

VOL. III. No. 31.

THE MARINE OBSERVER.

JULY 1926.

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THE RECENT NATIONAL EMERGENCY.

THE Director has asked us to make special acknowledgment in these pages for the maintenance of Voluntary Meteorological Work at sea in the difficult circumstances in which many Marine Observers found themselves during the recent Strike. At such a time the forecast service is enhanced in its national value, especially in its relation to flying, for the air transport of mails and other essential communications, so that the Atlantic Wireless Weather Reporting Service becomes of vital importance, and this was maintained at full efficiency.

The limitations of a restricted postal service may have resulted

in a number of ships becoming short of official stationery and the June Number of THE MARINE OBSERVER was delayed a fortnight in issue. Steps have been taken to rectify any shortage of the necessary forms as soon as possible and we hope that this Number will not be late in publication.

As it is possible that Meteorological Logs and Reports may have miscarried, Marine Observers are asked to examine the fleet list acknowledgments in this number with more than usual care, and to communicate any non-acknowledgment of records which they may have despatched to the Office.

A VERY IMPORTANT OBSERVATION. TEMPERATURE.

As every experienced seaman knows, heat is a fundamental source of energy in the atmosphere; it follows that it must have great effect upon weather, and therefore consideration of temperature is important for weather prediction.

In the chapters on Wireless and Weather in the 1924 Numbers we showed how important distant as well as near information of

air and sea surface temperature was for obtaining fore-knowledge of fog. We also explained the practical use of the thermometer as an auxiliary to the barometer in the prediction of weather.

The new developments introduced by Professor BJERKNES of Norway were outlined, in which it was shown how the observed contrasts of air temperature of the converging winds of depressions

were divided into cold fronts and warm sectors for forecasting weather.

The methods of Professor BJERKNES were thought so highly of by the British Meteorological Office that he was invited to make a protracted visit, and our Forecast service now makes much use of temperature observations.

Enough said; we need make no apology for our heading to this month's editorial note, it is a very important matter. After the publication of the results of the trials with experimental screens at sea, and all the stress we have laid upon the need for obtaining true temperatures, some have expected an announcement as to change of method of exposing the thermometers. It was considered necessary to move slowly rather than that difficulties both at sea and ashore should possibly be increased by any false steps, for this matter of temperature observation has been a source of much trouble in the past.

My own experience at sea of voluntary observation for the Office, before seeing the general aspect of both those in the field of observation at sea and those responsible for co-ordination ashore, was sufficient to prove that the faults were not one-sided.

Both points of view have been strongly represented, and now we are in a position to make suggestions and to supply the means of carrying them out. This matter of temperature observation can only be adjusted with mutual goodwill between Marine Observers and the Meteorological Office; let us tackle it with the characteristic good will and energy of our Corps.

The Old Fixed Screen is not only deficient on account of its solid back preventing proper ventilation, but the method of fixing it in one place, usually on a bulkhead, planked screen, bulwark or other surface, subject to local heat, renders true temperature observation often impossible.

Of the new screens the Modified Screen is handy, but by no means gives the best means of obtaining the true temperature, and the Portable Screen, though it has given the best results of the three, both at sea and ashore, will cause some little inconvenience afloat; but nothing was ever obtained without pains.

In the article "Thermometer Screens for Use at Sea" in this Number, is placed before you a brief account of the results of trials carried out last year at Kew Observatory, and the illustrations show the screens as placed during that trial; a sketch with dimensions of the Portable Screen was given in Volume I, No. 2.

The result of these trials by no means gives a final answer to the questions of the best method of temperature observation at sea. In the adoption of any method for sea work by the Meteorological Office, it is desirable that the instruments and apparatus should not be so expensive or fragile that they are not likely to be copied for general equipment in ships' outfits; and that practices advocated can be fitted in with the customs of the sea.

A limited number of Portable Screens which are marked C in the photograph and Modified Screens B will be substituted in certain ships for the old fixed screens. To Marine Observers supplied with one of these screens we make the following suggestions:—

At sea except when in use keep the screen in a position where it and its contents will be protected from damage, dirt, and heat, in the chart house, wheel house, or handy to the bridge.

Introduce a regular routine for observation such as this—At little one bell for the Log, or about 15 minutes before Greenwich Mean Time for observation for wireless weather reports, let the Quarter-master or bridge messenger hang the screen on the weather ridge rope or in one of the several selected positions which happen to be to windward. It would be handy to have hooks seized to the bridge awning ridge ropes, one at either side of the ship and one to an awning spar well abaft the funnel and ventilators in many ships, but different "long splices" are often needed in different ships.

Then at about eight bells or at observation time the observer or his assistant can read the air temperature and the wet bulb with little trouble by day or at night, and the Quarter-master will return the screen to its stowed position.

A few experiments will soon show how the screen can best be placed with winds from different directions relative to the keel, and where it should not be placed; and each ship can make her own arrangements to obtain the best observations in the circumstances of her particular service and the conditions at the time of observation. Usually, if there is not night radiation or evaporation on the dry bulb, the position where the temperature is lowest, above the deck, will be the more nearly correct observation.

The difficulty of obtaining true air and wet bulb temperatures in heavy weather on account of spray will remain and the position of the screen will still be a difficulty.

In order to reduce the breakage of thermometers, mahogany protectors for protecting them have been tried of which a photo is given; these are of two kinds. The protector for air thermometers protects them only, that for sea surface thermometers protects them and also provides a receptacle for sufficient water to cover the bulb while the temperature is being read.

In obtaining sea surface temperatures it has been found when the water is drawn from a great height above the water line of the ship, under conditions when there is a considerable contrast in the temperature of the air and sea surface that the time the water sample is exposed to the air is sufficient to cause a material change of temperature. It is therefore desirable to have the water drawn from the lowest weather deck in the ship. A canvas bucket with a canvas bottom and canvas false bottom with sand or lead between them for ballast will be found a great advantage in ships of speed.

In recording and reporting the observations remember Captain Toynbee's maxim—"A blank space is preferable to a doubtful observation."

Ships not equipped with Meteorological Office instruments would do well to compare their thermometers with those of ships indicated by the letters M.L., W.T. or C.C. in the Fleet List, all of which have official tested instruments, and the visiting officers will as far as possible make such comparisons and supply an index error where one is found to exist.

MARINE SUPERINTENDENT.

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.

ABNORMAL CURRENT.

Bay of Biscay.

THE following is an extract from the Meteorological Log of S.S. *Edinburgh Castle*, Commander H. STRONG, R.D., R.N.R., Southampton to Cape Town. Observer, Mr. C. S. KEEN, 4th Officer:—

"July 5th, 1925. Crossing the Bay of Biscay an abnormal current setting S. 82° E. at the rate of 1 knot was experienced from Latitude

47° 13' N., Longitude 6° 44' W., to Latitude 41° 57' N., Longitude 11° 19' W."

NOTE.—By referring to the Current Chart, Channel to Latitude of Cape St. Vincent, Vol. II, No. 17, it will be seen that this is one of the vagaries of current indicated in the current rose as having been experienced on a few occasions during the period of observations 1910 to 1923.

CURRENT.

Inset near Cape Verde.

THE following is an extract from the Meteorological Log of S.S. *Peshawur*, Commander C. HESTER, R.D., R.N.R., Liverpool to Cape Town:—

"Sunday, July 26th, 1925, noon position, Latitude $16^{\circ} 01' N.$, Longitude $17^{\circ} 59' W.$ Wind westerly 1 to 2, barometer 1014.1, dry bulb 80° , wet bulb 73° . Horizon hazy and slight northerly swell. Set course S. 13° E. true to pass 10' west of Cape Verde light-house distance to run $80'$. At 3.25 p.m. longitude by chronometer showed ship 6' to the eastward. At 4 p.m., barometer 1013.9, dry bulb 81° , wet bulb 74° , wind W.S.W. 2, horizon hazy and slight northerly swell. At 4.42 p.m. sighted Cape Verde light-house bearing S. 16° E. true being 3° on starboard bow. 4.54 p.m. hauled ship south true to pass 4' off light-house and at 6.10 p.m. the light-house bore east distant 4'. The set from noon to Cape Verde light-house bearing east 4' being N. 70° E. $9'$. Ship was steaming a steady $13\frac{1}{2}$ knots. Mention is made of this Easterly set in Vol. I, No. 1, page 4, of THE MARINE OBSERVER. 'Currents on Direct Cape Blanco-Table Bay Track.'"

METEORS.

In the Western North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Empress of Scotland*, Captain J. GILLIES, C.B.E., Quebec to Southampton. Observer, Mr. W. STANFIELD, 2nd Officer:—

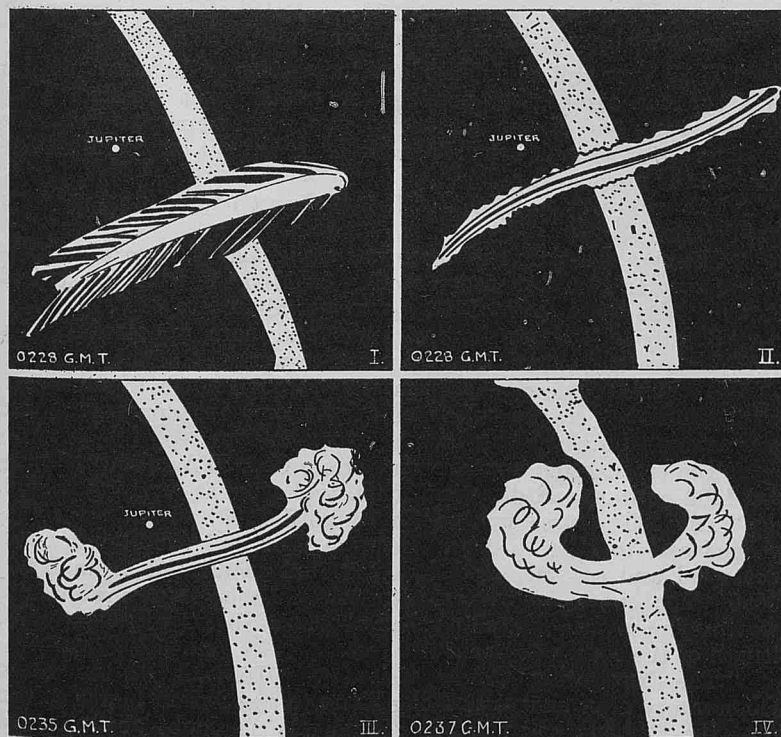
"July 10th, 1925.

"Whilst proceeding homeward from Quebec, and in Latitude $50^{\circ} 00' N.$, $60^{\circ} 09' W.$, ship steering 088° true, speed 18 knots, wind west, force 2, barometer 30.06, steady, temps., Air 54° , Sea 47° , an exceptional Meteor was observed at 0228 G.M.T.

"Meteor was first observed bearing 120 degrees true at an altitude of 30 degrees, and travelled in an upward direction and west. During its flight it increased in breadth and increased in brilliancy.

"Meteor travelled in this direction until it reached an altitude of 42 degrees and bearing 180° true and lay across and at right angles to the path of the Milky Way. This can best be understood by referring to diagrams attached.

"On reaching this position Meteor or after effect became stationary and formation was as is shown in DIAGRAM II. At 0235 G.M.T.



Milky Way exaggerated in order to show relative positions.
Diagrams II, III and IV meteor was stationary.

formation was as is shown in DIAGRAM III. At 0237 G.M.T. formation was as is shown in DIAGRAM IV, and remained so until final disappearance at 0238 G.M.T.

"Length of time Meteor was observed was 10 minutes.

"Weather was fine and clear with exceptional visibility, St. Mary's Island light being observed 30 miles distant.

"Bearing true north, Northern Lights were observed at low altitude.

"At 0235 G.M.T. a much smaller Meteor was observed travelling in similar direction; this, however, did not leave any effect in the sky.

"At 0434 G.M.T., in Latitude $50^{\circ} 30' N.$, Longitude $59^{\circ} 18' W.$, true bearing 140 degrees, a very bright falling meteor with broad tail was observed by First Officer. The head of same was at an altitude of 5 degrees and the tail at an altitude of 20 degrees. This meteor was observed close to the moon. The moon's altitude at the time being 16 degrees. The colour of the tail of the meteor was decidedly violet and yellow.

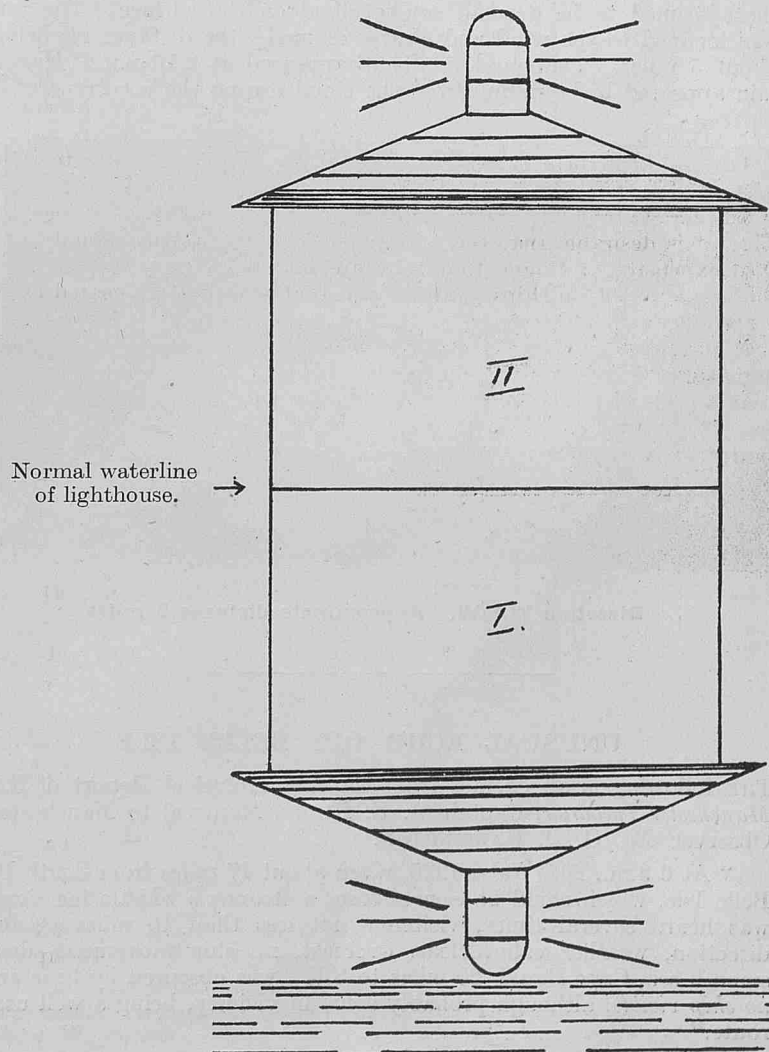
"Weather at the time was fine and clear with exceptional visibility, Flat Island Light being observed 42 miles, height of eye 65 feet."

MIRAGE.

At Singapore.

THE following is an extract from the Meteorological Log of H.M.S. *Iroquois*, Commander A. L. JACKSON, R.N., surveying at Singapore. Observers, Lieutenant W. I. FARQUHARSON, R.N., and Lieutenant A. K. BAXENDELL, R.A.N.:—

"19th July, 1925.—1200-1600 hours. While on current observation duty in steam launch *Angler*, anchored $1\frac{1}{2}$ miles south of Tg Balus, observed an unusual mirage effect. Sultan Shoal Lt. Ho. bearing 090° , distance 7 miles, appeared as shown in sketch, resting upside



down on the surface of the water (marked I). On top of this reversed image, the lighthouse appeared in its natural position, correct way up (marked II).

MIRAGE.

Off Belle Isle.

THE following is an extract from the Meteorological Report of S.S. *Manchester Importer*, Captain J. E. RILEY, Manchester to Montreal via Belle Isle.

"July 5th, 1925, 8 a.m. Belle Isle sighted about 45 miles off, a light haze prevailed, and land appeared upside down especially in the vicinity of Cape Bauld, due probably to mirage effects. This also applied to bergs sighted during the morning."

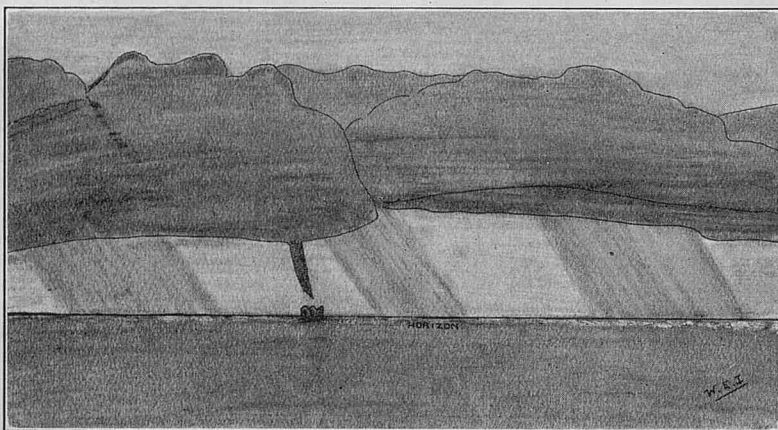
WATERSPOUT.

Off the Brazilian Coast.

THE following is an extract from the Meteorological Report of S.S. *Socrates*, Captain A. R. BIBBY, Cardiff to Buenos Aires. Observer, Mr. W. E. JORDAN, 2nd Officer:—

"July 2nd, 1925, 2 p.m. A.T.S. Latitude 18° 12' S. Longitude 38° 16' W. Off the Abrolhos rocks. Wind S'ly, force 3, sea calm with slight S'ly swell, weather o.r.c. Generally rainy, with heavy Nimbus and Stratus to the westward. To the east and S.E. Alto-Cumulus.

"My attention was drawn to a particularly heavy patch of Nimbus which appeared to have a long tail projecting from it. On examining it through the glasses, I observed that this tail tapered to a fine point when about two-thirds the way between sky and sea. Of the state of the sea I could not see much except that directly under the spout there seemed to be a small smoke cloud on the surface. The tail was inclined to the wind and clearly defined; the distance off being about 5 miles. The spout finally disappeared at 2.15 p.m. Heavy rain appeared to be falling from the cloud during the occurrence."



Direction W.S.W. Approximate distance 5 miles.

UNUSUAL ECHO OFF BELLE ISLE.

THE following is an extract from the Meteorological Report of S.S. *Manchester Importer*, Captain J. E. RILEY, Montreal to Manchester. Observer, Mr. G. B. HARRINGTON.

"At 6 a.m., 20th July, 1925, when about 17 miles from South Pt. Belle Isle, which could be clearly seen, a steamer's whistle fog signal was heard several times, visibility not less than 15 miles in any direction, weather calm, clear, overcast, no ship movement, dead smooth sea, Cape Bauld, 20 miles to S.W., was obscured by haze and no ship visible, although probably some in vicinity, being a well used route."

LOCAL WINDS.

In Bristol Channel.

THE following is an extract from the Meteorological Log of H.M.S. *Flinders*, Lieutenant-Commander W. A. HENDERSON, R.N., survey work in the Bristol Channel. Observer, Lieutenant H. E. TURNER, R.N.:—

"July 8th, 1925, at 1940 hours. At anchor off Weston. Wind N.W. by W. (true) force 2. Cu./Cu.-Nb., cloud amount 4. The wind at Barry was observed to be blowing in an opposite direction to that at Penarth and Cardiff. About mid-way between these two places there was no wind. Barry wind, E.N.E., force 2 approximately. Cardiff wind, W., force 3. Observations based on direction of smoke from factory chimneys, but direction and force are only approximate owing to ship being so far away."

TYPHOON.

THE following extract from the Remarks Book of H.M.S. *Hollyhock*, Commander A. G. PEACE, D.S.O., R.N., China Station. Observer, Lieutenant E. I. PEYTON, R.N., has been received from the Hydrographer of the Navy.

"From Kam-rank Bay to Hong Kong—At 1115 July 23rd, 1924, the first report of the typhoon was received from Kavite, which gave the position at 0600 as Latitude 19° or 20° N., Longitude 115° or 116° E.

"As its direction was not given and there were no local indications of it, it was decided to carry on until further reports were received, or conditions made it obvious that it was dangerous to do so.

"At 1253 orders were received by signal to arrive at Hong Kong as soon as possible.

"At 1309 Cape D'Aguilar reported that a typhoon might be forming to the Eastward of the Pratas Reef.

"At 1330 the Royal Observatory at Hong Kong was asked if it could confirm the report. The answer, namely, 'Conditions suggest it, but nothing definite at present. Hope to be able to broadcast warning this afternoon,' was not received until 1945 owing to delays in transmission, too late to be of any value.

"At 1646 the following signals were received from the Commodore, Hong Kong:—

"'Typhoon position signal. Typhoon intensity unknown, within 60 miles of Latitude 20° N., Longitude 114° E., travelling West. Signal hoisted at 1415'; and also 'There is no urgent reason why you should steam hard into bad weather.'"

"There were still no definite local indications of the near approach of a typhoon except that possibly the weather was too fine. The diurnal variation of the barometer was not interrupted, and the reading, about normal, was 0.12 inches lower than at the corresponding time on the previous day.

"The wind was so light that it was almost impossible to observe its direction.

"The sky was clear and there was a slight swell from the South-West, apparently the monsoon swell. At 1700 the wind was judged to be N.W. force 1, so at 1715 course was altered to 180°.

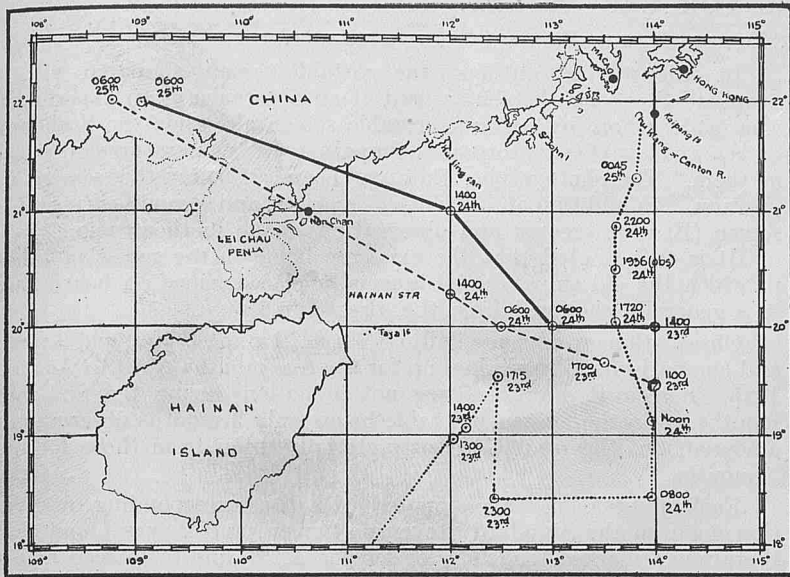
"Shortly afterwards heavy clouds and haze appeared on the N.E. horizon and spread through north to west.

"At sunset these clouds, from west through north to north-east, were a brilliant copper colour of a very ominous appearance, and after sunset the whole sky became overcast.

"The broadcasted weather report from Cape D'Aguilar confirming the 1400 position and direction of the typhoon was received at 2018.

"The 180° course was continued until 2300, when it was considered safe to alter to 090°. Between 0500 and 0600 on the 24th the wind and sea increased suddenly, but moderated again before 0800 when course was altered to 360°. From then onwards the weather improved. The ship rolled about 25°, being very light. The length of the swell was about 200 feet.

"The Navigating Officer visited the Director of the Royal Observatory after arrival at Hong Kong to ascertain if it was certain that the typhoon had existed. There was no doubt about it, and the Director supplied the information from which the track has been drawn. He was very surprised that *Hollyhock* approached the centre so closely without experiencing bad weather.



— Track of Typhoon as indicated by signals received at sea.
 Track of Typhoon indicated by Hong Kong Observatory
 Track of HMS 'Hollyhock'

"He said that the non-interruption of the diurnal variation of the barometer is not a sign of safety as it usually continues in the

storm area until swamped by the deep depression at the centre, and that a general downward trend is a much more sure guide.

"Apparently the typhoon was of small diameter and the bad weather occurred to the north and in rear of it. (At Gap Rock the wind reached force 6.)

"According to the sailing directions this is normal for the time of year.

"Notwithstanding it is disconcerting to know that it is possible to steam so close to a typhoon without better warning from the local conditions.

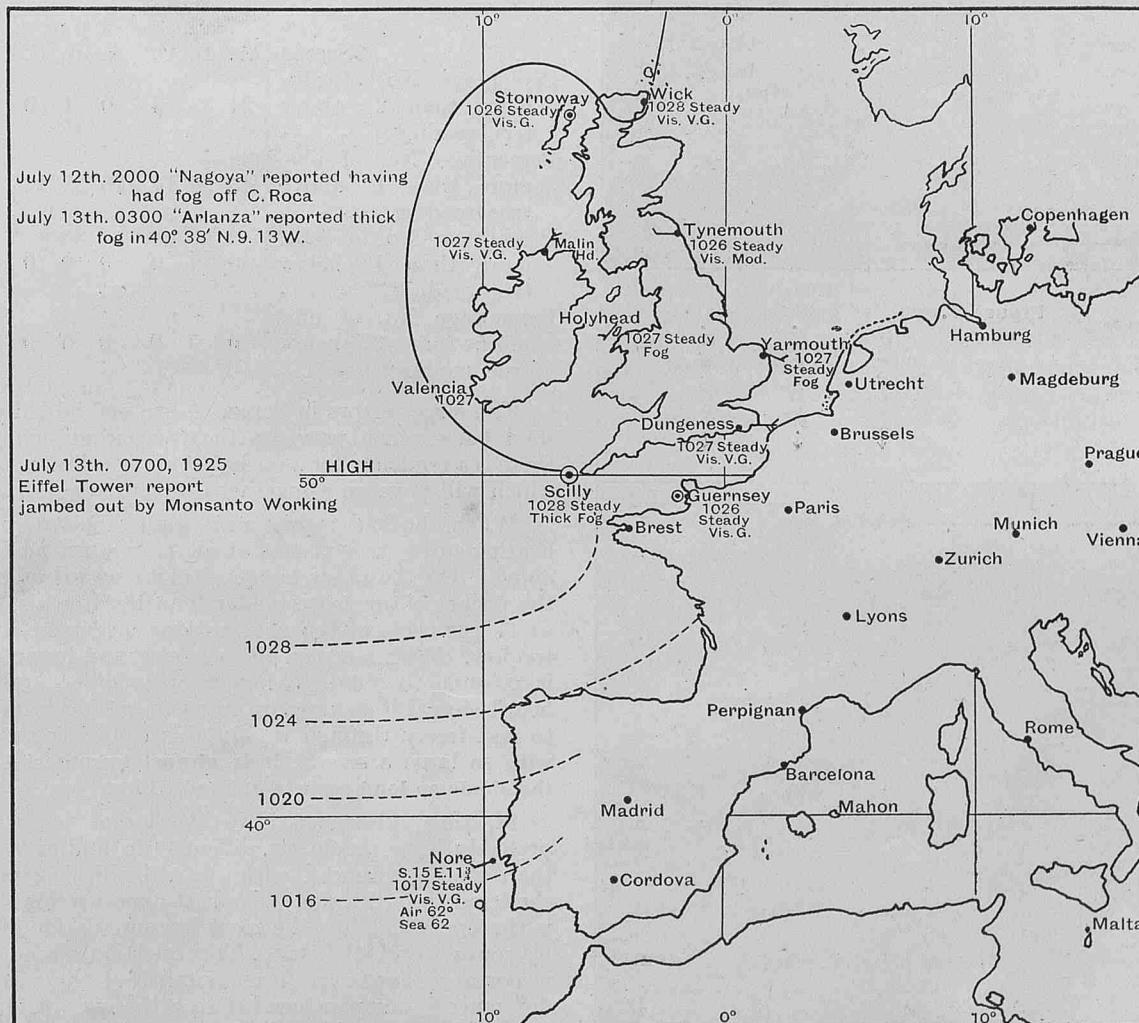
"The value of W.T. weather reports is emphasised."

NOTE.—The barometer reading recorded by *Hollyhock* at 5 p.m. on July 23rd, 1924, was 29.73 ins. The index error is not given, but the absolute pressure would be approximately 29.53 ins. and corrected for diurnal range 29.57 ins., which compared with the normal for the month—see East Indian Seas Chart, 29.68 ins.—shows a departure of $-.11$ ins., which was a sign of the probability of the formation or existence of a Typhoon in the vicinity.

Since this, the article "Typhoons of the North Pacific and China Seas" has been compiled—see page 124, Volume II, No. 20.

This question of the value of the Barometer corrected and compared with the normal as a sign of a Hurricane has been the subject of investigation, and it is considered of great importance. Seamen are strongly advised to read what has been written about it in this Journal—see Chapters VI and XI of "Wireless and Weather, an aid to Navigation," Volume I, Nos. 5 and 11; "West Indian Hurricanes, August and September, 1924," Volume II, No. 21, and "The Barometer," Volume II, No. 23.

COPY OF WEATHER CHART MADE AT SEA.



Copy of Weather Chart (one of a series) by Mr. C. B. Roche, Chief Officer, S.S. "Nore," Captain J. W. Parker.

THERMOMETER SCREENS FOR USE AT SEA.

PREPARED IN THE MARINE DIVISION BY C. S. DURST, SENIOR PROFESSIONAL ASSISTANT.

DURING the past four years experiments have been made with portable temperature screens at sea in order to discover if some means could not be found by which more accurate observation could be effected. From time to time notes have appeared on the backs of the Meteorological Charts and in THE MARINE OBSERVER on the results of these trials. Briefly, the results showed that the temperatures in fixed screens gave considerable divergency of reading when compared with the portable screen readings, and that, as was to be expected, this divergency was most pronounced when the wind was not blowing directly on to the fixed screen. In the readings of the fixed screen there was found to be a false diurnal variation of temperature of nearly 2° when the screen was sheltered from the wind.

Comparison of Temperature Screens at Kew Observatory.

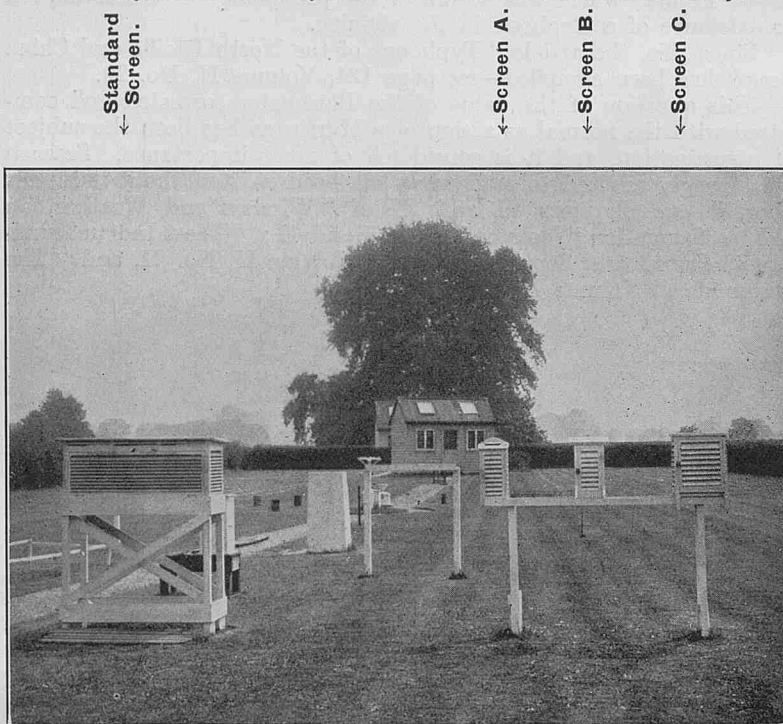


Figure 1.

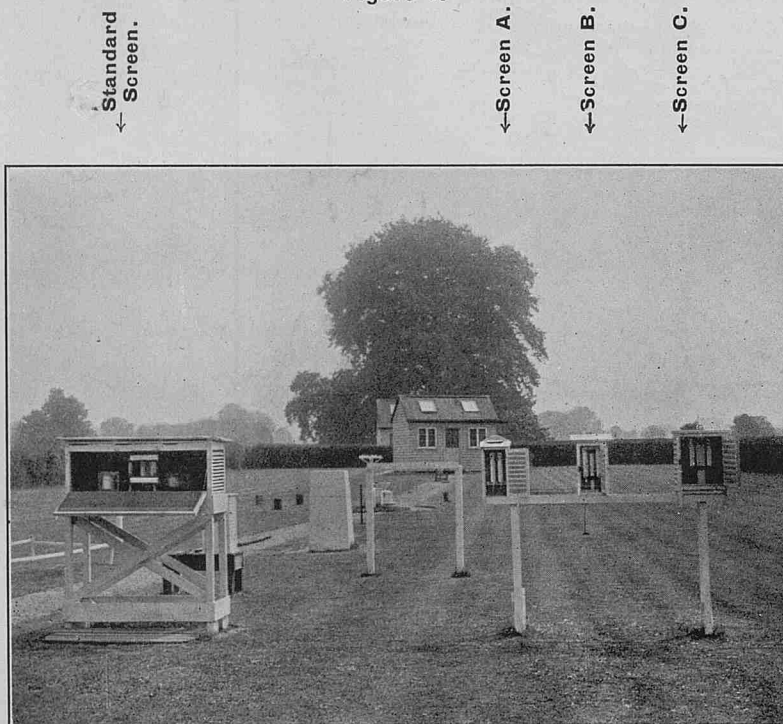


Figure 2.

