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TABLE OF PRINCIPAL CONTENTS.

	PAGE.		PAGE.
Which is the Best Route from Colombo or the East to the Straits of Bab-el-Mandeb during the S.W. Monsoon? ...	99	Wireless Stations detailed to receive Routine Coded Weather Reports from "B Selected Ships" ...	110
The Marine Observer's Log (with illustrations) ...	100	Spain, Portugal, Italy, Malta and Morocco ...	112
The Best Track from Colombo and the East to the Straits of Bab-el-Mandeb during the S.W. Monsoon ...	103	Lithographic Illustrations after page 114:—	
Southern Ice Reports during the years 1929 and 1930— May ...	107	Chart VI.—Ships' Wireless Weather Signals.	
Weather Signals:—		Charts 1 to 22.—The Best Track from Colombo and the East to Straits of Bab-el-Mandeb.	
Wireless Stations detailed to receive Routine Coded Weather Reports from "A Selected Ships" ...	108	Fog frequency in the South Atlantic—May.	
		Wind, Fog, Mist and Weather for the Region off the Coast of Portugal—May.	
		Typhoons in the Far East during the years 1882 to 1926—May.	

WHICH IS THE BEST ROUTE FROM COLOMBO OR THE EAST TO THE STRAITS OF BAB-EL-MANDEB DURING THE SOUTH WEST MONSOON?

FOLLOWING what we said in our January notes this question has again been examined and is answered as far as we can in this number so that the revised information and recommendations may reach the captains of ships concerned, well before the break of the South West Monsoon.

The recommendations now given for the selection of a route are made after consultation with the Hydrographer of the Navy who will further consider them when the Admiralty books OCEAN

PASSAGES OF THE WORLD, THE WEST COAST OF INDIA PILOT and other appropriate Sailing Directions are revised.

The captains of observing ships will greatly assist by showing this number of THE MARINE OBSERVER to the captains of ships not on our list who may not have received it and who may be going to make this passage.

MARINE SUPERINTENDENT.

THE MARINE OBSERVER'S LOG.

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

WEATHER CHART MADE AT SEA.
Eastern North Atlantic.

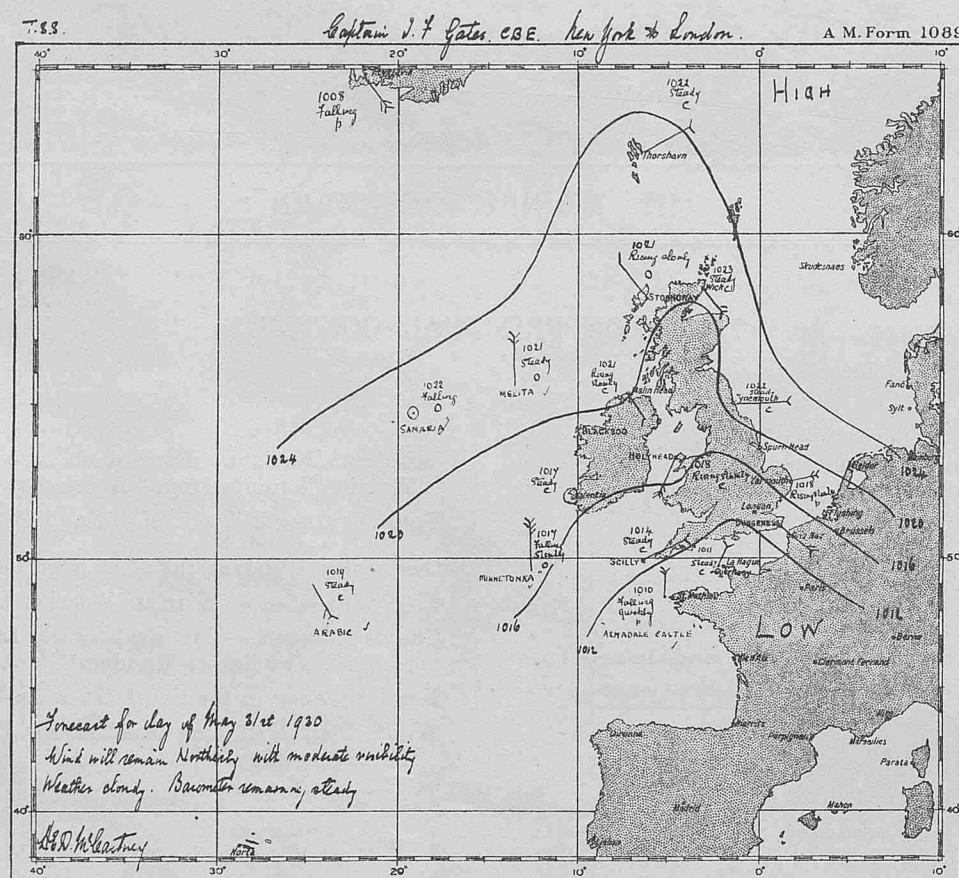
THE following weather chart and forecast made on the 31st May, 1930, by Mr. H. E. D. McCARTNEY on board R.M.S. *Minnetonka*, Captain T. F. GATES, C.B.E., is of special interest as it was the first actual example received in the Marine Division of the use of the roll-call, made through Portishead since 1st May, 1930, for the purpose of collecting weather reports from ships at sea.

The observations reported by ships, shown on this chart, are those made by chosen selected ships for the day, the roll-call being *Melita*,

Minnetonka, *Samaria*, *Arabic*, *Armada Castle*, and the chart shows that all were received.

To those officers who have not been in the habit of practising Wireless and Weather, an aid to Navigation, "Hints to Young Officers," pages 41-43 of the February, 1931, MARINE OBSERVER, will be of interest.

This chart was referred to in the Marine Superintendent's note "The Practical Side of the Work and its Utility to the Merchant Navy—II," published in the November, 1930, MARINE OBSERVER.

VISIBILITY AND REFRACTION.
South African Waters.

THE following is an extract from the Meteorological Log of S.S. *Walmer Castle*, Captain W. MORTON BETTS, Madeira to Cape Town. Observer, Mr. G. H. PICKERING.


May 18th, 1930. Exceptional visibility was experienced this night. The actual light of Dassen Island, the normal visibility of which is 23 miles, was observed at a distance of 50 miles. The loom of Green Pt. Lt., normal visibility 17½ miles, was observed at the same time, distance approximately 82 miles. The actual lights of bush fires on the slopes of Lion's Head mountain were distinctly visible at a distance of over 90 miles. The actual light of Green Point became visible at a distance of 35 miles. The stars were exceptionally brilliant, the sky having the appearance of one solid mass. The


Milky Way was particularly beautiful and well-defined. The air was quite dry, wind light and variable and no cloud. The bow wave gave off a brilliant greenish phosphorescent light.

The height of Lion's Head mountain is 2,178 feet, but as the bush fires were on the slope they would be much lower.

MIRAGE.
North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Newfoundland*, Captain A. W. FOXWORTHY, St. Johns, N.F., to Liverpool. Observer, Mr. R. F. HANDLEY, 2nd Officer.

May 20th 1930, at 12.50 p.m., observed large berg 3 points on starboard bow, then two more closer on bow. 2.20 p.m. bergs now assuming fantastic shapes. One with two pinnacles  appeared

to reach high in heavens, next one appeared  and away up high, the third was also shaped like the first but assumed a perfect cylindrical shape. In the north a growler and small berg appeared double, one reflection over the original. 3 p.m. everything again normal.

Position of ship, leaving St. Johns, Newfoundland. Course 50°, speed 14 knots. 12.50 p.m., Fine clear weather, apparent fog in the east. Wind S.S.E. force 2. Temperature—air 40°, sea 36° F. 2 p.m. wind hauled to S.W. 3 p.m. wind W.S.W. force 3.

BLUE AND GREEN FLASH AT SUNSET.

Mediterranean Sea.

THE following is an extract from the Meteorological Log of H.M.S. *Endeavour*, Captain J. A. EDGELL, O.B.E., R.N. Observer, Lieutenant M. B. THOMAS, R.N.

On May 8th, 1930, 6.30 p.m., as the upper limb of the sun dipped, for a period of 2-3 seconds it turned a pale cobalt blue, the colour appearing at the edges and moving towards the centre as the upper limb disappeared.

Temperature of air, dry bulb 70°, wet bulb 63°, sea 69°. Sky clear, sea calm. Visibility 8. Ship at Haifa. [Latitude 32° 49' N., Longitude 35° 00' E.]

On May 28th, 1930, 6.40 p.m. (sunset), the upper limb of the sun turned a vivid green colour about 3 seconds before it dipped. The green light persisted for half second after the upper limb had dipped. This green flash was very much brighter than any of the ones previously observed from the ship, either in the Mediterranean or the Red Sea, and was visible not only through binoculars, but to the naked eye. Temperature of air, dry bulb 72°, wet bulb 70°, sea 73°. Sky was clear, visibility good (8). There was a slight northwest-breeze and the sea was calm. Ship at Akka. [Latitude 32° 55' N., Longitude 35° 04' E.]

SOLAR HALOS.

North Atlantic.

THE following is an extract from the Meteorological Record of S.S. *Orbita*, Captain E. ROBERTS, Vigo to Havana. Observer, Mr. E. C. HICKS, 3rd Officer.

On Thursday 15th May, 1930, at 1.30 p.m. (1800 G.M.T.) clouds Ci./Ci-Cu., amount nine-tenths, a very brilliant 22° Solar Halo appeared and also an arc of a 46° halo below and concentric with it. Both halos showed the colours of the spectrum, the colours in the 46° arc being more pronounced although not so brilliant as those of the complete halo. At 2 p.m. (1830 G.M.T.) both halo and arc had disappeared.

Ship's position Latitude 30° 05' N., Longitude 69° 05' W. Barometer corrected 30.103 in. Wind South, force 4, Sun's true altitude 77° 48'.

WATERSPOUTS.

New Zealand Waters.

THE following account of an experience with a waterspout in New Zealand waters which happened some years ago has been forwarded by Captain A. T. NORTON, of M.V. *Hauraki*.

"I was at the time in command of the S.S. *Kekerangu* belonging to the Union Steam Ship Company of N.Z., and was bound from Napier (N.Z.) to Westport, the date as far as I can remember being May 1921. When we left Napier a strong westerly gale was blowing with a falling glass, and indications of a still heavier blow to come. Twenty-four hours later we were in Cook's Strait, where we found the wind had veered to the N.W., blowing very hard about force 10-11. The ship being in ballast made very little headway, and it was not until 11 a.m. the following day that we passed Stephen's Island, taking twelve hours to do a run of 30 miles between Brothers Light and Stephen's Island.

"At the time of passing Stephen's Island the wind had taken off considerably, but the glass was still very low, and the general appearance of the weather threatening. A course was set to pass five miles off Farewell Spit Light, distant 45 miles. At about 2 p.m. the wind again started to blow very hard from N.N.W. with thick driving rain, and a heavy confused sea. The ship was making about four knots, and at 8 p.m. I estimated that we were abreast of the Spit Light, though owing to the low visibility nothing was to be seen. The swell was now running very high from the south-west, and the engines were racing so heavily that it was impossible to proceed. I therefore turned the ship round and headed back for Stephen's Island, allowing two points for leeway and set, so as not to be set down into Golden Bay, the engines being at half speed. The wind still held to the N.N.W. with heavy rain, and as we were running back towards Stephen's and D'Urville Islands, I decided to put the ship round again if nothing was seen by 2 a.m. Nothing having been seen by that time, I gave the order 'hard a starboard'. There was a full moon at the time, and I had previously noticed a very black squall approaching from the port quarter, and as we were coming round on the starboard helm, this struck us. Before it reached us we heard a terrific roaring sound, similar to that made by an express train rushing through a station, and when it reached us the din was beyond description. The wind came from all points of the compass at once, and a veritable deluge of water fell on the ship, the water on the bridge being about eight inches deep in a few seconds. So heavy was the fall of water, that the weight of it falling on my shoulders *actually forced my knees to bend*, as one would if standing under a cataract. In about two minutes it had passed away to leeward, and as it passed the whole atmosphere cleared up, not a vestige of cloud remaining in the sky, and as it passed away Stephen's Island Light, and the land about D'Urville Island became plainly visible at about fifteen miles distance.

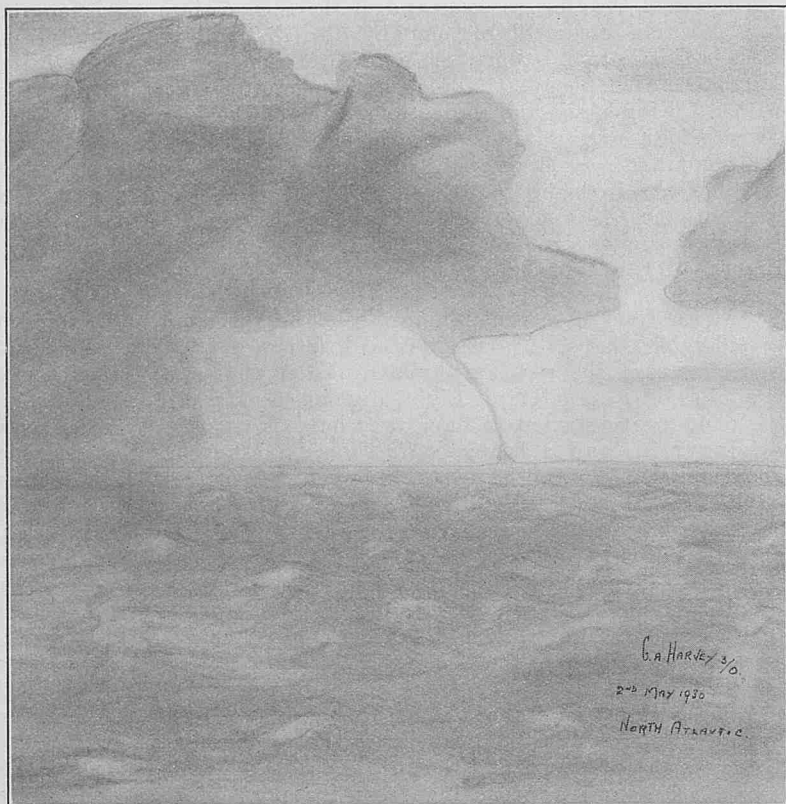
"I have seen it stated that waterspouts are never met with at night, but there is no doubt in my mind that this was a small spout, and the information may be of some use to you."

North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Tainui*, Captain W. P. CLIFTON-MOGE, Southampton to Colon. Observer, Mr. A. G. COLLINS, 4th Officer.

On 2nd May, 1930, at 7.45 a.m., a waterspout was observed on the port beam bearing southeast by south, distant about three and a half miles. Owing to intervening precipitation we were unable to observe initial stages of its formation. The clouds from which the waterspout emanated were heavy Cumulo-Nimbus and Nimbus with a well-defined base, but partially obscured by and showing rainfall to the eastward of the waterspout.

When first observed, the waterspout was vertical, but as the cloud moved to the eastward, it ran diagonally, trending from east at the top to west at the base. The sea at the base was agitated and rose up in a cone. The weather prior to the appearance of the phenomenon was unsettled, with variable winds from west by north to southwest by west, force 4 to 5, accompanied by frequent squalls of wind and rain. The sky, heavily clouded, was beginning to clear from the westward, following a heavy rain squall, and it was from the last or most westerly portion of heavy Cumulo-Nimbus that the waterspout appeared.



A sextant angle from the sea to base of the Nimbus cloud was 3° . The time occupied by the phenomenon was ten minutes.

Position of ship Latitude $39^{\circ} 27' N$. Longitude $40^{\circ} 13' W$. Course 237° speed 13 knots.

WATERSPOUT AND SQUALL.

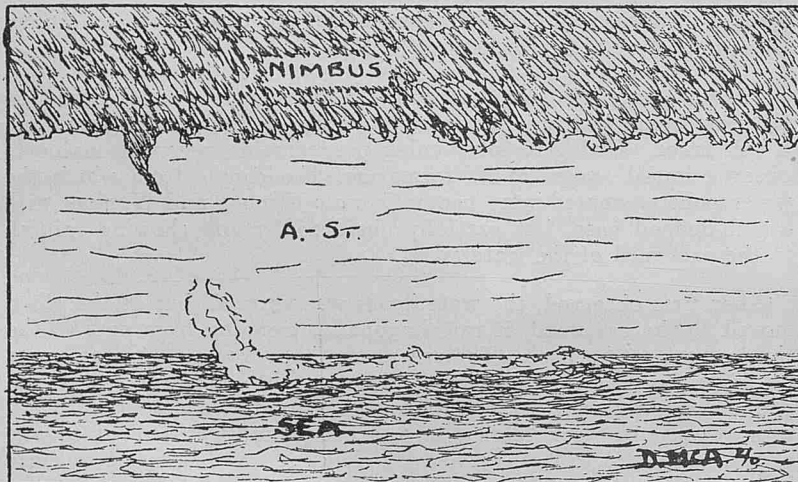
Bay of Bengal.

THE following is an extract from the Meteorological Record of S.S. *Clan Sinclair*, Captain H. CATER, Suez to Indian Ports. Observer, Mr. D. McALLISTER, 2nd Officer.

Saturday, 31st May, 1930, at 1.40 p.m. A.T.S., a violent squall from the N.W. struck the vessel with such force that it carried away awnings on forecastle, upper bridge and poop deck. The duration of the squall was about ten minutes, during which time the barometer fell 0.07 in. About 2.05 p.m. A.T.S. the wind backed to W.S.W. force 7.

Immediately before the squall a water spout was observed forming on the starboard quarter, however, before fully formed the squall struck and dispersed it.

Position of Ship Latitude $16^{\circ} 39' N$. Longitude $88^{\circ} 39' E$.



METEOR.

North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Ariguani*, Commander J. H. H. SCUDAMORE, D.S.C., R.D., R.N.R., Avonmouth to Barbados. Observer, Lieutenant W. IRELAND, R.N.R.

May 20th, 1930, at 10.05 p.m. (2317 G.M.T.) observed bright meteor which appeared near Alphecca and disappeared about one-third of the distance between Polaris and Dubhe. Duration of flight $1\frac{1}{2}$ secs., Magnitude about equal to full moon. Sky clear. Meteor appeared to stop for a fraction of a second in the zenith.

Position of ship Latitude $43^{\circ} 37' N$. Longitude $21^{\circ} 02' W$.

METEOR.

South Atlantic.

THE following is an extract from the Meteorological Record of S.S. *Elstree Grange*, Captain R. OWEN, Liverpool to South America. Observer, Mr. P. A. HAWKESWORTH, 3rd officer.

On May 12th, 1930, at 2126 G.M.T., a brilliant meteor was observed. The meteor first appeared in the constellation of Orion, on a line joining κ Orionis and Betelgeuse, midway between these two stars, travelling at a slow speed in a northerly direction, roughly following the line, on which it first appeared, slowly losing height. The meteor was in sight for about five seconds and finally disappeared in the vicinity of Capella. It was of considerable magnitude and gave off an exceedingly bright white light. There was a noticeable increase in the light of the western heavens, though the effect was probably lessened by the presence of the full moon in the east.

Position of ship Latitude $5^{\circ} 56' S$. Longitude $33^{\circ} 18' W$. Cloud Fr-Cu. Amount 1. Visibility 7.

METEOR.

Red Sea.

THE following is an extract from the Meteorological Log of H.M.S. *Ormonde*, Commander A. C. N. WYATT, R.N. Observer, Lieutenant S. W. S. ROBERTSON, R.A.N.

May 25th, 1930, time 22.58 (Zone 3), a bright flash was observed bearing 315° at an altitude of 19° . This appeared as a purple ball, which, remaining apparently fixed in space, instantaneously burst and spread out over an area of the heavens about 12° long and 3° deep. The whole appeared similar to the burst of an explosive shell. Sky was heavily clouded in the north-west at the time.

Position of ship Latitude $20^{\circ} 30' N$. Longitude $38^{\circ} 10.6' E$. Weather bc, Cloud amount 7. Visibility 7.

NOTE.—This was probably a large meteor, the path of which was observed end-on, hence the stationary appearance.

METEORIC SHOWER.

China Sea.

THE following is an extract from the Meteorological Log of S.S. *Nellore*, Captain A. S. GORDON, Hong Kong to Manila. Observer, Mr. J. HEDDLE, 2nd Officer.

May 4th, 1930, between 2.30 and 3.00 a.m. in the Middle Watch a number of meteors were observed in the S.E. quadrant of the sky. With the exception of two, they were of small magnitude (about equal to a third magnitude star) and each one was visible for about one or two seconds.

During the first five minutes of the above period seven of these small meteors were seen to the S.E. at an altitude of about 15 degrees, their direction of flight was from east to west and parallel to the horizon.

Several minutes later two brighter ones were seen bearing about East true. These were about equal in brilliance to the star Sirius, were of a greenish colour, and displayed bright tails of about 10 degrees in length. They remained visible for about two and a half seconds, during which time they fell in a slanting direction from east to west, from altitude about 30 degrees to altitude about 10 degrees before being lost to sight.

Other small meteors travelling in various directions were seen between 2.45 and 3.00 a.m.

