

VOL. IV. No. 46.

THE MARINE OBSERVER.

OCTOBER, 1927.

## TABLE OF PRINCIPAL CONTENTS.

	PAGE.	
Cloud Photography	189	Lithographic Illustrations after Page 206.
The Marine Observer's Log (with illustrations)	190	Charts XLIX to LX—"Wireless and Weather"—:
Wireless and Weather an Aid to Navigation:—Chapter IX— The Thermometer as an Auxiliary to the Barometer (with illustrations)	192	XLIX—LI, Weather Charts mornings of <b>December 11th and 12th,</b> <b>1921</b> , and evening of <b>December 11th, 1921</b> , Western N. Atlantic.
Clouds and What They Signify (with illustrations)	197	LII—LVII, Weather Charts, mornings of <b>October 17th to 22nd,</b> <b>1923</b> , Eastern N. Atlantic.
Local Winds, Atlantic Ocean, IV, Atlantic Islands	199	LVIII—LX, Weather Charts, mornings of <b>January 19th to 21st,</b> <b>1926</b> , N.W. Pacific.
The Port Meteorological Office, Liverpool (with illustrations)	201	Charts of Fog and Mist, over the North Atlantic, 30°-60° N., com- piled from observations for the years 1921-1925, <b>October, November,</b> <b>and December.</b>
Weather Signals, Australia, New Zealand, S. Pacific Ocean Islands:—		Chart showing Mean Sea Surface Temperatures South Atlantic for month of <b>October</b> from observations of British Ships during the years 1855-1899 and 1855-1878.
II. Wireless Weather Bulletins and Storm Warnings	202	
III. Wireless Time Signals	204	
IV. Visual Storm Warnings	205	

## CLOUD PHOTOGRAPHY.

ANOTHER of Mr. G. A. CLARKE's interesting articles on clouds, "Clouds and What They Signify," appears in this number in which he gives a few hints to cloud photographers.

As may be seen by the pages of the Marine Observer's Log month by month more Marine Observers are taking and returning photographs of clouds, and many beautiful pictures have been provided by our Corps. We wish to give every encouragement to this useful branch of Marine Observation and to thank all those who have contributed cloud pictures.

When "The Marine Observer's Handbook" was last revised as the Fourth Edition, endeavour was made to represent all the principal cloud types in the Cloud Plate accompanying it, with photographs taken at sea, but only suitable photographs of six cloud types could be provided from those returned from the sea and it was necessary to include photos of the four remaining cloud types taken ashore.

It is desirable that cloud pictures used for the guidance of observers at sea should be pictures of clouds actually observed at sea and so a fresh appeal to the Corps of Voluntary Marine

Observers is made to provide pictures of all types of clouds which it is possible to photograph at sea.

We are fortunate in having the assistance of Mr. CLARKE, who has made a life study of cloud observation and cloud photography, in providing information about clouds for seamen in this Journal. His own efforts at cloud photography are mainly confined to those which occur over the British Isles.

Not only are photographs of clouds taken at sea most welcome for illustrating this Journal, and for completing "The Marine Observer's Handbook," but they may be of great assistance to Mr. CLARKE in this study to which he is devoted.

It will increase the value of cloud photographs if the following particulars accompany them. Time, position, barometer, wind, weather, air and sea temperatures, and remarks of changes which may have been taking place in the appearance of the sky. Therefore cloud photographs may be conveniently attached to the Meteorological Log or Report Form 911.

MARINE SUPERINTENDENT.

## THE MARINE OBSERVER'S LOG.

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

### CROSS CURRENTS in the Red Sea.

THE following is an extract from the Remark Book of H.M.S. *Cornflower*, Commander E. T. WICKHAM, O.B.E., R.N., Observer, Lieut. G. M. S. STITT, R.N., received through the Hydrographer of the Navy.

#### Period of strong N.W. winds—May to October, 1926.

"During this period strong westerly sets may frequently be experienced in the middle of the Red Sea. This is probably due to the wind causing a drift current in a S.E. direction which, when it reaches the east coast gives rise to a westerly current which is generally stronger by night than it is by day. Since the wind often decreases after sunset, it is supposed that the westerly set caused by the strong N.W. wind during the day depends on the strength at which the wind blew six or eight hours previously.

"A westerly set may always be expected in the vicinity of the reefs and outlying shoals off the west coast.

"Eddy currents, i.e. easterly sets, may occur off the east coast and a course should be steered at night to pass at least 15 miles from any reef.

"The cross currents decrease in strength the further south one steams, due possibly to the N.W. wind being weaker.

#### Period of S.E. winds October to March.

"Insufficient experience has been obtained to justify making any observations as to the currents during this period, but during a trip north, in November, when the southerly winds were blowing, no westerly set was experienced."

### PHOSPHORESCENCE. North Indian Ocean.

THE following is an extract from the Meteorological Log of S.S. *Somersetshire*, Captain W. L. FOSTER, Suez to Calcutta, Observer, Mr. P. H. POTTER, 2nd Officer.

"October 30th to 31st, 1926, midnight to 4 a.m. Ship's Time. Observed heavy black Cu-Nb to be moving slowly from northward ahead. 1.20 Cu-Nb passing over ship. Vivid lightning with low rumbling thunder. Few drops of rain fell. No wind. Heavy clouds and lightning left astern by 2.15. 2.50 to 3.05 observed patches of brilliant phosphorescence. Balls of brilliant light seemed to shoot up from a depth, burst on nearing the surface, irradiate and cover an area, seemingly of a couple of hundred square yards. A small patch of phosphorescent light was visible on each quarter in the vicinity of the screws, although the bow wave did not show any phosphorescence whatever. 3.0 shower and breeze from northward. 3.20 stars faintly visible overhead. Cu and Cu-Nb still working up slowly from northward with occasional flashes of lightning.

"Position of ship at midnight 30th October, 1926, Latitude  $7^{\circ} 30' N.$ , Longitude  $74^{\circ} 30' E.$ , Course  $S75^{\circ} E.$ , Speed  $10\frac{1}{2}$  knots."

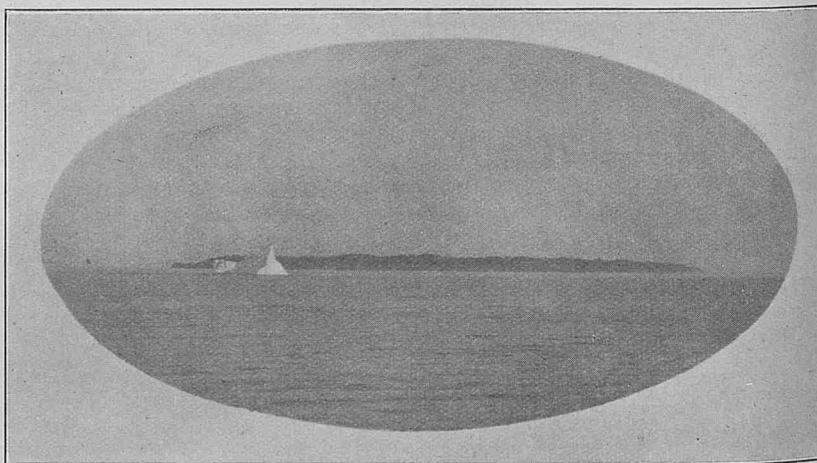
### PHOSPHORESCENCE AND ELECTRICAL STORM. South Atlantic.

THE following is an extract from the Meteorological Report of S.S. *Socrates*, Captain F. C. TAYLOR, Norfolk, Va., to Brazil, Observer, Mr. W. E. JORDAN, 2nd Officer.

"October 4th, 1926, bound to Rio Grande do Sul from Santos. The weather during the day was normal, wind S.E., force 4. Swell S.S.E. 3. Barometer steady around 1025.7 mb., mean temperature of air  $62^{\circ} F.$ , water  $58^{\circ} F.$ , sky cloudless and exceptionally clear. At 6.30 p.m., being abeam of Mostardos Lighthouse, in Latitude  $31^{\circ} 20' S.$ , Longitude  $50^{\circ} 45' W.$ , light wisps of Cirrus were observed in the zenith moving from W. by S. These, however, showed no signs

of increasing, but apparently disappeared with coming of dark. At the same time a heavy bank of Cu-Nb and Nb was seen to be banking up from W.S.W. accompanied by vivid fork and sheet lightning. By 8.00 p.m., the sky was completely overcast with heavy Cu-Nb, heavy drops of rain began to fall but ceased after a few minutes. The barometer remained steady at 1025.7 mbs., temperature of air  $59^{\circ}$ . Winds, variable, force 0-3. This prevailed until 10.00 p.m. when the sea became absolutely white with phosphorescence so that the vessel seemed to be moving in a sea of milk, at the same time a curious phenomenon was observed, the sky which was composed of very heavy Cu-Nb appeared to break up and turn absolutely white, looking like white Cumulus clouds in the sunlight and had the general appearance of a gigantic honeycomb extending over the whole vault of the heavens. No stars were visible. At 11.00 p.m., the phosphorescence subsided to isolated patches on breaking waves. Co-incident with its subsidence the sky again became pitch black, vivid lightning now played across the heavens from all directions, thunder being heard in the S.W. At midnight the conditions were the same, the barometer steady at 1026.1 mb., air  $50^{\circ}$ , wind N.E., force 0-3, swell S.S.E. 3. Between midnight and 1.00 a.m. a few drops of heavy rain fell and the barometer fell 3.4 mb., in the hour (1026.1 mb. to 1022.7 mb.). At 1.30 a.m. the sea again became milky white with phosphorescence, so as to render the shore lights invisible, and the same phenomenon was observed in the sky although not in such a marked degree as previously, rather the sky had a curious dappled white appearance and seemed to be composed of all sorts of erratic shapes, diamonds, circles, &c.; this lasted for fifteen minutes, the sea again losing its phosphorescent appearance, the sky becoming black at the same time. A small break now appeared to the westward through which stars were visible, this however disappeared in a few minutes, the heavy thunder clouds rolling up as black if not blacker than before. The lightning flashes became incessant, roll after roll of thunder pealing, but very little, if any, rain. During this period we arrived off the port and anchored at 2.00 a.m. The barometer now commenced to rise slowly, the storm appeared to die away to isolated flashes and peals. At 4.00 a.m. heavy rain set in, a steady downpour; the wind remaining at N.E., force 3, the barometer continued rising until 5.00 a.m. when it commenced to fall again. The wind now shifted to N.N.E., freshening, force 6-7. Heavy rain still falling. This type of weather prevailed until 7.30 a.m., the rain then ceased and the sky clearing slightly; there was however no change in the wind, the thunder clouds having also passed on. It is almost impossible to describe the awe-inspiring grandeur of that sky, it seemed to hint at the supernatural, this I know sounds ridiculous, but any others who witnessed it will, I am sure, agree with me. Other outstanding points are the absence of rain and wind until *after* the passing of the electric storm."

### ICEBERG OFF BELLE ISLE.



Photograph taken on board S.S. *Regina*, Captain R. G. SMITH, Liverpool to Montreal, by Mr. R. H. SHAW, 4th Officer, October 21st, 1926, Latitude  $51^{\circ} 47'$  N., Longitude  $55^{\circ} 23'$ , large berg bearing  $189^{\circ}$  6 miles, from Belle Isle, south Lighthouse.

### LARGE FLYING FISH.

Photograph received from Captain F. L. MOYH, S.S. *Nardana*, of a flying fish measuring 1 ft.  $8\frac{1}{4}$  ins., which flew on board on October 8th, 1926, off Albany, West Australia, in Latitude  $35^{\circ} 30'$  S., Longitude  $117^{\circ} 54'$  E. Sea temperature  $66^{\circ}$  F.



### METEOR.

#### East Indies.

The following is an extract from the Meteorological Log of H.M.S. *Herald*, Lieut.-Commander H. V. SILK, R.N., Sandakan to Labuan, Observer Lieutenant K. F. BOXALL, R.N.

"October 23rd. At 1820 observed a large meteor bearing W.S.W., altitude  $54^{\circ}$  travelling to N.N.W. After meteor had gone it left a track about  $5^{\circ}$  long looking like a straight streak of Cirrus cloud, slightly luminous. It remained straight for about 20 secs. and then

took a shape thus  and finally disappeared after a

minute looking thus ."

### AURORA.

#### North Atlantic.

The following is an extract from the Meteorological Log of S.S. *Hurumai*, Captain J. BURTON DAVIES, Antwerp to Philadelphia, Observer Mr. L. CANN, 3rd Officer.

"October 14th, 1926, at 2046 G.M.T. in position by Dead Reckoning Latitude  $49^{\circ} 45'$  N., Longitude  $26^{\circ} 05'$  W. The northern sky was heavily overcast except in patches at the horizon. These patches were of a bright white colour and had the appearance of icebergs but later proved to be aurora.

"At about 2246 G.M.T. of the same date, Dead Reckoning position Latitude  $49^{\circ} 42'$  N., Longitude  $26^{\circ} 33'$  W., the sky cleared from the Northward and was illuminated by the Aurora Borealis.

"Detached St-Cu was observed low down on the northern horizon. Bright rays of light radiated in the form of a segment of a circle from West through North to N.E. and at the Western and North Eastern extremities of the illumination patches of a dull red colour were observed, the remainder of the lighted area being of a very pale green colour. The altitude of the area was about  $20^{\circ}$  at the vertex and waves of light were continually being thrown off from this area and at times reached the Observer's zenith. About 0100 G.M.T. of the 15th the sky clouded over from N.E. with detached cumulus and the aurora was partially obscured leaving only a steady light visible through the breaks in the clouds. The compasses behaved normally throughout and no stars were visible in or near the illumination. When fresh streamers were formed they appeared to come from the centre and as a radius of the circle."

The following is an extract from the Meteorological Log of S.S. *Culebra*, Commander A. S. MACKAY, R.D., R.N.R., London to Bermuda, Observer Mr. H. V. TODD, 2nd Officer.

"October 15th, 1926. Latitude  $34^{\circ} 04'$  N., Longitude  $58^{\circ} 48'$  W. (D.R.), 3 a.m. A.T.S. During the whole of the middle watch a glow had been visible to the Northward, the principal part of which seemed to be bearing N.  $20^{\circ}$  W. (T.). This light was sufficient to cause a reflection on the water. At 3.00 (6.32 G.M.T. 15th October) auroral rays suddenly appeared and darted in fan-like forms to an altitude of about  $15^{\circ}$ , from a common centre, bearing about N.  $16^{\circ}$  W. (T.). At 3.08 (A.T.S.) the rays disappeared in a band of light turning yellow, crimson, red, brown and finally fading in a purple colour, bearing N.  $5^{\circ}$  E. (T.). The weather at this time was calm, sea calm and a thin line of cumulus round the horizon, to the northward, about  $2^{\circ}$  in altitude. Elsewhere, the sky was dark and no cloud forms at all. The moon set at 23.45 A.T.S. (3.17 G.M.T. October 15th) the previous night. At 3.30 A.T.S. (7.02 G.M.T. October 15th) all auroral light and glow disappeared abruptly. There were several rays of light between 3.08 and 3.30 (A.T.S.) but none to compare with the display at 3.00 a.m. No variation in the deviation of the compass was observed."

The following is an extract from the Meteorological Log of S.S. *Oriana*, Captain T. MANDER, Liverpool to West Coast South America, Observers, Messrs. R. ECKFORD and W. SALMON.

"15th October, 1926, at 8 p.m. (G.M.T. 2229) in Latitude  $37^{\circ} 20'$  N., Longitude  $38^{\circ} 40'$  W., wind W.N.W. force 6. Few small detached Cumulus clouds. What was taken to be an auroral display was first seen at 7.50 p.m. at which time it took the form of a moderate sized patch of a dull brick-red colour.

"Its dimensions were very approximately  $20^{\circ}$  vertically by  $25^{\circ}$  horizontally. In shape roughly parabolic (D-shape), the base being vertically disposed and towards the west.

"This westernmost extreme was very clearly defined, and was also the more luminous portion of the aurora, and might be considered to be the column from which the luminosity of the remaining portion emanated. The remaining portion was certainly less intense, and the other edges of the patch were very ill-defined and sinuous.

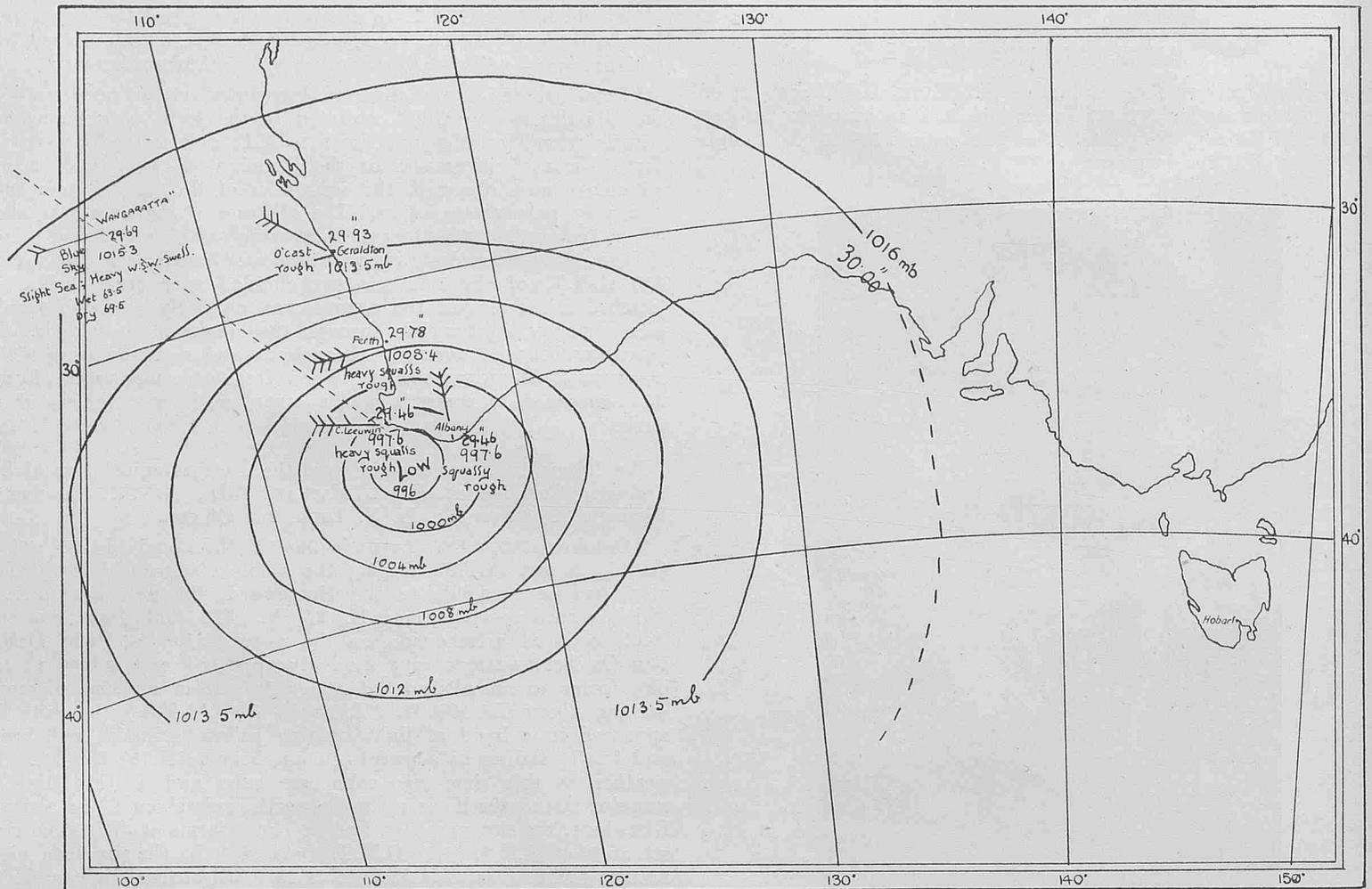
"At 7.55 p.m. the light had faded considerably and by 8.0 p.m. was barely perceptible. It soon, however, brightened up and at 8.05 p.m. it took the shape of an irregular ellipse of diffused light of the same reddish hue; the bright western column having meanwhile disappeared.

"Soon after this time it slowly waned until at 8.15 p.m., it was no longer visible, nor was it seen again.

"The moon at this time was bearing S.S.W., that is immediately opposite in azimuth to the phenomenon."

## WEATHER CHART MADE AT SEA.

Weather Chart (one of a series) made on board S.S. *Wangaratta*, Captain W. SCUTT, Colombo to Adelaide by Mr. S. R. MILLARD, second Officer. Friday, 22nd October, 1926, 0700 G.M.T., 3 p.m. West Australian time, 2.10 p.m. A.T.S.



"Forecast for *Wangaratta*: Wind will continue S.W. to Westerly, light to moderate; barometer will remain steady for some hours. Depression will most probably move eastward."

According to the Meteorological Log of S.S. *Wangaratta*, the wind remained S.Westerly during the evening of the 22nd and the barometer remained steady.

## WIRELESS AND WEATHER, AN AID TO NAVIGATION.

## CHAPTER IX.

## THE THERMOMETER AS AN AUXILIARY TO THE BAROMETER.

THE examples in previous chapters give conclusive proof of a definite law of relation of wind to pressure away from the land and disturbing causes.

The persistent alternation of sea and land breezes in the Tropics caused by the inrush of cooler air over the sea to take the place of the warmed rising air over the land during the day, and the out-rush of air cooled over the land at night to replace a warmer layer over the sea is sufficient to prove that there is a relationship of temperature to wind and indirectly to pressure, but no rule for temperature and wind or temperature and weather such as BUYS BALLOT'S law for wind and pressure has been found.

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

In the middle of the last century the German professor, H. W. DOVE, propounded a theory by which he accounted for the formation of cyclones as the result of the conflict of cold polar and warm equatorial winds meeting. DOVE dedicated the second edition of

his book "The Law of Storms considered in connection with the ordinary movements of the atmosphere" to Admiral FITZROY.

Of recent years Professor BJERKNES of Norway, has developed a theory which seems to revert to DOVE'S line of thought. Instead of dividing the cyclone with reference to the centre into four quadrants lying to left and right of the line of progression and in front and in rear of the trough according to ABERCROMBY as in FIGURE 3, Chapter II, BJERKNES divides it into two very unequal parts by two lines which meet at the centre. See FIGURE 39.

These two lines indicate the boundary between the warm and colder air of the cyclone and are dotted in the figure, thus dividing it into warm and cold sectors.

The dividing line from the centre, eastward and south-eastward or in advance, is called the warm "front," while that from the centre, south-westward or in rear, the cold "front."

The dark flow lines represent cold wind and the light flow lines warm winds.

Usually there is a marked rise of temperature at the warm front preceded by considerable rainfall, the area of which is shaded in

Typical Flow Lines of Air in a Cyclone of Northern Latitudes, after Bjerknes.

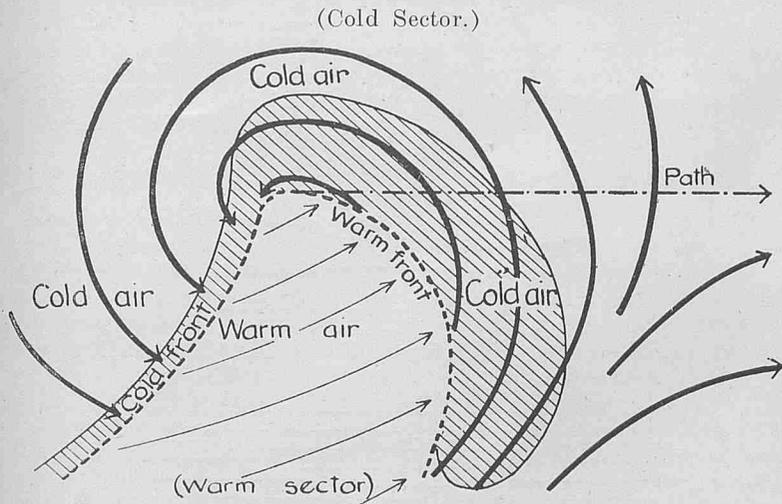


Figure 39.

the figure. At the cold front there is a sudden fall of temperature accompanied by a shower of rain; this corresponds with the "trough."

The rain in advance of the warm front is attributed to the ascent of warm moist air over cold air, and the rain in rear of the cold front to undercutting of the warm air by the cold winds from the rear.

Rainfall in regions outside the shaded areas in advance of the warm front and in rear of the cold front is attributed to local instability of air passing over warmer sea or land.

Working on this hypothesis the Norwegian Weather Service predicts local rainfall in all parts of its mountainous sea-girt country. What is of more interest to seamen is that it is contended that when the warm sector is of marked higher temperature than the cold sector, cyclones develop, while if the warm sector is cut off by cold air, surrounding it, the supply of warm air to the centre being cut off, the cyclones fill up.

The former case may frequently happen in the western North Atlantic when the wind from the southward circulating round the western side of the Atlantic anti-cyclone blows into a cyclone.

The latter case may occur when cyclones have crossed the Atlantic and the chilled air drawn from the Arctic circulates round them.

Since the first edition of these chapters was published Dr. BJERKNES has paid a long visit to the British Meteorological Office and the forecasters have had the benefit of his experience. Though the improvement in the forecasts given in the "Weather Shipping" Bulletin are undoubtedly due to the steady progress being made generally in forecasting in this country, which is in no small measure owing to reliable reports from the Atlantic, received ashore, there is no doubt that a closer study of the use of the thermometer as an auxiliary to the barometer and consideration of BJERKNES'S method have contributed to progress. Dr. BJERKNES tells us that the generalised plan of the cyclone depicted in FIGURE 39 represents a stage of its existence. In earlier stages the cyclone has the structure represented in FIGURES 40 and 41.

FIGURE 40 represents two winds from opposite directions separated by a nearly straight dividing line between the cold easterly wind and the warm westerly wind. The first step towards the formation and growth of the cyclone is shown in FIGURE 41. A bulge in the dividing line towards the colder wind occurs. At the polar ex-

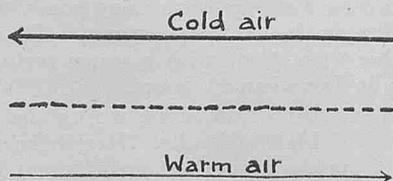


Figure 40.

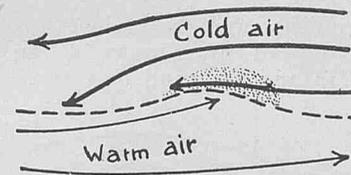


Figure 41.

tremity of this bulge of warm air is the centre of the growing cyclone and the cyclone draws eastward with the warm wind.

The bulge of warm air increases in length in a north and south direction as shown in FIGURE 42. The cold wind curves round the northern end of the warm bulge or tongue and arrives in rear of centre as a north-westerly wind. The next stage is as represented in FIGURE 43. The warm tongue has now narrowed, particularly on the southern outskirts of the depression. Cyclones of the structures shown in FIGURES 40 to 43 and 39 are deepening and when observations of temperature, barometer and wind plotted on a weather chart show this horizontal wind circulation and temperature distribution, generally an increase of wind in the cyclone may be predicted with fair certainty.

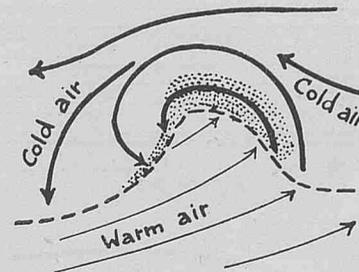


Figure 42.

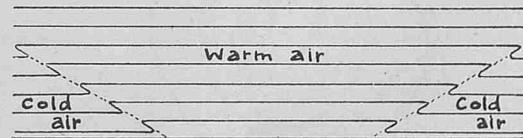


Figure 42a.

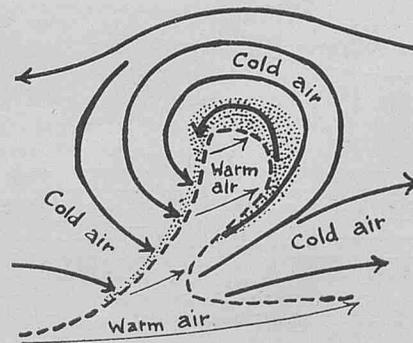


Figure 43.

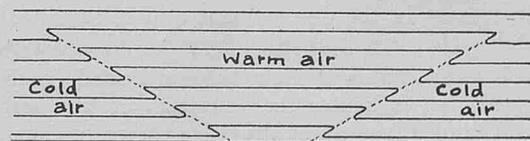


Figure 43a.

In the next stage shown in FIGURE 44 the cold air of the N.W. winds in the rear of the cyclone extends where the warm sector was at the surface in FIGURE 43 and cuts off the supply of warm air. The warm sector then soon disappears at the surface, FIGURE 45; where the warm sector disappeared a dividing line still can be traced if observations are taken with sufficient accuracy. Finally

this dividing line vanishes and the cyclone becomes a nearly symmetrical circulation of cold air, FIGURE 46. In this condition the depression is filling in and the wind dies away.

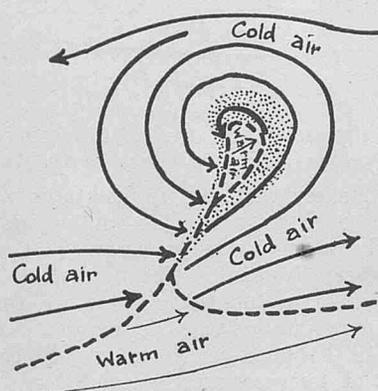


Figure 44.

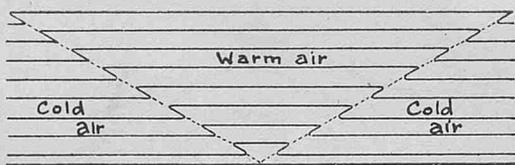


Figure 44a.

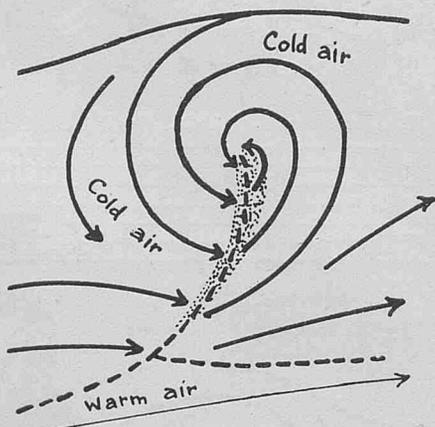


Figure 45.

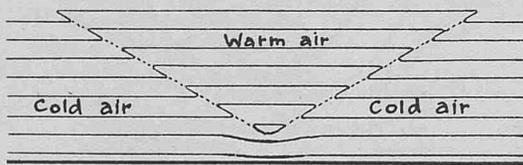


Figure 45a.

The different stages in the development and filling in of a cyclone is illustrated by Dr. BJERKNES also by vertical sections.

Looking at FIGURE 42a as if from the southward (in North Latitude) the dotted line indicates the boundary in the vertical plane between the cold and warm air at the stage shown by horizontal plan in FIGURE 42.

FIGURE 43a represents the vertical conditions of temperature corresponding with those given in FIGURE 43. FIGURE 44a shows the vertical temperature conditions when the cold N.W. wind has shut off the warm air entering the centre at the surface as in FIGURE 44.

FIGURES 45a and 46a show the warm air lifted clear of the surface after the warm sector at the surface has disappeared as in FIGURES 45 and 46 when the cyclone is dying.

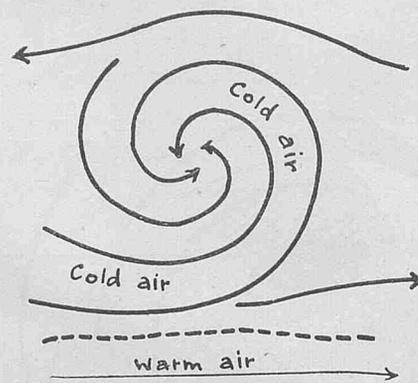


Figure 46.

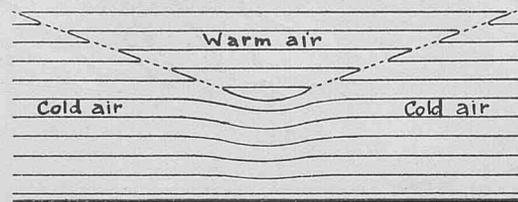


Figure 46a.

**An example which gives support to Bjerknes' contention.**

A severe storm which was encountered by R.M.S. *Olympic*, Commodore SIR BERTRAM HAYES, K.C.M.G., D.S.O., R.N.R., and other ships in December, 1921, affords an excellent example of a cyclone intensifying with a marked warm sector.

CHART XLIX, FOR MORNING OF DECEMBER 11TH, 1921, shows a depression centred just south of *Olympic's* position to the southward of Cape Sable and a wedge extending N.W. from the anti-cyclone to the S.E. The wind at Bermuda south of the depression is S.W. force 7, with air temperature 62°; this is the only report to indicate the warm sector; the ships in the depression are west, north and E.N.E. of the centre and all report much lower temperatures.

The depression travelled E.N.E. at 23 knots and *Olympic* steamed E. by N. 21 knots, so that the ship and depression were on slightly converging courses, the storm travelling rather faster than the ship. *Olympic* experienced a steady E.N.E. wind increasing in strength. At about 7.30 p.m. the storm's path had curved north-eastward and *Olympic* ran into the centre. CHART L shows the pressure distribution, wind, weather and temperatures existing in the cyclone at 8 p.m., on December 11th, 1921. *Olympic* had a moderate gale from S.E. with rain and air temperature of 61°. *Missouri*, *Winifredian*, *Orduna* and *Valacia* have northerly winds and air temperatures as much as 19° lower than *Olympic* in the warm sector.

The storm continued to travel N.E. by N. at about 15 knots, *Olympic* continuing on her course E. by N. at 17 knots, the wind remaining nearly steady in direction from E.S.E. but increasing in force with falling barometer.