In order to find out how the portable screen compared with a Standard Stevenson Screen as used at an observatory, an experiment was made ashore by fixing a portable screen alongside the Standard Screen at Kew Observatory and comparing the temperatures observed in them. The photographs, FIGURES 1 and 2, show the screens in position. In addition an old ships' screen (A) and a modified portable screen (B) were erected and observations made in those also.

It is to be noted that the exposure being in the sun is not that in which the old ships' screen is usually placed, since on board ship it is generally sheltered from the direct sun's rays.

Observations were made daily at 7 a.m., 1 p.m., 3 p.m. and 9 p.m., and comparisons were worked up for the five months April to August, 1925. Screen B, however, was not in action during the first two months, so in the figures and table below only 3 months observations are used, but the results do not materially differ from those for the 5 months.

Each observation was compared with the corresponding observation made in the Standard Stevenson Screen, and it was found that there was a marked tendency for screens A., B. and C. to read higher than the Standard Stevenson by day and lower than it by night. This result was to be expected when account is taken of the fact that their temperatures would be raised by absorption of radiation by day, but would be lowered by radiating heat outwards at night.

However, this radiation effect was far more pronounced in Screen A than in either of the other two. In this respect Screen C was rather better than Screen B, and it can be fairly confidently stated that Screen C is a considerable advance on the old type of ships' screen.

The frequencies of error in each screen are shown in the graphs, FIGURE 3 (on the assumption that the Standard Screen is correct).

Perhaps the significance will be best realised by the following table:—

	Screen	7 a.m.			1 p.m.			3 p.m.			9 p.m.		
		A.	B.	C.	A.	B.	C.	A.	B.	C.	A.	B.	C.
Percentage No. of obs. more than 2° above true reading.		24	3	3	0	1	0	0	0	0	0	0	0
Percentage No. of obs. more than 1° above true reading.		43	28	14	26	22	12	18	9	7	0	0	0
Percentage No. of obs. more than 1° below true reading.		0	0	0	0	0	0	0	0	0	17	12	6
Percentage No. of obs. more than 2° below true reading.		0	0	0	0	0	0	0	0	0	3	0	0

The larger errors in Screen A are undoubtedly due to its having a solid back which prevents the free circulation of the air. In fact, there is a tendency for a pocket of air to collect round the thermometers which will have an altogether different temperature to the free air.

When the sun is low and shining obliquely on the screens, the heating up of this pocket of air is greatest as is shown in the table above. On the other hand, at night when radiation is taking place, the pocket of air grows colder than the free air, and we find as many as 17 per cent. of the observations in Screen A more than a degree too low. With a screen the size of C and louvred on all four sides, it is possible to obtain a higher order of accuracy in observation on board ship if it is hung up so as to get the wind blowing directly on to and freely through it. In this connection it is to be noted that with so large a screen, it is almost immaterial if it is in the sun or the shade so long as it is painted white.

If, then, observers have the larger portable screen, they will probably have much less difficulty in finding a good exposure for it than was experienced with the old ships' screen, which had to be sheltered from the sun. The best exposure for the new type of screen is the one which has the most free circulation of air uncontaminated by contact with the ship. This question of contamination is of great importance, for it has been found that there is quite a considerable difference in temperature between the air outside the bridge and that just within the bridge shelters or bulwarks. A bad exposure is one in which the screen is placed with one of its sides against a deck structure for an air pocket will certainly be forming within a screen

Frequency of Errors obtained by Comparison with Standard Stevenson Screen at Kew Observatory during June, July and August, 1925.

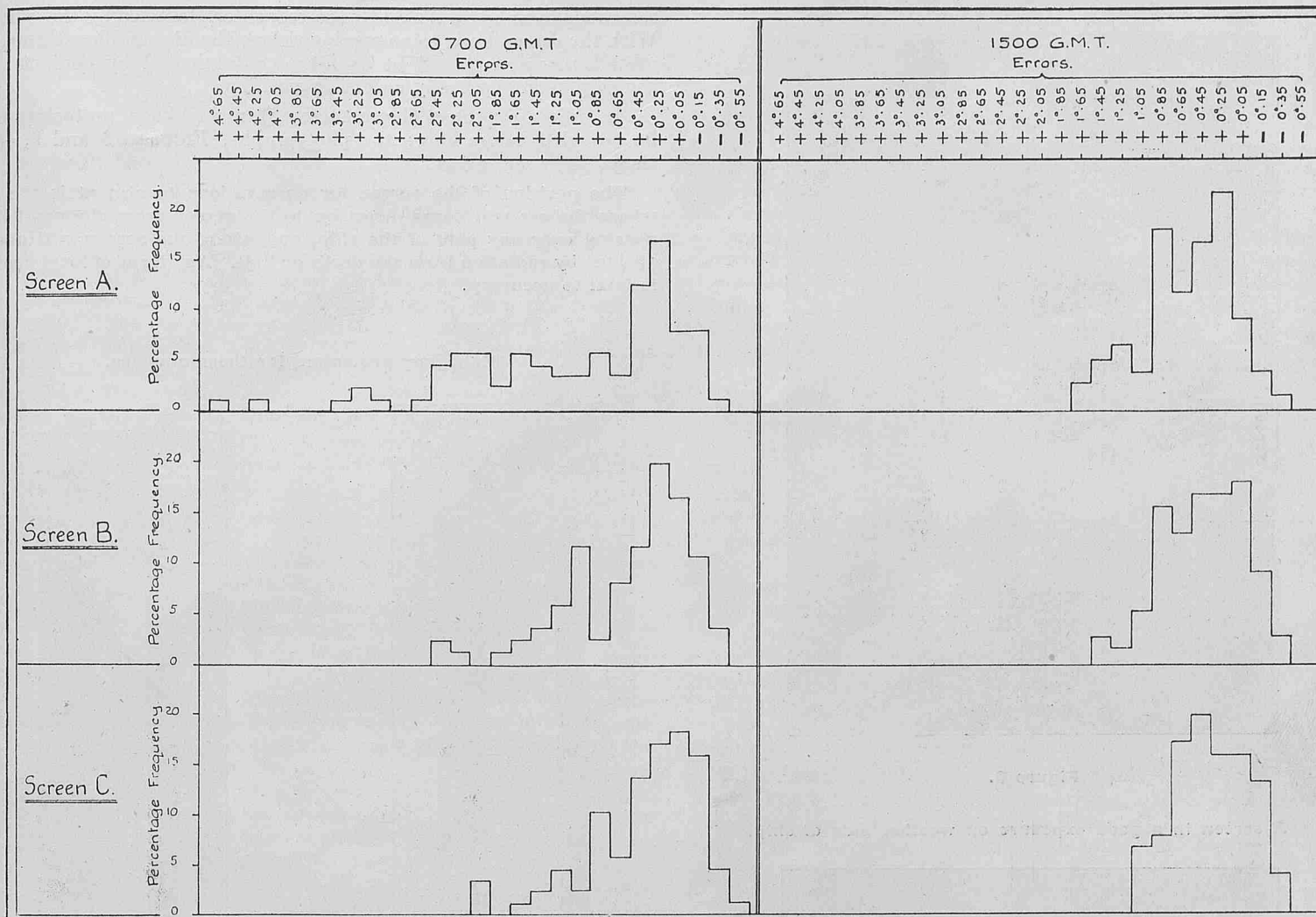


Figure 3.

A screen in a bad exposure.

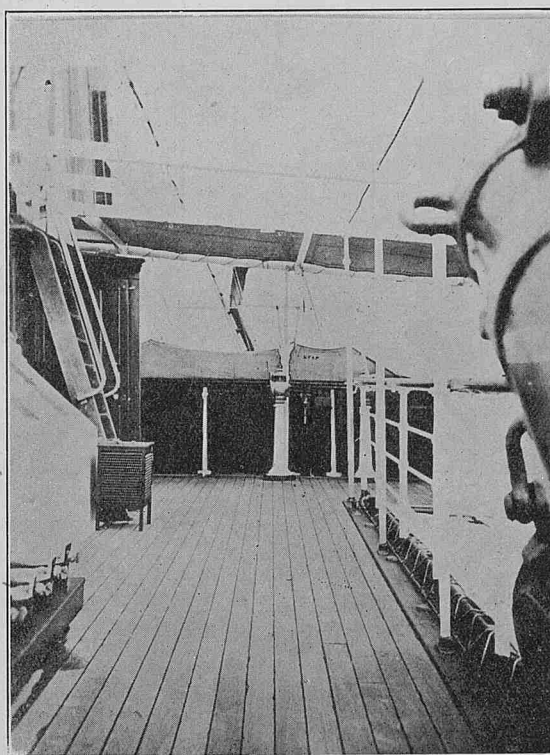


Figure 4.

in this position, and besides the air reaching the screen in such a position is almost sure to be contaminated.

The two photographs, FIGURES 4 and 5, show such bad exposures; FIGURE 6 shows a somewhat better exposure, the air has comparatively free access though, since the screen is not painted white, it should not have been in the sun, and it is quite obvious that there is a lot of heat being radiated towards the screen from the saloon skylight and from the deck, for it is too near the deck. A very much better

Screens in a bad exposure.

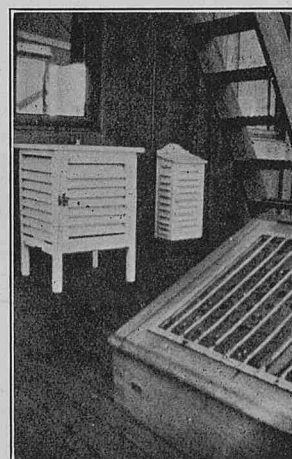


Figure 5.

A screen in a bad exposure.

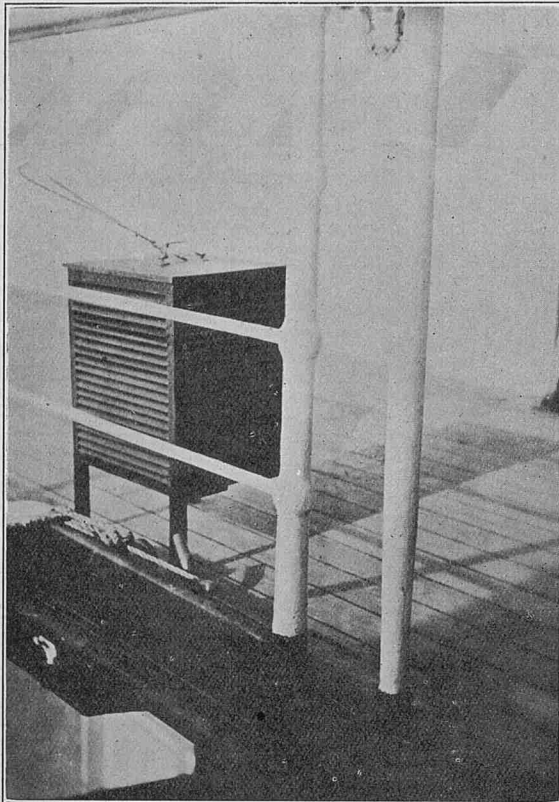


Figure 6.

A screen in a good exposure on weather side of ship.

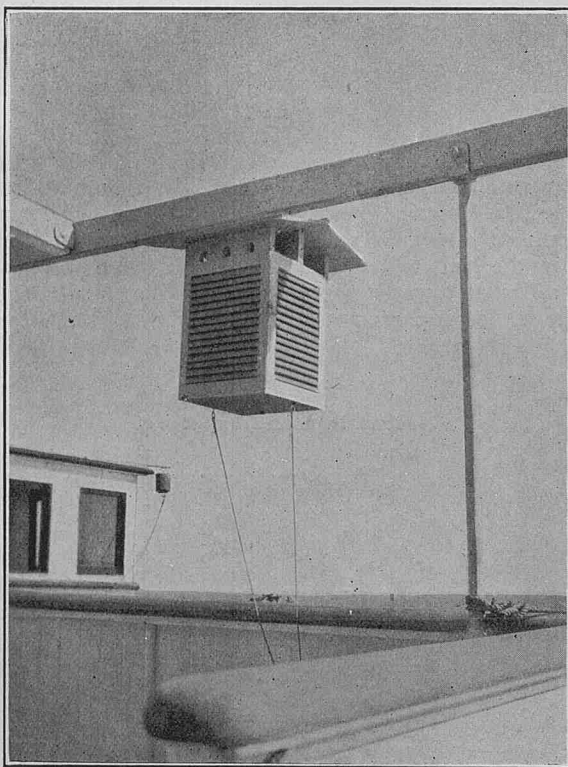


Figure 7.

exposure is that shown in FIGURE 7, which is a photograph of a screen made on board a ship by the carpenter, designed by the officers. With the screen hung to an awning ricker, the air can blow through it quite freely and should be as little contaminated by contact with the ship as in any easily accessible position.

In order to protect thermometers from breakage, protectors may be provided before long; the photographs, FIGURES 8 and 9, show these.

The position of the screen for observations to aim at is the one where the air will come direct on to the screen from the sea before passing over any part of the ship, and where the screen will not be affected by radiation from the decks or hull. Any form of local heating is fatal to accuracy.

Mahogany protectors for thermometers.

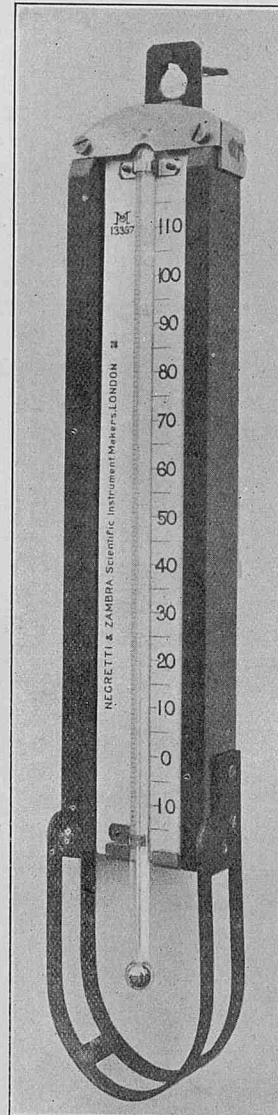


Figure 8.

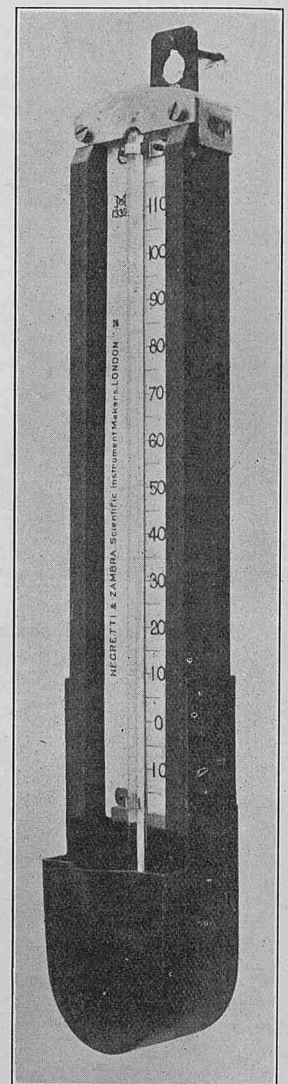


Figure 9.

CYCLONES OF THE BAY OF BENGAL.

PREPARED IN THE MARINE DIVISION BY J. HENNESSY, SENIOR NAUTICAL ASSISTANT.

IN Volume I, Nos. 5 to 12 of THE MARINE OBSERVER, charts were published showing selected tracks of cyclones which had occurred in the Bay of Bengal from 1845 to 1923, and in this article it is intended to summarise those general facts concerning them which may be of practical use to seamen navigating the Bay.

PIDDINGTON of Calcutta, author of the "Sailors' Horn Book," when investigating these storms in 1859, gave them the name of "Cyclones," from the Greek word *Kuklos*, meaning circle.

Sir JOHN ELIOT, M.A., F.R.S., C.I.E., when Director-General of Indian Observatories, made a special study of the storms occurring in the Bay, from observations which had up to that time been collected by the Calcutta Meteorological Office, and it is from his "Handbook of Cyclonic Storms in the Bay of Bengal," the second edition of which was published in 1900, that most of the following information has been obtained.

Elements.

Cyclones of the Bay of Bengal have the same general characteristics as the Typhoons of the North Pacific and Hurricanes of the West Indies. They consist of immense whirls of air revolving in an anti-clockwise direction round a calm centre termed by seamen the "Eye of the Storm," and at the same time having a general progressive movement.

The wind at any place within the whirl is made up of two constituents; that due to the general motion of the whole storm and that due to the spin within the whirl itself. At points right of the path these two components move in the same direction, while at points left of the path the two components are in opposite directions, the result being to give the strongest winds in that part of the storm right of path, *i.e.*, the right hand semicircle.

When a cyclone is represented on a synoptic chart, the distribution of isobars or lines drawn around the centre through parts of equal barometric pressure are rarely shown to be regular and symmetrical. The whole storm field generally follows the form of the centre and is usually elliptical in shape. The wind blows in a more or less spiral direction towards the centre, making an angle with the isobars which varies in the different quadrants of the storms, but is on the average about 30°. It should be borne in mind that the indraught is usually greatest on the outskirts of the storm, decreasing towards the centre.

Intensity and Extent of Storms.

The Indian Meteorological Office limits the use of the word storm to those cyclonic circulations in which the wind attains a force of from 8 to 9. When the wind reaches force 10 or above, the storm is termed a severe storm. In order to differentiate between them, they are known as cyclonic storms and cyclones respectively.

All storms are of gradual growth and commence as feeble circulations. Storms are therefore of varying intensity and magnitude which differ greatly in different storms. The intensity of storms are to a great extent independent of their magnitude. It is possible to have a storm of considerable extent but of feeble intensity, also to have a storm of small extent but of extraordinary intensity.

ELIOT divides the storm field of a cyclone into three areas:—

- (1) The outer storm area in which the barometer falls slowly, and in which winds of force 6–9 prevail.
- (2) The inner storm area in which the barometer falls rapidly and in which winds of force 10–12 prevail.
- (3) The "Eye of the Storm," generally an area of absolute calm, without rain and often with blue sky rarely exceeding 15 to 20 miles in diameter.

The width of the inner storm area gives an idea of the extent of the storm, while the intensity of the storm is shown by the amount the barometer at the centre falls, taking the normal height of the barometer at the time as the standard of reference.

Cyclones usually increase in intensity as they approach the land, the lowest pressure being recorded in the calm centre shortly before

reaching the coast. The danger of being caught in a cyclone near the land is therefore greatly increased by the exceptional strength of the storm when approaching it.

In the Bay of Bengal storms rarely exceed 600 miles in diameter; and in the majority of cases are less than 150 miles in diameter and of small intensity. In the smaller storms there is rarely a calm centre or inner area of hurricane winds. The weather, sea and wind, in these storms are such as occur in the outer storm area of the more vigorous storms.

Cyclone Season.

In the Bay of Bengal during the months of January and February, the steady and moderate N.E. monsoon wind prevails with fine clear weather. Early in March the rapid increase in temperature in Northern and Central India causes local sea winds to set in and strengthen at the head of the Bay, and to some extent spread down the Bay during April. In April and May the N.E. winds in the Bay decrease and become replaced by light, unsteady, variable winds in the centre of the Bay, while at the beginning of June the true winds of the south-west monsoon advance rapidly up the Bay and last until about the end of September. In October the S.W. winds commence to slowly retreat until the end of December. During this time the conditions then prevailing in the Bay cause the S.W. wind to blow over the south of the Bay, curve through south, south-east and east, finally reaching the Coromandel coast as damp N.E. winds causing occasional moderate to heavy rainfall in southern India. From the above conditions the year is divided into four periods:—

- (1) N.E. monsoon period from 1st January to the middle of March characterized by fine weather.
- (2) May, transition period extending from 15th March to the beginning of June, characterized by the extension of S.W. winds in the north and south of the Bay and terminated by the general advance and establishment of the south-west monsoon.
- (3) South-west monsoon period from the 1st June to the 15th September, which is the period of general rain in India.
- (4) October transition period from the 15th of September to the end of December, marked by the retreat of the south-west wind terminated by its final disappearance.

Storms only occur in the Bay during the period that S.W. winds are blowing more or less steadily over the entrance and south of the Bay; they never occur during the N.E. monsoon season. Storms may therefore be expected from the beginning or middle of April to the end of December, and this is termed the cyclone season.

Frequency of Storms.

During the S.W. monsoon period proper, *i.e.*, from 1st June to 15th September, there is a rapid succession of cyclonic storms. These storms form at the head of the Bay, thereby causing strong westerly and south-westerly winds over the centre and north of the Bay after the storm centre has passed inland. They are generally of moderate extent and small intensity, and rarely have a calm centre and inner belt of hurricane winds. In the majority of cases strong winds are only experienced in the south and south-east quadrants.

During the May and October transition periods, storms on the whole occur less frequently than during the S.W. monsoon period, but are generally of greater extent and intensity. About one out of every three storms which occur during these periods contain a well-marked calm centre and an inner storm area of hurricane winds.

The following table shows the monthly frequency of storms that occurred in the Bay in the 36 years, 1877–1912.

The storms are divided into three classes.—

- Class 1.** Severe storms in which the wind exceeds force 10 and in which there is generally a calm centre.
- Class 2.** Storms in which the winds range between force 8 and 10.
- Class 3.** Definite cyclonic circulations but in which the wind does not reach force 8.

Month.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Class 1 -	5	10	7	6	2	7	14	18	8
Class 2 -	1	7	15	29	21	25	22	13	4
Class 3 -	1	4	20	30	32	38	15	6	5
Total -	7	21	42	65	55	70	51	37	17

Region of Origin and Tracks of Storms.

Cyclonic storms do not form over or near the Equator. There is no record of a storm having formed to the south of Latitude 5° North. By far the greater number of storms experienced in the Bay are generated in the Bay itself north of the 8th parallel.

There are a few recorded instances of storms having passed from the Gulf of Siam across the Malayan Peninsula into the Bay but no storms formed in the Arabian Sea pass across India into the Bay.

The conditions favouring the formation of a cyclone, *i.e.* the inrush of a moist southerly wind, exist during the whole period that the south-west monsoon prevails in any part of the Bay. Storms may therefore originate north of the 5th parallel near the Coast, in the centre of the Bay or in the Gulf of Martaban during the months of April to December, their latitude of origin being governed by the advance and retreat of the south-west monsoon in the Bay.

The place of origin and tracks of storms recorded in the different months are as follows:—

April. The comparatively rare storms that occur during this month form in the south of the Bay or in the Andaman Sea but are less probable in the Andaman Sea than in the Bay proper. They generally move in a north and N.E. direction towards the Burma and Pegu coasts.

May. Storms are of comparatively frequent occurrence during May. Those that occur in the first half of the month generally form in the South of the Bay or in the Andaman Sea. In the second half of the month storms generally form north of the 16th parallel but may form in any part of the Bay. They may travel in any direction between West and E.N.E.

June. The storms of this month are of frequent occurrence but mostly of moderate intensity. The majority form north of the 18th parallel but may form as far south as Latitude 10° North. They generally travel in a west or N.W. direction towards the Orissa or Bengal coast but instances are recorded of storms travelling in an E.N.E. direction to the coast of Burma.

July. The storms of July are of frequent occurrence but of moderate intensity. They form in the northern half of the Bay and move in a west to N.N.W. direction across the N.W. angle of the Bay.

August. Storms are little less frequent during August than in the preceding month. They originate north of the 16th parallel and travel in a N.W.'ly direction across the head of the Bay to the Orissa coast. They are usually of moderate intensity.

September. The storms of this month are of maximum frequency. As a rule they form a little further south than is the case in the preceding three months, but generally to the north of the 14th parallel. They may be of moderate or violent force and move in any direction between West and N.N.E.

October. Storms occur a little less frequently in the Bay than during any of the three preceding months. Owing to the retreat of the S.W. monsoon down the Bay there is a marked change in the place of origin and tracks of storms in this month. Storms may originate in any part of the Bay and move in any direction between west and N.E.

November. In this month storms are a little less frequent than in October but like the storms of that month are generally of a very severe nature. They form in any part of the Bay, south of the 16th parallel. The majority of storms forming between the 12th and 16th parallels at first move in a N.W. to north direction then recurve to the N.E. and advance to the head of the Bay. Those storms forming south of the 12th parallel generally move in a west to N.W. direction towards the Madras coast.

December. Storms are of rare occurrence in the Bay during this month, but when they do occur, are likely to be of intense force. They form south of the 16th parallel in the centre or in the S.W.

portion of the Bay. There is no record of a storm having formed in the Andaman Sea, during this month. Some of the storms move in a W.N.W. direction towards the Madras coast while others recurve to the N.E. and move to the head of the Bay or strike the Burma or Pegu coasts.

Rate of Progression.

The rate of progression in cyclonic storms varies considerably in different storms, also for the same storm at different periods of its advancement. In the early stages of formation the storm may remain practically stationary or advance at less than 4 miles per hour. When fully formed the average velocity is from 10 to 12 miles per hour which remains fairly uniform during their progress at sea increasing to an average of 15 miles per hour when approaching land. In storms which recurve the rate of advance usually decreases while the recurve is in progress.

Movement of the Barometer.

In ordinary weather the movement of the barometer in the Bay of Bengal is always small in amount and takes place gradually. The most noticeable change in pressure is the up and down movement of the barometer which takes place twice a day and is known as the diurnal range.

There is never a cessation of the diurnal range, and before the observed pressure as read from the barometer corrected for index error, height, temperature and latitude, is used for comparison with the normal pressure as shown on the Meteorological Chart of the East Indian Seas, a correction for diurnal range which may be taken from the following table must be applied. This table is applicable to all longitudes having been compiled from observations taken at sea between Latitude 10° and 20°.

Table to correct Barometric Pressure for Diurnal Range.

Latitude 10° N. to 20° N. in all Longitudes at Sea.

Ship's Time.	Northern Spring.		Northern Summer.		Northern Autumn.		Northern Winter.	
	Mbs.	Ins.	Mbs.	Ins.	Mbs.	Ins.	Mbs.	Ins.
4 a.m.	- + 0.8	+ .02	+ 0.7	+ .02	+ 0.8	+ .02	+ 0.3	+ .01
8 a.m.	- - 1.1	- .03	- 0.9	- .03	- 0.9	- .03	- 0.9	- .03
Noon	- - 0.9	- .03	- 0.6	- .02	- 0.7	- .02	- 0.6	- .02
4 p.m.	- + 1.3	+ .04	+ 1.2	+ .04	+ 1.3	+ .04	+ 1.4	+ .04
8 p.m.	- + 0.1	.00	+ 0.1	.00	- 0.1	.00	0.0	.00
Midt.	- - 0.4	- .01	- 0.3	- .01	- 0.3	- .01	- 0.2	- .01

In the smaller storms of the Bay the fall of the barometer below its normal height for the season is never very large. It increases from the outer storm field to the centre of the storm and rarely exceeds 10 millibars (.30 in.).

In the intense storms the barometer falls from 14 to 17 millibars (.40 to .50 in.) below normal in the outer storm field. The inner storm field is one of comparatively small area in which the barometer falls with great rapidity until the storm centre is reached.

Within the calm area it is believed that the barometer remains at nearly the same height at the same instant but varies with the changes in the intensity of the storm. By carefully watching the movement of the barometer and comparing it with the normal, timely warning of the existence of a cyclone may be obtained from the following rules.

If the corrected barometer reading is at any time during the cyclone season, three millibars (.10 in.) below that normal to the time, the probabilities are two to one that a cyclonic storm has formed in the Bay; if five millibars (.15 in.) below it, the probabilities are at least three to one; and if seven millibars (.20 in.) below, it is practically certain that a cyclonic storm has formed.

On the outskirts of a storm that is generating in the Bay the barometer frequently stands unusually high and steady, sometimes as much as seven millibars (.20 in.) above normal.

Indications of the Formation or Approach of Cyclonic Storms.

From 15th June to 15th September.—A strong and squally monsoon over the south and centre of the Bay and a rapid increase in the strength of the south-west and south wind in the north of the Bay.

A rapid succession of severe rain squalls increasing in intensity and frequency as the storm area is approached.

Comparatively light cyclonic winds in the N.W. and S.W. quadrants even at moderate distances from the centre. These give no indication of the strength of the winds in the opposite quadrants.

From May 1st to June 15th, and September 15th to December 31st.—If in rear of the storm the barometer begins to fall at first very slowly and afterwards more quickly. The south-west winds in the south of the Bay increase in strength, the weather becomes more squally and unsettled, and cloud increases in amount and shows by its increasing movement indraught to a cyclonic disturbance. When in front of the storm, north and west of the area in which the storm has formed, a light cirrus veil forms and spreads northwards, thickening gradually. At sunset or sunrise these clouds often show very dark or vivid red colours. Halos appear round the sun or moon. Cirro-Stratus shortly begins to appear below the Cirrus and increasing, extends north and west. The weather becomes more sultry and the wind in the north of the Bay begins to shift and becoming steadier gradually increases in force.

The cloud bank next appears low down on the horizon, its position being shown at night by the almost continuous lightning seen by reflection from distant clouds. The cloud bank and lightning may sometimes be seen from two to three days before the approach of the storm.

With the wind freshening Cumulus and Nimbus clouds appear and gradually cover the sky when light drizzling rain sets in. The wind becomes gusty and squally, the squalls increasing in force and frequency as the storm draws nearer.

At the head of the Bay the setting in of and increasing heavy swell often gives the first indications of the approach of a storm. When north of the storm the bearing of its centre is often indicated by the point of radiation of the Cirrus Clouds. An approximate bearing may also be obtained from the direction of the cloud bank or at night from the lightning which occurs as soon as the bank becomes visible. At a distance the cloud bank retains its shape and position for hours only changing when the storm is drawing near.

Currents in Cyclonic Storms.

Records show that cyclonic storms give rise to strong currents within the storm field. Near the coasts the direction of the currents is greatly modified but in the open sea the set approximately agrees in direction with the winds. The drift in the inner storm area of intense storms in the Bay of Bengal may be as much as 6 to 8 knots. In the outer storm area it may be from 2 to 3 knots but near the head of the Bay the currents may be found stronger than this. A westerly increasing set at the head of the Bay is a marked indication of a cyclone forming or having formed in the Bay.

Wireless and Tropical Revolving Storms.

The Bay of Bengal owing to its geographical position and configuration is a self-contained meteorological area in which the generation or development of cyclonic storms may be observed from the earliest stages. There is therefore, no other sea in which the reciprocation of Routine Wireless Weather reports between coast stations and

ships can be used with greater advantage and rarely would a ship utilising these reports be involved in the inner field of a severe cyclone. With the exchange of synchronous reports of coast stations and ships in the Bay simple weather charts could be made by navigating officers giving a graphical illustration of the weather changes taking place over the Bay and from which in the case of a cyclone, the captain of a ship could act with far greater confidence and safety than if depending on his own observations alone. When exchanging weather messages for the making of a weather chart it is essential that the observations contained in them be made at the same time. The best time for making the observations is so that they will synchronize with those of the nearest shore stations.

CHARTS NOS. XIV, XV, and XVI, are made from observations taken at 0230 G.M.T. on the 24th November, 1901, in the Bay of Bengal after a cyclone had formed in the Bay, and serves to show how a reciprocation of Wireless Weather messages between shore and ship would assist the navigator.

Supposing S.S. *Malta* could have picked up a message from shore giving reports from those stations shown on the chart, of wind, corrected barometric pressure and departure of pressure from the normal including her own observations, a weather chart such as CHART XIV could have been drawn from which it is seen that a cyclonic circulation extends all over the Bay and that the greatest deficiency of pressure from normal is reported from False Point. Had *Malta* been able to exchange weather reports with other ships in the Bay only, she could have made a weather chart such as CHART XV. From this chart it will be seen that the data obtained is insufficient to allow her to complete the isobars and not knowing the barometer tendencies, course, and speed of the reporting ships, she is unable to estimate the direction in which the storm is moving.

Had *Malta* been able to pick up both shore and ship observations, CHART XVI could have been made, which is seen to be more complete than the other two charts. The additional observations allowing a continuation of the isobars, thus showing the conditions then prevailing over the whole of the Bay. Had observations from Port Blair also been obtainable they would have in this case given valuable information as ships' reports are lacking east of Longitude 90°E.

