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OCEAN CURRENTS ON THE ROUTES TO THE WEST INDIES AND PANAMA.

LAST July when we commenced to tabulate data for the construction of charts for these routes a circular letter was sent to the Commanders of observing ships running regularly to the West Indies and through the Panama Canal asking them to consider their experience and to send in remarks of a general nature which would assist in the elucidation of currents charted for the purpose of the navigator, not later than March, 1927, by which time they would receive the charts for the first quarter, *i.e.*, February, March and April.

They are now reminded of this and it is hoped that all Commanders with long experience of navigating these waters will send in their views after considering their experience of the set and drift of currents, not forgetting its vagaries.

Several have not waited to see the charts for the first quarter (the eastern portion was published in the last Number and the western portion in this, for the quarter February to April) but have sent

in their remarks. Amongst these is a most interesting letter accompanied by a chart from Captain J. M. ISAACSON, S.S. *Cristales*, which is considered of such interest that it is reproduced forthwith in "The Marine Observer's Log" and we hope that others will adopt such methods of forwarding information.

In comparing Captain ISAACSON's chart, it should be remembered that it represents his deductions made from his experience at all times of the year. While the charts which we have made represent the experience of all who returned observations made in the months of February, March and April from 1910 to 1925 and while we give only what is actually recorded as observation, Captain ISAACSON connects up that which he has observed by conjecture. When all four quarters have been charted and we have received more views, may be we shall be able to throw more light upon the general circulation of the surface waters in this extraordinarily interesting

region of currents.

It must be remembered that the set and drift determined by the difference between observed and D.R. positions which is entered in the log, is what the arrows and roses upon the chart are made from. In the channels between the islands and along the coast it is seldom that the set and drift is logged, so that here is where commanders can help us by giving information of the current they find when navigating narrow waters. Even if this information is not sufficient or suitable for making arrows and roses, the accumulated experience may be of great assistance in connecting up the drifts and streams.

Now, although in the Marine Division we are obliged to concentrate our work upon one route or part of the ocean at a time, do not let it be thought by the Corps of Marine Observers that there is any the less need for them to continue the study of the currents along other routes or in other oceans. We shall deal with all in turn. Observations from all oceans are being extracted as received. Meanwhile it is always well to compare currents experienced in any ocean with those being charted and examined in another, for causes and effect may be the same and comparison of currents found in different parts of the world with the conditions associated with them may help us to formulate laws which govern ocean currents, and of these laws as yet really very little is known.

To those who seek refreshment after vigil in navigating the Caribbean and studying the complexity of its currents and to those, like the writer, who have never had the privilege of visiting the West Indies and Spanish Main and who would like to know more of that historic quarter of the globe, if they have not already read it, they would find much entertainment in the pages of "The Cradle of the Deep" by Sir FREDERICK TREVES, a book which every officer should read.

The Panama Canal has been responsible for diverting much shipping

to routes across the Pacific and the number of observations of set and drift of current now collected from the routes between Balboa and New Zealand and Australia makes it possible to commence the construction of charts of currents for these routes, the first instalment of which we hope to publish in 1928. Here is where a special study of past and present experience may now be made by Marine Observers with advantage, so that when the time comes they will be in a position to forward remarks which will be most welcome at the end of the present year.

If "Laws of Currents" are to be formulated it is necessary to know more of what goes on down below as well as at the surface, for, just as in the atmosphere, there are vertical as well as horizontal currents in the ocean. The nature of the structure of the water layers in the depths must have great effect upon circulation.

In this Number we publish a note upon the Pycnosonde invented by the Danes, an instrument for obtaining samples of the densities of water at different depths. So far the Pycnosonde appears to have been used only in shallow water and the inventor claims that it can be used in a vessel making way through the water. Who knows, this instrument may be perfected and adapted for use with the patent sounding machine; if so, at least it might make it possible for the Corps of Marine Observers to ascertain the density of the water at different depths, while steaming, to the depth at which soundings are taken with the KELVIN machine, and at the same time, without an appreciable addition to exertion.

Sub-surface temperatures are also needed and it is hoped that Cable ships will assist in this; meanwhile we are solely dependent for sub-surface observations of current, temperature and density made by survey and research vessels, of which, so far, the latter have been few and far between.

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, of remarks from the Logs and Reports of regular Marine Observers.

Responsibility for statements rests with the Contributor.

### CURRENTS IN THE CARIBBEAN.

THE following is an extract from a letter and copy of chart from Captain J. M. ISAACSON, S.S. *Cristales*, giving his remarks in reply to a request for information of general experience of currents on the routes to the West Indies and Panama:—

"You have certainly, as our American cousins say, 'Started something.' Current, an ever variable element, is, in the Caribbean, the most fickle jade it was ever a seaman's luck—or ill luck—to court.

"I have had over fifteen years' experience of the waters where:—

The Admiral Belize  
Was scraped to death with oyster shells  
Among the Caribbees.

And I say at once that the man who says he will make good any given course for twelve hours together in these waters is—well, an optimist. The subject is one which is very dear to my heart; for years past I have been trying to get hold of some data as to why the currents in this inland sea should be so variable. One thing I am convinced of is—that the Trade Winds have nothing to do with them. They influence them certainly, inasmuch as they accelerate or retard them *if they happen to be flowing with, or diametrically opposite to, the wind.* But that's just the point: they *do* flow against the wind, which is what makes me say that I am convinced that the Currents in the Caribbean are caused by disturbances many hundreds of miles away from the scene of their activity. And also that they are very much more 'deep seated' than either—say, the Gulf stream or the Reynolds. That is to say—that I believe they would be felt very much further beneath the surface. No mere surface current would give you a negative slip in the face of a force 5 wind, which has often happened to me. But on the other hand, of course, I have been steaming 12 knots through the water and covering the ground at the rate of 9,

and—here's where the rub comes—with *identically similar weather conditions*, and nothing to indicate a change of current.

"In practice I never allow for current at all whilst actually inside the Caribbean, but steer straight courses, keeping myself constantly posted as to the ship's position both by day and night, and correcting for the *set that I get.* Often what she loses on the swings, she makes up on the roundabouts; but in any case, in this land of stars, it is fairly easy to keep oneself posted—in fact stars are much to be preferred to solar observations here, owing to the tremendous refraction attached to the sun.

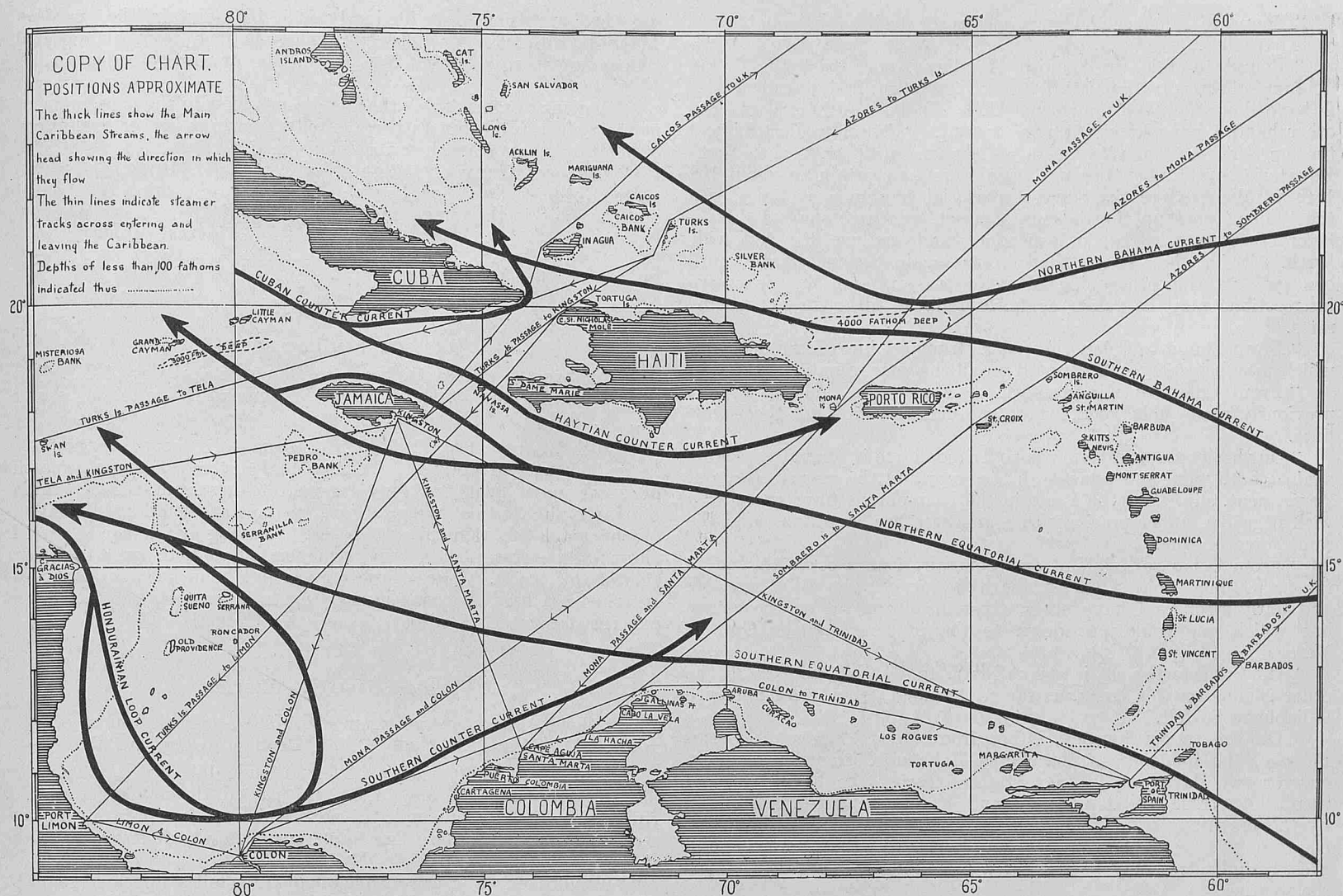
"I don't know how many 'Bottles' I have launched in these waters; I am continually sending them over. At the present time I am launching six and eight a voyage, and am putting them both in Spanish and English; but I have never had the luck to have them returned yet.

"With the view of giving you some idea of how I have found the Currents in the Caribbean affecting me, I have drawn a small chart showing the general trend of the Main streams, and my courses approaching, crossing, and leaving the Caribbean Sea. With this chart before you I will attempt to explain it:—

"The Currents in the Caribbean may be classed as consisting of 4 Main, and 4 Counter. The four Main are the North and South Bahama and the North and South Equatorial, and the four Counter are the Cuban Counter, the Haytian Counter, the Southern Counter, and what I call the Hondurainian Loop—an extraordinary 'back-wash' over an area of 300 miles in the S.W. corner of the Caribbean. It must be borne in mind that I have drawn the trend of these currents as I have found them affecting my course lines, and do not claim that they are geographically correct.

"Approaching Sombbrero Passage on a course from the Azores, the Northern arm of the Bahama current will generally be met with about the 21st or 22nd parallel, setting in a W.S.W'ly





direction to the edge of the 4,000 fathom deep, from whence it courses more to the Nor'ard, until off the Silver Bank it runs N.W.

"About 60 miles from the Island of Sombrero, the Southern arm of the Bahama current may be expected setting anywhere from W. to N.W. I am purposely giving no rates, as with all the Caribbean Currents the rates are so variable as to be quite unreliable; but they can all of them run from nothing up to three knots.

"Through the passage from Sombrero to St. Croix there is little or no set; what there is I have found setting to the west'rd, but it is very slight.

"Once through the passage the currents are variable and uncertain, until (on a direct course to Cabo la Vela) about the 16th parallel, when one may expect the North Equatorial Current setting to the W.N.W. This is not a wide belt, and one soon loses it and runs again into a belt of variable and uncertain currents. Then, in about the 14th parallel, one can meet the Southern Counter head on, and it can run like the deuce at times. Where this current goes to I have no idea, but I have encountered it at the position shown on the chart more than once. Then, in about the 12th parallel, one may expect to feel the South Equatorial setting about W. by N. From here you will notice I personally make in to the land, and taking a departure from the Falleron Rock, coast to La Hatcha and from thence to Santa Marta. My experience is that there is no set at all close in shore, and by doing this I get inside the counter-current, which at times runs very much closer to the coast line than I have shown it on the chart.

"Approaching the Mona Passage you will notice that the Bahama current is not met with generally, until about the 20th or 21st parallel. It is possible that at times the North and South arms of this current meet here, but as I have found 'slack water' between them, I have not connected them on the chart. As in the

Sombrero Passage, there is little or no set in the Mona, but what there is, is generally to the East'rd. The Haytian Counter may be felt here, at times setting as shown on the chart, but I have not infrequently known it to set N.W.

"On a direct course from Mona to Santa Marta the same remarks hold good as to probable sets to be expected at the positions shown, i.e., where the currents intersect the course lines. But there is a great risk of a strong set off the land when nearing Aguja Point (Santa Marta). On this course I have had good stellar positions at 6 p.m., with no set from noon to sights, and at 4 a.m. the next morning I have found myself set 20 miles to the W.N.W. Furthermore, it has taken me three hours to get back to the land, steaming at nearly 12 knots. After a stay of 24 hours in port I have come out back along the same track to Mona, and found the current gone; in fact if there was any, it was setting to the East'rd.

"Approaching the Turks Island Passage the general trend of the North Bahama Current is N.W.; but this current, like all its brethren, is erratic. For instance:—(see Meteorological Log *Cristales*, Voy. 5, 4.X.26) from a position  $23^{\circ} 06' N.$ ,  $67^{\circ} 55' W.$  to  $21^{\circ} 56' N.$ ,  $70^{\circ} 07' W.$ , the set was  $195^{\circ}$ , 7.0 miles. Or, in other words, it was setting about S. by W. Through the Passage, as far as I know, there is no set—at least, I have never experienced one.

"On a course from the end of the Passage to C. St. Nicholas Mole the Main Bahama Current will generally be met with in the position shown, and is perhaps the most constant of any of them, but the rate varies tremendously.

"From Nicholas Mole to Dame Marie, the currents are variable, there is generally a set into the Bight in the dry season, and a set out of it in the rainy season, but it is unreliable.

"Between Dame Marie and Nevassa Island the Counter Current sets to the S.E.; I have personally never known it to be strong, but have no doubt it can be.

"Bound to Jamaica, the chart speaks for itself as to probable sets to be expected.

"Bound to Tela, in Spanish Honduras, once past the Cuban Counter effect the set is all to the west'rd. At Swan Island I have known it as much as three knots. Although on the other hand I have known it non-existent. Bound to Port Limon, the currents are pretty much as shown, until past the North Equatorial, when they become variable and uncertain to about the 14th parallel. Here the South Equatorial combined at times with the 'Loop' puts up the dickens of a set, which in the old days—before they put a light on Roncador—made us give it a very wide berth. Inside the 'Loop' the currents again become erratic, until one gets to the other side of it as shown, and the next two intersections may be taken as fairly reliable, although at varying rates.

"From Limon to Colon there is a strong set into Bocas del Toro, which may be pretty well counted on all the year round.

"From Colon to Kingston—or to Mona—the remarks I have previously made hold good, where the currents intersect the course lines.

"On the course from Jamaica to Trinidad one is generally bucking against both wind and current all the way, and the average is about 20 per cent. slip. But, as I said in the beginning, I have gone down with negative, under precisely the same weather conditions, and the same force of wind.

"From Colon to Trinidad one generally gets a set with you as far as Gallina Point. Off Aruba the current generally sets W. and fairly strong. I have never experienced any set on the course line which one could put down to the influence of the Gulf of Maracaibo.

"Off Curacao the set is generally W. to W.N.W., as it is off the other islands on this track, as far as Trinidad, when tidal influence is liable to be felt.

"On the return journey, either from Mona Passage or Caicos Passage, the influence of the North Bahama Current is generally felt for two days, (at 12 knots) after clearing the Caribbean, and then all trace of it is lost, and surface currents controlled by the prevailing wind hold their sway until one gets up on to the edge of the Gulf Stream. From Barbados, the North'y and West'y influences may be felt for a little longer, it all depends on the weather.

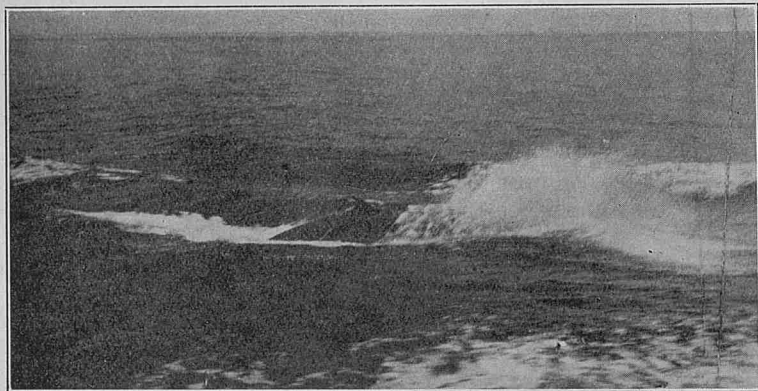
"In conclusion, I don't know that there is anything more I can say, except that I am with you all the way in trying to get the upper hand of this subject, and if there is anything I can do to forward the good work please let me know. I can assure you I will do my best to arrive at results."

## PHOTOGRAPH OF A WHALE.

### West Coast of S. America.

THE following is an extract from the Meteorological Log of S.S. *Oriana*, Captain J. Ross, Huacho to Balboa. Observer, Mr. R. ECKFORD, 3rd Officer.

"31st March, 1926, at 0.10 p.m., Latitude 1° 28' S., Longitude 81° 05' W., between La Plata Island and the mainland of Ecuador, a whale broke surface here, within 100 feet of the ship, and continued in our company for some 20 minutes. The fish (if I may



use the expression) was obviously able to maintain the speed of 14 knots with ease for fully four miles—in fact, from his repeated endeavours to rear himself into the air, he appeared to disdain our 14 knots.

"A point to remark was that he did not blow in the usual raucous manner of his kind, but rather allowed a constant line of respiratory bubbles to stream from the orifice in his head.

"The accompanying snapshot by Dr. G. D. ROBB, the ship's surgeon, will serve to show how close he was to the ship. The waves and the foam in the foreground were generated by our vessel's bows."

## TIDE RIPS.

### Western Mediterranean.

THE following is an extract from the Meteorological Log of S.S. *Clan Mackinnon*, Captain J. G. McLEAN, Birkenhead to Malta. Observer Mr. W. F. ISAAC, 2nd officer.

"30th March, 1926, 2.40 p.m., Tarifa Lighthouse bearing 19° 21' miles. Passed through tide rips and entered a smooth patch of water about 1,000 feet wide and stretching from about 2 miles off Tarifa Lighthouse to southward as far as I could see (7 miles). Much cuttle fish were in this patch. Leaving patch again passed through tide rips. There was a moderate sea and swell to either side of this patch. It was necessary to put helm hard to starboard entering and hard to port leaving. A strong easterly set was being experienced at the time."

### Pacific Coast N. America.

THE following is an extract from the Meteorological Report of S.S. *Benalder*, Captain J. H. COLE, D.S.C., Portland, Oreg. to Balboa:—

"4th March, 1926, 1310 G.M.T., Latitude 14° 55' N., Longitude 96° 15' W., about 6.15 a.m. A.T.S. we passed through a heavy tide rip nearly a quarter of a mile in width which extended in an almost straight north and south line apparently to the horizon on both sides.

"The broken water was visible about three miles, appeared slightly discoloured, and had patches of swirling eddies between the areas of rather rough and confused sea.

"The ship swung off about two points against the helm hard over.

"The following differences were noted:—

	Air	Sea				
	Temp.	Temp.	Wind.	Force.	Barometer.	Swell.
Before crossing	- 80°	83°	N.N.W.	3.	30.02	S.E., slight.
After crossing -	- 73°	72°	E.N.E.	1.	30.04	E., very slight.

"During the previous 12 hours we experienced current setting E.S.E., averaging 1.5 miles per hour, and during the following 12 hours the current set west at the average rate of 1.2 miles per hour.

"The weather was clear, the sky cloudless, and the sea very slight, except when passing through the tide rip."

## WATERSPOUTS.

### In the Indian Ocean.

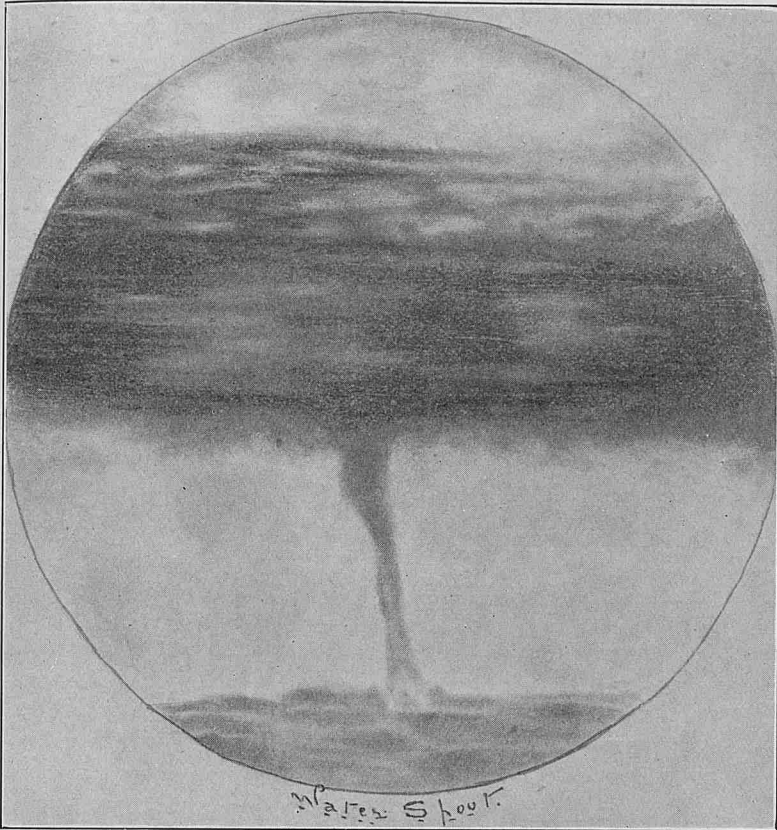
THE following is an extract from the Meteorological Log of S.S. *Arracan*, Captain M. WILLIS, Rangoon to Suez; Observer, Mr. M. S. STUART, 2nd Officer:—

"March 15th, 1926, 3.20 p.m. A.T.S. (10.40 G.M.T.) a waterspout was observed approximately 2 miles to Southward of ship. Position at time of observation, Latitude 7° 52' N., Longitude 72° 05' E.

"Prior to spout the sky became overcast with Cu/St-Cu/Cu-Nb/, a few drops of light rain fell and the N'y breeze freshened to force 3. Hygrometer, dry bulb, 82°; wet bulb, 78°. Barometer corrected 1010.6 mb.



"The water spout appeared to come from a cloud formation of Cu-Nb/St-Cu/, the base of Cu-Nb being in contact with spout. Duration, 20 minutes."



#### North Atlantic.

THE following is an extract from the Meteorological Report of S.S. *Ingoma*, Captain R. K. BARROW, West Indies to London; Observer, Mr. O. STANHOPE, 3rd Officer:—

"The morning of the 14th March, 1926, at 8 a.m., was heavily overcast, visibility 6-7. 9 a.m., hazy in patches. 10 a.m., moderate intermittent rain. Wind S., force 5. 10.40 a.m., heavy rain. 11 a.m., heard sudden piping of wind and saw up to windward a small portion of sea lashed into foam. 11.02, disturbance passed over ship with increase in force of wind to 7 or 8. In appearance it was a small whirlwind of spray about 10 feet high having a waterlevel diameter of about 8 feet and an upper diameter of about 15 feet, surrounded by a white wind-swept sea about 100 feet square. 11.16, wind hauled to W., force 3. 11.20, sky clearing to Wrd., rain eased. 11.30, wind N.W., force 2, rain ceased. In the sketch I have tried to give an idea of the whirlwind (anticlockwise).

"Position of ship at 8 a.m., 14th March, Latitude 39° 55' N., Longitude 29° 44' W."



#### ABNORMAL OFFSHORE CURRENT.

##### Off Cape Guardafui.

THE following is an extract from the Meteorological Log of S.S. *Clan Malcolm*, Captain G. A. NEILL, Fremantle to Aden; Observer, Mr. S. M. WERRY EASTERBROOK.

"13th March, 1926, at 6.30 a.m., Course N. 52° W. (T.) Speed 11.0 knots, cross bearings placed steamship in Latitude 11° 58.5' N., Longitude 51° 22' E., with Cape Guardafui Lighthouse bearing S. 30° W.(T), distant 9½ miles.

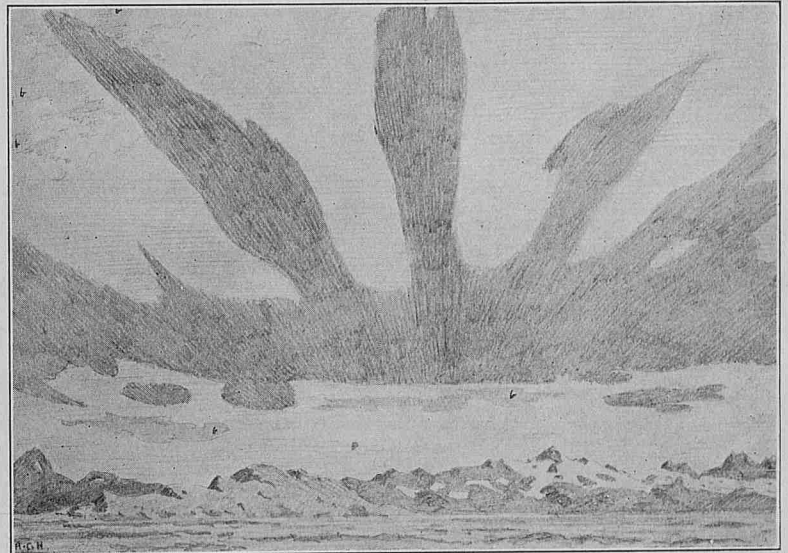
"Course was altered to N. 83° W.(T), and at 7.45 a.m. further cross bearings placed steamship in Latitude 12.05.5' N., Longitude 51° 10' E. It was seen that a strong set to the northward existed and was calculated out at N. 18° E.(T), 4¾ miles for the hour and a quarter vessel was steaming. Course was again altered to N. 83° W.(T), and when vessel passed the meridian of Ras Alula an onshore current (S. 52° E.) was observed."

#### CLOUD EFFECT.

##### South Georgia.

THE following is an extract from the Meteorological Log of R.S.S. *Discovery*, Captain J. R. STENHOUSE, at Grytviken, South Georgia; Observer, Mr. T. W. GOODCHILD:—

"Cloud effect seen off the coast near Cumberland Bay on March 19th, 1926, at 11.30 a.m. It was apparently produced by a sudden strong wind blowing a large cloud into wing finger like projection, almost parallel to each other, in the direction of the observer. The patches marked 'b' are blue sky."



#### CLOUD PHOTOGRAPHS.

##### South Indian and South Pacific Oceans.

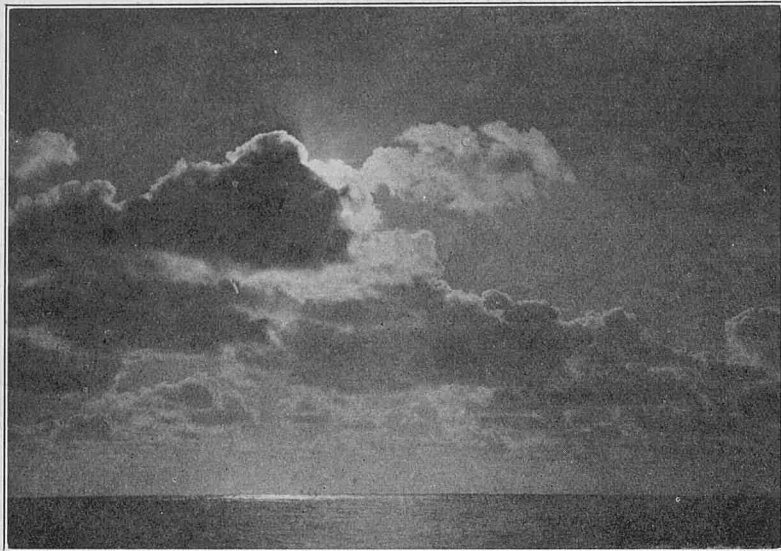
THE accompanying photographs have been received from Mr. C. F. POST, 3rd Officer, of S.S. *Port Hunter*, Captain S. C. COTTELL:—

"The first was taken on 14th March, 1922, from S.S. *Port Stephens*, Captain W. G. HIGGS, at 7.30 a.m., in Latitude 44° 45' S., Longitude 79° E., on a voyage London to Melbourne via Cape Good Hope.

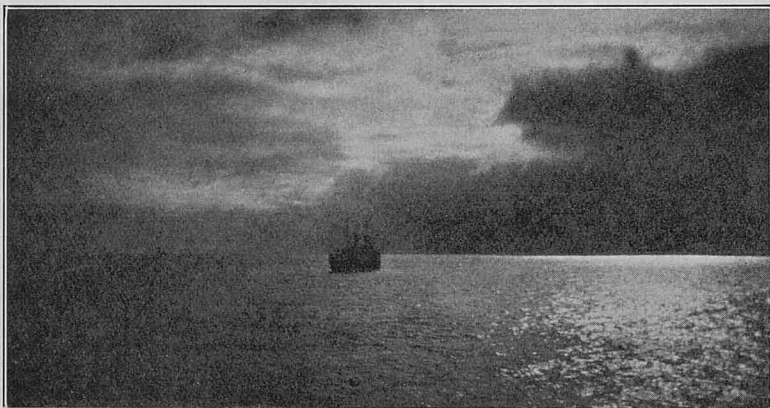
"The weather logged at 8 a.m. was: wind west, force 3, barometer 1006.3 mb. Dry bulb 50°, wet bulb 44°, cloud amount 3, Cu.

"The second was taken, 4th March, 1926, from the S.S. *Port Hunter*, at 8.20 a.m., in Latitude 23° 34' S. Longitude 116° 00' W. (approx), bound from Wellington, N.Z. to Panama.

"The weather logged at 8 a.m. was: wind calm, barometer 1014.8 mb. Dry bulb 78°, wet bulb 75°. Cloud amount 10, A-Cu/Cu."



CLOUD PHOTOGRAPH IN THE PACIFIC.



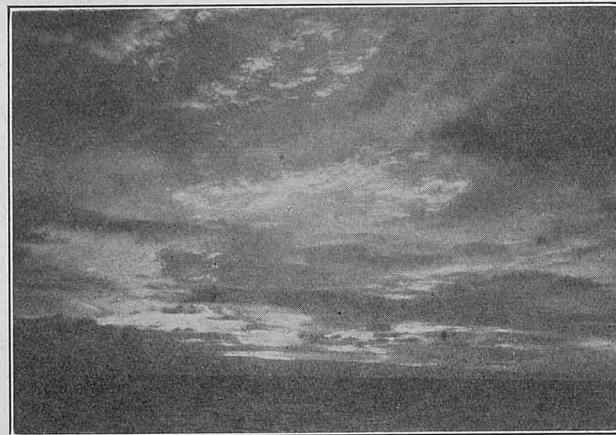
THE accompanying photo of S.S. *Asaka Maru*, flying the "not under command" signal on the 3rd March, 1926, at 10 a.m. in Latitude  $52^{\circ} 02' N.$ , Longitude  $165^{\circ} 04' W.$ , has been received from Captain R. J. WILLIAMS, S.S. *Ixion*, Vancouver to Yokohama. Captain WILLIAMS remarks that the background affords excellent cloud study.

Weather logged at 8 a.m.: Wind, N.E., force 2. Barometer, 1000.0 mb. Air Temperature,  $36^{\circ}$ . Sea,  $37^{\circ}$ .  $\frac{Ci-Cu}{N} 1 \frac{Cu}{N} 1$ . Cloud amount 6, bc. Sea, N.N.E., amount 2. Swell, S.W., amount 3.

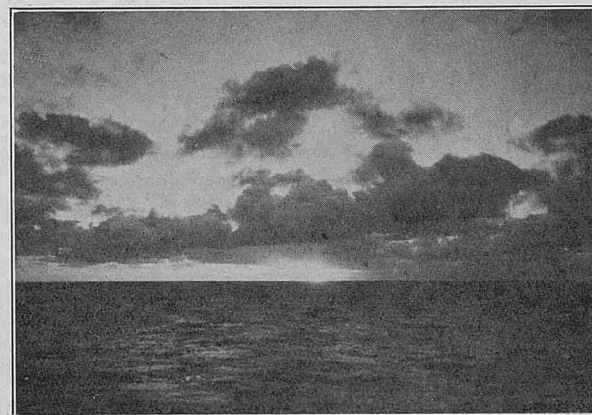
## CLOUD PHOTOGRAPHS.