At 4 a.m. (ship hove to) the wind was S. by E. force 10 and the trough passed.

In the morning watch with barometer rising the depression drawing away from the ship to the northward, the wind veered to N. by E. but increased in strength. At 6 a.m. the wind was S.S.W. force 11, very high sea, with frequent fierce rain squalls.

CHART LI, MORNING OF DECEMBER 12, 1921. *Olympic* and *Nile* have wind S.W. force 11, air temperature 52° and wind S.S.E. force 11, air temperature 53° respectively, indicating that the air in the warm sector has cooled some 8° since the previous evening. All other ships in the cyclone including *Vellavia* with wind south, temperature 40°, still report considerably lower temperatures. Thus a shallow depression on December 11th, 1921, with a warm sector developed into an intense cyclone in less than 24 hours.

CHART LI affords another example regarding the wind in moving cyclones of middle and high latitudes. It will be noted that ships nearly equidistant from the centre but on different bearings from it have widely different wind forces and that *Megantic*, nearest the centre and north of it, had only a fresh breeze from east.

Now the wind at any position or place over which a cyclone is passing is made up of two constituents, that due to the progressive movement of the system and that due to the spin within the whirl itself.

With an east moving cyclone at places south of the centre these two constituents are in the same direction and here the winds are strong, while north of the centre the constituents are in opposite directions resulting in less wind.

### Practical consideration of some effects of Temperature.

The atmosphere derives its heat directly or indirectly entirely from the sun. The temperature of the air depends more upon heating by conduction and radiation from the earth's surface heated by the sun's rays, than by the direct rays of the sun. That is the sun's rays pass through the air without imparting much heat to it, but the surface of the earth is heated by the sunshine and the air is warmed by contact with the earth by radiation and convection. Land absorbs heat and radiates it more quickly than water.

When the sun's rays fall upon water the heat produced instead of being arrested at the surface penetrates and by vertical and horizontal currents is diffused to a considerable depth over a large expanse.

The capacity of air to carry heat is small compared with water. Water absorbs heat, stores it, and conveys it whither it flows.

Over the ocean there is small diurnal variation of the temperature of the air but over the land this is considerable.

CHARTS showing the mean sea surface temperatures over the North Atlantic may be found in Vol. III of the "Marine Observer," in which the influence of currents particularly the Gulf Stream and Labrador current may be seen by the trend of the isotherms.

Variable currents and sunshine produce frequent variations from these normals so that large or even small areas of sea surface may have widely differing temperatures, which impart different degrees of heat to the air above them. These variations tend to produce unstable conditions which may contribute to the development of atmospheric disturbances.

Rain or any form of precipitation is generally attributed to cooling of ascending air which is often produced by converging or crossing winds of different temperatures, the warm wind of moist light air riding over the cold wind of heavy air; where this happens there are also frequently squalls.

Instability of the atmosphere, that is when a layer of light air under a layer or heavier air breaks through the layer above it causing a violent upward air current until stability is restored, produces heavy showers, thunderstorms, hail and squalls.

The processes involved are extremely complex and beyond the scope of these Chapters, but the following examples will illustrate that prediction of weather at sea may be improved if reports of air and sea temperature are used as an auxiliary to barometer pressure.

Barometer reports enable us to obtain the pressure distribution and its probable changes with which, and wind reports, we may be able to obtain the approximate flow lines of the air at the surface from day to day. Temperature reports will also assist us in tracing the air and ascertaining the changes it is undergoing.

### Weather Charts of Pressure, Wind and Air and Sea Temperature and predicting Wind and Weather.

For exercise let us suppose that the reports have been broadcast, intercepted and charted by all the ships shown on CHARTS LII to LVII each morning, and let us join the Commanders and Observing Officers of three of these ships in their Chart House in turn, i.e., *Miami*, Captain MAXWELL BROWN, Liverpool to Jamaica; *Empress of France*, Captain E. GRIFFITHS, Quebec to Cherbourg; and *Nascopie*, Captain T. F. SMELLIE, Newfoundland to Liverpool.

#### CHART LII. MORNING OF OCTOBER 17TH, 1923.

There is a depression to the north-westward of *Empress of France*, a small anti-cyclone centred east of *Miami* and a depression east of the Azores.

Barometer tendencies allowing for course and speed, reported by *Adriatic*, *Empress of France*, *Colonian* and *Zealand* indicate that the northern depression is travelling eastward or S.E. or spreading south or may be it is deepening, while those reported by *Horta* and *El Paraguayo* make it appear that the southern depression is nearly stationary and changing little.

*Miami* proceeding S. 59° W. 12 knots in the small anti-cyclone sees that *Empress of France* with a fresh breeze from S.W. has air 50° sea 51°, overcast and drizzle, while *Adriatic* to the S.S.W. of *Empress of France* has a gentle breeze from West, air 59°, sea 65°, overcast and that *Colonian*, E.N.E. from *Empress of France* with a strong S.W. by S. wind has sea and air 54°, overcast. The air at *Empress of France's* position is too cold to have come far from S.W., it has probably taken a curved cyclonic course from a region to the N.W. The sea surface is normal. According to the Chart of Mean Sea Temperature for October the air at *Adriatic's* position has possibly taken a curved anti-cyclonic course from a region to the southward of west where there is the cold water of the Labrador current. The sea surface is 4° above normal, probably due to the Gulf Stream or an off-shoot from it being further north than usual in October.

The air at *Colonian's* position being 4° warmer than *Empress of France* has probably travelled on a curved cyclonic course from a position southward of that ship. The sea is only about 1° above normal.

These three reports give indications from which we may conjecture winds composed of air with different regions of departure of widely differing temperatures. With the northern depression travelling S.E. or spreading south and the southern depression stationary it is very difficult to predict what the pressure distribution is likely to become, though it will probably result in a large depression over the eastern North Atlantic in the next 24 hours and *Miami* may expect variable, then southerly winds as she proceeds on her course and that there will be unsettled weather with showers of rain.

According to her Meteorological Report (Form 911) *Miami* had the wind east force 4 at midnight with air 57°, sky overcast, misty, rain showers, later wind S.S.W. force 3 with passing showers.

#### CHART LIII. MORNING OF OCTOBER 18TH, 1923.

Since yesterday when we discussed the weather and attempted prediction on board *Miami* the northern depression has travelled eastward and spread to the southward coalescing with the Azores depression, resulting in a large V-shaped, but not very deep, depression extending with its trough nearly along the 20th meridian of West Longitude to the southward of the latitude of Horta.

Generally the barometer tendencies reported indicate that the depression is deepening and moving eastward. The barometer tendency reported by *Verbania* on a S. 87° W. course at 7 knots steaming away from the trough and towards a "High" to the westward indicates the possibility of a "secondary" forming in her vicinity.

*Empress of France* sees that her wind N.W. force 5 (air 49°, sea 54° sky overcast) has come from a cold region and that the air will move onward with cyclonic curvature, she notes that eastward of the trough *Miami* and *Majestic* have southerly winds with much higher temperatures than her own and they have passing showers and rain respectively, while *Colonian* also east of the trough but much further to the northward has a moderate gale from S.S.E. with air 3° higher than her own and sea the same, sky overcast.

Near the trough the cold, comparatively dry, heavy air of the N.W. wind curving more from the westward, will be undercutting the warm comparatively moist light air of the southerly wind which will probably ride over the cold air coming from the N.W. causing rain and possibly squalls. *Empress of France* will expect that if the trough travels east at a greater speed than her own she may have north-westerly winds and clear cold weather, but if she overhauls the trough she may expect the wind to back considerably and that there will be rain. If a secondary is forming in *Verbania's* vicinity this prediction may be compromised. As *Empress of France's* barometer is rising slowly the depression is probably moving east at greater speed than her own.

According to her log the wind remained N.W. until midnight; after 8 a.m. on October 18th the barometer fell indicating that she had probably begun to overhaul the trough, or that the depression was deepening.

There were occasional rain squalls of short duration in the afternoon watch. From midnight the barometer rose slowly. At 2 a.m. on October 19th, 1923, the wind commenced to back and was logged as west, force 6 at 4 a.m. when there were passing showers. It is interesting to note that *Miami*, some 300 miles to the southward of *Empress of France's* track, experienced a heavy squall with rain at

11.40 a.m. when the wind shifted to N.N.W. this was on the line of the trough.

CHART LIV. MORNING OF OCTOBER 19TH, 1923.

This chart shows us that the trough of the depression travelled some 550 miles eastward in the 24 hours and that it drew further ahead of *Empress of France* and now stretches on a curved line from Cape Wrath to Brest.

Secondary depressions have developed to the N.W. of Corunna and near Latitude  $48^{\circ}$  N. Longitude  $30^{\circ}$  W. Barometer tendencies at stations in the British Isles indicate that the depression will probably continue to travel eastward. While the barometer tendencies of ships between the meridians of  $25^{\circ}$  and  $35^{\circ}$  W. indicate that there may be a not very unsimilar repetition of the pressure distribution which formed over the eastern north Atlantic between a.m. October 17th and a.m. October 18th, 1923.

Discussing the situation in *Nascopie's* chart house we see that it is not easy to forecast. However we bank on the expectation that the secondary to the southward will coalesce with the main depression. If this happens there will be a considerable strip of cold north-westerly winds in rear of the trough and ahead of *Nascopie*.

We therefore expect a fresh breeze to a gale from N.W. for the next 24 hours with cloudy weather and possibly passing showers. According to *Nascopie's* log the wind continued from W.N.W. with slowly falling barometer until 8 p.m., the sea and air temperature only falling  $1^{\circ}$  since 8 a.m.

At 8 p.m. the wind veered to N.N.W. and at midnight it was from N. by W. the barometer continuing to fall slowly up to that hour. The sky was cloudy or overcast throughout. During the first and middle watches the ship passed through a strip or tongue of cold water, the sea surface temperature being  $50^{\circ}$  at 8 p.m.,  $43^{\circ}$  at midnight and  $48^{\circ}$  at 4 a.m., during this time the air temperature fell another degree and squalls and rain were experienced. The passage of the cold N. by W. wind over warmer water, then over colder water and finally over warmer water, cannot be attributed to causing these squalls and rain; they were more likely due to processes connected with the coalescing of pressure systems.

*Nascopie* has been in the Arctic and they have much of interest to tell, let us stay on board a few days, for we may hear much that is not in the log, or available for the "Marine Observer" to publish, and the sequence of weather discussed on 4 days in one ship, will be more helpful.

CHART LV. MORNING OF OCTOBER 20TH, 1923.

There is now the extension of a depression with its trough along the meridian of  $17^{\circ}$  W. Longitude, which appears to be centred at some distance north of the limit of our chart and judged by the wind and barometer reported at Wick the centre has moved to the northward or north-west instead of to the eastward as we expected, showing the difficulty of prediction of movement or change in weather systems when observations are not available to the northward of the centre as well as to east, south and west. Here is where the Iceland observations now given in the "Weather Shipping" Bulletin come in.

In view of the conditions reported by *Baltic* near the trough, this extension cannot be regarded as a true V for her observations indicate that there is not a sharp dividing line between the north-westerly and south-westerly winds.

Generally considered, the barometer tendencies indicate that the depression is moving eastward with deepening of the gradients in parts of the system.

*Nascopie* on her course for Inishtrahull will expect a continuance of north-westerly winds with cloudy weather and squalls with passing showers of rain or hail; the wind may be expected to increase to gale force at times.

According to the log the wind remained from N.N.W. a strong breeze until 8 p.m. and there were frequent heavy squalls with rain; at 8 p.m. it backed to N.W. and increased to force 8; at midnight it was W.N.W. force 8 after which it moderated.

CHART LVI. MORNING OF OCTOBER 21ST, 1923.

This chart shows *Nascopie* that north-westerly winds and good visibility may be expected for another day, after which the possibility of the depression to the westward of *Vardulia* approaching

will have to be considered in predicting the weather at the time of her landfall.

According to the log the wind was N.W. by W. force 7 and 6 throughout the 24 hours for which we predicted, there were squalls and sky clouded with Cumulus and Cumulo-Nimbus.

CHART LVII. MORNING OF OCTOBER 22ND, 1923.

*Nascopie* now sees that the trough of the depression ahead has moved very little, but that the centre has moved eastward so that the trough now lies over the west coast of Scotland and the Irish sea. The barometer tendencies at coast stations indicate that this depression is nearly stationary.

The depression to the westward has travelled east, not less than 200 miles in the last 24 hours, probably more; the barometer tendencies of ships under its influence reported, indicate that it is probably deepening. *Nascopie's* own slowly falling barometer appears to be due to her approach to the trough of the depression on her port bow, but it may also be due to a general reduction of pressure spreading from the "Low," astern.

To predict visibility and weather in this case for the time of landfall next morning is not easy.

We anticipate that the wind will back as the depression astern comes up and probably coalesces with the depression ahead. With a S.W. or southerly wind some rain and reduced visibility may be expected. The reports are not sufficient to enable us to trace convergence of winds; indeed under such conditions even with a number of reports this would be an extremely difficult matter.

According to the log the wind backed to west at 8 p.m. and S.W. at 11.15 p.m. moderating to force 4. At 4 a.m. October 23rd, 1923, the wind was still S.W. force 4; there was rain with visibility reduced to less than 5 miles.

At 8 a.m. the wind had backed to S.E. by S. and the visibility improved; course was altered at 8.55 a.m. and Inishtrahull was abeam, distant 1.4 miles, at 9.30 a.m.

These examples are sufficient to show that until fairly extensive observations have been made in the upper air by ships at sea, we have to conjecture much of what may be happening aloft.

As Commander L. G. GARBETT, R.N., Superintendent of Naval Meteorological Services, has shown in his articles in the MARINE OBSERVER the officers of the Royal Navy are making air soundings in certain of His Majesty's ships in different parts of the oceans.

### North Pacific.

The Kurosiwo (Japan Stream) a warm current which has been often called the Gulf Stream of the Pacific and the Oyasiwo a cold but weaker stream than the Labrador current flowing down the east coasts of Kamchatka the Kuril Islands and Japan together with the continent of Asia produce changes of temperature and conditions in the atmosphere not unlike those found in the western North Atlantic where we have shown that cyclones frequently have a marked warm sector and develop. These same cyclones travelling across the N. Atlantic Ocean become a more symmetrical circulation of cold air and die out. This will probably be found to be the case in the North Pacific also.

With the strides which are now being made in British ships for the advancement of Wireless and Weather as an Aid to Navigation in the Pacific Ocean this chapter would not be complete without an example.

On the morning of January 19th, 1926, R.M.S. *Empress of Asia*, Captain L. D. DOUGLAS, from Kobe, approaching Yokohama, was in Latitude  $34^{\circ} 34'$  N., Longitude  $139^{\circ} 4'$  E., at observation time.

A selection of coast station observations from the Weather Message issued by the Tokio Observatory and reports from regular observing ships would provide the necessary data for drawing CHART No. LVIII which indicates a depression centred west of Minatsuki in the Japan Sea, an anti-cyclone S.E. of Bonin Island in the Pacific and a large depression to the N.E.

*Empress of Asia* in the S.E. sector of the Japan Sea depression has a fresh S.W. breeze with air temperature  $60^{\circ}$  the same as that of the sea surface; the only other observation of temperature available that is likely to give an indication of the nature and distribution of warm and cold winds in the region of Japan is that reported by *Belgenland* to the eastward of Shanghai where there is a moderate N.N.W. breeze, air temperature  $49^{\circ}$  over a sea surface  $10^{\circ}$  warmer. These observations coincide with a cyclone having

a warm-sector and we may expect the depression to deepen with more wind in the system as it moves eastward. The Japan reports do not give us the barometer tendency so that the path of the depression is difficult to predict by means of barometer observations, but according to the BJERKNES method cyclones travel on a path parallel to the isobars in the warm sector, hence this depression may be expected to travel N.E.

*Empress of Asia* arrived at Yokohama at 11.20 a.m. on January 19th, 1926, and sailed again for Vancouver, B.C., at 11.45 p.m. At 4 a.m. on January 20th she logged wind N.E. force 4, when the air temperature had fallen to 44° the barometer falling rapidly. CHART LIX indicates the weather conditions in the Western North Pacific at observation time on the morning of January 20th, 1926. The N.E. depression is now passing away to the eastward of the 180th meridian as indicated by *Benalder's* report; the depression which was yesterday centred over the Japan Sea has travelled N.E., centred S.E. of Shana in the Kuril Islands and has deepened considerably. *Empress of Asia* in rear of a secondary extending S.W. from the main depression has a strong N. by E. breeze. Unfortunately no observation is now available in the S.E. sector of this system so that we have no specific information of a marked

warm sector. The pecked line indicates where we should expect the trough to be and probably before this the southerly and S.W. winds coming off the Kurosiwo and from lower latitudes are warm. With such conditions we should expect the depression to continue to deepen and *Empress of Asia* may expect a Northerly gale which will back as the trough draws to the Eastward.

At noon *Empress of Asia* had a fresh gale from N. by W. the air temperature continuing to fall, later the wind backed to the West and in the second dog watch there was a great display of "St. Elmo's Lights" with snow squalls during the night.

CHART LX indicates the weather situation on the morning of January 21st, 1926, *Empress of Asia* now has a W.N.W. gale in the rear of the depression which has deepened considerably; as she proceeded on her course the wind increased to a whole gale with very hard snow squalls accompanied by a very high sea. Snow is probably the most difficult form of precipitation to predict but of all forms of precipitation there is none of which foreknowledge is more desirable to seamen, for not only does snow seriously reduce visibility but a snow covered coast usually means obliterated land marks.

(To be continued.)

## CLOUDS AND WHAT THEY SIGNIFY.

BY G. A. CLARKE OF ABERDEEN OBSERVATORY.

The ever-changing appearance of the sky is probably the most easily recognisable of all the factors which constitute our weather, and for that very reason it has always been regarded as capable of giving some indication of what the coming weather is likely to be.

Thus when we see a thin grey film of cloud spread over the sky, with the sun shining dimly through it, we expect that it will rain before long, and when we see massive heaps of towering clouds increasing in quantity we look for a thunderstorm or at least for thunder showers. Both of these expectations are quite justifiable and have been founded upon past experience. The differing forms of the clouds are due to the changes that take place in the atmosphere and the cloud formations therefore render these changes visible to us.

All sailors are familiar with the clouds called "Mares' tails," the delicate curved wisps of white clouds whose shape has given rise to their popular name. These clouds, (1) called **Cirrus**, are mostly brilliantly white in colour, though they may be golden or pink at sunset; they are sometimes arranged in long straight threads or lines instead of in curved wisps. Frequently they are the first clouds to appear in the blue sky after a period of fine weather, and when this occurs they generally appear to spread out fan-wise from one point on the horizon. In reality they are disposed in almost parallel lines, the apparent divergence is of course merely the ordinary effect of perspective.

But it is important to watch the point whence the clouds appear to come; gradually they will be seen to increase in quantity in that quarter of the heavens till finally the greater part of the sky becomes overspread with a white sheet of closely packed wisps and threads in which halos and mock suns are often seen. When this development has taken place the cloud is termed **Cirro-Stratus**, (2), but is of the same nature as the original "Mares' tail" Cirrus.

Coincident with these changes in the appearance of the sky, it will probably be found that the barometer, which had begun to fall at the first appearance of the Cirrus, is now falling more rapidly, and the rate of fall will increase still further as the white sheet of Cirro-Stratus thickens and develops into the darker blue-grey or yellow-grey sheet of **Alto-Stratus**, (3) which is simply a continuation at a lower level of the previous Cirro-Stratus.

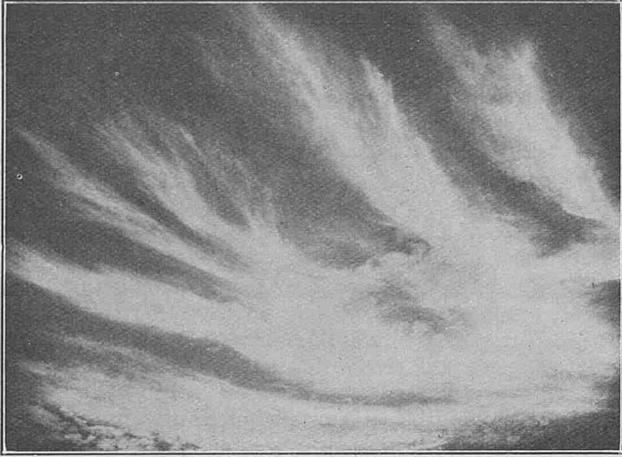
The Cloud sequence just described is the one commonly found in the forefront of an ordinary depression in our latitudes, and by the time the Alto-Stratus sheet has grown sufficiently dense for the sun to have become invisible, rain has usually begun to fall from the Alto-Stratus, and dark masses of "Scud" to form below it, which later increase and coalesce into a ragged formless sheet of cloud which is called **Nimbus**.

It will be gathered from this that the cloud associated with a depression is found in the form of a wedge, the Cirrus at the thin end of the wedge may be five miles or so above the earth's surface,

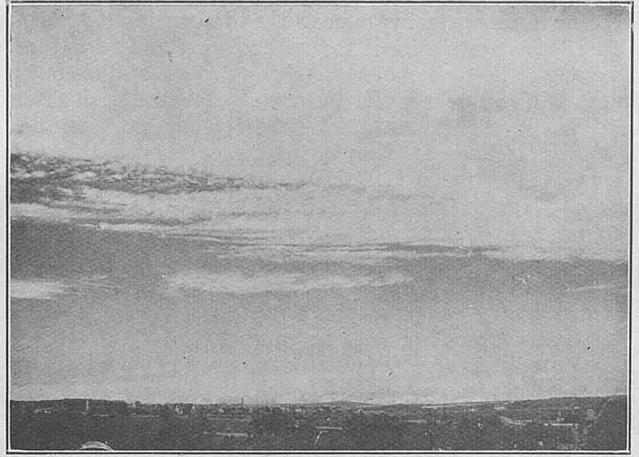
while near the centre of the depression, where the thick end of the wedge is found, the Nimbus may be not more than a couple of thousand feet above the surface. The slope of the wedge is, however, very slight, for though the thick end of it may be 4 or 5 miles deep, yet the length of the wedge may be 400 or 500 miles, so that the slope is only about 1 in 100.

Soon after the centre of the depression has passed the cloud begins to clear away and it may do so in either of two ways. Sometimes there comes a gradual dispersal of the gloom, the rain ceases, and the layer of Nimbus thins out and opens, the separated fragments assuming a rounded form resembling Cumulus or Strato-Cumulus, and finally the sky clears. At other times the passing of the depression is accompanied by a more or less violent squall, and the whole of the rain-cloud rolls away like a scroll, while over it there may be seen the sheet of upper cloud, either Cirro-Stratus or Alto-Stratus, terminating in a long sharp straight edge which stretches from horizon to horizon as in (4) which shows such a sheet of Alto-Stratus just beginning to change into Alto-Cumulus.

From the foregoing it will be gathered that the clouds described are found spreading over the sky in vast sheets of unbroken structure. But there are frequent occasions when widespread layers of cloud are seen which are broken up into ripples, waves or detached patches of flaked or globular form. Such sheets are found at almost any level between 1 and 4 miles, and are known as **Cirro-Cumulus**, **Alto-Cumulus** and **Strato-Cumulus** according to their altitude and average density, the first named being the highest and finest in structure, and the last named being the lowest and heaviest. They form very beautiful sky-scapes and are often referred to in popular terms as "Mackerel" and dappled skies. In (5) we have an example of waved **Alto-Cumulus**. Usually when these clouds are visible, weather is somewhat changeable though sometimes they may be seen during a fine spell. These clouds may be observed often to form out of one of the uniform cloud sheets, a preliminary rippling of this latter sheet being followed by the breaking up of the uniform sheet into a series of regular waves as in (4) which may in turn be intersected by another system of ripples or waves, crossing the former system at an angle more or less normal thereto. The result is that the separated cloudlets appear to be grouped in lines or ranks of great regularity. These groupings are known as "Single undulation" and "Double undulation" respectively. If the cloud sheet is observed to be opening up in this manner, then the weather is likely improve, but when the cloudlets or waves begin to fuse together and become heavier, it indicates an increase of condensation and the possibility of rain before long, at least in the case of the Cirro-Cumulus and Alto-Cumulus sheets. The lower **Strato-Cumulus**, on the other hand, is often found widespread in quiet settled weather in winter time in our latitude, but such layers are much less regular in their structure than are the higher layers, the individual cloudlets being more "Lumpy" and indefinite in



(1) **Cirrus**, bands before a depression.



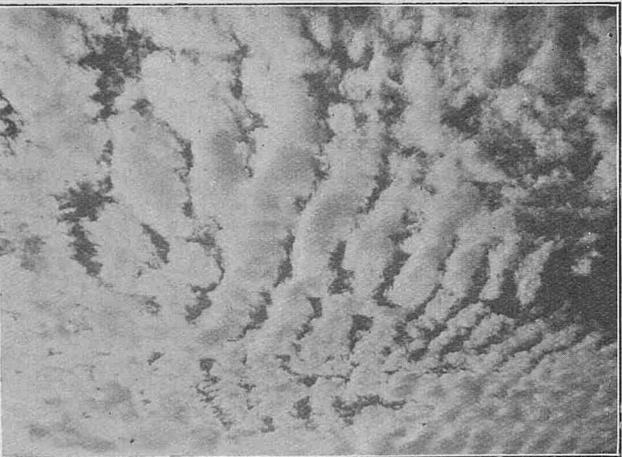
(2) **Cirro-Stratus**—coalesced from threads of Cirrus.



(3) **Alto-Stratus**—in dark sheet with sun shining dimly through it—some darker masses below which eventually become Nimbus.



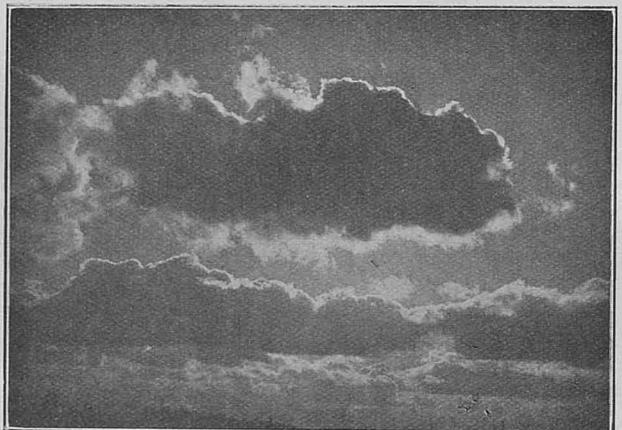
(4) **Sharp Edge of Upper Cloud** (Alto-Stratus opening into Alto-Cumulus) in the rear of a depression.



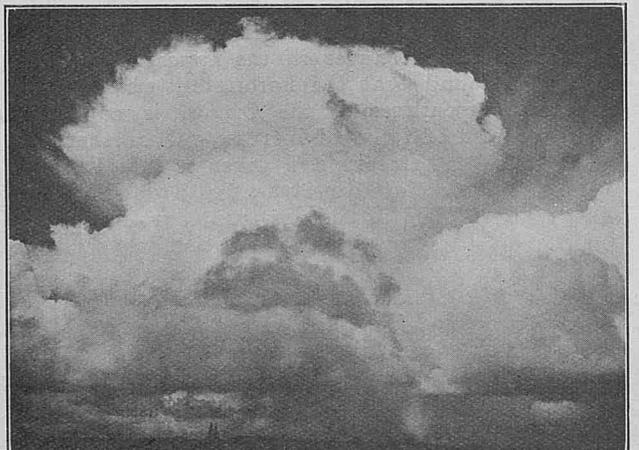
(5) **Alto-Cumulus**—in waves.



(6) **Strato-Cumulus**—in sheet, rather closely packed.



(7) **Cumulus**—showing flat base, and domed top—seen against the light and appearing dark with bright edges.



(8) **Cumulo-Nimbus**—heavy mass of cloud in thunderstorm, "anvil" top developing.

shape, while cleanly-cut waved arrangements are rather the exception than the rule (6).

In marked contrast with these extensive sheets of cloud are those forms where the individual clouds are greatly developed in the vertical direction, so that each cloud becomes a "heap" of very considerable dimensions. Two varieties are recognised in the International Classification, the **Cumulus** and the **Cumulo-nimbus**. Though essentially the same in their origin, these varieties differ in one or two particulars. In the case of the ordinary Cumulus the vertical depth is much less than in the case of the Cumulo-Nimbus, the former type usually has a depth of one or two thousand feet, but the latter may tower upwards to heights of four or five miles, and may also extend over a proportionately greater area.

Both Cumulus and Cumulo-Nimbus are in ordinary circumstances, clouds of the daytime; they begin to form during the morning hours and rapidly increase in number and in size till they reach a maximum in the early afternoon, after which they diminish, and usually disperse in the early evening, though the Cumulo-Nimbus in particular cases may sometimes persist throughout the night. While these clouds remain of the simple **Cumulus** type, (7) they are clouds associated with fine weather, a few slight showers may fall from them if they attain any considerable size, but nothing more. The **Cumulo-Nimbus** on the other hand are certain sooner or later to produce heavy showers of rain or hail and often give rise to thunderstorms. Their appearance is suggestive of ranges of mighty mountains or of fantastic towering domes, which may in the event of showers or thunderstorms spread outwards into anvil-shaped summits, (8), a form which is sufficiently characteristic to distinguish these clouds from all others.

Both Cumulus and Cumulo-Nimbus owe their origin to the condensation of moisture which is carried upwards, by rapidly rising vertical air currents, from the warmer surface layers of the air into the much cooler regions above. If these currents are gentle or do not rise far, the resultant cloud is Cumulus, but if the currents are very vigorous and the temperature decreases rather rapidly in the upper air layers, then the condensation is carried to greater heights, and the clouds assume massive proportions and become Cumulo-Nimbus. At the great heights reached by the summits of the Cumulo-Nimbus, the air is far below the freezing point, so that the condensed moisture often becomes frozen, hence the reason why hail showers fall during thunderstorms even in the hottest weather.

In most cases the Cumulus and Cumulo-Nimbus appear as bright white solid-looking clouds with level dark bases, as may be seen in (8), but when seen against the sun they appear dark and opaque, with very brilliant edges as in (7), though the level base is still apparent.

In addition to the clouds that have been described, the International Classification recognises two other types which are not very successful as photographs, but which are readily recognisable to the observer. One is the **Nimbus**, the ragged sheet of dark grey or blue grey cloud seen during heavy rain. The raggedness is due to the drifting masses of cloud called "Flying Scud" by seamen; but these are not the real source of the heavy rain, the latter really falls from the complex mass of dense Alto-Stratus and Cirro-Stratus which exists above the "Nimbus."

The other form is called **Stratus** and is also usually a grey sheet of cloud, generally unbroken, and of a very uniform appearance. It occurs usually in quiet fine weather, and is often due to sea fog which has risen and left the air below it fairly clear. Occasionally this Stratus may degrade into a drizzle, but at other times it breaks

up or thins out into patches which then appear white and sometimes simulate small Cumulus and Strato-Cumulus, but from which clouds it can be distinguished by its thinness and its obviously small altitude.

Many cloud forms are to be seen in different parts of the world which cannot readily be assigned to any particular one of the types described in the International Classification. Such forms are very often due to local effects of topography as, for instance, the "Tablecloth" often seen hanging over the top of Table Mountain at Cape Town. Curious "Stream-line" shaped clouds apparently stationary despite the wind, are found occasionally some distance away on the lee side of mountains like Etna in Sicily and Pico in the Azores, and the frequency and fixity of the appearance of such clouds has earned for them popular names locally. Mention might also be made of the strange "Whale-back" clouds of the Polar lands.

It is of such clouds as these, and of other formations that are seen in sudden weather changes that photographs are always very interesting and desirable. Observers at sea who have a camera and the necessary interest may have many splendid opportunities of obtaining pictures of great value in such cases as the oncoming of a sudden squall with a long rolling bank of heavy Cumulus or Cumulo-Nimbus, or of the bank of Cumulo-Nimbus in a thunderstorm, or of the cloud funnel of a "Waterspout." Cloud sheets showing a strongly marked "Mackerel" effect are also likely to provide good pictures.

Of late a considerable number of very good photographs have appeared in THE MARINE OBSERVER and are very interesting as showing how universal some cloud forms are. For example, the picture of Strato-Cumulus on p. 133 of the August, 1926, Number of this publication, taken on board S.S. *Euripides*, is of exactly the same type as that shown in the Meteorological Office pamphlet "Cloud Forms," which gives the Definitions and Descriptions approved by the International Meteorological Committee in 1910.

But one of the most interesting pictures was that taken by Mr. R. L. BISHOP on board S.S. *Glenamoy*, Captain J. ANGIER, on the voyage from Singapore to Hong Kong on August 27th, 1925, which appears on the same page as the preceding one. It showed a dark bank of Cumulo-Nimbus with some Cirrus and Cirro-Cumulus above it, the two types moving from different directions, and observed after a change from bad to fine weather.

One of the points the photographer will have to contend with is the difficulty of making the white clouds stand out from the blue of the sky. This is because the ordinary plate or film is almost as sensitive to pale blue as it is to white. But if care is taken to seize a moment when the white cloud is *brilliantly* lit, and the sun temporarily obscured by another cloud, a good result should be obtained by an ordinary rapid "Snap" with the lens fairly well stopped down. Those observers who are fortunate enough to possess a yellow filter should always use it on the lens, and will profit by the fact that the yellow filter absorbs a large proportion of the blue light, and thereby makes the sky rather darker in the finished print. By the use of this filter it will be quite possible to take pictures of the more delicate upper clouds like Alto-Cumulus and Cirro-Cumulus and also, in favourable circumstances, of some of the Cirrus. A somewhat longer exposure will, of course, be necessary, according to the particular filter used—they usually range from one and a half to five times the unscreened exposure—or alternatively the lens aperture may be opened to compensate and the exposure remain unaltered. It is really a matter of the photographer's convenience.