Comparing the three charts it is seen that the most useful information is obtained when co-operation exists between shore and ship, also that the information contained in the weather message should include barometer tendency, together with course and speed in the case of ships.

To obtain the greatest advantage from this system, even though only one chart a day be made, observations should be repeated and broadcast at equal intervals throughout the twenty-four hours by a number of selected ships in order to obtain definite information regarding the progress of the storm's centre.

With four equidistant times of observation as suggested in the scheme outlined in the December 1925 number of THE MARINE OBSERVER the option of reporting at such of those times which fall in the hours of daylight would probably be taken by the selected ships and would supply all the necessary data to all ships in the Bay as well as to those ashore who require it. When additional reports were required the intermediate times given in this scheme would suffice for all purposes. At present the time given on the Time chart, published in the January Number, for the North Indian Ocean, *i.e.*, 0230 G.M.T. should be adhered to and to obtain synchronization at other times must be a matter for mutual arrangement between ships themselves.

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

LOCAL WINDS—III.

Pacific Ocean Islands.

General. The various island groups and isolated islands in the North Pacific Ocean are nearly all situated within the boundaries of the north-east trade wind, which extends across almost the whole of the ocean. The area of these islands, which are mostly coral atolls, is so small compared with that of the surrounding ocean, that their influence on the direction of the trade wind is generally negligible, and in consequence their meteorological conditions are usually of simple character.

Some of the main island groups however lie near the verge of the trade wind region, and are subject to changes caused by the seasonal movement of the trade wind limits, and, in the western portion of the ocean, by the change of N.E. and S.W. monsoons.

In the South Pacific, the conditions may generally be assumed, with some modifications, to be the counterpart of those in the North Pacific.

The south-east trade is by no means so constant as the north-east trade, nor does it blow regularly across the whole width of the ocean except during the southern winter, July to September. At other times there appears to be great irregularity in the central region near the Tuamotu Archipelago and the Society Islands; while further west, the trade wind is frequently interrupted by winds from west or north-west, especially during the southern summer, January to March, when the N.W. monsoon of the Indian Ocean extends to the eastward as far as Samoa.

Between the N.E. and S.E. trades, there is found the usual doldrums belt of calms, variable winds, and occasional squalls; but in the Pacific this is not so wide as in the Atlantic.

Space will not permit of all the various groups of islands being dealt with separately, but a selection of those presenting features of interest is given below.

North Pacific.

Hawaiian Islands. The Hawaiian group as a whole experiences the N.E. trade wind during the greater part of the year. From May to October it blows almost uninterruptedly. In November and December, the trade is strong but irregular, being sometimes replaced by light southerly winds. In January, when the northern limit of the trade wind recedes to the southward of the islands, southerly and south-westerly gales often occur, lasting from a few hours to two or three days. These gales, which are called "Konas" by the natives, are caused by the passage of depressions to the northward. They commence with a freshening of the wind from south, and are accompanied by abundant rain; the wind gradually veers to south-west, and after a while shifts to N.W., followed by a clearing of the weather, and later a resumption of the N.E. trade. These westerly winds usually last until the middle of April, when the N.E. trade again sets in regularly.

In the summer months, it is generally calm during the night, except in the channels between the islands. During the morning, the trade wind freshens, reaching force 6 about noon, and weakens again during the afternoon.

In Hawaii, the largest island of the group, the great height of the mountains acts as a barrier to the trade wind, which seems to divide at Cape Kumukahi; part following the coast north-westward around Upolu Point, the other part following the south-east coast around Ka Lae. In consequence on the west side of the island, where the trade wind is shut off, there regularly occurs during the summer months the typical daily change of land and sea breezes. From sunrise there is a calm, until at 10 a.m. the sea breeze sets in from west. This breeze gradually creeps up the mountain sides, resulting in the formation of clouds and rain. About 9 p.m. the sea breeze fades away, and shortly afterwards a descending land breeze sets in, which disperses the clouds, the weather remaining clear until next morning.

Similarly on the adjoining island of Maui, the trade wind divides at Kauiki head, one part following the northern coast, and the other the southern coast. The northern portion again divides at the isthmus; one part turns southward and crosses the island, attaining great force in Maalaea Bay; the other part follows the northern coast and through Pailolo channel.

On the south coast of the island a sea breeze usually sets in about 9 a.m. and continues until after sunset, when it is followed by a land breeze.

Mariana Islands. The Mariana Islands lie close to the western limit of the N.E. trade wind, and are subject to seasonal changes in the direction and force of the wind on account of the Asiatic monsoons. The time of onset, strength, and extent of the monsoons vary from year to year, but the following details represent the average conditions.

The N.E. trade, or more properly the N.E. monsoon, blows generally from November to April or May; the prevailing direction being from N. to N.E. from January to March, during which time violent rain squalls, known as "Churadas" are liable to occur. In April, the prevailing direction is from E.N.E. to E.S.E., and in May from between east and south. The direction continues to veer with the advance of the season, and in June it is from S.E. to S.W.

From June to October, the S.W. monsoon exercises more or less control over the prevailing winds, and from July to September, stiff S.W. to W. winds generally prevail, with squalls, very heavy rain, and frequent thunderstorms. In October the winds are variable, with changeable weather; and in November the wind is from west to north and north-east.

On the west coast of Guam, the largest and most southern island of the group, the daily change in the force of the N.E. trade wind is characteristic of the lee side of a mountainous island. Here the easterly wind sets in about daybreak, freshening towards 10 a.m. During the afternoon it decreases in force, and is calm throughout the night.

Caroline Islands.—The Carolines are an extensive range of islands, lying between Longitude 135° and 164° E., between the parallels of Latitude 2° and 10° N., near the southern border of the N.E. trade wind.

The N.E. trade blows over the group fairly freshly and steadily from October until the end of May, but may be a month earlier or later in setting in.

At Ponape, in the eastern division of the group, the trade wind is later in establishing itself, and usually appears in December, but may sometimes be delayed until January. It generally ceases in June, when the N.E. trade recedes northward; and is replaced by calms and variable winds, accompanied by much cloud and rain typical of the doldrums, which continue until November or December.

Over the western division of the group, the influence of the S.W. monsoon is felt during the summer months, June to September, when the prevailing wind is mainly south-westerly, broken by short spells of easterly winds. Gales from S.W. blow occasionally towards the end of the monsoon season, late in August and in September.

Typhoons appear to originate in the vicinity of the islands, their tracks crossing the western division in a west-north-westerly direction.

Marshall Islands. Over these islands the N.E. trade wind usually sets in in December, and lasts until April. At the beginning and end of this season, the weather is often squally with heavy rain. At the commencement of these squalls, which vary in duration from a few minutes to several hours, the wind shifts from N.E. to E., and even to S.E. and S.; and after the squall is over, backs again to N.E.

During May and June, winds are mainly between E.N.E. and E. From July to November they vary between E.N.E. and S.E., and are frequently interrupted by strong, stormy S.W. winds, and during the season of the doldrums, July to September, by calms.

Westerly winds are rare, but may occasionally be expected.

Gilbert Islands.—This group of islands, although situated within a few degrees N. and S. of the Equator, enjoys an equable climate on account of the constant breezes which prevail.

From May to September the trade wind blows regularly from between E.N.E. and E.S.E., except for short intervals of calm, and is accompanied by fine weather, with occasional showers.

From October to April, variable winds from Northward and Westward are experienced, with frequent rain. During this season, violent gales, having the characteristics of Tropical Revolving storms, are sometimes experienced, commencing from S.W., veering gradually to north, and lasting three or four days.

South Pacific.

Tuamotu or Low Archipelago.—These islands, which are spread

out over a very large area, lie within the boundaries of the S.E. Trade, but from causes not satisfactorily explained they exercise, in spite of their small size and height, sufficient influence to interrupt the regularity of the trade wind, especially during the southern summer, November to March. Admiral FITZROY, who visited the islands in 1835, stated "not only does the easterly wind often fail among them, but heavy squalls come from the opposite direction, and more frequently by night than by day."

During the cold season, May to October, the trade wind blows fairly regularly from E. or E.S.E., and calms are extremely rare. Gales from the S.E. occur from May to September, but especially in August, when they may last from four to eight days. They are accompanied by a slight rise in the barometer, the daily range of which is not affected. The wind commences at S.E. or E.S.E. and shifts towards east. If the barometer falls when the wind passes East, the bad weather will cease within 24 hours; if the barometer remains high, the gale will last for several days.

During the warm season, October to May, the trade wind blows from the E. to E.N.E., but is not so regular as during the cold season. At this period, moderate winds from North to West occur, lasting sometimes for as much as a week. The wind shifts gradually from N.W. to S.W., except in the months of January and February, when sometimes winds from N.W. finish at N.E.

Gales from North to S.W., with a fall in the barometer, are relatively frequent from November to May, and last from one to three days; the end of the gales often being marked by violent storms. Sometimes from December to February, these gales commence at N.W. and shift to North and N.E.

Society Islands.—The Society Islands are within the limits of the S.E. trade, and at all times of the year the wind has a tendency to blow from the eastward. Various causes, however, disturb the regularity of the easterly winds, chief of which is apparently the close proximity of the islands to the Tuamotus.

If the trade wind happens to be light in the region eastward of the Tuamotus, it appears to be stopped altogether by those islands; and after a day or two of the resulting calm, during which the temperature appreciably increases, a breeze from the S.W. may spring up over the Society Islands carrying masses of cooler air to the Tuamotus.

During May to August, over the Society Islands, the trade wind generally blows steadily with moderate force from the S.E.; it is seldom that the wind blows from the westward during this season, and then only weakly and for a short period.

From September to November, as the sun moves more southward, the trade loses its strength, shifting to E.N.E., and sometimes to N.E.; the periods of the trade become of shorter duration, calms more persistent, and winds from the westward more frequent and stronger.

During December to April, the trade wind from E. to N.E. becomes very weak, and variable breezes, sometimes fresh from the westward, alternate with calms, storms, and returns of the trade.

At Tahiti, the winds are modified by the high mountains of the island, and by the action of land and sea breezes. The S.E. trade, on striking the Taiarapu peninsula usually divides into two branches. The northern portion blows along the northern coast as far as Venus point, where it becomes an easterly wind. The southern portion blows along the south-west coast of Tahiti, beyond which, impeded by the island of Murea, it is deflected into a S.W. or west or even a N.W. wind, according to the force of the trade wind. On the leeward side of Tahiti there are calms and local breezes, the extent of which varies with the time of day.

At Papeete, land and sea breezes prevail. The sea breeze generally sets in about 9 a.m. and, blowing from N.W., dies away at 5 p.m. The land breeze, which is more regular and steady than the sea breeze, commences at about 8 p.m. and lasts all night, falling calm at 7 a.m.

Samoa Islands.—The summer season at Samoa, November to April, is distinguished by variable light easterly winds, often interrupted by calms; westerly winds are also experienced at this period, sometimes accompanied by rain squalls. Hurricanes occur, especially

from January to the middle of April, commencing with a violent N.E. wind, shifting to north and west to S.W. For information of Hurricanes in the South Pacific, see Vol. I, No. 11.

From the middle or end of April to November, the S.E. trade blows freshly, and is rarely interrupted by calms, except near the land where land and sea breezes occur.

On the north coast of Upolu, from daybreak until 8, 9, or even 10 a.m., there is a calm; then the sea breeze begins to be felt, and increases gradually until 2 p.m. From 2 or 3 p.m., it gradually decreases and falls calm at sunset. Soon after a light breeze off the land commences, becoming strongest by 1 or 2 a.m., and then gradually fading into a calm by 6 a.m.

Fiji Islands.—Throughout the Fiji group, the S.E. trade blows fairly regularly, moderate to fresh, from April to November, its direction varying between S.E. and E.N.E. It reaches its greatest force when from the S.E., and during August to October, occasionally attains the force of a moderate gale. Whenever the direction is north of east, the force of the wind decreases.

From December to March, which is the hurricane season, the S.E.'ly wind is most feeble and the weather unsettled. The trade is frequently interrupted by northerly winds, with heavy rain, followed by a short period of calms or westerly winds; after which the wind usually shifts to S.S.W. or south in a sharp squall, and quickly backs to its original S.E.'ly direction. A sudden rise of about 3 mbs. (.10 inch) in the barometer, with lightning to the southward indicates the approach of a change of this description.

Around the islands of Viti Levu, Vanua Levu, and Taviuni, the general direction of the wind is much modified by the trend of the coast, the high mountains, and the effect of land and sea breezes which are well developed on many parts of the coast.

On the south coast of Viti Levu, during the night, a light breeze usually comes off the land, sometimes lasting until 9 a.m. During the day, the trade wind blows from E.S.E. On the west coast, there prevails during the day a sea breeze from N.W., while during the night a S.E. wind usually blows off the land.

Among the islands off the west and north-west coasts of Viti Levu, the S.E. wind, interrupted by the high land, finds its way sometimes as a N.E. and sometimes as a south wind, but is not to be relied upon for many hours. Violent gusts from off the land are occasionally experienced in this neighbourhood at night.

New Hebrides.—These islands, lying between the parallels of Latitude 15° and 20° S., are within the region of the S.E. trade wind, and during the so-called fine season, from May to October, it blows steadily, mainly from E.S.E. Frequently during this season, there is considerable rainfall, and this is usually the case when the trade wind is superseded by a calm, followed by an east to N.E. wind; occasionally the wind continues to back, through north to west or south, the trade direction being resumed with what is known among the natives as the "Lan San" or strong S.E. trade.

From December to April, the hurricane season, the winds are changeable, but mostly between north and east.

Solomon Islands.—These islands lie within the region of the N.W. monsoon, the season for which commences in December and lasts till March. The monsoon is mostly light, especially in the south-eastern portion of the group, where it is frequently broken by calms and variable winds, with an occasional spell of severe weather from N.W., generally accompanied by torrents of rain.

April is a transition month; the fine season sets in in May and extends to October. The prevailing direction of the wind is from E.S.E.; it blows freshest during the mid-day hours, being often calm in the mornings and evenings. The wind is far from steady, and as a rule calms may be expected when the wind backs to east or N.E. Occasionally the wind backs round, by way of north, to west, and when this occurs, some disturbance such as a gale, a squall, a thunder-storm, or rain, may be expected.

The trade winds generally blow stronger and with more regularity in the southern part of the group than in the northern portion.

(To be continued.)

WEATHER SIGNALS.

II.—WIRELESS WEATHER SIGNALS.

WIRELESS WEATHER BULLETINS.

CHINA SEA, AND JAPAN.

FRENCH INDO-CHINA.

Spark Issues.

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

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

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

Code used:—New International, expressed by symbols as follows: BBBDDFS.

BBB = The corrected barometer reading in millimetres and tenths, initial 7 omitted. (See Table XV, p. 50, Vol. III, No. 27 of this Journal to convert to mbs. and ins.)

DD = Wind direction true. (See Table III, p. 17, Vol. III, No. 25 of this Journal.)

F = Wind force by Beaufort Scale, forces 9 and above sent as 9.

S = State of sea and swell. (See Table XXIV, p. 51, Vol. III, No. 27 of this Journal.)

NOTE.—S is not sent for Kwang-chau-wan.

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

HONG KONG.

Spark Issues.

Cape d'Aguilar (Tailong head) W/T Station, approximate Latitude 22° 13' N., Longitude 114° 16' E., call sign VPS, broadcasts a summary of meteorological conditions and weather forecasts based on observations made at 2200 G.M.T., at 0500 and 0900 G.M.T., on a wavelength of 600 metres (spark). A second summary and forecast based upon 0600 G.M.T. observations is broadcast at 1200 G.M.T. and repeated at 1600 G.M.T.

NOTE.—Ships within W/T range of Cape d'Aguilar are invited to transmit weather reports to CQ and VPS, containing observations made at 0300, 0600, 0900 and 2200 G.M.T. For sample message see page 15, Vol. III, No. 25 of this Journal.

FORMOSA.

Spark Issues.

Keelung W/T Station, approximate Latitude 25° 08' N., Longitude 121° 45' E., call sign JFK, broadcasts weather forecasts issued by the Taihoku Meteorological Observatory, en clair in English at 0800 G.M.T. on a wavelength of 600 metres (spark). The forecasts are transmitted twice successively, and are preceded by the signal QST QST QST. They will give the direction and force of the wind, and general weather conditions for the following day for the north and east sea coast areas of Formosa, and for Formosan Channel respectively. Wind direction will be indicated for eight points of the compass, "light winds" being given as "variable." The Beaufort Scale will be used for velocity.

Storm warnings are also broadcast by this W/T station, for particulars see p. 122.

CHINA.

Spark Issues.

Shanghai-Zi-ka-wei W/T Station, approximate Latitude 31° 12' N., Longitude 121° 26' E., call sign FFZ, broadcasts weather bulletins at—

0300 G.M.T., after Time Signal, containing observations made at 0100 G.M.T.

0900 G.M.T., after Time Signal, containing observations made at 0700 G.M.T.

1400 and 1800 G.M.T., containing observations made at 1200 G.M.T.

Wavelength, 750 metres (spark).

The bulletins consist of weather messages, sent en clair, in French and English, for China and the China seas.

Typhoon and gale warnings are also broadcast by this W/T station, after the weather bulletins, for particulars see p. 122.

JAPAN.

C.W. Issues.

The Central Meteorological Observatory Tokyo, W/T Station, approximate Latitude 35° 39' N., Longitude 139° 45' E., call sign JFRA, broadcasts weather bulletins as follows:—

(1) Synoptic data messages giving a synopsis of the weather situation over Japan and the neighbouring seas by means of data, in code (Japanese Meteorological) for twenty (or less) selected stations.

(2) Storm warnings, for particulars see p. 122.

Synoptic data messages are broadcast thrice daily as follows:—

At 0010 G.M.T. giving the weather situation at 2100 G.M.T. (previous day).

At 0600 G.M.T. giving the weather situation at 0300 G.M.T.

„ 1110 „ „ „ „ 0900 „

Wave length used in the transmission of the synoptic data messages is 4,000 metres, undamped (valve). The range of the W/T station is approximately 1,000 nautical miles in daytime.

Method of transmission at all times is as follows:—

- | | |
|----------------------------------|-------------------|
| (1) Commencing signal: — — — — — | transmitted once. |
| (2) QST | „ thrice. |
| (3) "de": — . . . | „ once. |
| (4) Call sign JFRA | „ once. |
| (5) Message | „ twice. |
| (6) End of message . . . — — — | „ once. |

List of Selected Meteorological Stations.

The synoptic data messages give the barometric reading, direction and force of the wind and the state of the weather in code at the following twenty stations:—

Index Letter.	Name of Station.	Province.	Position (approx.).	
			Latitude.	Longitude.
A	Ishigakijima - - -	Loochoo	24° 20' N.	124° 10' E.
B	Nafa - - -	„	26° 13' N.	127° 41' E.
C	Nase - - -	„	28° 23' N.	129° 31' E.
W	Kagoshima - - -	Japan Proper	31° 34' N.	130° 33' E.
I	Murotozaki - - -	„	33° 15' N.	134° 11' E.
F	Tomie - - -	„	32° 37' N.	128° 46' E.

Index Letter.	Name of Station.	Province.	Position (approx.).	
			Latitude.	Longitude.
G	Sakai - - -	Japan Proper	35° 33' N.	133° 14' E.
V	Hamamatsu - -	"	34° 43' N.	137° 43' E.
H	Mera - - -	"	34° 55' N.	139° 50' E.
J	Bonin Is. - - -	"	27° 05' N.	142° 11' E.
K	Minatsuki - - -	"	37° 22' N.	136° 45' E.
L	Ishinomaki - -	"	38° 26' N.	141° 19' E.
M	Hakodate - - -	Hokkaido	41° 47' N.	140° 43' E.
N	Shana - - -	"	45° 14' N.	147° 53' E.
O	Mokpo - - -	Chosen (Korea)	34° 47' N.	126° 20' E.
S	Gensan (Wensan) -	"	39° 11' N.	127° 26' E.
P	Yūki - - -	"	42° 20' N.	130° 24' E.
Q	Dairen (Talien) -	Manchuria	38° 54' N.	121° 36' E.
R	Changchun - - -	"	43° 55' N.	125° 18' E.
T	Shanghai - - -	China	31° 15' N.	121° 30' E.

When the information from one or more stations is lacking, data from the auxiliary stations in the following table will be broadcast in lieu.

List of Auxiliary Stations.

Index Letter.	Name of Station.	Province.	Position (approx.).	
			Latitude.	Longitude.
U	Taihoku - - -	Formosa	25° 02' N.	121° 31' E.
D	Miyazaki - - -	Kiushiu	31° 55' N.	131° 26' E.
Z	Nemuro - - -	Hokkaido	43° 20' N.	145° 35' E.
X	Joshin - - -	N. Chosen	40° 30' N.	129° 11' E.
Y	Mukden - - -	S. Manchuria	41° 48' N.	123° 23' E.

Form of Messages.

The synoptic data messages are broadcast in a collection of *letters* forming 20 groups (or less), each group consists of five letters.

1st letter in each group is the index letter of the observation station.

2nd and 3rd letters in each group give the corrected barometer reading in mm., Table XXXIV. (To convert to mbs. and ins. see Table XV., p. 50, Vol. III, No. 27, of this Journal.)

4th letter in each group gives the wind force by Beaufort Scale and the state of the weather, Table XXXV.

5th and last letter in each group gives the wind direction, Table XXXVI.

SPECIAL WEATHER TELEGRAPHY TABLES,

NOT NEW INTERNATIONAL CODE.

Japanese Meteorological Code.

Table XXXIV.—Barometric Pressure.

Tenths	0	1	2	3	4	5	6	7	8	9
Millimetres.	Code Letters.									
less than 711	AA	—	—	—	—	—	—	—	—	—
711 -	AB	—	AC	—	AD	—	AE	—	AF	—
2 -	AG	—	AH	—	AI	—	AJ	—	AK	—
3 -	AL	—	AM	—	AN	—	AO	—	AP	—
4 -	AQ	—	AR	—	AS	—	AT	—	AU	—
5 -	AV	—	AW	—	AX	—	AY	—	AZ	—
6 -	BA	—	BB	—	BC	—	BD	—	BE	—
7 -	BF	—	BG	—	BH	—	BI	—	BJ	—
8 -	BK	—	BL	—	BM	—	BN	—	BO	—
9 -	BP	—	BQ	—	BR	—	BS	—	BT	—
720 -	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD
1 -	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN
2 -	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX
3 -	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH
4 -	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR

Table XXXIV (continued).—Barometric Pressure.

Tenths.	0	1	2	3	4	5	6	7	8	9
Millimetres.	Code Letters.									
725 -	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB
6 -	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
7 -	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV
8 -	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF
9 -	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP
730 -	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ
1 -	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ
2 -	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT
3 -	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
4 -	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN
5 -	HO	HP	HQ	HR	HS	HT	HU	HV	HW	HX
6 -	HY	HZ	IA	IB	IC	ID	IE	IF	IG	IH
7 -	II	IJ	IK	IL	IM	IN	IO	IP	IQ	IR
8 -	IS	IT	IU	IV	IW	IX	IY	IZ	JA	JB
9 -	JC	JD	JE	JF	JG	JH	JI	JJ	JK	JL
740 -	JM	JN	JO	JP	JQ	JR	JS	JT	JU	JV
1 -	JW	JX	JY	JZ	KA	KB	KC	KD	KE	KF
2 -	KG	KH	KI	KJ	KK	KL	KM	KN	KO	KP
3 -	KQ	KR	KS	KT	KU	KV	KW	KX	KY	KZ
4 -	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ
5 -	LK	LL	LM	LN	LO	LP	LQ	LR	LS	LT
6 -	LU	LV	LW	LX	LY	LZ	MA	MB	MC	MD
7 -	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN
8 -	MO	MP	MQ	MR	MS	MT	MU	MV	MW	MX
9 -	MY	MZ	OA	OB	OC	OD	OE	OF	OG	OH
750 -	OI	OJ	OK	OL	OM	ON	OP	OQ	OR	OS
1 -	OT	OU	OV	OW	OX	OY	OZ	PA	PB	PC
2 -	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM
3 -	PN	PO	PP	PQ	PR	PS	PT	PU	PV	PW
4 -	PX	PY	PZ	QA	QB	QC	QD	QE	QF	QG
5 -	QH	QI	QJ	QK	QL	QM	QN	QO	QP	QQ
6 -	QR	QS	QT	QU	QV	QW	QX	QY	QZ	RA
7 -	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK
8 -	RL	RM	RN	RO	RP	RQ	RR	RS	RT	RU
9 -	RV	RW	RX	RY	RZ	SA	SB	SC	SD	SE
760 -	SF	SG	SH	SI	SJ	SK	SL	SM	SN	SO
1 -	SP	SQ	SR	SS	ST	SU	SV	SW	SX	SY
2 -	SZ	TA	TB	TC	TD	TE	TF	TG	TH	TI
3 -	TJ	TK	TL	TM	TN	TO	TP	TQ	TR	TS
4 -	TT	TU	TV	TW	TX	TY	TZ	UA	UB	UC
5 -	UD	UE	UF	UG	UH	UI	UJ	UK	UL	UM
6 -	UN	UO	UP	UQ	UR	US	UT	UU	UV	UW
7 -	UX	UY	UZ	VA	VB	VC	VD	VE	VF	VG
8 -	VH	VI	VJ	VK	VL	VM	VN	VO	VP	VQ
9 -	VR	VS	VT	VU	VV	VW	VX	VY	VZ	WA
770 -	WB	WC	WD	WE	WF	WG	WH	WI	WJ	WK
1 -	WL	WM	WN	WO	WP	WQ	WR	WS	WT	WU
2 -	WV	WW	WX	WY	WZ	XA	XB	XC	XD	XE
3 -	XF	XG	XH	XI	XJ	XK	XL	XM	XN	XO
4 -	XP	XQ	XR	XS	XT	XU	XV	XW	XX	XY
5 -	XZ	YA	YB	YC	YD	YE	YF	YG	YH	YI
6 -	YJ	YK	YL	YM	YN	YO	YP	YQ	YR	YS
7 -	YT	YU	YV	YW	YX	YY	YZ	ZA	ZB	ZC
8 -	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM
9 -	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZW
780 -	ZX	ZY	—	—	—	—	—	—	—	—
more than 780.1	ZZ	—	—	—	—	—	—	—	—	—

Table XXXV.—Force of the Wind and State of the Weather.

Wind Force	0-1	2-3	4-6	6-7	8-9	10 and over.
Weather.	Code Letters.					
Fair - -	A	A	B	C	D	E
Cloudy - -	F	F	G	H	I	J
Rain - -	K	K	L	M	N	P
Snow - -	Q	Q	R	S	T	U
Fog - -	V	V	W	X	Y	Z

Note.—Although the same signals are given for "Calms" and "Light Winds," the former is always meant when the direction of the wind is omitted.

Table XXXVI.—Direction of the Wind.

Direction.	N.	NNE.	NE.	ENE.	E.	ESE.	SE.	SSE.	S.	SSW.	SW.	WSW.	W.	WNW.	NW.	NNW.	Calm.
Code Letter.	N	O	P	Q	E	F	G	H	S	T	U	V	W	X	Y	Z	C

WIRELESS STORM WARNINGS.

FRENCH INDO-CHINA.

Spark Issues.

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

Form of message :—

Typhoon LLLID₁D₁K or Coup de Vent D₁D₁Q.
followed by the control number of the previous group given in full.

Code :—

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

ll = Longitude ditto.

D₁D₁ = Forecast of the direction the typhoon (or storm) is likely to travel. (See Table III, p. 17, Vol. III, No. 25 of this Journal), with the following additions :—

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

K = Radius and force.

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

Q = Area threatened.

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

These warnings are also broadcast when necessary by the following W/T stations in French Indo-China. Normal wavelength 600 metres (spark).

W/T Station.	Position (approx.).		Call Sign.	
	Latitude.	Longitude.		
Fort Bayard	21° 13' N.	110° 23' E.	HVH	1800 metres, wavelength.
Tourane	16° 07' N.	108° 13' E.	HVI	
Mitho	10° 21' N.	106° 21' E.	HVM	
Pulo Condore	8° 44' N.	106° 36' E.	HVO	
Fu Kok	10° 18' N.	103° 58' E.	HVP	

HONG KONG.

Spark Issues.

Cape d'Aguilar (Tailong Head), W/T station, call sign VPS, broadcasts storm warnings at 0400 G.M.T. and repeats them every two hours until 1600 G.M.T. or until the next warning is issued, on a wavelength of 600 metres.

FORMOSA.

Spark Issues.

Keelung W/T Station, call sign JFK, broadcasts storm warnings when necessary, immediately upon receipt of information from the Taihoku Meteorological Observatory, repeating same at the beginning of the hour next following and again at 1230 G.M.T. of the same day.

The warnings will give the date and hour of observation (00 to 23 120th meridian time), whether typhoon or depression, position of the centre and the direction of its motion, together with brief explanatory remarks. Warnings for strong winter monsoons will be broadcast whenever a sudden threatening change is anticipated off the north and east coasts of Formosa, or in the Formosan Channel. The warnings will be preceded by the signal "QST" and are broadcast *en clair* in English.

Wavelength 600 metres (spark).

CHINA.

Spark Issues.

Shanghai-Zi-ka-wei W/T Station, call sign FFZ, broadcasts typhoon and gale warnings, when necessary, after the weather bulletins described on p. 120 at 0300 (after Time Signal), 0900, 1400 and 1800 G.M.T. The warnings are broadcast *en clair* and give information concerning the position of the centres of typhoons or continental depressions, for China and the China seas.

IMPORTANT.

Special Typhoon Warnings on Request.

It has been ascertained that ships near the coast off Foochow often experience difficulty in the reception of W/T weather signals broadcast from Shanghai W/T Station, call sign FFZ, owing to "screening" effects. Ships having difficulty in taking in the routine messages are invited to ask Shanghai W/T Station FFZ for *special typhoon warnings*, which will be transmitted *free of charge*.

JAPAN.

C.W. Issues.

The Central Meteorological Observatory, Tokyo, W/T Station, call sign, JFRA, broadcasts storm warnings, when necessary, *en clair*, in English after the weather bulletins explained on p. 120. The wavelength used is 600 metres (modulated wave). The warnings contain the following information :—approximate position of typhoon (or cyclone), the direction in which it is moving, or expected movement, or information concerning severe gales, or duration of monsoon, over Japan and the neighbouring seas.








III.—WIRELESS TIME SIGNALS.

Country and W/T Station.	Call Sign.	Wave Length.	G.M.T.	System.
Hong Kong.				
Stonecutters - - - - - Latitude 22° 19' 17.7" N. Longitude 114° 08' 40.0" E.	BXY	2,000 (I.C.W.)	<div>h. m. s. h. m. s.</div> <div>01 56 00—02 00 00</div> <div>12 55 00—13 00 00</div>	<p>Preliminary signals sent 2 minutes before transmission of Time Signal proper, "CQ de BXY HK TIME WAIT." The Time Signals are dots (of about 0.2 second duration) sent at each second. The dots are <i>omitted</i> at the 28th, 29th, 54th, 55th, 56th, 57th, 58th and 59th second of each minute for the purpose of identifying the signals.</p> <p>NOTE.—Signals controlled from Hong Kong Observatory.</p>
China.				
Shanghai - - - - - Latitude 31° 13' 14" N. Longitude 121° 27' 48" E.	FFZ	750 (spark)	<div>02 54 00—02 54 50</div> <div>02 55 00</div> <div>02 56 00—02 56 50</div> <div>02 57 00</div> <div>02 58 00—02 58 50</div> <div>02 59 00</div> <div>0854—0859</div>	<p>Time Signal preceded by "general call" (CQ de FFZ).</p> <p>— — — — — etc.</p> <p>▪ (Time Signal).</p> <p>— — — — — etc.</p> <p>▪ (Time Signal).</p> <p>— — — — — etc.</p> <p>▪ (Time Signal).</p> <p>(As above).</p> <p>NOTE.—Signals controlled from Zi-ka-wei Observatory.</p>

IV.—VISUAL STORM WARNINGS.

Hong Kong.**Local Storm Signals.**

In addition to the China seas storm signals, symbols from which are displayed when necessary at Blackhead Hill, Kowloon, the following system of **local** storm signals is in force at Hong Kong.

Signal.	Symbol.	Day Signals.	Signification.
1			A typhoon exists which may possibly cause a gale at Hong Kong within 24 hours.
2			Gale expected from the North (N.W. to N.E.).
3			Gale expected from the South (S.E. to S.W.).
4			Gale expected from the East (N.E. to S.E.).
5			Gale expected from the West (N.W. to S.W.).
6			Gale expected to increase.
7			Wind of typhoon force expected (any direction).