The total number seen was about twenty. The night was very fine and clear, being flat calm and cloudless except for a very low bank of stratus all round the horizon.

Position of ship, Latitude 17° 52' N. Longitude 117° 54' E. True Course S. 36° E.

THE BEST TRACK FROM COLOMBO AND THE EAST TO THE STRAITS OF BAB-EL-MANDEB DURING THE SOUTH WEST MONSOON.

By L. A. BROOKE SMITH, MARINE SUPERINTENDENT.

Ever since the commencement of steam navigation in the Indian Ocean it has been expedient in choosing a route to take into account the South West Monsoon. The early steamships of the Indian Navy and of the Peninsular and Oriental Steam Navigation Company found in their carriage of mails from Bombay to Suez, long before the canal was opened, that it paid to steam to the Southward from Bombay and make their westing in lower latitudes so cheating the strength of the South West Monsoon.

We owe much to the officers of the Indian Navy and Indian Marine, for they surveyed and charted much of the Indian Ocean, and many of their charts are in use to-day. In 1853 Lieutenant A. DUNDAS TAYLOR, Indian Navy, compiled a chart—now out of print—of the Arabian Sea, showing the winds and currents during the South West Monsoon from upwards of 100 logs of vessels of the Indian Navy. Upon this chart he gave “the probably best track for steamers from Bombay to Aden in that season” and this route remained the recommended route for low power steamers until 1921.

In 1921 following representations made by Captain A. TAYLOR, of S.S. *Rotenfels*, who had made the passage from Bombay to Suez in the previous season, the steam ship route from Colombo and the East, which had been the subject of several examinations by the Marine Division of the Meteorological Office since its establishment in 1855, was re-examined and as a result alternative routes for large high power steamers, full power steamers and low power steamers were recommended on the back of the East Indian Seas Meteorological Charts for June, 1921. At the same time information of currents, wind, cloud and condition of visibility in the region of Socotra and Cape Guardafui were published. These have been repeated from time to time, at first upon the East Indian Seas Meteorological Charts and later in THE MARINE OBSERVER, and these routes were adopted by the Admiralty in Ocean Passages for the World (1923) by Rear Admiral T. B. SOMERVILLE.

In 1921 we published the experiences and views of a number of masters of ships who had great experience in navigating the Indian Ocean. Now we have received so much more information, including the summarized opinions of some 70 masters through Captain E. C. STUBBS, the Master Attendant at Colombo, that it is not possible to give an account of them all; and this is no longer necessary,

for with the great interest which has been shown of recent years and the added experience, we are in a position not only to revise the recommended routes, but to state more definitely the dominating conditions and facts which make certain routes the best for different types of ships. It is certain at the present day with the great volume of British Shipping bringing Cargoes, Mails and Passengers from the British Dominions and Colonies to the Mother country, by way of the Suez Canal that there is no problem of Ocean Pilotage in which the consideration of meteorological conditions plays such an important part in the promotion of economical sea transport of the British Empire, as in the selection of the most suitable route Westward across the Indian Ocean during the South West Monsoon.

Every ship so engaged may save in cost of fuel, time and wear and tear by good judgment in using the information and aids which are provided, mainly through the efforts of British seamen. Since the tracks were revised in 1921 the chief new factors to be taken into consideration are:—

(1) A 4,000 candle-power light has been established at Ras Asir (Cape Guardafui) also a W/T fog signal. A small light has been established at Ras Hafun.

(2) Wireless Telegraphy stations have been established at Ras Asir (Cape Guardafui) and at Hafun. Ships having direction finders can take bearing of these, and ships fitted only with W/T may be informed of their bearing from the station at Ras Asir (Cape Guardafui).

W/T. bearings from Ras Asir have recently been reported to be very inaccurate at times; caution in their use is therefore necessary.

(3) A system of routine W/T Meteorological reports by “Selected Ships” has been established by which any ship at sea or in harbour may receive daily information of prevailing conditions over an area within a radius of up to 1,500 miles.

(4) There is more experience, particularly of the Southern routes.

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

The Indian Ocean South of a line Aden to Cape Comorin and West of Colombo during the S.W. Monsoon.

The South West Monsoon is generally well-established over the Indian Ocean from June to September and its southern limit may be taken as the Equator, for due to the rotation of the earth the S.E. Trade Wind upon crossing the Equator is deflected to the S.W. and so continues right into the South West Monsoon. Generally over that part of the ocean which lies West of Colombo and South of a line between Cape Comorin and the Island of Socotra the South West Monsoon decreases with latitude and increases and backs with westing. This wind has variations in direction and force but it is generally persistent. The variations are given in the wind roses of the Indian Seas Meteorological Charts which are based upon no less than 50 years' observation, 1855 to 1904. The strongest part of the South West Monsoon covers a strip of the ocean trending to the N.E. from Latitude 7°N. where it is about 100 miles wide and passing close to the Eastward of Ras Hafun and Socotra and expanding to a width of about 350 miles at its widest part. This is shown on **Charts No. 9 and 22**. In this region the force of the wind averages force 6 of the Beaufort Scale- and over-, a strong breeze, often reaching gale force, but very seldom decreasing below force 4 in the season. Squalls are frequent over this area and there may be strong gusts under the lee of the high land of Socotra.

Occasionally at the commencement and end of the South West Monsoon season, cyclones occur near the line Cape Comorin to Socotra; they influence the direction and force of the monsoon to the southward. During the South West Monsoon season the current, always variable, generally sets from the latitude of Cape Delgado, North Eastward, along the East coast of Africa. Upon reaching the region of Ras Hafun, Cape Guardafui and Socotra, it is deflected and spreads fanwise to the Eastward. A very strong stream reaching 7 knots at times sets E.S.E. 100 to 250 miles South of Socotra. Between the meridians of 60° and 76° East Longitude and Latitude 10° N. to 5° N. the general set of the current is E.S.E. In June there is a strong set to the Eastward near the Equator.

The variations of the currents in this part of the Indian Ocean are shown by roses in the quarterly current charts published in Volume VII MARINE OBSERVER.

In the region off Cape Guardafui and Socotra the visibility is frequently reduced by haze or mist and the sky may be clouded, but more often than not good sights are obtainable. When the current sets very strong to the E.S.E. athwart the wind in the area indicated by hatching on **Charts Nos. 10 to 12 and 22** there is often a dangerous cross sea in this locality, and west bound ships have suffered great inconvenience and some damage. The current at times probably runs faster here than in any other oceanic region.

In the Gulf of Aden the force of the S.W. monsoon is broken and it is more variable in direction. There is usually more wind in the northern portion of the Gulf than under the weather shore, but here squalls off the mountains may be encountered. The current sets generally to the Eastward, but in the southern portion of the Gulf it is weak and there is evidence of a current which sometimes sets to the Westward along the African coast as far as Burnt Island. The mean wind and current over the part of the ocean to be traversed, and averages of reduced visibility through haze and mist, mean cloud, and averages of sea and swell for the region of Socotra and Cape Guardafui, are given on **Charts No. 1 to 17**.

Such are the average or mean conditions; the prevailing conditions at any time may be ascertained by any ship fitted with W/T by intercepting the reports of selected ships and making a simple weather chart such as the Board of Trade now requires candidates for a certificate as master to be able to make.

Six degrees of longitude to the Westward of Colombo lying North and South and athwart the direction of the track of West bound shipping there is a chain of coral reefs and atolls, the Maldivé Islands, which complicate the selection of the best route in the S.W. monsoon for slow and small steam and motor vessels.

At the Northern end of the Maldives lie the Nine Degree and Eight Degree Channels, both wide, and separated only by the Island of Minikoi upon which is the only beacon light in the whole chain. As Minikoi light is on the south extreme of the island and the current sometimes runs strongly to the South it is safest always to pass to the Southward of the Island. Near the Southern end of the Maldivé Islands there is the One and a Half Degree Channel, 52 miles wide, and nearly half way between the Eight Degree and the One and a Half Degree Channels lies the Kardiva Channel, and here there is but 15 miles between Fadiffolu Atoll and Kardiva Island. There is no bank of soundings which can be used for navigation in any of the channels; the islands are low and the only landmarks are clumps of trees, but the coral reefs may be clearly seen from the mast-head with the sun in favourable position. The currents run strong through the channels usually to the Eastward during the S.W. monsoon and no attempt should be made to navigate the Kardiva Channel unless Olivelifuri Island, which marks the eastern entrance, has been made in daylight and a reliable fix obtained; nor should a ship attempt to pass through the One and a Half Degree Channel at night unless the latitude is reliably known.

On westerly courses it may be difficult in the late afternoon with the sun at low altitude approaching from the Eastward to see the islands, so that it is best to make the landfall if possible between sunrise and noon. Squalls and rain occur amongst these Islands during this season.

Off the most northeast extremity of Africa, Cape Guardafui (Ras Asir) lie Abd al Kuri, the Brothers and Socotra Islands. The Channel between Cape Guardafui (Ras Asir) and Abd al Kuri is more than 50 miles wide. During the S.W. monsoon the visibility is often reduced by haze and mist in this region and there is not much to choose between that off Ras Radressa, the eastern end of Socotra, and that off Cape Guardafui (Ras Asir), though off the former it is slightly more often hazy.

The current generally sets in an E.N.E. direction past Ras Radressa, but it must be remembered that it is always variable; soundings do not extend far from the coast and it is dangerous to make, as the lead is little guide and the low land to the eastward of the mountain range is often obscured by haze and mist. Ships should not attempt to approach Ras Radressa from the Southward during the S.W. monsoon; there is plenty of sea room to the northward of the Island. Extending to a distance of about 30 miles to seaward off Ras Jard Hafun—a high bluff some ten miles South of Cape Guardafui (Ras Asir), which is easily distinguishable in clear weather—there is a bank of soundings which is a natural guide for ships making a landfall from the South Eastward in hazy weather, while the promontory of Ras Hafun, 85 miles south of Cape Guardafui, is very distinctive in its appearance in clear weather.

Approaching the land about Cape Guardafui (Ras Asir) from the Southward and Eastward, the water changes colour from blue to dark green, and as the land is closed to the northward of Ras Hafun the swell alters its direction to the southward and the sea becomes smoother. At night ships have mistaken Ras Jard Hafun for Cape Guardafui (Ras Asir) and altering course too soon to the westward towards the low land between Ras Jard Hafun and Cape Guardafui (Ras Asir), thinking they were past the latter, have been stranded and lost.

The lead if constantly and systematically used is the best guide for rounding Cape Guardafui (Ras Asir) in hazy weather, for passing over the bank of soundings in a northerly direction, course may be safely altered to the westward after leaving the 100 fathom line astern. Added to this there are the artificial aids to navigation previously mentioned.

The Indian Ocean to the Eastward and Southward of Colombo, North of the Equator during the S.W. Monsoon.

Eastward of the longitude of Colombo from the Equator to Latitude 5° N. the S.W. Monsoon is generally stronger than it is in the same latitude to the westward as far as Longitude 60° E.

The general set of the current over this region is Easterly and off the South Coast of Ceylon this Easterly current is strong, particularly in the months of June, July and August. See **Charts No. 18 to 21.**

Alternative Routes, Chart No. 22.

In the selection of routes across this region of the strongest persistent seasonal wind over any part of the Oceans traversed by the main trade routes, setting up as it does strong currents, rough seas and heavy swells, the masters of power propelled ships have to take into consideration the fact that though a head wind offers resistance, unfavourable currents may retard progress over the ground more, and of all the elements, sea and swell may reduce speed and cause discomfort and damage most.

A short full lined steam or motor vessel will pitch and have her way deadened more than a long powerful fine lined ship in a seaway.

For the purpose of recommending the tracks which follow and which are shown on **Chart 22** the following broad classification of types of ships is used.

Large Powerful Liners.—Fine lined steam and motor vessels of 12,000 tons gross and upwards with a speed of 16 knots and over in smooth water.

Medium Ships.—Medium lined steam and motor vessels of 8,000 tons gross and upwards with a speed of not less than 13 knots in smooth water.

Slow Ships.—Full lined steam and motor vessels with a speed of less than 13 knots in smooth water.

Small Ships.—Steam and motor vessels of less than 2,000 tons gross.

We have to consider in making our westing where the monsoon is comparatively light, the channels through the islands at the early part of our passage, and above all where and at what angle to cross the strip of the ocean where the monsoon is strongest, and where we intend to make our landfall.

The track Westward as well as Eastward between Colombo and the Straits of Bab-el-Mandeb during the N.E. monsoon and fine weather season passes 75 miles south of Socotra and close to the Northward of Cape Guardafui. This track is unsuitable for West-bound ships during the South West Monsoon and should not then be used when Eastbound by any but powerful ships. By this route the shortest safe navigable distance between Colombo and the Straits of Bab-el-Mandeb is 2,182 miles.

Nearly all large powerful liners engaged in the carriage of passengers and mails from Australia, the far East via Malacca Straits, and from Burma via the Suez Canal, call at Colombo and a great many intermediate and cargo ships do so also; therefore it is necessary to give special attention to Colombo as a port of departure for ships which will encounter the worst of the S.W. Monsoon.

Some Commanders in large powerful liners prefer during the S.W. Monsoon to shape a course on a rhumb line after passing south of Minikoi for a position north of Ras Radressa. The distance is 2,192 miles; but this route cannot be commended for when the wind and sea are usually at their worst, if this route is adopted, the wind, sea and swell will be on the bow, and sufficient and at such an angle to the fore and aft line of the ship to cause discomfort and a considerable reduction of speed.

Route I.

If it is considered wisest to pass to the Northward of Socotra and the size and power of the ship is such that it is not considered desirable to lengthen the route to such an extent—as will be recom-

mended presently for less powerful vessels—in order to bring the wind and sea at their worst on a more favourable bearing, then it is certainly wise to shape a more westerly course at first, after passing Minikoi. If a course is steered from South of Minikoi to cross the 60th meridian in Latitude 10° 25' N. (i.e. the usual N.E. monsoon course) and course is then altered to pass at a distance of 40 miles North of Ras Radressa, the wind and sea will be 10° further aft when crossing the strip of strongest monsoon, thus easing the ship when she most needs it, and the distance 2,212 miles is only 20 miles more.

Route V.

When bound from Malacca Straits via the Suez Canal and not calling at Colombo **Route V** may be adopted with advantage by all but large powerful liners.

After passing Achin Head steer for the One and Half Degree Channel thus avoiding the strongest part of the Easterly current South of Ceylon, and after passing the Maldiv Islands steer a westerly course, crossing the 60th meridian near Latitude 2° N. After passing Achin Head the monsoon is likely to be fresh or strong, taking off as the One and a Half Degree Channel is approached, and becoming light and variable after passing the Maldiv Islands.

The Monsoon may be expected to freshen at about Longitude 60° E. whence course should be steered to a position in Latitude 8° N. Longitude 52° 30' E. This will bring the increasing monsoon on the port beam and ensure that a wide berth is given to the area of strong current and confused swell indicated on **Charts Nos. 10 to 12 and 22.** Over and over again ships taking the southern routes during the S.W. Monsoon have not steered sufficiently to the southward to avoid this area, or have altered course to the northward too soon and have so encountered the full strength of the current setting to the E.S.E. and a heavy confused swell or cross sea. Some have been damaged, others have become unmanageable and a few have been forced to run, and pass to the eastward and northward of Socotra. Once bitten, twice shy. Their masters have not returned to the southern routes and these experiences have lead others to doubt the wisdom of going to the southward of Socotra during the S.W. monsoon.

From the last position, course may be shaped to pass Cape Guardafui (Ras Asir) passing within sight of Ras Hafun if in daylight and clear weather, and over the bank of soundings off Ras Jard Hafun. Thus the wind, sea, swell and current will be on the port quarter. After rounding Cape Guardafui and after passing Ras Filuk, keep the African coast a'board as far as Burnt Island, thus avoiding adverse currents to the Northward, keeping in smooth water and possibly carrying a favourable current which has been sometimes experienced hereabouts. From Burnt Island, steer as requisite for the straits. The distance by **Route V** from Achin Head to the Straits of Bab-el-Mandeb is 3,415 miles.

Route III.

From Colombo, Medium Ships will be well advised to adopt **Route III** and should pass through the Eight Degree Channel giving Turakuna Island the northern extreme of Ihavandiffulu Atoll a good berth, particularly at night, for the current may be variable, but it generally sets to the S.E. during the S.W. Monsoon season. Thence steer for a position Latitude 7° 0' N. Longitude 56° 0' E. (Nothing to the Northward) which is well south of the S.E. extreme of the area to be avoided. From this position pass through Latitude 8° N. Longitude 52° 30' E. and thence as per **Route V.** The distance is 2,355 miles from Colombo to the Straits of Bab-el-Mandeb.

Route IV.

For slow ships, provided that time of departure from Colombo and speed can be regulated to make Olivelifuri Island between sunrise and noon **Route IV** probably traverses the most consistent Latitude and its distance over the ground is such as to obtain the best balance between distance steamed and time and fuel expended.

If it is decided to use this route, time and sailing should be subject to special consideration, having regard to the conditions of weather reported by wireless by ships at sea, for frequently the S.W. monsoon is fresh to the S.W. of Colombo with corresponding sea. From Colombo shape a course to pass close to the southward of Olivelifuri Island, Fadiffolu Atoll; and passing through Kardiva Channel and to the Southward of Horsburgh Atoll steer to cross the 60th meridian in Latitude $4^{\circ} 44' N.$ thence alter course to pass through Latitude $8^{\circ} N.$, Longitude $52^{\circ} 30' E.$, and then follow **Route V**. The distance from Colombo to the Straits of Bab-el-Mandeb by **Route IV** is 2,395 miles.

Route Va.

When it is not considered advisable for slow ships to use **Route IV** they will find **Route Va** advantageous, and all small ships should use this route, for though it lengthens the distance over the ground considerably, they are most likely to avoid bad weather, and will probably save time and fuel by doing so. The distance from Colombo to the Straits of Bab-el-Mandeb is 2,596 miles.

Route II.

To those masters of medium and slow ships who do not wish to use the Southern routes, **Route II** is commended. From Colombo follow **Route III** to Longitude $61^{\circ} E.$, thence alter course to pass at a distance of 40 miles to the northward of Ras Radressa, thus bringing the wind, sea and swell on the beam when they increase and when they are at their worse. After passing Ras Radressa follow **Route I**. The distance from Colombo to the Straits of Bab-el-Mandeb is thus 2,312 miles.

The Best Route and the Selection of it.

The tracks may be broadly divided, those passing North of Socotra being Northern Routes and those to the Southward of Socotra and via Cape Guardafui, Southern Routes. There seems little doubt when all the evidence we have received has been considered, during the prevalence of the S.W. Monsoon over the Indian Ocean, North of the Equator—now there is a Light and W/T. fog signal at Ras Asir and W/T. stations at Ras Asir, and Hafun—that the southern routes offer the greatest advantages to most ships.

Wireless bearings in this vicinity have been found to be incorrect, and this has been put down to "Coast refraction" see report on page 143, Vol. VII, No. 79, MARINE OBSERVER. Recent reports show that W/T. bearings from Cape Guardafui (Ras Asir) are still at times very inaccurate. Mariners should ever be on their guard against the effect of inaccuracy of bearings. The lead should never be neglected when passing over the bank off Ras Jard Hafun, for even in clear weather to use it is a good rule for this ensures that the sounding machine is in working order and that the officers and men are accustomed to working it.

In the selection of a route, the state of loading and stability of a ship are matters for consideration; for instance **Route II** is very unsuitable for a deeply laden full lined ship with a large G.M., not only because of the great resistance of wind, sea, and swell which she is sure to find, but also because she will roll heavily and ship water.

Generally the conditions which are experienced by ships on the southern routes as compared with those to be found on northern routes not only make for saving in fuel, but for infinitely greater comfort to all on board.

It will be asked upon what date should ships, leaving Colombo or passing Achin Head, commence using these recommended routes for ships of different types, and on what date should the use of them terminate? In using them why not round off the corners.

We have intentionally only provided information here of mean wind and mean current over the greater part of the regions to be traversed for the months of June, July, August and September. The accompanying charts numbered 1 to 22 only illustrate the mean or averages of the conditions during the period when the S.W. monsoon prevails each year. Some years it may commence and end earlier or later than others, and in some years cyclones may occur at the change of the monsoons as far south as **Route II**, and the monsoon is always subject to variations.

The tracks recommended are for average conditions for average ships. "Selected ships" report at regular times twice daily by W/T., the actual conditions prevailing; from this information a simple weather chart may be made in port or at sea; than which the master can have no better information to enable him to judge which route at that time is the most suitable for his particular ship. No one knows better than he her probable behaviour under different conditions of sea. As to rounding off the corners, course should be altered according to circumstances, and many will prefer several small alterations of course to one big one, where the chartered routes **I to Va** bend, but it cannot be too strongly stressed that ships using the southern routes should not pass to the Northward and Eastward of the positions given, viz.:—Latitude $7^{\circ} N.$, Longitude $56^{\circ} E.$, and Latitude $8^{\circ} N.$ Longitude $52^{\circ} 30' E.$ in the case of **Route III**, and Latitude $8^{\circ} N.$, Longitude $52^{\circ} 30' E.$ in the cases of **Routes IV and V**, for to the Northward and Eastward of those positions they are likely to encounter strong adverse currents and dangerous cross seas.