## South Indian Ocean.

THE accompanying photographs have been received from S.S. *Euripides*, Captain T. V. ROBERTS, Australia to London *via* Cape of Good Hope :—



"11th March, 1926, at sunrise, 8 a.m. in Latitude  $31^{\circ} 12' S.$ , Longitude  $90^{\circ} 11' E.$  Wind, E. by S., force 4. Barometer, 1025.0 mb. Air Temperature,  $68^{\circ}$ . Sea Temperature,  $71^{\circ}$ . Ci-St St-Cu, amount 8. Weather, c.

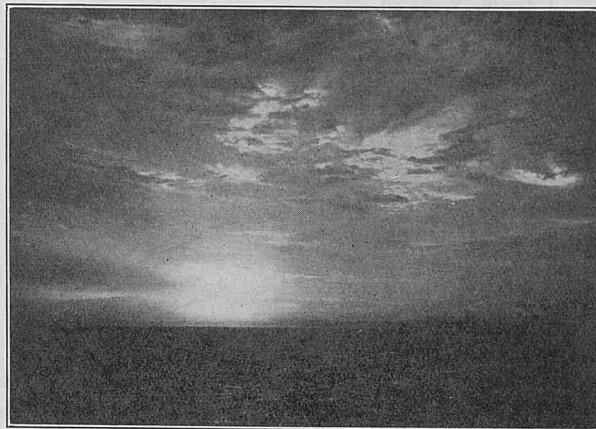


"12th March, 1926, at sunrise, 8 a.m. in Latitude  $30^{\circ} 57' S.$ , Longitude  $84^{\circ} 07' E.$  Wind, E. by N., force 4. Barometer, 1023.4 mbs. Air Temperature,  $72^{\circ}$ . Sea Temperature,  $72^{\circ}$ . Cu, amount 4. Weather, bc.



"17th March, 1926, just after sunrise (clouds to left of Sun).  
 "8 a.m. in Latitude  $30^{\circ} 06' S.$ , Longitude  $55^{\circ} 09' E.$  Wind, South, 3. Barometer, 1019.1 mb. Air Temperature,  $72^{\circ}$ . Sea Temperature,  $73^{\circ}$ . A-Cu, Cu, amount 6. Weather, bc.



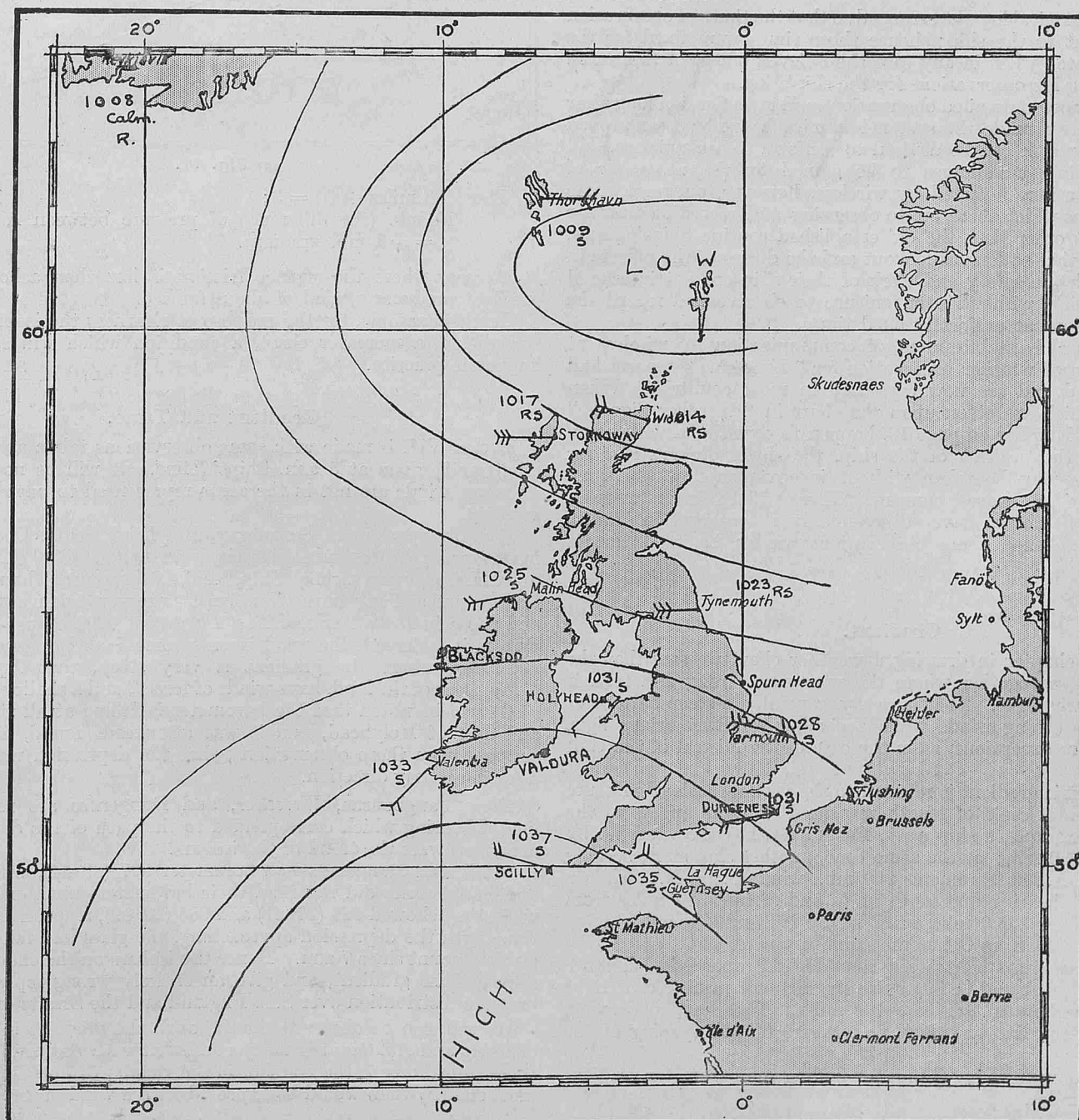


" 23rd March, 1926, at sunset, 4 p.m. in Latitude 30° 40' S., Longitude 30° 37' E. Wind, S.S.W., force 6-5. Barometer, 1017.3 mb. Air Temperature, 77°. Sea Temperature, 78°. St-Cu, amount 9. Weather, oz."

## WEATHER CHART.

**Weather Chart (one of a series) made by Mr. L. Rowling, 3rd officer, on board S.S. "Valdura," Captain J. Anderson, during successful salvage operations.**

12th March, 1926. 1800 G.M.T.



## WIRELESS AND WEATHER. AN AID TO NAVIGATION.

## CHAPTER III.

## TIME.

THE importance of time, position, course and speed in navigation can only be fully appreciated by those whose business is responsibility for navigation.

When an accident has occurred, how often has it been found upon examination of the deck log and engine-room register that the times recorded have differed! Such a contingency is now averted in many ships by the use of the magneto clock; if such clocks are not carried this can only be done by co-operation between the navigating and engineering staffs. That is to say, the observation of time of the movement of the engine room telegraph on bridge and in engine-room must be synchronised if their record is to prove reliable evidence.

When it is considered that the object of a weather chart is to give a graphic representation of weather over an area at a particular moment, that the reporting ships are travelling at different speeds and upon different courses, and that weather systems are usually also moving and often at great speed, the need for the observations in all reporting ships and at all reporting stations to be synchronised will be apparent.

The meteorological log was arranged so that the times of observation were convenient to the ship; hence those times were fixed for the relief of the watch when in any case the relieved officer of the watch would be taking his observations for the ship's log.

For the purpose of detailed observations and investigation long after the observations are made, this system is admirable and has been proved to be the best which can be devised to conform to sea practice.

The immediate advantages to be gained by the navigator of weather observations reported by wireless, however, outweigh some of the objections which there are to observing and recording weather observations at other than the old established routine Ships' Times. That is to say, that so long as lookout and the duties of the officers in connection with the safety and work of their ship are not interfered with, it is possible without inconvenience to observe and record the weather conditions at uniformly fixed times.

Now before the establishment of communication by wireless at sea, fixed times of weather observation for "Land line" reports had been established and are now organized in most countries. When these times, which are given upon the chart in "Weather Signals" in the January Number on page 16, happen to correspond with hours of daylight at the position of the ship, the ship's observations for wireless reports may be taken without inconvenience at the same time as those of the nearest country. There will be breaks midway between coasts which have different fixed observation times, but if the established shore observations are to be used this is inevitable.

## Gradient.

In the last chapter in drawing a weather chart we saw that the isobars were close together where the wind was strong and further apart where it was light. That is to say, generally, a steep barometer gradient causes strong winds while a shallow gradient brings light winds; there are exceptions, as in the case of the Mistral of the Guli of Lyons.

The barometric gradient is referred to the vertical scale of pressure and the horizontal scale of length measured at right angles to the isobars. For example, a ship at A, FIGURE 11, has the wind W. by N., barometer 990 mb.; at the same time, another ship at B, bearing S. 70° E. from A, has barometer 990 mb., wind W. by N.; while a third ship at C, bearing due south of A, and distant 191 miles from her, has barometer 1,000 mb., wind W. by N., and a fourth ship at D, bearing S. 70° E. from C, has the same barometer as C.

The barometer gradient does not depend upon the distance 191 miles between A and C, but upon the distance measured at right angles to the isobars in this case 180 miles. Therefore, in drawing a chart, Aa is the line on which to measure off the spacing of the isobars.

The most convenient lineal unit for finding the barometer gradient is 60 nautical miles.

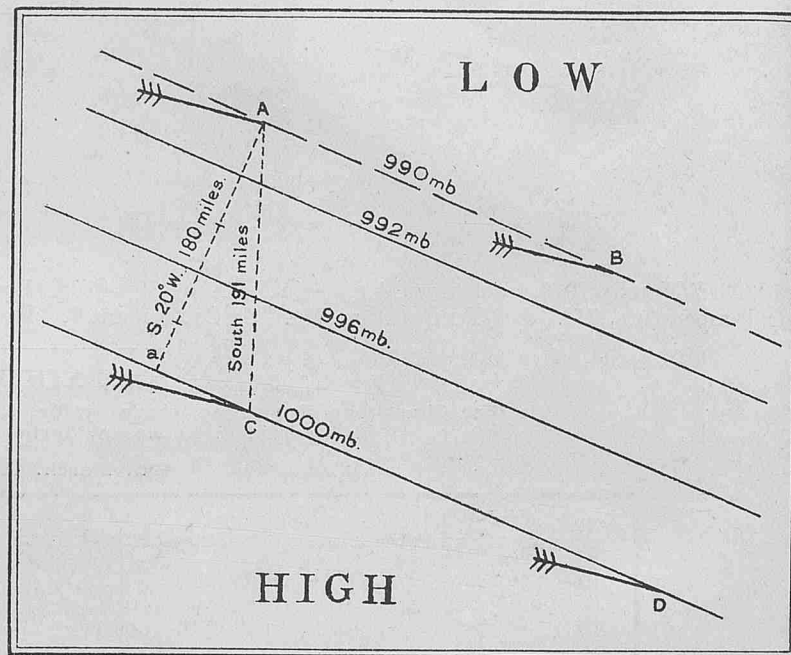


Fig. 11.

Thus  $180 \text{ miles} \div 60 = 3$ ;

10 mb. (the difference of pressure between A and C)  $\div 3$   
 $= 3.3 \text{ mb. gradient.}$

At sea, where the surface friction is less than ashore, 3.3 mb. gradient produces a wind of about force 6.

In this example, for the purpose of clearness the isobars are quite straight on a mercator chart, a condition which will scarcely ever happen in practice.

## Gradient and Time.

CHART VII. is made with some observations taken at 0700 G.M.T. (civil) and others at 8 a.m. Ships' Time. It will be noted that the strongest winds are not in the areas represented to have the steepest gradient.

The observations at Stornoway, Holyhead, Scilly, Dungeness, and in *Metagama*, *Celtic*, and *Aquitania*, were made at 0700 G.M.T. Those in *H.M.S. Conway*, School Ship, *H.M.S. Worcester*, Thames Nautical College, and at Pangbourne Nautical College were taken at 0800 G.M.T., and those in *Ionic Star* and *Port Darwin* at 0800 Ships' Time. Now why is it, although the wind is only force 7 at Dungeness and 5 at *Worcester*, where the gradient is very steep, that *Aquitania* and *Celtic*, clear of the land, have winds of force 7 and a shallower gradient?

It will be noted that the barometer is falling at all stations south and east of Holyhead, and it was afterwards found, as we should suppose from these observations, that the depression was moving in a south-easterly direction.

Now Pangbourne, *Worcester*, and Dungeness are roughly on a line of bearing which corresponded to the path of the depression and nearly athwart the trend of the isobars.

At 7 a.m. Dungeness had barometer 997 (29.44), while *Worcester* and Pangbourne did not read their barometers until one hour later, when they showed 989 (29.21) and 985 (29.09), respectively, by which time, with the depression approaching, the glass had fallen an appreciable amount since 7 a.m. Hence the isobars on the chart hereabouts show a false gradient, and give an entirely wrong representation of pressure distribution over S.E. England and the Straits of Dover.

It will also be observed that, though the gradient in the vicinity of *Celtic* and *Aquitania* is fairly consistent with the wind reported by those ships, force 7, the gradient in the vicinity of *Port Darwin* is much more shallow than would be expected with a wind of force 6.



*Aquitania's* observations were made at 0700 G.M.T. (civil) and *Port Darwin's* were made at 8 a.m. Ship's Time. This ship was bound to the westward and would be keeping Apparent Time for approximately Long.  $23^{\circ} 30' W.$ —equation of time 16 minutes, that is to say, her time differed by 1 hour 18 minutes from G.M.T., so that her observations were actually made 2 hours and 18 minutes later than those of *Aquitania*.

With increasing pressure in the rear of the trough the glass would read appreciably higher after such an interval.

Thus it will be seen that the gradient cannot be obtained either ashore or afloat unless the observations synchronize.

It is interesting to note that the drawing of a weather chart with these observations was a question set in the examination for the Senior Cadets of the *Conway* and *Worcester*, and though by no means easy was answered in a manner which promises well for the future.

Again CHART VIII. FOR NOVEMBER 7TH, 1925, made from observations taken at times which do not all synchronize is even more misleading than CHART VII.

*Conway* and *Worcester's* observations are those logged at 0800 G.M.T. Coast station observations and *Lapland*, *Majestic* and *Scythia's* are for 0700 G.M.T.; while *Zeeland*, *Orbita* and *Manchester Corporation* observations are those logged at 0800 Ship's Apparent Time.

The steep gradient indicated in the vicinity of *Orbita* and *Majestic* is entirely out of proportion with the Heavy or Whole\* gale force 10 reported by those ships; it is false and indicates a gradient with which we should expect wind of hurricane force, 12. In a later Chapter a table will be given showing the wind forces corresponding to difference of barometer pressure in 60 miles. First let us deal with what is most essential and practical to those new to the work. This false gradient is due to difference in time of the observations. *Orbita's* clock being set for Apparent Time for her expected longitude at noon would be 1 hour 48 minutes slow for longitude, and the Equation of Time is 16 minutes to be subtracted from Apparent Time, so that her observation was made at 0932 G.M.T. or 2 hours 32 minutes later than *Majestic's*. The ships were on opposite courses, *Orbita* eastbound and *Majestic* westbound and the depression travelling to the south eastward. *Majestic's* barometer represented the atmospheric pressure at 0700 G.M.T. at her position but *Orbita's* barometer which rising is not comparable with it because it was read later when the depression had changed its position and possibly its gradient also as it advanced at greater speed than the ship to the eastward.

The effect of non-synchronization with these ships' wind observations gives an even more practical illustration. *Majestic* had wind W. by S. at 0700 G.M.T. and the wind logged by *Orbita* at 0932 G.M.T. (8 a.m. A.T.S.) as N.W. by N. was W.N.W. at 0700 G.M.T.; by using the "Horn Card" described in Chapter I, the reason of this will be made clearer than can be shown by further description here.

The gradient is also false in the locality of *Conway* and *Worcester*.

#### Another example in support of G.M.T.

At midnight on April 20th, 1922, S.S. *Katori Maru* having passed through the ring of winds of hurricane force was in the vortex of a tropical cyclone which was nearly stationary in the Arabian Sea. There were a number of ships in the vicinity and FIGURE 12 gives their positions with that of *Katori Maru* in the centre.

The bearing of the centre from each ship is indicated by the number of points it lay to the right when facing the wind, and the height of the barometer above that in centre, knowledge of which is of great importance.

It will be noted that in some cases the number of points do not agree with the rules (which are derived from averages) laid down in the Laws of Storms, *i.e.*, 12 points at commencement of storm, 10 points when the barometer has fallen 10 mb. (.3 inch), and 8 points when it has fallen 20 mb. (.6 in.) or more.

The time used in all cases was Ship's Time, so that no doubt there were considerable intervals between the actual moments of observation, some ships being bound west and others east; and had the cyclone also

been moving fast the error in the bearings and the gradients would have been considerable, and so W/T weather reports based upon observations made at Ship's Time are misleading for our purpose.

Midnight, April 20th, 1922.

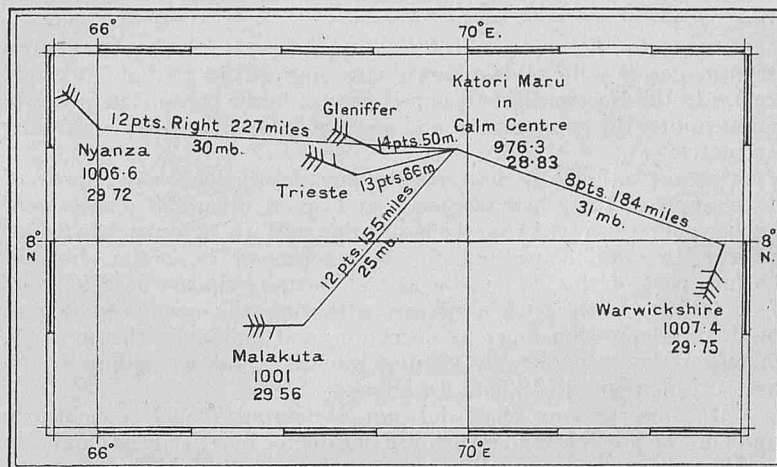


Fig. 12.—Ships' Observations in Cyclone in Arabian Sea.

#### A Very Heavy March Gale developed from a Secondary.

We saw in Chapter II. that a cyclone which caused severe gales on February 26th, 1923, off the S.W. coasts of the British Isles had probably developed from a secondary, but we did not give a series of charts which showed the development. As indicated in "Weather Systems of Temperate Northern Latitudes", the conditions of secondary depressions are very variable and so make forecasting difficult. There are, however, secondaries concerning which the prediction of strong winds may be made with confidence and the following example deals with such a secondary; it also serves to illustrate the need for care in drawing isobars and bears out the importance of time, position, course, speed, and barometer tendency. Having mastered the drawing of a simple weather chart and supposing that the ships shown upon CHARTS IX., X., XI. and XII. had been able to intercept each other's reports and those for the British coasts we will take it for granted that morning and evening charts were made and see how they would have assisted S.S. *Rhodesian Transport*, Captain W. Fowler, from Teneriffe to Antwerp.

EVENING, MARCH 6TH, 1922. CHART IX.

This chart shows that there is a depression near the 20th Meridian West, far north of *Baltic's* position, and as the barometer has risen at Stornoway and Wick in the last three hours it may have filled in slightly; we must wait until morning reports are received before we can form a definite idea of its movement.

It should be noted that there is a dip in the 996 (29.41) isobar south of the St. George's Channel and that the barometer is falling at Malin Head, Tynemouth, Scilly, and Dungeness; it is falling slowly at Yarmouth and Jersey, falling quickly at Holyhead, but rising at Valentia.

Now this is caused by a secondary over St. George's Channel, the barometer falling in its front and rising in its rear as it moves eastward.

*Rhodesian Transport*, steaming N.  $32^{\circ} E.$ , 9 knots, across the Bay, will expect her barometer to fall and strong westerly winds during the night. She will, however, note that *Baltic's* wind away to N.W. is from a more southerly direction than the other winds reported to the westward, and seeing that a secondary exists further east will examine *Baltic's* barometer tendency with care. As *Baltic* is steaming S.  $83^{\circ} W.$ , 11 knots and is evidently before the trough, her falling barometer tells little, for this is what would be expected.

MORNING, MARCH 7TH, 1922. CHART X.

The main depression has moved eastward since last evening. The secondary of last evening has probably moved rapidly east and there is a secondary westward of the Bristol Channel. At a glance the most important feature is the divergence of winds reported by *Scythia*, *Homerick*, and *Baltic*.

It will be noted that a secondary is indicated by the sharp curve in the 1004 (29.65) isobar in the vicinity of these ships, that *Baltic's* wind conforms to the circulation of the main depression and that steaming S.  $76^{\circ} W.$ , 13 knots, she has a rising barometer.

\* In the 3rd edition of "The Marine Observer's Handbook" the term "Heavy Gale" for force 10 was adopted as being that in most general use by seamen. In the 4th edition "Whole Gale" for force 10 originally laid down by Admiral BEAUFORT has been adopted in accordance with the agreement made at the last meeting of the International Meteorological Committee (1926).



*Scythia* and *Homer* have winds from nearly opposite points of the compass and are only 120 miles apart. Here there is a wind circulation round a Low, for Buys Ballot's Law indicates that the barometer is lower to the north-westward of *Homer*, also that it is lower to the south-eastward of *Scythia* than at the positions of those ships.

*Homer* to the eastward of this small area of lower barometric pressure has a falling glass when steaming N. 75° E. at 18 knots. *Scythia* to the westward of the small area of lower barometric pressure and steaming the same course and speed as *Homer* also has a falling barometer.

It is not a difficult matter with our knowledge of the Laws of Storms and of the effect of course and speed upon the tendency of the barometer to see what is happening. With a lower barometer between the two ships and the barometers of both the ships in the fore part of this depression as well as the ship in the after part of it falling, when both ships are steaming the same course and speed, the depression must be deepening and moving with the ships. Therefore the secondary is gaining intensity and travelling to the eastward at a speed of about 18 knots.

With observations that did not synchronize such conclusions would not be possible, and an error of one degree in latitude or longitude would also upset our calculations.

*Rhodesian Transport* will expect her barometer to fall and the wind to back to S.W., increasing with rain as she comes under the influence of the advancing secondary.

#### EVENING, MARCH 7TH, 1922. CHART XI.

The main depression is now north of Stornoway, the western secondary is indicated by the bend in the 996 (29.41) isobar and is centred east of *Homer's* position, having overhauled and passed that ship.

*Homer* still has a falling barometer. Now in a ship in rear of a depression but dropping astern of it the barometer rises when the depression is not altering its intensity and, therefore, this observation of *Homer's* barometer tendency with course and speed is of great value, for it is an indication that the depression is travelling at great speed to the eastward and is deepening considerably.

*Rhodesian Transport*, now in a strong S.W. gale, expects her barometer to fall quickly as the depression approaches with increasing wind, rain and dirty weather, a shift to N.W. and terrific squalls, after which the weather will probably moderate.

#### MORNING, MARCH 8TH, 1922. CHART XII.

The complete wind circulation of a cyclone is now shown in this depression which is centred near Bristol. The main depression on the southern part of which this cyclone developed from a secondary is now north of the Orkneys.

During the last 24 hours this secondary depression had rapidly developed and travelled E. by N. 900 miles, causing unusually heavy gales off the coasts of the British Isles.

At Scilly the anemometer before being blown away registered 108 statute miles an hour or 93 knots, which is the second highest recorded in the British Isles.

There were many casualties, including H.M. Destroyer *Laertes* in tow from Portsmouth to Dover, stranded near Newhaven. Four-masted Barque *Garthpool*, in tow of steam tug *Homer*, adrift off Start Point, lost or damaged all sails, braces and lifts, picked up by Dutch S.S. *Themisto* and towed into Weymouth Bay.

S.S. *Orcades* dragged anchors and stranded at Southend. Steam trawler *Marie Therese* sunk with 15 hands. S.S. *Reindeer* and many other vessels suffered damage to deck work and fittings.

#### Possibility of Development.

This question of Time is very important not only for observation but for transmission and reception of Wireless Weather reports by ships at sea.

From time to time during the last few years pioneers in the development of Wireless and Weather as an aid to navigation have pressed for organisation suggesting that zones should be laid down for governing times of transmission and that uniform Greenwich Times for observation should be adopted for ships in all longitudes at sea.

Based on these suggestions an organisation was outlined in principle and published along with an example to illustrate how useful such a system would be to aircraft navigating over seas as

well as ships, in the December, 1925, MARINE OBSERVER as a separate article.

This suggested organisation received very strong support from a number of prominent seamen while a few pointed out objections in detail; but when these were replied to in subsequent conversation they were in nearly all cases withdrawn, it being recognised that the scheme was drawn up in principle only and that details could not be worked out with advantage until principles were determined.

There is no doubt that great advantages would be gained by a system of fixed time for transmission and reception of Wireless reports giving observation of weather, current and navigational dangers with uniform times for observation all over the world; but there are objections also and so at the request of some of the keenest members of the Corps of Voluntary Marine Observers this example and scheme is repeated here with reasons for adhering to (at any rate for the present) the rather loose organisation which has grown up by degrees.\* Wireless Weather Reports from ships at sea to "all ships" may benefit Airships and Airmen as well as Ships and Seamen. We are told by the signal officers of the Royal Air Force that there need be no difficulty whatever in direct Wireless Telegraphy communication between airships aloft and ships at sea, so that we may assume that reports will be reciprocated direct whenever necessary and without difficulty.

Let us suppose, then, that reports are reciprocated and take an example by using observations from the Daily Weather Reports and from the Meteorological Logs and reports of ships. As no airships are as yet in regular service we shall have to exercise our imagination considerably concerning them. As ships in the Mediterranean are likely to be the first to see airships engaged in regular mercantile service let us see how Wireless Weather Telegraphy and Charts may be used with mutual advantage to ships and airships in that area.

R.M.S. *Osterley*, Commander E. P. CAMERON, R.N.R., sailed from Naples at 0.15 a.m. on December 15th, 1924, for Australian Ports, via Suez; let us suppose when in Latitude 38° 57' N., Longitude 15° 37' E., near the Island of Stromboli the usual weather observations are made at the standard Greenwich Time for synchronization and broadcast to all ships by Wireless Telegraphy. Reports from other ships commence to come in and by the time the ship is in the Straits of Messina data messages for Europe and North Africa have been received. With a selection from these reports CHART No. XIII. is made, from which it is seen that the Atlantic anticyclone extends eastward to Spain while another anticyclone is centred near Bucharest to the westward of the Black Sea. There is a depression to the northward of Brest and a shallow irregular depression centred near Sicily extends over the western Mediterranean which, according to the barometer tendencies reported is neither developing nor changing its position much. With the existing pressure distribution an east-south-east movement may be expected.

It will be noted that *Knight Companion* some 130 miles to the eastward of Malta reports calm, lightning and Cumulo-Nimbus cloud, while the winds reported by ships and stations and the pressure distribution shown indicate that a wide sweep of north-easterly wind from over Asia Minor and the Aegean is faced by an area of calm and south-easterly wind in the vicinity of the Malta and Port Said track between Longitude 15° E. to Longitude 23° E. Unfortunately *City of Marseilles* does not report air temperature which would be very useful compared with that reported by *Laomedon* to show if the air coming from the south-east was warmer than the north-east wind. The significance of converging winds, how instability of the atmosphere occurs, and its association with thunderstorms and squalls will be dealt with later. Here conditions reported are very unsettled and conducive to the development of thunderstorms and squalls. From the fact that *Knight Companion* already has lightning, thunderstorms and squalls are probable and the depression may be expected to move eastward.

*Osterley* will therefore expect squally weather with thunderstorms later.

According to her log a gentle breeze continued from east-south-east until after passing Cape Spartivento, when the wind freshened from

\* Just before going to press, information was received that the International Meteorological Committee have adopted a suggestion to obtain uniformity of observation times for synoptic meteorology in all parts of the world. The times they recommend are G.M.T. 0100, 0700, 1300 and 1900, with suitable modifications in parts of the world where these cannot be worked.



east, lightning was observed during the middle watch to the eastward.

In the morning watch off the south-west coast of Greece the wind increased to the force of a gale, Cumulo-Nimbus clouds came up and there were squalls with rain.

During the forenoon of December 16th, 1924, CHART No. XIV. is made, from which it is seen that the depression which was north of Brest has spread; the large shallow Mediterranean depression has also spread considerably; there being squalls, easterly winds with much Cumulo-Nimbus cloud, rain and some lightning south of Greece in the left advance portion of the depression, which is of still more irregular shape and probably has several Lows within it. This chart tells *Osterley* that strong winds with squalls, thunderstorms and heavy rain are probable along her route for the remainder of the day.

Her actual experience was as follows:—

“December 16th, 1924, Noon Latitude 35° 30' N., Longitude 22° 21' E., wind easterly 7, sky overcast, Cu-Nb, squally with rain.

“4 p.m. Wind N.E. 4. Cu-Nb 10. Orq.

“7.16 p.m. Reduced speed; low visibility; heavy rain; wind E.S.E. 7.

“8.14 p.m. Rain moderating; increased speed.

“8.40 p.m. Very heavy rain; reduced speed.

“Midnight wind E.S.E. 6 (varying and unsteady E.S.E. to N.N.E.; very heavy rain during first watch).

“2 a.m. Vivid blinding lightning and heavy thunder. From midnight to 2 a.m. wind veered to S.W.; speed adjusted throughout to low visibility on account of heavy rain.

“4 a.m. Wind S.W. 4; barometer lowest, 1005.6.

“4.30. Rain ceased, weather cleared.”

S.S. *Knight Companion*, Captain H. E. BEALE, from Newport, Mon., to Port Said recorded weather on this day as follows:—

“2.20 to 3.5 p.m. Wind E.N.E.; heavy rain, squally.

“4.00 to 8 p.m. Continuous squally weather.

“5.00. Wind veers all around compass from east through south and north to east in 10 minutes.

“8 p.m. Latitude 34° 14' N. Longitude 24° 00' E. Wind E.N.E. 3. o l u q r.”

All the foreknowledge which wireless weather reports plotted on CHARTS NOS. XIII. AND XIV. could have given Captain CAMERON would have been useful, particularly as to the heavy rain and reduced visibility he experienced on December 16th, 1924, but how much more useful—indeed, indispensable—wireless weather reports will be to airships commanders, may be gauged to some extent with the same charts and one more chart made with land observations only.

Now suppose that an airship is in Latitude 48° 53' N., Longitude 1° 00' E., indicated by A, on CHART No. XIIIa at 7 a.m. on December 15th, 1924, bound for Ismailia and that for reasons including load she does not wish to fly at a great height and that she has only been able to obtain the same surface land reports as *Osterley*. CHART No. XIIIa is made from these only, from which it appears that there are light winds all over the Mediterranean basin and that there is no indication of thunder; further, by shaping a course to pass well to the westward of Sardinia and thence on a rhumb line to Ismailia she will avoid high land and expect, from the information she has, to have fair and light surface winds for nearly the whole of her passage.

Proceeding at a speed over the ground of 40 knots (which is moderate) she would be abeam of *Osterley* at about midnight, December 16th. But, on the other hand, had she been able to receive reports by long-range wireless telegraphy from ships in the Mediterranean just as we have supposed *Osterley* did, she would have all the information given on CHART XIII. which shows the probability of squally weather and thunderstorms in the vicinity of Crete.

Now it seems that with the exception of a Tropical Revolving storm there are few things which may be more dreaded by airships than thunderstorms, for apart from the danger of lightning there are tremendous vertical air currents associated with them.

Possibly with this fuller information airship A would shape more southerly courses and prefer to increase her distance by passing over the African coast and so avoid the area of great atmospheric instability with its thunder clouds, lightning and squalls of both horizontal and vertical winds, for in December the desert is cool and so “bumpiness” in the air less than in summer when it is a source of difficulty to the airman.

