

TABLE OF PRINCIPAL CONTENTS.

	PAGE		PAGE
Oceanography - - - - -	153	Weather Signals, Canada, U.S.A. (Pacific and Gulf Coasts, &c.),	
United States of America Conference on Oceanography - - -	154	West Indian Islands.	
Meteorology and Cable Work (with illustrations) - - -	154	II. Wireless Weather Bulletins and Storm Warnings - - -	166
The Marine Observer's Log (with illustrations) - - -	156	III. Wireless Time Signals - - - - -	170
Ocean Fish - - - - -	160	IV. Visual Storm Warnings - - - - -	170
A Singular Mistake (with illustrations) - - - - -	161	Lithographic Illustrations after page 170.	
The Ocean regarded as a Pasture - - - - -	162	Chartlets B and C showing Sea Surface Temperatures for June	
Currents on the Track from the latitude of Cape Blanco to the		and December in South Atlantic, Latitude 0°—40° S. Longitude	
Brazils (<i>continued</i>) - - - - -	164	25°—55° W.	
Notes upon the Average Conditions in the Indian Ocean, North		Charts of Currents on Route, Latitude of Cape Blanco to the	
of Latitude 35° S.—X. October - - - - -	165	Brazils, November, December and January (with Figure 6, inset,	
		and explanation).	
		Charts of Tracks of Typhoons in the Far East, 1893–1918, for	
		month of October (three in number).	

OCEANOGRAPHY.

THIS number is largely devoted to matters embraced in the subject of Oceanography, of which MAURY, the father of organised Marine Meteorology, was a pioneer. The two are, indeed, very closely related.

The Marine Division of the Meteorological Office is responsible for the collection and compilation of reliable Marine Meteorological observations made at the surface, but in order that there shall not be overlapping in voluntary observation at sea for His Britannic Majesty's Government, it arranges for the collection of such other observations as can conveniently be made by officers of ocean-going steamships of the Mercantile Marine, notably the collection of seawater samples for the Ministry of Agriculture and Fisheries Laboratory at Lowestoft.

The close study of the life, nature and hydrography of the oceans is now less accessible to the general run of Merchant Service officers than was the case before the passing of sail, but there is much that can be done even in steamships working to an exacting schedule.

It is hoped that this Number may be the means of giving encouragement to those Marine Observers who are "sampling" the Liverpool-

West Indies and Liverpool–South American route, and that it may help to stimulate interest generally.

Remarks, observations and samples of special interest on all sea routes will be welcomed from all seafarers and will be forwarded to the Departments concerned.

It should be clearly understood that, as in Marine Meteorology, the collection of routine observations and water samples through the Marine Division for the Fisheries Laboratory is limited to those ships appearing in the list at the end of THE MARINE OBSERVER.

During the preparation of this Number Commander J. R. STENHOUSE, D.S.O., O.B.E., D.S.C., R.D., R.N.R., of the Royal Research Auxiliary Barque *Discovery*, and his navigating officer, Lieutenant-Commander J. M. CHAPLIN, R.N., called.

The *Discovery* is being sent upon a protracted cruise in the South Atlantic by the Government of the Falkland Islands to investigate Oceanographic subjects in general, but the life and habits of the whale in particular. We welcome her upon the list of regular marine observers and wish the expedition the success it deserves.

MARINE SUPERINTENDENT.

UNITED STATES OF AMERICA CONFERENCE ON OCEANOGRAPHY.

A CONFERENCE was summoned at the instigation of the Navy Department of the U.S.A. in June, 1924, with a view to organising research expeditions for Oceanography.

In the report submitted by this conference the objects of the expedition were recommended to be :—

- (i) Discovering, developing and utilising the resources of the sea;
- (ii) Facilitating navigation of the sea and of the air and improving communication by radio and submarine cable;
- (iii) Promoting the welfare of mankind through scientific discovery and the progress of knowledge;
- (iv) Safeguarding of human life;

and as the area of operation it was suggested that the first work should be devoted to the Gulf of Mexico—Caribbean region and the neighbouring parts of the North Atlantic extending through the Panama Canal into the Pacific.

The items of chief interest to the navigator in the scientific investigations to be made by this projected expedition are :—

(a) The soundings of the ocean for which purpose the conference hopes that valuable results will be obtained by the Sonic Depth Finder to which attention was directed by Captain BASSETT, U.S.N., who pointed out that in places the ocean was growing deeper and in others shallower owing to the growth of submarine mountains some of which rise to near the surface and may constitute a danger to navigation.

(b) The meteorology of the ocean with especial attention to

the periodic changes of the elements.

(c) Ocean currents and the vertical circulation of ocean waters.

(d) Changes in shore lines, warpings of the margins of continents and submarine upheavals.

(e) Height, length and velocity of ocean waves.

It is hoped that from the researches of such expeditions as that projected practical results will be obtained in the direction of a solution of the problem of weather changes and forecasting, especially as regards the inter-relation of the effect of weather on ocean currents and ocean currents on weather, the effect of ocean currents on ice drift, the sedimentation in navigational channels and harbour works, the better design of ships by increased knowledge of waves, greater knowledge of visibility, and the improvement of radio communication and of radio compass stations.

In addition to the information which will be of practical use for seamen it is hoped to gain much knowledge of the upper air over the ocean which will be of incalculable value to airmen and the designer of airships and aeroplanes. From expeditions of this nature it should be possible to send up aeroplanes and by that means obtain data from which, Lieutenant REICHELDERFER, U.S.N., foreshadowed, might eventually be produced, Pilot Charts for Aviators showing what winds could be expected at different heights in the same way that the Pilot Charts of the ocean show the winds to be expected at the surface.

It was suggested that the name of the undertaking should be the MAURY U.S. Naval Oceanographic Research and that the principal ship operating in it should be named the U.S.S. *Tanner*.

METEOROLOGY AND CABLE WORK.

BY LIEUTENANT W. E. ALLEN, R.N.R., and MR. F. BOLINGBROKE,

Observing Officers C.S. *Stephan*.

Commander G. F. Carlton, O.B.E., R.N.R.

By the application of modern knowledge the methods of making, laying and repairing submarine cables have far out-stripped those used when the first Trans-Atlantic cable was laid in 1858.

In this Article we will try to give an idea of cable work from the seaman's point of view. Before a cable is laid the route—if a new one—has to be surveyed and soundings taken, for, as can be imagined, a cable that is laid along a comparatively level and soft bottom will give far better service than one laid up hill and down dale as it were, with lengths hanging over some subterranean chasm where the suspended weight will gradually chafe it, eventually interrupting the working of the cable, the consequent repairs to which will greatly add to the cost of upkeep. Having surveyed the route and fixed on the line the cable will take, the next consideration is when are the weather conditions most favourable for the laying of the cable. Obviously one would not choose to lay a cable in the height of the S.W. Monsoon in the Indian Ocean, nor set out to lay a cable to some place which is ice-bound. In laying a cable every endeavour is made to continue laying until near the place to which the cable is landed, for if a vessel had to stop laying cable and "heave to" on account of very heavy weather, it would be necessary to cut and buoy the cable, which under the circumstances might entail losing the end overboard and spending many fruitless days before finding it; thus it is always wise to study the meteorological conditions as given in the various meteorological publications, the data of which has mostly been collected by marine observers.

Before deciding to lay a cable from say A to B, one has to bear in mind the set and drift of the prevailing current at that particular time of the year, for it might be more advantageous to lay it from B to A, other conditions being equal.

In loading a cable on board great care is necessary in coiling it into the circular tanks which are specially built into the cable ship.

The speed at which the cable is laid varies from three to eight knots according to whether the water is shallow or deep, so that with the cable going out at eight knots, damage to the cable and bad accidents to the crew may occur in the cable tanks if it is not carefully coiled. Having loaded the cable and arrived at the place where the first end is to be landed the seaman's responsibilities commence. The vessel, if the depth of water allows, is taken to a berth near the cable landing. This itself is sometimes an onerous duty as some

cable landings are in poorly surveyed places and great caution is necessary in placing the ship.

Having berthed the ship, a line is sent ashore, roved through a block and brought back to the ship, the line thus forming a single whip. The shore end of the cable is then made fast to one end of the whip while the other end is taken to the capstan on board and by this means the cable is hove ashore. To keep the cable off the bottom and clear of the rocks, barrels are tied at frequent intervals to the cable so that the cable is literally floated ashore.

If the landing place does not admit the cable vessel anchoring within reasonable distance of the shore, a tug and lighter have to be hired and the cable landed from the lighter, which is then towed out into a depth of water sufficient for the cable vessel to come and splice on to the cable laid from the lighter.

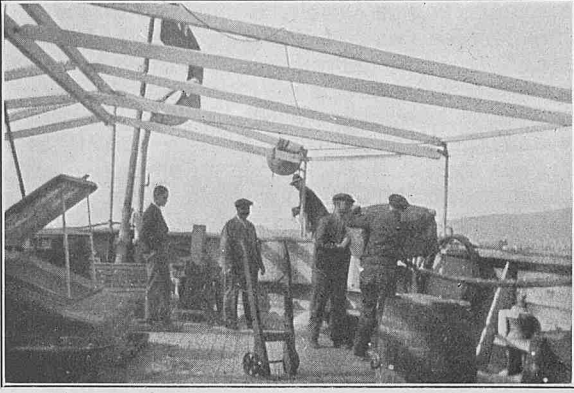
At the more important cable landings great care is necessary in laying the shore end owing to the number of cables already running in, and it is very necessary to keep every cable separate and avoid overlaying an existing one.

The cable ship is now ready to commence laying the thousand or more miles of cable which she has on board.

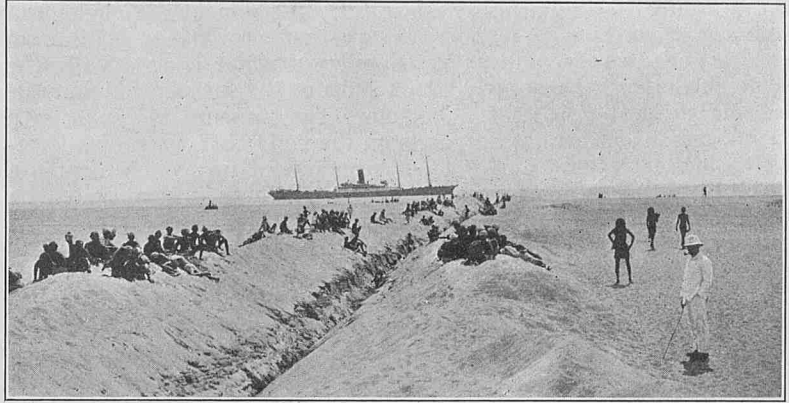
Close in shore, the heavier types of cables are laid as it is here that they experience the most wear and tear through trawlers, vessels anchoring, and the tides. To meet this wear the cables are double-sheathed with wires, and as the water gets deeper so the wear becomes less and admits of lighter type cables being used, until in very deep water—about a thousand fathoms and over—a cable of about 1 inch diameter is employed.

Whilst in sight of land the navigation is naturally done by sextant angles, bearings and range-finder which afford a quick and ready means of keeping track of the ship's course. After losing the land, however, one's sextant is an instrument which puts in many hours overtime, for sights are taken on every possible occasion in order to keep the vessel on the agreed track.

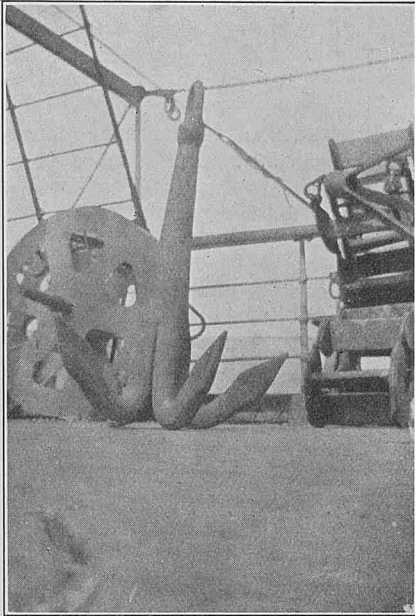
On cable work one finds that the ocean is restless, for currents are never absent, continually changing in direction and force, somewhat in the same manner as the veering, backing and unsteadiness of the wind. Although the current charts give a very good idea of the general rate and direction of the prevailing currents, a shift of a point in the direction of a current, if nearly ahead of a ship, will bring



Barrels being made fast to the cable in order to float it ashore.



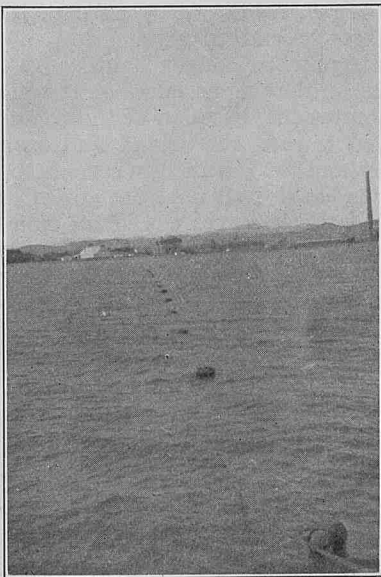
Cable being landed direct from cable ship.



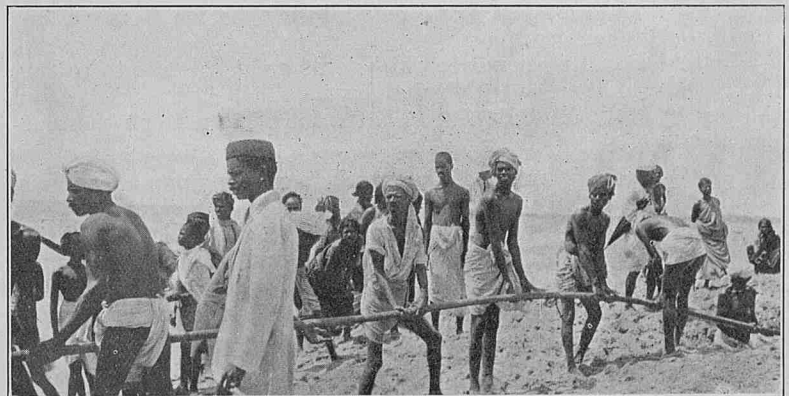
Grapnel used for picking up cables.



Cable being landed from lighter, the cable ship not being able to approach the cable landing owing to shoal water.



A cable being landed from the ship.



Cable on the beach being placed in the trench to protect it from damage.

cable as through a shorter one.

Approaching the place towards which the cable is being laid, a suitable point on the cable line is chosen at which to buoy and slip the cable. The ship then proceeds to the cable landing, lands the shore end as described above, lays out the cable to the end that has been buoyed and there splices the two portions together, thereby completing the circuit.

In repairing a cable, weather is a great consideration and in high latitudes no opportunity is ever missed of constructing weather charts. Every hour of fine weather has to be taken advantage of, since there is a considerable amount of boat work to be done, and generally speaking, when the weather is too rough for boats to work it is not possible to carry on with the work.

It might appear strange, but there are a large number of people even at sea who believe that cables do not reach the bottom of the

ocean owing to the pressure of water. A moment's thought will convince them that it is not pressure that prevents a body from sinking, but density, and as the density of water is practically the same at all depths, any body which sinks at the surface will continue to sink until it reaches the bottom. The pressure increases with depth, but it increases at all points on the body both upwards, downwards and laterally. Cables have been picked up from a depth of three thousand fathoms and the marks where they have rested on the ocean bed half buried in the ooze have been clearly visible, the cables not having moved from the positions in which they were laid perhaps fifty years ago.

On the Grand Banks of Newfoundland cables have been recovered with pieces of volcanic rock attached to them. Where did this rock come from? The Banks are composed of sand and there are no volcanoes in Newfoundland. The only solution appears to be that icebergs bring these pieces of rock down with them from Greenland and, as the bergs melt on their voyage south, the earth and rock embedded in them are freed and fall to the bottom of the sea, pieces

of rock sometimes falling on a cable.

When grappling for a cable to lift it from the bed of the ocean for repair, the ship's speed is only about three-quarters of a knot, and at such times sub-surface currents are often noticed.

When two buoys have been placed a few miles apart out in deep water away from the influence of the tidal streams it has often been observed that the current was setting in an opposite direction at one buoy to that in which it is running at the other. This may seem incredible but it has been observed many times. From experience it has been observed that if the meteorological conditions over a large area are not of the normal type for that particular time of the year, then the currents will not conform to those generally experienced, and added precautions are necessary.

An enormous amount of money and time would be saved by the invention of a current recorder or the promulgation of the laws of currents so that one could immediately know what current was being experienced and be able to foretell its direction and strength in the same manner as we are able to forecast the weather.

THE MARINE OBSERVER'S LOG.

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

Responsibility for statements rests with the Contributor.

MARINE BIOLOGY.

THE following note upon reports by Marine Observers upon Marine Organisms is by Dr. E. S. RUSSELL, Director of the Fisheries Laboratory, Lowestoft.

"The Observing Officer of R.M.S. *Orvieta*, Capt. W. S. SHELFORD, has reported passing through belts of dull yellow matter, lying S.S.W. and N.N.E., and having a width of about 12 ft., shortly after leaving Colombo on June 12th, 1924. A sample of this discoloured water taken at noon on that date in Lat. 7° 12' N., Long. 77° 47' E., was collected and sent to the Fisheries Laboratory, Lowestoft, for examination. The suspended matter was there identified as a species of *Trichodesmium*, a blue-green alga or microscopic seaweed which is composed of tiny filaments floating free or in little bundles at the surface of the ocean. The specimens were sent to a specialist, Dr. F. E. FRITCH, who confirmed the diagnosis and added that the actual species was *Trichodesmium hildebrandtii* already known from various parts of the Indian Ocean.

"In that excellent manual, which is of great interest to sailors, 'The Science of the Sea' (prepared by the Challenger Society, and published by JOHN MURRAY), there is the following note on the blue-green alga:—

"A small number of the members of this group are pelagic, though most live in fresh water. They sometimes occur in enormous numbers in tropical seas, forming large floating masses. They are usually threadlike, and arranged in groups or bundles. One form, *Trichodesmium erythraeum*, is of a reddish colour, and probably accounts for the special name of the Red Sea, for periodically it occurs in enormous quantities in those waters."

"It is possible that the red water mentioned in the following extract was due to *T. erythraeum*, though clearly many other living creatures were present in the sample, but cannot be identified from the description given.

"Extract from the Meteorological Log of S.S. *Frankenfels*, Captain G. E. CARTMER, O.B.E. (Observing Officer, Mr. L. M. BURFITT).

"August 27th, 1924. From 1.30 to 2 p.m. in 13° 40' N., 48° 16' E., vessel passed through reddish water. A bucket full of it was taken and the density was found to be 1024, temperature 85°. Under an ordinary microscope the water was found to contain small green pin-head fish, tangled cotton-like things about ½ in. long with very short wisps all over it, to the end of these wisps in places was attached minute red spots with opaque centres and when touched it darted to the other side of the bucket. Minute lumps were also seen, practically the same colour as water with small reddish spots in centre and alive."

It is hoped that Observing Officers will continue to note any peculiar phenomena of this kind which come to their attention and in particular will collect samples, as it is practically impossible to identify the minute life of the sea merely from a description. A small quantity of formalin should be added to the samples to preserve them.

PHOSPHORESCENCE.

THE following letter has been received with the Meteorological Report of S.S. *Deucalion*, Captain J. FINDLAY, Suez to Sabang, Observer, Mr. P. W. SAVERY, 3rd Officer.

"On the morning of October 27th, 1924, at 1 a.m., when entering Sunda Straits with Krakatoa Island bearing N. 58° E., distant 9½ miles, with a gentle S.E. breeze and sky overcast with Alto-Stratus and Stratus clouds, an unusual phenomena was observed. Rays of light appeared on the surface of the water coming from the south-east passing across the ship at regular intervals of half a second. These rays or beams of light resembled those given off by a searchlight and extended from horizon to horizon lighting up the surface of the water as they passed, but having no effect on the ship.

"After a few minutes the direction of the beams of light changed when they proceeded toward the Island and seemed to bank up, resembling a huge sea and the Island then seemed to be close alongside the ship. From then until 1.40 a.m. the direction of these beams continually changed, passing across the vessel from all points of the compass, when at the end of this time they gradually disappeared altogether and were not seen again. At 1.40 a.m. Krakatoa Island bore N. 7° W. distant 5 miles. There were small patches of phosphorescence showing on the surface of the water at the time, which is not unusual and in my opinion could not account for the phenomena described above."

CURRENT CHARTS.

THE following is an extract from the Meteorological Log of S.S. *Peshawur*, Commander C. HESTER, R.D., R.N.R., Liverpool to Australia via Cape of Good Hope and Home via Suez.

"Currents on direct Cape Route, Cape Blanco to Table Bay, published in MARINE OBSERVER, January, 1924, for months of February, March and April, and MARINE OBSERVER, July, 1924, for months of November, December and January.

"From 28th January, 1925, to 11th February, 1925, Liverpool to Cape Town, these two current charts were studied and found to be most reliable and we were quite pleased with them. They should prove of great assistance to navigators when calculating what currents may be looked for on this route.

"Current chart Channel to Latitude of Cape St. Vincent, MARINE

OBSERVER, February, 1925, for months of February, March and April, MARINE OBSERVER, May, 1925, for months of May, June, July. We consider these charts a great improvement on the 1923 Monthly Charts and they should prove of great value when navigating in these particular waters."

TIDAL CURRENTS AND WIND EFFECT ON THE NEWHAVEN-DIEPPE ROUTE.

Contributed by Captain Sydney MARMERY, S.S. *Dieppe*.

"THE tidal currents in the English Channel are very considerably affected by winds, possibly much more than is generally realised. I have noticed on the run between Newhaven and Dieppe that the advent of strong westerly winds is very often foretold by an increase in the strength of the flood, or east-going stream, and that the stream gathers force sooner after the turn than it does in the ordinary way. Perhaps my only reason for thinking this is by constant comparison of courses set and made good over a long period. I think, however, that it may be taken that it is fairly correct. Navigating the same vessel for more than ten years has given me sufficient experience to differentiate between leeway and set fairly accurately as regards their effects on this particular ship.

"I have endeavoured to connect the movements of the barometer with the above but without finding anything definite to work upon.

"When visibility is sufficiently good it is possible to watch the effect of the current on the ship's course for a distance of ten or twelve miles by carefully noting land-marks in day-time and leading lights at night, and when leaving either Newhaven or Dieppe the course can frequently be found to need a slight alteration owing to more or less current than was originally allowed for when the course was set.

"In cross-Channel work it is most important that a correct land fall is made as coastal or valley fog is common, and unless a good 'fetch' is made much valuable time is lost in getting into a proper position for entering between the piers, with generally a strong current running across them.

"In a like manner easterly winds greatly increase the ebb or west-going stream (also seeming to have the effect of weakening the flood). This is, perhaps, to be accounted for by the conformation of the Channel. In any case I consider there is no doubt that the strongest current met is the west-going one when easterly winds are blowing, and the ebb begins to run, and continues to run after its usual time of slackening, as much as half to three-quarters of an hour sooner than when the wind is westerly."

COMPARISON BY W/T OF CURRENT EXPERIENCED.

THE following has been received from Captain A. H. YOUNG, S.S. *Clan Macbeth*.

"The following extract may prove of some value for the purpose of illustrating the varying currents that were experienced by two vessels in close proximity to each other when in the vicinity of Sokotra Island during the latter part of the S.W. Monsoon.

"The relative Noon positions, as exchanged by radio, of the two vessels in question on the 30th September were as follows:—

"*Clan Macbeth*, Latitude 9° 45' N., Longitude 59° 11' E. 'Other Vessel' 10° 12' N., 59° 30' E. Respective courses steered *Clan Macbeth* N. 78° W., 'Other Vessel' N. 75° W. Between 8.14 a.m. and 3.18 p.m. the 30th, *Clan Macbeth* experienced 'no current,' but by a fix, obtained by stars, at 6.13 p.m. she was found to have been set N. 71° E. 6 miles since the 3.18 position; a radio received at 6.30 p.m. from the 'Other Vessel' indicated that she was suffering from an adverse current, speed of which was 2 knots. The *Clan Macbeth's* course was then altered five degrees to the southward, and when the next fix was obtained at 8.11 a.m. 1st October, she was found to have enjoyed a set of N. 56° W. 14 miles during the 14 hours, which fact was fully sustained when the Noon Latitude was obtained. The 'Other Vessel' experienced an adverse set until 6.00 a.m. the 1st October.

"It would appear therefore that, on the afternoon of the 30th Sept-

ember, the *Clan Macbeth* was on the extreme southerly edge of a body of water moving to the eastward; the two vessels having remained approximately 30 miles apart throughout.

"Another case is a comparison of currents experienced in the Gulf of Aden by the *Clan Macbeth* and the S.S. *Auditor*, whose Captain has kindly given permission for the progress of his vessel in comparison to that made by the *Clan Macbeth* to be quoted.

"Noon position, 2nd of October, S.S. *Auditor*, Latitude 12° 53' N., Longitude 50° 55' E., S.S. *Clan Macbeth*, Latitude 12° 06' N., Longitude 50° 30' E.: vessels were steering converging courses to make Ras Marshag Light.

"At Noon on the 3rd instant *Auditor*, Latitude 12° 38' N., Longitude 45° 48' E, *Clan Macbeth*, Latitude 12° 27' N., Longitude 46° 09' E., having experienced a set of N. 87° E. 24 miles, while the *Auditor's* Captain indicates by radio that he has enjoyed a set of $\frac{3}{4}$ of a knot westerly during the last 24 hours."

EXCEPTIONAL EASTERLY SET.

THE following is an extract from the Meteorological Log of S.S. *Nariva*, Captain T. J. C. BURET, Liverpool to River Plate, Observer, Mr. E. GILLER.

"16th October, 1924. An extraordinary current to the eastward was experienced between Noon (A.T.S.), Latitude 1° 47' S., Longitude 31° 25' W., and 10.30 p.m., Latitude 3° 48' S., Longitude 32° 00' W. Expecting to be in the Equatorial Current due allowance was made in shaping a course for 1 mile west of C. Placiliere (Fernando Noronha), but on making the light, the ship was found to be 23 miles to the eastward of the Island; between then and noon, 17th, the true westerly current was experienced. It would be interesting to know other ships' experiences at the same time in this position. Those known to be in the vicinity were *Sambre*, *Princesa*, *Eastway*, *Derwent River* and *Portvale*."

The following is an extract from the Meteorological Log of S.S. *Port Victor*, Captain L. H. SWAN, London to Melbourne via Cape. Observer, Mr. E. G. FULLICK, 2nd Officer.

"October 17th, Noon Position, Latitude 0° 52' N., Longitude 10° 13' W. The current ascertained for this day, S. 81° E. 19 miles, being contrary to the usual westward set of Equatorial Current is, perhaps, worth notice. The observed positions were good, and the D.R. obtained by Log distance, checked by screw distance, less normal slip."

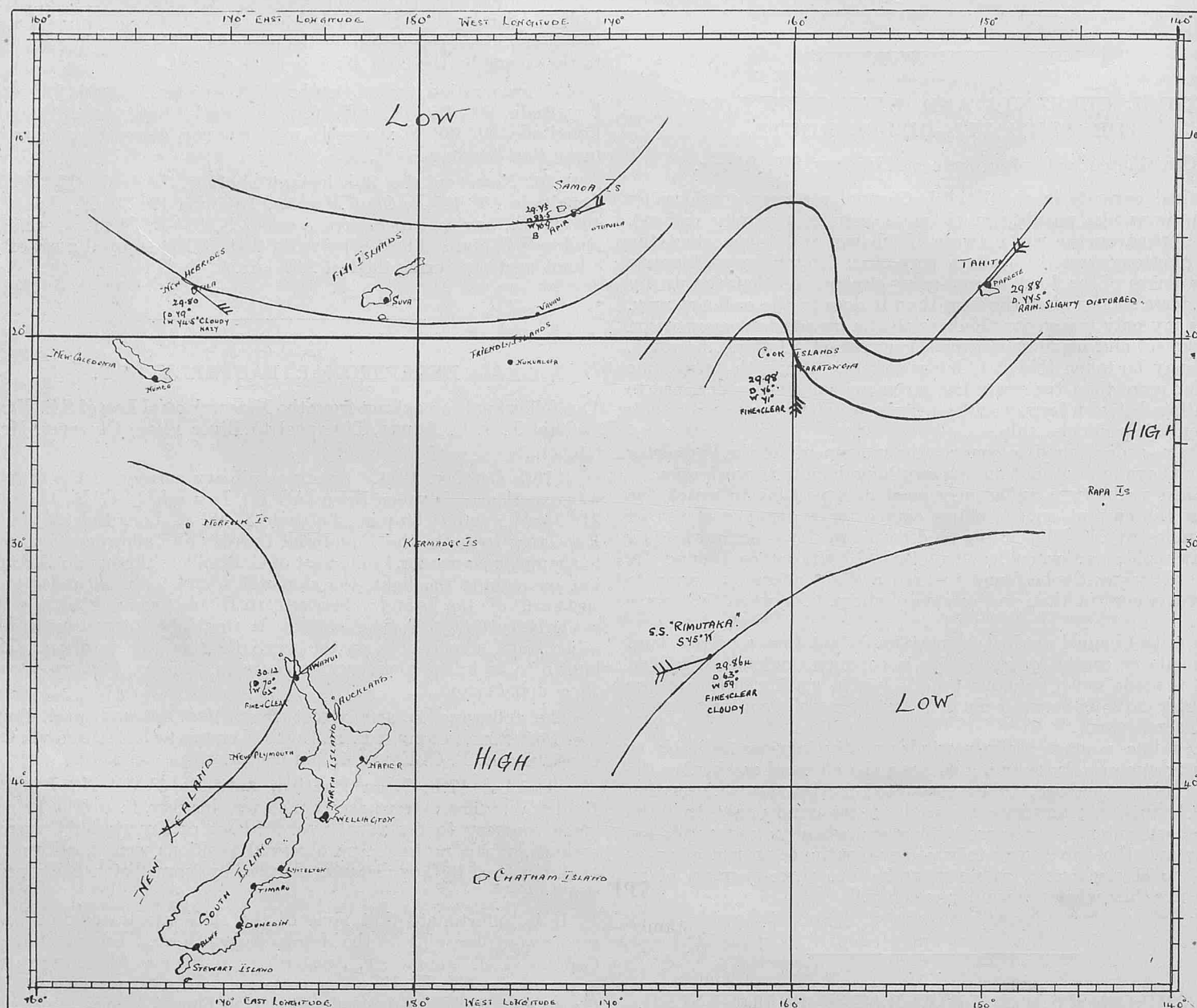
It is unfortunate that none of the ships mentioned in *Nariva's* report were observing for the Meteorological Office. But S.S. *Flandria*, Captain G. J. VELDKAMP, Amsterdam to Buenos Aires, experienced a set of N. 68° E. 10 miles between 5.37 a.m. on October 14th (Latitude 3° 00' N., Longitude 28° 15' W.) and 6.10 p.m. on the 15th (Latitude 3° 48' N., Longitude 32° 27' W.), and S.S. *Almanzora*, Captain G. A. MACKENZIE, Southampton to Buenos Aires, observed a current E. 5 miles between noon 13th (Latitude 2° 31' N., Longitude 30° 04' W.) and noon 14th (Latitude 3° 18' S., Longitude, 32° 14' W.).

As an inset to the *Chart* of "Currents on Route Latitude of Cape Blanco to the Brazils" (FIGURE 1) published in the MARINE OBSERVER, Vol. II, No. 13, a curve is given showing the annual variation in velocity of the Equatorial Current between Latitudes 0° and 2° N. In that figure it is seen that October is a month in which the average velocity of the Equatorial Current is at a minimum (though a far more pronounced minimum is in April and May) so that it is not altogether surprising to find occasional easterly sets near the Equator in that month.

An examination of the weather reports of other ships crossing the Equator on this route did not show any meteorological condition which could be associated with this easterly set.

The report of *Port Victor* is in accordance with the results obtained in the investigation of the "Currents on the direct Cape Blanco—Table Bay Track," which was published in the MARINE OBSERVER, Vol. I, Nos. 1 and 7. In the latter number it was stated that "in October easterly sets were found right down to the Equator, and in some cases were met with even in southern Latitudes."