We wish to thank all those, and they are many, for the information they have supplied, and from which these recommendations have been compiled.

In compiling this report The Hydrographer of the Navy has been consulted. No navigator should act upon these recommendations regarding the channels named without first referring to the West Coast of India Pilot and the Red Sea and Gulf of Aden Pilot, and Admiralty Charts 66a, 66b, 66c, 827, 1012, 5, 100a, and 6b. To see the variations of wind which may be encountered consult the Meteorological Charts of the East Indian Seas published by the Meteorological Office; upon them will be found Baillie Wind Roses, than which there are no better for the purpose of seamen. The variations of current will be found on charts in Volume VII of THE MARINE OBSERVER.

These are but recommendations made with a view to assisting the master of a ship to select the best route for his particular ship during the S.W. Monsoon. It is for the master to decide which of them is the best route for his ship and purpose, and to make such deviations from the route selected as may be necessary.

SOUTHERN ICE REPORTS.

During the Years 1929 and 1930.

May.

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1929	10-13	At Grytviken		Thin ice	In harbour	R.R.S. <i>William Scoresby</i> .
1930	9	52° 18' S.	37° 10' W.	17 bergs	Small irregular and tabular covering an area of about 5 square miles.	do.
	6	52° 08' S. (Approximately)	36° 54' W.	Tabular berg, growlers and small ice ..	.. .. .	do.
	7	51° 57' S. (Approximately)	36° 54' W.	Many bergs and growlers .. .. .	.. .. .	do.
	5	53° 36' S.	36° 40' W.	1 growler	Extent unknown. Long side lying S.E. and N.W. 45 miles of this side examined. Height estimated about 180 to 200 feet.	do.
	6-8	52° 08' S.	36° 28' W.	Large berg	Calved from main berg, lying within 2 or 3 miles of Southern side.	do.
		52° 08' S.	36° 28' W.	About 40 moderate tabular bergs	Berg could be heard calving continually during the three days " <i>Scoresby</i> " was within hearing distance. During the daylight between 7 a.m. and 7 p.m., except for short intervals, the large berg was not visible at a greater distance than 200 yards, although the smaller bergs might be seen from half to three miles. The only indication of approach to the large berg was a steady decrease in visibility or the noise of calving as brash ice and growlers were not continuous. During the dark hours between 7 p.m. and 7 a.m. the fog rose off the berg and while the moon was strong enough it could easily be seen for many miles until lost to sight in the distance.	do.
		52° 08' S.	36° 28' W.	Innumerable growlers and pieces of ice ..	Tabular. Well preserved. Estimated height 120 ft., length 1000 ft. Visibility 7.	R.R.S. <i>Discovery II</i>
	10	54° 11' S.	35° 50' W.	1 berg	Low green base, submerged area in middle, white pinnacle one end, much waterworn. Estimated height 40 ft., 150 by 300 ft. area. Visibility 7.	do.
	10	54° 16' S.	35° 48' W.	1 berg	Tabular. Estimated height 150 ft., length 800 ft. Visibility 6.	do.
	10	54° 12' S.	35° 28' W.	1 berg	Small Tabular. Visibility 4	do.
	10	54° 08' S.	35° 10' W.	1 berg	Small Conical. Weathered. Visibility 4	do.
	10	53° 53' S.	34° 45' W.	1 berg	Irregular and weathered. Peak in centre. Estimated height 100 ft., length 500 ft. Visibility 8.	do.
	11	52° 55' S.	32° 26' W.	1 berg	Irregular and weathered. Estimated height 120 ft., length 500 ft. Visibility 8.	do.
	11	53° 02' S.	32° 20' W.	1 berg	Tabular. Weathered, ridged and heavily listed. Estimated height 100 ft., length 40 ft. Visibility 8.	do.
	11	52° 30' S.	31° 08' W.	1 berg	Low Tabular. Pressure hummocks at one end. Estimated height 50 ft., length 300 ft. Visibility 8.	do.
	11	52° 29' S.	30° 55' W.	1 berg	Large Tabular. Stepped halfway along length to about 100 feet. Estimated height 200 ft., length 2,000 ft. Visibility 8.	do.
	11	52° 11' S.	30° 35' W.	1 berg	One Large Tabular. Calculated 3,600 ft. long, two small weathered. Visibility 8.	do.
	11	52° 20' S.	30° 34' W.	3 bergs	Large Stepped Tabular. Estimated height 150 ft., length 3,000 ft. Growlers and brash in vicinity. Visibility 8.	do.
	11	52° 11' S.	30° 30' W.	1 berg	Regular, Level and Tabular. Estimated length 2,000 ft. Visibility 8.	do.
	11	52° 17' S.	30° 20' W.	1 berg	Level Tabular. Estimated height 150 ft., length 2,700 ft. Visibility 8.	do.
	11	52° 07' S.	30° 09' W.	1 berg	Weathered with Pinnacle. Estimated height 80 ft., length 300 ft. Visibility 8.	do.
	11	52° 10' S.	30° 07' W.	1 berg	Small. Weathered and irregular. Visibility 7	do.
	11	51° 35' S.	28° 44' W.	1 berg	Moderate. Weathered and irregular. Visibility 7	do.
	11	51° 14' S.	28° 18' W.	1 berg	One Level and Tabular, about 200 ft. high and 1,000 ft. long; one small and weathered. Visibility 7.	do.
	12	51° 14' S.	28° 02' W.	2 bergs	All of moderate size and much weathered. Generally distributed within a 10 mile radius. Visibility 7.	do.
	12	51° 05' S.	27° 48' W.	10 bergs	Small, irregular, very weathered. Visibility 6	do.
	12	50° 58' S.	27° 22' W.	4 bergs	Growler awash 2 miles South of berg. Visibility 6	do.
	12	51° 03' S.	27° 22' W.	1 large tabular berg and growler ..	All moderate sized and weathered. Distributed within a 10 mile radius of position. Visibility 7.	do.
	12	50° 57' S.	26° 42' W.	6 bergs	One long, low and jagged. Two others, small and much weathered. Visibility 7.	do.
	12	50° 36' S.	25° 53' W.	3 bergs	7 of moderate size, of which 2 were tabular and 5 weathered and irregular; 2 small bergs, jagged and much weathered, all within a 10 mile radius, mainly to Southward. Visibility 7.	do.
	12	50° 23' S.	25° 25' W.	9 bergs	Tabular. Weathered. Estimated height 80 ft., length 300 ft. Visibility 7.	do.
	13	49° 20' S.	23° 40' W.	2 growlers	Low, flat base, with high tabular turret surmounting lower end, and pressure hummocks on higher end. Estimated height 150 ft., length 800 ft. Visibility 7.	do.
	13	48° 58' S.	22° 44' W.	1 berg	The last ice observed.	do.
	13	48° 43' S.	22° 30' W.	1 berg		do.

Reports of Ice previous to May, 1929, will be found in *The Marine Observer*, Vol. VI, No. 65, p. 111.

WEATHER SIGNALS.

I.—SHIPS' WIRELESS WEATHER SIGNALS.

Urgent Meteorological reports should be made at any time. Any ship at any time encountering a tropical revolving storm should report to all ships and the appropriate station, continuing to report at intervals of three hours so long as the ship remains under the influence of the storm.

Ships experiencing gales in which the wind reaches Force 10 or above in the Beaufort Scale should inform all ships within range.

Ships encountering Ice or other navigational dangers should report immediately to all ships and the appropriate station; see instructions for Danger to Navigation Signals for all ships, pages 31 and 32, Vol. VIII, No. 85.

For full particulars of "Selected Ships" Routine Meteorological Reports with Schedule for Communication, see pages 16 to 19, Vol. VIII, No. 85.

See List of W/T Stations detailed to receive reports from **A Selected Ships** with particulars up to date below, also on Chart VI.

In parts of the world where such stations and particulars are not given, British **A Selected Ships** should make their reports to **CQ**

on 2100 metres (143 kc/s) as stated on page 18 Vol. VIII, No. 85 (January, 1931, MARINE OBSERVER).

B Selected Ships broadcast their report to C.Q. on 600 m. spark, and these may be intercepted by the stations ringed in on Chart VI. In making these reports to C.Q. "B Selected Ships" should make special endeavour to ensure that the report is received at these shore stations. With a view to assisting Meteorological Services who have provided information and to ensuring that routine reports from all "Selected Ships" within range of certain coast stations may be received by those services a list of stations specially detailed to receive reports from "B Selected Ships" is also given on pages 110 and 111. The procedure given on pages 16 to 19, Vol. VIII, No. 85, should be adhered to as far as possible.

According to agreement reached by the International Meteorological Conference, 1929, all arrangements for the co-operation of shipping in Voluntary Marine Meteorological work are to be made through the Meteorological Services of the different countries in which the ships are registered, in accordance with the agreed upon International plan for all parts of the World, following the International Convention for Safety of Life at Sea, 1929.

WIRELESS STATIONS DETAILED TO RECEIVE ROUTINE CODED WEATHER REPORTS FROM "A SELECTED SHIPS."

Request for Information.

THE ATTENTION OF METEOROLOGICAL SERVICES IS INVITED TO THE INVITATION GIVEN ON PAGE 16 OF VOL. VIII, NO. 85, JANUARY
MARINE OBSERVER.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
North Atlantic and North Sea.	Portishead.	Lat. 51° 28' 41" N. Long. 2° 47' 30" W.	GKU.	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. and North of Latitude 38° N., but not within 300 miles of station. (see Chart VD).	Weather London.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	Control system. "Selected Ships" chosen to report in given order notified by station daily at 2230, 0330, and 1030 G.M.T. Roll call thus—Weather begins—Call signs of chosen "Selected Ships"—Weather ends.
	Chatham Mass.	Lat. 41° 42' N. Long. 70° 00' W.	WCC.		142.9 kc/s. (2098 metres).	North Atlantic West of Longitude 40° W.	Observer Washington.	Weather only. First four groups of observations taken at 0000 and 1200 G.M.T. only required.	No control. All British "A Selected Ships" within area to address their 0000 and 1200 G.M.T. observations to Observer Washington and their 1800 G.M.T. observations to CQ in accordance with schedule.
	Horta, Azores.	Lat. 38° 32' N. Long. 28° 38' W.	CTH.		125 kc/s. (2400 metres).	North Atlantic South of Latitude 38° N. and East of Longitude 40° W.	Radio Horta.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule.

(Continued.)

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WIRELESS STATIONS DETAILED TO RECEIVE ROUTINE CODED WEATHER REPORTS FROM
"B SELECTED SHIPS."

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Atlantic.	Horta, Azores.	Lat. 38° 32' N. Long. 28° 38' W.	CTH.	Radio Horta	Weather only, up to 7 groups, preferably No. 3 Supplementary Groups.	
Indian Ocean.	Calcutta.	Lat. 22° 33' 31" N. Long. 88° 20' 16" E.	VWC.	Weather.	Weather only up to 6 groups, No. 6 Supplementary Groups preferred.	
	Rangoon.	Lat. 16° 45' 57" N. Long. 96° 11' 51" E.	VTR.			
	Madras.	Lat. 12° 59' 17" N. Long. 80° 10' 56" E.	VWM.			
	Bombay.	Lat. 19° 04' 55" N. Long. 72° 49' 54" E.	VWB.			
	Karachi.	Lat. 24° 51' 05" N. Long. 67° 02' 32" E.	VWK.			
	Matara.	Lat. 6° 01' 07" N. Long. 80° 35' 39" E.	GZP.			
	Mauritius.	Lat. 20° 23' S. Long. 57° 35' E.	VRS.	Observatory Mauritius.	Weather 4 universal groups and first of No. 6 Supplementary Groups.	

WIRELESS STATIONS DETAILED TO RECEIVE ROUTINE CODED WEATHER REPORTS FROM
"B SELECTED SHIPS."

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12' 39" N. Long. 114° 15' 19" E.	VPS.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	
South Pacific.	Auckland.	Lat. 36° 50' 36" S. Long. 174° 46' 08" E.	ZLD.	Weather Wellington.	Weather only, up to 7 groups.	Apia, Rarotonga and Chatham Island relay to New Zealand. Rarotonga keeps watch 0630 to 1330 G.M.T. Chatham Island 0430 to 1230 G.M.T. Remainder cover schedule. Reports desired through nearest station when "B Selected Ships" are within 1,000 miles of New Zealand.
	Wellington.	Lat. 41° 16' 26" S. Long. 174° 01' 00" E.	ZLW.			
	Awarua.	Lat. 46° 30' 27" S. Long. 168° 22' 21" E.	ZLB.			
	Chatham Island.	Lat. 43° 57' 02" S. Long. 176° 31' 04" W.	ZLC.			
	Rarotonga.	Lat. 21° 11' 54" S. Long. 159° 48' 51" W.	ZKR.			
	Apia.	Lat. 13° 15' 17" S. Long. 170° 49' 42" W.	ZMA.			

II.—WIRELESS WEATHER SIGNALS. WIRELESS WEATHER BULLETINS. PORTUGAL.

Containing meteorological conditions at Madeira and Azores.

Spark and R/T Issues.

Monsanto W/T Station, approximate Latitude $38^{\circ} 44'$ N., Longitude $9^{\circ} 11'$ W., call sign **CTV**, broadcasts a meteorological report at 1130 and 2300 G.M.T. *en clair*, in Portuguese and English, on a wavelength of 1,000 metres (Spark) and 1,000 metres (R/T), giving:—

A statement of weather conditions and also a forecast for the next 24 hours for the coast of Portugal, Azores, Madeira, Straits of Gibraltar and the Bay of Biscay.

WIRELESS STORM WARNINGS. MOROCCO.

Spark Issues.

Casablanca — Chetaba W/T Station, approximate Latitude $33^{\circ} 37'$ N., Longitude $7^{\circ} 37'$ W., call sign **CNP**, broadcasts storm warnings when necessary on 600 m. spark. They are broadcast *en clair* and repeated at the commencement of the following watch for single operators. The area to which this message refers is not defined.

The message is preceded by the International Safety Signal (**TTT**) — — —.

III. WIRELESS TIME SIGNALS. SPAIN.

C.W. and R/T Issues.

Cadiz W/T Station, Latitude $36^{\circ} 28'$ N., Longitude $6^{\circ} 12'$ W. (approx.), call sign **EBC**, broadcasts a time signal daily, except Sundays, according to the International (Onogo) system as follows:—

Wavelength 700 metres (C.W.).

G.M.T.		Signal.	
h m s	h m s		
12 56 00	12 56 55	— — — — —	etc.
57 00	57 50	— . . . — —	etc.
57 55	58 00	— — — — —	Time signal.
58 08	58 50	— . . . — . . . — .	etc.
58 55	59 00	— — — — —	Time signal.
59 06	59 50	— . . . — — — .	etc.
12 59 55	13 00 00	— — — — —	Time signal.

The time signal is followed by the general call CQ and call signal EBC.

The end of the final dash of each time signal represents the exact even minute.

The final dots of the signals N and G coincide with the 10th, 20th, 30th, 40th and 50th seconds of each minute respectively.

PORTUGAL.

Spark and C.W. Issues.

Monsanto W/T Station, Latitude $38^{\circ} 43' 47''$ N., Longitude $9^{\circ} 11' 17''$ W., call sign **CTV**, broadcasts time signals three times daily according to the following procedure:—

(1) Wavelength 600 metres (Spark).

G.M.T.		Signal.
h m s	h m s	
9.28.00 to 9.28.39		— — — — — (MST) repeated 12 times.
9.29.32 „ 9.29.37		— — — — —
9.29.40 „ 9.29.46	
9.29.50 „ 9.29.57		— — — — —
9.30.00		■ (Time signal).

(2) Wavelength 3,070 metres (C.W.).

G.M.T.		Signal.
h m s	h m s	
9.38.00 to 9.38.39		— — — — — (MST) repeated 12 times.
9.39.32 „ 9.39.37		— — — — —
9.39.40 „ 9.39.46	
9.39.50 „ 9.39.57		— — — — —
9.40.00		■ (Time signal).

(3) Wavelength 3,000 metres (C.W.).

G.M.T.		Signal.
h m s	h m s	
9.59.00 to 9.59.49		— — — — — (MST) (repeated 15 times).
10.00.00 „ 10.04.59		A series of continuous dots at every second, omitting the 60th.
10.05.00		■ (Time signal).
10.06.00 „ 10.10.59		A series of continuous dots at every second, omitting the 60th.
10.11.00		■ (Time signal).
10.12.00 „ 10.16.59		A series of continuous dots at every second, omitting the 60th.
10.17.00		■ (Time signal).

The above time signal is not broadcast without previous warning.













NOTE.—The time signals are controlled from **Lisbon Observatory** (Latitude $38^{\circ} 42' 30.5''$ N., Longitude $9^{\circ} 11' 10.2''$ W.). The duration of a dot = 1/7 sec. and that of a dash 3/7 sec.




IV. VISUAL GALE WARNINGS. SPAIN.

The system of Visual Gale Warnings explained on p. 97 of Vol. VIII, No. 88 (the April, 1931, Number of this Journal) for France is also in operation at a number of Spanish ports. It should be noted that according to the latest available information there is no system in general use.

PORTUGAL.









The following system of storm signals is in use at the semaphore stations and port offices on the coast of Portugal:—

By day.	By night.	Signification.
		Gale probable from W. to N.
		Gale probable from S. to W.
		Gale probable from N. to E.
		Gale probable from S. to E.
		Cyclone or Hurricane Signal.
		Direction of gale not determined.

Red  White  Black 

MALTA.

ITALY.

South Cone.		North Cone.	
By Day.	By Night.	By Day.	By Night.
			
Hoisted for Gales.		Hoisted for Gales.	
From S.E., veering to S.W., W., or N.W.		From S.E., backing to E.	
„ S.W., veering to W. or N.W.		„ N.W., veering to N.	
„ W., veering to N.W.			
And also from E., veering to S. or S.W.			
Moderate “Gregale.”		Strong “Gregale.”	
By Day.	By Night.	By Day.	By Night.
			
Hoisted when the wind is expected from between N. and E., of force 5, 6 or 7 (Beaufort Scale).		Hoisted when the wind is expected from between N. and E., of force 8 and above (Beaufort Scale).	
When one of these signals is hoisted it indicates that information has been received by the station exhibiting the signal, that a gale or “gregale” is expected in the vicinity of Malta.			
Station :—Castille Signal Station.			

Black.











Red.

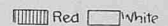


Green.



The following system of storm signals is in use on the coasts of Italy :—

By Day.	Signification.	By Night.
	Gale probable, commencing from N.W'd.	
	Gale probable, commencing from N.E'd.	
	Gale probable, commencing from S.E'd.	
	Gale probable, commencing from S.W'd.	
	Gale probable, direction of wind uncertain.	



Special Notices Regarding Personnel.

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

Obituary.

Mr. Henry Harries.

The death of Mr. HENRY HARRIES, which took place on 8th February, 1931, at the age of 79, is noted with regret.

Mr. HARRIES entered the service of the Meteorological Office in 1875, and from that date until 1903 served continuously in the Marine Division under successive Marine Superintendents, Captain H. TOYNBEE, Lieutenant C. W. BAILLIE, R.N., and Captain CAMPBELL HEPWORTH, R.N.R.

This period was notable for the large number of atlases of ocean meteorological and current charts which were produced by the Marine Division, no fewer than 12 important atlases being published during that period, Mr. HARRIES having a hand in the computation of all of them. He was also actively engaged in the preparation of the Monthly Meteorological Charts of the North Atlantic, during the first two years of their issue, 1901 to 1903.

With a view to obtaining first hand knowledge of the problems and difficulties of observation at sea, he made several voyages across the Atlantic and to the Mediterranean, and so gained much useful experience.

Mr. HARRIES was transferred to the Forecast Service in 1903, and remained there until the death of Captain CAMPBELL HEPWORTH in 1919, when he returned to the Marine Division as acting Superintendent pending the appointment of a Marine Superintendent. He retired on 31st March, 1920, after 45 years' service.

For many years Mr. HARRIES was the meteorological correspondent of the “Morning Post”; and during this period he issued in the newspapers circulating in the colliery districts warnings of periods of weather considered to produce dangerous conditions in coal mines.

Special Notices Regarding Personnel—*continued.*

Captain George Black.

Captain G. BLACK who has been joint merchant navy agent with Captain C. G. BONNER, V.C., for the Firth of Forth since 1923, has retired from the position of Towage Manager of the Leith Salvage and Towage Company, has left Edinburgh, and has therefore retired from the Agency.

He went to sea at the age of 14 in 1885 in coasting schooners, thence to the Newfoundland fish trade to the Mediterranean, and afterwards in the Colonial and San Francisco trades, never making two voyages in a vessel of the same rig.

In 1894 he entered the service of Messrs. James Little and Co., as second mate of S.S. *River Ettrick*, and in 1895 was given his first command as master of S.S. *River Mersey*. He also commanded the steamers *Indianapolis* and *Borderer*, the latter ship from her launch in 1904 until 1918, when she was sold.

