, square rigged forward with a ninety-seven foot fore yard.

In 1883 there was a depression in the Cape Trade and a number of ships were laid up; Captain Crutchley, in consequence, with a number of other officers was placed on half pay.

After drilling in H.M.S. *Trincomalee* he applied for promotion in the Royal Naval Reserve, but was informed that the rank of Sub-Lieutenant was ample for the Master of a mail steamer.

The offer of a command in the New Zealand Shipping Company was received and accepted, and Captain Crutchley took over their new *Ruapehu;* he later had the *Kaikoura*, taking her 23 voyages round the world. Of her he wrote "She never disappointed me or failed to come up to expectations at any time."

In 1893, after service as Lieutenant, R.N.R., in H.M.S. *Devastation*, Captain Crutchley retired from the sea and became Secretary of the Navy League, his genuinely kindly heart and great energy contributing largely to the success of that Institution.

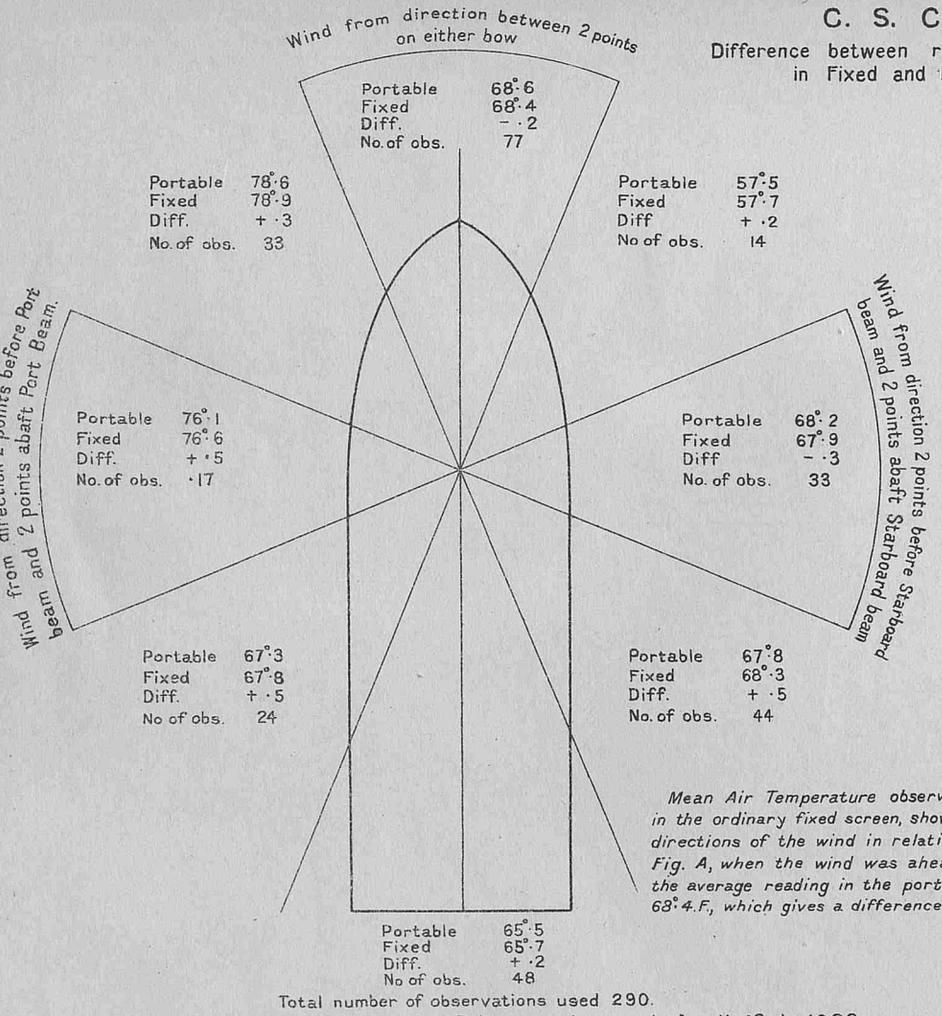
Up to two years ago he was a regular attendant at the Annual Court of Trinity House, of which corporation he was a Younger Brother.

In the Foreword to his Book "My Life at Sea," Lord Brassey wrote:—

"Captain Crutchley earned a deserved popularity as a representative seaman. He began his work as an Empire builder while serving at sea. It was continued ashore for a period of many years in the capacity of the Secretary of the Navy League."

# C. S. COLONIA.

Difference between readings of temperature in Fixed and Portable screens.




Total number of observations used 290.

Fig. A.—Observations made between February 1st and April 13th. 1923, on a voyage from London to Penang and return.

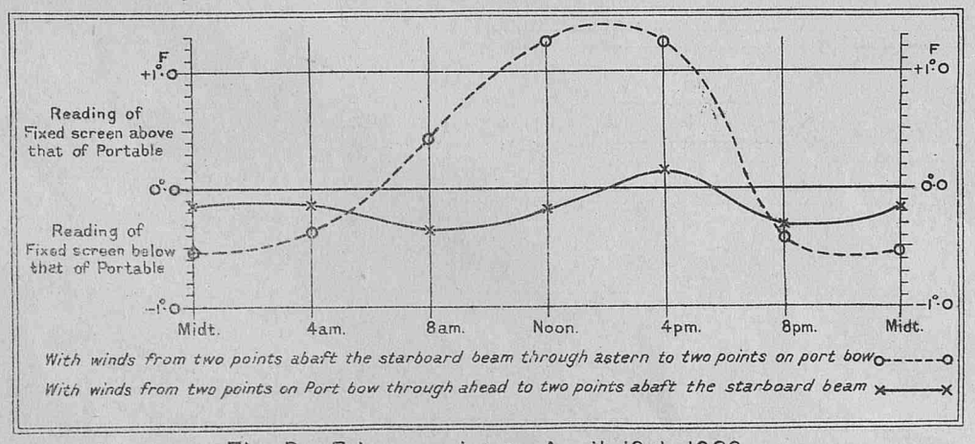
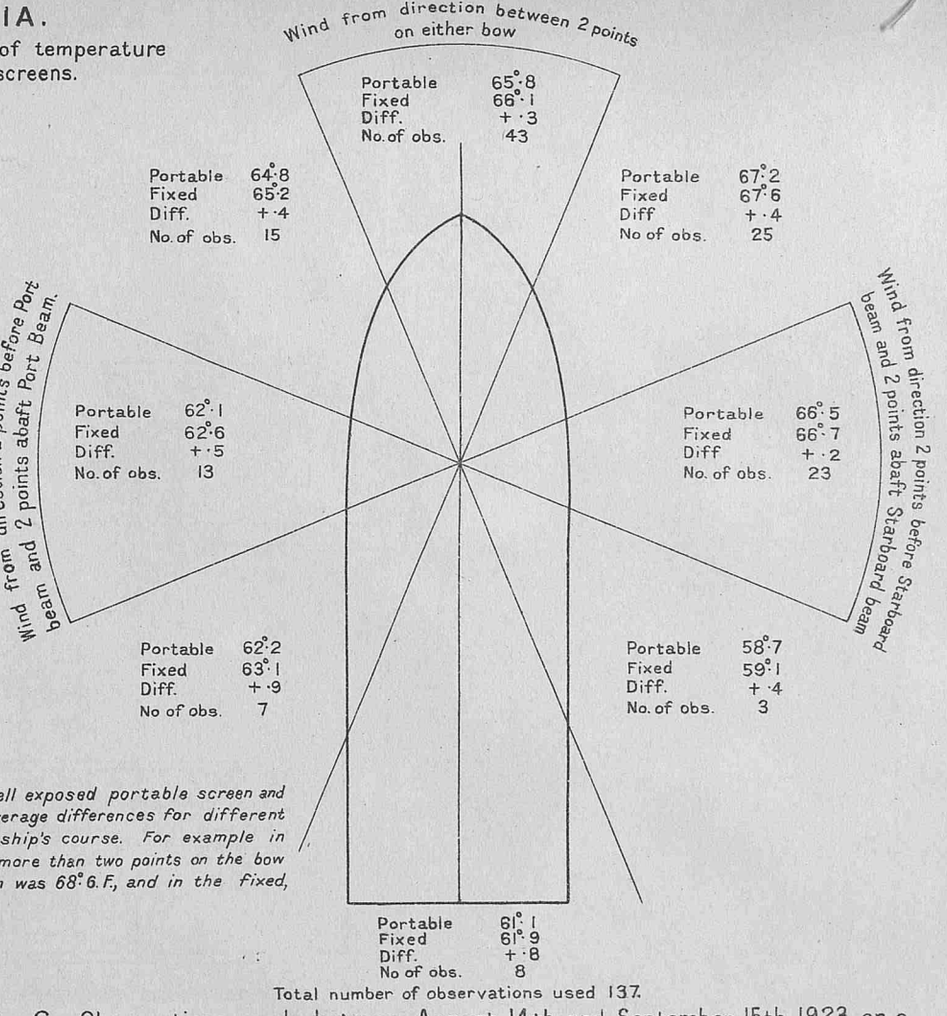



Fig. B.—February 1st. to April 13th. 1923.

*Mean Air Temperature observed in a well exposed portable screen and in the ordinary fixed screen, showing the average differences for different directions of the wind in relation to the ship's course. For example in Fig. A, when the wind was ahead, or not more than two points on the bow the average reading in the portable screen was 68°·6 F., and in the fixed, 68°·4 F., which gives a difference of 0°·2 F.*




Total number of observations used 137.

Fig. C.—Observations made between August 14th. and September 15th. 1923 on a voyage from London to Fox Bay, Nova Scotia and return via Azores.

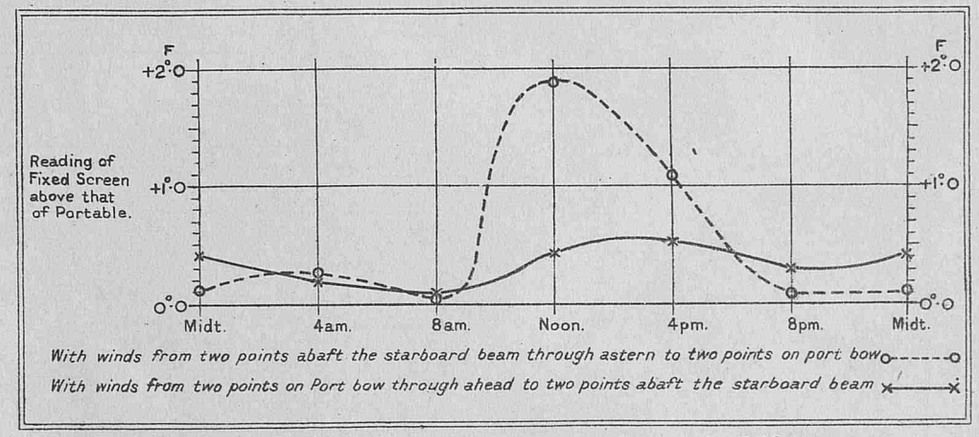



Fig. D.—August 14th. to September 15th. 1923.

*The curves above are obtained as follows:— The difference between the temperature in the fixed and portable screens was obtained from each observation. The mean of these differences was then calculated at each hour of observation. The points marked X and O were plotted corresponding to these means and curves drawn through the points.*

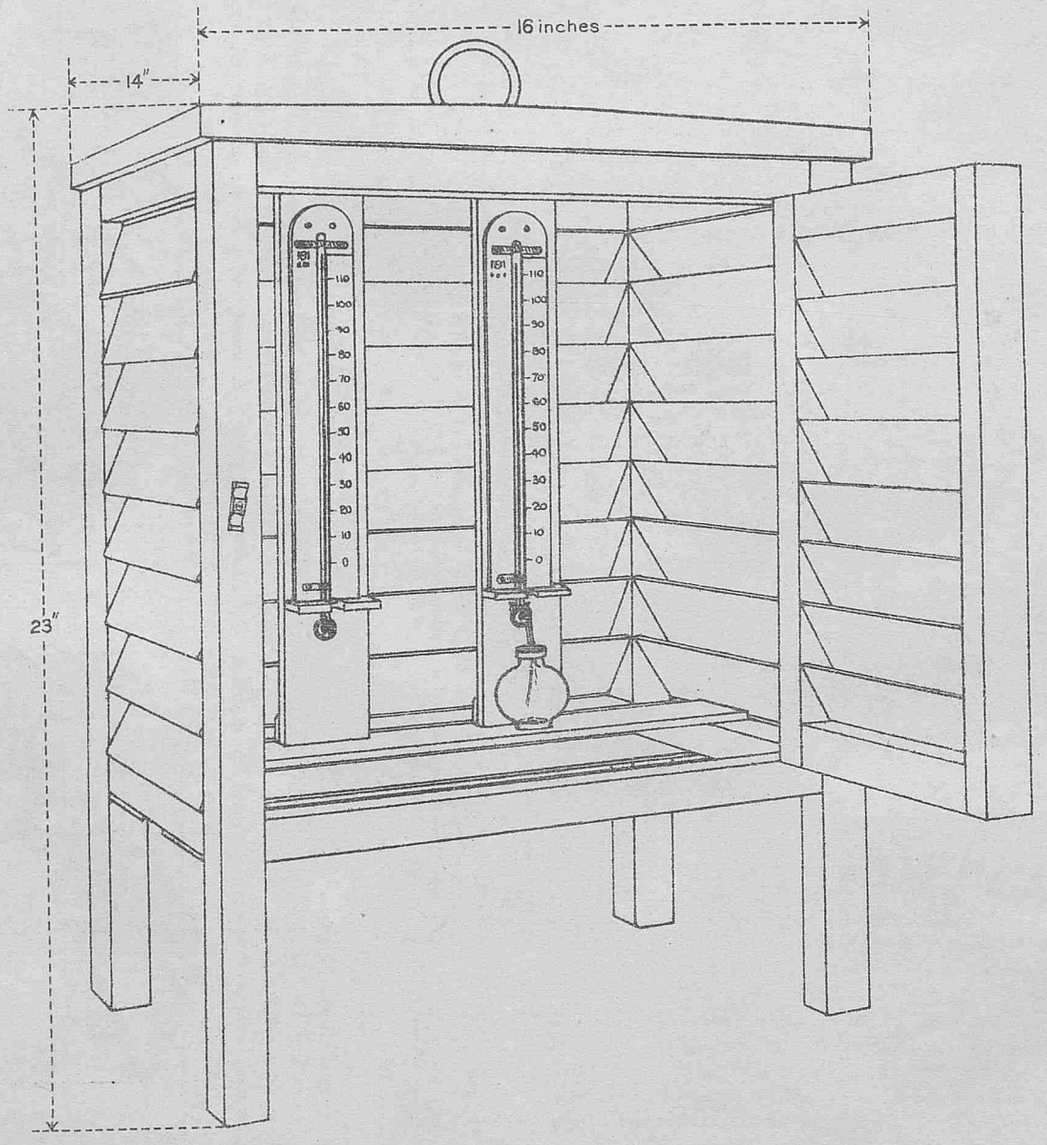



Fig. 9. "WIRELESS AND WEATHER."

EXPERIMENTAL HYGROMETER SCREEN, WITH SINGLE LOUVRES, USED FOR TRIALS.

PLOTTED OBSERVATIONS FOR WEATHER CHART, MORNING OF FEBRUARY 25TH, 1923.

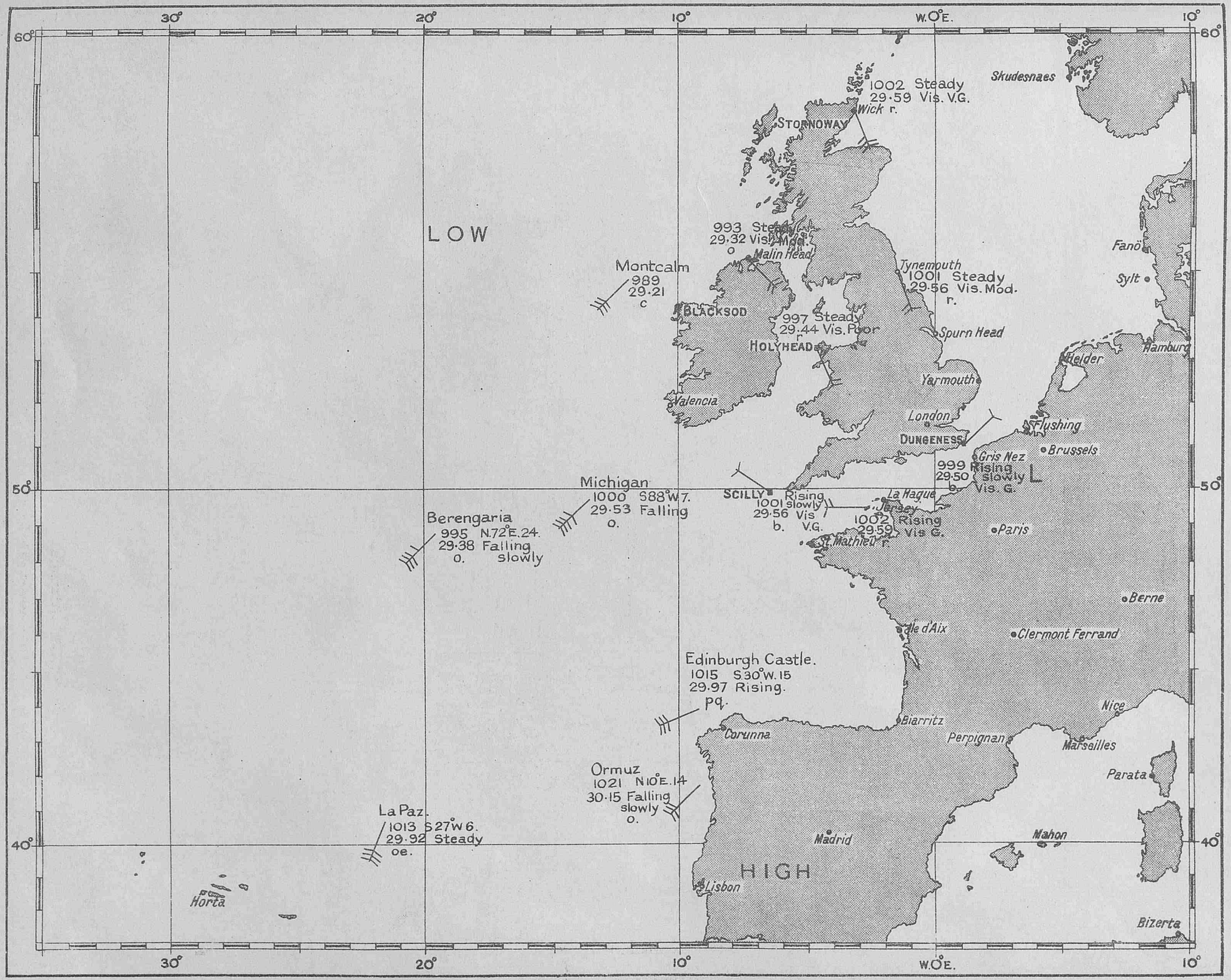



Chart I,—"WIRELESS AND WEATHER."