## LOCAL WINDS, ATLANTIC OCEAN.

### IV.—Atlantic Islands.

THE winds on the coasts of the different groups of islands in the Atlantic Ocean are often variable and uncertain, especially where the land is high and irregular. In general, within the Tropics, land and sea breezes prevail, but the direction of these breezes is modified by the configuration of the coast and other local circumstances; while in some cases where the land is very high, the prevailing wind of the region may be intercepted, and replaced on the lee side of the islands by calms, eddy winds, or breezes in an opposite direction.

**West Indies.**—These, the most important groups of islands in the Atlantic Ocean, lie wholly within the limits of the North-East trade. During the rainy season, June to November, its prevailing direction is generally from the southward of East, and it is frequently interrupted by calms; while in the dry season, November to March, the trade is usually steady at North-East. April and May are transition months.

In the Lesser Antilles the wind is usually moderate in force, but reaches a mean force of 6 in March. It is strongest towards

mid-day, moderating towards evening; while during the night, except at the smaller islands, it gives way to light land breezes, which do not however extend far seaward. At the smaller islands there are no land breezes, although the trade wind usually lulls during the night.

On the south and west coasts of the Greater Antilles, and also at places on their northern coasts where the trade wind does not blow home, land and sea breezes prevail with great regularity, these having their own local characteristics. The sea breeze sets in about 10 a.m., blowing either directly on shore, or at an angle to it, according to the trend of the coast line, and continues until about sunset, when it is succeeded by a calm interval of a few hours. The calm is followed by light airs off shore, which attain their greatest strength about dawn, after which they die away to a dead calm, which in its turn is replaced by the sea breeze again setting in. In July and August the sea breezes generally blow hard and in frequent squalls.

On the south coasts of Porto Rico and Haiti, land and sea breezes prevail close inshore, and are fresh and regular in the winter and spring months. Further seaward a calm or trade wind from an Easterly direction is experienced. On the west coast of Haiti the trade wind inshore takes the form of a very strong land breeze in the morning, and in the afternoon Westerly sea breezes prevail in the Bay. Further out, 10 to 20 miles from land, these give way to calms or moderate trades.

Cuba is sufficiently large for local influences to affect the trade wind. On the north coast, from November to January, the trade wind blows from northward of east, and there are occasional "Northerers" from the Gulf of Mexico. During the summer months the trade wind is light, irregular, and frequently interrupted by calms or rain squalls. At other times a moderate trade blows from the E.S.E., freshening during the day until about 2 p.m. and then backing more to the North.

Squalls of more or less severity are common throughout the West Indies, especially during the summer months. They are generally of the arched form, and are nearly always accompanied by thunder and lightning, being most frequent near the land. "White squalls," occur but rarely, giving little or no warning of their approach, except the disturbance of the sea caused by the wind, which gives rise to their name. They are generally caused by the wind rushing down from the mountains.

The most severe squalls of the West Indies are those experienced off the south coast of Cuba, known as "Bayamos," so called from being most frequently felt off the Bight of Bayamo. They are accompanied by vivid sheet and forked lightning, and torrential rain; and although of short duration, they frequently recur at very short intervals. A sign of their approach is the banking of heavy dense clouds over the mountains.

Normal conditions over the greater part of the West Indies are liable to interruption owing to the occurrence of the tropical hurricanes which bear their name. These hurricanes occur principally from July to October, when the trade wind is weakest and frequently interrupted by calms; general information concerning them has been given in the July, 1927, number of this Journal.

**Bahamas.**—The Bahama Islands are all within the influence of the trade wind, and are also within the limits of the West India hurricane region. Owing to their low elevation, regular land winds are not experienced. In the summer however a light breeze frequently comes from the Florida shore in the night, reaching the western side of the Little Bahama bank, but does not extend further.

During the winter months, the trade wind is sometimes interrupted, owing to the passage of depressions further northward; the wind veering to the South and S.W. with cloudy weather, and later to N.W. and North, when the weather clears. The fall and rise of the barometer is much less marked than in higher latitudes.

**Bermuda.**—The Bermuda Islands lie near the southern limit of the variable winds; they are on the track of West India hurricanes, and in winter especially, are also under the influence of cyclonic depressions passing eastward from the American coast.

During the summer months, April to September, the prevailing winds are from S.E. to S.W. usually light in force, but very moist; and there is little fluctuation in the barometer.

In November cyclonic systems begin to influence the weather, and gradually increase in frequency and strength as the winter season progresses, sometimes following each other in rapid succession. The usual sequence of wind, barometer, and weather changes associated

with the passage of depressions is experienced, while light winds and very fine weather usually intervene between the passage of the systems. During this season, northerly winds sometimes blow with considerable force, without change of direction, for two or three days together, the air being then cold and dry.

**Azores.**—This group of islands is situated in or near the North Atlantic permanent high pressure system, and is noted for the prevalence of strong winds throughout the year.

In summer the prevailing winds are from N.E. and East, but these are not steady unless they commence to blow well from the eastward and rise gradually. From October to April, the winds blow strongly from S.W., West, and N.W., frequently coming in heavy squalls. Winds from S.W. generally bring rain. The greatest number of gales occurs during the winter season, and being mainly of a cyclonic character, may be expected from any point of the compass.

Near Flores and Corvo, the weather is always very changeable, and even in summer fresh N.W. and S.W. winds are often experienced. When the summit of Pico Peak is enveloped in clouds, stormy weather and rain generally follow.

**Madeira.**—During the summer months, April to September, Madeira lies within the limits of the N.E. trade, but during the remainder of the year, the trades do not extend so far north.

In January and February very boisterous South and S.W. winds are sometimes experienced, but more generally N.Easterly winds prevail. In February there are sometimes sudden shifts of wind to East and E.S.E., frequently followed by gales of short duration, accompanied by thunder and heavy rain. It often happens that while rain is falling on the north side of the island, which is high and steep, it is fine and clear on the south side.

In March, N.W. winds prevail, and occasionally blow very hard and occasion a heavy surf at Funchal. About the middle of April, the N.E. trade usually sets in, and from then until September, there is generally fine weather, with regular land and sea breezes near the shore, and steady N.E. winds in the offing. Gales or gusty weather are very rarely experienced during this period.

From July to September a hot dry wind from E.N.E. to E.S.E., known as "L'Este," is sometimes experienced. This wind, which appears to be of the same nature as the Harmattan of the African coast, sometimes reaches force 6 in strength; it is accompanied by a cloudless sky, and a decided haze, and may last from one to six or seven days.

October is the month of periodic rains, which frequently commence with strong S.E. winds, veering to S.W. and N.W., when the weather clears.

In November and December fine weather is experienced, the prevailing wind being from N.E.; but gales are to be expected at this time, commencing a few points on either side of South, gradually veering to westward, and terminating at N.W.

**Canary Islands.**—The Canaries are situated near the northern limit of the N.E. trade, and the prevailing winds are from N.E. to North; but from November to January the trade wind is sometimes interrupted by violent but short gales from S.E., generally bringing rain and thick fog, and foretold by a swell two or three hours in advance. During the same period gales from between S.W. and N.W. are also experienced.

In the principal bays there are regular land and sea breezes, but the land breeze never extends far from the shore. It commences about 10 p.m. and dies away about 9 or 10 a.m., after which there is a calm interval until the sea breeze sets in. In the middle of the channels between the islands, the prevailing North or N.E. wind continues both night and day.

Owing to the height of the mountains, the N.Easterly winds are obstructed, and in this way a belt of calms is formed to leeward of each island, varying in extent generally from 15 to 30 miles, according to the height of the respective islands. When the N.E. trade is very fresh, it frequently occurs that to leeward of and near to the islands, a wind from an opposite direction is experienced, which is locally known as the "Embata."

**Cape Verde Islands.**—This group lies within the region of the N.E. trade, and here its direction from November to March is from between N.E. and North or N.N.W. The Harmattan is also felt here during this period.

From April to June the direction of the trade is from N.E. to East, weakening in force as it veers eastward. From July to

October the trade wind is varied by winds from between S.E. and S.W., with squalls, calms, fogs and rain.

Land and sea breezes are experienced near the coast, and calms extend for some distance to leeward of the islands as at the Canaries. From December to February, the islands are frequently enveloped in a dense haze, due to fine dust blown across from the Sahara desert.

**Falkland Islands.**—The Falkland Islands are within the zone of the westerly winds of the Southern Ocean and, in the words of the late Admiral R. FITZROY, "A region more exposed to storms, both in summer and winter, it would be difficult to mention. The winds are variable—seldom at rest while the sun is above the horizon, and very violent at times; during the summer a calm day is an extraordinary event. Generally speaking, the nights are less windy than the days; but neither by night nor by day, nor at any season of the year, are these Islands exempt from sudden and very severe squalls, or from the gales which blow heavily, though they do not usually last many hours."

The prevalent direction of the wind is westerly; during the southern winter, the winds are chiefly N.W., while in summer they are more frequently S.W. Gales in general commence in the N.W. and back, sometimes very suddenly, to S.W. from which point they blow strongest.

Winds from the East are rarely lasting, or strong, and generally bring fine weather.

They may be expected most frequently in December or January, but short intervals of fine weather, with light breezes from E.S.E. to E.N.E. occur occasionally throughout the year.

**Ascension.**—This island is situated in the heart of the S.E. trade wind, which blows constantly throughout the year, generally with the force of a moderate breeze. It is lightest in force from December to March. Its predominating direction is from S.E. to S. over 90 per cent. of all observed winds being from between these points.

Owing to its position the climate is remarkably uniform, and there is only a difference of 3° F. in the mean monthly air temperature throughout the year.

The island is subject to heavy periodic swells or rollers which break on the lee side of the island, and arrive without any apparent warning. Their origin has been the subject of much discussion, but the general conclusion appears to be that they are caused by distant gales of wind, either in the North or South Atlantic, blowing in the direction of the island.

**St. Helena.**—As at Ascension, the S.E. trade wind blows here unceasingly throughout the year, with little variation in its force. Here again, 90 per cent. of all observed winds are from between S.E. and South.

The island is also subject to similar rollers as those of Ascension.

## THE PORT METEOROLOGICAL OFFICE, LIVERPOOL.

PREPARED BY M. CRESSWELL, PORT METEOROLOGICAL OFFICER.

WITH post-war organisation a branch of the Marine Division of the Meteorological Office was established at the Port of Liverpool in April, 1921. Commander G. ff. H. LLOYD, R.D., R.N.R., was appointed and took over from Commander F. M. C. SERGEANT, R.D., R.N.R., Senior Examiner of Masters and Mates, and Secretary of the Local Marine Board, who had acted as Marine Agent to the Meteorological Office since 1909, and whose good work in interesting Masters and Officers of Liverpool ships in Marine Meteorology was much appreciated by the Meteorological Committee, who expressed their special thanks when his Agency was terminated.

After ably and successfully representing the Office for over three years Commander LLOYD resigned to take up the appointment of Assistant Marine Superintendent of the COAST LINES LTD., the writer

was appointed, and took over upon completion of a course in the Marine Division of the Meteorological Office.

The Office is accommodated on the lower ground floor of the MERSEY DOCKS and HARBOUR BOARD Building, at the Pier Head, which being centrally situated is readily accessible from any part of the Liverpool or Birkenhead Docks. A good supply of all instruments and other requirements for issue and replacement is always kept in stock, and besides copies of Office publications there are a number of interesting works upon Marine Meteorology, by such authors as TOYNBEE, CAMPBELL HEPWORTH, &c., also copies of Meteorological Charts for most seas. The British, International, and Northern Hemisphere Daily Weather Charts received since 1921 are also available, and access by Marine Observers to any of the above for reference is obtainable at any time.

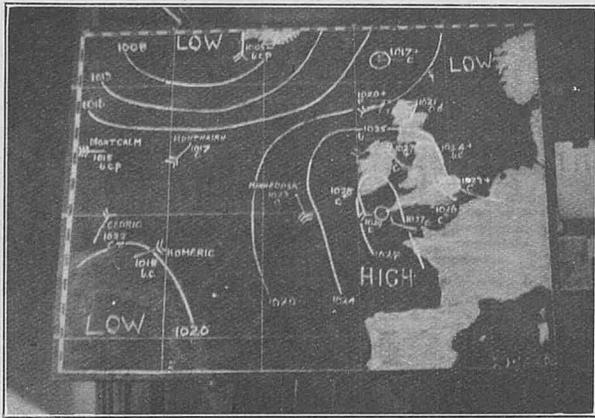
### The Pier Head, Liverpool.

To the right of the picture are the Offices of the MERSEY DOCKS and HARBOUR BOARD, a beautiful Renaissance building with a dome 230 feet high. The Port Meteorological Office is accommodated on the lower ground floor, facing the River.



Standard mercurial barometers are kept by means of which the barometers of ships are compared, and the error, if any, obtained. An endeavour is made to visit, and meet the Commanders and Officers of all regular observing ships arriving at the Port.

Marine Meteorology being a branch of Seamanship which has greatly increased in importance with the interchange of Weather information by Wireless Telegraphy, the drawing of simple Weather Charts at sea for the purpose of forecasting is becoming a steadily



Large blackboard used for instruction in the drawing of Simple Weather Charts, based on the "Weather Shipping" Bulletin and Ship's reports.

increasing practice, and instruction in this subject is always available to Marine Observers, either at the Office or on board their ships. At the Office a large blackboard, with a chart of the Eastern North Atlantic outlined upon it, is used to demonstrate the making of Weather Charts at sea.

The Port Meteorological Office also arranges for the collection of Sea Water samples for the Ministry of Agriculture and Fisheries, and other authorities. These samples are obtained regularly upon several routes, by ships observing for the Meteorological Office.

Since the Liverpool Office was opened Weather information for the use of Seamen and the Shipping interests has been disseminated. At first the "Western Seaboard" forecast only was received each morning by land wire, but since the introduction of the "Weather Shipping" Bulletin it has been possible to obtain this message by local enterprise, through the courtesy of the CUNARD LINE, whose ship in dock intercepts this bulletin by W/T, thus providing full, concise and timely Weather information to the Port, of forecasts for all the Sea Districts around the British Isles, together with actual conditions at Coast Stations.

## WEATHER SIGNALS.

### II.—WIRELESS WEATHER BULLETINS.

#### AUSTRALIA.

##### Spark and C.W. Issues.

WEATHER reports and forecasts issued by the Commonwealth Meteorological Bureau are broadcast *en clair* by Australian W/T stations as follows, special reports and warnings being broadcast immediately on receipt by the W/T Stations serving the area affected, when dangerous weather prevails or is expected.

##### Perth W/T Station.

Approximate, Latitude  $32^{\circ} 02'$  S. Longitude  $115^{\circ} 50'$  E.

Call sign, **VIP**. Wavelength 600 metres (spark).

At 0415 and 1300 G.M.T., Mondays to Saturdays, inclusive, weather forecasts.

Each forecast is for the ensuing 24 hours, except on Saturdays when it is for 48 hours.

At 0415 and 1300 G.M.T., on Sundays, supplementary forecasts for the next 24 hours.

In addition to the above, 0100 and 0700 observations of barometric pressure, wind direction and force, weather, and state of the sea at Fremantle and Cape Leeuwin on week-days and 0100 and 1000 observations of the same elements on Sundays, are broadcast. Other coastal reports and reports from shipping are included when necessary.

At 0030 G.M.T., on 2,400 metres (I.C.W.), weather forecast of the previous evening broadcast for the information of distant shipping. The 0100 observations of barometric pressure wind and weather from Kupang (Timor) are included when available.

##### Geraldton W/T Station.

Approximate, Latitude  $28^{\circ} 47'$  S. Longitude  $114^{\circ} 36'$  E.

Call sign, **VIN**. Wavelength 600 metres (spark).

At 0200 and 1200 G.M.T., Mondays to Fridays, inclusive, weather forecasts for the ensuing 24 hours.

At 0200 G.M.T. on Saturdays, weather forecast for the next 48 hours.

In addition to the above, observations of barometric pressure, wind direction and force, weather and state of the sea, at Fremantle and Cape Leeuwin are broadcast; 0000 and 0600 observations Mondays to Fridays; 0000 observations on Saturdays; 0000 and 0900 observations on Sundays. When available the 0000 observations of barometric pressure, wind and weather, at Kupang (Timor) are broadcast.

##### Broome W/T Station

Approximate, Latitude  $18^{\circ} 00'$  S. Longitude  $122^{\circ} 12'$  E.

Call sign, **VIO**. Wavelength 600 metres (spark).

At 0200 and 1300 G.M.T., Mondays to Fridays, inclusive, and on Saturdays at 0200 G.M.T., weather forecasts.

From 16th April to 16th December no separate forecast is broadcast for Sundays; the forecast issued on Saturdays is therefore for the next 48 hours.

The 0000 observations, referred to previously, of Kupang (Timor) are broadcast when available.

##### Wyndham W/T Station.

Approximate, Latitude  $15^{\circ} 27'$  S. Longitude  $128^{\circ} 07'$  E.

Call sign, **VIW**. Wavelength 600 metres (spark).

At 0130 and 1130 G.M.T., Mondays to Fridays, inclusive, weather forecasts for the following 24 hours.

At 0130 G.M.T. on Saturdays, weather forecast for the following 48 hours.

The 0000 observations, referred to previously, of Kupang (Timor) are broadcast when available.

##### Darwin W/T Station.

Approximate, Latitude  $12^{\circ} 27'$  S. Longitude  $130^{\circ} 48'$  E.

Call sign, **VID**. Wavelength 600 metres (spark).

At 1100 G.M.T., Weather forecast for the N.W. coast of Western Australia, Gulf of Carpentaria and E. coast of Queensland. From 16th December to 16th April the 2300 weather report for the coast of Queensland, and a forecast for the ensuing 24 hours, are issued by Brisbane Weather Bureau on Sunday mornings. During the remainder of the year Sunday forecasts are suspended. The forecast broadcast on Saturdays is therefore for the following 48 hours.

##### Thursday Island W/T Station.

Approximate, Latitude  $10^{\circ} 35'$  S. Longitude  $142^{\circ} 13'$  E.

Call sign, **VII**. Wavelength 600 metres (spark). Ships may obtain the 0500 weather report for the coast of Queensland and a forecast for the ensuing 24 hours upon application to the above W/T Station.

##### Cooktown W/T Station.

Approximate, Latitude  $15^{\circ} 28'$  S. Longitude  $145^{\circ} 15'$  E.

Call sign, **VIC**. Wavelength 600 metres (spark).

Ships may obtain weather information similar to above (Thursday I.) upon application to Cooktown W/T Station.

##### Townsville W/T Station

Approximate, Latitude  $19^{\circ} 15'$  S. Longitude  $146^{\circ} 50'$  E.

Call sign, **VIT**. Wavelength 2,400 metres (C.W.).

At 1100 G.M.T. The 0500 weather report for the coast of Queensland and a forecast for the following 24 hours, daily, except Sundays.

At 1100 on Sundays, from 16th December to 16th April, only, the 2300 weather report for the coast of Queensland, and a 24 hours' forecast issued by the Brisbane Weather Bureau. If an atmospheric disturbance is mentioned the broadcast is made immediately upon receipt of the information from the Weather Bureau. The forecasts on Saturdays from 16th April to 16th December are for the ensuing 48 hours.

**Willis Islets W/T Station.**

Approximate, Latitude 16° 18' S. Longitude 149° 59' E.

Call sign, **CGI**. Wavelength 600 metres (spark).

At 0645, 1045 and 2330 G.M.T. During the period from about mid-November to 30th April. Observations *en clair* of barometric pressure, wind direction and force, cloud, weather, state of sea, and characteristic and direction of ocean swell taken at the preceding even hour, except the 1045 G.M.T. broadcast, which contains 0800 observations. During stormy weather, however, the 1000 observations are substituted in the latter case.

**Rockhampton W/T Station.**

Approximate, Latitude 23° 25' S. Longitude 150° 31' E.

Call sign, **VIR**. Wavelength 600 metres (spark).

Ships may obtain the 0500 weather report for the coast of Queensland and a forecast for the ensuing 24 hours, upon application to the above W/T Station.

**Brisbane W/T Station.**

Approximate, Latitude 27° 26' S. Longitude 153° 07' E.

Call sign, **VIB**. Wavelength 600 metres (I.C.W.).

Between 0200 and 0230 G.M.T., daily, the 2300 coastal weather report and a 6 hours' forecast. Ships can also obtain this information on request.

At about 1200 G.M.T. daily (except Sundays), or earlier if requested, the 0500 coastal weather report and a forecast for the ensuing 24 hours. On Saturday the forecast is for 48 hours.

**Sydney W/T Station.**

Approximate, Latitude 33° 46' S. Longitude 151° 03' E.

Call sign, **VIS**. Wavelengths as given below.

Information broadcast daily, except Sundays.

At 2300 G.M.T., on 600 metres (spark). Weather report of coastal conditions.

Between 2300 and 0030 G.M.T., on 600 metres (spark). Weather forecast for 24 hours if the Weather Bureau is in receipt of sufficient information.

Between 0200 and 0300 G.M.T., on 2,400 (I.C.W.) both weather report and forecast if not available for issue until after 0030 G.M.T.

At 1030 G.M.T. on day of receipt, and repeated at 2230 G.M.T., on wavelengths of 2,400 metres (I.C.W.) and 600 metres (spark), respectively, a summary of the coastal weather reports and a 24 hours' forecast. Ships may also obtain this information on application to Sydney W/T Station after 0630 daily, except on Saturdays and Sundays. On Sundays at 1030 G.M.T., and repeated at 2230 G.M.T., a 24-hour forecast and coastal weather reports.

**Melbourne W/T Station.**

Approximate, Latitude 37° 47' S. Longitude 144° 52' E.

Call sign, **VIM**. Wavelength 600 metres (I.C.W.).

Information broadcast daily, except Sundays.

At 0200 G.M.T. (1) The 2300 observations of barometric pressure, wind direction and force, weather, state of the sea at Cape Borda, Cape Northumberland, Wilson's Promontory, Bruni Island and Jervis Bay. Reports from other coastal stations or from ships are on occasion broadcast in lieu of reports from one or more of the usual stations, or may be supplied in addition thereto.

(2) Brief information regarding any disturbance affecting or likely to affect, weather in the Great Australian Bight, south-eastern Australian waters, or the Tasman Sea.

(3) A forecast for the ensuing 24 hours.

At 2300 G.M.T. daily, a weather forecast for the ensuing 24 hours. In special circumstances this forecast is sometimes accompanied by reports from selected coastal stations.

**Flinders Island W/T Station.**

Approximate, Latitude 40° 01' S. Longitude 147° 54' E.

Call sign, **VIL**. Wavelength 600 metres (spark).

Soon after 2300 G.M.T.; the 2300 observations of barometric pressure, wind direction and force, weather, state of the sea in the Commonwealth word code.

**Hobart (Tasmania) W/T Station.**

Approximate, Latitude 42° 52' S. Longitude 147° 19' E.

Call sign, **VIH**. Wavelength 600 metres (spark).

Ships may obtain a summary of 2300 coastal weather reports on application to the W/T Station, after about 0030 G.M.T., daily (Sundays excepted). A 24 hours' forecast may also be obtained on application after about 0330 G.M.T. The forecast issued on Saturdays is for the ensuing 48 hours.

**Adelaide W/T Station.**

Approximate, Latitude 34° 52' S. Longitude 138° 31' E.

Call sign, **VIA**. Wavelength 600 metres (I.C.W.).

At 1130 and 1330 G.M.T. Information regarding the weather conditions prevailing at 0530, followed by a 24 hours' weather forecast.

On Saturdays a 48 hours' weather forecast *only* is broadcast. Ships may obtain a summary of the 2330 coastal weather reports and a 24 hours' forecast on application to the W/T Station after 0200, daily, except Sundays.

**Esperance W/T Station.**

Approximate, Latitude 33° 53' S. Longitude 121° 54' E.

Call sign, **VIE**. Wavelength 600 metres (spark).

At 0300 and 1300 G.M.T., Mondays to Fridays, inclusive; Saturdays at 0300 only; weather forecasts.

In addition, observations of barometric pressure, wind direction and force, weather, state of the sea at Fremantle and Cape Leeuwin. These observations are taken at 0100 and 0700 Mondays to Fridays; at 0100 on Saturdays; and at 0100 and 1000 on Sundays.

**British New Guinea.****Port Moresby W/T Station.**

Approximate, Latitude 9° 28' S. Longitude 147° 09' E.

Call sign, **VIG**. Wavelength 600 metres (spark).

Soon after 2300 G.M.T., daily. The 2300 observations of barometric pressure, temperature (dry and wet bulb, maximum and minimum) amount of rainfall, wind direction and force, state of the sea, broadcast in the Australian Commonwealth word code. Ships may obtain the 0500 weather report for the coast of Queensland and a 24 hours' forecast on application to the W/T Station.

**Samarai W/T Station.**

Approximate, Latitude 10° 37' S. Longitude 150° 40' E.

Call sign, **VIJ**. Wavelength 600 metres (spark).

Soon after 2300 G.M.T., the 2300 observations of barometric pressure, wind direction and force, and weather, broadcast in the Australian Commonwealth word code.

**New Britain—Rabaul (Bitapaka) W/T Station.**

Approximate, Latitude 4° 24' S. Longitude 152° 19' E.

Call sign, **VJZ**. Wavelength 2,400 metres (C.W.).

At 0600 G.M.T., daily. The 2300 weather report for the coast of Queensland and a 24 hours' forecast. Ships may also obtain this information on application to the W/T Station. From 16th April to 16th December, no forecast is broadcast on Sundays; the forecast issued on Saturdays is therefore for 48 hours.

**SOUTH PACIFIC OCEAN ISLANDS.****FIJI ISLANDS.****During the Hurricane Season (November 1st to April 30th).**

**Suva W/T Station**, approximate Latitude 18° 09' S., Longitude 178° 28' E., call sign **VPD**, broadcasts a weather bulletin at 0200 and 0930 G.M.T., containing observations taken at 2100 and 0300 G.M.T., respectively, at the following stations, on a wavelength of 600 metres (spark).

	Latitude (approx.)	Longitude (approx.)
Apia; Samoa (Observation time 2030 G.M.T.) ... ..	13° 51' S.	171° 48' W.
Nukualofa (Tonga Islands) ... ..	21° 08' S.	175° 12' W.
Fila (New Hebrides) ... ..	16° 00' S.	168° 00' E.
Norfolk Island ... ..	28° 58' S.	168° 03' E.
Suva (Fiji Islands) ... ..	18° 09' S.	178° 28' E.

The bulletin is sent *en clair* and consists of:—

- Name of the observation station.
- Barometer reading (corrected) in inches and hundredths.
- Dry and wet bulb thermometer readings (in whole degrees F.).
- Direction and force of the wind (Beaufort Scale).
- State of sky (scale 0-10).

Example:—Apia 2990 78 76 SE5 10.  
Nukualofa, &c., &c.

The 0200 G.M.T. bulletin is not broadcast on Saturdays, Sundays or holidays.

A similar bulletin is sent from **Apia (Samoa) W/T station**, approximate position, Latitude 13° 51' S., Longitude 171° 48' W., call sign **VMG** at 0830 and 2330 G.M.T., on a wavelength of 2000 metres spark.

During the period May 1st to October 31st, Suva W/T Station broadcasts one bulletin only, at 0930 G.M.T.

NOTE.—Ships within W/T range of Suva W/T Station are invited to transmit weather reports to **VPD** containing observations made at 0300 and 2100 G.M.T.

“Selected ships” may well address their reports to **VPD** and **CQ** when within range of Suva, for sample message *see* page 17, Volume IV, No. 37, of this Journal.

**WIRELESS STORM WARNINGS.**

**AUSTRALIA.**

Storm warnings are broadcast by the Australian W/T Stations as follows:—

For approximate positions of the Stations and wavelengths used, *see* pp. 202, 203.

<p>Geraldton ... <b>VIN</b> Broome ... <b>VIO</b> Wyndham ... <b>VIW</b></p>	}	<p>Special warnings of the approach of cyclonic storms of tropical origin, including information regarding barometric pressure at stations on the N.W. coast of W. Australia, immediately upon receipt from the Weather Bureau.</p>
<p>Darwin ... <b>VID</b></p>	}	<p>Special warnings of the approach of cyclonic storms of tropical origin immediately upon receipt from the Weather Bureau. In the case of cyclonic storms affecting the tropical seaboard of W. Australia the warnings include information of barometric pressure at stations on the N.W. coast of W. Australia.</p>
<p>Thursday Island <b>VII</b> Cooktown ... <b>VIC</b> Rockhampton ... <b>VIR</b> Brisbane ... <b>VIB</b></p>	}	<p>Special storm warnings, immediately upon receipt from the Weather Bureau, and thereafter during the regular W/T watches kept by coastal vessels until receipt of later information from Brisbane Weather Bureau. Ships may obtain special warnings, between watches, if the information is available, upon application to these W/T stations.</p>
<p>Townsville ... <b>VIT</b></p>	}	<p>Storm warnings immediately upon receipt from the Weather Bureau.</p>
<p>Willis Islets ... <b>CGI</b></p>	}	<p>Cyclone warnings during the months of November to April inclusive.</p>
<p>Sydney ... <b>VIS</b></p>	}	<p>Special storm warnings, immediately on receipt. They are repeated at intervals until receipt of later information from the Weather Bureau.</p>
<p>Hobart (Tasmania) <b>VIH</b></p>	}	<p>Special storm warnings, immediately on receipt from the Weather Bureau and at hourly intervals thereafter until 1000.</p>
<p>Adelaide ... <b>VIA</b> Esperance ... <b>VIE</b></p>	}	<p>Special storm warnings immediately on receipt from the Weather Bureau.</p>

Storm warnings are also broadcast by the W/T Stations at Perth (**VIP**) and Melbourne (**VIM**).

**British New Guinea.**

<p>Port Moresby ... <b>VIG</b> Rabaul-Bitapaka (New Britain) <b>VJZ</b></p>	}	<p>Special storm warnings for the Queensland coast immediately on receipt from the Weather Bureau when occasion warrants.</p>
---	---	---

Samarai ... **VIJ**

Special storm warnings immediately on receipt from the Weather Bureau and thereafter during the regular W/T watches kept by coastal vessels, until receipt of later information from Brisbane Weather Bureau. Ships may obtain special warnings between watches, if the information is available, upon application to the W/T station.

**SOUTH PACIFIC OCEAN ISLANDS.**

**SAMOA.**

**Apia W/T Station**, call sign, **VMG**, broadcasts when necessary, information concerning hurricanes in addition to the weather bulletins at 0830 and 2330 G.M.T., on a wavelength of 2,000 metres (spark). The message is sent *en clair* and commences with the general call to all stations, e.g. :—

**QST.** “Hurricane centre 200 miles N.W. of Suva at noon, 27th February, Apia time and date, travelling south.”

**FIJI ISLANDS.**

**Suva W/T Station**, call sign, **VPD**, broadcasts warnings, when necessary, during the hurricane season (from November 1st to April 30th) at 0200 and 0930 G.M.T., immediately after the weather bulletins, and at other times.

The 0200 warning is omitted from May 1st to October 31st.

Each warning commences with the call sign for “All Ships” (**CQ**).

**FRENCH OCEANIA.**

**Papeete (Tahiti)**, approximate Latitude 17° 29' S., Longitude 149° 29' W., call sign, **HUX**, broadcasts information concerning hurricanes &c. at 0500 and 2200 G.M.T. and at other times when necessary. The danger signal **TTT**, repeated at short intervals ten times on full power, is first sent out followed by the message which is repeated three times with intervals of ten minutes.

**III. WIRELESS TIME SIGNALS.**

**AUSTRALIA (Spark Issues).**

Station.	Call Sign.	Wave-length (metres).	G.M.T.	System.
<b>Perth</b> Lat. 32° 01' 51" S. Long. 115° 49' 31" E.	<b>VIP</b>	600 spk.	0257-0300 1457-1500	<p>(See Time Signal Figure, p. 122, Vol. IV, No. 42). Controlled by Perth Observatory.</p>
<b>Adelaide</b> Lat. 34° 51' 14" S. Long. 138° 31' 55" E.	<b>VIA</b>	600 spk.	0227-0230 1427-1430	

**Melbourne W/T Station**, Latitude 37° 46' 56" S., Longitude 144° 52' 09" E., call sign, **VIM**, wavelength 600 metres (spark).

Wireless time signals are broadcast from Melbourne W/T Station in accordance with the New International System of W/T time signals at the following times:—

G.M.T.						
h.	m.	s.	h.	m.	s.	
1	57	00	to	2	00	00
13	57	00	„	14	00	00

The transmission of each series of signals is similar, the procedure being as follows:—

G.M.T.				Signals.		
h.	m.	s.	h.	m.	s.	
13	57	00	13	57	50	— • • • — • • • — • • • — etc.
57	55	"	58	00		{ 55 56 57 58 59 60 • • • • • • Time Signal.
58	08	"	58	10		— •
58	18	"	58	20		— • •
58	28	"	58	30		— • • •
58	38	"	58	40		— • • • •
58	48	"	58	50		— • • • • •
58	55	"	59	00		{ 55 56 57 58 59 60 • • • • • • Time Signal.
59	06	"	59	10		— •
59	16	"	59	20		— • •
59	26	"	59	30		— • • •
59	36	"	59	40		— • • • •
59	46	"	59	50		— • • • • •
13	59	55	14	00	00	{ 55 56 57 58 59 60 • • • • • • Time Signal.

NEW ZEALAND.

The Dominion Observatory, Wellington, Latitude 41° 17' 04" S., Longitude 174° 46' 04" E., call sign, VLY, broadcasts time signals daily, on 600 metres (I.C.W.) as follows:—

The transmitting key at the W/T station is automatically operated by the Standard Time Clock of the Dominion Observatory (Latitude 41° 17' 03.8" S., Longitude 174° 46' 04.0" E.).