We have a great deal to learn, but one thing seems certain, that if airship navigation is developed over the oceans, ships' weather reports synchronised for time will be necessary for their safety and comfort at shorter intervals than once or twice a day both direct and through centres for collection and distribution.

It will be noted that we have only been able to chart the apparent direction of upper clouds logged by *Oxfordshire* and *Kaisar-i-Hind*, from all the logs and reports in the Mediterranean on the days used; these observations, if taken, will be especially valuable for they give some indication of the upper winds.

It must be clearly understood that what follows was published in December 1925 for the purpose of obtaining the views of shipping and seamen and that, just as with the proposed DOUGLAS Sea and Swell scale, no alteration in the present system should be made until a decision has been arrived at.

The following is the scheme as originally published.

### Some Considerations as to Time of Observation and transmission of Wireless Weather Reports, Range and Utility.

In the example we have given all the observations do not actually synchronise. Those for the land stations from Brest and Lisbon to Odessa, Athens and Ben Ghazi were taken at 0700 G.M.T., the fixed times for observation for Weather Telegraphy in Europe and North Africa being G.M.T. 0100, 0700, 1300 and 1800. Those for the land stations from Matruh to Limassol and Cairo were taken at 8 a.m. local time, equivalent to 0600 G.M.T., the time of observation for Weather Telegraphy in Egypt.

The ships' observations were logged at 8 a.m. Ship's Time (usually apparent) and therefore according to the longitude of the past or coming noon as each ship shifts her clock; also subject to equation of time.

On these days the difference of time in observation probably did not materially affect the information, but other examples given show how observations not synchronising for time produce misleading results. If this is so for ships with speed not exceeding 27 knots, error will be multiplied for aircraft with their terrific speeds and to whom the weather is of the greatest significance.

As already stated the present standard times of observation were fixed ashore before communication by wireless at sea was established, and therefore while these are in vogue ships are asked to make observations for wireless weather reports at the same time of the nearest country, so that within certain areas as many reports as possible may give synchronised data. The more wireless and weather advances and extends at sea, where observations have always to be considered in relation to position, course and speed, the more important will this question of synchronising for time become.

Then there are the questions of range, traffic, and utility.

Take the case of our imaginary airship A to give an illustration.

Before she proceeded from England she would require information compiled from the latest reports of observations at points along her projected route, from positions on either side of it and from the North Atlantic Ocean whence mostly weather systems approach Europe.

For this purpose, just as in the case of Forecasts and Storm Warnings for shipping, reports are required at central collective and distributive centres. Hence ships' reports will be required as the system is developed both in aid of navigation and aerial navigation at such centres as Malta, Ismailia and Aden.

These reports combined in synoptic data messages will also enable the airship to make on board, when on passage, at least a daily weather chart for a very large area of the earth's surface, just as at present the Eiffel Tower message repeating as it does ships' reports from the Atlantic and reports from America enables ships at sea to make a weather chart of a very large portion of the Northern Hemisphere. Then as ships are approached, passed, and left astern en route, while within range these same reports will be of far greater value if received direct because less time will elapse from time of actual observation.

Thus in the practical application of wireless and weather both shipping and aircraft have points of mutual interest and benefit.

Now if and when airships do work over the Oceans a definite plan is necessary if they are to reap full benefit from the co-operation of Marine Observers. From time to time Marine Observers have



made suggestions and the following is outlined upon those suggestions with a view to obtaining the views of all interested and their support when an extension of the Voluntary Work of the Corps of Marine Observers is desired for the purpose of aerial navigation in combination with improved information for mariners. This outline is tendered as a suggestion presenting principles; details will have to be worked out when a plan is adopted. It is intended to obtain synchronization for observation, to reduce wireless traffic and to make information reported by selected ships at sea of the widest possible utility to shipping, aircraft, and the shore community.

#### Observation Times.

G.M.T. 0100 0700 1300 1900. In all Longitudes.\*

By fixing observation at four equidistant times in the 24 hour day, not only may synchronization be effected, but during sun up or in waking hours ships and observing stations may observe without undue inconvenience on at least two occasions in the day.

If for special purposes four reports are insufficient additional observations could be made at

G.M.T. 0400 1000 1600 2200.†

but at least two of the four main observation times should always be used and when two are used they should be equidistant.

#### Transmission Times.

The times of observation being fixed for all longitudes, transmission by reporting ships will jam unless governed by time and position. The general movement of the world's shipping is more from east to west and west to east than it is from north to south and *vice versa*. Zones may be better limited by longitude than latitude.

Zones for transmission during fixed intervals which do not overlap S.O.S. lookout time are suggested as follows:—

#### Zones and Times for Transmission.

Ships detailed as reporters to transmit:—

Zone.	Between	and
Long. 0° to 15° W.	18 minutes after ob- servation Time (G.M.T.).	32 minutes after ob- servation Time (G.M.T.).
15    "   30	- 33       "       "	45       "       "
30    "   45	- 48       "       "	60       "       "
45    "   60	- 18       "       "	32       "       "
60    "   75	- 33       "       "	45       "       "
75    "   90	- 48       "       "	60       "       "
90    " 105	- 18       "       "	32       "       "
105   " 120	- 33       "       "	45       "       "
120   " 135	- 48       "       "	60       "       "
135   " 150	- 18       "       "	32       "       "
150   " 165	- 33       "       "	45       "       "
165   " 180 W.	- 48       "       "	60       "       "
180E., 165 E.	- 18       "       "	32       "       "
165   " 150	- 33       "       "	45       "       "
150   " 135	- 48       "       "	60       "       "
135   " 120	- 18       "       "	32       "       "
120   " 105	- 33       "       "	45       "       "
105   " 90	- 48       "       "	60       "       "
90    " 75	- 18       "       "	32       "       "
75    " 60	- 33       "       "	45       "       "
60    " 45	- 48       "       "	60       "       "
45    " 30	- 18       "       "	32       "       "
30    " 15	- 33       "       "	45       "       "
15E.,    0	- 48       "       "	60       "       "

For example: There are at 0700 G.M.T. on a certain day 7 fully-equipped observing ships in the Mediterranean; 4 of these ships are at different positions between Longitude 0° and 15° E. and 3 between Longitude 15° and 30° E. It is desired that weather reports should be received at the Malta Meteorological Office and by ships and airships direct.

\* In view of the decision referred to in the footnote p. 52 these times have been altered since this appeared in the December 1925 Number of THE MARINE OBSERVER and those now given here are the times which the International Meteorological Committee recommend for all parts of the world. Originally we suggested, 0000, 0600, 1200 and 1800 G.M.T. because they were round numbers and commenced with the day.

† Modified to fit the new International times.

The 3 ships in Longitude 15° and 30° E. each in turn make the call sign of Malta W/T station G.H.A. and CQ (all ships) followed by their weather report between 0733 G.M.T. and 0745 G.M.T. on a certain wave length. The next 3 minutes is occupied in S.O.S. lookout. The 4 ships in Longitude 0° and 15° E. follow the same procedure between 0748 and 0800 G.M.T. With such a system, when well organised, by devoting only about 24 minutes two or three times a day to ships' wireless weather report reception, it is thought that all ships would benefit by the observation and report of the Corps of Voluntary Marine Observers along all ocean routes, and not only would traffic for this purpose be reduced but there would be greater benefit from wireless installations and tested instruments, and Meteorological Offices and aircraft would receive more and better information than at present at reduced cost.

Ships reporting under this system would be restricted in number by limiting their number in the main trades to those specially equipped for meteorological observation. The best disposal would be obtained by selection according to shipping schedules, just as we have obtained such accurate, regular and well-disposed observations reported by wireless from the Trans-North Atlantic Services.

The objections to having 4 equi-distant Greenwich Mean Times for observation in all longitudes are:—

The Meteorologist requires observations taken when the sun in its passage over his particular area has nearly similar influence upon the temperature, atmospheric pressure and variations in weather. He has to cater for the shore community and therefore the times of observations must take into consideration the habits and customs of both land observers and the public for whom information is compiled.

These objections are overcome at sea by the greater need of the Navigator for more general synchronisation than that of the Meteorologist for associating Weather with the daily position of the sun at observation times.

The four times for all longitudes suggested would simplify matters and enable ships over very large areas to make reports of synchronised observations 2 or 3 times a day during sun up. The established watch-keeping system at sea disposes of the difficulty which exists ashore.\*

As regards the times suggested for transmission, which are dependent upon the Greenwich Mean Times for observation in all longitudes being adopted, until the shore services will change, very little would be gained, because as was stated in the "Preface," the coast observations form the foundation of this system from which to extend, and therefore until the time of shore observation is changed, the seamen would be the loser by adopting other time for observation.

Then these times do not lend themselves to the present times laid down for Wireless Watch-keeping zones for one or two wireless operator ships, so that until all these factors can be brought into line it is best to adhere to and develop the existing system both for observation and communication.

#### The Existing System which Marine Observers are invited to practise for the benefit of all ships fitted with Wireless Telegraphy.†

The Greenwich Times at which Weather observations are taken in the different countries, of which reports for coast stations may be transmitted for the information of seamen are as follows, and observing ships are advised to take their observations for sending reports to all ships at the same time within the approximate limits suggested.

G.M.T. of Shore Observations.	Suggested approximate limits for observation times by regular voluntary observers making reports to "All Ships."
British Isles 0700 and Europe. and 1800	From Longitude 40° W. in the Atlantic Ocean to the West and North coasts of Europe to the Equator including the Mediterranean to Longitude 20° E.

\* Attention is directed to previous footnotes, time does not permit the rewriting of this, nor should we wish to do so.

† As it will probably be some years before the new International times are used, this holds good notwithstanding the previous footnotes.



G.M.T. of Shore Observations.	Suggested approximate limits for observation times by regular voluntary observers making reports to "All Ships."
Egypt - - 0600	In the Mediterranean Eastward of Longitude 20° E. and in the Red Sea.
India - - 0230	Arabian Sea, Persian Gulf. Bay of Bengal and Indian Ocean North of the Equator.
China - - 2200	China Sea.
Japan - - 2100	From the East coast of Japan in the Pacific Ocean to Longitude 180° E., North of the Equator.
North America - 0100 and 1300	From Longitude 40° W. in the Atlantic to the East coast of North America North of the Equator. From Longitude 180° W. in the Pacific to the West coast of America North of the Equator.
South Africa - 0630	From Longitude 20° W. to the African Coast in the Atlantic Ocean South of the Equator.
	From Longitude 80° E. to the African Coast in the Indian Ocean South of the Equator.
Australia - - 2330	From Longitude 80° E. to the Australian Coast in the Indian Ocean South of the Equator.
	From Longitude 160° E. to the Australian Coast in the Pacific South of the Equator.
New Zealand - 2130	From Longitude 160° E. to Longitude 130° W. South of Latitude 30° S.
Fiji - - - 2100	From Longitude 160° E. to Longitude 130° W. between the Equator and Latitude 30° S.
South America - 1200	From Longitude 130° W. to the American Coast in the Pacific South of the Equator.
	From Longitude 20° W. to the American Coast in the Atlantic South of the Equator.

### Communication.

If all ships were to try to make Weather Reports to "All Ships"

their object would be defeated by jamming.

Of the 500 ships which are regular observers to the British Meteorological Office and whose names appear in the most recent Number of THE MARINE OBSERVER, a large number have mercurial barometers which are reliable, and these ships are best provided with information. Therefore ships indicated by the letters M.L., M., and W.T. after their names in the list are selected ships invited to make Wireless Weather Reports to "All Ships" for the purpose of providing observations which synchronise once or twice daily.

When all these selected ships carry out this practice the Corps of Marine Observers will have achieved much towards success, and as the geographical distribution of the Voluntary Observing Fleet is being steadily improved there will be suitable data in all parts of the Ocean for making a weather chart once daily.

When a weather chart is made, then, miscellaneous Wireless Reports giving weather at odd times will be the more valuable. Ships which are not selected as regular reporters to "All Ships" might be asked to refrain from communicating weather at the time that regular reporters are doing so.

The matter of wavelength and time of transmission is left to the Commanders of selected ships. They will do well to give first consideration to range and, as there are now a great many ships fitted for C.W. reception, selected ships fitted for C.W. transmission would do well to make their weather reports to "All Ships" on 2,400 m. C.W., and if they repeat them on 600 m. spark more may benefit. Selected ships fitted for spark transmission only, should usually report weather on 600 m. spark. The time of transmission should be regulated by each Commander having regard to the time zones laid down for Wireless Operator Watches. The great thing is to remember that the whole system is entirely voluntary and that the more regularly the Corps of Voluntary Marine Observers practices it the more useful will it become to the Sea Services as a whole. It is bound to benefit the shore community indirectly if not directly, and by adding the call sign of certain stations to the address "All Ships" when asked to do so, Marine Observers will receive the gratitude of Directors of Observatories who require Weather reports from ships at sea.

Apart from daily routine reports made by selected ships to "All Ships" any ship observing the formation of a Hurricane, Typhoon or Tropical Cyclone which has not been reported should make an "Urgent" report to "All Ships" and stations at any time.

Tropical revolving storms will be the subject of the next two chapters.

(To be continued.)

### THE PYCNOSONDE.

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

As has been pointed out in THE MARINE Observer the determination of Stream Currents in the ocean (in contradistinction to Drift Currents due to wind) is largely a question of the ascertainment of the temperature and salinity of the water not only at the surface but at all depths. For this reason any instrument which facilitates such measurements will be of great interest to seamen.

Such an instrument is the Pycnosonde\* invented by Dr. D. LA COUR, Director of the Danish Meteorological Institute.

The Pycnosonde consists essentially of a glass tube which is represented diagrammatically in FIGURE 1; the lower end of the wider arm of the tube has a watertight valve F opening inwards. This tube is enclosed in a metal case and is lowered into the sea. As it sinks the pressure on the open end of the arm H as well as the pressure on the valve F will increase. The valve will open and the air in the whole tube will become compressed. Owing to this compression a little water will pass the valve F. As lowering proceeds more water will pass in until the instrument has passed through all the

layers of water which it is required to sample. As soon as the instrument begins to be hauled up towards the surface the valve F will close, but as the pressure in the water decreases the compressed air in the instrument will expand and will bubble out from the open end of the arm H. When the instrument reaches the surface once more the tube E will contain a complete sample of the water through which it has passed, arranged in the proper order.

In the tube E there are inserted before lowering small coloured glass floats (called pycnodevils). These pycnodevils are designed to be of certain specific gravities, so that they will assume positions in the column of water corresponding to certain definite values. Thus, when the pycnosonde is brought up out of the water these pycnodevils will have arranged themselves at different heights, and the depths in the sea to which these heights refer can readily be determined by a suitable scale.

Thus the instrument measures essentially the specific gravity of the water at different depths.

It is found, however, that in most samples of sea water there will be no mixing of the layers of water in the pycnosonde even when

\* D. LA COUR, "Pycnosonde," Publikationer fra Danske Meteorologisk Institut Aarboger.

the temperature of the whole instrument is altered. On this account it is safe to leave the instrument for a considerable time and read it a *second* time when the water has assumed the temperature of the air. From this reading is readily ascertained the salinity of the water by tables giving the specific gravity of water for definite salt contents. Then, knowing the salt content, it is possible to calculate out what temperature the column of water had when first drawn up in order that the pycnodels should be in the position where they were at the *first* reading.

The advantage of the pycnosonde is the rapidity of its use compared with the old bottle method of obtaining salinities at depths. It can be lowered very rapidly and can be used from a moving vessel since it is not necessary that the line to which it is attached should be up and down, just as in the case of the KELVIN sounding machine.

Its disadvantage is that it is not quite so accurate as the bottle method, for specific gravity, as measured by a pycnodel, will not be as accurate as that determined by chemical analysis. For the instrument to be used to maximum advantage the site of observation must be one in which there is a considerable change of specific gravity with depth, and for this reason the author does not claim that it will be of great service in the open ocean, but nevertheless it would seem to be an instrument which may add greatly to the facility of examining the water structure in estuaries and narrow waters.

In his paper the author gives examples of the use of the instrument up to a depth of about 10 fathoms.

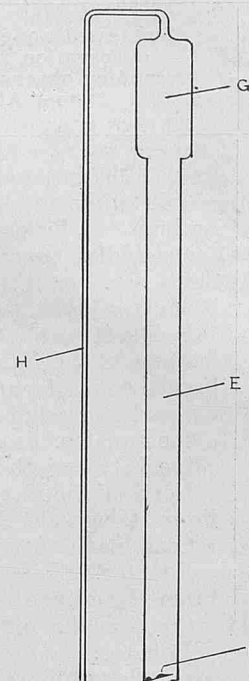


Fig. 1.—Diagram of an ordinary Pycnosonde.

## WEATHER SIGNALS.

### II WIRELESS WEATHER SIGNALS.

#### WIRELESS WEATHER BULLETINS.

##### HOLLAND.

##### North Sea (Spark Issue).

Scheveningen W/T station, Latitude 52° 06' N., Longitude 4° 16' E (approx.) call sign PCH, broadcasts a weather bulletin in special code, at 1115 G.M.T., daily (Sundays and holidays excepted).

Wavelength used 2,930 metres (spark).

The bulletin contains 0700 G.M.T. observations of eight stations, which are transmitted in the following order :—

Station.	Latitude.	Longitude.
Helder - - -	52° 58' N.	4° 45' E.
Flushing - - -	51° 26' N.	3° 34' E.
Gris Nez - - -	50° 54' N.	1° 35' E.
La Hague - - -	49° 43' N.	1° 57' W.
Yarmouth - - -	52° 35' N.	1° 43' E.
Tynemouth - - -	55° 01' N.	1° 25' W.
Skudesnaes - - -	59° 08' N.	5° 16' E.
Sylt - - -	54° 54' N.	8° 21' E.

#### Form in which the bulletin is broadcast :—

Commencing with the letters K.N.M.I. the observations of the above stations are given in two groups of five figures for each station (except last four stations, where second group contains only four figures).

#### Explanation of Code :—

**First Group.** 1st 3 figures give barometer reading corrected, in mms., and tenths, initial 7 omitted. (To convert to mbs. and ins. see Table XV.)

4th and 5th figures give wind direction true (from Table III, p. 19, Vol. IV. No. 37.)

**Second Group.** 1st figure gives wind force by Beaufort Scale.

2nd figure gives state of sky and weather (Table XVI).

3rd and 4th figures give temperature in whole degrees Centigrade, 50 added to negative values (to convert to Fahr. see Table XVII).

5th figure gives state of the sea (Table XVIII). This figure not transmitted for Yarmouth, Tynemouth, Skudesnaes nor Sylt.

NOTES (1) Letter "X" replaces each group of figures for which data cannot be supplied.

(2) For particulars of W/T Storm Warnings see p. 58.

(3) For particulars of W/T Ice Warnings see p. 59.

(4) If the bulletin is transmitted on request a charge will be debited to the ship concerned.

##### GERMANY.

##### North Sea. (Spark Issue.)

Norddeich W/T station, approximate Latitude 53° 36' N. Longitude 7° 08' E., call sign KAV, broadcasts on a wavelength of 1,100 metres spark, at 1015 and 2130 G.M.T. weather bulletins, *en clair*, containing the 0700 and 1800 G.M.T. observations, respectively, of wind direction and force, state of the sea, clouds, rain, mist, fog, etc., of the following stations :—

	Latitude.	Longitude.
Borkum Riff Light vessel	53° 45' N.	6° 04' E. (approx.)
Amrum Bank Light vessel	54° 33' N.	7° 53' E. "
Utsire - - -	59° 18' N.	4° 53' E. "
Tynemouth - - -	55° 01' N.	1° 25' W. "

Followed by information concerning atmospheric pressure over Europe and a 12 hours' weather forecast for the North Sea.

At 1205 G.M.T. Norddeich W/T station, broadcasts a weather bulletin on 2,300 metres (C.W.), containing a report on atmospheric pressure over the E. Atlantic, and a forecast for the Western Channel for the following day.



**Western and Middle Baltic. (C.W. Issue.)**

**Swinemünde W/T station**, approximate Latitude 53° 55' N., Longitude 14° 16' E., call sign **KAW**, broadcasts on a wavelength of 1,100 metres, C.W., at 1030 and 2145 G.M.T. weather bulletins, *en clair*, containing the 0700 and 1800 G.M.T. observations, respectively, of wind direction and force, state of the sea, etc.—as for Norddeich, of the following stations:—

	Latitude.	Longitude.
Bülk - - - -	54° 27' N.	10° 12' E. (approx.)
Adlergrund Light vessel -	54° 50' N.	14° 22' E. „
Skagen - - - -	57° 45' N.	10° 38' E. „
Visby - - - -	57° 39' N.	18° 18' E. „

Followed by a general review of the weather, and a 12-hour forecast for the western and middle Baltic.

**Eastern Baltic. (Spark Issue.)**

**Pillau W/T station**, approximate Latitude 54° 39' N. Longitude 19° 53' E., call sign **KAP**, broadcasts on a wavelength of 600 metres, spark, at 1130 G.M.T., a weather bulletin, *en clair*, containing the 0700 G.M.T. observations of wind direction and force, state of the sea, etc., as for Norddeich, of the following stations:—

	Latitude.	Longitude.
Pillau - - - -	54° 39' N.	19° 53' E. (approx.)
Brusterort - - - -	54° 56' N.	19° 56' E. „
Memel - - - -	55° 42' N.	21° 10' E. „
Visby - - - -	57° 39' N.	18° 18' E. „

Followed by a general review of the weather, and a forecast for the eastern Baltic.

**SWEDEN.****North Sea and Baltic (C.W. Issues).**

**Karlsborg W/T station**, Latitude 58° 29' N., Longitude 14° 29' E. (approx.), call sign **SAJ**, broadcasts weather bulletins for shipping as follows:—

at 1050 G.M.T. Wavelength 2,500 metres (C.W.).  
at 2200 G.M.T. do. 4,200 metres (C.W.).

**NOTE.**—The 1050 G.M.T. bulletin is broadcast at 1215 G.M.T. on Sundays and holidays.

The bulletins are similar in arrangement to the British “Weather Shipping” message which was explained in Vol. IV, No. 38, pp. 37–40 of this Journal. The two bulletins combined provide complete weather information in a simple form for the coasts of N.W. Europe, and on this account are strongly recommended to Mariners.

The 1050 G.M.T. bulletin is based upon observations made at 0700 G.M.T., and that broadcast at 2200 G.M.T. upon observations made at 1800 G.M.T.

The bulletins commence with the words “Weather Report” and are divided into five parts, viz.:—

**Part I, in code. (New International.)**

Contains observations made at nine Swedish and four Danish and Norwegian coast stations (*see* following List) and from ships in the North Sea.

Coast Stations' observations broadcast in two five-figure groups for each station as follows:—

$I_n K' ww V_s B B D D F$ .

$I_n$  = Index number of observation station.

$K'$  = Barometer tendency (Table XIX).

$ww$  = Present weather (from Table V, p. 19, Vol. IV, No. 37, of this Journal).

$V_s$  = Visibility (Table XX).

$B B$  = Barometer pressure, corrected, in whole millimetres, initial 7 omitted (*see* Table XV to convert to mbs. and ins.).

$D D$  = Wind direction, true (from Table III, p. 19, Vol. IV, No. 37, of this Journal).

$F$  = Wind force (from Table IV, p. 19, Vol. IV, No. 37, of this Journal).

Observations from ships in the North Sea, contained in four five-figure groups for each ship are sent next as follows:—

$P Q L L L \quad 111 G G \quad d_s K' ww v \quad B B D D F$

in which the symbols have the same meanings as are given on the “Decode Form” p. 18, Vol. IV, No. 37, except that the barometer readings ( $B B$ ) are given in millimetres, initial 7 omitted,  $d_s$  = direction of ship's movement:—

1 NE      3 SE      5 SW      7 NW  
2 E      4 S      6 W      8 N

and  $K'$  = Barometric tendency (Table XIX).

**List of Observation Stations.**

Index Number.	Station.	Position (approx.).	
		Latitude N.	Longitude E.
2	Bjurö klubb - -	64° 28'	21° 34'
3	Holmögadd - -	63° 35'	20° 45'
4	Bremö - -	62° 13'	17° 44'
5	Örskär - -	60° 31'	18° 22'
6	Sandhamn - -	59° 17'	18° 55'
7	Visby - -	57° 39'	18° 18'
8	Skanör - -	55° 24'	12° 49'
9	Kullen - -	56° 18'	12° 27'
0	Vingå - -	57° 38'	11° 36'
1	Hammershus - -	55° 16'	14° 47'
2	Hanstholm - -	57° 07'	8° 36'
3	Utsire - -	59° 18'	4° 53'
4	Kinn - -	61° 34'	4° 47'

**Part II, en clair (English).**

A General Inference of weather conditions in N.W. Europe and adjacent seas.

**Part III, en clair (English).**

Weather forecasts for 12 hours for the following areas:—

- 1 Eastern part of the North Sea (E. of Longitude 5° E.).
- 2 Sweden, West Coast (Skagerrak, Kattegat and the Sound).
- 3 Baltic (Southern Baltic; South Skane, Bleking and Oland; Northern Baltic; East Gotaland, Svealand and Gottland).
- 4 Gulf of Bothnia (Bothnia Sea; Bothnia Bay).

**Part IV, en clair (English).**

Gale warning for areas 2, 3 and 4 (above) for particulars, *see* p. 59.

**Part V.**

Navigation and Ice Warnings.

**SPECIAL WEATHER TELEGRAPHY TABLES,  
NOT NEW INTERNATIONAL CODE.****Table XV.**

Conversion of Millimetres into Millibars and Inches.

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

Table XVI.

State of Sky and Weather (Scheveningen Bulletin).			
Code Figure.		Code Figure.	
0	= Fine.	5	= Rain.
1	= Slightly cloudy.	6	= Snow.
2	= Cloudy.	7	= Misty.
3	= Very cloudy.	8	= Fog.
4	= Overcast.	9	= Storm.

Table XVII.

Conversion of Centigrade Temperatures into Fahrenheit.

Cent.* Trans- mitted.	Fahr.	Cent. Trans- mitted.	Fahr.	Cent. Trans- mitted.	Fahr.	Cent. Trans- mitted.	Fahr.
—	—	00	32	10	50	21	70
51	30	01	34	11	52	22	72
52	28	02	36	12	54	23	73
53	27	03	37	13	55	24	75
54	25	04	39	14	57	25	77
55	23	05	41	15	59	26	79
56	21	06	43	16	61	27	81
57	19	07	45	17	63	28	82
58	18	08	46	18	64	29	84
59	16	09	48	19	66	30	86
				20	68		

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

Table XVIII.

State of the Sea (Scheveningen Bulletin).

Code Figure.		Code Figure.	
0	= calm.	5	= rough.
1	= very smooth.	6	= very rough.
2	= smooth.	7	= high.
3	= slight.	8	= very high.
4	= moderate.	9	= phenomenal.

## NEW INTERNATIONAL CODE, WEATHER TELEGRAPHY TABLES.

Table XIX.

K'—Barometer Tendency (millimetres and millibars).

Code Figure.			
0	Barometer steady.	(The barometer has not fallen or risen more than $\frac{1}{2}$ mm. in 3 hours.)	
1	Do. rising slowly.	The barometer has risen $\frac{1}{2}$ to $1\frac{1}{2}$ mm. (0.7-2.0 mb.) in last 3 hours.	
2	Do. rising.	Do. do. $1\frac{1}{2}$ to $3\frac{1}{2}$ mm. (2.0-4.7 mb.)	do.
3	Do. rising quickly.	Do. do. $3\frac{1}{2}$ to 6 mm. (4.7-8.0 mb.)	do.
4	Do. rising very rapidly.	Do. do. over 6 mm. (8.0 mb.)	do.
5	Do. falling slowly.	Do. has fallen $\frac{1}{2}$ to $1\frac{1}{2}$ mm. (0.7-2.0 mb.)	do.
6	Do. falling.	Do. do. $1\frac{1}{2}$ to $3\frac{1}{2}$ mm. (2.0-4.7 mb.)	do.
7	Do. falling quickly.	Do. do. $3\frac{1}{2}$ to 6 mm. (4.7-8.0 mb.)	do.
8	Do. falling very rapidly.	Do. do. over 6 mm. (8.0 mb.)	do.

Table XX.

V and V<sub>s</sub>—Visibility.

Code Figure.		
0	= Objects not visible at	50 metres (55 yards).
1	= " " "	200 metres (220 yards).
2	= " " "	500 metres (550 yards).
3	= " " "	1,000 metres (1,100 yards).
4	= " " "	2,000 metres (2 $\frac{1}{4}$ miles).
5	= " " "	4,000 metres (2 $\frac{1}{2}$ miles).
6	= " " "	10,000 metres (6 $\frac{1}{4}$ miles).
7	= " " "	20,000 metres (12 $\frac{1}{2}$ miles).
8	= " " "	50,000 metres (31 $\frac{1}{4}$ miles).
9	= Objects visible at	50,000 metres or more.

## WIRELESS STORM WARNINGS.

## HOLLAND.

## North Sea. (Spark Issue.)

Scheveningen W/T station, call sign PCH, transmits a storm warning when necessary, both in Dutch and English, immediately after the daily weather bulletin at 1115 G.M.T., and also at 2315 G.M.T. Wavelength used is 2,930 metres (spark). If the warning should be sent out on Sundays and holidays (when the station does not transmit a weather bulletin) it will be preceded by the letters KNMI.

The warnings are sent three times in succession, the first quickly, the second and third slowly.

NOTE.—If the storm warning is sent on request a charge will be debited to the ship concerned.

## GERMANY.

## North Sea.

Norddeich W/T station, call sign KAV, broadcasts storm warnings, for the North Sea, on 600 metres, spark, on receipt, twice in succession. Warnings are also broadcast on 1,100 metres, spark and C.W., at 0515, 1015 (after the weather bulletin) 1630 and 2130 (after the weather bulletin) unless previously cancelled. All times are G.M.T. Warnings broadcast *en clair*.

The Warnings will contain information as to the type of disturbance, together with the direction and force of the wind.

## Western and Central Baltic.

Swinemünde W/T station, call sign KAW, broadcasts storm warnings for the coast from Flensburg to Leba, preceded by the word "Funksturm" on 600 metres, spark, on receipt three times successively. Warnings are also broadcast on 1,100 metres C.W. at 0530, 1030 (after the weather bulletin) 1650 and 2145 (after the weather bulletin) unless previously cancelled. All times are G.M.T. Warnings broadcast *en clair*.

The warnings will contain information as to the type of disturbance, together with the direction and force of the wind.

## Eastern Baltic.

Pillau W/T station, call sign KAP, broadcasts storm warnings for the Eastern Baltic, preceded by the words "Storm Warnungen für die östliche Ostsee" on 600 metres, spark, on receipt. Warnings are also broadcast on 600 metres, spark, at 1130 G.M.T. (after the weather bulletin) and on request.

## DENMARK.

## North Sea and Baltic. (Spark Issues.)

Transmitting stations		Blaavand.		Copenhagen.	
		Lat.	Long.	Lat.	Long.
Positions (approx.)		55° 34' N.	8° 05' E.	55° 41' N.	12° 37' E.
Call Signs		-	-	OXB.	OXA.
Wavelengths		-	-	600 metres (spk.)	600 metres (spk.)
Times of transmission		0100 0500 0900 1300 1700		0300 0700 1100 1500 1900	
G.M.T.		2100		2300	
Warnings directed to		CQ.		CQ.	

When necessary, gale warnings are broadcast from Blaavand and Copenhagen W/T Stations in the form of a six-figure group. Each of the first five figures refers to a district as follows:—

1st Figure	= West coast of Jutland.
2nd	= Skagerrak.
3rd	= Kattegat.
4th	= Baltic. West of Gjedser.
5th	= Baltic. Gjedser to Bornholm.



The meaning of the figure is as follows:—

0 =	No warning.
1 =	Probably strong winds from N.E.
2 =	" " " E.
3 =	" " " S.E.
4 =	" " " S.
5 =	" " " S.W.
6 =	" " " W.
7 =	" " " N.W.
8 =	" " " N.
9 =	" " " direction uncertain.

The sixth figure of the group gives additional information as follows:—

0 =	Strong wind probably of short duration	} Wind veering.
1 =	" " " long " "	
2 =	Duration doubtful - - - -	
3 =	Strong wind probably of short duration	} Wind backing.
4 =	" " " long " "	
5 =	Duration doubtful - - - -	
6 =	Strong wind probably of short duration	} No change in wind direction.
7 =	" " " long " "	
8 =	Duration doubtful - - - -	

The group 000009 denotes "unsettled weather, no district definitely threatened." This group is always transmitted when the outlook is threatening and it is desired to draw attention to unsettled weather conditions.