WEATHER CHART, MORNING OF FEBRUARY 25TH, 1923.

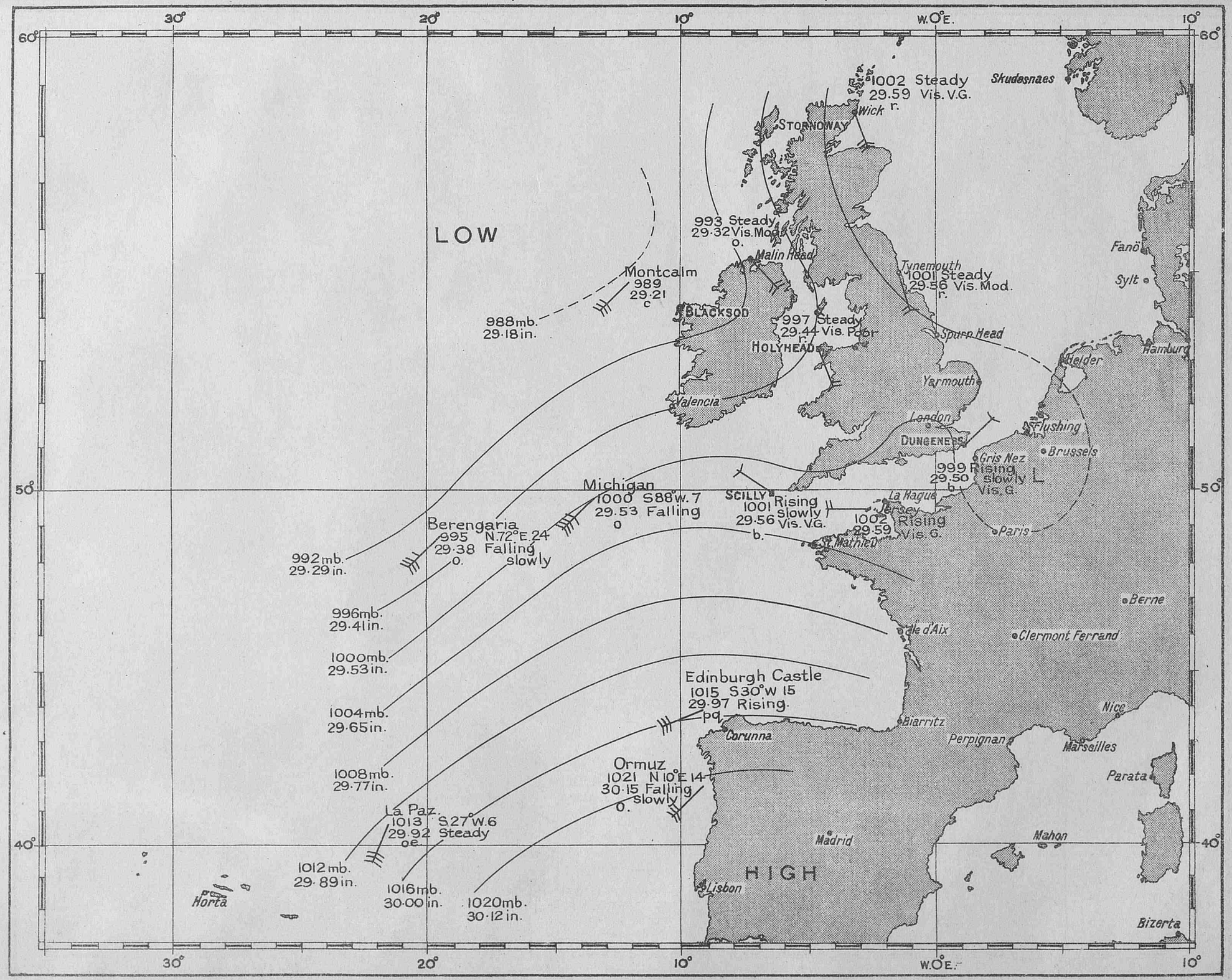



Chart II,—"WIRELESS AND WEATHER."

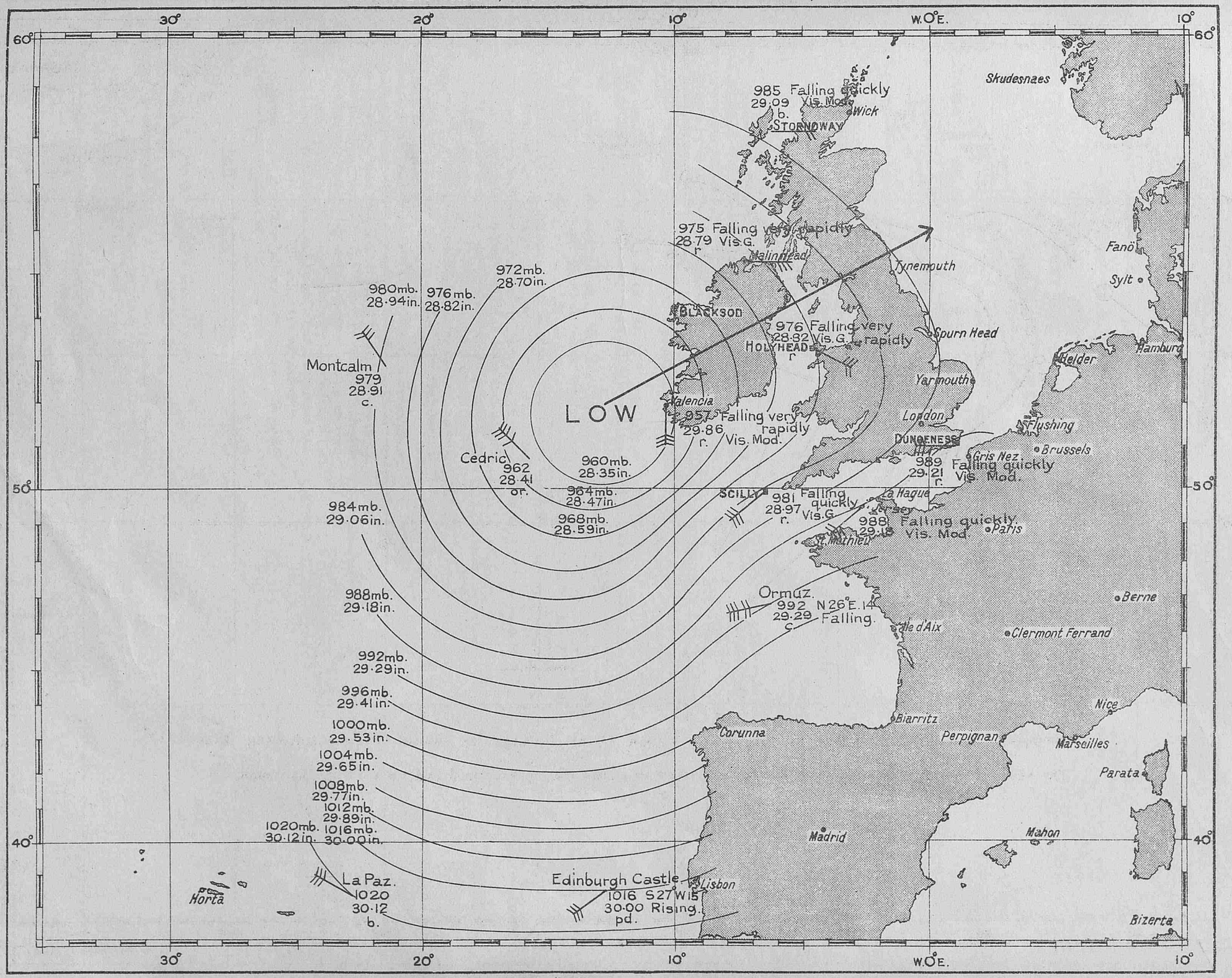
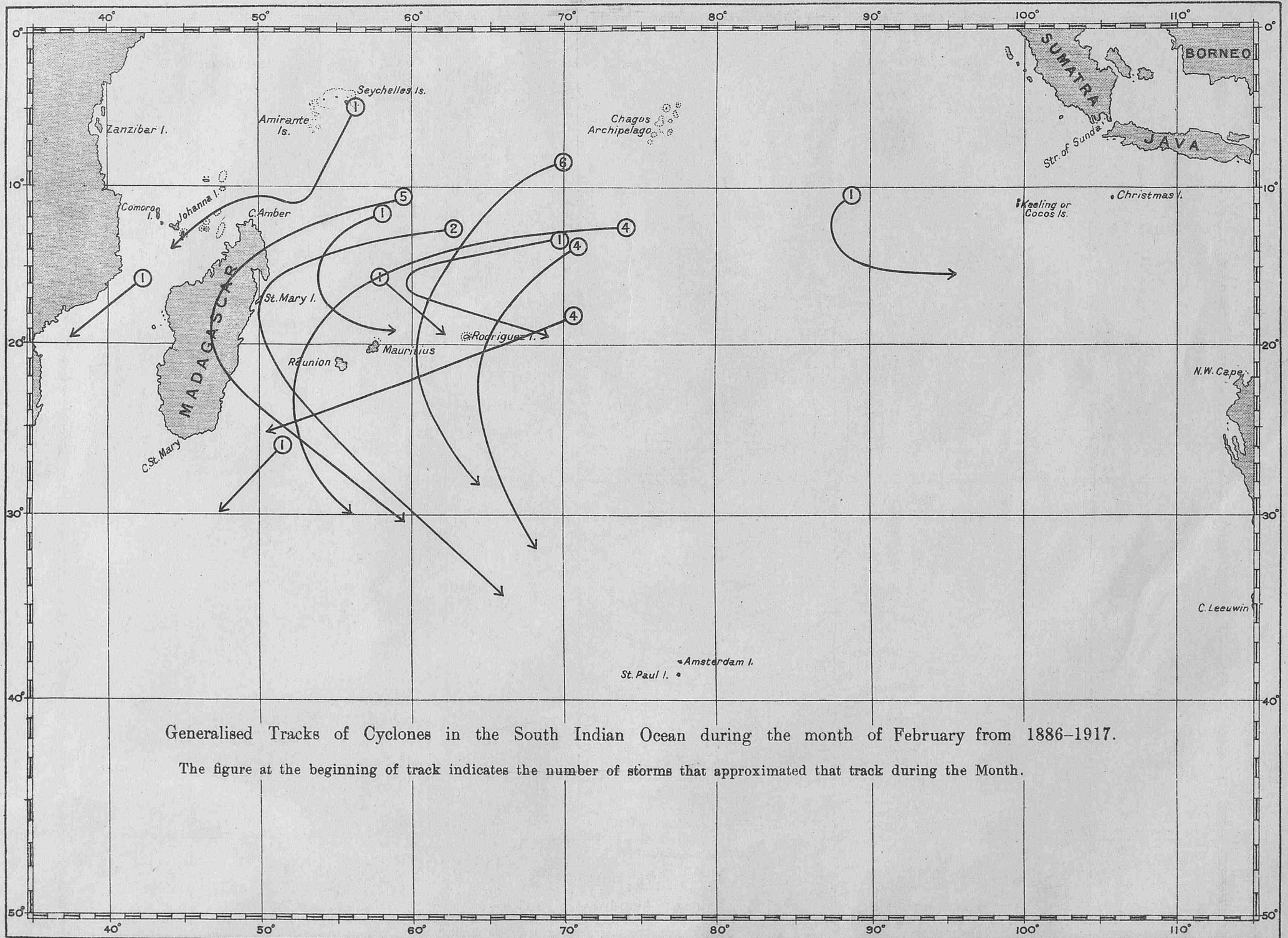



Chart III,—"WIRELESS AND WEATHER."

# CYCLONE TRACKS OF THE SOUTH INDIAN OCEAN.




Generalised Tracks of Cyclones in the South Indian Ocean during the month of February from 1886–1917.

The figure at the beginning of track indicates the number of storms that approximated that track during the Month.

H.M. Stationery Office Press, Kingsway W.C.2.

Ps.17380/837. Wt.17839 A. D.9135/P.88. 1500. 1/24.

## 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.

## Invitation to Marine Observers.

The Marine Superintendent will be pleased to see Captains of observing ships, who may be in London, between 10 a.m. and 4 p.m., at Room 319, Adastral House, Kingsway, W.C.2. Telephone No. :—Regent 8000. Extension 421. Telegrams, "Marine Superintendent, Weather, London."

(Nearest station—Temple, District Railway.)

## DERELICTS AND LATE PRESS.

| Date. | Position. Latitude. | Position. Longitude. | Description. |
|---|---|---|---|
| | **NORTH SEA.** | | |
| 10.12.23 | 50°50′N. | 1°27′E. | Floating upright spar. |
| 11.12.23 | 52°57′N. | 1°34′E. | Derelict bottom up. "Rose Marie." |
| 12.12.23 | 20′S.E. (mag.) of Smiths Knoll Lt. Vessel. | | Floating spars. |
| 17.12.23 | 53°34′N. | 5°14′E. | Large black buoy. |
| | **ENGLISH CHANNEL.** | | |
| 3.12.23 | 49°59½′N. | 5°51′W. | Big white and red striped buoy, long topmark with ball, dangerous. |
| 8.12.23 | E. by N.½N., 25′ from Beachy Head. | | Passed object, apparently float of seaplane. |
| 10.12.23 | 50°19′N. | 1°00′E. | Derelict. |
| 14.12.23 | N.E. by E.2½′ from Royal Sovereign Lt. Vessel. | | Submerged wreckage. |
| | **BALTIC SEA.** | | |
| 4.12.23 | 57°25′N. | 21°04′E. | Floating wreck, dangerous to navigation. |
| | **NORTH ATLANTIC OCEAN.** | | |
| 1.12.23 | 41°59′N. | 64°03′W. | Mast 16 ins. diameter, projecting 10 ft. out of water. |
| 1.12.23 | 41°53′N. | 64°36′W. | Mast projecting 15 ft. above water, apparently attached to submerged wreckage, dangerous to navigation. |
| 1.12.23 | 37°15′N. | 66°14′W. | Gas and whistle buoy marked "FH" floating upright about 16 ft. out of water. Whistle functioning but light out. |
| 2.12.23 | 36°59′N. | 74°37′W. | White can buoy marked "3." |
| 2.12.23 | 36°42′N. | 74°47′W. | White nun buoy marked "3" in black letters. |
| 2.12.23 | 36°48′N. | 74°44′W. | Black can buoy. |
| 4.12.23 | 37°56′N. | 62°54′W. | Black buoy with skeleton super-structure about 10 ft. high surmounted by square cage. |
| 4.12.23 | 35°00′N. | 66°20′W. | Red conical buoy with chain attached. |
| 4.12.25 | 42°26′N. | 60°02′W. | Spar 15 inches diameter, projecting 3 ft. out of water, apparently attached to submerged wreckage. |
| 5.12.23 | Between Gas Buoys 3 and 4, Ambrose Channel. | | Spar, projecting 4 ft. out of water, apparently attached to submerged wreckage. |
| 6.12.23 | 38°57′N. | 74°45′W. | Deck beam, projecting about 3 ft. out of water, apparently attached to submerged wreckage. |
| 9.12.23 | 55°09′N. | 13°17′W. (approx.). | Submerged obstruction. |
| 10.12.23 | 48°17′N. | 8°28′W. | Spar, projecting about 6 ft. out of water, apparently attached to submerged wreckage. |
| 12.12.23 | 43°01′N. | 51°50′W. | Derelict schooner "Governor Parr" dismantled, low in water, dangerous to navigation. |
| 12.12.23 | 48°20′N. | 4°50′W. | Derelict. |

# ICE CHART.

## WESTERN NORTH ATLANTIC.

NUMBERS OF TRANSATLANTIC TRACKS INDICATE

(7) (8) (9) From 15th November to 14th February, inclusive.

(12) (13) (14) From 15th February to 10th April, inclusive.

(15) (16) From 1st February to 31st August, inclusive.

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.

No later information received from the Cunard S.S. Co., since that appearing on November 1923, North Atlantic Chart.