The first time signal is at 23h. 00m. 00s., G.M.T., and is repeated at the 1st, 2nd, 4th and 5th minutes.

There is no time signal at 23h. 03m. 00s.

Each time signal commences exactly at the beginning of the minute and lasts for *three seconds*, approximately:—

G.M.T.				Signals.		
h.	m.	s.	h.	m.	s.	
22	58	00	22	59	00	— VLY (every 15 seconds, the dash being of two seconds duration).
22	59	10	22	59	50	— • • • — • • • — • • • — etc.
23	00	00	23	00	03	— • • • Time signal.
23	00	12	23	00	50	— • • • — • • • — • • • — etc.
23	01	00	23	01	03	— • • • Time signal.
23	01	13	23	01	50	— • • • — • • • — • • • — etc.
23	02	00	23	02	03	— • • • Time signal.
23	02	14	23	03	50	— • • • — • • • — • • • — etc.
23	04	00	23	04	03	— • • • Time signal.
23	04	09	23	04	50	— • • • — • • • — • • • — etc.
23	05	00	23	05	03	— • • • Time signal.

AR VLY VA.

In addition to the above, the undermentioned time signals are broadcast on Tuesdays and Fridays, except on New Zealand Government holidays, by the Dominion Observatory, Wellington.

The conditions governing the transmission are similar to those given above.

The first time signal is at 9h. 00m. 00s. (G.M.T.), and is repeated at the 1st, 2nd, 4th and 5th minutes.

There is no time signal at 9h. 03m. 00s. Each signal commences exactly at the beginning of the minute, and lasts for *three seconds*, approximately.

The signals are transmitted in the following manner:—

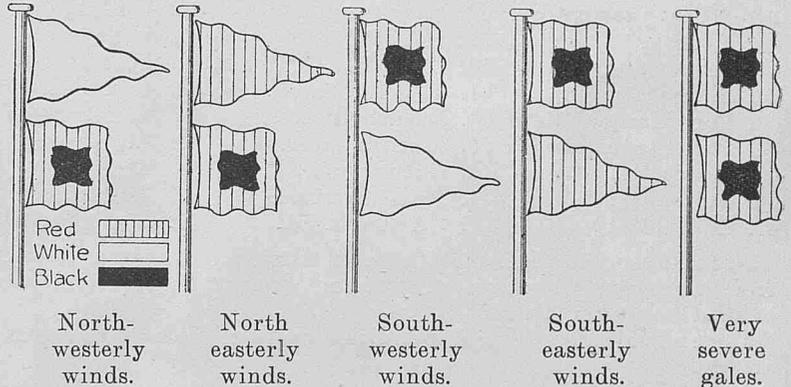
G.M.T.				Signals.		
h.	m.	s.	h.	m.	s.	
8	58	00	8	59	00	— VLY (every 15 seconds, the dash being of two seconds duration).
8	59	10	8	59	50	— • • • — • • • — • • • — etc.
9	00	00	9	00	03	— • • • Time signal.
9	00	12	9	00	50	— • • • — • • • — • • • — etc.
9	01	00	9	01	03	— • • • Time signal.
9	01	13	9	01	50	— • • • — • • • — • • • — etc.
9	02	00	9	02	03	— • • • Time signal.
9	02	14	9	03	50	— • • • — • • • — • • • — etc.
9	04	00	9	04	03	— • • • Time signal.
9	04	09	9	04	50	— • • • — • • • — • • • — etc.
9	05	00	9	05	03	— • • • Time signal.

AR VLY VA.

NOTE.—(1) Other signals which are transmitted by hand in addition to the automatic time signals must *not* be used as time signals.  
(2) The signals are automatically relayed by Wellington W/T Station (VLW).

IV.—VISUAL STORM WARNINGS.  
AUSTRALIA.

Wind warnings displayed in the Australian capitals.

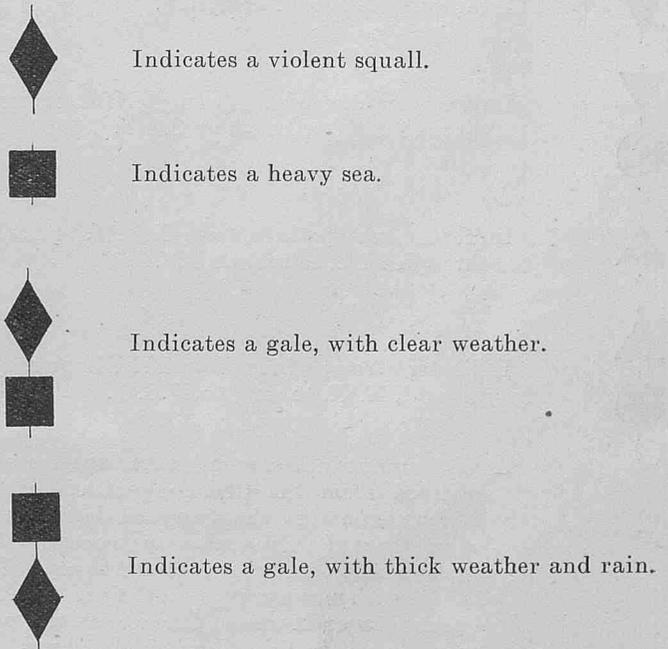


New South Wales.

The existence of gales which are likely to endanger shipping will be signalled at the principal telegraph stations on the coast of New South Wales in the following manner, viz.:—

The signal staffs will support two yards, which cross each other at right angles in the direction of the cardinal points of the compass, the yard-arms denoting respectively North, South, East and West; midway between North and East will denote N.E., &c., &c.

Symbols used and their Meanings.



The direction from which the gale is blowing will be indicated by the particular yard-arm between which and the mast-head the signal is suspended.

Place where squall or gale is blowing will be shown by the numerical pennants (*see below*) at the mast-head.

Gales that are general over a large portion of the coast will be indicated by the geometrical figures without the mast-head pennants.

**Numerical Pennants.**—The following pennants are used at the signal stations of New South Wales to indicate the numbers representing the place where a gale is blowing:—

1. Red.
2. Yellow and blue, horizontal, 2 divisions.
3. Blue, yellow, red, vertical.
4. Red and white, in opposite corners.
5. White, with 5 blue crosses.

- 6. Blue and yellow, 6 horizontal stripes.
- 7. Blue, with 7 white crosses.
- 8. Blue and white, 8 triangles.
- 9. Red and white, 10 vertical stripes.
- 0. Blue, white ball in centre.
- Substitute, White.

**Numbers representing Ports :**

- |                        |                          |                   |
|------------------------|--------------------------|-------------------|
| 10. Torres strait.     | 48. Corner inlet.        | 80. Keppel bay.   |
| 11. Cleveland bay.     | 49. Port Phillip.        | 81. Port Denison. |
| 37. Wilson promontory. | 54. Launceston.          | 82. Wollongong.   |
| 40. Sydney.            | 55. Hobart.              | 83. Wide bay.     |
| 41. Moreton bay.       | 56. Gulf of Carpentaria. | 84. Port Curtis.  |
| 42. Clarence river.    | 61. Shoalhaven.          | 88. Port Fairy or |
| 43. Port Macquarie.    | 68. Richmond river.      | Warrnambool.      |
| 44. Port Stephens.     | 70. Macleay river.       | 97. Hawke bay.    |
| 45. Newcastle.         | 72. Gabo island.         | 98. Kiama.        |
| 46. Jervis bay.        | 75. Manning river.       | 99. Wallaroo.     |
| 47. Twofold bay.       | 76. Circular head.       | 101. Port Mackay. |

NOTE.—Other numbers signify ports outside the eastern colonies from which a vessel arrives; they are not inserted as they would not be used for storm signals.

These signals are also used to indicate the place from which a vessel arrives.

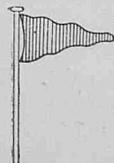
**Queensland.**

Storm signals are shown from the following stations in Queensland:—Cape Moreton and Cowan, Cowan Point, in Morton bay; Sandy Cape, Goode island, Torres Strait.

The signals are made from the quarters of the yards; the balls and cones are of large size and must not be mistaken for tidal signals, which are made from the yard-arms.

Symbols as follows:—

-  Indicates strong winds from S.S.W. or south, through S.E. to E. or E.N.E.
-  Indicates strong winds from W.N.W. or west, through S.W., to south or S.S.E.
-  Indicates strong winds from N.N.W. or north, through N.E., to east or E.S.E.
-  Indicates strong winds from N.N.E., or north, through N.W., to west or W.S.W.



A red pennant indicates that a message has been received from the Commonwealth Weather Bureau reporting the suspected development or existence of a dangerous storm or suspected development of a cyclonic disturbance. Details of such message may be obtained from the Postmaster or Harbour Officials at the port or place where this signal is displayed. A red light is shown at Fort Lytton by night.

When a vessel leaves the port of Brisbane without receiving a Cyclone warning, but observes the above signal at Fort Lytton, the Lightkeeper at the Pile Light will, if requested, transmit particulars of the message by means of semaphore, morse or megaphone.

At the lighthouse stations, viz.:—Goode island, Archer point, Cape Cleveland, Cape Capricorn, Bustard head, Sandy cape, Double Island point, Caloundra head, and Cape Moreton, the red pennant indicates that a storm warning will be signalled to vessels on demand.

**NEW ZEALAND.**

Storm signals are exhibited from Cape Maria Van Diemen, Tiri Tiri, Matangi island, Cape Campbell, Farewell spit lighthouse,

Nugget point and the lighthouse on Stephens island. They are not to be considered as covering a distance greater than 200 miles from the place at which they are hoisted, those hoisted with the red pennant below as covering only a distance of 50 miles from the place at which they are hoisted.

**Symbols used and their Meanings.**

-  Hoisted when strong winds or gales are probable from N., that is, from about N.E., changing through north towards west.  
NOTE.—This change of wind is usually followed by strong winds or gales from the southward.
- Northerly gales.
-  Hoisted when strong winds or gales are probable from W., that is from about N., changing through W. towards S.W.
- Westerly gales.
- NOTE.—After these gales have moderated the wind generally shifts to N.W. or to N.
-  Hoisted when strong winds or gales are probable from E., that is, from about N., changing towards E. and S.E.
- Easterly gales.
- NOTE.—This change of wind denotes a "black North-Easter" and an approaching cyclone.
-  Hoisted when strong winds or gales are probable from E., changing, through S., towards S.W.
- South-easterly gales.
-  Hoisted when strong winds or gales are probable from about W., changing, through S., towards S.E.
- Southerly gales.
-  Hoisted when strong winds or gales are probable from about S., changing, through E., towards N.

**Unusual gales.**

MODERATE WEATHER is indicated by the International code signals, but only in reply to inquiry and if meteorological conditions admit.

NOTE.—(1) A red pennant hoisted below any of the above signals made between the hours of 8 a.m. and noon indicates that the signal refers to the previous day.

(2) Signals hoisted without the red pennant refer to the day on which they are hoisted.

(3) The red pennant when hoisted alone, indicates that the forecast for the day has not been received at the station from the Meteorological Office, Wellington.

(4) Whenever the wind at any of the signal stations has changed in such manner that the forecast for the previous day will not apply no signal is displayed until the forecast for the day has been received at the station.

(5) When it is observed that the storm signals are not being shown at a storm signal station, the Dominion meteorological forecast for the same day may be obtained by hoisting the signal ZK.

**SOUTH PACIFIC OCEAN ISLANDS.**

**Fiji Islands.**

During the hurricane season (from November 1st to April 30th) storm signals as defined below will be exhibited at the signal station, Suva, and at the Government Wharf, to denote that a dangerous depression in the atmospheric pressure appears to be approaching the group. The signals will be displayed until conditions improve.

Between sunrise and sunset: Two black circles disposed vertically.

Between sunset and sunrise: Two red lights disposed vertically.

At the Wharf, Suva, attention will be drawn to the first exhibition of the signals by a detonator being fired twice, with an interval of one minute.

Weather reports are posted up outside the Harbour Master's office during the hurricane season.

WEATHER CHART, MORNING OF DECEMBER 11TH, 1921.

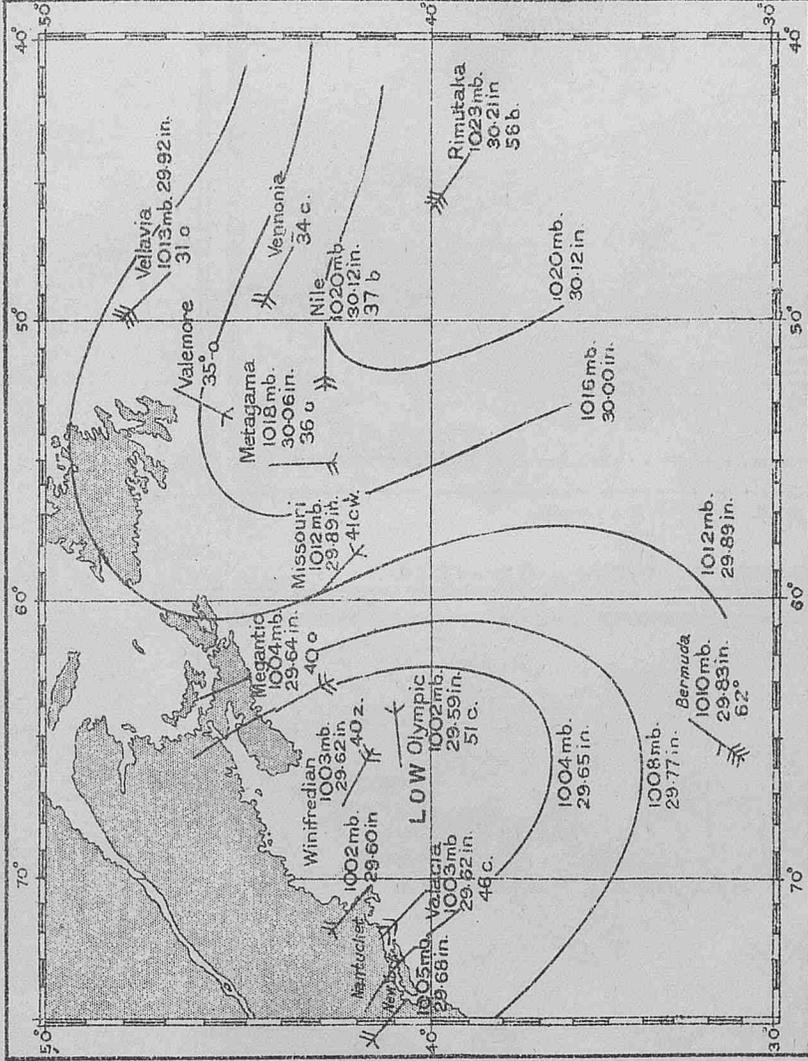


Chart XLIX "Wireless and Weather."

WEATHER CHART, EVENING OF DECEMBER 11TH, 1921.

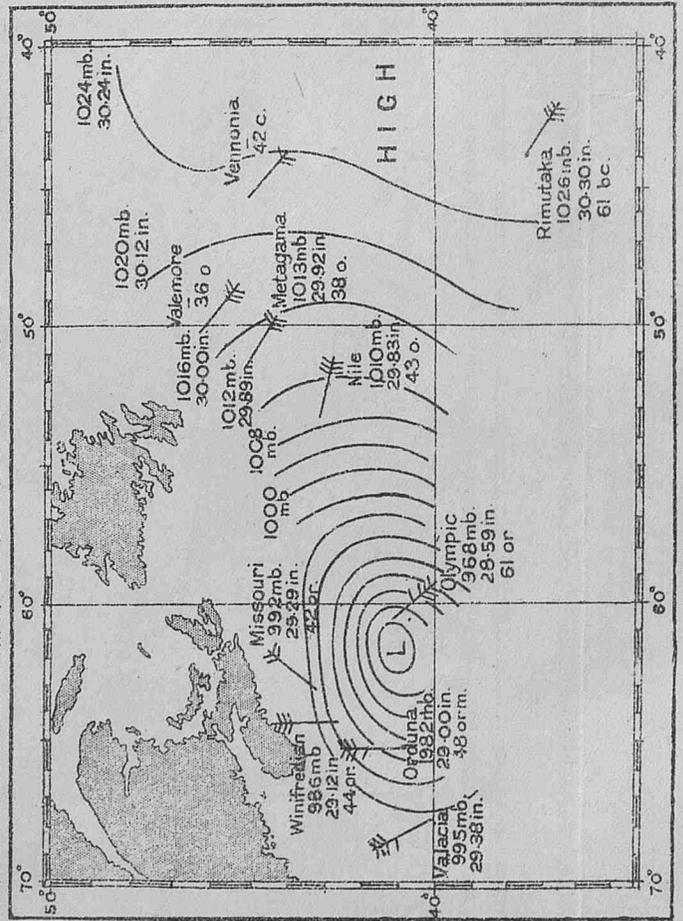


Chart L "Wireless and Weather."

WEATHER CHART, MORNING OF DECEMBER 12TH, 1921.

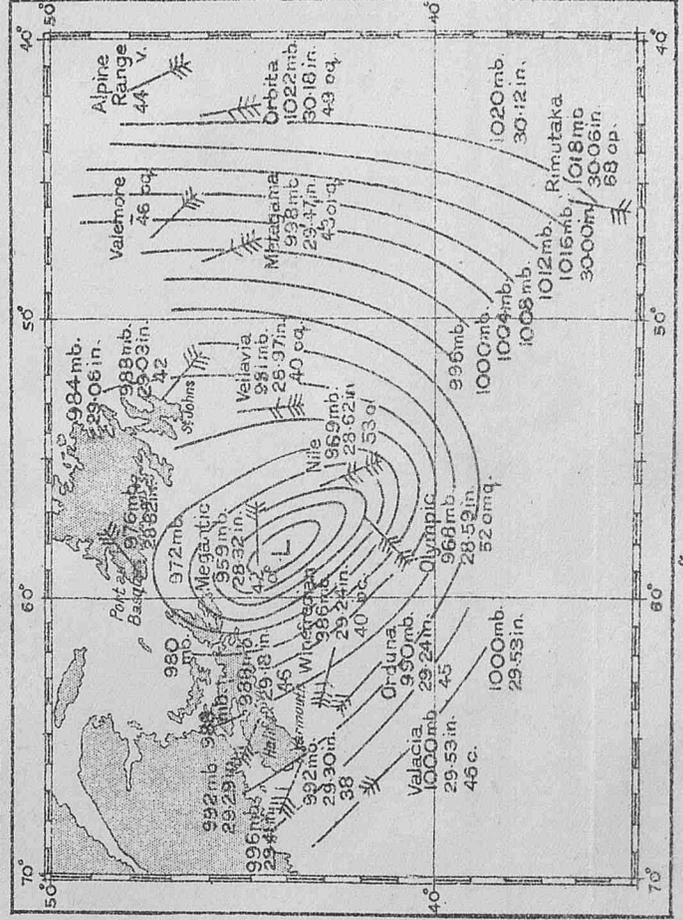


Chart LI "Wireless and Weather."

WEATHER CHART, MORNING OF OCTOBER, 17 TH., 1923.

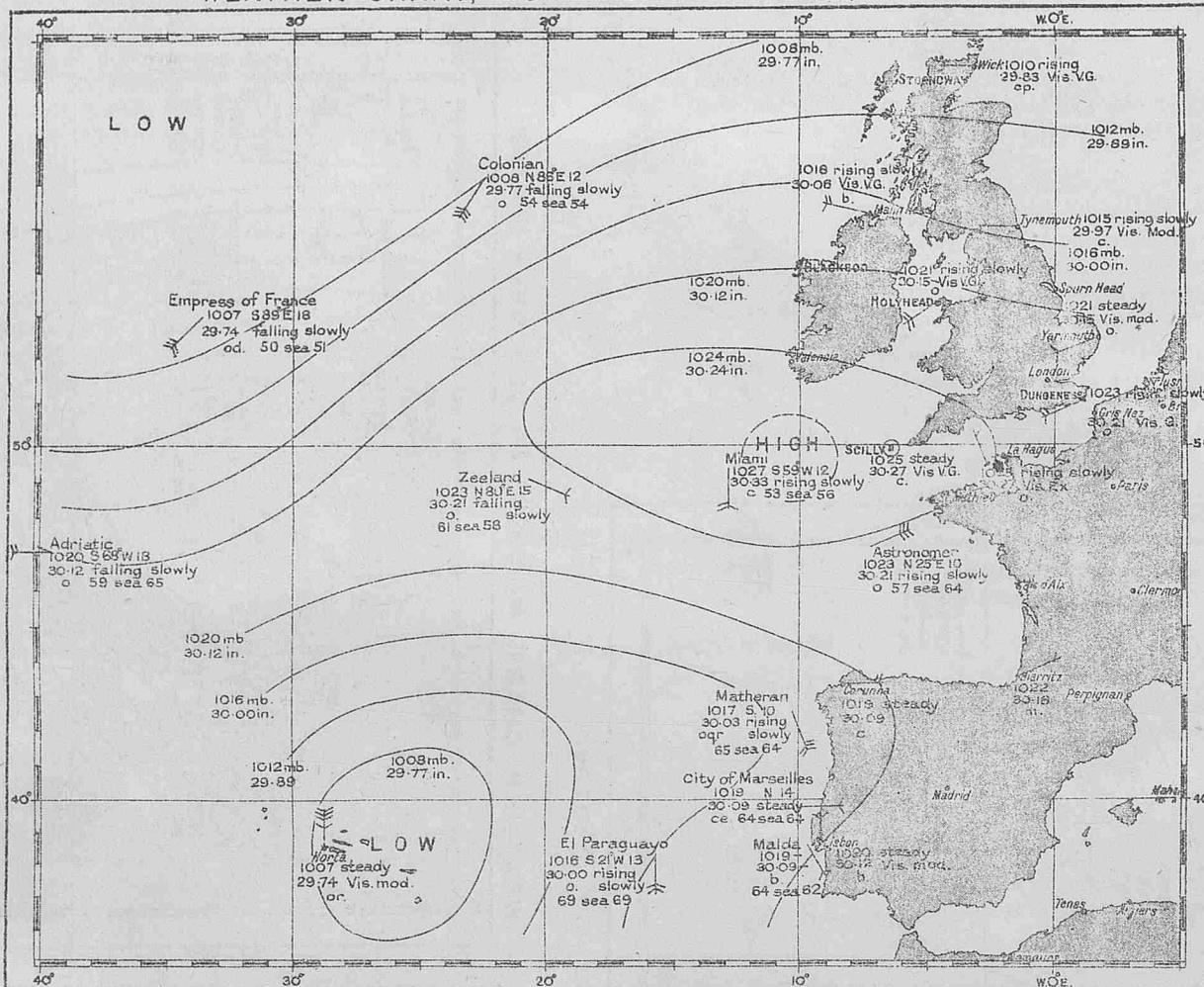


Chart LII - "Wireless and Weather"

WEATHER CHART, MORNING OF OCTOBER, 18 TH., 1923.

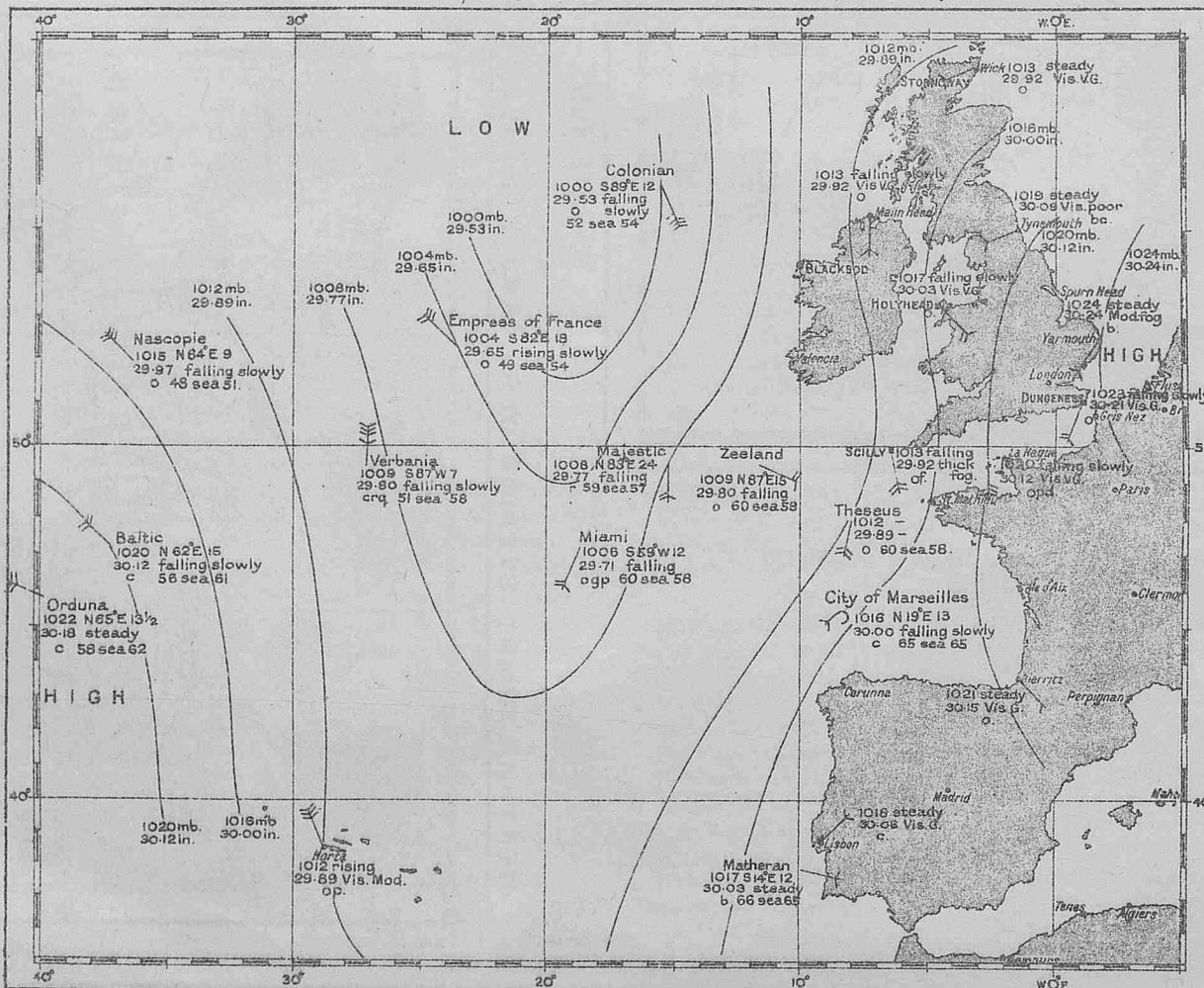


Chart LIII - "Wireless and Weather"

WEATHER CHART, MORNING OF OCTOBER, 19TH, 1923.

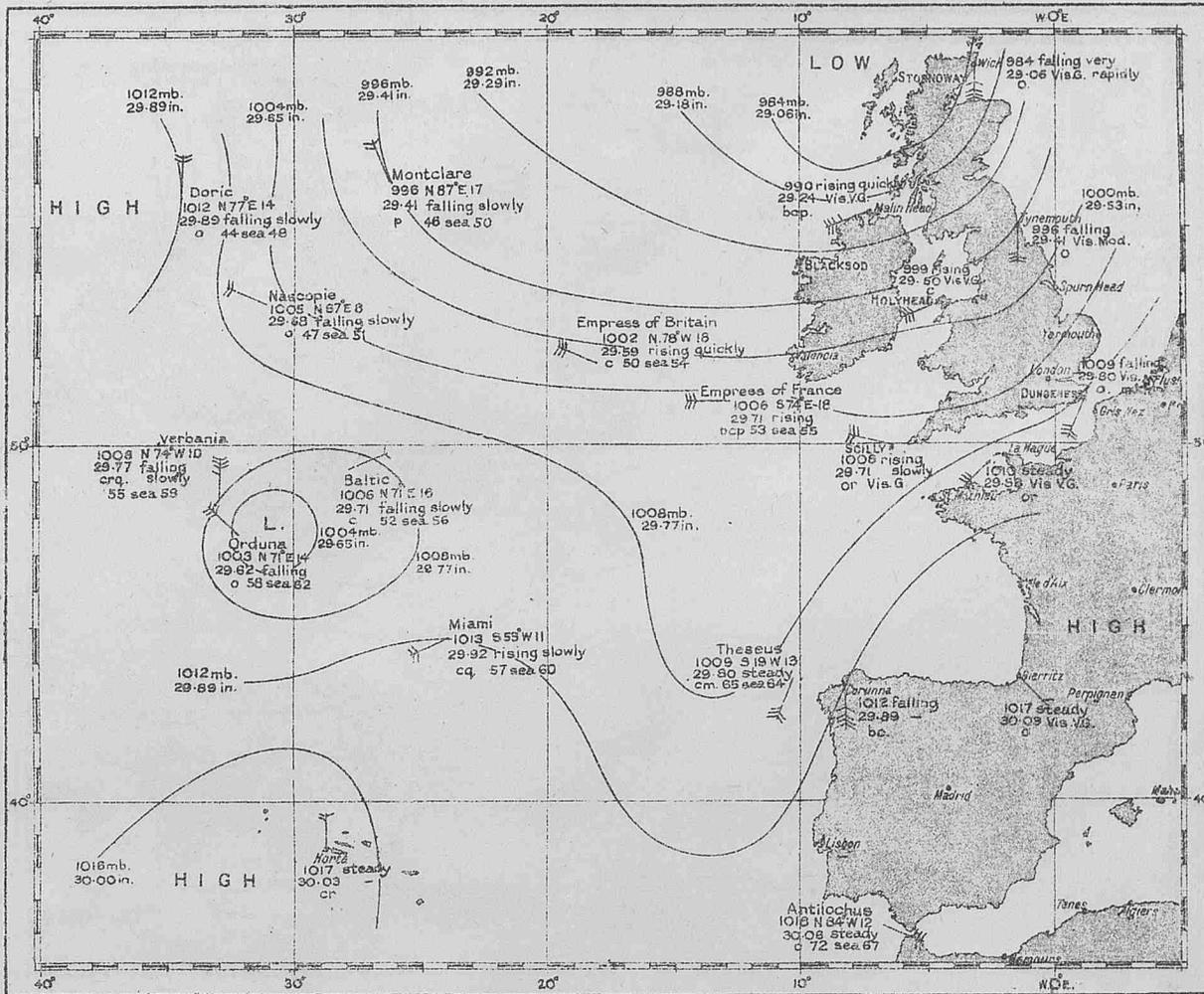


Chart LIV — "Wireless and Weather."

WEATHER CHART, MORNING OF OCTOBER, 20TH, 1923.