NOTE:—The warnings are broadcast immediately they are received by the W/T Station from the Danish Meteorological Institute, as well as at the scheduled times above, until cancelled.

## SWEDEN.

### Baltic. (C.W. Issues.)

Karlsborg W/T station broadcasts warnings, *en clair*, of strong winds or gales for the following areas:—

(a) Sweden, West Coast (Skagerrak, Kattegat and the Sound).

(b) Baltic (Southern Baltic; South Skane, Bleking and Oland; Northern Baltic; East Gotaland, Svealand and Gottland).

(c) Gulf of Bothnia (Bothnia Sea; Bothnia Bay).

The warnings commence with the words "Gale Warnings" and are valid for the ensuing 24 hours. They form Part IV of the weather bulletins broadcast by Karlsborg W/T at 1050\* and 2200 G.M.T., explained on p. 57.

## LATVIA.

### Eastern Baltic and Gulf of Riga. (Spark Issue.)

Riga W/T station, approximate Latitude 56° 27' N., Longitude 24° 05' E., call sign KCA, broadcasts a storm warning, when necessary, for the eastern Baltic and Gulf of Riga, *en clair*, in English, at 1005 G.M.T. on a wavelength of 600 metres, spark.

## WIRELESS ICE WARNINGS.

### HOLLAND.

#### Spark Issues.

Scheveningen W/T station, call sign PCH, broadcasts, when necessary, data concerning ice conditions in some Dutch harbours and approaches, daily as follows:—

at 1115 G.M.T. after the daily weather bulletin.

Wavelength 2,930 metres, spark, repeated twice immediately on 600 metres.

The ice report which is broadcast in code will contain the ice conditions for the following harbours:—

Delfzijl (Ems).  
Harlingen (Zuider Zee).  
Amsterdam (North Sea Canal).  
Zaandam (Voorzaan).

Helder (Zuider Zee).  
Rotterdam (Waterway).  
Dordrecht (North).  
Dordrecht (Mallegat).

The report commences with the words "Ijsbericht, Ice report."

The code consists of two four-figure groups.

The ice information for the harbours is always broadcast in the order given in the foregoing list.

Each code figure therefore gives by its position the navigational conditions existing in the different harbours.

### Code.

Code Figure.	Navigational Conditions.
1	Navigation practicable.
2	" " difficult for sailing vessels.
4	" " closed to sailing vessels; but still possible for steamers.
6	" " closed to small steamers and motor vessels.
8	" " closed.

### Example.

*Ijsbericht, ice report* 4611 1111

Meaning:—Delfzijl. Navigation closed to sailing vessels; but still possible for steamers.

Harlingen.—Navigation closed to small steamers and motor vessels. For the remaining localities navigation is practicable.

NOTE:—The broadcast of the ice reports will begin when navigation is closed to small steamers and seagoing motor vessels at any of the harbours mentioned in the list, and will cease when navigation is re-opened.

## GERMANY.

### Baltic. (Spark and C.W. Issues.)

Kiel W/T station, approximate Latitude 54° 24' N., Longitude 10° 11' E., call sign KBK, transmits information regarding ice conditions in the Baltic, on request. Wavelength 600 metres, spark.

Pillau W/T station, call sign KAP, transmits information regarding ice conditions in the Baltic, on request. Wavelength 600 metres, spark.

## DENMARK.

### Danish Waters. (Spark Issues.)

The following W/T stations broadcast a summary of ice conditions in Danish waters, *en clair* (English). Wavelength 600 metres, spark.

Blaavand W/T station, call sign OXB, at 0100 and 1300 G.M.T.

Copenhagen W/T station, call sign OXA at 1100 and 2300 G.M.T.

Ice Breakers.—The Danish Government's ice breaker *Isbjorn* (call signal OXP) listens continuously. No charge is made for this service. The call signal for the Copenhagen Harbour Authority's ice-breaker *Væderen* is OYK.

## IV. VISUAL GALE WARNINGS.

### BELGIUM, HOLLAND, GERMANY, DENMARK, NORWAY.

#### Day Signals.






Signal.

Meaning.



Indicates that a gale is expected, or is probable from S.W.

\* 1215 G.M.T. on Sundays and holidays.

	Indicates that a gale is expected, or is probable from S.E.
	Indicates that a gale is expected, or is probable from N.W.
	Indicates that a gale is expected, or is probable from N.E.
	"Atmospheric disturbance, be alert and look out for further information." Germany:—Displayed for benefit of fishing vessels and small craft. It denotes that the wind is expected to increase in strength to force 6-7 (Beaufort scale).
	Germany only :—Indicates the probability of a storm of which the direction of approach is not indicated.

A *red* or *black* flag indicates that the wind may be expected to veer during the gale.

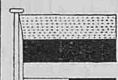
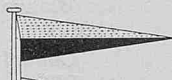
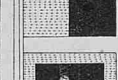
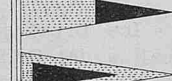

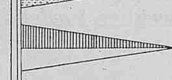
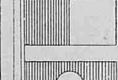
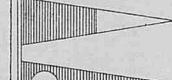


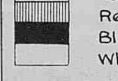

Two *red* or *black* flags indicate that the wind may be expected to *back* during the gale. *Red* flags exhibited at German, Danish and Norwegian stations. *Black* flags by Dutch stations.




For night signals, *see* next column.

#### DENMARK.

##### Additional Gale Signals.





















When a gale is blowing at Blaavands Huk, Hanstholm, the Skaw, Fornæs, Gjedser or Hammer point (Bornholm), the signals below are displayed at Skagenhavn, Frederikshavn, Aalborg, Helsingør, Copenhagen and Odense. The place and force of the wind, according to the Beaufort scale, are indicated by coloured flags, as follows :—

Place.	Force of the Wind.	
	7-9.	10-12.
Blaavands Huk		
Hanstholm		
The Skaw		
Fornæs		
Gjedser		
Hammeren		

 Yellow.  
 Red.  
 Black.  
 White.

These signals are usually made between 0900 and sunset.

#### SWEDEN.

Day Signals.	Night Signals.	Explanation.
		Gale is expected between N. and W.
		" " " S. " W.
		" " " N. " E.
		" " " S. " E.
		Gale of which the direction is not indicated.
		Storm is expected between N. and W.
		" " " S. " W.
		" " " N. " E.
		" " " S. " E.
		Storm of which the direction is not indicated.

R = Red.  
W = White.

Fifty-six stations along the coast of Sweden have day storm signals.

Two stations have night storm signals, and at Gothenburg the storm signals are indicated by a combination of small lights forming the outline of the day signals.

#### HOLLAND, GERMANY.

Signal.	Night Signals.	Meaning.
Two <i>white</i> lights vertical	- -	Gale probable from S.W'd.
Two <i>red</i> lights vertical	- -	Gale probable from N.W'd.
A <i>white</i> light over a <i>red</i> light	- -	Gale probable from S.E'd.
A <i>red</i> light over a <i>white</i> light	- -	Gale probable from N.E'd.
One <i>red</i> light	- -	"Atmospheric disturbance, be alert and look out for further information."

#### Important.

**Germany.**—It should be noted that according to the latest information available, the above signals are displayed as an experiment, at the various signal stations. Also that at Heligoland, Marienleucht and Arkona the signal one *red* light is replaced by two *red* lights, the meaning remaining the same.

#### Storm Signals by Searchlight.

##### Germany.

Storm warning signals are made by searchlight at List on Sylt island and Heligoland. At Heligoland, however, these signals are not (1924) made between the hours of 0200 and 0600.

The signals are made by searchlight directed towards the sky at an elevation of about 35°, and are repeated in various directions at intervals.

The day storm signals, indicated by cones, are made by long and short flashes. A short flash of about *three seconds'* duration corresponds



with the point of the cone, and a long flash of about *nine seconds'* duration corresponds with the base of the cone; thus the day storm signals, indicated by cones, are made as follows:—

- One cone point down — .
- Two cones points down — . — .
- One cone point up . —
- Two cones points up . — . —
- Two cones bases towards each other . — . — .

The day storm signal, indicated by a red flag, is made by a circular movement of the beam of light on the sky in a clockwise direction.

The day storm signal, indicated by two red flags, is made by a circular movement of the beam of light on the sky in an anti-clockwise direction.

The day storm signal, indicated by a ball, is made by a circular movement of the beam of light on the sky in a direction alternately clockwise and anti-clockwise.

The cone signal is preceded and followed by the flag signal. When no flag signal is made, the cone signal is preceded and followed by the ball signal, indicating that no direction of shift of wind can be given.

The warnings hold good for a distance of about 50 miles from the vicinity of the signal station; they continue in force until the evening of the day following the day of issue.

## NORWAY.

### Night Signals.

Signal.	Meaning.
Three <i>white</i> lights, triangle point up -	Gale from N.W.
Three <i>white</i> lights, triangle point down -	Gale from S.W.
Four <i>white</i> lights, triangle point up (one light above) - - - -	Gale from N.E.
Four <i>white</i> lights, triangle point down (one light below) - - - -	Gale from S.E.
One <i>red</i> light - - - -	"Atmospheric disturbance, be alert and look out for further information."

## Special Notices regarding Personnel.

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

### Captain L. A. Millard.

Captain L. A. MILLARD, late Commander of the R.M.S. *Edinburgh Castle* has, owing to ill health, recently retired after 37 years' service in the UNION and UNION CASTLE LINES.

After serving his apprenticeship in sail, Captain MILLARD joined the old UNION LINE in 1889. At the outbreak of the Boer War he was serving as Chief Officer of the R.M.S. *Scot*. Appointed to command in 1903 he has up to the date of retirement commanded all classes of ships in the UNION CASTLE Company's service, his last ship being the *Edinburgh Castle*.

From December, 1914, Captain MILLARD held command of the *Garth Castle*, Hospital ship to the Grand Fleet up to May, 1919, and from then to March, 1920, Hospital ship in the Eastern Mediterranean and Black Sea, for which services he received the special thanks of the Admiralty.

Captain MILLARD has been associated with the Voluntary Corps of Marine Observers since 1904 and his expert knowledge of the currents on the Cape routes placed at the disposal of the Marine Division was of great assistance when publishing "Currents on the Direct Cape Blanco—Table Bay Track" in Volume I of THE MARINE OBSERVER.

### Captain E. W. E. Morrison.

CAPTAIN MORRISON, Commodore of the ROYAL MAIL STEAM PACKET Company's Fleet, has retired after 37 years' service in the ROYAL MAIL LINE.

He was promoted to command in November, 1905, and on March 1st, 1925, was appointed Commodore of the Fleet.

In 1904 Captain MORRISON was granted special leave to take command of EARL FITZWILLIAM'S Yacht *Veronique* while she was engaged on the Cocos Island "Treasure Hunt."

He saw much war service and was in command of H.M.T. *Arcadian* during the Dardanelles operations. His last command was m.v. *Asturias*.

Captain MORRISON was a member of the Corps of Voluntary Marine Observers during 1920 and 1921.

### Captain G. A. Mackenzie.

Captain MACKENZIE retires after 34 years in the ROYAL MAIL STEAM PACKET Company's service.

He was promoted to command on June 28th, 1906.

He commanded S.S. BRECKNOCKSHIRE when that ship was captured and sunk in February, 1917, on her maiden voyage, by the German *Moewe*, being interned in Germany until the end of the war.

He was a member of the Corps of Voluntary Marine Observers whilst serving in S.S. *Para* 1893, and from 1921 to November, 1926, when in command of S.S. *Desna* and S.S. *Almanzora*.

### Captain J. E. P. Matthews.

Captain MATTHEWS, another commander of the ROYAL MAIL STEAM PACKET Company, also retired on January 24th, 1927.

Entering the Company's service in 1893 he gained command in 1907, his last command being S.S. *Arlanza*.

Captain MATTHEWS was a member of the Corps of Voluntary Marine Observers whilst serving in S.S. *Atrato* in 1900 and from 1921, when in command of S.S. *Orbita*, he took an active part in working up the North Atlantic Wireless Weather Reporting Service.

Marine Observers will join the Marine Division in wishing these officers long life and happiness in their well-earned retirement.

## Special Notices—continued.

**Captain James Turnbull, C.B.E., R.D., R.N.R.**

The appointment of Captain JAMES TURNBULL, C.B.E., R.D., R.N.R., of R.M.S. *Montnairn*, as Aide-de-Camp to HIS MAJESTY THE KING, has been announced. Captain TURNBULL has been a member of the Corps of Marine Observers for a number of years.

**Obituary.**

The death of Captain A. E. DUNN, C.B.E., R.D., A.-d.-C., R.N.R., Marine Superintendent of the NEW ZEALAND SHIPPING Company and the FEDERAL STEAM NAVIGATION Company, which took place after a sudden illness at Guy's Hospital on Thursday, January 6th, is noted with regret.

After leaving the *Worcester* in 1893 he served his apprenticeship, and later as an officer, in CORRY's sailing ships. Leaving sail for steam he joined the NEW ZEALAND SHIPPING Company and obtained his first command in 1911. Throughout the war he served in the Royal Naval Reserve and on demobilisation in 1919 was appointed Marine Superintendent of the NEW ZEALAND SHIPPING Company.

Captain DUNN was A.-d.-C. to His Majesty the King, a member of the R.N.R. Advisory Committee, and a Younger Brother of Trinity House. He was chairman of the executive committee of the Foundation Council of the Company of Master Mariners until the appointment of the Preliminary Management and the election of the first Court, of which he was a member.

When afloat he was for a short time a member of the Corps of Voluntary Marine Observers and, later, took a great interest in the work of the Marine Division, giving every encouragement to the ships of his company in observational work, particularly in the Pacific Ocean.

The death of Captain S. G. DALE, which took place on board his ship the S.S. *Ribera* on August 9th, 1926, when on passage from Singapore to Colombo, is noted with regret.

Captain DALE commenced his sea career in 1882 when he joined the sailing ship *Flying Venus*.

Serving six years in sail, he turned over to steam in 1888, obtaining his first command in 1898 when he was appointed Master of the S.S. *Tagus*. He has since commanded several of the Fleet of Messrs. FOSTER HAINES & Co., including S.S. *Trewidden* and latterly the *Rubens* and *Ribera* of the BOLTON STEAM SHIPPING Co.

Captain DALE kept a number of "Excellent" logs for the Meteorological Office, having been a keen member of the Corps of Voluntary Marine Observers since 1911.

The death of Mr. CHARLES HARDING, late Principal Clerical Assistant in the Marine Division, which took place at Eastbourne on 9th January, 1927, is noted with deep regret.

Mr. HARDING joined the Meteorological Department of the Board of Trade in 1861 under Admiral R. FITZROY, R.N., and, on the re-organisation of the Meteorological Office as a separate department in 1867, served in the Marine Division under Captain HENRY TOYNBEE, Lieut. BAILLIE and Captain CAMPBELL HEPWORTH, retiring on pension in 1911, after 50 years' service.

He was for 30 years principal clerical assistant in the Marine Division, and was engaged for the greater part of his time in the production of the many atlases of ocean meteorological charts which were published by the Office during that period.

For four years during and immediately after the late war, he also rendered part time service in marine meteorological work.



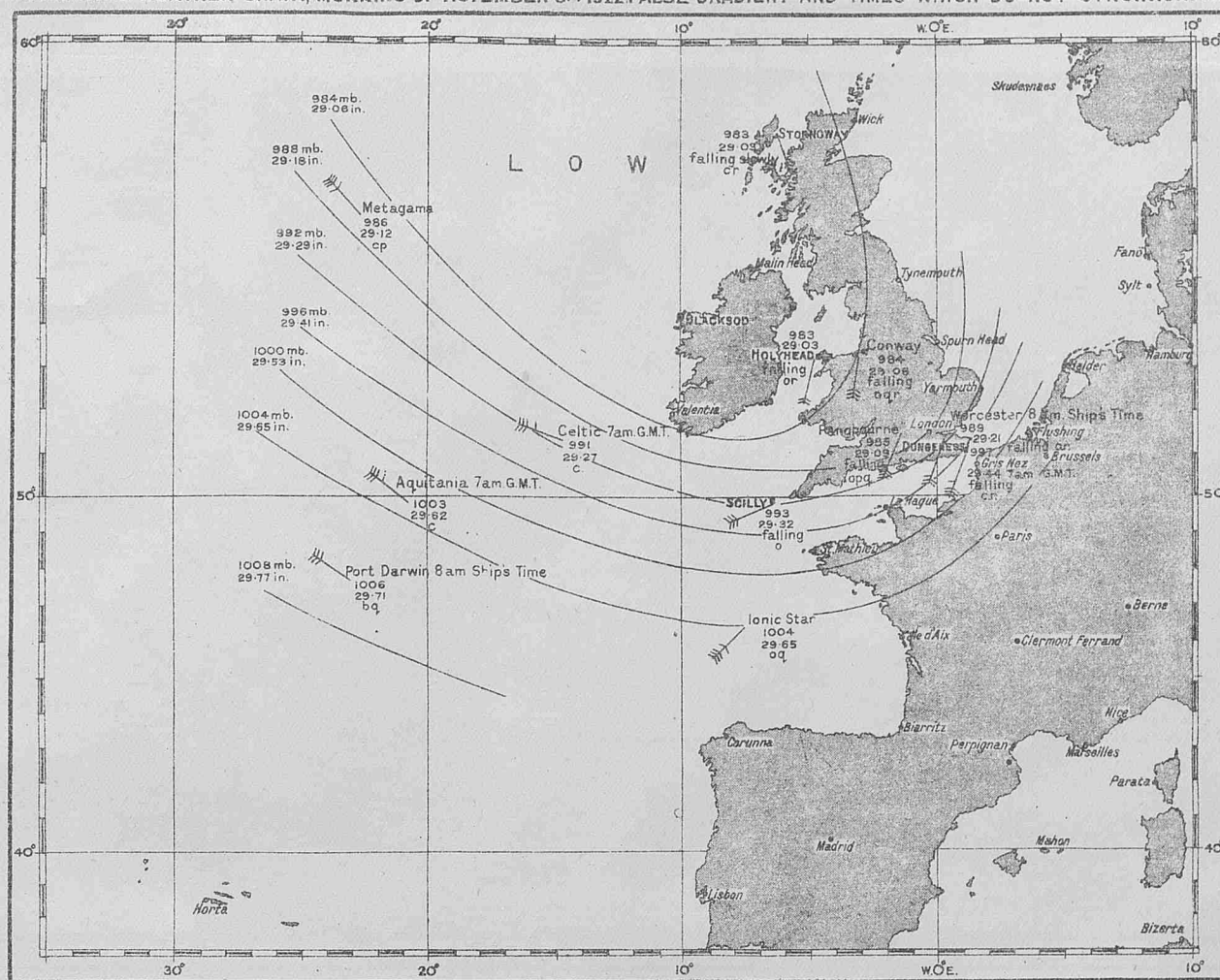
MISLEADING WEATHER CHART, MORNING OF NOVEMBER 6<sup>TH</sup> 1922. FALSE GRADIENT AND TIMES WHICH DO NOT SYNCHRONIZE.

Chart VII - "Wireless and Weather."

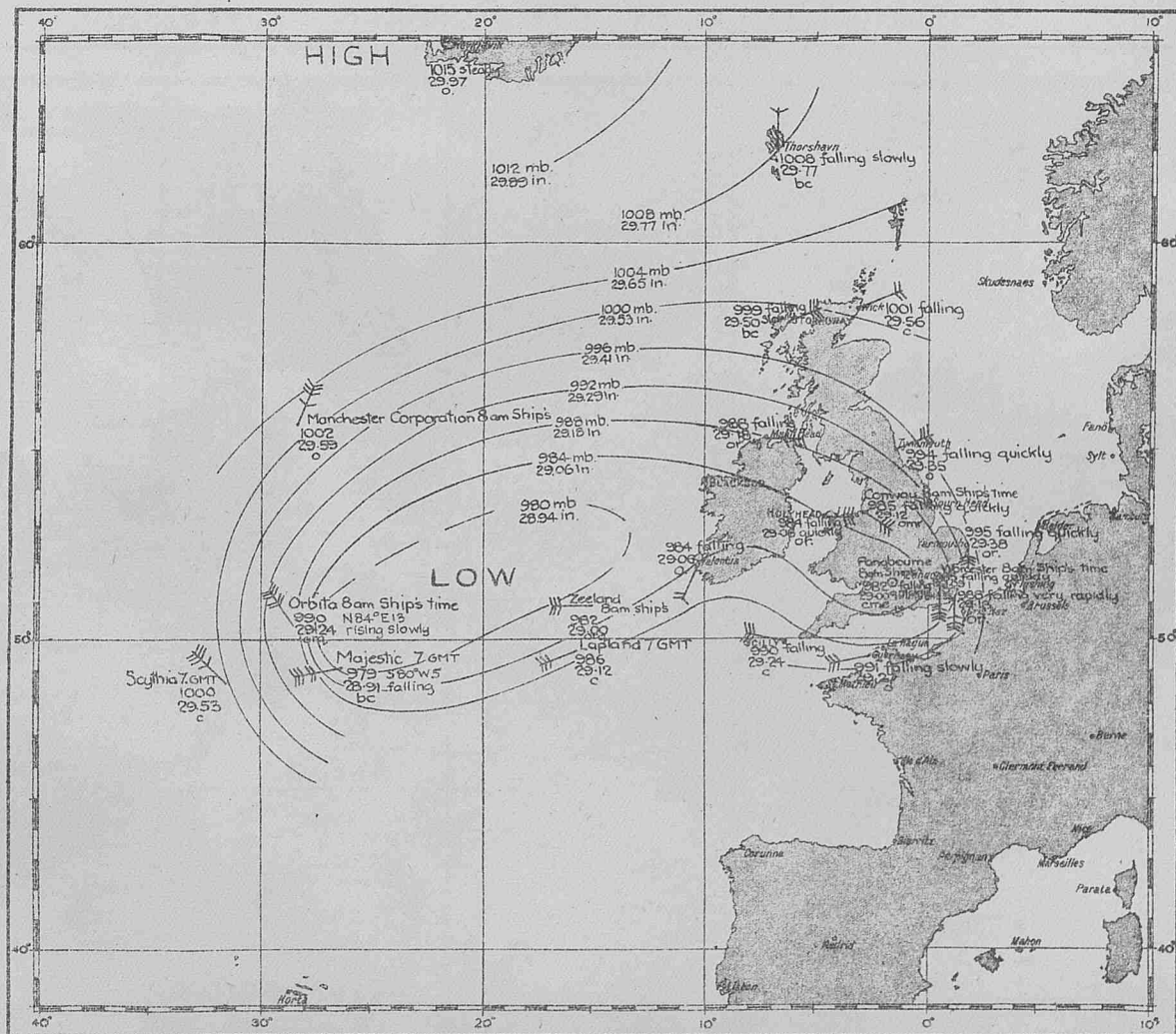
MISLEADING WEATHER CHART, MORNING OF NOVEMBER 7<sup>TH</sup> 1925. FALSE GRADIENT AND TIMES WHICH DO NOT SYNCHRONIZE.

Chart VIII - "Wireless and Weather."

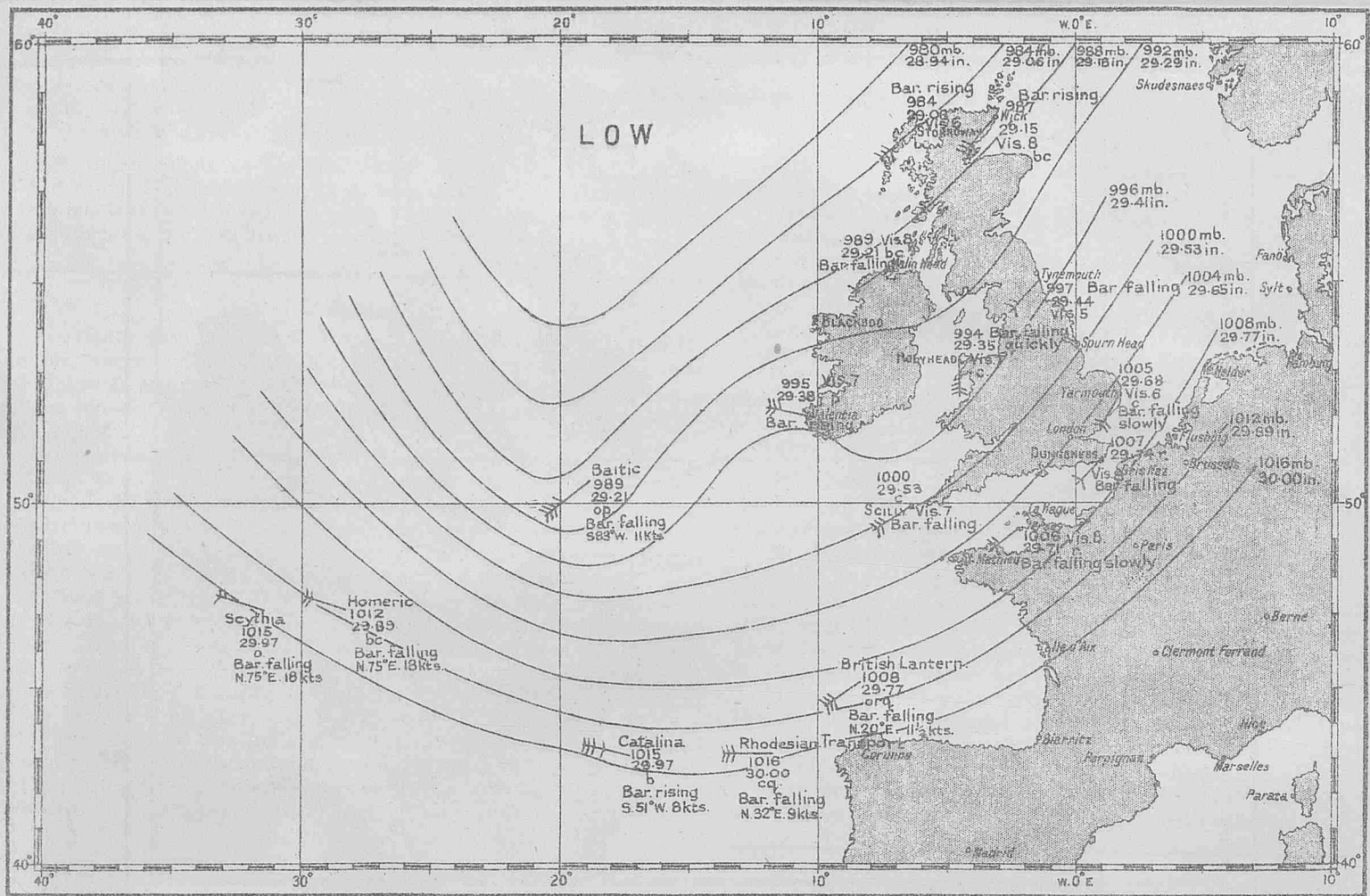


Chart IX,—"Wireless and Weather."

WEATHER CHART, MORNING OF MARCH 7TH. 1922.

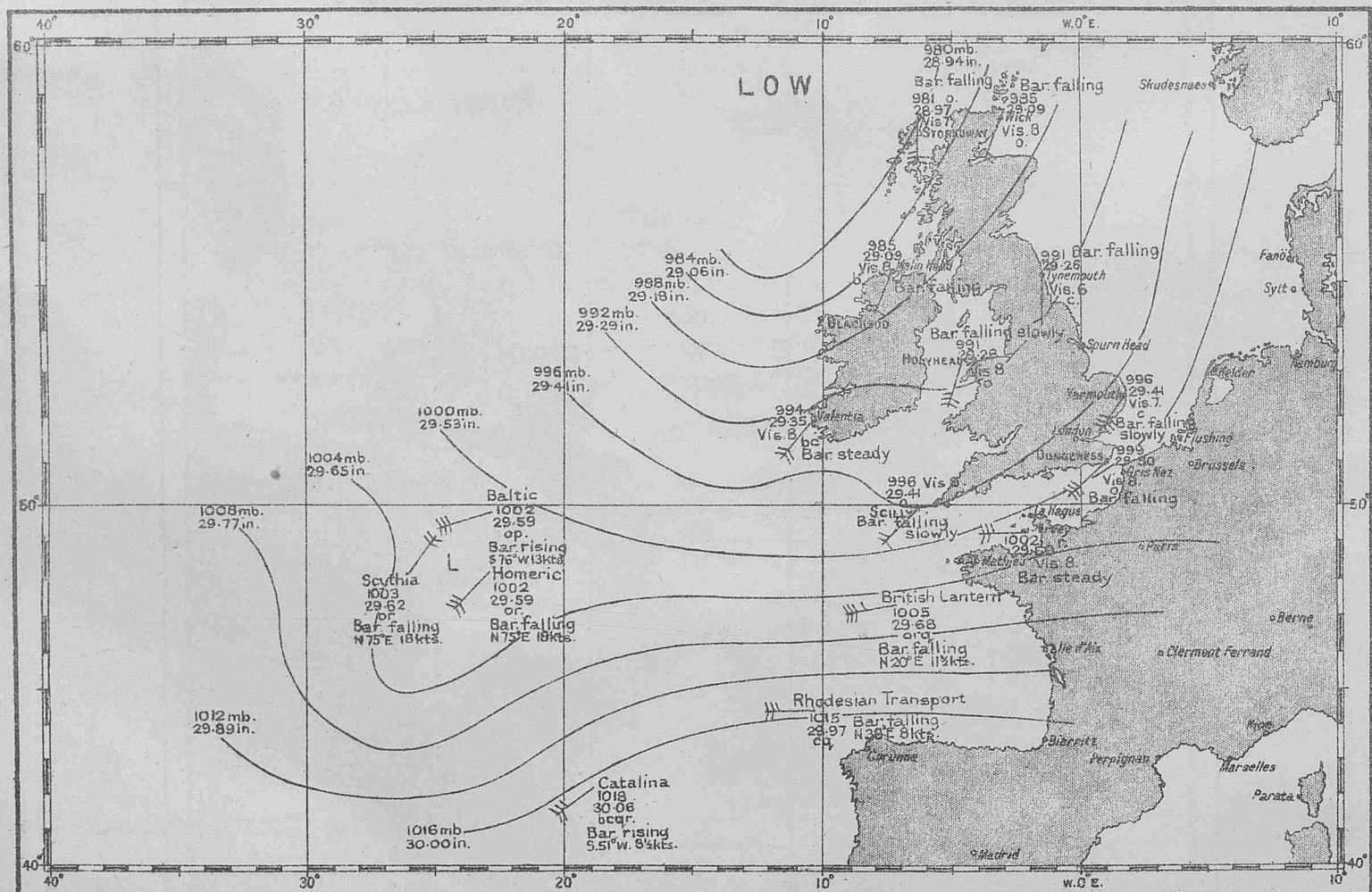


Chart X,—"Wireless and Weather."