The symbol for Signal No. 1 is coloured *red*, the remaining symbols are *black*.

Signal No. 7 will be accompanied by three explosive bombs, fired at intervals of 10 seconds at the Water police station, and repeated at the Harbour Office.

The signals will be lowered when it is considered that all danger is over.

Day signals displayed at Harbour Office, H.M.S. *Tamar*, W/T mast Royal Observatory, Green Island signal mast, a flagstaff on the premises of the Hong Kong and Kowloon Wharf and Godown Coy. at Kowloon, the Standard Oil Coy.'s flagstaff at Lai chi Kok, and a flagstaff near the field officers' quarters at Lye Mun.

Night Signals (Lights).

Signal No. 1	2	3	4	5	6	7
WHITE	WHITE	GREEN	GREEN	WHITE	GREEN	RED
WHITE	GREEN	WHITE	GREEN	WHITE	GREEN	GREEN
WHITE	GREEN	WHITE	WHITE	GREEN	GREEN	RED

Night signals displayed, at sunset, on the tower of the railway station, W/T mast Royal Observatory, H.M.S. *Tamar*, and on the Harbour Office flagstaff. **They have the same signification as the day signals.**

Signal No. 7 will be accompanied by explosive bombs, as above, in the event of the information conveyed by this signal being first published at night.

Supplementary Warnings.

When signals are displayed in the harbour a cone will be exhibited at the following stations:—

Gap rock
Waglan
Stanley
Aberdeen

Sau ki wan
Sai kung
Sha tau kok
Tai Po

to notify the fact to native craft and passing ocean vessels.

Further details can always be given to ocean vessels on demand, by signal from lighthouses.

The object of the system is to give at least 24 hours' warning of a gale (force 8 Beaufort scale) and also warnings of expected changes in the direction and force of the wind. Owing, however, to the uncertain movements of typhoons, it will occasionally happen that Signals 2 to 5 may be displayed without a gale occurring at Hong Kong, or even Gap rock, but the reverse is not likely to happen, except in the case of typhoons forming in the vicinity and travelling rapidly towards Hong Kong, or of a located typhoon increasing its rate of progression abnormally. Signal No. 1 is intended as a warning to "Stand by" and watch for the next signal.

NOTE.—The China seas storm signal system necessitates a mast-head symbol which should not be mistaken for a black signal of the local system.

FORMOSA.

All stations in Formosa will hoist proper signals at the masthead to indicate storm warnings, fuller details of which can be obtained upon inquiry. Signals employed are :—

By day.	By night.	Signification.
Red ball - -	One red light -	Coast warning of approach of threatening weather; a typhoon in adjacent seas.
Red cone point upwards.	Two red lights horizontal.	Coast and inland warning of dangerous typhoon expected.

The signals are hoisted and lowered on receipt of telegraphic instructions from Taihoku Observatory.

PHILIPPINE ISLANDS.

Typhoon Warning Signals.

TYPHOON warning signals are displayed upon receipt of information from the Weather Bureau at Manila, as follows :—

Day Signals.—Black cylinder, 1½ feet in diameter, 2 feet high. Black cone, base 1½ feet in diameter, 2 feet high. Black sphere, 2 feet in diameter. Flag, 3 or 4 feet square, of any convenient colour.

Night Signals.—Red and White lights shown vertically or horizontally.

Signal

No. By Day. By Night.

1



Meaning.
Indicates (a) A distant typhoon the direction of whose movements is still unknown. The signal will be changed in case the typhoon approaches.

(b) The direction of the distant typhoon is at present such that the storm may pass off without seriously affecting the archipelago.

(c) A general warning, viz., when the weather indications are dangerous but such as are not covered by any one of the other signals in use; for instance, when the typhoon recurves east of the archipelago. In such cases see the daily weather note posted at all the meteorological and telegraph stations and Custom houses.

Precautions.—Vessels should prepare to strengthen their moorings and to get up steam. Small vessels, especially open launches, should not risk going far from port.

Signal

2

By Day.

By Night.

Meaning.



Indicates that the centre of the typhoon will pass (or is passing) to the northward at a considerable distance. Winds from west to south are to be expected, which may acquire considerable force and continue for several days.

Precautions.—Vessels should strengthen their moorings. It is considered advisable that vessels should send down light yards and masts. Steam vessels should be ready to use their engines at short notice. Dangerous for small vessels to be in Manila bay.

3



Indicates that the centre of the typhoon will pass (or is passing) to the northward at a considerable distance. Winds from east to south are to be expected. These are generally less violent than those referred to in signal No. 2.

Precautions.—As for signal No. 2.

4



Indicates that the location of the typhoon is dangerous for the place where the signal is hoisted, though the danger is not imminent. Look out for the next signal.

Precautions.—Vessels should strengthen their moorings. Steam vessels must be ready to use their engines in case of sudden emergency. Small vessels must remain at their moorings.

5



Indicates that the centre of the typhoon will pass (or is passing) to the northward at a short distance. Strong winds from south, through west, to north are to be expected, which may become very violent.





Precautions.—Vessels should strengthen their moorings as much as possible. Lower and secure all gear. Use steam to help anchors. Vessels outside Manila harbour may find it necessary to seek refuge in Kavite. No vessels should be under way while this signal is hoisted.

6



Indicates that the centre of the typhoon will pass (or is passing) to the northward at a short distance. Strong winds from north, through east, to south are to be expected, which may become very violent, though usually they are less severe than those referred to in signal No. 5.

Precautions.—As for signal No. 5.

Signal No.	By Day.	By Night.	Meaning.
7			Indicates that the centre of the typhoon will pass over the place where the signal is hoisted. Precautions. —As for signal No. 5. It must be noted, however, that after the absolute or relative lull, due to the actual passing of the centre, the wind will suddenly change to a direction opposite to the one from which it came before the lull; also that it may often be more violent than before.
8			Indicates strong winds, very high tides, and floods. Precautions. —As for signal No. 5.











CHINA SEAS STORM SIGNAL SYSTEM.

Typhoon and Storm Signals.

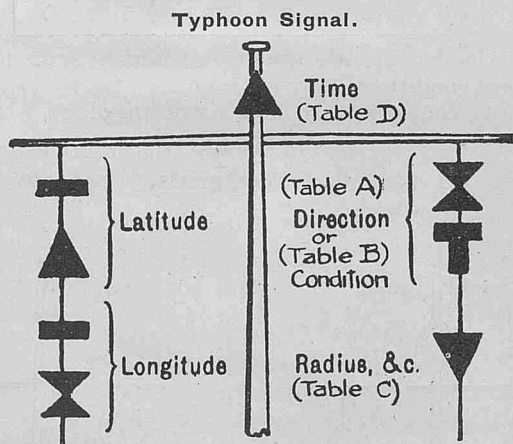
THE China seas storm signal system which has been drawn up by joint agreement between the observatories at Zi-ka-wei and Hanoi and the Chinese Maritime Customs, is now definitely adopted along the whole China coast, including Hong Kong and the Indo-China ports.

General Explanation.

The signals are made by means of certain symbols, each corresponding, for certain purposes, to a number :—

									
1	2	3	4	5	6	7	8	9	0

The symbols are hoisted at the yardarms and masthead of the storm-signal mast and have the general characteristics as shown below.



Meaning.—A severe typhoon within 30 miles of Lat. 26° N., Long. 120° E., travelling N.E. Warning issued this morning.

The two upper symbols, on one yardarm indicate latitude, 26°, the lower two figures longitude, the 100 being omitted, i.e., 20 indicates longitude 120°.







The two upper symbols on the opposite yardarm indicate the direction in which a typhoon is travelling, see Table A.

TABLE A.

DIRECTION SIGNALS.															
															
N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW

(Note.—The numbers corresponding to the symbols indicate the number of points from North or alternatively certain conditions of the typhoon, see Table B.)

TABLE B.

CONDITION SIGNALS.					
					
Forming	Two centres	Direction unknown.	Stationary or very slow.	Recurring.	Filling up.

The lower symbol on this side indicates the radius of the circle whose centre is shown by the latitude and longitude. This symbol may also indicate degree of intensity. In the case of a continental depression it indicates that it is such, and the corresponding latitude and longitude is the centre of an indefinite area affected. See Table C.

TABLE C.

RADIUS AND INTENSITY SIGNALS.											
Radius of position Circle.	120'	60	30'								
Intensity:	Unknown	Severe	Unknown	Severe	Deepening	Unknown	Severe	Excep. velocity	Contin. depress.	Position uncertain	

Note.—It should be clearly understood that the position indicated is not necessarily the centre of the typhoon, but merely indicates the centre of a circle of a specified radius within which the centre of the typhoon is believed to lie.

The signal at the masthead indicates the time the warning was issued by the Observatory. See Table D.

TABLE D.

TIME SIGNALS.			
			
Yesterday morning.	Yesterday afternoon.	This morning.	This afternoon.

It is important that seamen should realise that the position of the centre of the typhoon as signalled is the position according to the data possessed by the Observatory at the time of the issue of the warning. That data may be as much as 12 hours old. Thus, if the time signal indicates that the warning was issued "This morning," it may be that the position corresponds to data concerning yesterday afternoon.

If the signal "Deepening" is made, it indicates that there is reason to believe that the barometric gradient and, consequently, the intensity of the typhoon are increasing.

If the signal "Exceptional velocity" is made, it indicates that there is reason to believe that the rate of progression is 25 per cent. or more greater than the average rate.

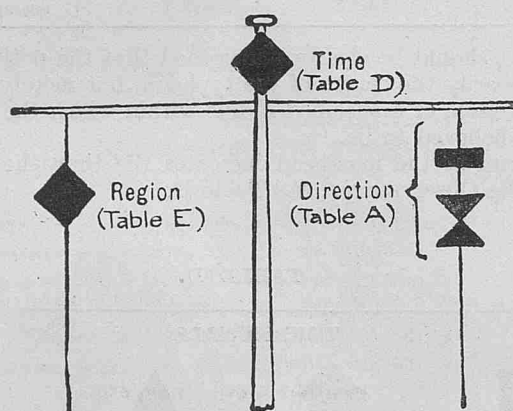
If the signal "Position uncertain" is made, it indicates that the data possessed is unreliable and that the position signalled is a mere probability.

The several tracks which a typhoon may follow in the several months are very varied, and the velocity of progression is liable to be erratic. It is not safe to count on a typhoon maintaining a velocity indicated by previous position of its centre. The velocity is liable to increase very suddenly. Seamen are recommended to study from available sources the tracks and average velocities for the month and locality concerned. The following table taken from "Typhoons of the North Pacific and China Seas," Vol. II, No. 20, may be useful.

MEAN AND EXTREME SPEEDS OF TYPHOONS IN NAUTICAL MILES.

Locality.	Month - Direction -	Jan.		Feb.		March.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		Yearly Mean.	
		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.		N.W. N.E.	
		N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.	N.W.	N.E.
(1) China Sea and coast to South of Hainan Island.	Mean Speed -	11.0	—	9.0	—	6.0	—	9.7	—	11.3	—	10.1	—	10.8	—	10.7	—	11.0	—	10.6	—	10.1	—	11.8	—	10.2	—
	Extreme Speed	14.0	—	9.0	—	6.0	—	12.0	—	16.0	—	15.0	—	14.0	—	14.0	—	17.0	—	16.0	—	16.0	—	16.0	—	—	—
(2) North China Sea and coast up to Swatow.	Mean Speed -	—	—	—	—	—	—	—	—	10.0	—	10.0	—	8.7	25.0	10.2	12.0	10.8	40?	9.9	10.0	8.0	8.0	12.0	—	10.1	19.0
	Extreme Speed	—	—	—	—	—	—	—	—	10.0	—	12.0	—	13.0	—	16.0	12.0	18.0	—	12.0	10.0	8.0	8.0	12.0	—	—	—
(3) Approaches to Formosa and coast up to Hushan.	Mean Speed -	—	—	—	—	—	—	—	—	—	—	11.5	18.7	10.3	19.8	11.1	20.2	12.1	22.4	13.5	—	—	—	—	—	11.7	20.3
	Extreme Speed	—	—	—	—	—	—	—	—	—	—	16.0	23.0	12.0	23.0	22.0	26.0	17.0	34.0	15.0	—	—	—	—	—	—	—
(4) Eastern and Yellow Seas and coast from Hushan to Korea.	Mean Speed -	—	—	—	—	—	—	—	—	—	—	—	—	11.4	18.6	12.9	18.7	10.6	21.4	—	21.0	—	—	—	—	11.6	19.9
	Extreme Speed	—	—	—	—	—	—	—	—	—	—	—	—	15.0	26.0	20.0	27.0	16.0	25.0	—	21.0	—	—	—	—	—	—
(5) Pacific and southern coast of Japan.	Mean Speed -	—	23.4	13.3	16.0	10.0	21.5	7.5	20.7	9.7	19.2	—	14.0	11.9	18.9	11.1	18.9	11.9	22.8	11.9	21.5	16.3	22.6	11.0	25.0	11.5	20.4
	Extreme Speed	—	30.0	18.0	18.0	—	30.0	8.0	28.0	13.0	25.0	—	14.0	16.0	25.0	21.0	40.0	20.0	52.0	20.0	39.0	15.0	40.0	12.0	38.0	—	—
(6) Pacific far from all coasts with the Bonin about the centre.	Mean Speed -	—	18.8	—	21.6	11.0	21.6	13.7	26.0	8.9	16.9	9.0	17.1	11.3	18.5	13.2	18.0	10.0	18.2	12.5	17.0	8.2	16.8	12.0	19.7	11.0	19.2
	Extreme Speed	—	31.0	—	10.0	11.0	30.0	10.0	43.0	16.0	28.0	10.0	32.0	15.0	28.0	17.0	25.0	15.0	38.0	20.0	25.0	11.0	25.0	12.0	28.0	—	—

GALE SIGNALS.



Meaning.—The north coast of Hokkaido threatened by a gale from S.W. Warning issued yesterday afternoon.

The one symbol at one end of the yardarm shows the region threatened. See Table E.

TABLE E.

DISTRICT SIGNAL.									
I	—	⊥	T	+	▲	▼	◆	■	⋈
Coast of G. of Tongking	Formosa	Yangtze to G. of Yalu	Sea of Japan.	North of Hokkaido.	East Coast of Japan.	South of Japan.	Kiusiu.		
Annam.	to Swatow.	Strait.	to Yangtze.	Shantung.	G. of Pechihill.				

The two symbols at the other yardarm show the direction from which the gale is expected to blow. See Table A.

The symbol at the masthead shows the time the warning was issued by the Observatory. See Table D.

Note.—In addition to the above general signals local storm signals are displayed at Hong Kong. See p. 123.

JAPAN.

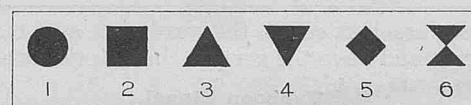
Storm Signals.—The storm signals made at various places on the coasts of Japan consist of General storm signals and Local storm signals. The former, shown on special masts, are composed of five signals, giving the time of observation, the position, the direction, the

rate of progressive movement and intensity of the storm, while the latter only furnish a general idea of the character of the storm expected.

The following General System of Storm Signals is in use at all Japanese storm signal stations:—

General Details.

By day the signals are made from a mast with a yard by means of certain symbols; these symbols and their equivalent numbers are as follows:—

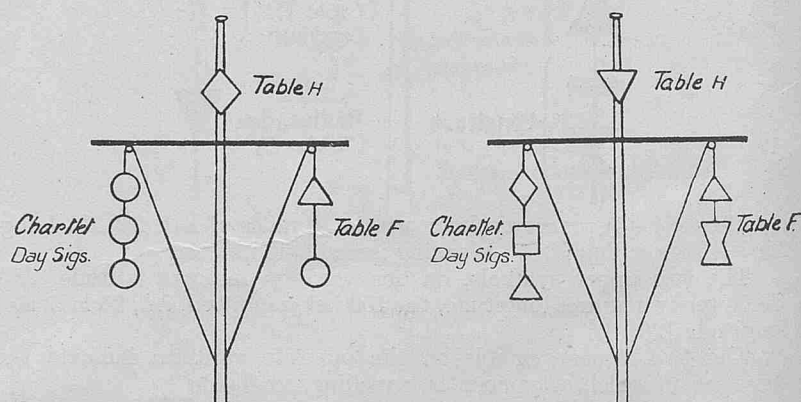


The symbols are usually *red*, but in some places, to suit local conditions, they are *white*.

By night the signals are made by means of *red*, *white*, and *green* lights.

1. Day Signals.

Examples of Day Signals.



Meaning.

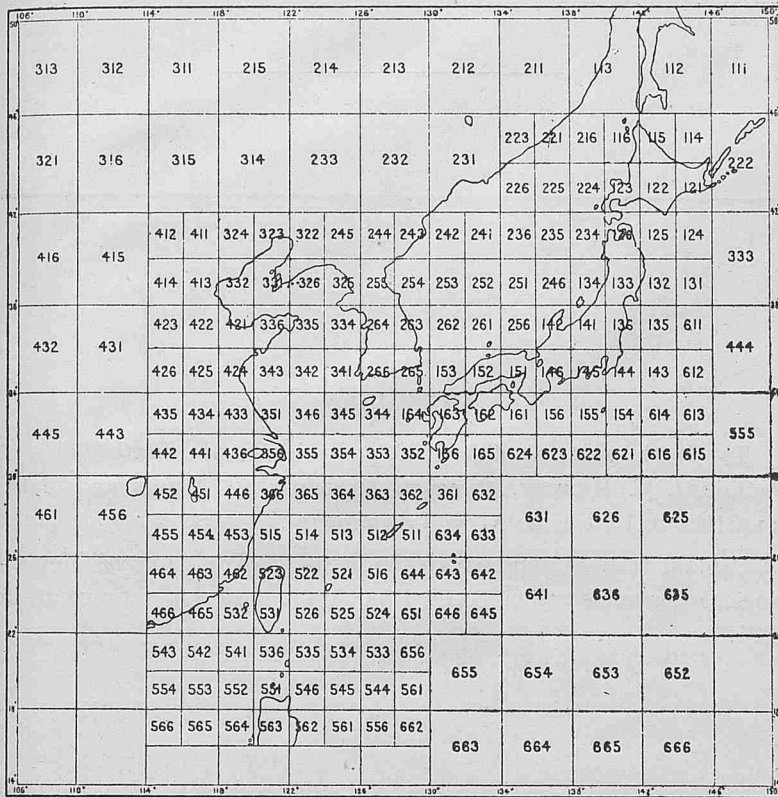
Last night, at 10 p.m. a typhoon or cyclone off the north-east coast of Japan moving towards north-east with a velocity of 10 to 20 miles per hour, the intensity not indicated.

Meaning.

This morning, at 6 a.m. a violent typhoon in northern Formosa moving towards the south-west, its velocity not known.

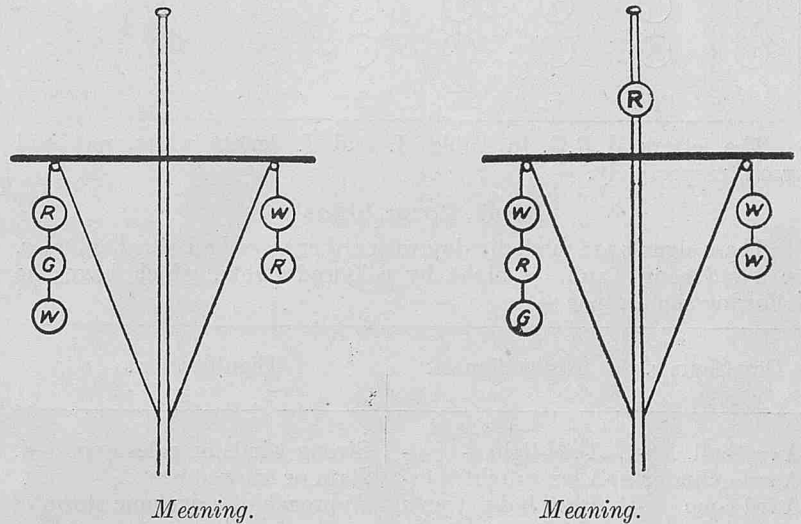
One symbol at the masthead shows the time at which the centre was located, and the intensity (force) of the typhoon. See Table H.

TABLE H.—Time and Force.



Time Force.	This Morning 6 am.	This Afternoon 2 pm.	Last Night 10 pm.
Not indicated.	●	⊗	◆
Violent.	▼	▲	■

Examples of Night Signals.



Three lights, *vertical*, at one yardarm indicate the district in which the typhoon or cyclone is situated. See POSITION LIGHT CHARTLET.

Position Light Chartlet.

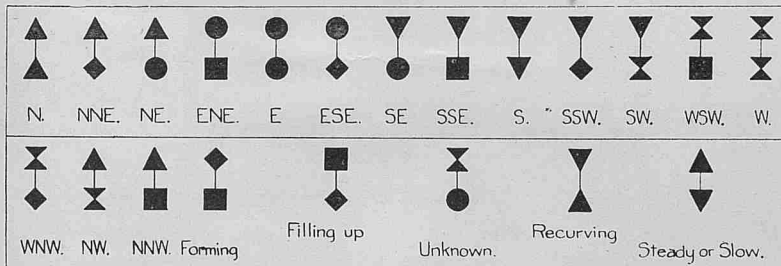
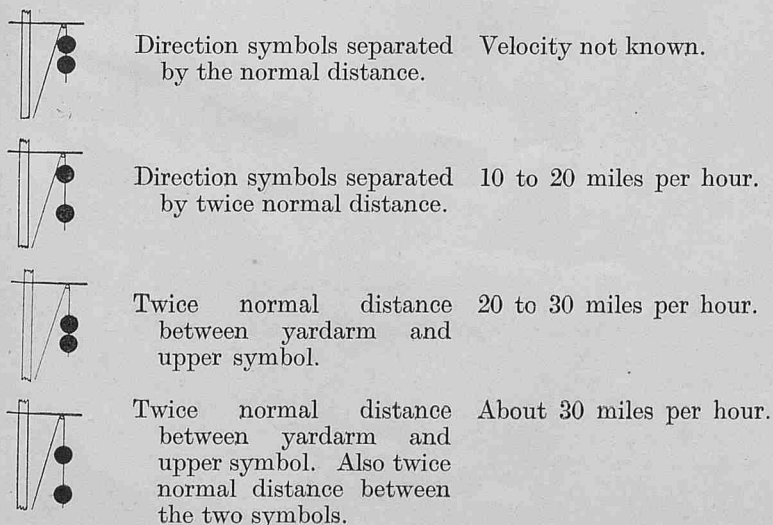


Figure 1 is a map of the western North Pacific, showing the distribution of four species of the genus *Pseudoceros*. The map covers latitudes from 15°N to 55°N and longitudes from 100°E to 150°E. The species are indicated by Roman numerals (I, II, III, IV) inside circles. The circles are arranged in a grid, with some cells containing multiple species. The map also shows the outlines of Japan, Korea, and the Philippines.

The letters W, R, G, denote White, Red, and Green, respectively.



One light at the masthead shows the subdivision of the district in which the centre is situated. See Table I. and POSITION LIGHT CHARTLET.

TABLE I.—Subdivision Light.

<div>W</div> 1 st Quadrant.	<div>R</div> 2 nd Quadrant.	<div>G</div> 3 rd Quadrant.	None 4 th Quadrant.
--	--	--	-----------------------------------

Two lights, vertical, at the other yardarm show the direction of the motion of the centre. See Table J.

TABLE J.—Direction of Motion Lights.

<div>G</div> <div>W</div> N.	<div>W</div> <div>R</div> NE.	<div>W</div> <div>W</div> E.	<div>R</div> <div>R</div> SE.	<div>R</div> <div>G</div> S.	<div>R</div> <div>W</div> SW.	<div>G</div> <div>G</div> W.	<div>W</div> <div>G</div> NW.
------------------------------	-------------------------------	------------------------------	-------------------------------	------------------------------	-------------------------------	------------------------------	-------------------------------

The letters W.R.G. in Tables I. and J. denote white, red, and green, respectively.

Local Storm Signals.

These signals are made by day with either a red ball, a red cylinder, or a red cone; and by night by coloured lights, which have the following significance :—

Day Signals.	Night Signals.	Signification.
A red ball -	A red light - -	Strong winds or gales expected.
A red cylinder -	A green light - -	Rain or snow storm.
A red cone -	A red light over a green light.	Approach of a cyclonic storm of dangerous intensity.

Special Notices regarding Personnel.

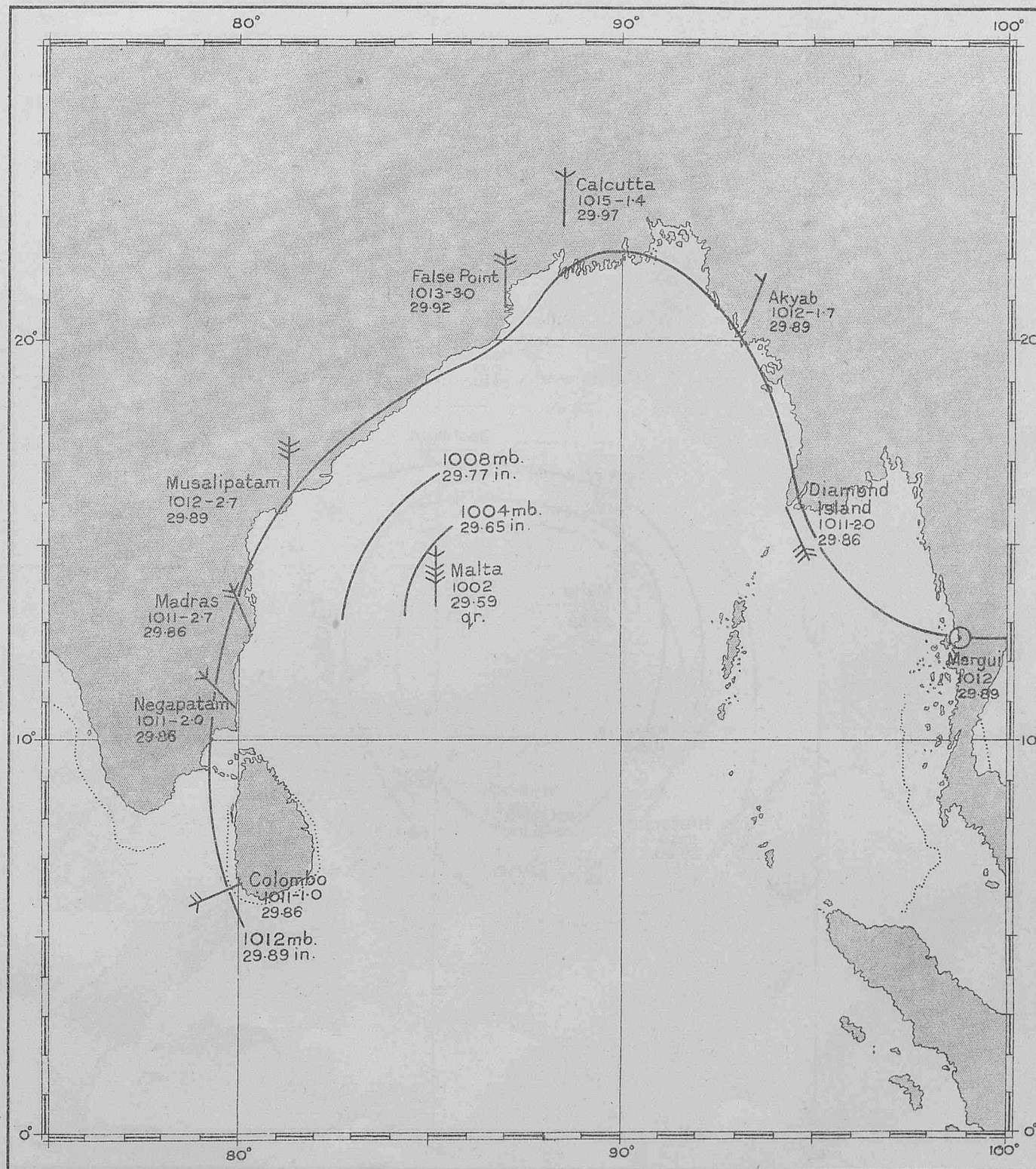
The Marine Superintendent will be glad to receive information of special distinctions gained and retirements, &c., of Marine Observers.

OBITUARY.

The death on March 20th, 1926, at Ruthin Castle, North Wales, of Captain J. M. HARVEY, Principal Examiner of Masters and Mates from 1903 to 1921, is noted with deep regret.

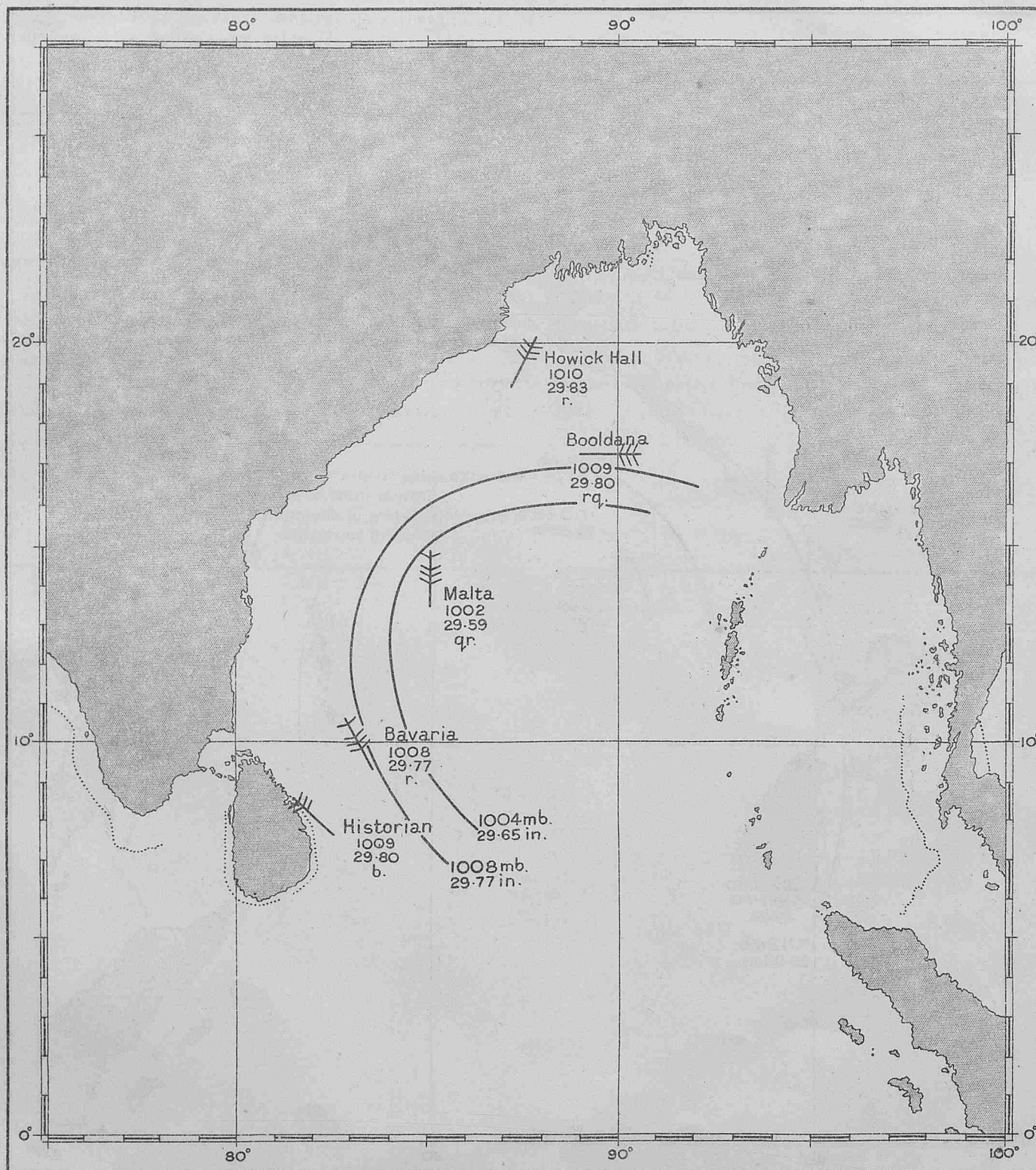
Captain HARVEY represented the Board of Trade on the Meteorological Committee from April 11th, 1910, until his retirement in 1921.

MORNING OF NOVEMBER 24TH, 1901.