WIRELESS AND WEATHER IN SOUTHERN WATERS.

WEATHER Chart and Remarks by Mr. Oswald M. WATTS, 2nd Officer, S.S. *Rimutaka*, Captain F. A. HEMMING.

Weather Forecasting Chart for South Pacific Ocean. 0330 G.M.T. 5 p.m. A.T.S. Friday, November 21, 1924.

"Herewith a weather chart made on outward voyage from Panama to Auckland on board S.S. *Rimutaka*, Captain F. A. HEMMING; with such reports as we could get by W/T, from which it will be seen that we obtained a very good idea of the weather we should expect for the next 24 hours, which was as follows:—High pressure ahead, we expected good weather with a rising barometer and a shift of wind. The wind backed round to the E.S.E. and anti-cyclonic conditions prevailed with good visibility until our arrival 4 days later.

"At this time I had not seen your chapter on 'Wireless and Weather, an Aid to Navigation, Southern Waters' in the MARINE OBSERVER,

and, therefore, my isobars are not drawn with any attempt to get the gradient, and so are not stepped with any definite spacing.

"I am sending you this example, because I think it shows what enormous possibilities there are for assisting navigation with a suitable system of W/T weather reports, particularly between ships at sea. If the Australian and New Zealand Weather Bureau would adopt a bulletin similar to the 'Weather Shipping' Bulletin, just giving seamen the actual observations they want for coast stations and forecasts for coast waters, navigation would benefit generally."

METEOR.

THE following is an extract from the Meteorological Log of S.S. *Chindwin*, Captain C. ESSLEMONT, Rangoon to Aden. Observer, Mr. W. WILSON, 3rd Officer.

"At 10.35 p.m., 30th October, 1924. Latitude 10° 30' N., Longitude 57° 17' E., a brilliant falling meteor became visible in the vicinity of Polares and starting in a curve across the sky to the westward from Polares leaving a long and very bright trail behind it. The meteor disappeared, but the trail remained quite bright and having my sextant handy, I measured it, 93° (approx.).

"Later the trail got dimmer and shorter, and leading straight

from the first star in the Little Bear. Measuring it again, 64°. Time 10.48 p.m.

"I watched it continuously after this, and it lengthened and shortened alternatively as if flashing and also, to my eyes, assumed an undulating appearance, finally steadying up, and at 10.58 disappearing altogether.

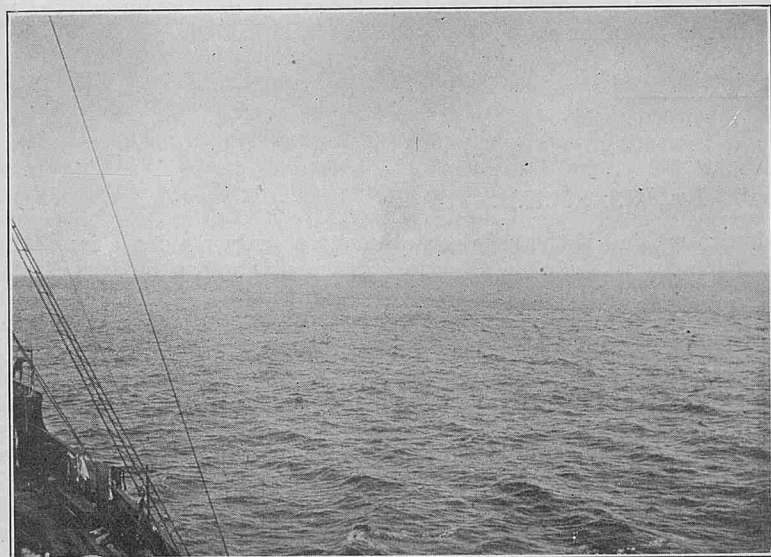
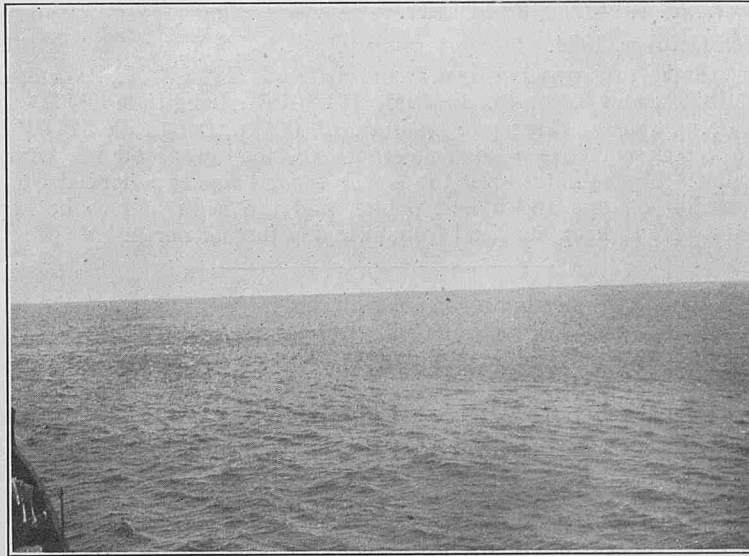
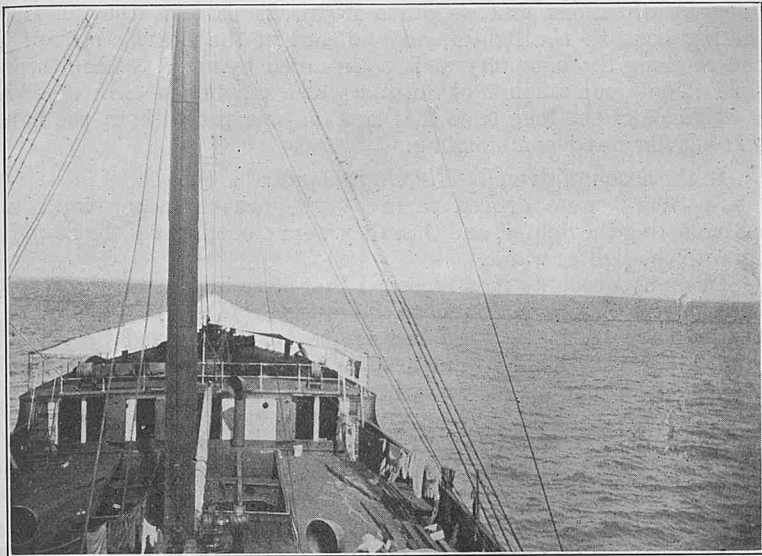
"In appearance it resembled a searchlight flash being thrown across and curving very gently, almost straight.

"The sky was cloudless, except for small tufts of Det. Cu., proportion 1-2.

"I called the apprentice's attention to it at 10.45, when it was clearly visible."

SUDDEN CHANGE IN SPECIFIC GRAVITY.

THE following note and photographs are from the Meteorological Log of S.S. *Hillfern*, Captain A. M. GRIFFITHS, Rio Janeiro to St. Lucia, West Indies.



"September 8th, 1912. Latitude $5^{\circ} 19' N.$, Longitude $50^{\circ} 25' W.$

"8.30 a.m. Observed an appearance as of shoal water on the port bow and beam extending in a N.N.W. and S.S.E. direction as far as could be seen both ways.

"9.00 a.m. Ship close up to the line. Found that the water to the N.E. was deep blue as usual in the open ocean and water to the S.W. was dark olive green, the line of division being sharp and clear and marked by small waves breaking into foam. Crossed the line and took observations for Temperature and Specific Gravity, which gave the following results. Water to the N.E., Temperature 81° , Specific Gravity 24; water to the S.W., Temperature 82° , Specific Gravity 16. These results were obtained from water drawn from overside at two positions about 100 yards apart on opposite sides of the dividing line.

"9.45 a.m. Stood across the line again and took observations as before, which agreed with those taken at 9.00 a.m.

"9.50 a.m. Steered the ship exactly on line of contact. Water on starboard side being deep blue and water on port side dark olive green.

"10.0 a.m. The line of contact which hitherto had been nearly straight and trending to the N.N.W. became very erratic, forming a curved line with Bay and projecting capes and finally taking a more or less N.N.E. line of direction.

"The ship which was being steered N.W. left the salt water and entered the fresh water. On passing from the salt to the fresh water I took the following observations:—

"Fresh water - Temperature 82° , Specific Gravity 16.

"Salt water - Temperature 81° , Specific Gravity 23.

"On the edge of the line the sea on the fresh water side was crowded with Pink Nautilus (commonly called 'Portuguese Men-o'-War' by sailors). Roughly speaking, I should estimate them as approximately about one per square yard of surface. But they were not symmetrically distributed, but more commonly in groups of two to a dozen; thickest on the line of convergence of the waters and finishing up at a distance of about 300 yards from it.

"None was observed on the salt water side of the line, and this appears to me to be rather a remarkable thing as the 'Portuguese Man-o'-War' is frequently found out in the open ocean, and I have hitherto never seen it in fresh water.

"Flying fish were also seen in great numbers, but they were as frequent in the salt as in the fresh water.

"About 11.0 a.m. ship being in the fresh water, a very large shoal of porpoise crossed the bow moving towards the salt water and going at great speed and taking very high jumps out of the water.

"The line of division of salt and fresh water was very plainly and sharply marked. An inspection of the enclosed photos (taken at the time) shows this very clearly. It will probably aid in realising the sharpness of the line to remember that the camera does not distinguish the difference between dark blue and olive green nearly so well as the human eye.

"After entering finally into the fresh water section the water retained its dark olive colour till dark; after which of course no further observations for colour could be taken, but at daylight on the 9th September the water had almost but not quite, regained its normal colour of deep blue, and the observations for density (given above) seem to show that there was no sharp line of demarcation on the western side, but rather a gradual mixing of the fresh and salt water as it flowed along to the N.W."

TIDE RIPS.

THE following is an extract from the Meteorological Report of S.S. *Benalder*, Captain J. H. COLE, D.S.C., Suez to Penang, Observer, Mr. W. M. WEBSTER, 2nd Officer.

" 5th October, 1924.

" Slight tide rips between Noon, Latitude 12° 09' N., Longitude 49° 48' E., and 3.45 p.m., Latitude 12° 10' N., Longitude 50° 30' E., 6.45 p.m. a heavy tide rip in Latitude 12° 03' N., Longitude 51° 04' E. The vessel, which is a good steering one, was swept off her course a point. Ten minutes after the first, a second was experienced which swept her off one and a half points, and the helm had to be kept hard a-port to keep her head from swinging further north."

When a ship entering a current rip takes a sheer it is often thought that the sheer is due to the effect of divergent currents acting upon her ends, but the following is put forward as a possible explanation.

Tide or Current Rips are caused by the juxtaposition of water of different temperature or specific gravity. It is an experimental fact which has been shown by SANDSTROM that liquid of different densities does not easily mix (examples of this law are often shown in the atmosphere by layers of cloud stretching over vast expanses at uniform height). In the ocean there are layers of water of different densities caused often by the out-flowing of rivers. Where the boundary between the two layers meets the surface there is a tendency for waves to form. It must not be thought that the boundary is a vertical one, in the majority of cases it is probably inclined at quite

a small angle to the horizontal, the lighter water lying above the heavier in a thin sheet. If the two layers of water are moving in different directions and at different speeds so that the heavier is sinking beneath the lighter, any flotsam in the heavier stream will collect along the boundary as is often noted by ships passing through rips. The great amount of flotsam which may be seen in these rips is evidence of the long time that rips may persist without the lighter and heavier water commingling.

In the account given by *Hillfern* it is probable that the "Portuguese Men-o'-War" were drifted there by the heavier water which was undercutting the lighter, and that they were passed across the boundary rip into the lighter water.

In many accounts it is recorded that a vessel on passing through current rips has been found to be sluggish in answering her helm and to have been swept off her course (as is recorded by *Benalder* above). A very similar phenomenon is often experienced by ships entering and leaving rivers when they get into what is termed "dead water." EKMAN has investigated the problem of "dead water" and collected a large number of accounts from ships which have experienced it. He concluded that the phenomenon was due to a surface layer of river water lying above a bottom layer of salt water, and that sluggishness of the ship was due to the formation by the ship of large waves in the surface of separation of the two layers, though these waves would scarcely affect the surface of the sea or river. It seems probable that the behaviour of ships in current rips is due to a similar cause.

OCEAN FISH.

BY CAPTAIN SIR DAVID WILSON BARKER, KT., R.D., R.N.R., F.R.S.E.

THE surface of the sea may be described as a living broth of minute organisms; too minute often to be caught in any net and only discoverable by passing the water through a Centrifuge, and then only can the very minute forms be seen under a powerful microscope. They appear also to be only at the surface during the night and during the day sink to a depth of 4 to 5 fathoms. The surface is the home of the young fish, the majority of which are so transparent that many of them can only be detected by their eyes.

The **Flying Fish** is the most commonly seen. In the warm waters of the Tropics they are met with constantly in shoals, starting up from the sea as the ship ploughs her way through the waves. Much has been said about the flight of the flying fish, but they are physically incapable of using their large pectoral fins as a bird uses its wings. They are propelled out of the water by their powerful tails, and are able to float considerable distances in the air, sustained by the large area of the pectoral fins. They appear at times to rise in the air, but, in reality, what happens is that they are floating in air which is forced up by a wave. Professor WOOD JONES, D.Sc., F.Z.S., was good enough to take much trouble for the writer in settling this question from an anatomical point of view, and his views are stated in "Nature" for April 21st, 1921.

Pursuing the flying fish is often seen a large and powerful fish, the **Coryphene**, sometimes erroneously called a dolphin. The coryphene when dying on deck undergoes wonderful changes of skin colouring. **Bonitos** and **Albacore** also pursue the flying fish. In the sailing ship, it was a good form of sport to take the "grains" (a sort of small trident on a staff with a line attached) and try to harpoon them from the dolphin striker. They could be caught sometimes with a hook and strong line and make a welcome meal. One of the large fish of the sea—the **Tunny**—is allied to these fish, but is seldom seen away from the regular fisheries. It has the peculiarity of having warm blood.

Sharks naturally attract much attention: they are members of a family which includes many species and a great variety of form, such as the **Saw Fishes**, **Threshers** or **Dog Fish** and the **Rays**. The most generally seen are the white shark, the blue shark, the tiger shark (many species are called after this name, which is not very descriptive), and the Greenland shark. They range from a length of 8 feet up to 30 feet or more, and are voracious monsters. They can be distinguished at sea by the appearance of a triangular fin above

the water, and if the ship is stationary or only moving slowly, they will be sure to swim up close to her, when they can be attracted by any kind of bait. If the shark is of any size a bowline has to be slipped down over the tail to haul it on board, and when inboard it had better at once be given a sharp knock on the nose to stun it before killing it. They are extremely tenacious of life. Accompanying the shark will be seen generally one or two pretty striped fish like a herring in shape and called a **Pilot Fish**. It is generally believed that these fish attach themselves to sharks and other large slow-swimming fish for the purpose of feeding on the fragments of food that the large fish lets go. It is a case of mutually beneficial partnership. It seems quite likely that the pilot fish in some way communicates the result of its investigations of food to the shark and then itself comes in for some of the fragments. Another fish that accompanies the shark is the **Sucking Fish**. One or two and sometimes more of this strange fish are sure to be found attached by their suckers to the shark when hauled on board. The "sucking-apparatus" is a modified dorsal or back fin which occupies the top of the head and fore part of the back. This fish also seems to live by its partnership with its huge associate. The **Hammer Headed Shark**—so called from the head being shaped like a hammer, with an eye at each end—grows to a large size, and is a formidable and dangerous fish. They are found in the Tropics; the writer has seen them in the West Indian Seas, and they are a truly remarkable sight in the water. Is it possible that they may gain some advantage of stereoscopic vision from having the eyes so wide apart? The teeth in all these sharks are very sharp and serrated, and there are several rows of them. A victim has no chance of escape when once captured. They all seem to have a great range in depth; they can descend to a depth of 1,500 fathoms.

Occasionally a specimen of the huge **Barking Shark** may be seen. These are immense fish which may grow to a length of 40 or 50 feet, but they have small teeth and do not attack human beings.

The **Saw Fish**, in which the upper jaw is prolonged into a long sword, edged with teeth, may be seen sometimes, and is very dangerous. It appears to hack its victims to pieces with the saw and then eat the fragments.

The **Rays** are odd-looking flat sort of fishes, some growing to an enormous size, and armed with curious spines and whip-like tails. The spines grow out above the base of the tail. Some of them can

leap perpendicularly out of the water and then present a curious appearance in the air. Others, like the **Devil Fish** sometimes seen in the Tropics, are dangerous animals, although slow-swimming. The writer once saw one harpooned but it could not be captured. One species of this family has developed an electric battery in its body and can give quite a smart shock.

The **Sun Fish** may often be seen in the Temperate and Tropical regions. It is a strange-looking fish, like a large plate, swimming about in the water, and often seems to have no complete control over itself. Its circular shape and absence of a true tail gives it this manner.

Sword Fish (which must not be confounded with the narwhal, a Cetacean found in the Arctic Regions), is a large and powerful fish which may grow to a length of 12 to 15 feet. The upper jaw is prolonged into the "sword," which becomes a very efficient piercer, as can be seen from a specimen of wood (2 inches thick) in the British Museum, which was pierced by one of these fish, and the "sword" broken off. They have a large dorsal fin and may sometimes be seen at sea. It is said they will attack a whale with great fierceness. One wonders how they withdraw the sword.

The **Barracuta**, barracuda or snook, a large, long and powerful fish, which may reach a length of 5 feet, is sometimes caught when running the "Easting" down in the Southern Hemisphere. A strong line and hook baited with a piece of white linen or bright tin is all that is necessary, but there is little hope of landing a fish if the vessel is going more than 12 knots. They are good to eat.

Large shoals of fish may at times be seen at sea and they make a remarkable spectacle, especially when they jump out of the water in large numbers. The writer once saw such a shoal evidently pursued by some enemy and, in their frantic attempts to escape, they appeared like a silver wave in the air.

If a vessel is by any chance held up at sea for any time, lines should be lowered with hooks baited with different substances. It is quite possible good catches may be made. The writer has seen this done frequently, and in one case he had to stop the fishing as more were being caught than could be eaten by "all hands."

Much interesting small sport was had in the sailing ships when coming up through the Sargasso Sea, as when masses of this weed were caught in a net and shaken out into a bowl, little fish were often found, also little crabs, shrimps and other forms of life. The absence of big fish from the Gulf weed district is remarkable. It was interesting to see how the fish have adapted themselves in colour and appearance

to the weed in which they live.

The **salmon** and **eels** are remarkable cases of fish that live in the ocean and also in rivers. The former goes up the rivers yearly to spawn, the latter, after living some 6 or 7 years in the river, then changes its colour and proceeds to the depths of the ocean to N.E. of the West Indian Islands to spawn, the young eels taking some 3 years to arrive back in the rivers, up which they ascend. The parent eels never return.

Fish seem to live almost entirely on one another; the larger eating the smaller (though there are cases of deep sea fish that have been discovered with a fish larger than themselves in their stomachs), and the eating of their young is also common. The question of the sleep of fish has received a good deal of attention; there seems no doubt that they do sleep, but probably, like most living things, in a very broken manner.

The colours of many fish are gorgeous, but disappear when the fish is dead. As mentioned before, the colours of the dying coryphene are marvellous, and due to the fine striæ on the scales and the trembling of the body as the fish expires.

Temperature, currents and barometric pressure must play an important part in the distribution of life in the sea. The growth of coral reefs is controlled chiefly by the temperature and pressure of the sea. Temperature must also affect the plankton. Some naturalists think that the almost total destruction of the Tile Fish (a good food fish) off the east coast of N. America some years ago, was due to a sudden influx of cold water, that destroyed millions of this fish which were found floating dead on the surface. Speaking generally fish seem to prefer cold water, but they like apparently to herd together with their noses as near to the warm currents (speaking of Newfoundland and the Iceland coasts) as they dare.

Barometric pressure must also exert its influence, but to what degree cannot be gauged until further researches reveal to us the full extent of the influence of meteorological conditions on biological problems and their connection.

Viscosity and surface tension, and also the prevailing conditions on the actual demarcation line between the sea surface and the air, must have an important bearing on the surface life. This is complicated by the slow-moving temperature changes which take place below.

For further information see "Nature Notes for Ocean Voyagers," published by C. GRIFFIN & Co., Exeter Street, Strand, London, W.C.2.

A SINGULAR MISTAKE.

BY LIEUTENANT COMMANDER P. M. VAN RIEL, R.H.M.,
NETHERLANDS METEOROLOGICAL INSTITUTE.

IN Chapter 16 of his "Sailing Directions," 8th Edition, Vol. I (1858), MAURY showed a new field for investigation for those who cross the oceans, viz., that concerning the life of the denizens of the seas, and more especially that of the lower animals. On page 217 we read:—

"With such a subject for study and contemplation as these insects afford to all who can use the microscope, let no naturalist, who crosses the ocean, and no passenger on board ship, or mariner, who can afford to purchase a microscope, talk hereafter about monotony of a sea voyage or the ennui of a passage."

It was in this way that our knowledge of the fauna of the sea was soon increased, as many people were willing to carry out MAURY's advice. In the old times people did not live in such a hurry and voyages in sailing vessels often were long and monotonous, so that useful occupation was much needed. This was the case especially with passengers and the Captains' wives, who often accompanied their husbands on their sea voyages, and whose time was not daily filled up with small household-business on board.

In the same Chapter a letter to MAURY is inserted (January, 1857) from the wife of a Captain well known by British mariners, namely, H. TOYNBEE. It appears from this letter, that the surgeon of a detachment of the 12th Lancers was in possession of a microscope. With the aid of this instrument many samples of sea-water were

examined and each bucket of water drawn for taking the surface temperature "was a perpetual feast." The work of Mrs. TOYNBEE consisted in making drawings of the enlarged specimens. Many of these are to be found on Plates XX to XXXVII, with an explanation by Professor DANA of New Haven, to whom the drawings were submitted for identification.

It is with one of these sketches that an amusing mistake took place. Some months ago our Institute received a request from Dr. A. C. OUDEMANS* of Arnhem, for the loan of the above-mentioned volume in order to make a reproduction from the drawing of an *Acarus* (-mite), which was printed therein.

The example referred to was that on Plate XXI, FIGURE 14 (one of the drawings of Mrs. TOYNBEE) regarding which the following explanation was given on page 224:—

"FIG. 14. Found in freshly drawn sea water the animalculæ, represented in the accompanying sketch; very active, with a rapid darting motion. It is here highly magnified and seen by transmitted light; when seen by reflected light it looked of a pale yellow colour, and the body seemed covered by a tuberculated shell."

* Probably known to British readers as the writer of "The Great Sea-Serpent."

When returning the volume, Dr. OUDEMANS informed us that the drawing represents the female of an ordinary house-mite (*Acarus Domesticus*) and writes further:—

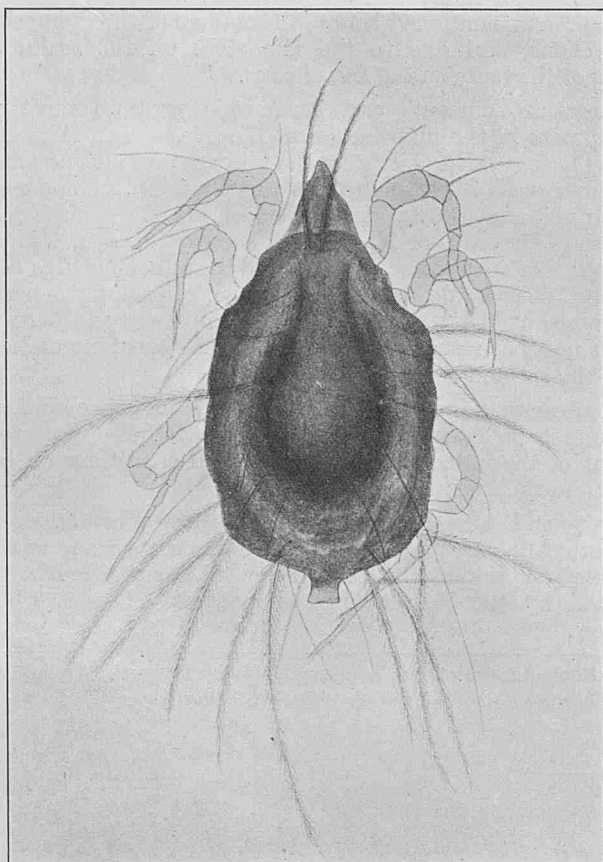
“It lives in houses and shops, and absolutely *dislikes water especially sea-water*. The observer, who probably found it in a basin filled with freshly drawn sea-water, had not realised

that this acarus, ‘very active with a rapid darting motion,’ had just left the laboratory table and was enduring an involuntary sea-bath.”

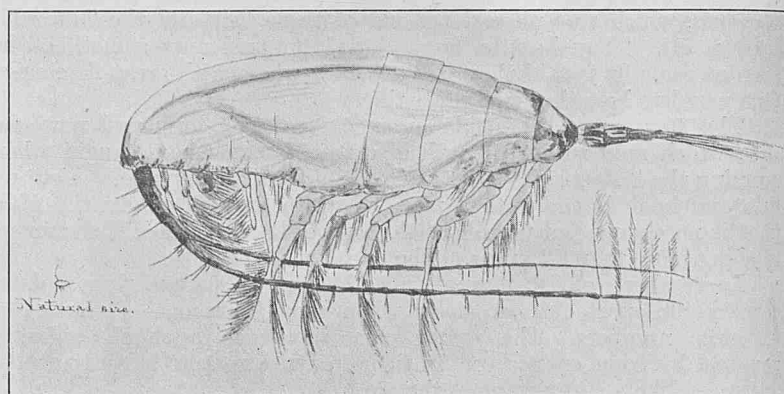
A remarkable mistake, indeed! But Mrs. TOYNBEE was in good company with Professor DANA.

The Plate of Maury’s “Sailing Directions,” referred to by Lieutenant-Commander VAN RIEL, is reproduced below, to the left; while to the right, we reproduce one of Mrs. TOYNBEE’s original drawings from Captain TOYNBEE’s log of the *Gloriana*, which loses much of its beauty due to it not being possible to reproduce it in colour.

Reproduction of Plate XXI, Fig. 14, from Maury’s “Sailing Directions,” 8th Edition, Vol. I., referred to above by Lieutenant-Commander P. M. Van Riel.



Reproduction of an original drawing, by Mrs. Toynbee, from Meteorological Log of Ship “Gloriana,” Captain H. Toynbee, with description.



5th November, 1856. “This insect was pumped from the sea by a pump which has a pipe about seven feet under water, and was drawn off into a bath. The large sketch was taken when it was lying on its side, with its horns under it; but when moving in the water the horns were at right angles to its body; it was very active and seemed to be fond of standing on the bottom, head downwards. No eyes could be distinguished; perhaps the horns act as feelers, for all the insects that we have yet found with horns have no eyes. With a high power under Mr. WRENCH’s microscope, quick vibration was visible along the back, but no cilia were to be seen, though the body was almost transparent. Its shape much resembled that of the insect formerly described as the food of the whale bird.”

THE OCEAN REGARDED AS A PASTURE.

By W. R. G. ATKINS, O.B.E., Sc.D., MARINE
BIOLOGICAL LABORATORY, PLYMOUTH.

WE are not in the least surprised to see a flock of sheep or a herd of cattle browsing on the herbage of a green pasture; the sight is one to which we have always been accustomed, and we draw the obvious conclusion that the animals live upon the plants. The sea, however, is well stocked with a variety of animals, some larger than any on the land, some microscopic, but the source of their food supply is not immediately evident. As a general rule the larger animals prey upon the smaller—though occasionally a rapacious little fish may tuck away one larger than itself in the folds of a highly distensible stomach. But this self-contained system, this living by taking in one another’s washing cannot go on indefinitely, for all animals give off a gas, carbon dioxide, as a result of the slow combustion of their cells, oxygen being taken in either in the air or dissolved in the water. No animal, however, can make use of carbon dioxide as a food, for this very staple compound is formed with the evolution of much energy, in the form of heat, and the animal has no available source of energy for its decomposition. This process of respiration, as the taking in of oxygen and the giving out of carbon dioxide is termed, would,

therefore, in time come to an end, were animals to feed solely upon animals, for the fuel supply would become exhausted.

Returning, however, to the cattle in the field, we observe that they eat, not other animals, but grasses, clovers and various plants. Green plants, however, can use carbon dioxide to build up their cells, and even though this gas exists in the air to the extent of only about 3 parts per 10,000, all the carbon compounds found in plants are derived from it.

The energy required to decompose the carbon dioxide and liberate oxygen is derived from sunlight, which those cells of the plant which contain the green pigment are able to utilise. The first readily recognised result of this process is the formation of a sugar in the plant, and the process is termed photosynthesis—a putting together by means of light. This is the reverse of respiration, though plants respire just as do animals. In sunlight, however, the two processes are going on together and photosynthesis predominates, so that the net result is a withdrawal of carbon dioxide from the air.

Plants, however, require not only carbon compounds, but com-

pounds of nitrogen also. The gas, nitrogen, constitutes roughly four-fifths of the air, but plants are unable to make use of it. It has to be prepared for them and converted into salts of nitric acid nitrates, and compounds containing ammonia, by certain kinds of bacteria found in the soil and in nodules on the roots of clovers.

The other elements required for plant growth are absorbed, along with the nitrogen compounds, from the moisture in the ground, by means of the fine hairs with which the tips of the roots are covered. Among these elements are phosphorus, but not in its free state—in which it is a deadly poison—but combined to form phosphoric acid; this when mixed with lime forms the salt calcium phosphate, the chief constituent of bone.

A crop therefore may fail on account of the lack of any one essential element in sufficient amount. Thus insufficient light leads to a lack of carbon compounds; an inadequate supply of nitrogen compounds may be, and is often, the condition which limits the growth of a crop, this, of course, can be remedied by applying a suitable manure. In some cases manuring with nitrogenous compounds has no effect, for the lacking element has not been nitrogen but phosphorus; dressing with "superphosphate" or "basic slag," both of which contain phosphates, leads in such instances to an increased crop.

There is, therefore, a cycle on the land, the animals eat the plants and give out carbon dioxide, also nitrogenous and other waste products. These the plants build up again, deriving the necessary energy from sunlight.

Turning now to the sea, it is found on closer examination that in a general way the relations between plants and animals are precisely the same, all the animals in the sea are directly or indirectly dependent upon plants for their food, and the plants are dependent upon sunlight. Sea water, however, does not strike one as particularly nutritious, nor is the existence of an adequate amount of vegetation at all obvious. It is true that our coasts are fringed with sea-weeds, and these together with that strange plant, the green ribbon grass or *Zostera* of the mud flats and shallow bottoms—a landplant with true flowers which has adopted a submarine existence—do provide a considerable amount of food for the smaller animals which live among them. But compared with the area of the oceans these coastal zones are of but minor significance. In the ocean waters plants exist in quantity, but in size they are microscopic. Of these, there are two principal classes, the diatoms—which are usually very minute, brownish green in colour and enclosed in two delicate valves made of silica, some like pill boxes, some rectangular and elongated, others again boat-shaped—and the peridinians so called because they have a groove running round an outer covering of vegetable matter, consisting of a number of minute plates; these also contain green and other colouring matters, and are in general rather larger than the diatoms. Such plants are collected for examination by means of silk nets, having in the usual set of four nets, 26, 50, 100 and 180 strands per inch. The diatoms and peridinians, together with minute green flagellates are found mainly in the 100 and the 180 strand nets, while the 26 and 50 nets contain animals almost entirely. Very minute diatoms and peridinians which pass even the finest of these nets may be obtained by the use of a centrifuge.

It is not at all easy to get an estimate of the quantity of this minutely divided plant food stuff present in any given volume of water, because there is no way of measuring exactly how much water is passed through the nets, and if resort is had to the centrifuge there is always a certain amount of silt and miscellaneous debris which is thrown down along with the diatoms. Furthermore, successive hauls in the same region show that the microscopic plankton may vary considerably in amount from place to place. Recourse may, however, be had to chemical methods, for the water of the sea is fairly uniformly mixed so far as that at the same depth is concerned.