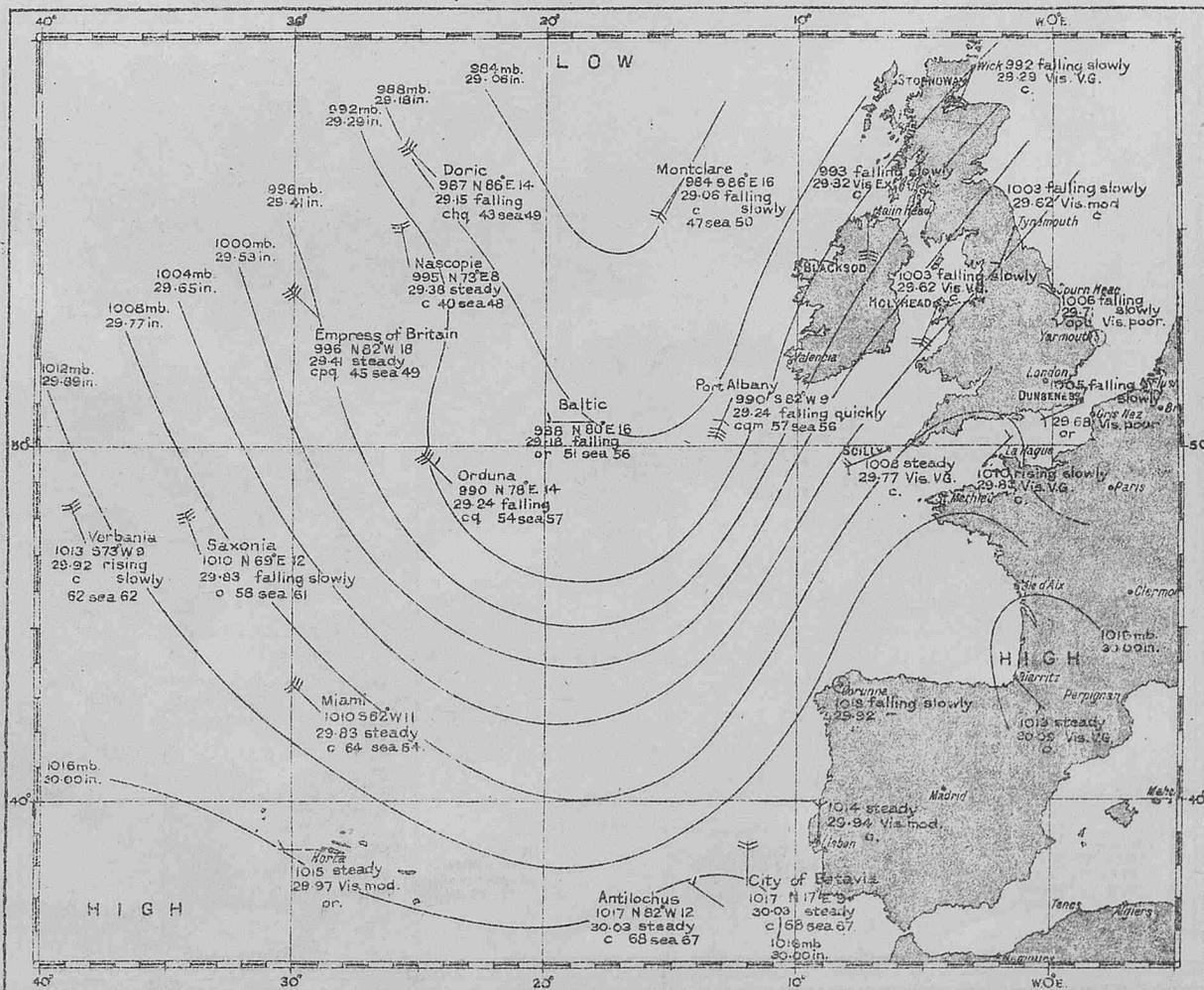
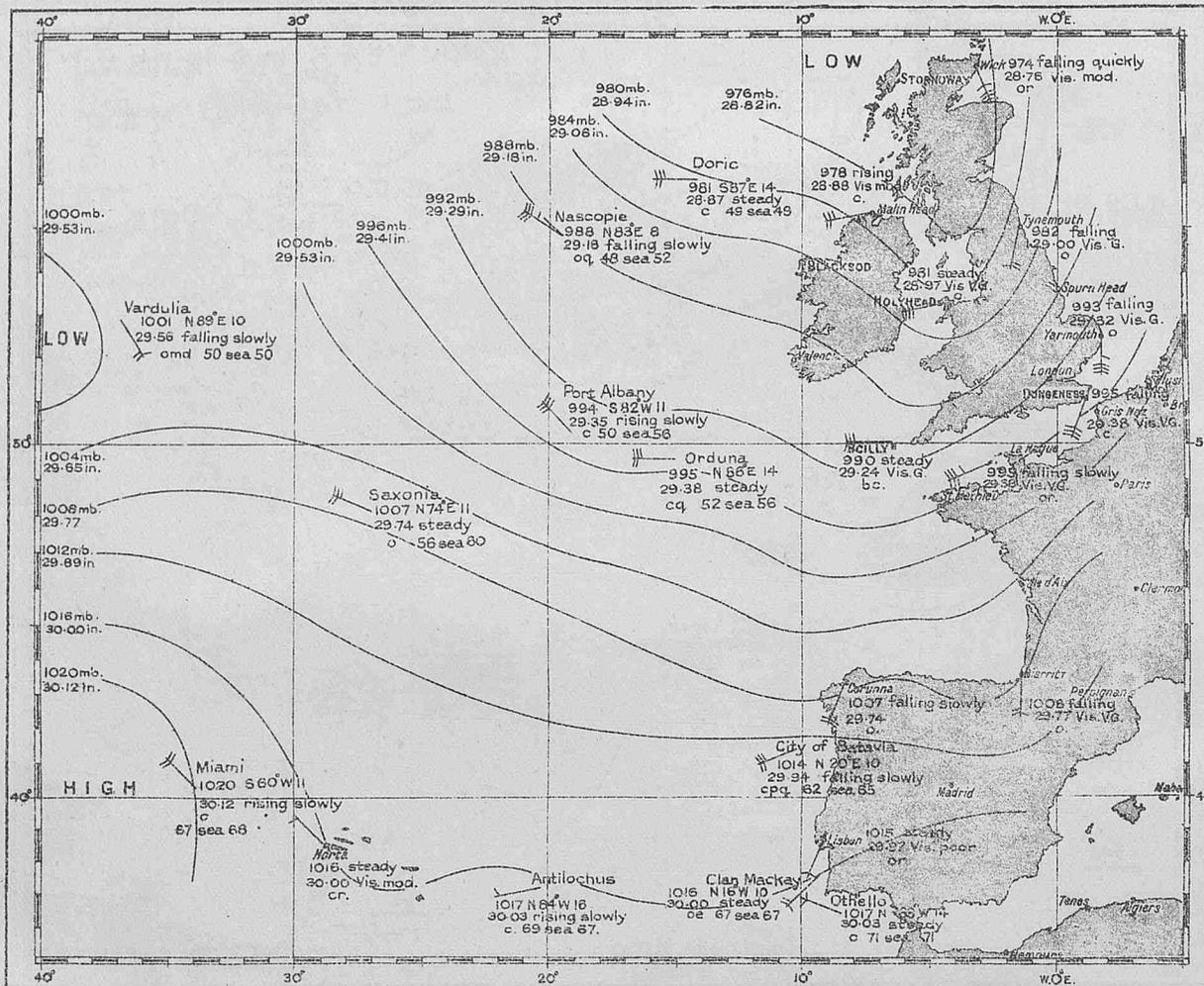


Chart LV — "Wireless and Weather."

WEATHER CHART, MORNING OF OCTOBER, 21st., 1923.



WEATHER CHART, MORNING OF JANUARY 19TH., 1926.

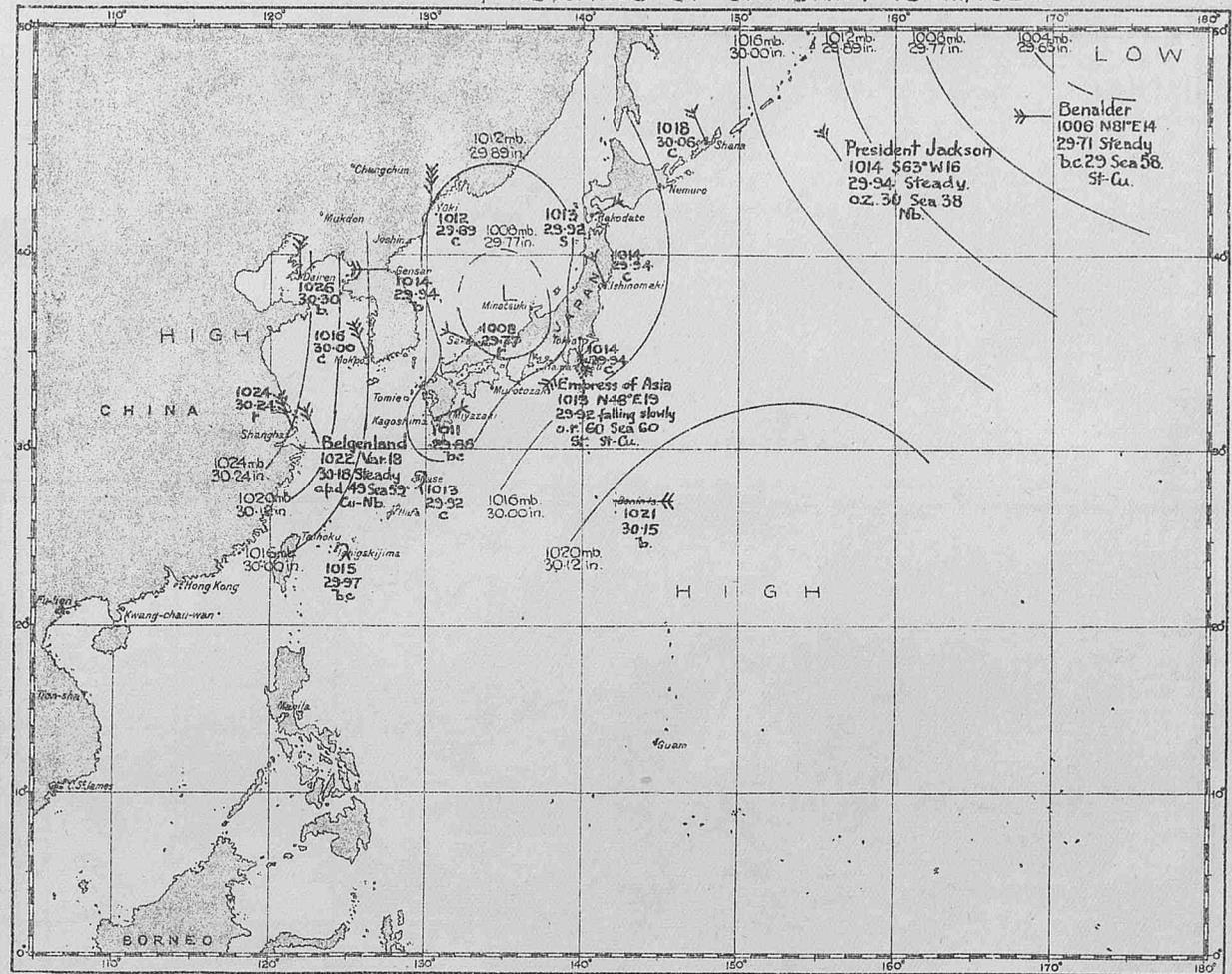


Chart LVIII—"WIRELESS AND WEATHER."

WEATHER CHART, MORNING OF JANUARY 20TH., 1926.

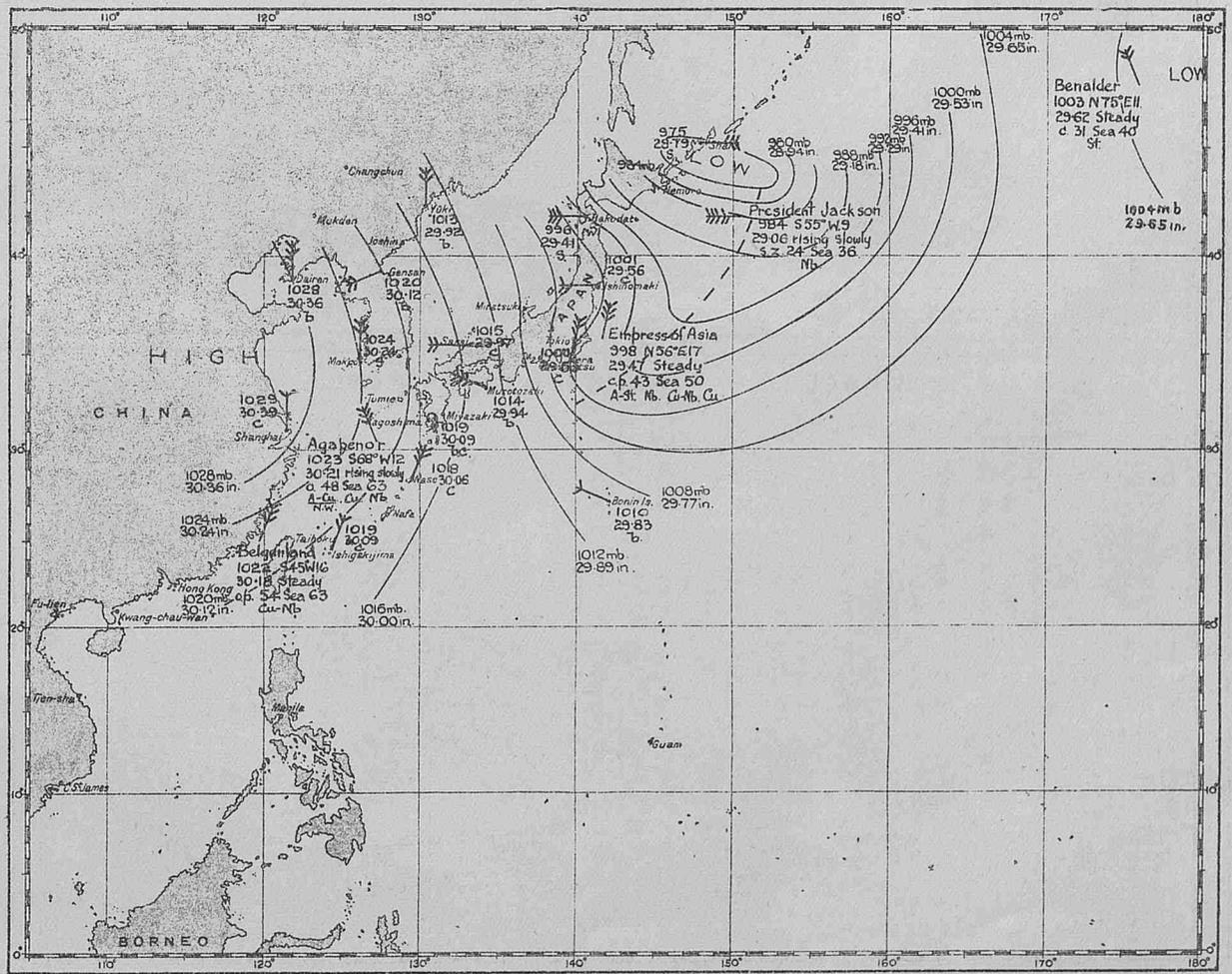


Chart LIX—"WIRELESS AND WEATHER."

WEATHER CHART, MORNING OF JANUARY 21st., 1926.

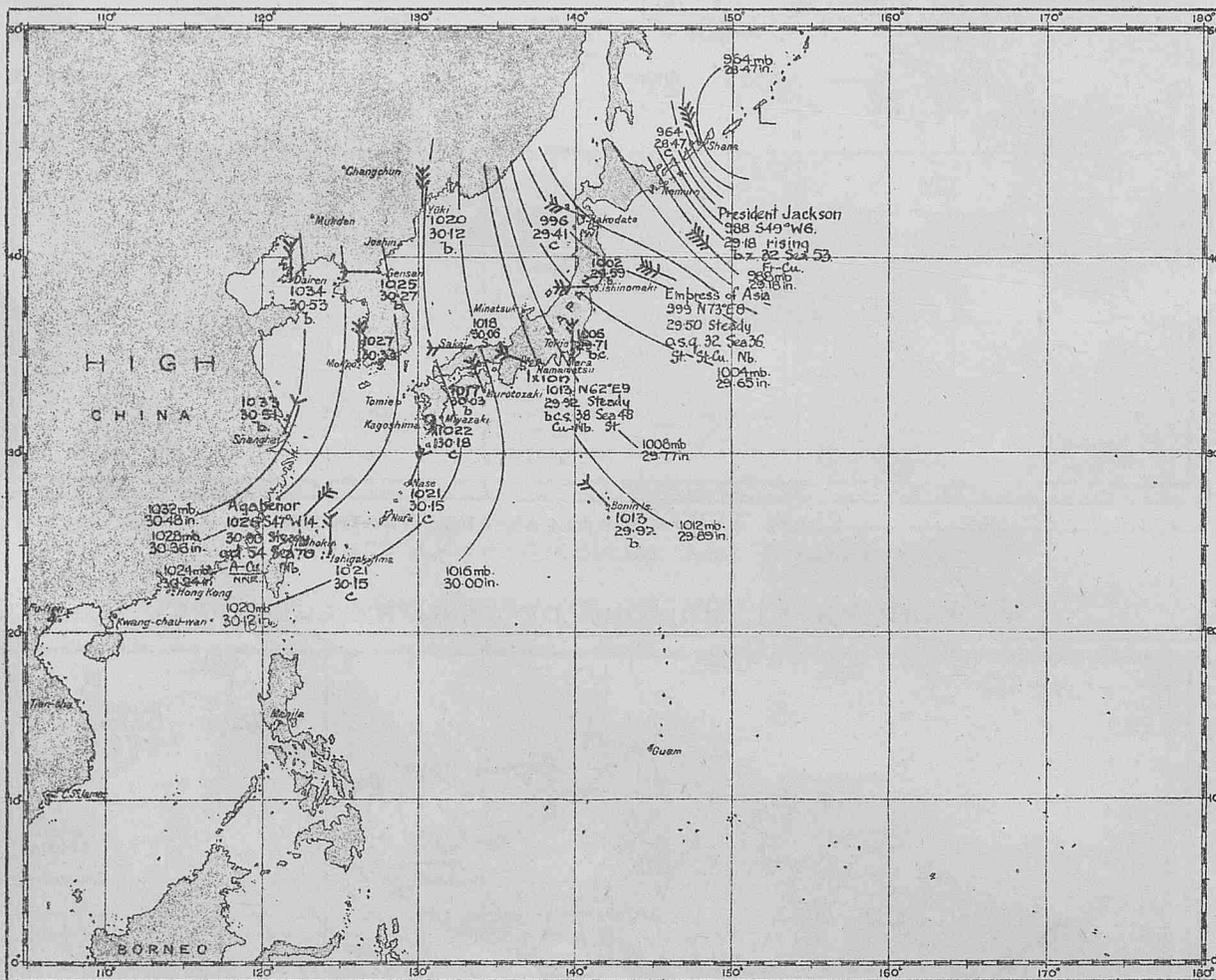
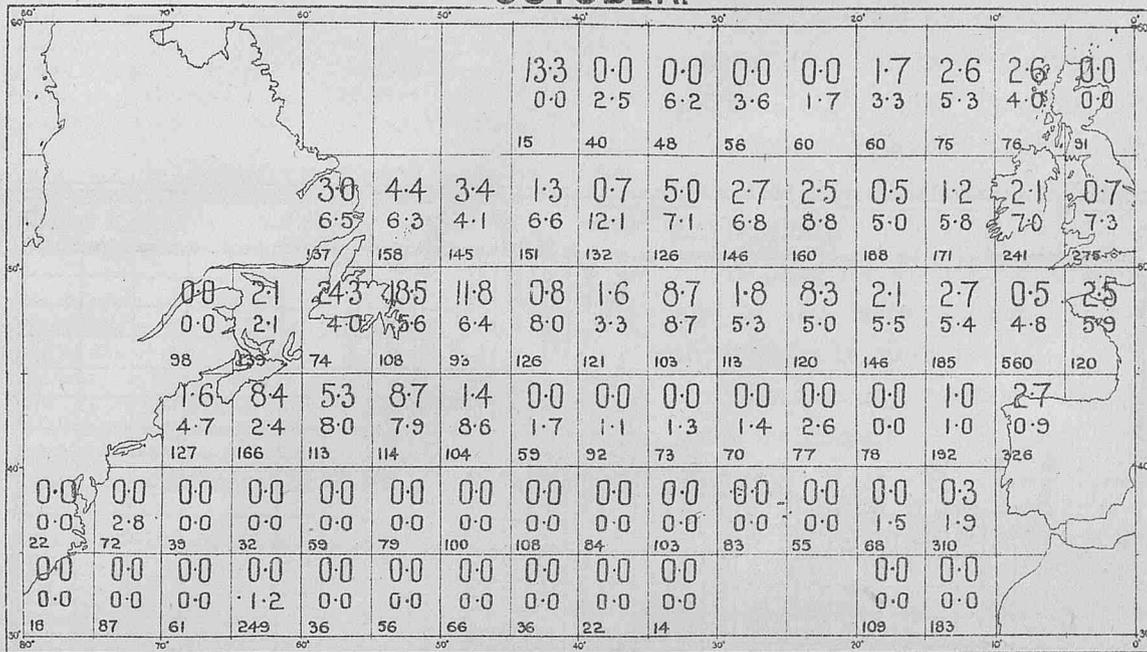


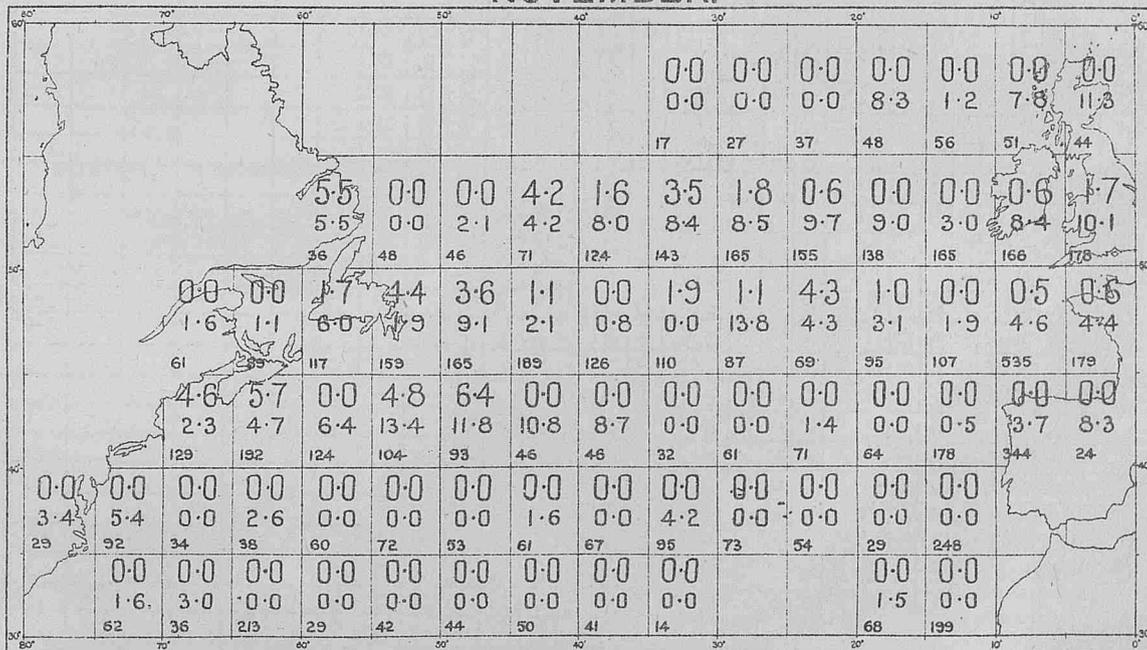
Chart LX—"Wireless and Weather."

COMPILED FROM OBSERVATIONS FOR THE YEARS 1921-1925.

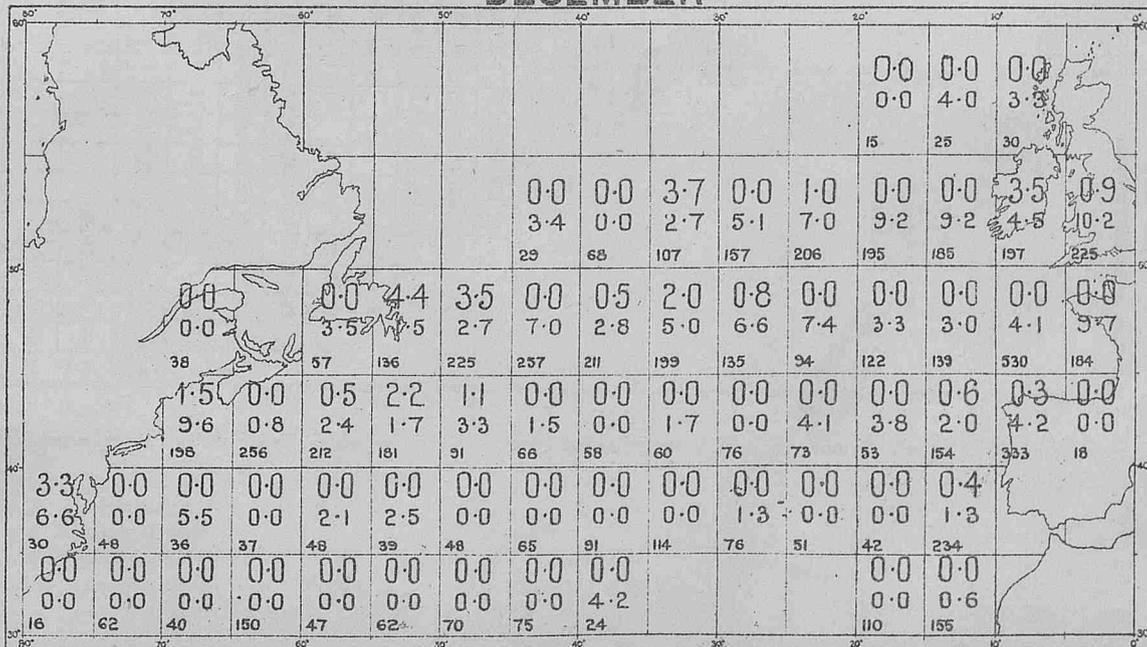
OCTOBER.



NOVEMBER.

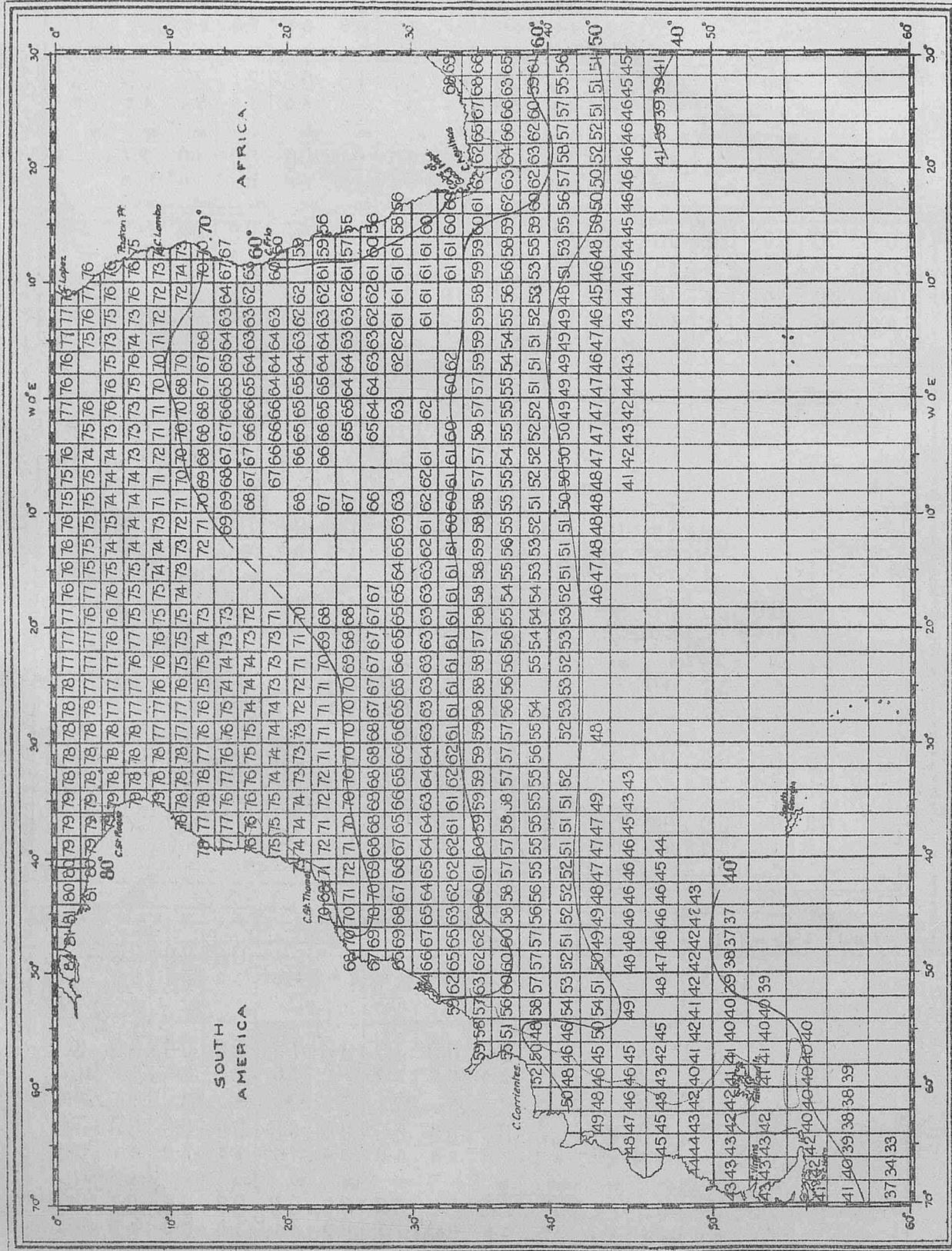


DECEMBER



The upper (large) numbers in the centre of each 5 square show the percentage frequency of observations of fog. The lower (medium sized) numbers in the centre of each 5 square show the percentage frequency of observations of mist. The small number in the lower left hand corner of each 5 square is the number of observations on which the percentage frequency is based.

SOUTH ATLANTIC.  
MEAN SEA SURFACE TEMPERATURES FOR MONTH OF OCTOBER.



Computed from observations of British ships during the years 1855 to 1899 except to the Southward and Eastward of Latitude 30° South and Longitude 10° East where the observations are for the years 1855 to 1878.

## NOTICES.

### INVITATION TO MARINE OBSERVERS.

The Marine Superintendent will be pleased to see the Captains of Observing Ships or their Observing Officers when they are in London, between 10 a.m. and 4 p.m. at Room 319, Adastral House, Kingsway, W.C.2. Telephone No., Holborn 3434, Extension 421. Telegrams, Marine Superintendent, Weather, London. (Nearest Station, Temple, District Railway.)

Personal touch is not only conducive to efficient work, but by this means we may be better able to advance upon lines which will further the practice of Meteorology in Navigation and at the same time provide the most suitable data for the general needs of Meteorological Science.

Those Marine Observers who do not come to London wishing to discuss matters connected with Marine Meteorology, are asked to consult the Agents at the Ports.

The Marine Agencies in the British Isles are visited at least once a year by the Marine Superintendent, and it is hoped by these means to further promote voluntary co-operation between ships at sea, and with the Meteorological Office.

Usually the Marine Superintendent visits the Marine Agencies as follows:—

- Southampton and Cardiff, first week of March.
  - Belfast and Liverpool, last week of May.
  - Glasgow and Liverpool, early October.
  - Leith, North Shields and Hull, mid November.
- Marine Agencies are given about two weeks notice of exact dates.

### POSTAL ARRANGEMENTS.

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

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

*S.S.*..... *Captain*.....  
*Port of Call*.....  
*Date of Homeward Departure*.....  
*Postal Address*.....

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

### TROPICAL REVOLVING STORMS. OBSERVATIONS.

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

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

### IMPORTANT.

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

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

Photographs, sketches and weather charts will be most welcome.

### ILLUSTRATIONS FOR THE MARINE OBSERVER.

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

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

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

### CARE OF INSTRUMENTS.

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

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

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

### CONVERSION TABLE.

To Convert Inches into Millibars.

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

# ICE CHART. WESTERN NORTH ATLANTIC.

## LETTERS OF TRANSATLANTIC TRACKS INDICATE

- (C) From 1st September to 31st January, inclusive.
- (F) From 16th May to Opening of Belle Isle route, and to 30th November when not using Belle Isle route.
- (F) Westbound, on approaching Cape Race steer a course to pass 10 miles S. of Cape Race.
- (F) Eastbound, steer from position 25 miles S. of Cape Race.
- (A) From the opening of the Straits of Belle Isle to 14th November.

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

## ROUTE NOTICES.

For latest information re Tracks see pages 78-9, Vol. IV. No. 40, of this Journal.

## SYMBOLS USED ON THE CHART

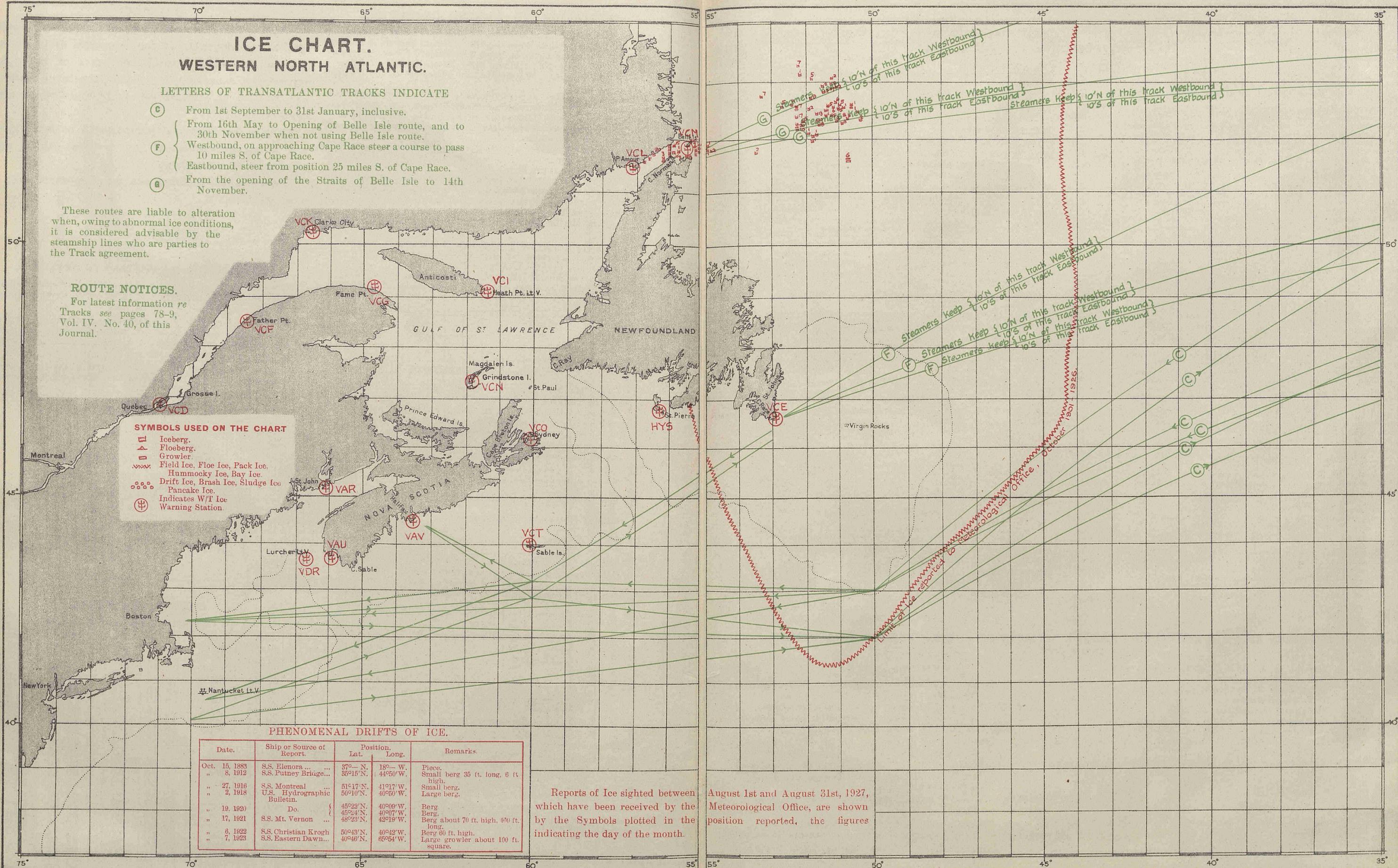
- Iceberg.
- Floeberg.
- Growler.
- Field Ice, Floe Ice, Pack Ice.
- Hummocky Ice, Bay Ice.
- Drift Ice, Brash Ice, Sludge Ice.
- Pancake Ice.
- Indicates W/T Ice Warning Station.