### 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.

### LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 12th December, 1923, was received from the Superintendent, Canadian Signal Service, Quebec: "All points report no ice."

### PHENOMENAL DRIFTS OF ICE.

| Date. | Ship or Source of Report. | Position. Lat. | Position. Long. | Remarks. |
|---|---|---|---|---|
| Feb. 3rd, 1922 | S.S. Weehawken... | 41°42′N. | 58°59′W. | Ice (sustained bow damage). |

No reports of ice, sighted during the month of December, have been received at the Meteorological Office.

Ps 37340/837. wt. 17639 A. D.9138/F.88. 1500. 1/24.

FEBRUARY M.O., 1924. H.M.S.O. Press, Kingsway, W.C.2.

## MARINE METEOROLOGY.

### 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.

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. 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.

All Masters who wish to assist in developing the rapid interchange of Meteorological information and Weather Forecasting at sea can do so by using the form of W/T Weather Report suggested in "Weather Signals," given in this Journal, January Number.

The Marine Observer is sent monthly to all ships regularly contributing Logs, Forms and W/T Registers to the Meteorological Office.

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## Marine Agencies and Port Meteorological Officers.

| | |
|---|---|
| LIVERPOOL .. | (Port Meteorological Office) Commander G. ff. H. Lloyd, R.D., R.N.R., Dock Office. *Telephone No.: Bank 8959.* |
| CARDIFF .. .. | Captain James Weir, Examiner of Masters and Mates, Mercantile Marine Office.<br>Captain W. H. Hunter, Board of Trade Surveyor's Office. |
| DUNDEE .. .. | Captain W. K. Stewart, Nautical Instructor, Technical College, Bell Street, Dundee. |
| THE CLYDE .. | Captain M. Corrance, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow. |
| HULL .. .. .. | Captain Geo. B. Sturdy, Ellerman's-Wilson Line, Ltd. |
| 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 Depôt. |
| 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, Mercantile Marine Office (1st Floor), Siddeley Street. |
| FREMANTLE .. | Captain J. J. Airey, Dalgety's Buildings. |

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## 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.

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## 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.

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 | | |

# 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.

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

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

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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.

| Name of Vessel. | Captain. | Observing Officers. | Official Meteoro-logical Equipment. | Line. | Last Log, Register, or Report Contributed. | Date Received. |
|---|---|---|---|---|---|---|
| *Aba* ... ... | Hughes, J. ... | W. E. Thomas ... ... | No. | Elder Dempster ... | Form 911 8.2.23 to 16.3.23 ... | 20.3.23. |
| *Abaris*... ... | Rippon, A. P. ... | R. C. Jones ... ... | ,, | L. Walford ... ... | ,, 11.8.23 to 21.8.23 ... | 24.8.23. |
| *Abinsi* ... ... | Wright, J. B. ... | H. Welton ... ... | ,, | Elder Dempster ... | ,, 7.3.23 to 14.4.23 ... | 23.4.23. |
| *Actor* ... ... | Haylett, E. ... | F. Medwell ... ... | ,, | Harrison ... ... | ,, 3.5.23 to 31.5.23 ... | 4.6.23. |
| *Adda* ... ... | Toft... ... ... | G. R. Langmaid ... ... | ,, | Elder Dempster ... | ... ... ... ... ... | ... |
| *Adriatic* ... | Beadnell, F. E., Commr., R.N.R. | A. E. Dyer, J. Collins, G. Howe, R. H. Shaw. | W.T. | White Star ... ... | W.T.Reg. 12.11.23 to 1.12.23... / Form 911 12.11.23 to 1.12.23... | 6.12.23. / 5.12.23. |
| *Agapenor* ... | Ramsay, J. ... | P. S. Atkins ... ... | No. | A. Holt ... ... | ,, 4.10.23 to 16.11.23... | 21.11.23. |
| *Alban* ... ... | Whayman, W. R.... | ... ... ... ... | ,, | Booth ... ... | ,, 20.10.23 to 8.11.23... | 24.11.23. |
| *Albania* ... | Gibbons, G., R.D., Commr., R.N.R. | H. A. W. Waterhouse ... | ,, | Cunard ... ... | ,, 22.10.23 to 20.11.23 | 5.12.23. |
| *Aleppo*... ... | Duncan, W. B. ... | H. B. Smith ... ... | ,, | Ellerman Wilson ... | ,, 28.4.23 to 30.6.23 ... | 5.7.23. |
| *Algerian Prince* ... | Rowlands, D. ... | R. C. Proctor ... ... | ,, | Prince ... ... | ,, 25.10.23 to 1.12.23... | 10.12.23. |
| *Alipore* ... | Gordon, L. M. ... | R. E. Cowell ... ... | ,, | P. and O. ... ... | ,, 30.5.23 to 18.6.23 ... | 10.7.23. |
| *Almanzora* ... | Mackenzie, G. A. ... | H. Chamberlain ... ... | ,, | R.M.S.P. ... ... | ,, 11.8.23 to 27.9.23 ... | 6.10.23. |
| *Alondra* ... | Prendergast, J. J. ... | H. Martin ... ... | ,, | Yeoward ... ... | ,, 20.10.23 to 13.11.23 | 20.11.23. |
| *Alpine Range* ... | Fell, — ... ... | W. C. Excell ... ... | ,, | Furness Withy ... | ,, 5.1.23 to 18.1.23 ... | 23.1.23. |
| *Ampetco* ... | Verstichelen, A. ... | R. Janssen ... ... | ,, | American Petroleum... | ,, 23.10.23 to 29.11.23 | 10.12.23. |
| *Anglia*... ... | Sorge, P.... ... | W. H. Hughes ... ... | C.C. | L.M. & S. Rly. ... | Telegraphic Report 7.12.23 ... | 7.12.23. |
| *Antilochus* ... | McHutchon, W. H. | J. J. Daniel ... ... | No. | A. Holt ... ... | Form 911 12.10.23 to 29.10.23 | 12.11.23. |
| *Appam* ... | Yardley, H. A. ... | ... ... ... ... | M.L. | Elder Dempster ... | ... ... ... ... ... | ... |
| *Aquitania* ... | Charles, Sir J. T. W., K.B.E., C.B., R.D., Commodore, R.N.R. | J. L. Croasdaile, P. A. Morgan, A. T. Hamer. | W.T. | Cunard ... ... | W.T Reg. 4.11.23 to 18.11.23... | 20.11.23. |
| *Arafura* ... | Gordon, A. S. ... | W. McIntyre ... ... | No. | Eastern and Australian | Form 911 19.5.23 to 28.7.23 ... | 25.9.23. |
| *Araguaya* ... | Gillard, G. S. ... | H. M. Rennie ... ... | ,, | R.M.S.P. ... ... | ,, 9.9.23 to 28.9.23 ... | 3.10.23. |
| *Arana* ... ... | Moir, A. G. ... | R. Jones ... ... ... | ,, | ,, ... ... | ... ... ... ... ... | ... |
| *Armadale Castle*... | George, J., O.B.E. | L. G. May ... ... | ,, | Union Castle ... | Form 911 28.9.23 to 15.10.23... | 17.10.23. |
| *Armagh* ... | Vint, S. ... ... | M. D. Stewart ... ... | ,, | Union S.S. Co., N.Z.... | ,, 25.6.23 to 4.11.23 ... | 9.11.23. |
| *Arracan* ... | Willis, M. ... | R. MacInnes, H. E. Canner, W. Wilson, A. Olding. | M.L. | P. Henderson ... | Met. Log. 16.6.23 to 10.9.23 ... | 12.9.23. |
| *Arundel* ... ... | ... ... ... ... | ... ... ... ... | C.C. | Southern Rly. ... | Telegraphic Report 28.11.23 ... | 28.11.23. |
| *Arundel Castle* ... | Hague, J. W., Capt., R.N.R. | Blailhock, C. Williams, C. Keen | M.L. | Union Castle ... | Met. Log. 23.3.23 to 15.7.23 ... | 26.7.23. |
| *Assyria* ... | Erskine, R. ... | J. Hamilton ... ... | No. | Anchor ... ... | Form 911 7.11.23 to 4.12.23 ... | 10.12.23. |
| *Astronomer* ... | Booth, W. M. ... | W. A. Hall, J. Jackson, W. Moore. | M.L. | Harrison ... ... | Met. Log. 25.7.23 to 18.10.23... | 16.11.23. |
| *Athenic* ... | Crosland, J. E., R.D., Lt.-Commr., R.N.R. | A. C. I. Anson ... ... | No. | White Star ... ... | Form 911 16.8.23 to 28.9.23 ... | 4.10.23. |
| *Atsuta Maru* ... | Segawa, N. ... | H. Kubota ... ... | ,, | Nippon Yusen Kaisha | ,, 13.10.23 to 29.10.23 | 7.12.23. |
| *Auldmuir* ... | Ramsay, J. D. ... | A. Kelso ... ... ... | ,, | Glen & Co. ... ... | ,, 1.9.23 to 9.10.23 ... | 17.10.23. |
| *Author*... ... | Kinlock, R. ... | A. Goddard ... ... | , | Harrison ... ... | ,, 29.8.23 to 7.10.23 ... | 12.10.23. |
| *Ballena* ... | Pape, E. R. ... | W. Webster ... ... | No. | P.S.N. Co. ... ... | Form 911 19.9.23 to 11.10.23... | 15.10.23. |
| *Baltic* ... ... | Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R. | E. S. Bell, A. E. Weller, G. D. R. Eales. | W.T. | White Star ... ... | W.T. Reg. 26.10.23 to 18.11.23 / Form 911 26.10.23 to 18.11.23 | 22.11.23. |
| *Bambra* ... | 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. |
| *Bampton Castle* ... | Swiney, W. A. ... | F. Norfolk, F. O. Wilbraham, G. W. Smith. | M.L. | Union Castle ... | Met. Log. 26.2.22 to 12.6.22 ... | 2.12.22. |
| *Banffshire* ... | Wynne, R. H. ... | ... ... ... ... | No. | Turnbull Martin ... | Form 911 2.10.23 to 19.10.23... | 19.11.23. |
| *Barambah* ... | Mayne, W. ... ... | T. Swann ... ... | ,, | Commonwealth Govt. | ,, 4.8.23 to 5.9.23 ... | 16.10.23. |
| *Baron Cawdor* ... | Baillie, T. ... | A. Campbell ... ... | ,, | Hogarth & Sons ... | ,, 16.6.23 to 5.7.23 ... | 10.8.23. |
| *Beaufort* ... | 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. |
| *Belgenland* ... | Bradshaw, J. ... | ... ... ... ... | M.L. | Red Star ... ... | ... ... ... ... ... | ... |
| *Benalder* ... | Cole, J. H., D.S.C.... | A. K. Watson ... ... | No. | Ben Line ... ... | Form 911 6.9.23 to 6.10.23 ... | 24.10.23. |
| *Benedict* ... | Aspinall, W. ... | H. R. Mackay, K. S. Monro | ,, | Booth ... ... | ,, 17.6.23 to 13.8.23 ... | 27.8.23. |
| *Bengloe* ... | McCorquodale, A. ... | M. A. Gilmour ... ... | ,, | Ben Line ... ... | ,, 28.10.23 to 12.11.23 | 20.11.23. |
| *Berengaria* ... | Irvine, W. R. D., R.D.,Capt., R.N.R. | J. A. Myles, J. E. P. Hocken, E. R. Taylor. | W.T. | Cunard ... ... | W.T. Reg. 18.11.23 to 2.12.23... / ,, 28.10.23 to 11.11.23 | 4.12.23. / 15.11.23. |