It has been mentioned that all green plants can use carbon dioxide to form sugars when supplied with energy by sunlight. Carbon dioxide when dissolved in water forms a weak acid, carbonic acid, consequently, when it is withdrawn by plants from the sea, the water becomes more alkaline. The change is small, but it can be accurately measured by adding to the sea water an appropriate indicator, which is yellow in acid or neutral solutions and red in alkaline. This indicator is always red in the water of the open sea, but becomes yellow when added to the water of an aquarium which is stocked with far more animals than is an equal volume of the sea. It is found, moreover, that the indicator is a deeper red near the surface—and down to 15 or 20 metres in calm summer weather—than it is at the bottom. It is also a deeper red in spring and summer than in winter. This

indicates that the plants are more active at those seasons when the light is brightest, in the regions round the British Isles be it understood, for in the tropics such seasonal changes are less marked. Measurements made in this manner have shown that considering this change as it affects the water down to a depth of about eighty metres off the Cornish coast in the English Channel, about one kilogram of sugar is formed by the plants which occupy the column of water under an area of four square metres. This value was arrived at as a minimum, under the conditions prevailing in the autumn when the water has become thoroughly mixed from surface to bottom. The temperature is then uniform throughout the column. The amount, one kilogram per four square metres may not seem large, but it amounts to 250 metric tons per square kilometre. It represents only the gain for the season, for while the plants have been withdrawing carbon dioxide the animals have been putting it back into the sea—and this they continue to do throughout the winter, so that by the following spring the sea water is no more alkaline than it was the previous year.

It is noticeable, however, that the process of removal of carbon dioxide attains its maximum, as shown by the alkalinity of the water, quite early in the summer. This is partly because the increase in the animals in the sea, the smaller ones of which feed on the microscopic plants and the larger ones in turn upon the smaller ones, are giving out this gas more rapidly as they increase in numbers and because their rate of respiration also increases as the sea warms up. It is not at all due to the fact that the sea water has no more carbon dioxide available, for in rock pools and in certain fresh water ponds the water is found to become far more alkaline, denoting the withdrawal of more carbonic acid. Something, however, seems to limit the increase in the number of the diatoms, peridinians, &c., and this had been found to be the lack of phosphates in the sea water. Phosphates are normally present in winter only to the extent—when reckoned conventionally as phosphorus pentoxide—of about forty milligrams per cubic metre, or forty parts per thousand million. In summer, however, the surface water is almost absolutely stripped of phosphate, and the bottom water at 70 metres about 20 miles out from Plymouth contains only about ten milligrams per cubic metre. FIGURES 1 and 2 show these seasonal changes in phosphate content at the International Hydrographic Station, E. 1, 10 miles S.W. of the Eddystone, during the years 1923 and 1924. When the phosphate is all used up no further increase in the microscopic plants is possible, for this substance is an essential for their growth. A little phosphate is being rendered available all the time through the excretion of animals and through the decomposition of both animals and plants. Gradually, as the light energy diminishes these down-grade processes predominate, so that by about mid-winter the phosphate cycle is completed and the water contains approximately as much as it did the previous winter.

Now, taking an average value for the phosphorus content of these minute plants, and knowing the annual consumption, it is possible to calculate the weight of the crop. No exact figures are available for diatoms, &c., but taking that for brown sea weeds—which is closely the same as that for the green leaves of land plants—the value is 0.15 per cent. of phosphorous pentoxide, reckoned on the wet weight. Now, from the phosphate—depth curve for Station E. 1—it has been found that by July the water has given up approximately 30 milligrams of the pentoxide per cubic metre, averaged down to 70 metres. The exact figures were 29.6 for 1923 and 28.3 for 1924. Taking the round number, 30, the consumption down to 70 metres is 2.1 grams, which represents only 0.15 per cent. of the crop, which is therefore 1.4 kilograms, wet weight per column of water one square metre in area, or 1,400 metric tons per square kilometre. Taking approximate values for the amount of sugar and similar carbon compounds in these algae the figure agrees well with that found from the measurements of the change in alkalinity.

It may be seen, therefore, that at Station E. 1 there is insufficient sunlight in winter to enable the plants to use all the phosphate, and in summer there is insufficient vertical mixing of the water for an appreciable amount of phosphate still remains in the deeper water. Analyses made on water from other stations has shown that deep water may act as a reservoir of phosphate, but that this may remain unused unless brought up to within about 20 metres of the surfaces where the light is adequate for plant growth. Thus off the coast of Norway, well out in the North Sea, water at 280–150 metres had 39–37 milligrams of phosphorus pentoxide per cubic metre on March 22nd, whereas surface water had 22, and at 20 metres 28 milligrams were found. On May 6th, however, the deep water had 36 milligrams and the surface only 14 milligrams. In shallower water in the North

Sea, 43 metres to bottom, surface and bottom had 14 milligrams alike, so that owing to the mixing there had been a more complete utilisation of the phosphate of the water column; since the plants are responsible for this withdrawal of phosphate there is obviously more food available for the smaller animals—and consequently for fish—where vertical mixing of the water takes place. This is quite in keeping with the known facts that the great fisheries are in the shallow seas or around the banks in the oceans—for the currents meeting banks lead to turbulent flow and upwelling. Thus many trawlers visit the coast of Morocco, shown in the paper by Lieutenant LUMBY in the *MARINE OBSERVER*, Vol. II, No. 16, April 1925, pp. 50, 52, 53, as a region of upwelling. Very little is known, however, about these vertical movements. They may always be suspected where for no very obvious

reason, such as the encountering of a polar stream, the temperature of the water is a degree Centigrade or more colder than is to be expected. This is well illustrated by the curve in the 20° C. isotherm shown in FIGURE 1 of Lieutenant LUMBY's paper previously mentioned.

Much more work remains to be done in the direction of correlating phosphate consumption and productiveness of fisheries. It would be of especial interest to get samples from high latitudes during the winter, more particularly as it is suspected that the darker days lead to a more pronounced phosphate cycle just as other seasonal changes are more noticeable. Samples, best taken in soda water bottles or spring clip milk bottles, would also be of interest from the region of Labrador at any time of the year.

Seasonal Changes in the Phosphate Content of Sea Water at Station E1, Surface.

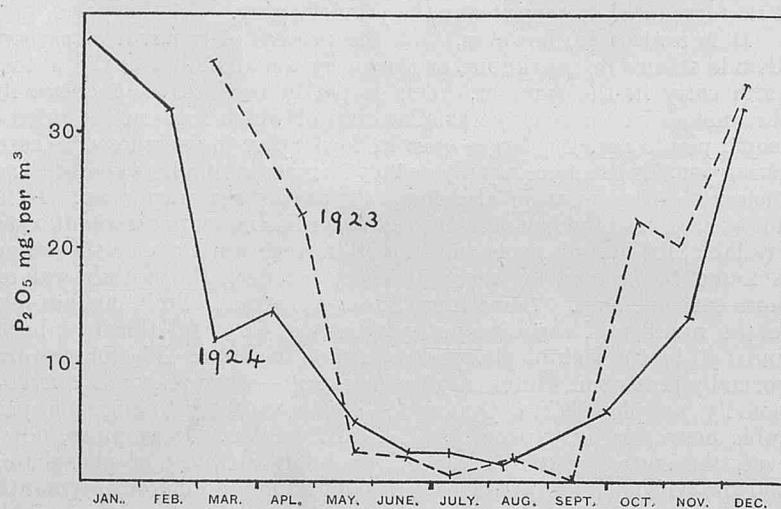


FIG. 1.—The ordinates denote phosphate, shown as milligrams of P_2O_5 per cubic metre of water. The abscissæ are months during 1923 and 1924.

Seasonal Changes in the Phosphate Content of Sea Water at Station E1, Bottom, 70 metres.

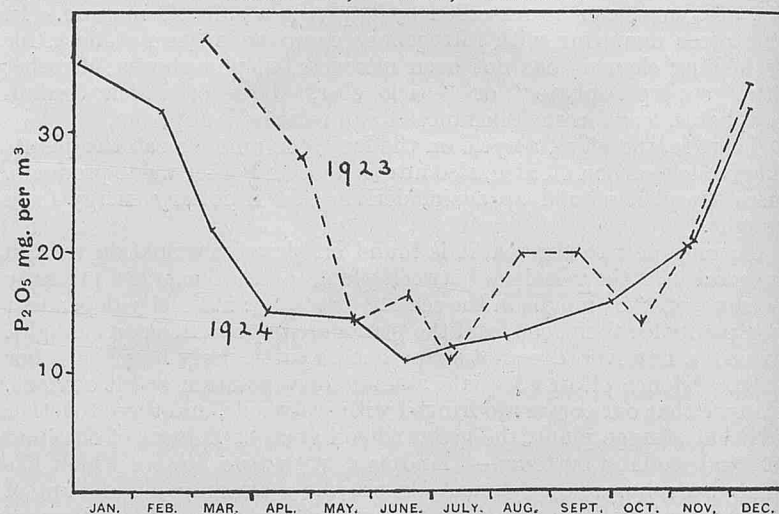


FIG. 2.—The ordinates denote phosphate, shown as milligrams of P_2O_5 per cubic metre of water.

CURRENTS ON THE TRACK FROM THE LATITUDE OF CAPE BLANCO TO THE BRAZILS.

(Continued.)

With the charts of the four quarters now all published it is possible to examine the currents on the Coast of Brazil and to see if any conclusions can be drawn from the behaviour of the water as to the causes at work to produce its circulation. For simplicity it is proposed to divide the coast into the regions (i) from C. St. Roque to Latitude 10° S., (ii) Latitude 10° S. to Abrolhos, (iii) Abrolhos to C. Frio, (iv) C. Frio to Rio Grande de Sul, (v) Rio Grande do Sul to Lobos I.

First to sketch the winds of this coastal region. They are governed at least as far as Latitude 30° S. by the South Atlantic high-pressure system and the comparative low pressure over the South American continent. The difference of atmospheric pressure over the ocean and the continent is largely due to the greater facility with which the continent absorbs and radiates heat and therefore the difference is most pronounced in the summer. Accordingly comparing the months of June and December it is seen that the following changes take place in the winds of the regions described above.

In Region (i) in both seasons the South-East Trade blows home to the shore, but there is a tendency for it to draw more to the eastward in December, more to the southward in June.

In Regions (ii) and (iii) in June the wind is from the south-east, but in December, owing to the increased difference of atmospheric pressure over land and sea the South-East Trade turns eastward round the anti-cyclone and eventually becomes the North-East monsoon of the Brazil Coast.

In Regions (iv) and (v) there is a decided tendency for the wind to blow up or down the coast from N.E. or S.W. with a preponderance of north-easterly winds in Summer.

It will be necessary to recapitulate the theory of ocean currents in neighbourhood of coasts in order to see how far it is corroborated

by the present charts.

In the open ocean a wind blowing over the water sets up a current flowing in the same general direction as the wind but at an angle of 45° to the right in the Northern Hemisphere and 45° to the left in the Southern Hemisphere. While this is true of the surface water it is not true of the total flow of water down to the depth to which current extends. The total flow is directed at right angles to the wind to the right in the Northern, to the left in Southern Hemisphere. To take a concrete example, if far from land in the Southern ocean the wind is westerly, it is causing water to flow to the northward between the surface and a depth of some hundred fathoms, though actually at the surface the current may be observed setting to north-eastward.

Now suppose the wind is blowing over a straight coast-line. If it is blowing direct on shore or off shore it does not raise or lower the water level; but if it is blowing up and down the coast-line it will produce the greatest differences of level. For instance, in the Southern Hemisphere if the coast line lies to the left of an observer facing the wind, the water will be drawn away from the coast, if on his right the water will be piled up on the coast. This piling up or drawing away of water will produce currents in addition to those directly due to friction of the wind on the water. In general the presence of a coast-line will tend to make the current flow more swiftly, and also flow more nearly with the wind than it would in the open ocean.

In passing it may be noted that the current due to piling up or drawing away of water is formed more slowly than that due directly to wind, but it tends to persist for a longer time after the wind has fallen light or changed its direction.

With this outline of the effect of wind on current in mind it will be seen that the results obtained on the charts are essentially in

agreement with theory.

From C. St. Roque to Latitude 10° S. during June there is more piling of water on the coast than in December and therefore the current tends to set more rapidly to the northward in the Winter than in the Summer, as is shown to be the case by FIGURE 5.

From Latitude 10° S. to Abrolhos Rocks where the track lies up to 100 miles from the land the change in direction of the wind from season to season changes the direction of the current correspondingly, but does not increase its velocity to anything like the extent that it does from Abrolhos Rocks to C. Frio where the track again lies nearer to the land, see FIGURE 6. In this case, however, the wind in Summer tends to draw water away from the coast so that in that season the southerly component is increased. From C. Frio to Rio Grande do Sul there is not very much variation from season to season, while between Rio Grande do Sul and Lobos Island a north-easterly current predominates in Winter and a south-westerly current in Summer, when north-easterly winds are prevailing.

It seems that the north-easterly current is an inshore counter current felt by ships as they close the land to make Lobos Island. This supposition is strongly confirmed by the CHARTS OF SEA SURFACE TEMPERATURE (CHARTLETS B AND C FOR JUNE AND DECEMBER). The tongue of warm water brought down by the Brazil Current and

the strip of cold water close inshore are well shown. The Brazil current is primarily caused by the north-easterly winds drawing away water from the coast and causing a slight slope of the ocean downwards towards the land as explained above with a consequent increased S.S.W. set, but close inshore, the drawing off of surface water to eastward will cause a raising of cold water from the depth of the ocean and so creates the strip of cold water seen on the chart. But why should this cold water flow to the northward?

It is a noticeable feature on the charts of the oceans that there is a marked tendency for a strong poleward flowing current to be generated on the western sides of the oceans just where the winds blowing around the permanent anti-cyclones turn towards the pole and so round into the Westerlies. In each case also there is a cold current running quite close inshore in a reverse direction, the most obvious examples being the cold N.E. inshore current running between the Aghullas Current and the South African Coast and the cold S.W. inshore current running along the coast of the Eastern United States of N. America. The coldness of their waters is undoubtedly due to the action of the wind in pumping up cold water from beneath, but in our present state of knowledge it does not appear to be possible to assign a definite reason for the inshore counter current.

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

X.—October.

WITH the movement of the sun south, the waters of the North Indian Ocean and adjacent land masses are losing heat while the reverse is happening in the Southern Hemisphere, consequently the distribution of atmospheric pressure and winds are undergoing changes, making the month of October as in April, one of transitional conditions.

In the North Indian Ocean there has taken place a general increase in atmospheric pressure which is most marked north of Latitude 10° North. There are two areas of high barometer; one situated over the Red Sea, 1014 mb. (29.94 in.) decreasing in a south-easterly direction, the other situated over the Chinese Provinces 1016 mb. (30.00 in.) decreasing in a south-westerly direction.

This distribution of pressure causes an irregular and shallow area of comparatively low pressure, 1010 mb. (29.83 in.) to cover the whole surface of the Ocean north of the Equator.

In the north of the Arabian Sea westerly winds predominate. Between Latitudes 20° and 10° N. on the eastern side of the Sea, the mean winds are northerly, N.E. in the centre of the Sea, and from N.E. to east on the western side.

Over the Bay of Bengal the winds are unsteady, but north-easterly winds predominate over the northern half and south-easterly winds over the southern half of the Bay.

Between Latitude 10° North and the Equator, the wind's direction varies between N.W. and S.W. excepting in the vicinity of the African coast where south-easterly winds predominate.

The mean strength of the winds over the Northern Ocean is force 3, calms not being infrequent.

In the South Indian Ocean pressure increases in a southerly direction from the Equator to the permanent high pressure system, 1022 mb. (30.18 in.) which is receding south, and this month shows two distinct centres; one situated in about Latitude 32° S., Longitude 56° E. and the other in about Latitude 31° S., Longitude 88° E.

The difference in normal pressure over the South Indian Ocean this month is 12 mb. (.35 in.) the same as that of the preceding month.

Between Latitudes 25° South and 5° South and the Longitudes of the west coast of Australia and the east coast of Madagascar, the S.E. trade wind blows steadily with mean force varying between 2 and 4. West of the 60th meridian the trades extend up to the Equator. Off the S.E. coast of Madagascar the prevailing wind is from the N.E. East of the 60th meridian between the Equator and Latitude 5° S. there are light to moderate variable winds, calms not being infrequent, especially near the coast of Sumatra.

South of the trade wind area there is a belt of variables in which the winds not infrequently attain Gale force.

In the Mozambique Channel the wind is variable, both in direction and force.

Cyclonic Storms. In the Arabian Sea during the years 1890–1912, ten storms were recorded in this month, giving a percentage frequency of 21 per cent, making the month of October, like June, one of maximum frequency.

Some of the storms form over the Arabian Sea itself while others enter the sea after crossing the Peninsula from the Bay of Bengal. Their general direction of travel is to the W.N.W. and may be either of great or little intensity.

Bay of Bengal. Storms are a little less frequent in the Bay during this month than in the four preceding months. In the years 1877–1923 fifty-three storms were reported, giving a percentage frequency of 14 per cent.

They originate between Latitudes 10° and 15° N. and are generally severe, following such varied paths that any portion of the Bay may be visited. See Chart giving tracks of the above storms in Vol. I, No. 10, of this Journal.

South Indian Ocean. Cyclonic storms are very infrequent in the South Indian Ocean during this month, only seven storms being recorded during the seventy years 1848–1917, a percentage frequency of one per cent.

Air Temperature. In the Arabian Sea the normal air temperature for the month is about 79° F. on the western side, and about 81° F. over the centre and eastern side of the Sea. Over the Bay of Bengal the temperature ranges from 83° F. in the north to 81° F. in the south, and is a little lower on the eastern than on the western side.

Between the parallels of 10° N. and the Equator, east of the 60th meridian, the average temperature is 81° F. West of the 60th meridian it ranges from 80° to 78° F. Between the Equator and Latitude 5° S. the normal temperature is about 80° F., whence it gradually decreases with increased latitude and is about 60° F. in Latitude 35° S.

Sea Surface Temperature. On the eastern side of the Arabian Sea the normal sea surface temperature for the month is about 82° F. Over the central area of the sea it is about 81° F. and on the western side it is about 79° F.

In the Bay of Bengal the normal temperature is 84° F. in the north, and 83° F. in the south of the Bay.

Between the parallels of 10° North and South, east of the 60th meridian, the normal sea surface temperature is about 82° F. Between the same parallels west of the 60th meridian it varies between 81° F. and 78° F. From Latitude 10° South, temperature gradually decreases with increased latitude and is about 60° F. in Latitude 35° South.

Currents. In the South Indian Ocean, south of the 20th parallel, the currents are irregular, but the general set is in a north-easterly direction which gradually turns to the westward and mingling with the S.E. trade drift flows in that direction between the 20th and 6th parallels. On reaching the East coast of Madagascar an offshoot of the S.E. trade drift sets down and rounds the south point of Madagascar while the main body of the stream flowing north of the island strikes the African coast in the vicinity of Cape Delgado, where it divides and flows up and down the African coast.

The stream setting down and keeping parallel with the coast runs steadily on around the Cape forming the Agulhas current.

Over the centre and eastern side of the Mozambique Channel the general set of the current is in a north to north-east direction. Between the Equator and Latitude 6° South, east of the 50th meridian, the current sets in an easterly direction. West of the 50th meridian it

flows to the N.W., turning to N.E. on meeting the set up the African coast.

North Indian Ocean. The current flowing up the African coast passes between Cape Guardafui and Sokotra, and separates in the Gulf of Aden, one branch setting S.W. into the Red Sea and the other N.E. into the Arabian Sea. In the Arabian Sea the currents are complicated; over the north and east of the Sea the set is to the south. In the centre of the Sea, S.W.; and on the western side the currents are confused.

In the Bay of Bengal the currents follow the coast in an anti-clockwise direction, but are irregular over the centre of the Bay.

On the eastern side the set is to the north. At the head of the Bay, west, on the western side south, and in the south of the Bay, east. Between the parallels of 6° North and South, east of the 50th meridian, the current sets in an easterly direction.

WEATHER SIGNALS.

II. WIRELESS WEATHER BULLETINS.

CANADA, NOVA SCOTIA, NEWFOUNDLAND AND LABRADOR, ETC.

(Spark Issues.)

THE following stations transmit the weather forecasts issued by the Canadian Meteorological Service, the wavelength used being 600 metres (spark) in all cases. Where the times of transmission are omitted forecasts are sent on request without charge. Stations marked with an asterisk (*) are open during the season of navigation only.

Country.	W/T Station.	Call Sign.	Position (approx.)		Time, G.M.T.
			Lat. N.	Long. W.	
Canada (Nova Scotia).	†Lurher Lt. Vsl. ...	VDR	43 49	66 32	—
	Cape Sable ...	VCU	43 23	65 37	0200, 1400
	Camperdown ...	VCS	44 31	63 33	—
	North Sydney ...	VCO	46 13	60 15	—
	Sable Island ...	VCT	43 56	60 02	—
Canada ...	Grindstone Island ...	VCN	47 23	61 54	—
	*Fame Point, Que. ...	VCG	49 07	64 36	0145, 1345
	*Clarke City, Que. ...	VCK	50 11	66 37	—
	*Father Point, Que. ...	VCF	48 31	68 28	—
	Grosse Island, Que. ...	VCD	47 02	70 40	—
	Quebec ...	VCC	46 48	71 12	—
	*Montreal ...	VCA	45 34	73 38	—
	*Heath Point Lt. Vsl. (Anticosti I.)	VCI	49 03	61 30	—
	Canada (New Brunswick).	VAR	45 14	66 03	—
Newfoundland and Labrador.	Belle Isle ...	VCM	51 53	55 22	0230, 1430
	Cape Race ...	VCE	46 39	53 04	0215, 1415
	Point Amour ...	VCL	51 27	56 50	—
St. Pierre and Miquelon Is.	St. Pierre ...	HYS	46 46	56 11	1100, 1600, 2300

† The station keeps watch for the first half of every odd hour from 1200 to 0000, and from 0300 to 0330, G.M.T.

BRITISH COLUMBIA.

(Spark Issues.)

THE following W/T stations in British Columbia transmit weather forecasts issued by the Canadian Meteorological Service to any ship upon request.

The hours of service are from 0000–1200 G.M.T. and the wave length used is 600 metres spark in all cases.

W/T Station.	Position (approx.)		Call Sign.
	Latitude.	Longitude.	
Digby Island - - -	54° 17' N.	130° 23' W.	VAJ
Dead Tree Point - - -	53° 21' N.	131° 56' W.	VAH
Bull Harbour - - -	50° 55' N.	127° 56' W.	VAG
Alert Bay - - -	50° 35' N.	126° 56' W.	VAF
Cape Lazo - - -	49° 42' N.	124° 53' W.	VAC
Estevan - - -	49° 22' N.	126° 32' W.	VAE
Point Grey - - -	49° 16' N.	123° 15' W.	VAB
Gonzales Hill (Victoria) - - -	48° 25' N.	123° 19' W.	VAK

UNITED STATES OF AMERICA (PACIFIC COAST, ETC.).

(C. W. Issues.)

San Francisco, California, W/T Station approximate Latitude 37° 39' N., Longitude 122° 23' W., call sign NPG, broadcasts weather bulletins twice daily as follows:—

At 0330 G.M.T. on a wave length of 7,000 metres (C.W.)
and 1700 G.M.T. " " " 7,000 " "

The bulletins commence with the letters USWB (U.S. Weather Bureau) and are divided into two parts.

Part I, in code, consists of surface weather conditions and upper air data, the former being based upon observations taken at 0100 and 1300 G.M.T., except as follows, where the observation times do not synchronise.

Alaskan observations are taken at 0500 and 1700 G.M.T.

Honolulu observations at 0630 and 1830 G.M.T.

Guam, Manila, China and Japan observations at 2200 G.M.T.

Weather reports from ships in the North Pacific Ocean follow the reports from land stations in Part I. Ships' observations taken at 0000 G.M.T. being broadcast in the 1700 G.M.T. bulletin and those taken at Noon G.M.T. being broadcast in the 0330 G.M.T. bulletin.

Part II, in plain language, consists of a summary of general atmospheric pressure distribution over land and sea, including the locations of "high" and of "low" areas, and the barometer readings at their centres; wind and weather forecasts for Pacific Offshore areas; storm warnings for these areas; and flying weather forecasts for each of three aviation zones. (See CHARTLET, page 167.)

First Part.

Indicator Letters and Stations.

Indicator Letters.	Station.	Position (approx.).	Latitude.	Longitude.
Alaska.				
*NM	- Nome	- - - - -	64° 50' N.	167° 20' W.
*SPI	- St. Paul	- - - - -	57° 02' N.	170° 30' W.
*DH	- Dutch Harbour	- - - - -	53° 53' N.	166° 32' W.
*TN	- Tanana	- - - - -	65° 00' N.	151° 40' W.
*EA	- Eagle	- - - - -	64° 50' N.	140° 50' W.
*KD	- Kodiak	- - - - -	57° 40' N.	152° 30' W.
*CV	- Cordova	- - - - -	60° 35' N.	145° 40' W.
*JU	- Juneau	- - - - -	58° 18' N.	134° 25' W.
*SK	- Sitka	- - - - -	57° 03' N.	135° 20' W.
Canada.				
*ED	- Edmonton, Alberta	- - - - -	53° 32' N.	113° 05' W.
*KA	- Kamloops, B.C.	- - - - -	50° 48' N.	120° 03' W.
*CY	- Calgary, Alberta	- - - - -	51° 00' N.	114° 00' W.
*SC	- Swift Current, Sask.	- - - - -	50° 30' N.	107° 45' W.
*PR	- Prince Rupert, B.C.	- - - - -	54° 15' N.	130° 21' W.
United States, &c.,				
TAT	- Tatoosh I, Wash.	- - - - -	48° 23' N.	124° 44' W.
†SE	- Seattle, Wash.	- - - - -	47° 38' N.	122° 25' W.
NH	- North Head, Wash.	- - - - -	46° 18' N.	124° 05' W.
PD	- Portland, Oreg.	- - - - -	45° 31' N.	122° 31' W.

Indicator Letters.	Station.	Position (approx.).	
		Latitude.	Longitude.
<i>United States, &c.—cont.</i>			
RO	- Roseburg, Oreg.	- 43° 11' N.	123° 10' W.
EUR	- Eureka, Calif.	- 40° 42' N.	124° 16' W.
RB	- Red Bluff, Calif.	- 40° 10' N.	122° 10' W.
SM	- Sacramento, Calif.	- 38° 32' N.	121° 30' W.
†SF	- San Francisco, Calif.	- 37° 50' N.	122° 30' W.
FN	- Fresno, Calif.	- 36° 10' N.	119° 50' W.
SLO	- San Luis Obispo, Calif.	- 35° 08' N.	120° 43' W.
*PAR	- Point Arguello, Calif.	- 34° 35' N.	120° 38' W.
LA	- Los Angeles, Calif.	- 33° 42' N.	118° 15' W.
†DI	- San Diego, Calif.	- 32° 42' N.	117° 15' W.
SPO	- Spokane, Wash.	- 47° 40' N.	116° 41' W.
*WW	- Walla Walla, Wash.	- 46° 08' N.	118° 50' W.
BA	- Baker, Oreg.	- 45° 00' N.	117° 30' W.
HL	- Helena, Mont.	- 46° 10' N.	111° 50' W.
BS	- Boise, Idaho	- 43° 40' N.	116° 00' W.
LD	- Lander, Wyo.	- 41° 40' N.	108° 40' W.
WM	- Winnemucca, Nev.	- 40° 50' N.	118° 10' W.
R	- Reno, Nev.	- 39° 20' N.	119° 50' W.
SLC	- Salt Lake City, Utah	- 40° 45' N.	111° 40' W.
MD	- Modena, Utah	- 37° 30' N.	113° 50' W.
*DV	- Denver, Colo.	- 39° 48' N.	105° 05' W.
GJ	- Grand Junction, Colo.	- 39° 10' N.	108° 20' W.
SA	- Santa Fe, N. Mex.	- 35° 39' N.	106° 02' W.
*PH	- Phoenix, Ariz.	- 33° 00' N.	112° 00' W.
YU	- Yuma, Ariz.	- 32° 46' N.	114° 38' W.
*HO	- Honolulu, Hawaii	- 21° 18' N.	157° 52' W.
*MDI	- Midway Island	- 28° 15' N.	177° 22' W.
*FMA	- Manila P.I.	- 14° 35' N.	120° 52' E.
*FGM	- Guam.	- 13° 32' N.	144° 53' E.

China and Japan, etc.

*FHO	Hong Kong, China	22° 13' N.	114° 16' E.
*FSH	Shanghai, China	31° 15' N.	121° 30' E.
*FBI	Bonin Island	27° 05' N.	142° 11' E.
*FKO	Koshun, Formosa	25° 08' N.	121° 45' E.
*FNA	Naha, Japan	26° 13' N.	127° 41' E.
*FKA	Kagoshima, Japan	31° 34' N.	130° 33' E.
*FTO	Tokio, Japan	35° 39' N.	139° 45' E.
*FNE	Nemuro, Japan	43° 20' N.	145° 35' E.

* Cloud reports not included.

† Upper air observations from these stations included in bulletins.

The stations are indicated by one or more key-letters which are followed by one or more 5-unit groups of figures. Additional groups containing upper air data are included only in the reports from stations marked with a dagger (†).

The letter "X" will be substituted for any missing or unavailable data.

Explanation of Groups.

First Group.—1st three figures give the barometer reading corrected, in inches and hundredths, the first figure (2 or 3) being omitted. (To convert to millbars, see Table L, p. 151. September 1925, MARINE OBSERVER.)

4th figure gives the wind direction. (Table XLV, p. 151. September 1925, MARINE OBSERVER.)

5th figure gives the wind force by Beaufort scale. The letters W (Whole gale), S (Storm), H (Hurricane), being used for forces 10, 11 and 12 respectively.

Second Group.—1st figure gives the present weather (State of weather at surface). (Table XLVI, p. 151. September 1925, MARINE OBSERVER.)

2nd figure gives the barometer change in hundredths of an inch during the two hours preceding observation. (Table XLVII, p. 151. September 1925, MARINE OBSERVER.)

3rd figure gives the past weather during the preceding 12 hours. (Table LI.)

4th and 5th figures give the air temperature in degrees F.

Third Group.—1st figure gives the prevailing upper clouds. (Table LII.)

2nd figure gives the direction of upper clouds. (Table XLV, p. 151. September 1925, MARINE OBSERVER.)

3rd figure gives the prevailing lower clouds. (Table LIII.)

4th figure gives the direction of lower clouds. (Table XLV, p. 151. September 1925, MARINE OBSERVER.)

5th figure gives the amount of lower clouds. (Table XLVIII, p. 151. September 1925, MARINE OBSERVER.)

Cloud reports are not received from Alaskan, Canadian, foreign and some U.S. Stations. (See list of indicator-letters and stations.)

Remaining groups if sent refer to upper air observations; they are included in five groups and have identifying numbers 4 to 8, inclusive.

Ship reports are included in the first part of the bulletin immediately following the land stations. They are included in two groups, preceded by the call letters identifying the ship. The first group consists of five numerals, signifying the ship's position, and the second group of five numerals expressing the barometric pressure, wind direction and force. In the group giving the ship's position (to the nearest degree), the first two numerals express the latitude (north) and the last three the longitude (west).

Second Part.

The second part of the bulletin is in plain language and consists of a summary of general pressure distribution; wind and weather forecasts for ocean zones (see CHARTLET below); storm warnings (see p. 169), and flying forecasts by zones (see CHARTLET below).

Period covered by Forecasts.

