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## WIRELESS TELEGRAPHY AND TROPICAL REVOLVING STORMS.

Of all the uses to which wireless communication may be put by the navigator as regards weather, there is probably none in which it has greater value than in these storms.

We need make no apology for repeating this, and this Number and the next will be mainly devoted to the subject.

In this month's Number last year, Captain J. HENNESSY gave us the results of his investigation of observations returned for the great typhoon of August 18th, 1923, which caused heavy loss of life and property afloat and ashore at Hong Kong. Its vortex having come in from seaward, originating apparently some 1,800 miles to the E.S.E. of Hong Kong a week earlier, passed over at least three ships fitted with wireless telegraphy on its way. Captain G. BYERS of S.S. *Changchow* told us of another typhoon he encountered five days later, concerning which he wrote :—

"S.S. *Mylic* left Chingwangtao same date as we did for Shanghai at noon. We sighted S.S. *Mylic* through the rain; when we hove to she appeared to be hove to also. She was close to us and astern about 9 p.m. when we could see her lights; after this we did not see her any more. The Chinese messroom boy was picked up six days later on a life raft near Patahekok, also a lifeboat awash containing the dead body of the Chief Engineer; the messroom boy stated the *Mylic* foundered about 9 p.m. on the 23rd. He was the sole survivor."

In this Number Captain HENNESSY has summarised mainly from

the works of Fathers ALGUÉ and FROC, the practical essentials of information concerning the habits of typhoons.

Commander SLEE points out in his article that application of wireless telegraphy to navigation and meteorology must develop along two independent lines, viz., communication and direction finding.

Father GHERZI in his "Typhoons and Statics" says that decrease in the intensity of statics in a typhoon may indicate nearing the centre. Concerning which Senator G. MARCONI wrote in March of this year.

"The only record available at present is the report from a ship with a Direction Finder just outside the track of a hurricane in the West Indies last summer, and the operator stated that atmospherics appeared to come from the centre of the hurricane."

In these circumstances it would appear that investigation of atmospherics at sea rather than application of their position or bearing in a tropical revolving storm for purposes of the "Laws of Storms" (rules for handling ships) is necessary first.

Marine Observers are therefore invited to record, in the space provided for additional remarks at the end of the Meteorological Log, notes upon the intensity of atmospherics observed by wireless operators. If, in ships fitted with direction finders where it is customary to make a weather chart, they will also record the bearing

of greatest atmospheric by D.F. and the bearing of the centre as shown by chart or as estimated by wind direction and barometer, and similarly note these, investigation may be furthered.

These remarks will be forwarded to Father GHERZI and other experts engaged upon the investigation of statics.

With regard to communication, a general invitation was given in the final chapter of "Wireless and Weather, and Aid to Navigation," Vol. I, No. 12, to ships fitted with tested instruments to make wireless reports of observations, made at the standard time of observation of the nearest country, to all ships, and to record these in the columns specially provided at the end of the Meteorological Log. The logs show that an increasing number of Commanders are doing this, and there is evidence that on several occasions these have been of assistance to ships in the vicinity of hurricanes. The value of a number of reports containing observations which synchronize received direct from the vicinity of a hurricane or typhoon is great, both to the Captain of a ship at sea and the Director of an observatory. But it is not sufficient that reports should be made only when there is known to be a disturbance, they should be made as a matter of daily routine if warning is to be effective.

In home waters the issue since June, 1921, of reports giving the actual weather observations made at coast stations in the British Isles, along with the forecasts made at the Meteorological Office, have not only enabled mariners with their own observations and those from other ships to form their own conclusions, but this practice has led to greater confidence in the official forecasts and storm warnings.

In Chapter VI of "Wireless and Weather, an Aid to Navigation," Vol. I, No. 5, we showed how with routine reports reciprocated by coast stations and ships the same method was applicable to tropical seas.

For this purpose the Bay of Bengal was selected because of its general configuration and with the Andaman Islands within, it is particularly adaptable to the application of the method. We had sufficient synchronized ships' observations there. In the Western North Pacific and China Seas, with the Ladrone Islands and Philippine Islands to the eastward and the China Coast to the west, there is a fine geographical distribution for weather telegraphy, which with ships' wireless weather reports will make for better typhoon warnings. As will be seen in "Weather Signals" in this number, the Central

Meteorological Observatory of Tokyo, Japan, has this year commenced to broadcast a data message which gives the necessary land observations for making a weather chart at sea and it is reasonable to hope that other observatories in the Far East will in time institute similar bulletins to cover the coasts south of those dealt with by Japan. The January Number "Weather Signals" not only gave the particulars and decode for ships' North Atlantic wireless weather reports but a standard form plain language report recommended for sending to "All ships" in all parts of the world, with a chart showing the daily routine times of observation. As has already been mentioned the use of this report is steadily growing.

Now Hong Kong Observatory is particularly anxious to receive wireless weather reports from ships at sea. As is shown on the Time Chart (page 12) referred to, the standard time of observation in China is G.M.T. 2200, but in addition the following are routine times of observation for Hong Kong, G.M.T. 0300, 0600 and 0900.

To the British Corps of Voluntary Marine Observers there is no need to repeat the method of barometer correction for they already have that in Vol. I, No. 2 of this Journal and in the "Marine Observer's Handbook." Also to them, it will be evident that by systematically reporting to Hong Kong through Cape d'Agular W/T Station and to "all ships" that they are but working in the general interest of seamen. They are asked to help to make known generally amongst seamen in the trades to the Far East the requirements of Hong Kong Observatory.

MARINE SUPERINTENDENT.

May, 1925.

N.B.—Just before going to press S.S. *War Nizam*, Captain R. O. PUTT, in sending in the Meteorological Report (Form 911) for the passage San Pedro, Cal., to Yokohama, Japan, forwarded copies of W/T weather reports received; amongst which were a number from ships addressed to "All ships" in plain language and generally corresponding to the standard form recommended in THE MARINE OBSERVER; thus illustrating the valuable influence which the data message now broadcast by Tokyo Observatory, Japan, is having upon the application of wireless and weather as a self aid to the navigator.

M. S.

## TYPHOONS OF THE NORTH PACIFIC AND CHINA SEAS.

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

IN each number of this year's MARINE OBSERVER charts compiled by the Rev. LOUIS FROC, S.J., Director Zi-ka-Wei Observatory, are being published showing tracks of typhoons which have occurred in the waters of the Far East from month to month during the 26 years 1893-1918.

Tropical Revolving Storms or Typhoons of the Far East have the same general characteristics as the Hurricanes of the West Indies and Cyclones of the Indian Seas. The name Typhoon is derived from the Chinese words *tat*, meaning great, and *fung*, meaning wind.

In this article it is not intended to discuss the origin of these storms, the theory of which was clearly and simply explained by Captain D. BRUNT, M.A., B.Sc., in Vol. I, No. 9 of this Journal, but to summarise those general facts concerning them which are of practical use to seamen.

### Elements.

Typhoons 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 direction, 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 typhoon is represented on a synoptic chart the distribution of isobars or lines drawn around the centre through points of equal

barometric pressure are rarely shown to be regular and symmetrical; the whole storm field generally follows the form of the centre, which 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 on the average is about 30°

The difference of atmospheric pressure along a measured distance perpendicular to the isobars is termed the gradient, and is spoken of as steep or slight according to whether the difference of pressure be great or small. The standard for their comparison that has been adopted is the difference of pressure in millibars per 60 nautical miles. The intensity of the wind force chiefly depends on the steepness of the barometric gradient; strong winds being associated with a steep gradient while, if pressure decreases only slowly, light winds may be expected.

### Disturbed Area.

The Rev. JOSÉ ALGUÉ, S.J., Director of the Manila Observatory, in his book "Cyclones of the Far East" divides a typhoon into four zones or rings A, B, C, D, corresponding to four distinct barometric gradients which present marked characteristics in typhoons. FIGURE 1, in which the storm field is shown as circular for the sake of clearness, gives a general idea of the wind circulation in a typhoon and shows the different zones wherein barometric pressure is very unequally distributed.

The area over which the influence of a typhoon is felt fluctuates considerably, but the following averages for the different zones were obtained from observations made at Manila Observatory during the passage of these storms.

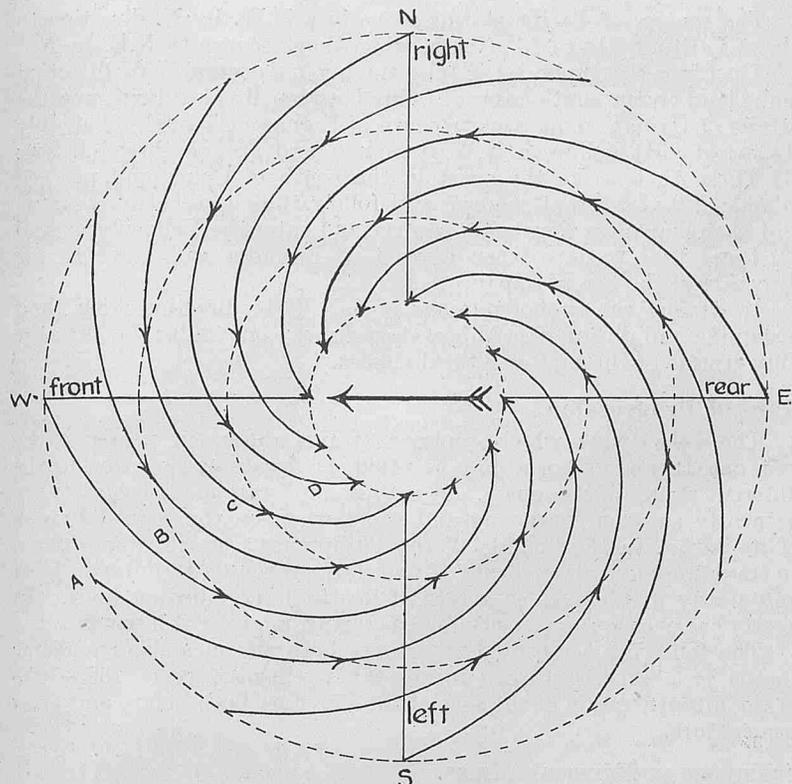


Figure 1.

**Zone A.**—Vortex distant from 120–500 nautical miles. The influence of the hurricane is slight and does not obliterate the daily range of the barometer.

**Zone B.**—Vortex distant from 60 to 120 nautical miles. A depression is clearly indicated by the fall of the barometer, but the daily range can still be traced.

**Zone C.**—Vortex distant from 10 to 60 nautical miles. The outer storm area, in which the barometer commences to fall rapidly solely under the influence of the storm movement.

**Zone D.**—Vortex distant from 0 to 10 nautical miles. The inner storm area wherein the fall of the barometer continues with great rapidity.

Within the vortex or centre of the typhoon which rarely exceeds 14 nautical miles in diameter there is an area of absolute calms surrounded by a narrow zone of relative calm within which light variable airs prevail.

Within the storm field of a typhoon there is in every case an appreciable fall of the barometer, it not being unusual for pressure to decrease over 68 millibars (2 inches) from the outer edge to the centre of the depression.

The barometric gradient does not always indicate the exact force of wind in a typhoon, but on the average it is of force 12 within zone D, force 11–12 in zone C, force 9–10 in zone B and force 5–8 in zone A.

**Frequency.**

Typhoons occur during all months of the year, but are most frequent during the months of July to November inclusive, which is considered the typhoon season proper.

The following table by FROC shows the total number of storms in each month and the yearly frequency for the twenty-six years 1893–1918.

Month.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep	Oct.	Nov.	Dec.
No. of storms	31	17	18	14	33	34	90	92	110	95	52	34
Yearly Fre- quency.	1.2	0.7	0.7	0.5	1.3	1.3	3.4	3.5	4.2	3.7	2.0	1.3

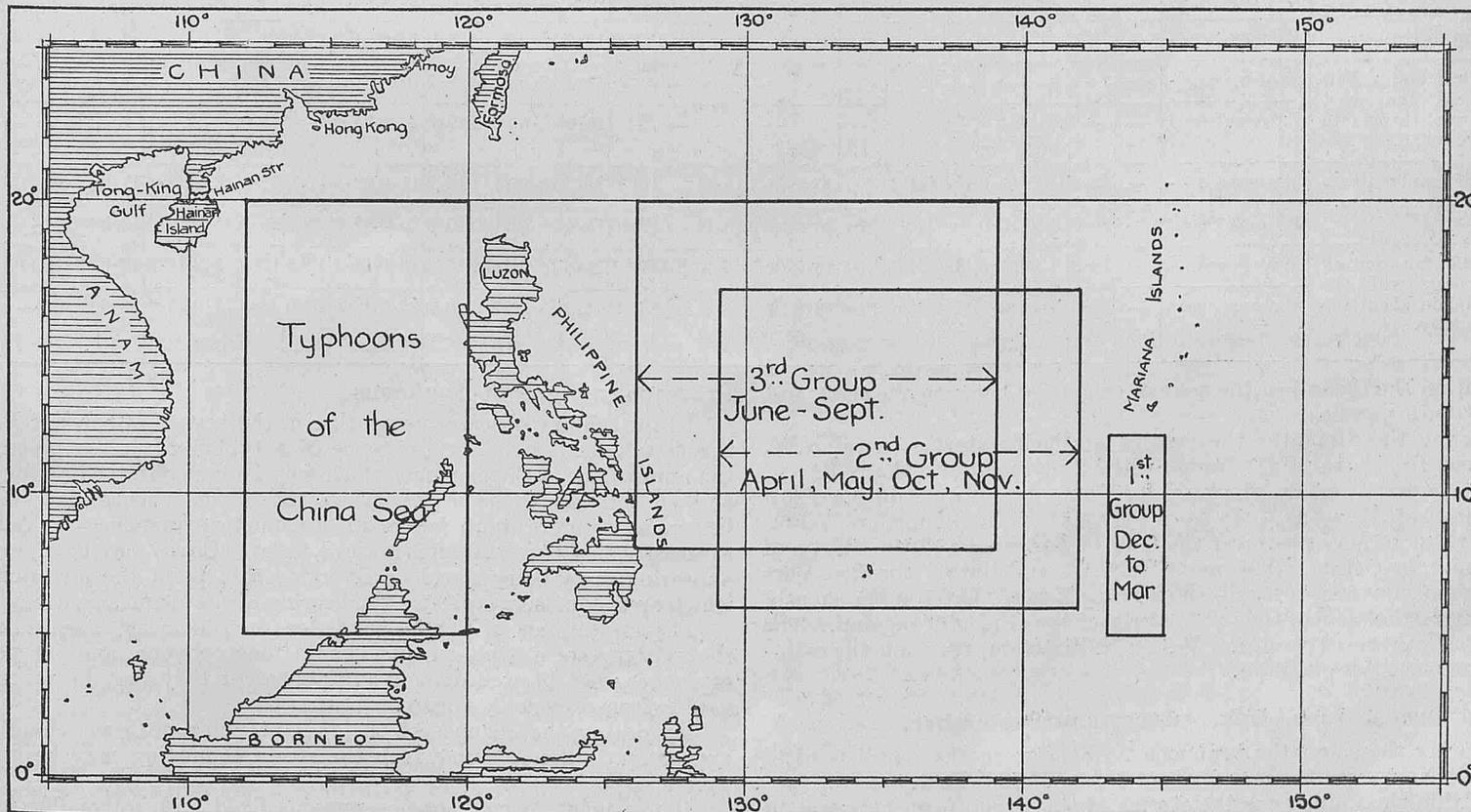
**Region of Origin and Tracks of Typhoons.**

From the observation of nearly all typhoons during recent years, ALGUÉ has fixed the probable zones of origin of these storms, dividing the year into three groups of months.

During the month following each group typhoons may appear having the characteristics of those of the preceding group. The number of typhoons formed within the China Sea is insignificant when compared to the great number formed in the Pacific. The zone of their formation lies between the parallels of 5° and 20° North and the meridians of 112° and 120° East.

Those formed between the parallels of 5° and 14° North are few in number, the majority originating between 14° and 20° North to the west or N.W. of Luzon.

The CHART below shows the zones of origin of typhoons according to ALGUÉ's groups.



Zones of Origin of Typhoons according to Algué's Groups.

In order to clearly define the tracks followed by typhoons they are divided into two broad classes. The typhoons of the Pacific and those of the China Sea.

The typhoons of the Pacific are those whose tracks do not cross the 124th meridian, and China Sea typhoons are those which originate in the Pacific but travel west of this meridian or those which form in the China Sea.

**First Group, December, January, February and March.**

Typhoons which develop during these months generally form in Latitudes lower than 10° North excepting during the early part of December, and at the end of March, when their region of origin is a little farther north so that the zone of formation for this group lies between Latitudes 5° and 12° North and Longitudes 145° and 143° East.

Within the China Sea the zone of origin for typhoons during these months lies between the 5th and 12th parallels.

The centres of the Pacific storms travel N.N.W. recurving between Latitudes 15° and 19° North to the N.N.E.

China Sea storms retain their original direction W. by N. and do not recurve over the sea. In December and January the storm centres reach the mainland in Cochin China or in South Anam, while those of February and March, moving further to the north, strike the coast in Anam.

**Second Group, April, May, October and November.**

The zone of origin in this group is more extended than that of the first. It lies between the parallels of 6° and 17° North and the meridians of 142° and 129° East.

The centres of Pacific storms move in a N.W. by N. direction to about Latitude 21° to 25° North, when they recurve to N.E. by N.

The China Sea typhoons of June moving in a general N.W. direction make land on the south coast of China between Breaker Point and the Straits of Hainan, some recurve south of Formosa Channel. The July storms at first follow a N.W.'ly course and are of three classes: (1) Those that strike the coast in the south of China and proceed inland; (2) those that recurve and follow the coast between Amoy and Shanghai when they again recurve and enter the Yellow Sea; and (3) those that recurve when abreast of Formosa and move in the direction of the Sea of Japan.

In August the typhoons move in a N.W.'ly direction from their beginning and during September, storms move on similar tracks to the July storms of the first and third classes.

**Rate of Progression.**

The velocity at which typhoons travel differs in nearly every instance, the same storm may be rapid, moderate or slow during the different stages of its course. It may be moderate at first, stationary or nearly so when recurving and rapid when on the second branch of its path. In the vicinity of the Philippines a storm is considered to travel rapidly if its velocity of translation exceeds 12 miles an hour and slowly if it moves at a rate of less than 12 miles an hour. In nearly every case the velocity increases with increase of latitude.

The following table by FROC shows both the mean and extreme speeds of observed storms during the twenty-six years 1893-1918 in the different parts of the seas of the Far East both before and after recurvature.

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.	
		(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	—	40.0	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	—	—	—	—	

Within the China Sea the zone of origin lies between the sixth and seventeenth parallels.

During these months the centres of Pacific storms travel N.W. to about 16° North to 21° North, when they recurve to the N.E.

The mean direction of travel for China Sea storms during April and May is N.W. by W. In April they make the land north of Anam, while those of May pass over the Gulf of Tongking and the Straits of Hainan. In October they move W.N.W. and during the first part of the month reach as far north as Hong Kong. Later in the month, moving farther south, they pass south of the Gulf of Tongking. The November storms travel in a W. by N. direction, reaching the mainland on the coast of Anam.

**Third Group, June, July, August and September.**

During these months typhoons form between the parallels of 8° and 20° North and the meridians of 139° and 126° East.

Within the China Seas the storms of this group form between the 8th and 12th parallels.

**Precursory Signs of Typhoons.**

To the solitary observer navigating in the waters of the Far East, the first indication of the existence of a typhoon is often given by the appearance of Cirrus cloud which may be best observed at sunrise and sunset. In many cases, when the storm's centre is distant 600 miles or more, both before the barometer commences to fall or the least sign of bad weather is noticed, isolated Cirrus may be observed appearing in feathery streaks converging in a point the direction of which approximately indicates the bearing of the storm's centre.

The appearance of Cirrus cloud does not in every case indicate the existence of a typhoon, but should they converge and the point of convergence be well defined and persistent they may be taken as issuing from a cyclonic vortex.

By noting the changes of the radiant point of Cirrus cloud the approximate direction in which the storm is moving may be ascertained.

If the point of convergence remains fixed and immovable for a long time the storm centre is probably advancing directly towards the

observer, but if it successively changes its bearing appreciably the observer may consider that he is outside of the storm's path, which will pass to the north or south of him according to whether the bearing changes to the north or south.

Another indication of the existence of a typhoon at a distance may be given from the appearance of a heavy swell not caused by the then prevailing wind.

In the Northern Hemisphere the greatest development of waves takes place in the right hand rear quadrant of a hurricane in which the strongest winds are generally to be found and where the direction of both the waves and advance of the storm are the same. The waves so developed have a velocity far greater than that of the storm itself, and so travel ahead of it beyond the influence of the winds which raised them, as swell. The distance from the centre that swell may be propagated depends greatly upon the position of the nearest coast and upon the intervention of land, such as the Philippine Archipelago, which would turn it from its original direction; but with a clear reach the cyclonic swell generally makes itself felt when distant 600 miles from the storm's centre.

By carefully watching the movement of the barometer and comparing it with the normal, timely warning of the existence of a typhoon may be obtained, but before comparison is made the barometer reading must be corrected for Temperature, Height, Latitude and Index Error. The daily range of the barometer which is very regular within the tropics consists of a double oscillation, there being two periods of increase and two of decrease in twenty-four hours.

In the China Sea and adjoining waters the barometer rises from 4 a.m. to 9 or 10 a.m., the normal rise during this period being from 3.4 mb. (.10 in.) to 4.1 mb. (.12 in.). From 9 or 10 a.m. until 3 or 4 p.m. (and during the hot season 5 p.m.) the barometer falls an amount equal to its rise in the morning.

From 3 or 4 p.m. (during the hot season 5 p.m.) the barometer rises again until 9.45 or 10 p.m. This rise is not so great as the morning rise, but fluctuates between 2.7 mb. (.08 in.) and 3.4 mb. (.10 in.).

The barometer falls again between 10 p.m. and 4 a.m. to an amount not exceeding 3.4 mb. (.10 in.).

During the stated times should the barometer not rise so much or fall so much as the amounts given, the weather should be watched with great care.

In the following table by ALGUÉ is shown the height of the barometer corresponding to the outer limit or Zone A of a typhoon applicable to the seas of the Far East.

Whenever the barometer at the time of the daily minimum falls as far as the tabular value corresponding to the place of observation and the time of the year, the observer may be reasonably sure of the presence of an atmospheric disturbance.

Still another indication of the existence of a typhoon may be obtained from the direction of the wind, but this requires an intimate knowledge of the normal conditions for the locality and season.

Between Parallels.	Barometer Millibars.	Barometer Inches.	Season.
0°-11° N.	1007.8	29.76	Throughout the year.
11°-17° N.	{ 1007.8 1006.8	{ 29.76 29.73	During months of first group. " " second and third groups.
17°-21° N.	{ 1009.1 1007.8 1006.8	{ 29.80 29.76 29.73	" " first group. " " second group. " " third group.
21°-25° N.	{ 1013.2 1009.1 1004.0	{ 29.92 29.80 29.65	" " first group. " " second group. " " third group.
25°-32° N.	{ 1020.0 1015.9 1010.5 1004.0	{ 30.12 30.00 29.84 29.65	" " first group. " October and November. " April and May. " months of third group.
32°-35° N.	{ 1017.3 1010.5 1005.4	{ 30.04 29.84 29.69	" " first group. " " second group. " " third group.
35°-40° N.	{ 1014.5 1009.1 1005.4	{ 29.96 29.80 29.69	" " first group. " " second group. " " third group.
40°-50° N.	1007.8	29.76	Throughout the year.

From observations made at the Manila Observatory it has been found that in the seas adjacent to the Philippines there is no season in the year during which winds from S.W. or N.W. predominate and they should be suspected. According to ALGUÉ should the wind blow in the China Sea or Philippine Archipelago steadily from the S.W. during the months of June, July, August and September a navigator may be quite sure that there is a cyclone vortex situated to the north. He says: "Unfortunately many sailors have the idea so firmly fixed in their minds that the southwesterers are nothing more than monsoons or 'collas' that when in navigating the above-named seas they find the steady southwesterers freshening they often continue their northern direction (ship's course) even when the barometer is relatively low, persuaded that the force of the wind will be the same during the whole of the voyage, while in reality they run into a great danger from which they cannot always escape."

Other indirect premonitory signs of typhoons at a great distance are a long spell of dry, hot weather with light airs or calms. Halos round the sun and moon and the scintillation of the stars at night.