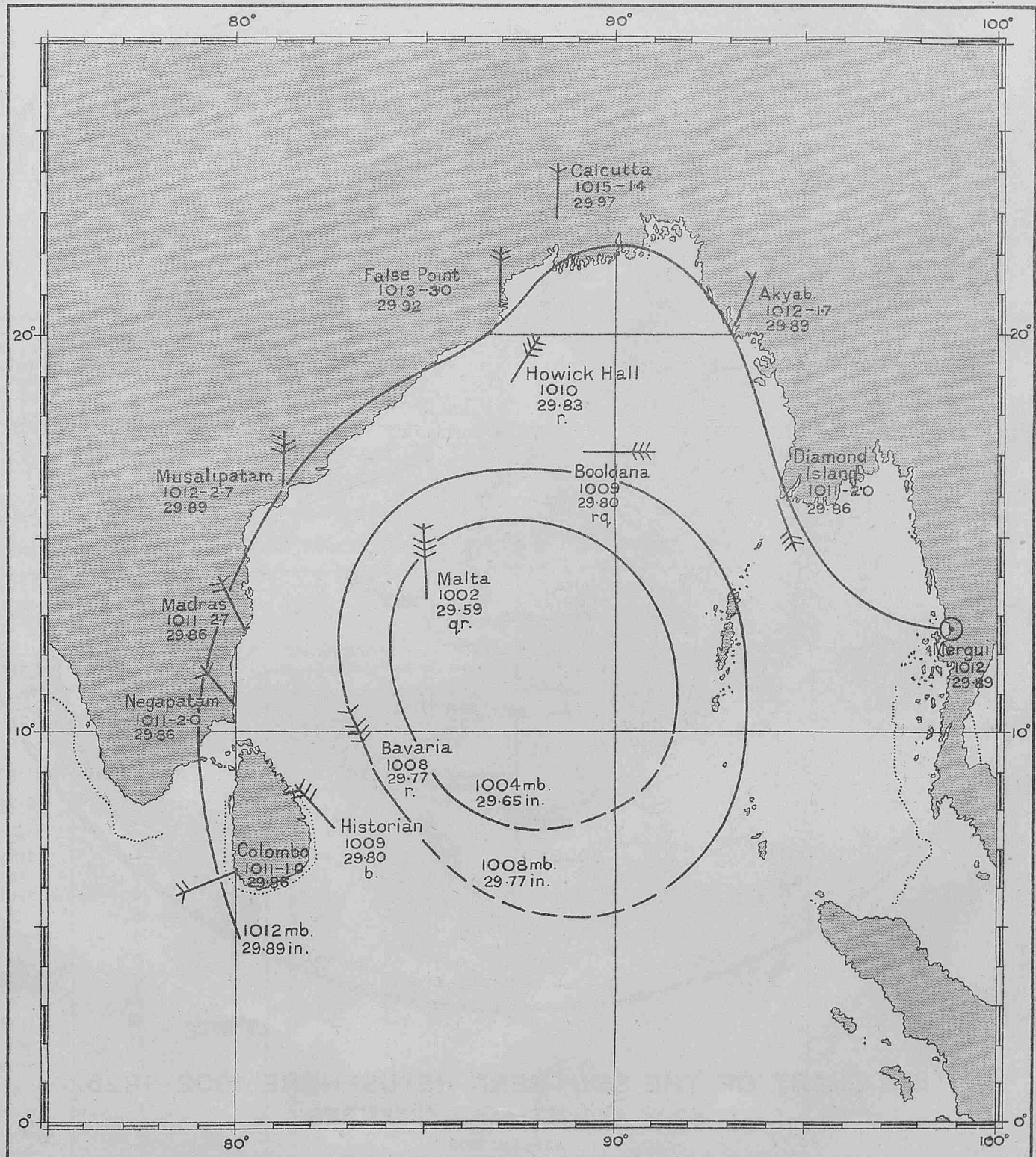
Weather Chart XIV.

MORNING OF NOVEMBER 24TH, 1901.

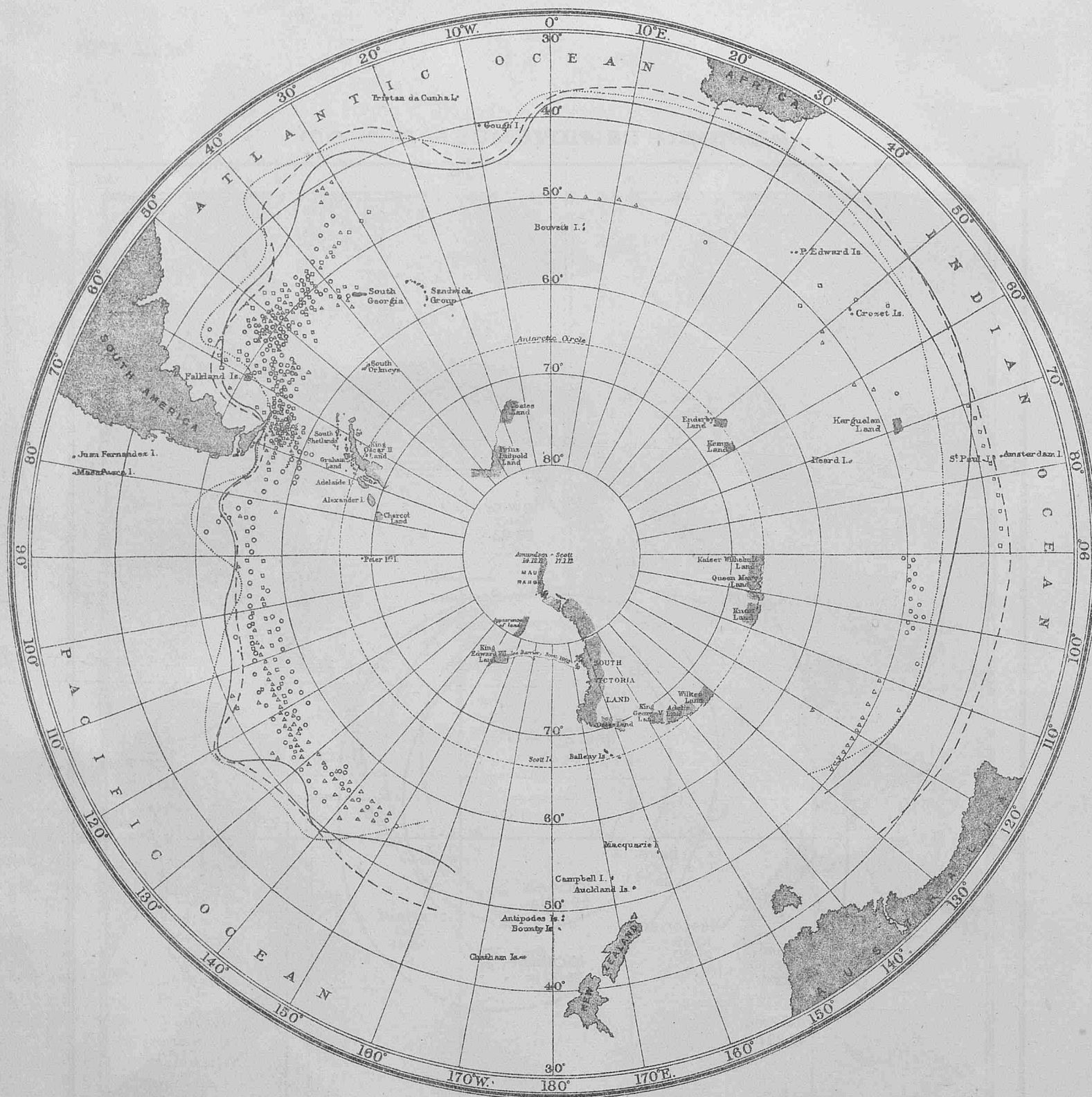


Weather Chart XV.

MORNING OF NOVEMBER 24TH, 1901.



Weather Chart XVI.

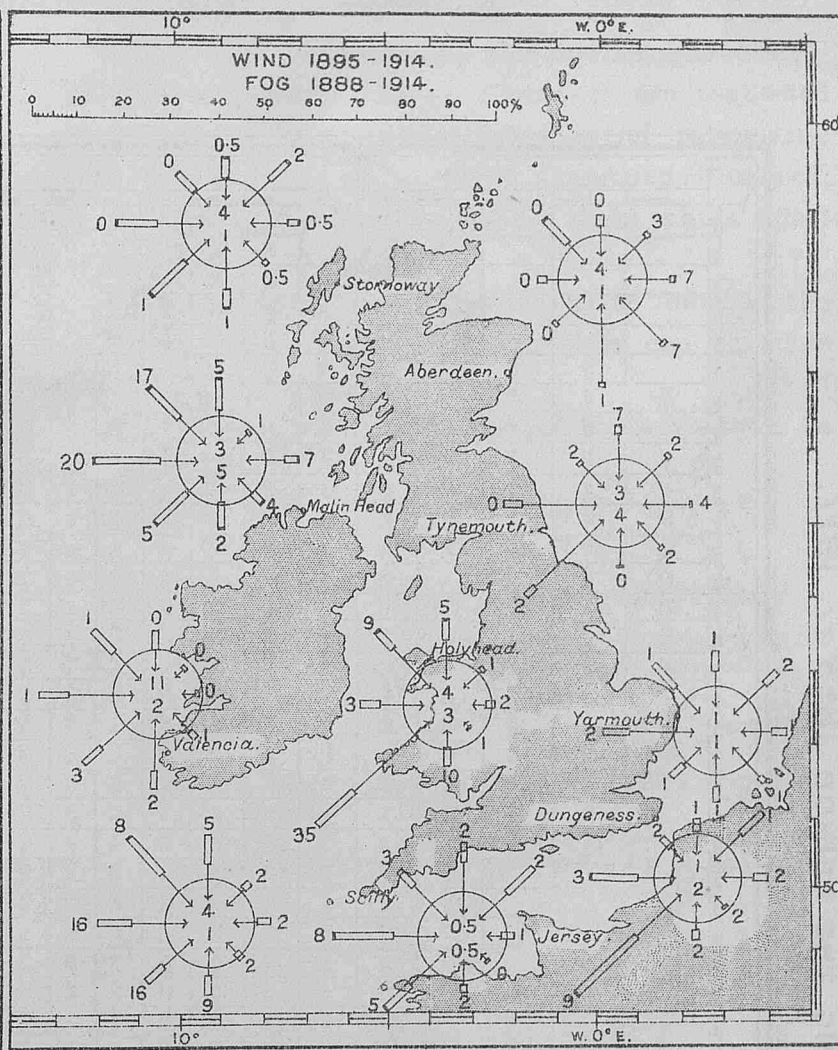
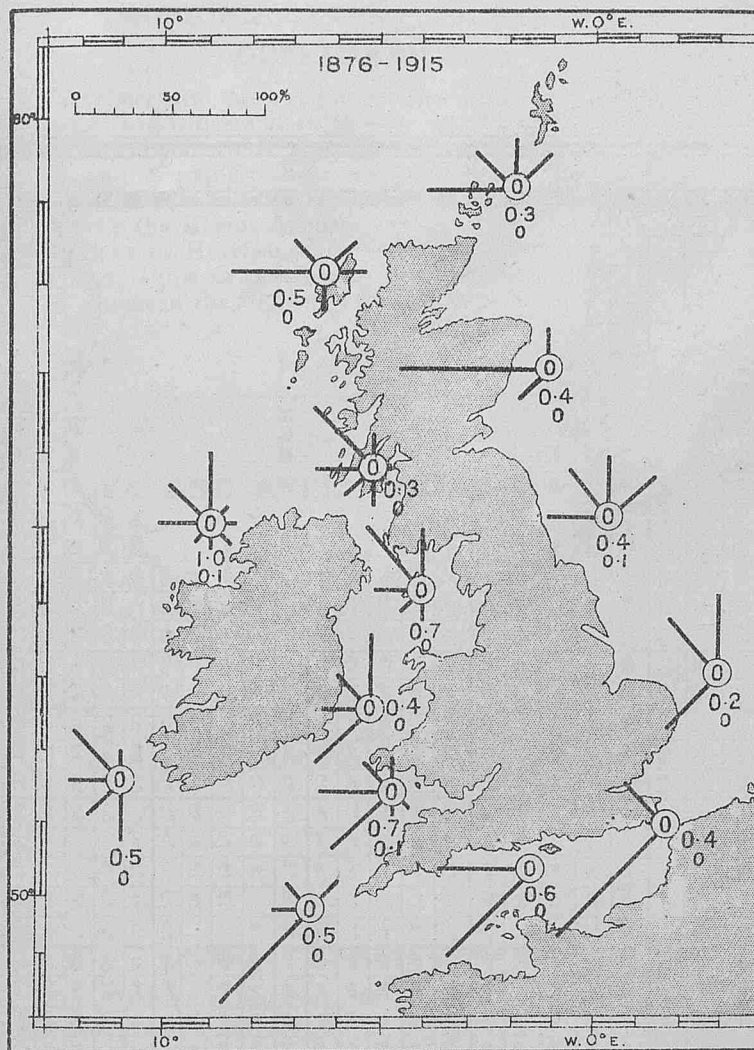


ICE CHART OF THE SOUTHERN HEMISPHERE, 1902-1925. JULY, AUGUST and SEPTEMBER.

EXPLANATION.

The symbols used to distinguish the records of each of the three months represented during the period 1902-1924, are as follows:—July, bergs Δ , pack ice $\sim\sim\sim\sim$; August, bergs \square , pack ice $\sim\sim\sim\sim$; September, bergs \circ , pack ice $\sim\sim\sim\sim$. No reports of ice have been received for these months, 1925. Extreme limits are given thus:—July, ————; August, ————; September,; these include ice reported since 1772.

WIND AND FOG AT COAST STATIONS. GREAT BRITAIN AND IRELAND



WIND, FOG AND MIST.

S.W. APPROACHES TO GREAT BRITAIN AND IRELAND.

Frequency of fog per thousand observations for each 2 points of compass 1921-1924.

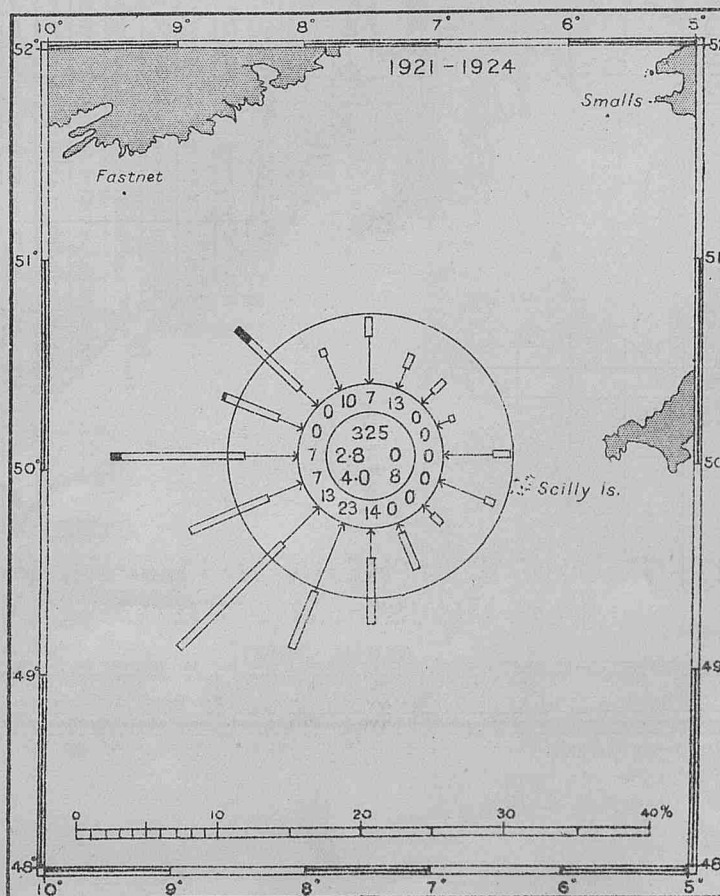
Latitude 48°-52°N.

Longitude 5°-10°W.

Direction. Frequency.

N	3
NNE	3
NE	0
ENE	0
E	0
ESE	0
SE	0
SSE	0
S	9
SSW	21
SW	19
WSW	6
W	9
WNW	0
NW	0
NNW	3
Calm	0
Var.	3
Total	76

Percentage frequency of fog and mist for area = 8%.

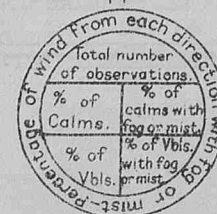


Mean and Maximum number of days with fog during the month at the different stations.

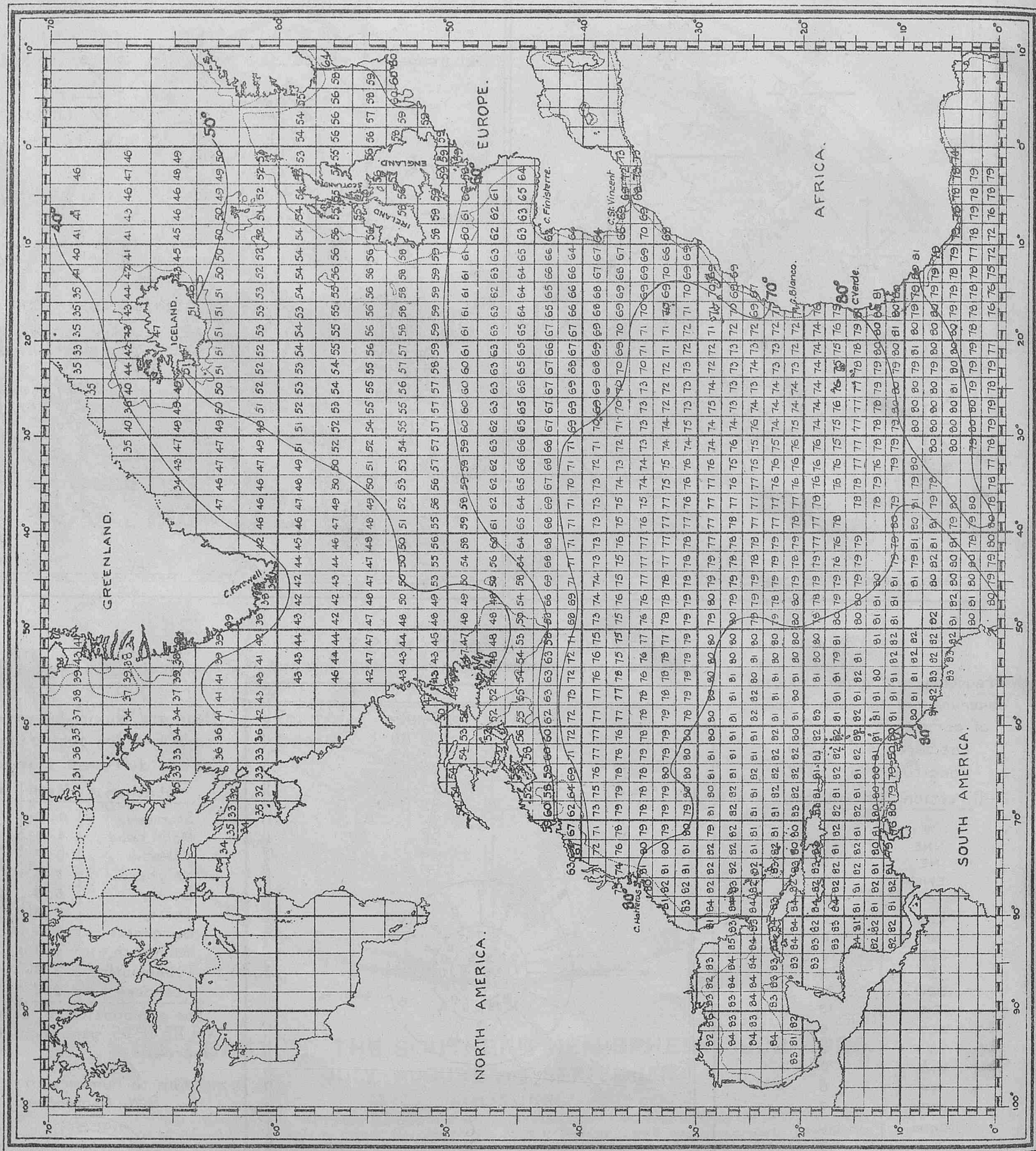
Station.	Mean.	Max.
Stornoway	0.7	4
Malin Head	4.9	11
Valencia	0.7	4
Holyhead	7.0	15
Scilly	5.3	10
Jersey	3.4	10
Dunegness	2.8	8
Yarmouth	1.3	5
Tynemouth	2.8	10
Aberdeen	2.2	7

For explanation of charts see Vol. III No 25, page 10, of this Journal.

Key to numbers in rose, S.W. Approaches.



MEAN SEA SURFACE TEMPERATURES FOR MONTH OF JULY. COMPUTED FROM ALL AVAILABLE SOURCES DURING THE PERIOD 1855 TO 1917. NORTH ATLANTIC.



NOTICES.

TROPICAL REVOLVING STORMS.

OBSERVATIONS.

Marine Observers are requested to bring to the notice of Commanders and Officers of ships who are not on the Meteorological Office list, Form 905 which was reproduced in the June Number of this year, and to request those who encounter Tropical Revolving Storms to send in observations set out in this form, which may be obtained from the Marine Agents.

Observations of Hurricanes, Cyclones and Typhoons are required from as many ships as possible in the vicinity of these storms for the development of the "Laws of Storms."

SEA AND SWELL MEASUREMENTS.

Marine Observers are invited to make special efforts to obtain measurements of Seas and Swells in all parts of the Oceans and under all conditions of weather. These observations are required for completing scales for routine observation and for many other purposes including information upon which to base form of ship's hull and construction.

An article will be found in Volume II, No. 19, upon "Sea and Swell" giving suggestions as to how to take these observations and Form 684 has been circulated to all regular observing ships for the purpose. Further supplies of Form 684 may be had on request.

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.

CARE OF INSTRUMENTS.

Marine Observers are earnestly requested to exercise every precaution in the care of instruments lent by the Meteorological Office.

It is requested that the Captains and Officers will give the Port Meteorological Officers assistance when they visit the ship, by having all instruments accessible for their inspection.

In the event of breakages or losses, the broken parts should be handed to the Port Meteorological Officer or Agent at the ports, with a brief and clear account of how the breakage or loss occurred.

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.

ILLUSTRATIONS FOR THE MARINE OBSERVER.

When making sketches, charts or plans, Marine Observers will give us great assistance if they will give consideration to reproduction in THE MARINE OBSERVER.

The size of any chart or drawing should not, if possible, exceed that of a page of THE MARINE OBSERVER, and if charts and drawings of all kinds are made with Indian Ink upon white drawing paper their reproduction will be greatly facilitated.

When photographs are sent in it would give us great assistance if they are accompanied by the plate or film, which will be returned if desired.

CONVERSION TABLE.

To Convert Inches into Millibars.

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

ICE REPORTS.

Commanders of ships in the Trans-North Atlantic and Southern Ocean Trades are earnestly requested to have the Ice Report Form 912 completed and returned at the end of each passage. A nil return is desired if no ice is seen.

These forms are supplied with THE MARINE OBSERVER each month to regular observing ships in these Trades.

ICE CHART. WESTERN NORTH ATLANTIC. IMPORTANT. TRANSATLANTIC TRACKS.

- (A) In case of necessity, owing to extreme southerly drift of ice, operative dates will be fixed for Track A.
- (B) From 1st February to 31st August, inclusive.
- (F) From 16th May to Opening of Belle Isle route, and to 30th November when not using the Belle Isle route.
- (F) Westbound, on approaching Cape Race steer a course to pass 10 miles S. of Cape Race.
- (F) Eastbound, steer from position 25 miles S. of Cape Race.
- (G) From opening of Belle Isle route to 14th November.

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

ROUTE NOTICES.

For latest information re Tracks see page 17 "Supplementary Board of Trade Notices to Mariners," 27th April, 1926.

SYMBOLS USED ON THE CHART.

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

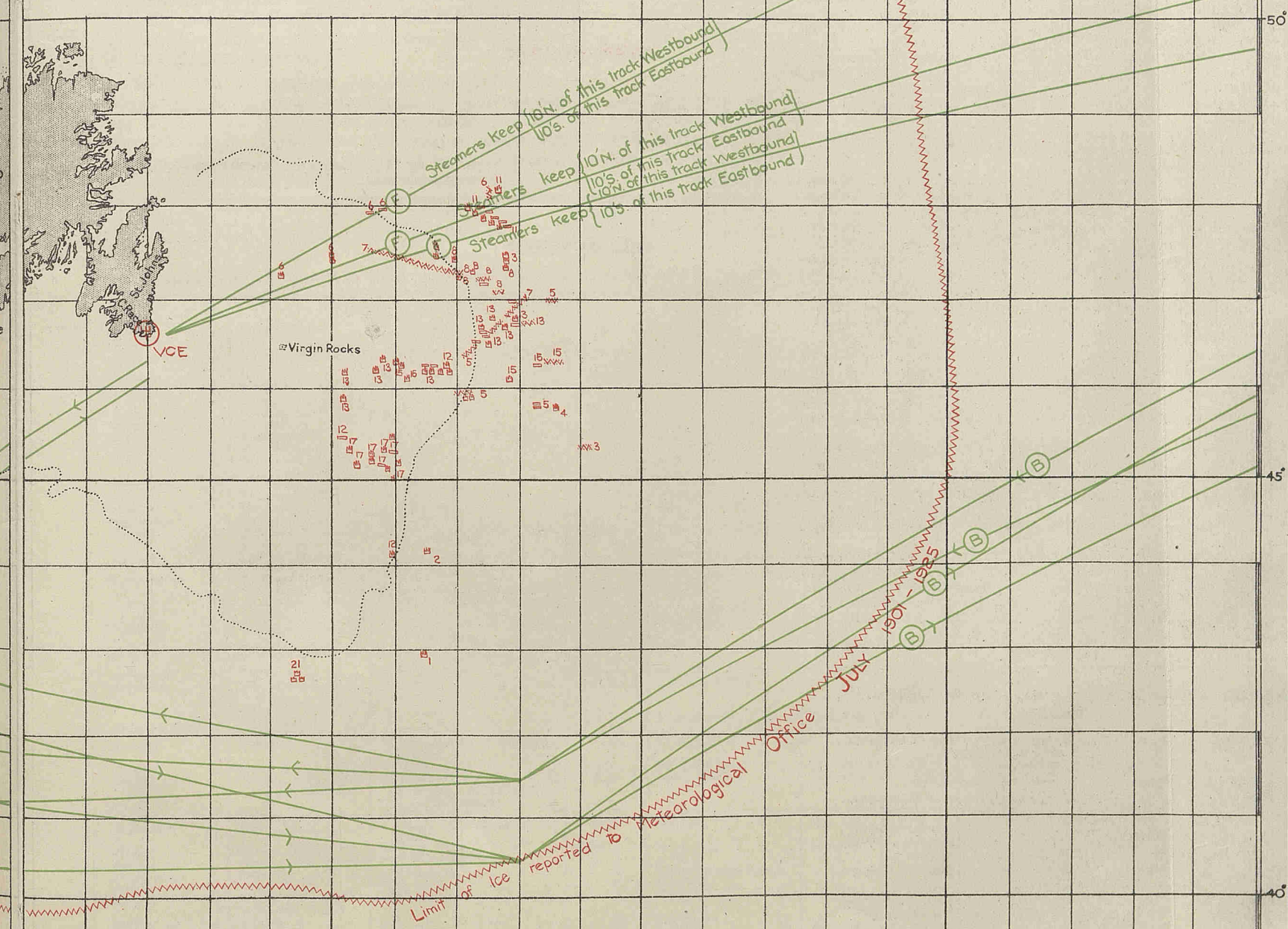
PHENOMENAL DRIFTS OF ICE.

Date.	Ship or Source of Report.	Position. Lat. Long.	Remarks.
July, —, 1890	S.S. Slavonia	48°53' N. 24°11' W.	Last remnants of berg.
" —, 1902	2 reports by Fishermen.	56°30' N. 6°30' W. approx.	40 to 50 ft. long, 15 ft. wide, 2 ft. 6 in. out of water.
" 31, 1909	S.S. Shimosa	36°59' N. 30°01' W.	25 ft. long, 3 to 8 ft. wide.
" 10, 1913	S.S. Lothian	37°27' N. 30°48' W.	Piece 6 ft. high, 50 ft. in cir.
" 18, 1916	U.S. Hydrographic Bulletin.	32°09' N. 54°28' W.	Piece of berg 3 or 4 ft. out of water.
" 23, 1916	S.S. San Giorgio	42°00' N. 69°24' W.	Berg, 60 ft. long.
" 23, 1918	U.S. Hyd. Bulletin	44°25' N. 55°01' W.	Large berg.
" 18, 1921	Do.	41°30' N. 39°26' W.	Small berg about 15 ft. sq.
" 21, 1921	Do.	39°09' N. 40°39' W.	Berg.
" 31, 1921	Do.	37°37' N. 27°29' W.	Berg.

Reports of Ice sighted between May 1st and May 31st, 1926, which have been received by the Meteorological Office, are shown by the Symbols plotted in the position reported, the figures indicating the day of the month.

LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 12th May, 1926, was received from the Superintendent, Canadian Signal Service, Quebec:—
"Cabot Strait, scattered ice not interfering with navigation; Magdalen Islands, scattered ice; Belle Isle Strait, heavy close packed ice everywhere, numerous bergs and growlers; elsewhere no ice."



May 1st and May 31st, 1926, Meteorological Office, are shown by the Symbols plotted in the position reported, the figures indicating the day of the month.

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, Ship's Meteorological Report, using the ship's instruments, the barometer being compared with Standards. The number of ships regularly contributing approved forms of all descriptions to the Marine Division is limited to 500.

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

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

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

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

Vessels making voyages of less than two months' duration are requested to retain their logs until nearly filled up, but the log should be returned in all cases at least twice yearly.

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.

Marine Observers who wish to assist in developing the rapid interchange of Meteorological information and Weather Forecasting at sea can do so by using the standard form, **not** in code, of W/T Weather Report suggested in "Weather Signals," given in Vol. III, No. 25, pages 14 and 15. For this purpose a mercurial barometer of which the index error has been ascertained is essential.

THE MARINE OBSERVER is sent monthly to all ships regularly contributing Logs, Forms and W/T Registers to the Meteorological Office. It is hoped that each ship will preserve *all* her copies. Personal copies of Numbers are sent to those whose special contributions are published in them. A suitable cover may be obtained from H.M. Stationery Office, price 2s.

Marine Agencies and Port Meteorological Officers.

LIVERPOOL	..	(Port Meteorological Office), Lieut.-Commander M. Cresswell, R.N.R., Dock Office. Telephone No.: Bank 8959.
CARDIFF	..	Captain T. Johnston, Technical College.
CLYDE	..	Captain M. C. Corrance, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow.
DUBLIN	..	{ Captain M. H. Clarke, Chief Surveyor, Department of Industry and Commerce, Marine Branch, 27, Eden Quay.
HULL	..	Captain Geo. B. Sturdy, c/o Mr. W. Hakes, Commercial Road.
LEITH	..	Captains G. Black and C. G. Bonner, V.C., D.S.C., Leith Salvage and Towage Co., Ltd., 2, Commercial Street.
SOUTHAMPTON	..	Captain D. Forbes, Nautical Academy, 1, Albion Place.
TYNE	..	Captain J. J. McEwan, Marine School, South Shields.
HONG KONG	..	Lieut.-Commander O. C. G. Leveson-Gower, R.N., Superintendent, Admiralty Chart and Chronometer Depot.
VANCOUVER	..	T. S. H. Shearman, Esq., Room 40, Post Office Building.
AUSTRALIA	..	The Commonwealth Meteorologist.

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

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

LATE PRESS.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
ENGLISH CHANNEL.			
17.5.26	48°55'N.	4°22'W.	Red cylindrical buoy, with small conical top mark superstructure apparently broken off. Very dangerous to navigation.
19.5.26	48°—'N.	6°40'W.	Large buoy painted red, partly covered with weed. Dangerous to navigation.
NORTH ATLANTIC.			
1.5.26	18°44'N.	75°18'W.	Log, about 20 ft. long, 6 ft. wide, awash.
1.5.26	32°30'N.	46°45'W.	Spar, approximately 50 ft. long covered with marine growth.
1.5.26	26°22'N.	75°08'W.	Wreckage.
2.5.26	39°50'N.	72°40'W.	Spar, about 75 ft. long, 2 ft. diameter, apparently schooner's mast.
18.5.26	48°28'N.	9°18'W.	Red conical buoy, drifting.
GULF OF MEXICO.			
5.5.26	29°—'N.	92°08'W.	Tree trunk, about 45 ft. long and 4 ft. diameter.

LIST OF VOLUNTARY OBSERVING SHIPS.

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

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

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

Only in special cases will individual letters be sent.

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

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

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

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

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

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

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

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

No. = Keeps Ship's Meteorological Report Form 911 with ship's instruments. Letter M after No. indicates ship's barometer Mercurial; A. ship's barometer Aneroid.