| Name of Vessel. | Captain. | Observing Officers. | Official Meteorological Equipment. | Line. | Last Log, Register, or Report Contributed. | Date Received. |
|---|---|---|---|---|---|---|
| *Bernini* ... | Evans, W. ... | ... ... ... ... | No. | Lamport & Holt ... | ... ... ... ... ... | ... |
| *Berrima* ... | Hussey Cooper, E. M., R.D., Commr., R.N.R. | G. R. Wheeler ... ... | ,, | P. & O. Branch ... | Form 911 30.8.23 to 17.9.23 ... | 9.10.23. |
| *Bolingbroke* ... | Landy, E., Sargent A. H., Aikman, E. | R. Campbell, R. F. Walker, W. P. Hains. | M.L. | Canadian Pacific ... | Met. Log. 22.2.23 to 18.10.23... | 14.11.23. |
| *Borda* ... ... | Holland, R. ... | J. F. Wrigley ... ... | No. | P. & O. Branch ... | Form 911 ... ... ... ... | ... |
| *Borneo*... ... | Morzer Bruyns, M. F. | C. Zimmerman ... ... | ,, | Nederland ... ... | ,, 10.7.23 to 27.7.23 ... | 13.8.23. |
| *Bosworth* ... | McDonald, J. ... | J. Alexander ... ... | M.L. | Canadian Pacific ... | Met. Log. 19.5.23 to 8.8.23 ... | 29.8.23. |
| *Bothwell* ... | Freer, A. ... | K. Hutchings ... ... | No. | ,, ,, ... | Form 911 23.5.23 to 7.6.23 ... | 11.6.23. |
| *Braemar Castle* ... | Whitfield, G. I. ... | C. G. Dann ... ... | ,, | Union Castle ... ... | ,, 6.9.23 to 23.9.23 ... | 24.10.23. |
| *Brandon* ... | Freer, A., R.D., Commr., R.N.R. | J. Mackenzie ... ... | ,, | Canadian Pacific ... | ,, 21.10.23 to 20.11.23 | 27.11.23. |
| *Brecon* ... | Griffiths, J. N. ... | ... ... ... ... | M.L. | ,, ,, ... | Met. Log. 9.5.23 to 29.7.23 ... | 27.8.23. |
| *Brighton* ... | Hill, — ... ... | ... ... ... ... | C.C. | Southern Railway ... | Telegraphic Report 10.12.23 ... | 10.12.23. |
| *British Engineer*... | Piper, H. C. ... | A. Campbell ... ... | No. | British Tankers ... | Form 911 3.11.23 to 16.11.23... | 27.11.23. |
| *British Lantern* ... | Taylor, R. J. ... | C. O. Tucker ... ... | ,, | ,, ,, ... | ,, 12.8.23 to 6.9.23 ... | 25.10.23. |
| *Browning* ... | Davies, G. W. ... | W. Simcox ... ... | ,, | Lamport & Holt ... | ,, 13.3.23 to 9.4.23 ... | 14.4.23. |
| *Bruyere* ... | Heasley, W. S. ... | W. S. Perry ... ... | ,, | ,, ,, ... | ,, 4.9.23 to 19.11.23 ... | 23.11.23. |
| *Bulla* ... ... | Daniel, F. ... | ... ... ... ... | ,, | Commonwealth Govt. | ,, 28.4.23 to 17.5.23 ... | 5.6.23. |
| *Calypso* ... | Brown, A. M. ... | A. Snowden, E. Ford, J. S. Landers. | M.L. | Ellerman's Wilson ... | Met. Log. 20.10.22 to 11.11.23 | 27.11.23. |
| *Cambria C.S.* ... | Wightman, H. G. E., D.S.C. | ... ... ... .. | M.L. | Eastern Tel. Co. ... | ... ... ... ... ... | ... |
| *Cambria* ... | ... ... ... | V. S. Phillips ... ... | C.C. | L.M. & S. Rly. ... | Telegraphic Report 14.9.23 ... | 14.9.23. |
| *Camito*... ... | Scudamore, J. H. H., D.S.C., R.D., Commr., R.N.R. | D. A. Jack, D. Hay, D. V. Smith, F. Gregg. | M.L. | Elders & Fyffes ... | Met. Log. 19.6.23 to 13.10.23... | 18.10.23. |
| *Canada* ... | Smith, R. S. ... | S. S. Fieldwood ... ... | No. | White Star-Dominion | Form 911 4.11.23 to 25.11.23... | 27.11.23. |
| *Canadian Scottish* | Hocking, N. P. ... | S. Fieldhouse ... ... | ,, | Canadian Govt. Merchant Marine. | ,, 16.5.23 to 11.7.23 ... | 31.8.23. |
| *Canadian Skirmisher.* | Miller, W. H. ... | G. B. Price ... ... | ,, | ,, ,, ,, | ,, 28.5.23 to 5.8.23 ... | 5.9.23. |
| *Canadian Winner* | Wingate, W. ... | J. N. Downes ... ... | ,, | ,, ,, ,, | ,, 4.11.22 to 27.1.23 ... | 19.3.23. |
| *Carmania* ... | McNeil, S. G. S., R.D., Capt., R.N.R. | P. J. Robinson, J. S. Glendinning, H. R. Lane. | W.T. | Cunard ... ... | W.T. Reg. 25.10.23 to 18.11.23 | 20.11.23. |
| *Caronia* ... | Diggle, E. G., R.D., Capt., R.N.R. | J. H. Wood, R. Allen, G. H. Morris. | W.T. | Cunard ... ... | W.T. Reg. 7.10.23 to 27.10.23... / Form 911 7.10.23 to 27.10.23... | 30.10.23. / 31.10.23. |
| *Carpentaria* ... | Rowe, S. N. ... | ... ... ... ... | M.L. | British India ... | Met. Log. 22.4.23 to 16.10.23... | 27.11.23. |
| *Cassandra* ... | Mitchell, W. E. ... | A. Murray ... ... | No. | Anchor Donaldson ... | Form 911 26.10.23 to 19.11.23 | 27.11.23. |
| *Cawdor Castle* ... | Purse, C. R. ... | J. A. Lowden, F. P. Wyeth, W. S. J. Aldous, C. B. Hoggan. | M.L. | Union Castle ... | Met. Log. 22.12.21 to 14.4.22... | 10.5.22. |
| *Cedric* ... ... | Metcalfe, G. R., Lt.-Commr., R.N.R. | T. F. P. Pratt, R. J. Crangle, J. W. Peters. | W.T. | White Star ... ... | W.T. Reg. 4.11.23 to 24.11.23 / Form 911 4.11.23 to 24.11.23 | 27.11.23. |
| *Celtic* ... ... | Greame, C. H., R.D., Commr., R.N.R. | R. S. Walker, O. V. Lucas, G. T. Kavanagh. | W.T. | ,, ,, ... ... | W.T. Reg. 25.10.23 to 12.11.23 / Form 911 24.10.23 to 12.11.23 | 15.11.23. |
| *Ceramic* ... | Summers, A. H. ... | H. A. Billiald ... ... | No. | ,, ,, ... ... | ,, 1.4.23 to 17.7.23 ... | 23.7.23. |
| *Changchow* ... | Byers, G. ... | Messrs. Hunter, Adkins and Wherny. | M.L. | China Nav. Co. ... | Met. Log. 25.10.22 to 23.7.23... | 6.9.23. |
| *Changsha* ... | Gambrill, F. C. ... | ... ... ... ... | M.L. | Yuill & Co.... ... | ,, 5.1.23 to 20.5.23 ... | 12.7.23. |
| *Chignecto* ... | Green, J.... ... | H. H. Treweeks, A. F. Walker | No. | R.M.S.P. Co. ... | Form 911 8.6.23 to 22.7.23 ... | 23.10.23. |
| *China* ... ... | King, A. M., D.S.C. | E. Cox Walker ... ... | ,, | P. & O. ... ... | ,, 19.10.23 to 8.11.23... | 5.12.23. |
| *Chindwara* ... | Jones ... | C. E. Cara, S. Waldron ... | ,, | British India ... | ,, 18.7.23 to 15.9.23 ... | 11.10.23. |
| *Chindwin* ... | Paterson, G. ... | J. Walker, L. Ratcliffe, H. Poole, D. Frame. | M.L. | P. Henderson ... | Met. Log. 2.6.23 to 20.8.23 ... | 25.8.23. |
| *City of Alexandria* | Bedford, G. B. ... | T. C. Higgins ... ... | No. | Ellerman ... ... | ... ... ... ... ... | ... |
| *City of Baroda* ... | Haddy, B. H. ... | A. V. Radcliffe, R. J. Witton, A. B. Carson. | M.L. | ,, ... ... | Met. Log. 20.6.23 to 15.9.23 ... | 4.10.23. |
| *City of Batavia* ... | Spencer, H. ... | J. L. Robertson ... ... | No. | ,, ... ... | Form 911 29.9.23 to 24.10.23... | 2.11.23. |
| *City of Benares* ... | Macdonald, K., O.B.E. | A. A. Fullerton ... ... | ,, | ,, ... ... | ,, 24.9.23 to 12.10.23... | 30.10.23. |
| *City of Brisbane*... | Pine, R. ... ... | F. B. McLaren, R. H. Spearman, W. Robinson. | ,, | ,, ... ... | ,, 17.7.23 to 28.8.23 ... | 6.9.23. |
| *City of Canterbury* | Bremner, D. M. ... | W. H. Matheson ... ... | ,, | ,, ... ... | ,, 21.9.23 to 3.10.23 ... | 8.10.23. |
| *City of Chester* ... | Teague, R. E. ... | F. S. Honeyman, P. C. Wilson, M. G. Fraser. | M.L. | ,, ... ... | Met. Log. 3.8.23 to 29.10.23 ... | 31.10.23. |
| *City of Dunkirk* ... | Seaborne, F. O. ... | W. Leadbeater ... ... | No. | ,, ... ... | Form 911 21.9.23 to 4.10.23 ... | 17.10.23. |
| *City of London* ... | Martin, D. ... | C. Inglis ... ... ... | ,, | ,, ... ... | ,, 15.10.23 to 30.10.23 | 27.11.23. |
| *City of Marseilles* | Henderson, R. C. ... | G. M. Womersley ... ... | ,, | ,, ... ... | ,, 29.9.23 to 19.10.23... | 24.10.23. |
| *City of Newcastle* | Oliver, R. E., D.S.C. | C. Paton ... ... | ,, | ,, ... ... | ,, 26.9.23 to 22.10.23... | 31.10.23. |
| *City of Rangoon*... | 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. |
| *City of Valencia*... | Williamson, W. A. | A. R. Muir ... ... | No. | ,, ... ... | Form 911 2.7.23 to 7.8.23 ... | 14.8.23. |
| *City of Yokohama* | Jinks, J. W. ... | J. C. McWhirter ... ... | ,, | ,, ... ... | ,, 23.10.23 to 12.11.23 | 24.11.23. |
| *Clan Buchanan* ... | George, L. S. ... | P. G. de Gruchy ... ... | ,, | Clan ... ... | ,, 26.9.23 to 10.10.23... | 24.10.23. |
| *Clan Lindsay* ... | Baker, C. W. ... | S. J. Shennan ... ... | ,, | ,, ... ... | ,, 16.9.23 to 6.10.23 ... | 14.11.23. |
| *Clan Macgillivray* | Young, A. H. ... | A. Campbell ... ... | ,, | ,, ... ... | ,, 13.10.23 to 26.11.23 | 11.12.23. |
| *Clan Macindoe* ... | Miller, W. ... | D. A. Stark ... ... | ,, | ,, ... ... | ,, 6.9.23 to 29.11.23 ... | 7.12.23. |
| *Clan Macinnes* ... | Mee, F. T. ... | A. Lynch, R. Dando ... | ,, | ,, ... ... | ,, 4.12.22 to 25.3.23 ... | 17.4.23. |
| *Clan Mackay* ... | Rayner East, H. ... | J. A. Forster, J. Steven, J. E. Gordon. | M.L. | ,, ... ... | Met. Log. 30.6.23 to 25.10.23... | 30.10.23. |
| *Clan Mackellar* ... | Cowie, J. G. ... | S. F. Carter ... ... | No. | ,, ... ... | ... ... ... ... ... | ... |
| *Clan Mackenzie*... | Young, G. ... | W. G. Arthur, J. M. Lorimer | No. | ,, ... ... | Form 911 29.9.23 to 26.10.23... | 5.12.23. |
| *Clan Mackinnon* | Thomson, W. ... | F. Elwell, W. S. Holden, T. Kay. | M.L. | ,, ... ... | Met. Log. 6.4.23 to 4.8.23 ... | 17.8.23. |
| *Clan Maclaren* ... | Scott, G. ... | L. Copland ... ... | No. | ,, ... ... | Form 911 21.1.23 to 15.2.23 ... | 13.3.23. |
| *Clan Macnaughton* | Gray, J. N. ... | C. D. Worthington, F. B. Parke | ,, | ,, ... ... | ,, 12.6.23 to 7.9.23 ... | 11.9.23. |
| *Clan Macphee* ... | Gourlay J. B. ... | P. Haydon, J. H. Mellor, R. J. Roberts. | M.L. | ,, ... ... | Met. Log. 28.10.22 to 30.4.23... | 3.5.23 |
| *Clan Macvicar* ... | Phillips, G. P. ... | J. O. Woodall ... ... | No. | ,, ... ... | Form 911 21.9.23 to 15.10.23... | 7.11.23. |
| *Clan Malcolm* ... | Higgins, C. J. ... | T. G. Young, A. Cameron ... | M.L. | ,, ... ... | Met. Log. 5.8.23 to 10.11.23 ... | 14.11.23. |
| *Clan Morrison* ... | Porterfield, W. M.... | D. A. Evans ... ... | No. | ,, ... ... | Form 911 28.7.23 to 11.8.23 ... | 22.8.23. |
| *Clan Murdoch* ... | Pagan, Q. C. ... | R. E. Owen ... ... | ,, | ,, ... ... | ... ... ... ... ... | ... |
| *Clan Ranald* ... | Henderson, C. W. ... | P. J. Green ... ... | ,, | ,, ... ... | Form 911 20.10.23 to 22.11.23 | 11.12.23. |
| *Clan Ross* ... | Christian, W. G. M. | S. M. Werrey Easterbrook ... | ,, | ,, ... ... | ,, 3.8.23 to 8.10.23 ... | 19.10.23. |
| *Clan Sinclair* ... | Neill, G. A. ... | J. L. A. Hogg ... ... | ,, | ,, ... ... | ,, 9.10.23 to 20.11.23... | 26.11.23. |
| *Clan Urquhart* ... | Sharpland, C. C. ... | R. M. MacDonald ... ... | ,, | ,, ... ... | ,, 13.8.23 to 20.11.23... | 5.12.23. |
| *Colonia*, C.S. ... | Campos, V., O.B.E., Lt.-Commdr. 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. |

| Name of Vessel. | Captain. | Observing Officers. | Official Meteoro-logical Equipment. | Line. | Last Log, Register, or Report Contributed. | Date Received. |
|---|---|---|---|---|---|---|
| *Colonial* ... | Barrow, R. K. ... | A. V. Jones ... ... | No. | Harrison ... ... | Form 911 17.5.23 to 14.8.23 ... | 18.9.23. |
| *Colonian* ... | Gittins, R. P. ... | J. Crangle ... ... | ,, | Leyland ... ... | ,, 10.10.23 to 20.10.23 | 25.10.23. |
| *Columbia* ... | Gemmell, W. ... | T. C. Watson ... ... | ,, | Anchor ... ... | ,, 21.10.23 to 14.11.23 | 17.11.23. |
| *Comino* ... | Nuttall, E. L. ... | A. McVicar ... ... | ,, | Furness Withy ... | ,, 6.9.23 to 16.10.23 ... | 30.10.23. |
| *Cooee* ... ... | Festa, M. ... | C. Keen, D. C. Rees ... | ,, | Commonwealth Govt. | ,, 29.6.23 to 16.8.23 ... | 8.10.23. |
| *Copenhagen* ... | Kerr, J. J. ... | W. G. Rees ... ... | ,, | Glen & Co. ... ... | ,, 27.4.23 to 6.6.23 ... | 23.7.23. |
| *Corinthic* ... | Hart, F. ... ... | W. T. Fitzgerald, M. Bennett, F. G. Rogers. | M.L. | White Star ... | Met. Log. 26.1.23 to 15.5.23 ... | 22.5.23. |
| *Cornish City* ... | Bowen, T. S. ... | G. S. Dawes ... ... | No. | Reardon Smith ... | ... ... ... ... ... | ... |
| *Cornwall* ... | Robertson, H. W. ... | R. Wilkins ... ... | ,, | Dowie, J., & Co. ... | Form 911 21.8.23 to 10.9.23 ... | 18.9.23. |
| *Cyclops* ... | Cosker, W. ... | E. W. Jones ... ... | ,, | A. Holt ... ... | ,, 21.7.23 to 9.8.23 ... | 23.8.23. |
| *Dardanus* ... | Shaw, A. T. ... | A. Morton ... ... | No. | A. Holt ... ... | Form 911. 29.10.23 to 6.11.23 ... | 16.11.23. |
| *Darian*... ... | Masters, W. ... | J. L. McLaren ... ... | ,, | Leyland ... ... | ,, 10.11.23 to 23.11.23 | 27.11.23. |
| *Darro* ... ... | Smith, W. E., D.S.O., R.D.,Capt., R.N.R. | E. H. Giller ... ... | ,, | R.M.S.P. Co. ... | ,, 8.9.23 to 4.11.23 ... | 6.11.23. |
| *Daytonian* ... | Walker, C. J., D.S.C. | W. T. Godwin ... ... | ,, | Leyland ... ... | ,, 18.10.23 to 24.11.23 | 5.12.23. |
| *Delta* ... ... | Brooks, C., D.S.O. R.D.,Commr.,R.N.R. | J. O. V. Young ... ... | ,, | P. & O. ... ... | ,, 25.8.23 to 14.9.23 ... | 9.10.23. |
| *Demerara* ... | Hill, T. A. ... | H. J. Holland ... ... | ,, | R.M.S.P. Co. ... | ,, 26.10.23 to 8.11.23 | 5.12.23. |
| *Demosthenes* ... | Williams, — ... | R. Woodgates ... ... | ,, | Aberdeen ... ... | ... ... ... ... ... | ... |
| *Deseado* ... | Wakeman, E. C. ... | T. Powell, F. Collinson ... | ,, | R.M.S.P. Co. ... | Form 911. 28.9.23 to 17.11.23 ... | 23.11.23. |
| *Desna* ... ... | Adam, C., R.D., Commr., R.N.R. | H. D. Jackman ... ... | ,, | ,, ... | ,, 6.10.23 to 1.12.23 ... | 10.12.23. |
| *Deucalion* ... | Batt, A. E. ... | W. G. Smith ... ... | ,, | A. Holt ... ... | ... ... ... ... ... | ... |
| *Devon* ... ... | Gardner, H. W. ... | ... ... ... ... | ,, | New Zealand S.S. Co. | Form 911. 23.8.23 to 13.10.23... | 19.10.23. |
| *Dieppe*... ... | ... ... ... | ... ... ... ... | C.C. | Southern Railway ... | Telegraphic Report. 7.12.23 ... | 7.12.23. |
| *Digby* ... ... | Chambers, F. W., D.S.C. | J. Pascoe, J. W. Murphy, W. P. Paterson. | M.L. | Furness Withy ... | Met. Log. 29.3.23 to 22.9.23 ... | 3.10.23. |
| *Director* ... | Watson, R. ... | L. Jones ... ... ... | No. | Harrison ... ... | Form 911. 31.1.23 to 13.3.23 ... | 21.3.23. |
| *Discoverer* ... | Sawyer, E. I. ... | J. Stanhope ... ... | ,, | ,, ... ... | ,, 8.4.23 to 29.5.23 ... | 8.6.23. |
| *Dogra* ... ... | Robb, G. P. ... | H. Hardwick ... ... | ,, | Asiatic S.N. Co. ... | ,, 4.8.23 to 27.8.23 ... | 25.9.23. |
| *Domala*, M.V. ... | Whittingham, W. E. | C. E. Merchant ... ... | ,, | British India ... | ... ... ... ... ... | ... |
| *Doric* ... ... | Davies, J. ... | A. Thompson ... ... | ,, | White Star ... | Form 911. 28.10.23 to 18.11.23 | 22.11.23. |
| *Dorington Court*... | Barcham, H. C. ... | H. Tulloch ... ... | ,, | Haldin & Co. ... | ,, 23.5.23 to 12.6.23 ... | 19.6.23. |
| *Dramatist* ... | Gibbings, W. H. ... | R. W. Roberts ... ... | | Harrison ... ... | ,, 2.10.23 to 2.11.23 ... | 8.11.23. |
| *Dromore Castle* ... | Harvey, H. B. ... | R. May ... ... ... | ,, | Union Castle ... | ,, 13.7.23 to 15.8.23 ... | 20.8.23. |
| *Duendes* ... | Jones, J. S. ... | B. M. Morris ... ... | ,, | Pacific S.N. Co. ... | ,, 19.5.23 to 4.6.23 ... | 20.9.23. |
| *Duquesa* ... | Jarvis, G. ... | C. Lockwood, R. Martin, D. Thornton. | ,, | Furness Withy ... | ,, 8.7.23 to 22.9.23 ... | 27.9.23. |
| *Durenda* ... | Wilson, W. ... | C. McFarlane ... ... | ,, | British India ... | ... ... ... ... ... | ... |
| *Durham* ... | Hains, F. P. ... | ... ... ... ... | ,, | Federal ... ... | Form 911. 29.11.22 to 26.1.23... | 30.1.23. |
| *Eastern* ... | 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. |
| *Edinburgh Castle* | Culverwell, J. N. Strong, H., R.D., Commr., R.N.R. | — Perkins ... ... | M.L. | Union Castle ... | ,, 13.7.23 to 13.11.23... | 21.11.23. |
| *Eemland* ... | Van Noppen, C. D. | G. W. Yonwen ... ... | No. | Holland Lloyd ... | Form 911. 26.8.23 to 18.11.23... | 11.12.23. |
| *Egori* ... ... | McDowall, J. ... | K. Redmore ... ... | ,, | Elder Dempster ... | ,, 16.9.23 to 2.10.23 ... | 15.10.23. |
| *El Cordobes* ... | Noton, F. G. ... | W. Myerscough ... ... | ,, | British & Argentine S.N. Co. | ,, 5.3.23 to 26.3.23 ... | 8.5.23. |
| *Elmina* ... | Evans, D. ... Millson, H. E. ... | J. Kelsey, W. Q. McKeown, H. Millson, R. A. Kenyon, J. L. Hughes. | M.L. | Elder Dempster ... | Met. Log. 4.1.23 to 2.5.23 ... | 7.6.23. |
| *El Paraguayo* ... | Ellis, F. ... ... | E. B. Sergeant ... ... | No. | Houlder Bros. ... | Form 911. 10.3.23 to 17.7.23 ... | 25.7.23. |
| *Elpenor* | Evans, T. R. Evans, D. L. ... | D. L. Evans, C. Houghton, L. Johnstone, C. Mock. | M.L. | A. Holt ... ... | Met. Log. 12.8.23 to 26.11.23... | 1.12.23. |
| *Elysia* ... ... | Kinnaird, J. ... | G. K. Lynas ... ... | No. | Anchor ... ... | Form 911. 25.4.23 to 21.6.23 ... | 20.7.23. |
| *Empress of Asia*... | Douglas, L. D., R.D., Lt. - Commr., R.N.R. | F. C. Stratford, R. Jackson, W. T. Kinley, R. J. Hickey. | M.L. | Canadian Pacific ... | Met. Log. 19.4.23 to 22.9.23 ... | 29.10.23. |
| *Empress of Australia.* | Robinson, S., R.D., Commr., R.N.R. | ... ... ... ... | M.L. | ,, ,, ... | ,, 24.11.22 to 23.5.23... | 26.6.23. |
| *Empress of Britain* | Latta, R. G. ... | S. C. Fox, J. B. Marriott, O. F. Pennington. | W.T. | ,, ,, ... | W.T. Reg. 18.10.23 to 2.11.23 Form 911. ,, | 6.11.23. |
| *Empress of Canada* | Hailey, A. J. ... | ... ... ... | M.L. | ,, ,, ... | Met. Log. 14.12.22 to 17.6.23... | 30.7.23. |
| *Empress of France* | Griffiths, E. ... | R. V. Everett, A. S. Phillips, B. Grant. | M.L. | ,, ,, ... | ,, 13.6.23 to 17.11.23... | 21.11.23. |
| *Empress of Russia* | Hosken, A. J. ... | I. H. Blythe, A. B. Smith, J. D. Vosper, J. B. Napier, C. S. Morris. | M.L. | ,, ,, ... | ,, 22.3.23 to 2.7.23 ... | 30.7.23. |
| *Endeavour* ... | Geary Hill, S. A., D.S.O., Commr., R.N. Nares, J. D., D.S.O., Capt., R.N. | H. Exton Turner ... ... | M.L. | His Majesty's Ship ... | ,, 3.7.22 to 8.6.23 ... | 18.6.23. |
| *Essequibo* ... | Pearce, A. W. ... | C. S. Humphries ... ... | No. | R.M.S.P. Co. ... | Form 911 19.8.23 to 4.10.23 ... | 2.11.23. |
| *Eumaeus* ... | Read, J. W. ... | D. L. Hoare ... ... | ,, | A. Holt ... ... | ,, 5.9.23 to 20.9.23 ... | 24.10.23. |
| *Euripides* ... | Collins, P. J., O.B.E. | Cox, A. R. Payne, F. Fuller | M.L. | Aberdeen ... ... | Met. Log. 28.3.23 to 20.7.23 ... | 31.7.23. |
| *Eurybates* ... | Lloyd, R. ... | W. H. Michie ... ... | No. | A. Holt ... ... | Form 911 14.7.23 to 31.7.23 ... | 21.8.23. |
| *Explorer* ... | Lamont, J. ... | ... ... ... ... | M.L. | Scottish Fishery Board | ... ... ... ... ... | ... |
| *Fantome* ... | Maxwell, P. S. E., Commr., R.N. | A. D. Conder, T. Taylor, J. Taylor, W. I. Farquharson. | M.L. | His Majesty's Ship ... | Met. Log. 26.5.23 to 22.9.23 ... | 10.12.23. |
| *Finland* ... | Newman, C. ... | A. B. Thompson ... ... | No. | Red Star ... ... | Form 911 3.3.23 to 11.3.23 ... | 19.3.23. |
| *Fitzroy*... ... | Woodhouse, A. F. B., Lt.-Commr., R.N. | C. W. Sabine ... ... | M.L. | His Majesty's Ship ... | Met. Log. 25.7.23 to 1.11.23 ... | 10.11.23. |
| *Flandria* ... | Veldkamp, G. J. ... | H. D. Sicherer ... ... | No. | Holland Lloyd ... | Form 911 16.10.22 to 22.1.23... | 14.2.23. |
| *Flinders* ... | Henderson, D. A., Lt.-Commr., R.N., | A. B. Fouleston ... ... | M.L. | His Majesty's Ship ... | Met. Log. 25.7.23 to 1.11.23 ... | 10.11.23. |
| *Francisco* ... | Wilkins, J., O.B.E. | J. A. Vickers ... ... | No. | Ellerman Wilson ... | Form 911 18.10.23 to 30.11.23 | 5.12.23. |
| *Francol* ... | Gatley, E. ... | H. J. Prout ... ... | ,, | Royal Fleet Auxiliary | ,, 20.6.23 to 15.9.23 ... | 27.11.23. |
| *Frankenfels* ... | Taylor, A., O.B.E., Lieut., R.N.R. | J. Gardiner, J. W. Allingham, F. Davenport. | M.L. | India Office Shipping | Met. Log. 20.3.23 to 23.6.23 ... | 4.7.23. |
| *Freienfels* ... | Cleugh, J. W. ... | C. F. Bennett ... ... | ,, | ,, ,, ,, | Form 911 7.8.23 to 6.9.23 ... | 11.9.23. |
| *Gallic* ... ... | Summers, F. F. ... | H. C. Rugg ... ... | No. | White Star ... | ,, 12.8.23 to 21.9.23 ... | 6.11.23. |
| *Galtymore* ... | Ledsome, J. S. ... | D. Wilson ... ... | ,, | Furness Withy ... | ,, 21.11.23 to 5.12.23... | 11.12.23. |