## PHENOMENAL DRIFTS OF ICE.

Date.	Ship or Source of Report.	Position.		Remarks.
		Lat.	Long.	
Oct. 15, 1883	S.S. Elenora ...	37° N.	18° W.	Piece.
" 8, 1912	S.S. Putney Bridge...	35°15' N.	44°50' W.	Small berg 35 ft. long, 6 ft. high.
" 27, 1916	S.S. Montreal ...	51°17' N.	41°17' W.	Small berg.
" 2, 1918	U.S. Hydrographic Bulletin.	50°10' N.	40°50' W.	Large berg.
" 19, 1920	Do.	45°22' N.	40°00' W.	Berg.
" 17, 1921	S.S. Mt. Vernon ...	45°24' N.	40°07' W.	Berg.
" 8, 1922	S.S. Christian Krogh	48°23' N.	42°19' W.	Berg about 70 ft. high, 400 ft. long.
" 7, 1923	S.S. Eastern Dawn...	50°43' N.	40°42' W.	Berg 60 ft. high.
		40°46' N.	66°54' W.	Large growler about 100 ft. square.

Reports of Ice sighted between which have been received by the by the Symbols plotted in the indicating the day of the month.

August 1st and August 31st, 1927, Meteorological Office, are shown in position reported, the figures



**MARINE METEOROLOGY.**

**NOTICES.**

**Co-operation of Shipowners, Masters and Mates.**

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

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

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

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

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

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

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

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

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

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

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

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

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

Ships on the List of Voluntary Observers to the Meteorological Office which have a mercurial barometer are indicated by the letters M.L., W.T. and M.

These are selected ships for reporting weather observations made at specified times by W/T to "All Ships," and they are invited to perform this service, which is for the benefit of all shipping fitted for W/T reception.

For sample weather report message see pages 15 and 17 of Vol. IV. No. 37

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

**LATE PRESS.**

**DERELICTS AND FLOATING WRECKAGE.**

Date.	Position.		Description.
	Latitude.	Longitude.	
<b>BALTIC.</b>			
27.8.27	About 4½ miles 33° of Dornbusch Light.		Drifting wreck.
<b>NORTH SEA.</b>			
27.8.27	53°31'N.	4°53'E.	Large spar upright, probably mast attached to wreckage; dangerous to navigation.
<b>ENGLISH CHANNEL.</b>			
19.8.27	10 miles S.W. of Needles.		Green painted buoy marked <i>A.V. No. 9.</i>
<b>IRISH SEA.</b>			
19.8.27	4 miles N. 33° W. (mag.) from Bar Light Vessel.		Unlighted buoy adrift.
<b>MEDITERRANEAN.</b>			
5.8.27	41°47'N.	6°20'E.	Large tree trunk, dangerous to navigation. Rusty cylindrical object 10 metres in length.
11.8.27	41°07'N.	3°25'E.	
<b>NORTH ATLANTIC.</b>			
1.8.27	45°06'N.	41°35'W.	Upright spar projecting about 6 feet out of water, apparently attached to submerged wreckage.
3.8.27	Finisterre bearing 106°, 6 miles.		Empty ship's lifeboat, painted white outside, reddish brown inside, no name, badge on bow <i>AV.</i>
5.8.27	40°26'N.	73°53'W.	Large tree trunk.
5.8.27	43°45'N.	56°35'W.	Two heavy spars projecting about 5 feet out of water, apparently attached to submerged wreckage and covered with marine growth.
5.8.27	41°41'N.	52°08'W.	Spar projecting about 6 feet out of water.
6.8.27	12°48'N.	75°26'W.	Large can buoy floating on its side, very rusty, but in a white patch was number "3" in black.
9.8.27	18°40'N.	74°49'W.	Red can buoy mounted by a staff and black ball.
10.8.27	39°47'N.	73°48'W.	Deckhouse of launch with red top and five sidelights screened.
13.8.27	17°47'N.	74°14'W.	Large tree trunk about 50 feet long and 2 feet in diameter.
15.8.27	19°10'N.	75°20'W.	Partly submerged obstruction.
15.8.27	44°27'N.	60°35'W.	Submerged wreck about 28 fathoms; masts floating upside down attached. Menace to shipping as butt of main mast rises and falls through swell.
16.8.27	26°32'N.	75°22'W.	Large can buoy marked <i>No. 3.</i>
17.8.27	19°07'N.	67°05'W.	Large upright spar covered with barnacles and apparently attached to submerged wreckage.
19.8.27	46°57'N.	27°48'W.	Red light and whistle buoy, marked <i>G.3.</i> , light not burning; dangerous to navigation; buoy normal afloat and everything intact.
19.8.27	43°58'N.	90°—'W.	Red conical whistle buoy with letters <i>L.S.</i> in black on side; whistle working though apparently been in water very long time by the covering of barnacles and weed.
24.8.27	48°24'N.	7°20'W.	Schooner <i>Agua Acoreana</i> abandoned, on fire.
27.8.27	42°30'N.	9°30'W.	Floating derelict.
29.8.27	49°01'N.	6°25'W.	Cylindrical buoy, painted red, heavy marine growth dangerous to navigation.
<b>GULF OF MEXICO.</b>			
1.8.27	29°38'N.	88°03'W.	Empty lifeboat marked <i>Louisiana.</i>
9.8.27	28°38'N.	91°10'W.	Log about 4 ft. in diameter, projecting about 6 ft. out of water.
9.8.27	44°31'N.	82°53'W.	Pile about 60 ft. long and 18 ins. in diameter.
10.8.27	29°06'N.	87°04'W.	Obstruction having the appearance of a floating island, about 150 ft. long and 30 ft. wide. The whole mass was covered with grass and two small trees or shrubs standing at one end.
<b>INDIAN OCEAN.</b>			
15.8.27	29°35'S.	48°56'E.	Red painted spherical buoy, with iron tripod support
<b>NORTH PACIFIC.</b>			
2.8.27	37°28'N.	123°47'W.	Spar about 25 feet long.
6.8.27	5°—'N.	77°56'W.	Columbian stern wheeler <i>San Francisco</i> , capsized, adrift, partly submerged, menace to navigation.
6.8.27	35°17'N.	121°12'W.	Log about 40 ft. long and 3 ft. in diameter.
10.8.27	40°24'N.	126°08'W.	Log about 30 ft. long and 4 ft. in diameter.
10.8.27	44°33'N.	124°39'W.	Log about 50 ft. long and 6 ft. in diameter.
<b>SOUTH PACIFIC.</b>			
9.8.27	8°35'S.	80°10'W.	Partly submerged object about 120 feet long and 20 feet wide, having the appearance of a vessel bottom up.

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

**LONDON ...** ... Captain L. A. BROOKE SMITH, R.D., R.N.R., Marine Superintendent.  
 Commander J. Hennessy, R.D., R.N.R., Senior Nautical Assistant.  
 Room 319, Adastral House, Kingsway, W.C.2. (Telephone No.: *Holborn 3434 Extension 421*).  
 Nearest station Temple, District Railway.  
 Mr. W. T. GRIEVES, Visiting Officer for the Port of London.

**LIVERPOOL ...** ... Lieut. Commander M. CRESSWELL, R.N.R., Port Meteorological Officer, Dock Office. (Telephone No.: *Bank 3959*).

**Agents.**

**BELFAST ...** ... Captain J. MCINTYRE, Harbour Master, Harbour Office. (Telephone No.: *Belfast 4090*).

**CARDIFF ...** ... Captain T. JOHNSTON, Technical College, Cathays Park.

**CLYDE ...** ... Captain M. C. CORRANCE, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow.

**Agents (contd.).**

**FREMANTLE,** W. Australia. Captain J. J. AIREY, Deputy Director of Navigation, Dalgety's Buildings.

**HONG KONG,** China. Lieut. Commander O. C. G. LEVESON-GOWER, R.N., Superintendent, Admiralty Chart and Chronometer Depot, H.M. Dockyard.

**HULL ...** ... Captain Geo. B. STURDY, c/o Mr. W. HAKES, Commercial Road.

**LEITH ...** ... Captains G. BLACK and C. G. BONNER, V.C., D.S.C., Leith Salvage and Towage Co., Ltd., 2, Commercial Street.

**SOUTHAMPTON** Captain D. FORBES, Nautical Academy, 1, Albion Place.

**SYDNEY,** New South Wales. Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation, Customs House.

**TYNE ...** ... Captain J. J. MCEWAN, Marine School, South Shields.

**VANCOUVER,** British Columbia. Mr. T. S. H. SHEARMAN, Room 40, Post Office Building.

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

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

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

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.8.27.	Date Received.
<i>Aba</i>	Hughes, J.	S. J. Bristowe, O. E. Jones, C. Spark.	M.L.	Elder Dempster	Met. Log. 13.10.26 to 12.3.27...	17.3.27.
<i>Abinsi</i>	Millson, H. E.	E. W. Bascombe	No. A.	"	Form 911 29.12.26 to 23.2.27...	3.3.27
<i>Achilles</i>	Wilson, C. A.	A. Gillard, A. M. Wright, F. B. Allen.	M.L.	A. Holt	Met. Log. 27.12.26 to 1.5.27	10.6.27
<i>Actor</i>	Haylett, E.	A. Frew, J. McKay, G. Morrice.	"	Harrison	" 9.1.27 to 7.4.27	21.4.27
<i>Adda</i>	Toft, J. T.	A. E. Longlen	M.L.	Elder Dempster	Form 911 11.5.27 to 19.6.27	22.6.27
<i>50 Adriatic</i>	Hickson, V. W., Lieut. Commr. R.N.R.	J. McCormick, O. V. Lucas	W.T.	White Star	{ W.T. Reg. 27.6.27 to 18.7.27... " 26.7.27 to 13.8.27...	19.7.27 15.8.27
<i>Aeneas</i>	Wallace, W. K.	"	No. A.	A. Holt	Form 911 27.5.27 to 10.7.27	26.7.27
<i>Agapenor</i>	Ramsay, J.	S. G. Ellams	" A.	"	" 23.5.27 to 23.6.27	5.8.27
<i>Aidan</i>	Pym, J.	J. S. Thompson	" A.	Booth	" 13.6.27 to 9.8.27	16.8.27
<i>Alban</i>	Welsh, A.	F. Lyons	" A.	"	" 19.5.27 to 19.7.27	25.7.27
<i>Alipore</i>	Harrison, R., D.S.O., R.D., Captain, R.N.R.	"	" M.	P. and O.	" 2.3.27 to 5.5.27	30.5.27
<i>Almanzora</i>	Clarke, E. C.	D. O. Llewellyn	" A.	R.M.S.P.	" 14.5.27 to 27.6.27	29.6.27
<i>Albertic</i>	Parker, W. H., C.B.E., R.D., Capt. R.N.R.	J. Farrell	" A.	White Star	" 16.7.27 to 5.8.27	8.8.27
<i>Alondra</i>	Prendergast, J. J.	H. Peters	" A.	Yeoward	" 2.7.27 to 23.7.27	25.7.27
<i>Ampetco</i>	Vandenkerckhove, A.	L. Brachs	" A.	American Petroleum	" 5.7.27 to 13.8.27	19.8.27
<i>Andalucia</i>	Thomas, R. J.	R. A. Winne	" M.	Blue Star	" 12.5.27 to 26.6.27	6.7.27
<i>Anchises</i>	Woodgett, R. J.	"	" A.	A. Holt	Form 911 27.3.27 to 15.4.27	9.5.27
<i>Andes</i>	Smith, W. E.	F. J. Horan	" M.	R.M.S.P. Co.	" 4.6.27 to 18.7.27	25.7.27
<i>Antilochus</i>	Clark, J. W.	O. P. H. Wynne	" A.	A. Holt	" 16.6.27 to 5.7.27	9.8.27
<i>Aorangi</i>	Crawford, R.	G. H. Kime, E. Anderson, C. G. Eustace, D. Richards.	M.L.	Canadian-Australasian	Met. Log. 15.12.26 to 26.5.27	16.6.27
<i>30 Aquitania</i>	Charles, Sir J. T. W., K.B.E., C.B., R.D., Commodore, R.N.R.	J. L. Croasdaile, J. Locke, D. MacLean.	W.T.	Cunard	{ W.T. Reg. 3.7.27 to 15.7.27 ... " 24.7.27 to 5.8.27 ...	19.7.27 10.8.27
<i>62 Arabic</i>	Harvey, H.	J. M. Appleby, W. Jenkins, A. Lewis.	"	White Star	" 5.7.27 to 23.7.27	25.7.27
<i>Arafura</i>	Gordon, A. S.	G. C. Smith, R. Lloyd Harry, C. G. Knight, B. W. Dun.	M.L.	Eastern and Australian	Met. Log. 28.1.27 to 26.4.27	18.6.27
<i>Arawa</i>	Summers, W. G.	D. Aitchison, A. C. Jones, J. Jackson.	"	Shaw, Savill and Albion	" 30.3.27 to 28.7.27	11.8.27
<i>Archimedes</i>	Downs, E. B.	E. R. Hartley	No. A.	Lamport & Holt	Form 911 19.6.27 to 8.7.27	13.8.27
<i>Argyllshire</i>	Wallace, J.	J. M. Crone	" M.	Federal	" 22.4.27 to 12.5.27	2.6.27
<i>Ariguani</i>	Scudamore, J. H. H., D.S.C., R.D., Commr., R.N.R.	J. W. Kendal	M.L.	Elders & Fyffes	Met. Log. 15.1.27 to 14.5.27	4.7.27
<i>Armada Castle</i>	{ Owen, S. H. Imlah, C. B.	A. B. Cannon, G. D. Pennick, L. G. May.	"	Union Castle	" 31.10.26 to 24.4.27	9.5.27
<i>Arracan</i>	Willis, M.	R. McInnes, G. B. Christie, C. C. Weir.	"	P. Henderson	" 22.5.26 to 3.12.26	4.4.27
<i>Arundel</i>	Short, H.	Mr. Hill	C.C.	Southern Rly.	Telegraphic Report 15.8.27	15.8.27
<i>Arundel Castle</i>	George, J., O.B.E.	H. G. Leach, L. G. May	No. A.	Union Castle	Form 911 20.5.27 to 10.7.27	12.7.27
<i>Astronomer</i>	Richards, J.	A. Brown, J. Glen, A. Thompson.	M.L.	Harrison	Met. Log. 22.1.27 to 20.6.27	28.6.27
<i>Ascanius</i>	Agnew, J.	"	"	A. Holt	"	9.6.27
<i>Athenic</i>	Binks, J. W.	W. Hill	No. A.	White Star	Form 911 25.4.27 to 17.5.27	9.6.27
<i>Atrous</i>	Salter, G. H.	F. A. Brown	" A.	A. Holt	" 26.6.27 to 29.7.27	19.8.27
<i>Atsuta Maru</i>	Shibutami, S.	A. Hurakami	" A.	Nippon Yusen Kaisha	" 12.2.27 to 13.6.27	17.6.27
<i>Auditor</i>	Owen, W. T.	T. E. Steel	" M.	Harrison	" 2.7.27 to 22.7.27	3.8.27
<i>Autolytus</i>	Dunlop, J. K.	"	" A.	A. Holt	"	16.8.27
<i>Ausonia</i>	Stafford, W., D.S.C., R.D., Lt.-Commr., R.N.R.	J. J. Wiseman	" A.	Cunard	Form 911 26.6.27 to 31.7.27	16.8.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.8.27.	Date Received.
Avon	Hannam, F. S.	E. S. Dunch	No. M.	R.M.S.P.	Form 911 10.11.26 to 20.1.27...	8.2.27
Balfour	Moore, F.	J. Biggs	" A.	Canadian Pacific	1.6.27 to 8.6.27	28.6.27
Balranald	Townshend, W. P., Commr., R.N.R.	C. Hannen, F. Ward, — Cowell, — Davis.	M.L.	P. & O. Branch	Met. Log. 25.12.26 to 1.5.27	7.5.27
51 Baltic	Roberts, J., C.B.E., D.S.O., R.D., Capt. R.N.R.	J. W. Paine, J. Boyce, J. Law	W.T.	White Star	W.T. Reg. 11.7.27 to 29.7.27 Form 911 10.7.27 to 30.7.27	3.8.27 3.8.27
Bampton Castle	Hutchings, A. H.	J. F. H. Coombes	No. A.	Union Castle	" 18.6.27 to 20.7.27	15.8.27
Banbury Castle	Swiney, W. A.	C. G. Cuthbertson	" A.	"	" 21.4.27 to 9.5.27	9.6.27
Banffshire	Wynne, R. H.	W. F. Lockhead	" A.	Turnbull Martin	" 19.7.27 to 28.7.27	6.8.27
Baradine	Rollo, W.	S. Gibson, C. Bowden, J. Alleyne, D. Buckley.	M.L.	P. & O. Branch	Met. Log. 17.3.27 to 22.6.27	28.7.27
Baron Murray	Edgar, J. E.	W. P. G. Arthur, H. Thompson	No. A.	Hogarth & Sons	Form 911 8.5.26 to 10.6.26	21.9.26
Barpeta	Strachan, J.	W. P. Page	" M.	British India	" 18.5.27 to 15.6.27	5.7.27
Barrabool	Rhodes, H. R.	F. S. Bowman	" M.	P. & O. Branch	" 19.4.27 to 27.5.27	10.6.27
Baychimo	Cornwall, S. A.	W. H. Deans	" A.	Hudson's Bay Co.	" 14.5.27 to 5.6.27	24.6.27
59 Belgenland	Howell, T.	F. Good, F. Clitty	W.T.	Red Star	W.T. Reg. 17.7.27 to 7.8.27 Form 911 17.7.27 to 8.8.27	10.8.27 10.8.27
Beltana	Allin, C. H. C.	F. Ardern	No. M.	P. & O. Branch	" 23.6.27 to 19.7.27	9.8.27
Benalder	Cole, J. H., D.S.C.	"	" A.	Ben Line	" 3.7.27 to 15.7.27	25.7.27
Bendigo	Nicholl, R. N. C.	J. Young	" M.	P. & O. Branch	" 4.2.27 to 18.3.27	24.3.27
Benefactor	O'Connor, T.	A. Watson	" M.	Harrison	" 25.6.27 to 20.7.27	3.8.27
Bengloe	"	"	No.	Ben Line	"	"
31 Berengaria	Rostron, A. H., Sir, K.B.E., R.D., Capt. R.N.R.	J. A. Myles, W. C. A. Robson, S. A. T. Bullock.	W.T.	Cunard	W.T. Reg. 10.7.27 to 24.7.27	27.7.27
Berrima	Short, C. E.	T. Ferguson	No. M.	P. & O. Branch	Form 911 4.8.26 to 5.12.26	7.12.26
Bervyn	McCombie, G.	D. Dunn	" A.	Canadian Pacific	" 23.1.27 to 19.3.27	24.3.27
Binang	Morzer Bruyns, M. F.	M. C. Altins	" M.	Nederland	" 26.2.27 to 25.3.27	29.3.27
Bogota	Pape, E. R.	S. E. Ayland	" M.	R.M.S.P. Co.	" 24.7.27 to 1.8.27	19.8.27
Bolingbroke	Murray, M. F.	J. B. Hewson, F. G. Webster, N. Scallon, R. Davidson.	M.L.	Canadian Pacific	Met. Log. 16.9.26 to 23.3.27	25.5.27
Borda	Holland, R.	"	No. M.	P. & O. Branch	Form 911 18.2.27 to 28.6.27	7.7.27
Bothwell	Rothwell, A. J.	— Biggs	" A.	Canadian Pacific	" 6.3.27 to 14.4.27	20.4.27
Brecon	Rothwell, A.	E. H. Coleman	" A.	"	" 5.5.27 to 6.6.27	14.6.27
Brenda	Lamont, A.	N. Ross	" A.	Scottish Fishery Board	" 1.7.27 to 29.7.27	3.8.27
Brighton	Hill, A.	Mr. Munton	C.C.	Southern Railway	Telegraphic Report 1.8.27	1.8.27
British Advocate	Taylor, R. J.	E. Williams	No. M.	British Tankers	Form 911 15.2.27 to 1.4.27	8.4.27
British Engineer	Joures, F. W.	W. Evans	" M.	"	" 11.2.27 to 26.2.27	25.5.27
British Enterprise	Putt, R. O.	T. Seaman	" M.	"	" 30.4.27 to 18.7.27	5.8.27
British Soldier	Putt, R. O.	H. J. Crangle	" A.	"	Form 911 17.11.26 to 10.12.26	3.1.27
Bronte	Crapper, J. S.	W. Jones, C. E. Legg	" A.	Lampert & Holt	" 5.6.27 to 1.7.27	8.8.27
Burma	Reid, R. B.	J. Henderson	" A.	Henderson	" 24.7.26 to 10.10.26	29.10.26
Cambria C.S.	Sherwood, C. A., D.S.C.	A. J. English, B. C. Farrow, C. F. St. John.	No.	Eastern Tel. Co.	Met. Log. 9.9.26 to 25.1.27	23.2.27
Cambria	Telfer, J. E., O.B.E.	V. S. Phillips	C.C.	L.M. & S. Rly	Telegraphic Report 15.8.27	15.8.27
Cameronia	Gemmell, W.	W. Black	No. A.	Anchor	Form 911 8.5.27 to 5.6.27	23.6.27
Camilo	Forrester, W. T., O.B.E.	H. H. Dunning, J. McIntyre, C. M. Schofield.	M.L.	Elders & Fyffes	Met. Log. 28.3.27 to 24.7.27	29.7.27
Canadian Importer	Forson, A.	G. R. Randall	No. A.	Canadian Gov. Mercantile Marine.	Form 911 21.6.27 to 24.7.27	11.8.27
Canadian Inventor	Boulton, F. W.	O. Dalcorn	" A.	"	" 13.2.27 to 2.6.27	9.6.27
Canadian Scottish	Wallace, C.	"	" A.	"	" 26.5.27 to 11.7.27	19.8.27
Canadian Skirmisher.	Millar, W. H.	"	" A.	"	" 19.11.26 to 5.1.27	11.1.27
Canadian Winner	Hocking, N. P.	"	" M.	"	" 26.5.27 to 21.6.27	7.7.27
Canonesa	Brodie, W. H.	"	" M.	Houlder Bros.	"	"
35 Carmania	Brown, F. G., R.D., Capt., R.N.R.	W. M. Stewart, P. L. Williams, D. E. Sibson.	W.T.	Cunard	W.T. Reg. 11.7.27 to 29.7.27	2.8.27
Carnarvon Castle	Hague, J. W., Commr., R.N.R.	S. Colbourne, H. A. Causton, G. Gorringe, H. Iddes.	M.L.	Union Castle	Met. Log. 24.12.26 to 17.4.27	1.5.27
34 Caronia	Hossack, W. H., R.D., Capt., R.N.R.	M. Boston, H. G. Hayward, D. McMillan.	W.T.	Cunard	W.T. Reg. 4.7.27 to 22.7.27 Form 911 4.7.27 to 23.7.27	3.8.27 3.8.27
Casanare	Steidelmann, H.	R. O. Jones	No. A.	Elders & Fyffes	" 14.5.27 to 18.6.27	27.6.27
Cavina	Riseley, A. D.	W. J. Dodd	" A.	"	" 20.6.27 to 22.7.27	28.7.27
52 Cedric	Smith, R. G.	S. S. Fieldwood, D. W. Chamberlain, E. Lloyd.	W.T.	White Star	W.T. Reg. 17.7.27 to 7.8.27 Form 911 17.7.27 to 7.8.27	10.8.27 10.8.27
53 Celtic	Berry, G.	J. Peters, T. Pratt	"	"	W.T. Reg. 4.7.27 to 24.7.27 Form 911 3.7.27 to 24.7.27	27.7.27 28.7.27
Centaur	Rose, A. F.	L. Johnstone	No. M.	A. Holt & Co.	" 22.12.26 to 2.2.27	14.3.27
Ceramic	Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R.	H. J. Yates	" A.	White Star	" 14.4.27 to 20.5.27	21.5.27
Changte	Gambrill, F. C.	J. Thomas, D. D. Tyer, J. A. Allan.	M.L.	Yuill & Co.	Met. Log. 18.12.26 to 8.4.27	7.6.27
Changuinola	Thorburn, R. A.	"	No.	Elders & Fyffes	"	"
China	Furlong, G. H. S., R.D., Capt., R.N.R.	M. K. Stone	No. M.	P. & O.	Form 911 8.10.26 to 27.10.26	15.11.26
Chindwara	Brooks, E. G.	J. J. Smith	" M.	British India	" 20.11.26 to 28.11.26	29.12.26
Chindwin	Esslemont, C.	W. D. Tulloch	" A.	Henderson	" 22.1.27 to 8.4.27	13.4.27
Chirripo	McColm, F.	"	No.	Elders & Fyffes	"	"
City of Baroda	McMillan, J.	A. Beaton, E. H. Routledge, H. C. Snow.	M.L.	Ellerman	Met. Log. 3.2.27 to 17.5.27	27.6.27
City of Benares	Anderson, W. W.	C. G. Inglis	No. A.	"	Form 911 9.5.27 to 2.6.27	9.6.27
City of Brisbane	Seaborne, F. O., D.S.C.	R. M. Redhead	" A.	"	" 11.3.27 to 8.5.27	11.5.27
City of Canterbury	Bremner, D. M.	W. F. Munro	" A.	"	" 19.5.27 to 15.6.27	21.6.27
City of Carlisle	Mordue, J. A.	"	" A.	"	" 1.5.27 to 22.5.27	9.6.27
City of Chester	Letton, F. W.	H. Asher, W. Speakman, H. A. Hazell.	M.L.	"	Met. Log. 21.9.26 to 5.2.27	23.2.27
City of Edinburgh	Wyper, J.	N. G. Fraser	No. M.	"	Form 911 17.2.27 to 9.4.27	13.4.27
City of Hong Kong	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	"	" A.	"	" 29.4.27 to 22.5.27	1.6.27
City of London	Parker, F. W., R.D., Commr., R.N.R.	J. McHattie	" A.	"	" 26.2.27 to 8.5.27	28.5.27
City of Rangoon	Jones, P.	E. R. Wildermoth, R. H. Stewart, G. T. Willet.	M.L.	"	Met. Log. 22.1.27 to 4.6.27	29.6.27
City of Venice	Lee, A.	"	No. A.	"	Form 911 2.3.27 to 17.3.27	4.5.27
City of Yokohama	McDonald, W. D.	W. N. M. Faichney	" A.	"	" 14.5.27 to 28.6.27	16.7.27
Clan Alpine	Lyall, A. B.	H. J. Winchester	" A.	Clan	" 17.6.27 to 6.7.27	10.8.27
Clan Lamont	Urquhart, P., D.S.C.	P. de Gruchy	" A.	"	" 26.6.27 to 9.7.27	18.7.27