In 0330 G.M.T. bulletins:

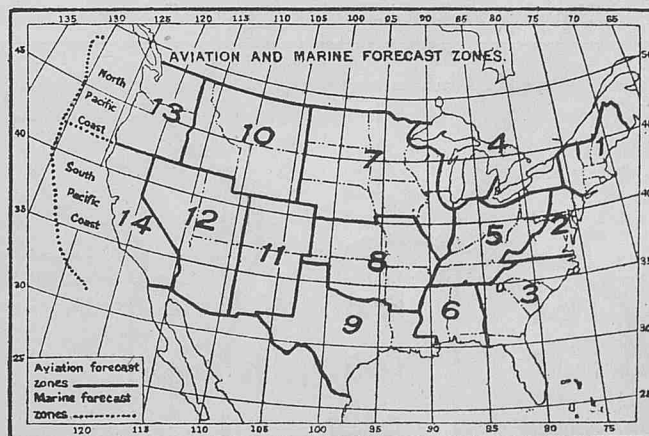
Wind and weather forecasts; 24 hours, beginning at 0800 G.M.T.

Flying weather forecasts; 12 hours, 0800 G.M.T., until 2000 G.M.T.

In 1700 G.M.T. bulletins:

Wind and weather forecasts; 24 hours beginning at 2000 G.M.T.

Flying weather forecasts; 12 hours, 2000 G.M.T., until 0800 G.M.T.



San Francisco W/T Station also transmits a report of the weather conditions in the Bonita Channel, every four hours, commencing with 0000 G.M.T. The report is sent enclair. Wave length, 2,607 metres (C.W.).

Weather Bulletins from Light Vessels, U.S.A. Pacific Coast. (Spark Issues.)

The W/T stations on board the following light vessels broadcast reports pertaining to existing weather conditions in the immediate vicinity at the times stated.

The wave length used is 600 metres (spark) in each case.

W/T Station.	Position (approx.).		Call Sign.	Time of Transmission G.M.T.
	Latitude.	Longitude.		
Umatilla Reef Lt.V.	48° 10' N.	124° 51' W.	WWBP	0000, 0400 1600, 2000
Blunts Reef Lt.V., Calif.	40° 26' N.	124° 30' W.	WWBU	0400, 1600 2000
San Francisco, Lt.V.	37° 45' N.	122° 42' W.	WWBV	0400, 1600 2000

The information is also transmitted on request.

NOTE.—Weather reports will not be furnished when the W/T fog signal is in operation at Blunts Reef and San Francisco Light Vessels. Ships are requested not to ask for weather reports during such periods.

UNITED STATES OF AMERICA CARIBBEAN SEA, GULF COAST AND WEST INDIAN ISLANDS.

WEATHER bulletins are broadcast from the undermentioned W/T stations. They are of the same general character and can be similarly decoded. They are based upon observations taken in the U.S.A. at 0100 and 1300 G.M.T., and one hour earlier at stations in the Gulf of Mexico and Caribbean Sea as indicated. The bulletins are divided into two parts.

Explanation of bulletins.

Part I contains reports in code of barometer pressure wind direction and force at certain stations each of which is denoted by one or more indicator letters, and using a group of five figures to represent the data contained in the report, viz. :—

1st, 2nd and 3rd figures of group give the corrected barometer reading in inches and tenths, the first figure (2 or 3) being omitted. (See Table L, p. 151. September 1925, MARINE OBSERVER, for conversion of ins. to mbs.)

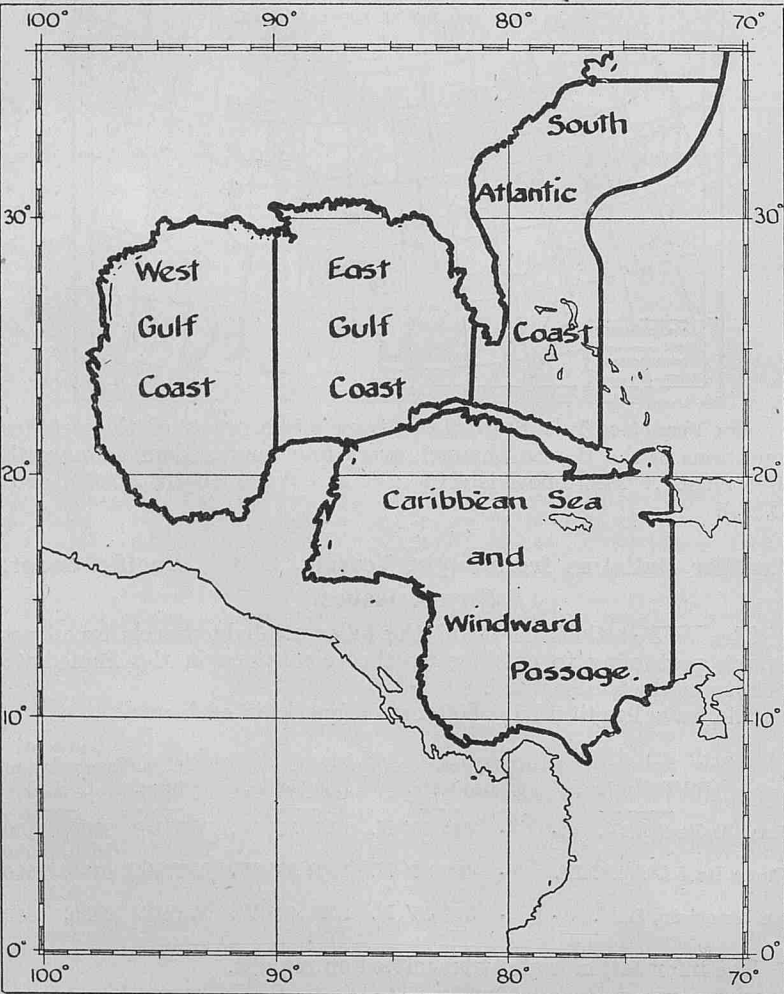
4th figure of group gives the wind direction true. (Table XLV, p. 151. September 1925, MARINE OBSERVER.)

5th figure of group gives the wind force. Forces above 9 sent as 9.

NOTE.—If observations from any station cannot be supplied, the indicator letters and data figures will be omitted altogether. If only a portion of the observations are missing the letter “X” will be sent in lieu.

Part II.—Sent in plain language, consists of wind and weather forecasts, storm and hurricane warnings for the various areas shown on the CHARTLET, and as described below.

Chartlet of U.S. Marine Forecast Areas.



W/T Stations from which the Bulletins are Broadcast.

Caribbean Sea (C.W. Issues).

Almirante—Panama—by arrangement with the United Fruit Co. (owners of the W/T station).

Approximate Latitude 9° 20' N., Longitude 82° 17' W.

Call Sign UB. Wave length 3,750 metres (C.W.).

Times (G.M.T.) of broadcast, 0445 and 1730.

At 1730 G.M.T. Part I. Observations from following stations taken at 1300 G.M.T. broadcast *only during* the hurricane season, July to November inclusive. Part II broadcast *daily throughout* the year.

Observation Stations in Part I. of Bulletin.			Part II. of Bulletin.
Indicator Letters.	Station.	Position (approx.). Lat. Long.	
SI	Swan Island -	17° 24' N. 83° 57' W.	Storm and Hurricane Warnings, see p. 169. Wind and Weather forecasts for West Gulf of Mexico. Wind and Weather forecasts for East Gulf of Mexico. Wind and Weather forecasts for Caribbean Sea and Windward Passage. <i>See Chartlet opposite.</i>
BZ	Belize, Honduras -	18° 00' N. 88° 20' W.	
TEL	Tela, Honduras -	— —	
BFD	Bluefields, Nicaragua.	12° 00' N. 83° 45' W.	
W	Willemstadt, Curaçao.	12° 10' N. 69° 00' W.	
SJ	San Juan, P.R. -	18° 28' N. 66° 06' W.	
PP	Port au Prince, Haiti.	18° 37' N. 72° 17' W.	
CFG	Cienfuegos, Cuba -	22° 11' N. 80° 33' W.	
LFE	La Fé, Cuba -	— —	
KN	Kingston, Jamaica -	18° 10' N. 76° 48' W.	
TI	Turks I., Bahamas -	21° 31' N. 71° 08' W.	

At 0445 G.M.T. Part II only of bulletin as above, based on observations taken at 0100 G.M.T., broadcast *daily throughout* the year.

The above bulletins are sent by W/T to Almirante and Swan Island W/T stations from the Tropical Radio Telegraph Station at New Orleans La., call sign WNU at 0430 and 1630 G.M.T. on a wave length of 3,331 metres (C.W.) and ships are invited to intercept them and repeat them to other ships should they so desire.

Gulf Coast and Islands. (C.W. and Spark Issues.)

Key West, Fla.—Approximate Latitude 24° 33' N., Longitude 81° 48' W. Call sign NAR. Wave lengths 5,674 metres (C.W.) and 1,463 metres (Spk). Time of broadcast 0300 G.M.T.

Observation Stations in Part I. of Bulletin.			Part II. of Bulletin.
Indicator Letters.	Station.	Position (approx.). Lat. Long.	
H	Hatteras, N.C. -	35° 14' N. 75° 32' W.	Wind and Weather forecasts for South Atlantic Coast. Wind and Weather forecasts for East Gulf of Mexico. Wind and Weather forecasts for West Gulf of Mexico. Wind and Weather forecasts for Caribbean Sea and Windward Passage. Storm and Hurricane Warnings (see p. 169.) <i>(See Chartlet opposite.)</i>
C	Charleston, S.C. -	32° 43' N. 79° 52' W.	
JA	Jacksonville, Fla. -	30° 19' N. 81° 51' W.	
MI	Miami, Fla. -	30° 35' N. 84° 13' W.	
K	Key West, Fla. -	24° 33' N. 81° 48' W.	
P	Pensacola, Fla. -	30° 21' N. 87° 19' W.	
BW	Burwood, La. -	28° 57' N. 89° 23' W.	
GV	Galveston, Tex. -	29° 19' N. 94° 48' W.	
BV	Brownsville, Tex. -	25° 53' N. 97° 26' W.	
FW	Fortworth, Tex. -	32° 30' N. 97° 40' W.	
KN	Kingston, Jam. -	18° 01' N. 76° 48' W.	
TI	Turks Island -	21° 31' N. 71° 08' W.	
HA	Havana, Cuba -	23° 10' N. 82° 22' W.	
GO	Guantanamo Bay (Cuba).	19° 54' N. 75° 12' W.	
SI	Swan Island -	17° 24' N. 83° 57' W.	
SJ	San Juan, P.R. -	18° 28' N. 66° 06' W.	

West Indian Islands. (C.W. and Spark Issues.)

San Juan P.R. (July 1 to November 15, inclusive).—Approximate Latitude 18° 28' N., Longitude 66° 06' W.

Call Sign NAU.

Times of broadcast, 0045 and 0200 G.M.T.

Wave Lengths : at 0045 G.M.T., 4,836 metres (C.W.), at 0200 G.M.T. 2,855 metres (Spk).

Observation Stations in Part I. of Bulletin.			Part II. of Bulletin.	
Indicator. Letters.	Station.	Position (approx.). Lat. Long.	Hurricane Warnings.	
SJ	San Juan, P.R.	18° 28' N. 66° 06' W.		
ST	St. Thomas, Virgin Is.	18° 23' N. 64° 55' W.		
BT	Basseferre, St. Kitts	17° 18' N. 62° 43' W.		
RS	Roseau, Dominica	15° 17' N. 61° 24' W.		
BB	Bridgetown, Barbados.	13° 09' N. 59° 35' W.		
SD	Santa Domingo, S.D.	18° 28' N. 69° 53' W.		
SL	Puerto Plata, S.D.	19° 49' N. 70° 42' W.		
LU	Castries, St. Lucia	14° 01' N. 61° 00' W.		
W	Willemstadt, Curaçao.	12° 10' N. 69° 00' W.		
PS	Port of Spain, Trinidad.	10° 40' N. 61° 30' W.		
SM	St. Martins, D. W. I.	— —		

NOTE.—This bulletin is re-broadcast by **Guantanamo, Cuba, W/T station** call sign NAW, on a wave length of 4,543 metres (C.W.) at 0200 G.M.T. during the hurricane season, July 1 to November 15 inclusive.

Special Weather Telegraphy Tables. Not New International Code.

Table L1. Past Weather.

Information concerning occurrence of thunderstorms, high winds (40 miles per hour or more) and precipitation during the preceding 12 hours.

- 1 Thunderstorm without high winds and less than .06 inch precipitation.
- 2 Thunderstorm without high winds and with .06 inch or more precipitation.
- 3 Thunderstorm with high winds and less than .06 inch precipitation.
- 4 Thunderstorm with high winds and .06 inch or more precipitation.
- 5 Precipitation less than .06 inch.
- 6 Precipitation from .06 to .16 inch, inclusive.
- 7 Precipitation more than .16 inch.
- 8 High winds without thunderstorm and without precipitation in excess of .06 inch.
- 9 High winds without thunderstorm and with precipitation in excess of .06 inch.
- 0 No precipitation or high winds.

Table L11. Upper Clouds.

- 0 1 tenth clouds or less (kind not indicated).
- 1 Cirrus or cirro-stratus moving slowly.
- 2 Cirrus or cirro-stratus moving rapidly.
- 3 Cirro-cumulus or alto-cumulus moving slowly.
- 4 Cirro-cumulus or alto-cumulus moving rapidly.
- 5 Alto-stratus moving slowly.
- 6 Alto-stratus moving rapidly.

Table L111. Lower Clouds.

- 0 1 tenth clouds or less (kind not indicated).
- 1 Strato-cumulus moving slowly.
- 2 Strato-cumulus moving rapidly.
- 3 Cumulus moving slowly.
- 4 Cumulus moving rapidly.
- 5 Stratus moving slowly.
- 6 Stratus moving rapidly.
- 7 Nimbus or cumulo-nimbus moving slowly.
- 8 Nimbus or cumulo-nimbus moving rapidly.

NOTE.—When upper and lower clouds are indicated the amount of the former can be determined approximately by the difference between the *amount of lower clouds* (fifth figure of third group) and the amount of sky obscured as shown in *state of weather* (first figure of second group).

WIRELESS STORM WARNINGS.

United States of America. (Pacific Coast.) (C.W. and Spark Issues.)

THE following W/T Stations broadcast storm warnings at the times stated or as necessary. Ships may request any of the stations mentioned to furnish the latest storm warning. The warnings are for a period of 24 hours beginning at the hour indicated in the messages.

W/T Station and position (approx.).	Call Sign.	Wave length metres.	Broad-casting Time G.M.T.	Particulars.
Seattle, Wash. - Lat. 47° 24' N. Long. 122° 37' W.	NPC	2,500 (C.W.)	0100, 0300 0400, 1300 1700, 2100	Storm Warnings.
Tatoosh, I., Wash. Lat. 48° 23' N. Long. 124° 44' W.	NPD	600	0100, 0400 1300, 1700 2100.	
North Head, Wash. Lat. 46° 18' N. Long. 124° 05' W.	NPE	2,725 (Spk.)	0130, 0430 1330, 1730 2130	Storm Warnings.
Eureka, Calif. - Lat. 40° 41' N. Long. 124° 16' W.	NPW	3,156 (C.W.)	1700	
San Francisco Calif. Lat. 37° 39' N. Long. 122° 23' W.	NPG	3,156 (C.W.) 7,000 (C.W.)	0130, 2200 0330, 1700	Storm Warnings. In second part of weather bulletin, see p. 166.
San Diego, Calif. Lat. 32° 42' N. Long. 117° 15' W.	NPL	2,607 (C.W.) 1,535 (C.W.)	0000, 0400 0800, 1200 1600, 2000 0600, 1600 2000	

United States of America (Caribbean Sea, Gulf Coast) and West Indian Islands.

(C.W. and Spark Issues.)

Storm and hurricane warnings are broadcast by the following W/T stations for the areas shown on the CHARTLET, p. 168, at the times stated or when necessary. When a storm exists that is likely to affect an area, the location and expected direction of movement of the storm centre will be given, followed by any storm or hurricane warnings and advices to shipping that have been issued.

Almirante, Panama.—Call sign UB. Wave length 3,750 metres (C.W.). Times G.M.T. 0445 and 1730.

Storm Warnings precede the wind and weather forecasts in Part II of the weather bulletins. The warnings will also contain information regarding "northers" during the winter months.

Hurricane Warnings.—Location, direction, progress and intensity of the hurricane broadcast every 2 hours.

Swan Island.—Call Sign US. Approximate Latitude 17° 24' N., Longitude 83° 57' W.

Ships are permitted to call this W/T station for weather information regarding hurricanes or "northers." The following signals are exhibited from the W/T towers to indicate that such information is in the possession of the W/T operator—

By day : a large red pendant.
By night : a red light.

Key West, Fla.—Call sign NAR. Wave lengths 5,674 metres (C.W.) and 1,463 metres (Spk.). Time G.M.T. 0300.

Storm Warnings broadcast for S. Atlantic Coast (Hatteras to Key West), and east and west Gulf Coasts, see Chartlet, p. 168.

Hurricane Warnings and advices.

San Juan P.R.—Call sign NAU. Wave lengths 4,836 metres (C.W.) and 2,855 metres (Spk.).

Hurricane Warnings and advisory messages relating thereto are broadcast when necessary or repeated at 0000, 0400, 1200, 1600, 2000 G.M.T. In the absence of a tropical storm the words "Weather Normal" will be sent each day.

Guantanamo (Cuba) - NAW—1,395 spk. } transmit hurri-
Port au Prince (Haiti) NSC—2,225 spk. } cane warnings
St. Croix } Virgin { NNI—425 spk. } when necessary
St. Thomas } Islands { NBB—1,685 spk. } and repeat them
every 4 hours.

III. WIRELESS TIME SIGNALS.

Canada.

Nova Scotia (Spark issue).

Station.	Call Sign.	Wave-length.	G.M.T.	System.
Camperdown (Halifax). Lat. 44° 31' 12" N. Long. 63° 32' 35" W.	VCS	600 sp.	h m s h m s 13 58 00-13 58 57 13 59 00 13 59 03-13 59 50 14 00 00	A dot at each second. (T.S.) A dot at each second. (T.S.)

Note.—The signals are not transmitted on Sundays.

For method of transmission of the undermentioned Time Signals, see diagram, p. 152, September, 1925, MARINE OBSERVER.

Hawaiian Islands (C.W. and Spark issues).

W/T Station.	Call Sign.	Wave length metres.	Time of Signal being made, G.M.T.	—
Honolulu, Pearl Hbr. Lat. 21° 20' 45" N. Long. 157° 57' 56" W	NPM	2,254 (Spk.) and 11,490 (C.W.)	h m s h m s 23 55 00-0 00 00	Sent daily.

United States of America. Pacific Coast.
(C.W. and spark issues.)

North Head, Wash. Lat. 46° 17' 58" N. Long. 124° 04' 30" W.	NPE	2,726 (SPK)	19 55 00-20 00 00	Sent daily.
Eureka, Calif. Lat. 40° 41' 22" N. Long. 124° 16' 10" W.	NPW	3,156 (C.W.)	19 55 00-20 00 00	Sent daily.
San Francisco, Calif. Lat. 38° 05' 03" N. Long. 122° 15' 57" W.	NPG	1,333 (C.W.)	5 55 00- 6 00 00	} Sent daily.
San Diego, Calif. Lat. 32° 42' 28" N. Long. 117° 14' 49" W.	NPL	4,836 (C.W.) 1,538 (C.W.) and 9,801 (C.W.)	19 55 00-20 00 00 19 55 00-20 00 00	

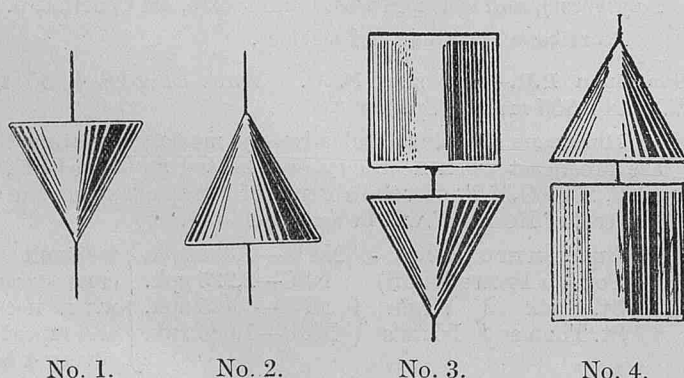
United States of America. Gulf Coast.
(C.W. issues.)

W/T Station.	Call Sign.	Wave length metres.	Time of Signal being made G.M.T.	—
New Orleans - Lat. 29° 56' 50" N. Long. 90° 02' 18" W.	NAT	2,607 (C.W.)	h m s h m s 16 55 00-17 00 00	Sent daily.
Key West - Lat. 24° 33' 22" N. Long. 81° 48' 21" W.	NAR	1,463 (C.W.)	16 55 00-17 00 00	"Lag" of Key West time signal is 0.28 second.

IV. VISUAL STORM WARNINGS.

Canada.

By Day.

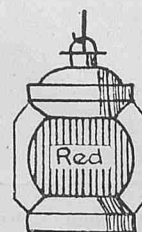


No. 1.

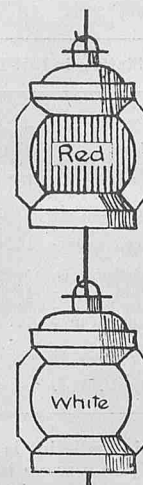
No. 2.

No. 3.

No. 4.



Nos. 1 or 3.



Nos. 2 or 4.

Storm signals are hoisted on warning being received from the Meteorological Office, Toronto, at Camperdown (Halifax), Canso, Digby, Halifax, Liscomb, Liverpool, and Yarmouth, Westport (Brier island) in Nova Scotia; at Point Lepreau, St. Andrews, St. John, in New Brunswick; Eastport (State of Maine), at several places on the coasts of Cape Breton island, New Brunswick, Prince Edward island, Quebec, Newfoundland and British Columbia.

Signification, Day or Night Signals.

No. 1, hoisted to indicate the probability of a gale at first from an Easterly direction.

No. 2, hoisted to indicate the probability of a gale at first from a Westerly direction.

No. 3, hoisted to indicate the probability of a *heavy* gale at first from an Easterly direction.

No. 4, hoisted to indicate the probability of a *heavy* gale at first from a Westerly direction.

It must be borne in mind that the storm signals do not necessarily mean that a storm will occur at the place where the signal is displayed, but that one is expected either there or within such a distance that vessels leaving port would be liable to be caught in it.

United States of America (Pacific and Gulf Coasts) and West Indian Islands.

The United States system of Visual Small-craft, Storm, and Hurricane Warnings as explained on p. 152 of the September 1925 MARINE OBSERVER is in operation at a number of stations on the Pacific and Gulf Coasts of the United States.

These warnings are also displayed at certain places in the following West Indian Islands:—St. Kitts, Porto Rico, Jamaica (Kingston), Vieques Island, Santo Domingo, Haiti, Dominico, St. Thomas, Virgin Islands of the U.S.A., Grand Turk Island, Swan Island, Turks Islands and Cuba.

Swan Island.—For special signals regarding information of hurricanes or "Northers," see under "Wireless Storm Warnings," p. 169.

Special Notices regarding Personnel.

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

Retirement.

Commander A. J. Coad, R.D., R.N.R.

Captain A. J. COAD, the Commodore of the Orient Line and lately Commander of R.M.S. *Oronsay*, has recently retired after 37 years' service under the Orient House flag, of which 28 years were in command.

He has been a member of the Corps of Marine Observers since 1901 and has contributed no less than 45 Meteorological Logs.

Marine Observers will join the Marine Division in wishing Captain COAD many years of health and happiness in his well-earned retirement.

Obituary.

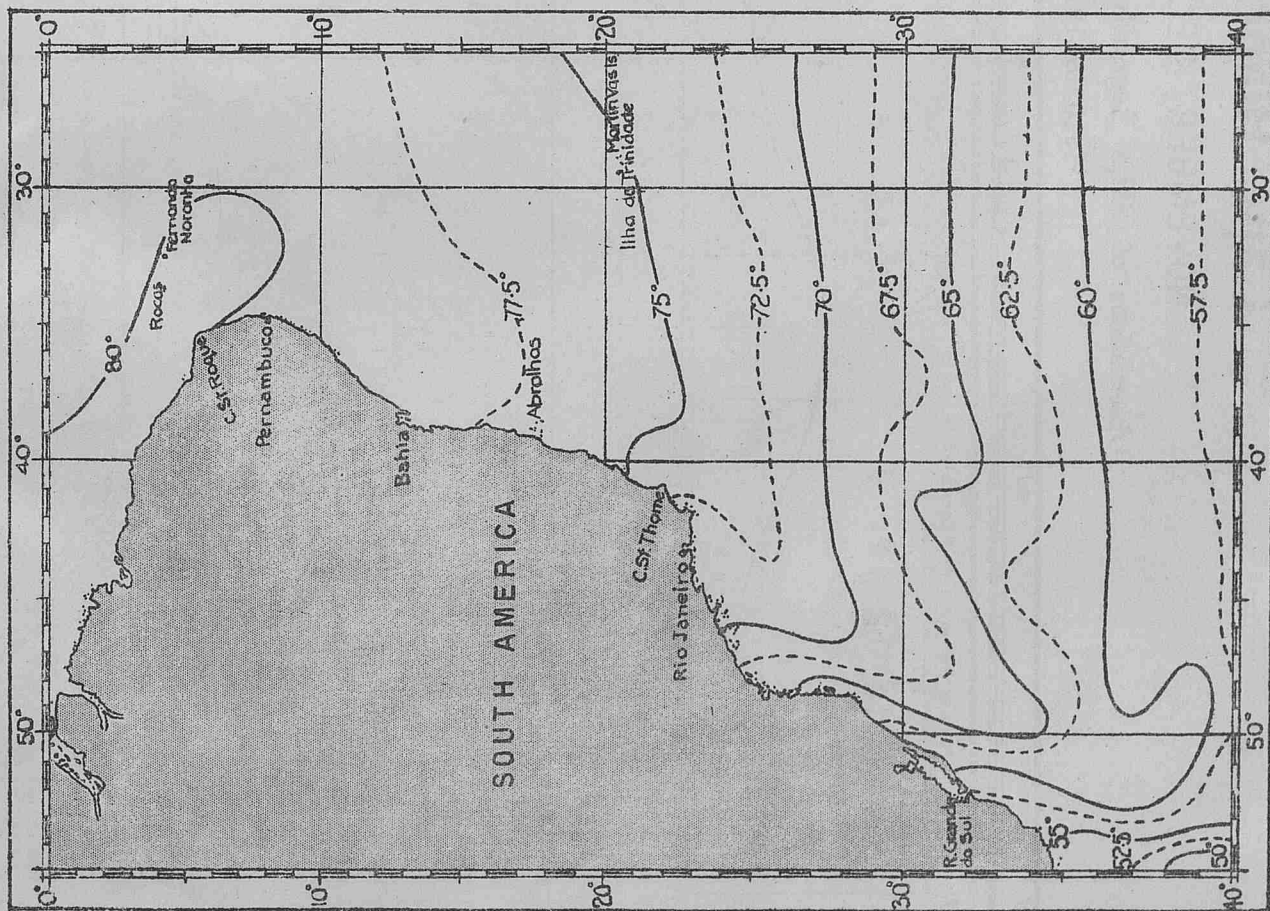
We deeply regret to note the death of Captain R. C. WARDEN, O.B.E., late Professional Adviser to the Marine Department Board of Trade, which occurred at his residence, 49, Talbot Road, Highgate, in his 67th year, on Saturday, August 15th, 1925.

Captain WARDEN joined the Board of Trade as a Nautical Surveyor in 1903 after thirty years' service with the City Line, eleven of which were spent in command. He was appointed Principal Officer of the London district in 1914 and in 1923 was appointed Professional Adviser to the Marine Department Board of Trade, from which position he retired in May last, on reaching the age limit.

Since 1922 Captain WARDEN represented the Board of Trade on the Meteorological Committee, also serving upon the sub-committee for Marine Meteorology in which subject he had been particularly interested.

SEA SURFACE TEMPERATURE.

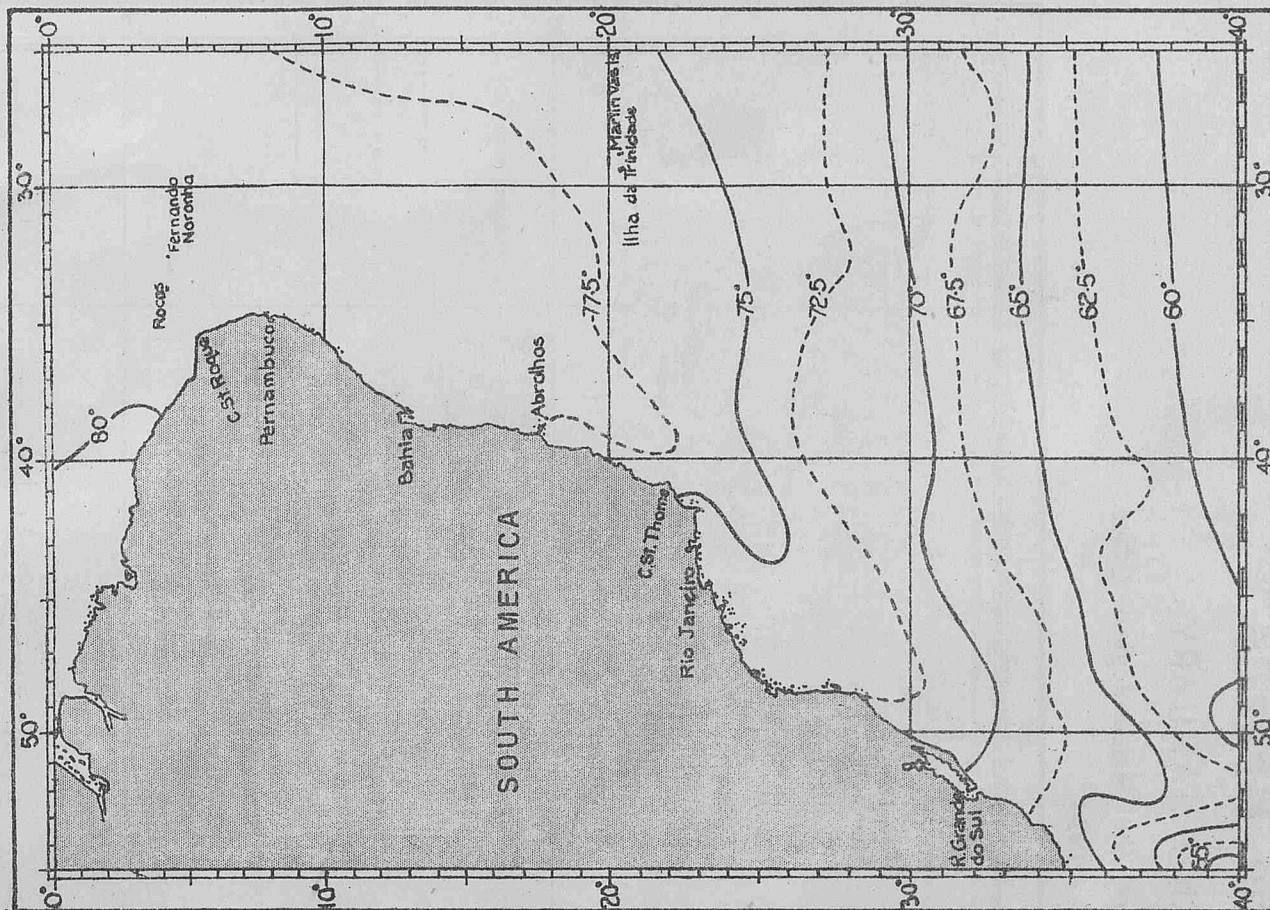
JUNE.



Chartlet B.

SEA SURFACE TEMPERATURE.

DECEMBER.