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

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

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.5.26.	Date Received.
<i>Aba</i> ...	Hughes, J. ...	R. A. Roberts, R. A. Downes, L. B. Silvester, S. J. Bristowe.	M.L.	Elder Dempster ...	Met. Log. 11.11.25 to 11.4.26...	23.4.26.
<i>Abinsi</i> ...	Wright, J. B. ...	R. R. Watson ...	No. A.	"	Form 911 31.3.26 to 9.5.26 ...	13.5.26.
<i>Achilles</i> ...	Hill, R. ...	D. MacTavish ...	" A.	A. Holt ...	" 8.10.25 to 19.10.25...	18.11.25.
<i>Actor</i> ...	Haylett, E. ...	A. Frew, J. McKay, G. Penston.	M.L.	Harrison ...	Met. Log. 28.1.26 to 4.4.26 ...	12.4.26.
<i>Adda</i> ...	Toft, J. T. ...	B. C. Davis ...	No. M.	Elder Dempster ...	" 17.3.26 to 24.4.26 ...	30.4.26.
<i>50 Adriatic</i> ...	Beadnell, F. E., Capt., R.N.R.	J. Collins, A. C. I. Anson, R. G. Roberts.	W.T.	White Star ...	W.T. Reg. 5.4.26 to 24.4.26 ...	30.4.26.
<i>Aeneas</i> ...	Wallace, W. K. ...	J. M. Anderson ...	No. A.	A. Holt ...	Form 911 4.4.26 to 24.4.26 ...	30.4.26.
<i>Agapenor</i> ...	Ramsay, J. ...	S. G. Ellams ...	" A.	"	" 21.3.26 to 9.4.26 ...	17.5.26.
<i>Alban</i> ...	Whayman, W. ...	C. D. Lane, A. T. Douglas ...	" A.	Booth ...	" 28.4.26 to 8.5.26 ...	17.5.26.
<i>Albania</i> ...	Gronow, S. ...	L. Harper ...	" A.	Cunard ...	" 6.12.25 to 22.12.25...	4.1.26.
<i>Alipore</i> ...	Gordon, L. M., R.D., Commr., R.N.R.	F. R. W. Page ...	" M.	P. and O. ...	" 29.8.25 to 22.9.25 ...	24.9.26.
<i>Almanzora</i> ...	Mackenzie, G. A. ...	J. Clark ...	" A.	R.M.S.P. ...	" 8.8.25 to 22.8.25 ...	21.9.25.
<i>Alondra</i> ...	Prendergast, J. J. ...	H. Peters ...	" A.	Yeoward ...	" 2.4.26 to 15.5.26 ...	19.5.26.
<i>Ampelco</i> ...	Vandenkerckhove, A. ...	A. Aspeslagh ...	" A.	American Petroleum...	" 28.3.26 to 16.5.26 ...	19.5.26.
<i>Antilochus</i> ...	Wilkinson, H. ...	E. T. Bayes ...	" A.	A. Holt ...	" 4.4.26 to 18.4.26 ...	26.4.26.
<i>Aorangi</i> ...	Crawford, R. ...	J. W. Bray, G. H. Kime, H. A. Titchfield.	M.L.	Canadian-Australasian	Met. Log. 10.11.25 to 31.3.26...	6.4.26.
<i>Appam</i> ...	Yardley, H. A., D.S.C.	S. C. Fry, J. A. McGough, W. Page.	"	Elder Dempster ...	Met. Log. 24.9.25 to 7.1.26 ...	2.2.26.
<i>30 Aquitania</i> ...	Charles, Sir J. T., W. K.B.E., C.B., R.D., Commodore, R.N.R.	J. L. Croasdale, R. G. Thelwell, J. Locke, R. V. Youd.	W.T.	Cunard ...	" 24.6.25 to 5.12.25 ...	24.12.25.
<i>62 Arabic</i> ...	Davies, J. ...	R. Walker, H. G. Morgan, W. Clements.	"	White Star ...	W.T. Reg. 4.4.26 to 19.4.26 ...	21.4.26.
<i>Arafura</i> ...	Gordon, A. S. ...	J. T. Heddle, G. C. Smith, O. B. Godfrey, F. O. Colvin.	M.L.	Eastern and Australian	" 25.4.26 to 9.5.26 ...	13.5.26.
<i>Archimedes</i> ...	Taylor, F. C. ...	F. W. Johnson ...	No. A.	Lamport & Holt ...	Form 911 21.4.26 to 13.5.26 ...	17.5.26.
<i>Ariquani</i> ...	Scudamore, J. H. H., D.S.C., R.D., Commr., R.N.R.	G. Dobson ...	M.L.	Elders & Fyffes ...	Met. Log. 20.4.26 to 14.5.26 ...	17.5.26.
<i>Armada Castle</i> ...	Millard, L. A., Knight, A.	"	M.L.	Union Castle ...	Met. Log. 6.1.26 to 4.4.26 ...	14.5.26.
<i>Arracan</i> ...	Willis, M. ...	R. McInnes, M. S. Stuart, C. C. Weir.	"	P. Henderson ...	" 7.6.25 to 8.7.25 ...	9.7.25.
<i>Arundel</i> ...	Short, H. ...	Mr. Hill ...	C.C.	Southern Rly. ...	" 28.2.26 to 3.4.26 ...	8.4.26.
<i>Arundel Castle</i> ...	Hague, J. W., Commr., R.N.R.	G. Blaiklock, C. Lloyd, H. S. Colbourne, T. A. Rainey, F. O. Wilbraham.	M.L.	Union Castle ...	Met. Log. 9.8.25 to 4.4.26 ...	19.4.26.
<i>Assyria</i> ...	Donald, D. R. ...	A. Middleton ...	No. A.	Anchor ...	" 4.1.26 to 11.4.26 ...	26.4.26.
<i>Astronomer</i> ...	Booth, W. M. ...	J. Rae, H. Thomas, E. Shatton.	M.L.	Harrison ...	Telegraphic Report 29.3.26 ...	29.3.26.
<i>Athenic</i> ...	Davies, E. ...	W. Hill ...	No. A.	White Star ...	Met. Log. 24.10.25 to 15.2.26...	23.2.26.
<i>Atrous</i> ...	Salter, G. H. ...	J. C. Podmore ...	" A.	A. Holt ...	Form 911 16.8.25 to 7.9.25 ...	9.9.25.
<i>Atsuta Maru</i> ...	Saito, B. ...	K. Murazumi ...	" A.	Nippon Yusen Kaisha	Met. Log. 29.8.25 to 12.1.26 ...	14.1.26.
<i>Auditor</i> ...	Owen, W. T. ...	T. E. Steel ...	" M.	Harrison ...	" 3.5.26 to 17.5.26 ...	19.5.26.
<i>Ausonia</i> ...	Gibbons, G., R.D., Commr., R.N.R.	L. T. Sampson ...	" A.	Cunard ...	" 1.4.26 to 18.4.26 ...	17.5.26.
<i>Author</i> ...	Kinloch, R. ...	"	" M.	Harrison ...	" 23.2.26 to 8.3.26 ...	15.3.26.
<i>Avon</i> ...	Adam, C., R.D., Commr., R.N.R.	E. S. Munch ...	" M.	R.M.S.P. ...	" 11.3.26 to 25.4.26 ...	10.5.26.
<i>Balfour</i> ...	Rothwell, A. ...	A. Hammersley ...	No. A.	Canadian Pacific ...	" 5.3.26 to 23.3.26 ...	6.4.26.
<i>51 Baltic</i> ...	White, E. R., Commr., R.N.R.	J. Farrell, H. R. Wilkinson	W.T.	White Star ...	Form 911 27.1.26 to 12.3.26 ...	17.3.26.
					W.T. Reg. 26.11.25 to 5.1.26 ...	20.1.26.
					Form 911 18.4.26 to 7.5.26 ...	13.5.26.
					" 21.3.26 to 11.4.26 ...	14.4.26.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.5.26.	Date Received.
<i>Bambra</i> ...	Buckeridge, G. ...	H. W. Norris, J. E. Turner, F. Humble.	M.L.	State Service, Australia	Met. Log. 12.8.25 to 22.11.25...	28.12.25.
<i>Bampton Castle</i> ...	Hutchings, A. H. ...	J. W. S. Brooks ...	No.	Union Castle ...	" 3.10.25 to 11.2.26 ...	15.2.26.
<i>Banbury Castle</i> ...	Singeisen, E. A., D.S.C., R.D., Capt., R.N.R.	" " " " " "	"	" " " " " "	" " " " " " " "	" " " " " " " "
<i>Banffshire</i> ...	Wynne, R. H. ...	J. M. Bowie ...	No. A.	Turnbull Martin ...	Form 911 23.3.26 to 27.4.26 ...	6.5.26.
<i>Baron Cawdor</i> ...	Cairns, W. ...	A. Campbell ...	" A.	Hogarth & Sons ...	" 26.7.25 to 16.10.25...	20.10.25.
<i>Barpeta</i> ...	Denne, G. A. ...	J. W. Knight ...	" M.	British India ...	" 24.3.26 to 22.4.26 ...	10.5.26.
<i>Baychimo</i> ...	Cornwall, S. A. ...	S. Jackson ...	" A.	Hudson's Bay Co. ...	" 18.11.25 to 9.1.26 ...	13.1.26.
<i>Beaufort</i> ...	Rice, W. V., D.S.O., D.S.C., Commr., R.N.	J. Taylor ...	M.L.	His Majesty's Ship ...	Met. Log. 14.8.25 to 13.11.25...	11.1.26.
59 <i>Belgenland</i> ...	Bradshaw, J. ...	C. J. Murray, J. M. Appleby, J. Hargreaves.	W.T.	Red Star ...	Met. Log. 12.11.25 to 17.4.26... W.T. Reg. 13.11.25 to 17.4.26... Form 911 3.10.25 to 21.10.25	19.4.26. 19.4.26. 23.10.25.
<i>Benalder</i> ...	Cole, J. H., D.S.C....	T. S. Rawlinsong ...	No. A.	Ben Line ...	" 22.2.26 to 3.4.26 ...	8.4.26.
<i>Bendigo</i> ...	Nicholl, R. N. C. ...	C. E. Arundel ...	" M.	P. & O. Branch ...	" 7.1.26 to 25.1.26 ...	15.3.26.
<i>Bengloe</i> ...	McCorquodale, A. ...	G. M. Duff ...	" A.	Ben Line ...	" 12.8.25 to 29.8.25 ...	30.9.25.
31 <i>Berengaria</i> ...	Diggle, E. G., R.D., Jones, D. C., Capt., R.N.R.	J. A. Myles, W. C. A. Robson, E. W. Connell.	W.T.	Cunard ...	W.T. Reg. 11.4.26 to 26.4.26 ...	30.4.26.
<i>Berrima</i> ...	Townshend, W. P.	T. Ferguson ...	No. M.	P. & O. Branch ...	Form 911 13.2.26 to 30.3.26 ...	11.5.26.
<i>Bintang</i> ...	Morzer Bruyns, M. F.	A. A. H. Blankestyn ...	" M.	Nederland ...	" 27.3.26 to 8.4.26 ...	10.5.26.
<i>Bogota</i> ...	Dunn, R. E., O.B.E.	T. R. Thomas ...	" A.	R.M.S.P. Co. ...	" 8.10.25 to 28.10.25...	5.11.25.
<i>Bolingbroke</i> ...	Jones, D. C., Capt., R.N.R.	C. A. Mott ...	M.L.	Canadian Pacific ...	Met. Log. 30.6.25 to 16.1.26 ...	20.1.26.
<i>Borda</i> ...	Holland, R. ...	" " " " " "	No. M.	P. & O. Branch ...	Form 911 25.7.25 to 1.9.25 ...	15.2.26.
<i>Bothwell</i> ...	Jones, D. J. C. ...	G. Mowatt ...	" A.	Canadian Pacific ...	" 31.10.25 to 30.11.25	8.12.25.
<i>Brandon</i> ...	Henderson, W. ...	T. Beck ...	" A.	" " " " " "	" 15.2.26 to 17.3.26 ...	20.3.26.
<i>Brecon</i> ...	McCombie, G. ...	F. E. Bevis ...	" A.	" " " " " "	" 16.3.26 to 19.4.26 ...	28.4.26.
<i>Brenda</i> ...	Lightbody, J. ...	F. R. Ness ...	" A.	Scottish Fishery Board ...	Form 911 21.3.26 to 30.4.26 ...	10.5.26.
<i>Brighton</i> ...	Hill, A. ...	Mr. Munton ...	C.C.	Southern Railway ...	Telegraphic Report 18.5.26	18.5.26.
<i>British Advocate</i> ...	Taylor, R. J. ...	C. J. Metcalf ...	No. M.	British Tankers ...	Form 911 17.10.25 to 13.3.26...	17.3.26.
<i>British Engineer</i> ...	Joures, T. W. ...	E. L. W. Evans ...	" M.	" " " " " "	" 26.1.26 to 9.3.26 ...	12.4.26.
<i>British Soldier</i> ...	Putt, R. O. ...	H. J. Crangle ...	" A.	" " " " " "	" 13.3.26 to 4.4.26 ...	26.4.26.
<i>Browning</i> ...	Connorton, W. A. ...	A. B. Murray ...	" A.	Lampert & Holt ...	" 16.11.25 to 13.2.26...	16.2.26.
<i>Bruyere</i> ...	Denson, W. ...	R. Mowbray ...	" A.	" " " " " "	" 20.1.26 to 12.2.26	22.3.26.
<i>Cambria C.S.</i> ...	Sherwood, C. A. ...	H. Selby, A. J. English, B. C. Farrow.	M.L.	Eastern Tel. Co. ...	Met. Log. 14.7.25 to 21.11.25...	26.1.26.
<i>Cambrina</i> ...	Telfer, J.E. ...	V. S. Phillips ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report 10.4.26 ...	10.4.26.
<i>Cameronia</i> ...	Smart, R. W. ...	C. Paton ...	No.	Anchor ...	" " " " " " " "	" " " " " " " "
<i>Camito</i> ...	Scudamore, J. H. H., D.S.C., Commr., R.N.R.	R. M. Cossantine, P. C. Congdon, A. E. Harvey, F. Dudgeon, W. G. W. Chanter.	M.L.	Elders & Fyffes ...	Met. Log. 14.9.25 to 15.1.26 ...	20.1.26.
<i>Canada</i> ...	Jones, T. ...	G. T. Kavanagh ...	No. M.	White Star-Dominion	Form 911 24.4.26 to 17.5.26 ...	19.5.26.
<i>Canadian Importer</i> ...	Wallace, C. ...	C. W. Gilding ...	" A.	Canadian Govt. Mercantile Marine.	" 1.6.25 to 7.7.25 ...	24.7.25.
<i>Canadian Inventor</i> ...	Boulton, F. W. ...	T. Edgar ...	" A.	" " " " " "	" 21.11.25 to 9.12.25...	1.2.26.
<i>Canadian Miller</i> ...	McConehy, W. T. ...	B. D. Ranns ...	" A.	" " " " " "	" " " " " " " "	" " " " " " " "
<i>Canadian Scottish</i> ...	Wallace, C. ...	P. D. Angus ...	" A.	" " " " " "	Form 911 7.11.25 to 20.12.25 ...	2.2.26.
<i>Canadian Skirmisher</i> ...	Millar, W. H. ...	R. J. Watson ...	" A.	" " " " " "	" 3.3.26 to 15.4.26 ...	5.5.26.
<i>Canadian Winner</i> ...	Hocking, N. P. ...	R. Girling ...	" M.	" " " " " "	" 15.3.26 to 28.4.26 ...	4.5.26.
<i>Carlou Castle</i> ...	Whitfield, G. J. ...	J. W. Kirby ...	" A.	Union Castle ...	" 8.5.25 to 2.6.25 ...	8.6.25.
35 <i>Carmania</i> ...	Brown, E. G., R.D., Capt., R.N.R.	W. M. Stewart, W. B. Tanner, L. Harper, D. E. Sibson.	W.T.	Cunard ...	W.T. Reg. 1.3.26 to 21.3.26 ...	25.3.26.
34 <i>Caronia</i> ...	Hossack, W. H., R.D., Capt., R.N.R.	R. F. Bovey, T. Ashcroft, D. Butler.	"	" " " " " "	W.T. Reg. 25.4.26 to 1.5.26 ...	19.5.26.
52 <i>Cedric</i> ...	Hickson, V. W., Lt.-Commr., R.N.R.	E. A. Crowley, A. Thompson, D. K. Crawford.	"	White Star ...	Form 911 9.4.26 to 9.5.26 ...	17.5.26.
53 <i>Celtic</i> ...	Berry, G. ...	J. W. Peters, F. E. Patchett, H. C. Gray.	"	" " " " " "	W.T. Reg. 19.4.26 to 2.5.26 ...	13.5.26.
<i>Centauro</i> ...	Rose, A. F. ...	L. Johnston ...	No. M.	A. Holt & Co. ...	Form 911 28.3.26 to 16.5.26 ...	18.5.26.
<i>Ceramic</i> ...	Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R.	D. W. Chamberlain ...	" A.	White Star ...	" 6.2.26 to 26.3.26 ...	3.5.26.
<i>Changte</i> ...	Gambrell, F. C. ...	J. Thomas, Tyer, J. A. Allan	M.L.	Yuill & Co....	Met. Log. 30.9.25 to 28.1.26 ...	24.3.26.
<i>China</i> ...	Cossey, W. F. ...	E. R. Chaffin ...	No. M.	P. & O. ...	Form 911 31.3.26 to 19.4.26 ...	21.4.26.
<i>Chindwara</i> ...	Brisley, P. L. ...	W. Welch ...	" M.	British India ...	" 29.8.25 to 17.12.25...	11.1.26.
<i>Chindwin</i> ...	Besslemont, C. ...	J. Summers, J. P. Stewart, C. S. Owen.	M.L.	P. Henderson ...	Met. Log. 22.8.25 to 18.2.26 ...	4.3.26.
<i>City of Baroda</i> ...	Houghton, W. ...	A. Beaton, J. Cook, H. N. Jones.	M.L.	Ellerman ...	Met. Log. 27.5.25 to 13.8.25 ...	17.8.25.
<i>City of Benares</i> ...	Spencer, H. ...	C. G. Inglis ...	No. A.	" " " " " "	Form 911 27.3.26 to 13.4.26 ...	22.4.26.
<i>City of Brisbane</i> ...	Seaborne, F. O., D.S.C.	R. W. Watkin ...	" A.	" " " " " "	" 15.3.26 to 17.4.26 ...	20.4.26.
<i>City of Canterbury</i> ...	Bremner, D. M. ...	A. M. Hamilton ...	" A.	" " " " " "	" 3.4.25 to 24.6.25 ...	29.6.25.
<i>City of Chester</i> ...	Letton, F. W. ...	F. C. Wilson, H. Asher, W. Speakman.	M.L.	" " " " " "	Met. Log. 15.11.25 to 3.3.26 ...	8.3.26.
<i>City of Edinburgh</i> ...	Spencer, H. ...	J. D. MacDonald ...	No. M.	" " " " " "	Form 911 4.6.25 to 2.7.25 ...	18.8.25.
<i>City of London</i> ...	Martin, D. ...	J. J. McTigue ...	" A.	" " " " " "	" 8.3.26 to 2.4.26 ...	12.4.26.
<i>City of Marseilles</i> ...	Brown, G. ...	W. A. MacAdams, G. F. L. Coates.	" A.	" " " " " "	" 25.2.26 to 18.3.26 ...	22.3.26.
<i>City of Rangoon</i> ...	Dunning, T. W. J....	A. Gibb, V. S. Turner, A. H. Cosker, E. J. Sawyer, G. Lawrey.	M.L.	" " " " " "	Met. Log. 16.6.25 to 17.11.25...	9.12.25.
<i>City of Valencia</i> ...	Williamson, W. A., R.D., Lieut.-Commr., R.N.R.	C. C. Duncan ...	No. M.	" " " " " "	Form 911 5.3.25 to 3.4.25 ...	2.6.25.
<i>City of Yokohama</i> ...	McDonald, W. D. ...	R. A. Jutton ...	" A.	" " " " " "	" 14.1.26 to 28.1.26 ...	15.2.26.
<i>Clan Lamont</i> ...	McCormish, A. B. ...	C. W. Banbury, A. F. Martin	" A.	Clan ...	" 31.1.26 to 8.3.26 ...	6.4.26.
<i>Clan Lindsay</i> ...	Willits, J., R.D., Commr., R.N.R.	J. C. Carter ...	" A.	" " " " " "	" 9.4.26 to 28.4.26 ...	3.5.26.
<i>Clan Macbeth</i> ...	Young, A. H., R.D., Lieut.-Commr., R.N.R.	J. T. Bell... ..	" A.	" " " " " "	" 17.2.26 to 19.3.26 ...	25.3.26.
<i>Clan Macfadyen</i> ...	Stenson, F. J., R.D., Capt., R.N.R.	R. Hindmarsh ...	" A.	" " " " " "	" 11.2.26 to 7.3.26 ...	30.3.26.
<i>Clan Macgillivray</i> ...	West, W. F. ...	P. G. de Gruchy ...	" A.	" " " " " "	" 18.12.25 to 17.1.26...	11.2.26.
<i>Clan Macindoe</i> ...	Law, A. ...	J. G. Baillie ...	" A.	" " " " " "	" 22.10.25 to 20.1.26...	8.2.26.
<i>Clan Mackellar</i> ...	Scotland, A. ...	D. McAllister ...	" A.	" " " " " "	" 11.4.26 to 29.4.26 ...	17.5.26.