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.8.27.	Date Received.
<i>Clan Lindsay</i> ...	Worthington, J. H. ...	E. P. Smith ...	No. A.	Clan ...	Form 911 26.5.27 to 11.6.27 ...	20.6.27
<i>Clan Macbeth</i> ...	Young, A. H., R.D., Lieut. - Comdr. R.N.R.	J. M. Lorimer ...	" A.	" ...	" 18.6.27 to 11.7.27 ...	13.8.27
<i>Clan Macfadyen</i> ...	Stenson, F. J. R.D., Capt. R.N.R.	H. M. Wavell ...	" A.	" ...	" 25.3.27 to 23.4.27 ...	27.4.27
<i>Clan Macgillivray</i> ...	West, W. F. ...	R. W. Roberts ...	" A.	" ...	" 27.4.27 to 24.5.27 ...	20.6.27
<i>Clan Macindoe</i> ...	Low, A. ...	D. McAllister ...	" A.	" ...	" 10.5.27 to 4.6.27 ...	28.6.27
<i>Clan Mackellar</i> ...	Smith, W. P. ...	G. A. A. Grant ...	" A.	" ...	" 16.7.27 to 28.7.27 ...	9.8.27
<i>Clan Mackinnon</i> ...	McCormish, A. B. ...	W. F. Isaac, G. E. G. Davey, J. W. Innes.	M.L.	" ...	Met. Log. 21.12.26 to 5.5.27 ...	13.5.27
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	D. S. Rae, A. F. Martin, W. A. Shewan.	"	" ...	" 14.5.26 to 2.5.27 ...	9.6.27
<i>Clan Macnaughton</i> ...	Simpson, A. W. ...	F. Cossar ...	No. A.	" ...	Form 911 8.6.27 to 27.6.27 ...	3.8.27
<i>Clan Macnagart</i> ...	Mee, F. T. ...	S. A. Carter, R. J. Richardson	" A.	" ...	" 9.4.27 to 16.5.27 ...	21.5.27
<i>Clan Macwhirter</i> ...	Waterhouse, J. ...	R. W. Roberts ...	M.L.	" ...	" 26.11.26 to 12.12.26 ...	17.12.26
<i>Clan Macwilliam</i> ...	Thompson, W. ...	T. B. Cranwill ...	No. A.	" ...	" 7.12.26 to 20.6.27 ...	11.7.27
<i>Clan Malcolm</i> ...	Neill, G. A. ...	J. T. Bell, H. V. Wightman, A. R. McDonald.	M.L.	" ...	Met. Log. 23.9.26 to 3.3.27 ...	30.3.27
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	L. C. Higgins ...	No. A.	" ...	Form 911 5.7.27 to 2.8.27 ...	3.8.27
<i>Clan Murdoch</i> ...	Miller, W. ...	H. F. M. Preston ...	" A.	" ...	" 25.5.27 to 14.6.27 ...	22.6.27
<i>Clan Ranald</i> ...	Laird, C. ...	J. B. Templeman ...	" A.	" ...	" 16.5.27 to 14.6.27 ...	27.6.27
<i>Clan Ross</i> ...	Openshaw, L. G. ...	H. T. Booth ...	" A.	" ...	" 6.8.27 to 20.6.27 ...	25.7.27
<i>Clan Sinclair</i> ...	George, L. S. ...	N. Macleod ...	" A.	" ...	" 8.6.27 to 30.7.27 ...	9.8.27
<i>Clan Urquhart</i> ...	Baker, E. W. ...	E. A. Hewson ...	" A.	" ...	" 8.2.27 to 8.5.27 ...	12.5.27
<i>Colonia, C.S.</i> ...	Carlton, G. F., O.B.E., Commr., R.N.R.	W. E. Allen, W. F. Anderson, F. B. Bolingbroke.	M.L.	Telegraph Construction & Maintenance. Leyland	Met. Log. 4.12.26 to 25.2.27 ...	8.3.27
<i>Colonian</i> ...	Gitins, R. P. ...	... ..	No. A.	" ...	Form 911 15.4.27 to 8.6.27 ...	10.6.27
<i>Comorin</i> ...	Borland, J. Mc. I., C.B., D.S.O., R.D., Capt., R.N.R.	B. Pollitt ...	" M.	P. & O. ...	" 26.2.27 to 2.6.27 ...	8.6.27
<i>Concordia</i> ...	Telfer, J. H. ...	T. Philip, W. Law, L. H. Hobson.	M.L.	Anchor Donaldson ...	Met. Log. 5.2.27 to 11.7.27 ...	14.7.27
<i>Corinthic</i> ...	Hart, F. ...	E. Burt, M. Bennett, S. A. Macnaughton.	"	White Star ...	" 24.4.27 to 6.8.27 ...	10.8.27
<i>Cornwall</i> ...	Haines, F. P. ...	H. S. White ...	No. A.	Federal ...	Form 911 26.1.27 to 28.2.27 ...	12.4.27
<i>Craftsman</i> ...	Gibbins, W. ...	J. Williams ...	" A.	Harrison ...	" 15.4.27 to 14.7.27 ...	16.7.27
<i>Crawford Castle</i> ...	Morgan, A. O., R.D., Commr., R.N.R.	J. A. Wilson ...	" A.	Union Castle ...	" 12.5.27 to 30.6.27 ...	7.7.27
<i>Culebra</i> ...	Mackay, A. S., R.D., Commr., R.N.R.	P. Cooper, R. W. Hurst, G. Ferguson.	M.L.	R.M.S.P. Co. ...	Met. Log. 15.5.27 to 15.7.27 ...	27.7.27
<i>Chumberland</i> ...	Macmillan, D. ...	J. D. Marks ...	No. A.	Federal ...	Form 911 16.3.27 to 23.4.27 ...	28.7.27
<i>Cuthbert</i> ...	Barlow, F. P. ...	... ..	" A.	Booth ...	" 25.6.27 to 16.7.27 ...	3.8.27
<i>Cyclops</i> ...	Cosker, W. ...	J. R. C. Evans ...	" A.	A. Holt ...	" 13.6.27 to 15.7.27 ...	15.8.27
<i>Dardanus</i> ...	Williams, D. T. ...	C. F. Morgan ...	" M.	" ...	" 3.5.27 to 26.7.27 ...	11.8.27
<i>Dartan</i> ...	Masters, W. ...	... ..	" A.	Leyland ...	" 9.7.27 to 21.7.27 ...	25.7.27
<i>Darro</i> ...	Matthews, G. P. ...	W. Halder-Campe ...	" M.	R.M.S.P. Co. ...	" 28.5.27 to 22.7.27 ...	25.7.27
<i>Demerara</i> ...	Shillito, B., R.D., Commr., R.N.R.	J. R. Baty ...	" M.	" ...	" 17.5.27 to 7.7.27 ...	14.7.27
<i>Demosthenes</i> ...	Ogilvy, A. ...	J. Cruickshank ...	" M.	Aberdeen ...	" 27.6.27 to 11.7.27 ...	3.8.27
<i>Desado</i> ...	Furvis, A. ...	... ..	" M.	R.M.S.P. Co. ...	" 11.6.27 to 6.8.27 ...	16.8.27
<i>Desna</i> ...	Green, J. ...	A. F. Walker ...	" M.	" ...	" 3.12.26 to 19.1.27 ...	31.1.27
<i>Deucalion</i> ...	Melling, C. F. ...	R. Wilson ...	" A.	A. Holt ...	" 28.5.27 to 20.6.27 ...	11.7.27
<i>Dieppe</i> ...	Marmery, S. ...	Mr. Parsons ...	C.C.	Southern Railway ...	Telegraphic Report 19.8.27 ...	19.8.27
<i>Dimboola</i> ...	Lloyd, T. L. ...	H. L. Price ...	No. A.	Melbourne S.S. Co. ...	Form 911 11.6.27 to 7.7.27 ...	9.8.27
<i>Discoverer</i> ...	Ling, J. T. ...	H. W. Gostage ...	" M.	Harrison ...	" 8.4.27 to 9.7.27 ...	12.7.27
<i>Discovery</i> , R.R.S.	Stenhouse, J. R., D.S.O., D.S.C., O.B.E., R.D., Commr., R.N.R.	T. W. Goodchild ...	M.L.	Discovery Expedition	Met. Log. 21.9.26 to 31.1.27 ...	20.7.27
<i>Domala, M.V.</i> ...	Kitson, A. G. ...	J. G. Wallace ...	No. M.	British India ...	Form 911 28.3.27 to 4.6.27 ...	15.6.27
<i>Domitia, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr., R.N.R.	S. A. Garnham, C. Bullock, L. J. Hegarty, R. Johnson.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 11.9.26 to 4.2.27 ...	25.2.27
<i>Doric</i> ...	Kearney, J., Lieut.- Commr., R.N.R.	H. R. Wilkinson ...	No. A.	White Star ...	Form 911 10.7.27 to 30.7.27 ...	4.8.27
<i>Doric Star</i> ...	Thomas, R. T. ...	L. McDermott ...	" A.	Blue Star ...	" 22.11.26 to 20.12.26 ...	10.1.27
<i>Dorington Court</i> ...	Clarke, E. J. ...	E. W. Blomberg ...	" A.	Haldin & Co. ...	" 11.2.27 to 1.5.27 ...	9.5.27
<i>Dromore Castle</i> ...	Vincent, E. S., R.D., Commr., R.N.R.	D. H. McDougall ...	" A.	Union Castle ...	" 10.12.26 to 3.4.27 ...	13.4.27
<i>Dryden</i> ...	Major, T. W. ...	... ..	" M.	Lampart & Holt ...	" 27.2.27 to 18.3.27 ...	4.5.27
<i>Dueñas</i> ...	Pape, E. R. ...	S. E. Ayland ...	" M.	P.S.N. Co. ...	" 9.7.27 to 23.7.27 ...	5.8.27
<i>Dunaff Head</i> ...	Butt, H. L., R.D., Commr., R.N.R.	S. Duff ...	" A.	Ulster S.S. Co. ...	" 3.2.27 to 15.5.27 ...	23.5.27
<i>Dundrum Castle</i> ...	Weller, H. E. ...	H. H. F. Trew ...	" A.	Union Castle ...	" 17.6.27 to 15.7.27 ...	28.7.27
<i>Dunrobin</i> ...	Ramsay, J. D. ...	C. H. Kendall ...	" A.	Glen & Co. ...	" 27.5.27 to 2.7.27 ...	13.7.27
<i>Duquesa</i> ...	Ellis, F., D.S.C.	E. W. Denman ...	" A.	Furness Withy ...	" 12.6.27 to 10.8.27 ...	18.8.27
<i>Durenda</i> ...	Beeching, P. H. ...	... ..	" A.	British India ...	" ... ..	...
<i>Edinburgh Castle</i> ...	Knight, A. ...	... ..	No. A.	Union Castle ...	" 6.5.27 to 22.5.27 ...	24.5.27
<i>Egri</i> ...	Sola, P., D.S.O. ...	... ..	No.	Elder Dempster ...	" ... ..	...
<i>Egyptian Prince</i> ...	Ord, T. ...	... ..	" A.	Prince ...	" 13.1.27 to 7.3.27 ...	31.3.27
<i>El Paraguayo</i> ...	St. Pierre, P. ...	S. B. Wright ...	" M.	Houlder Bros. ...	" 22.5.27 to 13.7.27 ...	9.8.27
<i>Elpenor</i> ...	Gordon, A. L. ...	M. Robertson, C. Kavanagh	M.L.	A. Holt ...	Met. Log. 27.3.27 to 30.7.27 ...	18.8.27
<i>Elysia</i> ...	Duncan, A. R. ...	A. Laidlaw, H. C. Fry, J. Herbert.	"	Anchor ...	" 4.5.27 to 7.7.27 ...	13.7.27
<i>Empress of Asia</i> ...	Douglas, L. D. R.D., Lt.-Commr., R.N.R. (Robinson, S., C.B.E., R.D., Commr., R.N.R.)	P. Sinclair, L. G. Goddard, R. Hickey.	"	Canadian Pacific ...	" 6.2.27 to 27.5.27 ...	2.7.27
<i>Empress of Canada</i> ...	Hailey, A. J. ...	... ..	"	" ...	" 26.2.27 to 18.6.27 ...	14.7.27
<i>Empress of France</i> ...	Griffiths, E. ...	E. Roberts, W. Ewens, W. Pickersgill.	"	" ...	" 29.1.27 to 15.4.27 ...	1.5.27
<i>Empress of Russia</i> ...	Hosken, A. J. ...	F. A. R. Dobbin ...	"	" ...	" 25.12.26 to 8.5.27 ...	13.6.27
<i>Empress of Scotland</i> ...	Latta, R. G. ...	P. Powys Smith, T. Sargent, E. Aikman.	"	" ...	" 14.11.26 to 22.4.27 ...	3.5.27
<i>Endeavour</i> ...	Commr. S. A. Geary- Hill, D.S.O., R.N.	C. S. E. Lansdown ...	M.L.	His Majesty's Ship ...	" 14.3.27 to 11.7.27 ...	19.7.27
<i>Essequibo</i> ...	Kite, E. ...	J. E. Williams ...	No. M.	R.M.S.P. Co. ...	Form 911 14.7.27 to 31.7.27 ...	13.8.27
<i>Eumaeus</i> ...	Read, J. W. ...	J. L. Millar ...	" A.	A. Holt ...	" 6.3.27 to 6.5.27 ...	14.6.27
<i>Euripides</i> ...	Collins, P. J., O.B.E.	H. S. Cox, K. D. Fisher, P. Congdon.	M.L.	Aberdeen ...	Met. Log. 1.1.27 to 8.5.27 ...	14.5.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.8.27.	Date Received.
<i>Buryades</i> ...	Stewart, J. R. ...	...	No. A.	A. Holt ...	Form 911 20.5.27 to 5.6.27 ...	15.8.27
<i>Explorer</i> ...	Ling, J. T. ...	...	" M.	Harrison ...	...	...
<i>Explorer</i> ...	Allan, J. ...	A. Stout ...	" A.	Scottish Fishery Board.	Form 911 19.7.27 to 30.7.27 ...	3.8.27
<i>Ferndale</i> ...	Daniel, F. ...	D. Jones, R. T. Hartrick ...	" M.	Commonwealth Govt.	" 4.7.27 to 7.8.27 ...	12.8.27
<i>Flandria</i> ...	Maars, L. ...	T. Doornbosch ...	" M.	Holland Lloyd ...	" 15.4.27 to 2.6.27 ...	9.6.27
<i>Francisco</i> ...	Scales, H. ...	J. C. Nettleship ...	" A.	Ellerman Wilson ...	" 31.3.27 to 6.7.27 ...	8.7.27
<i>Freya</i> ...	Angus, W. ...	W. Pirrie ...	" A.	Scottish Fishery Board.	" 1.7.27 to 26.7.27 ...	5.8.27
<i>Gaika</i> ...	Whitfield, G. J. ...	R. E. H. Partington ...	" A.	Union Castle ...	" 26.1.27 to 21.4.27 ...	4.5.27
<i>Galtymore</i> ...	Yeoman, J. T. ...	R. B. Gurner ...	" M.	Furness Withy ...	" 27.5.27 to 5.6.27 ...	27.7.27
<i>Garoot</i> ...	Visser, C. W. ...	C. J. Vandenoorn ...	" M.	Rotterdam Lloyd ...	" 26.6.27 to 15.7.27 ...	25.7.27
<i>Garth Castle</i> ...	Jackson, C. R. ...	W. S. J. Aldous ...	" A.	Union Castle ...	" 28.5.27 to 18.6.27 ...	22.8.27
<i>Gelria</i> ...	Veldkamp, C. J. ...	T. van der Mast ...	" M.	Holland Lloyd ...	" 24.6.27 to 14.7.27 ...	16.7.27
<i>Geranium</i> ...	Bennett, H. T., D.S.O., Commr., R.A.N.	...	No. M.	His Majesty's Australian Ship.	...	...
<i>Glamorganshire</i> ...	Spriddell, F. G., R.D., Commr., R.N.R.	T. G. S. Cains ...	M.L.	R.M.S.P. Co. ...	Form 911 12.6.27 to 1.7.27 ...	25.7.27
<i>Glenamoy, M.V.</i> ...	Homan, C. E. ...	R. H. Bishop ...	" A.	Glen Line ...	" 11.6.27 to 24.6.27 ...	5.7.27
<i>Glengarry</i> ...	Angier, J. ...	C. S. Brewer ...	" M.	" ...	" 25.6.27 to 6.7.27 ...	13.7.27
<i>Glenluce</i> ...	Kennett, W. H. ...	H. B. Porter ...	" A.	" ...	" 24.7.27 to 5.8.27 ...	15.8.27
<i>Glenshane</i> ...	Beer, E. ...	D. C. Evans ...	" A.	" ...	" 4.2.27 to 21.4.27 ...	4.5.27
<i>Gloucestershire</i> ...	Robin, E. ...	H. J. Jarrett ...	" A.	Bibby ...	" 12.3.27 to 20.5.27 ...	23.5.27
<i>Gorjon</i> ...	Hughes, J. W. ...	A. E. Bowlt, E. W. Powell, J. M. T. Edward.	M.L.	A. Holt & Co. ...	Met. Log. 29.10.27 to 7.4.27 ...	9.5.27
<i>Grantully Castle</i> ...	Whitfield, G. T. ...	R. Wren ...	No. A.	Union Castle ...	Form 911 3.6.27 to 14.8.27 ...	17.8.27
<i>Halesius</i> ...	Samuels, C. ...	L. W. Cook ...	" A.	R. P. Houston ...	" 3.6.27 to 21.7.27 ...	25.7.27
<i>Haliartius</i> ...	Marsh, L. V. ...	...	" A.	" ...	" 25.6.27 to 19.7.27 ...	15.8.27
<i>Harmonides</i> ...	Hughes, W. F. ...	S. S. Davidson ...	" A.	" ...	" 10.4.27 to 2.5.27 ...	16.5.27
<i>Hatarana</i> ...	Graham, H. A. ...	...	M.L.	British India ...	...	...
<i>Hatimura</i> ...	Lane, S. R., R.D., Capt., R.N.R.	W. Tingle, R. W. Scotchman	No. M.	" ...	Form 911 13.3.27 to 21.7.27 ...	3.8.27
<i>Hauraki, M.V.</i> ...	Frew, J. D. ...	B. F. Fisher ...	M.L.	Union S.S. Co., N.Z. ...	Met. Log. 11.8.26 to 6.3.27 ...	9.6.27
<i>Henry Holmes, C.S.</i>	Bicker Caarten, A. ...	M. A. Green ...	No. M.	W. I. & Panama Telegraph Co.	Form 911 1.6.27 to 27.7.27 ...	18.8.27
<i>Herald</i> ...	Silk, H. V., Lieut-Commr., R.N. Haselfoot, F.E.B., Capt., R.N.	D. G. V. Williams ...	M.L.	His Majesty's Ship ...	Met. Log. 1.3.27 to 20.6.27 ...	3.8.27
<i>Herefordshire</i> ...	Mann, R. P. ...	H. R. Mackay ...	No. A.	Bibby ...	Form 911 21.8.26 to 29.1.27 ...	7.2.27
<i>Herminius</i> ...	Roberts, T. V. ...	O. C. Hayles ...	" A.	Shaw, Savill & Albion	" 24.2.27 to 10.4.27 ...	15.8.27
<i>Herschel</i> ...	Watson, W. W. ...	J. F. Maurey ...	" A.	Lamport & Holt ...	" 13.4.27 to 3.7.27 ...	25.7.27
<i>Hertford</i> ...	Urquhart, D. ...	A. Robertson ...	" A.	Federal ...	" 22.5.27 to 13.6.27 ...	25.7.27
<i>Hibernia</i> ...	Tanner, E. B., O.B.E.	R. Woodall ...	C.C.	L.M. & S. Railway ...	Telegraphic Report 19.8.27 ...	19.8.27
<i>Highland Laddie</i> ...	Jones, T. J. ...	E. F. Smart ...	No. A.	Nelson ...	Form 911 9.5.27 to 27.5.27 ...	12.7.27
<i>" Piper</i> ...	Collings, D. ...	S. E. Jackson, R. G. Owen, G. E. Leech.	M.L.	" ...	Met. Log. 11.10.26 to 12.5.27 ...	8.6.27
<i>" Pride</i> ...	Robinson, R. H. ...	...	No. A.	" ...	Form 911 8.4.27 to 6.6.27 ...	10.6.27
<i>" Prince</i> ...	Brown, J. B. ...	S. A. Wheaton ...	" A.	Prince ...	" 24.6.27 to 14.7.27 ...	28.7.27
<i>" Rover</i> ...	Ashby Graves, F. ...	C. C. Legg ...	" A.	Nelson ...	" 25.4.27 to 11.6.27 ...	23.6.27
<i>Hildebrand</i> ...	Maddrell, J. ...	...	" A.	Booth ...	" 18.5.27 to 30.6.27 ...	12.7.27
<i>Hobson's Bay</i> ...	Kydd, O. J. ...	R. Pearce, G. Clinch, H. Benson, H. Hendy.	M.L.	Commonwealth Govt.	Met. Log. 18.1.27 to 8.5.27 ...	18.5.27
<i>Holbein</i> ...	Gough, W. A. ...	H. L. Rudd ...	No. A.	Lamport & Holt ...	Form 911 2.4.27 to 9.6.27 ...	20.6.27
<i>54 Homeric</i> ...	Holme, A. ...	A. E. Dyer, H. G. Morgan, S. B. Morfee.	W.T.	White Star ...	W.T. Reg. 14.7.27 to 29.7.27 ...	2.8.27
<i>Hororata</i> ...	Holland, E. ...	B. Evans, F. Malcouronne ...	No. A.	New Zealand S.S. Co.	Form 911 22.1.27 to 17.5.27 ...	21.5.27
<i>Hubert</i> ...	Evans, L. ...	S. G. Edwards ...	" A.	Booth ...	" 14.6.27 to 2.8.27 ...	12.8.27
<i>Huntingdon</i> ...	Ashworth, W. ...	A. Carlyon ...	" A.	Federal ...	" 4.5.27 to 27.5.27 ...	12.7.27
<i>Huntsman</i> ...	Russell, H. ...	...	" M.	Harrison ...	" 5.7.27 to 18.7.27 ...	15.8.27
<i>Hurunui</i> ...	Burton Davies, J. ...	J. Oxnard, F. Longheed, L. Cann, K. Goldsworthy.	M.L.	New Zealand S.S. Co.	Met. Log. 2.1.27 to 23.6.27 ...	28.6.27
<i>Ingoma</i> ...	Barrow, R. K. ...	D. G. Russell ...	No. M.	Harrison ...	Form 911 17.6.27 to 28.7.27 ...	15.8.27
<i>Inkum</i> ...	Meetham, J. T. ...	...	" A.	J. H. Welsford ...	...	...
<i>Iris, C.S.</i> ...	Hughes, H. R. ...	W. Oliver, D. Bruce, D. Macdonald, T. Vickers.	M.L.	Pacific Cable Board ...	Met. Log. 23.1.26 to 25.4.26 ...	5.10.26
<i>Iroquois</i> ...	Jackson, A. L., Commr., R.N.	H. L. Jenkins ...	"	His Majesty's Ship ...	" 24.8.26 to 3.12.26 ...	15.2.27
<i>Ixion</i> ...	Reed, G. C. ...	M. H. Vincent ...	No. A.	A. Holt ...	Form 911 31.5.27 to 11.7.27 ...	18.8.27
<i>Japanese Prince</i> ...	Naylor, E. ...	W. Venn ...	" A.	Prince ...	" 5.5.27 to 6.6.27 ...	23.6.27
<i>Jervis Bay</i> ...	Chaplin, W. R. ...	R. W. Laycock ...	" M.	Commonwealth Govt.	" 30.3.27 to 18.4.27 ...	9.5.27
<i>John Pender, C.S.</i>	Smythe, T. W. ...	H. W. Milne ...	" A.	Eastern Tel. Co. ...	" 8.9.26 to 25.9.26 ...	25.10.26
<i>Justin</i> ...	Lee, O. J. P., R.D., Commr., R.N.R.	...	" A.	Booth ...	" 17.6.27 to 1.7.27 ...	5.7.27
<i>Kaiser-i-Hind</i> ...	Manley, G. ...	A. H. Cole ...	" M.	P. & O. ...	" 4.6.27 to 22.6.27 ...	27.6.27
<i>Kalyan</i> ...	Cotching, A. ...	...	" M.	" ...	...	...
<i>Kamo Maru</i> ...	Shiratori, S. ...	...	" A.	Nippon Yusen Kaisha	Form 911 15.1.27 to 15.2.27 ...	6.4.27
<i>Kangaroo</i> ...	Norris, H. C. ...	V. J. Denton, V. L. Gilbert, Turner, J. E. ...	M.I.	State Service Australia.	Met. Log. 21.11.26 to 30.4.27 ...	13.6.27
<i>Karaparā</i> ...	Miller, A. C. ...	H. Brackenridge.	No. M.	British India ...	Form 911 24.11.26 to 7.1.27 ...	24.1.27
<i>Kashmir</i> ...	Stringer, R. H., O.B.E., R.D., Commr., R.N.R.	J. H. Anderson ...	" M.	P. & O. ...	" 11.6.27 to 17.7.27 ...	19.7.27
<i>Kenilworth Castle</i>	Chave, Sir B., K.B.E.	...	M.L.	Union Castle ...	Met. Log. 8.8.26 to 30.1.27 ...	5.4.27
<i>Kent</i> ...	Downton, M. M. ...	F. M. Knight ...	No. A.	New Zealand S.S. Co.	Form 911 28.7.26 to 31.8.26 ...	8.9.26
<i>Khiva</i> ...	Cooper, C. P., O.B.E., R.D., Capt., R.N.R.	G. W. Wood, F. Hewison, E. Allen.	M.L.	P. & O. ...	Met. Log. 12.3.27 to 19.4.27 ...	8.6.27
<i>Khyber</i> ...	Hester, C. W., R.D., Commr., R.N.R.	C. B. Roche, E. J. Parry, H. D. Case, G. S. B. Collard.	"	P. & O. ...	" 1.1.27 to 19.5.27 ...	23.5.27
<i>Kia Ora</i> ...	McIntosh, A. ...	E. A. Hickling ...	"	Shaw Savill & Albion	" 30.1.27 to 15.6.27 ...	20.6.27
<i>Knight Companion</i>	Cox, B. T. ...	A. Lamb, D. W. Williams ...	No. M.	A. Holt ...	Form 911 16.3.27 to 31.7.27 ...	3.8.27
<i>Koolinda, M.V.</i>	Norris, H. ...	J. S. Airey ...	" M.	State Service Australia.	" 9.5.27 to 25.5.27 ...	28.6.27
<i>Kovno</i> ...	Dossor, W. A. ...	A. Snowdon, S. N. Stokes, N. W. Glendenning.	M.L.	Ellerman Wilson ...	Met. Log. 30.10.26 to 13.6.27 ...	18.7.27
<i>Kyogle</i> ...	Coalstad, C. ...	E. W. Hughes, C. B. Odman	No. A.	Commonwealth Light-house Service.	Form 911 26.11.26 to 19.12.26 ...	7.2.27
<i>37 Laconia...</i>	Britten, E. T., R.D., Commr., R.N.R.	J. Ashcroft, H. R. Lane, J. W. Caunce, G. Noonan.	W.T.	Cunard ...	W.T. Reg. 27.6.27 to 17.7.27 ... 24.7.27 to 14.8.27 ... Form 911 26.6.27 to 14.8.27 ...	20.7.27 19.8.27 19.8.27

LIST OF VOLUNTARY OBSERVING SHIPS

V

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.8.27.	Date Received.
Laguna ...	Kirkwood, J. H. ...	E. A. Owen ...	No. A.	Pacific S.N. Co. ...	Form 911 9.3.27 to 27.3.27 ...	19.4.27
Lahore ...	Dawson, E. N. ...	W. G. Stevenson ...	" M.	P. & O. ...	" 27.11.26 to 31.12.26 ...	5.1.27
Lalande ...	Hamil, H. ...	A. E. Warburton ...	" A.	Lampport & Holt ...	" 25.3.27 to 26.6.27 ...	11.7.27
Lancashire ...	de Legh, P. ...	F. Holdsworth ...	" A.	Bibby ...	" 9.4.27 to 18.6.27 ...	27.6.27
36 Lancastria ...	Oram, B. B., R.D., Capt., R.N.R.	R. P. Cambell, L. R. Sharp, F. G. Russell.	W.T.	Cunard ...	W.T. Reg. 8.5.27 to 2.6.27 ... Form 911 7.5.27 to 2.6.27 ...	7.6.27 9.6.27
Laomedon ...	Beswick, W., D.S.C., Lt.-Commr., R.N.R.	H. A. Standfield ...	No. A.	A. Holt... ...	" 20.7.27 to 7.8.27 ...	17.8.27
La Paz, M.V. ...	Benson, C. W. ...	D. Beamer ...	" M.	Pacific S.N. Co. ...	" 13.5.27 to 30.7.27 ...	3.8.27
Laplace ...	Shaw, W. ...	A. L. Murray, E. D. Coitnam	" A.	Lampport & Holt ...	" 18.11.26 to 31.3.27... ..	13.4.27
55 Lapland ...	Knight, R. A. ...	E. Cornellie, T. Wills... ..	W.T.	Red Star ...	W.T. Reg. 26.6.27 to 14.7.27 ... Form 911 26.6.27 to 14.7.27 ...	18.7.27
Leaturo, M.V. ...	Dunn, R. E., O.B.E... ..	E. Sandon ...	No. M.	Pacific S.N. Co. ...	" 6.6.27 to 26.6.27 ...	13.7.27
Leicestershire ...	Lyon, H. ...	J. Cullen, P. Hawkins, J. K. Gemmell, H. S. Vickers.	M.L.	Bibby ...	Met. Log. 13.2.27 to 15.4.27 ...	27.4.27
Leighton, M.V. ...	Lindesay, J. M. ...	J. T. A. Thomson ...	No. A.	Lampport & Holt ...	Form 911 21.2.27 to 12.3.27 ...	4.4.27
Lehrim ...	Kemp, E. R. ...	C. R. Brown ...	" A.	Dowie, J., & Co. ...	" 28.5.27 to 22.6.27 ...	18.7.27
Llandaff Castle ...	Morton Betts, W. ...	R. Bayen ...	" A.	Union Castle ...	" 19.5.27 to 9.6.27 ...	5.7.27
Llandoverly Castle ...	Owens, G. ...	C. H. Williams, G. Moon, M. J. G. Freeman.	M.L.	" ...	Met. Log. 5.5.27 to 14.7.27 ...	15.7.27
Loch Katrine ...	Buret, T. J. C. ...	R. J. Finch ...	No. M.	R.M.S.P. Co. ...	Form 911 5.2.27 to 2.5.27 ...	12.5.27
London Commerce ...	Young, H. J., D.S.C... ..	H. P. Longland... ..	" A.	Furness Withy ...	" 9.7.27 to 20.7.27 ...	15.8.27
London Importer ...	Fowler, W. H. ...	J. S. Williams, J. H. Metcalfe, J. G. Freeman.	M.L.	" ...	Met. Log. 19.5.27 to 5.8.27 ...	19.8.27
Lora Antrim ...	Jarvis, F. E. ...	L. G. Kirwan ...	No. A.	Ulster S.S. Co. ...	Form 911 27.4.27 to 10.5.27 ...	23.5.27
Loriga, M.V. ...	Clapham, E. C. ...	E. W. Gill ...	" A.	Pacific S.N. Co. ...	" 28.1.27 to 12.4.27 ...	19.4.27
Losada, M.V. ...	Ross, J.... ..	E. Baxter ...	" M.	" ...	" 23.2.27 to 16.5.27 ...	24.5.27
Macedonia ...	Potter, H. W., R.D., Commr., R.N.R.	E. Lee ...	" M.	P. & O. ...	" 13.6.27 to 26.6.27 ...	5.8.27
Macharda ...	Tyers, W. O. ...	W. Cowie... ..	" M.	Brocklebank ...	" 17.6.27 to 27.7.27 ...	3.8.27
Maharani ...	Elliot, G. F. ...	M. Haslett ...	" M.	Asiatic S.N. Co. ...	Form 911 16.5.27 to 5.6.27 ...	7.7.27
Maihar ...	Rowe, J. P. ...	C. Shaw, C. Cadwallader, S. S. Slade.	M.L.	Brocklebank ...	Met. Log. 24.7.26 to 1.5.27 ...	10.5.27
Maimyo ...	Smith, G. C. ...	" ...	No. A.	Burns Philp ...	Form 911 26.5.27 to 1.7.27 ...	18.8.27
Maiwara ...	Brown, T. M. ...	" ...	M.L.	White Star ...	" ...	25.7.27
58 Majestic ...	Metcalfe, G. R. ...	W. W. Pearson, L. Thompson	W.T.	" ...	W.T. Reg. 7.7.27 to 21.7.27 ... Met. Log. 28.7.27 to 11.8.27 ...	15.8.27 17.5.27
Makambo ...	Brown, T. M. ...	F. C. Vogelmann, W. O. L. Wilding, J. B. Norris, R. W. Holmes.	M.L.	Burns Philp ...	Met. Log. 16.10.26 to 3.3.27 ...	17.5.27
Makura ...	Mawson, J. ...	A. Gell ...	"	Canadian- Australasian	Form 911 16.6.27 to 11.7.27 ...	25.7.27
Malabar ...	Hillman, E. J. ...	R. Morris ...	No. M.	Burns, Philp & Co. ...	Met. Log. 6.7.26 to 15.12.26 ...	23.3.27
Malakuta ...	Adamson, F. L. ...	N. Grayson ...	" M.	Brocklebank ...	Form 911 15.4.27 to 19.5.27 ...	24.5.27
Malancha ...	Whitham, F. ...	R. Humble, J. H. Round ...	" M.	" ...	" 12.4.27 to 22.6.27 ...	15.8.27
Malda ...	Baird, S. K. ...	D. J. B. Bailing... ..	" M.	British India ...	" 12.4.27 to 8.7.27 ...	12.7.27
Maloja ...	Manley, G. ...	A. D. Dennis ...	" M.	P. & O. ...	" 1.7.27 to 22.7.27 ...	16.8.27
Mamari ...	Falconer, H. ...	P. Campbell ...	" A.	Shaw, Savill & Albion	" 16.5.27 to 13.6.27 ...	28.7.27
Manchester Brigade ...	Stott, C. H. ...	W. S. Eustace ...	" A.	Manchester Liners ...	" 9.7.27 to 6.8.27 ...	9.8.27
Manchester Corporation ...	Makin, T. ...	H. Swindells ...	" A.	" ...	" 2.4.27 to 16.5.27 ...	9.6.27
Manchester Hero ...	Riley, J. E. ...	H. Anderton ...	M.L.	" ...	Met. Log. 16.2.27 to 27.6.27 ...	7.7.27
Manchester Regiment ...	Foale, J. R. ...	J. Shaw ...	No. A.	" ...	Form 911 28.5.27 to 25.6.27 ...	30.6.27
Manchester Shipper ...	Raper, E. W. ...	H. Swindells, C. A. Walker, W. R. Cullen.	M.L.	" ...	Met. Log. 10.12.26 to 16.6.27... ..	20.6.27
Manipur ...	Cochran, G. N. ...	R. Penston, K. Leadbetter ...	No. M.	Brocklebank ...	Form 911 6.1.27 to 4.2.27 ...	8.3.27
Mantua ...	Randell, G. G. ...	D. B. Leader ...	" M.	P. & O. ...	" 15.5.27 to 27.7.27 ...	13.8.27
Marella ...	Mortimer, S. ...	" ...	M.L.	Burns Philp ...	Met. Log. 3.10.25 to 7.11.26 ...	5.4.27
Mavengo ...	Williams, J. C., R.D., Commr., R.N.R.	F. Barnard, H. Bryon, J. Ford	"	Ellerman Wilson ...	" 14.1.27 to 21.2.27 ...	16.3.27
Margia ...	Milne, R. A., R.D., Commr., R.N.R.	P. Wright, H. E. Evans, R. M. Wyatt, R. A. Clarke.	No. A.	British India ...	" 27.2.27 to 7.5.27 ...	18.5.27
Marsina ...	Rothery, S. ...	H. C. Tarrington ...	No. A.	Burns, Philp & Co. ...	Form 911 15.9.26 to 6.10.26 ...	15.11.26
Masirah ...	Mallett, R. ...	A. E. Evans ...	" M.	Brocklebank ...	" 12.9.26 to 13.10.26... ..	16.11.26
Matakana ...	Thurston, H. P. ...	J. Hart, J. Dickson, G. E. Lindsay.	M.L.	Shaw, Savill & Albion	Met. Log. 1.2.27 to 13.3.27 ...	18.3.27
Mataram ...	Voy, W. ...	V. V. Edmonds... ..	No. A.	Burns, Philp & Co. ...	Form 911 26.12.26 to 20.1.27... ..	28.2.27
Mataroa ...	Kershaw, W. A. R. ...	T. T. Oliver, J. J. Nicoll, G. Lindsay.	M.L.	Shaw, Savill & Albion	Met. Log. 25.3.27 to 10.7.27 ...	12.7.27
Matheran ...	Ison, W. A. ...	L. Jeans, H. Simpson, J. Richardson	"	Brocklebank ...	" 2.2.27 to 29.4.27 ...	30.5.27
Matiana ...	Green, F. V. ...	R. M. Morrison ...	No. M.	British India... ..	Form 911 18.4.27 to 24.5.27 ...	25.5.27
Maungamui ...	Daye, A. H. ...	C. G. Eustace ...	" M.	Union S.S. Co. of N.Z.	" 4.6.26 to 9.7.26 ...	23.8.26
32 Mauretania ...	McNeil, S. G. S., R.D., Capt., R.N.R.	E. R. Taylor, J. A. Quarrie, G. Duguid.	W.T.	Cunard ...	W.T. Reg. 17.7.27 to 1.8.27 ...	3.8.27
Medic ...	Jones, W. H. ...	W. Nicoll... ..	No. A.	White Star ...	Form 911 10.3.27 to 18.4.27 ...	21.4.27
Megantic ...	Trant, E. L., R.D., Commr., R.N.R.	" ...	" A.	" ...	" 5.6.27 to 25.6.27 ...	29.6.27
22 Melita ...	Stewart, A. ...	J. Shearer ...	W.T.	Canadian Pacific ...	W.T. Reg. 10.7.27 to 28.7.27 ...	2.8.27
Mennon ...	Dougall, W. T. ...	R. E. Hannaford ...	No. A.	A. Holt... ..	Form 911 9.6.27 to 19.6.27 ...	22.7.27
21 Metagama ...	Freer, A., Capt., R.N.R.	R. Walker, H. J. Ferguson, T. Beck	W.T.	Canadian Pacific ...	W.T. Reg. 26.6.27 to 14.7.27 ... Form 911 23.7.27 to 11.8.27 ...	19.7.27 15.8.27
Middlesex ...	MacRae, A., D.S.C., Lt.-Commr., R.N.R.	A. V. Pearce ...	No. M.	Federal... ..	Form 911 25.5.27 to 28.6.27 ...	5.7.27
Minderoo ...	Richardson, E. ...	B. J. Bennie, W. J. McPhedran, J. H. Oxtom.	" A.	West Australia Nav. Co.	Met. Log. 2.5.26 to 4.10.26 ...	1.12.26
Minna ...	Mackenzie, G. G. ...	A. M. Campbell ...	" A.	Scottish Fishery Board.	Form 911 30.6.27 to 14.8.27 ...	18.8.27
23 Minnedosa ...	Griffiths, J. N. ...	A. Mackie, J. Chatterton, W. McCormick.	W.T.	Canadian Pacific ...	W.T. Reg. 25.6.27 to 14.7.27 ... Form 911 24.7.27 to 11.8.27 ...	19.7.27 16.8.27
Minnesota ...	Pollard, W. F., D.S.O., Capt., R.N.R.	A. J. Smith ...	No. M.	Atlantic Transport... ..	" 26.6.27 to 13.8.27 ...	17.8.27
Minnetonka ...	Gates, T. F., C.B.E. ...	H. E. Macartney ...	" M.	" ...	" 4.7.27 to 23.7.27 ...	26.7.27
Minnewaska ...	Claret, F. H., C.B.E., Commr., R.N.R.	F. Mummery, E. Pengelly ...	" M.	" ...	" 18.7.27 to 6.8.27 ...	11.8.27
Mirror, C.S. ...	Gibson, L. ...	A. G. Watts ...	" M.	Eastern Tel. Co. ...	" 8.3.27 to 17.3.27 ...	8.4.27
Mississippi ...	Wylie, J. T. J. ...	S. C. Skinner ...	" A.	Atlantic Transport ...	" 16.5.27 to 26.6.27 ...	8.7.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.8.27.	Date Received.
Moldavia ...	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R.	G. H. Durrant ...	No. M.	P. & O. ...	Form 911 24.5.27 to 30.6.27 ...	5.7.27
Mongolian Prince	Edwards, W. ...	V. E. Palmer ...	" A.	Prince ...	21.3.27 to 4.4.27 ...	4.5.27
24 Montcalm ...	Hamilton, G. ...	H. McFadyen ...	W.T.	Canadian Pacific ...	W.T. Reg. 17.7.27 to 4.8.27 ...	8.8.27
25 Montclare ...	Webster, G. S., R.D., Lt.-Commr., R.N.R.	A. Mansey, R. W. Jackson, W. J. Roberts.	"	"	" 3.7.27 to 22.7.27 ...	25.7.27
Montferland ...	Van Noppen, C.D. ...	W. Slooten ...	No. M.	Holland Lloyd ...	Form 911 5.8.26 to 6.11.26 ...	17.11.26
27 Montmairn ...	Notley, A. H., R.D., Commr., R.N.R.	L. Hammersley, N. A. Goater, J. Roche, K. Hutchings.	W.T.	Canadian Pacific ...	W.T. Reg. 4.6.27 to 22.6.27 ...	18.7.27
Montoro ...	Donaldson, A. ...	R. M. Blunt ...	No. A.	Burns, Philp & Co. ...	Form 911 18.5.27 to 26.6.27 ...	9.8.27
23 Montrrose ...	Landy, E. ...	A. Watt ...	W.T.	Canadian Pacific ...	W.T. Reg. 9.7.27 to 28.7.27 ...	2.8.27
20 Montroual ...	Sibbons, H. ...	R. Antrobus ...	"	"	" 16.7.27 to 1.8.27 ...	4.8.27
Moresby ...	Edgell, J. A., O.B.E., Capt., R.N.	W. H. Martin ...	M.L.	His Majesty's Australian Ship.	Met. Log. 31.8.26 to 14.12.26...	24.1.27
Morvada ...	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	D. S. Johnston ...	No. M.	British India ...	Form 911 13.3.27 to 6.6.27 ...	10.6.27
Mulbera ...	Steadman, W. R. ...	E. H. Spriggs ...	" M.	"	" 30.6.27 to 5.7.27 ...	21.7.27
Nagara ...	Foster, E. ...	J. Watson ...	" M.	R.M.S.P. Co. ...	" 15.1.27 to 24.5.27 ...	1.6.27
Nagoya ...	Davis, H. C., D.S.C., R.D., Commr., R.N.R.	L. Porter ...	" M.	P. & O. ...	" 28.1.27 to 3.5.27 ...	12.5.27
Naldera ...	Coldwell, G. J. ...	W. F. Laughland ...	" M.	"	"	"
Nardana ...	Moth, F. L. ...	F. G. Sharp ...	" M.	British India ...	Form 911 4.6.27 to 15.6.27 ...	22.6.27
Nelore ...	Hignett, A. H., R.D., Lt.-Commr., R.N.R.	S. H. Baldwin ...	" M.	P. & O. ...	" 29.3.27 to 21.6.27 ...	27.6.27
Nerbudda ...	Williams, B. N. ...	J. W. B. Archibald, T. Barnard, J. H. Robottom,	" M.	British India ...	" 8.6.27 to 21.7.27 ...	25.7.27
Nestor ...	Houghton, G. K. ...	O. C. Williams, G. R. Cheet- ham, N. Anderson.	M.L.	A. Holt ...	Met. Log. 17.1.27 to 19.5.27 ...	26.5.27
Neuby Hall ...	Butler, J. ...	E. M. Robertson, A. W. Wise, R. Y. Smith.	"	Ellerman ...	" 26.11.26 to 6.3.27 ...	28.3.27
Newfoundland ...	Furneaux, S. ...	R. F. Handley, E. Sainty, S. Moore.	"	Furness Withy ...	" 11.12.26 to 6.5.27 ...	18.5.27
Niagara ...	Showman, A. C. ...	A. P. Cousin, D. McKenzie, T. Haulton, J. M. Hood.	"	Canadian- Australasian	" 22.9.26 to 30.1.27 ...	5.4.27
Ningchow ...	Christie, W. ...	"	No. A.	A. Holt ...	Form 911 13.10.26 to 30.12.26 ...	10.1.27
Norfolk ...	Mead, G. F. ...	J. W. Pring ...	" A.	Federal ...	" 28.5.27 to 10.7.27 ...	13.7.27
Norna ...	Wright, J. W. ...	"	" A.	Scottish Fishery Board	" 5.6.27 to 27.6.27 ...	5.7.27
Norseman, C.S. ...	Barter, H. O., R.D., Commr., R.N.R.	R. W. Greenfield ...	" M.	Western Tel. Co. ...	" 3.6.27 to 7.6.27 ...	30.6.27
Northwestern Millr	Nuttall, E. L. ...	"	" A.	Furness Withy ...	" 20.11.26 to 23.12.26 ...	29.12.26
Nova Scotia ...	Furneaux, S. ...	"	" A.	"	" 13.7.27 to 7.8.27 ...	13.8.27
Noushera ...	Rowe, S. N. ...	W. D. L. Reeves ...	" M.	British India ...	" 12.3.27 to 1.6.27 ...	10.6.27
Nubian ...	Watmough, T. M. ...	"	" A.	Leyland ...	" 28.2.27 to 14.3.27 ...	22.3.27
Oaklands Grange	St. Clair, C., D.S.C. ...	E. J. Longhead ...	" A.	Houlder Bros. ...	" 1.6.27 to 30.6.27 ...	5.7.27
57 Olympic ...	White, E. R., R.D., Commr., R.N.R.	A. Fisher, H. J. C. Day, A. E. Weller.	W.T.	White Star ...	W.T. Reg. 30.6.27 to 14.7.27 ...	19.7.27
Opawa ...	Robinson, F. W. ...	J. G. Perry, A. E. Williams, E. T. Renny, A. Dowman.	M.L.	New Zealand S.S. Co.	Form 911 29.6.27 to 6.8.27 ...	15.8.27
Orama ...	Shelford, W. S., Lieut. - Commr., R.N.R.	T. Fox Russell, C. K. Blake, H. Tanner.	"	Orient ...	Met. Log. 14.2.27 to 9.8.27 ...	17.8.27
Oranian ...	Hoskins, W. ...	W. R. Atkinson ...	No. A.	Leyland ...	Form 911 28.3.27 to 1.6.27 ...	9.6.27
Orbita ...	Dominy, R. H., C.B.E., Commr., R.N.R.	J. Lloyd Jones ...	" M.	R.M.S.P. Co. ...	" 10.5.27 to 13.7.27 ...	25.7.27
Oreoma ...	"	T. Naylor, G. Gerety, T. Mitchell.	M.L.	Pacific S.N. Co. ...	Met. Log. 18.11.26 to 4.2.27 ...	22.2.27
Orduna ...	Daniel, T. ...	E. Hicks ...	No. M.	R.M.S.P. Co. ...	Form 911 12.4.27 to 16.6.27 ...	21.6.27
Orestes ...	Flynn, G. A. ...	F. T. Berry ...	" A.	A. Holt ...	" 1.5.27 to 9.5.27 ...	18.5.27
Orta ...	Splatt, W. A. ...	D. W. Hutchinson, J. L. Jones, A. G. Litherhead, J. W. Milne.	M.L.	Pacific S.N. Co. ...	Met. Log. 22.12.26 to 30.5.27...	10.6.27
Ormonde ...	Rice, W. V., D.S.O., D.S.C., Commr., R.N.	J. Taylor, H. P. L. Tennent, C. F. Loveless, H. P. Price.	"	His Majesty's Ship ...	" 4.3.27 to 1.7.27 ...	3.8.27
Ormonde ...	James, L. V., D.S.C. ...	"	No. M.	Orient ...	Form 911 29.5.27 to 8.6.27 ...	3.8.27
Oronsay ...	Owens, A. L., R.D., Commr., R.N.R.	J. C. K. Dowding, R. K. Rogerson, R. Galpin, R. S. Hawker.	M.L.	"	Met. Log. 6.2.27 to 11.5.27 ...	16.5.27
Oroya ...	Ridyard, A. ...	S. Lewis ...	No. M.	Pacific S.N. Co. ...	Form 911 24.5.27 to 1.8.27 ...	10.8.27
Orosova ...	Cameron, E. P., R.D., Commr., R.N.R.	L. E. Fordham, L. J. Vesty, A. Croft Cohen, H. A. Whittle.	M.L.	Orient ...	Met. Log. 3.4.27 to 7.7.27 ...	13.7.27
Orvieto ...	Thorne, G. G., R.D., Commr., R.N.R.	I. E. G. Goldsworthy, G. L. Carter, J. L. Skilling, T. L. Shurrock.	"	"	" 25.12.26 to 31.3.27...	4.4.27
Osterley ...	Hayes, I. J. ...	S. Burnnand ...	No. A.	"	Form 911 1.11.26 to 3.2.27 ...	8.2.27
Otaki ...	McNish, R. ...	C. R. Brown ...	" A.	New Zealand S.S. Co.	" 24.12.26 to 7.2.27 ...	10.2.27
Otra ...	Wood, C., D.S.C. ...	D. N. MacGregor ...	" M.	Shaw, Savill & Albion	" 3.6.27 to 23.6.27 ...	3.8.27
Otranto ...	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	"	" M.	Orient ...	" 20.1.27 to 1.4.27 ...	19.4.27
Oxfordshire ...	Crumplin, W. E. ...	C. F. Hicks ...	" A.	Bibby Bros. ...	" 27.3.27 to 3.6.27 ...	9.6.27
Pacific Shipper, M.V.	Newman, G. W. A. ...	G. Davis ...	" A.	Furness Withy ...	" 5.5.27 to 2.6.27 ...	8.7.27
Pacuare ...	Sapsworth, S. A. ...	V. R. Watkins ...	" A.	Elders & Fyffes ...	" 25.6.27 to 30.7.27 ...	6.8.27
Pakeha ...	W. P. Clifton Mogg ...	E. T. Baker, R. E. Nicholson, A. J. Tillot.	M.L.	Shaw, Savill & Albion	Met. Log. 21.12.26 to 29.4.27...	7.5.27
Pareora ...	Evans, J. O. ...	N. F. Finch ...	No. A.	Hain S.S. Co. ...	Form 911 27.3.27 to 3.5.27 ...	24.5.27
Paris ...	Cook, C. L. ...	Mr. Bles ...	C.C.	Southern Ry. ...	Telegraphic Report. 31.7.27	31.7.27
Patia ...	Makepeace, S. ...	J. Kinsley ...	No. A.	Elders & Fyffes ...	Form 911 19.6.27 to 23.7.27 ...	3.8.27
Patrician ...	Pugh, R. H. ...	H. W. Stanley ...	" M.	Harrison ...	" 11.6.26 to 28.9.26 ...	23.11.26
Patrol, C.S. ...	Welsh, T. X. ...	J. S. Brown ...	No.	Eastern Extension (A. & C.) Telegraph Co.	Met. Log. 18.10.26 to 15.11.26 ...	9.2.27
Feisander ...	Slater, H. ...	A. E. Bartlett ...	No. A.	A. Holt ...	Form 911 10.7.27 to 7.8.27 ...	9.8.27