| Name of Vessel. | Captain. | Observing Officers. | Official Meteorological Equipment. | Line. | Last Log, Register, or Report Contributed. | Date Received. |
|---|---|---|---|---|---|---|
| *Garoet* ... ... | Visser, C. W. ... | ... ... ... ... | No. | Rotterdam Lloyd ... | Form 911 16.9.23 to 3.10.23 ... | 23.10.23. |
| *Garthgarry*, Ship | Roberts, D. ... | W. Wylie, J. Pearce, H. Bento | M.L. | Marine Nav. Co. ... | Met. Log. 15.7.22 to 27.7.23 ... | 4.10.23. |
| *Gascoyne* ... | Mills, A. ... ... | J. Donaldson ... ... | No. | Dalgety & Co. ... | Form 911 2.9.23 to 16.9.23 ... | 5.11.23. |
| *Gelria* ... ... | Kolkman, J. M. ... | ... ... ... ... | ,, | Holland Lloyd ... | ,, 21.9.23 to 9.11.23 ... | 13.11.23. |
| *Glenamoy*, M.V. ... | Angier, J. ... | L. C. Riggs ... ... | ,, | Glen Line ... ... | ,, 11.9.23 to 2.10.23 ... | 8.11.23. |
| *Glenapp*, M.V. ... | Griffiths, J. E ... | F. Poate ... ... ... | ,, | ,, ... ... | ,, 10.10.23 to 3.11.23... | 5.12.23. |
| *Glenluce*, M.V. ... | Kennett, W. H. ... | A. Hodd ... ... ... | ,, | ,, ... ... | ,, 31.7.23 to 10.9.23 ... | 16.10.23. |
| *Gloucestershire* ... | Robin, E. ... | T. E. Field ... ... | ,, | Bibby ... ... | ,, 1.9.23 to 11.11.23 ... | 14.11.23. |
| *Gorala* ... ... | D'Cruz, A. B. ... | A. R. H. Barton ... ... | ,, | British India ... | ,, 4.10.23 to 30.10.23... | 27.11.23. |
| *Gorgon*... ... | Hughes, J. W. ... | J. E. Cooper ... ... | ,, | Dalgety & Co. ... | ,, 13.7.23 to 17.9.23 ... | 23.10.23. |
| *Governor Musgrave* | Coalstad, C. ... | C. B. Odman, E. W. Hughes | ,, | Commonwealth Lighthouse Service. | ,, 20.7.23 to 11.10.23... | 5.12.23. |
| *Graciana* ... | Yeoman, J. T. ... / Clark, J. ... | P. Hays, M. C. Turner ... | M.L. | Furness Withy ... | Met. Log. 23.3.22 to 29.9.22 ... | 25.10.22. |
| *Griqua*... ... | Nancollas, H. E. ... | A. Rearch ... ... | No. | Ellerman Bucknall ... | Form 911 23.12.22 to 3.2.23 ... | 14.2.23. |
| *Haliartus* ... | Marsh, L. V. ... | W. H. Upton ... ... | No. | R. P. Houston ... | ,, 16.8.23 to 3.10.23 ... | 20.11.23. |
| *Harmonides* ... | Hughes, W. J. ... | R. P. Davies ... ... | ,, | ,, ... | ,, 24.7.23 to 13.8.23 ... | 20.8.23. |
| *Harmony*, Auxy. | Jackson, J. C. ... | A. W. Bush ... ... | ,, | Moravian Mission ... | ,, 29.8.23 to 17.10.23... | 19.11.23. |
| *Hatarana* ... | Cutbush, H. M. ... / Thompson, R. F.... | J. L. Durkee, F. Wells, E. B. Heath. | M.L. | British India ... | Met. Log. 28.4.23 to 25.7.23 ... | 8.8.23. |
| *Hauraki*, M.V. ... | Showman, A. C. ... | D. McLeish ... ... | No. | Union S.S. Co., N.Z.... | Form 911 30.9.23 to 21.11.23... | 5.12.23. |
| *Hazel Branch* ... | Barnet, P. K. ... | R. S. Young ... ... | ,, | Nautilus ... ... | ,, 16.3.23 to 18.6.23 ... | 23.6.23. |
| *Henry Holmes*, C.S. | Bicker-Caarten, A. | R. Rudd. ... ... | ,, | W. I. & Panama Telegraph Co. | ,, 11.9.23 to 25.10.23... | 23.11.23. |
| *Herefordshire* ... | Stanley, W. ... | P. Hawkins, P. Flood, B. Beesley, M. Simmons, G. Whitworth, P. S. Cooper, H. Moore. | M.L. | Bibby ... ... | Met. Log. 3.2.23 to 22.7.23 ... | 11.8.23. |
| *Herschel* ... | Carey, W. J. ... | S. C. Smith ... ... | No. | Lamport & Holt ... | Form 911 15.9.23 to 22.11.23... | 28.11.23. |
| *Hibernia* ... | Tanner ... ... | R. Woodall ... ... | C.C. | L.M. & S. Rly. ... | Telegraphic Report. 16.11.23 ... | 16.11.23. |
| *Highland Enterprise* | Pond, R. H. ... | ... ... ... ... | No. | Nelson ... | ... ... ... ... ... | ... |
| ,, *Glen* ... | Jones, T. J. ... | F. Abbott ... ... | ,, | ,, ... ... | Form 911 23.6.23 to 13.7.23 ... | 27.7.23. |
| ,, *Heather* | 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. |
| ,, *Laddie*... | Alford, C. ... | A. H. Barnes ... ... | No. | ,, ... ... | Form 911 29.4.23 to 14.6.23 ... | 3.7.23. |
| ,, *Laird* ... | Davis, G. O. ... | ... ... ... ... | ,, | ,, ... ... | ... ... ... ... ... | ... |
| ,, *Piper* ... | Collings, D. ... | A. S. Jones, J. S. Collins, J. H. Cobles. | M.L. | ,, ... ... | Met. Log. 10.10.22 to 11.4.23... | 2.5.23. |
| ,, *Pride* ... | Robinson, R. H. ... | McKinnon, H. Devlin. Sargeant. | ,, | ,, ... ... | ,, 31.5.23 to 4.8.23 ... | 14.8.23. |
| ,, *Rover* ... | Ashby Graves, F. ... | W. Watson, S. G. King. F. Abbott. | ,, | ,, ... ... | ,, 14.6.23 to 7.11.23 ... | 16.11.23. |
| ,, *Warrior* | Brooke, W. ... | H. W. Bennett ... ... | No. | ,, ... ... | Form 911 10.7.23 to 23.9.23 ... | 27.9.23. |
| *Hobsons Bay* ... | Ogilvie, F. J. ... | G. Ronguie, J. E. Williams, E. Bailie. | M.L. | Commonwealth Govt. | Met. Log. 28.7.23 to 2.11.23 ... | 19.11.23. |
| *Holbein* ... | Symons, P. ... | G. P. Kitto ... ... | No. | Lamport & Holt ... | Form 911 20.10.23 to 8.11.23... | 5.12.23. |
| *Homeric* ... | Howarth, F. B., Commr., R.N.R. | W. Hill, F. Patchett ... | W.T. | White Star ... ... | W.T. Reg. 27.9.23 to 13.10.23 / Form 911 ,, ,, | 16.10.23. |
| *Huanchaco* ... | Jenkins, J. H. ... | W. E. McMullen ... ... | ,, | Pacific S.N. Co. ... | , 28.3.23 to 5.9.23 ... | 12.9.23. |
| *Hubert*... ... | Evans, T. G. ... | C. C. Beal ... ... | ,, | Booth ... ... | ,, 5.7.23 to 15.7.23 ... | 14.8.23. |
| *Hurunui* ... | Burton Davies, J. ... | A. Smith, S. Bryant, J. Carpenter. | M.L. | New Zealand S.S. Co. | Met. Log. 2.2.23 to 22.6.23 ... | 6.7.23. |
| *Ibex* ... ... | Langdon, C. ... | ... ... ... ... | C.C. | G.W. Railway ... | Telegraphic Report. 18.10.23 ... | 18.10.23. |
| *Ikala* ... ... | Meetham, J. T. ... | E. Lightfoot ... ... | No. | Welsford, J. H. ... | Form 911 9.6.23 to 19.6.23 ... | 26.7.23. |
| *Ionic Star* ... | Wilson, G. ... | J. Sinclair ... ... | ,, | Blue Star ... ... | ,, 17.1.23 to 19.3.23 ... | 22.3.23. |
| *Iroquois* ... | Tinson, C. W., O.B.E., Commr., R.N. | ... ... ... ... | M.L. | His Majesty's Ship. | ... ... ... ... ... | ... |
| *Ixion* ... ... | Baetens, F. ... | A. K. Sanderson ... ... | No. | A. Holt ... ... | Form 911 28.9.23 to 15.11.23... | 20.11.23. |
| *John Pender*, C.S. | Smythe, T. W., O.B.E. | B. C. Farrow ... ... | No. | Eastern Tel. Co. ... | ,, 31.10.23 to 13.11.23 | 22.11.23. |
| *Junin* ... ... | Barkley, E. ... | E. F. Potter ... ... | ,, | Pacific S.N. Co. ... | ,, 29.1.23 to 23.2.23 ... | 6.3.23. |
| *Kaikoura* ... | Downton, M. ... | H. Emmett, C. Pilcher, N. Anderson, J. Hopkins. | M.L. | New Zealand S.S. Co. | Met. Log. 19.6.22 to 23.6.23 ... | 26.6.23. |
| *Kaisar-i-Hind* ... | Manley, G. ... | R. K. Lowry ... ... | No. | P. & O. ... ... | Form 911 9.8.23 to 9.9.23 ... | 1.10.23. |
| *Kamo Maru* ... | Okano, Y. ... | S. Matsumura ... ... | ,, | Nippon Yusen Kaisha | ,, 5.9.23 to 4.10.23 ... | 27.11.23. |
| *Kangaroo* ... | Norris, H. C. ... | C. M. Clayton, W. Johnston, R. J. Sinclair, F. Humble. | M.L. | State Service Australia | Met. Log. 19.12.22 to 27.5.23... | 3.7.23. |
| *Karroo*... ... | Robinson, T. ... | S. J. Nash ... ... | No. | Ellerman Bucknall ... | Form 911 30.6.23 to 11.7.23 ... | 27.7.23. |
| *Kashima Maru* ... | Shinomiya, T. ... | J. G. Tsukada ... ... | ,, | Nippon Yusen Kaisha | ,, 1.8.23 to 9.9.23 ... | 16.10.23. |
| *Kashmir* ... | Bartlett, E. B., O.B.E. | F. Hopkins ... ... | ,, | P. & O. ... | ,, 7.11.23 to 16.11.23... | 11.12.23. |
| *Kellett* ... ... | 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. |
| *Khiva* ... ... | Redhead, C. M., D.S.O., R.D., Capt., R.N.R. | J. D. Strike, J. Maxwell, L. Fraser. | M.L. | P. & O. ... ... | ,, 25.5.23 to 17.9.23 ... | 4.10.23. |
| *Khyber*... ... | Pinckney, L. D., O.B.E. | H. F. Gray ... ... | No. | ,, ... ... | ,, 23.9.23 to 15.10.23 | 5.12.23. |
| *Kia Ora* ... | Thurston, H. P. ... | P. W. Kime ... ... | ,, | Shaw Savill & Albion | ,, 13.10.23 to 2.11.23... | 13.11.23. |
| *Kinderdijk* ... | Herbschleb, G. C. ... | A. H. Van der Vliet ... | ,, | Holland America ... | ,, 10.10.22 to 12.1.23... | 6.2.23. |
| *Kitano Maru* ... | Kamada, N. ... | G. Chilara ... ... | ,, | Nippon Yusen Kaisha | ,, 4.8.23 to 29.8.23 ... | 1.10.23. |
| *Knight Companion* | Beale, H. E. ... | E. H. Powell ... ... | ,, | A. Holt ... ... | ,, 29.9.23 to 11.10.23... | 16.10.23. |
| *Kovno* ... ... | Casson, D. H., R.D., Commr., R.N.R. | E. R. Massam, G. H. Duncan, L. Griffiths | M.L. | Ellerman Wilson ... | Met. Log. 5.5.23 to 27.11.23 ... | 3.12.23. |
| *Kroonland* ... | Newman, C. ... | W. E. Leaman ... ... | No. | Red Star ... ... | Form 911 18.11.22 to 1.1.23 ... | 5.1.23. |
| *Kurmark* ... | Cartmer, G. E., O.B.E. | J. R. Laurenson S. E. Clowser, C. H. Porter. | M.L. | Graham & Co. ... | Met. Log. 27.6.23 to 28.11.23... | 3.12.23. |
| *Lady Brenda* ... | Young, W. J. ... | B. L. Brind ... ... | No. | Dawson ... ... | Form 911 25.9.23 to 4.10.23 ... | 13.10.23. |
| *Lady Denison Pender*, C.S. | ... ... ... | ... ... ... ... | ,, | Eastern Tel. Co. ... | ... ... ... ... ... | ... |
| *Laguna* ... | Pleignier, H. T. S.... | F. W. Parker ... ... | ,, | Pacific S.N. Co. ... | Form 911 15.10.23 to 4.11.23... | 8.11.23. |
| *Lalande* ... | Bambra, W. A. ... | N. Webster ... ... | ,, | Lamport & Holt ... | ,, 29.9.23 to 5.10.23 ... | 30.10.23. |
| *Lancashire* ... | Beckett, F. W. ... | T. Owen ... ... ... | ,, | Bibby ... ... | ,, 23.6.23 to 2.9.23 ... | 6.9.23. |