### THE MARINE OBSERVER'S LOG.

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

Responsibility for statements rests with the Contributor.

### WATERSPOUTS IN THE BALTIC.

THE following report has been received from S.S. *Kovno*, Commander D. H. CASSON, R.N.R.

"On Sunday morning, August 24th, 1924, at about 11 a.m., when two miles west of Adlergrund Light Vessel in the Baltic, we observed several waterspouts S.W. of our ship. The force of the wind at the time with us was 2, the wind backing from N. by E. to W. by N. Three of them were perfectly formed—a large water column from sea to cloud, the remainder (about 6 or 7) though nearly making contact, never quite reached, or touched. The nearest of them seemed about three miles from us. The whole disturbance was no more than about 4 miles long. The sea in this area was of course very disturbed as though by very strong wind. We had had a lot of rain before this, but afterwards we had fine weather."

### METEORITE.

EXTRACT from the Meteorological Report of S.S. *Orbita*, Captain W. H. PARKER, C.B.E., R.D., R.N.R., on voyage from New York to Southampton.

"11.20 p.m., G.M.T., 20th August, 1924, in Latitude 43° 05' N., Longitude 41° 05' W., observed a phenomenal meteorite appearing about 15° to eastward of Polaris in a line from Pole Star pointers and travelling to south-westward, disappearing in the zenith under Vega. The meteorite had the appearance of being of large magnitude and very close, leaving a well-defined trail of sparks in the heavens, lasting for an appreciable amount of time."

## TEMPERATURE SCREEN.

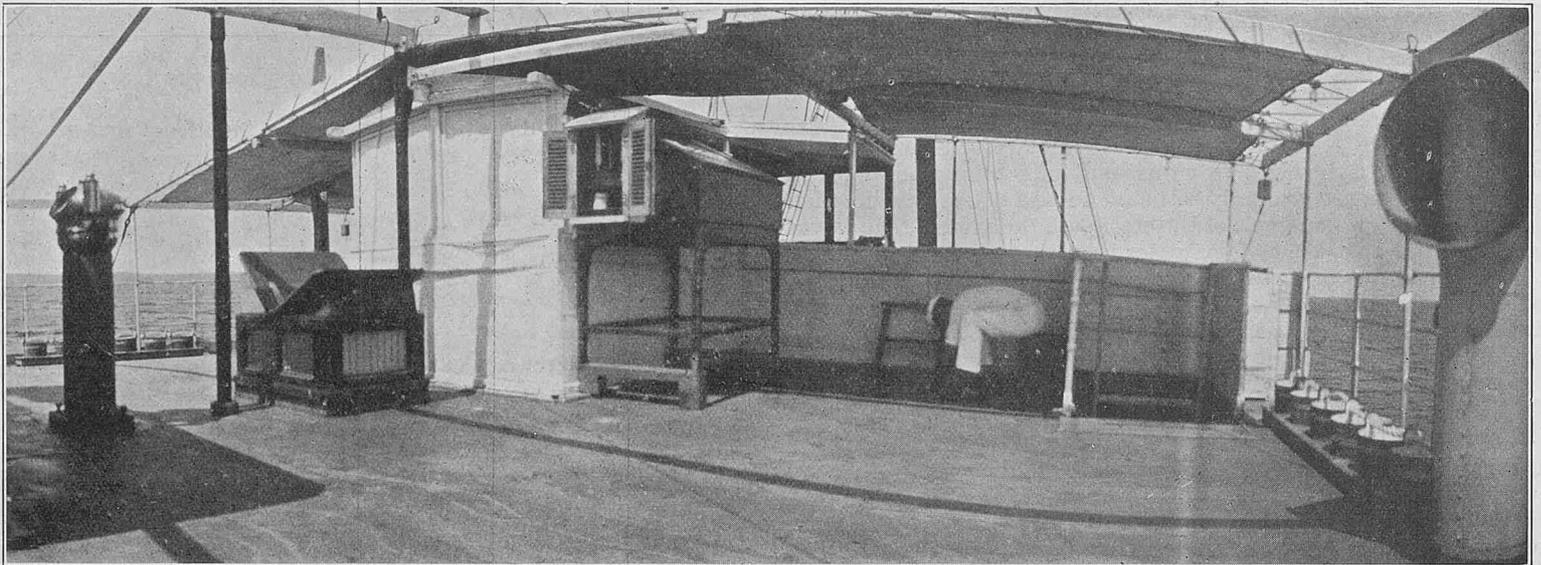


Photo of forepart of Promenade Deck of S.S. *Chinhua*, Captain G. BYERS, showing Meteorological Instruments in place in a fixed screen constructed in the ship. The instrument at the bottom of the screen is a private-owned thermograph.

### CURRENTS AND TIDAL STREAMS IN THE PERSIAN GULF.

The following remarks by Lieutenant F. A. SLOCUM, R.N., H.M.S. *Crocus*, Commander G. WILSON, R.N., have been forwarded by the Hydrographer of the Navy.

"During the past 18 months, efforts have been made in *Crocus* to obtain reliable information with reference to the complicated system of currents and tidal streams, and the following conclusions have been arrived at:—

"As stated on page 18 of the 'Persian Gulf Pilot' (1924)—the greater part of the supposed current is apparently due to tidal streams—but these streams are greatly affected by the winds.

"During calm weather—The Tidal Stream from Musandam via Jezirat Tanb, Farur, Kais Island and up the Persian coast to Bushire can be relied upon to follow the directions stated on the charts and in the 'Sailing Directions,' but as soon as a 'Shamal' or 'Kaus' is experienced, the action of the streams is thrown into confusion, and no attempt to pre-surmise their strength and direction appears to be successful.

"The streams never appear to act in the same manner under similar conditions on two consecutive occasions.

"The Streams between Tanb Island and the western entrance to Henjam Sound are always particularly erratic.

"Even in calm weather these streams continue flowing in one direction long after the prescribed time for turning.

"The Streams in the Shatt-al-Arab River have also been observed to act in accordance with expectations until influenced by wind.

"A perceptible indraught into the bay east of Ras-al-Mutaff has been observed on several occasions during the S.E. going stream.

"The following observations have recently been made in the vicinity of the Pearl Banks.

"During a falling tide at Bushire—

"(1) Between Sir Abu Nu Air and the Meridian of  $53^{\circ} 10' E$ , Stream E.S.E.  $\frac{1}{4}$  knot.

"(2) Between the Meridian of  $53^{\circ} 10' E$ . and Habul, Stream—South  $\frac{1}{2}$  knot.

"(3) From midway between Jezirat Sirri and Jezirat Bu Musa to Sir Abu Nu Air—Stream—Easterly  $\frac{3}{4}$  knot.

"Persian Gulf Pilot, page 22.

"As stated in the 'Sailing Directions' the greater part of the current supposed to exist is probably due to the Tidal Streams.

"The Tidal Streams are mostly felt along the Persian Coast between Bandar Abbas and Bushire. They follow the general tendencies stated in the 'Pilot' and are strongest between Tanb Island and Sheik Shuaib Island, and again between Ras-al-Mutaff and Bushire.

"They are greatly influenced by the prevailing winds ('Shamal' and 'Kaus') especially between the above-mentioned places.

"A 'Kaus' appears to have the greater effect often causing a strong and continuous current in a westerly and north-westerly direction respectively during the period of the 'Kaus.'

"The streams and currents are only felt within about 10 or 15 miles off the land: to seaward of this limit there appears to be very little stream.

"An indraught of about 1 knot into the Bay east of Ras-al-Mutaff has been felt during the ebb stream, and a strong indraught into the deep bay enclosing Bahrim Island has also been experienced during the flood stream, although on other occasions it has not been apparent.

"Once clear of the shoal water in the approaches to the Shatt-al-Arab the streams appear to be negligible."

### CLIMATE OF PORTLAND BIGHT, JAMAICA.

AN abstract of some notes on the Meteorology of Portland Bight, Jamaica, contributed by Captain H. P. DOUGLAS, C.M.G., R.N., H.M.S. *Mutine*, together with a questionnaire answered by Mr. V. VERLEY of Thetford Hall, Bushey Park P.O., Jamaica.

#### Rain.

The wet Seasons (of from 10 to 20 inches per month) occur in May or June and October or November, the greatest fall recorded being 12 inches in 24 hours.

It is believed that there has been a tendency for rainfall to decrease of late years.

#### Wind.

The months of strong wind are March to August; during these months the sea breeze gets up between 8 and 9 a.m. and reaches its maximum between 2 and 3 p.m. The land breeze is strongest at about 3 a.m. The sea breeze generally blows from S.E. but sometimes it changes to south, seldom to west. The land breeze generally blows from N.E. and sometimes changes to N.W.

A strong sea breeze is not preceded or followed necessarily by a strong land breeze, but after three days of fresh sea breeze or fresh land breeze showers of rain are probable.

The land breeze is generally light, not more than force 2. There is no marked calm at the change from sea to land breeze, the S.E. sea breeze dying down and backing to N. or N.E. But in the early morning the land breeze dies to a flat calm which is broken by bursting

of the sea breeze.

The sea breeze tends to veer as it blows harder. In the eastern portion of Portland Bight, there is a tendency for the wind to follow the coastline between Cabicelta Point and Old Harbour Bay so that it may be from westward of south off Goat Island when it is from east at the anchorage off Old Harbour, though between the latter place and Salt River it is south-east.

It was noticed in March and April, 1923, that a clear atmosphere foretells a strong sea breeze or rain, but that thick hazy weather always accompanies a strong sea breeze.

#### Water level.

The highest tides at Old Harbour may be expected in July and August due to passing hurricanes. Generally a strong wind on shore lowers the level of the water, a strong wind off shore raises the level. In July and August sea breeze affects the level over one foot.

#### Weather Signs.

Locally it is believed that heavy grey low clouds over the hills foretell a north wind, and heavy low clouds over the sea with mares' tails overhead foretell sea breeze. Heavy white clouds over the hills and a straight horizontal grey line over the sea foretell rain. The natives also say that the cuango tree does not bear heavily when rain is expected. A small red and black beetle and flying ants come in droves to a light at nights before rain. Rain is also foretold by remarkably misty weather. Before a hurricane, sea birds like the frigate come inland.

The natives also say that just before an earthquake there is a dead calm, after the quake the wind starts strong again.

### SOUTH-WEST MONSOON.

THE following remarks were contributed with the meteorological report of S.S. *Poona*, Captain W. G. W. CHERRY.

"Leaving Melbourne on the 20th July, 1924, and rounding Cape Leeuwin on the 27th idem, a course was laid for a position Latitude 3° 00' N., Longitude 51° 00' E., passing to the southward of the Chagos Group, and northward of the Seychelles. Normal weather and currents for the season were experienced until in Latitude 1° 14' S., Longitude 57° 20' E. at Noon on the 11th August, when a current was found to have set the ship S. 76° W. 27 m. in the previous 24 hours, and at noon on the 12th, Latitude 1° 22' N., Longitude 53° 41' E., the current was found to have been S. 85° W. 17½ m. I conclude that the absence of an easterly set in this region was due to having shaped a course to a position so far south of Ras Hafun—viz., 3° N., Longitude 51° E.

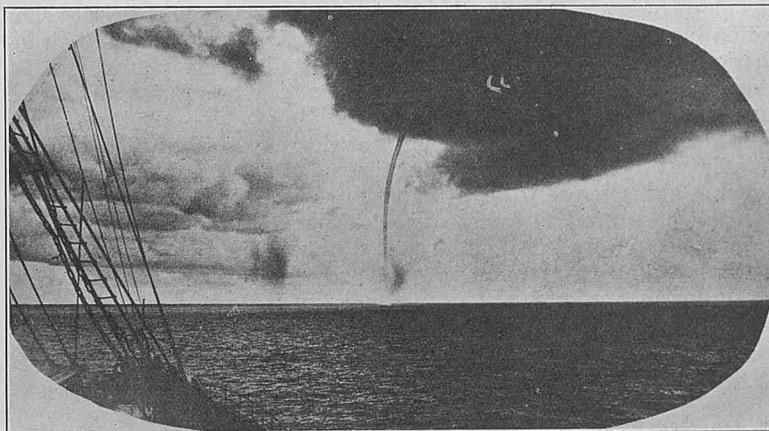
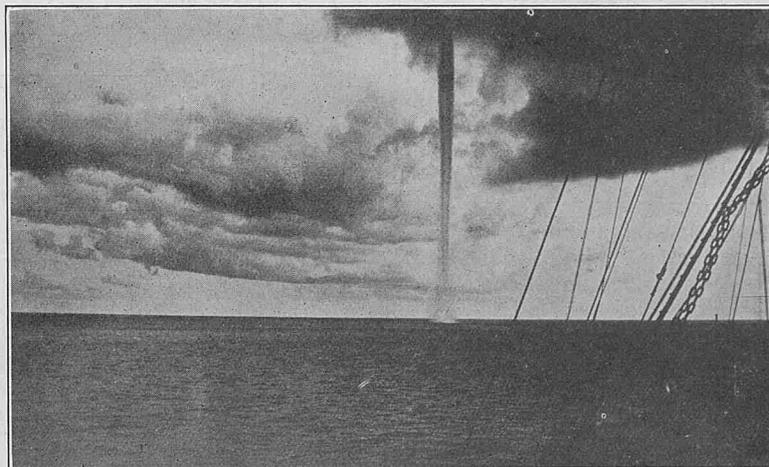
"On arrival at (or near) the above position at 8 a.m. on the 13th August, I steered for 5 m. east of Ras Hafun, bringing the wind and sea, both slight, on the port quarter. Weather fine, cloudy; horizon good. From this point onwards strong easterly currents were met with, the wind increasing, but never exceeding force 7 of Beaufort's scale—generally a good deal less. The weather continued cloudy, with a good horizon. By noon the next day, 14th August, Latitude 8° 35' N., Longitude 51° 32' E., the current was found to have set the ship about 50 m. to the eastward, and 19½ m. to the northward—this latter, however, was all experienced in the last 7 hours of the 24. By 9 p.m. on the same day a further set of N. 35° E. 38 m. was noted. Owing to a full moon and the favourable state of the horizon, I was able to obtain solar and/or stellar observations practically every watch, which enabled me to gauge the current with some degree of exactness. Ras Hafun was not seen, partly owing to the haze to landward, partly owing to the distance the ship was found by stellar observation and soundings to have been set to the eastward in this region. A further slight N.E.'ly set was met with from here to C. Guardafui, the light on which was sighted at 3.30 a.m. next morning (15th August). The light is a good one, and in spite of the monsoon haze which hung over the land, was seen at an estimated maximum distance of 15 miles.

"The advantages of making for a position so far south of Ras Hafun I conceive to be that less easterly set is met with while making westing from the Seychelles to the African coast, and the weather is generally clearer, enabling solar and stellar observations to be taken until approach to the bank of soundings off Ras Hafun affords another means of locating the ship's position, when the horizon may be expected to be bad.

"Other advantages are the presence of smoother water and quarterly wind and sea as soon as the strong part of the monsoon is entered. I am, however, disposed to be of opinion that conditions were possibly somewhat unusually favourable on this occasion. The obvious disadvantage is, of course, the extra mileage entailed in following this course."

### WATERSPOUTS.

The accompanying photos of waterspouts have been contributed by Captain J. ALLAN MORDUE, S.S. *Rialto* and were taken when he was in command of the S.S. *Karonga*, San Francisco to Japan, in August, 1916. The approximate position of the ship was Latitude 40° N. Longitude 180° E.



### BALL LIGHTNING.

THE following report from S.S. *Redstart*, Captain F. D. MOON, has been received through the General Steam Navigation Co., Ltd.

"On August 21st, 1924, on the voyage from London to Amsterdam at 8.30 a.m. we were about 11 miles north of the Maas Light Vessel. During the preceding night we had experienced wind, lightning and heavy thunder. From 8 a.m. to 8.30 a.m. we had a very heavy rain squall. Just as the squall was over we heard a tremendous crash and a flash of light immediately in front of our bow. This did not seem to be thunder and lightning. Our fore-castle deck on the star-board side was covered with sparks, also the starboard No. 1 crane and the lower part of the mainmast. The sparks resembled sparks when an iron plate is being burned, not acetylene.

"The watch below in the fore-castle tell me that when they heard the report it sounded like the heavy clanging of a bell. Had the ship been a few feet farther ahead we should have received the full force of whatever the disturbance was. The sparks appeared to run up our stem on to the deck along the starboard No. 1 crane and thence to the main lower mast. No damage was done to the ship."

## CURRENT.

THE following is an extract from the Meteorological Log of S.S. *Makambo*, Captain T. M. BROWN, Sydney, N.S.W., to New Hebrides. Observer, Mr. F. C. REE, 2nd Officer.

" August 7th-8th, 1924.

" At 9.15 a.m. obtained a fix by sun and planet, Lat. 32° 39' S., Long. 154° 38' E.

" At 3.00 p.m. obtained a fix by sun and moon, Lat. 32° 12' S., Long. 155° 47' E.

" At 5.00 p.m., Latitude by moon's meridian altitude 32° 8½' S.

" True Course steered N. 72° E. Speed 9 kts.

" Current Course N. 34° E. 13½ miles from 9.15 a.m. to 3 p.m. Approximately 2 kts.

" From 5 p.m. to 5.56 a.m. True Course steered N. 80° E., Speed 9 kts. when Mt. Gower, Lord Howe Is. was observed bearing N. 63° E. true, approximate distance 33 miles. True Course made N. 82° E., speed 10 kts., giving an easterly current of 1 kt.

" The northerly set therefore ceased shortly after 5 p.m.

" The islanders report that during the 3rd, 4th and 5th strong southerly and S.W.'ly winds which eased up on the 6th; this vessel experienced light variable airs and calm with a moderate S.E.'ly swell since leaving Sydney on the 6th."

## CLOUD FORMATION.

THE following is an extract from the Meteorological Log of H.M.S. *Iroquois*, Commander C. W. TINSON, R.N., surveying E. Coast Johore. Observer, Lieutenant GOULD, R.A.N.

" August 5th, 1924, 11 a.m. Observed peculiar St-Cu., formation, Cu. much denser than usual St-Cu., and interspersed with streaks of blue sky in a manner similar to cracks in sun-backed mud, or a flagstone. All cloud edges were straight and not curved as in ordinary St-Cu. Formation lasted about 15 mins."

## PRACTICAL SEAGOING APPLICATION OF WIRELESS TO NAVIGATION AND METEOROLOGY.

BY COMMANDER J. A. SLEE, C.B.E., R.N. (RET.).

FROM a seagoing point of view, wireless is of assistance to the navigator in two distinct ways. It is a method of communicating information over distances far exceeding visibility, and it forms the means of finding the direction of transmitting stations, and so allowing the navigator to obtain bearings at great distances from the object. The accuracy of these bearings is such that a position obtained by their means will in any case be at least as good as that of a Dead Reckoning position, and under favourable conditions it may be almost as accurate as a position obtained by astronomical observation.

From the point of view of meteorology at sea the main use of wireless lies in the great distances over which information can be passed about from ship to ship. It is possible that there may be some definite connection between the frequency and violence of what are called "atmospherics" and the state of the weather at different points, but at present the state of knowledge on this subject is not far advanced, one of the greatest obstacles to progress lying in the fact that atmospherics themselves are of so complicated a nature that it is difficult to single out those which may act as forerunners to a change of weather of such a character as to be of importance to the seaman, from those which are connected with meteorological phenomena of comparatively insignificant nature. All are equally obnoxious to communication by wireless, and it is not at present possible to distinguish those of meteorological importance from among the large number of sounds which are heard.

It is well known that a thunderstorm is usually a source of atmospherics, and it is sometimes possible to obtain the bearing of a centre of violent electrical disturbance by means of a direction finder. There is at least one authenticated case of the track of a hurricane having been followed by this means. Observations of this nature seem to be reliable if they can be made at all, but in the present state of knowledge it is difficult to take satisfactory observations of any particular group of atmospherics. All kinds of atmospheric disturbances sound very much alike and it is very hard to distinguish one group from another.

Thus it is clear that the development of the application of wireless telegraphy to navigation and meteorology must advance along two independent lines; firstly, to make the most of the facilities which exist for communication, and secondly, to make the most of the facilities which exist for directional work.

The messages with which we are concerned under this subject can be divided into two classes—those transmitted by large shore stations of high power, which have a range to be measured in thousands of miles, and those transmitted by small shore stations or by other ships.

The wireless equipment of most ships consists of a spark transmitter of moderate power and a receiver making use of a crystal detector. The inter-ship range of vessels so equipped is about 200 miles on the average, a pair of small vessels with the least equipment which will comply with Government requirements being capable of covering not much more than half this distance, and a pair of large vessels having

the most powerful equipment in common use are capable of covering about twice this distance.

There are, at the time of writing, a large and growing number of vessels equipped with valve receivers, which are far more sensitive than crystals, so much so that if two vessels are fitted out with valve receivers, their communicating range will be about double that which they could cover were they equipped with crystal receivers.

The transmitters now in use are of two types. All ships which carry wireless are fitted with a transmitter of the "Spark" type, or with its equivalent, and all high power stations on land make use of transmitters of the "continuous wave" type, with the exception of Eiffel Tower at Paris, which still uses a powerful spark transmitter for the assistance of navigation. Ships fitted with crystal receivers cannot receive continuous wave signals and are thus cut off from the direct reception of a great deal of information of a very valuable character. Against this it should be remembered that, speaking for the British Mercantile Marine, all ocean-going passenger vessels and about one-quarter of the remainder are now fitted with valve receivers, and so far as equipment is concerned these vessels are capable of receiving a great deal of information and repeating it to other vessels in their neighbourhood which may be unable to receive it direct.

The large passenger vessels carry three fully qualified telegraphists, and in such ships constant wireless watch is kept while at sea. The majority of vessels only carry one fully qualified telegraphist, who keeps watch at certain scheduled hours, dependent upon the position of the ship. (See "Admiralty List of Wireless Signals.") From this it is clear that meteorological messages which are intended to reach the maximum number of ships by direct reception must be transmitted during the hours when single operator ships are keeping watch, and, for the same reason, any organisation for the repetition of meteorological messages by specially well equipped ships to their less fortunate neighbours must be worked out so that the re-transmission takes place when single operator ships in that neighbourhood are keeping wireless watch.

In order to reduce the amount of traffic which takes place on any particular wave, a regular organisation exists for the purpose of diverting as much traffic as possible to other wavelengths. The standard wavelength for inter-ship and ship-and-shore communication is 600 metres, and for this purpose "spark" is almost universally employed. The object of organisation is to relieve the 600-metre spark wave of as much private traffic as possible. It is very necessary that such an organisation should be well worked out and faithfully applied in those parts of the sea which are crowded with shipping, such as the English Channel and approaches to New York, but it does not by any means follow that identical regulations are required in all such places, because the dominant factors are the shape of the coast line, the position of shore wireless stations, and the position of the most crowded steamer tracks. These are not alike in any two parts of the world, and the organisation for each place should be determined by the local authorities to meet the local cases. As far as the high seas are concerned, where ships are scattered and where there are no

shore stations, nothing is to be gained by diverting traffic on to waves other than 600 metres.

In order to reduce the congestion of traffic in crowded waters, most of the important passenger vessels are equipped with continuous wave transmitters in addition to their spark transmitters, thus providing a second line of communication. These sets, though not of very great power, are very efficient and are therefore capable of comparatively long-range work—say 1,000 miles—and by their aid a large amount of traffic is carried in congested waters, thus materially easing the situation on 600 metres.

The long-distance sets are effective in the reduction of congestion in two ways. The messages do not interfere with the 600-metre working, and their long range allows the stream of traffic to commence sooner than would be the case if spark only were available, and so reduces the density of the stream. Precautions are necessary to prevent vessels that make use of this method of communication from becoming so engrossed in it as to miss important communications on other wavelengths, so all these big ships revert to the 600-metre wave for short periods twice an hour.

Nowadays there are very few parts of the ocean where a ship fitted with wireless is entirely cut off from communication with all other ships; the majority of ships at sea at any moment are within wireless range of two or more others. It is quite possible for the Captain of a ship to obtain information as to the movement of the barometer well ahead of his position, and also of the actual state of the weather, and so to obtain ample warning of the coming changes. In many cases ships fitted with wireless apparatus may be able to collect sufficient information to locate the position and movement of centres of low pressure, and from this information the advisability of any alteration of course can be decided.