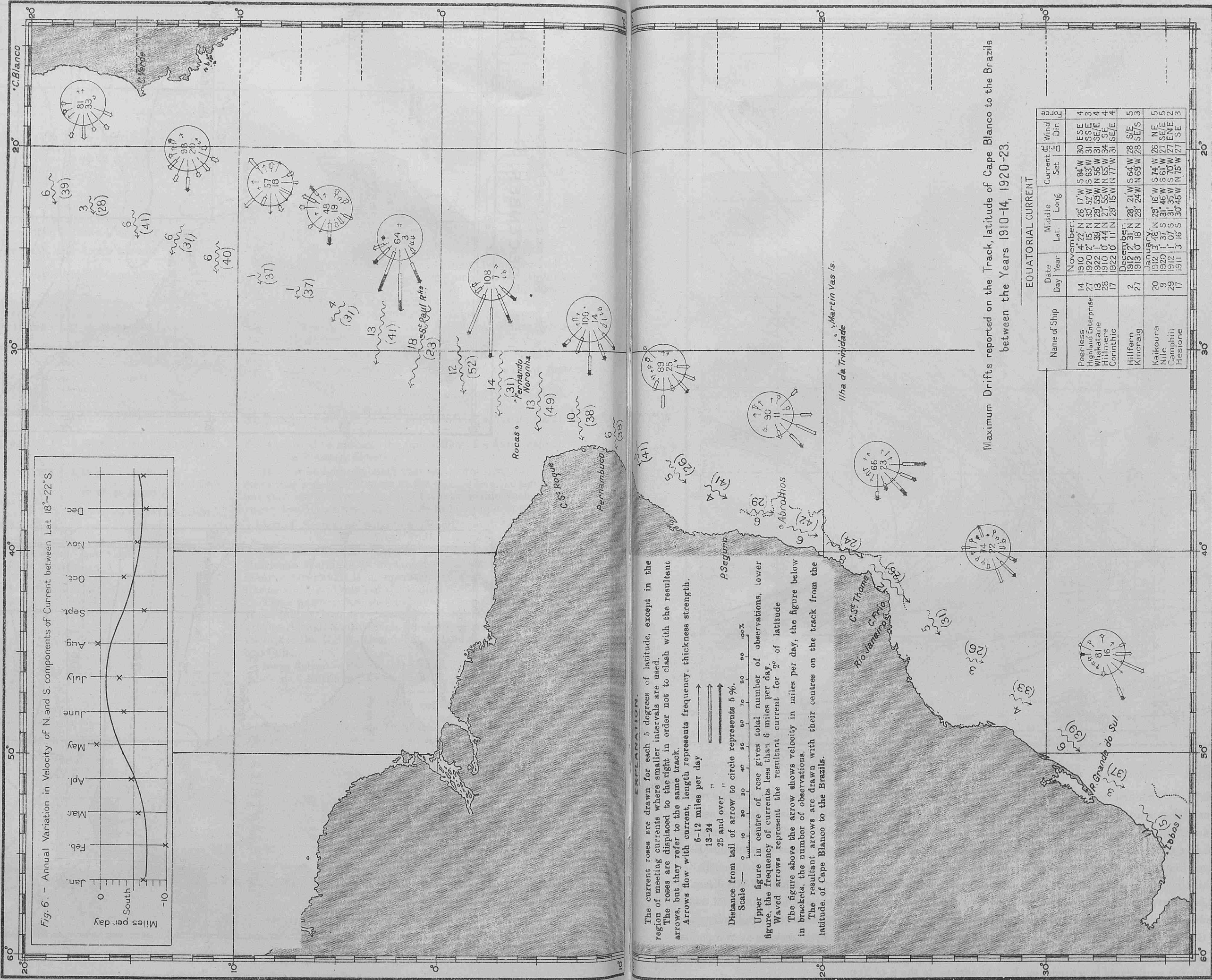


Chartlet C.

CURRENTS ON ROUTE, Latitude of Cape Blanco to the Brazils.

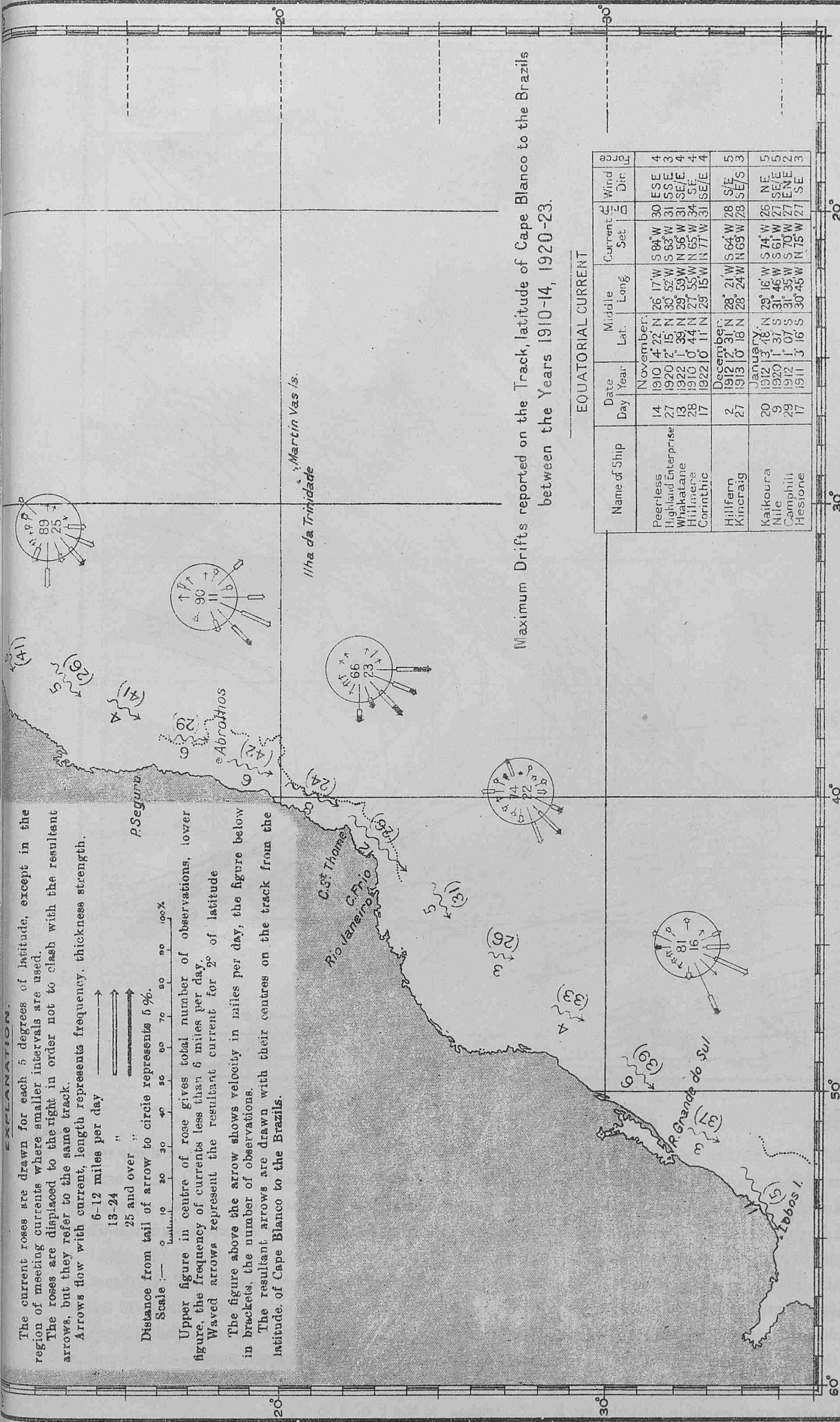
NOVEMBER, DECEMBER AND JANUARY.

Observations of Ships Regularly Observing for the Meteorological Office.
1910 to 1914 and 1920 to 1923.



EXPLANATION.

The current roses are drawn for each 5 degrees of latitude, except in the region of meeting currents where smaller intervals are used.
The roses are displaced to the right in order not to clash with the resultant arrows, but they refer to the same track.
Arrows flow with current, length represents frequency, thickness strength.
6-12 miles per day
13-24
25 and over
Distance from tail of arrow to circle represents 5%.
Scale: 0 10 20 30 40 50 60 70 80 90 100%
Upper figure in centre of rose gives total number of observations, lower figure, the frequency of currents less than 6 miles per day.
Waved arrows represent the resultant current for 2° of latitude
The figure above the arrow shows velocity in miles per day, the figure below in brackets, the number of observations.
The resultant arrows are drawn with their centres on the track from the latitude of Cape Blanco to the Brazils.

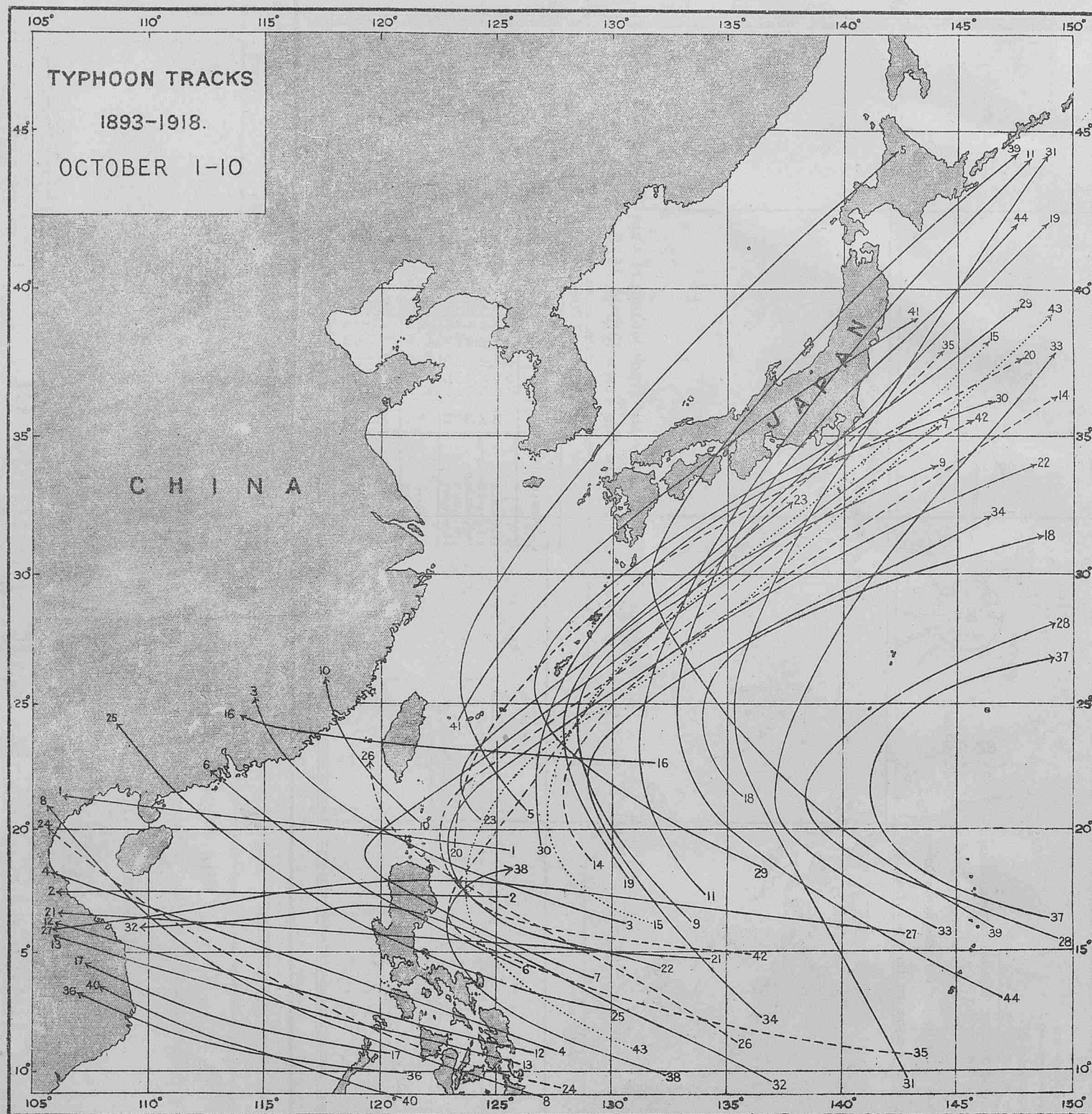


Maximum Drifts reported on the Track, latitude of Cape Blanco to the Brazils between the Years 1910-14, 1920-23.

EQUATORIAL CURRENT

Name of Ship	Date Day Year	Middle Lat. Long.	Current Set	Wind Dir.
Peerless	14 1910	4° 22' N 26° 17' W	S 84° W 30	ESE
Highland Enterprise	27 1920	2° 15' N 30° 52' W	S 63° W 31	SSE
Whakatane	13 1922	1° 39' N 29° 59' W	N 56° W 31	SE/E
Hillmore	28 1910	0° 44' N 27° 55' W	N 65° W 34	SE
Corinthio	17 1922	0° 11' N 29° 15' W	N 77° W 31	SE/E
Hillfarn	2 1912	2° 31' N 28° 21' W	S 64° W 28	SE
Kincraig	27 1913	1° 18' N 28° 24' W	N 69° W 28	SE/S
Kaikoura	20 1912	3° 48' N 29° 16' W	S 74° W 26	NE
Nile	9 1920	1° 37' S 31° 46' W	S 61° W 27	SE/E
Camphili	29 1912	1° 07' S 31° 35' W	S 70° W 27	ENE
Hesione	17 1911	3° 16' S 30° 45' W	N 75° W 27	SE

TYPHOONS IN THE FAR EAST DURING 26 YEARS.



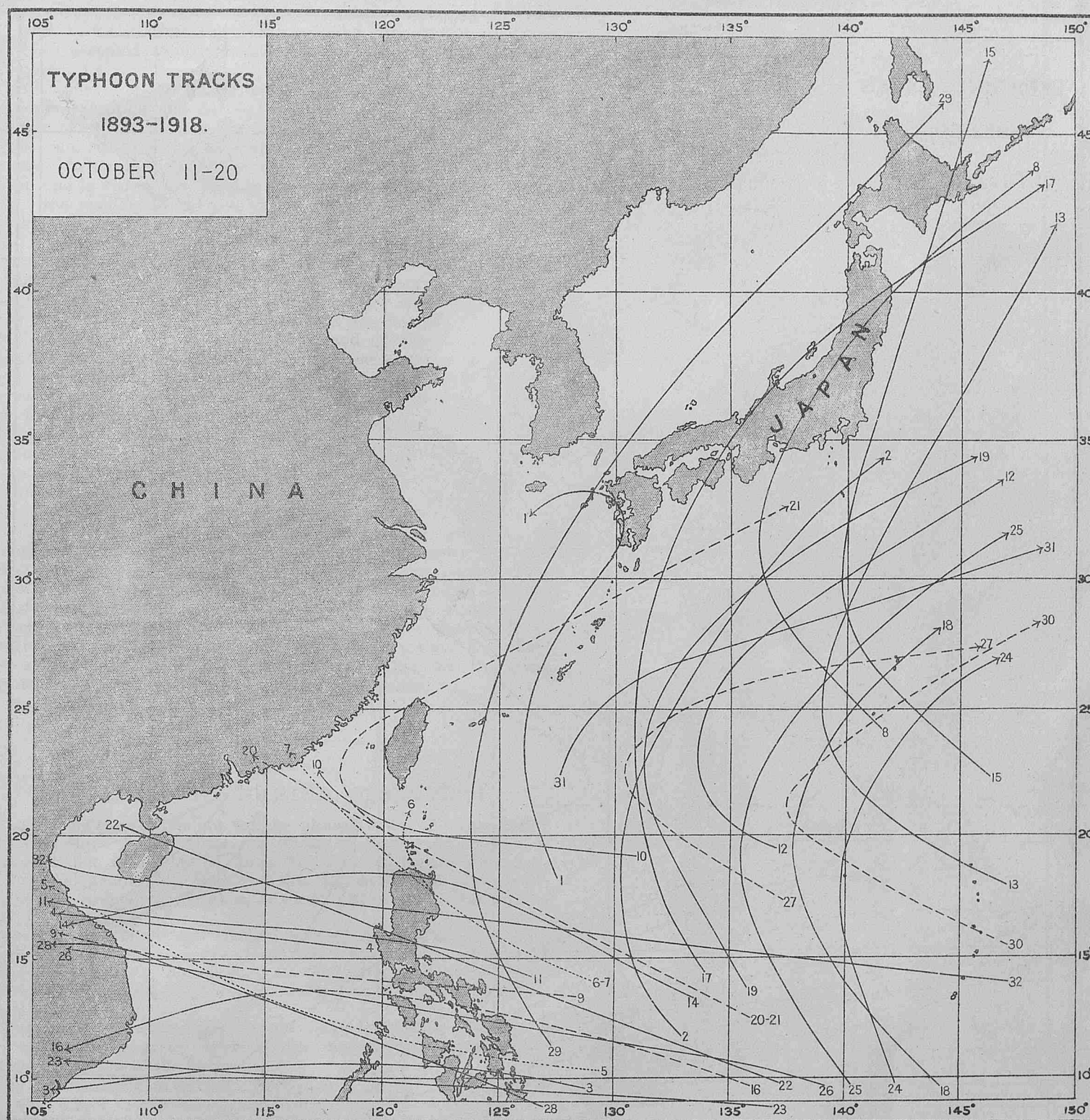
OCTOBER. — *Three charts: 95 tracks; three or four instances every year.*

First decade: 1-10. — 44 tracks. — This first decade is the richest period of the whole year. The effect of the obstacle raised on the Continent against the incursions of the oceanic storms is such, that they are almost entirely expelled from land. Three centres only have ventured between Swatow and Amoy, and as soon as landed, they have been brought to a standstill and filled up. Only one typhoon has crossed the middle of the Eastern Sea, and a broken line joining Swatow to S. Formosa, then to Nagasaki and the E of Hokkaido, marks practically the western frontier that the enemy cannot cross any more.

The storms are numerous at this time, along the S coast of Japan, and it is remarkable how they follow the same SW-NE direction on a road about 300 miles broad that leads between Nippon and the Bonin to the open Pacific: There is also a thick bundle of tracks on the China Sea, where October is a bad month; no less than 16 typhoons are sweeping over the space between the Philippines and the coast of Indo-China, between the Gulf of Tongking and Padaran. The trajectories have a great tendency to recurve at two points, the one about long. 130° and lat. 25°, E of the Meiaco-Simas, the other along the 123rd meridian, off the eastern coast of Luzon. The radiant point of the tracks has still advanced southwards in latitude, far E of Mindanao, to the S of Yap.

[From *Atlas of the Tracks of 620 Typhoons, 1893-1918*, by Louis Froc, S. J. Director, Zi-ka-wei Observatory, Zi-ka-wei-Chang-hai, 1920]

TYPHOONS IN THE FAR EAST DURING 26 YEARS.



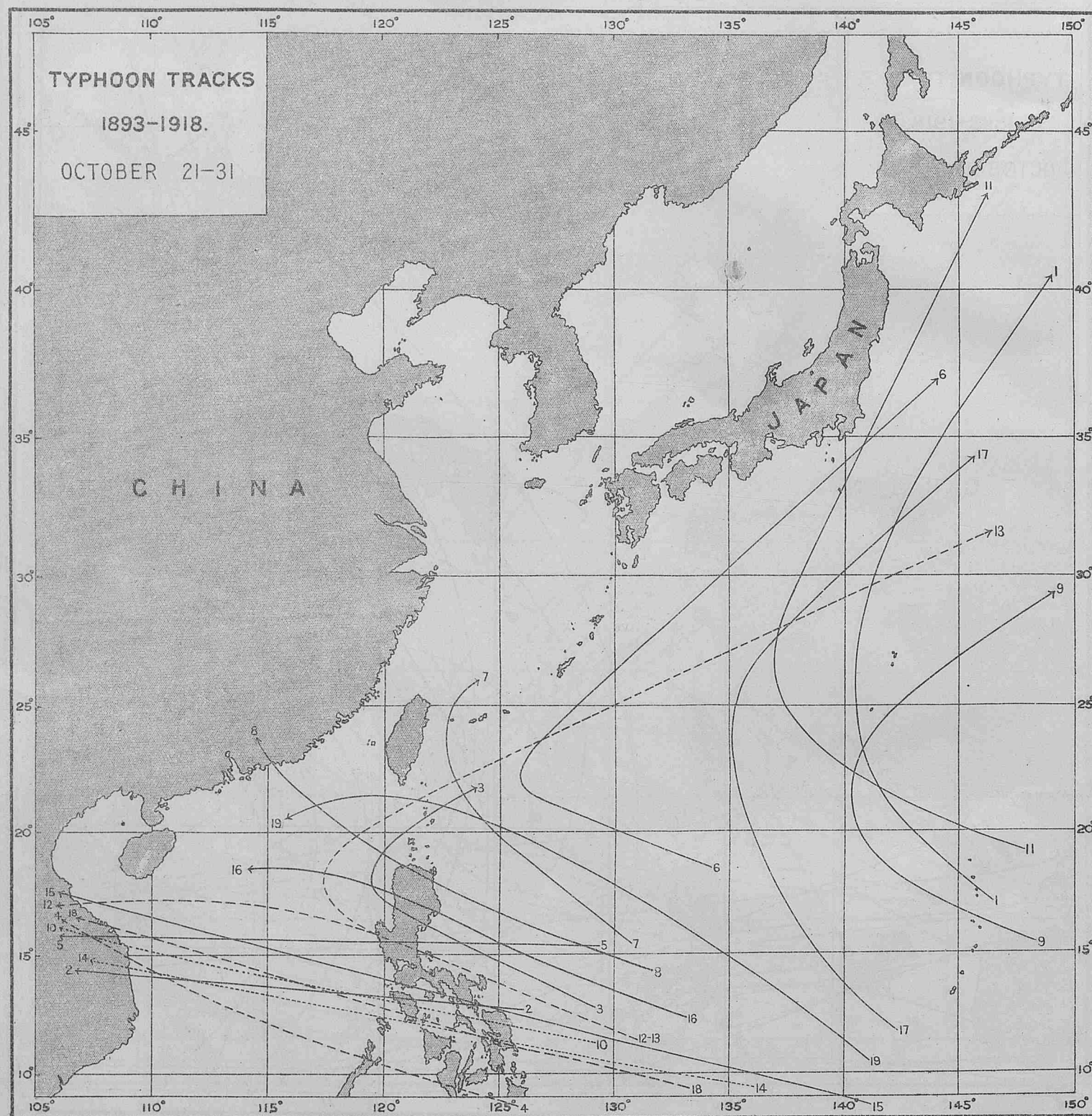
OCTOBER. — *Three charts: 95 tracks; three or four instances every year.*

Second decade: 11-20. — 32 tracks. — The number of typhoons has decreased from 44 to 32 since the first decade, and we are going out of the typhoon season proper: the beginning of the month accounted for nearly the half of all the tracks of October. Now three centres only have ventured as far as the coast of Kwangtung; Formosa, the Eastern Sea and the Sea of Japan are practically a forbidden territory for the tropical storms. Some trajectories are scattered between the Bonin group and the S. coast of Japan, where they do not form a dense bundle gathered close to a mean direction.

But at the same time an increasing activity is shown in the China Sea where the typhoons, keeping away from the Gulf of Tongking, come mostly to strike the coast between the extreme N. of Annam and lower Cochin-china with a great attraction towards the Paracels. Several centres have travelled straight from Palawan to Cochin-china: two more tracks are bent towards WSW. — The origin of the depressions is going down more and more to the S. of Yap.

[From *Atlas of the Tracks of 620 Typhoons, 1893-1918*, by Louis Frog, S. J., Director, Zi-ka-wei Observatory, Zi-ka-wei-Chang-hai, 1920].

TYPHOONS IN THE FAR EAST DURING 26 YEARS.



OCTOBER. — *Three charts: 95 tracks; three or four instances every year.*

Third decade: 21-31. — 19 tracks. — The number of typhoons is steadily decreasing: we do not find one typhoon every year during the 10 last days of the month; and we may say that their season is over, as far as the East of the 130th meridian is concerned. Only a few trajectories are seen between the Marianas and the Loochoos, and very few centres venture up to the Ballintang Channel, where they are soon repulsed or filled up. All the space to the NW of a line drawn up from the S end of Formosa to the SE corner of Japan is now perfectly free from their incursions.

But it must be remembered that the middle of the China Sea, along the 15th parallel, is still a dangerous region; and there remains a bundle of tracks, fairly dense, running from Palawan or the S. of Luzon towards the coast of Annam, in the neighbourhood of Tourane. The Gulf of Tongking and Hainan Island are practically free during this end of the month.

[From *Atlas of the Tracks of 620 Typhoons, 1893-1918*, by Louis Froc, S.J., Director, Zi-ka-wei Observatory, Zi-ka-wei-Chang-hai, 1920].

CURRENT OBSERVATION.

It is very desirable that good current data should be recorded. Spaces are provided for current experienced throughout the day and for current determined at shorter intervals in Meteorological Logs, while Form 911 provides for either or both.

Generally the difference between the *Dead Reckoning Position* at noon, reckoned from previous noon, and the *observed position* has been accepted as attributable to a single current for the whole 24 hours.

It is necessary to make careful distinction between *Dead Reckoning Position* and *Estimated Position*, the former being the position as reckoned from the last fix by courses steered and distances run, corrected for all known errors and disturbances *except* current. When a fix cannot be obtained, an estimation for current (when one is known generally to exist) is sometimes applied to the D.R.; the result may then be conveniently termed the *Estimated Position*.

If this estimated position is given in the Meteorological Log or Form 911, it should be clearly stated, otherwise it may be misleading.

Currents of varying velocity and direction may be experienced along the track made in 24 hours; therefore, when reliable fixes such as by Stellar observations at twilight are obtained, the current should be determined for the intervals, and all should be checked with the noon to noon result. Each of these currents determined at shorter intervals than 24 hours should be entered in the Meteorological Log in the appropriate column, and the time and latitude and longitude of each observation position should be given in the latitude and longitude columns. The times given on Form 911 indicate the interval.

The period of short interval currents should usually not be less than, say, six hours. The best interval is probably from twilight to twilight.

It is desirable that whenever possible two methods of ascertaining the distance run through the water should be used, as recent investigation goes to show that with one means of measuring the speed the inclination has been to credit the ship. When possible it is recommended that both patent log and revolutions should be used.

For working out the set and drift of current the position *from* as well as the position *to* must always be *fixes*. Some observers have used an *estimated position from*, which makes the set and drift false. The same remarks apply to course allowances for set; the latter are naturally necessary to make an *estimated course*.

INVITATION TO MARINE OBSERVERS.

The Marine Superintendent will be pleased to see 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 Great Britain and Ireland 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.

Liverpool, last week of May.

Dublin and Glasgow, mid October.

Leith, North Shields and Hull, mid November.

Marine Agencies are given about two weeks notice of exact dates.

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.

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		

CARE OF INSTRUMENTS.

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

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

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

ICE CHART.

WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE

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

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

ROUTE NOTICES.

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

SYMBOLS USED ON THE CHART.

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

PHENOMENAL DRIFTS OF ICE.

Date.	Ship or Source of Report.	Position.	Remarks.
Oct. 15, 1883	S.S. Elenora...	37°-N. 18°-W.	Piece.
" 8, 1912	S.S. Putney Bridge...	35°15'N. 44°50'W.	Small berg 35 ft. long, 6 ft. high.
" 2, 1918	U.S. Hydrographic Bulletin.	50°10'N. 40°50'W.	Large berg.
" 19, 1920	Do.	45°22'N. 40°09'W.	Berg.
" 17, 1921	S.S. Mt. Vernon...	45°24'N. 40°07'W.	Berg about 70 ft. high, 400 ft. long.
" 6, 1922	S.S. Christian Krogh	50°43'N. 40°42'W.	Berg 60 ft. high.
" 7, 1923	S.S. Eastern Dawn...	40°48'N. 65°54'W.	Large growler about 100 ft. square.

Reports of Ice sighted between August 1st and August 31st, 1925, which have been received by the Meteorological Office, are shown by the Symbols plotted in the position reported, the figures indicating the day of the month.

Co-operation of Shipowners, Masters and Mates.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Marine Agencies and Port Meteorological Officers.

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

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

SYDNEY	..	Captain G. D. Williams, D.S.O., Customs House.
MELBOURNE	..	Captain L. J. Bolger, Electricity Commissioners Building, 23, William Street.
FREMANTLE	..	Captain J. J. Airey, Dalgety's Buildings.

LATE PRESS.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
BALTIC.			
4.8.25	59°—N.	19°—E.	Wreckage consisting of heavy baulks.
15.8.25	56°10'N.	11°45'E.	Lighter adrift.
20.8.25	57°—N.	19°—E.	Wreck of sailing vessel, bottom up.
NORTH SEA.			
6.8.25	59°10'N.	4°35'E.	Part of ship's bottom, heavy wood, about 40 ft. long by 30 ft. wide, dangerous to navigation.
15.8.25	2 m. E.S.E. of West Hinder Lt. V.		Drifting mast about 20 metres long, dangerous to navigation.
ENGLISH CHANNEL.			
8.8.25	50°59'N.	1°33'E.	Fishing boat.
10.8.25	49°16'N.	3°32'W.	Drifting object, apparently turned over fishing boat, dangerous to navigation.
20.8.25	8 to 10 m. S.W. of Porthleven.		Vessel about 100 to 120 ft. long, bottom up.
23.8.25	50°22'N.	1°49'W.	Drifting conical buoy painted red.
NORTH ATLANTIC.			
1.8.25	40°45'N.	10°28'W.	Large red buoy marked <i>21 Company</i> in black letters.
1.8.25	34°17'N.	13°33½'W.	Spar projecting vertically out of water for about 5 or 6 ft., apparently attached to wreckage.
1.8.25	40°51'N.	31°25'W.	White two-cylinder raft. No ship's name visible.
2.8.25	33°46'N.	77°12'W.	Broken spar projecting about 6 ft. out of water.
2.8.25	28°26'N.	79°44'W.	Log about 50 ft. long, 2 ft. diameter.
5.8.25	49°16'N.	12°07'W.	Large buoy adrift.
6.8.25	50°36'N.	10°10'W.	Cable marking buoy marked <i>Telegraph C 4</i> .
6.8.25	28°20'N.	73°31'W.	Partly submerged spar about 2 ft. diameter, apparently attached to submerged wreckage.
6.8.25	36°20'N.	74°53'W.	Ship's topmast, about 35 ft. long 14 ins. diameter, apparently carried away at the cap.
20.8.25	49°27'N.	11°45'W.	Can buoy painted red unlighted and extending about 20 ft. out of water.
20.8.25	50°31'N.	9°50'W.	Large spherical lighted buoy marked <i>C 4</i> with light apparently out.
22.8.25	49°50'N.	11°59'W.	Lower part of schooner's lower mast, approx. 18 ins. in diameter, about 20 ft. long.
23.8.25	49°30'N.	11°44'W.	Drifting buoy marked <i>Silvertown 20</i> , dangerous to navigation.
GULF OF MEXICO.			
6.8.25	29°38'N.	85°49'W.	Ship's charred mast and rigging projecting 15 ft. out of water.
NORTH PACIFIC.			
6.8.25	35°45'N.	129°14'W.	Tree trunk, about 35 ft. long 3 ft. diameter, with roots attached.

LIST OF VOLUNTARY OBSERVING SHIPS.

i

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

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

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

Only in special cases will individual letters be sent.