| Name of Vessel. | Captain. | Observing Officers. | Official Meteorological Equipment. | Line. | Last Log, Register, or Report Contributed. | Date Received. |
|---|---|---|---|---|---|---|
| *Laomedon* ... | Smith, A. ... | A. S. Barclay ... ... | No. | A. Holt ... ... | ... ... ... ... ... | ... |
| *La Paz*, M.V. ... | Ross, J. ... ... | R. Collister ... ... | ,, | Pacific S.N. Co. ... | Form 911 19.9.23 to 8.10.23 ... | 30.10.23. |
| *Laplace* ... | Davies, G. W. ... | A. Hughes I. O. Jones ... | ,, | Lamport & Holt ... | ,, 11.11.23 to 3.12.23... | 10.12.23. |
| *Lapland* ... | Howell, T. ... | B. T. Harris, H. H. Grace, J. M. Appleby. | W.T. | Red Star ... ... | W.T. Reg. 5.10.23 to 24.10.23<br>Form 911 5.10.23 to 24.10.23 | 2.11.23. |
| *Lassell*, M.V. ... | Turner, J. E. ... | A. T. Crilly ... ... | No. | Lamport & Holt ... | ,, 5.8.23 to 24.10.23 ... | 27.11.23. |
| *Leicestershire* ... | De Legn, P. ... | R. Cuming ... ... | M.L. | Bibby ... ... | ,, 2.10.23 to 12.10.23... | 18.10.23. |
| *Leitrim* ... | Robertson, A. ... | H. C. Roberts ... ... | No. | Dowie, J., & Co. ... | ,, 16.8.23 to 5.9.23 ... | 24.10.23. |
| *Levant*, C.S. ... | West, G. W. ... | ... ... ... ... | ,, | Eastern Tel. Co. | ,, 15.10.23 to 25.11.23 | 5.12.23. |
| *Lexington* ... | Adams, S. E. ... | A. T. Church, J. McInnes, C. H. Robinson. | M.L. | Furness Withy ... | Met. Log. 28.4.22 to 4.9.22 ... | 11.9.22. |
| *Ling Nam* ... | ... ... ... | ... ... ... ... | No. | Chunghwa Nav. Co. ... | ... ... ... ... ... | ... |
| *Llanstephan Castle* | Samuel, D. ... | E. Perkins ... ... | ,, | Union Castle ... | Form 911 15.6.23 to 24.8.23 ... | 28.8.23. |
| *Loch Katrine*, M.V. | Matthews, G. P. ... | P. Cooper ... ... | ,, | R.M.S.P. Co. ... | ,, 4.2.23 to 3.3.23 ... | 8.3.23. |
| *London Commerce* | ... ... ... | E. A. Bennett ... ... | ,, | Furness Withy ... | ... ... ... ... ... | ... |
| *Loreto*, M.V. ... | Splatt, W. A. ... | ... ... ... ... | ,, | Pacific S.N. Co. ... | ... ... ... ... ... | ... |
| *Losada*, M.V. ... | Barkley, E. ... | A. H. Turner ... ... | ,, | ,, ,, ... | Form 911 13.10.23 to 31.10.23 | 26.11.23. |
| *Lowestoft* ... | Brownrigg, H. J. S., D.S.O., Capt., R.N. | ... ... ... ... | M.L. | His Majesty's Ship | ... ... ... ... ... | ... |
| *Macedonia* ... | Potter, H. W., R.D Commr., R.N.R. | G. Readman ... ... | No. | P. & O. ... ... | ... ... ... ... ... | ... |
| *Macharda* ... | Tyers, W. O. ... | W. Moore ... ... | ,, | Brocklebank ... | Form 911 4.8.23 to 27.10.23 ... | 31.10.23. |
| *Mahana* ... | Kershaw, W. A. R. | F. M. Smith ... ... | ,, | Shaw Savill & Albion | ,, 5.8.23 to 25.8.23 ... | 16.10.23. |
| *Maharaja* ... | Elliott, G. F. ... | W. J. Corp ... ... | ,, | Asiatic S.N. Co. ... | ,, 3.5.23 to 28.6.23 ... | 24.7.23. |
| *Mahopac* ... | Puttick, J. ... | F. J. Mummery ... ... | ,, | Atlantic Transport .. | ,, 23.4.23 to 3.8.23 ... | 27.8.23. |
| *Maihar* ... | Rowe, J. P. ... | C. Straw, L. Robertson, H. F. Scoins. | M.L. | Brocklebank ... | Met. Log. 14.4.23 to 18.7.23 ... | 24.8.23. |
| *Maimyo* ... | Hamilton, G. ... | R. A. L. Williams ... ... | No. | ,, ... | Form 911 20.10.23 to 11.11.23 | 5.12.23. |
| *Maine* ... ... | Seymour, A. ... | J. W. Prier ... ... | ,, | Atlantic Transport ... | ,, 29.5.23 to 8 6.23 ... | 18.6.23. |
| *Majestic* ... | Hayes, Sir B. F., K.C.M.G., D.S.O., R.D., Commodore R.N.R. | A. F. Butcher ... ... | W.T. | White Star ... ... | W.T. Reg. 15.11.23 to 28 11.23 | 1.12.23. |
| *Makambo* ... | Williams, G. E. ...<br>Brown, T. M. ...<br>Griffiths, G. I. ... | A. Brown, W. R. Robertson, F. C. Ree, D. Wilson. | M.L. | Burns Philp ... | Met. Log. 28.3.23 to 10.9.23 ... | 4.12.23. |
| *Makura* ... | Crawford, R. ...<br>Barlow, A. E. ... | C. A. Stein, R. B. Denniston, T. A. McPherson, R. K. Parry, W. W Fish, A. Lansley. | M.L. | Canadian-Australasian | ,, 30.6.23 to 26.10 23... | 17.11.23. |
| *Malancha* ... | Whitham, F, ... | J. Robertson ... ... | No. | Brocklebank ... | Form 911 23.8.23 to 16.9.23 ... | 2.10.23. |
| *Malda* ... ... | Gray, T. N. ... | F. R. K. Langdon... ... | ,, | British India ... | ,, 17.10.23 to 18.11.23 | 11.12.23. |
| *Manchester Corporation.* | Everest, J. E. ... | V. R. Jeffrey ... ... | ,, | Manchester Liners ... | ,, 18.10.23 to 28.10.23 | 6.11.23. |
| *Manchester Mariner* | Riley, J. E. ... | ... ... ... ... | M.L. | ,, ,, | ... ... ... ... ... | ... |
| *Manchester Merchant.* | Barclay, J. ... | D. H. Burton ... ... | No. | ,, ,, ... | Form 911 19.3.23 to 31.3.23 ... | 8.5.23. |
| *Mandasor* ... | Kershaw, R. W. ... | W. Baxter ... ... | ,, | Brocklebank ... | ,, 18.7.23 to 13.10.23... | 19.11.23. |
| *Manhattan* ... | Lazell, F. W. ... | ... ... ... ... | ,, | Atlantic Transport ... | ,, 12.3.23 to 7.4.23 ... | 11.4.23. |
| *Manipur* ... | Scurr, T. W. ... | ... ... ... ... | ,, | Brocklebank ... | ... ... ... ... ... | ... |
| *Manistee* ... | Isaacson, J. M. ... | F. McColm, A. M. Houghton, H. E. Carter, L. C. Bach, L. A. Flower. | M.L. | Elders & Fyffes ... | Met. Log. 9.3.23 to 1.7.23 ... | 6.7.23. |
| *Marburn* ... | Clews, A. H. ... | A. M. Watt, W. R. Reid, W. Masson. | M.L. | Canadian Pacific ... | ,, 12.5.23 to 6.10.23 ... | 26.10.23. |
| *Marella* ... | Mortimer, S. ... | ... ... ... ... | M.L. | Burns Philp ... | ,, 21.2.23 to 11.7.23 ... | 8.9.23. |
| *Margha* ... | Milne, R. A. ... | J. Strachan, R. W. Cooper, E. H. Rabey, E. Shepherd. | M.L. | British India ... | ,, 28.4.23 to 22.7.23 ... | 27.7.23. |
| *Marglen* ... | Landy, E. ... | E. Laurence ... ... | No. | Canadian Pacific ... | Form 911 18.5.23 to 25.5.23 ... | 11.6.23. |
| *Maryland* ... | Pollard, F. W. ... | F. T. Good ... ... | ,, | Atlantic Transport ... | ,, 2.11.23 to 11.11 23... | 20.11.23. |
| *Mashobra* ... | Gallgie ... ... | M. W. K. Bishop ... ... | ,, | British India ... | ... ... ... ... ... | ... |
| *Masirah* ... | Thowless, E. ... | R. C. Baker ... ... | ,, | Brocklebank ... | Form 911 30.7.23 to 26.8.23 ... | 26.11.23. |
| *Massilia* ... | Caithness, J. B. ... | G. H. Squires ... ... | ,, | Anchor ... ... | ,, 12.5.23 to 4.6.23 ... | 27.6.23. |
| *Matakana* ... | Bosdet, V. J. ... | H. C. Mont, S. Oswald ... | ,, | Shaw, Savill & Albion | ,, 20.6.23 to 31.7.23 ... | 11.8.23. |
| *Matheran* ... | Smith, W. ... | G. C. Smith, W. J. Miller, G. W. Barker. | M.L. | Brocklebank ... | Met. Log. 14.5.23 to 7.8.23 ... | 10.8.23. |
| *Mathura* ... | Hanna, R. G. ... | ... ... ... ... | No. | ,, ... | ... ... ... ... ... | ... |
| *Matiana* ... | Langlands, D. H. ... | E. H. Brady ... ... | ,, | British India ... | ... ... ... ... ... | ... |
| *Matina* ... | Henderson, J. ... | J. W. Parsons, H. Carden, N. A. Moore. | M.L. | Elders & Fyffes ... | Met. Log. 9.9.22 to 24.3.23 ... | 26.4.23. |
| *Mauretania* ... | Rostron, A. H., C.B.E., R.D., Capt., R.N.R. | G. H. Jones, P. O. Davis, W. C. A. Robson. | W.T. | Cunard ... ... | W.T. Reg 21.10.23 to 4.11.23...<br>Form 911 29.9.23 to 14.10.23... | 8.11.23.<br>23.10.23. |
| *Megantic* ... | Berry, G. ... | H. J. C. Day, R. Conway ... | W.T. | White Star ... | W.T. Reg. 24.10.23 to 15.11.23 | 17.11.23. |
| *Melita* ... ... | Landy, E. ... | J. Shearer, R. Campbell, H. Knight. | W.T. | Canadian Pacific ... | ,, 1.9.23 to 19.9.23 ... | 29.9.23. |
| *Memnon* ... | Salter, G. H. ... | E. R. Pritchard ... ... | No. | A. Holt ... ... | Form 911 1.9.23 to 14.9.23 ... | 11.12.23. |
| *Menominee* ... | Finch, E. ... | H. E. McCartney ... ... | ,, | Atlantic Transport ... | ,, 19.8.23 to 17.9.23 ... | 21.9.23. |
| *Mesaba* ... | Claret, F. H. ... | L. A. Williams ... ... | ,, | ,, ,, ... | ,, 2.7.23 to 11.7.23 ... | 27.8.23. |
| *Metagama* ... | Henderson, W. ... | H. A. MacCallum, H. Coughlan | W.T. | Canadian Pacific ... | W.T. Reg. 8.11.23 to 29.11.23... | 3.12.23. |
| *Miami*... ... | Maxwell Brown, W. E. | A. Orchard ... ... | No. | Elders & Fyffes ... | Form 911 15.10.23 to 17.11.23 | 21.11.23. |
| *Michigan* ... | Tribe, A. E. ... | H. E. McCartney ... ... | ,, | Atlantic Transport ... | ,, 13.5.23 to 15.6.23 ... | 21.6.23. |
| *Minderoo* ... | Richardson, E. ... | B. J. Bennie, W. J. McPhedron, J. H. Oxton. | M.L. | West Australia Nav. Co. | Met. Log. 16.2.23 to 10.7.23 ... | 17.9.23. |
| *Minnedosa* ... | Sibbons, H. ... | R. Fegan, L. Outram, H. F. Pullen. | W.T. | Canadian Pacific ... | W.T. Reg. 13.10.23 to 1.11.23<br>Form 911 26.10.23 to 1.11.23 | 10.11.23. |
| *Mirror*, C.S. ... | ... ... ... | ... ... ... ... | No. | Eastern Tel. Co. | ... ... ... ... ... | ... |
| *Mississippi*, M.V. | Wylie, J. T. J. ... | A. H. Middleton ... ... | ,, | Atlantic Transport ... | Form 911 6.10.23 to 15.10.23... | 23.10.23. |
| *Missouri* ... | Hutchison, J. G. ... | W. W. Howard ... ... | ,, | ,, ,, ... | ,, 30.7.23 to 2.9.23 ... | 6.9.23. |
| *Moldavia* ... | Burleigh, C. W. ... | H. Robbins ... ... | ,, | P. & O. ... ... | ... ... ... ... ... | ... |
| *Mongolian Prince* | Chilvers, J. ... | H. A. Shaw ... ... | ,, | Prince ... ... | Form 911 15.8.23 to 27.8.23 ... | 12.9.23. |
| *Monkbarns*, Ship | Davies, W. ... | M. B. Glasier ... ... | ,, | J. Stewart & Co. ... | ,, 10.3.23 to 13.7.23 ... | 18.9.23. |
| *Montcalm* ... | Gillies, J. ... ... | F. E. Williams, W. P. Hains | W.T. | Canadian Pacific ... | W.T. Reg. 4.11.23 to 21.11.23...<br>Form 911 4.11.23 to 23.11.23... | 24.11.23.<br>30.11.23. |
| *Montclare* ... | Webster, G. S., R.D., Commr., R.N.R. | E. J. Jones, M. Cresswell, M. Jack. | W.T. | ,, ,, ... | W.T. Reg. 26.10.23 to 15.11.23 | 17.11.23. |
| *Montrose* ... | Parry, H. ... | H. McFadyen, G. Marriott | W.T. | ,, ,, ... | ,, 10.11.23 to 30.11.23<br>Form 911 13.10.23 to 1.11.23 | 3.12.23.<br>5.11.23. |
| *Morvada* ... | Mills, T. L., O.B.E., R.D., Commr., R.N.R. | J. Norris, D. Lonie, F. Dyson | M.L. | British India ... | Met. Log. 15.9.23 to 27.11.23... | 29.11.23. |
| *Mulbera* ... | Steadman, W. R. ... | E. Holland, R. B. Clark ... | No. | ,, ,, ... | Form 911 13.9.23 to 18.9.23 ... | 27.9.23. |