If full advantage is taken of the present-day weather signals transmitted by powerful shore stations, and of the comparatively local information which can be obtained from ships in the neighbourhood, a very full weather intelligence system can be worked up on board any ship. It is only a question of asking neighbours for their position and weather. No payments are involved, as in almost all cases ship-to-ship messages between Captains are passed free of charge. The facilities exist; it is only necessary to make use of them.

The use of wireless as an aid to determining a ship's position, as opposed to ascertaining the state of the weather in the neighbourhood, is twofold. A large number of stations transmit time signals, and at least one of these is audible to a ship fitted with a valve receiver, on any day, wherever she may be. The list of these signals is given in several publications, of which the "Admiralty List of Wireless Stations" is the most complete and the most accurate.

The time signal usually takes the form of a series of squeaks audible in the telephone headpiece in the wireless room, and the chronometer is generally a long way off. Not everyone has the knack of comparing chronometers and not everybody is accustomed to listening to time signals, so some arrangement has to be come to. The best scheme is to make use of the telephone between the wireless room and the bridge, the telegraphist giving a warning ring at the beginning of the series of sounds and finishing with a long ring terminating with the last dot of the time signal.

The use of the direction finder fitted on board ships as an aid to navigation has already been very fully discussed in a previous number of this Journal, and but little can be added to what has already been stated. The use of direction finders is steadily extending, and as a direct consequence the extent and position of the areas in which "land effect" is to be expected is gradually becoming known. This information is circulated in the form of sketches called "Arcs of Good Bearings," which are prepared by the Marconi International Marine Communication Co., Ltd., as soon as sufficient details come to hand.

One of the chief difficulties which besets the use of ships' direction finders as regular aids to navigation is the small number of transmitting stations on land whose position is suitable for the purpose, but steps are now being taken to put matters right by the erection of special transmitting stations for this express purpose. These stations are called "beacon stations" in this country, "Radio Fog Signals" in the United States and "Radiophares" in France. Most of them transmit on a wavelength of 1,000 metres, the range at which bearings can be taken varying with the situation of the station. Bearings can be obtained from some of the Radio Fog Signals situated in the approaches to New York at a distance of 200 miles, the European stations being content with ranges of about 50 miles or even less. Most of them are situated on light vessels, and in this case good bearings of them can be obtained from any direction.

A recent extension of this scheme, not as yet very far advanced, is to fit the beacon station with a submarine bell or a fog horn, or perhaps both, worked in conjunction with the wireless transmitter. A blast on one or the other (or both) of these instruments is sounded at the same instant as a similar dash is transmitted by wireless, and, if within range, two of them should be received by separate observers in the same ship. The wireless signal travels so rapidly that its time of arrival may be considered to be identical with its time of despatch, and therefore it is identical with the time of despatch of the other signal (submarine bell or sound). Sound passes through air at the rate of 1,090 ft. per second, so at a distance of two sea miles the fog horn would be heard at just over 11 seconds after the dash was heard by wireless. An error of one second in timing only means an error of 363 yards, and with a little practice there is no difficulty in observing within half a second of accuracy. If the submarine bell is in use, the rate at which the sound travels is 4,900 ft. per second, so at six miles the interval between the arrival of the wireless sound and the submarine bell signal will be almost exactly 8 seconds.

These arrangements—the combination of fog horn or submarine bell with wireless direction finding—give both bearing and distance from a known point; in fact, a pretty good fix when the limits of accuracy of the two types of observation are taken into account.

The conditions under which a beacon station must work demand that it shall always be available in hazy weather. As the range is usually about 50 miles, and as it is impossible for any person to tell what the weather is 50 miles away, it follows that the beacon station must run all through the 24 hours, or else it must be fitted with sufficient communication devices to allow ships that so desire to ask for the beacon to be started. The former of these two is more satisfactory, but it opens up the difficulty of finding a wavelength that can be used in the congested European waters without causing interference to other sources or being interfered with by them. At the same time sufficient power must be employed to enable good bearings to be taken at the desired range. This is the strongest reason for limiting the range of beacon stations in the Channel and North Sea.

The wavelength of 1,000 metres seems very satisfactory for the purpose, and good bearings can be obtained at 50 miles from stations using it. If the transmitters are well designed—especially if interrupted continuous waves are used—the interference caused to existing services may be regarded as negligible.

### Wireless Beam.

A further development of wireless science for the benefit of navigation has been made in revolving beam stations. These have not yet emerged from the experimental stage, but experience gained with them has already shown that they are capable of rendering most valuable assistance.

The construction of the transmitter is such that the signal which it emits is sent out in one direction only—hence the name "beam"—and the dispersion of the beam can be adjusted to meet the requirements of the case. The whole transmitter is made to rotate slowly, and as the beam traverses round the horizon it transmits different letters at each two points of the compass.

A very short wave is used for the purpose—about six metres—and special receivers can be provided to receive it. As there is no other wireless working going on at this wavelength no trouble is experienced from interference.

The general idea is to fit this special receiver on a ship's bridge, entirely independent of the main wireless installation, and to leave it to the Navigating Staff to use it as and when required.

The letters transmitted by the beam are signalled very slowly and are very easy to read, and the dispersion of the beam is arranged so that at ordinary distances two letters are heard. This fixes the bearing at somewhere between the points of the compass indicated by the letters. The space between the letters is occupied by arbitrary signs indicating the points and half points, and if the first and last of these arbitrary signs that can be heard are recorded, the bearing from the transmitter can be determined to a quarter of a point. Full details of the working of this arrangement have been published in the "Wireless Year Book" for 1924.

The first experimental station was erected on the Island of Inchkeith, and has an effective range of 10 miles. A second experimental station has been commenced at South Foreland and is still in the trial stage. This is a more powerful station, having a longer range and capable of transmitting a narrower beam, but the best working arrangements for this station have not yet been determined.

## TYPHOONS AND STATICS.

BY THE REVEREND FATHER E. GHERZI, S.J. OF ZI-KA-WEI  
OBSERVATORY.

SINCE the advent of wireless telegraphy a real struggle has been waged against some electric disturbances which are produced in the atmosphere and cause in the receiving telephones noises and claps very strong and persistent at times.

Although progress has been made in studying them, the wireless officer on board his ship will always try and do his utmost to get rid of them the best he can.

So we are afraid that the following lines will rather astonish our readers, since as a matter of fact, we think that greater attention paid to these atmospheric or statics, can probably be of a real utility to the officer navigating in our regions during the typhoon season.

And the aim of this article would be to ask other seagoing people to see if what we have noticed over the Eastern Sea during the last two typhoon seasons is really a general fact in Far East waters and even possibly in other tropical regions of the world.

Here are the few facts we have collected and which we hope will be found interesting.

By means of a big loop (hexagone of 4 meters of diameter) we have been doing radiogoniometric measures with the European and American stations during two years. In the meantime during the winter season we had many occasions to ascertain that really by finding out the quadrant from which most of the statics were coming (by the "extinction method") one can follow the centre of the continental storms originated over China or over the Siberian regions and even locate rather exactly their azimuths. The same should be said of the thunderstorms in summer. Needless to say we had a continuous control of our measures by means of our Weather Service embracing the China Provinces and the adjacent seas. And these experiences quite agree with those similarly admitted by European meteorologists.

When the typhoon season for our shores sets in, we tried to keep the same look-out by means of our loop, on these tropical cyclones, but we failed to make any correct finding of the centres' position.

We had the possibility of following almost hour by hour through our China Coast Weather Service twelve strong typhoons, sometimes passing just close to the observatory, but despite all the terrific rain-squalls and the precipitous fall of the barometer, our revolving loop while searching for the centre in the same way as we had done for the continental depressions, was only finding out very erratic positions and azimuths.

Moreover we were greatly astonished to experience very good radio reception with almost no statics when the storm was raging all over our coasts. These experiences were so striking and, we venture to say, so new (in 1922) that we resolved to ask the radio people of the Koukaza Wireless Station in the French Concession, engaged in the commercial traffic of Shanghai (spark emission on 750 m.) and in the regular reception of the French Press via Bordeaux (continuous waves), if they had had any results similar to ours.

The answer was quite positive and even they added that in their routine work they admitted as an ascertained fact that the typhoon in its path was "clearing up" and so to say "sweeping clean" any electrical activity of the atmosphere.

Our first experiences were in this way confirmed. But we wanted more.

Knowing by our daily Weather and Storm Warning Service which steamers had been just passing through the typhoon centres, receiving sometimes from us special meteorological forecasts through the Koukaza Radio station, while they were in distress in the typhoon

vortex, we sent letters and had appointments on board with the radio operators of these very same ships.

Their answer was also that during these stormy hours the statics had been either completely disappearing, or that they had kept quite normal, although according to the regular routine remarks in the radio operator book, the well known QRN (= atmospheric) are intense) had been written when the steamer was at about 200 miles from the typhoon centre.

The case of the Italian mail steamer *Trieste* of the Lloyd Triestino was very striking. The steamer on account of some reefs located to port, when coming from Kobe to Shanghai had not been able to keep clear of the storm zone: so extremely rough weather and strong currents setting in, the *Trieste* was sucked so to say, towards the typhoon's centre and during six full hours remained completely out of control. As we had several times sent out special forecasts for the Captain, the assurance given by the radio officer of the complete absence of statics during those long and exciting six hours is really interesting.

Now if the same thing be ascertained in the centre zone of all the tropical storms, at least while these are moving in the tropical or subtropical regions this fact, we think, might be added as a premonitory sign to the other signs already known to seamen.

Namely, "the decrease in the intensity of statics (atmospherics) when navigating in the neighbourhood of a typhoon may indicate that the ship is getting nearer the storm centre."

We will immediately add two words, to prevent any misleading interpretation of this provisional rule.

Typhoons are known to have been attended sometimes by thunder and lightning. An old French Captain of the China Seas told us that according to his experience these occurrences were altogether rather exceptional and he had even found out, that many of these electrical displays were in fact only visual, namely, lightning without real thunder. And as we ventured to say that possibly the typhoon whirl, composed at first only of equatorial air could become in some way electrified by the impact with the anticyclone (polar air) hurrying down against it from the Siberian and Chinese regions, the same Captain quite agreed with us and told us that once in the China Sea he had witnessed the extinction or filling up of a typhoon which had previously swept over the Philippines. All lasted a full night amidst a wonderful but silent display of continuous lightning above the Paracels Bank.

These last experiences will prevent people from thinking that never a typhoon centre should originate statics; but such an electrical activity, exceptional to the ordinary rule, could possibly mean either that the typhoon is gradually, filling up or, especially after the centre has recurred N.E.'ward, that the typhoon whirl is now in some way enveloped by the anticyclonic air of the continent, which would cause in the revolving storm, strata and lines of electric and thermic discontinuity originating statics in the radio reception.<sup>1</sup>

These few lines are sufficient we think, to show that thanks to the good will of the numerous correspondents of THE MARINE OBSERVER very useful remarks concerning the statics' intensity in the radio reception on board ships riding out a storm, tropical or non-tropical, could be collected quickly and surely.

We expect that these data from all the oceans of the world, would perhaps show that these electrical disturbances so vexing in the radio service, might become an additional help to the seamen trading along the treacherous seas of the Far Eastern countries.

<sup>1</sup> We will add that the statics which should be recorded are those of the "grinding type," although any remark about the "hissing type" and the "thunder-clap type" might be very useful too. The "grinding type" is very easily distinguished from the "thunder-clap type" which is characteristic of thunderstorms and is rather intermittent.

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

## NOTES UPON AVERAGE CONDITIONS IN THE INDIAN OCEAN, NORTH OF LATITUDE 35° S.

## VIII. August.

BAROMETRIC pressure has commenced to increase over the North Indian Ocean since the preceding month.

From the area of lowest barometer situated over north-west India 1,000 mb. (29.53 in.) pressure increases in a southerly direction to the centre of the high pressure system 1,026 mb. (30.30 in.) which has further developed since July, and has moved to the eastward, being now situated in about Latitude 30° S., Longitude 65° E.

The normal range in pressure over the North Indian Ocean for the month is 10 mb. (.30 in.) a decrease of 2 mb. (.06 in.) since July; over the South Indian Ocean the normal range is 16 mb. (.47 in.), an increase of 2 mb. since July; thus the normal range for the month over the whole Ocean is 26 mb. (0.77 in.) which is the same as for July.

There is comparatively little alteration in the general direction of the wind over the whole Ocean since the two preceding months, but the average force of the S.W. monsoon is a little lower.

Between the Equator and Latitude 5° N. from the African Coast to the 80th meridian the average wind gradually changes in direction from south to west. On the western side of the Arabian Sea the wind comes from S.W., but draws a little more to the westward in the centre, while on the eastern side of the sea it comes from the northward of west.

In the Bay of Bengal the average wind direction is from S.W. except at the head of the Bay, where it varies between S.W. and S.E.

The monsoon continues to blow strongest west of the 60th meridian, where the mean force varies between 4 and 7, but forces of 8 and above are frequently experienced. In the centre of the Arabian Sea the force varies between 3 and 5, and off the west coast of the Indian Peninsula between 2 and 4, but in both of these areas winds of moderate gale force are occasionally reported. In the Bay of Bengal the normal force of the monsoon is moderate but gales may be experienced in any part of the Bay.

The S.E. Trade winds blow steadily between Latitudes 25° and 5° South. West of the 70th meridian the trades blow right up to the Equator when they become the S.W. monsoon. The mean strength of the trades varies between forces 3 and 5. They are strongest between the 10th and 20th parallels, where they occasionally increase to the force of a moderate gale.

Between the Equator and Latitude 5° S., east of the 70th meridian, light to moderate variable winds are general.

South of the Trade wind area there is a belt of variables where winds with a westerly component predominate and which frequently attain gale force.

**Cyclonic Storms.**—There is no record of a cyclonic storm occurring in the Arabian Sea during the month of August.

In the Bay of Bengal cyclonic storms are a little less frequent during August than in the preceding month. In the years 1877–1923, fifty-seven storms are recorded, giving a percentage frequency of 15 per cent. The majority of storms originate north of the 16th parallel and travel in a N.W. ly direction, but are not usually of very great intensity.

**South Indian Ocean.**—There are no cyclonic storms in the

South Indian Ocean during the month of August.

**Air Temperature.**—In the Arabian Sea the normal air temperature for the month is about 78° F. on the western side, and 81° F. on the eastern side of the Sea. Over the Bay of Bengal the average temperature is about 82° F., but is a little lower off the coast of Lower Burma than elsewhere.

Between the parallels of 5° north and south, east of the 60th meridian the average temperature is about 81° F. West of the 60th meridian it ranges from 80° F. to about 77° F. off the East African coast

South of Latitude 5° S. temperature decreases gradually with increasing Latitude, being about 55° F. in Latitude 35° S.

**Sea Surface Temperature.**—In the Arabian Sea the normal sea surface temperature for the month is highest at the extreme head of the Sea and off the west coast of the Peninsula, where it averages 81° F. Elsewhere in the Sea the temperature is irregular, but is somewhat lower on the western side than in the centre, averaging 76° and 78° F. respectively.

In the Bay of Bengal the normal sea surface temperature ranges from 84° F. in the north to 82° F. in the south.

Between Latitude 10° S. and the Equator, east of the 60th meridian the normal sea surface temperature is about 82° F. West of the 60th meridian it ranges from 81° F. to 76° F.

From the Equator southward temperature gradually decreases and is about 60° F. in Latitude 35° S.

**Currents.**—In the South Indian Ocean between the parallels of 35° and 20° south the sea surface currents are irregular.

The S.E. Trade drift setting west between the parallels of 20° and 8° south separates in about Longitude 65° E. and flows to the north and south of Madagascar. The stream flowing north of the Island dividing off Cape Delgado flows up and down the African coast. The branch setting down the western side of the Mozambique Channel, reinforced by the stream flowing to the southward of Madagascar, when off Delagoa Bay, continues around the Cape as the Agulhas current. Over the centre and eastern parts of the Mozambique Channel the currents are variable.

Between Latitude 8° S. and the Equator the currents are irregular, but generally set to the westward.

**North Indian Ocean.**—The current flowing parallel with and setting strongly up the African coast combines with a current setting out of the Gulf of Aden, and spreading, flows in a north-easterly direction over the western and central portions of the Arabian Sea. Over the eastern part of the sea the current turns to the S.E. and flows down the western coast of the Peninsula.

Between the Equator and Latitude 10° N. an offshoot from the African coast current turns to the east and S.E. between the 50th and 60th meridians and flows in a direction between these points across the Ocean to the 80th meridian. Here it is met by the stream flowing down the west coast of the Peninsula and rounding the south coast of Ceylon turns north and N.E. flowing between these points over the Bay of Bengal.

## WEATHER SIGNALS.

## CHINA SEA, AND JAPAN.

## II.—WIRELESS WEATHER BULLETINS.

## 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 :  
BBDDDFS.

- BBB = The corrected barometer reading in millimetres and tenths, initial 7 omitted. (See Table XV, p. 45, March 1925 MARINE OBSERVER to convert to mbs. and ins.)
- DD = Wind direction true. (See Table III, p. 13, January 1925 MARINE OBSERVER.)
- F = Wind force by Beaufort Scale, forces 9 and above sent as 9.
- S = State of sea and swell. (See Table XXIV, p. 46, March 1925 MARINE OBSERVER.)

NOTE.—(1) S is not sent for Kwang-chau-wan.  
(2) When the observations of a station are missing a group of ciphers is transmitted in lieu.

**HONG KONG.**  
**Spark Issues.**

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

NOTE.—Hong Kong Observatory has recently issued an appeal for reports from ships at sea, through the above W/T station (Board of Trade Notice to Mariners, December 1st, 1924).

For Ships' Wireless Weather Signals, Standard Form not in Code, see pp. 11-13, Vol. II, No. 13, 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. 136.

**CHINA.**

**Spark Issues.**

Shanghai-Zikawei W/T Station, approximate Latitude 31° 12' N., Longitude 121° 26' E., call sign FFZ, broadcasts weather bulletins at 0300, 0900, 1400 and 1800 G.M.T. on a wave length of 750 metres (spark).

The bulletins consist of weather messages, sent *en clair*, in French and English, for China and the China seas and contain observations of 0100 (at 0300), of 0700 (at 0900) and of 1200 (at 1400 and 1800). All times are G.M.T.

Typhoon and gale warnings are also broadcast by this W/T station, after the weather bulletins, for particulars see p. 136.

**JAPAN.**

**C.W. Issues.**

The W/T Station attached to the Central Meteorological Observatory Tokyo, 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. 136.

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.
G	Sakai - - - -	„	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 XLII. (To convert to mbs. and ins. see Table XV., p. 45, March 1925, MARINE OBSERVER.)
- 4th letter in each group gives the wind force by Beaufort Scale and the state of the weather, Table XLIII.
- 5th and last letter in each group gives the wind direction, Table XLIV.

Special Weather Telegraphy Tables,  
Not New International Code.  
Japanese Meteorological Code.  
Table XLII.—Barometric Pressure.

Tenths	0	1	2	3	4	5	6	7	8	9	
Millimetres. less than 711	AA	—	—	Code Letters :							—
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	EG	DH	
4 -	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	
5 -	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 -	IJ	IK	IL	IM	IN	IO	IP	IQ	IR	IS	
8 -	IT	IU	IV	IW	IX	IY	IZ	JA	JB	JC	
9 -	JD	JE	JF	JG	JH	JI	JJ	JK	JL	JM	
740 -	JN	JO	JP	JQ	JR	JS	JT	JU	JV	JW	
1 -	JX	JY	JZ	KA	KB	KC	KD	KE	KF	KG	
2 -	KH	KI	KJ	KK	KL	KM	KN	KO	KP	KQ	
3 -	KR	KS	KT	KU	KV	KW	KX	KY	KZ	LA	
4 -	LB	LC	LD	LE	LF	LG	LH	LI	LJ	LK	
5 -	LL	LM	LN	LO	LP	LQ	LR	LS	LT	LU	
6 -	LV	LW	LX	LY	LZ	MA	MB	MC	MD	ME	
7 -	MF	MG	MH	MI	MJ	MK	ML	MM	MN	MO	
8 -	MP	MQ	MR	MS	MT	MU	MV	MW	MX	MY	
9 -	MZ	OA	OB	OC	OD	OE	OF	OG	OH	OI	
750 -	OJ	OK	OL	OM	ON	OP	OQ	OR	OS	OT	
1 -	OU	OV	OW	OX	OY	OZ	PA	PB	PC	PD	
2 -	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	
3 -	PO	PP	PQ	PR	PS	PT	PU	PV	PW	PX	
4 -	PY	PZ	QA	QB	QC	QD	QE	QF	QG	QH	
5 -	QI	QJ	QK	QL	QM	QN	QO	QP	QQ	QR	
6 -	QS	QT	QU	QV	QW	QX	QY	QZ	RA	RB	
7 -	RC	RD	RE	RF	RG	RH	RI	RJ	RK	RL	
8 -	RM	RN	RO	RP	RQ	RR	RS	RT	RU	RV	
9 -	RW	RX	RY	RZ	SA	SB	SC	SD	SE	SF	
760 -	SG	SH	SI	SJ	SK	SL	SM	SN	SO	SP	
1 -	SQ	SR	SS	ST	SU	SV	SW	SX	SY	SZ	
2 -	TA	TB	TC	TD	TE	TF	TG	TH	TI	TJ	
3 -	TK	TL	TM	TN	TO	TP	TQ	TR	TS	TT	
4 -	TU	TV	TW	TX	TY	TZ	UA	UB	UC	UD	
5 -	UE	UF	UG	UH	UI	UJ	UK	UL	UM	UN	
6 -	UO	UP	UQ	UR	US	UT	UU	UV	UW	UX	
7 -	UY	UZ	VA	VB	VC	VD	VE	VF	VG	VH	
8 -	VI	VJ	VK	VL	VM	VN	VO	VP	VQ	VR	
9 -	VS	VT	VU	VV	VW	VX	VY	VZ	WA	WB	
770 -	WC	WD	WE	WF	WG	WH	WI	WJ	WK	WL	
1 -	WM	WN	WO	WP	WQ	WR	WS	WT	WU	WV	
2 -	WW	WX	WY	WZ	XA	XB	XC	XD	XE	XF	
3 -	XG	XH	XI	XJ	XK	XL	XM	XN	XO	XP	
4 -	XQ	XR	XS	XT	XU	XV	XW	XX	XY	XZ	
5 -	YA	YB	YC	YD	YE	YF	YG	YH	YI	YJ	
6 -	YK	YL	YM	YN	YO	YP	YQ	YR	YS	YT	
7 -	YU	YV	YW	YX	YY	YZ	ZA	ZB	ZC	ZD	
8 -	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	
9 -	ZO	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZW	ZX	
780 -	ZY	—	—	—	—	—	—	—	—	ZZ	
more than 780·1	ZZ	—	—	—	—	—	—	—	—	—	

Table XLIII.—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 XLIV.—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

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. on a wave length of 1,200 metres spark.

Form of message :—

Typhoon LL<sub>1</sub>D<sub>1</sub>D<sub>1</sub>K or Coup de Vent D<sub>1</sub>D<sub>1</sub>Q, 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.

D<sub>1</sub>D<sub>1</sub> = Forecast of the direction the typhoon (or storm) is likely to travel. (See Table III, p. 13, January 1925 MARINE OBSERVER), with the following additions :—

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

K = Radius and force.

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

Q = Area threatened.

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

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

Storm and typhoon warnings are also broadcast when necessary by the following W/T stations in French Indo-China Normal wave length 600 metres (spark).

W/T Station.	Position (approx.).		Call Sign.	
	Latitude.	Longitude.		
Fort Bayard -	21° 13' N.	110° 23' E.	HVH	1800 metres, wave length.
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 or until the next warning is issued, on a wave length 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 (from, 01 to 24, beginning at midnight), 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.

**CHINA.**

**Spark Issues.**

Shanghai-Zikawei W/T Station, call sign FFZ, broadcasts typhoon and gale warnings, when necessary, after the weather bulletins described on p. 134, at 0300, 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.