In 1919 Messrs. James Little acquired an interest in the Leith Salvage and Towage Co. and appointed Captain BLACK their towage manager.

Captain BLACK will be missed by marine observers using the ports of the Firth of Forth.

Captain T. E. Williams.

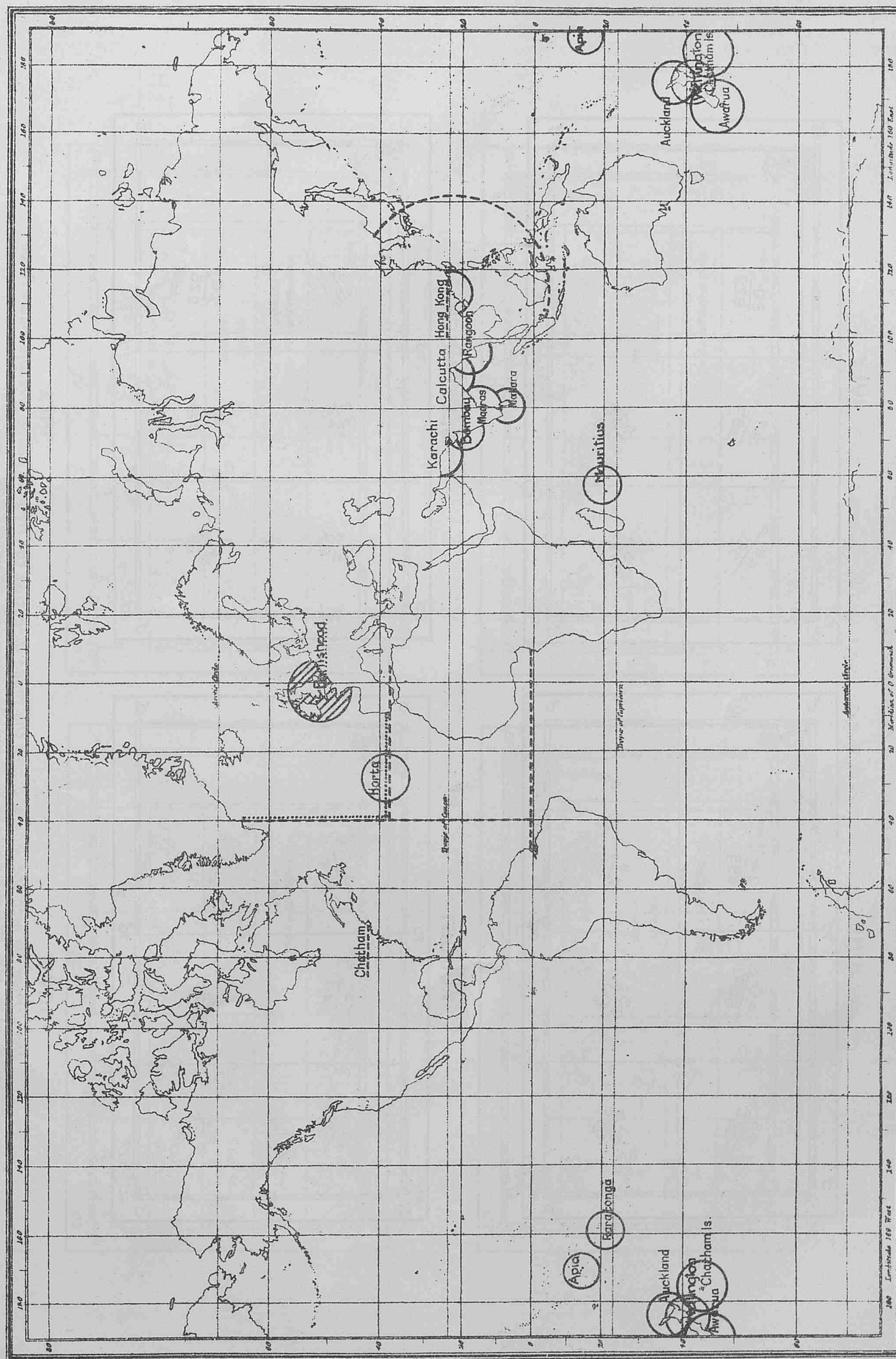
Captain T. E. WILLIAMS, master of the Elder Dempster Motor Vessel *Aba* has retired after nearly 51 years afloat. Captain WILLIAMS commenced his sea career in 1880 when he was apprenticed to Messrs. Ellis & Co. of Liverpool, serving his time in their Barque *Faith*. Completing his time in 1885 he served for a further seven years as third, second, and Chief Mate of sailing ships.

In 1892 he transferred to steam joining Messrs. Elder Dempster & Company's fleet as a third officer and three years later was promoted to command, his first ship being the *Kwarra*. Since then Captain WILLIAMS has commanded several of the Elder Dempster Fleet, including the *Shonga*, *Appam*, *Patani*, *Dakar*, *Monarch*, *Elmina* and *Aba*.

Captain WILLIAMS has been associated with the Corps of Voluntary Marine Observers since 1922.

The Corps of Voluntary Marine Observers join with the Marine Division in wishing these officers long life and happiness in their retirement.

Chart VI— SHIPS' WIRELESS WEATHER SIGNALS. Stations for Reception of Routine Wireless Weather Reports from "Selected Ships"



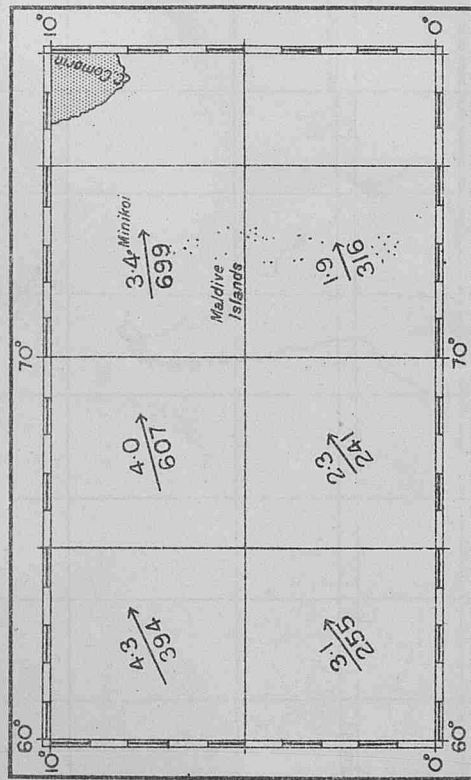
The dotted line indicates the area in which British "A Selected Ships" report under control to Portishead. The small shaded circle indicates the area from which reports are prohibited to Portishead.

A pecked line indicates the reporting area round stations in other countries to which British "A Selected Ships" should report. The names of such stations being also underlined with a pecked line.

The full-line circles indicate the areas round islands and coast stations which could receive spark Selected Ships reports to CQ.

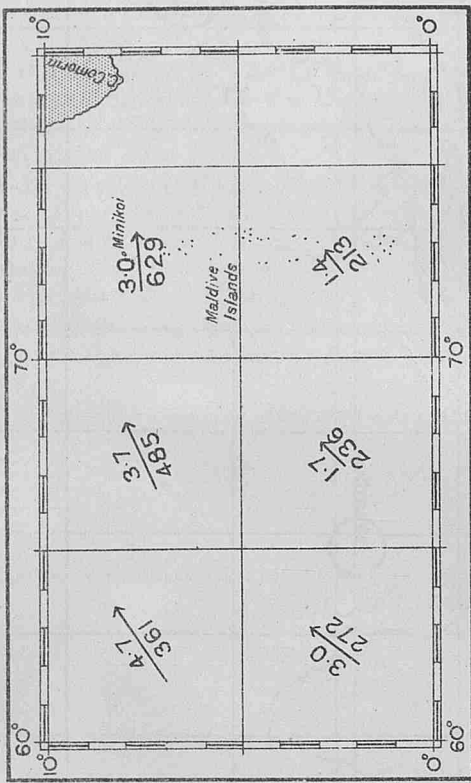
THE BEST TRACK FROM COLOMBO AND THE EAST TO STRAITS OF BAB-EL-MANDEB. CHARTS OF MEAN WIND, PART OF INDIAN OCEAN.

JUNE.



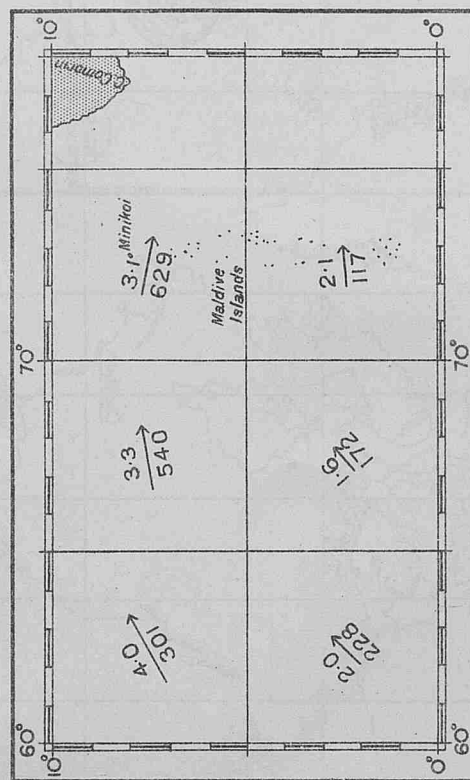
No. 1.

JULY.



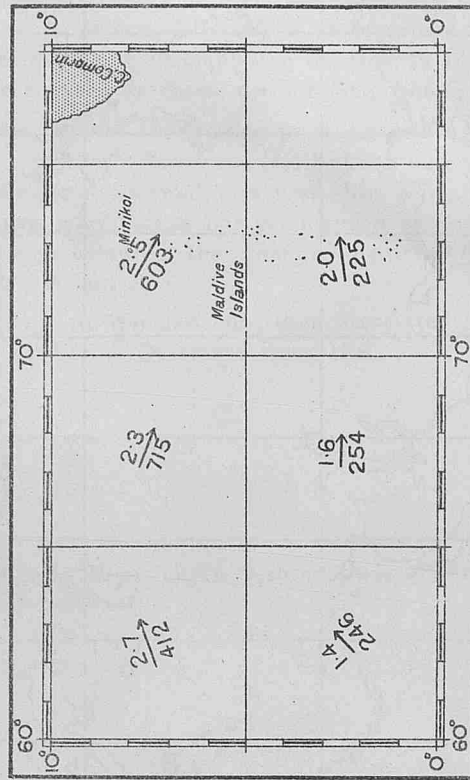
No. 2.

AUGUST.



No. 3.

SEPTEMBER.

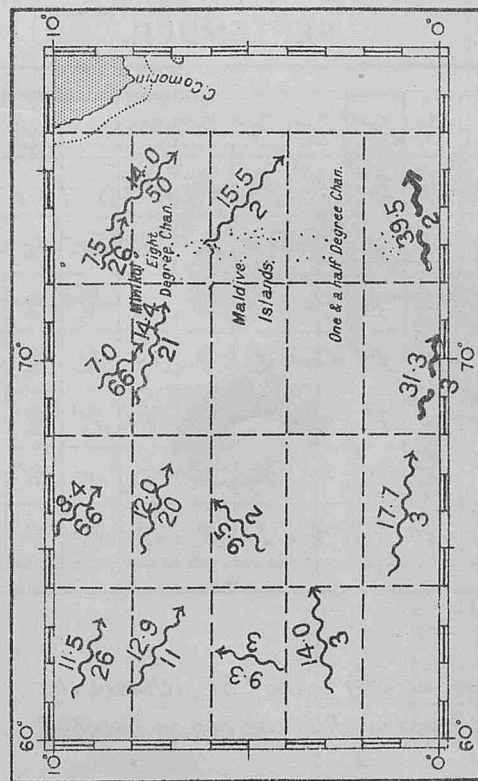


No. 4.

The arrows fly with the wind and give the mean direction, the figures above give the mean force by Beaufort Scale; the figures below, the number of observations.
Compiled from observations of British Ships during the years 1855 to 1904.

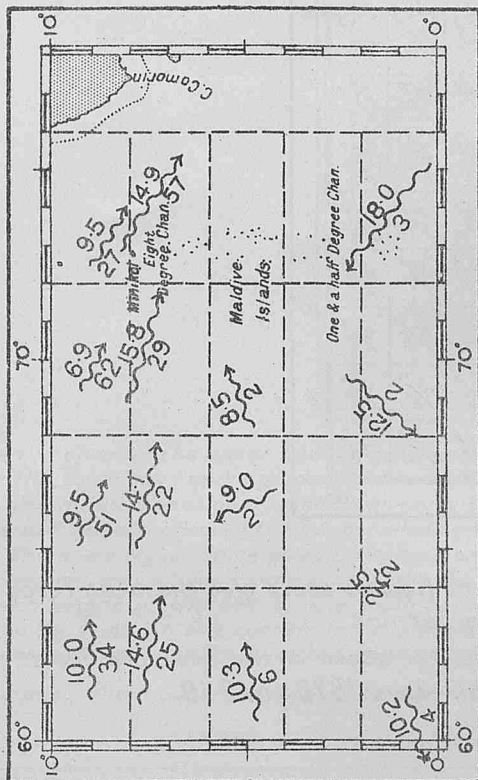
THE BEST TRACK FROM COLOMBO AND THE EAST TO STRAITS OF BAB-EL-MANDEB.
CHARTS OF MEAN CURRENTS PART OF INDIAN OCEAN.

JUNE.



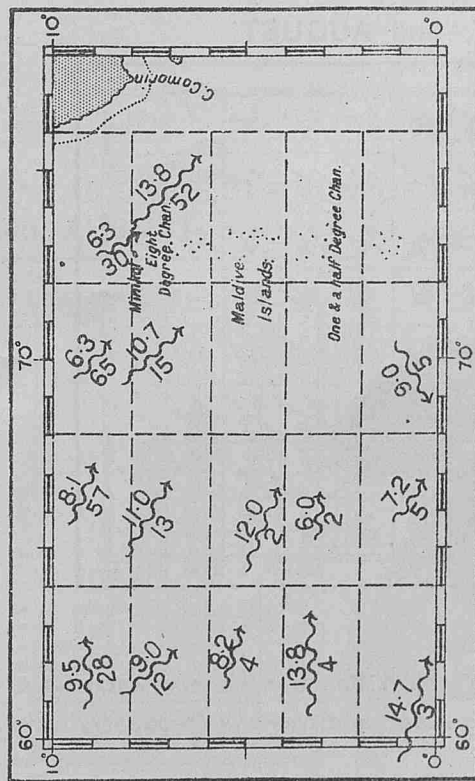
No. 5

JULY.



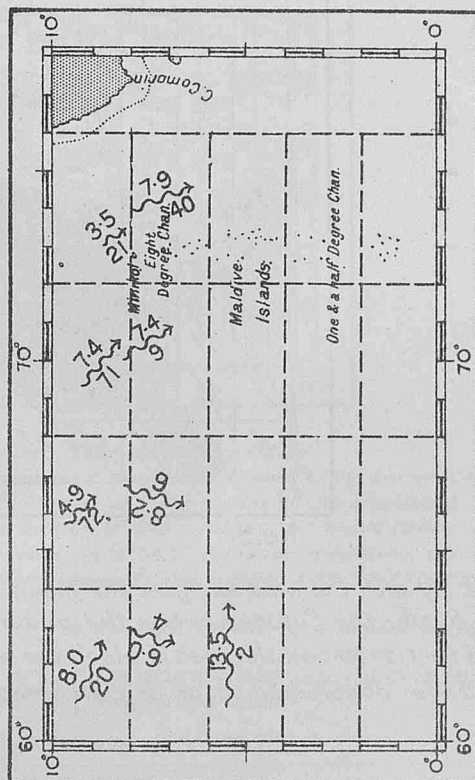
No. 6.

AUGUST



No. 7.


SEPTEMBER.



No. 8.

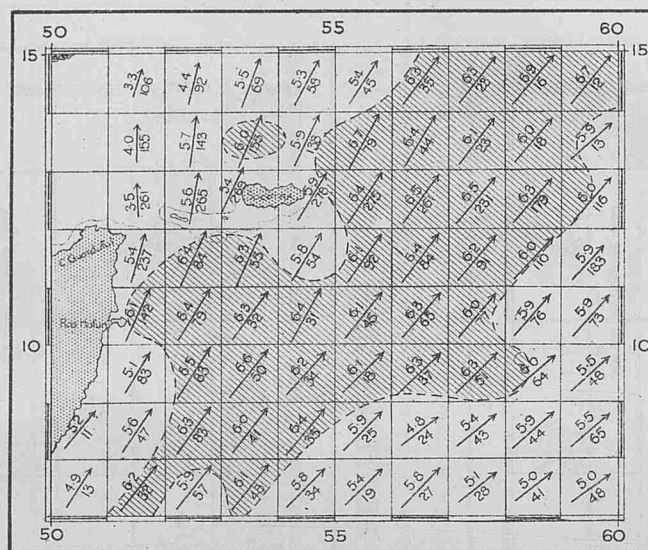
Computed from observations of British Ships during the years 1910-1928.

EXPLANATION OF CURRENT ARROWS.

The arrows flow with the current and represent the resultant of currents observed within the pecked lines.
The centre of each arrow lies in the mean position of observation. The figures above the arrows give the velocity of current in miles per day; the figures below the arrows the number of observations.
In cases where the arrows drawn to scale are inconveniently long, the symbol  is substituted.

THE BEST TRACK FROM COLOMBO AND THE EAST TO STRAITS OF BAB-EL-MANDEB. CHARTS OF MEAN WIND. REGION OF SOKOTRA AND CAPE GUARDAFUI.

JULY. and AUGUST



No. 9.

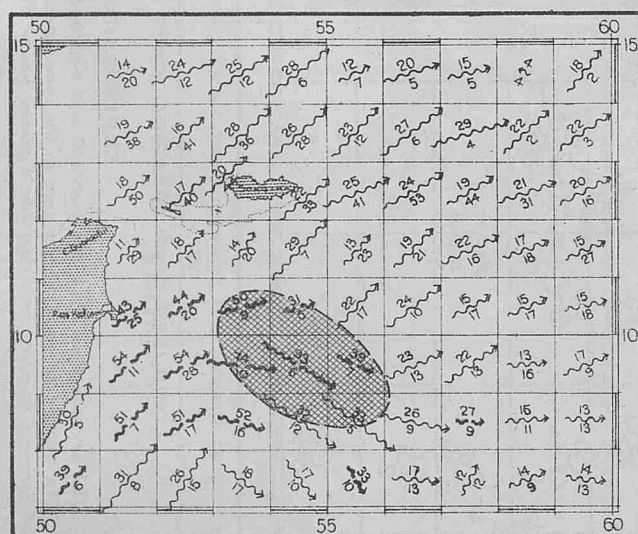
The arrows fly with the wind and give the mean direction, the figures above give the mean force by Beaufort Scale, the figures below the number of observations.

The shaded portion shows the area in which the wind force is 6 or above on the Beaufort Scale.

Compiled from observations of British Ships during the years 1870 to 1919.

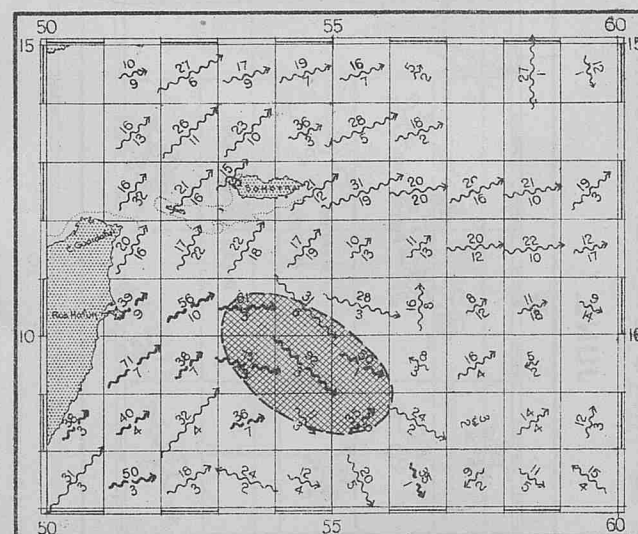
CHARTS OF MEAN CURRENT REGION OF SOKOTRA AND CAPE GUARDAFUI.

JULY, and AUGUST



No. 10.

SEPTEMBER.



No. 11.

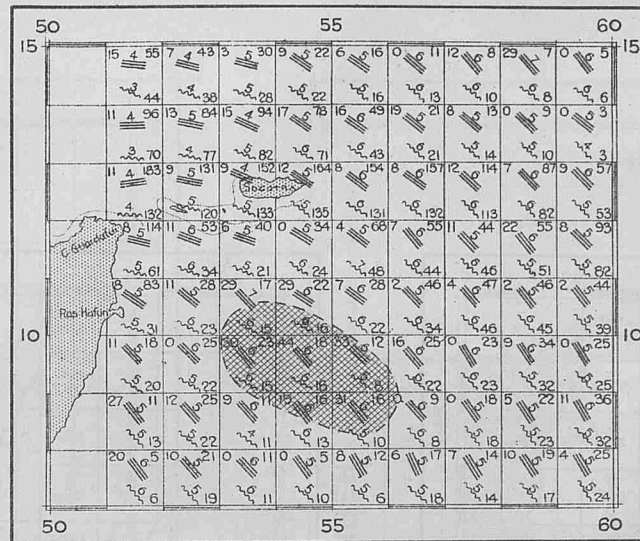
During the S.W. Monsoon the current, always variable, runs strong to the E.S.E., athwart the prevailing wind and there is frequently a dangerous confused swell in the region hatched.