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

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

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

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

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

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

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

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

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

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

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

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.8.25.	Date Received.
<i>Aba</i> ...	Hughes, J. ...	G. Pugh Williams, R. Wilkinson, W. L. James.	M.L.	Elder Dempster ...	Met. Log. 2.4.25 to 5.7.25 ...	10.7.25.
<i>Abinsi</i> ...	Wright, J. R. ...	W. Borrowes ...	No.	" " " " ...	Form 911 10.6.25 to 17.7.25 ...	28.7.25.
<i>Achilles</i> ...	Melling, C. F. ...	O. V. Jones ...	M.L.	A. Holt " " ...	" " " " " " " " ...	" " " " " " " "
<i>Actor</i> ...	Haylett, E. ...	W. Rennie ...	M.L.	Harrison " " ...	" " " " " " " " ...	" " " " " " " "
<i>Adda</i> ...	Toft, J. T. ...	J. E. Wood, G. A. Boswell, J. R. Jones.	No.	Elder Dempster ...	" " " " " " " " ...	" " " " " " " "
50 <i>Adriatic</i> ...	Trant, E. L., Commr., R.N.R.	J. Collins, A. C. I. Anson, R. G. Roberts.	W.T.	White Star ...	W.T. Reg. 6.7.25 to 25.7.25 ...	28.7.25.
<i>Agapenor</i> ...	Ramsay, J. ...	A. T. Gillard ...	No.	A. Holt ...	Form 911 5.7.25 to 26.7.25 ...	28.7.25.
<i>Alban</i> ...	Torrible, R. H. ...	G. E. Freeman ...	"	Booth ...	" " " " " " " " ...	" " " " " " " "
<i>Albania</i> ...	Gronow, S. ...	E. W. Connell ...	"	Cunard ...	" " " " " " " " ...	" " " " " " " "
<i>Algerian Prince</i> ...	Shaw, D. C. ...	G. Potts ...	"	Prince ...	" " " " " " " " ...	" " " " " " " "
<i>Alipore</i> ...	Gordon, L. M., R.D., Commr., R.N.R.	F. R. W. Page ...	"	P. and O. ...	" " " " " " " " ...	" " " " " " " "
<i>Almanzora</i> ...	Mackenzie G. A. ...	E. B. Ingram ...	"	R.M.S.P. ...	" " " " " " " " ...	" " " " " " " "
<i>Alondra</i> ...	J. J. Prendergast ...	H. Peters ...	"	Yeoward ...	" " " " " " " " ...	" " " " " " " "
<i>Ampetco</i> ...	Vandenkerckhove, A. ...	F. Smet ...	"	American Petroleum ...	" " " " " " " " ...	" " " " " " " "
<i>Antilochus</i> ...	Wilkinson, H. ...	A. C. D. Howes ...	"	A. Holt ...	" " " " " " " " ...	" " " " " " " "
<i>Aorangi</i> ...	Crawford, R. ...	R. B. Denniston, D. Rollo, G. Eustace, R. Blampied, A. Lansley.	M.L.	Canadian-Australasian	Met. Log. 3.1.25 to 28.5.25 ...	27.6.25.
<i>Appam</i> ...	Yardley, H. A., D.S.C.	S. C. Fry, G. H. George, P. Marriott.	"	Elder Dempster ...	" " " " " " " " ...	" " " " " " " "
30 <i>Aquitania</i> ...	Charles, Sir J. T., W., K.B.E., C.B., R.D., Commadore, R.N.R.	J. L. Croasdaile, J. Locke, L. T. Simpson.	W.T.	Cunard ...	W.T. Reg. 19.7.25 to 3.8.25 ...	5.8.25.
<i>Arafura</i> ...	Gordon, A. S. ...	R. Lloyd Harry ...	No.	Eastern and Australian	Form 911 17.8.24 to 18.10.24...	15.12.24.
<i>Archimedes</i> ...	Taylor, F. C. ...	F. W. Johnson ...	"	Lamport & Holt ...	" " " " " " " " ...	" " " " " " " "
<i>Armada Castle</i> ...	Millard, L. A., Knight.	M. M. Tomkins, R. F. Bayer, C. H. Williams.	M.L.	Union Castle ...	Met. Log. 31.1.25 to 22.7.25 ...	8.8.25.
<i>Arracan</i> ...	Willis, M. ...	R. McInnes, M. S. Stuart, A. McCullum.	M.L.	P. Henderson ...	Met. Log. 28.2.25 to 30.5.25 ...	4.6.25.
<i>Arundel</i> ...	Short, H. ...	Mr. Hill ...	C.C.	Southern Rly. ...	Telegraphic Report 28.6.25 ...	28.6.25.
<i>Arundel Castle</i> ...	Hague, J. W., Commr., R.N.R.	G. Blaiklock, C. Williams, F. Granger.	M.L.	Union Castle ...	Met. Log. 17.1.25 to 10.5.25 ...	20.5.25.
<i>Assyria</i> ...	Erskine, R., Smart, R. W.	C. Mortimer ...	No.	Anchor ...	Form 911 24.5.25 to 13.7.25 ...	17.7.25.
<i>Astronomer</i> ...	Booth, W. M. ...	L. Harriman, H. Thomas, E. Shatton.	M.L.	Harrison ...	Met. Log. 16.3.25 to 17.7.25 ...	1.8.25.
<i>Athenic</i> ...	Davies, E. ...	W. Hill ...	No.	White Star ...	Form 911 29.5.25 to 5.7.25 ...	16.7.25.
<i>Atreus</i> ...	Salter, G. H. ...	W. Anderson ...	"	A. Holt ...	" " " " " " " " ...	" " " " " " " "
<i>Atsuta Maru</i> ...	Furuhashi, M. ...	S. Mizoguchi ...	"	Nippon Yusen Kaisha	" " " " " " " " ...	" " " " " " " "
<i>Auditor</i> ...	Owen, W. F. ...	T. E. Steel ...	"	Harrison ...	" " " " " " " " ...	" " " " " " " "
<i>Auldmuir</i> ...	Ramsay, J. D. ...	J. A. S. Adams ...	"	Glen & Co. ...	" " " " " " " " ...	" " " " " " " "
<i>Ausonia</i> ...	Gibbons, G., R.D., Commr., R.N.R.	E. R. B. Freeman ...	"	Cunard ...	" " " " " " " " ...	" " " " " " " "
<i>Avon</i> ...	Matthews, J. E. P.	R. S. Holland ...	"	R.M.S.P. ...	" " " " " " " " ...	" " " " " " " "
51 <i>Baltic</i> ...	White, E. R. ...	W. Nicoll, J. Law, F. Patchett.	W.T.	White Star ...	W.T. Reg. 20.7.25 to 8.8.25 ...	11.8.25.
<i>Bambra</i> ...	Wyles, W. S. ...	G. Buckeridge, H. W. Norris, W. Walters, V. Denton, G. Simpson.	M.L.	State Service, Australia	Form 911 19.7.25 to 9.8.25 ...	11.8.25.
<i>Bampton Castle</i> ...	Swiney, W. A. ...	A. E. Benn, D. Campbell, S. E. Aldam.	"	Union Castle ...	Met. Log. 12.11.24 to 28.2.25...	16.4.25.
<i>Banffshire</i> ...	Wynne, R. H. ...	J. M. Bowie ...	No.	Turnbull Martin	" " " " " " " " ...	" " " " " " " "
<i>Barambah</i> ...	Daniel, E. ...	" " " " " " " " ...	"	Commonwealth Govt.	Form 911 1.6.25 to 20.6.25 ...	14.7.25.
<i>Baron Cavador</i> ...	Baillie, T. ...	A. Campbell ...	"	Hogarth & Sons ...	" " " " " " " " ...	" " " " " " " "
<i>Barpeta</i> ...	Beedle, T. S. ...	W. G. E. Rawlinsong ...	"	British India	" " " " " " " " ...	" " " " " " " "
<i>Baychimo</i> ...	Cornwall, S. A. ...	R. J. Summers ...	"	Hudson's Bay Co. ...	" " " " " " " " ...	" " " " " " " "

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.8.25.	Date Received.
<i>Beaufort</i> ...	Rice, W. V., D.S.O., D.S.C., Commr., R.N.	H. M. S. Forbes ...	M.L.	His Majesty's Ship ...	Met. Log. 28.7.24 to 3.11.24 ...	28.11.24.
59 <i>Belgenland</i> ...	Bradshaw, J. ...	C. J. Murray, J. M. Appleby, W. E. Hesketh. ...	W.T.	Red Star ...	W.T. Reg. 12.7.25 to 30.7.25 ... Form 911 11.7.25 to 30.7.25 ...	1.8.25. 1.8.25.
<i>Benalder</i> ...	Cole, J. H. D.S.C. ...	W. M. Webster ...	No.	Ben Line ...	" 27.4.25 to 30.6.25 ...	17.7.25.
<i>Bendigo</i> ...	Nicholl, R. N. C. ...	J. K. Crane ...	"	P. & O. Branch ...	" 5.6.25 to 22.6.25 ...	25.7.25.
<i>Bengloe</i> ...	McCorquodale, A. ...	G. M. Duff ...	"	Ben Line ...	" 20.6.25 to 21.7.25 ...	13.8.25.
31 <i>Berengaria</i> ...	Irvine, W. R. D., R.D. Capt., R.N.R.	J. A. Myles, W. C. A. Robson, E. W. Connell. ...	W.T.	Cunard ...	W.T. Reg. 26.7.25 to 10.8.25 ...	12.8.25.
<i>Bernini</i> ...	Evans, W. ...	H. L. Rudd ...	No.	Lampart & Holt ...	Form 911 21.11.24 to 31.1.25 ...	16.2.25.
<i>Berrima</i> ...	Townshend, W. P. ...	H. C. Slinn ...	"	P. & O. Branch ...	" 2.6.25 to 29.7.25 ...	5.8.25.
<i>Bintang</i> ...	Morzer Bruyns, M. F. ...	A. A. H. Blankestyn ...	"	Nederland ...	" 21.5.25 to 4.6.25 ...	6.7.25.
<i>Bogota</i> ...	Dunn, R. E., O.B.E. ...	T. R. Thomas ...	"	R.M.S.P. Co. ...	" 20.4.25 to 16.5.25 ...	19.5.25.
<i>Bottingbroke</i> ...	Jones, D. C. ...	C. A. Mott ...	M.L.	Canadian Pacific ...	Met. Log. 19.11.24 to 27.5.25 ...	27.6.25.
<i>Borda</i> ...	Holland, R. ...	" ...	No.	P. & O. Branch ...	Form 911 12.2.25 to 19.6.25 ...	25.6.25.
<i>Bothwell</i> ...	Murray, M. F. ...	S. W. Keay ...	"	Canadian Pacific ...	" 24.6.25 to 22.7.25 ...	27.7.25.
<i>Brandon</i> ...	Mc. Combie, G. F. G. ...	A. H. Easton, G. B. Marriott, J. Mackenzie, H. C. Waters, T. J. Webster, D. Durin, N. B. Goater, T. Golby. ...	M.L.	" ...	" 9.2.25 to 5.5.25 ...	21.5.25.
<i>Brecon</i> ...	Newman, J. ...	" ...	"	" ...	Met. Log. 2.12.24 to 24.2.25 ...	4.3.25.
<i>Brenda</i> ...	Murdoch, R. G. ...	F. R. Ness ...	No.	Scottish Fishery Board	Form 911 1.7.25 to 31.7.25 ...	1.8.25.
<i>Brighton</i> ...	Hill, A. ...	Mr. Munton ...	C.C.	Southern Railway ...	Telegraphic Report 9.8.25 ...	9.8.25.
<i>British Advocate</i> ...	Taylor, R. J. ...	C. J. Metcalf ...	No.	British Tankers ...	Form 911 31.5.25 to 4.8.25 ...	7.8.25.
<i>British Engineer</i> ...	T. W. Jours ...	M. J. Grieves ...	"	" ...	" 7.5.25 to 13.7.25 ...	24.7.25.
<i>Browning</i> ...	Connorton, C. A. ...	W. E. Johnston ...	"	Lampart & Holt ...	" 17.11.25 to 16.2.25 ...	23.2.25.
<i>Bruyere</i> ...	Denson, W. ...	C. E. Legg ...	"	" ...	" 8.4.25 to 11.6.25 ...	6.7.25.
<i>Cambria C.S.</i> ...	Wightman, H. G. E., D.S.C.	E. N. L. Staples ...	M.L.	Eastern Tel. Co. ...	Met. Log. 8.7.24 to 5.10.24 ...	27.1.25.
<i>Cambria</i> ...	" ...	V. S. Phillips ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report 3.8.25 ...	3.8.25.
<i>Camito</i> ...	Scudamore, J. H. H., D.S.C., R.D., Commr., R.N.R.	D. A. Jack, R. M. Cossantine, S. Borrie, R. Sutherland. ...	M.L.	Elders & Fyfes ...	Met. Log. 22.12.24 to 3.5.25 ...	18.6.25.
<i>Canada</i> ...	Jones, T. ...	A. Thompson ...	No.	White Star-Dominion	Form 911 12.7.25 to 18.7.25 ...	23.7.25.
<i>Canadian Importer</i> ...	Wallace, C. ...	C. W. Gilding ...	"	Canadian Govt. Mercantile Marine. ...	" 1.6.25 to 7.7.25 ...	24.7.25.
<i>Canadian Miller</i> ...	McConechy, W. T. ...	B. D. Ranns ...	"	" ...	" ...	"
<i>Canadian Raider</i> ...	Dixon, C. C. ...	C. J. Carp ...	"	" ...	" 16.3.25 to 22.4.25 ...	5.5.25.
<i>Canadian Scottish</i> ...	Forson, A. ...	S. Fieldhouse ...	"	" ...	" 8.1.25 to 24.1.25 ...	9.2.25.
<i>Canadian Skirmisher</i> ...	Millar, W. H. ...	C. W. Crofts ...	"	" ...	" 16.5.25 to 4.6.25 ...	7.8.25.
<i>Canadian Winner</i> ...	Hocking, N. P. ...	R. Girling ...	"	" ...	" 5.6.25 to 10.7.25 ...	25.7.25.
<i>Carlow Castle</i> ...	Whitfield, G. J. ...	J. W. Kirby ...	"	Union Castle ...	" 8.5.25 to 2.6.25 ...	8.6.25.
35 <i>Carmania</i> ...	McNeil, S. G. S., R.D., Capt., R.N.R.	W. M. Stewart, T. A. O. Ellis, A. T. Hamer. ...	W.T.	Cunard ...	W.T. Reg. 13.7.25 to 1.8.25 ... Form 911 11.7.25 to 1.8.25 ...	4.8.25. 5.8.25.
34 <i>Caronia</i> ...	Hossack, W. H., R.D., Capt., R.N.R.	J. A. Quarrie, R. Campbell, D. M. MacLean. ...	"	" ...	W.T. Reg. 29.6.25 to 14.7.25 ... Form 911 28.6.25 to 15.7.25 ...	20.7.25. 18.7.25.
<i>Cassandra</i> ...	Mitchell, W. E. ...	G. M. Sime ...	No.	Anchor Donaldson ...	" 8.10.24 to 16.12.24 ...	18.12.24.
52 <i>Cedric</i> ...	Hickson, V. W. ...	A. E. Weller, H. J. Yates, W. W. Pearson. ...	W.T.	White Star ...	W.T. Reg. 12.7.25 to 2.8.25 ... Form 911 12.7.25 to 2.8.25 ...	4.8.25. 5.8.25.
53 <i>Celtic</i> ...	Berry, G. ...	E. Burt, G. T. Kavanagh, J. W. Allingham. ...	"	" ...	W.T. Reg. 29.6.25 to 19.7.25 ... Form 911 28.6.25 to 19.7.25 ...	22.7.25. 22.7.25.
<i>Centaur</i> ...	Rose, A. F. ...	L. Johnstone ...	No.	A. Holt & Co. ...	" 28.3.25 to 31.5.25 ...	6.7.25.
<i>Ceramic</i> ...	Trant, E. L., R.D., Commr., R.N.R.	A. E. Harvey ...	"	White Star ...	" 9.4.25 to 13.5.25 ...	19.5.25.
<i>Changsha</i> ...	Gambrell, F. C. ... Thomas, R. D. ...	A. M. Frame, F. G. Stratford, H. Lishman, L. A. Baillie, W. Bailley. ...	M.L.	Yuill & Co. ...	Met. Log. 25.4.24. to 2.10.24 ...	10.3.25.
<i>China</i> ...	Short, E. E. ...	G. C. Case ...	No.	P. & O. ...	Form 911 26.6.25 to 15.7.25 ...	10.8.25.
<i>Chindwara</i> ...	Brisley, P. L. ...	W. Welch ...	"	British India ...	" 26.6.25 to 13.7.25 ...	4.8.25.
<i>Chindwin</i> ...	Esslemont, C. ...	J. Summers, W. Wilson, J. G. Walker. ...	M.L.	P. Henderson ...	Met. Log. 18.4.25 to 5.7.25 ...	20.7.25.
<i>City of Alexandria</i> ...	Bedford, G. B. ...	T. Telleson ...	No.	Ellerman ...	Form 911 14.3.25 to 7.4.25 ...	5.5.25.
<i>City of Baroda</i> ...	Houghton, W. ...	A. D. Henderson, H. N. Jones, G. S. Gaylard. ...	M.L.	" ...	Met. Log. 18.11.24 to 15.4.25 ...	17.4.25.
<i>City of Butavia</i> ...	Nancollas, H. E. ...	S. J. Nash ...	No.	" ...	Form 911 27.12.24 to 25.1.25 ...	9.3.25.
<i>City of Benares</i> ...	Wyper, J. ...	C. G. Inglis ...	"	" ...	" 15.5.25 to 26.5.25 ...	14.7.25.
<i>City of Brisbane</i> ...	Seaborne, F. O., D.S.C.	W. E. Fletcher ...	"	" ...	" 11.5.25 to 6.6.25 ...	15.6.25.
<i>City of Canterbury</i> ...	Bremner, D. M. ...	A. M. Hamilton ...	"	" ...	" 3.4.25 to 24.6.25 ...	29.6.25.
<i>City of Chester</i> ...	Letton, F. W. ...	F. C. Wilson, E. Garner, D. B. Carson, J. Shearer. ...	M.L.	" ...	Met. Log. 4.12.24 to 27.4.25 ...	4.5.25.
<i>City of Edinburgh</i> ...	Spencer, H. ...	E. V. Henday ...	No.	" ...	Form 911 31.8.24 to 30.9.24 ...	16.10.24.
<i>City of London</i> ...	Martin, D. ...	J. J. McLigue ...	"	" ...	" 11.5.25 to 5.6.25 ...	8.6.25.
<i>City of Marseilles</i> ...	Brown, G. ...	W. J. Nixon ...	"	" ...	" 5.12.24 to 28.12.24 ...	6.1.25.
<i>City of Rangoon</i> ...	Dunning, F. W. ...	" ...	M.L.	" ...	" ...	"
<i>City of Valencia</i> ...	Williamson, W. A., R.D., Lieut.-Commr., R.N.R.	C. C. Duncan ...	No.	" ...	Form 911 5.3.25 to 3.4.25 ...	2.6.25.
<i>City of Yokohama</i> ...	McDonald, W. D. ...	R. Moloney ...	"	" ...	" 1.5.25 to 23.6.25 ...	15.7.25.
<i>Clan Cumming</i> ...	McLean, J. G. ...	S. M. Werrey Easterbrook ...	"	Clan ...	" 25.12.24 to 29.1.25 ...	9.3.25.
<i>Clan Lindsay</i> ...	Willits, J., Commr.	C. Davenport ...	"	" ...	" 1.5.25 to 3.6.25 ...	15.6.25.
<i>Clan Macbeth</i> ...	Young, A. H., R.D., Lieut.-Commr., R.N.R.	J. T. Bell ...	"	" ...	" 21.4.25 to 1.5.25 ...	6.7.25.
<i>Clan Macgillivray</i> ...	West, W. F. ...	P. G. de Gruchy ...	"	" ...	" 12.4.25 to 8.5.25 ...	2.6.25.
<i>Clan Macindoe</i> ...	Miller, W. ...	F. G. Darnborough ...	"	" ...	" 24.9.24 to 27.11.24 ...	3.12.24.
<i>Clan Mackellar</i> ...	Scotland, A. ...	A. V. Howard ...	"	" ...	" 3.6.25 to 11.6.25 ...	23.6.25.
<i>Clan Mackenzie</i> ...	Young, G. ...	W. G. Arthur, F. B. Fairweather. ...	"	" ...	" 7.11.24 to 21.11.24 ...	12.12.24.
<i>Clan Mackinnon</i> ...	Mackie, R. W. ...	T. V. Wilson, C. Jones, W. F. Isaac. ...	M.L.	" ...	Met. Log. 27.1.25 to 9.5.25 ...	15.5.25.
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	D. S. Rae, A. W. Jones, J. J. Millar. ...	"	" ...	" 28.12.24 to 24.7.25 ...	4.8.25.
<i>Clan Macnaughton</i> ...	W. Thomson ...	A. J. Storkey, F. Barnes ...	No.	" ...	Form 911 11.4.25 to 3.6.25 ...	6.7.25.
<i>Clan Macnagart</i> ...	Gray, J. N. ...	W. J. Henderson ...	"	" ...	" 23.6.25 to 18.7.25 ...	11.8.25.
<i>Clan Macvicar</i> ...	Phillips, G. P. ...	L. S. Murrin ...	"	" ...	" 30.6.25 to 11.7.25 ...	10.8.25.
<i>Clan Malcolm</i> ...	Higgins, C. J. ...	T. G. Young, R. F. Buckley ...	M.L.	" ...	Met. Log. 6.10.24 to 30.3.25 ...	6.4.25.
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	G. Morren ...	No.	" ...	Form 911 26.5.25 to 21.6.25 ...	14.7.25.
<i>Clan Murdoch</i> ...	Pagan, J. C. ...	C. W. Thomas ...	"	" ...	" 10.1.25 to 5.2.25 ...	2.3.25.
<i>Clan Ranald</i> ...	Openshaw, L. G. ...	T. E. Woodall ...	"	" ...	" 19.6.25 to 30.6.25 ...	20.7.25.
<i>Clan Ross</i> ...	Jones, R. C. ...	G. Short ...	"	" ...	" 25.4.25 to 17.6.25 ...	22.6.25.
<i>Clan Sinclair</i> ...	Neill, G. A. ...	J. Brittain ...	"	" ...	" 10.3.25 to 29.7.25 ...	5.8.25.
<i>Clan Stuart</i> ...	Stenson, F. J., R.D., Commr., R.N.R.	R. Silk ...	"	" ...	" 17.6.25 to 19.7.25 ...	21.7.25.