LIST OF VOLUNTARY OBSERVING SHIPS

iii

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.5.26.	Date Received.
<i>Clan Mackinnon</i>	McLean, J. G. ...	W. F. Isaac, S. Y. Strange, J. E. Clayton, ...	M.L.	Clan ...	Met. Log. 5.11.25 to 16.2.26 ...	22.3.26.
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	D. S. Rae, A. W. Jones, J. J. Millar, ...	"	" ...	" 28.12.24 to 24.7.25...	4.8.25.
<i>Clan Macnaughton</i>	Thomson, W. ...	A. J. Storkey, D. MacDiarmid ...	No. A.	" ...	Form 911 24.12.25 to 13.1.26...	22.2.26.
<i>Clan MacLaggart</i> ...	Gray, J. N. ...	W. J. Henderson ...	" A.	" ...	" 12.2.26 to 1.3.26 ...	6.4.26.
<i>Clan MacTavish</i>	Higgins, C. J. ...	" ...	" A.	" ...	" ...	"
<i>Clan Macvicar</i> ...	Phillips, G. P. ...	L. S. Murrin ...	" A.	" ...	Form 911 14.7.25 to 2.8.25 ...	24.8.25.
<i>Clan Macwilliam</i>	Williamson, A. ...	" ...	" A.	" ...	" ...	"
<i>Clan Malcolm</i> ...	Neill, G. A. ...	S. M. Werrey Easterbrook, N. MacLeod, ...	M.L.	" ...	Met. Log. 18.10.25 to 5.4.26 ...	13.4.26.
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	G. Morren ...	No. A.	" ...	Form 911 30.3.26 to 6.5.26 ...	13.5.26.
<i>Clan Murdoch</i> ...	Miller, W. ...	P. McMillan ...	" A.	" ...	" 24.3.26 to 14.4.26 ...	17.5.26.
<i>Clan Ranald</i> ...	Openshaw, L. G. ...	T. E. Woodall ...	" A.	" ...	" 22.1.26 to 23.2.26 ...	25.2.26.
<i>Clan Ross</i> ...	Jones, R. C. ...	G. Short ...	" A.	" ...	" 4.3.26 to 27.4.26 ...	17.5.26.
<i>Clan Sinclair</i> ...	Neill, G. A. ...	J. Brittain ...	" A.	" ...	" 10.3.25 to 29.7.25 ...	5.8.25.
<i>Clan Urquhart</i> ...	Gibb, A. F. W. ...	T. G. Mitchell ...	" A.	" ...	" 29.3.26 to 4.4.26 ...	10.5.26.
<i>Colonia, C.S.</i> ...	Garnham, S. A. ...	A. S. Muir, F. Bolingbroke, J. M. Matthews, W. Sangwine, ...	M.L.	Telegraph Construction & Maintenance.	Met. Log. 29.8.25 to 1.10.25 ...	9.10.25.
<i>Colonian</i> ...	Gittins, R. P. ...	T. A. Schofield-Miller ...	No. A.	Leyland ...	Form 911 7.1.26 to 31.1.26 ...	8.2.26.
<i>Concordia</i> ...	Morris, J. ...	T. Philip, J. McIntosh, ...	M.L.	Anchor Donaldson ...	Met. Log. 7.8.25 to 8.2.26 ...	19.2.26.
<i>Comino</i> ...	Telfer, J. H. ...	J. Davies, H. A. Hartley, ...	"	"	"	"
<i>Copenhagen</i> ...	Nuttall, E. L. ...	E. J. Johnson ...	No. A.	Furness Withy ...	Form 911 27.3.26 to 2.5.26 ...	3.5.26.
<i>Corinthic</i> ...	Kerr, J. J. ...	" ...	"	Glen & Co. ...	"	"
<i>Cornish City</i> ...	Hart, F. ...	F. Kean, M. Bennett, F. G. Rogers, ...	M.L.	White Star ...	Met. Log. 4.4.25 to 18.7.25 ...	27.7.25.
<i>Cornwall</i> ...	James, D. P. ...	" ...	No. A.	Reardon Smith ...	"	"
<i>Crawford Castle</i> ...	Haines, F. P. ...	Mr. Maltby, Mr. Ray ...	No. A.	Federal ...	Form 911 4.7.25 to 13.8.25 ...	21.9.25.
<i>Cristales</i> ...	Morgan, A. O., R.D., ...	J. E. R. Wilford ...	" A.	Union Castle ...	" 10.1.26 to 9.2.26 ...	15.2.26.
<i>Culebra</i> ...	Commr. R.N.R.	"	"	"	"	"
<i>Cumberland</i> ...	Isaacson, J. M. ...	P. Cooper, J. W. Duncan, ...	M.L.	Elders & Fyffes ...	Met. Log. 4.5.25 to 15.12.25 ...	1.1.26.
<i>Cuthbert</i> ...	Mackay, A. S., R.D., ...	C. A. Payne, ...	"	"	"	"
<i>Cyclops</i> ...	Commr. R.N.R.	"	"	"	"	"
<i>Dardanus</i> ...	Deith, G. T. ...	" ...	No.	Federal ...	"	"
<i>Darian</i> ...	Barlow, F. P. ...	S. E. Adam ...	No. A.	Booth ...	Form 911 10.1.26 to 24.2.26 ...	15.3.26.
<i>Darro</i> ...	Cosker, W. ...	H. L. Cole ...	" A.	A. Holt ...	" 4.3.26 to 16.3.26 ...	8.4.26.
<i>Demerara</i> ...	Williams, D. T. ...	C. F. Morgan ...	" A.	"	" 20.4.26 to 27.4.26 ...	7.5.26.
<i>Demosthenes</i> ...	Masters, W. ...	A. S. Holland ...	" A.	Leyland ...	" 17.1.26 to 8.3.26 ...	10.3.26.
<i>Desado</i> ...	Matthews, G. P. ...	R. S. Holland, A. Barff ...	" M.	R.M.S.P. Co. ...	" 24.1.26 to 21.3.26 ...	23.3.26.
<i>Desna</i> ...	Willan, F. C. L. ...	J. J. C. Blake ...	" M.	R.M.S.P. Co. ...	" 12.1.26 to 8.3.26 ...	10.3.26.
<i>Diepion</i> ...	Orriss, F. A. ...	S. J. Buckland ...	" M.	Aberdeen ...	" 24.1.26 to 9.3.26 ...	18.3.26.
<i>Dieppe</i> ...	Hannam, F. S. ...	A. H. Phillipson ...	" M.	R.M.S.P. Co. ...	" 12.2.26 to 31.3.26 ...	6.4.26.
<i>Dimboola</i> ...	Huff, G. F. ...	J. W. Smith ...	" M.	"	" 20.2.26 to 17.4.26 ...	21.4.26.
<i>Discoverer</i> ...	Findlay, J. ...	L. E. Brown ...	" A.	A. Holt ...	" 16.1.26 to 5.4.26 ...	12.4.26.
<i>Discovery, R.R.S.</i>	Marmery, S. ...	Mr. Parsons ...	C.C.	Southern Railway ...	Telegraphic Report 19.5.26 ...	19.5.26.
<i>Domala, M.V.</i> ...	Roy, C. M. ...	G. A. Molyneux ...	No. A.	Melbourne S.S. Co. ...	Form 911 19.2.26 to 14.4.26 ...	17.5.26.
<i>Doric</i> ...	Ling, J. T. ...	H. Hall ...	" M.	Harrison ...	" 19.12.25 to 5.2.26 ...	25.3.26.
<i>Doric Star</i> ...	Stenhouse, J. R., D.S.O., D.S.C., O.B.E., R.D., Commr. R.N.R.	T. W. Goodchild ...	M.L.	Discovery Expedition	Met. Log. 24.7.25 to 7.1.26 ...	19.2.26.
<i>Dorington Court</i> ...	Buswell, W. ...	C. E. Merchant ...	No. M.	British India ...	Form 911 20.2.26 to 21.4.26 ...	6.5.26.
<i>Dorset</i> ...	S. Bolton, D.S.C., R.D., Commr. R.N.R.	W. F. Dennison, W. Nicoll, E. N. Lloyd, ...	No.	White Star ...	W.T. Reg. 18.4.26 to 11.5.26 ...	17.5.26.
<i>Dorsetshire</i> ...	Thomas, R. T. ...	L. McDermott ...	No. M.	Blue Star ...	Form 911 16.4.26 to 12.5.26 ...	17.5.26.
<i>Dromore Castle</i> ...	Isaacs, W. A. ...	E. D. A. Gibbs ...	" A.	Haldin & Co. ...	" 11.4.26 to 21.4.26 ...	3.5.26.
<i>Dryden</i> ...	Kettlewell, C. R. ...	E. Smith, H. S. Rogers, S. T. Woodhouse, ...	M.L.	New Zealand S.S. Co. ...	Met. Log. 12.9.25 to 6.11.25 ...	20.11.25.
<i>Duendes</i> ...	Adamson, B. W. ...	C. H. Griffiths, W. A. Kent, R. Cuming, J. Logan, ...	"	Bibby ...	" 3.10.25 to 7.1.26 ...	12.1.26.
<i>Dundrum Castle</i> ...	Vincent, E. S., R.D., Commr. R.N.R.	D. H. McDougall ...	No. A.	Union Castle ...	Form 911 6.3.26 to 3.4.26 ...	3.5.26.
<i>Dunrobin</i> ...	Major, T. W. ...	A. Hewitt ...	" M.	Lampert & Holt ...	" 1.9.25 to 17.9.25 ...	7.10.25.
<i>Duquesa</i> ...	Cox, F. D. ...	H. Jones ...	" M.	P.S.N. Co. ...	" 15.2.26 to 3.3.26 ...	8.3.26.
<i>Durenda</i> ...	Weller, H. E. ...	W. S. Byles ...	" A.	Union Castle ...	" 9.2.26 to 9.3.26 ...	10.3.26.
<i>Edinburgh Castle</i>	Ramsay, J. D. ...	M. M. Ramsay ...	" A.	Glen & Co. ...	" 9.3.26 to 2.4.26 ...	22.4.26.
<i>El Cordobes</i> ...	Ellis, F., D.S.C. ...	W. Myerscough ...	" M.	Furness Withy ...	" 6.2.26 to 2.4.26 ...	12.4.26.
<i>Elmina</i> ...	Wilson, W. ...	K. G. Pullman ...	" M.	British India ...	" 1.1.26 to 9.1.26 ...	1.2.26.
<i>El Paraguay</i> ...	Morton Betts, W. ...	" ...	M.L.	Union Castle ...	Met. Log. 5.9.25 to 27.12.25 ...	30.12.25.
<i>Elpenor</i> ...	Noton, F. G. ...	S. C. N. Burridge ...	No. A.	British & Argentine S.N. Co. ...	Form 911 17.1.26 to 15.2.26 ...	10.5.26.
<i>Empress of Asia</i> ...	Allen, E. E. ...	R. A. Roberts, J. A. Jones, C. V. Evans, ...	M.L.	Elder Dempster ...	Met. Log. 9.9.25 to 3.11.25 ...	16.11.25.
<i>Empress of Australia</i> .	Smith, F. C. ...	J. Allerton ...	No. M.	Houlder Bros. ...	Form 911 4.2.26 to 28.3.26 ...	6.4.26.
<i>Empress of Canada</i>	T. W. Hannay ...	M. Robertson ...	M.L.	A. Holt ...	Met. Log. 1.11.25 to 1.3.26 ...	4.3.26.
<i>Empress of France</i>	Douglas, L. D., R.D., Lt. - Commr., R.N.R.	R. H. Foley, M. Kissack, L. Johnston, L. C. Hogg, T. M. W. Golby, ...	"	Canadian Pacific ...	" 17.9.25 to 20.1.26 ...	2.3.26.
<i>Empress of Russia</i>	Halley, A. J. ...	R. Leicester, J. Downes ...	"	"	" 21.3.25 to 17.12.25...	12.1.26.
<i>Empress of Scotland</i>	Robinson, S., C.B.E., R.D., Commr., R.N.R.	W. S. Halliday, L. C. Barry, J. W. Thomas, ...	"	"	" 15.5.25 to 21.9.25 ...	16.12.25.
<i>Endeavour</i> ...	Griffiths, E. ...	E. Roberts, F. Chodzko, W. Ewens, ...	"	"	" 27.1.26 to 13.4.26 ...	19.4.26.
<i>Essequibo</i> ...	Hosken, A. J. ...	G. R. Newell, H. B. Metcalfe, J. S. Clark, J. H. Reid, ...	"	"	" 17.10.25 to 22.2.26 ...	29.3.26.
<i>Eumaeus</i> ...	Latta, R. G. ...	B. Grant, W. Bacon, F. G. Hutchings, ...	"	"	" 14.11.25 to 20.4.26...	26.4.26.
<i>Euripides</i> ...	Commr. S. A. Geary-Hill, D.S.O., R.N.	G. S. Norrington, E. V. B. Baker, E. H. B. Baker, J. Torlesse, ...	"	His Majesty's Ship ...	" 7.11.25 to 2.3.26 ...	23.3.26.
<i>Eurybates</i> ...	Duncan, E. E. ...	A. Lyall ...	No. M.	R.M.S.P. Co. ...	Form 911 29.1.26 to 14.3.26 ...	29.3.26.
<i>Explorer</i> ...	Read, J. W. ...	W. J. Ryan ...	" A.	A. Holt ...	" 18.4.26 to 26.4.26 ...	7.5.26.
<i>Ferndale</i> ...	Roberts, T. V. ...	H. S. Cox, G. R. Fisher, G. Perry, ...	M.L.	Aberdeen ...	Met. Log. 17.7.25 to 16.4.26 ...	23.4.26.
	Carnon, C. G. ...	C. Napier ...	No. A.	A. Holt ...	Form 911 27.3.26 to 7.4.26 ...	19.4.26.
	Lamont, A. ...	Scientific Staff ...	M.L.	Scottish Fishery Board	Met. Log. 2.3.25 to 17.10.25 ...	29.12.25.
	Daniel, F. ...	D. Jones ...	No. M.	Commonwealth Govt.	Form 911 7.3.26 to 7.4.26 ...	11.5.26.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.5.26.	Date Received.
<i>Fitzroy</i> ...	Silk, H. V., Lt.-Commr., R.N.	M. E. Welby ...	M.L.	His Majesty's Ship ...	Met. Log. 25.8.25 to 16.11.25...	21.11.25.
<i>Flandria</i> ...	Veldkamp, G. J. ...	T. Doornbosch ...	No. M.	Holland Lloyd ...	Form 911 12.3.26 to 29.4.26 ...	3.5.26.
<i>Flinders</i> ...	Henderson, D. A., Lt.-Commr., R.N.	H. E. Turner ...	M.L.	His Majesty's Ship ...	Met. Log. 23.8.25 to 20.11.25...	2.12.25.
<i>Francisco</i> ...	Collins, F. ...	C. Walker ...	No. A.	Ellerman Wilson ...	Form 911 23.1.26 to 5.2.26 ...	15.2.26.
<i>Freya</i> ...	Angus, W. ...	J. Murray ...	" A.	Scottish Fishery Board ...	" 1.4.26 to 30.4.26 ...	5.5.26.
<i>Garret</i> ...	Visser, C. W. ...	C. J. Vandenberg ...	" M.	Rotterdam Lloyd ...	" 20.1.26 to 20.2.26 ...	12.4.26.
<i>Gascoyne</i> ...	Rutt, W. N. ...	R. Simpson ...	" A.	Dalgaty & Co. ...	" 19.1.26 to 24.2.26 ...	30.3.26.
<i>Gelria</i> ...	Bakker, T. J. ...	K. H. Schilp ...	" M.	Holland Lloyd ...	" 26.3.26 to 13.5.26 ...	17.5.26.
<i>Glenamoy, M.V.</i> ...	Angier, J. ...	R. H. Bishop ...	" A.	Glen Line ...	" 17.3.26 to 6.5.26 ...	17.5.26.
<i>Glenapp, M.V.</i> ...	Roberts, W. E. ...	S. W. Bell ...	" A.	" ...	" 14.11.25 to 27.12.25 ...	4.1.26.
<i>Glenshane</i> ...	Beer, E. ...	R. A. Dale ...	" A.	" ...	" 21.2.26 to 11.3.26 ...	6.4.26.
<i>Gloucestershire</i> ...	Robin, E. ...	M. W. Simmons ...	" A.	Bibby ...	" 30.1.26 to 9.4.26 ...	12.4.26.
<i>Gorgon</i> ...	Hughes, J. W. ...	E. W. Powell ...	" A.	A. Holt & Co. ...	" 19.3.26 to 4.4.26 ...	11.5.26.
<i>Gourko</i> ...	Aspinall, A. E. ...	G. B. Bray, S. N. Stokes, J. D. Birch.	No.	Ellerman Wilson ...	Met. Log. 16.5.25 to 1.11.25 ...	10.12.25.
<i>Haliartus</i> ...	Marsh, L. V. ...	W. H. Upton ...	No. A.	R. P. Houston ...	Form 911 11.2.26 to 11.3.26 ...	12.4.26.
<i>Harmonides</i> ...	Hughes, W. J. ...	D. L. Roberts ...	" A.	" ...	" 1.3.25 to 16.3.25 ...	30.4.25.
<i>Harmony, Auxy.</i> ...	Jackson, J. C. ...	A. W. Bush ...	" A.	Moravian Mission ...	" 1.12.25 to 18.12.25...	29.12.25.
<i>Hatarana</i> ...	Denne, G. H. A. ...	F. Wells, C. Parkes, W. T. Barnes.	M.L.	British India ...	" 12.6.25 to 27.2.26 ...	29.3.26.
<i>Hauraki, M.V.</i> ...	Davey, A. H. ...	J. A. Pearson ...	No. M.	Union S.S. Co., N.Z. ...	" 12.1.26 to 17.3.26 ...	29.4.26.
<i>Henry Holmes, C.S.</i> ...	Bicker Caarten, A.	R. J. M. Pearce ...	" M.	W. I. & Panama Telegraph Co.	" 7.7.25 to 5.9.25 ...	23.9.25.
<i>Herald</i> ...	Harvey, J. R., O.B.E., Commr., R.N.	W. C. Jenks ...	M.L.	His Majesty's Ship ...	Met. Log. 25.9.25 to 25.12.25	24.2.26.
<i>Herefordshire</i> ...	Mann, R. P. ...	J. E. Cullen, G. Whitworth, P. S. Cooper.	No.	Bibby ...	" 11.10.25 to 17.12.25	14.1.26.
<i>Herschel</i> ...	Davies, G. W. ...	J. M. Edgar ...	No. A.	Lampport & Holt ...	Form 911 14.10.25 to 15.12.25	29.12.25.
<i>Hertford</i> ...	Urquhart, D. ...	A. Robertson ...	No. A.	Federal ...	" 12.12.25 to 11.2.26 ...	10.3.26.
<i>Hibernia</i> ...	Tanner, E. B. ...	R. Woodall ...	G.C.	L.M. & S. Rly. ...	Telegraphic Report, 18.5.26 ...	18.5.26.
<i>Highland Enterprise</i> ...	Pond, R. H. ...	J. H. Tilton ...	No. A.	Nelson ...	Form 911 12.12.25 to 11.2.26 ...	10.3.26.
" <i>Glen</i> ...	Jones, T. J. ...	C. M. Best ...	" A.	" ...	" 8.2.26 to 27.2.26 ...	13.3.26.
" <i>Heather</i> ...	Powell, G. A. ...	J. H. Cables, F. Jeyes ...	No.	" ...	Met. Log. 10.12.24 to 1.6.25 ...	16.6.25.
" <i>Laddie</i> ...	Alford, C. ...	E. F. Smart ...	No. A.	" ...	Form 911 15.3.26 to 8.5.26 ...	19.5.26.
" <i>Piper</i> ...	Collings, D. ...	A. S. Jones, J. S. Collins, W. T. Breen, E. F. Smart.	M.L.	" ...	Met. Log. 20.6.25 to 3.11.25 ...	18.11.25.
" <i>Pride</i> ...	Davies, G. A. ...	F. Falconer, R. R. Soanes, G. E. Leech.	No.	" ...	" 5.12.25 to 31.1.26 ...	4.2.26.
" <i>Rover</i> ...	Ashby Graves, F. ...	G. J. Evans ...	No. A.	" ...	Form 911 1.3.26 to 24.4.26 ...	17.5.26.
" <i>Warrior</i> ...	Robinson, R. H. ...	R. B. Scullard ...	" M.	" ...	" 15.12.25 to 21.2.26...	24.2.26.
<i>Hildebrand</i> ...	Maddrell, J. ...	A. Allan ...	" A.	Booth ...	" 17.3.26 to 29.4.26 ...	5.5.26.
<i>Hobsons Bay</i> ...	Kydd, O. J. ...	Morrison, Henty, Grantham, M. P. Pearce.	M.L.	Commonwealth Govt.	Met. Log. 24.11.25 to 12.3.26...	18.3.26.
<i>Holbein</i> ...	Gough, W. A. ...	H. L. Rudd ...	No. A.	Lampport & Holt ...	Form 911 13.2.26 to 28.4.26 ...	5.5.26.
<i>54 Homeric</i> ...	Holme, A. ...	A. E. Dyer, A. Griffiths, J. W. Best.	W.T.	White Star ...	W.T. Reg. 22.4.26 to 7.5.26 ...	12.5.26.
<i>Hororata</i> ...	Holland, E. ...	H. J. Wilde ...	No. A.	New Zealand S.S. Co. ...	Form 911 16.7.25 to 27.1.26 ...	2.2.26.
<i>Honorius</i> ...	Samuels, C. ...	J. E. Martin, W. G. Iddes ...	" A.	R. P. Houston ...	" 27.7.25 to 27.8.25 ...	31.8.25.
<i>Hubert</i> ...	Pym, J. H. ...	S. G. Edwards ...	" A.	Booth ...	" 14.1.26 to 12.3.26 ...	6.4.26.
<i>Hurunui</i> ...	Burton Davies, J. ...	J. C. Tuckett, C. D. Watt, F. Pover, G. R. Hogg.	M.L.	New Zealand S.S. Co. ...	Met. Log. 20.11.24 to 17.5.25...	9.6.25.
<i>Ikala</i> ...	Meetham, J. T. ...	E. Lightfoot, C. W. Smithurst ...	No. A.	J. H. Welsford & Co. ...	Form 911 22.5.25 to 5.6.25 ...	16.7.25.
<i>Ingoma</i> ...	Barrow, R. K. ...	O. Stanhope ...	" M.	Harrison ...	" 31.1.26 to 19.3.26 ...	22.3.26.
<i>Intaba</i> ...	Gibbings, W. A. ...	A. M. Hughes ...	" A.	" ...	" 11.3.26 to 25.4.26 ...	30.4.26.
<i>Iris, C.S.</i> ...	Hughes, H. R. ...	" ...	" M.L.	Pacific Cable Board ...	" ...	" ...
<i>Iroquois</i> ...	Jackson, A. L., Commr., R.N.	A. K. Baxendell ...	"	His Majesty's Ship ...	Met. Log. 17.8.25 to 30.11.25...	27.1.26.
<i>Ixion</i> ...	Williams, R. J. ...	A. S. Brotherton ...	No. A.	A. Holt ...	Form 911 10.12.25 to 13.3.26...	3.5.26.
<i>Javanese Prince</i> ...	Naylor, E. ...	F. Armstrong ...	" A.	Prince ...	" ...	" ...
<i>Jervis Bay</i> ...	Chaplin, W. R. ...	R. W. Laycock ...	" M.	Commonwealth Govt. ...	Form 911 10.3.26 to 29.3.26 ...	20.4.26.
<i>John Pender, C.S.</i> ...	Gibson, L. ...	A. E. Everall ...	" A.	Eastern Tel. Co. ...	" 31.10.25 to 19.11.25 ...	9.12.25.
<i>Jumin</i> ...	Benson, C. W. ...	A. Beharrel ...	" A.	Pacific S.N. Co. ...	" 16.5.25 to 5.6.25 ...	17.6.25.
<i>Justin</i> ...	Evans, L. ...	A. R. Fastling ...	" A.	Booth ...	" ...	" ...
<i>Kaikoura</i> ...	McNish, R. ...	H. E. Reilly, H. Neagle, D. Glegg, S. Toyne.	M.L.	New Zealand S.S. Co. ...	Met. Log. 26.1.25 to 8.8.25 ...	26.8.25.
<i>Kaisar-i-Hind</i> ...	Manley G. ...	G. R. Baker ...	No. M.	P. & O. ...	Form 911 10.4.26 to 27.4.26 ...	13.5.26.
<i>Kamo Maru</i> ...	Shiratori, S. ...	— Heyesaki ...	" A.	Nippon Yusen Kaisha ...	" 21.3.26 to 11.4.26 ...	10.5.26.
<i>Kangaroo</i> ...	Norris, H. C. ...	R. J. Sinclair, V. Gilbert, J. Egglestone.	M.L.	State Service Australia	Met. Log. 11.4.25 to 20.9.25 ...	2.11.25.
<i>Kashmir</i> ...	Stringer, R.H., O.B.E., Commr., R.N.R.	H. Aubrey ...	No. M.	P. & O. ...	Form 911 10.4.26 to 18.4.26 ...	20.4.26.
<i>Kathlamba</i> ...	Mordue, J. A. ...	" ...	" A.	Ellerman Bucknall ...	" 9.3.26 to 27.3.26 ...	26.4.26.
<i>Kellett</i> ...	Maxwell, P. S. E., Commr., R.N.	D. G. V. Williams...	M.L.	His Majesty's Ship ...	Met. Log. 29.7.25 to 16.11.25...	18.11.25.
<i>Kenilworth Castle</i> ...	Chave, Sir B., K.B.E.	J. W. Beckh, A. C. Grove Price, L. G. May, H. L. Iddas.	"	Union Castle ...	" 8.2.25 to 26.8.25 ...	12.1.26.
<i>Kent</i> ...	Downton, M. ...	" ...	No. A.	New Zealand, S.S. Co. ...	" ...	" ...
<i>Khiva</i> ...	Randall, H.W., R.D., Capt., R.N.R.	J. H. Anderson ...	M.L.	P. & O. ...	" 18.1.26 to 23.4.26 ...	4.5.26.
<i>Khyber</i> ...	Browning, J. B., R.D., Commr., R.N.R.	C. B. Roche ...	No. M.	" ...	Form 911 27.3.26 to 15.4.26 ...	17.5.26.
<i>Kia Ora</i> ...	McIntosh, A. ...	E. A. Hickling ...	" A.	Shaw Savill & Albion ...	" 27.2.26 to 9.4.26 ...	13.4.26.
<i>Kildonan Castle</i> ...	Imlah, C. B. ...	G. H. Pickering ...	" A.	Union Castle ...	" 2.1.26 to 21.2.26 ...	1.3.26.
<i>Kitano Maru</i> ...	Gotoh, M. ...	M. Hara ...	" A.	Nippon Yusen Kaisha ...	" 12.9.25 to 6.10.25 ...	13.11.25.
<i>Knight Companion</i> ...	Beale, H. E. ...	J. J. Daniel, A. M. Hunter...	" M.	A. Holt ...	" 8.7.25 to 23.7.25 ...	24.8.25.
<i>Kayno</i> ...	Dosser, W. A. ...	J. Marshall, T. Tindell, J. J. Collier, F. T. Shaw.	M.L.	Ellerman Wilson ...	Met. Log. 26.4.25 to 3.10.25 ...	10.11.25.
<i>Kweiyang</i> ...	Brown, A. M. ...	" ...	"	" ...	" ...	" ...
<i>Kyogle</i> ...	Byers, G. ...	" ...	"	" ...	" ...	" ...
<i>Lady Denison Pender, C.S.</i> ...	West, G. W. ...	F. Lawrence ...	" A.	China Nav. Co. ...	Form 911 17.8.25 to 9.11.25 ...	14.12.25.
<i>Laguna</i> ...	Pape, E. R. ...	W. P. Boon ...	" A.	Commonwealth Light-house Service.	" 22.3.26 to 10.4.26 ...	10.5.26.
<i>Lahore</i> ...	Gordon, L. M., R.D., Commr., R.N.R.	A. D. Dennis ...	" M.	Eastern Tel. Co. ...	" ...	" ...
<i>Lalande</i> ...	Hamill, H. ...	A. N. Blundell ...	" A.	Pacific S.N. Co. ...	" 29.3.26 to 7.5.26 ...	13.5.26.
<i>Lancashire</i> ...	Beckett, F. W. ...	W. M. S. Higginson ...	" A.	P. & O. ...	" 26.2.26 to 27.4.26 ...	17.5.26.
<i>36 Lancastria</i> ...	Malin, R. G., Lt.-Commr., R.N.R.	P. J. Robinson, R. P. Campbell, L. R. Sharp.	W.I.	Lampport & Holt ...	" 15.10.25 to 14.12.25 ...	8.2.26.
<i>Laomedon</i> ...	Bewick, W. ...	H. Howe ...	No. A.	Bibby ...	" 21.11.25 to 28.1.26...	5.2.26.
<i>La Paz, M.V.</i> ...	Dunn, R. E. ...	F. T. Gale ...	"	Cunard ...	W.T. Reg. 18.4.26 to 15.5.26 ...	17.5.26.
					Form 911 11.10.25 to 1.11.25...	4.11.25.
					" 11.12.25 to 15.1.26...	15.3.26.
					" 13.2.26 to 4.3.26 ...	25.3.26.

LIST OF VOLUNTARY OBSERVING SHIPS

V

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.5.26.	Date Received
<i>Laplace</i> ...	Shaw, W. ...	W. Boyde, R. B. Langley ...	No. A.	Lamport & Holt ...	Form 911 19.4.25 to 19.7.25 ...	18.8.25.
55 <i>Lopland</i> ...	Howell, T. ...	E. Cornellie, F. Good, Flett ...	W.T.	Red Star ...	Met. Log. 1.1.26 to 8.5.26 ...	17.5.26.
<i>Lassell, M.V.</i> ...	Hickman, V. T. ...	F. J. Durrant ...	No. A.	Lamport & Holt ...	W.T. Reg. 15.4.26 to 7.5.26 ...	17.5.26.
<i>Leicestershire</i> ...	English, G. L. ...	J. Cullen, P. H. Potter, D. Y. Sharrock, J. Tradewell.	M.L.	Bibby ...	Form 911 17.10.25 to 7.11.25...	9.11.25.
<i>Leighton, M.V.</i> ...	Lindesay J. M. ...	H. A. Bolding ...	No. A.	Lamport & Holt ...	Met. Log. 20.2.26 to 9.3.26 ...	29.3.26.
<i>Leitrim</i> ...	Robertson, A. ...	E. F. C. Higgins ...	" A.	Dowie, J., & Co. ...	Met. Log. 2.1.26 to 12.3.26 ...	18.3.26.
<i>Loch Katrine</i> ...	Shillitoe, B. ...	K. Whitaker ...	" M.	R.M.S.P. Co. ...	Form 911 2.3.26 to 3.4.26 ...	19.4.26.
<i>London Commerce</i> ...	Young, H. J., D.S.C.	H. P. Longland ...	" A.	Furness Withy ...	" 10.12.25 to 26.1.26 ...	5.2.26.
<i>London Importer</i> ...	Williamson, J. M. ...	G. Lusty ...	M.L.	White Star ...	" 14.11.25 to 9.2.26 ...	11.2.26.
<i>Loriga, M.V.</i> ...	Barkley, E. ...	W. N. Anders ...	No. A.	Pacific S.N. Co. ...	" 13.3.26 to 16.4.26 ...	22.4.26.
<i>Losada, M.V.</i> ...	Meldrum, G. W. ...	E. Baxter ...	" M.	" ...	Met. Log. 11.10.25 to 10.1.26...	22.1.26.
<i>Macedonia</i> ...	Potter, H. W., R.D., Commr., R.N.R.	E. R. Bodley ...	" M.	P. & O. ...	Form 911 22.5.25 to 6.8.25 ...	25.8.25.
<i>Macharda</i> ...	Richardson, T. ...	D. M. Fulton ...	" M.	Brocklebank ...	" 23.11.25 to 15.2.26 ...	18.2.26.
<i>Mahana</i> ...	Kershaw, W. A. R. ...	F. M. Smith, J. C. K. Rogers	M.L.	Shaw, Savill & Albion	" 3.3.26 to 3.4.26 ...	6.4.26.
<i>Maharaja</i> ...	Matthews, E. G. ...	D. M. Swaine ...	No. M.	Asiatic S.N. Co. ...	" 13.1.26 to 20.2.26 ...	1.3.26.
<i>Maihar</i> ...	Rowe, J. P. ...	C. Shaw, H. T. Scoins, G. Henshaw, A. C. Hocking.	M.L.	Brocklebank ...	" 1.2.26 to 22.2.26 ...	22.3.26.
<i>Maimyo</i> ...	Richardson, T. ...	P. Yates ...	No. A.	Atlantic Transport ...	Met. Log. 17.12.25 to 17.2.26...	8.3.26.
<i>Maine</i> ...	Seymour, H. ...	A. S. Smith ...	" A.	Burns Philp ...	Form 911 23.7.25 to 13.10.25...	3.11.25.
<i>Maivara</i> ...	Brown, T. M. ...	W. Pearson, J. A. Mac-naughton, J. Paine.	M.L.	White Star ...	" 20.4.25 to 26.5.25 ...	15.6.25.
58 <i>Majestic</i> ...	Metcalf, G. R. ...	A. Blair, F. C. Vogelmann, T. R. Lang.	W.T.	Burns Philp ...	W.T. Reg. 15.4.26 to 28.4.26 ...	3.5.26.
<i>Makambo</i> ...	Brown, T. M. ...	O. C. Bray, J. M. Hood, A. Foster.	M.L.	Canadian-Australasian	Met. Log. 8.8.25 to 19.2.26 ...	7.4.26.
<i>Makura</i> ...	Adamson, F. L. ...	J. H. Round ...	No. M.	Brocklebank ...	" 11.3.25 to 19.2.26 ...	4.5.26.
<i>Malakuta</i> ...	Whitham, F. ...	E. A. Randall ...	" M.	British India ...	Form 911 28.2.26 to 12.4.26 ...	26.4.26.
<i>Malancha</i> ...	Gray, T. N. ...	H. J. O'Donohoe ...	" M.	Manchester Liners ...	" 30.3.26 to 13.4.26 ...	3.5.26.
<i>Malda</i> ...	Everest, J. E. ...	W. L. Lavers ...	" A.	" ...	" 19.1.26 to 22.2.26 ...	1.3.26.
<i>Manchester Corporation</i> ...	Riley, J. E. ...	R. A. Walker ...	M.L.	" ...	" 7.4.26 to 16.4.26 ...	22.4.26.
<i>Manchester Hero</i> ...	Hudson, J. H. ...	" ...	No. A.	" ...	Form 911 14.3.26 to 28.3.26 ...	6.4.26.
<i>Manchester Merchant</i> ...	Dormer, A. E. ...	" ...	M.L.	" ...	" ...	"
<i>Manchester Shipper</i> ...	Scurr, T. W. ...	H. M. Drummond... ..	No. M.	Brocklebank ...	" ...	"
<i>Manipur</i> ...	Butler, G. E. ...	J. Paice ...	" M.	P. & O. ...	Form 911 28.13.25 to 17.1.26...	19.1.26.
<i>Mantua</i> ...	Randell, G. G. ...	G. S. Gracie ...	" A.	Elders & Fyffes ...	" 2.4.26 to 4.5.26 ...	13.5.26.
<i>Manzanares</i> ...	Maxwell Brown, W.E.	R. H. W. Jackson ...	No. M.	Canadian Pacific ...	" 10.11.25 to 25.11.25 ...	4.1.26.
<i>Marburn</i> ...	Mortimer S. ...	J. A. Street ...	M.L.	Burns Philp ...	Form 911 22.3.26 to 11.4.26 ...	22.4.26.
<i>Marella</i> ...	Collins, T. ...	F. Eglin, J. E. Stott, J. Donovan, B. Bryon, J. Ford	"	Ellerman Wilson ...	Met. Log. 2.4.25 to 25.8.25 ...	1.12.25.
<i>Marengo</i> ...	Milne, A. R., R.D., Commr., R.N.R.	J. Strachan, P. Wright, H. E. Evans.	"	British India ...	" 19.9.25 to 8.3.26 ...	16.3.26.
<i>Margha</i> ...	Thurston, H. P. ...	A. Chrystal ...	M.L.	Shaw, Savill & Albion	" 24.10.25 to 3.1.26 ...	18.1.26.
<i>Matakana</i> ...	Hillman, E. J. ...	K. L. Thompson ...	No. A.	Burns Philp & Co. ...	" 26.7.25 to 3.1.26 ...	8.1.26.
<i>Matheran</i> ...	Columbine, F. F. ...	J. A. Embley, R. E. Gartside, G. T. Hogg, D. Newton.	M.L.	Brocklebank ...	" 18.6.25 to 18.7.25 ...	31.8.25.
<i>Mathura</i> ...	Bacon, A. E. ...	H. H. Armstrong ...	No. M.	British India ...	" 14.7.25 to 13.10.25...	2.11.25.
<i>Matiana</i> ...	Langlands, D. H. ...	W. R. Sobey ...	" M.	Canadian Pacific ...	Form 911 1.2.26 to 3.3.26 ...	8.3.26.
<i>Maunganui</i> ...	Worrall, L. C. H. ...	A. R. Noble ...	" M.	Union S.S. Co. of N.Z. ...	" 23.11.25 to 11.4.26 ...	27.1.26.
32 <i>Mauretania</i> ...	Rostron, A. H., C.B.E., R.D., Capt., R.N.R.	E. R. Taylor, A. Mackellar, J. A. Quarrie.	W.T.	Cunard ...	" 8.8.25 to 3.9.25 ...	28.9.25.
<i>Media</i> ...	Mallett, R. ...	S. C. Cramb ...	No. A.	T. & J. Brocklebank...	W.T. Reg. 4.2.26 to 22.2.26 ...	25.3.26.
56 <i>Megantic</i> ...	Trant, E. L., Commr. R.N.R.	F. A. Billiard, J. Clarke, A. H. Young.	W.T.	White Star ...	" 28.3.26 to 11.4.26 ...	16.4.26.
22 <i>Melita</i> ...	Aikman, E. ...	D. Dunn, J. Shearer, H. Lewis	"	Canadian Pacific ...	Form 911 20.10.25 to 20.11.25...	14.12.25.
<i>Mennon</i> ...	Evans, D. L. ...	L. S. Evans ...	No. A.	A. Holt ...	W.T. Reg. 11.1.26 to 9.4.26 ...	13.4.26.
<i>Menominee</i> ...	Pollard, W. F., D.S.O., R.D., Capt. R.N.R.	R. Day ...	" A.	Atlantic Transport ...	Form 911 5.4.26 to 23.4.26 ...	26.4.26.
<i>Mercian</i> ...	Gardner, J. ...	R. Hughes ...	" A.	Leyland ...	Form 911 30.11.25 to 17.12.25 ...	21.12.25.
21 <i>Metagama</i> ...	Freer, A., Commr. R.N.R.	R. Walker, A. Mansey ...	W.T.	Canadian Pacific ...	" 16.11.25 to 3.3.26 ...	13.3.26.
<i>Miami</i> ...	Makepeace, S. ...	A. F. Woodhouse, J. W. Kendall.	No. A.	Elders & Fyffes ...	" 15.10.25 to 21.11.25...	25.11.25.
<i>Minderoo</i> ...	Richardson, E. ...	B. J. Bennie, W. J. McPhedron, J. H. Oxtou.	M.L.	West Australia Nav. Co.	Form 911 20.10.25 to 21.11.25 ...	24.11.25.
<i>Minna</i> ...	Mackenzie, G. G. ...	J. H. Hennessey ...	No. A.	Scottish Fishery Board	Met. Log. 31.5.25 to 9.11.25 ...	12.1.26.
23 <i>Minnedosa</i> ...	Griffiths, J. N. ...	C. E. Duggan, F. W. Roberts, W. F. MacGowan.	W.T.	Canadian Pacific ...	Form 911 2.4.26 to 1.5.26 ...	10.5.26.
<i>Minnetonka</i> ...	Gates, T. F., C.B.E.	H. E. McCartney ...	No. M.	Atlantic Transport ...	W.T. Reg. 21.3.26 to 13.5.26 ...	17.5.26.
<i>Minnewaska</i> ...	Claret, F. H., C.B.E., Commr., R.N.R.	J. W. Grier ...	" M.	" ...	" 11.4.26 to 1.5.26 ...	4.5.26.
<i>Mirror, C.S.</i> ...	Gibson, L. ...	A. G. Watts ...	" M.	Eastern Tel. Co. ...	" 27.2.26 to 6.3.26 ...	13.3.26.
<i>Mississippi, M.V.</i> ...	Wylie, J. T. J. ...	H. K. Cockerill ...	" A.	Atlantic Transport ...	" 21.4.26 to 24.4.26 ...	7.5.26.
<i>Moldavia</i> ...	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R.	G. E. Owen ...	" M.	P. & O. ...	" 17.5.25 to 28.5.25 ...	3.6.25.
<i>Mongolian Prince</i> ...	Durrant, G. D. ...	M. Gibson ...	" A.	Prince ...	" 26.2.26 to 6.4.26 ...	17.5.26.
<i>Monkbarns, Ship</i> ...	Davies, W. ...	R. Baise ...	" A.	J. Stewart & Co. ...	" 13.9.25 to 15.10.25...	26.10.25.
24 <i>Montcalm</i> ...	Hamilton, G. ...	H. McFadyen ...	W.T.	Canadian Pacific ...	" 23.10.25 to 16.11.25 ...	29.12.25.
25 <i>Montclare</i> ...	Webster, G. S., R.D., Lt.-Commr., R.N.R.	R. Fegan, H. S. Knight, A. Harrison.	"	" ...	W.T. Reg. 23.3.26 to 16.4.26 ...	19.4.26.
<i>Montferland</i> ...	Van Noppen, C. D. ...	F. E. Williams, T. H. Carter, T. Jones.	No. M.	Holland Lloyd ...	" 25.4.26 to 14.5.26 ...	18.5.26.
27 <i>Montnairn</i> ...	Turnbull, J., C.B.E., R.D., Capt., R.N.R.	K. Morris ...	W.T.	Canadian Pacific ...	Form 911 3.4.26 to 22.4.26 ...	28.4.26.
<i>Montoro</i> ...	Donaldson, A. ...	A. Watt, F. H. Carter, H. A. McCallum.	No. A.	Burns, Philp & Co. ...	" 3.4.26 to 23.4.26 ...	28.4.26.
26 <i>Montrose</i> ...	Landy, E. ...	J. H. Tudor, R. Hains, W. Biggs.	"	" ...	W.T. Reg. 30.11.25 to 26.2.26...	2.3.26.
20 <i>Montroyal</i> ...	Sibbons, H. ...	" ...	"	" ...	W.T. Reg. 17.4.26 to 7.5.26 ...	13.5.26.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.5.26.	Date Received.
<i>Moresby</i> ...	Edgell, J. A., O.B.E., Capt. R.N.	C. F. Mills ...	M.L.	His Majesty's Australian Ship.	Met. Log. 4.7.25 to 13.12.25 ...	10.2.26.
<i>Morvada</i> ...	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	A. J. Norris ...	No. M.	British India	Form 911 9.11.25 to 6.2.26 ...	9.2.26.
<i>Mulbera</i> ...	Steadman W. R. ...	F. Broomhead ...	No. M.	"	" 18.4.26 to 29.4.26 ...	7.5.26.
<i>Nagara</i> ...	Buret, T. J. C. ...	F. A. C. Thacker ...	" M.	R.M.S.P. Co.	" 16.1.26 to 19.3.26 ...	26.3.26.
<i>Nagoya</i> ...	Davis, H. C. ...	P. Haworth ...	" M.	P. & O. ...	" 23.1.26 to 14.2.26 ...	8.3.26.
<i>Nardana</i> ...	Moth, F. L. ...	S. C. T. Smith ...	" M.	British India	" 15.9.25 to 25.10.25...	31.10.25.
<i>Nariva</i> ...	Hodge, W. C., Sprid- dell, F. G., R.D., Commr., R.N.R.	H. M. S. Laidlaw, A. E. Randle, W. A. Delap, R. A. B. Ardley, C. Frankson	M.L.	R.M.S.P. Co.	Met. Log. 12.9.25 to 24.2.26 ...	4.3.26.
<i>Nellore</i> ...	Hignett, A. H., R.D., Lt. - Commr., R.N.R.	F. Squire ...	No. M.	P. & O. ...	Form 911 10.1.26 to 7.2.26 ...	9.2.26.
<i>Nestor</i> ...	Owen, R. D., O.B.E.	D. Rees, R. Wilks, F. J. Silva	M.L.	A. Holt ...	Met. Log. 30.8.25 to 8.1.26 ...	18.1.26.
<i>Newby Hall</i> ...	Edge T. P. ...	R. H. Stewart, G. E. M. Jenkins, R. M. Redhead.	M.L.	Ellerman ...	Met. Log. 2.5.25 to 24.10.25 ...	25.11.25.
<i>Niagara</i> ...	Showman, A. C. ...	T. A. Macpherson, J. Dawson, A. P. Cousin, D. McKenzie	"	Canadian-Australian...	" 27.8.25 to 10.1.26 ...	2.3.26.
<i>Ningchow</i> ...	Wilson, C. A. ...	G. H. Oldridge ...	No. A.	A. Holt ...	Form 911 6.11.25 to 9.3.26 ...	15.3.26.
<i>Norna</i> ...	Wright, J. ...	T. Mather ...	" A.	Scottish Fishery Board	" 12.4.26 to 30.4.26 ...	10.5.26.
<i>Norseman, C.S.</i> ...	Barter, H. O., R.N., Commr., R.N.R.	" ...	M.L.	Western Tel. Co. ...	Met. Log. 19.10.25 to 29.4.26...	17.5.26.
<i>Nubian</i> ...	Watmough, T. M. ...	H. R. Gaskill ...	No. A.	Leyland ...	Form 911 23.12.25 to 24.1.26	28.1.26.
<i>Oaklands Grange</i> ...	Routledge, R. ...	E. J. Longheed ...	No. A.	Houlder Bros. ...	Form 911 5.2.26 to 2.3.26	6.4.26.
<i>42 Ohio</i> ...	Parker, W. H., C.B.E., R.D., Capt. R.N.R.	J. Smith, H. Baylis, E. A. E. Littlewood.	W.T.	R.M.S.P. Co. ...	W.T. Reg. 8.1.26 to 3.4.26 ...	9.4.26.
<i>Olympia</i> ...	Caldwell, R. ...	D. R. Urquhart, G. Lynas, W. Proudfoot.	M.L.	Anchor ...	Form 911 20.2.26 to 5.4.26 ...	12.4.26.
<i>57 Olympic</i> ...	Marshall, W., C.B., D.S.O., R.D., Capt., R.N.R.	H. J. C. Day, A. Fisher, J. Law.	W.T.	White Star ...	Met. Log. 13.11.25 to 28.1.26...	13.2.26.
<i>Orama</i> ...	Staunton, H. G., C.B.E., R.D., Commr. R.N.R.	L. J. Vesty, F. L. Hubbard, J. S. Metcalfe, A. S. Nicholls, T. Fox Russell.	M.L.	Orient ...	W.T. Reg. 8.4.26 to 22.4.26 ...	24.4.26.
<i>Oranian</i> ...	Hoskins, W. ...	R. H. Theaker ...	No. A.	Leyland ...	Form 911 17.10.25 to 10.11.25	12.11.25.
<i>Orari</i> ...	Robinson, F. W. ...	F. Longheed, C. Wilkinson, W. Tarr.	M.L.	New Zealand S.S. Co.	Met. Log. 7.3.25 to 11.8.25 ...	15.8.25.
<i>40 Orbita</i> ...	Smith, W. E., D.S.O., R.D., Capt. R.N.R.	B. C. Dodds, H. G. Whittle, H. M. Rennie, H. Baylis.	W.T.	R.M.S.P. Co. ...	W.T. Reg. 19.10.25 to 9.11.25	12.11.25.
<i>Oreoma</i> ...	Dominy, R. H., C.B.E., Commr. R.N.R.	R. Griffiths, W. Billington ...	M.L.	Pacific S.N. Co. ...	Form 911 17.10.25 to 10.11.25	12.11.25.
<i>41 Orduna</i> ...	Smith, W. E., D.S.O., R.D., Capt. R.N.R.	H. G. Whittle, S. Robbins, R. W. Sumpton, R. J. Finch	W.T.	R.M.S.P. Co. ...	Met. Log. 18.2.26 to 4.5.26 ...	14.5.26.
<i>Oriana</i> ...	Ross, J. ...	W. Pearce, R. D. Eckford, T. H. McGill.	M.L.	Pacific S.N. Co. ...	W.T. Reg. 21.3.26 to 15.4.26 ...	21.4.26.
<i>Orita</i> ...	Splatt, W. A. ...	T. R. Scott, D. W. Hutchinson, R. W. Hanson.	"	" " ...	Form 911 19.3.26 to 16.4.26 ...	22.4.26.
<i>Ormonde</i> ...	Knowles, C. H., D.S.O., Commr., R.N.	A. M. Hughes ...	"	His Majesty's Ship ...	Met. Log. 10.2.26 to 24.4.26 ...	3.5.26.
<i>Ormonde</i> ...	Shelford, W. S., Lt.- Commr., R.N.R.	B. Windsor, H. Petit Dan, J. F. Thompson.	"	Orient ...	" 23.6.25 to 17.2.26 ...	10.3.26.
<i>Ormuz</i> ...	O'Sullivan, F. R. ...	E. Hatch, W. Wickham, W. Elliot.	"	" ...	" 4.9.25 to 4.12.25 ...	22.12.25.
<i>Oronsay</i> ...	Owens, A. L., R.D., Lt. Commr., R.N.R.	C. Dodgson, P. R. Murphy, R. K. Rogerson.	"	" ...	" 7.2.26 to 11.5.26 ...	17.5.26.
<i>Oroya</i> ...	Pearce, A. ...	S. Lewis ...	No. M.	Pacific S.N. Co. ...	" 1.11.25 to 4.2.26 ...	10.2.26.
<i>Orsova</i> ...	Matheson, C. G., D.S.O., R.D., Capt. R.N.R.	G. E. Martin, A. J. Croft Cohen, H. Petit Dann.	M.L.	Orient ...	" 20.9.25 to 26.12.25...	31.12.25.
<i>Orvieto</i> ...	James, L. V., D.S.C.	L. E. Fordham, J. Goldsworthy, A. Hawker, A. H. Dyer.	M.L.	" ...	Form 911 27.1.26 to 6.4.26 ...	13.4.26.
<i>Osterley</i> ...	Cameron, E. P., R.D. Commr. R.N.R.	H. Tanner, J. E. Goldsworthy, G. L. Carter.	No.	" ...	Met. Log. 26.7.25 to 12.1.26 ...	20.1.26.
<i>Othello</i> ...	Montgomery, H. ...	A. C. Fullerton ...	No. A.	Ellerman Wilson ...	" 24.8.25 to 17.3.26 ...	23.3.26.
<i>Otira</i> ...	Elford H. E. ...	E. J. Riccard ...	" M.	Shaw, Savill & Albion	" 4.10.25 to 7.1.26 ...	18.1.26.
<i>Otranto</i> ...	Simner, G. L., R.D., Commr., R.N.R.	R. H. Rogerson ...	" M.	Orient ...	Form 911 6.9.25 to 27.11.25 ...	15.2.26.
<i>Ovul</i> ...	Groom, A. C. B. ...	" ...	" A.	Shakespear Shipping Co.	" 19.3.26 to 7.4.26 ...	7.5.26.
<i>Oxfordshire</i> ...	Crumplin, W. E. ...	" ...	" A.	Bibby Bros. ...	" 29.1.26 to 10.4.26 ...	15.4.26.
<i>Pacific Shipper,</i> <i>M.V.</i>	Newman, G. W. A.	G. Davis ...	" A.	Furness Withy ...	" 27.3.26 to 9.4.26 ...	22.4.26.
<i>Pakeha</i> ...	W. P. Clifton Mogg	E. T. Baker, A. Black, A. Lockhart	M.L.	Shaw, Savill & Albion	" 25.3.26 to 23.4.26 ...	4.5.26.
<i>Pareoru</i> ...	Evans, J. O. ...	R. F. Hillings ...	No. A.	Hain S.S. Co. ...	Met. Log. 26.9.25 to 28.2.26 ...	8.3.26.
<i>Paris</i> ...	Cook, C. L. ...	Mr. Biles ...	C.C.	Southern Rly. ...	Form 911 28.12.25 to 6.2.26 ...	11.2.26.
<i>Patia</i> ...	Bostock, R. J. ...	W. McIlwaine ...	No. A.	Elders & Fyffes ...	Telegraphic Report. 14.4.26 ...	14.4.26.
<i>Patrol C.S.</i> ...	Welsh, T. K. ...	H. F. P. Albrecht ...	M.L.	Eastern Extension (A. & C.) Telegraph Co.	Form 911 4.7.25 to 8.8.25 ...	12.8.25.
<i>Persic</i> ...	Bulman, J. B. ...	R. Conway ...	No. A.	White Star ...	Met. Log. 8.7.25 to 3.2.26 ...	1.4.26.
<i>Peshawar</i> ...	Hester, C. W., R.D., Commr., R.N.R.	D. G. Baillie, E. J. R. North, R. D. Whyte-Mackay.	M.L.	P. & O. ...	Form 911 27.9.25 to 4.11.25 ...	17.3.26.
<i>Pharos</i> ...	Ewing, T. N. ...	A. McLachlan ...	No. A.	Northern Lighthouse Board.	Met. Log. 18.7.25 to 22.11.25...	24.11.25.
<i>Philadelphia</i> ...	Baker, J. A. ...	W. T. Godwin ...	" A.	Leyland ...	Form 911 29.6.25 to 14.8.25 ...	18.8.25.
<i>Polycarp</i> ...	Evans, T. G. ...	C. W. Smethurst ...	" A.	Booth ...	" 9.10.25 to 1.11.25 ...	16.11.25.
<i>Port Adelaide</i> ...	Hayter S W. ...	E. Catchpole, G. Lovegrove, C. Hodson.	M.L.	Commonwealth & Do- minion	" 21.4.26 to 7.5.26 ...	17.5.26.
<i>Port Albany</i> ...	Robinson, C. A. ...	E. A. Leavett, A. G. Newbury, W. Eastoe, N. A. Crowe.	"	"	Met. Log. 21.8.25 to 28.12.25...	7.1.26.