## WEATHER CHART, EVENING OF MARCH 7TH. 1922.

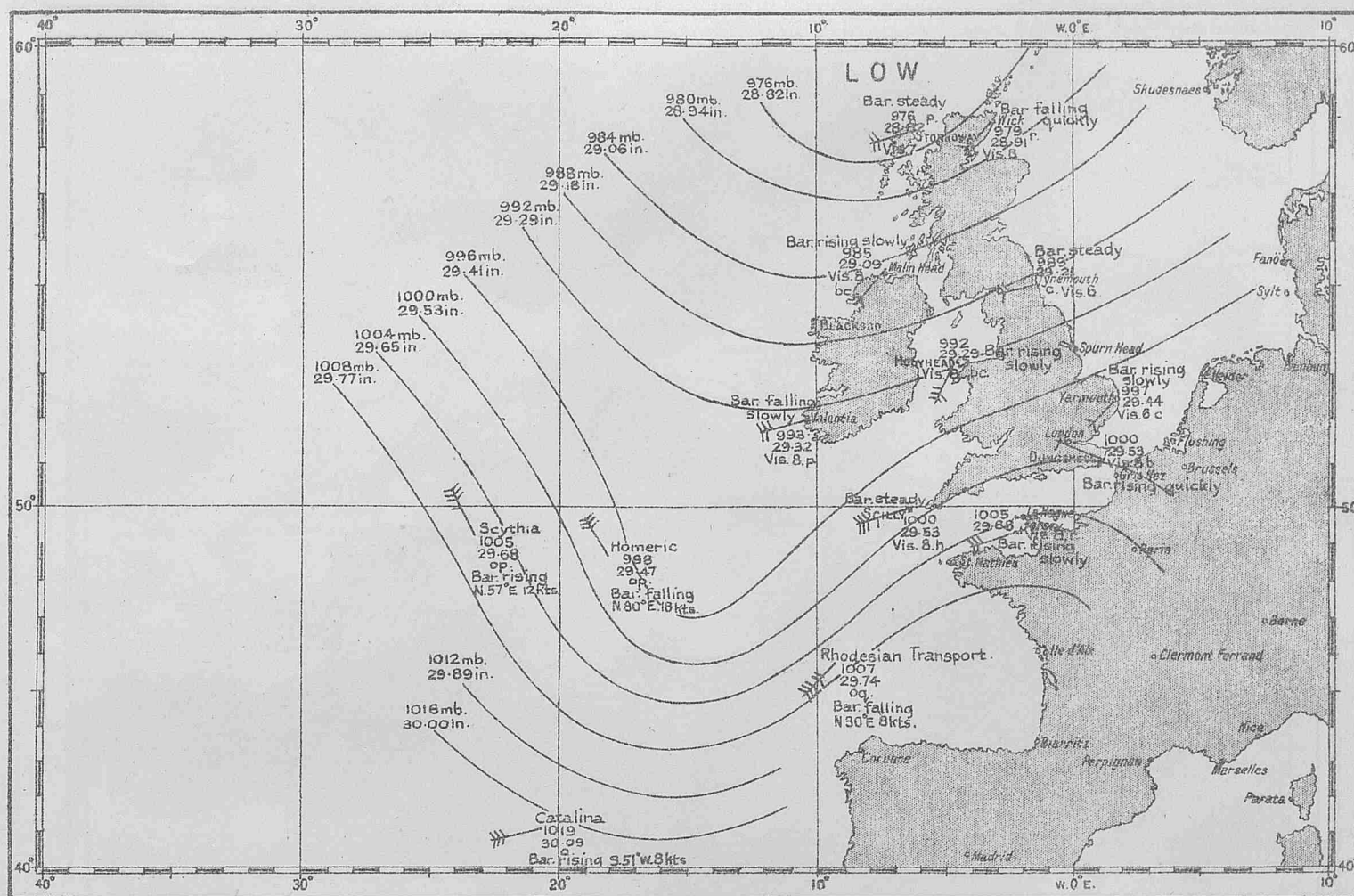


Chart XI, —"WIRELESS AND WEATHER."

## WEATHER CHART, MORNING OF MARCH 8TH. 1922.

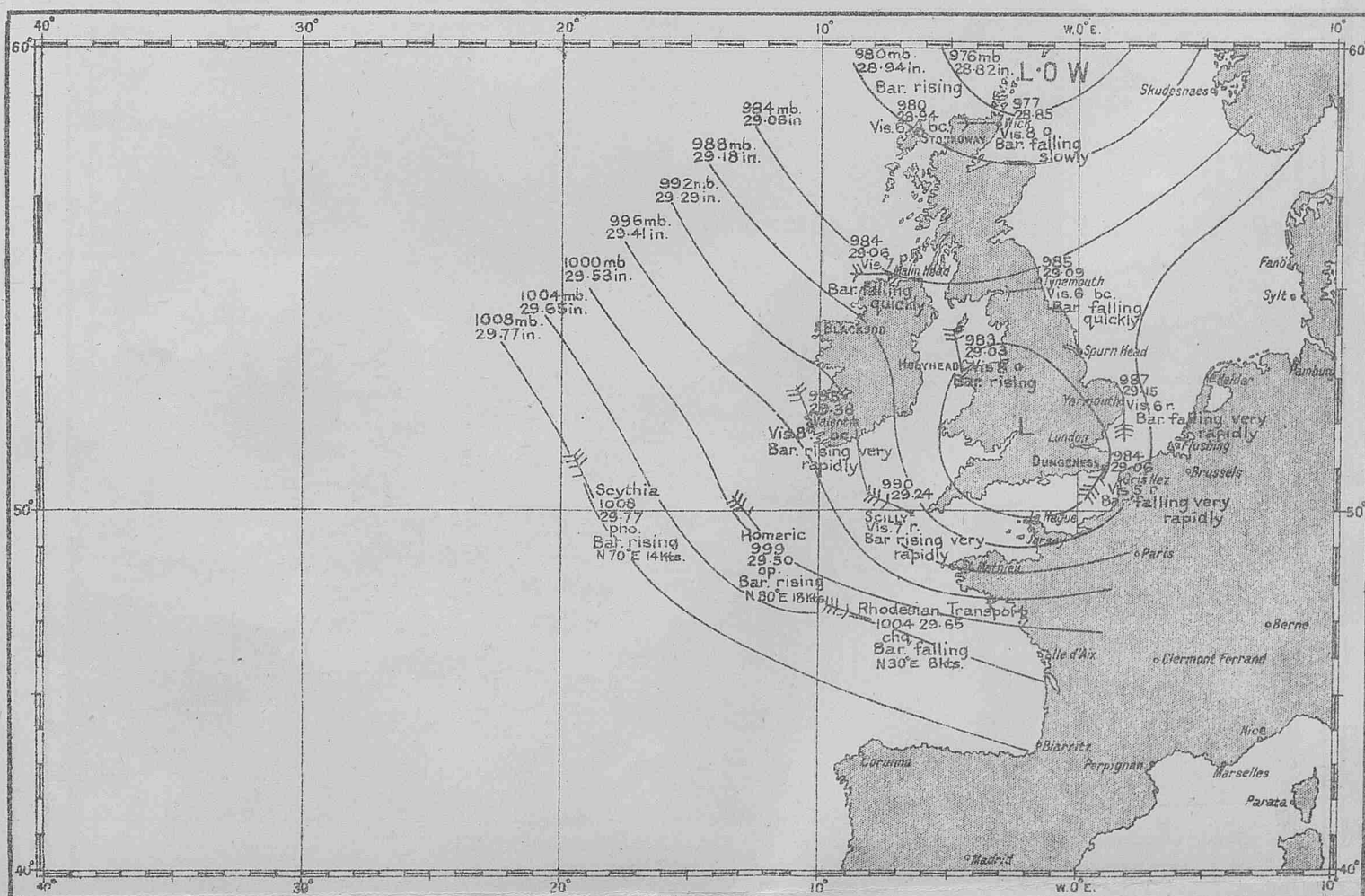


Chart XII, —"WIRELESS AND WEATHER."

WEATHER CHART, MORNING OF DECEMBER 15<sup>TH</sup> 1924.

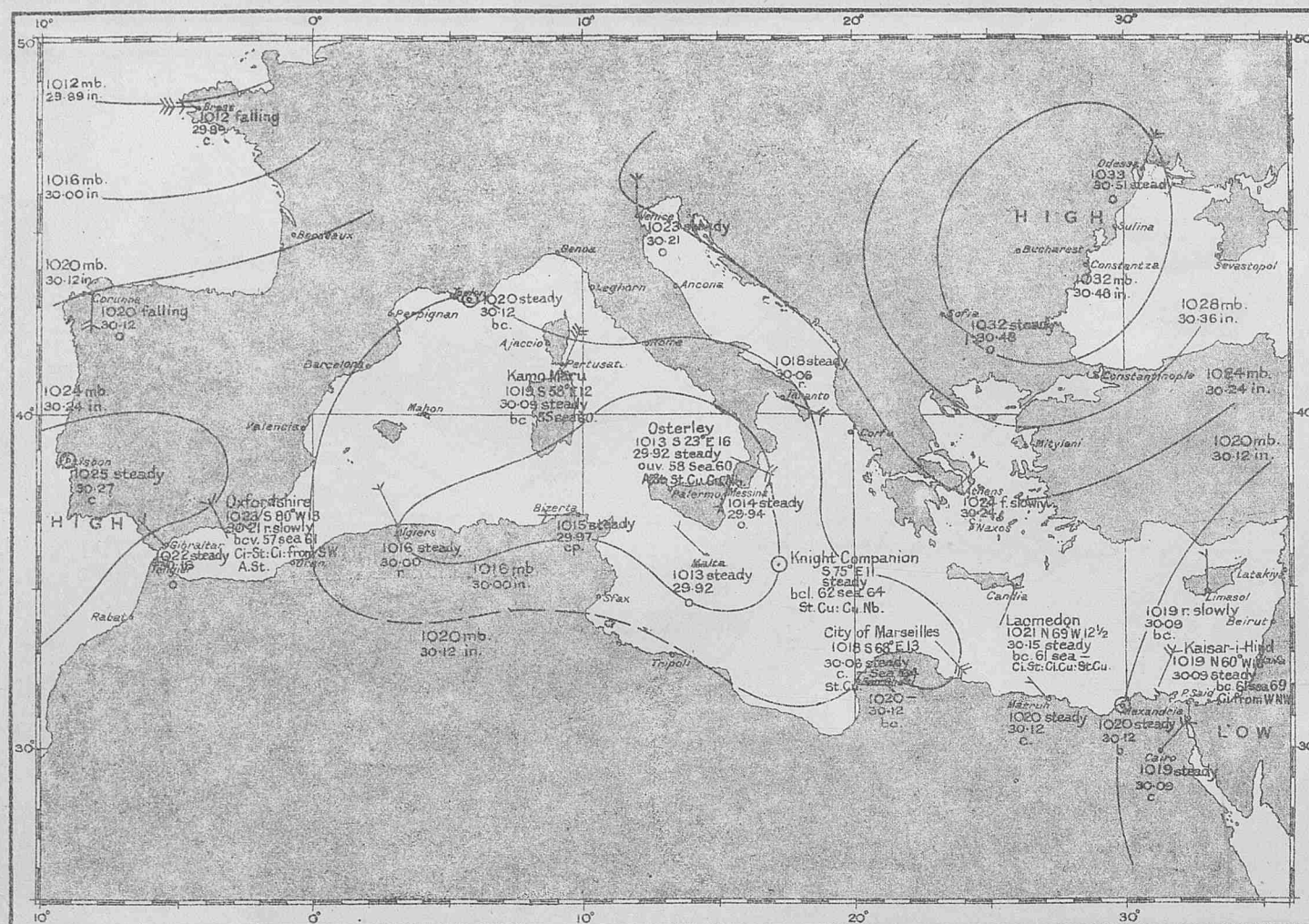


Chart XIII. "WIRELESS AND WEATHER"

WEATHER CHART, MORNING OF DECEMBER 16<sup>TH</sup> 1924.

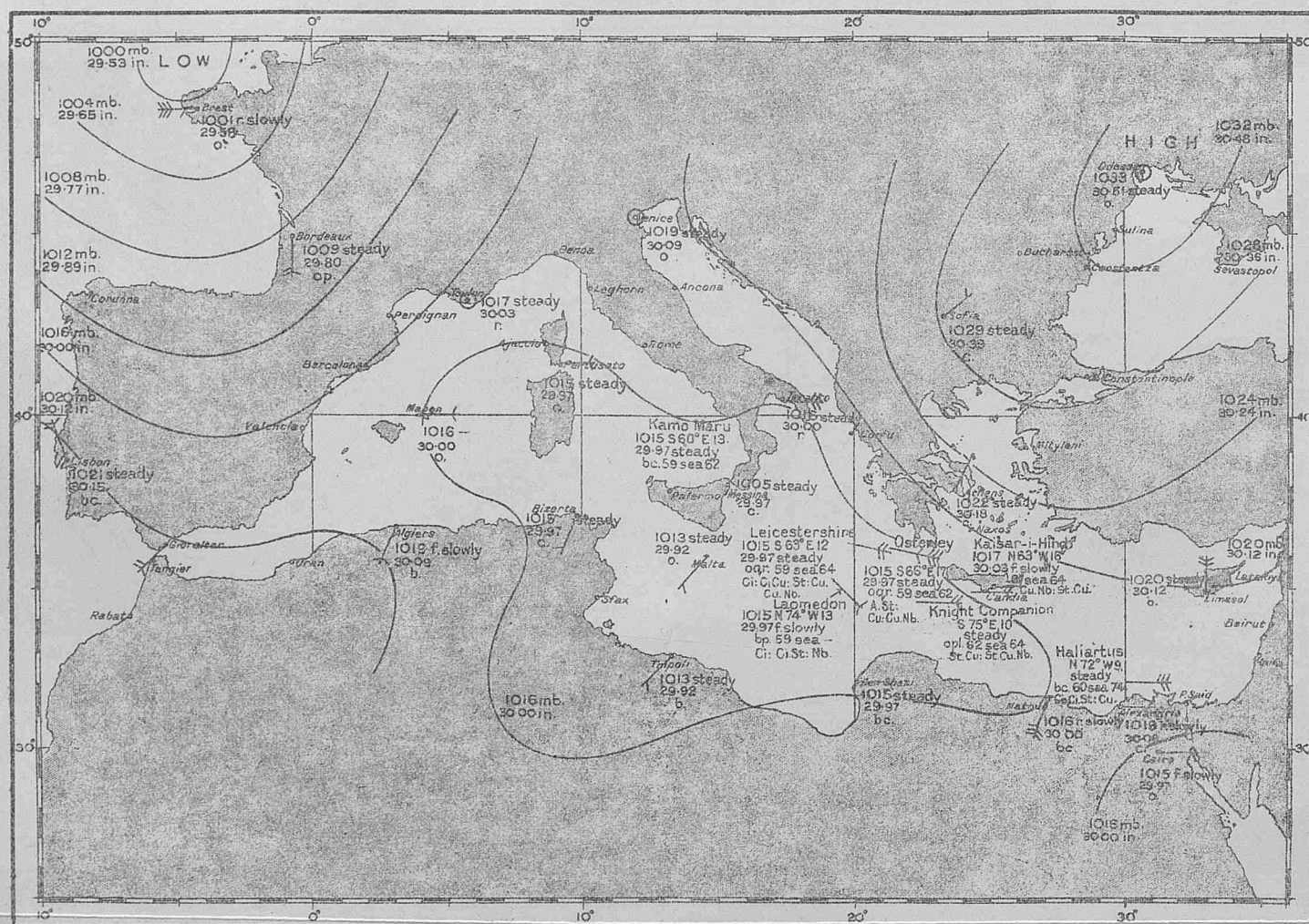


Chart XIV - "WIRELESS AND WEATHER."



WEATHER CHART, MORNING OF DECEMBER 15<sup>TH</sup>, 1924.

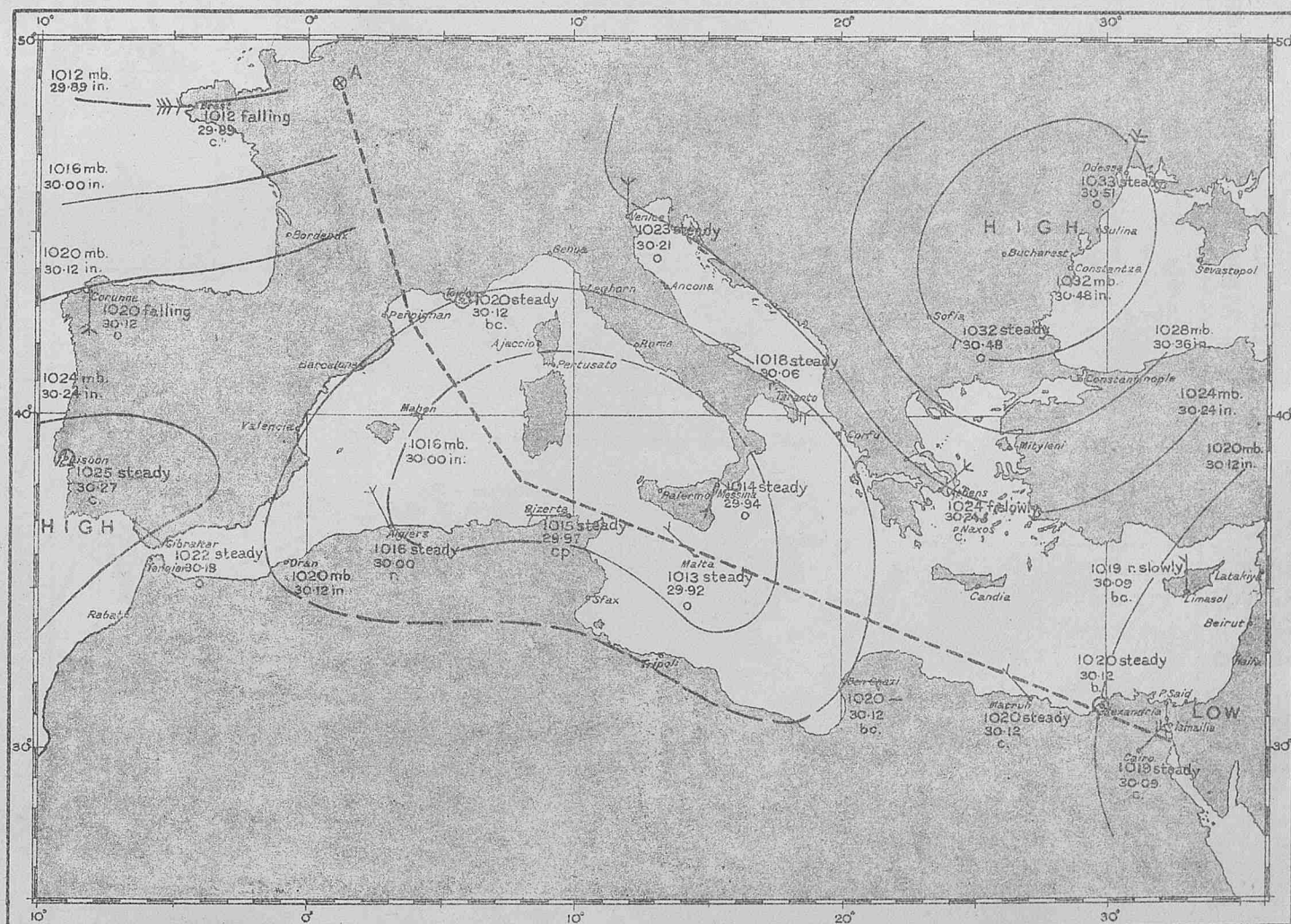
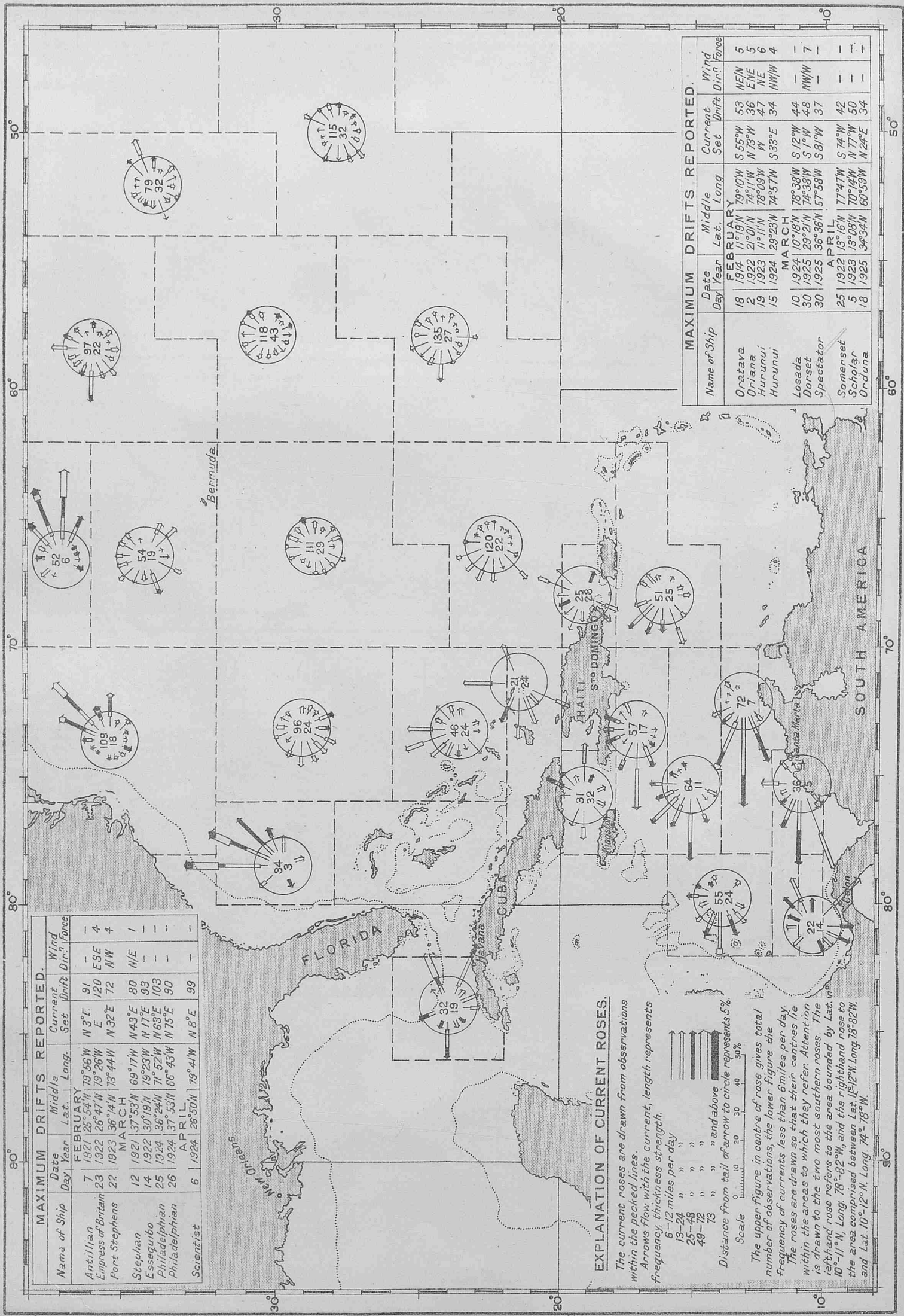


Chart XIIIa. "WIRELESS AND WEATHER."

CURRENTS ON THE TRACKS TO AND FROM THE WEST INDIES AND PANAMA.  
(WESTERN PORTION)  
FEBRUARY, MARCH AND APRIL.  
Observations of ships regularly observing for British Meteorological Office 1910-1925.



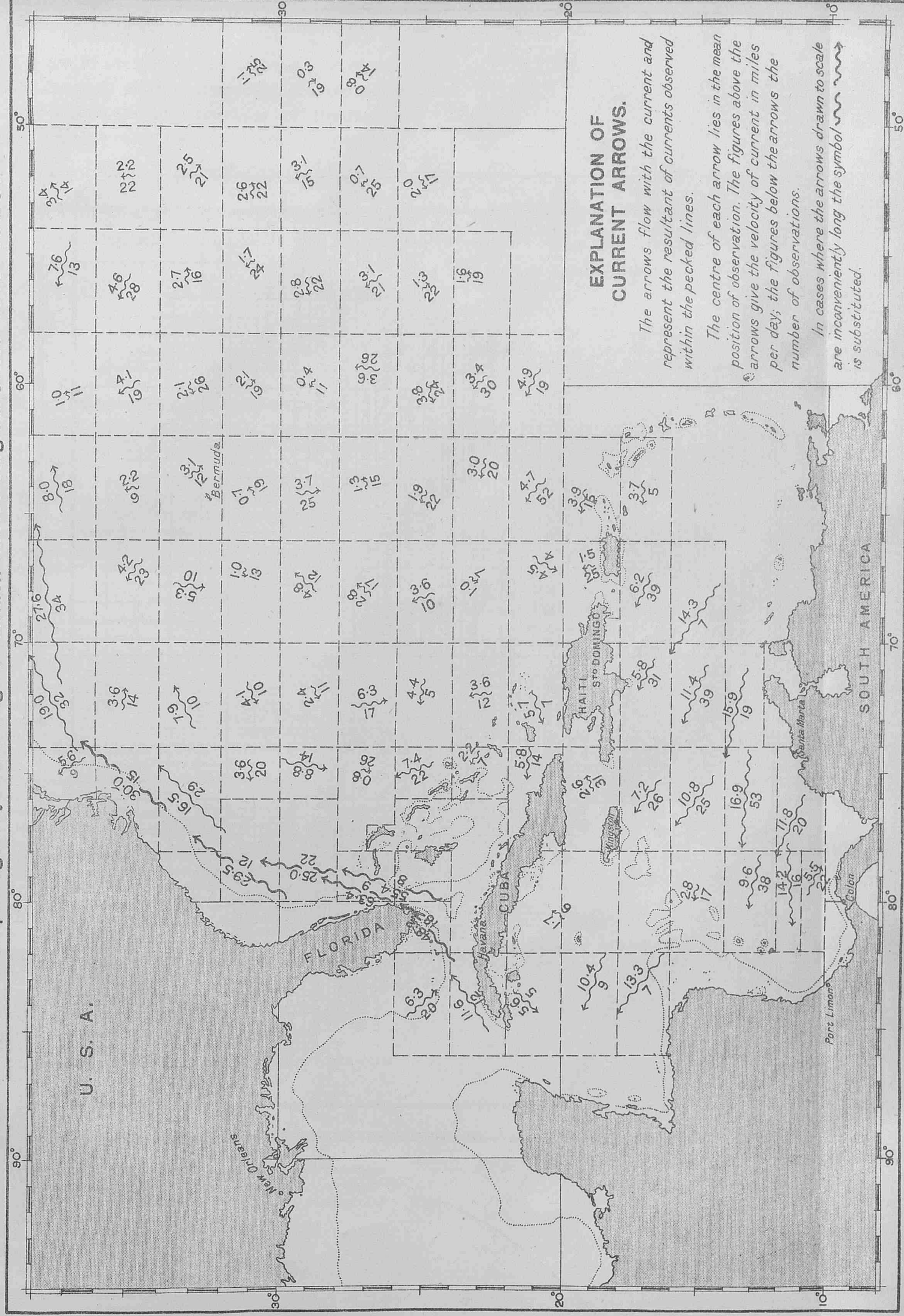


Vol. IV. No. 39.

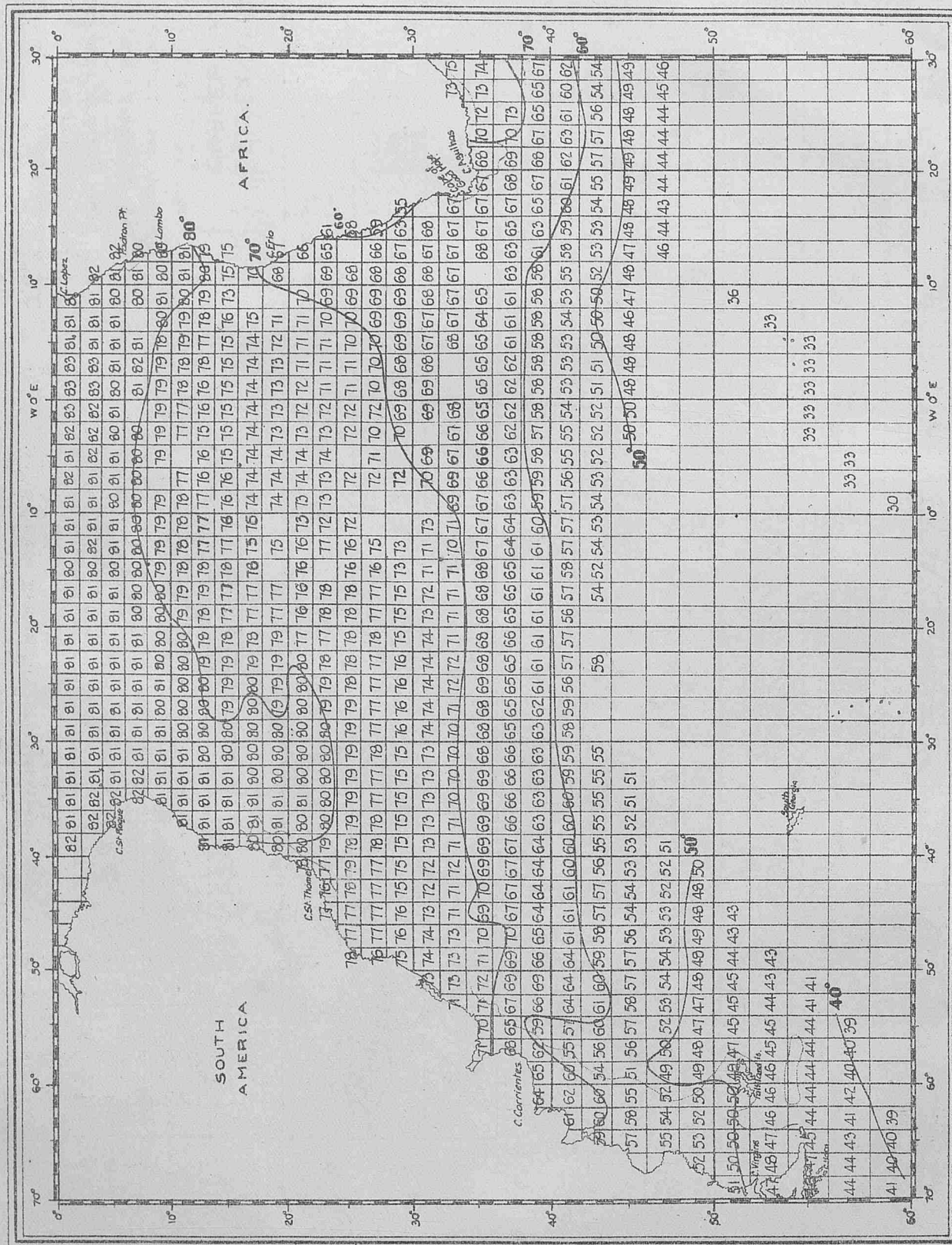
CURRENTS ON THE TRACKS TO AND FROM THE WEST INDIES AND PANAMA.  
(WESTERN PORTION)

FEBRUARY, MARCH AND APRIL.

Observations of ships regularly observing for British Meteorological Office 1910-1925.



# SOUTH ATLANTIC. MEAN SEA SURFACE TEMPERATURES FOR MONTH OF MARCH.



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.

### 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.

### 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.

### ICE REPORTS.

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

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

### THE BAROMETER.

Before barometer readings are compared with the normal isobars shown on the Meteorological Ocean Charts, transmitted by W/T or plotted on Weather Charts, mercurial barometers should be corrected for height, gravity, temperature and index error, for which tables are given on pp. 84 to 92 4th edition of the Marine Observer's Handbook; see also pp. 10-12, Vol. IV, No. 37, of this Journal. A table for converting inches to millibars is also given below.

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

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

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

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

### CONVERSION TABLE.

#### To Convert Inches into Millibars.

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

### 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.



# ICE CHART.

## WESTERN NORTH ATLANTIC.

### LETTERS OF TRANSATLANTIC TRACKS INDICATE.

NOTE.—In case of necessity owing to extreme southerly drift of ice, operative dates will be fixed for Track A.

(B) From 1st March to 31st August, inclusive.

(D) From 15th February to 10th April, inclusive.

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

### ROUTE NOTICES.

For latest information re Tracks see Copy of letter from Cunard S.S. Co. on this Chart.

### SYMBOLS USED ON THE CHART.

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

Reports of Ice sighted between January 1st and January 31st, 1927, which have been received by the Meteorological Office, are shown by the Symbols plotted in the indicating the day of the month.

### PHENOMENAL DRIFTS OF ICE.

Date.	Ship or Source of Report.	Position. Lat. Long.	Remarks.
March 24, 1913	S.S. Floride ...	46°21'N. 34°05'W.	Berg 60 ft. high, 200 ft. long.
" 20, 1915	S.S. Wanaby ...	38°55'N. 48°32'W.	Piece—supposed portion of a berg 5 ft. high, 80 ft. long.
" 21, 1920	U.S. Hydrographic Bulletin.	38°02'N. 40°38'W.	3 ft. high, 30 ft. long.
" 21, 1921	Cape Race W/T report, via S.S. Hollandia.	37°50'N. 47°23'W.	Berg.

### IMPORTANT.

The following is a copy of a letter received from The Cunard S.S. Co. dated 21st January, 1927.

### NORTH ATLANTIC TRACKS.

"For your information and guidance, we have to advise you that the question of The North Atlantic Lane Routes, has recently been receiving consideration by the Lines Party to the North Atlantic Track Agreement. It has been unanimously decided that Track "B", which in the ordinary course of events would become operative West & East, on the 1st February should not be brought into force this Year, until the 1st March. This decision has been arrived at, in view of the fact that the United States Track "C", which will now automatically remain in force for a further period from the 1st proximo, was brought down to the extreme Southern edge of the Banks of Newfoundland in December 1923. This, therefore allows us to remain on this Track for a longer period than was originally the case when this track crossed the Banks."

Limit of Ice reported to Meteorological Office March 1901-1926.