EXPLANATION OF CURRENT ARROWS.

The arrows flow with the current and represent the resultant of currents observed within the one degree squares. The figures above the arrows give the velocity of current in miles per day, the figures below, the number of observations. In cases where the arrows drawn to scale are inconveniently long, the symbol $\sim \sim \rightarrow$ is substituted.

Computed from observations of British Ships during the years 1870 to 1929.

THE BEST TRACK FROM COLOMBO AND THE EAST TO STRAITS OF BAB-EL-MANDEB
CHARTS OF MEAN SEA AND SWELL REGION OF SOKOTRA AND CAPE GUARDAFUI.
JULY, and AUGUST



No. 12.

Swell is given in the upper half of each one degree square, Sea in the lower half.

SWELL—The top right figure gives total number of observations of swell; the top left, the percentage of confused swell.

The mean direction of swell is given by the symbol |||| (drawn at right angles to the direction), the direction being towards the number attached to the symbol which gives the mean height of the swell on the scale below.

SEA—The lower right figure gives the total number of observations of sea. The mean direction is given by the symbol ~~~~ (drawn at right angles to the direction) the direction being towards the number attached to the symbol which gives the mean height of the sea on the scale below.

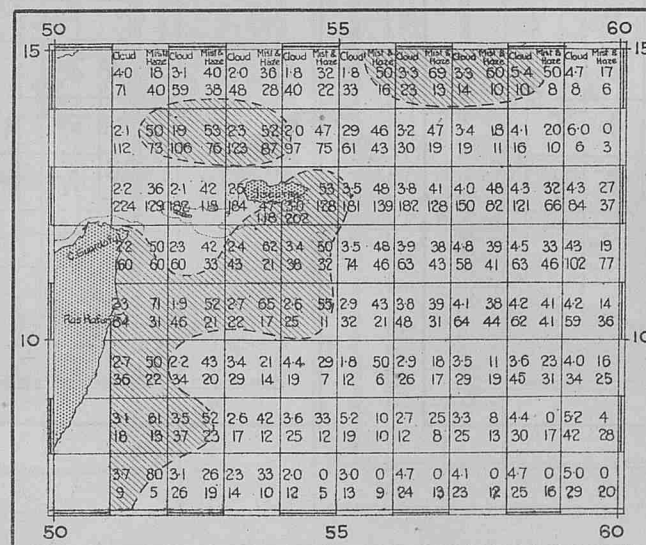
During the S.W. Monsoon the current, always variable, runs strong to the E.S.E. athwart the prevailing wind, and there is frequently a dangerous confused swell in the region hatched.

Compiled from observations of British Ships for the years { Swell 1870-1888 and 1905-1920.
Sea 1905-1920.

Scale of Sea and Swell Disturbance in use up to 1920.

Scale.	Description.	Height of Waves in feet from crest to trough.	Condition of Surface.
0	Calm ... ..	...	Glassy.
1	Smooth ... ..	...	Rippled.
2	Slight to moderate	Under 5 feet.	Rocks buoy or small boat.
3			Furrowed.
4			Much disturbed; deeply furrowed.
5	Rough to very rough	5 to 10 feet.	
6			
7			
8	High to very high	11 to 15 feet.	Rollers with steep fronts.
9		16 to 35 feet.	
10	Phenomenal	36 feet and above.	Precipitous; towering.

CHART OF MEAN CLOUD AND PERCENTAGE FREQUENCY OF MIST AND HAZE
JULY, and AUGUST



No. 13.

Cloud observations are given on the left of each one degree square, Mist and Haze on the right.

CLOUD—Top left figure gives average amount of sky covered; the figure below, the total number of observations.

Compiled from observations of British Ships for the years 1870 to 1888 and 1905 to 1920.

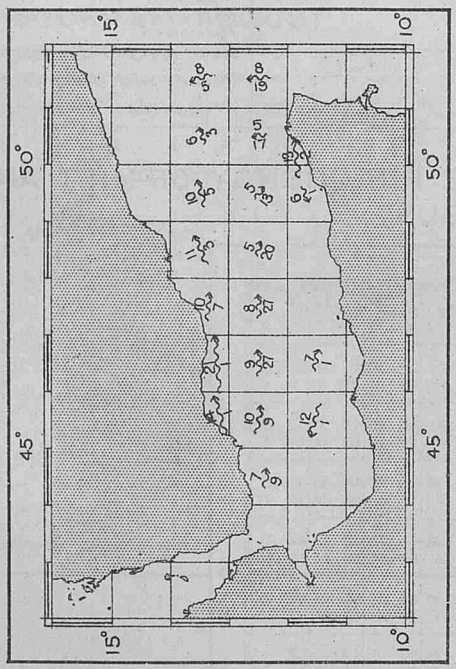
MIST AND HAZE—Top right figure gives percentage frequency of observations of mist and haze combined; the figure below, the total number of observations.

Compiled from observations of British Ships for the years 1907 to 1920.

The shaded portion shows the area in which there is a percentage frequency of 50 or more observations of mist and haze.

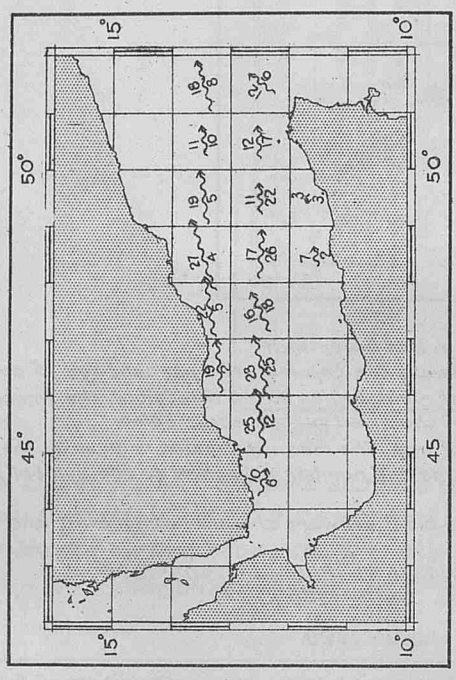
THE BEST TRACK FROM COLOMBO AND THE EAST TO STRAITS OF BAB-EL-MANDEB.
CHARTS OF MEAN CURRENTS. GULF OF ADEN.

JUNE.



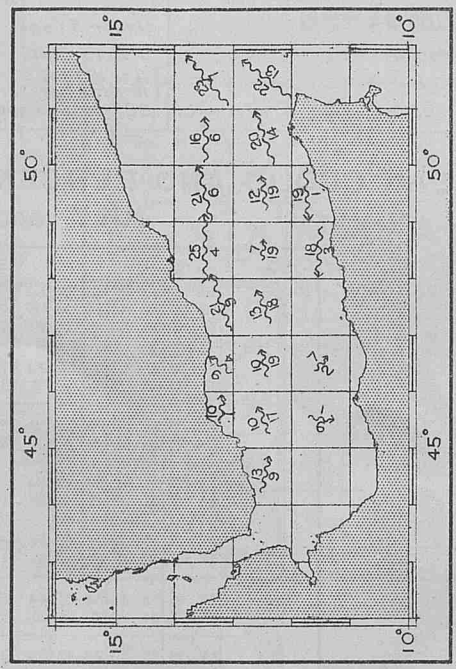
No. 14.

JULY,



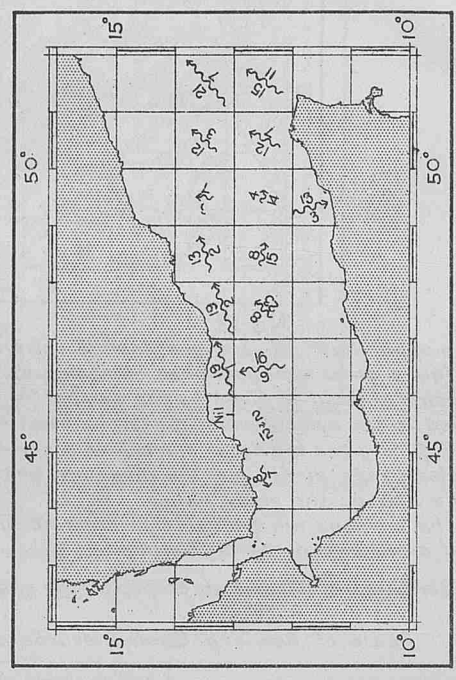
No. 15.

AUGUST



No. 16.

SEPTEMBER



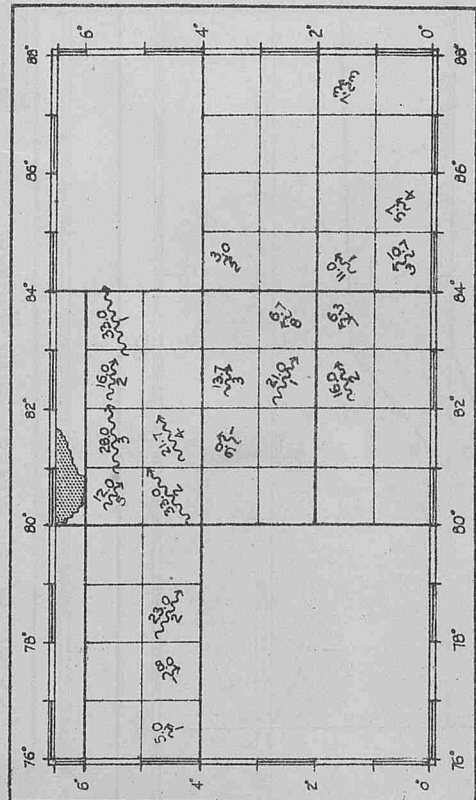
No. 17.

EXPLANATION OF CURRENT ARROWS.

The arrows flow with the current and represent the resultant of currents observed within the one degree squares.
The figures above the arrows give the velocity of current in miles per day; the figures below, the number of observations.

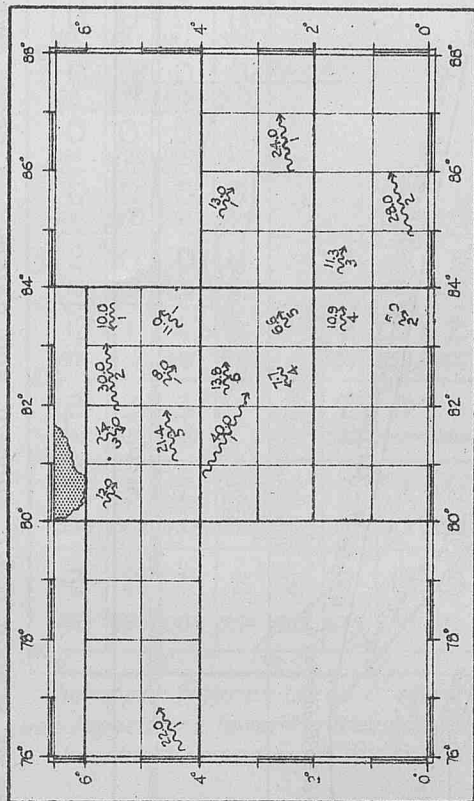
THE BEST TRACK FROM COLOMBO AND THE EAST TO STRAITS OF BAB-EL-MANDEB.
CHARTS OF MEAN CURRENTS. SOUTH OF CEYLON.

JUNE.



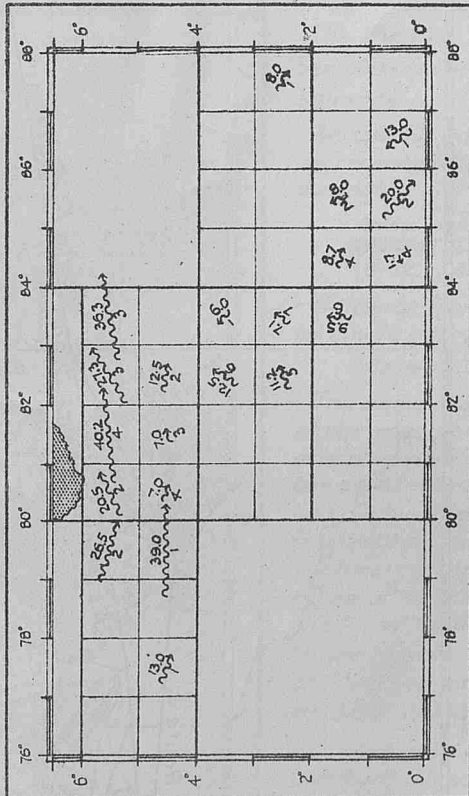
No. 18.

JULY.



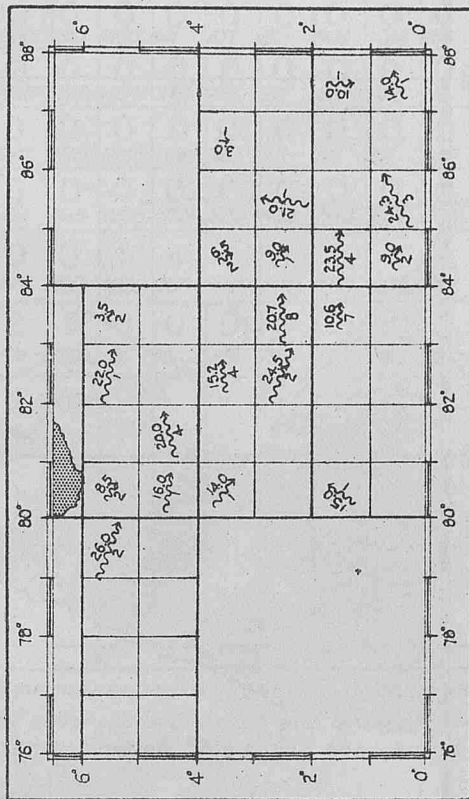
No. 19.

AUGUST.



No. 20.

SEPTEMBER.



No. 21.

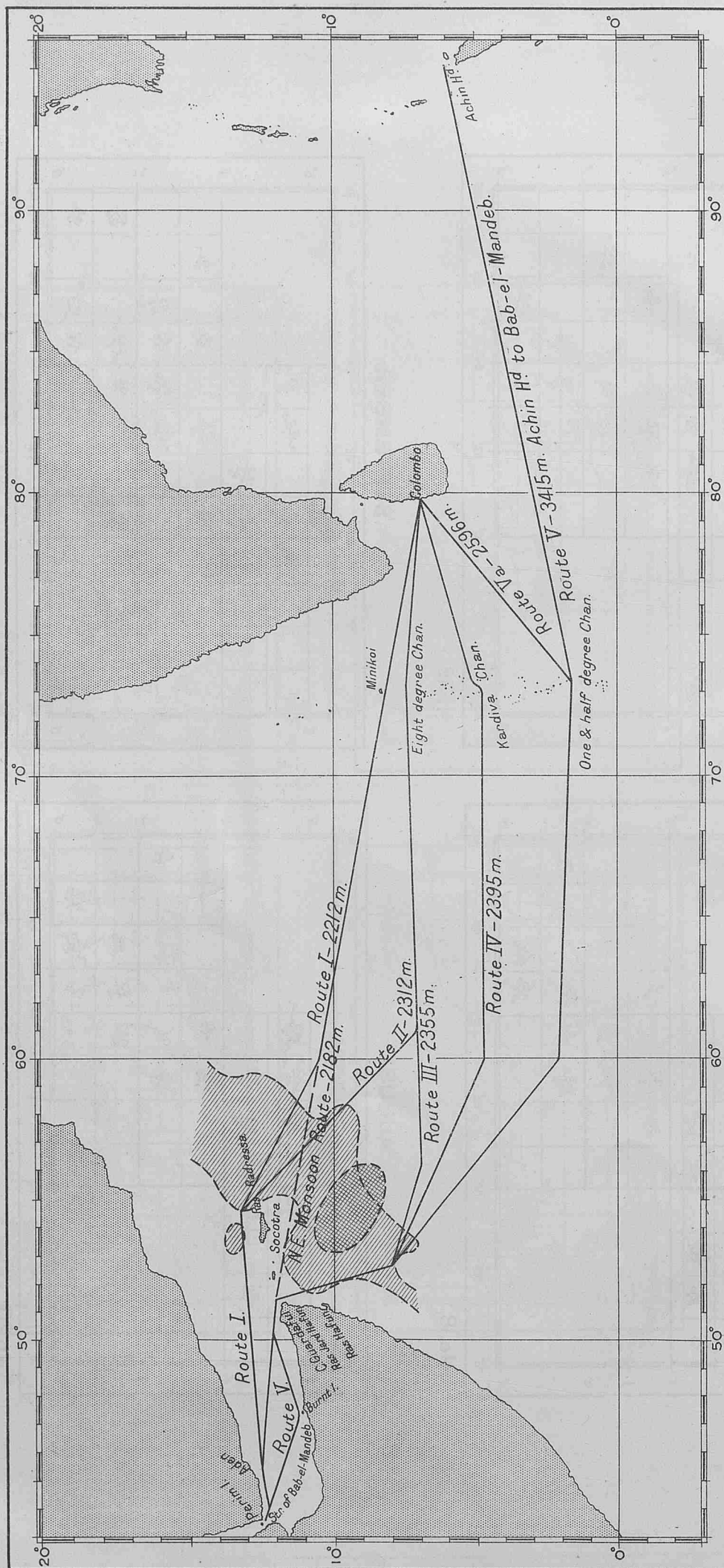
Computed from observations of British Ships during the years 1910-1928.

EXPLANATION OF CURRENT ARROWS.

The arrows flow with the current and represent the resultant of currents observed within the one degree squares.
The figures above the arrows give the velocity of current in miles per day; the figures below, the number of observation.

THE BEST TRACK FROM COLOMBO AND THE EAST TO STRAITS OF BAB-EL-MANDEB.

CHART SHOWING ALTERNATIVE ROUTES.



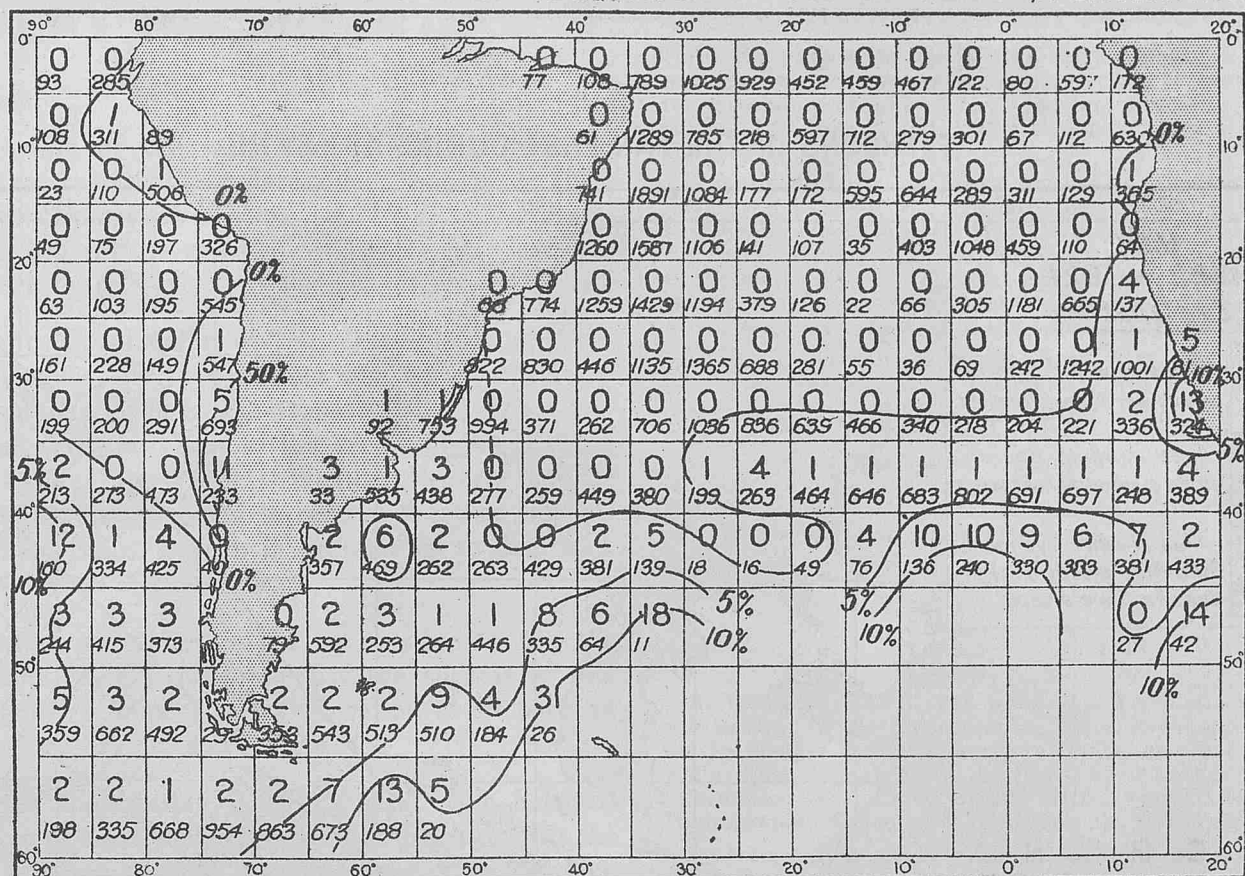
No. 22.