LIST OF VOLUNTARY OBSERVING SHIPS

iii

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.8.25.	Date Received.
<i>Clan Urquhart</i> ... <i>Colonia, C.S.</i> ...	Gibb, A. F. W. ... Campos, V., O.B.E., Lt.-Commr., R.N.R.	T. G. Mitchell ... S. A. Garnham, A. S. Muir, J. M. Matthews, W. Sangwine.	No. M.L.	Clan ... Telegraph Construction & Maintenance.	Form 911 4.7.25 to 9.8.25 ... Met. Log. 26.3.25 to 11.6.25 ...	12.8.25. 1.7.25.
<i>Colman</i> ... <i>Columbia</i> ... <i>Concordia</i> ...	Gittins, R. P. ... Erskine, R. ... Morris, J. ...	T. A. Schofield-Miller ... C. L. Seaman ... T. Philip, J. McIntosh, J. Davies.	No. M.L.	Leyland ... Anchor ... Anchor Donaldson ...	Form 911 2.7.25 to 28.7.25 ... 28.6.25 to 19.7.25 ... Met. Log. 7.3.25 to 30.6.25 ...	4.8.25. 27.7.25. 20.7.25.
<i>Comino</i> ... <i>Covee</i> ... <i>Copenhagen</i> ... <i>Corinthic</i> ...	Nuttall, E. L. ... Festa, M. ... Kerr, J. J. ... Hart, F. ...	J. Woodward ... C. Keen F. Kean, M. Bennett, F. G. Rogers.	No. " M.L.	Furness Withy ... Commonwealth Govt. ... Glen & Co. ... White Star ...	Form 911 7.1.25 to 4.4.25 ... " 9.8.24 to 29.8.24 ... Met. Log. 4.4.25 to 18.7.25 ...	20.4.25. 7.10.21. 27.7.25.
<i>Cornwall</i> ... <i>Crawford Castle</i> ...	Haines, F. P. ... Morgan, A. O., R.D., Commr. R.N.R.	Mr. Maltby, Mr. Ray ... G. Montgomery ...	No.	Dowie, J., & Co. ... Union Castle ...	Form 911 10.4.25 to 23.5.25 ... " 4.7.25 to 3.8.25 ...	28.5.25. 11.8.25.
<i>Culebra</i> ...	Mackay, A. S. ...	C. Wolfenden, J. W. Duncan, R. Hocken.	M.L.	R.M.S.P. Co. ...	Met. Log. 10.11.24 to 10.4.25...	4.5.25.
<i>Cuthbert</i> ... <i>Cyclops</i> ...	Reynolds, W. H. B. ... Cosker, W. ...	J. Watson ... A. Brotherton ...	No. "	Booth ... A. Holt ...	Form 911 22.6.25 to 5.7.25 ... " 10.4.25 to 2.6.25 ...	11.8.25. 9.7.25.
<i>Dardanus</i> ... <i>Darian</i> ... <i>Darro</i> ...	Williams, D. T. ... Masters, W. ... Smith, W. E., D.S.O., R.D., Capt., R.N.R.	W. K. Kerr ... A. S. Holland ... T. W. Bolland ...	" " "	A. Holt ... Leyland ... R.M.S.P. Co. ...	" 24.6.25 to 9.7.25 ... " 27.5.25 to 8.6.25 ... " 18.4.25 to 14.6.25 ...	10.8.25. 10.6.25. 16.6.25.
<i>Daytonian</i> ... <i>Demerara</i> ... <i>Desado</i> ... <i>Desna</i> ... <i>Deucalion</i> ... <i>Dieppe</i> ... <i>Dinboola</i> ... <i>Discoverer</i> ... <i>Discovery, R.R.S.</i> ...	Walker, C. J., D.S.O. Willan, F. C. L. Hannam, F. S. Huff, G. F. Findlay, J. Marmery, S. Roy, C. M. Ling, J. T. Stenhouse, J. R., D.S.O., D.S.C.	... E. Hewitt ... F. G. Dawson, A. H. Phillipson W. S. Thomas ... L. E. Brown ... Mr. Parsons ... G. A. Molyneux ... J. Richardson O.B.E., R.D., R.N.R.	" " " " " C.C. No. M.L.	Leyland ... R.M.S.P. Co. ... " ... " ... A. Holt ... Southern Railway ... Melbourne S.S. Co. ... Harrison ... Discovery Expedition ...	" 30.3.25 to 13.5.25 ... " 18.6.25 to 25.7.25 ... " 8.5.25 to 23.6.25 ... " 16.5.25 to 11.7.25 ... " 5.7.25 to 15.7.25 ... Telegraphic Report 21.7.25 ... Form 911 5.6.25 to 30.6.25 ... " 30.11.24 to 9.3.25 ... " ...	21.5.25. 28.7.25. 4.7.25. 18.7.25. 22.7.25. 21.7.25. 4.8.25. 11.3.25. ...
<i>Dogra</i> ... <i>Domala, M.V.</i> ... <i>Doric</i> ...	Hartock, L. ... Buswell, W. ... S. Bolton, D.S.C., R.D., Commr., R.N.R.	E. C. Akers ... C. E. Merchant ... W. A. Calway ...	No. " "	Asiatic S.N. Co. ... British India ... White Star ...	Form 911 27.12.24 to 12.1.25... " 12.6.25 to 24.6.25 ... " 5.7.25 to 25.7.25 ...	2.2.25. 20.7.25. 28.7.25.
<i>Doric Star</i> ... <i>Dorington Court</i> ... <i>Dorset</i> ...	Thomas, R. T. ... Isaacs, W. A. ... Kettlewell, C. R. ...	T. Williams ... E. V. Quickenden ... F. G. Capon, L. Cann, D. M. Lambert.	" " M.L.	Blue Star ... Haldin & Co. ... New Zealand S.S. Co. ...	" 28.2.25 to 11.3.25 ... " 17.8.24 to 8.9.24 ... Met. Log. 24.11.24 to 20.4.25...	23.3.25. 18.9.24. 27.4.25.
<i>Dorsetshire</i> ... <i>Dromore Castle</i> ...	Adamson, B. W. ... Vincent, E. S., R.D., Commr. R.N.R.	... S. S. Smith ...	No.	Bibby ... Union Castle ...	Form 911 2.4.25 to 8.7.25 ...	4.8.25.
<i>Dryden</i> ... <i>Dundrum Castle</i> ... <i>Dundes</i> ... <i>Duffield</i> ... <i>Dunrobin</i> ... <i>Duquesa</i> ... <i>Durenda</i> ...	Knight, R. A. ... Kershaw, H. J. ... Pape, E. R. ... King, A. ... Ramsay, J. D. ... Ellis, F. ... Wilson, W. ...	G. D. Oldfield ... R. May ... D. P. Morgan ... T. S. Robertson ... M. M. Ramsay ... C. P. Lane, W. Thornton ... W. H. Creese ...	" " " " " " "	Lampert & Holt ... Union Castle ... Pacific S.N. Co. ... Hunting & Sons ... Glen & Co. ... Furness Withy ... British India ...	" 28.9.24 to 7.12.24 ... " 3.5.25 to 28.5.25 ... " 22.11.24 to 24.12.24 ... " 10.11.24 to 9.12.24... " 25.7.25 to 2.8.25 ... " 10.4.25 to 9.6.25 ... " 31.1.25 to 28.4.25 ...	6.1.25. 12.6.25. 29.12.24. 16.12.24. 7.8.25. 19.6.25. 12.5.25.
<i>Edinburgh Castle</i> ...	Strong, H., R.D., Commr., R.N.R.	C. S. Kean ...	M.L.	Union Castle ...	Met. Log. 24.10.24 to 19.4.25...	23.4.25.
<i>Eemland</i> ... <i>El Cordobes</i> ...	Van Noppen, C. D. Noton, F. G. ...	C. C. Van Huizen ... J. W. Ekins ...	No. "	Holland Lloyd ... British & Argentine S.N. Co.	Form 911 10.4.25 to 14.6.25 ... " 17.5.25 to 11.6.25 ...	19.6.25. 16.7.25.
<i>Elmina</i> ...	Millson, H. E. ...	R. Wilkinson, C. Cryer, R. Griffiths.	M.L.	Elder Dempster ...	Met. Log. 10.10.24 to 21.2.25...	11.3.25.
<i>El Paraguay</i> ... <i>Elpenor</i> ...	Smith, F. C. ... T. W. Hannay ...	W. E. Williams ... P. E. Wright, W. T. Pennington.	No. M.L.	Houlder Bros. ... A. Holt ...	Form 911 19.4.25 to 16.6.25 ... Met. Log. 3.11.24 to 18.2.25 ...	18.6.25. 23.2.25.
<i>Empress of Asia</i> ...	Douglas, L. D., R.D., Lt. - Commr., R.N.R.	G. H. Blyth, R. H. Foley, R. Dobbin, L. Johnston.	"	Canadian Pacific ...	" 6.2.25 to 18.5.25 ...	26.6.25.
<i>Empress of Australia</i> ... <i>Empress of Canada</i> ...	Hailey, A. J. ... Robinson, S., C.B.E., R.D., Commr., R.N.R.	C. Critchley, R. A. Leicester, A. B. Smith. W. S. Halliday, L. C. Barry, L. M. Goddard.	" "	" " ... " " ...	" 6.11.25 to 10.5.25 ... " 15.11.24 to 11.5.25...	3.6.25. 26.6.25.
<i>Empress of France</i> ...	Griffiths, E. ...	O. Pennington, E. Roberts, A. W. Patrick.	"	" " ...	" 31.12.24 to 3.6.25 ...	12.6.25.
<i>Empress of Russia</i> ... <i>Empress of Scotland</i> ...	Hosken, A. J. ... Gillies, J., C.B.E. ...	J. Reid, D. F. McNeill ... B. Grant, S. C. Fox, D. Loran, L. W. Akerman, W. J. Phillips.	" "	" " ... " " ...	" 20.12.24 to 5.6.25 ... " 26.4.24 to 29.10.24...	17.7.25. 11.12.24.
<i>Endeavour</i> ...	Commr. S. A. Geary-Hill, D.S.O., R.N.	M. L. Harrison, E.V.B. Baker, E. H. B. Baker, J. Torlesse.	"	His Majesty's Ship ...	" 26.5.25 to 24.6.25 ...	13.7.25.
<i>Essequibo</i> ... <i>Eumaevus</i> ... <i>Euripides</i> ...	Duncan, E. E. ... Read, J. W. ... Collins, P. J., O.B.E.	G. Pattison ... W. E. Steer ... H. S. Cox, G. R. Fisher, A. J. Terry.	No. M.L.	R.M.S.P. Co. ... A. Holt ... Aberdeen ...	Form 911 23.4.25 to 8.6.25 ... " 16.7.25 to 25.7.25 ... Met. Log. 27.2.25 to 18.6.25 ...	29.6.25. 4.8.25. 29.6.25.
<i>Eurybates</i> ... <i>Explorer</i> ...	Carnon, C. G. ... Lamont, A. ...	C. Napier ... Scientific Staff ...	No. M.L.	A. Holt ... Scottish Fishery Board ...	Form 911 9.5.25 to 24.5.25 ... Met. Log. 20.6.24 to 27.9.24 ...	9.7.25. 24.10.24.
<i>Fitzroy</i> ...	Silk, H. V., Lt.-Commr. R.N.	C. W. Sabine ...	"	His Majesty's Ship ...	" 24.7.24 to 31.10.24...	11.11.24.
<i>Flandria</i> ... <i>Flinders</i> ...	Veldkamp, G. J. ... Henderson, D. A., Lt.-Commr. R.N.	T. Doornbosch ... K. F. Boxall ...	No. M.L.	Holland Lloyd ... His Majesty's Ship ...	Form 911 26.4.25 to 11.6.25 ... Met. Log. 26.7.24 to 30.10.24...	15.6.25. 18.11.24.
<i>Francisco</i> ... <i>Freya</i> ...	Wilkins, J., O.B.E. Angus, W. ...	C. Leonard ... J. H. Hennessey ...	No. "	Ellerman Wilson ... Scottish Fishery Board ...	Form 911 22.3.25 to 28.4.25 ... " 28.4.25 to 29.6.25 ...	4.5.25. 4.7.25.
<i>Galic</i> ...	Summers, E. F., R.D., Commr. R.N.R.	W. G. O. Jones ...	"	White Star ...	Met. Log. 3.8.24 to 9.12.24 ...	12.12.24.
<i>Galtymore</i> ... <i>Garret</i> ... <i>Gascoyne</i> ...	Ledsome, J. S. ... Visser, C. W. ... Mills, A. ...	N. Goubrough ... C. J. Vandenboom ... P. G. Collins ...	" " "	Furness Withy ... Rotterdam Lloyd ... Dalgety & Co. ...	Form 911 5.3.25 to 15.3.25 ... " 21.4.25 to 22.5.25 ... " 21.10.24 to 1.2.25 ...	13.3.25. 26.5.25. 9.3.25.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log Register, or Report Contributed. Received up to 14.8.25.	Date Received.
<i>Galra</i> ...	Kolkman, J. M. ...	K. H. Schilp ...	No.	Holland Lloyd ...	Form 911 10.4.25 to 28.5.25 ...	2.6.25.
<i>Glenamoy, M.V.</i> ...	Angier, J. ...	R. H. Bishop ...	"	Glen Line ...	" 11.7.25 to 23.7.25 ...	4.8.25.
<i>Glenapp, M.V.</i> ...	Griffith, J. E. ...	S. W. Bell ...	"	" ...	" 8.3.25 to 18.3.25 ...	22.6.25.
<i>Glenluce, M.V.</i> ...	Barkley, E. ...	J. D. Richards ...	"	" ...	" 22.2.25 to 24.3.25 ...	30.3.25.
<i>Glenishane</i> ...	Roberts, W. E. ...	H. N. Russell ...	"	" ...	" 3.4.25 to 22.6.25 ...	30.6.25.
<i>Gloucestershire</i> ...	Robin, E. ...	T. E. Field ...	"	Bibby ...	" 10.4.25 to 20.6.25 ...	23.6.25.
<i>Gorgon</i> ...	Hughes, J. W. ...	W. Simpson ...	"	A. Holt & Co. ...	" 26.4.25 to 4.6.25 ...	13.7.25.
<i>Gourko</i> ...	Montgomery, H. ...	N. J. Donovan ...	M.L.	Ellerman Wilson ...	Met. Log. 12.11.24 to 2.4.25 ...	24.4.25.
<i>Haliartus</i> ...	Marsh, L. V. ...	W. H. Upton ...	No.	R. P. Houston ...	Form 911 13.6.25 to 10.7.25 ...	1.8.25.
<i>Harmonides</i> ...	Hughes, W. J. ...	D. L. Roberts ...	"	" ...	" 1.3.25 to 16.3.25 ...	30.4.25.
<i>Harmony, Auxy.</i> ...	Jackson, J. C. ...	A. W. Bush ...	"	Moravian Mission ...	" 4.12.24 to 20.12.24 ...	6.1.25.
<i>Hatarana</i> ...	Woodget, H. T. ...	J. L. Durkee, F. Wells, H. Harrison, H. J. O'Donohoe.	M.L.	British India ...	" 7.10.24 to 22.4.25 ...	4.5.25.
<i>Hauraki, M.V.</i> ...	Frew, J. D. ...	A. K. Champion ...	No.	Union S.S. Co., N.Z. ...	" 24.5.25 to 16.6.25 ...	22.7.25.
<i>Henry Holmes, C.S.</i> ...	Bicker Caarten, A. ...	R. J. M. Pearce ...	"	W. I. & Panama Telegraph Co. ...	" 28.5.25 to 6.7.25 ...	5.8.25.
<i>Herald</i> ...	Harvey, J. R., O.B.E., Commr., R.N.	W. C. Jenks ...	M.L.	His Majesty's Ship ...	Met. Log. 1.2.25 to 27.5.25 ...	27.7.25.
<i>Herefordshire</i> ...	Stanley, W. ...	R. C. Leitch, G. Whitworth, P. S. Cooper, H. G. Walton	"	Bibby ...	" 13.9.24 to 26.2.25 ...	23.3.25.
<i>Herschel</i> ...	Davies, G. W. ...	A. N. Blundell, H. Phillips ...	No.	Lampport & Holt ...	Form 911 30.4.25 to 4.7.25 ...	6.7.25.
<i>Hibernia</i> ...	Tanner, E. B. ...	R. Woodall ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report. 12.8.25 ...	12.8.25.
<i>Highland Enterprise</i> ...	Pond, R. H. ...	J. H. Tilton ...	No.	Nelson ...	Form 911 31.1.24 to 26.4.25 ...	12.5.25.
" <i>Glen</i> ...	Jones, T. J. ...	C. M. Best ...	"	" ...	" 3.2.25 to 20.6.25 ...	24.6.25.
" <i>Heather</i> ...	Powell, G. A. ...	J. H. Cables, F. Jeyes ...	M.L.	" ...	Met. Log. 10.12.24 to 1.6.25 ...	16.6.25.
" <i>Laddie</i> ...	Alford, C. ...	G. L. Goodman ...	No.	" ...	Form 911 28.5.25 to 19.7.25 ...	22.7.25.
" <i>Piper</i> ...	Collings, D. ...	A. S. Jones, J. S. Collins, W. T. Breen.	M.L.	" ...	Met. Log. 6.1.25 to 25.5.25 ...	10.6.25.
" <i>Pride</i> ...	Robinson, R. H. ...	H. McKinnon, F. Falconer, R. R. Soanes, G. E. Leech.	"	" ...	" 25.9.24 to 17.2.25 ...	3.3.25.
" <i>Rover</i> ...	Ashby Graves, F. ...	F. W. Harvey, H. Thomas, F. Abbott.	"	" ...	" 9.4.25 to 9.6.25 ...	25.6.25.
" <i>Warrior</i> ...	Robinson, R. H. ...	G. I. Evans ...	No.	Booth ...	Form 911 1.6.25 to 29.7.25 ...	10.8.25.
<i>Hildebrand</i> ...	Maddrell, J. ...	R. S. H. Goodier ...	"	" ...	" 18.3.25 to 1.5.25 ...	4.5.25.
<i>Hobsons Bay</i> ...	Kydd, O. J. ...	J. E. Williams, O. J. Edwards, M. P. Pearce.	M.L.	Commonwealth Govt. ...	Met. Log. 2.12.24 to 12.3.25 ...	8.4.25.
<i>Holbein</i> ...	Gough, W. A. ...	G. P. Kitto, E. King ...	No.	Lampport & Holt ...	Form 911 25.5.25 to 25.7.25 ...	1.8.25.
<i>54 Homeric</i> ...	Bulman, J. ...	A. E. Dyer, A. Griffiths, S. A. Jones.	W.T.	White Star ...	W.T. Reg. 9.7.25 to 24.7.25 ...	27.7.25.
"	"	"	"	"	" 28.5.25 to 11.6.25 ...	15.6.25.
"	"	"	"	"	" 18.6.25 to 3.7.25 ...	6.7.25.
"	"	"	"	"	" 7.3.25 to 3.5.25 ...	26.5.25.
<i>Honorius</i> ...	Samuels, C. ...	J. E. Martin, W. G. Idles ...	No.	R. P. Houston ...	Form 911 7.12.24 to 21.2.25 ...	24.2.25.
<i>Hororata</i> ...	Haines, F. P. ...	S. G. Edwards ...	"	New Zealand S.S. Co. ...	Met. Log. 20.11.24 to 17.5.25 ...	9.6.25.
<i>Hubert</i> ...	Jones, W. C. H. ...	J. C. Tuckett, C. D. Watt, F. Pover, G. R. Hogg.	M.L.	Booth ...	"	"
<i>Hurunui</i> ...	Burton Davies, J. ...	"	"	New Zealand S.S. Co. ...	"	"
<i>Ibez</i> ...	Langdon, C. ...	"	C.C.	G.W. Railway ...	Telegraphic Report. 19.3.25 ...	19.3.25.
<i>Iceland, Auxy. Brigantine.</i> ...	Worsley, F.A., D.S.O., O.B.E., Commr., R.N.R.	"	M.L.	Algarsson Polar Expedition.	"	"
<i>Ikala</i> ...	Meetham, J. T. ...	E. Lightfoot, C. W. Smithurst	No.	J. H. Welsford & Co. ...	Form 911 22.5.25 to 5.6.25 ...	16.7.25.
<i>Ingoma</i> ...	Barrow, R. K. ...	"	"	Harrison ...	" 13.6.25 to 30.7.25 ...	7.8.25.
<i>Intaba</i> ...	Gibbings, W. A. ...	A. M. Hughes ...	"	" ...	" 3.8.24 to 19.10.24 ...	22.10.24.
<i>Intombi</i> ...	Sawyer, E. I. ...	J. Richardson ...	"	" ...	"	"
<i>Iroquois</i> ...	Tinson, C. W., O.B.E., Commr., R.N.	G. A. R. J. Leslie, R. H. Lucy, G. A. Gould.	M.L.	His Majesty's Ship ...	Met. Log. 15.7.24 to 7.11.24 ...	3.2.25.
<i>Ixion</i> ...	Reed, G. C. ...	A. R. Cook ...	No.	A. Holt ...	Form 911 19.5.25 to 10.8.25 ...	12.8.25.
<i>Jervis Bay</i> ...	Chaplin, W. R. ...	R. W. Laycock ...	"	Commonwealth Govt. ...	" 2.7.25 to 20.7.25 ...	11.8.25.
<i>John Pender, C.S.</i> ...	Smythe, T. W., O.B.E.	A. G. Watts ...	"	Eastern Tel. Co. ...	" 6.5.25 to 12.5.25 ...	8.6.25.
<i>Junin</i> ...	Benson, C. W. ...	A. Beharrel ...	"	Pacific S.N. Co. ...	" 16.5.25 to 5.6.25 ...	17.6.25.
<i>Kaikoura</i> ...	Downton, M. ...	H. E. Reilly, F. T. Bisley, G. T. Webb, F. Vesington.	M.L.	New Zealand S.S. Co. ...	Met. Log. 15.7.24 to 19.12.24 ...	29.12.24.
<i>Kaisar-i-Hind</i> ...	Manley, G. ...	G. R. Baker ...	No.	P. & O. ...	Form 911 4.7.25 to 21.7.25 ...	1.8.25.
<i>Kamo Maru</i> ...	Okano, Y. ...	F. Takaku ...	"	Nippon Yusen Kaisha ...	" 10.5.25 to 8.6.25 ...	16.7.25.
<i>Kangaroo</i> ...	Norris, H. C. ...	R. J. Sinclair, V. J. Denton, V. Gilbert, J. Egglestone.	M.L.	State Service Australia ...	Met. Log. 27.8.24 to 11.3.25 ...	25.5.25.
<i>Kashmir</i> ...	Stringer, R. H., O.B.E., R.D., Commr., R.N.R.	F. Hopkins ...	No.	P. & O. ...	Form 911 24.8.24 to 8.9.24 ...	18.11.24.
<i>Kellett</i> ...	Maxwell, P. S. E., Commr., R.N.	D. G. V. Williams ...	M.L.	His Majesty's Ship ...	Met. Log. 15.4.25 to 28.7.25 ...	11.8.25.
<i>Kenilworth Castle</i> ...	Millard, L. A. ...	A. E. Denn, W. M. Toickins — May.	"	Union Castle ...	" 16.5.24 to 25.1.25 ...	6.2.25.
<i>Khiva</i> ...	Randall, H.W., R.D., Capt., R.N.R.	L. Fraser, K. H. Cummins, G. K. Fox.	"	P. & O. ...	" 24.10.24 to 31.1.25 ...	5.2.25.
<i>Khyber</i> ...	Collyer, R. M. M., R.D., Commr., R.N.R.	J. C. Davies ...	No.	" ...	Form 911 25.3.25 to 10.5.25 ...	14.5.25.
<i>Kia Ora</i> ...	McIntosh, A. ...	A. E. Lockhart ...	"	Shaw Savill & Albion ...	" 5.4.25 to 27.4.25 ...	19.5.25.
<i>Kildonan Castle</i> ...	Wilford, T.H. ...	G. H. Pickering ...	"	Union Castle ...	" 19.6.25 to 9.8.25 ...	11.8.25.
<i>Kilano Maru</i> ...	Gotoh, M. ...	R. Nakane ...	"	Nippon Yusen Kaisha ...	" 11.2.25 to 7.3.25 ...	13.3.25.
<i>Knight Companion</i> ...	Beale, H. E. ...	J. J. Daniel, A. M. Hunter ...	"	A. Holt ...	" 14.6.25 to 4.7.25 ...	14.7.25.
<i>Koranna</i> ...	Mordue, J. A. ...	"	"	Ellerman Bucknall ...	" 20.5.25 to 31.5.25 ...	2.7.25.
<i>Kovno</i> ...	Casson, D. H., R. D. Brown, A. M., Commr., R.N.R.	L. Griffiths, J. Sanders, J. Marshall, T. Tindell, N. W. Glendinning, F. T. Shaw.	M.L.	Ellerman Wilson ...	Met. Log. 26.7.24 to 20.4.25 ...	24.4.25.
<i>Kuogle</i> ...	Coalstad, C. ...	C. B. Odman, E. W. Hughes	No.	Commonwealth Light-house Service.	Form 911 13.11.24 to 13.12.24 ...	19.1.25.
<i>Lady Denison Pender, C.S.</i> ...	West, G. W. ...	F. Lawrence ...	"	Eastern Tel. Co. ...	" 21.5.25 to 9.6.25 ...	14.7.25.
<i>Laguna</i> ...	Pape, E. R. ...	W. P. Boon ...	"	Pacific S.N. Co. ...	" 9.6.25 to 4.7.25 ...	6.7.25.
<i>Lalande</i> ...	Taylor, G. C. ...	H. Phillips ...	"	Lampport & Holt ...	" 24.4.25 to 13.5.25 ...	6.7.25.
<i>Lancashire</i> ...	Beckett, F. W. ...	W. M. S. Higginson ...	"	Bibby ...	" 9.5.25 to 19.7.25 ...	14.8.25.
<i>Laomedon</i> ...	Smith, A. H. ...	A. J. Barclay ...	"	A. Holt ...	" 19.11.24 to 23.12.24 ...	5.1.25.
<i>La Paz, M.V.</i> ...	Ross, J. ...	A. Davies ...	"	Pacific S.N. Co. ...	" 14.6.25 to 18.7.25 ...	23.7.25.
<i>Laplace</i> ...	Davies, G. W. ...	W. Boyde, R. B. Langley ...	"	Lampport & Holt ...	" 13.12.24 to 30.3.25 ...	3.4.25.
<i>55 Lapland</i> ...	Howell, T. ...	F. T. Good, E. Cornellie, F. G. Edwards, Van Dyck	W.T.	Red Star ...	W.T. Reg. 25.6.25 to 14.7.25 ...	16.7.25.
"	"	"	"	"	Form 911 25.6.25 to 14.7.25 ...	16.7.25.
<i>Lassell, M.V.</i> ...	Hickman, V. T. ...	H. G. Cuthill ...	No.	Lampport & Holt ...	" 3.11.24 to 28.11.24 ...	19.12.24.
<i>Leicestershire</i> ...	English, G. L. ...	W. Whiteside, P. H. Potter, D. Y. Sharrock, J. Trade-well.	M.L.	Bibby ...	Met. Log. 14.3.25 to 22.5.25 ...	3.6.25.

LIST OF VOLUNTARY OBSERVING SHIPS

V

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.8.25.	Date Received.
<i>Leighton, M.V.</i> ...	Lindesay J. M. ...	... ..	No.	Lamport & Holt ...	... ..	...
<i>Leitrim</i> ...	Robertson, A. ...	E. F. C. Higgins ...	"	Dowie, J., & Co. ...	Form 911 27.6.25 to 12.7.25 ...	1.8.25.
<i>Glanstephan Castle</i> ...	Owen, S. H. ...	J. B. M. Reynolds... ..	"	Union Castle ...	" 20.9.24 to 25.11.24...	29.11.24.
<i>Loch Katrine</i> ...	Shillitoe B. ...	C. Noakes, C. N. Hatchard ...	"	R.M.S.P. Co. ...	" 15.3.24 to 12.6.25 ...	18.6.25.
<i>London Commerce</i> ...	Young, H. J., D.S.C. ...	P. G. Leverett ...	"	Furness Withy ...	" 20.6.25 to 22.7.25 ...	25.7.25.
<i>Lorica, M.V.</i> ...	Barkley, E. ...	W. N. Anders ...	"	Pacific S.N. Co. ...	" 26.4.25 to 19.5.25 ...	8.6.25.
<i>Losada, M.V.</i> ...	Meldrum, G. W. ...	A. H. Turner ...	"	" " ...	" 20.5.24 to 8.6.25 ...	6.7.25.
<i>Macedonia</i> ...	Potter, H. W., R.D., Commr., R.N.R. ...	E. R. Bodley ...	"	P. & O. ...	" 20.6.25 to 4.7.25 ...	20.7.25.
<i>Macharda</i> ...	Cochran, G. ...	W. Moore ...	"	Brocklebank ...	" 6.9.24 to 24.11.24 ...	5.12.24.
<i>Mahana</i> ...	Kershaw, W. A. R. ...	F. M. Smith, J. C. K. Rogers ...	"	Shaw Savill & Albion ...	" 14.3.25 to 19.4.25 ...	25.5.25.
<i>Maharaja</i> ...	Perry, C. R. ...	C. B. Miller, D. M. Swaine... ..	"	Asiatic S.N. Co. ...	" 18.5.25 to 7.6.25 ...	6.7.25.
<i>Maihar</i> ...	Rowe J. P. ...	C. Shaw, H. T. Scoins, R. G. Widdon. ...	M.L.	Brocklebank ...	Met. Log. 15.8.24 to 29.4.25 ...	7.5.25.
<i>Maimyo</i> ...	Richardson, T. ...	P. Yates ...	No.	" " ...	Form 911 31.5.25 to 21.6.25 ...	1.8.25.
<i>Maine</i> ...	Seymour, H. ...	A. S. Smith ...	"	Atlantic Transport ...	" 20.4.25 to 26.5.25 ...	15.6.25.
58 <i>Majestic</i> ...	Metcalfe, G. R. ...	L. Thompson, W. Pearson, W. T. Poustie, J. A. Macnaughton. ...	W.T.	White Star ...	W.T. Reg. 16.7.25 to 30.7.25 ... Form 911 9.12.24 to 22.12.24...	1.8.25. 29.12.24.
<i>Makambo</i> ...	Brown, T. M. ...	P. C. Ree, H. Mann, D. G. Irvine, D. Wilson, J. Abbot, K. Thompson. ...	M.L.	Burns Philp ...	Met. Log. 13.2.24 to 28.8.24 ...	2.12.24.
<i>Makura</i> ...	Mawson, J. ...	J. D. Lundie, G. H. Kime, N. Archibald, A. R. Noble. ...	"	Canadian-Australasian ...	" 23.10.24 to 6.3.25 ...	30.3.25.
<i>Malancha</i> ...	Whitham, F. ...	A. Hill ...	No.	Brocklebank ...	Form 911 12.3.25 to 8.4.25 ...	27.4.25.
<i>Malda</i> ...	Gray, T. N. ...	R. F. Wetherseed ...	"	British India ...	" 21.3.25 to 18.6.25 ...	22.6.25.
<i>Manchester Corporation.</i> ...	Everest J. E. ...	W. L. Lavers ...	"	Manchester Liners ...	" 11.7.25 to 9.8.25 ...	14.8.25.
<i>Manchester Importer</i> ...	Riley, J. E. ...	H. Scholfield, G. S. Robertson ...	"	" " ...	" 27.6.25 to 27.7.25 ...	30.7.25.
<i>Manchester Marine.</i> ...	Riley, J. E. ...	C. E. Stocker, J. F. Fisher, W. H. Downing. ...	M.L.	" " ...	Met. Log. 23.3.24 to 25.11.24...	5.12.24.
<i>Manchester Merchant.</i> ...	Barclay, J. ...	R. A. Walker ...	No.	" " ...	Form 911 4.7.25 to 15.7.25 ...	20.7.25.
<i>Mandasor</i> ...	Kershaw, R. W. ...	W. Baxter ...	"	Brocklebank ...	" 27.5.25 to 29.6.25 ...	18.7.25.
<i>Manhattan</i> ...	Hutchinson J. G. ...	R. Day ...	"	Atlantic Transport ...	" 10.11.24 to 18.12.24 ...	22.12.24.
<i>Manipur</i> ...	Scurr T. W. ...	G. W. Barker ...	"	Brocklebank ...	" 16.2.25 to 11.5.25 ...	15.5.25.
<i>Manistee</i> ...	Isaacson, J. M. ...	A. M. Houghton, J. Blower, F. R. Inch. ...	M.L.	Elders & Fyffes ...	Met. Log. 20.12.24 to 26.4.25...	8.8.25.
<i>Mantua</i> ...	Butler, G. E. ...	J. Paice ...	No.	P. & O. ...	Form 911 23.5.25 to 11.6.25 ...	6.7.25.
<i>Manzanares</i> ...	Henderson, J. N. ...	H. E. Lees ...	"	Elders & Fyffes ...	" 7.7.25 to 7.8.25 ...	12.8.25.
<i>Marella</i> ...	Mortimer S. ...	D. Pemberton, W. McBride, A. M. Hill, A. Campbell, W. Middleton. ...	M.L.	Burns Philp ...	Met. Log. 18.4.24 to 18.2.25 ...	11.5.25.
<i>Marengo</i> ...	... ..	L. T. Hale, F. Elgin, J. E. Stott, W. G. Pearce, E. Wood. ...	"	Ellerman Wilson ...	" 12.9.24 to 21.2.25 ...	25.2.25.
<i>Margha</i> ...	Milne, A. R., R.D., Commr., R.N.R. ...	J. Strachan, P. Wright, H. E. Evans, B. Paul. ...	"	British India ...	" 15.2.25 to 12.5.25 ...	20.5.25.
<i>Marglen</i> ...	Griffiths, J. N. ...	E. Eastley ...	No.	Canadian Pacific ...	Form 911 19.2.25 to 9.4.25 ...	14.4.25.
<i>Maryland</i> ...	Hutt, F. C. ...	A. C. Clay ...	"	Atlantic Transport ...	" 16.1.25 to 18.2.25 ...	24.2.25.
<i>Massilia</i> ...	Henderson, J. L. ...	E. Richardson ...	"	Anchor ...	" 12.9.24 to 20.9.24 ...	22.9.24.
<i>Matakana</i> ...	Thurston, H. P. ...	A. Chrystal ...	"	Shaw, Savill & Albion ...	" 1.2.25 to 30.5.25 ...	5.6.25.
<i>Mataram</i> ...	Brown, A. ...	K. L. Thompson ...	"	Burns Philp & Co. ...	" 29.3.25 to 3.5.25 ...	29.6.25.
<i>Matheran</i> ...	Columbine, F. F. ...	J. A. Embley, J. Robertson, R. E. Gartside. ...	M.L.	Brocklebank ...	Met. Log. 21.3.25 to 13.6.25 ...	16.6.25.
<i>Mathura</i> ...	Hanna, R. G. ...	H. H. Armstrong ...	No.	" " ...	Form 911 15.4.25 to 30.6.25 ...	3.7.25.
<i>Matiana</i> ...	Langlands, D. H. ...	B. Paul, J. H. Fletcher ...	"	British India ...	" 20.3.25 to 10.5.25 ...	6.2.25.
<i>Maunganui</i> ...	Worrall, L. C. H. ...	D. M. Todd ...	"	Union S.S. Co. of N.Z. ...	" 20.2.25 to 10.4.25 ...	29.6.25.
32 <i>Mauretania</i> ...	C.B.E., R.D., A.-d.-C., Capt., R.N.R. ...	R. Allen, E. R. Taylor, A. Mackellor. ...	W.T.	Cunard ...	W.T. Reg. 5.7.25 to 20.7.25 ...	22.7.25.
<i>Media</i> ...	Maughan ...	... ..	No.	T. & J. Brocklebank... ..	... ..	...
56 <i>Megantic</i> ...	Kearney, J. ...	F. A. Billiard, J. Clarke, N. E. Banks. ...	W.T.	White Star ...	W.T. Reg. 4.7.25 to 31.7.25 ...	5.8.25.
22 <i>Melita</i> ...	Clews, A. H. ...	J. McLennan, J. Mackenzie, D. Dunn. ...	"	Canadian Pacific ...	Form 911 4.7.25 to 21.7.25 ... 4.7.25 to 21.7.25 ...	24.7.25. 24.7.25.
<i>Memnon</i> ...	Salter, G. H. ...	E. D. Potts ...	No.	A. Holt ...	" 3.10.24 to 19.10.24...	21.10.25.
<i>Menominee</i> ...	Pollard, W. F., D.S.O., R.D., Capt. R.N.R. ...	C. F. Hicks ...	"	Atlantic Transport ...	" 14.2.25 to 19.3.25 ...	23.3.25.
<i>Mercian</i> ...	Gardner, J. ...	R. Hughes ...	"	Leyland ...	" 16.3.25 to 26.4.25 ...	1.5.25.
21 <i>Metagama</i> ...	Henderson W. ...	W. F. Reid, A. M. Watt, E. Laurence. ...	W.T.	Canadian Pacific ...	W.T. Reg. 5.7.25 to 20.7.25 ...	23.7.25.
<i>Miami</i> ...	Makepeace, S. ...	A. C. Woodhouse ...	No.	Elders & Fyffes ...	Form 911 4.7.25 to 18.7.25 ...	28.7.25.
<i>Minderoo</i> ...	Richardson, E. ...	B. J. Bennie, W. J. McPhedron, J. H. Oxtan. ...	M.L.	West Australia Nav. Co. ...	Met. Log. 27.11.24 to 16.5.25...	15.7.25.
<i>Minna</i> ...	Mackenzie, G. G. ...	D. Rattray ...	No.	Scottish Fishery Board ...	Form 911 5.7.25 to 29.7.25 ...	1.8.25.
23 <i>Minnedosa</i> ...	Notley, A. H., R.D., Commr., R.N.R. ...	R. Antrobus ...	W.T.	Canadian Pacific ...	W.T. Reg. 20.6.25 to 6.7.25 ...	10.7.25.
<i>Minnetonka</i> ...	Gates, T. F. ...	H. E. McCartney ...	No.	Atlantic Transport ...	Form 911 19.7.25 to 8.8.25 ...	13.8.25.
<i>Minnewaska</i> ...	Claret, F. ...	W. S. Mackie ...	"	" " " ...	" 6.7.25 to 25.7.25 ...	28.7.25.
<i>Mirror, C.S.</i> ...	Gibson, L. ...	C. E. F. St. John ...	"	Eastern Tel. Co. ...	" 2.4.25 to 29.5.25 ...	30.6.25.
<i>Mississippi, M.V.</i> ...	Wylie, J. T. J. ...	H. K. Cockerill ...	"	Atlantic Transport ...	" 17.5.25 to 28.5.25 ...	3.6.25.
<i>Moena</i> ...	Morzer Bruyns, M. F. ...	G. H. Vander Roest ...	"	Nederland ...	" 18.12.24 to 6.2.25 ...	10.2.25.
<i>Mongolian Prince</i> ...	Durrant, G. D. ...	P. F. Owens ...	"	Prince ...	" 22.2.25 to 11.4.25 ...	15.4.25.
<i>Monkbarns, Ship</i> ...	Davies, W. ...	R. Baise, J. Williams ...	"	J. Stewart & Co. ...	" 7.2.25 to 6.5.25 ...	15.6.25.
24 <i>Montcalm</i> ...	Sibbons, H. ...	H. McFadyen ...	W.T.	Canadian Pacific ...	W.T. Reg. 11.7.25 to 30.7.25 ...	1.8.25.
25 <i>Montclare</i> ...	Webster, G. S., R.D., Commr., R.N.R. ...	R. Fegan, W. Phillips, H. S. Knight. ...	"	" " ...	Form 911 18.7.25 to 6.8.25 ...	8.8.25.
27 <i>Mountainair</i> ...	Turnbull, J. C.B.E., R.D., Capt. R.N.R. ...	F. E. Williams ...	"	" " ...	" 18.7.25 to 6.8.25 ...	10.8.25.
<i>Montoro</i> ...	Hillman, E. J. ...	K. Morris ...	No.	Burns, Philp & Co. ...	" 6.3.25 to 14.4.25 ...	29.6.25.
26 <i>Montrose</i> ...	Landy, E. ...	T. Beck, C. Clarke, A. Mansey ...	W.T.	Canadian Pacific ...	W.T. Reg. 14.7.25 to 16.7.25 ... Form 911 26.6.25 to 17.7.25 ...	20.7.25. 20.7.25.
20 <i>Montroyal</i> ...	Latta, R. G. ...	R. W. Jones, J. H. Tudor, A. K. Benham. ...	"	" " ...	W.T. Reg. 4.7.25 to 23.7.25 ...	27.7.25.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.8.25.	Date Received.
<i>Moresby</i> ...	Edgell, J. A., O.B.E., Capt. R.N.	...	M.L.	His Majesty's Ship ...	...	...
<i>Mulbera</i> ...	Steadman, W. R. ...	E. Holland, H. W. Norris ...	No.	British India ...	Form 911 30.3.25 to 8.4.25 ...	16.4.25.
<i>Nagara</i> ...	Purvis, A. ...	H. V. Todd ...	"	R.M.S.P. Co. ...	" 11.3.25 to 7.5.25 ...	12.5.25.
<i>Nagoya</i> ...	Cherry, W. G. W. ...	P. Haworth ...	"	P. & O. ...	" 25.4.25 to 1.7.25 ...	22.7.25.
<i>Nardana</i> ...	Moth, F. L. ...	S. C. T. Smith, A. H. Hogge ...	"	British India ...	" 15.5.25 to 26.5.25 ...	8.6.25.
<i>Narva</i> ...	Buret, T. J. C. ...	E. Delahay, E. I. Fletcher, R. S. Wooley, H. Trenchard, W. Hughes.	M.L.	R.M.S.P. Co. ...	Met. Log. 1.5.25 to 24.6.25 ...	8.7.25.
<i>Nascopie</i> ...	Smellie, T. F. ...	A. S. Watts, T. D. Roseburgh ...	"	Hudson's Bay Co. ...	" 16.6.24 to 17.10.24 ...	23.10.24.
<i>Navasota</i> ...	Willan, F. G. L., R.D. Commr., R.N.R.	W. A. Delap ...	No.	R.M.S.P. Co. ...	Form 911 23.6.24 to 20.8.24 ...	28.8.24.
<i>Nellore</i> ...	Hignett, A. H., R.D., Lt. - Commr. R.N.R.	F. Squire ...	"	P. & O. ...	" 11.5.25 to 9.6.25 ...	20.6.25.
<i>Nestor</i> ...	Owen, R. D., O.B.E.	W. H. Newby, R. Wilks, F. J. Silva.	M.L.	A. Holt ...	Met. Log. 22.3.25 to 23.7.25 ...	5.8.25.
<i>Nevasa</i> ...	Swanson, C. J. ...	D. Lorrie ...	No.	British India ...	Form 911 21.2.25 to 12.5.25 ...	19.5.25.
<i>Newby Hall</i> ...	Kendall, J. W. ...	A. Martin ...	M.L.	Ellerman ...	Met. Log. 12.9.24 to 10.1.25 ...	27.1.25.
<i>Niagara</i> ...	Showman, A. C. ...	T. A. Macpherson, J. V. Bray, J. Dawson, A. P. Cousin.	"	Canadian-Australian ...	" 20.11.24 to 30.4.25 ...	25.5.25.
<i>Ningchow</i> ...	Wilson, C. A. ...	F. A. Brown ...	No.	A. Holt ...	Form 911 6.5.25 to 22.6.25 ...	25.6.25.
<i>Nore</i> ...	Parker, J. W. ...	R. W. Mackie, C. B. Roche, R. H. Turner, G. Haughey.	M.L.	P. & O. ...	Met. Log. 7.3.25 to 3.6.25 ...	15.6.25.
<i>Norman</i> ...	Morton Betts W. ...	D. A. Hodgson ...	No.	Union Castle ...	Form 911 22.3.25 to 10.4.25 ...	8.5.25.
<i>Norna</i> ...	Wright, J. ...	T. Mather ...	"	Scottish Fishery Board ...	" 3.7.25 to 27.7.25 ...	5.8.25.
<i>Norseman</i> , C.S. ...	W. Douglas ...	...	M.L.	Western Tel. Co. ...	Met. Log. 16.8.24 to 30.1.25 ...	3.3.25.
<i>Nortonian</i> ...	McCormick, J. ...	T. Griffiths ...	No.	Leyland ...	Form 911 2.8.24 to 30.9.24 ...	4.10.24.
<i>Nubian</i> ...	Watmough, T. M. ...	H. R. Gaskill ...	"	" ...	" 21.12.24 to 2.1.25 ...	6.1.25.
<i>Nyanza</i> ...	Carpendale, F. W. J.	G. D. Brown, R. H. Hand, A. L. Hill.	M.L.	P. & O. ...	Met. Log. 9.2.25 to 28.4.25 ...	2.5.25.
<i>Oaklands Grange</i> ...	Routledge, R. ...	E. A. Insley ...	No.	Houlder Bros. ...	Form 911 18.10.24 to 2.2.25 ...	19.2.25.
<i>42 Ohio</i> ...	Parker, W. H., C.B.E., R.D., Capt., R.N.R.	W. Paine, P. M. Burrell, H. F. Woodroffe, R. W. Stoney.	W.T.	R.M.S.P. Co. ...	W.T. Reg. 15.4.25 to 9.7.25 ...	20.7.25.
<i>Olympia</i> ...	Caldwell, R. ...	D. R. Urquhart, G. Lynas	M.L.	Anchor ...	Form 911 20.7.25 to 6.8.25 ...	10.8.25.
<i>57 Olympic</i> ...	Marshall, W., C.B., D.S.O., R.D., Capt., R.N.R.	H. J. C. Day, C. J. Warltire, W. Fitzgerald.	W.T.	White Star ...	Form 911 15.4.25 to 7.8.25 ...	10.8.25.
<i>Orama</i> ...	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	L. J. Vesty, F. Butler, M. C. Lester, J. S. Metcalf.	M.L.	Orient ...	" 14.3.25 to 23.5.25 ...	27.6.25.
<i>Oranian</i> ...	Hoskins, W. ...	R. H. Theaker ...	No.	Leyland ...	Form 911 27.4.25 to 14.5.25 ...	26.5.25.
<i>Orari</i> ...	Robinson, F. W. ...	R. Newman, T. Breen, F. Longheed, C. Wilkinson, H. Farrant.	M.L.	New Zealand S.S. Co. ...	Met. Log. 9.8.24 to 20.1.25 ...	27.1.25.
<i>40 Orbita</i> ...	Warner, G. E. ...	B. C. Dodds, H. G. Whittle, H. M. Rennie, R. Wray Hurt, R. H. East.	W.T.	R.M.S.P. Co. ...	W.T. Reg. 29.6.25 to 19.7.25 ...	22.7.25.
<i>Orcona</i> ...	Dominy, R. H., C.B.E. Commr. R.N.R.	G. B. Wardale, L. Jones, W. Billington.	M.L.	Pacific S.N. Co. ...	Form 911 27.6.25 to 20.7.25 ...	25.7.25.
<i>41 Orduna</i> ...	Le Brecht, H. G. ...	R. W. Sumpton, J. Vivian, K. M. Drake, W. Lowe.	W.T.	R.M.S.P. Co. ...	Met. Log. 21.5.25 to 3.8.25 ...	13.8.25.
<i>Oriana</i> ...	Mander, T. ...	R. E. Skellorn, R. D. Eekford, T. H. McGill.	M.L.	Pacific S.N. Co. ...	W.T. Reg. 12.7.25 to 2.8.25 ...	6.8.25.
<i>Orila</i> ...	Splatt, W. A. ...	J. G. Harvey, T. R. Scott, D. W. Hutchinson, C. P. D. Dean.	"	" ...	Form 911 12.7.25 to 2.8.25 ...	6.8.25.
<i>Ormonde</i> ...	Knowles, C. H., D.S.O., Commr., R.N.	A. M. Hughes ...	"	His Majesty's Ship ...	Met. Log. 12.5.25 to 20.7.25 ...	1.8.25.
<i>Ormonde</i> ...	Shelford, W. S., Lt- Commr., R.N.R.	N. A. Whinfield, W. A. Wickham, A. H. Dyer.	"	Orient ...	" 19.12.24 to 29.5.25 ...	12.6.25.
<i>Oronsay</i> ...	Coad, A. J., Commr., R.N.R.	J. C. K. Dowding, P. R. Murphy, R. K. Rogerson.	"	" ...	" 8.11.24 to 6.12.24 ...	31.12.24.
<i>Oroya</i> ...	Pearce, A. ...	S. Lewis ...	No.	Pacific S.N. Co. ...	" 4.1.25 to 7.4.25 ...	15.4.25.
<i>Orsova</i> ...	Matheson, C. G., D.S.O., R.D., Commr., R.N.R.	A. J. Croft Cohen, C. V. Dodgson, C. Fox.	M.L.	Orient ...	" 8.2.25 to 12.5.25 ...	20.5.25.
<i>Ortega</i> ...	Pleignier, H. S. ...	C. Leatherbarrow ...	No.	Pacific S.N. Co. ...	Form 911 28.4.25 to 6.7.25 ...	22.7.25.
<i>Orvieto</i> ...	Simner, G. L., R.D., Commr., R.N.R.	A. O. H. O'Brien, Hawker, A. H. Dyer.	M.L.	Orient ...	Met. Log. 5.4.25 to 8.7.25 ...	11.7.25.
<i>Osterley</i> ...	Cameron, E. P. ...	E. Hatch, H. Tanner, W. J. Rice.	"	" ...	" 9.12.24 to 16.2.25 ...	25.2.25.
<i>Othello</i> ...	Montgomery, H. ...	G. Binks ...	No.	Ellerman Wilson ...	Met. Log. 4.5.25 to 4.8.25 ...	8.8.25.
<i>Olira</i> ...	Elford, H. E. ...	J. H. Fuller ...	"	Shaw, Savill & Albion ...	Form 911 7.12.25 to 10.3.25 ...	13.5.25.
<i>Ovid</i> ...	Groom, A. C. B. ...	...	"	Shaw, Savill & Albion ...	" 19.4.25 to 28.7.25 ...	12.8.25.
<i>Oxfordshire</i> ...	Crumplin, W. E. ...	F. C. Brooks ...	"	Shakespeare-Shipping Co. Bibby Bros.	" 13.6.25 to 2.7.25 ...	10.8.25.
<i>Pacific Shipper</i> ...	Newman, G. W. A. ...	R. S. Smith ...	"	Furness Withy ...	" 20.4.25 to 20.5.25 ...	23.5.25.
<i>M.V. Pakeha</i> ...	W. P. Clifton Mogg ...	R. K. Vandervard, E. T. Baker ...	M.L.	Shaw, Savill & Albion ...	" 4.6.25 to 22.6.25 ...	21.7.25.
<i>Paparoa</i> ...	Dowse, F. ...	G. Mathieson ...	No.	New Zealand S.S. Co. ...	Met. Log. 25.12.24 to 12.1.25 ...	14.4.25.
<i>Paparoa</i> ...	Evans, J. O. ...	R. F. Hillings ...	"	Hain S.S. Co. ...	Form 911 20.5.25 to 21.6.25 ...	22.7.25.
<i>Paris</i> ...	Cook, C. L. ...	Mr. Biles ...	C.C.	Southern Ry. ...	" 30.5.25 to 21.7.25 ...	24.7.25.
<i>Patia</i> ...	Postock, R. J. ...	W. McIlwaine ...	No.	Elders & Fyffes ...	Telegraphic Report. 6.6.25 ...	6.6.25.
<i>Patrol, C.S.</i> ...	Welsh, T. K. ...	W. H. S. Clark, H. F. P. Albrecht, W. G. MacBryde, A. T. Morrell.	M.L.	Eastern Extension (A. & C.) Telegraph Co.	Form 911 4.7.25 to 8.8.25 ...	12.8.25.
<i>Persic</i> ...	Bulman, J. B. ...	H. G. Morgan ...	No.	White Star ...	Met. Log. 1.10.24 to 12.1.25 ...	16.4.25.
<i>Peshawar</i> ...	Hester, C. W., R.D., Commr., R.N.R.	D. G. Baillie, E. J. R. North, R. D. Whyte-Mackay.	M.L.	P. & O. ...	Form 911 8.2.25 to 19.6.25 ...	23.6.25.
<i>Pharos</i> ...	Ewing, T. N. ...	D. Tullock, A. McLachlan ...	No.	Northern Lighthouse Board.	Met. Log. 22.1.25 to 30.5.25 ...	5.6.25.
<i>Philadelphun</i> ...	Baker, J. A. ...	W. T. Godwin ...	"	Leyland ...	Form 911 13.4.25 to 30.4.25 ...	21.5.25.
<i>Polycarp</i> ...	Evans, T. G. ...	S. E. Adam ...	"	Booth ...	" 1.6.25 to 8.7.25 ...	1.8.25.
<i>Polypheumus</i> ...	Hatfield, J. ...	R. E. Wilkes ...	"	A. Holt ...	" 16.6.25 to 26.6.25 ...	25.7.25.
<i>Port Adelaide</i> ...	Hayter S. W. ...	E. Catchpole, E. Rogerson, C. Hodson.	M.L.	Commonwealth & Do- minion.	" 1.2.25 to 23.2.25 ...	25.2.25.