## MARINE METEOROLOGY.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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>ENGLISH CHANNEL.</b>			
2.1.27	S.26°E. (T.) 4 m. from Dungeness Light House.		Submerged wreckage. Mast projecting 4 feet out of water, dangerous to navigation.
2.1.27	49°24'N. 3°31'W.		Drifting buoy.
8.1.27	Bearing East approx. 5 m. off Dungeness Light House.		Spar rising 10 feet above water, dangerous to navigation.
14.1.27	N.16°E. (T.) 9 m. from St. Catherine's Point.		Drifting spherical buoy, painted blue.
16.1.27	50°51'N.	1°02'E.	Spar projecting 10 feet above water, apparently attached to wreckage.
21.1.27	50°29'N.	0°45'W.	Floating spar, 40 feet long, 20 inches diameter, 4 iron bands, probably ship's derrick, dangerous to navigation.
<b>BRISTOL CHANNEL.</b>			
1.1.27	51°24'N.	3°40'W.	Mast projecting from submerged wreckage.
<b>IRISH CHANNEL.</b>			
18.1.27	54°39'N.	4°45'W.	Two-masted schooner on fire.
<b>NORTH ATLANTIC.</b>			
1.1.27	47°45'N.	38°32'W.	Black spar, about 30 feet long.
3.1.27	19°38'N.	65°30'W.	A spar floating upright, and apparently a broken lower mast, attached to submerged wreckage.
5.1.27	33°30'N.	52°35'W.	Large submerged wreck with two masts showing above water, one about 30 feet and a smaller one about 10 feet, distance between masts about 90 feet.
7.1.27	32°40'N.	75°50'W.	Partly submerged obstruction.
8.1.27	33°46'N.	74°03'W.	Red nun buoy.
9.1.27	48°06'N.	5°30'W.	Drifting spar buoy with red cone as topmark.
13.1.27	49°20'N.	7°—'W.	Spherical buoy adrift.
13.1.27	41°—'N.	64°51'W.	Light and whistle buoy marked <i>S.W. Ledge</i> .
17.1.27	18°45'N.	75°—'W.	Wreck spar projecting, dangerous to navigation.
18.1.27	33°53'N.	61°40'W.	Derelict dismasted schooner <i>Edna M. McKnight</i> , very dangerous to navigation.
19.1.27	42°20'N.	63°57'W.	Derelict schooner <i>Annabel Cameron</i> .
<b>GULF OF MEXICO.</b>			
2.1.27	28°13'N.	92°07'W.	Tree trunk, about 25 feet long, 2 feet in diameter.
2.1.27	28°16'N.	91°12'W.	Large black obstruction, apparently a schooner's bottom, showing about 5 feet out of water at one end.
<b>NORTH PACIFIC.</b>			
1.1.27	42°30'N.	124°53'W.	Log, about 40 feet long and 5 feet diameter.
5.1.27	33°48'N.	118°35'W.	Large timber, 4 feet square and 75 feet long, with several cross pieces of small timbers; apparently waterlogged.

## 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 8959).

## Agents.

BELFAST ...	Captain J. MCINTYRE, Harbour Master, Harbour Office. (Telephone No.: Belfast 4090).
CARDIFF ...	Captain T. JOHNSTON, Technical College, Cathays Park.
GLYDE ...	Captain M. C. CORRANCE, Board of Trade Sur- veyor's Office, 73, Robertson Street, Glasgow.

## Agents (contd.).

FREMANTLE, W. Australia.	Captain J. J. AIREY, Deputy Director of Naviga- tion, 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

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

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

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

Only in special cases will individual letters be sent.

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

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

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

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

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

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

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

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

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

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

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

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line	Last Log, Register, or Report Contributed. Received up to 14.1.27.	Date Received.
<i>Aba</i> ...	Yardley, H. A., D.S.C.	J. Doyle, L. B. Silvester, S. J. Bristowe.	M.L.	Elder Dempster	Met. Log. 28.4.25 to 25.9.26	14.10.26.
<i>Abinsi</i> ...	Millson, H. E.	E. W. Bascombe	No. A.	"	Form 911 6.10.26 to 1.12.26	8.12.26.
<i>Achilles</i> ...	Wilson, C. A.	"	M.L.	A. Holt	"	"
<i>Actor</i> ...	Haylett, E.	A. Frew, J. McKay, J. D. Greeves.	M.L.	Harrison	Met. Log. 29.8.26 to 4.12.26	10.1.27.
<i>Adda</i> ...	Toft, J. T.	"	No. M.	Elder Dempster	Form 911 27.10.26 to 3.12.26	7.12.26.
<i>50 Adriatic</i> ...	Beadnell, F. E., Capt. R.N.R.	R. G. Roberts, O. V. Lucas	W.T.	White Star	W.T. Reg. 15.11.26 to 4.12.26	8.12.26.
<i>Aeneas</i> ...	Wallace, W. K.	J. M. Anderson	No. A.	A. Holt	Form 911 18.10.26 to 6.11.26	9.11.26.
<i>Agapenor</i> ...	Ramsay, J.	"	" A.	"	" 7.12.26 to 24.12.26	13.1.27.
<i>Aidan</i> ...	Harris, F. C. P.	J. J. West	" A.	Booth	" 20.11.26 to 8.12.26	10.1.27.
<i>Alban</i> ...	Whayman, W.	R. Parry	" A.	"	" 7.9.26 to 5.10.26	11.1.26.
<i>Albania</i> ...	Gronow, S.	L. Harper	" A.	Cunard	" 18.10.26 to 29.11.26	8.12.26.
<i>Alipore</i> ...	Harrison, R., D.S.O., R.D., Captain, R.N.R.	D. A. C. Butler	" M.	P. and O.	" 29.8.25 to 22.9.25	24.9.26.
<i>Almanzora</i> ...	Wakeman, E. C.	A. H. Phillipson	" A.	R.M.S.P.	" 12.9.26 to 24.11.26	13.12.26.
<i>Alondra</i> ...	Prendergast, J. J.	H. Peters	" A.	Yeoward	" 19.11.26 to 2.1.27	5.1.27.
<i>Ampelco</i> ...	Vandenkerckhove, A.	A. Vandenbulck	" A.	American Petroleum	" 4.12.26 to 27.12.26	29.12.26.
<i>Andes</i> ...	Parker, W. H., C.B.E., R.D., R.N.R.	"	No.	R.M.S.P. Co.	" 11.10.26 to 30.10.26	13.11.26.
<i>Antiochus</i> ...	Dunlop, S. K.	E. T. Bayes	" A.	A. Holt	"	"
<i>Aorangi</i> ...	Crawford, R.	G. H. Kime, H. A. Titchfield, E. Anderson, C. Holdaway.	M.L.	Canadian-Australasian	Met. Log. 4.9.26 to 19.10.26	27.10.26.
<i>30 Aquilania</i> ...	Showman, A. C.	J. L. Croasdaile, J. Locke, D. MacLean.	W.T.	Cunard	Met. Log. 25.8.26 to 9.12.26	10.1.27.
<i>62 Arabic</i> ...	Charles, Sir J. T. W., K.B.E., C.B., R.D., Commodore, R.N.R.	"	"	"	W.T. Reg. 17.10.26 to 1.11.26	3.11.26.
<i>Arafura</i> ...	Harvey, H.	W. F. Jackman, J. M. Appleby, W. Jenkins.	"	White Star	" 15.10.26 to 6.11.26	9.11.26.
<i>Archimedes</i> ...	Gordon, A. S.	J. T. Heddle, G. C. Smith, O. B. Godfrey, R. Lloyd Harry.	M.L.	Eastern and Australian	Form 911 20.4.26 to 14.5.26	17.5.26.
<i>Argyllshire</i> ...	Downs, E. B.	J. M. Edgar	No. A.	Lampart & Holt	Met. Log. 30.6.26 to 26.10.26	29.12.26.
<i>Ariguani</i> ...	Wallace, J.	J. McCrone	No. M.	Federal	"	"
<i>Armada Castle</i> ...	Sundamore, J. H. H., D.S.C., R.D., Commr., R.N.R.	S. A. Sapworth, G. McKee, W. E. Butcher, J. W. Kendall.	M.L.	Elders & Fyffes	Form 911 22.3.26 to 9.6.26	16.7.26.
<i>Arracan</i> ...	Millard, A.	A. B. Connor, G. D. Pinnick, L. May.	"	Union Castle	Met. Log. 14.8.26 to 12.12.26	18.12.26.
<i>Arundel</i> ...	Willis, M.	R. McInnes, M. S. Stuart, C. C. Weir.	"	P. Henderson	Met. Log. 17.4.26 to 10.10.26	30.10.26.
<i>Arundel Castle</i> ...	Short, H.	Mr. Hill	C.C.	Southern Rly.	" 4.1.26 to 11.4.26	26.4.26.
<i>Astronomer</i> ...	George, J., O.B.E.	C. S. Keen	No. A.	Union Castle	Telegraphic Report 13.1.27	13.1.27.
<i>Athenic</i> ...	Richards, J.	A. Brown, J. Glen, Thompson.	M.L.	Harrison	Form 911 12.11.26 to 2.1.27	4.1.27.
<i>Atreus</i> ...	Davies, E.	W. Hill	No. A.	White Star	Met. Log. 15.8.26 to 25.12.26	1.1.27.
<i>Atsuta Maru</i> ...	Salter, G. H.	J. C. Podmore	" A.	A. Holt	Form 911 13.11.26 to 27.11.26	20.12.26.
<i>Auditor</i> ...	Arakida, R.	K. Murazumi	" A.	"	" 1.10.26 to 5.12.26	13.12.26.
<i>Ausonia</i> ...	Owen, W. T.	T. E. Steel	" M.	Nippon Yusen Kaisha	" 29.7.26 to 10.8.26	16.8.26.
<i>Avon</i> ...	Stafford, W., D.S.C., R.D., Lt. Commr., R.N.R.	E. R. B. Freeman	" A.	Harrison	" 28.11.26 to 2.1.27	5.1.27.
<i>Balfour</i> ...	Adam, C., R.D., Commr., R.N.R.	E. S. Dunch	" M.	Cunard	" 19.11.26 to 13.12.26	14.12.26.
<i>Balranald</i> ...	McQueen, O. S.	N. P. Phillips	No. A.	Canadian Pacific	" 24.3.26 to 2.7.26	17.7.26.
	Townshend, W. P., Commr., R.N.R.	F. Ward, E. Cowell, J. Davis, E. Alexander.	M.L.	P. & O. Branch	" 13.12.26 to 22.12.26	29.12.26.
					Met. Log. 2.7.26 to 7.11.26	20.11.26.



Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.1.27.	Date Received.
51 Baltic ...	White, E. R., Commr. R.N.R.	H. C. Gray, D. K. Crawford, J. Law.	W.T.	White Star ...	W.T. Reg. 29.11.26 to 18.12.26	22.12.26.
Bambra ...	Turner, J. E. ...	H. W. Norris, J. Eggleston, C. Melson.	M.L.	State Service, Australia	Form 911 29.11.26 to 19.12.26	21.12.26.
Bampton Castle ...	Hutchings, A. H. ...	J. W. S. Brooks ...	No. A.	Union Castle ...	Met. Log. 4.5.26 to 11.11.26 ...	29.12.26.
Banbury Castle ...	Singeisen E. A., D.S.C., R.D., Capt., R.N.R.	C. G. Cuthbertson ...	" A.	" ...	Form 911 24.7.26 to 26.12.26...	10.1.27.
Banffshire ...	Wynne, R. H. ...	W. F. Lockhead ...	" A.	Turnbull Martin ...	" 24.11.26 to 27.12.26	31.12.26.
Baron Murray ...	Edgar, J. E. ...	W. P. G. Arthur, H. Thompson	" A.	Hogarth & Sons ...	" 14.10.26 to 26.11.26	2.12.26.
Barpeta ...	Strachan, J. ...	W. P. Page ...	" M.	British India ...	" 8.5.26 to 10.6.26 ...	21.9.26.
Barrabool ...	" ...	F. N. Wyatt ...	No.	P. & O. Branch ...	" 1.12.26 to 14.12.26	10.1.27.
Baychino ...	Cornwall, S. A. ...	E. J. Hankin ...	" A.	Hudson's Bay Co. ...	" 17.10.26 to 1.12.26	8.12.26
Baymaud ...	Foellmer, G. ...	" ...	" M.	" ...	" ...	" ...
59 Belgenland ...	Howell, T. ...	C. Murray, J. Cross ...	W.T.	Red Star ...	W.T. Reg. 4.10.26 to 23.10.26...	26.10.26.
Benalder ...	Cole, J. H., D.S.C. ...	" ...	No. A.	Ben Line ...	Form 911 4.10.26 to 23.10.26...	26.10.26.
Bendigo ...	Nicholl, R. N. C. ...	H. J. Cholerton ...	" M.	P. & O. Branch ...	" 21.12.26 to 1.1.27 ...	13.1.27.
81 Berengaria ...	Rostron, Sir A. H., K.B.E., R.D., Capt., R.N.R.	J. A. Myles, W. C. A. Robson, E. W. Connell ...	W.T.	Cunard ...	W.T. Reg. 4.9.26 to 8.10.26 ...	21.10.26.
Berrima ...	Short, C. E. ...	T. Ferguson ...	No. M.	P. & O. Branch ...	" 8.12.26 to 20.12.26	23.12.26.
Berwyn ...	McCombie, G. ...	D. Dunn ...	" A.	Canadian Pacific ...	Form 911 4.8.26 to 5.12.26 ...	7.12.26.
Bintang ...	Morzer Bruyns, M. F.	M. C. Altins ...	" M.	Nederland ...	" 12.12.26 to 23.12.26	10.1.27.
Bogota ...	Good, W. J. ...	W. Billington ...	" A.	R.M.S.P. Co. ...	" 11.12.26 to 30.12.26	10.1.27.
Bolingbroke ...	Dott, J. F. ...	C. A. Mott ...	M.L.	Canadian Pacific ...	Met. Log. 21.5.26 to 19.9.26 ...	21.9.26.
Borda ...	McQueen, D., Murray, M. F.	" ...	No. M.	P. & O. Branch ...	" 23.1.26 to 31.8.26 ...	8.9.26.
Bothwell ...	Holland, R. ...	" ...	" A.	Canadian Pacific ...	Form 911 3.9.26 to 12.10.26 ...	7.12.26.
Brandon ...	Rothwell, A. J. ...	" ...	" A.	" ...	" 19.11.26 to 26.12.26	13.1.27.
Brecon ...	Sargent, A. H., R.D., Lt.-Commr., R.N.R.	T. Beck ...	" A.	" ...	" 25.7.26 to 25.8.26 ...	27.8.26.
Brenda ...	McCombie, G. ...	F. E. Bevis ...	" A.	Scottish Fishery Board	" 29.6.26 to 27.7.26 ...	3.8.26.
Brighton ...	Lamont, A. ...	F. R. Ness ...	" A.	Southern Railway ...	" 1.6.26 to 30.6.26 ...	3.7.26.
British Advocate ...	Hill, A. ...	Mr. Munton ...	C.C.	British Tankers ...	Telegraphic Report 11.1.27 ...	11.1.27.
British Engineer ...	Taylor, R. J. ...	M. Kennedy ...	No. M.	" ...	Form 911 12.10.26 to 13.11.26	23.12.26.
British Soldier ...	Joures, T. W. ...	E. L. W. Evans ...	" M.	" ...	" 12.10.26 to 13.11.26	23.12.26.
Bronte ...	Putt, R. O. ...	H. J. Crangle ...	" A.	Lampport & Holt ...	" 26.1.26 to 9.3.26 ...	12.4.26.
Browning ...	Crapper, J. S. ...	W. Jones, H. L. Rudd ...	" A.	" ...	" 17.11.26 to 10.12.26	3.1.27.
Bruyere ...	Connorton, W. A. ...	A. B. Murray ...	" A.	" ...	" 3.10.26 to 14.10.26	18.10.26.
Burma ...	Deuson, W. ...	R. Mowbray ...	" A.	" ...	" 29.3.26 to 1.7.26 ...	5.7.26.
Cambria C.S. ...	Reid, R. B. ...	J. Henderson ...	" A.	Henderson ...	" 20.1.26 to 12.2.26 ...	22.3.26.
Cambria ...	Sherwood, C. A., D.S.C.	A. J. English, B. C. Farrow, C. P. St. John.	M.L.	Eastern Tel. Co. ...	" 24.7.26 to 10.10.26...	29.10.26.
Cambria ...	Telfer, J. E., O.B.E.	V. S. Phillips ...	C.C.	L.M. & S. Rly. ...	Met. Log. 20.6.26 to 24.8.26 ...	29.9.26.
Cameronia ...	Smart, R. W. ...	" ...	No. A.	Anchor ...	Telegraphic Report 8.1.27 ...	8.1.27.
Camito ...	Forrester, W. T., O.B.E.	W. T. Broome, P. C. Congdon, F. Dudgeon, C. N. Schofield.	M.L.	Elders & Fyffes ...	Form 911 21.11.26 to 12.12.26	18.12.26.
Canadian Importer ...	McCulloch ...	C. R. Randle ...	No. A.	Canadian Govt. Mercantile Marine.	Met. Log. 21.6.26 to 16.10.26...	30.10.26.
Canadian Inventor ...	Boulton, F. W. ...	D. Grey ...	" A.	" ...	Form 911 18.11.26 to 4.1.27 ...	10.1.27.
Canadian Miller ...	McConechy, W. T. ...	C. E. Moore, H. Ruegg ...	" A.	" ...	" 25.8.26 to 4.9.26 ...	22.9.26.
Canadian Scottish ...	Wallace, C. ...	J. T. White ...	" A.	" ...	" 14.3.26 to 23.6.26 ...	15.7.26.
Canadian Skimisher ...	Millar, W. H. ...	" ...	" A.	" ...	" 1.10.26 to 3.11.26 ...	23.12.26.
Canadian Winner ...	Bisset, C. R. ...	R. Girling, J. Cochrane ...	" M.	" ...	" 19.11.26 to 5.1.27 ...	11.1.27.
35 Carmania ...	Brown, F. G., R.D., Capt., R.N.R.	L. R. Simpson, W. M. Stewart, P. L. Williams.	W.T.	Cunard ...	W.T. Reg. 29.8.26 to 9.10.26 ...	2.11.26.
Carnarvon Castle ...	Hague, J. W., Commr., R.N.R.	S. Colbourne, H. A. Causton, G. Goringe, H. Iddes.	M.L.	Union Castle ...	W.T. Reg. 29.11.26 to 15.12.26	18.12.26.
34 Caronia ...	Hossack, W. H., R.D., Capt., R.N.R.	R. F. Bovey, T. Ashcroft, D. Butler, S. V. Williams.	W.T.	Cunard ...	Form 911 25.7.26 to 13.8.26 ...	20.8.26.
Casanare ...	" ...	" ...	No.	Elders & Fyffes ...	Met. Log. 18.7.26 to 12.12.26...	21.12.26.
52 Cedric ...	Hickson, V. W., Lt.-Commr., R.N.R.	E. A. A. Crowley, J. Farrell.	W.T.	White Star ...	W.T. Reg. 1.11.26 to 20.11.26...	24.11.26.
53 Celtic ...	Berry, G. ...	F. Pratt, A. Thompson, J. Peters.	"	" ...	Form 911 1.11.26 to 20.11.26...	24.11.26.
Centaure ...	Rose, A. F. ...	L. Johnstone ...	No. M.	A. Holt & Co. ...	W.T. Reg. 22.11.26 to 13.12.26	16.12.26.
Ceramic ...	Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R.	D. W. Chamberlain ...	" A.	White Star ...	Form 911 21.11.26 to 13.12.26	15.12.26.
Change ...	Gambrill, F. C. ...	J. Thomas, D. D. Tyer, J. A. Allan.	M.L.	Yuill & Co. ...	W.T. Reg. 20.12.26 to 8.1.27 ...	13.1.27.
China ...	Furlong, G. H. S., R.D., Capt., R.N.R.	M. K. Stone ...	No. M.	P. & O. ...	Form 911 19.12.26 to 8.1.27 ...	13.1.27.
Chindwara ...	Brooks, E. G. ...	J. J. Smith ...	" M.	British India ...	" 30.8.26 to 17.10.26...	22.11.26.
Chindwin ...	Esslemont, C. ...	J. P. Stewart ...	" A.	Henderson ...	" 29.8.26 to 13.12.26...	15.12.26.
City of Baroda ...	Houghton, W. ...	A. Beaton, J. Cook, W. H. Dalton.	M.L.	Ellerman ...	Met. Log. 2.10.26 to 21.12.26...	14.1.27.
City of Benares ...	Anderson, W. W. ...	C. G. Inglis ...	No. A.	" ...	Met. Log. 19.9.25 to 31.5.26 ...	4.6.26.
City of Brisbane ...	Seaborne, F. O., D.S.C.	R. W. May ...	" A.	" ...	Form 911 1.10.26 to 19.10.26...	8.11.26.
City of Canterbury ...	Brenner, D. M. ...	" ...	" A.	" ...	" 29.10.26 to 11.12.26	20.12.26.
City of Chester ...	Letton, F. W. ...	H. Asher, W. Speakman, H. A. Hazell.	M.L.	" ...	" 21.10.26 to 12.11.26	17.11.26.
City of Edinburgh ...	Wyper, J. ...	N. G. Fraser ...	No. M.	" ...	Met. Log. 11.4.26 to 18.8.26 ...	20.9.26.
City of Hong Kong ...	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	" ...	" A.	" ...	Form 911 13.9.26 to 12.10.26...	2.11.26.
City of London ...	Martin, D. ...	J. J. McTigue ...	" A.	" ...	" 7.11.26 to 9.12.26 ...	3.1.27.
City of Marseilles ...	Brown, G. ...	W. A. MacAdams, G. F. L. Coates.	" A.	" ...	" 8.3.26 to 2.4.26 ...	12.4.26.
City of Rangoon ...	Jones, P. ...	A. Gibb ...	M.L.	" ...	" 25.2.26 to 18.3.26 ...	22.3.26.
City of Yokohama ...	McDonald, W. D. ...	R. A. Fulton ...	No. A.	" ...	Met. Log. 4.9.26 to 4.12.26 ...	15.12.26.
Clan Alpine ...	Lennox, W. J. ...	G. Short ...	" A.	" ...	Form 911 4.9.26 to 30.9.26 ...	25.10.26.
Clan Lamont ...	Urquhart, P., D.S.C.	P. de Gruchy ...	" A.	Clan ...	" 9.10.26 to 10.11.26 ...	20.12.26.
Clan Lindsay ...	Worthington, J. H. ...	" ...	" A.	" ...	" 10.12.26 to 5.1.27 ...	13.1.27.
Clan Macbeth ...	Young, A. H., R.D., Lieut.-Commr., R.N.R.	W. Hurst ...	" A.	" ...	" 17.11.26 to 26.11.26	29.12.26.
Clan Macfadyen ...	Stenson, F. J., R.D., Capt., R.N.R.	" ...	" A.	" ...	" 15.11.26 to 22.12.26	3.1.27.
Clan Macgillivray ...	West W. F. ...	J. H. Johnson ...	" A.	" ...	" 23.11.26 to 23.12.26	11.1.27.
					" 23.10.26 to 20.11.26	14.12.26.

## LIST OF VOLUNTARY OBSERVING SHIPS

iii

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.1.27.	Date Received.
<i>Clan Macindoe</i> ...	Low, A. ...	J. G. Baillie ...	No. A. ...	Clan ...	Form 911 1.10.26 to 3.12.26 ...	7.12.26.
<i>Clan Mackellar</i> ...	Scotland, A. ...	D. McAllister ...	" A. ...	" ...	14.11.26 to 31.12.26 ...	5.1.27.
<i>Clan Mackinnon</i> ...	McComish, A. B. ...	W. F. Isaac, S. Y. Strange, J. W. Innes. ...	M.L. ...	" ...	Met. Log. 21.8.26 to 27.11.26 ...	2.12.26.
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	D. S. Rae, J. O. Woodall, J. J. Millar. ...	" ...	" ...	" 6.9.25 to 14.5.26 ...	24.6.26.
<i>Clan Macnaughton</i> ...	Simpson, A. W. ...	F. Cossar ...	No. A. ...	" ...	Form 911 1.12.26 to 26.12.26 ...	31.12.26.
<i>Clan Macnaghtart</i> ...	Mee F. T. ...	F. B. Fairweather ...	" A. ...	" ...	" 24.10.26 to 25.11.26 ...	3.12.26.
<i>Clan Macwhirter</i> ...	Waterhouse, J. ...	R. W. Roberts ...	" A. ...	" ...	" 26.11.26 to 12.12.26 ...	17.12.26.
<i>Clan Macwilliam</i> ...	Williamson, A. ...	T. B. Cranwill ...	" A. ...	" ...	" 28.8.26 to 9.10.26 ...	30.10.26.
<i>Clan Malcolm</i> ...	Neill, G. A. ...	S. M. Werrey Easterbrook, H. V. Wightman, H. M. Macrone ...	M.L. ...	" ...	Met. Log. 5.5.26 to 5.9.26 ...	25.9.26.
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	L. C. Higgins ...	No. A. ...	" ...	Form 911 13.9.26 to 2.10.26 ...	25.10.26.
<i>Clan Murdoch</i> ...	Miller, W. ...	P. McMillan ...	" A. ...	" ...	" 27.6.26 to 25.7.26 ...	26.10.26.
<i>Clan Ranald</i> ...	Laird, C. ...	T. O. Marr ...	" A. ...	" ...	" 12.12.26 to 5.1.27 ...	13.1.27.
<i>Clan Ross</i> ...	Smith, W. P. ...	D. B. Edgar ...	" A. ...	" ...	" 8.12.26 to 21.12.26 ...	13.1.27.
<i>Clan Sinclair</i> ...	George, L. S. ...	N. Macleod ...	" A. ...	" ...	" 12.11.26 to 26.11.26 ...	20.12.26.
<i>Clan Urquhart</i> ...	Gibb, A. F. W. ...	T. G. Mitchell ...	" A. ...	" ...	" 31.10.26 to 1.12.26 ...	7.12.26.
<i>Colonia, C.S.</i> ...	Carlton, G. F., O.B.E., Commr., R.N.R. ...	W. E. Allen, R. E. Coad, F. B. Bolingbroke. ...	M.L. ...	Telegraph Construction & Maintenance.	Met. Log. 13.6.26 to 24.9.26 ...	30.9.26.
<i>Colonian</i> ...	Gittins, R. P. ...	" ...	No. A. ...	Leyland ...	Form 911 13.11.26 to 24.11.26 ...	7.12.26.
<i>Comorin</i> ...	Borland, J. Mc. I., C.B., D.S.O., R.D., Capt., R.N.R. ...	E. A. O. Chambers ...	" M. ...	P. & O. ...	" 24.8.26 to 23.9.26 ...	28.9.26.
<i>Concordia</i> ...	Telfer, J. H. ...	T. Philip, J. McIntosh, J. Mackay. ...	M.L. ...	Anchor Donaldson ...	Met. Log. 3.4.26 to 20.8.26 ...	27.8.26.
<i>Corinthic</i> ...	Hart, F. ...	E. Burt, J. Warltire, V. Evans. ...	" ...	White Star ...	" 17.7.26 to 30.10.26 ...	8.11.26.
<i>Cornish City</i> ...	James, D. P. ...	" ...	No. A. ...	Reardon Smith ...	" ...	" ...
<i>Cornwall</i> ...	Haines, F. P. ...	R. Gowthorpe, W. Thompson ...	" A. ...	Federal ...	Form 911 26.9.26 to 8.11.26 ...	11.11.26.
<i>Craftsman</i> ...	Gibbings, W. ...	D. G. Russell ...	" A. ...	Harrison ...	" 11.10.26 to 26.11.26 ...	2.12.26.
<i>Crawford Castle</i> ...	Morgan, A. O., R.D., Commr., R.N.R. ...	J. E. R. Wilford ...	" A. ...	Union Castle ...	" 9.11.26 to 16.12.26 ...	29.12.26.
<i>Cristales</i> ...	Isaacson, J. M. ...	S. Browne, R. Southerland, D. M. Baker, J. M. Hampshire. ...	M.L. ...	Elders & Fyffes ...	Met. Log. 25.7.26 to 4.12.26 ...	14.12.26.
<i>Culebra</i> ...	Mackay, A. S., R.D., Commr., R.N.R. ...	P. Cooper, H. V. Todd, J. W. Smith, F. G. Dawson. ...	" ...	R.M.S.P. Co. ...	" 16.7.26 to 4.12.26 ...	13.12.26.
<i>Cumberland</i> ...	Deith, G. T. ...	E. F. Hopkins ...	No. A. ...	Federal ...	Form 911 18.2.26 to 19.6.26 ...	22.6.26.
<i>Cuthbert</i> ...	Lee, O. J. P. ...	C. C. Beal ...	" A. ...	Booth ...	" 20.10.26 to 3.11.26 ...	10.11.26.
<i>Cyclops</i> ...	Cosker, W. ...	H. L. Cole ...	" A. ...	A. Holt ...	" 1.8.26 to 1.10.26 ...	8.10.26.
<i>Dardanus</i> ...	Williams, D. T. ...	C. F. Morgan ...	" M. ...	" ...	" 24.10.26 to 12.11.26 ...	21.12.26.
<i>Darian</i> ...	Masters, W. ...	" ...	" A. ...	Leyland ...	" 5.12.26 to 21.12.26 ...	23.12.26.
<i>Darro</i> ...	Matthews, G. P. ...	W. Halder Campe ...	" M. ...	R.M.S.P. Co. ...	" 30.10.26 to 23.11.26 ...	15.12.26.
<i>Demerara</i> ...	Willan, F. C. L. ...	J. J. C. Blake ...	" M. ...	" ...	" 17.10.26 to 11.12.26 ...	14.12.26.
<i>Demosthenes</i> ...	Orriss, F. A. ...	J. F. Cruickshank ...	" M. ...	Aberdeen ...	" 7.11.26 to 27.11.26 ...	21.12.26.
<i>Desado</i> ...	Hannam, F. S. ...	C. C. Dingle, L. D. Jennings ...	" M. ...	R.M.S.P. Co. ...	" 4.9.26 to 31.10.26 ...	5.11.26.
<i>Desna</i> ...	Huff, G. ...	A. F. Walker ...	" M. ...	" ...	" 20.9.26 to 12.11.26 ...	19.11.26.
<i>Deucalion</i> ...	Findlay, J. ...	W. L. Michie, R. Wilson ...	" A. ...	A. Holt ...	" 8.10.26 to 31.10.26 ...	13.11.26.
<i>Dieppe</i> ...	Marmery, S. ...	Mr. Parsons ...	C.C. ...	Southern Railway ...	Telegraphic Report 14.1.27 ...	14.1.27.
<i>Dimboola</i> ...	Roy, C. M. ...	S. J. Griffith ...	No. A. ...	Melbourne S.S. Co. ...	Form 911 29.10.26 to 24.11.26 ...	29.12.26.
<i>Discoverer</i> ...	Ling, J. T. ...	C. C. Heaton ...	" M. ...	Harrison ...	" 26.6.26 to 19.8.26 ...	21.9.26.
<i>Discovery, R.R.S.</i> ...	Stenhouse, J. R., D.S.O., R.D., Commr., R.N.R. ...	T. W. Goodchild ...	M.L. ...	Discovery Expedition ...	Met. Log. 8.5.23 to 11.7.26 ...	30.9.26.
<i>Domala, M.V.</i> ...	Kitsen, A. G. ...	R. W. Smith ...	No. M. ...	British India ...	Form 911 9.9.26 to 11.10.26 ...	30.10.26.
<i>Domina, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr., R.N.R. ...	" ...	M.L. ...	Telegraph Construction and Maintenance.	" ...	" ...
<i>61 Doric</i> ...	Bolton, S., D.S.C., R.D., R.N.R. ...	T. Pratt, F. W. Laws, E. N. Lloyd. ...	W.T. ...	White Star ...	Form 911 1.10.26 to 24.10.26 ...	27.10.26.
<i>Doric Star</i> ...	Thomas, R. T. ...	L. McDermott ...	No. A. ...	Blue Star ...	W.T. Reg. 31.10.26 to 21.11.26 ...	25.11.26.
<i>Dorington Court</i> ...	Clarke, E. J. ...	E. W. Blomberg ...	" A. ...	Haldin & Co. ...	Form 911 22.11.26 to 20.12.26 ...	10.1.27.
<i>Dromore Castle</i> ...	Vincent, E. S., R.D., Commr., R.N.R. ...	D. H. McDougall ...	" A. ...	Union Castle ...	" 20.8.26 to 27.9.26 ...	4.10.26.
<i>Dryden</i> ...	Major, T. W. ...	G. W. Major ...	" M. ...	Lamport & Holt ...	" 25.9.26 to 16.10.26 ...	1.11.26.
<i>Duendes</i> ...	Pape, E. R. ...	W. Billington ...	" M. ...	P.S.N. Co. ...	" 10.10.26 to 13.11.26 ...	6.12.26.
<i>Dunaff Head</i> ...	Butt, H. L., R.D., Commr., R.N.R. ...	P. S. Fullerton, J. P. Napier ...	" A. ...	Ulster S.S. Co. ...	" ...	" ...
<i>Dundrum Castle</i> ...	Weller, H. E. ...	W. S. Byles ...	" A. ...	Union Castle ...	" 17.10.26 to 16.11.26 ...	21.12.26.
<i>Dunrobin</i> ...	Ramsay, J. D. ...	" ...	" A. ...	Glen & Co. ...	" 13.11.26 to 20.12.26 ...	10.1.27.
<i>Duquesa</i> ...	Ellis, F., D.S.C. ...	E. W. Denman ...	" M. ...	Furness Withy ...	" 24.10.26 to 15.12.26 ...	21.12.26.
<i>Durenda</i> ...	Wilson, W. ...	K. G. Pullman ...	" M. ...	British India ...	" 1.1.26 to 9.1.26 ...	1.2.26.
<i>Edinburgh Castle</i> ...	Wilford, T. H. ...	" ...	No. ...	Union Castle ...	Met. Log. 8.1.26 to 24.1.26 ...	29.5.26.
<i>Egyptian Prince</i> ...	Ord, T. ...	W. R. Holt ...	No. A. ...	Prince ...	Form 911 10.8.26 to 18.10.26 ...	22.10.26.
<i>Elmina</i> ...	Williams, T. E. ...	J. A. McGough, G. Shorter, E. Moger. ...	M.L. ...	Elder Dempster ...	Met. Log. 2.6.26 to 5.10.26 ...	11.10.26.
<i>El Paraguay</i> ...	Smith, F. C. ...	J. Allerton ...	No. M. ...	Houlder Bros. ...	Form 911 16.10.26 to 16.12.26 ...	21.12.26.
<i>Elpenor</i> ...	Leslie, G., D.S.C., R.D., Lt.-Commr., R.N.R. ...	M. Robertson ...	M.L. ...	A. Holt ...	Met. Log. 28.3.26 to 28.8.26 ...	8.9.26.
<i>Elysia</i> ...	Duncan, A. R. ...	A. Laidlaw, C. Jenkins, J. A. C. A. Leitch ...	" ...	Anchor ...	" 15.10.26 to 26.12.26 ...	10.1.27.
<i>Empress of Asia</i> ...	Holland, A. T. ...	R. H. Foley, L. Johnston, L. C. Hogg, T. M. W. Golby, W. T. Miller ...	" ...	Canadian Pacific ...	" 27.5.26 to 6.9.26 ...	8.10.26.
<i>Empress of Canada</i> ...	Lovegrove, A. V. R., D.S.O., R.D., Capt., R.N.R. ...	" ...	" ...	" ...	" 10.6.26 to 20.9.26 ...	20.10.26.
<i>Empress of France</i> ...	Robinson, S., C.B.E., R.D., Commr., R.N.R. ...	H. C. Halliday ...	" ...	" ...	" 1.5.26 to 3.11.26 ...	8.11.26.
<i>Empress of Russia</i> ...	Griffiths, E. ...	E. Roberts, W. Ewens, O. F. Pennington, W. Pickersgill. ...	" ...	" ...	" 7.3.26 to 14.6.26 ...	6.9.26.
<i>Empress of Scotland</i> ...	Hosken, A. J. ...	J. H. Reid ...	" ...	" ...	" 15.5.26 to 13.10.26 ...	28.10.26.
<i>Endeavour</i> ...	Latta, R. G. ...	M. McLellan, W. Bacon, F. G. Hutchings. ...	" ...	" ...	" ...	" ...
	Stuart, R.N., V.C., D.S.O. ...	" ...	" ...	His Majesty's Ship ...	" 3.3.26 to 30.6.26 ...	17.7.26.
	Commr. S. A. Geary-Hill, D.S.O., R.N. ...	R. M. Southern, G. S. Norrington, E. V. B. Baker, E. H. B. Baker, J. Torlesse. ...	" ...	" ...	" ...	" ...



Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.1.27.	Date Received.
<i>Essequibo</i> ...	Kite, E. ...	J. L. Forster, J. H. Birtles ...	No. M.	R.M.S.P. Co. ...	Form 911 5.11.26 to 20.12.26...	3.1.27.
<i>Eumaeus</i> ...	Elford, W. J. ...	Elford, W. J. ...	" A.	A. Holt ...	" 27.11.26 to 29.12.26	5.1.27.
<i>Euripides</i> ...	Collins, P. J., O.B.E.	H. S. Cox, K. D. Fisher, P. Longdon.	M.L.	Aberdeen ...	Met. Log. 18.7.26 to 22.11.26...	29.11.26.
<i>Euryades</i> ...	Stewart, J. R. ...	... ..	No. A.	A. Holt ...	Form 911 24.11.26 to 11.12.26	4.1.27.
<i>Explorer</i> ...	Lamont, A., Allan, J.	... ..	No.	Scottish Fishery Board	Met. Log. 1.3.26 to 27.9.26 ...	9.11.26.
<i>Ferndale</i> ...	Daniel, F. ...	D. Jones, E. F. Pemble ...	No. M.	Commonwealth Govt.	Form 911 16.12.26 to 24.12.26	3.1.27.
<i>Flandria</i> ...	Maars, L. ...	T. Doornbosch ...	No. M.	Holland Lloyd ...	Form 911 1.10.26 to 21.10.26...	22.11.26.
<i>Francisco</i> ...	Scales, H. ...	J. C. Nettleship ...	No. A.	Ellerman Wilson ...	Form 911 2.10.26 to 4.11.26 ...	9.11.26.
<i>Freya</i> ...	Angus W. ...	T. R. Ness ...	" A.	Scottish Fishery Board	" 1.12.26 to 23.12.26...	29.12.26.
<i>Gaika</i> ...	Whitfield, G. J. ...	... ..	" A.	Union Castle ...	" 30.11.26 to 21.12.26	29.12.26.
<i>Galthymore</i> ...	Southerland, —	... ..	No. M.	Furness Withy ...	... ..	...
<i>Garret</i> ...	Visser, C. W. ...	C. J. Vandenboom ...	" M.	Rotterdam Lloyd ...	Form 911 1.11.26 to 16.11.26...	29.12.26.
<i>Garth Castle</i> ...	Jackson, C. R. ...	... ..	No.	Union Castle ...	... ..	...
<i>Gascoyne</i> ...	Rutt, W. N. ...	R. Simpson ...	No. A.	Dalgely & Co. ...	Form 911 19.1.26 to 24.2.26 ...	30.3.26.
<i>Gelria</i> ...	Veldkamp, G. J. ...	... ..	" M.	Holland Lloyd ...	" 19.11.26 to 6.1.27 ...	9.11.26.
<i>Geranium</i> ...	Bennett, H. T., D.S.O., Commr. R.A.N.	... ..	M.L.	His Majesty's Australian Ship	... ..	...
<i>Glenamoy, M.V.</i> ...	Homan, C. E. ...	R. H. Bishop ...	No. A.	Glen Line ...	" 24.12.26 to 5.1.27 ...	14.1.27.
<i>Glenluce</i> ...	Kennett, W. H. ...	... ..	No.	" ...	... ..	...
<i>Glenishane</i> ...	Beer, E. ...	R. A. Dale ...	" A.	" ...	" 27.9.26 to 9.1.27 ...	13.1.27.
<i>Houcestershire</i> ...	Robin, E. ...	H. J. Janett ...	" A.	Bibby ...	" 28.8.26 to 3.11.26 ...	9.11.26.
<i>Gorgon</i> ...	Hughes, J. W. ...	A. E. Bowlt ...	M.L.	A. Holt & Co. ...	" 30.9.26 to 17.10.26...	22.11.26.
<i>Halesius</i> ...	... ..	... ..	No. A.	R. P. Houston ...	... ..	...
<i>Haliartius</i> ...	Marsh, L. V. ...	W. H. Upton ...	" A.	R. P. Houston ...	Form 911 11.4.26 to 8.5.26 ...	7.6.26.
<i>Harmonides</i> ...	Hughes, W. F. ...	S. S. Davidson ...	" A.	" ...	" 5.9.26 to 27.9.26 ...	18.10.26.
<i>Harmony, Auxy.</i> ...	Jackson, J. C. ...	A. W. Bush ...	" A.	Moravian Mission ...	" 7.10.26 to 30.11.26...	21.12.26.
<i>Hatarana</i> ...	Denne, G. H. A. ...	F. Wells, C. Parkes, W. T. Barnes.	M.L.	British India ...	" 12.6.25 to 27.2.26 ...	29.3.26.
<i>Hauraki, M.V.</i> ...	Frew, J. D. ...	... ..	M. L.	Union S.S. Co. N.Z....	" 22.6.26 to 11.7.26 ...	20.9.26.
<i>Henry Holmes, C.S.</i> ...	Bicker Caarten, A.	M. A. Green ...	No. M.	W. I. & Panama Telegraph Co.	" 12.11.26 to 21.12.26	5.1.27.
<i>Herald</i> ...	Silk, H. V., Lieut.-Commr., R.N.	W. C. Jenks ...	M.L.	His Majesty's Ship ...	Met. Log. 22.3.26 to 5.9.26 ...	20.10.26.
<i>Herefordshire</i> ...	Mann, R. P. ...	H. R. Mackay ...	No. A.	Bibby ...	Form 911 25.4.26 to 3.7.26 ...	12.7.26.
<i>Herminius</i> ...	Roberts, T. V. ...	G. P. McCraith ...	" A.	Shaw, Savill & Albion	" 25.9.26 to 11.10.26...	22.11.26.
<i>Herschel</i> ...	Watson, W. W. ...	J. F. Maurey ...	" A.	Lampart & Holt ...	" 18.11.26 to 30.11.26	17.12.26.
<i>Hertford</i> ...	Urguhart, D. ...	A. Robertson ...	" A.	Federal ...	" 18.8.26 to 7.9.26 ...	4.10.26.
<i>Hibernia</i> ...	Tanner, E. B., O.B.E.	R. Woodall ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report, 1.1.27	1.1.27.
<i>Highland Enterprise</i> ...	Pond, R. H. ...	J. H. Tilton ...	No. A.	Nelson ...	Form 911 12.12.25 to 11.2.26...	10.3.26.
" <i>Glen</i> ...	Jones, T. J. ...	W. Jealous ...	" A.	" ...	" 29.3.26 to 26.5.26 ...	31.5.26.
" <i>Heather</i> ...	Powell, G. A. ...	J. H. Fitton, J. Hardy ...	" A.	" ...	" 13.12.25 to 24.6.26 ...	14.7.26.
" <i>Laddie</i> ...	Alford, C. ...	E. F. Smart ...	" A.	" ...	" 31.8.26 to 24.10.26	5.10.26.
" <i>Piper</i> ...	Collings, D. ...	J. S. Collins, S. E. Jackson	M.L.	" ...	Met. Log. 25.4.26 to 16.9.26 ...	23.9.26.
" <i>Pride</i> ...	Robinson, R. H. ...	W. Williams ...	No. A.	" ...	Form 911 30.7.26 to 2.10.26 ...	7.10.26.
" <i>Prince</i> ...	Brown, J. B. ...	S. A. Wheaton ...	" A.	Prince ...	" 24.11.26 to 23.12.26	10.1.27.
" <i>Rover</i> ...	Ashby Graves, F. ...	C. C. Legg ...	" A.	Nelson ...	" 10.11.26 to 1.1.27 ...	14.1.27.
" <i>Warrior</i> ...	Robinson, R. H. ...	J. O. Simons ...	" M.	" ...	" 25.3.26 to 19.5.26 ...	26.5.26.
<i>Hildebrand</i> ...	Maddrell, J. ...	A. Allan ...	" A.	Booth ...	" 22.9.26 to 8.11.26 ...	11.11.26.
<i>Hobsons Bay</i> ...	Kydd, O. J. ...	R. Pearce, A. Badman, T. Morrison, H. Hendy.	M.L.	Commonwealth Govt.	Met. Log. 3.8.26 to 17.12.26 ...	23.12.26.
<i>Holbein</i> ...	Gough, W. A. ...	H. L. Rudd ...	No. A.	Lampart & Holt ...	Form 911 31.10.26 to 8.12.26...	3.1.27.
<i>54 Homeric</i> ...	Holme, A. ...	A. S. Dyer, H. G. Morgan, J. W. Best.	W.T.	White Star ...	W.T. Reg. 28.10.26 to 12.11.26	15.11.26.
<i>Hororata</i> ...	Holland, E. ...	E. R. Kemp, F. Malcouronne	No. A.	New Zealand S.S. Co.	Form 911 1.9.26 to 3.1.27 ...	5.1.27.
<i>Hubert</i> ...	Pym, J. H. ...	S. G. Edwards ...	" A.	Booth ...	" 21.9.26 to 29.11.26...	14.12.26.
<i>Huntingdon</i> ...	Ashworth, W. ...	R. Cox ...	" A.	Federal ...	" 14.9.26 to 6.10.26 ...	11.10.26.
<i>Huruvu</i> ...	Burton Davies, J. ...	J. Oxnard, L. C. Hill, L. Cann, K. Goldsworthy.	M.L.	New Zealand S.S. Co.	Met. Log. 10.10.26 to 18.11.26	26.11.26.
<i>Ingoma</i> ...	Barrow, R. K. ...	A. M. Hughes ...	No. M.	Harrison ...	Form 911 15.10.26 to 2.12.26...	7.12.26.
<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 ...	" 26.4.26 to 23.8.26 ...	29.9.26.
<i>Ixion</i> ...	Williams, R. J. ...	W. Angus ...	No. A.	A. Holt ...	Form 911 29.7.26 to 18.10.26...	1.11.26.
<i>Japanese Prince</i> ...	Naylor, E. ...	W. Venn ...	" A.	Prince ...	" 2.11.26 to 19.12.26...	30.12.26.
<i>Jervis Bay</i> ...	Chaplin, W. R. ...	R. W. Laycock ...	" M.	Commonwealth Govt.	" 4.12.26 to 13.12.26 ...	3.1.27.
<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. C. Holmes ...	" A.	Booth ...	" 7.12.26 to 19.12.26 ...	10.1.27.
<i>Kaisar-i-Hind</i> ...	Headlam, P. C. ...	A. H. Cole ...	" M.	P. & O. ...	" 3.10.26 to 24.11.26...	30.11.26.
<i>Kamo Maru</i> ...	Shiratori, S. ...	M. Tamura ...	" A.	Nippon Yusen Kaisha	" 12.11.26 to 15.12.26...	3.1.27.
<i>Kangaroo</i> ...	Norris, H. C. ...	V. J. Denton, H. W. Norris, Sinclair, R. J.	M.L.	State Service Australia	Met. Log. 25.7.26 to 13.11.26...	21.12.26.
<i>Karapara</i> ...	Baird, S. K. ...	E. Hutchinson, H. Griffiths.	No. M.	British India ...	... ..	...
<i>Kashmir</i> ...	Stringer, R. H., O.B.E., R.D., Commr., R.N.	J. H. Anderson ...	" M.	P. & O. ...	Form 911 7.11.26 to 13.12.26...	14.1.27.
<i>Kathlamba</i> ...	Mordue, J. A. ...	... ..	" A.	Ellerman Bucknall ...	Met. Log. 21.8.26 to 27.9.26 ...	11.10.26.
<i>Kenilworth Castle</i> ...	Chave, Sir B., K.B.E., Attwood, J., Owen, S.	H. L. Iddes, T. M. Gordon ...	M.L.	Union Castle ...	" 17.1.26 to 11.7.26 ...	15.7.26.
<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, —	... ..	M.L.	P. & O. ...	... ..	...
<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. ...	Form 911 27.8.26 to 8.12.26 ...	13.12.26.
<i>Kia Ora</i> ...	McIntosh, A. ...	E. A. Hickling, J. Laurensen	"	Shaw Savill & Albion	Met. Log. 21.6.26 to 15.12.26...	30.12.26.
<i>Knight Companion</i> ...	Reed, G. C. ...	J. J. Daniel ...	No. M.	A. Holt ...	Form 911 26.9.26 to 9.11.26 ...	13.11.26.
<i>Kovno</i> ...	Dossor, W. A. ...	H. Redfern, A. Snowden, A. Hebblewhite.	M.L.	Ellerman Wilson ...	Met. Log. 12.6.26 to 26.11.26	27.11.26.
<i>Kweiyang</i> ...	Byers, G. ...	W. McDonald, T. Hackett ...	"	China Nav. Co. ...	" 25.3.26 to 4.8.26 ...	27.9.26.
<i>37 Laconia</i> ...	West, G. W. ...	F. Lawrence ...	W.T.	Cunard ...	... ..	...
<i>Lady Denison Pender, C.S.</i> ...	Pattison, G. H. ...	... ..	No. A.	Eastern Tel. Co. ...	" 9.5.26 to 7.7.26 ...	7.8.26.
<i>Laguna</i> ...	Kirkwood, J. H. ...	... ..	" A.	Pacific S.N. Co. ...	" 7.11.26 to 24.11.26...	14.12.26.
<i>Lahore</i> ...	Dawson, E. N. ...	W. G. Stevenson ...	" M.	P. & O. ...	" 27.11.26 to 31.12.26	5.1.27.
<i>Lalinde</i> ...	Hamill, H. ...	A. E. Warburton ...	" A.	Lampart & Holt ...	Form 911 25.9.26 to 29.10.26...	16.11.26.
<i>Lancashire</i> ...	de Legh, P. ...	W. H. Muirhead ...	" A.	Bibby ...	" 25.9.26 to 2.12.26 ...	9.12.26.

## LIST OF VOLUNTARY OBSERVING SHIPS

V

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.1.27.	Date Received
36 <i>Lancastria</i> ...	Malin, R. G., Lt.-Commr., R.N.R.	R. P. Campbell, L. R. Sharp, F. G. Russell	W.T.	Cunard ...	W.T. Reg. 7.11.26 to 27.11.26... Form 911 7.11.26 to 28.11.26...	1.12.26. 1.12.26.
<i>Laomedon</i> ...	Beswick, W., D.S.C., Lt.-Commr., R.N.R.	A. Yarwood ...	No. A	A. Holt ...	" 16.11.26 to 1.12.26...	29.12.26.
<i>La Paz, M.V.</i> ...	Benson, C. W.	...	" M.	Pacific S.N. Co.	" 2.12.26 to 18.12.26...	7.1.27.
<i>Laplace</i> ...	Shaw, W.	A. L. Murray, R. D. Cottam	" A.	Lampport & Holt	" 7.8.26 to 13.10.26 ...	18.10.26.
55 <i>Lapland</i> ...	Thomas, A. J.	E. Cornellie, J. C. Flett	W.T.	Red Star ...	Met. Log. 1.1.26 to 8.5.26 ...	17.5.26.
<i>Lassell, M.V.</i> ...	Hickman, V. T.	F. J. Durrant	No. A.	Lampport & Holt	W.T. Reg. 8.11.26 to 27.11.26... Form 911 7.11.26 to 27.11.26...	29.11.26. 29.11.26.
<i>Leicestershire</i> ...	English, G. L.	J. Cullen, W. A. Kent, D. Y. Sharrock, J. D. Archer.	M.L.	Bibby ...	Met. Log. 20.2.26 to 9.3.26 ...	29.3.26.
<i>Leighton, M.V.</i> ...	Lindesay, J. M.	J. T. A. Thomson	No. A.	Lampport & Holt	Form 911 17.8.26 to 20.11.26...	13.12.26.
<i>Leitrim</i> ...	Robertson, A.	H. G. Letts	" A.	Dowie, J., & Co.	" 10.7.26 to 7.9.26 ...	10.9.26.
<i>Loch Katrine</i> ...	Shillitoe, B.	K. Whitaker	" M.	R.M.S.P. Co.	" 24.6.26 to 21.9.26 ...	28.9.26.
<i>London Commerce</i> ...	Young, H. J., D.S.C.	...	" A.	Furness Withy	" 4.12.26 to 4.1.27 ...	10.1.27.
<i>London Importer</i> ...	Williamson, J. M.	J. S. Williams, W. Stanley	M.L.	Ulster S.S. Co.	Met. Log. 12.6.26 to 2.9.26 ...	17.9.26.
<i>Lord Antrim</i> ...	Jarvis	C. J. Rea	No. A.	Pacific S.N. Co.	Form 911 20.8.26 to 6.12.26...	10.12.26.
<i>Loriga, M.V.</i> ...	Makin, F. W.	E. C. Hicks	" A.	"	" 4.12.26 to 29.12.26...	31.12.26.
<i>Losada, M.V.</i> ...	Ross, J.	E. Baxter	" M.	"	"	"
<i>Macedonia</i> ...	Potter, H. W., R.D., Commr., R.N.R.	E. R. Bodley	" M.	P. & O.	" 15.11.26 to 6.1.27 ...	14.1.27.
<i>Macharda</i> ...	Tyers, W. O.	D. M. Fulton	" M.	Brocklebank	" 23.11.26 to 6.12.26...	8.12.26.
<i>Mahana</i> ...	Kershaw, W. A. R.	F. M. Smith, H. C. Smith, J. C. K. Rogers.	" A.	Shaw, Savill & Albion	Met. Log. 15.4.26 to 10.8.26 ...	30.8.26.
<i>Maharaja</i> ...	Hinton, J. C.	H. A. Hartley	" M.	Asiatic S.N. Co.	Form 911 23.10.26 to 18.11.26	20.12.26.
<i>Mahia</i> ...	Williams, G.	R. Naef	No.	Shaw, Savill & Albion	"	"
<i>Maihar</i> ...	Rowe, J. P.	C. Shaw, H. T. Scoins, G. Henshaw.	M.L.	Brocklebank	Met. Log. 20.3.26 to 23.6.26 ...	15.7.26.
<i>Maimyo</i> ...	Scurr, T. W.	H. M. Drummond	No. A.	Burns Philp	Form 911 9.7.26 to 1.12.26 ...	6.12.26.
<i>Maiwara</i> ...	Brown, T. M.	...	M.L.	White Star	W.T. Reg. 2.12.26 to 15.12.26...	21.12.26.
58 <i>Majestic</i> ...	Metcalfe, G. R.	W. Pearson, J. Paine, A. Young.	W.T.	Burns Philp	Met. Log. 23.12.26 to 5.1.27 ...	10.1.27.
<i>Makambo</i> ...	McLean, J.	F. C. Vogelmann, T. R. Lang, W. O. L. Wilding.	M.L.	Burns Philp	Met. Log. 26.6.26 to 6.10.26 ...	29.12.26.
<i>Makura</i> ...	Brown, T. M.	O. C. Bray, J. M. Hood, L. English.	"	Canadian-Australasian	" 24.2.26 to 4.7.26 ...	29.12.26.
<i>Malabar</i> ...	...	...	" M.	Burns, Philp & Co.	"	"
<i>Malakuta</i> ...	Adamson, F. L.	J. H. Round	No. M.	Brocklebank	Form 911 8.9.26 to 22.9.26 ...	25.9.26.
<i>Malancha</i> ...	Sharpe, G.	R. Humble	" M.	"	" 29.7.26 to 15.12.26 ...	28.9.26.
<i>Malda</i> ...	Gray, T. N.	W. S. Donald	" M.	British India	" 21.9.26 to 27.10.26...	3.11.26.
<i>Maloja</i> ...	Warner, S. C.	...	" M.	P. & O.	"	"
<i>Mamari</i> ...	Falconer, H.	P. Campbell	" A.	Shaw, Savill & Albion	" 6.8.26 to 11.9.26 ...	1.11.26.
<i>Manchester Brigade</i> ...	Stott, C. H.	E. Hale	" A.	Manchester Liners	" 29.11.26 to 31.12.26	13.1.27.
<i>Manchester Corporation</i> ...	Everest, J. E.	W. L. Lavers	" A.	"	" 11.12.26 to 22.12.26	5.1.27.
<i>Manchester Hero</i> ...	Riley, J. E.	J. H. Emmitt, H. Anderton, B. M. Brown.	M.L.	"	Met. Log. 3.10.25 to 20.7.26 ...	27.7.26.
<i>Manchester Merchant</i> ...	Struss, F. D.	E. W. Jeffries	No. A.	"	Form 911 26.6.26 to 11.8.26 ...	20.8.26.
<i>Manchester Regiment</i> ...	Foale, J. R.	R. H. Walker	" A.	"	" 15.11.26 to 7.1.27 ...	13.1.27.
<i>Manchester Shipper</i> ...	Dormer, A. E.	H. Swindells	M.L.	"	Met. Log. 24.7.26 to 16.11.26...	29.11.26.
<i>Manipur</i> ...	Cochran, G. N.	R. Penston, K. Leadbetter	No. M.	Brocklebank	Form 911 5.9.26 to 2.10.26 ...	14.10.26.
<i>Mantua</i> ...	Randell, G. G.	D. B. Leader	" M.	P. & O.	" 5.11.26 to 15.12.26 ...	18.12.26.
<i>Marburn</i> ...	Stewart, A.	R. H. W. Jackson	" M.	Canadian Pacific	" 24.4.26 to 17.5.26 ...	20.5.26.
<i>Marella</i> ...	Mortimer, S.	J. A. Street	M.L.	Burns Philp	Met. Log. 2.4.25 to 25.8.25 ...	1.12.25.
<i>Marengo</i> ...	Williams, J. C., R.D., Commr., R.N.R.	F. Barnard, H. Bryon, J. Ford	"	Elleman Wilson	" 11.9.26 to 21.12.26...	30.12.26.
<i>Margha</i> ...	Milne, R. A., R.D., Commr., R.N.R.	J. Strachan, P. Wright, H. E. Evans.	"	British India	" 20.6.26 to 14.9.26 ...	20.9.26.
<i>Marsina</i> ...	Rothery, S.	H. C. Tarrington	No. A.	Burns, Philp & Co.	Form 911 15.9.26 to 6.10.26 ...	15.11.26.
<i>Masirah</i> ...	Mallett, R.	A. E. Evans	" M.	Brocklebank	" 12.9.26 to 13.10.26...	16.11.26.
<i>Matakana</i> ...	Thurston, H. P.	J. Hart, J. Dickson, G. E. Lindsay.	M.L.	Shaw, Savill & Albion	Met. Log. 15.8.26 to 23.9.26 ...	29.11.26.
<i>Mataram</i> ...	Voy, W.	V. V. Edmonds	No. A.	Burns Philp & Co.	Form 911 8.10.26 to 2.11.26 ...	13.12.26.
<i>Mataroa</i> ...	Kershaw, W. A. R.	...	M.L.	Shaw, Savill & Albion	"	"
<i>Matheran</i> ...	Hanna, R. G.	H. H. Armstrong, H. Willington, J. Richardson.	"	Brocklebank	Met. Log. 5.9.26 to 31.12.26 ...	5.1.27.
<i>Mathura</i> ...	Bacon, A. E.	H. H. Armstrong	No. M.	British India	Form 911 1.2.26 to 3.3.26 ...	8.3.26.
<i>Matiana</i> ...	Langlands, D. H.	G. Earl	" M.	Union S.S. Co. of N.Z.	" 29.4.26 to 27.5.26 ...	31.5.26.
<i>Maunganui</i> ...	Davey, A. H.	C. G. Eustace	" M.	Cunard	" 4.6.26 to 9.7.26 ...	23.8.26.
32 <i>Mauretania</i> ...	Diggle, E. G., R.D., Capt., R.N.R.	E. R. Taylor, J. A. Quarrie, G. Duguid.	W.T.	"	W.T. Reg. 10.10.26 to 24.10.26	15.11.26.
<i>Media</i> ...	Mallett, R.	S. C. Cramb	No. A.	T. & J. Brocklebank	" 31.10.26 to 15.11.26	17.11.26.
<i>Medic</i> ...	Jones, W. H.	W. Nicoll	" A.	White Star	" 21.11.26 to 5.12.26...	10.12.26.
56 <i>Megantic</i> ...	Trant, E. L., R.D., Commr., R.N.R.	H. A. Billiald, R. Conway, J. C. Boyce.	W.T.	"	Form 911 2.5.26 to 28.6.26 ...	7.7.26.
22 <i>Melita</i> ...	Notley, A. H.	J. Shearer, N. J. P. Roberts	" A.	Canadian Pacific	W.T. Reg. 28.11.26 to 17.12.26	11.1.27.
<i>Memnon</i> ...	Melling, C. F.	L. S. Evans	No. A.	A. Holt	" 6.12.26 to 26.12.26...	29.12.26.
21 <i>Metagama</i> ...	Freer, A., Commr., R.N.R.	R. Walker, A. Mansey	W.T.	Canadian Pacific	" 22.11.26 to 10.12.26	17.12.26.
<i>Middlesex</i> ...	Macrae, A. B.	...	No. M.	Federal	Form 911 5.11.26 to 19.12.26...	6.1.27.
<i>Minderoo</i> ...	Richardson, E.	B. J. Bennie, W. J. McPhedran, J. H. Oxtou.	" A.	West Australia Nav. Co.	W.T. Reg. 28.11.26 to 18.12.26	21.12.26.
<i>Minna</i> ...	Mackenzie, G. G.	J. H. Hennessey	" A.	Scottish Fishery Board	Met. Log. 2.5.26 to 4.10.26 ...	1.12.26.
23 <i>Minnedosa</i> ...	Griffiths, J. N.	J. P. Dobson, F. W. Roberts	W.T.	Canadian Pacific	Form 911 9.12.26 to 27.12.26...	30.12.26.
<i>Minnesota</i> ...	Gates, T. F., C.B.E.	H. E. McCartney	No. M.	H.M. Transport	W.T. Reg. 4.12.26 to 22.12.26...	30.12.26.
<i>Minnetonka</i> ...	Claret, F. H., C.B.E.	C. H. Denton	" M.	Atlantic Transport	Form 911 5.12.26 to 26.12.26...	30.12.26.
<i>Minnewaska</i> ...	Commr., R.N.R.	...	" M.	"	" 19.12.26 to 8.1.27 ...	11.1.27.
<i>Mirror, C.S.</i> ...	Gibson, L.	A. G. Watts	" M.	Eastern Tel. Co.	" 8.10.26 to 14.10.26	4.11.26.
<i>Mississippi</i> ...	Wylie, J. T. J.	A. T. Perrin	" A.	Atlantic Transport	" 29.10.26 to 29.11.26	8.12.26.
<i>Moldavia</i> ...	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R.	R. H. Maskell	" M.	P. & O.	" 17.7.26 to 9.10.26 ...	16.11.26.
<i>Mongolian Prince</i> ...	Edwards, W.	F. Mugford	" A.	Prince	W.T. Reg. 16.10.26 to 29.10.26	11.11.26.
24 <i>Montcalm</i> ...	Hamilton, G.	H. McFadyen	W.T.	Canadian Pacific	" 4.12.26 to 21.12.26...	24.12.26.
25 <i>Montclare</i> ...	Webster, G. S., R.D., Lt.-Commr., R.N.R.	R. Fegan, H. S. Knight, E. Shergold.	"	"	Form 911 14.11.26 to 2.12.26...	20.12.26.
					" 16.10.26 to 4.11.26...	9.11.26.