Region of strongest S.W. Monsoon.

Area of strong E.S.E. current and dangerous cross swell.

MAY

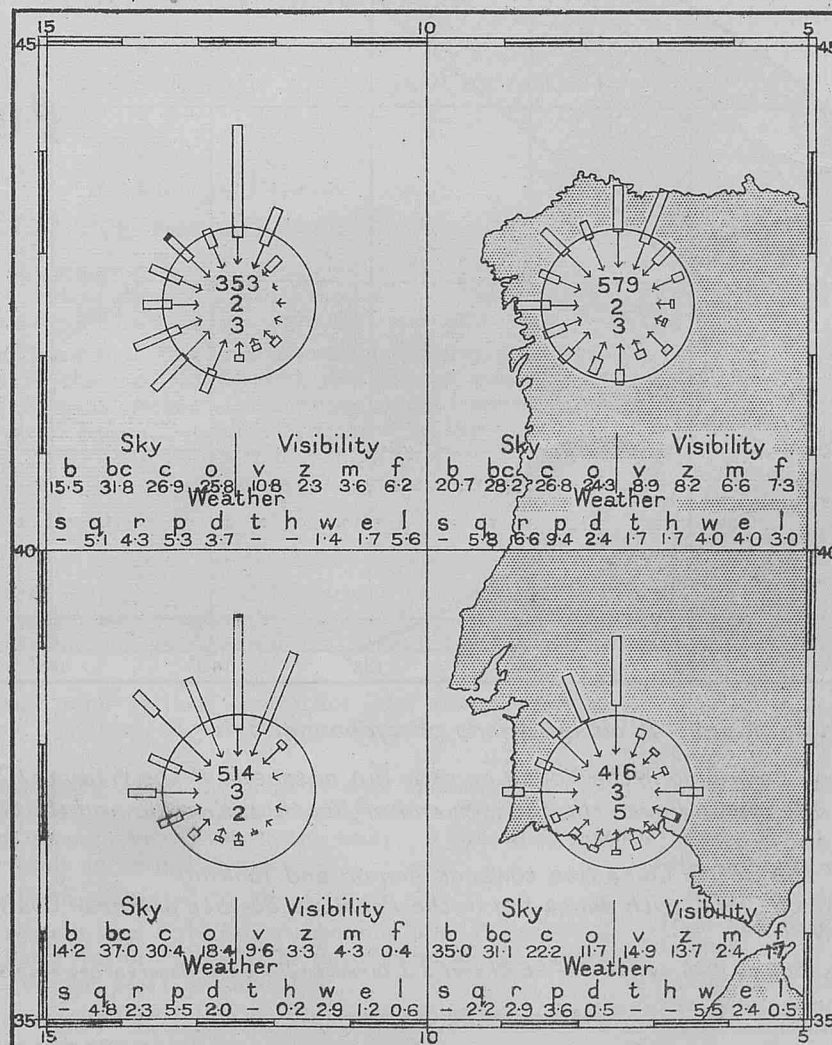
FOG IN THE SOUTH ATLANTIC AND VICINITY OF WEST COAST OF SOUTH AMERICA, PERCENTAGE FREQUENCY.



The upper figures in the 5° squares give the percentage frequency of occasions upon which Fog was logged, the lower figures the total number of observations. Lines are drawn for 0, 5, 10 and 20%. The chart is compiled from observations from British Ships for the period 1855 to 1899.

MAY

WIND, FOG, MIST AND WEATHER FOR THE REGION OFF THE COAST OF PORTUGAL.



EXPLANATION.

The Wind roses are drawn from Sea observations within the 5° squares.

Arrows fly with the wind, length represents frequency, thickness strength.

Gales. Moderate. Light.
8-12 4-7 1-3

Distance from head of arrow to circle represents 5%,
Scale: 0 10 20%

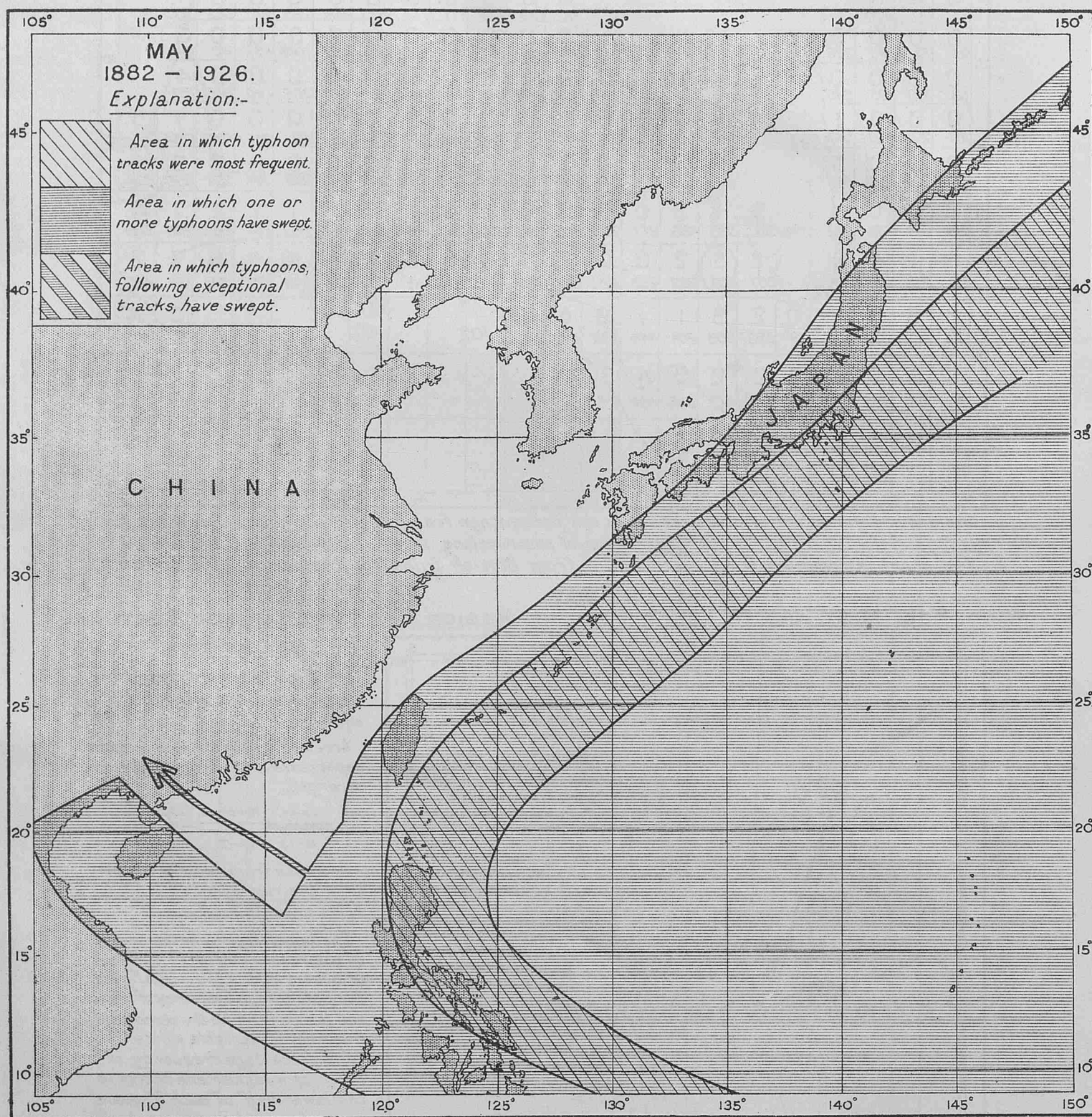
The upper figure in the centre of the rose gives total number of observations, the middle figure the percentage frequency of calms and the lower figure the percentage frequency of variable winds.

The percentage frequency of types of weather are shown in the lower half of each 5° square by the figures beneath each of the letters of the Beaufort weather notation.

For example, in the 5° square Latitude 35° to 40° N. Longitude 10° to 15° W. bc was logged 37 times in every 100 observations while d was logged 2 times.

Compiled from observations of British Ships received since the adoption of the Hollerith system of extraction, covering the years 1921-1928.

TYPHOONS IN THE FAR EAST DURING 45 YEARS.



MAY- Single chart: 46 observations of typhoons.

Principal Track: The most frequent track beginning in the South, or near Yap, passes N. of the Vizayas (Calamianes) Is, Luzon, S. of Formosa, over the Riu-Kiu islands and over the Eastern end of Honshiu: Kiushiu and the Chinese coast N. of Hongkong are free.

Secondary Track: across the centre of the South China Sea towards Annam and Tonking.

The weather is variable along the coast of China, with dense fog in the Formosa Straits and near Shanghai.
Continental depressions travelling E. or NE.

(From Atlas of the Typhoons of the China Seas, 1882 to 1926, by the Rev. P.E. Gherzi S.J., Director Zi-ka-wei Observatory, near Shanghai China).

VERY IMPORTANT.

An examination of the work done by British Selected Ships shows that remarkable progress has been made since the new scheme commenced on May 1st, 1930. The result of this examination will be given in "Work of the Year" in the June number.

Meanwhile the Commanders of "Selected Ships" are asked to ensure that their W/T. operators are fully conversant with the Instructions given in the January 1931 number and that they see monthly the Chart of the World giving Stations for Reception of Routine Wireless Weather Reports and the list of Wireless Stations detailed to receive Weather Reports from "A Selected Ships" which is brought up to date each month in THE MARINE OBSERVER.

All concerned are asked as far as possible to use the correct times and wave lengths, so that the success of this trial of the British Scheme of communication in all parts of the Oceans may be beyond question.

Especially in the Eastern North Atlantic "A Selected Ships" are asked to make their reports in accordance with the Roll Call and, as far as possible, preserving the order in which they are given.

EXTRACT FROM NOTICE ISSUED BY THE ROYAL SOCIETY OF ARTS.

THOMAS GRAY MEMORIAL TRUST PRIZES OFFERED IN 1931 FOR THE IMPROVEMENT AND ENCOURAGEMENT OF NAVIGATION.

The Council now offer the following Prizes:—

I.—PRIZE FOR AN INVENTION.

A Prize of £100 to any person who may bring to their notice a valuable improvement in the Science or Practice of Navigation proposed or invented by himself in the years 1930 and 1931.

In the event of more than one such improvement being approved, the Council reserve the right of dividing the amount into two or more prizes at their discretion. Competitors must forward their proofs of claim on or before December 31st, 1931, to the Secretary, Royal Society of Arts, John Street, Adelphi, W.C. 2.

II.—PRIZE FOR AN ESSAY.

A Prize of £100 for an essay on the following subject:—

"The Stability of Ships, with special reference to the particulars which should be supplied by Shipbuilders, and also the value of any mechanical devices for ascertaining the M.G., with which you are acquainted."

Competitors must send in their essays not later than December 31st, 1931, to the Secretary, Royal Society of Arts, at the above address.

The essays must be typed. They must be sent in under a motto, accompanied by a sealed envelope enclosing the author's name, which must on no account be written on the essay. A breach of this regulation will result in disqualification.

The Judges will be appointed by the Council.

The Council reserve the right of withholding the Prize or of awarding a smaller Prize or Prizes, if in the opinion of the Judges no suitable invention or essay is submitted.

The Council also reserve an option on the copyright of the successful essay.

January, 1931.

INTERNATIONAL ICE PATROL SERVICE.

For the purpose of carrying on the International Ice Observations and Ice Patrol Service provided for by the International Convention for the Safety of Life at Sea, London, 1929, the U.S. Coast Guard cutters "Mojave" and "Pontchartrain" have been detailed for this service.

The object of the Ice Patrol Service is to locate icebergs and field ice nearest to the North Atlantic Lane Routes. It will be the duty of the patrol vessels to determine the southerly, easterly, and westerly limits of the ice and to keep in touch with these fields as they move to the southward, in order that radio messages may be sent out daily, giving the whereabouts of the ice, particularly the ice that may be in the immediate vicinity of the regular North Atlantic Lane Routes.

During the months of **March, April, May, and June**, and as much longer as necessary these two vessels will alternate on patrol.

Having located the ice, the patrol vessel will send daily radio-grams and broadcasts as stated below, each broadcast being repeated twice, with an interval of 2 minutes between each repeat. Each broadcast will be preceded by the general call "CQ" on 600 metres (500 kilocycles) wave length, immediately followed by the ice broadcast on the wave length specified, as follows:

G. M. T.	Time	Wave length (metres)	Frequency (in kilocycles)
0000	75 Meridian		
0000	7.00 p.m.	1,713	175 A.I.
1100	6.00 a.m.	706	425 A.I.
1200	7.00 a.m.	1,713	175 A.I.
2300	6.00 p.m.	706	425 A.I.

At 0030 (G. M. T.), 7.30 p.m., 75th meridian time, a radiogram will be sent to the Hydrographic Office, Washington, D.C., defining the ice danger zone, its southern limits, or other definite ice news, while other messages will be sent during the night if any later information is obtained by the patrol vessel. The address of the Hydrographic Office is "Hydrographic, Washington, D.C."

Ice information will be given by radio at any time to any ship with which the patrol vessel can communicate. Such information will be furnished as regular radio traffic (without charge) on commercial traffic frequencies (wave lengths).

Ice information broadcasts will be given in as plain, concise English as practicable and will state in the following order—

- Position of patrol vessel.
- Location and description of ice.
- Other data.

The Ice Patrol vessels' general radio call letters are NIDK. This is a special call for the vessel actually on patrol, and should not be confused with the regular radio call letters assigned to the individual vessels.

The radio messages from the patrol vessel and from other sources will be given publicity by the Hydrographic Office as follows:—

- By radio broadcast from—

Station	G. M. T.	75th meridian Standard Time	Wave length (metres)	Frequency (in kilocycles)
Washington ...	{ 1700 0200	{ 12.00 noon 9.00 p.m. }	2653	113 A.I.
Boston ...	{ 1600 2200	{ 11.00 a.m. 5.00 p.m. }	2939	102 A.I.
New York ...	{ 1530 2130	{ 10.30 a.m. 4.30 p.m. }	2939	102 A.I.
Norfolk ...	{ 0900 1600 2100	{ 4.00 a.m. 11.00 a.m. 4.00 p.m. }	2458	122 A.I.

- All reports of ice are published in the Daily Memorandum and the weekly Hydrographic Bulletin.

The work of the U.S. Coast Guard cutters engaged on this Ice Patrol duty will be greatly facilitated if the principal trans-Atlantic steamships report the following data by radio to the patrol vessels:—

- Icebergs or obstructions sighted, giving date, time (G. M. T.), latitude, longitude, set, and drift; and in case it is an iceberg, the temperature of the water at the time should be included.

- Surface temperature of the sea water every four hours when between latitudes 39° N. and 49° N., and between longitudes 43° W. and 56° W., when bound either east or west, giving time of observation (G. M. T.), the latitude, longitude, course, and speed.

These data will facilitate the drawing of a temperature curve which will be useful in locating the branches of the Labrador Current.

It is requested that radio operators desist, as far as practicable, from operating at the above times in order to lessen radio interference.

The radio procedure will be in accordance with the provisions of the International Radiotelegraph Convention of Washington, 1927, which went into effect January 1st 1929.

ICE CHART. WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE.

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

- (B) From 11th April to 30th June, inclusive.
- (E) From 11th April to 15th May, or until the Cape Race route clear of ice.
- (F) From 16th May to Opening of Belle Isle route.
Westbound, on approaching Cape Race steer a course to pass 10 miles S. of Cape Race.
Eastbound, steer from position 25 miles S. of Cape Race.

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 87 and 88 of Vol. VIII, No. 88, April, 1931 Number, and Notice of Changes on this chart.

SYMBOLS USED ON THE CHART

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

PHENOMENAL POSITIONS OF ICE

Date.	Ship or Source of Report.	Position. Lat. Long.	Remarks.
May 20, 1907	S.S. Lord Landsdowne.	31°00' N. 38°00' W.	2 small pieces, 6 ft. by 6 ft. and 12 ft. by 4 ft. out of water.
" 6, 1908	S.S. Oceano ...	150-200 miles N. of Bermuda.	Pieces.
" 27, 1909	S.S. Reventazon ...	32°28' N. 44°10' W.	60 ft. long, 10 ft. high.
" 15, 1911	S.S. Camillo ...	10 miles E. of Nantucket Shoal L.V.	Small berg.
" 11, 1914	S.S. Indradeo ...	42°18' N. 62°43' W.	Large slabs of field ice and growlers 100-150 ft. long, 5 ft. out of water.
" 17, 1915	S.S. Pola ...	38°16' N. 61°50' W.	Some field ice.
" 15, 1920	U.S. Hydrographic Bulletin.	45°11' N. 36°42' W.	Berg.
" 27, 1930	S.S. Valperga ...	40°37' N. 37°50' W.	Berg about 16 ft. high, with growlers.

No Reports of Ice, sighted during the month of March, 1931, have been received at the Meteorological Office.

IMPORTANT.

The following is an extract from a letter received from the Cunard Steamship Company dated 16th March, 1931:

NORTH ATLANTIC LANE ROUTES.

Changes to come into operation as from the 31st March, 1931.

"B" Track (Southern)—Westbound and Eastbound.

At present operative:—
From 1st April to 31st August (both days inclusive).

Under revised agreement will be operative:—
From 11th April to 30th June (both days inclusive).

"C" Track (Northern)—Westbound and Eastbound.

At present operative:—
From 1st September to 31st March (both days inclusive).

Under revised agreement will be operative:—
From 1st July to 10th April (both days inclusive).

MARINE METEOROLOGY.

CO-OPERATION OF SHIPOWNERS, MASTERS AND MATES.

Captains and officers who wish to co-operate regularly with the Meteorological Office should apply to the appropriate Port Meteorological Officers or Agents, a list of these gentlemen with addresses is given below. A general description of Marine Meteorological Work, including the particulars desired from intending Marine Observers, is given in Chapter I of *THE MARINE OBSERVER'S HANDBOOK*, 5TH EDITION, which may be obtained from H.M. Stationery Office direct, or through any booksellers, price 2s. 6d.

The names of vessels regularly observing for the Meteorological Office, London, together with their Commanders and Observing Officers, are given monthly in *THE MARINE OBSERVER*, which may be obtained from H.M. Stationery Office, price 2s., 2s. 2d. post free.

The Captains and Officers of regular observing ships constitute the Corps of Voluntary Marine Observers. For certain branches of this work tested instruments are lent to the Captains of British ships registered at ports in Great Britain. A certain number of Regular Observing ships are detailed as "Selected Ships" for the purpose of the World Wide Scheme of Routine Ships' Wireless Weather Telegraphy Reporting. These "Selected Ships" are indicated monthly in the "Fleet List" in *THE MARINE OBSERVER* by a number.

To decode "Selected Ships" reports the pamphlet M.O. 329, price 3d. may be obtained from H.M. Stationery Office.

Only ships registered at Ports in Great Britain will, in future, be included in the Meteorological Office, London, "Fleet List."

Marine Observers are asked to send in their Meteorological Log through the appropriate Port Meteorological Officer or Agent (accompanied by Form 138 in the case of "Selected Ships") at intervals of not more than six months. The Meteorological Record Form 911 (accompanied by Form 138 in the case of "Selected Ships") should be posted direct to the Meteorological Office, London, at the end of each voyage.

When sending in the Meteorological Log or Record, Regular Observing ships will render great assistance if they will notify the Port Meteorological Officer or Agent of their requirements.

The Port Meteorological Officers and Agents inspect official instruments at regular intervals, replacing those which are defective.

Where ships' instruments are found by comparison to be reliable they may be used for the work of "Selected Ships." A reliable mercurial barometer is essential as part of the equipment of a "Selected Ship."

A copy of *THE MARINE OBSERVER* is sent monthly to the Captain of every observing ship for the information and guidance of the officers doing this work. He is also supplied with *THE MARINE OBSERVER'S HANDBOOK* and such charts and atlases as are considered necessary as Meteorological equipment for *The Work* of a Regular Observing ship in a particular trade.

WIRELESS AND WEATHER AN AID TO NAVIGATION, published by H.M. Stationery Office, which affords information and guidance for the practical application of Marine Meteorology to Navigation, may be purchased through any bookseller, price 5s.

Returns made by Regular Observing ships are acknowledged monthly in *THE MARINE OBSERVER*, and a list of those Commanders and Officers who have performed specially fine work is published yearly in *THE MARINE OBSERVER* and Excellent Awards are made to them.