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 14.8.25.	Date Received.
<i>Port Albany</i> ...	Robinson, C. A. ...	A. Jenkyns, A. G. Newbury, G. Lovegrove.	M.L.	Commonwealth & Dominion.	Met. Log. 15.11.24 to 1.4.25...	9.4.25.
" <i>Auckland</i> ...	Durham, R. S. ...	G. T. C. Harris, R. C. Carter, C. F. Coate.	No.	" " "	" " " " " " " "	" " " "
" <i>Augusta</i> ...	Sawbridge, I. R. ...	T. Copeland, E. Fenton, C. Chamberlin.	M.L.	" " "	Met. Log. 6.4.24 to 15.10.24 ...	7.11.24.
" <i>Caroline</i> ...	Renaut, F. A. ...	W. H. Miles ...	"	" " "	" " " " " " " "	" " " "
" <i>Curtis</i> ...	Van den Bergh, C. ...	E. T. N. Lawrey, E. W. R. Young.	No.	" " "	Form 911 14.12.24 to 25.4.25 ...	2.6.25.
" <i>Darwin</i> ...	Brown, A. H. ...	W. H. Sadler ...	"	" " "	" " " " " " " "	" " " "
" <i>Denison</i> ...	Ferris, J. ...	Rowland Hill ...	"	" " "	" " " " " " " "	" " " "
" <i>Hacking</i> ...	Williams, R. ...	A. Cooper, C. F. Post, J. T. Weldin.	M.L.	" " "	Met. Log. 18.10.24 to 2.3.25 ...	26.1.25.
" <i>Hunter</i> ...	Cottell, S. C. ...	D. G. H. Bradley, J. A. Fairbairn, A. G. Starkey.	"	" " "	" " " " " " " "	" " " "
" <i>Melbourne</i> ...	Kearney, F. J. ...	H. C. Jeffery, W. G. Jones, J. T. Nicholson, E. G. L. Jones.	"	" " "	" " " " " " " "	" " " "
" <i>Pirie</i> ...	Higgs, W. G. ...	A. W. Sams, C. Groves, A. M. Stanton.	"	" " "	" " " " " " " "	" " " "
" <i>Sydney</i> ...	Lea, W. H. ...	E. G. Fullick, R. T. R. Tomsett, W. Pickup.	"	" " "	" " " " " " " "	" " " "
" <i>Victor</i> ...	Swan, L. H. ...	J. E. Murphy ...	No.	Pacific Mail S.S. Co....	Form 911 24.4.25 to 24.5.25 ...	15.7.25.
<i>President Cleveland</i> ...	Yardley, W. ...	E. E. Henry ...	"	Admiral Oriental Line	" " " " " " " "	" " " "
<i>President Jackson</i> ...	Griffith, J. ...	H. E. Clarke ...	"	" " " " " " " "	" " " " " " " "	" " " "
<i>President Jefferson</i> ...	Nichols, F. R. ...	L. C. Leeds ...	"	Pacific Mail S.S. Co. ...	" " " " " " " "	" " " "
<i>President McKinley</i> ...	Carey, R. E. ...	A. F. Jones ...	"	" " " " " " " "	" " " " " " " "	" " " "
<i>President Pierce</i> ...	January, G. T. ...	Woodhouse, A. F. B., Lt.-Commr., R.N.	"	South African Naval Service.	Form 911 1.6.25 to 30.6.25 ...	11.8.25.
<i>President Wilson</i> ...	Nelson, H. ...	W. Owen ...	"	A. Holt ...	" " " " " " " "	" " " "
<i>Protea</i> , H.M.S.A.S. ...	Woodhouse, A. F. B., Lt.-Commr., R.N.	" " " " " " " "	"	" " " " " " " "	" " " " " " " "	" " " "
<i>Pyrrhus</i> ...	Elford, W. J. ...	" " " " " " " "	"	" " " " " " " "	" " " " " " " "	" " " "
<i>Regina</i> ...	Smith, R. G. ...	G. W. Couch ...	M.L.	White Star-Dominion	" " " " " " " "	" " " "
<i>Reindeer</i> ...	Mulhall, W. ...	W. Heritage ...	C.C.	G.W. Railway ...	Telegraphic Report. 28.5.25 ...	13.7.25.
<i>Rhodesian Transport</i> ...	Fowler, W. H. ...	" " " " " " " "	No.	Houlder Bros. ...	Form 911 27.3.25 to 28.6.25 ...	28.5.25.
<i>Rimutaka</i> ...	Henning, F. A. ...	H. Horwood, R. S. Cox, O. M. Watts.	M.L.	New Zealand S.S. Co.	Met. Log. 12.10.24 to 1.4.25 ...	6.4.25.
<i>Risaldar</i> ...	Park, G. ...	B. Walsh, P. A. Handforth, T. E. Ward.	"	Asiatic S.N. Co. ...	" " " " " " " "	" " " "
<i>Romney</i> ...	Syms, G. ...	W. H. Underhill ...	No.	Lampport & Holt ...	Form 911 20.3.25 to 20.4.25 ...	5.5.25.
<i>Rotorua</i> ...	Hunter, J. B. ...	C. A. H. Landfield ...	"	N.Z.S. Co. ...	" " " " " " " "	" " " "
<i>Royal Fusilier</i> ...	Dawson, J. ...	J. Fraser ...	"	London & Edinburgh S.S. Co.	" " " " " " " "	" " " "
<i>Royal Transport</i> ...	Dove, J. ...	C. Feaver ...	"	Houlder Bros. ...	" " " " " " " "	" " " "
<i>Ruapehu</i> ...	McKellar, A. W., R.D., Capt., R.N.R.	P. J. Connolly, T. N. Bennett, F. Cooke.	M.L.	New Zealand S.S. Co.	Met. Log. 25.10.24 to 14.3.25...	27.7.25.
<i>Sachem</i> ...	Westgarth, W. A. ...	C. Waldron, E. Sainty, G. R. Watson.	"	Furness Withy ...	Form 911 24.12.24 to 20.6.25...	23.3.25.
<i>St. Albans</i> ...	Pilcher, E. ...	W. McIntyre ...	"	" " " " " " " "	" " " " " " " "	" " " "
<i>St. George</i> ...	Blair, D., O.B.E., R.D., Commr., R.N.R.	G. H. Blair, R. A. Edwards	No.	Eastern and Australian Scientific Expeditionary Research Assn.	Met. Log. 1.5.24 to 10.12.24 ...	19.1.25.
<i>St. Helier</i> ...	Mulhall, W. ...	C. Bell ...	M.L.	" " " " " " " "	" " " " " " " "	" " " "
<i>St. Julien</i> ...	Langdon, C. H. ...	C. Joy ...	C.C.	G.W. Railway ...	Telegraphic Report 13.8.25 ...	1.4.25.
<i>St. Patrick</i> ...	Bearpark, E. W. ...	J. Hill ...	No.	" " " " " " " "	" " " " " " " "	" " " "
<i>Salaya</i> ...	Sola, P., D.S.O. ...	G. E. Dutton ...	"	Rankin Gilmour ...	Form 911 24.5.25 to 13.6.25 ...	12.8.25.
<i>Samaria</i> ...	Horsburgh, G., O.B.E.	D. Macmillan ...	"	Elder Dempster ...	" " " " " " " "	" " " "
<i>Sandown Castle</i> ...	Jackson, C. R. ...	E. H. de Heaume ...	"	Cunard ...	" " " " " " " "	" " " "
<i>10 Saturnia</i> ...	Mitchell, W. ...	D. Macqueen ...	"	Union Castle ...	" " " " " " " "	" " " "
<i>Saroleine</i> ...	Biddick, E. ...	B. Johnsen ...	W.T.	Anchor Donaldson ...	W.T. Reg. 27.6.25 to 17.7.25 ...	27.7.25.
<i>Saxon</i> ...	Owen, S. H. ...	F. O. Wilbraham ...	No.	Hunting & Son ...	Form 911 27.6.25 to 17.7.25 ...	25.7.25.
<i>Saxonia</i> ...	Jones, R. D. ...	H. A. D. Waterhouse ...	"	Union Castle ...	" " " " " " " "	" " " "
<i>Scholar</i> ...	McCullum, J. ...	J. D. Grieves ...	"	Cunard ...	" " " " " " " "	" " " "
<i>Scindia</i> ...	Caithness, J. B. ...	R. S. Paton ...	"	Harrison ...	" " " " " " " "	" " " "
<i>Scotia</i> ...	Teller ...	O. W. L. Jones ...	"	Anchor ...	" " " " " " " "	" " " "
<i>Scottish Bard</i> ...	McDonnell, S. ...	S. W. Watts ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report 11.7.25 ...	2.7.25.
<i>Scottish Strath</i> ...	French, A. L. ...	W. Black ...	No.	Tankers Ltd. ...	Form 911 12.4.25 to 16.6.25 ...	14.7.25.
<i>33 Scythia</i> ...	Prothero, W. ...	T. Parry, E. S. Simmonds, W. B. Tanner.	"	" " " " " " " "	" " " " " " " "	" " " "
<i>Sheaf Mount</i> ...	Groves, C. V. ...	C. A. Gould ...	W.T.	Cunard ...	W.T. Reg. 6.6.25 to 27.6.25 ...	30.6.25.
<i>Sheaf Spear</i> ...	Whitfield G. A., O.B.E.	A. E. Harvey, W. H. Grisewood.	"	Souter, W. A. ...	Form 911 6.6.25 to 27.6.25 ...	30.6.25.
<i>Sicilia</i> ...	Davis, H. C., D.S.C., R.D., Commr., R.N.R.	G. C. Bateman ...	No.	" " " " " " " "	" " " " " " " "	" " " "
<i>Socrates</i> ...	James, F. R. ...	E. R. Hartley ...	"	P. & O. ...	Form 911 17.2.25 to 16.3.25 ...	21.4.25.
<i>Soekaboemi</i> ...	Lap, J. ...	W. N. de Wijn ...	"	" " " " " " " "	" " " " " " " "	" " " "
<i>Somerset</i> ...	Barnett, H. ...	J. J. Youngs ...	"	Lampport & Holt ...	" " " " " " " "	" " " "
<i>Somersetshire</i> ...	De Legh, P. ...	P. Hawkins, R. C. Lietch, M. Simmons.	"	Rotterdam Lloyd ...	" " " " " " " "	" " " "
<i>Somme</i> ...	Spriddell, F. G. ...	K. W. Simpton, H. Chamberlain, V. Hill, C. C. Prosser.	M.L.	N.Z.S. Co. ...	Met. Log. 20.3.25 to 21.6.25 ...	4.7.25.
<i>Songster</i> ...	Jackson, J. ...	W. Weatherall, W. Wilford, L. Bull.	"	Bibby ...	" " " " " " " "	" " " "
<i>Spectator</i> ...	Richardson, R. ...	D. Fraser, J. G. F. Betson ...	"	R.M.S.P. Co. ...	" " " " " " " "	" " " "
<i>Spero</i> ...	French, H. E. ...	W. Harbord, R. O. Otley	No.	Harrison ...	" " " " " " " "	" " " "
<i>Stephan C.S.</i> ...	Carlton, G. F., O.B.E., Commr., R.N.R.	F. B. Bolingbroke, W. E. Allen, T. J. Horan.	M.L.	" " " " " " " "	Form 911 26.1.25 to 9.4.25 ...	16.4.25.
<i>Stuart Prince</i> ...	Durrant, G. D. ...	W. C. Freeman ...	"	Ellerman Wilson ...	Met. Log. 15.8.24 to 16.5.25 ...	12.6.25.
<i>Surrey</i> ...	Field, H. E. B. ...	C. P. Jackson, C. H. Landfield.	No.	" " " " " " " "	" " " " " " " "	" " " "
<i>Sussex</i> ...	Upton, E. C. S. ...	W. A. Ewington ...	"	Telegraph Construction & Maintenance	" " " " " " " "	" " " "
<i>Tainui</i> ...	Hartman, W. H. ...	P. S. Horwood ...	No.	Prince ...	Form 911 17.6.25 to 29.7.25 ...	4.8.25.
<i>Tairoa</i> ...	Summers, W. G. ...	S. A. Bannister ...	M.L.	Federal ...	Met. Log. 2.11.24 to 28.3.25 ...	14.4.25.
			No.	" " " " " " " "	Form 911 28.10.24 to 13.11.24	15.12.24.
			"	Shaw, Savill & Albion	" " " " " " " "	" " " "
			"	" " " " " " " "	" " " " " " " "	" " " "

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 14.8.25.	Date Received.
<i>Tahiti</i> ...	Hamilton, H. E. ...	W. Bailey ...	No	Union S.S. Co. of N.Z.	Form 911	...
<i>Taiyuan</i> ...	Thomas, R. D. ...	...	M.L.	Yuill & Co. ...	Met. Log.	20.12.24 to 5.5.25 ... 6.7.25.
<i>Talthybius</i> ...	Lloyd, R. ...	P. Elder ...	No.	A. Holt ...	Form 911	2.7.25 to 16.7.25 ... 11.8.25.
<i>Tanda</i> ...	Pilcher, E. ...	...	M.L.	E. & A. S.S. Co. ...	"	...
<i>Tambora</i> ...	Huisman, N. ...	H. Van Manen ...	No.	Rotterdam Lloyd ...	"	27.2.25 to 15.4.25 ... 27.4.25.
<i>Teiresias</i> ...	Holden, W. R. F. ...	R. S. Young ...	"	A. Holt ...	"	8.1.25 to 23.1.25 ... 2.2.25.
<i>Teucer</i> ...	Hodgson, R. N. ...	A. Lightbody ...	"	"	"	4.7.25 to 14.7.25 ... 22.7.25.
<i>Themistocles</i> ...	Jernyn, W. M. ...	W. F. Sargent ...	"	Aberdeen ...	"	11.3.25 to 23.4.25 ... 5.5.25.
<i>Theseus</i> ...	Batt, A. E. ...	J. T. Fettes ...	"	A. Holt ...	"	5.6.25 to 25.6.25 ... 27.7.25.
<i>Titan</i> ...	Wilkinson, T. G. ...	G. Gow, L. Morton, S. C. Timmouth, F. D. Lovewell.	M.L.	"	Met. Log.	12.11.24 to 14.3.25... 11.5.25.
<i>Tolmie, S.F.Bqtne.</i>	Stewart, J. C. ...	E. F. Collins ...	No.	B. C. Mills, Tug and Barge Co.	Form 911	1.11.24 to 24.12.24... 2.3.25.
<i>Totori Maru</i> ...	Matsukura, B. ...	S. Ibori ...	"	Nippon Yusen Kaisha	"	7.9.24 to 13.10.24 ... 20.10.24.
<i>Trematon</i> ...	Evans, B. ...	S. Smith, C. Mayberry, J. Bell.	M.L.	Hain S.S. Co. ...	Met. Log.	21.10.24 to 16.7.25... 11.8.25.
<i>Tuscania</i> ...	Bone, D. W. ...	J. W. Cherry ...	No.	Anchor ...	Form 911	23.6.25 to 11.7.25 ... 21.7.25.
<i>Tyndareus</i> ...	Slater, H. N. ...	C. Broad, A. C. H. Jones, S. A. Beith.	M.L.	A. Holt ...	Met. Log.	23.4.25 to 2.7.25 ... 4.8.25.
<i>Ulimaroa</i> ...	Wyllie, W. J. ...	J. Gilbertson ...	No.	Huddart Parker, Ltd.	Form 911	17.10.24 to 23.11.24 ... 19.1.25.
<i>Ulysses</i> ...	McHutcheon, W. ...	T. R. Phillips ...	"	A. Holt ...	"	20.6.25 to 7.7.25 ... 10.8.25.
<i>Umvolsi</i> ...	Barnes, E. W. ...	"	"	Bullard King ...	"	...
<i>Valacia</i> ...	Doyle, M. ...	N. Grayson ...	"	Cunard ...	Form 911	8.6.25 to 7.7.25 ... 13.7.25.
<i>Valdura</i> ...	Mitchell, A. ...	H. J. Maughan, J. Anderson, A. M. S. Well.	M.L.	Gow Harrison ...	Met. Log.	19.6.24 to 20.11.24... 8.12.24.
<i>Vardulia</i> ...	Murchie, P. A., R.D., Commr., R.N.R.	A. Bridgewater ...	No.	Cunard ...	Form 911	4.7.25 to 16.7.25 ... 20.7.25.
<i>Vasconia</i> ...	Inch, F. ...	L. Hunter ...	"	"	"	15.6.25 to 24.6.25 ... 10.7.25.
<i>Vellavia</i> ...	Fear, E. T. C. ...	J. E. Deans ...	"	"	"	26.3.25 to 6.4.25 ... 14.4.25.
<i>Ventura de Lar-rinaga.</i>	Keay, W. S. ...	H. J. Kay ...	"	Larrinaga ...	"	3.12.24 to 28.3.25 ... 19.5.25.
<i>Verbania</i> ...	Pooley, T. S. M. ...	J. G. Wiseman ...	"	Cunard ...	"	23.5.25 to 26.6.25 ... 29.6.25.
<i>Verentia</i> ...	Jones, R. D. ...	A. F. Watts ...	"	"	"	18.5.25 to 17.6.25 ... 22.6.25.
<i>Vigilant</i> ...	Simpson, E. S. S. ...	J. Hunter ...	"	Scottish Fishery Board	"	1.7.25 to 21.7.25 ... 24.7.25.
<i>Waiotapu</i> ...	Davey, A. ...	B. S. Cave, N. M. Boneth, R. N. Turner.	"	Canadian-Australasian	"	23.10.24 to 30.4.25... 2.6.25.
<i>Walmer Castle</i> ...	Stanley, W. P., R.D., Commr., R.N.R.	C. Aylen ...	"	Union Castle ...	"	8.5.25 to 29.6.25 ... 30.6.25.
<i>Wangaratta</i> ...	Scutt, W. ...	T. W. Wordingham, W. C. Cripps, K. M. Morrison, N. A. Pope.	M.L.	British India ...	Met. Log.	21.1.25 to 19.7.25 ... 20.7.25.
<i>Warfelda</i> ...	Steel, R. ...	H. Coffey ...	No.	"	Form 911	16.3.25 to 28.5.25 ... 8.6.25.
<i>War Nizam</i> ...	Putt, R. O. ...	D. Beaumont ...	"	British Tankers ...	"	20.5.25 to 17.6.25 ... 9.7.25.
<i>Welshman</i> ...	Rollerson, W. ...	W. A. Fletcher ...	"	White Star-Dominion	"	24.6.25 to 21.7.25 ... 25.7.25.
<i>Winifredian</i> ...	Harrocks, W. ...	L. A. Cording ...	"	Leyland ...	"	20.6.25 to 29.6.25 ... 4.7.25.
<i>Woodarra</i> ...	Reilly, J. V. ...	L. D. Graham, A. V. Fisher, L. C. Comber, J. Wallace.	M.L.	British India ...	Met. Log.	3.4.24 to 22.6.24 ... 2.8.24.
<i>Yorkshire</i> ...	Millson, G. C. ...	E. E. Jones ...	No.	Bibby ...	Form 911	23.5.25 to 2.8.25 ... 4.8.25.
<i>Zeeland</i> ...	Thomas, A. J. ...	J. N. Lee ...	"	Red Star ...	"	17.7.25 to 7.8.25 ... 10.8.25.
<i>Conway H.M.S.</i>	Broadbent, H. W., R.D. Capt., R.N.R.	The Senior Cadets...	Cadets' M.L.	...	Cadets' Met. Log.	3.5.25 to 25.7.25 ... 31.7.25.
<i>Pangbourne Nautical College.</i>	Tracy, A. F. G., Commr., R.N.	"	"	...	Cadets' Met. Log.	10.5.25 to 24.7.25 ... 30.7.25.
<i>Worcester, H.M.S.</i>	Sayer M. B., O.R.E., R.D., Capt., R.N.R.	"	"	...	Cadets' Met. Log.	23.1.25 to 16.4.25 ... 20.4.25.
<i>Abaco</i> ...	...	The Keepers ...	Lighthouse Register.	...	Lighthouse Register	7.7.24 to 14.1.25 ... 9.3.25.
<i>Cay Lobos</i> ...	...	"	"	...	Lighthouse Register	1.7.24 to 31.12.24 ... 9.3.25.
<i>Double Headed Shot</i> ...	...	"	"	...	Lighthouse Register	1.7.24 to 31.12.24 ... 9.3.25.
<i>Inagua</i>...	...	"	"	...	Lighthouse Register	11.7.24 to 18.1.25 ... 9.3.25.
<i>Sombrero</i> ...	...	"	"	...	Lighthouse Register	1.1.25 to 30.6.25 ... 7.8.25.
<i>Watling Island</i> ...	...	"	"	...	Lighthouse Register	1.7.24 to 30.12.24 ... 9.3.25.
<i>Cape Pembroke (Falkland Is.).</i>	...	"	"	...	Lighthouse Register	1.7.24 to 31.12.24 ... 4.3.25.

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

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., Received up to 31.7.25.	Date Received.
<i>Herschel</i> ...	Davis, T. J. ...	T. Lester Guy ...	Lampart & Holt	Water Samples ...	...
<i>Hildebrand</i> ...	Maddrell, J. ...	H. Welch ...	Booth ...	" " ...	30.6.25.
<i>Holbein</i> ...	Gough, W. A. ...	G. P. Kitto ...	Lampart & Holt	" " ...	6.7.25.
<i>Manzanares</i> ...	Henderson, J. N. ...	H. E. Lees ...	Elders & Fyfes	" " ...	27.7.25.
<i>Miami</i> ...	Makepeace, S. ...	H. H. Dunning ...	"	" " ...	...

October M.O., 1925.