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.8.27.	Date Received.
<i>Peshawur</i> ...	Wilding, H. G. ...	J. C. Mellonie, J. K. Crone, R. G. Wood.	M.L.	P. & O. ...	Met. Log. 30.10.26 to 6.3.27 ...	18.3.27
<i>Piako</i> ...	Kettlewell, C. R. ...	E. W. Smith, M. Rose, H. N. Lawson.	"	New Zealand S.S. Co.	" 7.12.26 to 20.5.27 ...	26.5.27
<i>Polycarp</i> ...	Jackson, T. ...	... ..	No. A.	Booth ...	Form 911 14.6.27 to 11.7.27 ...	26.7.27
<i>Port Adelaide</i> ...	Williams, R. ...	E. N. Rogerson ...	M.L.	Commonwealth & Dominion.	Met. Log. 13.1.27 to 20.6.27 ...	12.7.27
<i>Port Albany</i> ...	Robinson, C. A. ...	E. A. Leavett, W. Eastoe, J. Thom.	"	" " "	" 24.12.26 to 10.5.27... ..	23.5.27
" <i>Auckland</i> ...	Durham, R. S. ...	G. L. Hazlewood, C. F. Post, J. H. Sloan, H. E. Braine.	"	" " "	" 4.3.27 to 31.7.27 ... ..	10.8.27
" <i>Bowen</i> ...	Gilling, W. ...	W. R. Johnston ...	No. A.	" " "	Form 911 8.2.27 to 20.3.27 ... ..	28.3.27
" <i>Caroline</i> ...	Hoad, A. C. ...	... ..	M.L.	" " "	Met. Log. 16.1.27 to 16.6.27 ... ..	29.6.27
" <i>Darwin</i> ...	Sawbridge, I. R. ...	S. Hearn, W. Lynd, E. T. N. Lawrey.	"	" " "	" 28.1.27 to 29.6.27 ... ..	4.7.27
" <i>Denison</i> ...	Ferris, J. ...	P. J. Howe ...	"	" " "	Form 911 25.5.27 to 7.7.27 ... ..	9.7.27
" <i>Dunedin</i> ...	Lea, W. H. ...	E. G. Jones, R. Needham, H. M. Post, E. Wheeler.	M.L.	" " "	Met. Log. 4.12.26 to 2.3.27 ... ..	5.4.27
" <i>Fremantle</i> ...	Kearney, F. J. ...	... ..	No.	" " "	... ..	...
" <i>Gisborne</i> ...	Hutchinson, ...	... ..	No. A.	" " "	... ..	...
" <i>Hacking</i> ...	Higgs, H. E. ...	F. W. Elgar, J. A. Fairbairn, E. Luker.	M.L.	" " "	Met. Log. 1.1.27 to 14.6.27 ... ..	16.6.27
" <i>Hobart</i> ...	Craven, R. ...	C. Hersee, L. Copeland, G. G. Langford, C. L. Webb.	"	" " "	" 4.2.27 to 30.5.27 ... ..	10.6.27
" <i>Hunter</i> ...	Cottell, S. C. ...	A. Cooper, R. Forrest, J. T. Weldin.	"	" " "	" 7.1.27 to 13.5.27 ... ..	7.6.27
" <i>Melbourne</i> ...	Brown, A. H. ...	D. G. H. Bradley, E. M. Fenton, L. H. B. Bloye.	"	" " "	" 26.10.26 to 3.3.27 ... ..	23.3.27
" <i>Napier</i> ...	Jones, C. N. ...	... ..	No. A.	" " "	Form 911 25.2.27 to 12.4.27 ... ..	21.4.27
" <i>Nicholson</i> ...	Jack, J. ...	J. G. Lewis, G. L. H. Dean, P. A. Munday, C. Jolly.	M.L.	" " "	Met. Log. 26.2.27 to 24.7.27 ... ..	11.8.27
" <i>Pirie</i> ...	Kippins, T. ...	... ..	"	" " "	" 6.11.26 to 8.3.27 ... ..	24.3.27
" <i>Sydney</i> ...	Higgs, W. G. ...	H. G. Boys Smith ...	"	" " "	" 25.9.26 to 19.2.27 ... ..	28.2.27
" <i>Victor</i> ...	Swan, L. H. ...	L. M. R. Bayly, J. B. Watson, A. Brown.	"	" " "	" 8.12.26 to 8.6.27 ... ..	13.6.27
" <i>Wellington</i> ...	Farmer, F. ...	P. H. Pedrick ...	No. A.	" " "	Form 911 14.10.26 to 2.2.27 ... ..	11.2.27
<i>President Jackson</i> ...	Griffith, J. ...	P. Treanor ...	" A.	Pacific Mail S.S. Co...	" 25.5.27 to 9.6.27 ... ..	22.7.27
<i>President Jefferson</i> ...	Nichols, F. R. ...	C. H. Moen, B. Christensen ...	" A.	Admiral Oriental Line	" 8.6.27 to 28.7.27 ... ..	19.8.27
<i>President Wilson</i> ...	Nelson, H. ...	A. M. Quinlan ...	" A.	Dollar ...	" 5.9.26 to 2.11.26 ... ..	22.11.26
<i>Protea, H.M.S.A.S.</i> ...	Woodhouse, A. F. B., Lt.-Commr., R.N.R.	... ..	M.L.	South African Naval Service.	" 1.2.27 to 28.2.27 ... ..	29.3.27
<i>Protesilaus</i> ...	Nelson, T. B. ...	... ..	"	A. Holt ...	... ..	...
<i>Pyrrhus</i> ...	Elford, W. J. ...	R. E. Wilks ...	No. A.	" ...	Form 911 15.6.27 to 2.7.27 ... ..	5.8.27
<i>Ranpura</i> ...	King, A. M., D.S.C. ...	G. R. Peters ...	" M.	P. & O. ...	" 25.6.27 to 14.7.27 ... ..	9.8.27
<i>Regina</i> ...	Davies, E. ...	R. C. Cochrane ...	" A.	White Star-Dominion	" 26.6.27 to 13.8.27 ... ..	16.8.27
<i>Reindeer</i> ...	Langdon, C. ...	... ..	C.C.	G.W. Railway	Telegraphic Report 1.6.27 ... ..	1.6.27
<i>Reventazon</i> ...	Jack, D. A. ...	B. R. Wickham Farr ...	No. A.	Elders & Fyffes ...	Form 911 9.4.27 to 14.5.27 ... ..	21.5.27
<i>Rhodesian Transport</i> ...	Bullock, F. W. H. ...	H. B. Parkins ...	" A.	Houlder Bros. ...	" 6.4.27 to 22.5.27 ... ..	10.6.27
<i>Rimutaka</i> ...	Hemming, F. A. ...	H. A. Fryer, D. E. Hughes, G. O. Saul, H. Vernon.	M.L.	New Zealand S.S. Co.	Met. Log. 23.12.26 to 21.4.27... ..	28.4.27
<i>Risaldar</i> ...	Matthews, E. G. ...	R. H. Feindlande ...	No. M.	Asiatic S.N. Co. ...	Form 911 22.6.27 to 9.7.27 ... ..	9.8.27
<i>Rotorua</i> ...	Hunter, J. L. B. ...	E. Lawrence, R. G. Rees, H. Cockerill.	M.L.	New Zealand S.S. Co.	Met. Log. 9.4.27 to 26.7.27 ... ..	5.8.27
<i>Royal Fusilier</i> ...	Dawson, J. ...	J. Fraser ...	No. A.	London & Edinburgh S.S. Co.	Form 911 19.5.27 to 7.7.27 ... ..	11.7.27
<i>Royal Transport</i> ...	Dove, J. ...	R. W. Wass ...	" A.	Houlder Bros. ...	" 7.5.27 to 15.8.27 ... ..	19.8.27
<i>Ruapehu</i> ...	McKellar, A. W., R.D., Capt., R.N.R.	H. M. Selmer, W. J. Glassborow, T. M. Devitt.	M.L.	New Zealand S.S. Co.	Met. Log. 4.2.27 to 9.6.27 ... ..	15.6.27
<i>St. Albans</i> ...	Smith, G. L. ...	J. M. Heddle, F. O. Colvin, R. S. Millington, J. Kavanagh.	"	Eastern and Australian.	" 31.12.26 to 29.3.27... ..	23.5.27
<i>St. Helier</i> ...	Mulhall, W. ...	C. Bell ...	C.C.	G.W. Railway ...	Telegraphic Report 18.8.27 ... ..	18.8.27
<i>St. Julien</i> ...	Langdon, C. H. ...	C. Joy ...	"	" ...	" 17.8.27 ... ..	17.8.27
<i>St. Andrew</i> ...	Beaupark, E. W. ...	J. G. Feint ...	No. A.	Rankin Gilmour ...	Form 911 2.1.27 to 17.2.27 ... ..	11.3.27
<i>Salaga</i> ...	Jones, W. ...	C. V. Evans ...	" A.	Elder Dempster ...	" 19.3.27 to 4.6.27 ... ..	15.6.27
<i>38 Samaria</i> ...	Malin, R. G., Lieut.-Commr., R.N.R.	C. S. Williams, A. B. Fasting, W. B. Pamer.	W.T.	Cunard ...	{ 10.7.27 to 31.7.27 ... ..	3.8.27
<i>Samarinda</i> ...	Flack, Z. W. ...	R. F. Rikherst ...	No. M.	Rotterdam Lloyd ...	Form 911 8.5.27 to 3.6.27 ... ..	9.6.27
<i>Saxon</i> ...	Lang, T. M., Lieut.-Commr., R.N.R.	G. H. Pickering ...	" A.	Union Castle ...	" 14.5.27 to 3.7.27 ... ..	5.7.27
<i>Scholar</i> ...	Egerton, J. J. ...	J. McLellan ...	" M.	Harrison ...	" 25.5.27 to 8.8.27 ... ..	10.8.27
<i>Scotia</i> ...	Prichard, S. D., M.B.E.	O. W. L. Jones ...	C.C.	L.M. & S. Railway ...	Telegraphic Report 13.8.27 ... ..	13.8.27
<i>Scottish Bard</i> ...	McDonnell, S. ...	J. W. Lilley ...	No. A.	Tankers Ltd. ...	Form 911 22.11.26 to 3.12.26... ..	3.1.27
<i>33 Scythia</i> ...	Prothero, W. ...	G. Overton, G. H. Morris, P. G. Britten.	W.T.	Cunard ...	{ W.T. Reg. 6.6.27 to 25.6.27 ... ..	4.7.27
<i>Sheaf Mount</i> ...	Groves, C. V. ...	W. Thomson ...	No. A.	W. A. Souter ...	Form 911 26.1.27 to 19.2.27 ... ..	3.3.27
<i>Sheaf Spear</i> ...	Whitfield, G. A., O.B.E.	S. J. Dring, T. B. Fishley ...	M.L.	" ...	" 5.6.27 to 14.7.27 ... ..	20.7.27
<i>Shropshire, M.V.</i> ...	Adamson, B. W. ...	W. L. Whiteside, R. V. Brown, W. H. Brittain, J. E. Goldsworthy.	"	Bibby ...	Met. Log. 14.10.26 to 13.2.27... ..	1.3.27
<i>Socrates</i> ...	Taylor, F. C. ...	W. E. Jordan ...	No. A.	Lampert & Holt ...	Form 911 1.4.27 to 18.6.27 ... ..	8.7.27
<i>Somerset</i> ...	Howell Price, J. ...	... ..	" A.	Federal... ..	... ..	...
<i>Spero</i> ...	Montgomery, H. ...	D. Millward ...	M.L.	Ellerman Wilson ...	Met. Log. 24.12.26 to 3.7.27 ... ..	8.7.27
<i>Stockwell</i> ...	Thowless, E. ...	W. Gibson ...	No. A.	Brooklebank ...	Form 911 5.4.27 to 29.5.27 ... ..	2.6.27
<i>Surrey</i> ...	Lamb, C. B. ...	S. C. Bradley ...	" A.	Federal... ..	" 28.3.27 to 15.8.27 ... ..	19.8.27
<i>Suwa Maru</i> ...	Gotoh, M. ...	... ..	" A.	Nippon Yusen Kaisha	" 26.6.27 to 25.7.27 ... ..	4.8.27
<i>Sylvanfield</i> ...	Biddick, E. ...	E. Holmes ...	" A.	Hunting & Son ...	" 28.6.27 to 4.8.27 ... ..	8.8.27
<i>Tainui</i> ...	Elford, H. C. ...	P. S. Horwood ...	" A.	Shaw, Savill & Albion	" 26.2.27 to 7.6.27 ... ..	10.6.27
<i>Tahiti</i> ...	Aldwell, B. M. ...	G. M. Coote ...	" A.	Union S.S. Co. of N.Z.	" 19.5.27 to 8.7.27 ... ..	18.8.27
<i>Taipung</i> ...	Frame, A. M. ...	... ..	M.L.	Yuill & Co. ...	Met. Log. 17.9.26 to 8.1.27 ... ..	15.3.27
<i>Talkhybius</i> ...	Hatfield, J. ...	R. T. Hames ...	No. A.	A. Holt... ..	Form 911 22.6.27 to 4.7.27 ... ..	5.8.27
<i>Tamara</i> ...	Hartman, W. H. ...	F. W. Lutyens ...	" M.	Shaw, Savill & Albion	" 9.4.27 to 15.5.27 ... ..	20.5.27
<i>Tambora</i> ...	Huisman, N. ...	H. Van Manen ...	" M.	Rotterdam Lloyd ...	" 29.8.26 to 14.10.26... ..	30.10.26
<i>Tanda</i> ...	Pilcher, E. T., Lieut.-Commr., R.N.R.	C. Stratford, H. E. Nuzum, J. Heddle, W. McIntyre.	" M.	E. & A. S.S. Co. ...	" 8.1.27 to 31.5.27 ... ..	2.8.27
<i>Tetrestias</i> ...	Wilkinson, W. H. ...	... ..	" A.	A. Holt & Co. ...	" 9.4.27 to 7.8.27 ... ..	12.8.27
<i>Tekoa</i> ...	Barnett, H. ...	D. J. Murray ...	" M.	New Zealand S.S. Co.	" 8.5.27 to 13.6.27 ... ..	25.7.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.8.27.	Date Received.
<i>Telamon</i> ...	Willcox, J. H. ...	F. Wardrobe, J. C. Oppen ...	No. A.	A. Holt ...	Form 911 20.7.27 to 4.8.27 ...	17.8.27
<i>Teucer</i> ...	Hodgson, R. N. ...	D. T. Thorne ...	" A.	" ...	" 22.5.27 to 10.6.27 ...	24.6.27
<i>Themistocles</i> ...	Jermyn, W. M. ...	H. C. Howe ...	" M.	Aberdeen ...	" 5.5.27 to 18.6.27 ...	30.6.27
<i>Theseus</i> ...	Jones, E. ...	W. A. Fyffe ...	" A.	A. Holt ...	" 3.7.27 to 4.8.27 ...	8.8.27
<i>Titan</i> ...	Wilkinson, T. G. ...	D. MacFavish, G. W. Best, C. G. Bailey.	M.L.	" ...	Met. Log. 27.8.26 to 12.2.27 ...	23.2.27
<i>Tongariro</i> ...	Williams, J. M. ...	E. A. Quick ...	No. M.	New Zealand S.S. Co.	Form 911 7.6.27 to 12.7.27 ...	21.7.27
<i>Transylvania</i> ...	Bone, D. W. ...	P. Middleton ...	" A.	Anchor ...	" 9.7.27 to 31.7.27 ...	3.8.27
<i>Traveller</i> ...	Worthington, B. ...	E. L. Stockley ...	" M.	T. & J. Harrison ...	" 3.5.27 to 21.6.27 ...	5.7.27
<i>Trematon</i> ...	Evans, B. ...	R. Gregory, C. Warren, J. Toms.	M.L.	Hain S.S. Co. ...	Met. Log. 10.10.26 to 7.3.27 ...	25.4.27
<i>Turakina</i> ...	Hamilton, E. S. ...	A. N. Marshall ...	No. M.	New Zealand S.S. Co.	Form 911 21.3.27 to 12.7.27 ...	3.8.27
<i>Tuscania</i> ...	Smart, R. W. ...	" ...	" A.	Anchor ...	" 25.6.27 to 14.7.27 ...	22.7.27
<i>Tyndareus</i> ...	Williams, R. J. ...	A. G. Phillips, F. Howe, A. R. McDavid.	M.L.	A. Holt ...	Met. Log. 16.12.26 to 18.5.27 ...	2.7.27
<i>Ulimaroa</i> ...	Wylie, W. J. ...	A. N. Robertson ...	No. M.	Huddart Parker, Ltd.	Form 911 29.4.27 to 30.5.27 ...	25.7.27
<i>Ulysses</i> ...	Owen, R. D. O.B.E. ...	A. Studholme ...	" A.	A. Holt ...	" 2.3.27 to 10.7.27 ...	13.7.27
<i>Umwolosi</i> ...	Barnes, E. W. ...	R. L. B. Ryde ...	" A.	Bullard King ...	" 4.5.27 to 20.5.27 ...	20.6.27
<i>Valacia</i> ...	Inch, F. ...	G. Meggitt ...	" M.	Cunard ...	" 12.1.27 to 10.4.27 ...	13.4.27
<i>Vardulia</i> ...	Robinson, F. W. ...	" ...	" A.	" ...	" 31.5.27 to 12.6.27 ...	11.7.27
<i>Verbania</i> ...	Pooley, T. S. M. ...	A. F. Watts ...	" A.	" ...	" 8.2.27 to 26.3.27 ...	19.4.27
<i>Vigilant</i> ...	Simpson, E. S. S. ...	J. Hunter ...	" A.	Scottish Fishery Board.	" 1.7.27 to 31.7.27 ...	3.8.27
<i>Waioapu</i> ...	Harris, E. ...	" ...	" M.	Canadian - Australasian.	" 24.4.27 to 11.6.27 ...	3.8.27
<i>Wairuna</i> ...	Whyborn, H. S. ...	R. Howie, G. H. George, A. W. Rabbits.	M.L.	Union S.S. Co. of N.Z.	Met. Log. 19.6.26 to 25.9.26 ...	29.12.26
<i>Walmer Castle</i> ...	Owen, S. H. ...	A. E. Denn ...	No. A.	Union Castle ...	Form 911 27.5.27 to 17.7.27 ...	19.7.27
<i>Wangarata</i> ...	Scutt, W. ...	T. W. Wordingham, S. R. Millard, K. M. Morrison, A. G. Brooks.	M.L.	British India ...	Met. Log. 18.9.26 to 1.2.27 ...	7.2.27
<i>Warfield</i> ...	Steel, R. ...	C. M. Quick ...	No. A.	" ...	Form 911 6.7.27 to 25.7.27 ...	3.8.27
<i>War Nizam</i> ...	Moncrieff, T. ...	J. Row, B. Kieran ...	" A.	British Tankers ...	" 6.4.27 to 30.6.27 ...	9.7.27
<i>Welshman</i> ...	Rollerson, W. ...	J. Mendus ...	" M.	White Star-Dominion Federal ...	" 22.10.26 to 14.11.26 ...	26.11.26
<i>Westmoreland</i> ...	Gardner, H. W. ...	" ...	M.L.	Falkland Islands Government.	Met. Log. 24.12.26 to 22.4.27 ...	20.7.27
<i>William Scoresby, R.S.S.</i>	Mercer, G. M., D.S.C., Lt.-Commr., R.N.R.	A. Irving, M. C. Lester ...	"	Union Castle ...	" 1.10.26 to 29.5.27 ...	13.6.27
<i>Windsor Castle</i> ...	Strong, H., R.D., Commr., R.N.R.	F. Wilbraham, C. L. Lovegrove, S. E. Aldham, L. A. J. Keeble.	"	" ...	" ...	" ...
<i>Winifredian</i> ...	Harrocks, W. ...	" ...	No. M.	Leyland ...	Form 911 18.5.27 to 16.6.27 ...	23.6.27
<i>Wonganella</i> ...	Suffern, H. ...	G. F. Phillips ...	"	W. Crossby & Sons ...	" 21.4.27 to 20.5.27 ...	28.6.27
<i>Woodarra</i> ...	Reilley, J. V. ...	L. D. Graham, H. Goater, B. W. Smith.	M.L.	British India ...	Met. Log. 23.10.26 to 18.4.27 ...	1.5.27
<i>Yorkshire</i> ...	Millson, G. E. ...	W. M. C. Higginson, R. Allen	No. A.	Bibby ...	Form 911 23.4.27 to 4.7.27 ...	9.7.27
<i>Conway H.M.S.</i> ...	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets ...	Cadets' M.L.	" ...	Cadets' Met. Log. 8.5.27 to 23.7.27 ...	27.7.27
<i>Pangbourne Nautical College</i>	Tracy, A. F. G., Commr., R.N.	" ...	"	" ...	Cadets' Met. Log. 1.5.27 to 22.7.27 ...	27.7.27
<i>Worcester, H.M.S.</i>	Sayer, M.B., C.B.E., R.D., Capt., R.N.R.	" ...	"	" ...	Cadets' Met. Log. 6.5.27 to 27.7.27 ...	30.7.27
<i>Abaco</i> ...	" ...	The Keepers ...	Lighthouse Register.	" ...	Lighthouse Register 1.7.26 to 20.10.26	20.4.27
<i>Cay Lobos</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.26 to 31.12.26	20.4.27
<i>Double Headed Shot</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.26 to 31.12.26	20.4.27
<i>Inagua</i> ...	" ...	" ...	"	" ...	Lighthouse Register 15.7.26 to 23.1.27	20.4.27
<i>Sombrero</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.1.27 to 30.6.27	10.8.27
<i>Watling Island</i> ...	" ...	" ...	"	" ...	Lighthouse Register 17.1.26 to 20.7.26	10.11.26
<i>Cape Pembroke (Falkland Is.)</i>	" ...	" ...	"	" ...	Lighthouse Register 1.7.26 to 31.12.26	24.2.27

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 31.7.27.	Date Received.
<i>Casanare</i> ...	Steidelman, H. ...	R. O. Jones ...	Elders & Fyffes ...	Water Samples ...	29.6.27
<i>Darro</i> ...	Matthews, G. P. ...	W. Halder-Campe ...	R.M.S.P. Co. ...	" ...	27.7.27
<i>Deseado</i> ...	Shillitoe, B. ...	F. F. Wheeler ...	" ...	" ...	3.6.27
<i>Hildebrand</i> ...	Maddrell, J. ...	A. Allan ...	Booth ...	" ...	8.7.27
<i>Reventazon</i> ...	Jack, D. A. ...	J. Hughes ...	Elders & Fyffes ...	" ...	30.6.27