| Name of Vessel. | Captain. | Observing Officers. | Official Meteorological Equipment. | Line. | Last Log, Register, or Report Contributed. | Date Received. |
|---|---|---|---|---|---|---|
| *Musician* ... | Egerton, J. J. ... | O. Stanhope ... ... | No. | Harrison ... ... | Form 911 5.4.23 to 17.6.23 ... | 2.8.23. |
| *Mutine* ... | Douglas, H.P., C.M.G., Capt., R.N. | R. A. Stephens ... ... | M.L. | His Majesty's Ship ... | Met. Log. 10.4.23 to 7.8.23 ... | 30.8.23. |
| *Nagara* ... | Turner, E. A. ... | C. E. Mason ... ... | No. | R.M.S.P. Co. ... | Form 911 14.9.23 to 15.11.23... | 20.11.23. |
| *Napierian* ... | Kerruish, W. ... | T. Griffiths ... ... | ,, | Leyland ... ... | ,, 4.11.23 to 17.11.23... | 5.12.23. |
| *Nardana* ... | Brown, H. ... | K. C. Le Breton ... ... | ,, | British India ... | ,, 3.3.23 to 5.8.23 ... | 21.8.23. |
| *Nariva*... ... | Macey, W. H. ... | W. H. Grimshaw, F. O. Newton, H. H. Lancaster. | M.L. | R.M.S.P. Co. ... | Met. Log. 3.5.23 to 27.6.23 ... | 29.6.23. |
| *Nascopie* ... | Smellie, T. F. ... | P. Lloyd, R. J. Summers, R. S. Mott. | M.L. | Hudson's Bay Co. ... | ,, 15.6.23 to 24.10.23... | 31.10.23. |
| *Navasota* ... | Willan, F. G. L. ... | Ingram, E. B. ... ... | No. | R.M.S.P. Co. ... | Form 911 9.5.23 to 8.7.23 ... | 21.7.23. |
| *Navigator* ... | Mowat, J. ... | ... ... ... ... | ,, | Harrison ... ... | ,, 29.4.23 to 26.6.23 ... | 11.7.23. |
| *Nawab*... ... | Smith, J. F. ... | ... ... ... ... | ,, | Asiatic S.N. Co. ... | ,, 7.8.23 to 24.9.23 ... | 17.10.23. |
| *Nebraska* ... | Collins, A. R. D. ... | J. Vivian... ... ... | ,, | R.M.S.P. Co. ... | ,, 20.6.23 to 31.8.23 ... | 24.9.23. |
| *Nellore*... ... | Murray, F. S., R.D., Lt. - Commr., R.N.R. | G. Aspinall ... ... | ,, | P. & O. ... ... | ,, 16.8.23 to 5.9.23 ... | 1.10.23. |
| *Nestor* ... ... | Owen, R. D., O.B.E. | W. J. Eyson ... ... | ,, | A. Holt ... ... | ,, 23.8.23 to 6.10.23 ... | 9.10.23. |
| *Nevasa*... ... | Swanson, C. J. ... | C. D. White ... ... | ,, | British India ... | ... ... ... ... ... | ... |
| *Newby Hall* ... | Kendall, J. W. ... | W. Rogerson, E. J. Myles, A. MacAllister. | M.L. | Ellerman ... ... | Met. Log. 5.1.23 to 19.6.23 ... | 18.7.23. |
| *Niagara* ... | Rolls, J. T. ... | R. M. Scott, N. G. Buxton, O. C. Bray. | M.L. | Canadian-Australian... | ,, 2.6.23 to 28.9.23 ... | 29.10.23. |
| *Ningchow* ... | Wilson, C. A. ... | W. K. Kerr ... ... | No. | A. Holt ... ... | Form 911 18.7.23 to 10.9.23 ... | 14.9.23. |
| *Nizam* ... ... | Park, G. ... ... | ... ... ... ... | ,, | Asiatic S.N. Co. ... | ,, 21.4.23 to 1.5.23 ... | 29.5.23. |
| *Nore* ... ... | Randall H. W., R.D., Capt., R.N.R. | J. C. Ablewhite, R. W. Mackie, J. O. Divers, H. C. Slinn. | M.L. | P. & O. ... ... | Met. Log. 30.6.23 to 21.9.23 ... | 27.9.23. |
| *Norfolk Range* ... | Moore ... ... | H. Richardson ... ... | No. | Furness Withy ... | Form 911 27.9.23 to 11.10.23... | 24.10.23. |
| *Norman* ... | Morton Betts, W. ... | D. A. Hodgson ... ... | ,, | Union Castle ... | ,, 27.8.23 to 15.9.23 ... | 19.10.23. |
| *Norseman*, C.S. ... | Barter, H. O. ... | S. M. Hammond, E. R. Duffey, L. M. Cooper. | M.L. | Western Tel. Co. ... | Met. Log. 12.2.23 to 21.8.23 ... | 24.9.23. |
| *Northumberland* ... | Haines, F. P. ... | ... ... ... ... | No. | Federal ... ... | Form 911 16.6.23 to 28.7.23 ... | 31.7.23. |
| *Nortonian* ... | McCormick, J. ... | T. Miller ... ... ... | ,, | Leyland ... ... | ,, 9.9.23 to 11.10.23 ... | 23.10.23. |
| *Nubian* ... | Watmough, T. M. ... | G. H. Jolly ... ... | ,, | ,, ... ... | ,, 30.6.23 to 13.9.23 ... | 18.9.23. |
| *Nyanza* ... | Fitzroy, F. H., R.D., Capt., R.N.R. | F. Aheir, S. J. Holland, F. Ardern. | M.L. | P. & O. ... ... | Met. Log. 17.3.23 to 8.7.23 ... | 12.7.23. |
| *Odland I.* ... | Villiamsen ... | H. Svendgaard ... ... | No. | Hannevig Bros. ... | Form 911 20.7.23 to 5.8.23 ... | 20.8.23. |
| *Ohio* ... ... | Lainson, W. H. ... | ... ... ... ... | M.L. | R.M.S.P. Co. | ... ... ... ... ... | ... |
| *Olympia* ... | Duncan, A. R. ... | H. Gorman, J. F. Adam, D. Haig. | M.L. | Anchor ... ... | Met. Log. 22.3.22 to 26.8.23 ... | 1.10.23. |
| *Olympic* ... | Marshall, W., D.S.O., R.D., Capt. R.N.R. Howarth F. B., Commr., R.N.R. | S. B. Morfee, J. C. M. Boyce | W.T. | White Star ... | W.T. Reg. 1.11.23 to 15.11.23... ,, 22.11.23 to 6.12.23... | 19.11.23. 10.12.23. |
| *Omar* ... ... | Simner, G. L., R.D., Commr., R.N.R. | A. J. Baxter, N. Savage A. J. Croft-Cohen, G. C. Lylie. | M.L. | Orient ... ... | Met. Log. 27.1.23 to 16.5.23 ... | 25.5.23. |
| *Onitsha* ... | Williams, T. E. ... | D. Rollo ... ... | No. | Elder Dempster ... | Form 911 1.9.23 to 21.9.23 ... | 20.11.23. |
| *Oranian* ... | Watmough, T. M. ... | R. J. S. Pope ... ... | ,, | Leyland ... ... | ,, 12.2.23 to 26.4.23 ... | 30.4.23. |
| *Orari* ... ... | Robinson, F. W. ... | C. H. Denton, C. F. Hicks, E. Mills. | M.L. | New Zealand S.S. Co. | Met. Log. 3.2.23 to 19.7.23 ... | 25.7.23. |
| *Orator* ... ... | Flynn, D. ... | J. C. Sinclair ... ... | No. | Harrison ... ... | Form 911 2.7.23 to 22.7.23 ... | 22.8.23. |
| *Orbita* ... ... | Parker, W. H., C.B.E., R.D., Capt., R.N.R. | D. R. Lee, H. H. Lancaster... | W.T. | R.M.S.P. Co. ... | W.T. Reg. 14.10.23 to 4.11.23... Form 911 14.10.23 to 5.11.23... | 8.11.23. 9.11.23. |
| *Orcoma* ... | Pearson, A. T. D. ... | R. E. Ward, J. J. Buckley ... | M.L. | Pacific S.N. Co. ... | Met. Log. 24.8.23 to 9.11.23 ... | 10.11.23. |
| *Orduna* ... | Warner, G. E. ... | J. W. Carr, J. Vivian, J. Smith, A. A. Martin. | W.T. | R.M.S.P. Co. ... | W.T. Reg. 4.11.23 to 24.11.23... Form 911 3.11.23 to 26.11.23... | 29.11.23. 30.11.23. |
| *Oriana*... ... | Christian, G. H. ... | G. Pattison, Mason, G. F. Nicholson, Cruikshank. | M.L. | Pacific S.N. Co. ... | Met. Log. 26.1.23 to 14.8.23 ... | 18.8.23. |
| *Orita* ... ... | Dominy, R. H., C.B.E., Commr., R.N.R. | H. S. Roberts, J. A. Adamson | M.L. | ,, ,, ... | Met. Log. 23.3.23 to 18.7.23 ... | 15.9.23. |
| *Ormonde* ... | Staunton, H. G., C.B.E., R.D., Commr., R.N.R. | G. A. Moir, F. J. L. Butler, E. G. Smithard. | M.L. | Orient ... ... | , 1.1.23 to 23.4.23 ... | 30.4.23. |
| *Ormuz* ... ... | James, L. V., D.S.C. | H. Schofield, J. S. Metcalf, H. H. McLean, I. E. G. Goldsworthy. | M.L. | ,, ... ... | ,, 1.4.23 to 17.7.23 ... | 21.7.23. |
| *Oroya* ... ... | Daniel, T. ... | S. Lewis ... ... ... | No. | Pacific S.N. Co. ... | Form 911 27.7.23 to 15.10.23... | 19.10.23. |
| *Orsova* ... ... | Matheson, C. G., D.S.O., R.D., Commr., R.N.R. | C. Fox, J. C. K. Dowding, T. J. Jones, J. C. Jackson. | M.L. | Orient ... ... | Met. Log. 29.4.23 to 12.8.23 ... | 22.8.23. |
| *Ortega* ... ... | Chittenden, A. ... | J. G. Aitken ... ... | No. | Pacific S.N. Co. ... | Form 911 18.7.23 to 22.9.23 ... | 29.9.23. |
| *Orvieto*... ... | Owens, A. L., R.D., Lt.-Commr., R.N.R. | G. H. Wylie, A. J. Baxter, G. E. Martin, A. O. H. O'Bryen, M. C. Lester. | M.L. | Orient ... ... | Met. Log. 24.6.23 to 7.10.23 ... | 24.10.23. |
| *Osterley* ... | Coad, A. J., R.D., Commr., R.N.R. | F. G. Goodman, T. B. Grainger-Grieve, E. Hatch. | M.L. | ,, ... ... | ,, 22.7.23 to 6.11.23 ... | 27.11.23. |
| *Othello* ... ... | Pearson, Z. C. ... | A. J. Walker ... ... | No. | Ellerman Wilson ... | Form 911 10.10.23 to 27.10.23 | 31.10.23. |
| *Oxfordshire* ... | Adamson, B. W. ... | W. L. Whiteside, C. J. Blyten-Beesley, H. J. Jarrett. | M.L. | Bibby ... ... | Met. Log 15.9.23 to 22.11.23... | 28.11.23. |
| *Pakeha* ... | Hartman W. H. ... | W. L. P. Cox ... ... | No. | Shaw, Savill & Albion | Form 911 3.1.23 to 5.5.23 ... | 11.5.23. |
| *Paparoa* ... | Ashworth, F. ... | A. E. Lettington ... ... | ,, | New Zealand S.S. Co. | ... ... ... ... ... | ... |
| *Paris* ... ... | ... ... ... | ... ... ... ... | C.C. | Southern Rly. ... | Telegraphic Report. 22.9.23 ... | 22.9.23. |
| *Patia* ... ... | Downes, F. J. ... | S. A. Sapsworth ... ... | No. | Elders & Fyffes ... | Form 911 2.1.23 to 4.2.23 ... | 9.2.23. |
| *Patrol*, C.S. ... | Bredenberg, F. ... | Davison, Gardiner, Albrecht, Morrell. | M.L. | Eastern Extension (A. & C.) Telegraph Co. | Met. Log. 3.3.23 to 26.6.23 ... | 3.8.23. |
| *Persic* ... ... | Davies, E. ... | W. A. Calway ... ... | No. | White Star ... | Form 911 30.4.23 to 27.8.23 ... | 3.9.23. |
| *Peshawur* ... | Hester, C. ... | ... ... ... ... | M.L. | P. & O. | ... ... ... ... ... | ... |
| *Philadelphian* ... | Baker,— ... | ... ... ... ... | No. | Leyland ... ... | ... ... ... ... ... | ... |
| *Polyphemus* ... | Hatfield, J. ... | F. Silva ... ... ... | ,, | A. Holt ... ... | ... ... ... ... ... | ... |
| *Poona* ... ... | Cherry, W. G. W. ... | F. J. Ablewhite ... ... | ,, | P. & O. ... ... | Form 911 22.9.23 to 13.10.23... | 21.11.23. |
| *Port Albany* ... | Robinson, C. A. ... | G. L. Hazlewood, A. W. Jenkyns, J. S. Beardshaw, W. B. Craig. | M.L. | Commonwealth & Dominion. | Met. Log. 18.5.23 to 23.9.23 ... | 2.10.23. |
| ,, *Augusta* ... | Hearn, G. W. ... | G. T. Harris, R. C. Carter, C. F. Coate. | M.L. | ,, ,, ,, | ,, 14.4.23 to 19.9.23 ... | 25.9.23. |
| ,, *Caroline* ... | Renaut, F. A. ... | E. G. Fullick, P. H. Pedrick, T. Palmer. | M.L. | ,, ,, ,, | ,, 18.7.23 to 19.11.23... | 24.11.23. |