**JAPAN.**

**C.W. Issues.**

The W/T Station attached to the Central Meteorological Observatory, Tokyo, call sign JFRA., broadcasts storm warnings, when necessary, *en clair*, in English after the weather bulletins explained on p. 134. The wave length 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.
<b>Hong Kong.</b>						
Stonecutters - - -	BXY	2,000 (I.C.W.)	h.	m.	s.	Preliminary signals sent 2 mins. before transmission of T.S. proper CQ de BXY "Time wait." The T.S. are dots (0.2 sec. duration) sent at the <i>even</i> seconds from 0156-0200 G.M.T. and from 1256-1300 G.M.T. The dots are <i>omitted</i> at the 2nd, 28th, 50th, 52nd and 54th sec. of each minute for the purpose of identifying the signals.
Lat. 22° 19' 17.7" N.			01	56	00—02 00 00	
Long. 114° 08' 40.0" E.			12	56	00—13 00 00	
<b>China.</b>						
Shanghai - - - -	FFZ	750 (spark)	02	54	00—02 54 50	T.S. preceded by "general call" (CQ de FFZ). - - - - - etc. ▪ (T.S.). - - - - - etc. ▪ (T.S.). - - - - - etc. ▪ (T.S.).  (As above).  NOTE.—Signals controlled from Zikawei Observatory.
Lat. 31° 13' 14" N.			02	55	00	
Long. 121° 27' 48" E.			02	56	00—02 56 50	
			02	57	00	
			02	58	00—02 58 50	
			02	59	00	
			0854—0859			

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.

Day Signals.

Signal.	Symbol.	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	Sau ki wan
Waglan	Sai kung
Stanley	Sha tau kok
Aberdeen	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.

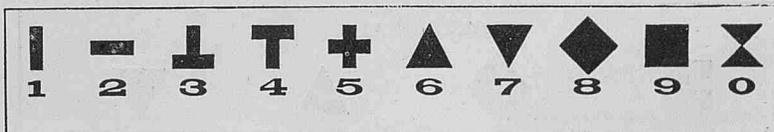
CHINA SEAS STORM SIGNAL SYSTEM.

Typhoon and Storm Signals.

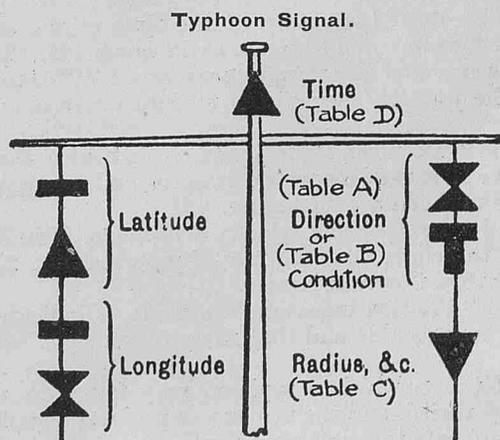
THE China seas storm signal system which has been drawn up by joint agreement between the observatories at Zikawei and Hanoi and the Chinese Maritime Customs, is now definitely adopted along the whole China coast, including Hong Kong and the Indo-China ports.

General Explanation.

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



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	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	Contn. Position depres. 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.

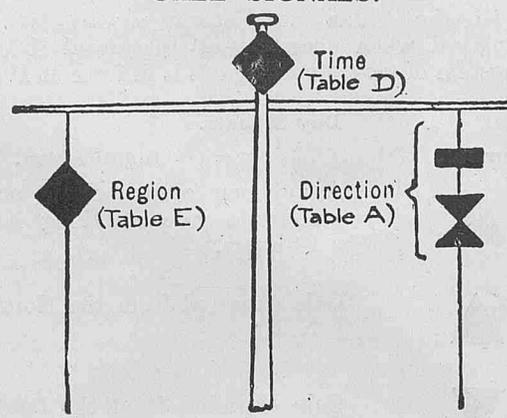
If the signal "Exceptional velocity" is made, it indicates that there is reason to believe that the rate of progression is 25 per cent. or more greater than the average rate.

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. (See Table of "Mean and Extreme Speeds of Typhoons in Nautical Miles," p. 126.)

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.									
Coast of G. of Tongking	Formosa	Formosa	Yangtze to G. of Yalu	Sea of Japan	North of Hokkaido	East Coast of Japan	South of Kiusiu		
Annam. to Swatow.	Strait.	to Yangtze.	Shantung.	G. of Pechihli.					

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. 137.

Tsingtau Storm Signal Station.

The storm signals in use at this station are as follows:—

By Day.	By Night.	Signification.
A red ball -	A red light - - -	Gale expected.
A red cylinder -	Two red lights, vertical -	Storm expected.
A red cone -	Three red lights, vertical	Cyclonic storm expected.

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, 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.

(a) 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:—

1	2	3	4	5	6

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

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

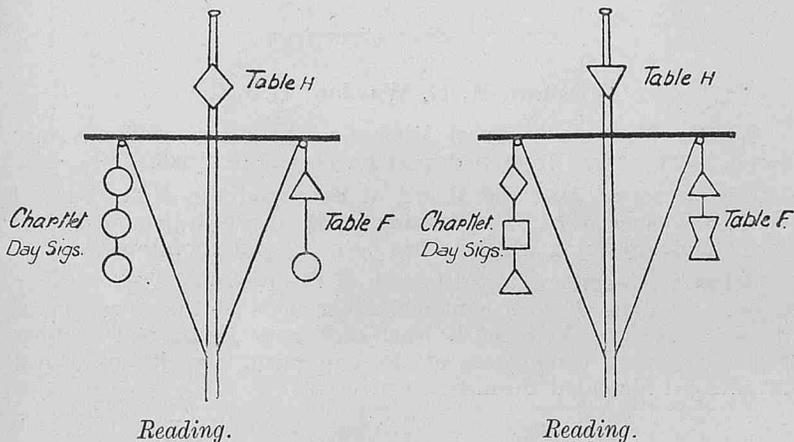


Day Signals for General Storm Signals.

Chartlet indicating position of Storm Centre. Japan.

1. Day Signals.

Examples of Day Signals.



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.

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

- (a) Three symbols, vertical, at one yardarm of the storm-signal mast, indicate the number of the district in which the centre of a typhoon or cyclone is situated.
- (b) Two symbols at the other yardarm show the direction of the progressive motion. See Table F.
- (c) The rate of progression is shown by changing the relative positions of the direction symbols to the yardarm. See Table G.
- (d) One symbol at the masthead shows the time at which the centre was located, and the intensity of the rotatory storm. See Table H.

TABLE F.—Direction of Motion.

▲	▲	▲	●	●	●	▼	▼	▼	▼	▼	▼	▼	▼
▲	◆	●	■	●	◆	●	■	▼	◆	▼	■	▼	▼
N.	NNE.	NE.	ENE.	E	ESE.	SE	SSE.	S.	SSW.	SW.	WSW.	W.	W.
▼	▲	▲	◆	■	■	◆	▼	▼	▼	▼	▼	▼	▼
◆	▲	▲	◆	■	■	◆	▼	▼	▼	▼	▼	▼	▼
WNW.	NW.	NNW.	Forming	Filling up	Unknown.	Recurving	Steady or Slow.						

TABLE G.—Rate of Progression.

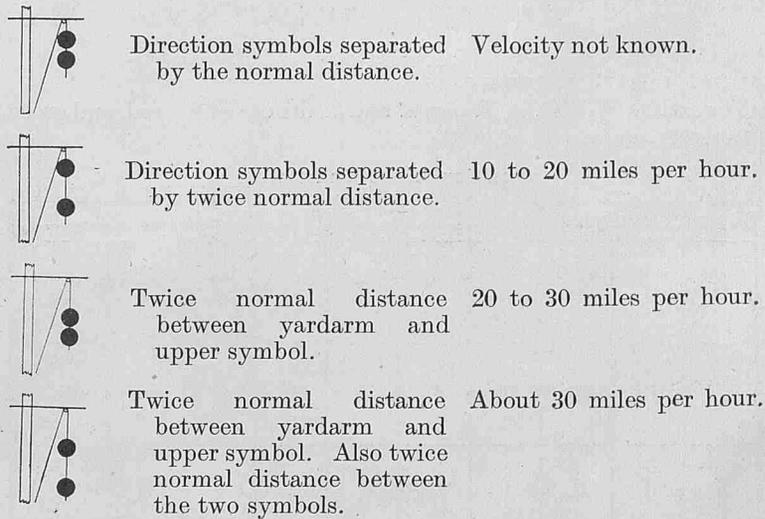
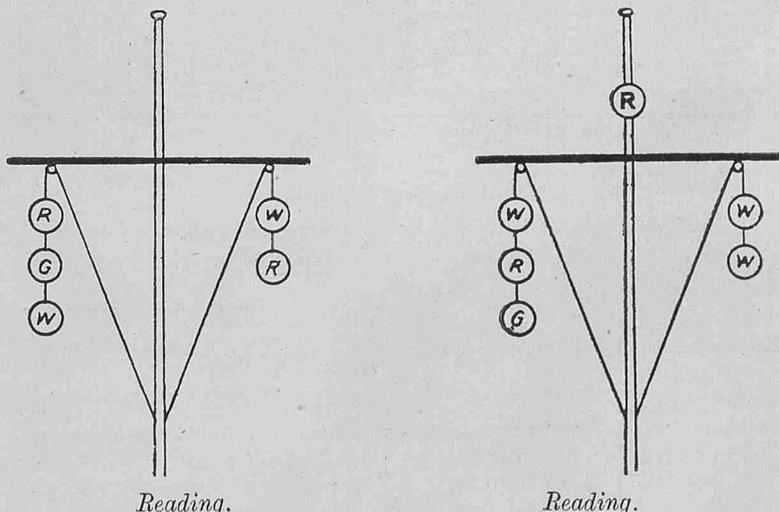


TABLE H.—Time and Force.

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

2. Night Signals.

Examples of Night Signals.



A cyclone or typhoon over Korea (Chosen), moving towards the north-east. A cyclone over Hokushu, moving towards the east.

- (a) Three lights, vertical, at one yardarm indicate the district in which the typhoon or cyclone is situated. See POSITION LIGHT CHARTLET.
- (b) 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.

(W)	(R)	(G)	None
1 <sup>st</sup> Quadrant.	2 <sup>nd</sup> Quadrant.	3 <sup>rd</sup> Quadrant.	4 <sup>th</sup> Quadrant.

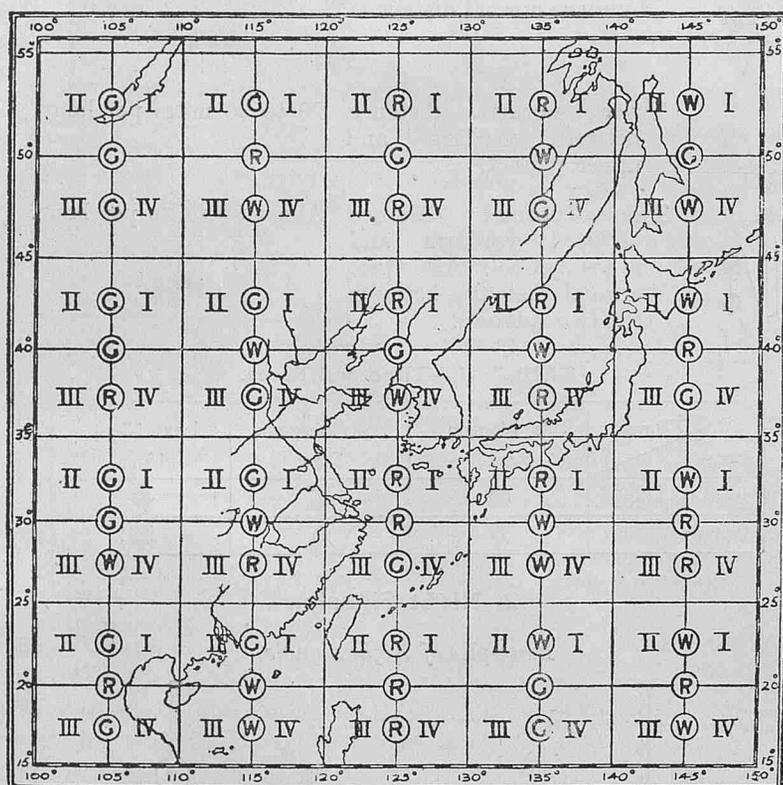
(c) Two lights, vertical, at the other yardarm show the direction of the motion of the centre. See Table J.

TABLE J.—Direction of Motion Lights.

(G)	(W)	(W)	(R)	(R)	(R)	(G)	(W)
(W)	(R)	(W)	(R)	(G)	(W)	(G)	(G)
N.	NE.	E.	SE.	S.	SW.	W.	NW.

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

Position Light Chartlet.



The letters W,R,G, 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.

**GREAT BRITAIN.**

Supplementary to pages 27-30 and 102.

For the special information of small craft and vessels fitted for Wireless Telephony reception; commencing from 1st July, 1925, the British Broadcasting Company will transmit appropriate parts of the "Weather Shipping" Bulletin. For particulars regarding times, stations, &c., see Notice to Mariners (Board of Trade), July 1925.

**Special Notices regarding Personnel.**

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

**Vice-Admiral F. C. Learmonth, C.B., C.B.E., R.N. (Retd.).**

Admiral LEARMONTH, late Hydrographer of the Navy, whose retirement was noted in the December, 1924, Number has received the honour of Knight Commander of the British Empire (Military) on the occasion of HIS MAJESTY THE KING'S birthday.

**Captain William Marshall, D.S.O., R.D., R.N.R.**

THE KING has been pleased to confer the Order of Companion of the Bath (Military) upon the occasion of HIS MAJESTY'S birthday upon Captain MARSHALL of the White Star R.M.S. *Olympic*, a senior Captain in the Royal Naval Reserve and a member of the Corps of Marine Observers since 1912.

**Captain R. C. Warden, C.B.E.**

Captain WARDEN, Nautical Adviser to the Board of Trade since March, 1923, retired from that post on May 30th, 1925.

He has represented the Board of Trade on the Meteorological Committee since 1922, also serving upon the Sub-Committee for Marine Meteorology in which he has been particularly interested.

Before joining the nautical branch of the Board of Trade Survey in 1903, Captain Warden commanded steamers of the City Line of Glasgow. He is a Younger Brother of Trinity House and member of the governing committees of the Gravesend Sea School, Royal Alfred Aged Merchant Seamen's Institutions.

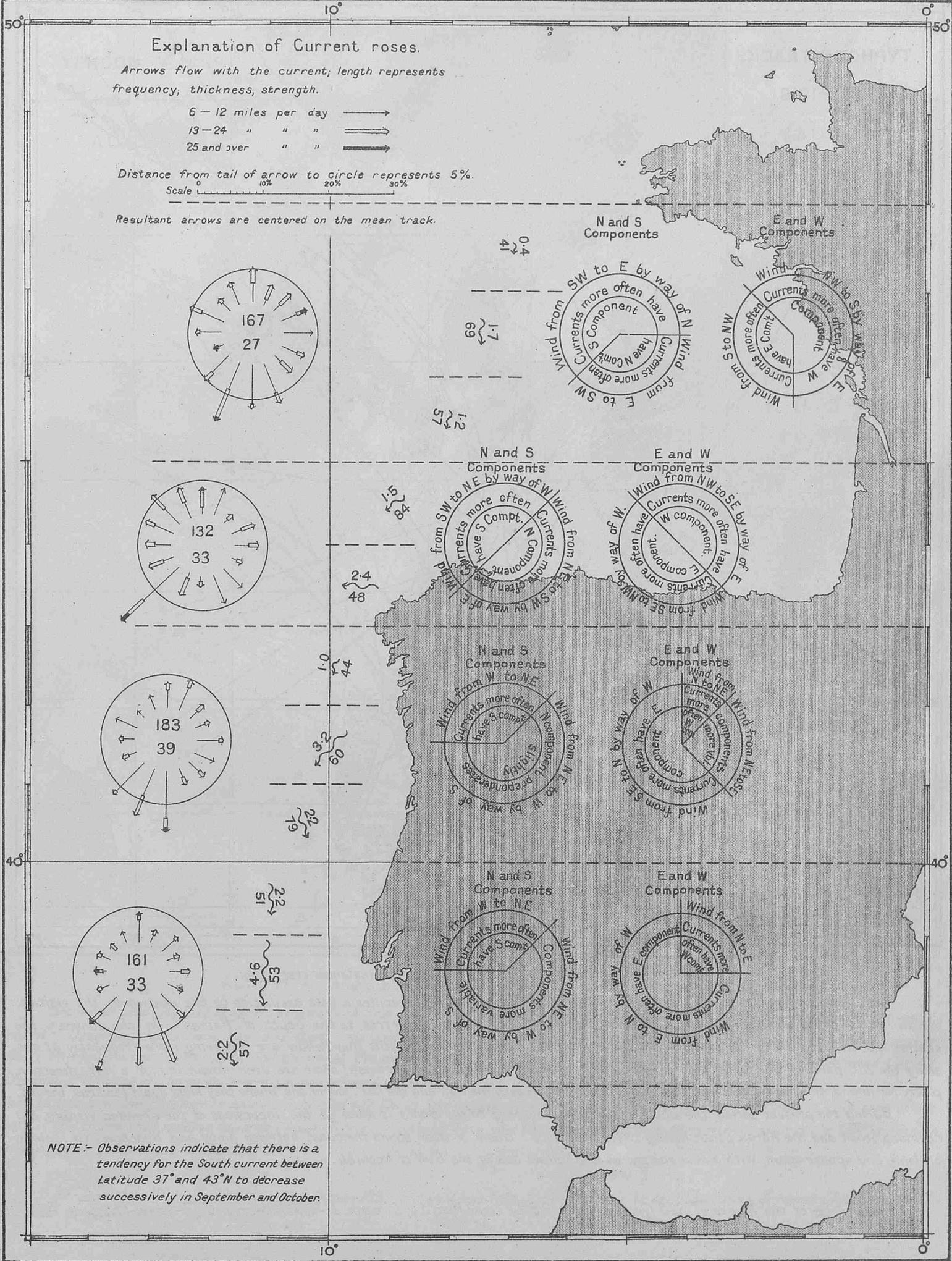
**Captain F. W. Bate, O.B.E., R.D., R.N.R.**

Captain BATE, who succeeds Captain WARDEN as Nautical Adviser to the Board of Trade, was Marine Agent to the Meteorological Office at Southampton in 1920 and 1921 when he was Senior Nautical Surveyor at that port. He relinquished the duties of agent upon being promoted to Principal Officer.

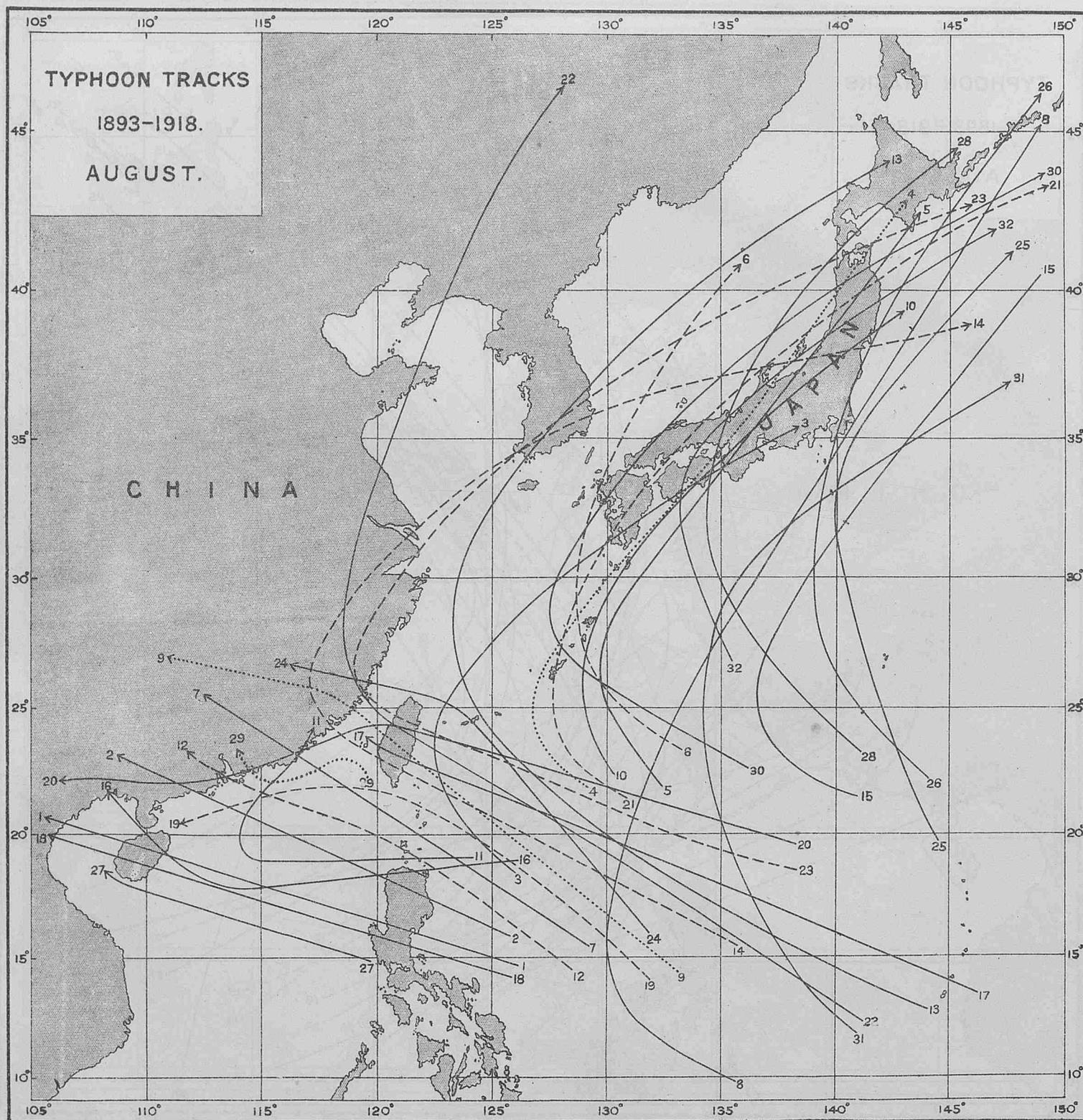
Captain BATE is an old Conway boy and was formerly a Commander in the Union Castle Line.

# CURRENT CHART, CHANNEL TO LATITUDE OF CAPE ST. VINCENT.

Compiled from observations made by ships using the routes from the Channel to Madeira and southward and the Mediterranean, in the months of August, September and October during the years 1910-1923.



## TYPHOONS IN THE FAR EAST DURING 26 YEARS.



AUGUST. — Three charts : 92 tracks ; three or four instances every year.

Third decade: August 20-31--32 storms — The opening of the bundle or fan formed by the tracks is a remarkable feature of the end of August. The middle of it is less dense, and the trajectories traced by the centres are gathering more towards the edges which glide on one side as far as the Gulf of Tongking, on the other on the Marianas, the Bonin group and the eastern shores of Nippon. The Formosa Strait remains a very dangerous place, but we must note that the storms in the middle of the fan, appear to find it more and more difficult to reach the coast to the N of Foochow, and many of those which come inland between Foochow and Hongkong are exhausted and die away after a short life on the Continent.

One feels that the great asiatic anticyclone is slowly approaching, and its advance though still distant, is gradually barring the way to the tropical depressions, and preparing a rent in the middle of the fan by bending the tracks, on one hand towards the southern provinces of China, on the other towards Japan.

[From Atlas of the Tracks of 620 Typhoons, 1833-1918, by Louis Froc, S. J., Director, Zi-ka-wei Observatory, Zi-ka-wei-Chang-hai, 1920].

# NOTICE.

## Wireless and Weather an Aid to Navigation.

Advance in any subject or movement can only be truly attained from within, and therefore advancement of meteorology as a branch of seamanship will be the surer if seamen take the initiative, hence in the chapters under the above heading, published in the 1924 numbers, we made suggestions based upon experience at sea for the promotion of the application of Wireless Weather Telegraphy to seamanship, and in the concluding chapter an invitation was given to ships, equipped with reliable instruments, to report to "all ships," observations made at synchronized times.

For full information as to ships' wireless weather signals, see pages 11—16, Vol. II., No. 13. A sample message is reproduced below.

Plain Language Wireless Weather Report in  
standard form recommended.

*To C.Q.*

*Weather 4757 N 1908 W Barometer corrected  
2994 NNW 2 Overcast 0700 G.M.T. Fifth  
Course N70 E 10 rising slowly Current S59 E  
quarter knot from 47 N 24 W to 48 N 20 W  
Air 59 Sea 61 Catalina.*

NOTE.—The date appears in the middle of this message, the most important elements appearing before it. If abbreviation is desired omit all after date.

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# ICE CHART.

## WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE

- (B) { Westbound. From 1st July to 31st August, inclusive.  
Eastbound. From 8th July to 31st August, inclusive.
- (F) { Optional, during the operative dates of Track (B) for  
vessels bound to or from U.S. Ports from or to the  
North of Ireland.
- (G) From the opening of Straits of Belle Isle to 14th November.