LIST OF VOLUNTARY OBSERVING SHIPS

vii

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.5.26.	Date Received.
<i>Port Auckland</i> ...	Durham, R. S. ...	R. B. Stannard ...	No. A.	Commonwealth & Dominion.	Form 911 25.11.25 to 5.1.26 ...	20.1.26.
„ <i>Bowen</i> ...	Gilling, W. ...	W. R. Johnston ...	„	„	„	„
„ <i>Caroline</i> ...	Renaut, F. A. ...	H. H. Smith, E. Fenton, C. Chamberlin, A. T. C. Cooper.	M.L.	„	Met. Log. 3.10.25 to 11.4.26 ...	19.4.26.
„ <i>Chalmers</i> ...	Enright, W. J. ...	„	„	„	„	„
„ <i>Curtis</i> ...	Van den Bergh, C. ...	W. H. Miles ...	No. A.	„	Form 911 14.12.24 to 25.4.25 ...	2.6.25.
„ <i>Darwin</i> ...	Sawbridge, I. R. ...	E. T. N. Lawrey, G. F. Pannett.	„ A.	„	„ 27.1.26 to 10.3.26 ...	22.4.26.
„ <i>Denison</i> ...	Ferris, J. ...	W. H. Sadler, J. C. Goddard	„ M.	„	„ 15.6.25 to 14.8.25 ...	21.9.25.
„ <i>Dunedin</i> ...	Hutchinson ...	E. G. Jones ...	No. A.	„	„ 7.1.26 to 1.5.26 ...	19.5.26.
„ <i>Hacking</i> ...	Hoad, A. C. ...	C. Newton ...	No. A.	„	Form 911 18.11.25 to 2.1.26 ...	5.1.26.
„ <i>Hobart</i> ...	Craven, R. ...	L. Copeland ...	No.	„	„	„
„ <i>Hunter</i> ...	Cottell, S. C. ...	A. Cooper, C. F. Post, J. T. Weldie.	M.L.	„	Met. Log. 30.10.25 to 2.4.26 ...	14.4.26.
„ <i>Melbourne</i> ...	Kearney, F. J. ...	D. G. H. Bradley, J. A. Fairbairn, A. G. Starkey.	M.L.	„	Met. Log. 17.10.25 to 1.4.26 ...	7.4.26.
„ <i>Napier</i> ...	Jones, C. N. ...	M. E. Craven ...	No. A.	„	Form 911 27.3.26 to 14.4.26 ...	4.5.26.
„ <i>Nicholson</i> ...	Jack, J. ...	„	„	„	„	„
„ <i>Pirie</i> ...	Higgs, W. G. ...	H. C. Jeffery, W. G. Jones, N. M. Muzzill, S. Hearn.	M.L.	„	Met. Log. 26.8.25 to 27.2.26 ...	2.3.26.
„ <i>Sydney</i> ...	Lea, W. H. ...	A. W. Sams, C. Groves, H. Higgs, H. Boys Smith.	„	„	„ 9.7.25 to 31.3.26 ...	9.4.26.
„ <i>Victor</i> ...	Swan, L. H. ...	E. G. Fullick, W. Howe, W. Renout.	„	„	„ 5.4.25 to 14.8.25 ...	22.8.25.
„ <i>Wellington</i> ...	Farmer, F. ...	„	No.	„	„	„
<i>President Jackson</i> ...	Griffith, J. ...	B. Christensen ...	No. A.	Pacific Mail S.S. Co. ...	Form 911 12.3.26 to 9.4.26 ...	17.5.26.
<i>President Jefferson</i> ...	Nichols, F. R. ...	C. H. Moen ...	„ A.	Admiral Oriental Line	„ 4.2.26 to 23.3.26 ...	12.4.26.
<i>Protea</i> , H.M.S.A.S. ...	Woodhouse, A. F. B. ...	R. J. Whitley ...	„ A.	South African Naval Service.	„ 8.3.26 to 16.4.26 ...	18.5.26.
<i>Pyrrhus</i> ...	Lt-Commr., R.N. Elford, W. J. ...	J. L. Millar ...	„ A.	A. Holt ...	„ 7.1.26 to 23.3.26 ...	6.4.26.
<i>Ranpura</i> ...	King, A. M., D.S.C. ...	R. H. Hand ...	No. M.	P. & O. ...	„ 20.3.26 to 13.5.26 ...	18.5.26.
<i>Regina</i> ...	Smith, R. G. ...	G. W. Couch, R. H. Shaw, C. Cochrane.	M.L.	White Star-Dominion	W.T. Reg. 5.4.26 to 20.4.26 ...	22.4.26.
<i>Reindeer</i> ...	Langdon, C. ...	„	C.C.	G.W. Railway	Form 911 5.4.26 to 20.4.26 ...	26.4.26.
<i>Remuera</i> ...	Cameron ...	F. McCullum ...	„	New Zealand S.S. Co.	Telegraphic Report 15 5.26 ...	15.5.26.
<i>Rhodesian Transport</i> ...	Fowler, W. H. ...	W. Heritage ...	No. A.	Houlder Bros.	Form 911 14.11.25 to 12.3.26 ...	18.3.26.
<i>Rimutaka</i> ...	Hemming, F. A. ...	F. Bishop ...	M.L.	New Zealand S.S. Co.	Met. Log. 31.5.25 to 29.3.26 ...	1.4.26.
<i>Risaldar</i> ...	Park, G. ...	A. J. Cavallo, H. Hardwick, C. M. Knight.	„	Asiatic S.N. Co. ...	„ 11.10.25 to 9.4.26 ...	11.5.26.
<i>Romney</i> ...	Syms, G. ...	H. Trodden ...	No. A.	Lamport & Holt ...	Form 911 9.10.25 to 21.10.25 ...	30.11.25.
<i>Rotorua</i> ...	Hunter, J. B. ...	D. F. Clegg ...	M.L.	N.Z.S. Co. ...	„ 26.9.25 to 12.1.26 ...	20.1.26.
<i>Royal Fusilier</i> ...	Dawson, J. ...	J. Fraser ...	No. A.	London & Edinburgh S.S. Co.	„ 28.2.26 to 28.3.26 ...	6.4.26.
<i>Royal Transport</i> ...	Dove, J. ...	R. Martin ...	„ A.	Houlder Bros.	„ 17.11.25 to 17.12.25 ...	21.12.25.
<i>Ruapehu</i> ...	McKellar, A. W., R.D., Capt., R.N.R.	Lettington, J. D. Tooms, A. J. Webb, F. Russel.	M.L.	New Zealand S.S. Co.	Met. Log. 20.11.25 to 22.3.26 ...	27.3.26.
<i>Sachem</i> ...	Westgarth, W. A. D.S.C.	C. Waldron, E. Salnty, G. R. Watson.	„	Furness Withy ...	„ 30.6.25 to 10.12.25 ...	17.12.25.
<i>St. Albans</i> ...	Smith, G. L. ...	J. W. Kavanagh, J. F. Heddle, H. J. Jeans, W. McIntyre.	„	Eastern and Australian	„ 5.8.25 to 2.12.25 ...	24.3.26.
<i>St. Helier</i> ...	Mulhall, W. ...	C. Bell ...	C.C.	G.W. Railway	Telegraphic Report 18.5.26 ...	18.5.26.
<i>St. Julien</i> ...	Langdon, C. H. ...	C. Joy ...	„	„	„ 8.4.26 ...	8.4.26.
<i>St. Patrick</i> ...	Bearpark, E. W. ...	J. Hill ...	No. A.	Rankin Gilmour	Form 911 15.1.26 to 1.2.26 ...	15.2.26.
<i>Salaga</i> ...	Sola, P., D.S.O. ...	G. E. Dutton ...	„ A.	Elder Dempster	„ 12.1.26 to 9.2.26 ...	15.2.26.
<i>Samaria</i> ...	McNeil, S. G. S. ...	H. L. Pryse ...	„ A.	Cunard	„ 3.4.26 to 26.4.26 ...	28.4.26.
<i>Sandown Castle</i> ...	Jackson, C. R. ...	P. G. Maciver ...	„ A.	Union Castle	„ 16.12.25 to 23.2.26 ...	26.2.26.
<i>Saxoleine</i> ...	Rodgers, C. S. ...	B. Johnsen ...	No. A.	Hunting & Son	„ 18.2.26 to 9.3.26 ...	29.3.26.
<i>Saxon</i> ...	Knight, A. ...	T. M. Lockwood ...	„ A.	Union Castle	„ 19.2.26 to 11.4.26 ...	13.4.26.
<i>Scholar</i> ...	McCullum, J. ...	J. D. Grieves ...	„ M.	Harrison ...	„ 1.4.25 to 20.6.25 ...	2.7.25.
<i>Scindia</i> ...	Matthews, W. ...	R. S. Paton ...	„ A.	Anchor ...	„ 28.11.25 to 1.3.26 ...	8.3.26.
<i>Scotia</i> ...	Prichard, S.D. ...	O. W. L. Jones ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report 1.5.26 ...	1.5.26.
<i>Scottish Bard</i> ...	McDonnell S. ...	J. W. Lilley ...	No. A.	Tankers Ltd. ...	Form 911 31.1.26 to 15.2.26 ...	9.3.26.
<i>33 Scythia</i> ...	Prothero, W. ...	A. Nicholson, J. C. Munro, J. W. Caunce.	W.T.	Cunard ...	W.T. Reg. 12.4.26 to 2.5.26 ...	10.5.26.
<i>Sheaf Mount</i> ...	Groves, C. V. ...	C. A. Goold ...	No. A.	W. A. Souther	Form 911 11.4.26 to 2.5.26 ...	6.5.26.
<i>Sheaf Spear</i> ...	Whitfield G. A., O.B.E.	W. H. Grisewood, N. Thompson.	M.L.	„	Met. Log. 22.1.26 to 26.2.26 ...	12.4.26.
<i>Socrates</i> ...	Taylor, F. C. ...	W. E. Jordan ...	No. A.	Lamport & Holt ...	Form 911 22.12.25 to 21.1.26 ...	25.1.26.
<i>Soekaboemi</i> ...	Z. W. Flach ...	C. van Reenen ...	„ M.	Rotterdam Lloyd ...	„ 19.12.26 to 28.3.26 ...	19.4.26.
<i>Somerset</i> ...	Barnett, H. ...	J. J. Youngs ...	„ M.	N.Z.S. Co. ...	„ 15.12.25 to 21.1.26 ...	26.1.26.
<i>Somersetshire</i> ...	Leitch, R. C. ...	P. Hawkins, R. C. Leitch, H. G. Walton.	M.L.	Bibby ...	Met. Log. 14.12.25 to 18.3.26 ...	8.4.26.
<i>Somme</i> ...	Miles, F. R., Commr., R.N.R.	H. Chamberlain, A. P. Portsmouth.	No.	R.M.S.P. Co. ...	„ 22.11.24 to 29.8.25 ...	10.2.26.
<i>Spectator</i> ...	Harding, C. H. J. ...	D. Fraser, J. G. F. Betson ...	No. A.	„	Form 911 20.11.25 to 20.2.26 ...	26.2.26.
<i>Spero</i> ...	Norton, W. J. ...	T. E. Fea, R. O. Otley ...	M.L.	Ellerman Wilson ...	Met. Log. 22.5.25 to 6.12.25 ...	10.12.25.
<i>Stockwell</i> ...	Kershaw, R. W. ...	W. Baxter ...	No. A.	Brooklebank ...	Form 911 20.9.25 to 9.10.25 ...	21.10.25.
<i>Stuart Prince</i> ...	Kemp, E. J. ...	W. Venn ...	„ A.	Prince ...	Met. Log. 18.2.26 to 6.3.26 ...	26.4.26.
<i>Surrey</i> ...	Field, H. G. B. ...	C. P. Jackson, C. Welch, H. Harris.	M.L.	Federal ...	„ 9.5.25 to 22.10.25 ...	26.10.25.
<i>Suva Maru</i> ...	Okuno, Y. ...	T. Nosaka ...	No. A.	Nippon Yusen Kaisha	Form 911 21.3.26 to 4.4.26 ...	5.5.26.
<i>Tainui</i> ...	Hartman, W. H. ...	P. S. Horwood ...	„ A.	Shaw, Savill & Albion	„ 17.3.26 to 22.4.26 ...	26.4.26.
<i>Tairoa</i> ...	Summers, W. G. ...	S. A. Bannister ...	„ A.	„	„ 30.3.26 to 12.5.26 ...	17.5.26.
<i>Tahiti</i> ...	Aldwell, B. L. ...	W. Gould ...	„ A.	Union S.S. Co. of N.Z.	„ 5.1.26 to 19.2.26 ...	6.4.26.
<i>Taipung</i> ...	Hamilton, H. E. ...	„	M.L.	Yuill & Co. ...	„	„
<i>Talhybuis</i> ...	Ireland, T. R. ...	P. Elder ...	No. A.	A. Holt ...	Form 911 19.9.25 to 26.10.25 ...	2.11.25.
<i>Tanda</i> ...	Pilcher, E. ...	C. G. Holdaway, R. Lloyd	M.L.	E. & A. S.S. Co. ...	Met. Log. 2.12.25 to 1.3.26 ...	7.4.26.
<i>Tambora</i> ...	Laing, J. D. ...	Harry, B. Dun, H. Jeans.	„	„	„	„
	Huisman, N. ...	H. Van Manen ...	No. M.	Rotterdam Lloyd ...	Form 911 15.2.26 to 31.3.26 ...	15.4.26.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.5.26.	Date Received.
<i>Teiresias</i> ...	Dodds, R. ...	W. H. Newby ...	No. A.	A. Holt & Co. ...	Form 911 13.12.25 to 14.1.26...	28.1.26.
<i>Tekoa</i> ...	Barnett, H. ...	... ..	No. M.	New Zealand S.S. Co. ...	" 17.3.26 to 8.4.26 ...	13.5.26.
<i>Telamon</i> ...	Duggan, C. ...	G. Bevan ...	No. A.	A. Holt ...	" 30.3.26 to 16.4.26 ...	17.5.26.
<i>Teucer</i> ...	Hodgson, R. N. ...	A. Lightbody ...	" A.	" ...	" 3.2.26 to 21.2.26 ...	19.4.26.
<i>Themistocles</i> ...	Jernyn, W. M. ...	R. J. Buckland ...	" M.	Aberdeen ...	" 1.4.26 to 15.4.26 ...	4.5.26.
<i>Theseus</i> ...	Jones, E. ...	W. A. Fyffe ...	" A.	A. Holt ...	" 20.3.26 to 30.3.26 ...	8.4.26.
<i>Titan</i> ...	Wilkinson, T. G. ...	S. C. Timmouth, J. Morris, N. L. Thompson.	M.L.	" ...	Met. Log. 20.10.25 to 11.3.26...	18.3.26.
<i>Tongariro</i> ...	White Parsons, V.C. ...	G. B. H. Cave ...	No. M.	New Zealand S.S. Co. ...	Form 911 11.4.26 to 9.5.26 ...	17.5.26.
<i>Transylvania</i> ...	Bone, D. W. ...	A. Middleton ...	No. A.	Anchor ...	" 11.4.26 to 2.5.26 ...	7.5.26.
<i>Trematon</i> ...	Evans, B. ...	R. Gregory, J. Toms, J. Bell.	M.L.	Hain S.S. Co. ...	Met. Log. 2.9.25 to 8.2.26 ...	2.3.26.
<i>Turakina</i> ...	... ..	W. Dickinson ...	No.	New Zealand S.S. Co. ...	" ...	"
<i>Tuscania</i> ...	Gemmell, W. J. ...	G. H. Squires ...	No. A.	Anchor ...	Form 911 3.10.25 to 11.10.25...	20.10.25.
<i>Tyndareus</i> ...	Slater, H. N. ...	C. Broad, A. C. H. Jones, S. A. Beith.	M.L.	A. Holt ...	Met. Log. 16.7.25 to 16.12.25...	12.1.26.
<i>Ulimaroa</i> ...	Wylie, W. J. ...	J. Gilbertson ...	No. M.	Huddart Parker, Ltd. ...	" ...	"
<i>Ulysses</i> ...	McHutchison, W. ...	H. A. Standfield ...	No. A.	A. Holt ...	Form 911 28.1.26 to 11.3.26 ...	16.3.26.
<i>Umvolosi</i> ...	Barnes, E. W. ...	R. L. B. Ryde ...	" A.	Bullard King ...	" 18.3.26 to 24.4.26 ...	17.5.26.
<i>Valucia</i> ...	Doyle, M. ...	N. Grayson ...	" M.	Cunard ...	" 19.10.25 to 25.11.25 ...	3.12.25.
<i>Vardulia</i> ...	Hughes, W. ...	A. Watts ...	No. A.	Cunard ...	" 3.11.25 to 14.11.25...	8.2.26.
<i>Vasconia</i> ...	Inch, F. ...	G. Watts ...	" A.	" ...	" 22.1.26 to 15.3.26 ...	26.3.26.
<i>Vellavia</i> ...	Fear, E. T. C. ...	F. R. Gorman ...	" A.	" ...	" 4.4.26 to 14.4.26 ...	19.4.26.
<i>Verbania</i> ...	Pooley, T. S. M. ...	W. Bradley ...	" A.	Cunard ...	" 4.4.26 to 7.5.26 ...	11.5.26.
<i>Verentia</i> ...	Wray, C. M. ...	F. H. Wood ...	" A.	" ...	" 11.1.26 to 24.3.26 ...	6.4.26.
<i>Vigilant</i> ...	Simpson, E. S. S. ...	J. Hunter ...	" A.	Scottish Fishery Board	" 1.4.26 to 19.4.26 ...	20.4.26.
<i>Waimana</i> ...	Andrews, C. M. ...	J. Miller ...	" A.	Shaw, Savill & Albion	" 23.2.26 to 16.3.26 ...	13.5.26.
<i>Waotapu</i> ...	Norton, A. ...	W. Johnson ...	" A.	Canadian-Australasian	" 19.3.26 to 16.4.26 ...	17.5.26.
<i>Walmer Castle</i> ...	Stuart, C. E. ...	H. A. Deller ...	" A.	Union Castle ...	" 29.1.26 to 22.3.26 ...	6.4.26.
<i>Wangaratta</i> ...	Scutt, W. ...	T. W. Wordingham, G. R. Millard, K. M. Morrison, N. A. Pope.	M.L.	British India ...	Met. Log. 30.8.25 to 19.1.26 ...	26.1.26.
<i>Warfield</i> ...	Steel, R. ...	H. Coffey ...	No. A.	" ...	Form 911 29.1.26 to 10.2.26 ...	22.2.26.
<i>Welshman</i> ...	Rollerson, W. ...	W. A. Fletcher ...	" M.	White Star-Dominion	" 9.2.26 to 11.3.26 ...	22.3.26.
<i>Westmoreland</i> ...	Upton, H. C. ...	R. G. Kers ...	" M.	Federal ...	" 18.9.25 to 3.4.26 ...	3.5.26.
<i>White Heather, Ketch</i> ...	Glenister, S. L. ...	F. R. Smith ...	"	S. L. Glenister ...	" ...	"
<i>Windsor Castle</i> ...	Strong, H., R.D., Commr., R.N.R.	T. M. Gordon ...	" A.	Union Castle ...	Form 911 23.1.26 to 14.3.26 ...	16.3.26.
<i>Winifredian</i> ...	Harrocks, W. ...	G. P. Boyle ...	" M.	Leyland ...	" 14.12.25 to 19.1.26...	30.1.26.
<i>Woodarra</i> ...	Reilly, J. V. ...	L. D. Graham, G. Hyland, L. C. Comber, J. Wallace.	M.L.	British India ...	Met Log. 27.9.25 to 13.2.26 ...	22.2.26.
<i>Yorkshire</i> ...	Millson, G. C. ...	E. E. Jones ...	No. A.	Bibby ...	Form 911 11.12.25 to 17.2.26...	19.2.26.
<i>Zealand</i> ...	Thomas, A. J. ...	W. N. Jenkins ...	" M.	Red Star ...	" 25.4.26 to 15.5.26 ...	17.5.26.
<i>Conway H.M.S.</i>	Broadbent, H. W., R.D. Capt., R.N.R.	The Senior Cadets...	Cadets' M.L.	"	Cadets' Met. Log. 24.1.26 to 3.4.26	12.4.26.
<i>Pangbourne Nautical College.</i>	Tracy, A. F. G., Commr., R.N.	"	"	"	Cadets' Met. Log. 18.1.26 to 26.3.26	1.4.26.
<i>Worcester, H.M.S.</i>	Sayer, M. B., O.B.E., R.D., Capt., R.N.R.	"	"	"	Cadets' Met. Log. 22.1.26 to 14.4.26	16.4.26.
<i>Abaco</i> ...	...	The Keepers	Lighthouse Register.	"	Lighthouse Register 20.7.25 to 31.12.25	9.3.26.
<i>Cay Lobos</i> ...	...	"	"	"	Lighthouse Register 1.7.25 to 31.12.25	8.3.26.
<i>Double Headed Shot</i> ...	...	"	"	"	Lighthouse Register 1.7.25 to 31.12.25	21.4.26.
<i>Inagua</i>...	...	"	"	"	Lighthouse Register 1.7.25 to 31.12.25	9.3.26.
<i>Sombrero</i> ...	...	"	"	"	Lighthouse Register 1.7.25 to 31.12.25	9.2.26.
<i>Walling Island</i> ...	...	"	"	"	Lighthouse Register 1.7.25 to 31.12.25	8.3.26.
<i>Cape Pembroke (Falkland Is.).</i>	...	"	"	"	Lighthouse Register 18.7.25 to 16.1.26 1.7.25 to 31.12.25	24.2.26.

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

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., Received up to 30.4.26.	Date Received.
<i>Herschel</i> ...	Carey, J. J. ...	T. Lester Guy ...	Lamport & Holt	Water Samples ...	26.3.26.
<i>Hildebrand</i> ...	Maddrell, J. ...	A. Allan ...	Booth ...	" " ...	8.1.26.
<i>Holbein</i> ...	Gough, W. A. ...	H. L. Rudd ...	Lamport & Holt	" " ...	23.1.26.
<i>Manzanares</i> ...	Edwards, H. ...	A. F. Moss ...	Elders & Fyffes	" " ...	12.3.26.
<i>Miami</i> ...	Makepeace, S. ...	D. Smith ...	"	" " ...	12.3.26.

July M.O., 1926.