| Name of Vessel. | Captain. | Observing Officers. | Official Meteorc-logical Equipment. | Line. | Last Log, Register, or Report Contributed. | Date Received. |
|---|---|---|---|---|---|---|
| *Port Curtis* ... | Van den Bergh, C. | A. G. Rhind ... ... | No. | Commonwealth & Dominion. | ... ... ... ... ... | ... |
| ,, *Darwin* ... | Farmer, F. ... | E. T. N. Lawrey ... ... | No. | ,, ,, ,, | Form 911 3.8.23 to 23.9.23 ... | 9.10.23. |
| ,, *Hacking* ... | Stickland, A. E. ... | E. M. Robb ... ... | ,, | ,, ,, ,, | ,, 18.3.23 to 16.9.23 ... | 5.10.23. |
| ,, *Hunter* ... | Cottell, S. C. ... | C. P. Thrower. W. R. Johnston, L. Copeland, A. G. Newbury. | M.L. | ,, ,, ,, | Met. Log. 4.5.23 to 22.9.23 ... | 27.9.23. |
| ,, *Lyttelton* ... | Ferris, J.... ... | W. L. Lynd, E. Leavett, G. Fergusson, G. H. Harvey. | M.L. | ,, ,, ,, | ,, 24.2.23 to 16.8.23 ... | 18.8.23. |
| ,, *Melbourne* ... | Kearney, F. J. ... | D. G. H. Bradley, C. F. Post, T. L. Kidwell. | M.L. | ,, ,, ,, | ,, 15.3.23 to 18.7.23 ... | 25.7.23. |
| ,, *Nicholson* ... | Hoad, A. C. ... | J. G. Lewis, W. G. Jones, J. Buchan, F. Dow. | M.L. | ,, ,, ,, | ,, 30.12.22 to 24.6.23... | 28.6.23. |
| ,, *Pirie* ... | Higgs, W. G. ... | H. C. Jeffery, E. E. Roswell, R. S. Stannard, E. N. Rogerson. | M.L. | ,, ,, ,, | ,, 22.2.23 to 8.7.23 ... | 13.7.23. |
| ,, *Stephens* ... | Sawbridge, I. K. ... | E. J. Syvret, H. G. B. Pinkney, L. Bayley. | M.L. | ,, ,, ,, | ,, 28.1.23 to 13.6.23 ... | 10.7.23. |
| ,, *Sydney* ... | Lea, W. H. ... | H. E. Higgs, A. W. Sams, A. R. Martin, J. Fishwick. | M.L. | ,, ,, ,, | ,, 15.6.23 to 16.10.23... | 20.10.23. |
| ,, *Victor* ... | Jack, J. ... ... | J. Hunter, R. S. Keating, R. T. R. Tomsett. | M.L. | ,, ,, ,, | ,, 6.4.23 to 3.9.23 ... | 14.9.23. |
| *President Jackson* | Griffith, J. ... | C. W. Hawkins ... ... | No. | Pacific S.S. Co. ... | Form 911 25.4.23 to 24.5.23 ... | 7.8.23. |
| *Professor* ... | Lowe, J. ... | W. Squirrel ... ... | ,, | Harrison ... ... | 19.11.22 to 26.1.23... | 31.1.23. |
| *Protea*, H.M.S.A.S. | Dalgleish... ... | H. McMaster ... ... | ,, | South African Naval Service. | ,, 14.5.23 to 29.6.23 ... | 31.7.23. |
| *Protesilaus* ... | Wilkinson, H. ... | T. Miners, R. C. Neville, A. Woolfenden, F. Smith. | M.L. | A. Holt ... ... | Met. Log. 28 6.23 to 3.9 23 ... | 1.10.23. |
| *Pyrrhus* ... | Clark, G. T. ... | F. Berry ... ... ... | No. | ,, ... ... | Form 911 28.4.23 to 7.5.23 ... | 10.5.23 |
| *Rajah* ... ... | Park, G. ... ... | ... ... ... ... | No. | Asiatic S.N. Co. ... | ,, 17.6.23 to 10.7.23 ... | 15.8.23. |
| *Regina*... ... | Morehouse, W. A. ... | A. Hulme ... ... | ,, | White Star-Dominion | ,, 10.11.23 to 2.12.23... | 6.12.23. |
| *Reindeer* ... | Mulhall, W. ... | ... ... ... ... | C.C. | G.W. Railway ... | Telegraphic Report 8.12.23 ... | 8.12.23. |
| *Rhodesian Transport.* | Fowler, W. H. ... | E. A. Insley ... ... | No. | Houlder Bros. ... | Form 911 25.4.23 to 27.7.23 ... | 10.8.23. |
| *Rialto* ... ... | Mordue, J. A. ... | ... ... ... ... | ,, | Ellerman Bucknall ... | ,, 12.10.23 to 24.10.23 | 12.11.23. |
| *Rimutaka* ... | Hemming, F. A. ... | P. McCallum, H. Horwood, W. Kyles. | M.L. | New Zealand S.S. Co. | Met. Log. 7.4.23 to 19.8.23 ... | 24.8.23. |
| *Romney* ... | Leicester, F. S. ... | E. S. Phillips ... ... | No. | Lamport & Holt ... | Form 911 2.8.23 to 14.10.23 ... | 30.10.23. |
| *Royal Transport*... | Dove, J. ... ... | F. W. Pawson ... ... | ,, | Houlder Bros. ... | ,, 3.7.23 to 13.10.23 ... | 17.10.23. |
| *Ruapehu* ... | McKelar, A. W., R.D., Capt., R.N.R. | ... ... ... ... | M.L. | New Zealand S.S. Co. | ... ... ... ... ... | ... |
| *Sachem*... ... | Furneaux, S. ... | C. Waldron, A. Tomkins ... | No. | Furness Withy ... | Form 911 28.7.23 to 1.9.23 ... | 6.9.23. |
| *Samaria* ... | Horsburgh, G. ... | E. Esson ... ... | ,, | Cunard ... ... | ,, 24.9.23 to 10.10.23... | 16.10.23. |
| *Sandown Castle* ... | Jackson, C. R. ... | W. F. Malden ... ... | ,, | Union Castle ... | ,, 13.10.23 to 2.11.23... | 16.11.23. |
| *Saoirse*, Yacht ... | O'Brien, C. ... | H. S. Hodges ... ... | ,, | C. O'Brien ... ... | ,, 1.9.23 to 6.10.23 ... | 7.11.23. |
| *Sardinia* ... | Cadiz, F. G. ... | C. E. Arundel ... ... | ,, | P. & O. ... ... | ,, 13.6.23 to 3.7.23 ... | 19.7.23. |
| *Saturnia* ... | Black, J. ... | T. Ure ... ... | W.T. | Anchor Donaldson ... | W.T. Reg. 22.10.23 to 14.11.23 | 23.11.23. |
| | | | | | Form 911 21.10.23 to 14.11.23 | 24.11.23. |
| *Saxoleine* ... | Biddick, E. ... | C. S. Rodgers ... ... | No. | Hunting & Son ... | ,, 27.10.23 to 13.11.23 | 24.11.23. |
| *Saxon* ... ... | Stanley, W. F. ... | R. S. W. Harris ... ... | ,, | Union Castle ... | ,, 7.9.23 to 29.10.23 ... | 31.10.23. |
| *Saxonia* ... | Storey, F. E., R.D., Capt., R.N.R. | E. S. Simmonds ... ... | ,, | Cunard ... ... | ,, 27.9.23 to 23.10.23... | 2.11.23. |
| *Scholar* ... | O'Connor, T. ... | W. J. Wearing ... ... | ,, | Harrison | ,, 18.4.23 to 2.5.23 ... | 15.5.23. |
| *Scientist* ... | Hansen, W. A. ... | D. G. Russell ... ... | ,, | ,, ... ... | ,, 9.6.23 to 3.9.23 ... | 20.9.23. |
| *Scindia* ... | Matthews, W. ... | H. D. Campsie ... ... | ,, | Anchor ... ... | ,, 7.7.23 to 19.9.23 ... | 25.9.23. |
| *Scotia* ... ... | Telfer ... ... | O. W. L. Jones ... ... | C.C. | L.M. & S. Rly. ... | Telegraphic Report 11.12.23 ... | 11.12.23. |
| *Scottish Earl* ... | McDonnell, S. ... | W. H. Campbell ... ... | No. | Tankers, Ltd. | Form 911 25.8.23 to 14.9.23 ... | 1.10.23. |
| *Scottish Borderer* | Jeffrey, D. G., D.S.O. | G. F. Widger ... ... | ,, | ,, ... | ,, 20.9.23 to 3.11.23 ... | 22.11.23. |
| *Scythia* ... | Prothero, W. ... | T. Parry, D. S. Kite, M. Boston. | W.T. | Cunard ... ... | W.T. Reg. 5.11.23 to 24.11.23... | 30.11.23. |
| | | | | | Form 911 6.11.23 to 25.11.23... | 3.12.23. |
| *Sheaf Mount* ... | Groves, C. V. ... | J. L. Forster ... ... | No. | Souter, W. A. ... | ,, 28.3.23 to 17.4.23 ... | 3 7.23. |
| *Sheaf Spear* ... | Whitfield, G. A., O.B.E. | Mr. Harvey, Mr. Grisewood | M.L. | ,, ... | Met. Log. 18.3.23 to 20.8.23 ... | 8.10.23. |
| *Sicilia* ... ... | Miller, E. C. ... | H. Sanders ... ... | No. | P. & O. ... ... | Form 911 19.9.23 to 2.10.23 ... | 31.10.23. |
| *Socrates* ... | James, F. R. ... | E. R. Hartley ... ... | | Lamport & Holt ... | ,, 8.8.23 to 28.8.23 ... | 8.11.23. |
| *Sokoto* ... ... | Dennitts, W. ... | J. M. Stuart, J. McNae, D. S. Mackenzie. | M.L. | Elder Dempster ... | Met. Log. 27.3.23 to 26.6.23 ... | 28.6.23. |
| *Somerset* ... | Barnett, H. ... | C. H. Landfield ... ... | No. | New Zealand S.S. Co. | Form 911 2.8.23 to 3.9.23 ... | 24.10.23. |
| *Somme*... ... | Miles, F. R., Commr., R.N.R. ... | P. A. Yeatman, B. K. Berry, W. Smith, D. P. Larham. | M.L. | R.M.S.P. Co. ... | Met. Log. 17.7.22 to 24.4.23 ... | 18.8.23. |
| *Songster* ... | Smith, D. P. ... | J. R. McIntyre, D. Richards, W. H. Hunt. | M.L. | Harrison ... ... | ,, 16.7.22 to 23.10.22... | 2.11.22. |
| *Spectator* ... | Owen, W. F. ... | L. Seddon ... ... | No. | ,, ... ... | Form 911 25.10.23 to 14.11.23 | 5.12.23. |
| *Spero* ... ... | French, H. E. ... | ... ... ... ... | M.L. | Ellerman Wilson | ... ... ... ... ... | ... |
| *Stephan*, C.S. ... | Carlton, G. F., O.B.E., Commr., R.N.R. | L. J. Hegarty, J. Matthews, F. B. Bolingbroke. | M.L. | Telegraph Construction & Maintenance. | Met. Log. 5.5.23 to 3.10.23 ... | 10.10.23. |
| *Surrey* ... ... | Kettlewell, C. R. ... | G. W. Allard, S. E. Hobbin, D. McIntyre. | M.L. | Federal ... ... | ,, 27.5.23 to 3.11.23 ... | 7.11.23. |
| *Sussex* ... ... | Upton, E. C. S. ... | W. A. Ewington ... ... | No. | ,, ... ... | Form 911 27.7.23 to 7.9.23 ... | 21.11.23. |
| *St. Albans* ... | ... ... ... | ... ... ... | ,, | Eastern and Australian | ... ... ... ... ... | ... |
| *St. Patrick* ... | Bearpark, E. W. ... | W. P. Baker ... ... | ,, | Rankin Gilmour ... | Form 911 13.9.23 to 26.9.23 ... | 7.11.23. |
| *Tainui*... ... | Kelly, R. A. ... | T. T. Oliver ... ... | No. | Shaw, Savill & Albion | Form 911 5.12.22 to 14.1.23 ... | 12.2.23. |
| *Tairoa*... ... | Summers, W. G. ... | J. Steele ... ... ... | ,, | ,, ,, ,, | ,, 16.10.22 to 27.2.23... | 7.3.23. |
| *Taiyuan* ... | Hamilton, H. E. ... | R. D. Thomas, W. Bailley, D. D Tyer. | M.L. | Yuill & Co. ... | Met. Log. 30.4.23 to 5.10.23 ... | 20.11.23. |
| *Talthybius* ... | Agnew, J. ... | F. Parker ... ... | No. | A. Holt ... ... | Form 911 26.11.22 to 10.1.23... | 20.2.23. |
| *Tambora* ... | Meerburg, J. M. ... | H. Van Manen ... ... | ,, | Rotterdam Lloyd ... | ,, 16.8.23 to 7.10.23 ... | 19.10.23. |
| *Teiresias* ... | Reynard, J. G. ... | W. F. Dark ... ... | ,, | A. Holt ... ... | ,, 23.7.23 to 2.8.23 ... | 14.8.23. |
| *Teucer* ... ... | Hanney, T. W. ... | J. C. Norton ... ... | ,, | ,, ... ... | ,, 8.9.23 to 18.9.23 ... | 1.10.23. |
| *Themistocles* ... | Jermyn, W. M. ... | R. H. Harrison ... ... | ,, | Aberdeen ... ... | ... ... ... ... ... | ... |
| *Theseus* ... | Williams, D. T. ... | W. Cowperthwaite ... | ,, | A. Holt ... ... | Form 911. 18.10.23 to 26.10.23 | 6.11.23. |
| *Titan* ... ... | Ireland, T. R. ... | J. P. Williams, A. C. H. Jones, D. J. Davies, A. Taylor. | M.L. | ,, ... ... | Met. Log. 3.6.23 to 7.10.23 ... | 10.10.23. |
| *Tolmie*, S.F. Bqtne. | Stewart, J. C. ... | F. Burch ... ... | No. | B. C. Mils Tug and Barge Co. | Form 911 4.11.22 to 17.1.23 ... | 1.3.23. |
| *Tottori Maru* ... | Karita, I. ... | S. Ariyoshi ... ... | ,, | Nippon Yusen Kaisha | ,, 20.7.23 to 4.9.23 ... | 14.9.23. |
| *Transmitter*, C.S. | Jones, Ll. T., M.B.E. | S. P. Sheldon ... ... | ,, | Eastern Tel. Co. ... | ,, 17.9.23 to 7.10.23 ... | 13.11.23. |
| *Traveller* ... | Jones, E. W. ... | ... ... ... ... | ,, | Harrison ... ... | ,, 4.8.23 to 8.10.23 ... | 18.10.23. |
| *Tredenham* ... | Evans, J. O. ... | C. Warren ... ... | | Hain S.S. Co. ... | ,, 24.6.23 to 31.7.23 ... | 26.9.23. |

| Name of Vessel. | Captain. | Observing Officers. | Official Meteorological Equipment. | Line. | Last Log, Register, or Report Contributed. | Date Received. |
|---|---|---|---|---|---|---|
| *Trematon* ... | Hicks, F. H. ... | J. Christopher, D. Thomas, F. J. Webb. | M.L. | Hain S.S. Co. ... | Met. Log. 28.8.22 to 30.3.23 ... | 18.4.23. |
| *Tuscania* ... | Bone, D. W. ... | J. McGill Brown ... ... | No. | Anchor ... ... | Form 911 23.10.23 to 17.11.23 | 21.11.23. |
| *Tuscanstar* ... | Thomas, R. J. ... | W. H. Webster ... ... | ,, | Blue Star ... ... | ,, 29.5.23 to 3.7.23 ... | 11.7.23. |
| *Tyndareus* ... | Adcock, F. ... | H. G. S. Emery ... ... | ,, | A. Holt ... ... | ,, 7.9.23 to 4.10.23 ... | 13.11.23. |
| *Ulysses* ... | Hazeland, J. H. D. | W. J. Peard ... ... | No. | A Holt ... ... | Form 911 2.11.23 to 17.11.23... | 11.12.23. |
| *Valacia* ... | Doyle, M. ... | H. H. Kidwell ... ... | No. | Cunard ... ... | Form 911 20.7.23 to 27.7.23 ... | 31.7.23. |
| *Valdura* ... | Rennie, A. ... | ... ... ... | M.L. | Gow Harrison. | ... ... ... ... ... | ... |
| *Vardulia* ... | Townley, J. C ... | S. L. Carter ... ... | No. | Cunard ... ... | Form 911 20.9.23 to 25.10.23... | 31.10.23. |
| *Vasconia* ... | Inch, F. ... ... | P. S. Britten ... ... | ,, | ,, ... ... | ,, 3.7.23 to 12.7.23 ... | 18.7.23. |
| *Vellavia* ... | Birnie H. C., D.S.O., R.D., Commr., R.N.R. | ... ... ... ... | ,, | , ... ... | ,, 4.11.23 to 16.11.23... | 24.11.23. |
| *Vennonia* ... | Gronow S. ... | L. V. Dewdney ... ... | ,, | ,, ... ... | ,, 1.10.23 to 8.11.23 ... | 14.11.23. |
| *Ventura de Larrinaga.* | Echevarria, J. Vde. A. | G. W. E. Brazendale ... | ,, | Larrinaga ... ... | ,, 9.5.23 to 24.5.23 ... | 30.5.23. |
| *Venusia* ... | Stafford, W. ... | W. P. Armour ... ... | ,, | Cunard ... ... | ,, 3.6.23 to 4.7.23 ... | 10.7.23. |
| *Verbania* ... | Hatcher, W. H. ... | H. R. Rooper ... ... | ,, | ,, ... | ,, 15.10.23 to 30.11.23 | 5.12.23. |
| *Verentia* ... | Stafford, W., D.S.C., R.D., Lt.-Commr., R.N.R. | A. S. W. Watts ... ... | ,, | ,, ... ... | ,, 3.9.23 to 5.10.23 ... | 9.10.23. |
| *Victoria* ... | 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. |
| *Vindelia* ... | Henderson, J. L. ... | J. Noble ... ... ... | No. | Cunard ... ... | Form 911 28.7.23 to 9.11.23 ... | 16.11.23. |
| *Vittoria* ... | Jackson, G. W. ... | F. Galbraith ... ... | ,, | Vittoria S.S. Co. ... | ,, 10.5.23 to 20.6.23 ... | 26.6.23. |
| *Waihemo* ... | Showman, A. C. ... | G. Atwood ... ... | No. | Union S.S. Co., N.Z.... | Form 911 23.2.23 to 16.5.23 ... | 20.6.23. |
| *Waiotapu* ... | Ruxton, G. M. ... | F. A. Wilson ... ... | ,, | Canadian-Australasian | ,, 8.5.23 to 3.6.23 ... | 26.6.23. |
| *Walmer Castle* ... | Chave, Sir B., K.B.E. | E. E. Spradbrow ... ... | ,, | Union Castle ... | ,, 28.9.23 to 18.11.23... | 28.11.23. |
| *Wangaratta* ... | O'Connor, E. W., D.S.C. | T. W. Wordingham, M. Chant, W. Hunt. | M.L. | British India ... | Met. Log. 1.6.23 to 10.11.23 ... | 1.12.23. |
| *Warfield* ... | Steel, R. ... | W. A. Hughes ... ... | No. | ,, ,, ... | Form 911 27.7.23 to 20.8.23 ... | 27.8.23. |
| *Welshman* ... | Rollerson, W. ... | J. F. Spears ... ... | ,, | White Star-Dominion | ,, 3.10.23 to 30.10.23... | 5.11.23. |
| *Winifredian* ... | Harrocks, W. ... | G. P. Boyle ... ... | ,, | Leyland ... ... | ,, 23.8.23 to 16.9.23 ... | 21.9.23. |
| *Woodarra* ... | Reilly, J. V. ... | F. L. Sampson, L. D. Graham, F. W. Felgate A. V. Fisher | M.L. | British India ... | Met. Log. 10.2.23 to 9.8.23 ... | 23.8.23. |
| *Yorkshire* ... | Millson, G. C. ... | E. Jones ... ... ... | No. | Bibby ... ... | Form 911 7.7.23 to 15.9.23 ... | 19.9.23. |
| *Zeeland* ... | Thomas, A. J. ... | F. Chilman ... ... Unless otherwise stated, | No. vessels on t | Red Star ... ... he above list are S.S. | Form 911 31.8.23 to 20.9.23 ... | 21.9.23. |
| *Conway*, H.M.S. | Broadbent, H. W., R.D., Capt., R.N.R. | The Senior Cadets... ... | Cadets' M.L. | ... ... ... | Cadets' Met. Log. 6.5.23 to 21.7.23 | 28.7.23. |
| Pangbourne Nautical College. | Tracy, A. F. G., Commr., R.N. | ,, ,, ... ... | ,, | ... ... ... | Cadets' Met. Log. 14.5.23 to 28.7.23 | 1.8.23. |
| *Worcester*, H.M.S. | Sayer, M. B., O.B.E., R.D., Capt., R.N.R. | ,, ,, ... ... | ,, | ... ... ... | Cadets' Met Log. 4.5.23 to 25.7.23 | 1.8.23. |
| *Abaco* ... ... | ... ... ... | The Keepers ... ... | Lighthouse Register. | ... ... ... | Lighthouse Register 1.1.23 to 30.6.23 | 12.9.23. |
| *Cay Lobos* ... | ... ... ... | ,, ... ... | ,, | ... ... ... | Lighthouse Register 1.1.23 to 30.6.23 | 12.9.23. |
| *Double Headed Shot* | ... ... ... | ,, ... ... | ,, | ... ... ... | Lighthouse Register 1.1.23 to 30.6.23 | 12.9.23. |
| *Inagua*... ... | ... ... ... | ,, ... ... | ,, | ... ... ... | Lighthouse Register 1.1.23 to 30.6.23 | 12.9.23. |
| *Sombrero* ... | ... ... ... | ,, ... ... | ,, | ... ... ... | Lighthouse Register 1.1.23 to 30.6.23 | 10.8.23. |
| *Watling Island* ... | ... ... ... | ,, ... ... | ,, | ... ... ... | Lighthouse Register 1.1.23 to 30.6.23 | 12.9.23. |
| *Cape Pembroke* (Falkland Is.). | ... ... ... | ,, ... ... | ,, | ... ... ... | Lighthouse Register 1.1.23 to 30.6.23 | 27.8.23. |

## 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. |
|---|---|---|---|---|---|
| *Alban* ... ... | Whayman, W. R. ... | R. Griffiths ... ... | Booth ... ... | Water Samples ... ... | 24.3.23. |
| *Hildebrand* ... ... | Maddrell ... ... | H. Welch ... ... | ,, ... ... | ,, ,, ... ... | 15.11.23. |
| *Patia* ... ... | Downes, F. J. ... ... | S. A. Sapsworth ... | Elder & Fyffes ... | ,, ,, ... ... | 29.10.23. |
| *Tortuguero* ... ... | Martin ... ... | H. H. Dunning ... | ,, ,, ... ... | ,, ,, ... ... | 7.11.23. |

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