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

### ROUTE NOTICES.

For latest information re Tracks see pages 35-36, March, 1925, "Marine Observer."

### SYMBOLS USED ON THE CHART.

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

### PHENOMENAL DRIFTS OF ICE.

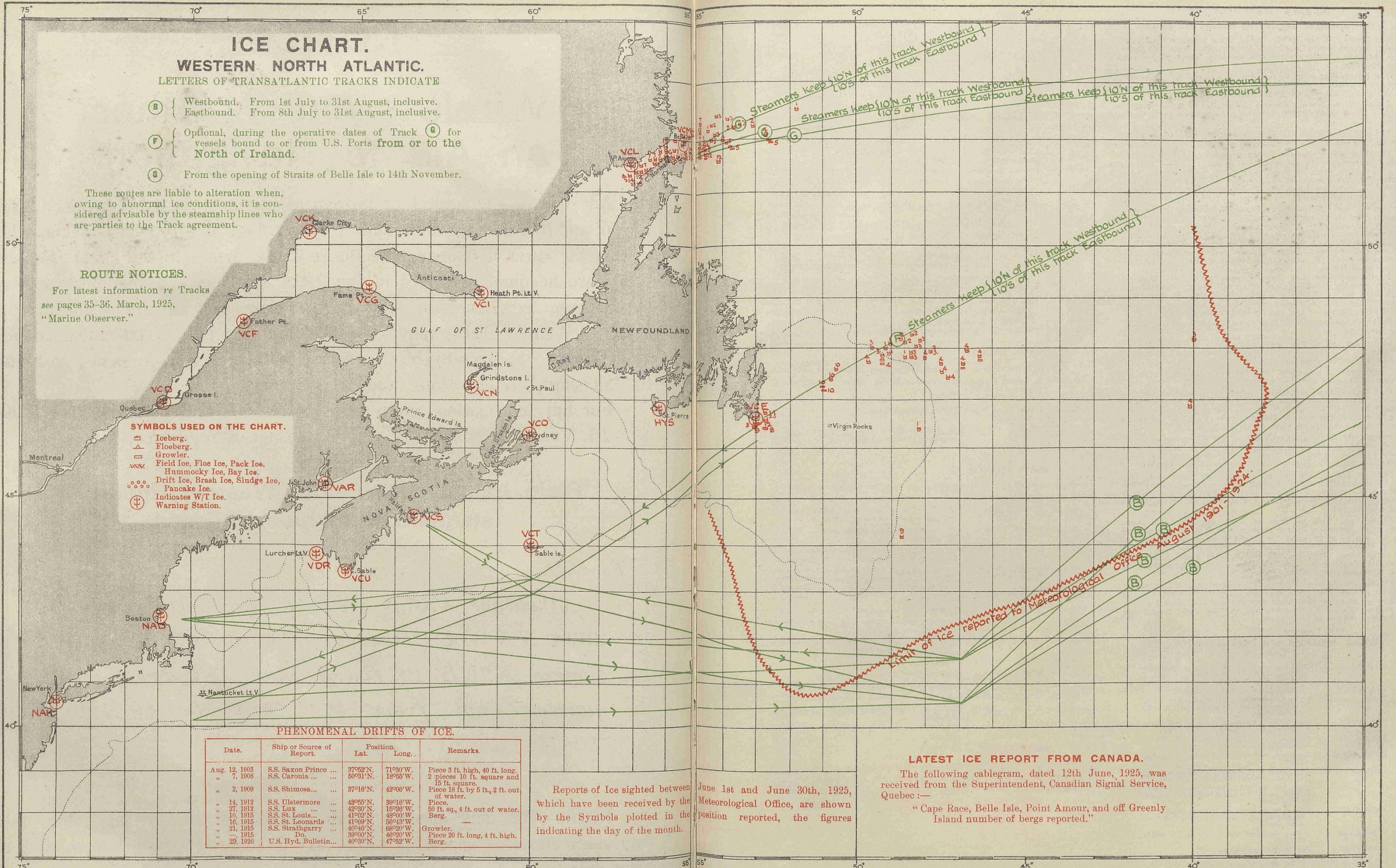
Date.	Ship or Source of Report.	Position.	Remarks.
		Lat. Long.	
Aug. 12, 1903	S.S. Saxon Prince ...	37°52'N. 71°30'W.	Piece 3 ft. high, 40 ft. long.
" 7, 1908	S.S. Caronia ...	50°31'N. 18°55'W.	2 pieces 10 ft. square and 15 ft. square.
" 2, 1909	S.S. Shimosa...	37°16'N. 42°08'W.	Piece 13 ft. by 5 ft., 2 ft. out of water.
" 14, 1912	S.S. Ulstermore ...	48°55'N. 39°18'W.	Piece.
" 27, 1912	S.S. Lux ...	42°30'N. 15°28'W.	50 ft. sq., 4 ft. out of water.
" 10, 1915	S.S. St. Louis...	41°02'N. 48°00'W.	Berg.
" 16, 1915	S.S. St. Leonards ...	41°08'N. 56°43'W.	—
" 21, 1915	S.S. Strathgarry ...	40°48'N. 68°20'W.	Growler.
" 1915	Do.	39°00'N. 46°20'W.	Piece 20 ft. long, 4 ft. high.
" 29, 1920	U.S. Hyd. Bulletin...	40°30'N. 47°52'W.	Berg.

Reports of Ice sighted between June 1st and June 30th, 1925, 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 June, 1925, was received from the Superintendent, Canadian Signal Service, Quebec:—

"Cape Race, Belle Isle, Point Amour, and off Greenly Island number of bergs reported."



MARINE METEOROLOGY.

Co-operation of Shipowners, Masters and Mates.

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

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

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

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

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

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

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

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

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

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

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

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

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

Masters who wish to assist in developing the rapid interchange of Meteorological information and Weather Forecasting at sea can do so by using the standard form, not in code, of W/T Weather Report suggested in "Weather Signals," given in this Journal, January, 1925 Number (see pages 11 and 12). For this purpose a mecurial barometer of which the index error has been ascertained is essential.

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

Marine Agencies and Port Meteorological Officers.

- LIVERPOOL .. (Port Meteorological Office). Lieut.-Commander M. Cresswell, R.N.R., Dock Office. Telephone No.: Bank 8959.
  - CARDIFF .. .. Captain T. Johnston, Technical College.
  - LEITH .. .. Captains G. Black and C. G. Bonner, V.C., D.S.C., Leith Salvage and Towing Co., Ltd., 2, Commercial Street.
  - THE CLYDE .. Captain M. C. Corrance, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow.
  - HULL .. .. Captain Geo. B. Sturdy, c/o Mr. W. Hakes, Commercial Road.
  - SOUTHAMPTON .. Captain D. Forbes, Nautical Academy, 1, Albion Place.
  - TYNE .. .. Commander E. S. Macleod, R.D., R.N.R., Board of Trade Surveyor's Office, North Shields.
  - DUBLIN .. .. { Captain M. H. Clarke, Chief Surveyor, Ministry of Industry and Commerce, Marine Department, 27, Eden Quay.
  - HONG KONG .. Lieut.-Commander C. R. H. Harvey, O.B.E., R.N., Superintendent, Admiralty Chart and Chronometer Depot.
  - VANCOUVER .. T. S. H. Shearman, Esq., Room 40, Post Office Building.
  - AUSTRALIA .. The Commonwealth Meteorologist.
- The Deputy Directors of Navigation act as sub-agents as follows:—
- SYDNEY .. .. Captain G. D. Williams, D.S.O., Customs House.
  - MELBOURNE .. Captain L. J. Bolger, Electricity Commissioners Building, 22, William Street.
  - FREMANTLE .. Captain J. J. Airey, Dalgety's Buildings.

LATE PRESS.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
<b>BALTIC.</b>			
14.6.25	63°—'N.	20°—'E.	Wreck, dangerous to navigation.
<b>NORTH SEA.</b>			
3.6.25	56°17'N.	7°24'E.	Large conical buoy, red, with white band, adrift.
5.6.25	10 mls. S. by E. from Wick.		Floating mast, 80 ft. long, half submerged.
16.6.25	W.N.W. of Haisboro', Lt.Vsl., in line of Yarmouth Rds. and Dudgeon Lt. Vsl.		Derrick or mast, point upwards, about 1 ft. above water.
20.6.25	55°48'N.	6°13'E.	Ship's boat, bottom up, painted black.
<b>ENGLISH CHANNEL.</b>			
1.6.25	48°40'N.	5°04'W.	Large red mooring buoy, dangerous to navigation.
1.6.25	E. Ushant Lt. Ho., bearing S. by W. (Mag.) 10 mls.		Large white buoy, with letters "NW-X." adrift.
10.6.25	4 mls. N. of Cape de la Hague.		Drifting red conical buoy.
19.6.25	50°24'N.	2°07'W.	Cylindrical black and white buoy, with staff with black and red flag "N 114."
<b>NORTH ATLANTIC.</b>			
5.6.25	51°05'N.	7°18'W.	Rusty globular buoy, dangerous to navigation.
5.6.25	34°15'N.	77°19'W.	Spar, apparently attached to submerged wreckage.
5.6.25	41°38'N.	60°34'W.	Black conical buoy, badly battered and covered with marine growth, no distinguishing marks.
8.6.25	47°30'N.	6°13'W.	Large red buoy floating upside down. Dangerous to navigation.
8.6.25	39°00'N.	74°00'W.	Heavy spar, projecting 10 ft. perpendicularly out of water, probably attached to submerged wreckage.
9.6.25	37°18'N.	74°41'W.	Staff projecting 12 ft. out of water, flying a white flag with red markings, apparently attached to submerged wreckage. Two barrels also visible.
10.6.25	30°05'N.	74°13'W.	Ship's mast upright.
11.6.25	32°43'N.	25°46'W.	Black can buoy covered with barnacles.
16.6.25	46°—'N.	8°38'W.	Heavy log awash, 12 ft. long, 4 ft. in diameter. Dangerous to navigation.
18.6.25	49°53'N.	11°48'W.	Large red can buoy with cage or lantern on top. Dangerous to navigation.
19.6.25	46°50'N.	7°17'W.	Conical buoy, marked "Company 21."
19.6.25	51°24'N.	10°45'W.	Black can buoy, marked "C4 Telegraph."
19.6.25	31°50'N.	77°12'W.	Upright spar, projecting about 12 ft. out of water.
20.6.25	46°27'N.	8°18'W.	Large buoy. Dangerous to navigation.
21.6.25	46°18'N.	8°30'W.	Large buoy painted red, figures 22. Dangerous to navigation.
<b>NORTH PACIFIC.</b>			
1.6.25	35°17'N.	121°15'W.	Large crate constructed of heavy planks.
1.6.25	50°05'N.	141°50'W.	2 logs, about 30 ft. long, and part of an obstruction.
2.6.25	38°43'N.	125°00'W.	Heavy log, about 15 ft. long, 6 ft. in diameter.
4.6.25	47°53'N.	124°54'W.	Floating tree with roots.

LIST OF VOLUNTARY OBSERVING SHIPS.

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

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

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

Only in special cases will individual letters be sent.

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

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

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

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

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

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

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

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

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

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

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

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 12.6.25.	Date Received.
<i>Aba</i> ...	Hughes, J.	G. Pugh Williams ...	M.L.	Elder Dempster ...	Form 911 11.12.24 to 15.1.25 ...	21.1.25.
<i>Abinsi</i> ...	Wright, J. B.	W. Borrow ...	No.	Elder Dempster ...	" 15.4.25 to 24.5.25 ...	27.5.25.
<i>Actor</i> ...	Haylett, E.	W. Rennie ...	"	Harrison ...	" 22.8.24 to 6.9.24 ...	7.10.24.
<i>Adda</i> ...	Toft, J. T.	J. E. Wood, E. H. Gatward ...	"	Elder Dempster ...	" 12.6.24 to 18.7.24 ...	21.7.24.
<i>50 Adriatic</i> ...	Beadnell, F. E., Commr., R.N.R.	J. Collins, A. C. I. Anson, R. G. Roberts.	W.T.	White Star ...	W.T. Reg. 11.5.25 to 30.5.25 ...	2.6.25.
<i>Agapenor</i> ...	Ramsay, J.	J. P. Makepeace ...	No.	A. Holt ...	Form 911 10.5.25 to 30.5.25 ...	2.6.25.
<i>Alban</i> ...	Torrible, R. H.	G. E. Freeman ...	"	Booth ...	" 23.4.25 to 3.5.25 ...	26.5.25.
<i>Albania</i> ...	Gronow, S.	E. W. Connell ...	"	Cunard ...	" 20.4.25 to 2.5.25 ...	26.5.25.
<i>Algerian Prince</i> ...	Shaw, D. C.	G. Potts ...	"	Prince ...	" 4.12.24 to 17.3.25 ...	1.4.25.
<i>Alipore</i> ...	Gordon, L. M., R.D., Commr., R.N.R.	F. R. W. Page ...	"	P. and O. ...	" 17.3.25 to 31.3.25 ...	6.4.25.
<i>Almanzora</i> ...	Mackenzie G. A.	E. B. Ingram ...	"	R.M.S.P. ...	" 28.3.25 to 16.4.25 ...	3.6.25.
<i>Alondra</i> ...	J. J. Prendergast ...	H. Peters ...	"	Yeoward ...	" 4.4.25 to 17.5.25 ...	19.5.25.
<i>Ampelco</i> ...	Verstichelen, A.	E. Smet ...	"	American Petroleum ...	" 9.5.25 to 31.5.25 ...	2.6.25.
<i>Antilochus</i> ...	Wilkinson, H.	A. C. D. Howes ...	"	A. Holt ...	" 31.1.25 to 1.3.25 ...	3.4.25.
<i>Aorangi</i> ...	Crawford, R.	R. B. Denniston ...	M.L.	Canadian-Australasian ...	Form 911 30.3.25 to 19.4.25 ...	28.4.25.
<i>Appam</i> ...	Yardley, H. A.	B. Holt, J. Doyle, P. Marriott ...	M.L.	Elder Dempster ...	Met. Log. 9.7.24 to 21.12.24 ...	29.12.24.
<i>30 Aquitania</i> ...	Charles, Sir J. T., W. K.B.E., C.B., R.D., Commodore, R.N.R.	J. L. Croasdale, P. O. Davis, J. Locke.	W.T.	Cunard ...	W.T. Reg. 10.5.25 to 25.5.25 ...	27.5.25.
<i>Arafura</i> ...	Gordon, A. S.	R. Lloyd Harry ...	No.	Eastern and Australian ...	Form 911 17.8.24 to 18.10.24 ...	15.12.24.
<i>Archimedes</i> ...	Taylor, F. C.	S. C. Smith, H. A. Bolding ...	"	Lampart & Holt ...	" 15.3.25 to 17.4.25 ...	20.4.25.
<i>Armadaile Castle</i> ...	Millard, L. A.	M. M. Tomkins ...	"	Union Castle ...	" 2.1.25 to 18.1.25 ...	10.2.25.
<i>Arracan</i> ...	Willis, M.	R. McInnes, M. S. Stuart, A. McCullum.	M.L.	P. Henderson ...	Met. Log. 28.2.25 to 30.5.25 ...	4.6.25.
<i>Arundel</i> ...	Short, H.	Mr. Hill ...	C.C.	Southern Rly. ...	Telegraphic Report 12.6.25 ...	12.6.25.
<i>Arundel Castle</i> ...	Hague, J. W., Commr., R.N.R.	G. Blacklock, C. Williams, F. Granger.	M.L.	Union Castle ...	Met. Log. 17.1.25 to 10.5.25 ...	20.5.25.
<i>Assyria</i> ...	Erskine, R.	C. Mortimer ...	No.	Anchor ...	Form 911 26.4.25 to 18.5.25 ...	25.5.25.
<i>Astronomer</i> ...	Booth, W. M.	L. Harriman, H. Thomas, E. Shatton.	M.L.	Harrison ...	Met. Log. 11.11.24 to 8.2.25 ...	18.2.25.
<i>Athenic</i> ...	Davies, E.	W. Hill ...	No.	White Star ...	Form 911 14.3.25 to 28.3.25 ...	15.4.25.
<i>Atreus</i> ...	Salter, G. H.	... ..	"	A. Holt ...	" ... ..	...
<i>Atsuta Maru</i> ...	Furuhashi, M.	S. Mizoguchi ...	"	Nippon Yusen Kaisha ...	" 1.4.25 to 1.5.25 ...	7.5.25.
<i>Auditor</i> ...	Owen, W. F.	T. E. Steel ...	"	Harrison ...	" 1.4.25 to 23.4.25 ...	27.4.25.
<i>Auldmuir</i> ...	Ramsay, J. D.	J. A. S. Adams ...	"	Glen & Co. ...	" 11.10.24 to 27.10.24 ...	11.11.24.
<i>Ausonia</i> ...	Gibbons, G., R.D., Commr., R.N.R.	A. T. Hamer ...	"	Cunard ...	" 21.2.25 to 16.3.25 ...	20.3.25.
<i>Avon</i> ...	Matthews, J. E. P.	R. S. Holland ...	No.	R.M.S.P. ...	Form 911 15.11.24 to 29.12.24 ...	6.1.25.
<i>51 Baltic</i> ...	A. Holme ...	E. A. A. Crowley, J. Law, F. Patchett.	W.T.	White Star ...	W.T. Reg. 20.4.25 to 9.5.25 ...	13.5.25.
<i>Bambra</i> ...	Wyles, W. S.	G. Buckeridge, H. W. Norris, W. Walters, V. Denton, G. Simpson.	M.L.	State Service, Australia ...	Form 911 19.4.25 to 9.5.25 ...	13.5.25.
<i>Bampton Castle</i> ...	Swiney, W. A.	A. E. Benn, D. Campbell, S. E. Aldam.	"	Union Castle ...	Met. Log. 12.11.24 to 28.2.25 ...	16.4.25.
<i>Banffshire</i> ...	Wynne, R. H.	J. M. Bowie ...	No.	Turnbull Martin ...	" 28.11.24 to 25.2.25 ...	17.3.25.
<i>Barambah</i> ...	Daniel, F.	... ..	"	Commonwealth Govt. ...	Form 911 20.2.25 to 27.3.25 ...	6.4.25.
<i>Baron Cawdor</i> ...	Baillie, T.	... ..	"	Hogarth & Sons ...	" 28.3.25 to 6.5.25 ...	14.5.25.
<i>Barpeta</i> ...	Beedle, T. S.	A. Campbell ...	"	British India ...	" 15.8.24 to 28.8.24 ...	16.10.24.
<i>Beaufort</i> ...	Rice, W. V., D.S.O., D.S.C., Commr., R.N.	W. G. E. Rawlingson ... H. M. S. Forbes ...	M.L.	His Majesty's Ship ...	" 22.4.25 to 21.5.25 ...	8.6.25.
<i>59 Belgenland</i> ...	Bradshaw, J.	C. J. Murray, J. M. Appleby, W. E. Hesketh.	W.T.	Red Star ...	Met. Log. 28.7.24 to 3.11.24 ...	28.11.24.
<i>Benalder</i> ...	Cole, J. H. D.S.C.	W. M. Webster ...	No.	Ben Line ...	W.T. Reg. 17.5.25 to 3.6.25 ...	6.6.25.
<i>Bendigo</i> ...	Furlong, G. H. S.	C. E. Arundel ...	"	P. & O. Branch ...	Form 911 16.5.25 to 4.6.25 ...	8.6.25.
<i>Bengloe</i> ...	McCorquodale, A.	G. M. Duff ...	"	Ben Line ...	" 13.4.25 to 25.4.25 ...	5.5.25.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 12.6.25.	Date Received.
31 <i>Berengaria</i> ...	Irvine, W. R. D., R.D. Capt., R.N.R.	R. F. Bovey, J. A. Myles, W. C. A. Robson.	W.T.	Cunard ...	W.T. Reg. 18.5.25 to 1.6.25 ...	3.6.25.
<i>Bermini</i> ...	Evans, W.	H. L. Rudd ...	No.	Lampport & Holt ...	Form 911 21.11.24 to 31.1.25...	16.2.25.
<i>Berrima</i> ...	Townshend, W. P.	H. C. Slinn ...	"	P. & O. Branch ...	" 14.3.25 to 1.4.25 ...	20.4.25.
<i>Bintang</i> ...	Morzer Bruyns, M. F.	A. A. H. Blankestyn ...	"	Nederland ...	Form 911 5.5.25 to 18.5.25 ...	27.5.25.
<i>Bogota</i> ...	Dunn, R. E., O.B.E.	T. R. Thomas ...	"	R.M.S.P. Co. ...	" 20.4.25 to 16.5.25 ...	19.5.25.
<i>Bolin, broke</i> ...	Stewart, A.	C. E. Duggan ...	M.L.	Canadian Pacific ...	Met. Log. 25.8.24 to 23.9.24 ...	2.10.24.
<i>Borda</i> ...	Holland, R.	"	No.	P. & O. Branch ...	Form 911 4.9.24 to 15.1.25 ...	6.2.25.
<i>Bothwell</i> ...	Murray, M. F.	S. W. Keay ...	"	Canadian Pacific ...	" 19.3.25 to 17.4.25 ...	24.4.25.
<i>Brandon</i> ...	Mc. Combie, G. F. G.	A. H. Easton, G. B. Marriott, J. Mackenzie, H. C. Waters, T. J. Webster, D. Durin, N. B. Goater, T. Golby.	M.L.	"	" 9.2.25 to 5.5.25 ...	21.5.25.
<i>Brecon</i> ...	J. Newman...	"	"	"	Met. Log. 2.12.24 to 24.2.25 ...	4.3.25.
<i>Brenda</i> ...	Murdoch, R. G.	F. R. Ness ...	No.	Scottish Fishery Board	Form 911 1.5.25 to 31.5.25 ...	3.6.25.
<i>Brighton</i> ...	Hill, A.	Mr. Munton ...	C.C.	Southern Railway ...	Telegraphic Report 30.5.25 ...	30.5.25.
<i>British Advocate</i> ...	Taylor, R. J.	C. J. Metcalf ...	No.	British Tankers ...	Form 911 6.4.25 to 25.5.25 ...	27.5.25.
<i>British Engineer</i> ...	T. W. Jours	M. J. Grieves ...	No.	"	Form 911 13.2.25 to 26.4.25 ...	1.5.25.
<i>Browning</i> ...	Connorton, C. A.	W. E. Johnston ...	"	Lampport & Holt ...	" 17.11.25 to 6.2.25 ...	23.2.25.
<i>Bruyere</i> ...	Denson, W.	C. E. Legg ...	"	"	" 27.2.25 to 21.3.25 ...	14.4.25.
<i>Cambria C.S.</i> ...	Wightman, H. G. E., D.S.C.	E. N. L. Staples ...	M.L.	Eastern Tel. Co. ...	Met. Log. 8.7.24 to 5.10.24 ...	27.1.25.
<i>Cambria</i> ...	"	V. S. Phillips ...	C.C.	L.M. & S. Rly.	Telegraphic Report 1.6.25 ...	1.6.25.
<i>Camito</i> ...	Scudamore, J. H. H., D. S. C., R. D., Commr., R.N.R.	D. A. Jack, R. M. Cossantine, S. Borrie, S. Ray.	M.L.	Elders & Fyffes ...	Met. Log. 8.7.24 to 13.12.24 ...	19.12.24.
<i>Canada</i> ...	Jones, T.	A. Thompson ...	No.	White Star-Dominion	Form 911 2.5.25 to 23.5.25 ...	25.5.25.
<i>Canadian Importer</i> ...	"	K. Macleod ...	"	Canadian Govt. Mer- cantile Marine.	" ... ..	"
<i>Canadian Raider</i> ...	Dixon, C. C.	C. J. Carp ...	"	Canadian Govt. Mer- chant Marine.	" 16.3.25 to 22.4.25 ...	5.5.25.
<i>Canadian Scottish</i> ...	Forson, A.	S. Fieldhouse ...	"	"	" 8.1.25 to 24.1.25 ...	9.2.25.
<i>Canadian Skir- misher.</i> ...	Millar, W. H.	C. W. Crofts ...	"	"	" 17.3.25 to 28.3.25 ...	18.4.25.
<i>Canadian Winner</i> ...	Hocking, N. P.	R. D. Ranns ...	"	"	" 28.3.25 to 28.4.25 ...	20.5.25.
<i>Carlow Castle</i> ...	Whitfield, G. J.	J. W. Kirby ...	"	Union Castle ...	" 8.5.25 to 2.6.25 ...	8.6.25.
35 <i>Carmania</i> ...	McNeil, S. G. S. R.D., Capt., R.N.R.	D. S. Kite, W. M. Stewart, T. A. O. Ellis.	W.T.	Cunard ...	W.T. Reg. 18.5.25 to 6.6.25 ...	10.6.25.
<i>Caronia</i> ...	Hossack, W. H., R.D., Capt., R.N.R.	J. A. Quarrie, P. Clarke, D. M. MacLean.	W.T.	Cunard ...	Form 911 16.5.25 to 7.6.25 ...	10.6.25.
<i>Cassandra</i> ...	Mitchell, W. E.	G. M. Sime ...	No.	Anchor Donaldson ...	Form 911 4.5.25 to 22.5.25 ...	26.5.15.
52 <i>Cedric</i> ...	Hickson, V. W.	A. E. Weller, H. J. Yates, W. W. Pearson.	W.T.	White Star ...	Form 911 3.5.25 to 23.5.25 ...	26.5.25.
<i>Celtic</i> ...	Berry, G.	R. S. Walker, R. H. Shaw, J. W. Allingham.	W.T.	"	Form 911 8.10.24 to 16.12.24 ...	18.12.24.
<i>Centaur</i> ...	Rose, A. F.	L. Johnstone ...	No.	A. Holt & Co.	W.T. Reg. 17.5.25 to 7.6.25 ...	10.6.25.
<i>Ceramic</i> ...	Trant, E. L., R.D., Commr., R.N.R.	A. E. Harvey ...	"	White Star ...	Form 911 17.5.25 to 7.6.25 ...	10.6.25.
<i>Changsha</i> ...	Gambrill, F. C., Thomas, R. D.	A. M. Frame, F. G. Strat- ford, H. Lishman, L. A. Baillie, W. Baillie.	M.L.	Yuill & Co. ...	Form 911 4.5.25 to 24.5.25 ...	27.5.25.
<i>China</i> ...	Cossey, A.	G. W. du Posse ...	No.	P. & O. ...	Form 911 9.4.25 to 13.5.25 ...	19.5.25.
<i>Chindwara</i> ...	Brisley, P. L.	F. O. Copeland ...	"	British India ...	" 29.1.25 to 19.3.25 ...	20.4.25.
<i>Chindwin</i> ...	Esslemont, C.	J. Summers, W. Wilson, J. G. Walker.	M.L.	P. Henderson ...	Met. Log. 28.12.24 to 12.3.25 ...	27.3.25.
<i>City of Alexandria</i> ...	Bedford, G. B.	T. Telleson ...	No.	Ellerman ...	Form 911 14.3.25 to 7.4.25 ...	5.5.25.
<i>City of Baroda</i> ...	Houghton, W.	A. D. Henderson, H. N. Jones, G. S. Gaylard.	M.L.	"	Met. Log. 18.11.24 to 15.4.25 ...	17.4.25.
<i>City of Batavia</i> ...	Nancollas, H. E.	S. J. Nash ...	No.	"	Form 911 27.12.24 to 25.1.25 ...	9.3.25.
<i>City of Benares</i> ...	Wyper, J.	C. G. Inglis ...	"	"	" 26.4.25 to 14.5.25 ...	25.5.25.
<i>City of Brisbane</i> ...	Seaborne, F. O., D.S.C.	W. E. Fletcher ...	"	"	" 27.3.25 to 20.4.25 ...	19.5.25.
<i>City of Canterbury</i> ...	Macdonald, K., O.B.E.	A. M. Hamilton ...	"	"	" 3.9.24 to 9.11.24 ...	14.11.24.
<i>City of Chester</i> ...	Letton, F. W.	F. C. Wilson, E. Garner, D. B. Carson, J. Shearer.	M.L.	"	Met. Log. 4.12.24 to 27.4.25 ...	4.5.25.
<i>City of Edinburgh</i> ...	Spencer, H.	E. V. Henday ...	No.	"	Form 911 31.8.24 to 30.9.24 ...	16.10.24.
<i>City of London</i> ...	Martin, D.	J. J. McTigue ...	"	"	" 11.5.25 to 5.6.25 ...	8.6.25.
<i>City of Marseilles</i> ...	Brown, G.	W. J. Nixon ...	"	"	" 5.12.24 to 28.12.24 ...	6.1.25.
<i>City of Ranonoo</i> ...	Dunning, F. W.	"	M.L.	"	" ... ..	"
<i>City of Valencia</i> ...	Williamson, W. A., R.D., Lieut.-Commr. R.N.R.	C. C. Duncan ...	No.	"	Form 911 5.3.25 to 3.4.25 ...	2.6.25.
<i>City of Yokohama</i> ...	McDonald, W. D.	R. Moloney ...	"	"	" 24.4.25 to 29.5.25 ...	2.6.25.
<i>Clan Cumming</i> ...	McLean, J. G.	S. M. Werrey Easterbrook ...	"	Clan ...	" 25.12.24 to 29.1.25 ...	9.3.25.
<i>Clan Lindsay</i> ...	Worthington, C. D.	G. K. Johnson ...	"	"	Form 911 8.10.24 to 13.11.24 ...	19.11.24.
<i>Clan Macbeth</i> ...	Young, A. H., R.D., Lieut.-Commr., R.N.R.	T. Lund ...	"	"	" 27.2.25 to 26.3.25 ...	2.4.25.
<i>Clan Macgillivray</i> ...	West, W. F.	P. G. de Gruchy ...	"	"	" 12.4.25 to 8.5.25 ...	2.6.25.
<i>Clan Macindoe</i> ...	Miller, W.	F. G. Darnborough ...	"	"	" 24.9.24 to 27.11.24 ...	3.12.24.
<i>Clan Mackellar</i> ...	Scotland, A.	A. V. Howard ...	"	"	" 2.5.25 to 2.6.25 ...	8.6.25.
<i>Clan Mackenzie</i> ...	Young, G.	W. G. Arthur, F. B. Fair- weather.	"	"	" 7.11.24 to 21.11.24 ...	12.12.24.
<i>Clan Mackinnon</i> ...	Mackie, R. W.	T. V. Wilson, C. Jones, W. F. Isaac.	M.L.	"	Met. Log. 27.1.25 to 9.5.25 ...	15.5.25.
<i>Clan Macphee</i> ...	Gourlay, J. B.	W. D. E. Campbell, F. Buckley, E. C. Carter.	M.L.	"	Met. Log. 13.6.24 to 26.12.24 ...	2.3.25.
<i>Clan Macnaughton</i> ...	W. Thomson	A. J. Storkey, F. Barnes ...	No.	"	Form 911 22.3.25 to 10.4.25 ...	12.5.25.
<i>Clan Macnagart</i> ...	Gray, J. N.	T. Walls, W. J. Henderson ...	"	"	" 5.4.25 to 9.5.25 ...	12.5.25.
<i>Clan Macnicar</i> ...	Phillips, G. P.	L. S. Murrin ...	"	"	" 2.4.25 to 18.4.25 ...	12.5.25.
<i>Clan Malcolm</i> ...	Higgins, C. J.	T. G. Young, R. F. Buckley ...	M.L.	"	Met. Log. 6.10.24 to 30.3.25 ...	6.4.25.
<i>Clan Morrison</i> ...	Porterfield, W. M.	G. Morren ...	No.	"	Form 911 24.3.25 to 20.4.25 ...	22.4.25.
<i>Clan Murdoch</i> ...	Pagan, J. C.	C. W. Thomas ...	"	"	" 10.1.25 to 5.2.25 ...	2.3.25.
<i>Clan Ranald</i> ...	Openshaw, L. G.	W. H. D. Stephen ...	"	"	" 8.2.25 to 28.3.25 ...	3.4.25.
<i>Clan Ross</i> ...	Jones, R. C.	G. Short ...	"	"	" 12.2.25 to 15.4.25 ...	4.5.25.
<i>Clan Stenclair</i> ...	Neill, G. A.	F. B. Parker ...	"	"	" 21.12.24 to 31.1.25 ...	5.2.25.
<i>Clan Stuart</i> ...	Stenson, F. J., R.D., Commr. R.N.R.	R. Silk ...	"	"	" 10.4.25 to 25.4.25 ...	19.5.25.
<i>Clan Urquhart</i> ...	Gibb, A. F. W.	T. G. Mitchell ...	"	"	" 7.4.25 to 1.5.25 ...	25.5.25.
<i>Colonia, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr., R.N.R.	S. A. Garnham, A. S. Muir, J. M. Matthews, W. Sang- wine.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 4.10.24 to 21.1.25 ...	30.1.25.
<i>Colonial</i> ...	Barrow, R. K.	D. Wolstenholme ...	No.	Harrison ...	Form 911 3.1.25 to 2.4.25 ...	15.4.25.
<i>Colombian</i> ...	Giffins, R. P.	W. R. Vaughan ...	"	Leyland ...	" 16.1.25 to 12.2.25 ...	20.2.25.
<i>Columbia</i> ...	Gemmell, W.	J. K. Macmillan ...	"	Anchor ...	" 5.4.25 to 26.4.25 ...	29.4.25.