The work done by Regular Observing Ships in making written returns, and by "Selected Ships" in broadcasting routine information by W/T, together with "Weather Shipping" Bulletins broadcast from the shore, conforming with the recommendations of the International Convention of Safety of Life at Sea, 1929, provide the necessary information for the use of all shipping. Thus by shipowners encouraging the specialist work in those of their ships whose names appear in *THE MARINE OBSERVER*, this Voluntary Work under the supervision of the Meteorological Office provides a service to all shipping at minimum cost to the National funds.

Shipowners are asked to facilitate the forwarding of postal matter from the Air Ministry addressed to the Captains of their ships.

LATE PRESS.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
NORTH SEA.			
16.3.31	23 miles SE x S½S of Girdleness.		Damaged lifeboat marked <i>Starkad</i> .
ENGLISH CHANNEL.			
10.3.31	49°53'N.	5°48'W.	Derelict vessel, partly submerged.
13.3.31	50°10'N.	1°31'W.	Wreckage.
20.3.31	50°26'N.	0°51'W.	Red painted buoy adrift.
MEDITERRANEAN SEA.			
10.3.31	35°54'N.	15°03'E.	Red can buoy, surmounted by staff and skeleton pyramid. Danger to navigation.
NORTH ATLANTIC.			
6.3.31	29°42'N.	72°28'W.	Derelict lumber laden four-masted schooner <i>Emerett</i> .
8.3.31	48°23'N.	5°21'W.	Partly submerged small black lighter, bow above water. Danger to navigation.
8.3.31	26°50'N.	79°52'W.	Double steel cylindrical float, with section of pipe about 14 ft. long. One cylinder partly submerged.
11.3.31	5°36'N.	25°02'W.	Quantity of wreckage, 25 ft. submerged, 10 ft. above water. Danger to navigation.
12.3.31	42°30'N.	65°08'W.	Spar about 30 ft long. Attached to submerged wreckage.
13.3.31	60°09'N.	1°31'W.	Portion of derelict motor vessel.
13.3.31	44°38'N.	59°46'W.	Heavy beam with iron fittings, attached to submerged wreckage.
GULF OF MEXICO.			
2.3.31	28°07'N.	91°51'W.	Buoy carrying red flag.
4.3.31	28°52'N.	88°28'W.	Piece of wreckage, 20 ft. square, showing 5 ft. out of water.
5.3.31	29°59'N.	85°38'W.	Derelict scow.
PACIFIC.			
11.3.31	7°35'N.	79°16'W.	Tree trunk 20 ft. long, 1½ ft. diameter, with roots attached.
INDIAN OCEAN.			
21.3.31	9°47'N.	64°37'E.	Large tree 70 ft. long, branches visible. Danger to navigation.

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

LONDON ...	Captain L. A. BROOKE SMITH, R.D., R.N.R., Marine Superintendent. Commander J. HENNESSY, R.D., R.N.R., Senior Nautical Assistant. Room 319, Adastral House, Kingsway, W.C.2. (Telephone No.: Holborn 3434 Extension 421). Nearest station Temple, District Railway.
THAMES ...	Lieut. C. H. WILLIAMS, R.N.R., Port Meteorological Officer, P.L.A. Building, King George V Dock (south side), London, E.16. (Telephone No.: Albert Docks 2659. Telegraphic Address: Barometric Aldock, London).
MERSEY ...	Lieut. Commander M. CRESSWELL, R.N.R., Port Meteorological Officer, Dock Office, Liverpool. (Telephone No.: Bank 8959. Telegraphic Address: Meteorite, Liverpool).

Agents.

BELFAST ...	Captain J. MCINTYRE, Harbour Master, Harbour Office. (Telephone No.: Belfast 4090).
BRISTOL CHANNEL	Captain T. JOHNSTON, Technical College, Cathays Park, Cardiff. (Telephone No.: Cardiff 6813).
CLYDE ...	Mr. ROBERT CLEARY, Master Mariner, The Clutha Stevedoring Co., Ltd., Princes Dock, Glasgow. (Telephone No.: 513 Ibrox).
FREMANTLE W. Australia.	Captain J. J. AIREY, Deputy Director of Navigation, Customs House. (Telephone No.: B 1391).

Agents (contd.).

HONG KONG, China.	Lieut. Commander G.B.R. RUDYERD-HELPMAN, R.N., Superintendent, Admiralty Chart and Chronometer Depot, H.M. Dockyard. (Telephone No.: 108 Dockyard).
HUMBER ...	Captain A. M. BROWN, Ellerman Wilson Line Office, Hull. (Telephone No.: Central 2180).
FORTH ...	Captains C. G. BONNER, V.C., D.S.C., and D. AITCHISON, Leith Salvage and Towage Co., Ltd., 2, Commercial Street, Leith.
SOUTHAMPTON	Mr. R. I. T. MCEWAN, Master Mariner, Gilchrist Navigation School, 5, Union Bank Chambers, 1, Bernard Street. (Telephone No. Southampton 4277).
SYDNEY, New South Wales.	Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation. Captain C. LINDBERGH. Customs House. (Telephone No.: B6421).
TYNE ...	Captain J. J. MCEWAN, Marine School, South Shields.
VANCOUVER, British Columbia.	Mr. T. S. H. SHEARMAN, 61, Leigh Spencer Building, 553, Granville Street. (Telephone No.: Seymour 3309).

LIST OF VOLUNTARY OBSERVING SHIPS

i

FLEET LIST.

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 records received, are given with the date and description of last log, register or record 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 records 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.

Explanation of Abbreviations.

Unless otherwise stated, vessels on the following list are s.s.—M.V. indicates Motor Vessel.

M.L. = Equipped with tested Instruments lent by the Meteorological Office for keeping Meteorological Logs.

W.T. = Equipped wholly or partly with tested Instruments lent by the Meteorological Office for reporting in code by W/T in the International Selected Ship system.

No. = No Meteorological Office instrumental equipment on board.

M = Ship's barometer *mercurial*.

A = Ship's barometer *aneroid*.

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

To indicate the nature of the wireless apparatus of Selected Ships—

†† preceding ship's name indicates fitted for long range continuous wave transmission and reception.

*† = Short range transmission and long range continuous wave reception.

** = Short range transmission and reception.

The numbers preceding the names of ships are for identification purposes, when observations are re-transmitted in synoptic messages by wireless or cable, and are not intended for use at sea.

Selected Ships.

Those ships in this list which have a number and symbols indicating W/T apparatus before their names are "Selected Ships" invited to make by W/T, reports of observations taken at arranged G.M. Times to "All Ships."

Name of Vessel.	Captain	Observing Officers.	Meteorological Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 13.31	Date Received.
233 †† <i>Aba</i> , M.V. ...	Williams, T. E. ...	J. D. Townson, R. A. Cherry ...	W.T.	Elder Dempster ...	Forms 911 & 138 19.12.30 to 19.1.31	23.1.31
121 †† <i>Abinsi</i> ...	Sola, P. ...	G. H. Worsley, J. J. Smith. ...	"	" " ...	" " 25.12.30 to 29.1.31	3.2.31
122 †† <i>Accra</i> , M.V. ...	Toft, J. T. ...	R. B. Ellis ...	W.T.-M.	" " ...	" " 28.1.31 to 3.3.31	7.3.31
155 *† <i>Achilles</i> ...	Cosker, W. ...	C. Broad, R. E. Agar, J. S. Stratford. ...	M.L.	A. Holt ...	Form 915 4.10.30 to 13.2.31 ...	19.2.31
055 *† <i>Actor</i> ...	Whyte, D. L. ...	G. Penston, E. Pearce, G. Howard. ...	No. M.	Harrison ...	Forms 911 & 138 14.11.30 to 24.1.31	28.1.31
123 †† <i>Adda</i> , M.V. ...	Shooter, J. C. ...	J. Boyd, F. C. Langton ...	W.T.-M.	Elder Dempster ...	" " 1.1.31 to 2.2.31	5.2.31
050 †† <i>Adriatic</i> ...	Binks, J. ...	O. V. Lucas, N. Fisher, G. T. Kavanagh. ...	W.T.	White Star ...	" " 2.2.31 to 23.2.31	25.2.31
<i>Aeneas</i> ...	Wallace, W. K. ...	A. McL. Pilcher ...	No. A.	A. Holt ...	Form 911 24.1.31 to 28.1.31 ...	2.2.31
166 *† <i>Agamemnon</i> ...	Beswick, W., D.S.C., Commr., R.N.R. ...	C. Mackinnon ...	W.T.	" " ...	Forms 911 & 138 17.11.30 to 22.1.31	29.1.31
<i>Aidan</i> ...	Reynolds, W. H. B. ...	A. A. Gerrard ...	No. A.	Booth ...	Form 911 13.12.30 to 25.12.30 ...	21.1.31
<i>Alaunia</i> ...	Prothero, M. ...	T. O. Ellis ...	" A.	Cunard ...	" 16.11.30 to 6.12.30 ...	8.12.30
<i>Alban</i> ...	Evans, L. ...	J. G. Tippet ...	" A.	Booth ...	" 16.8.30 to 7.10.30 ...	27.10.30
310 †† <i>Alcantara</i> , M.V. ...	Wakeman, E. C. ...	" " ...	W.T.	R.M.S.P. ...	" 19.12.30 to 27.1.31 ...	2.2.31
178 *† <i>Alipore</i> ...	Lyndon, E. P. ...	J. P. McArthur ...	No. M.	P. & O. ...	" 15.1.31 to 25.1.31 ...	23.2.31
175 †† <i>Almanzora</i> ...	Hannam, F. S. ...	P. M. Burrell, C. K. Brown ...	W.T.	R.M.S.P. ...	" 8.12.30 to 17.1.31 ...	22.1.31
012 †† <i>Almeda Star</i> ...	Turner Russell, W. ...	E. K. Watkins, H. Metcalf, C. Potts, E. Russell. ...	No. M.	Blue Star ...	Forms 911 & 138 30.11.30 to 14.1.31	21.1.31
<i>Alondra</i> ...	Scott, L. S. ...	G. Hamilton, E. W. Thomas ...	" A.	Yeoward ...	Form 911 15.2.31 to 7.3.31 ...	12.3.31
<i>Alynbank</i> ...	Robertson, J. ...	G. E. Beaton ...	" A.	A. Weir & Co. ...	" 5.1.31 to 5.2.31 ...	10.2.31
103 †† <i>Andalucia Star</i> ...	Vernon, R. ...	W. Cumming ...	" M.	Blue Star ...	Forms 911 & 138 22.12.30 to 4.2.31	16.2.31
<i>Anchises</i> ...	Dunlop, J. K. ...	E. N. Sandon, E. G. Coombe ...	" A.	A. Holt ...	Form 911 24.2.30 to 5.4.30 ...	10.6.30
<i>Antiloehus</i> ...	Dougall, W. T. ...	C. F. Lock ...	" A.	" " ...	" 20.1.31 to 5.2.31 ...	10.3.31
209 †† <i>Aorangi</i> , M.V. ...	Martin, W. ...	E. Anderson, J. Watling, R. N. Turner, D. H. Richards, H. Webster. ...	M.L.	Canadian-Australasian ...	Form 915 1.5.30 to 15.8.30 ...	11.12.30
120 †† <i>Apapa</i> , M.V. ...	Beith, A. ...	J. R. Sergiades, V. Feeney. ...	W.T.-M.	Elder Dempster ...	Forms 911 & 138 16.1.31 to 16.2.31 ...	23.2.31
129 †† <i>Appam</i> ...	Draper, J. M. ...	W. M. M. Hutchings, C. V. Evans, H. O. Forster. ...	W.T.	" " ...	" " 21.1.31 to 28.2.31	3.3.31
<i>Araby</i> ...	Lee, J. ...	H. Haigh ...	No. A.	MacIver ...	Form 911 8.12.30 to 28.2.31 ...	9.3.31
115 †† <i>Arandora Star</i> ...	Moulton, E. W. ...	" " ...	" M.	Blue Star ...	" 21.12.30 to 6.1.31 ...	15.1.31
278 *† <i>Architect</i> ...	Mowat, I. ...	A. C. Bannister ...	" M.	Harrison ...	Forms 911 & 138 4.10.30 to 8.12.30	15.12.30
293 *† <i>Ariguaní</i> ...	Scudamore, J. H. H. ...	G. McKee, W. Ireland, M. H. Thomson, J. S. Bell. ...	M.L.	Elders & Fyffes ...	Form 915 9.8.30 to 7.12.30 ...	24.12.30
<i>Ariosto</i> ...	Biggins, R. L. ...	N. F. Hewetson, R. W. Holdsworth. ...	No. A.	Ellerman Wilson ...	Form 911 22.9.30 to 27.12.30 ...	6.1.31
144 †† <i>Arianza</i> ...	Clarke, E., R.D., Commr., R.N.R. ...	W. Dorrell, H. V. Todd, F. T. Brett. ...	W.T.	R.M.S.P. ...	Forms 911 & 138 17.1.31 to 3.3.31 ...	5.3.31
091 †† <i>Armada Castle</i> ...	Whitfield, G. J. ...	W. Pace, C. Lloyd, A. H. Parry, E. T. Day. ...	M.L.	Union Castle ...	Form 915 1.8.30 to 23.11.30 ...	26.11.30
296 *† <i>Arracan</i> ...	Thomson, S. ...	K. Currie, B. Bain, T. B. Wilkins. ...	M.L.	P. Henderson ...	Form 915 26.3.30 to 5.11.30 ...	11.11.30
<i>Arundel</i> ...	Shaw, B. ...	E. Hill ...	C.C.	Southern Rly. ...	Telegraphic Report 10.3.31 ...	10.3.31

THE MARINE OBSERVER

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 13.3.31.	Date Received.
095 †† <i>Arundel Castle</i> ...	Morton Betts, W. ...	G. L. Clarke, O. Pitts, E. McKinley.	M.L.	Union Castle ...	Form 911 8.8.30 to 28.12.30 ...	21.31
280 *† <i>Astronomer</i> ...	Richards, J. ...	T. R. Hill ...	No. M.	Harrison ...	Forms 911 & 138 4.11.30 to 30.11.30 ...	4.12.30
065 †† <i>Asturias M.V.</i> ...	LeBrecht, H. A. ...	H. G. Whittle, S. J. Hill, T. W. Stevens, L. H. Smith.	W.T.	R.M.S.P. Co. ...	Form 138 30.1.31 to 10.2.31 ...	4.3.31
156 *† <i>Ascantus</i> ...	Wilson, C. A. ...	R. Robinson, E. Radford, R. Holdstock.	M.L.	A. Holt ...	Form 915 14.9.30 to 15.1.31 ...	23.1.31
<i>Atlantian</i> ...	Masters, W. ...	... ..	No. A.	Leyland ...	Form 911 6.2.31 to 15.2.31 ...	25.2.31
<i>Atrous</i> ...	Wilcox, J. H. ...	E. A. H. Gepp ...	" A.	A. Holt ...	4.3.30 to 28.6.30 ...	2.8.30
281 *† <i>Auditor</i> ...	Owen, W. T. ...	L. Richardson ...	" M.	Harrison ...	Forms 911 & 138 31.8.30 to 15.11.30 ...	25.11.30
<i>Ausonia</i> ...	Murchie, P. A., R.D., Capt., R.N.R.	E. R. Taylor ...	" A.	Cunard ...	Form 911 15.11.30 to 7.12.30 ...	15.12.30
212 *† <i>Australia</i> ...	Parkin, J. W. ...	H. Falkiner, E. H. Lidstone, A. G. Brooks.	M.L.	British India ...	Form 915 27.9.30 to 10.2.31 ...	23.2.31
010 †† <i>Avelona Star</i> ...	Thomas, R. J. ...	F. N. Johnson, A. Malcouronne, L. Parsons.	No. M.	Blue Star ...	Forms 911 & 138 3.1.31 to 19.2.31 ...	25.2.31
124 †† <i>Avila Star</i> ...	Hopper, G.E. ...	W. J. Stratton, C. Barratt, R. C. Frazier, D. Marshall.	" M.	" ...	" " 17.1.31 to 3.3.31 ...	10.3.31
<i>Balmoral Castle</i> ...	Gilbert, E. F. ...	H. Baty ...	" A.	Union Castle ...	Form 911 21.3.30 to 7.5.30 ...	14.5.30
179 *† <i>Balranald</i> ...	Short, C. E. ...	E. R. Physick, H. P. Mallet, G. E. Owen.	" M.	P. & O. Branch ...	Forms 911 & 138 8.1.31 to 15.1.31 ...	20.1.31
051 †† <i>Baltic</i> ...	Davies, E. ...	J. Law, D. W. Chamberlain, N. E. Banks.	W.T.	White Star ...	" " 16.2.31 to 8.3.31 ...	12.3.31
<i>Bampton Castle</i> ...	James, J. S., D.S.C. ...	H. R. Graham ...	No. A.	Union Castle ...	Form 911 15.10.30 to 29.11.30 ...	20.12.30
248 *† <i>Banffshire</i> ...	Westropp, T. G. ...	A. Banks, N. Stewart ...	" M.	Turnbull Martin ...	Forms 911 & 138 28.8.30 to 19.9.30 ...	25.9.30
180 *† <i>Baradine</i> ...	Elliot Smith, H. ...	C. B. Roche, A. G. Jenkins, L. A. Hill, C. F. Halliday, G. L. Farnfield.	M.L.	P. & O. Branch ...	Form 915 21.11.30 to 27.2.31 ...	3.3.31
037 *† <i>Baronesa</i> ...	Compton, R. W. ...	H. N. Sherwell ...	No. M.	Houlder ...	Form 911 17.11.30 to 6.1.31 ...	20.1.31
<i>Baron Forbes</i> ...	Cairns, W. ...	J. Maclean ...	" A.	H. Hogarth & Sons ...	" 4.2.31 to 26.2.31 ...	9.3.31
213 *† <i>Barpeta</i> ...	Partridge, H. ...	J. H. Kerr, R. H. A. Bond, J. D. Bardsley.	" M.	British India ...	Forms 911 & 138 7.1.31 to 6.2.31 ...	10.3.31
181 *† <i>Barrabool</i> ...	Sheepwash, J. S. ...	F. N. Mosey ...	" M.	P. & O. Branch ...	" " 22.9.30 to 1.1.31 ...	9.1.31
070 †† <i>Bayano</i> ...	Swain, F. H. ...	F. Leach, A. Sandham, W. Hannak.	W.T.	Elders & Fyffes ...	" " 23.1.31 to 25.2.31 ...	2.3.31
<i>Baychimo</i> ...	Cornwell, S. A. ...	" ...	No. A.	Hudson Bay Co ...	Form 911 8.7.30 to 29.9.30 ...	6.11.30
059 †† <i>Belgenland</i> ...	Morehouse, W. A. ...	J. E. Loe, J. H. I. Mackie, F. Good.	W.T.	Red Star ...	Forms 911 & 138 4.12.30 to 11.12.30 ...	22.12.30
<i>Benalder</i> ...	Fairweather, J. J. ...	E. D. Copeman ...	No. A.	Ben Line ...	Form 911 10.3.30 to 18.4.30 ...	24.4.30
183 †† <i>Benadigo</i> ...	Wyatt, F. N. ...	J. K. Krone, H. Morgan, R. S. Frost.	" M.	P. & O. Branch ...	Forms 911 & 138 8.12.30 to 12.2.31 ...	2.3.31
<i>Bengore Head</i> ...	Milligan, J. ...	O. J. Rea ...	" A.	Ulster S.S. Co. ...	Form 911 28.2.31 to 6.3.31 ...	10.3.31
233 *† <i>Berwickshire</i> ...	Evans, E. H. ...	J. O. Woodall, R. Frankish, C. Allister.	W.T.	Turnbull Martin ...	Forms 911 & 138 28.10.30 to 1.1.31 ...	6.1.31
<i>Brenda</i> ...	Wright, J. ...	N. Ross ...	No. A.	Scottish Fishery Bnd.	Form 911 2.2.31 to 28.2.31 ...	4.3.31
<i>Brighton</i> ...	Munton, G. ...	H. L. Smith ...	C.C.	Southern Railway ...	Telegraphic Report 5.10.30 ...	6.10.30
057 †† <i>Britannic</i> ...	Summers, F. F., R.D., Commr., R.N.R.	J. W. Peters.	W.T.	White Star ...	Forms 911 & 138 14.2.31 to 23.2.31 ...	4.3.31
269 *† <i>British Consul</i> ...	Putt, R. O. ...	C. Galley ...	No. M.	British Tankers ...	" " 10.1.31 to 24.2.31 ...	27.2.31
311 *† <i>British Dominion</i> ...	Taylor, R. J. ...	J. E. Jones, C. A. James ...	" M.	" ...	" " 13.10.30 to 21.1.31 ...	26.1.31
308 *† <i>Butysses M.V.</i> ...	Head, B. P. ...	G. P. Hansard ...	" M.	Anglo-Saxon Petroleum Co. ...	Forms 911 & 138 2.7.30 to 10.9.30 ...	22.9.30
249 *† <i>Buteshire</i> ...	Gibb, A. W. P. ...	P. McMillan, S. W. Brown, F. C. Doyle.	M.L.	Turnbull Martin ...	Form 915 20.4.30 to 24.8.30 ...	12.9.30
031 †† <i>Caledonia</i> ...	Collie, A. ...	M. J. Harvey, R. Leiper, J. McMillan.	W.T.	Anchor ...	Forms 911 & 138 11.1.31 to 19.1.31 ...	3.2.31
011 †† <i>Calgarie</i> ...	Jackson, W. ...	J. W. Paine ...	"	White Star ...	Form 911 2.2.31 to 10.3.31 ...	12.3.31
139 †† <i>California</i> ...	Frank, F. A., D.S.O., R.D., Commr., R.N.R.	" ...	"	Anchor ...	" ...	"
<i>Cambrisa</i> ...	Smart, R. W. ...	O. W. L. Jones ...	C.C.	L.M. & S. Rly ...	Telegraphic Report 12.3.31 ...	12.3.31
250 *† <i>Cambridge</i> ...	Copland, C. P. ...	H. C. Fryer, F. Pover, D. H. Chadwick, H. Mackillican.	M.L.	Federal ...	Form 915 1.5.30 to 9.8.30 ...	12.8.30
026 †† <i>Cameronia</i> ...	Gemmell, W. ...	D. C. Shedden ...	W.T.	Anchor ...	Forms 911 & 138 1.2.31 to 22.2.31 ...	24.2.31
295 †† <i>Camito</i> ...	Forrester, W. T., O.B.E.	H. H. Dunning, G. M. Roberts, E. F. Witchell, A. H. Peacock, W. A. C. Wood, H. J. Perrett.	M.L.	Elders & Fyffes ...	Form 915 6.10.30 to 11.2.31 ...	21.2.31
101 *† <i>Canonesa</i> ...	Brodie, W. H. ...	F. E. Flint ...	No. M.	Furness Houlder ...	Forms 911 & 138 29.10.30 to 7.1.31 ...	13.1.31
<i>Cape of Good Hope</i> ...	Jacobson, T. A. ...	W. R. G. Carling ...	" A.	Lyle S.S. Co. ...	Form 911 4.12.30 to 7.2.31 ...	27.2.31
282 †† <i>Carinthia</i> ...	Hawkes, W. A., R.D., Commr., R.N.R.	" ...	W.T.	Cunard ...	" ...	"
035 †† <i>Carmania</i> ...	Townley, J. C. ...	J. McKie, E. R. B. Freeman, N. Kingscote.	"	" ...	Forms 911 & 138 28.12.30 to 4.1.31 ...	17.1.31
092 †† <i>Carnarvon Castle M.V.</i> ...	Chave, Sir B., K.B.E.	L. H. Farrow, E. Clancy ...	"	Union Castle ...	" " 13.12.30 to 31.1.31 ...	9.2.31
034 †† <i>Caronia</i> ...	Brown, F. G., R.D., Capt., R.N.R.	W. B. Tanner, D. S. Kite, R. D. McCallum.	"	Cunard ...	" " 5.1.31 to 10.1.31 ...	3.2.31
<i>Casanare</i> ...	Browne, S. ...	H. Holmes ...	No. A.	Elders & Fyffes ...	Form 911 16.11.30 to 14.12.30 ...	20.12.30
184 †† <i>Cathay</i> ...	Niven, J. D. ...	A. M. Askin ...	" M.	P. & O. ...	Forms 911 & 138 5.10.30 to 1.1.31 ...	3.1.31
<i>Cavina</i> ...	Riseley, A. D. ...	B. R. Coe ...	" A.	Elders & Fyffes ...	Form 911 26.1.31 to 28.2.31 ...	4.3.31
052 †† <i>Cedric</i> ...	Freeman, C. P., R.D., Commr., R.N.R.	G. T. Kavanagh ...	W.T.	White Star ...	Forms 911 & 138 21.12.30 to 11.1.31 ...	14.1.31
157 *† <i>Centaur M.V.</i> ...	Ward Hughes, J. ...	J. Cockburn, B. L. Brind, D. M. McAdam.	M.L.	A. Holt & Co. ...	Met. Log. 19.2.30 to 21.7.30 ...	7.10.30
056 †† <i>Ceramic</i> ...	Lloyd, W. ...	J. A. Webbe ...	W.T.	White Star ...	Form 911 26.8.30 to 9.12.30 ...	10.12.30
<i>Cerinthus M.V.</i> ...	Hammond, M. J. ...	E. Allen ...	M.L.	Hadley Shipping ...	" ...	"
<i>Changuinola</i> ...	Thorburn, R. A., R.D., Commr., R.N.R.	H. K. Houghton ...	No. A.	Elders & Fyffes ...	Form 911 20.10.30 to 22.11.30 ...	28.11.30
<i>Chindwin</i> ...	Paterson, G. ...	W. S. Keith ...	" A.	Henderson ...	" 17.2.30 to 24.4.30 ...	19.5.30
<i>Chitripo</i> ...	Sapsworth, S. A. ...	S. Waddington ...	" A.	Elders & Fyffes ...	" 25.7.30 to 10.10.30 ...	16.10.30
192 †† <i>Chitral</i> ...	Siggers, O. ...	T. D. Forbes, A. D. Dennis, A. H. Thompson.	" M.	P. & O. ...	" 1.11.30 to 5.1.31 ...	7.2.31
265 *† <i>City of Baroda</i> ...	McMillan, J. ...	H. G. Williams, J. E. Jenkins, R. W. Leese, A. G. Daniells.	M.L.	Ellerman ...	Form 915 16.3.30 to 2.1.31 ...	3.3.31
<i>City of Benares</i> ...	Wyper, J. ...	R. W. Kellie ...	No. A.	" ...	Form 911 5.8.30 to 15.8.30 ...	1.9.30
<i>City of Cambridge</i> ...	Wilson, E. G. ...	H. H. Asher ...	" A.	" ...	" 2.12.30 to 11.1.31 ...	23.2.31
<i>City of Carlisle</i> ...	Mordue, J. A. ...	" ...	" A.	" ...	" 24.11.30 to 28.12.30 ...	1.1.31
268 *† <i>City of Chester</i> ...	Letton, F. W. ...	P. R. Winship, C. W. Nelson, W. V. Highton.	M.L.	" ...	Form 915 5.5.30 to 19.9.30 ...	11.12.30
266 †† <i>City of Exeter</i> ...	Nicholl, L. ...	H. Burns ...	W.T.	" ...	Forms 911 & 138 20.10.30 to 29.10.30 ...	15.12.30
<i>City of Harvard</i> ...	McMillan, J. ...	E. Brook-Williams ...	No. A.	" ...	Form 911 18.1.31 to 9.2.31 ...	3.3.31
<i>City of Hong Kong</i> ...	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	H. Saunders ...	" A.	Ellerman ...	Forms 911 & 138 12.12.30 to 27.12.30 ...	19.1.31