## THE MARINE OBSERVER

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed Received up to 14.1.27.	Date Received.
<i>Montferland</i> ...	Van Noppen, C. D.	W. Slooten ...	No. M.	Holland Lloyd	Form 911 5.8.26 to 6.11.26 ...	17.11.26.
<i>27 Montnairn</i> ...	Turnbull, J., C.B.E., R.D., Capt., R.N.R.	F. E. Williams, F. Chodzko, F. Hindle.	W.T.	Canadian Pacific	W.T. Reg. 12.12.26 to 30.12.26	4.1.27.
<i>26 Montrose</i> ...	Landy, E.	A. Watt, R. Woods, A. W. Patrick.	"	"	" 2.10.26 to 21.10.26	27.10.26.
<i>20 Montroyal</i> ...	Griffiths, E., Lieut.-Commr. R.N.R.	H. Tudor ...	"	"	" 21.11.26 to 12.12.26	15.12.26.
<i>Moresby</i> ...	Edgell, J. A., O.B.E., Capt., R.N.	W. H. Martin ...	M.L.	His Majesty's Australian Ship.	Form 911 17.7.26 to 22.7.26 ...	26.7.26.
<i>Morvada</i> ...	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	A. J. Norris ...	No. M.	British India	Met. Log. 15.4.26 to 12.8.26	30.9.26.
<i>Mulbera</i> ...	Steadman, W. R.	E. H. Spriggs ...	" M.	"	Form 911 11.7.26 to 1.10.26 ...	5.10.26.
<i>Nagara</i> ...	Foster, E.	E. Hewitt ...	" M.	"	" 26.12.26 to 31.12.26	3.1.27.
<i>Nagoya</i> ...	Davis, H. C., D.S.C., R.D., Commr., R.N.R.	L. Porter, T. A. Sargeant ...	" M.	R.M.S.P. Co. P. & O.	" 9.12.26 to 28.12.26...	3.1.27.
<i>Nellore...</i> ...	Hignett, A. H., R.D., Lt. - Commr., R.N.R.	S. H. Baldwin ...	" M.	"	" 3.10.26 to 19.12.26...	29.12.26.
<i>Nestor</i> ...	Houghton, G. K.	D. W. Stroud, O. C. Williams, N. Anderson.	M.L.	A. Holt	Met. Log. 15.8.26 to 18.12.26...	29.12.26.
<i>Newby Hall</i> ...	Butler, J.	D. F. Galloway, A. W. Wise, D. T. Smith.	"	Ellerman	" 22.6.26 to 15.10.26...	27.10.26.
<i>Newfoundland</i> ...	Westgarth, W. A., D.S.C.	R. F. Handley, E. Sainty, S. Moore.	"	Furness Withy	" 19.8.26 to 3.12.26 ...	14.12.26.
<i>Niagara</i> ...	Showman, A. C.	A. P. Cousin, D. McKenzie, T. Haulton.	"	Canadian-Australian...	Met. Log. 2.6.26 to 16.9.26 ...	8.10.26.
<i>Ningchow</i> ...	Mawson, J.	...	No. A.	A. Holt	Form 911 13.10.26 to 30.12.26	10.1.27.
<i>Norfolk</i> ...	Christie, W.	...	" A.	Federal	...	...
<i>Norna</i> ...	Wilde, H. J.	...	" A.	Scottish Fishery Board	Form 911 6.12.26 to 31.12.26...	3.1.27.
<i>Norseman, C.S.</i> ...	Wright, J. W.	...	" A.	Western Tel. Co.	" 19.11.26 to 15.12.26	4.1.27.
<i>Northwestern Miller</i> ...	Barter, H. O., R.N., Commr., R.N.R.	E. Pearce ...	" M.	"	"	...
<i>Nova Scotia</i> ...	Nuttall, E. L.	...	" A.	Furness Withy	" 20.11.26 to 23.12.26	29.12.26.
<i>Nowshera</i> ...	Furieux, S.	W. P. Paterson ...	" A.	"	" 8.9.26 to 4.10.26	18.10.26.
<i>Nubian</i> ...	Rowe, S. N.	T. E. C. Earl ...	" M.	British India	...	...
<i>Oaklands Grange...</i> ...	Watmough, T. M.	...	" A.	Leyland	Form 911 28.12.26 to 10.1.27...	14.1.27.
<i>42 Ohio</i> ...	St. Clair, C., D.S.C.	E. J. Longheed ...	" A.	Houlder Bros.	" 22.10.26 to 7.11.26...	22.11.26.
<i>57 Olympic</i> ...	Clarke, E., R.D., Commr., R.N.R.	E. A. E. Littlewood, D. P. Larnham, G. N. Elliott.	W.T.	R.M.S.P. Co.	W.T. Reg. 17.10.26 to 7.11.26	12.11.26.
<i>Orama...</i> ...	Marshall, W., C.B., D.S.O., A.-d.-C., R.D., Capt., R.N.R.	A. Fisher, H. J. C. Day, R. Crangle.	"	White Star	Form 911 18.9.26 to 7.11.26 ...	12.11.26.
<i>Oranian</i> ...	Shelford, W. S., Lieut. - Commr., R.N.R.	T. Fox Russell, C. K. Blake, H. Tanner.	M.L.	Orient	W.T. Reg. 16.12.26 to 3.1.27 ...	6.1.27.
<i>Orbita</i> ...	Hoskins, W.	W. Lawton	No. A.	Leyland	Form 911 16.12.26 to 4.1.27 ...	6.1.27.
<i>43 Orca...</i> ...	Warner, G. E., R.D., R.N.R.	C. V. Fletcher, H. H. Tre-weeks, A. Chamberlin.	No.	R.M.S.P. Co.	Met. Log. 25.7.26 to 26.10.26...	2.11.26.
<i>Orcoma</i> ...	Le Brecht, H. A.	R. Griffiths, R. Gill, T. Naylor.	W.T.	"	Form 911 11.9.26 to 13.11.26...	26.11.26.
<i>Orduna...</i> ...	Dominy, R. H., C.B.E., Commr., R.N.R.	H. G. Whittle, S. Robbins, J. E. P. Matthews, D. P. Larham.	M.L.	Pacific S.N. Co.	W.T. Reg. 12.9.26 to 3.10.26 ...	7.10.26.
<i>Orestes</i> ...	Smith, W. E., D.S.O., R.D., Capt., R.N.R.	...	No.	R.M.S.P. Co.	Form 911 11.9.26 to 3.10.26 ...	7.10.26.
<i>Orita</i> ...	Hanney, T. W.	C. C. N. Gibson, D. W. Hutchinson, G. R. Bubb, J. L. Jones.	No. A.	A. Holt	Met. Log. 19.8.26 to 5.11.26 ...	11.11.26.
<i>Ormonde</i> ...	Splatt, W. A.	...	M.L.	Pacific S.N. Co.	W.T. Reg. 5.9.26 to 26.9.26 ...	4.10.26.
<i>Ormonde Ormuz</i> ...	Wyatt, A. G. N., Lieut. Commr., R.N.	A. M. Hughes ...	"	His Majesty's Ship	Form 911 4.9.26 to 27.9.26 ...	4.10.26.
<i>Oronsay</i> ...	James, L. V., D.S.C.	F. J. L. Butler, W. Wickham, A. A. Addison, H. A. Whittle.	No. M.	Orient	" 1.11.26 to 11.11.26...	17.11.26.
<i>Oroya</i> ...	O'Sullivan, F. R.	— Hatch, — Rice, W. Elliot	M.L.	Orient	Met. Log. 22.6.26 to 29.11.26...	20.12.26.
<i>Orsova</i> ...	Owens, A. L., R.D., Lt.-Commr., R.N.R.	G. Lewis	No. M.	Pacific S.N. Co.	" 7.9.26 to 17.11.26 ...	1.12.26.
<i>Ortega</i> ...	Duncan, E. E.	L. J. Vesty W. Elliott, J. F. Castle-Bartley.	M.L.	Orient	" 8.8.26 to 11.11.26 ...	17.11.26.
<i>Orvieto...</i> ...	Cameron, E. P., R.D., Commr., R.N.R.	G. M. Rice	No. M.	Pacific S.N. Co.	" 21.2.26 to 25.5.26 ...	31.5.26.
<i>Osterley</i> ...	Barkley, E.	A. Hawker, G. L. Carter, J. L. Skilling, T. L. Shurrock.	No.	"	Form 911 28.10.26 to 4.1.27 ...	10.1.27.
<i>Otahi</i> ...	Matheson, C. G., D.S.O., R.D., Capt., R.N.R.	H. Tanner, N. A. Whinfield, S. Burnnand.	No. A.	New Zealand S.S. Co.	Met. Log. 22.8.26 to 24.11.26...	4.12.26.
<i>Otira</i> ...	Sarson, M. J.	C. R. Brown	" M.	Shaw, Savill & Albion	Form 911 29.9.26 to 15.11.26...	24.11.26.
<i>Otranto</i> ...	McNish, R.	D. N. MacGregor ...	" M.	Orient	Met. Log. 5.9.26 to 9.12.26 ...	14.12.26.
<i>Oxfordshire</i> ...	Wood, C.	S. Myers ...	" A.	Bibby Bros.	" 24.1.26 to 27.4.26 ...	20.5.26.
<i>Pacific Shipper,</i> ...	Crumplin, W. E.	D. T. Nicholas ...	" A.	"	Form 911 26.9.26 to 11.11.26...	23.12.26.
<i>M.V. Pacuare</i> ...	Newman, G. W. A.	G. Davis	" A.	Elders & Fyffes	" 18.10.26 to 7.11.26...	13.12.26.
<i>Pakeha</i> ...	Harvey, A. E.	M. C. Cruickshank	" A.	Shaw, Savill & Albion	" 22.11.26 to 22.12.26	31.12.26.
<i>Pareora</i> ...	W. P. Clifton Mogg	E. T. Baker, R. E. Nicholson, A. J. Tillot.	M.L.	"	" 11.9.26 to 25.11.26	30.11.26.
<i>Paris</i> ...	Evans, J. O.	N. Turner	No. A.	Hain S.S. Co.	Met. Log. 3.8.26 to 16.8.26 ...	8.9.26.
<i>Patia</i> ...	Cook, C. L.	Mr. Biles...	C.C.	Southern Rly.	Form 911 27.5.26 to 12.10.26...	18.10.26.
<i>Patrician</i> ...	Maxwell Brown, W. E.	J. Kinsley	No. A.	Elders & Fyffes	Form 911 25.10.26 to 7.11.26	9.11.26.
<i>Patrol, C.S.</i> ...	Pugh, R. H.	H. W. Stanley	" M.	Harrison	Form 911 19.9.26 to 24.10.26...	4.11.26.
<i>Persic</i> ...	Welsh, T. K.	H. E. P. Albrecht, T. A. Flett, E. J. Evans, G. Brown.	M.L.	Eastern Extension (A. & C.) Telegraph Co.	Met. Log. 11.6.26 to 28.9.26 ...	23.11.26.
<i>Peshavur</i> ...	Bulman, J. B.	R. Conway	No. A.	White Star	Met. Log. 7.7.26 to 4.9.26 ...	13.11.26.
<i>Pinko</i> ...	Hester, C. W., R.D., Commr., R.N.R.	D. G. Baillie, J. K. Crone, R. D. Whyte-Mackay.	M.L.	P. & O.	Form 911 27.9.25 to 4.11.25 ...	17.3.26.
<i>Polycarp</i> ...	Kettlewell, C. R.	...	" A.	New Zealand S.S. Co.	Met. Log. 16.1.26 to 2.7.26 ...	9.7.26.
<i>Polyeap</i> ...	Evans, T. G.	...	No. A.	Booth	Form 911 6.11.26 to 19.11.26...	10.1.27.

## LIST OF VOLUNTARY OBSERVING SHIPS

vii

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.1.27.	Date Received.
<i>Port Adelaide</i> ...	Hayter, S. W. ...	R. W. Linklater, E. N. Rogers, L. Porter.	M.L.	Commonwealth & Dominion	Met. Log. 14.8.26 to 18.12.26...	29.12.26.
" <i>Albany</i> ...	Robinson, C. A. ...	E. A. Leavett, W. Eastoe, J. Thom.	"	" " "	" 1.5.26 to 9.11.26 ...	17.11.26.
" <i>Auckland</i> ...	Durham, R. S. ...	R. B. Stannard ...	No. A.	" " "	Form 911 4.3.26 to 20.7.26 ...	26.7.26.
" <i>Bowen</i> ...	Gilling, W. ...	W. R. Johnston ...	"	" " "	" 21.7.26 to 27.8.26 ...	20.9.26.
" <i>Caroline</i> ...	Williams, R. ...	" ...	M.L.	" " "	Met. Log. 31.5.26 to 2.12.26 ...	8.1.27.
" <i>Darwin</i> ...	Sawbridge, J. R. ...	E. T. N. Lawrey ...	"	" " "	Form 911 23.10.26 to 4.12.26...	13.12.26.
" <i>Dunedin</i> ...	Lea, W. H. ...	E. G. Jones, R. Needham, H. M. Post, E. Wheeler.	"	" " "	Met. Log. 17.7.26 to 29.10.26...	4.11.26.
" <i>Hacking</i> ...	Hoad, A. C. ...	F. W. Elgar, G. Lovegrove, E. Luker.	"	" " "	" 30.10.26 to 11.12.26	15.12.26.
" <i>Hobart</i> ...	Craven, R. ...	C. Hersee, L. Copeland, G. Langford, C. L. Webb.	"	" " "	" 12.9.26 to 5.1.27 ...	13.1.27.
" <i>Hunter</i> ...	Cottell, S. C. ...	A. Cooper, R. Forrest, J. T. Weldie.	"	" " "	" 1.6.26 to 2.11.26 ...	23.11.26.
" <i>Melbourne</i> ...	Kearney, F. J. ...	D. G. H. Bradley, J. A. Fairbairn, A. G. Starkey.	M.L.	" " "	" 4.5.26 to 5.9.26 ...	8.9.26.
" <i>Napier</i> ...	Jones, C. N. ...	J. L. Lewis, A. McDonald, P. A. Munday, C. Jolly.	No. A.	" " "	Form 911 2.10.26 to 20.11.26...	9.12.26.
" <i>Nicholson</i> ...	Jack, J. ...	" ...	M.L.	" " "	Met. Log. 20.2.26 to 18.7.26 ...	24.7.26.
" <i>Pirie</i> ...	Kippons, T. ...	H. C. Jeffery, W. G. Jones, N. M. Muzzill, S. Hearn.	"	" " "	" 6.4.26 to 6.9.26 ...	13.9.26.
" <i>Sydney</i> ...	Higgs, W. G. ...	G. L. H. Dean, K. D. Morgan, H. G. Boys Smith.	"	" " "	" 26.6.26 to 29.7.26 ...	5.8.26.
" <i>Victor</i> ...	Swan, L. H. ...	L. M. R. Bayly, W. J. Watson, A. Brown.	"	" " "	" 16.7.26 to 20.11.26...	1.12.26.
" <i>Wellington</i> ...	Farmer, F. ...	P. H. Pedrick ...	No. A.	" " "	Form 911 22.3.26 to 24.7.26 ...	6.8.26.
<i>President Jackson</i> ...	Griffith, J. ...	" ...	" A.	Pacific Mail S.S. Co....	" 4.10.26 to 30.11.26...	10.1.27.
<i>President Jefferson</i> ...	Nichols, F. R. ...	B. Christensen ...	" A.	Admiral Oriental Line	" 31.10.26 to 18.11.26	17.12.26.
<i>President Wilson</i> ...	Nelson, H. ...	A. M. Quinlan ...	" A.	Dollar ...	" 5.9.26 to 2.11.26 ...	22.11.26.
<i>Protea</i> , H.M.S.A.S. ...	Woodhouse, A. F. B., Lt.-Commr., R.N.	R. J. Whitley ...	No. M.	South African Naval Service.	" 1.8.26 to 14.9.26 ...	12.10.26.
<i>Pyrrhus</i> ...	Read, J. W. ...	W. J. Ryan ...	" A.	A. Holt ...	" 1.12.26 to 7.1.27 ...	10.1.27.
<i>Ranpura</i> ...	King, A. M., D.S.C.	G. Randall ...	" M.	P. & O.	" 26.11.26 to 16.12.26	3.1.27.
<i>60 Regina</i> ...	Smith, R. G. ...	R. H. Shaw, C. Cochrane, H. J. Yates.	" W.T.	White Star-Dominion	W. T. Reg. 14.11.26 to 4.12.26	8.12.26.
<i>Reindeer</i> ...	Langdon, C. ...	" ...	C.C.	G.W. Railway	Form 911 14.11.26 to 4.12.26	8.12.26.
<i>Remuera</i> ...	Cameron, J. J. ...	P. McCullum, P. Shakespeare	No. A.	New Zealand S.S. Co.	Telegraphic Report 13.1.27	13.1.27.
<i>Reventazon</i> ...	Jack, D. A. ...	L. C. Bach, H. C. Drummond	No.	Elders & Fyffes	Form 911 13.3.26 to 19.4.26 ...	27.7.26.
<i>Rhodesian Transport</i> ...	Fowler W. H. ...	F. F. Feint ...	No. A.	Houlder Bros.	" 23.11.26 to 26.12.26	30.12.26.
<i>Rimutaka</i> ...	Hemming, F. A. ...	H. A. Fryer, D. E. Hughes, G. O. Saul, H. Vernon	M.L.	New Zealand S.S. Co.	" 22.4.26 to 19.8.26 ...	25.8.26.
<i>Risaldar</i> ...	Park, G. ...	T. E. Hart, C. B. Miller, W. H. J. Llewellyn.	"	Asiatic S.N. Co. ...	Met. Log. 17.7.26 to 10.12.26	15.12.26.
<i>Rotorua</i> ...	Hunter, J. B. ...	E. Lawrence, R. G. Rees, H. Cockerill.	M.L.	N.Z.S. Co. ...	" 10.4.26 to 16.9.26 ...	19.10.26.
<i>Royal Fusilier</i> ...	Dawson, J. ...	" ...	No. A.	London & Edinburgh S.S. Co.	" 3.7.26 to 15.10.26 ...	26.10.26.
<i>Royal Transport...</i>	Dove, J. ...	R. W. Wass ...	" A.	Houlder Bros.	Form 911 9.12.26 to 1.1.27 ...	4.1.27.
<i>Ruapehu</i> ...	McKellar, A. W., R.D., Capt., R.N.R.	H. M. Selmer, W. J. Glassborow, H. C. Russell.	" M.L.	New Zealand S.S. Co.	" 24.1.26 to 24.7.26 ...	6.8.26.
<i>Sachem</i> ...	"	"	No.	Furness Withy	Met. Log. 26.8.26 to 26.12.26...	30.12.26.
<i>St. Albans</i> ...	Smith, G. L. ...	J. W. Kavanagh, W. McIntyre	M.L.	Eastern and Australian	" 9.4.26 to 5.9.26 ...	26.10.26.
<i>St. Helier</i> ...	Mulhall, W. ...	C. Bell ...	C.C.	G.W. Railway	Met. Log. 29.9.26 ...	29.9.26.
<i>St. Julien</i> ...	Langdon, C. H. ...	C. Joy ...	"	"	Telegraphic Report 4.11.26 ...	4.11.26.
<i>St. Andrew</i> ...	Bearpark, E. W. ...	" ...	No. A.	Rankin Gilmour	Form 911 25.11.26 to 6.12.26	23.12.26.
<i>Salaga</i> ...	Sola, P., D.S.O.	C. V. Evans ...	" A.	Elder Dempster	" 18.9.26 to 4.12.26 ...	14.12.26.
<i>38 Samaria</i> ...	McNeil, S. G. S., R.D., Capt., R.N.R.	C. S. Williams, M. Boston, A. B. Fasting.	" W.T.	Cunard	" 20.12.26 to 8.1.27 ...	13.1.27.
<i>Sazoleine</i> ...	Rodgers, C. S. ...	B. Johnsen ...	No. A.	Hunting & Son	W.T. Reg. 20.12.26 to 8.1.27 ...	11.1.27.
<i>Saxon</i> ...	Owen, S. H. ...	E. G. Broodbank ...	" A.	Union Castle	Form 911 18.2.26 to 9.3.26 ...	29.3.26.
<i>Scindia</i> ...	Matthews, W. ...	R. S. Paton ...	" A.	Anchor ...	" 27.8.26 to 18.10.26...	29.10.26.
<i>Scholar</i> ...	Egerton, J. J. ...	" ...	" M.	Harrison	" 18.8.26 to 17.11.26	1.12.26.
<i>Scotia</i> ...	Prichard, S.D., M.B.E.	O. W. L. Jones ...	C.C.	L.M. & S. Rly.	Telegraphic Report 13.1.27 ...	13.1.27.
<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 Seythia</i> ...	Prothero, W. ...	G. Overton, J. C. Munro, P. G. Britten.	" W.T.	Cunard	W.T. Reg. 22.11.26 to 12.12.26	15.12.26.
<i>Sheaf Lance</i> ...	Earl, C. ...	" ...	No.	W. A. Souter ...	Form 911 21.11.26 to 12.12.26	15.12.26.
<i>Sheaf Mount</i> ...	Groves, C. V. ...	C. A. Goold ...	No. A.	"	" 10.6.26 to 8.7.26 ...	22.7.26.
<i>Sheaf Spear</i> ...	Whitfield, G. A., O.B.E.	" ...	M.L.	"	Met. Log. 25.6.26 to 3.10.26 ...	18.10.26.
<i>Shropshire, M.V.</i> ...	Grisewood, W. H., Dring, S. J.	" ...	"	"	"	"
<i>Socrates</i> ...	Adamson, B. W. ...	" ...	No. A.	Bibby	Form 911 25.11.26 to 14.12.26	3.1.27.
<i>Soekaboemi</i> ...	Taylor, F. C. ...	W. E. Jordan ...	" M.	Lampport & Hoyt	" 2.5.26 to 30.7.26 ...	12.8.26.
<i>Somerset</i> ...	Z. W. Flach ...	C. van Reenen ...	" M.	Rotterdam Lloyd	" 15.12.25 to 21.1.26...	26.1.26.
<i>Somersetshire</i> ...	Barnett, H. ...	J. J. Youngs ...	" M.L.	N.Z.S. Co. ...	Met. Log. 3.10.26 to 4.1.27 ...	10.1.27.
<i>Somme</i> ...	Foster, W. L. ...	R. C. Leitch, H. G. Walton, P. H. Potter.	"	Bibby ...	"	"
<i>Spectator</i> ...	Miles, F. R., Commr. R.D., R.N.R.	J. Watson ...	No. A.	R.M.S.P. Co.	Form 911 1.5.26 to 23.7.26 ...	13.8.26.
<i>Spero</i> ...	Harding, C. H. J. ...	D. Fraser, J. G. F. Betson ...	" A.	Harrison ...	" 20.11.25 to 20.2.26...	26.2.26.
<i>Stockwell</i> ...	Montgomery, H. ...	T. E. Fea, D. Millward ...	M.L.	Ellerman Wilson	Met. Log. 17.6.26 to 18.12.26...	24.12.26.
<i>Stuart Prince</i> ...	Thowless, E. ...	W. Gibson ...	No. A.	Brocklebank	Form 911 11.8.26 to 23.8.26 ...	27.8.26.
<i>Suva Maru</i> ...	Kemp, E. J. ...	W. Venn ...	" A.	Prince ...	" 18.2.26 to 6.3.26 ...	26.4.26.
<i>Sylvafield</i> ...	Okuno, Y. ...	" ...	" A.	Nippon Yusen Kaisha	" 23.8.26 to 20.9.26 ...	11.10.26.
<i>Tainui</i> ...	Biddick, E. ...	" ...	" A.	Hunting & Son	" 23.10.26 to 31.12.26	11.1.27.
<i>Tairoa</i> ...	Elford, H. C. ...	P. S. Horwood ...	" A.	Shaw, Savill & Albion	" 8.10.26 to 14.11.26...	23.12.26.
<i>Tahiti</i> ...	Summers, W. G. ...	S. A. Bannister ...	" A.	"	" 30.3.26 to 12.5.26 ...	17.5.26.
<i>Taipung</i> ...	Hill, T. V. ...	D. A. Menlove ...	" A.	Union S.S. Co. of N.Z.	" 8.9.26 to 28.10.26 ...	16.11.26.
<i>Tamaroa</i> ...	Hamilton, H. E. ...	A. M. Frame, T. G. Stratford, W. Bailley L. A. Bailie.	M.L.	Yuill & Co.	Met. Log. 22.1.26 to 17.5.26 ...	19.7.26.
<i>Tanda</i> ...	Frame, A. M. ...	" ...	"	"	"	"
<i>Tamaroa</i> ...	Hartman, W. H. ...	T. A. Smith ...	No. M.	Shaw, Savill & Albion	"	"
<i>Tanda</i> ...	Pilcher, E. ...	J. W. Kavanagh, B. Dun, C. Stratford, H. E. Nuzum.	"	E. & A. S.S. Co. ...	" 27.8.26 to 3.12.26 ...	7.1.27.



Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.1.27.	Date Received.
<i>Tambora</i> ...	Huisman, N. ...	H. Van Manen ...	No. M.	Rotterdam Lloyd ...	Form 911 29.8.26 to 14.10.26...	30.10.26.
<i>Teiresias</i> ...	Wilkinson, W. H. ...	W. Stanger ...	" A.	A. Holt & Co. ...	" 25.6.26 to 7.10.26 ...	12.10.26.
<i>Tekoa</i> ...	Barnett, H. ...	P. H. Chalwin ...	" M.	New Zealand S.S. Co. ...	" 10.11.26 to 2.12.26...	7.1.27.
<i>Telamon</i> ...	Duggan, C. ...	G. Bevan ...	" A.	A. Holt ...	" 20.4.26 to 21.6.26 ...	3.7.26.
<i>Teucer</i> ...	Hodgson, R. N. ...	P. Cross ...	" A.	" ...	" 5.10.26 to 2.12.26 ...	13.12.26.
<i>Themistocles</i> ...	Jernyn, W. M. ...	R. J. Buckland ...	" M.	Aberdeen ...	" 13.9.26 to 23.10.26...	21.12.26.
<i>Theseus</i> ...	Jones, E. ...	W. A. Fyffe ...	" A.	A. Holt ...	" 5.11.26 to 21.11.26...	20.12.26.
<i>Titan</i> ...	Wilkinson, T. G. ...	D. MacLavith, D. T. Williams, G. W. Best, C. G. Bailey.	M.L.	" ...	Met. Log. 20.10.25 to 11.3.26	18.3.26.
<i>Tongariro</i> ...	White Parsons, V.C. ...	J. J. Youngs, E. Quick ...	No. M.	New Zealand S.S. Co. ...	Form 911 24.10.26 to 7.11.26...	29.11.26.
<i>Transylvania</i> ...	Bone, D. W. ...	P. Middleton ...	" A.	Anchor ...	" 28.11.26 to 18.12.26	30.12.26.
<i>Traveller</i> ...	Worthington, B. ...	" ...	" M.	T. & J. Harrison ...	" 11.11.26 to 18.12.26	11.1.27.
<i>Trematon</i> ...	Evans, B. ...	R. Gregory, J. Toms, J. Bell.	M.L.	Hain S.S. Co. ...	Met. Log. 2.9.25 to 8.2.26 ...	2.3.26.
<i>Turakina</i> ...	Hamilton, E. S. ...	A. N. Marshall, G. S. Shepherd	No. M.	New Zealand S.S. Co. ...	Form 911 9.2.26 to 4.5.26 ...	26.5.26.
<i>Tuscania</i> ...	Gemmell, W. J. ...	J. Hamilton ...	" A.	Anchor ...	" 25.9.26 to 17.10.26...	21.10.26.
<i>Tyndareus</i> ...	Scott, J. R. ...	A. G. Phillips, F. Howe, A. R. McDavid.	M.L.	A. Holt ...	Met. Log. 1.7.26 to 22.11.26...	10.1.27.
<i>Ulimaroa</i> ...	Wylie, W. J. ...	J. Gilbertson ...	No. M.	Huddart Parker, Ltd. ...	Form 911 22.10.26 to 15.11.26	7.1.27.
<i>Ulysses</i> ...	McHutchon, W. ...	E. C. Radford ...	" A.	A. Holt ...	" 17.10.26 to 4.11.26...	13.12.26.
<i>Umolosi</i> ...	Barnes, E. W. ...	R. L. Ryde ...	" A.	Bullard King ...	" 30.11.26 to 12.12.26	4.1.27.
<i>Valacia</i> ...	Inch, F. ...	G. Meggitt ...	" M.	Cunard ...	" 28.9.26 to 7.11.26 ...	22.11.26.
<i>Varadua</i> ...	Fear, E. T. C. ...	L. D. W. Rand ...	" A.	" ...	" 9.9.26 to 21.9.26 ...	4.10.26.
<i>Verbania</i> ...	Pooley, T. S. M. ...	A. F. Watts ...	" A.	" ...	" 28.5.26 to 3.8.26 ...	13.12.26.
<i>Vigilant</i> ...	Simpson, E. S. S. ...	J. Hunter ...	" A.	Scottish Fishery Board	" 1.12.26 to 23.12.26...	6.1.27.
<i>Waiotapu</i> ...	Norton, A. ...	S. A. Smith ...	" M.	Canadian-Australasian	" 6.11.26 to 10.12.26 ...	29.12.26.
<i>Wairuna</i> ...	Whyborn, H. S. ...	R. Howie, G. H. George, A. W. Rabbitts.	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> ...	Chave, Sir B., K.B.E.	H. A. Deller ...	No. A.	Union Castle ...	Form 911 7.5.26 to 23.5.26 ...	7.6.26.
<i>Wangaratta</i> ...	Scutt, W. ...	T. W. Wordingham, G. R. Millard, K. M. Morrison, N. A. Pope.	M.L.	British India ...	Met. Log. 6.3.26 to 30.7.26 ...	3.8.26.
<i>Warfield</i> ...	Steel, R. ...	C. M. Quick ...	No. A.	" ...	Form 911 18.10.26 to 4.11.26...	7.12.26.
<i>War Nizam</i> ...	Moncrieff, T. ...	J. Row ...	" A.	British Tankers ...	" 6.11.26 to 17.12.26...	21.12.26.
<i>Welshman</i> ...	Rollerson, W. ...	J. Mendus ...	" M.	White Star-Dominion	" 22.10.26 to 14.11.26	26.11.26.
<i>William Scoresby</i> , R.S.S.	Mercer, G. M., D.S.C., Lt.-Commr., R.N.R.	" ...	"	Falkland Islands Government.	" ...	"
<i>Windsor Castle</i> ...	Strong, H., R.D., Commr., R.N.R.	F. Wilbraham, C. L. Lovegrove, J. Montgomery, F. Norfolk.	No. A.	Union Castle ...	Met. Log. 1.6.26 to 20.9.26 ...	2.10.26.
<i>Winifredian</i> ...	Harrocks, W. ...	" ...	No. M.	Leyland ...	Form 911 3.12.26 to 12.12.26...	17.12.26.
<i>Wonganella</i> ...	Suffern, H. ...	G. F. Phillips ...	"	W. Crossby & Sons ...	" 18.11.26 to 4.12.26...	10.1.27.
<i>Woodarra</i> ...	Hudson, H. T. ...	L. D. Graham, G. Hyland, H. Goater, J. Wallace.	M.L.	British India ...	Met. Log. 20.3.26 to 8.9.26 ...	15.9.26.
<i>Yorkshire</i> ...	Millson, G. E. ...	F. C. Holdsworth ...	No. A.	Bibby ...	Form 911 9.10.26 to 16.12.26...	29.12.26.
<i>Conway H.M.S.</i>	Broadbent, H. W., R.D. Capt., R.N.R.	The Senior Cadets...	Cadets' M.L.	" ...	Cadets' Met. Log. 19.9.26 to 13.12.26	18.12.26.
<i>Pangbourne Nautical College.</i>	Tracy, A. F. G., Commr., R.N.	" ...	"	" ...	Cadets' Met. Log. 20.9.26 to 11.12.26	20.12.26.
<i>Worcester, H.M.S.</i>	Sayer, M. B., O.B.E., R.D., Capt., R.N.R.	" ...	"	" ...	Cadets' Met. Log. 24.9.26 to 15.12.26	17.12.26.
<i>Abaco</i> ...	" ...	The Keepers ...	Lighthouse Register.	" ...	Lighthouse Register 1.1.26 to 30.6.26	26.10.26.
<i>Cay Lobos</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.1.26 to 30.6.26	26.10.26.
<i>Double Headed Shot</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.1.26 to 30.6.26	26.10.26.
<i>Inagua</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.1.26 to 30.6.26	26.10.26.
<i>Sombrero</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.1.26 to 30.6.26	5.8.26.
<i>Watling Island</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.1.26 to 30.6.26	10.11.26.
<i>Cape Pembroke (Falkland Is.)</i>	" ...	" ...	"	" ...	Lighthouse Register 17.1.26 to 20.7.26	18.8.26.

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

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., Received up to 31.12.26.	Date Received.
<i>Cristales</i> ...	Isaacson, J. M. ...	J. A. Hampshire ...	Elders & Fyffes ...	Water Samples ...	15.12.26.
<i>Darro</i> ...	Matthews, G. P. ...	W. Halder-Campe ...	R.M.S.P. Co. ...	" ...	23.10.26.
<i>Desado</i> ...	Hannam, F. S. ...	C. C. Dingle ...	" ...	" ...	8.11.26.
<i>Hildebrand</i> ...	Maddrell, J. ...	A. Allan ...	Booth ...	" ...	12.11.26.
<i>Manzanares</i> ...	Edwards, H. ...	A. F. Moss ...	Elders & Fyffes ...	" ...	"
<i>Reventazon</i> ...	Jack, D. A. ...	L. C. Bach ...	" ...	" ...	"

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