## 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 12.6.25.	Date Received
<i>Concordia</i> ...	Lowson, P. ...	...	M.L.	Anchor Donaldson ...	Met. Log. ...	...
<i>Comino</i> ...	Nuttall, E. L. ...	J. Woodward ...	No.	Furness Withy ...	Form 911 7.1.25 to 4.4.25 ...	20.4.25.
<i>Cooee</i> ...	Festa, M. ...	C. Keen ...	"	Commonwealth Govt. ...	" 9.8.24 to 29.8.24 ...	7.10.24
<i>Copenhagen</i> ...	Kerr, J. J. ...	...	"	Glen & Co. ...	...	...
<i>Corinthic</i> ...	Hart, F. ...	F. Kean, W. Fitzgerald, F. G. Rogers, ...	M.L.	White Star ...	Met. Log. 28.11.24 to 17.3.25...	26.3.25.
<i>Cornwall</i> ...	Haines, F. P. ...	Mr. Maltby, Mr. Ray ...	No.	Dowie, J., & Co. ...	Form 911 10.4.25 to 23.5.25 ...	28.5.25.
<i>Crawford Castle</i> ...	Morgan, A. O., R.D., Commr. R.N.R.	G. Montgomery ...	"	Union Castle ...	" 10.3.25 to 26.3.25 ...	8.4.25.
<i>Culebra</i> ...	Mackay, A. S. ...	C. Wolfenden, J. W. Duncan. R. Hocken.	M.L.	R.M.S.P. Co. ...	Met. Log. 10.11.24 to 10.4.25...	4.5.25.
<i>Cuthbert</i> ...	Reynolds, W. H. B. ...	K. S. Monroe, J. Watson ...	No.	Booth ...	Form 911 10.3.25 to 30.3.25 ...	1.4.25.
<i>Cyclops</i> ...	Cosker, W. ...	R. W. Ellis ...	"	A. Holt ...	" 5.12.24 to 27.2.25 ...	3.3.25.
<i>Dardanus</i> ...	Shaw, A. T. ...	...	No.	A. Holt ...	" 26.4.25 to 9.5.25 ...	18.5.25.
<i>Darian</i> ...	Masters, W. ...	A. S. Holland ...	"	Leyland ...	" 27.5.25 to 8.6.25 ...	10.6.25.
<i>Darro</i> ...	Smith, W. E., D.S.O., R.D., Capt., R.N.R.	W. H. Fowler ...	"	R.M.S.P. Co. ...	" 7.2.25 to 5.4.25 ...	17.4.25.
<i>Daytonian</i> ...	Walker, C. J., D.S.C.	...	"	Leyland ...	" 30.3.25 to 13.5.25 ...	21.5.25.
<i>Delta</i> ...	Brooks, C., D.S.O., R.D., Commr. R.N.R.	J. O. V. Young ...	"	P. & O. ...	" 28.6.24 to 8.8.24 ...	13.8.24.
<i>Demerara</i> ...	Willan, F. C. L. ...	H. Hewitt ...	"	R.M.S.P. Co. ...	" 12.4.25 to 16.5.25 ...	19.5.25.
<i>Demosthenes</i> ...	Williams, W. J. ...	R. A. Alcock, S. J. Buckland ...	"	Aberdeen ...	" 14.4.25 to 27.5.25 ...	3.6.25.
<i>Deseado</i> ...	Hannam, F. S. ...	F. G. Dawson, A. H. Phillipson ...	"	R.M.S.P. Co. ...	" 26.2.24 to 17.4.25 ...	21.4.25.
<i>Desna</i> ...	Huff, G. F. ...	A. Hambly ...	"	" ...	" 8.3.25 to 2.5.25 ...	6.5.25.
<i>Deucalion</i> ...	Findlay, J. ...	P. W. Savery, F. W. Duffy ...	"	A. Holt ...	" 23.3.25 to 26.5.25 ...	5.6.25.
<i>Dieppe</i> ...	Marmery, S. ...	Mr. Parsons ...	C.C.	Southern Railway ...	Telegraphic Report 11.6.25	11.6.25.
<i>Digby</i> ...	Chambers, F. W. D.S.C.	J. Pascoe, J. W. Murphy, W. P. Paterson, W. B. Conn.	M.L.	Furness Withy ...	Met. Log. 25.11.25 to 30.5.25...	8.6.25.
<i>Dimboola</i> ...	Roy, C. M. ...	F. L. Heppell ...	No.	Melbourne S.S. Co. ...	Form 911 10.4.25 to 5.5.25 ...	8.6.25.
<i>Discoverer</i> ...	Ling, J. T. ...	J. Richardson ...	"	Harrison ...	" 30.11.24 to 9.3.25 ...	11.3.25.
<i>Discovery, R.R.S.</i> ...	Stenhouse, J. R., D.S.O., D.S.C., O.B.E., R.D., R.N.R.	...	M.L.	Discovery Expedition ...	...	...
<i>Dogra</i> ...	Hartock, L. ...	E. C. Akers ...	No.	Asiatic S.N. Co. ...	" 27.12.24 to 12.1.25...	2.2.25.
<i>Domala, M.V.</i> ...	Buswell, W. ...	C. E. Merchant ...	"	British India ...	" 13.2.25 to 13.4.25 ...	28.4.25.
<i>Doric</i> ...	S. Bolton, D.S.C., R.D., Commr. R.N.R.	D. W. Chamberlain ...	"	White Star ...	" 10.5.25 to 30.5.25 ...	3.6.25.
<i>Doric Star</i> ...	Thomas, R. T. ...	T. Williams ...	"	Blue Star ...	Form 911 28.2.25 to 11.3.25 ...	23.3.25.
<i>Dorington Court</i> ...	Isaacs, W. A. ...	E. V. Quickenden ...	"	Haldin & Co. ...	" 17.8.24 to 8.9.24 ...	18.9.24.
<i>Dorset</i> ...	Kettlewell, C. R. ...	F. G. Capon, L. Cann, D. M. Lambert.	M.L.	New Zealand S.S. Co. ...	Met. Log. 24.11.24 to 20.4.25...	27.4.25.
<i>Dorsetshire</i> ...	Adamson, B. W. ...	...	"	Bibby ...	...	...
<i>Dromore Castle</i> ...	Vincent, E. S., R.D., Commr. R.N.R.	S. S. Smith ...	No.	Union Castle ...	Form 911 13.3.25 to 1.4.25 ...	19.5.25.
<i>Dryden</i> ...	Knight, R. A. ...	G. D. Oldfield ...	"	Lampont & Holt ...	" 28.9.24 to 7.12.24 ...	6.1.25.
<i>Dundrum Castle</i> ...	Kershaw, H. J. ...	R. May ...	"	Union Castle ...	" 3.5.25 to 28.5.25 ...	12.6.25.
<i>Duendes</i> ...	Pape, E. R. ...	D. P. Morgan ...	"	Pacific S.N. Co. ...	" 22.11.24 to 24.12.24 ...	29.12.24.
<i>Duffield</i> ...	King A. ...	T. S. Robertson ...	"	Hunting & Sons ...	" 10.11.24 to 9.12.24...	16.12.24.
<i>Dunrobin</i> ...	Ramsay, J. D. ...	M. M. Ramsay ...	"	Glen & Co. ...	Form 911 2.5.25 to 20.5.25 ...	3.6.25.
<i>Duquesa</i> ...	Ellis, F. ...	C. P. Lane, W. Thornton ...	"	Furness Withy ...	Form 911 18.1.25 to 21.3.25 ...	26.3.25.
<i>Durenda</i> ...	Wilson, W. ...	W. H. Creese ...	"	British India ...	" 31.1.25 to 28.4.25 ...	12.5.25.
<i>Edinburgh Castle</i> ...	Strong, H., R.D., Commr. R.N.R.	C. S. Kean ...	M.L.	Union Castle ...	Met. Log. 24.10.24 to 19.4.25...	23.4.25.
<i>Eemland</i> ...	Van Noppen, C. D. ...	J. G. Sander ...	No.	Holland Lloyd ...	Form 911 27.11.24 to 4.2.25 ...	10.3.25.
<i>El Cordobes</i> ...	Noton, F. G. ...	J. W. Elkins ...	"	British & Argentine S.N. Co. ...	" 17.3.25 to 12.4.25 ...	20.4.25.
<i>Elmina</i> ...	Millson, H. E. ...	R. Wilkinson, C. Cryer, R. Griffiths.	M.L.	Elder Dempster ...	Met. Log. 10.10.24 to 21.2.25...	11.3.25.
<i>El Paraguay</i> ...	Ellis, F., D.S.C. ...	W. E. Williams ...	No.	Houlder Bros. ...	Form 911 8.11.24 to 8.1.25 ...	16.1.25.
<i>Elpenor</i> ...	T. W. Hannay ...	P. E. Wright, W. T. Pennington.	M.L.	A. Holt ...	Met. Log. 3.11.24 to 18.2.25 ...	23.2.25.
<i>Empress of Asia</i> ...	Douglas, L. D., R.D., Lt. Commr., R.N.R.	G. H. Blyth, A. M. Barff, D. Smith, L. Johnston ...	M.L.	Canadian Pacific ...	Met. Log. 25.9.24 to 26.1.25 ...	3.3.25.
<i>Empress of Australia</i> ...	Hailey, A. J. ...	C. Critchley, R. A. Leicester, A. B. Smith	M.L.	" " ...	" 6.11.25 to 10.5.25 ...	3.6.25.
<i>Empress of Canada</i> ...	Robinson, S., C.B.E., R.D., Commr., R.N.R.	W. S. Halliday, L. C. Barry ..	M.L.	" " ...	Met. Log. 19.6.24 to 13.11.24...	29.12.24.
<i>Empress of France</i> ...	Griffiths, E. ...	O. Pennington, E. Roberts, A. W. Patrick.	M.L.	" " ...	" 7.6.24 to 11.11.24 ...	18.11.24.
<i>Empress of Russia</i> ...	Hosken, A. J. ...	— Reid ...	M.L.	" " ...	" 28.8.24 to 8.12.24 ...	26.1.25.
<i>Empress of Scotland</i> ...	Gillies, J., C.B.E. ...	B. Grant, S. C. Fox, D. Loram, L. W. Akerman, W. J. Phillips.	M.L.	" " ...	Met. Log. 26.4.24 to 29.10.24...	11.12.24.
<i>Endearour</i> ...	Commr. S. A. Geary-Hill, D.S.O., R.N.	M. L. Harrison, E. V. B. Baker, E. H. B. Baker.	M.L.	His Majesty's Ship ...	Met. Log. 30.1.25 to 25.5.25 ...	10.6.25.
<i>Essequito</i> ...	Duncan, E. E. ...	G. Pattison ...	No.	R.M.S.P. Co. ...	Form 911 2.1.25 to 13.4.25 ...	15.5.25.
<i>Eumaeus</i> ...	Read, J. W. ...	E. R. Pritchard, M. B. Glasier	"	A. Holt ...	" 7.3.25 to 2.6.25 ...	8.6.25.
<i>Euripides</i> ...	Collins, P. J., O.B.E.	H. S. Cox, G. R. Fisher, F. Fuller.	M.L.	Aberdeen ...	Met. Log. 10.10.24 to 2.2.25 ...	9.2.25.
<i>Eurybates</i> ...	Lloyd, R. ...	J. J. Goldsmith ...	No.	A. Holt ...	Form 911 5.3.25 to 17.3.25 ...	19.3.25.
<i>Explorer</i> ...	Lamont, A. ...	Scientific Staff ...	M.L.	Scottish Fishery Board	Met. Log. 20.6.24 to 27.9.24 ...	24.10.24.
<i>Fitzroy</i> ...	Silk, H. V., Lt.-Commr. R.N.	C. W. Sabine ...	M.L.	His Majesty's Ship ...	" 24.7.24 to 31.10.24...	11.11.24.
<i>Flandria</i> ...	Veldkamp, G. J. ...	T. Doornbosch ...	No.	Holland Lloyd ...	Form 911 20.2.25 to 11.4.25 ...	14.4.25.
<i>Finders</i> ...	Henderson, D. A., Lt.-Commr. R.N.	K. F. Boxall ...	M.L.	His Majesty's Ship ...	Met. Log. 26.7.24 to 30.10.24...	18.11.24.
<i>Francisco</i> ...	Wilkins, J., O.B.E.	C. Leonard ...	No.	Ellerman Wilson ...	Form 911 22.3.25 to 28.4.25 ...	4.5.25.
<i>Frankenfels</i> ...	Cartmer, G. E., O.B.E.	L. M. Burfitt, J. H. A. Mackie, J. Garmory.	M.L.	India Office Shipping	Met. Log. 1.11.24 to 5.2.25 ...	14.2.25.
<i>Freienfels</i> ...	Cleugh, J. W. ...	C. H. Porter, V. R. Watkins, H. Wilson.	"	" " " ...	" 7.9.24 to 7.12.24 ...	17.12.24.
<i>Freya</i> ...	Angus, W. ...	J. H. Hennessey ...	No.	Scottish Fishery Board	Form 911 29.3.25 to 22.4.25 ...	25.4.25.
<i>Gallic</i> ...	Summers, F. F., R.D., Commr. R.N.R.	W. G. O. Jones ...	"	White Star ...	Met. Log. 3.8.24 to 9.12.24 ...	12.12.24.
<i>Galtymore</i> ...	Ledsome, J. ...	N. Goubrough ...	"	Furness Withy ...	Form 911 5.3.25 to 15.3.25 ...	18.3.25.
<i>Garoe</i> ...	Visser, C. W. ...	C. J. Vandenoorn ...	"	Rotterdam Lloyd ...	" 21.4.25 to 22.5.25 ...	26.5.25.
<i>Gascoyne</i> ...	Mills, A. ...	P. G. Collins ...	"	Dalgety & Co. ...	" 21.10.24 to 1.2.25 ...	9.3.25.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log Register, or Report Contributed. Received up to 12.6.25.	Date Received.
<i>Gelria</i> ...	Kolkman, J. M. ...	K. H. Schilp ...	No.	Holland Lloyd ...	Form 911 10.4.25 to 28.5.25 ...	2.6.25.
<i>Glenamoy</i> , M.V. ...	Angier, J. ...	R. H. Bishop ...	"	Glen Line ...	" 5.4.25 to 3.6.25 ...	8.6.25.
<i>Glenapp</i> , M.V. ...	Griffith, J. E. ...	F. Poate ...	"	" ...	" 17.12.24 to 28.12.24 ...	8.1.25.
<i>Glenluce</i> , M.V. ...	Barkley, E. ...	J. D. Richards ...	"	" ...	" 22.2.25 to 24.3.25 ...	30.3.25.
<i>Glenshane</i> ...	Roberts, W. E. ...	H. N. Russell ...	"	" ...	" 13.3.25 to 1.4.25 ...	12.6.25.
<i>Gloucestershire</i> ...	Robin, E. ...	T. E. Field ...	"	Bibby ...	" 3.1.25 to 13.3.25 ...	16.3.25.
<i>Gorgon</i> ...	Hughes, J. W. ...	W. E. Crompton ...	"	A. Holt & Co. ...	" 28.12.24 to 19.2.25 ...	30.3.25.
<i>Gourko</i> ...	Montgomery, H. ...	N. J. Donovan ...	M.L.	Ellerman Wilson ...	Met. Log. 12.11.24 to 2.4.25 ...	24.4.25.
<i>Haliartus</i> ...	Marsh, L. V. ...	W. H. Upton ...	No.	R. P. Houston ...	Form 911 15.2.25 to 10.3.25 ...	14.4.25.
<i>Harmonides</i> ...	Hughes, W. J. ...	D. L. Roberts ...	"	" ...	" 1.3.25 to 16.3.25 ...	30.4.25.
<i>Harmony</i> , Auxy. ...	Jackson, J. C. ...	A. W. Bush ...	"	Moravian Mission ...	" 4.12.24 to 20.12.24 ...	6.1.25.
<i>Hatarana</i> ...	Woodget, H. T. ...	J. L. Durkee, F. Wells, H. Harrison, H. J. O'Donohoe.	M.L.	British India ...	" 7.10.24 to 22.4.25 ...	4.5.25.
<i>Hauraki</i> , M.V. ...	Frew, J. D. ...	E. A. Buckingham ...	No.	Union S.S. Co., N.Z. ...	" 10.11.24 to 1.12.24 ...	12.1.25.
<i>Henry Holmes</i> , C.S. ...	Bicker Caarten, A. ...	E. S. C. Hale ...	"	W. I. & Panama Telegraph Co. ...	" 29.3.25 to 7.5.25 ...	12.6.25.
<i>Herald</i> ...	Harvey, J. R., O.B.E., Commr., R.N. ...	W. C. Jenks ...	M.L.	His Majesty's Ship ...	Met. Log. 4.10.24 to 31.1.25 ...	7.4.25.
<i>Herefordshire</i> ...	Stanley, W. ...	R. C. Leitch, G. Whitworth, P. S. Cooper, H. G. Walton	"	Bibby ...	" 13.9.24 to 26.2.25 ...	23.3.25.
<i>Herschel</i> ...	Carey, W. J. ...	A. N. Blundell ...	No.	Lampport & Holt ...	Form 911 2.2.25 to 7.4.25 ...	14.4.25.
<i>Hibernia</i> ...	Tanner, E. B. ...	R. Woodall ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report. 6.6.25 ...	6.6.25.
<i>Highland Enterprise</i> ...	Pond, R. H. ...	J. H. Titton ...	No.	Nelson ...	Form 911 31.1.25 to 26.4.25 ...	12.5.25.
<i>Glen</i> ...	Jones, T. J. ...	C. M. Best ...	"	" ...	" 14.12.24 to 2.1.25 ...	16.1.25.
<i>Heather</i> ...	Powell, G. A. ...	G. L. Goodman ...	M.L.	" ...	" ...	" ...
<i>Laddie</i> ...	Alford, C. ...	A. S. Jones, J. S. Collins, W. I. Breen.	No.	" ...	Form 911 16.9.24 to 8.11.24 ...	22.12.24.
<i>Piper</i> ...	Collings, D. ...	" ...	M.L.	" ...	Met. Log. 6.1.25 to 25.5.25 ...	10.6.25.
<i>Pride</i> ...	Robinson, R. H. ...	H. McKinnon, F. Falconer, R. R. Soanes, G. E. Leech, F. W. Harvey, H. Thomas, F. Abbott.	"	" ...	" 25.9.24 to 17.2.25 ...	3.3.25.
<i>Rover</i> ...	Ashby Graves, F. ...	G. I. Evans ...	"	" ...	" 15.1.25 to 19.3.25 ...	1.4.25.
<i>Warrior</i> ...	Davies, G. O. ...	R. S. H. Goodier ...	No.	Booth ...	Form 911 6.3.25 to 2.5.25 ...	8.5.25.
<i>Hildebrand</i> ...	Maddrell, J. ...	J. E. Williams, O. J. Edwards, M. P. Pearce.	M.L.	Commonwealth Govt. ...	Met. Log. 2.12.24 to 12.3.25 ...	8.4.25.
<i>Hobsons Bay</i> ...	Kydd, O. J. ...	G. P. Kitto, D. B. Woods ...	No.	Lampport & Holt ...	Form 911 8.12.24 to 27.12.24 ...	16.2.25.
<i>Holbein</i> ...	Roberts, J., C.B.E., D.S.O., R.D., Capt. R.N.R. ...	H. Clark, H. Yates, A. Griffiths.	W.T.	White Star ...	W.T. Reg. 16.4.25 to 1.5.25 ...	4.5.25.
<i>54 Homeric</i> ...	Samuels, C. ...	J. E. Martin, W. G. Idides ...	No.	R. P. Houston ...	Form 911 7.3.25 to 3.5.25 ...	26.5.25.
<i>Honorius</i> ...	Haines, E. P. ...	A. G. Litherland ...	"	New Zealand S.S. Co. ...	" 15.7.24 to 5.8.24 ...	15.8.24.
<i>Hororata</i> ...	Redyard, A. ...	S. G. Edwards ...	"	Pacific S.N. Co. ...	" 7.12.24 to 21.2.25 ...	24.2.25.
<i>Huanchaco</i> ...	Jones, W. C. H. ...	J. C. Tuckett, C. D. Watt, F. Pover, G. R. Hogg.	M.L.	Booth ...	Met. Log. 20.11.24 to 17.5.25 ...	9.6.25.
<i>Hubert</i> ...	Burton Davies, J. ...	" ...	"	New Zealand S.S. Co. ...	" ...	" ...
<i>Huruni</i> ...	Langdon, C. ...	" ...	C.C.	G.W. Railway ...	Telegraphic Report. 19.3.25 ...	19.3.25.
<i>Ibez</i> ...	Worsley, F.A., D.S.O., O.B.E., Commr., R.N.R. ...	" ...	M.L.	Algarsson Polar Expedition. ...	" ...	" ...
<i>Iceland, Auxy. Brigantine.</i> ...	Meetham, J. T. ...	E. Lightfoot, C. W. Smithurst	No.	J. H. Welford & Co. ...	Form 911 19.2.25 to 3.5.25 ...	19.5.25.
<i>Ikala</i> ...	Gibbins, W. A. ...	O. Stanhope ...	"	Harrison ...	" 19.4.25 to 2.6.25 ...	5.6.25.
<i>Intaba</i> ...	Sawyer, E. I. ...	J. Richardson ...	"	" ...	" 3.8.24 to 19.10.24 ...	22.10.24.
<i>Irotoibi</i> ...	Tinson, C. W., O.B.E., Commr., R.N. ...	G. A. R. J. Leslie, R. H. Lucy, G. A. Gould.	M.L.	His Majesty's Ship ...	Met. Log. 15.7.24 to 7.11.24 ...	3.2.25.
<i>Itroquois</i> ...	Reed, G. O. ...	A. R. Cook ...	No.	A. Holt ...	Form 911 21.4.25 to 17.5.25 ...	12.6.25.
<i>Izion</i> ...	Smythe, T. W., O.B.E. ...	A. G. Watts ...	No.	Eastern Tel. Co. ...	" 6.5.25 to 12.5.25 ...	8.6.25.
<i>John Pender</i> , C.S. ...	Benson, C. W. ...	A. Beharrel ...	"	Pacific S.N. Co. ...	" 29.4.25 to 15.5.25 ...	10.6.25.
<i>Junin</i> ...	Downton, M. ...	H. E. Reilly, F. T. Bisley, G. T. Webb, F. Vespington.	M.L.	New Zealand S.S. Co. ...	Met. Log. 15.7.24 to 19.12.24 ...	29.12.24.
<i>Kaikoura</i> ...	Manley G. ...	G. R. Baker ...	No.	P. & O. ...	Form 911 25.4.25 to 12.5.25 ...	21.5.25.
<i>Kaisar-i-Hind</i> ...	Okano, Y. ...	F. Takaku ...	"	Nippon Yusen Kaisha ...	" 2.3.25 to 2.4.25 ...	14.4.25.
<i>Kamo Maru</i> ...	Norris, H. C. ...	R. J. Sinclair, V. J. Denton, V. Gilbert, J. Egglestone.	M.L.	State Service Australia ...	Met. Log. 27.8.24 to 11.3.25 ...	25.5.25.
<i>Kangaroo</i> ...	Stringer, R. H., O.B.E., R.D., Commr., R.N.R. ...	F. Hopkins ...	No.	P. & O. ...	Form 911 24.8.24 to 8.9.24 ...	18.11.24.
<i>Kashmir</i> ...	Haselfoot, F. E. B., D.S.O., Commr., R.N.R. ...	E. H. B. Baker, R. A. Stephens	M.L.	His Majesty's Ship ...	Met. Log. 30.7.24 to 15.10.24 ...	20.10.24.
<i>Kellett</i> ...	Millard, L. A. ...	A. E. Denn, W. M. Tomkins	M.L.	Union Castle ...	" 16.5.24 to 25.1.25 ...	6.2.25.
<i>Kenilworth Castle</i> ...	George J., O.B.E. ...	L. Fraser, K. H. Cummins, G. K. Fox.	M.L.	P. & O. ...	" 24.10.24 to 31.1.25 ...	5.2.25.
<i>Khiva</i> ...	Randall, H.W., R.D., Capt., R.N.R. ...	J. C. Davies ...	No.	" ...	Form 911 25.3.25 to 10.5.25 ...	14.5.25.
<i>Khyber</i> ...	Collyer, R. M. M., R.D., Commr., R.N.R. ...	" ...	"	" ...	" ...	" ...
<i>Kia Ora</i> ...	McIntosh, A. ...	A. E. Lockhart ...	"	Shaw Savill & Albion ...	" 5.4.25 to 27.4.25 ...	19.5.25.
<i>Kildonan Castle</i> ...	Wilford, T.H. ...	R. S. W. Harris, N. P. Curtoys	"	Union Castle ...	" 19.12.24 to 12.4.25 ...	14.4.25.
<i>Kitano Maru</i> ...	Gotoh, M. ...	R. Nakane ...	"	Nippon Yusen Kaisha ...	" 11.2.25 to 7.3.25 ...	13.3.25.
<i>Knight Companion</i> ...	Beale, H. E. ...	J. J. Daniel, A. M. Hunter ...	"	A. Holt ...	" 11.4.25 to 1.5.25 ...	18.5.25.
<i>Koranna</i> ...	Mordue, J. A. ...	L. Griffiths, J. Sanders, J. Casson, D. H., R. D. Brown, A. M., Commr., R.N.R. ...	M.L.	Ellerman Bucknall ...	Met. Log. 1.5.25 to 19.5.25 ...	3.6.25.
<i>Kovno</i> ...	Coalstad, C. ...	Marshall, T. Tindell, N. W. Glendinning, F. T. Shaw.	"	Ellerman Wilson ...	" 26.7.24 to 20.4.25 ...	24.4.25.
<i>Kvogle</i> ...	West, G. W. ...	C. B. Odman, E. W. Hughes	No.	Commonwealth Light-house Service. ...	Form 911 13.11.24 to 13.12.24 ...	19.1.25.
<i>Lady Denison Pender</i> , C.S. ...	Pape, E. R. ...	F. Lawrence ...	"	Eastern Tel. Co. ...	" 5.3.25 to 24.3.25 ...	27.4.25.
<i>Laguia</i> ...	Banbra, W. A. ...	W. P. Boon ...	"	Pacific S.N. Co. ...	" 11.4.25 to 8.6.25 ...	10.6.25.
<i>Lalande</i> ...	Beckett, F. W. ...	H. Phillips ...	"	Lampport & Holt ...	" 8.3.25 to 29.3.25 ...	15.4.25.
<i>Lancashire</i> ...	Smith, A. H. ...	W. M. S. Higginson ...	"	Bibby ...	" 31.1.25 to 10.4.25 ...	17.4.25.
<i>Laomedon</i> ...	Ross, J. ...	A. J. Barclay ...	"	A. Holt ...	" 19.11.24 to 23.12.24 ...	5.1.25.
<i>La Paz</i> , M.V. ...	Davies, G. W. ...	S. T. Gale ...	"	Pacific S.N. Co. ...	" 29.3.25 to 16.4.25 ...	5.5.25.
<i>Lapluc</i> ...	Howell, T. ...	W. Boyde, R. B. Langley ...	"	Lampport & Holt ...	" 13.12.24 to 30.3.25 ...	3.4.25.
<i>55 Lanland</i> ...	Hickman, V. T. ...	W. N. Jenkins, B. T. Harries.	W.T.	Red Star ...	W.T. Reg. 30.4.25 to 5.5.25 ...	7.5.25.
<i>Lassell</i> , M.V. ...	English, G. L. ...	H. G. Cuthill ...	No.	Lampport & Holt ...	Form 911 15.4.25 to 6.5.25 ...	9.5.25.
<i>Leicestershire</i> ...	W. White-side, P. H. Potter, D. Y. Sharrock, J. Trade-well.	" ...	M.L.	Bibby ...	Met. Log. 3.11.24 to 28.11.24 ...	19.12.24.
<i>Leighton</i> M.V. ...	Lindesay J. M. ...	" ...	No.	Lampport & Holt ...	" 14.3.25 to 22.5.25 ...	3.6.25.

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 12. 6. 25.	Date Received.
<i>Leitrim</i> ...	Robertson, A. ...	E. F. C. Higgins ...	No.	Dowie, J., & Co. ...	Form 911 26.4.25 to 18.5.25 ...	8.6.25.
<i>Llanstephan Casile</i> ...	Owen, S. H. ...	J. B. M. Reynolds... ..	"	Union Castle ...	" 20.9.24 to 25.11.24... ..	29.11.24.
<i>Loch Katrina</i> ...	Matthews, G. P. ...	C. Noakes ...	"	R.M.S.P. Co. ...	" 9.11.24 to 6.2.25 ...	13.3.25.
<i>London Commerce</i> ...	Young, H. J., D.S.C.	P. G. Leverett ...	No.	Furness Withy ...	" 29.3.25 to 28.4.25 ...	6.5.25.
<i>Loriga M.V.</i> ...	Barkley, E. ...	W. N. Anders ...	"	Pacific S.N. Co. ...	" 26.4.25 to 19.5.25 ...	8.6.25.
<i>Losada M.V.</i> ...	Meldrum, G. W. ...	A. H. Turner ...	"	" " ...	" 16.12.24 to 22.3.25... ..	26.3.25.
<i>Macedonia</i> ...	Potter, H. W., R.D., Commr., R.N.R.	E. R. Bodley ...	No.	P. & O. ...	" 29.4.25 to 28.5.25 ...	2.6.25.
<i>Macharda</i> ...	Cochran, G. ...	W. Moore ...	"	Brocklebank ...	" 6.9.24 to 24.11.24 ...	5.12.24.
<i>Mahana</i> ...	Kershaw, W. A. R. ...	F. M. Smith, J. C. K. Rogers	"	Shaw Savill & Albion	" 14.3.25 to 19.4.25 ...	25.5.25.
<i>Maharaja</i> ...	Perry, C. R. ...	C. B. Miller, D. M. Swaine...	"	Asiatic S.N. Co. ...	" 29.3.25 to 9.5.25 ...	8.6.25.
<i>Maihar</i> ...	Rowe J. P. ...	C. Shaw, H. T. Scoins, R. G. Widdon.	M.L.	Brocklebank ...	Met. Log. 15.8.24 to 29.4.25 ...	7.5.25.
<i>Maimyo</i> ...	Richardson, T. ...	P. Yates ...	No.	" " ...	Form 911 9.3.25 to 15.4.25 ...	4.5.25.
<i>Maine</i> ...	Seymour, H. ...	S. C. Skinner ...	"	Atlantic Transport ...	" 23.2.25 to 5.4.25 ...	14.4.25.
<i>58 Majestic</i> ...	Metcalfe, G. R. ...	L. Thompson, A. H. Young, W. T. Poustie, J. A. Macnaughton.	W.T.	White Star ...	W.T. Reg. 14.5.25 to 28.5.25 ...	2.6.25.
					Form 911 9.12.24 to 22.12.24... ..	29.12.24.
<i>Makambo</i> ...	Brown, T. M. ...	F. C. Ree, H. Mann, D. G. Irvine, D. Wilson, J. Abbot, K. Thompson.	M.L.	Burns Philp ...	Met. Log. 13.2.24 to 28.8.24 ...	2.12.24.
<i>Makura</i> ...	Mawson, J. ...	J. D. Lundie, G. H. Kime, N. Archibald, A. R. Noble.	M.L.	Canadian-Australasian	" 23.10.24 to 6.3.25 ...	30.3.25.
<i>Malancha</i> ...	Whitham, F. ...	A. Hill ...	No.	Brocklebank ...	Form 911 12.3.25 to 8.4.25 ...	27.4.25.
<i>Malda</i> ...	Gray, T. N. ...	W. E. Murphy ...	"	British India ...	" 16.1.25 to 20.2.25 ...	24.2.25.
<i>Manchester Corporation.</i>	Everest J. E. ...	W. L. Lavers ...	"	Manchester Liners ...	" 14.4.25 to 23.4.25 ...	25.4.25.
<i>Manchester Importer.</i>	Riley, J. E. ...	H. Scholfield, G. S. Robertson	"	" " ...	" 9.5.25 to 9.6.25 ...	12.6.25.
<i>Manchester Mariner.</i>	Riley, J. E. ...	C. E. Stocker, J. F. Fisher, W. H. Downing.	M.L.	" " ...	Met. Log. 23.3.24 to 25.11.24... ..	5.12.24.
<i>Manchester Merchant.</i>	Barclay J. ...	R. A. Walker ...	No.	" " ...	Form 911 16.4.25 to 27.4.25 ...	30.4.25.
<i>Mandasor</i> ...	Kershaw, R. W. ...	W. Baxter ...	"	Brocklebank ...	" 29.12.24 to 9.3.25 ...	18.3.25.
<i>Manhattan</i> ...	Hutchison J. G. ...	R. Day ...	"	Atlantic Transport ...	" 10.11.24 to 18.12.24	22.12.24.
<i>Manipur</i> ...	Scurr T. W. ...	G. W. Barker ...	"	Brocklebank ...	" 16.2.25 to 11.5.25 ...	15.5.25.
<i>Manistee</i> ...	Isaacson, J. M. ...	S. Browne, J. Blower, F. R. Inch.	M.L.	Elders & Fyffes ...	Met. Log. 26.7.24 to 7.12.24 ...	16.12.24.
<i>Manzanares</i> ...	Henderson, J. N. ...	H. E. Lees ...	No.	" " ...	Form 911 14.4.25 to 17.5.25 ...	21.5.25.
<i>Marella</i> ...	Mortimer S. ...	D. Pemberton, W. McBride, A. M. Hill, A. Campbell, W. Middleton.	M.L.	Burns Philp ...	Met. Log. 18.4.24 to 18.2.25 ...	11.5.25.
<i>Marengo</i> ...	Bean, A. ...	L. T. Hale, F. Elgin, J. E. Stott, W. G. Pearce, E. Wood.	"	Ellerman Wilson ...	" 12.9.24 to 21.2.25 ...	25.2.25.
<i>Margha</i> ...	Milne, A. R., R.D., Commr., R.N.R.	J. Strachan, P. Wright, H. E. Evans, B. Paul.	"	British India ...	" 15.2.25 to 12.5.25 ...	20.5.25.
<i>Marjlen</i> ...	Griffiths, J. N. ...	E. Eastley ...	No.	Canadian Pacific ...	Form 911 19.2.25 to 9.4.25 ...	14.4.25.
<i>27 Marloch</i> ...	Hamilton, G. ...	H. A. McCallum, E. V. Glen- nie, D. I. C. Robertson.	W.T.	" " ...	W.T. Reg. 25.4.25 to 15.5.25 ...	18.5.25.
					Form 911 9.11.24 to 28.11.24... ..	15.12.24.
<i>Maryland</i> ...	Hutt, F. C. ...	A. C. Clay ...	No.	Atlantic Transport ...	" 16.1.25 to 18.2.25 ...	24.2.25.
<i>Massilia</i> ...	Henderson, J. L. ...	E. Richardson ...	"	Anchor ...	" 12.9.24 to 20.9.24 ...	22.9.24.
<i>Matakana</i> ...	Thurston, H. P. ...	A. Chrystal ...	"	Shaw, Savill & Albion	" 1.2.25 to 30.5.25 ...	5.6.25.
<i>Mataram</i> ...	Williams, D. J. ...	E. H. Doughty ...	"	Burns Philp & Co. ...	" 6.1.25 to 3.2.25 ...	23.3.25.
<i>Matheran</i> ...	Columbine, F. F. ...	J. A. Embley, J. Robertson, S. C. Cramb.	M.L.	Brocklebank ...	Met. Log. 18.11.24 to 16.2.25... ..	23.2.25.
<i>Mathura</i> ...	Hanna, R. G. ...	H. H. Armstrong ...	No.	" " ...	Form 911 3.4.25 to 13.4.25 ...	22.4.25.
<i>Matiana</i> ...	Langlands, D. H. ...	B. Paul, J. H. Fletcher ...	"	British India ...	" 20.3.25 to 10.5.25 ...	2.6.25.
<i>Mawngamui</i> ...	Worrall, L. C. H. ...	D. M. Todd ...	"	Union S.S. Co. of N.Z.	" 1.1.25 to 19.2.25 ...	15.4.25.
<i>32 Mavretania</i> ...	C.B.E., R.D., A.-d.-C., Capt., R.N.R.	F. A. York, R. Allen, E. R. Taylor, A. Mackellor.	W.T.	Cunard ...	W.T. Reg. 3.5.25 to 18.5.25 ...	22.5.25.
					" 25.5.25 to 28.6.25 ...	10.6.25.
<i>Media</i> ...	Maughan ...	" " " " " "	No.	T. & J. Brocklebank... ..	" " " " " "	" " " "
<i>56 Megantic</i> ...	White, E. R., R.D., Commr., R.N.R.	F. A. Billiard, R. Conway, J. Clarke.	W.T.	White Star ...	W.T. Reg. 16.5.25 to 5.6.25 ...	9.6.25.
<i>22 Melita</i> ...	Clews, A. H. ...	J. McLennan, B. Leslie ...	W.T.	Canadian Pacific ...	Form 911 9.5.25 to 27.5.25 ...	29.5.25.
					" 8.5.25 to 27.5.25 ...	2.6.25.
<i>Memnon</i> ...	Salter, G. H. ...	E. D. Potts ...	No.	A. Holt ...	" 3.10.24 to 19.10.24... ..	21.10.24.
<i>Menominee</i> ...	Pollard, W. F., D.S.O., R.D., Capt. R.N.R.	C. F. Hicks ...	"	Atlantic Transport ...	" 14.2.25 to 19.3.25 ...	23.3.25.
<i>Mercian</i> ...	Gardner, J. ...	R. Hughs ...	"	Leyland ...	" 16.3.25 to 26.4.25 ...	1.5.25.
<i>21 Metagama</i> ...	Henderson, W. ...	W. F. Reid, A. M. Watt, E. Laurence.	W.T.	Canadian Pacific ...	W.T. Reg. 10.5.25 to 28.5.25 ...	2.6.25.
<i>Miami</i> ...	Makepeace, S. ...	H. H. Dunning ...	No.	Elders & Fyffes ...	Form 911 24.3.25 to 26.4.25 ...	30.4.25.
<i>Michigan</i> ...	Tribe, A. E. ...	L. A. Williams ...	"	Atlantic Transport ...	" 11.6.24 to 20.6.24 ...	25.6.24.
<i>Minderoo</i> ...	Richardson, E. ...	B. J. Bennie, W. J. McPhedron, J. H. Oxtan.	M.L.	West Australia Nav. Co.	Met. Log. 13.6.24 to 26.11.24... ..	4.3.25.
<i>Minna</i> ...	Mackenzie, G. G. ...	D. Rattray ...	No.	Scottish Fishery Board	Form 911 9.4.25 to 24.4.25 ...	12.5.25.
<i>23 Minnedosa</i> ...	Notley, A. H., R.D., Commr., R.N.R.	R. Antrobus ...	W.T.	Canadian Pacific ...	W.T. Reg. 25.4.25 to 12.5.25 ...	16.5.25.
					" 23.5.25 to 10.6.25 ...	11.6.25.
<i>Minnetonka</i> ...	Gates, T. F. ...	C. F. Hicks ...	No.	Atlantic Transport ...	Form 911 27.4.25 to 16.5.25 ...	20.5.25.
<i>Minnewaska</i> ...	Claret, F. ...	F. J. Mummery ...	"	" " " " " "	" 11.5.25 to 30.5.25 ...	2.6.25.
<i>Mirror, C.S.</i> ...	Gibson, L. ...	C. E. F. St. John ...	"	Eastern Tel. Co. ...	" 19.11.24 to 17.1.25... ..	19.2.25.
<i>Mississippi, M.V.</i> ...	Wylie, J. T. J. ...	H. K. Cockerill ...	"	Atlantic Transport ...	" 17.5.25 to 28.5.25 ...	3.6.25.
<i>Moena</i> ...	Morzer Bruyns, M. F.	G. H. Vander Roest ...	"	Nederland ...	" 18.12.24 to 6.2.25 ...	10.2.25.
<i>Moltavia</i> ...	Burleigh, C. W., D.S.O., Capt., R.N.R.	D. C. S. Cook ...	"	P. & O. ...	" 21.11.24 to 25.2.25... ..	2.3.25.
<i>Mongolian Prince</i>	Durrant, G. D. ...	P. F. Owens ...	"	Prince ...	" 22.2.25 to 11.4.25 ...	15.4.25.
<i>Monkbarns, Ship</i>	Davies, W. ...	R. Baise, J. Williams ...	"	J. Stewart & Co. ...	" 10.10.24 to 26.11.24	5.2.25.
<i>24 Montcalm</i> ...	Sibbons, H. ...	H. McFadyen ...	W.T.	Canadian Pacific ...	W.T. Reg. 17.5.25 to 4.6.25 ...	6.6.25.
<i>25 Montclare</i> ...	Webster, G. S., R.D., Commr., R.N.R.	R. Regan, W. Phillips, H. S. Knight.	"	" " " " " "	" 25.4.25 to 15.5.25 ...	18.5.25.
					Form 911 25.4.25 to 15.5.25 ...	18.5.25.
<i>Monteith</i> ...	Henderson, W. ...	F. E. Williams ...	No.	" " " " " "	W.T. Reg. 26.1.25 to 12.2.25 ...	17.2.25.
<i>Montoro</i> ...	McInnes, J. ...	T. W. Burdis ...	"	Burns, Philp & Co. ...	Form 911 6.1.25 to 16.2.25 ...	12.5.25.
<i>26 Montrose</i> ...	Landy, E. ...	T. Beck, C. Clarke, A. Mansey	W.T.	Canadian Pacific ...	W.T. Reg. 3.5.25 to 22.5.25 ...	25.5.25.
					Form 911 1.5.25 to 22.5.25 ...	25.5.25.
<i>20 Montroyal</i> ...	Latta, R. G. ...	R. W. Jones, J. H. Tudor, A. K. Benham.	"	" " " " " "	" 10.4.25 to 17.4.25 ...	4.5.25.
					W.T. Reg. 9.5.25 to 29.5.25 ...	3.6.25.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 12.6.25.	Date Received.
<i>Morvada</i> ...	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	J. Norris, C. L. Hazeldine ...	M.L.	British India ...	Met. Log. 13.9.24 to 15.3.25 ...	9.4.25.
<i>Mulbera</i> ...	Steadman, W. R. ...	E. Holland, H. W. Norris ...	No.	British India ...	Form 911 30.3.25 to 8.4.25 ...	16.4.25.
<i>Nagara</i> ...	Purvis, A. ...	H. V. Todd ...	"	R.M.S.P. Co. ...	" 11.3.25 to 7.5.25 ...	12.5.25.
<i>Nagoya</i> ...	Cherry, W. G. W. ...	P. Haworth ...	"	P. & O. ...	" 28.3.25 to 23.4.25 ...	2.6.25.
<i>Nardana</i> ...	Moth, F. L. ...	S. C. T. Smith, A. H. Hogge ...	"	British India ...	" 15.5.25 to 26.5.25 ...	8.6.25.
<i>Nariva</i> ...	Buret, T. J. C. ...	B. Y. Vickers, J. S. Scott, R. H. East.	M.L.	R.M.S.P. Co. ...	Met. Log. 25.1.25 to 25.3.25 ...	2.4.25.
<i>Nascopie</i> ...	Smellie, T. F. ...	A. S. Watts, T. D. Roseburgh ...	M.L.	Hudson's Bay Co. ...	" 16.6.24 to 17.10.24 ...	23.10.24.
<i>Navasota</i> ...	Willan, F. G. L., R.D., Commr., R.N.R.	W. A. Delap ...	No.	R.M.S.P. Co. ...	Form 911 23.6.24 to 20.8.24 ...	28.8.24.
<i>Nellore</i> ...	Hignett, A. H., R.D., Lt. - Commr., R.N.R.	F. Squire ...	"	P. & O. ...	" 22.3.25 to 22.4.25 ...	18.5.25.
<i>Nestor</i> ...	Owen, R. D., O.B.E.	W. H. Newby, C. J. Beasley, F. J. Silva.	M.L.	A. Holt ...	Met. Log. 12.10.24 to 12.2.25 ...	20.2.25.
<i>Nevasa</i> ...	Swanson, C. J. ...	D. Lorrie ...	No.	British India ...	Form 911 21.2.25 to 12.5.25 ...	19.5.25.
<i>Newby Hall</i> ...	Kendall, J. W. ...	A. Martin ...	M.L.	Ellerman ...	Met. Log. 12.9.24 to 10.1.25 ...	27.1.25.
<i>Niagara</i> ...	Showman, A. C. ...	T. A. Macpherson, J. V. Bray, J. Dawson, A. P. Cousin.	M.L.	Canadian-Australian ...	" 20.11.24 to 30.4.25 ...	25.5.25.
<i>Ningchow</i> ...	Wilson, C. A. ...	F. A. Brown ...	No.	A. Holt ...	Form 911 6.3.25 to 25.4.25 ...	2.6.25.
<i>Nore</i> ...	Parker, J. W. ...	R. W. Mackie, C. B. Roche, R. H. Turner, G. Haughey.	M.L.	P. & O. ...	Met. Log. 6.11.24 to 24.1.25 ...	29.1.25.
<i>Norman</i> ...	Morton Betts W. ...	D. A. Hodgson ...	No.	Union Castle ...	Form 911 22.3.25 to 10.4.25 ...	8.5.25.
<i>Norna</i> ...	Wright, J. ...	T. Mather ...	"	Scottish Fishery Board ...	" 1.5.25 to 4.6.25 ...	5.6.25.
<i>Norseman, C.S.</i> ...	W. Douglas ...	" ...	M.L.	Western Tel. Co. ...	Met. Log. 16.8.24 to 30.1.25 ...	3.3.25.
<i>Nortonian</i> ...	McCormick, J. ...	T. Griffiths ...	No.	Leyland ...	Form 911 2.8.24 to 30.9.24 ...	4.10.24.
<i>Nubian</i> ...	Watmough, T. M. ...	H. R. Gaskill ...	"	" ...	" 21.12.24 to 2.1.25 ...	6.1.25.
<i>Nyanza</i> ...	Carpendale, F. W. J.	G. D. Brown, R. H. Hand, A. L. Hill.	M.L.	P. & O. ...	Met. Log. 9.2.25 to 28.4.25 ...	2.5.25.
<i>Oaklands Grange</i> ...	Routledge, R. ...	E. A. Insley ...	No.	Houlder Bros. ...	Form 911 18.10.24 to 2.2.25 ...	19.2.25.
<i>42 Ohio</i> ...	Nicholson, M. S., R.D., Capt., R.N.R.	R. W. Morford, P. M. Burrell, H. F. Woodroffe.	W.T.	R.M.S.P. Co. ...	W.T. Reg. 1.2.25 to 3.4.25 ...	7.4.25.
<i>Olympia</i> ...	A. R. Duncan ...	D. R. Urquhart, G. Lynas, C. Mortimer.	M.L.	Anchor ...	Form 911 28.3.25 to 4.4.25 ...	7.4.25.
<i>57 Olympic</i> ...	Marshall, W., C.B., D.S.O., R.D., Capt., R.N.R.	H. J. C. Day, C. J. Warltire, W. Fitzgerald.	W.T.	White Star ...	W.T. Reg. 1.5.25 to 14.5.25 ...	16.5.25.
<i>Orama</i> ...	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	L. J. Vesty, F. Butler, M. C. Lester, J. S. Metcalf.	M.L.	Orient ...	Form 911 1.5.25 to 4.6.25 ...	8.6.25.
<i>Oranian</i> ...	Hoskins, W. ...	R. H. Theaker ...	No.	Leyland ...	Form 911 27.4.25 to 14.5.25 ...	26.5.25.
<i>Orari</i> ...	Robinson, F. W. ...	R. Newman, T. Breen, F. Longheed, C. Wilkinson, H. Farrant.	M.L.	New Zealand S.S. Co. ...	Met. Log. 9.8.24 to 20.1.25 ...	27.1.25.
<i>40 Orbita</i> ...	Matthews, G. P. ...	B. C. Dodds, H. G. Whittle, H. M. Rennie, R. Wray Hurt, R. H. East.	W.T.	R.M.S.P. Co. ...	W.T. Reg. 4.5.25 to 24.5.25 ...	27.5.25.
<i>Orcoma</i> ...	Dominy, R. H., C.B.E., Commr., R.N.R.	G. B. Wardale, L. Jones, W. Billington.	M.L.	Pacific S.N. Co. ...	Form 911 3.5.25 to 25.5.25 ...	2.6.25.
<i>41 Orduna</i> ...	Warner, G. E., R.D., Capt., R.N.R.	R. W. Sumpton, J. Vivian, H. David, G. F. Russell.	W.T.	R.M.S.P. Co. ...	W.T. Reg. 18.5.25 to 7.6.25 ...	10.6.25.
<i>Oriana</i> ...	Makin, T. W. ...	R. E. Skellorn, R. D. Eckford, J. Reed.	M.L.	Pacific S.N. Co. ...	Form 911 17.5.25 to 7.6.25 ...	10.6.25.
<i>Orita</i> ...	Splatt, W. A. ...	J. G. Harvey, T. R. Scott, D. W. Hutchinson, C. P. D. Dean.	M.L.	" ...	Met. Log. 10.2.25 to 25.4.25 ...	4.5.25.
<i>Ormonde</i> ...	Knowles, C. H., D.S.O., Commr., R.N.	A. M. Hughes ...	M.L.	His Majesty's Ship ...	Met. Log. 19.9.24 to 6.12.24 ...	19.12.24.
<i>Ormonde</i> ...	Shelford, W. S., Lt.-Commr., R.N.R.	N. A. Whinfield, W. A. Wickham, A. H. Dyer.	M.L.	Orient ...	Met. Log. 8.11.24 to 6.12.24 ...	31.12.24.
<i>Ormuz</i> ...	James L. V., D.S.C.	A. E. Nicholls, H. Schofield, H. MacLean, F. S. Shurrock.	M.L.	" ...	Met. Log. 4.1.25 to 7.4.25 ...	15.4.25.
<i>Oronsay</i> ...	Coad, A. J., Commr., R.N.R.	J. C. K. Dowding, P. R. Murphy, R. K. Rogerson.	"	" ...	Met. Log. 22.2.25 to 27.5.25 ...	6.6.25.
<i>Oroya</i> ...	Pearce, A. ...	S. Lewis ...	No.	Pacific S.N. Co. ...	Met. Log. 8.2.25 to 12.5.25 ...	20.5.25.
<i>Orsova</i> ...	Matheson, C. G., D.S.O., R.D., Commr., R.N.R.	M. J. Sarson, A. J. Croft Cohen, C. V. Dodgson, P. P. Murphy, L. E. Fordham.	M.L.	Orient ...	Form 911 27.1.25 to 6.4.25 ...	16.4.25.
<i>Ortega</i> ...	Pleignier, H. S. ...	C. Leatherbarrow ...	No.	Pacific S.N. Co. ...	Met. Log. 12.10.24 to 13.1.25 ...	19.1.25.
<i>Orvieto</i> ...	Simner, G. L., R.D., Commr., R.N.R.	M. Petit Daun, G. E. Martin	M.L.	Orient ...	Form 911 9.12.24 to 16.2.25 ...	25.2.25.
<i>Osterley</i> ...	Cameron, E. P. ...	E. Hatch, H. Tanner, W. J. Rice.	M.L.	" ...	Met. Log. 9.11.24 to 10.2.25 ...	14.2.25.
<i>Othello</i> ...	Pearson, Z. C. ...	J. W. Botheroyd ...	No.	Ellerman Wilson ...	" 7.12.25 to 10.3.25 ...	13.5.25.
<i>Otira</i> ...	Elford, H. E. ...	J. H. Fuller ...	"	Shaw, Savill & Albion ...	Form 911 27.1.25 to 17.3.25 ...	19.3.25.
<i>Ovid</i> ...	Groom, A. C. B. ...	" ...	"	Shakespear Shipping Co ...	" 5.3.25 to 12.4.25 ...	18.4.25.
<i>Oxfordshire</i> ...	Crumplin, W. E. ...	F. C. Brooks ...	"	Bibby Bros. ...	" 20.4.25 to 20.5.25 ...	23.5.25.
<i>Pacific Shipper, M.V.</i> ...	Newman, G. W. A.	R. S. Smith ...	"	Furness Withy ...	" 26.2.25 to 27.3.25 ...	2.4.25.
<i>Pakeha</i> ...	W. P. Clifton Mogg	R. K. Vandervard, E. T. Baker	M.L.	Shaw, Savill & Albion ...	" 25.12.24 to 12.1.25 ...	14.4.25.
<i>Paparoa</i> ...	Dowse, F. ...	C. J. Brewer ...	No.	New Zealand S.S. Co. ...	Met. Log. 7.11.24 to 27.3.25 ...	30.3.25.
<i>Pareora</i> ...	Evans, J. O. ...	R. F. Hillings ...	"	Hain S.S. Co. ...	Form 911 21.4.25 to 3.5.25 ...	18.5.25.
<i>Paris</i> ...	Cook, C. L. ...	Mr. Biles ...	C.C.	Southern Rly. ...	" 11.3.25 to 15.4.25 ...	25.5.25.
<i>Patia</i> ...	Bostock, R. J. ...	W. McIlwaine ...	No.	Elders & Fyffes ...	Telegraphic Report. 6.6.25 ...	6.6.25.
<i>Patrol, C.S.</i> ...	Welsh, T. K. ...	W. H. S. Clark, H. F. P. Albrecht, W. G. MacBryde, A. T. Morrell.	M.L.	Eastern Extension (A. & C.) Telegraph Co. ...	Form 911 17.1.25 to 4.2.25 ...	2.3.25.
<i>Persi</i> ...	Davies, E. ...	H. Williams ...	No.	White Star ...	Met. Log. 1.10.24 to 12.1.25 ...	16.4.25.
<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 19.10.24 to 1.12.24 ...	3.12.24.
<i>Pharos</i> ...	Ewing, T. N. ...	D. Tullock, A. McLachlan ...	No.	Northern Lighthouse Board ...	Met. Log. 22.1.25 to 30.5.25 ...	5.6.25.
<i>Philadelphum</i> ...	Baker, J. A. ...	W. Lawton ...	No.	Leyland ...	Form 911 13.4.25 to 30.4.25 ...	21.5.25.
<i>Polycarp</i> ...	Evans, T. G. ...	" ...	"	Booth ...	Form 911 2.10.24 to 20.11.24 ...	26.11.24.
<i>Polyphemus</i> ...	Hatfield, J. ...	R. E. Wilkes ...	"	A. Holt ...	" 1.2.25 to 23.2.25 ...	25.2.25.
<i>Poona</i> ...	Cherry, W. G. W. ...	F. R. W. Page ...	"	P. & O. ...	" 21.7.24 to 31.8.24 ...	15.9.24.
<i>Port Adelaide</i> ...	Hayter, S. W. ...	" ...	M.L.	Commonwealth & Dominion.	" ...	"



Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 12.6.25.	Date Received.
<i>Tahiti</i> ...	Hamilton, H. E. ...	T. M. Young, W. Bailey, ...	No	Union S.S. Co. of N.Z.	Form 911 ...	10.2.25.
<i>Taiyuan</i> ...	Thomas, R. D. ...	A. M. Frame, ...	M.L.	Yuill & Co. ...	Met. Log. 11.7.24 to 15.12.24 ...	...
<i>Talhybius</i> ...	Duggan, C. ...	P. Elder ...	No.	A. Holt ...	Form 911 26.3.25 to 12.4.25 ...	23.5.25.
<i>Tanda</i> ...	Pilcher, E. ...	... ..	M.L.	E. & A. S.S. Co. ...	Form 911 ...	...
<i>Tambora</i> ...	Huisman, N. ...	H. Van Manen ...	No.	Rotterdam Lloyd ...	" 27.2.25 to 15.4.25 ...	27.4.25.
<i>Teiresias</i> ...	Holden, W. R. F. ...	R. S. Young ...	"	A. Holt ...	" 8.1.25 to 28.1.25 ...	2.2.25.
<i>Teucer</i> ...	Hodgson, R. N. ...	G. Lancaster ...	"	" ...	" 12.3.25 to 6.5.25 ...	18.5.25.
<i>Themistocles</i> ...	Jermyn, W. M. ...	W. F. Sargent ...	"	Aberdeen ...	" 11.3.25 to 23.4.25 ...	5.5.25.
<i>Theseus</i> ...	Batt, A. E. ...	J. T. Fettes ...	"	A. Holt ...	" 25.2.25 to 25.4.25 ...	1.5.25.
<i>Titan</i> ...	Wilkinson, T. G. ...	G. Gow, L. Morton, S. C. Timmouth, F. D. Lovewell.	M.L.	" ...	Met. Log. 12.11.24 to 14.3.25...	11.5.25.
<i>Tolmie, S.F.Bqtn.</i>	Stewart, J. C. ...	E. F. Collins ...	No.	B. C. Mills, Tug and Barge Co.	Form 911 1.11.24 to 24.12.24...	2.3.25.
<i>Totori Maru</i> ...	Matsukura, B. ...	S. Ibori ...	"	Nippon Yusen Kaisha	" 7.9.24 to 13.10.24 ...	20.10.24.
<i>Trawler</i> ...	Worthington, B. ...	A. Robertson ...	"	Harrison ...	" 19.6.24 to 18.7.24 ...	22.7.24.
<i>Trematon</i> ...	Hicks, F. H. ...	J. Christopher, D. Thomas, F. J. Webb, S. Smith, C. Mayberry.	M.L.	" ...	Met. Log. 31.3.23 to 24.9.24 ...	14.10.24.
<i>Tuscania</i> ...	Bone, D. W. ...	J. W. Cherry ...	No.	Anchor ...	Form 911 17.5.25 to 6.6.25 ...	12.6.25.
<i>Tyndareus</i> ...	Slater, H. N. ...	C. Broad, A. C. H. Jones ...	M.L.	A. Holt ...	" ...	...
<i>Ukmaroa</i> ...	Wyllie, W. J. ...	J. Gilbertson ...	No.	Huddart Parker, Ltd.	Form 911 17.10.24 to 23.11.24 ...	19.1.25.
<i>Ulysses</i> ...	McHutcheon, W. ...	T. R. Phillips ...	"	A. Holt ...	" 11.3.25 to 23.4.25 ...	30.4.25.
<i>Umvolosi</i> ...	Barnes, E. W. ...	... ..	"	Bullard King ...	" ...	...
<i>Valacia</i> ...	Doyle, M. ...	N. Grayson ...	"	Cunard ...	" 16.5.25 to 27.5.25 ...	2.6.25.
<i>Valdura</i> ...	Mitchell, A. ...	H. J. Maughan, J. Anderson, A. M. S. Well.	M.L.	Gow Harrison ...	Met. Log. 19.6.24 to 20.11.24...	8.12.24.
<i>Vardulia</i> ...	Murchie, P. A., R.D., Commr., R.N.R.	P. G. Britten ...	No.	Cunard ...	Form 911 10.5.25 to 22.5.25 ...	26.5.25.
<i>Vasconia</i> ...	Inch F. ...	E. Gleave ...	"	" ...	" 18.3.25 to 30.5.25 ...	3.6.25.
<i>Vellavia</i> ...	Fear, E. T. C. ...	J. E. Deans ...	"	" ...	" 26.3.25 to 6.4.25 ...	14.4.25.
<i>Ventura de Larrinaga.</i>	Keay, W. S. ...	H. J. Kay ...	"	Larrinaga ...	" 3.12.24 to 28.3.25 ...	19.5.25.
<i>Verbania</i> ...	Brown, A. T., R.D., Commr., R.N.R.	J. G. Wiseman ...	"	Cunard ...	" 12.4.25 to 14.5.25 ...	19.5.25.
<i>Verentia</i> ...	Jones, R. D. ...	A. F. Watts ...	"	" ...	" 6.4.25 to 8.5.25 ...	12.5.25.
<i>Vigilant</i> ...	Simpson, E. S. S. ...	J. Hunter ...	No.	Scottish Fishery Board	Form 911 21.4.25 to 12.5.25 ...	19.5.25.
<i>Vaiotapu</i> ...	Davey, A. ...	B. S. Cave, N. M. Boneth, R. N. Turner.	No.	Canadian-Australasian	Form 911 23.10.24 to 30.4.25...	2.6.25.
<i>Walmer Castle</i> ...	Stanley, W. P., R.D., Commr., R.N.R.	C. Ayles ...	"	Union Castle ...	" 6.3.25 to 27.4.25 ...	28.4.25.
<i>Wangaratta</i> ...	Scutt W. ...	T. W. Wordingham, W. C. Cripps, K. M. Morrison.	M.L.	British India ...	Met. Log. 30.6.24 to 26.11.24...	1.12.24.
<i>Warfield</i> ...	Steel, R. ...	H. Coffey ...	No.	" ...	Form 911 16.3.25 to 28.5.25 ...	8.6.25.
<i>War Nizam</i> ...	Putt, R. O. ...	D. Beaumont ...	"	British Tankers ...	" 13.4.25 to 17.5.25 ...	8.6.25.
<i>Welshman</i> ...	Rollerson, W. ...	W. A. Fletcher ...	"	White Star-Dominion ...	" 12.4.25 to 12.5.25 ...	19.5.25.
<i>Winifredian</i> ...	Harrocks W. ...	W. E. Boyle ...	"	Leyland ...	" 14.12.24 to 19.1.25...	2.2.25.
<i>Woodarra</i> ...	Reilly, J. V. ...	L. D. Graham, A. V. Fisher, L. C. Comber, J. Wallace.	M.L.	British India ...	Met. Log. 3.4.24 to 22.6.24 ...	2.8.24.
<i>Yorkshire</i> ...	Millson, G. C. ...	F. C. Holdsworth ...	No.	Bibby ...	Form 911 26.3.25 to 23.4.25 ...	4.5.25.
<i>Zealand</i> ...	Thomas, A. J. ...	J. Cross ...	No.	Red Star ...	Form 911 27.3.25 to 17.4.25 ...	20.4.25.
<i>Conway H.M.S.</i>	Broadbent, H. W., R.D. Capt., R.N.R.	The Senior Cadets...	Cadets' M.L.	...	Cadets' Met. Log. 25.1.25 to 4.4.25	9.4.25.
<i>Pangbourne Nautical College.</i>	Tracy, A. F. G., Commr., R.N.	" ...	"	...	Cadets' Met. Log. 18.1.25 to 2.4.25	7.4.25.
<i>Worcester, H.M.S.</i>	Sayer M. B., O.B.E., R.D., Capt., R.N.R.	" ...	"	...	Cadets' Met. Log. 23.1.25 to 16.4.25	20.4.25.
<i>Abaco</i> ...	...	The Keepers ...	Lighthouse Register.	...	Lighthouse Register 7.7.24 to 14.1.25	9.3.25.
<i>Cay Lobos</i> ...	...	" ...	"	...	Lighthouse Register 1.7.24 to 31.12.24	9.3.25.
<i>Double Headed Shot</i> ...	...	" ...	"	...	Lighthouse Register 1.7.24 to 31.12.24	9.3.25.
<i>Inagua</i> ...	...	" ...	"	...	Lighthouse Register 11.7.24 to 18.1.25	10.2.25.
<i>Sombrero</i> ...	...	" ...	"	...	Lighthouse Register 1.7.24 to 31.12.24	9.3.25.
<i>Walling Island</i> ...	...	" ...	"	...	Lighthouse Register 1.7.24 to 30.12.24	4.3.25.
<i>Cape Pembroke (Falkland Is.)</i>	...	" ...	"	...	Lighthouse Register 1.7.24 to 31.12.24	...

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

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., Received up to 31.5.25.	Date Received.
<i>Denis</i> ...	Harris, F. C. P. ...	Mr. Heyburn ...	Booth ...	Water Samples ...	29.5.25.
<i>Hildebrand</i> ...	Maddrell, J. ...	R. S. Hulme Goodier ...	" ...	" " ...	7.5.25.
<i>Manzanares</i> ...	Henderson, J. N. ...	H. E. Lees ...	Elders & Fyffes ...	" " ...	27.5.25.
<i>Miami</i> ...	Makepeace, S. ...	H. H. Dunning ...	" " ...	" " ...	29.4.25.

August M.O., 1925.