LIST OF VOLUNTARY OBSERVING SHIPS

iii

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 13.3.31.	Date Received.
286 †† <i>City of London</i> ...	Brown, J. G. ...	A. J. Barrett, E. Gillies, C. Macpherson.	W.T.	Ellerman ...	Forms 911 & 138 16.11.30 to 9.12.30	29.12.30
274 †† <i>City of Nagpur</i> ...	Martin, D. ...	J. Campbell, J. W. Wotherpoon, W. Kerr.	"	" ...	" " 29.9.30 to 19.10.30	27.11.30
267 †† <i>City of Paris</i> ...	MacMillan, J. ...	E. A. Davidson ...	"	" ...	" " 15.10.30 to 5.11.30	1.1.31
270 †† <i>City of Rangoon</i> ...	Jones, P. ...	B. H. Constable, S. A. Martyn. B. McLennan.	M.L.	" ...	Form 915 " 14.6.30 to 6.9.30...	20.9.30
271 †† <i>City of Roubaix</i> ...	Radcliffe, A. V., R.D., Lt.-Com., R.N.R.	J. A. Williams, J. L. Robertson, A. N. G. Jones.	No. M.	" ...	Forms 911 & 138 14.10.30 to 3.11.30	15.12.30
272 †† <i>City of Singapore</i> ...	Kendall, J. W. ...	F. Wrigley ...	" M.	" ...	" " 3.12.30 to 25.12.30	12.1.31
273 †† <i>City of Valencia</i> ...	Ewing, W. ...	A. Travis, C. C. Duncan, C. B. P. Bradbury.	" M.	" ...	" " 21.12.30 to 20.1.31	9.3.31
<i>City of Yokohama</i> ...	Singleton, J. G. ...	J. Kinley, N. Dawson, H. Nish	" A.	" ...	Form 911 29.10.30 to 20.11.30	25.11.30
<i>Clan Alpine</i> ...	Young, A. H., R.D., Commr., R.N.R.	S. S. Stammwitz ...	" A.	Clan " ...	" 17.11.30 to 5.12.30	17.12.30
<i>Clan Kenneth</i> ...	" ...	T. A. Pearson ...	" A.	" ...	" 17.12.30 to 22.1.31	2.2.31
<i>Clan Macalister</i> ...	Stenson, F. J., A.D.O., R.D., Capt., R.N.R.	T. M. Rees Davis ...	" A.	" ...	" 21.1.31 to 17.2.31	24.2.31
<i>Clan MacBean</i> ...	Boag, J. ...	G. W. Spiller ...	" A.	" ...	" 5.12.30 to 15.12.30	22.12.30
<i>Clan Macbeth</i> ...	Worthington, C. D. ...	W. R. Woodruffe, A. G. Beynon, H. J. M. Watkins.	" A.	" ...	" 15.10.30 to 7.11.30...	11.11.30
<i>Clan Macfadyen</i> ...	Laird, C. ...	W. C. Dazell ...	" A.	" ...	" 14.12.30 to 6.1.31	9.2.31
<i>Clan Macfarlane</i> ...	Redford, L. F. ...	W. H. Simpson, H. F. Town	" A.	" ...	" 22.9.30 to 12.10.30	17.10.30
<i>Clan Macgillivray</i> ...	Mackinlay, A. ...	S. R. J. Woods ...	" A.	" ...	" 24.10.30 to 19.1.31	5.2.31
<i>Clan Macindoe</i> ...	Scott-Smith, H. E. G.	J. W. Thompson, J. West ...	" A.	" ...	" 8.10.30 to 18.10.30	17.11.30
<i>Clan Mackellar</i> ...	Lyall, A. B. ...	A. V. Howard ...	" A.	" ...	" 23.1.31 to 7.2.31	7.3.31
001 †† <i>Clan Macphee</i> ...	Gourlay, J. B. ...	E. H. Stone, T. Cornelius, A. Pollock.	M.L.	" ...	Form 915 6.7.30 to 3.10.30	8.11.30
004 †† <i>Clan MacNair</i> ...	Holman, W. G. ...	F. H. Petheridge, A. Woodrow, J. Napier.	W.T.	" ...	Forms 911 & 138 30.8.30 to 16.1.31	10.2.31
<i>Clan Macnaughton</i> ...	Clark, J. ...	R. C. Steel ...	No. A.	" ...	Form 911 18.5.30 to 19.6.30	28.6.30
<i>Clan Macquarrie</i> ...	West, W. F. ...	J. H. Thorpe ...	" A.	" ...	" 13.10.30 to 22.11.30	1.12.30
002 †† <i>Clan Macwhirter</i> ...	Low, A. ...	T. G. Mitchell, M. J. Lewis, L. Grant.	M.L.	" ...	Form 915 10.6.30 to 2.9.30	11.12.30
003 †† <i>Clan Malcolm</i> ...	George, L. S. ...	A. Lynch, J. W. Jones, B. Hind, W. E. Baker, R. J. Brittain ...	"	" ...	" 15.8.30 to 6.11.30	16.12.30
<i>Clan Morrison</i> ...	Porterfield, W. M. Lt.-Commr., R.N.R.	P. S. Evans ...	No. A.	" ...	Form 911 18.1.31 to 9.2.31	13.3.31
<i>Clan Murdoch</i> ...	Wynne, R. H. ...	J. W. Rennie ...	" A.	" ...	" 5.1.31 to 7.2.31	25.2.31
<i>Clan Ranald</i> ...	Douglas, R. ...	R. H. McElligott ...	" A.	" ...	" 7.8.30 to 30.8.30...	13.10.30
<i>Clan Ross</i> ...	Neill, G. A. ...	L. Thomson ...	" A.	" ...	" 28.12.30 to 20.1.31	23.1.31
<i>Clan Sinclair</i> ...	Cater, H. ...	W. J. Brooks, E. Holmes ...	" A.	" ...	" 4.9.30 to 10.12.30	17.12.30
312 †† <i>Clanfield</i> ...	Love, J. S. ...	F. M. Eales ...	W.T.	Hunting & Son, Ltd.	Forms 911 & 138 26.12.30 to 4.2.31	6.2.31
<i>Colonial</i> ...	Baird ...	E. J. R. North ...	No. M.	Harrison ...	" " " " " " " "	"
<i>Comedian</i> ...	Cadogan, A. ...	R. E. Nicholson, T. Davies, T. Burt.	" M.	" ...	" " 3.1.31 to 16.2.31...	2.3.31
185 †† <i>Comorin</i> ...	Cartwright, C. W., D.S.C.	Williams, G. ...	" M.	P. & O. ...	" " 8.1.30 to 9.12.30	16.12.30
049 †† <i>Coptic, M.V.</i> ...	" ...	" ...	W.T.	Shaw, Savill & Albion	" " 9.11.30 to 24.2.31	26.2.31
040 †† <i>Cornithic</i> ...	Bowan, H. ...	R. Orangle, W. Nicholl, E. Burt	"	White Star ...	" " 25.1.31 to 11.2.31	5.3.31
<i>Cornwall</i> ...	Almond, J. G. ...	W. H. G. Timberlake ...	No. A.	New Zealand S.S.	Form 911 25.1.31 to 11.2.31	5.3.31
006 †† <i>Coronado</i> ...	Legge, A. W. ...	W. J. Dodd, B. E. Druce, A. Orchard.	W.T.	Elders & Fyffes	Forms 911 & 138 6.2.31 to 11.3.31	13.3.31
301 †† <i>Culebra</i> ...	Rathkins, E. C., Commr., R.N.R.	H. D. Hooper, H. E. Sang, R. J. Finch.	M.L.	R.M.S.P. Co. ...	Form 915 19.11.30 to 31.1.31	13.2.31
251 †† <i>Cumberland</i> ...	Macmillan, D. ...	A. Taylor, J. Pring, J. K. Macdonald, F. R. J. Wilson.	"	Federal... ..	" 1.6.30 to 18.10.30	24.10.30
285 †† <i>Custodian</i> ...	O'Connor, T. ...	J. Johnson, W. Rennie, W. F. O'Neill.	No. M.	Harrison ...	Forms 911 & 138 25.11.30 to 4.3.31	11.3.31
<i>Cyclops</i> ...	Glossop, S. ...	R. A. Hanney ...	" A.	A. Holt ...	Form 911 8.12.30 to 5.2.31	13.2.31
<i>Dakotian</i> ...	Atkinson, W. H. ...	R. J. S. Pope ...	" A.	Leyland ...	" 10.11.30 to 17.12.30	24.12.30
<i>Dardanus</i> ...	Christie, W. ...	J. S. Ogilvie ...	" A.	A. Holt ...	" 23.8.30 to 2.10.30	22.10.30
<i>Darian</i> ...	Hannafor, W. ...	A. S. Holland ...	" A.	Leyland ...	" 27.9.30 to 8.10.30	14.10.30
302 †† <i>Darro</i> ...	Green, J. ...	G. B. Medleycott, H. Chamberlain, W. H. Roberts.	W.T.-M.	R.M.S.P. Co. ...	Forms 911 & 138 27.11.30 to 14.1.31	2.2.31
<i>Davisan</i> ...	Trickey, J. ...	P. M. Ralston ...	No. A.	Leyland ...	Form 911 29.8.30 to 22.10.30	28.10.30
053 †† <i>Delphic</i> ...	Hodgson, W. S. ...	J. V. Jones ...	" M.	White Star ...	" 23.2.30 to 3.1.30	11.4.30
303 †† <i>Demerara</i> ...	Matthews, G. P. ...	H. H. Treveekes, E. N. Gillet, F. Crankshaw.	W.T.-M.	R.M.S.P. Co. ...	Forms 911 & 138 27.10.30 to 17.12.30	22.12.30
073 †† <i>Demosthenes</i> ...	Lloyd, W. ...	S. A. Fergusson ...	"	Aberdeen Common-wealth.	" " 29.3.30 to 12.5.30	15.5.30
008 †† <i>Denis</i> ...	Jackson, T. H. ...	A. W. Hanchett ...	W.T.	Booth ...	" " 9.1.31 to 26.2.31	3.3.31
304 †† <i>Desado</i> ...	Buret, J. ...	H. Fraser, F. Collinson ...	W.T.-M.	R.M.S.P. Co. ...	" " 11.12.30 to 27.1.31	10.2.31
117 †† <i>Desna</i> ...	Huff, G. ...	G. L. Elliott, R. G. Woolley...	"	" ...	" " 23.12.30 to 11.2.31	9.3.31
252 †† <i>Devon</i> ...	Kinnell, G. ...	G. Chaplin, G. Landfield, M. Willinott.	No. M.	Federal ...	" " 4.1.31 to 13.2.31	26.2.31
<i>Dieppe</i> ...	Lidbetter, W. ...	E. A. Biles ...	C.C.	Southern Railway ...	Telegraphic Report 20.2.31	20.2.31
284 †† <i>Director</i> ...	Worthington, B. ...	R. W. Baldwin ...	No. M.	Harrison ...	Forms 911 & 138 29.5.30 to 29.8.30	9.9.30
080 †† <i>Discovery, Auxy. Barque.</i> ...	McKeyne, K. N. ...	W. R. Colbeck ...	M.L.	Douglas Mawson Expedition.	" " " " " " " "	"
081 †† <i>Discovery II, R.R.S.</i> ...	Carey, W. M. Commr. R. N.	A. L. Nelson, R. A. B. Ardley, F. E. C. Davies.	"	Falkland Islands Government.	Form 915 10.5.30 to 3.12.30	14.2.31
214 †† <i>Domala, M.V.</i> ...	Kitson, A. G. ...	T. L. Sampson, A. Earl, G. Henderson, D. Cowley.	No. M.	British India... ..	Forms 911 & 138 29.10.30 to 5.1.31	6.1.31
<i>Domitia, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr., R.N.R.	W. E. Allen, A. S. Muir, W. F. Anderson.	M.L.	Telegraph Construc-tion & Maintenance.	Form 915 5.9.30 to 24.11.30	6.12.30
<i>Dorelian</i> ...	Griffith, W. ...	F. W. Boden ...	No. A.	Booth ...	Form 911 14.2.31 to 10.3.31	13.3.31
<i>Dorington Court</i> ...	Hugan, C. ...	F. R. Hicken ...	" A.	Leyland ...	" 11.1.31 to 22.1.31	11.2.31
275 †† <i>Dramatist</i> ...	Adamson, B. ...	G. E. C. Garrick ...	" A.	Haldin & Co. ...	" 31.7.29 to 17.2.30	27.3.30
<i>Dromore Castle</i> ...	Meek, A. J. ...	I. W. Page ...	" M.	Harrison ...	" " " " " " " "	"
142 †† <i>Duchess of Atholl</i> ...	Heanly, T. W. ...	P. Swan ...	" A.	Union Castle ...	Form 911 18.1.30 to 3.7.30	9.9.30
152 †† <i>Duchess of Bedford</i> ...	Latta, R. G. ...	G. H. D. Williams ...	W.T.-M.	Canadian Pacific	Forms 911 & 138 6.12.30 to 22.12.30	30.12.30
151 †† <i>Duchess of Richmond.</i> ...	Gibbons, H. ...	A. Mawsey ...	"	" ...	Form 911 29.12.30 to 4.1.31	17.1.31
143 †† <i>Duchess of York</i> ...	Freer, A., R.N.R.	F. H. Stell, G. D. Williams, C. J. MacKenzie.	"	" ...	Forms 911 & 138 23.1.31 to 4.3.31	10.3.31
098 †† <i>Dunbar Castle, M.V.</i> ...	Stuart, R. N., V.C., D.S.O., Commr., R.N.R.	N. Scallan ...	"	" ...	" " 22.11.30 to 11.12.30	9.1.31
<i>Dunluce Castle</i> ...	Vincent, E. S., R.D., Commr., R.N.R.	J. Daziel, G. D. Pennick, P. G. MacIver.	W.T.	Union Castle ...	" " 23.1.31 to 10.2.31	3.3.31
<i>Dunrobin</i> ...	Hutchings, A. H. ...	A. C. M. Black ...	No. A.	" ...	Form 911 5.9.30 to 13.11.30	19.11.30
102 †† <i>Duquesa</i> ...	Ramsay, J. D. ...	W. R. Holt, J. R. Butt ...	" A.	Glen & Co. ...	" 23.11.30 to 21.1.31	10.3.31
215 †† <i>Durenda, M.V.</i> ...	Williams, W. E. ...	F. D. Jones ...	" M.	Furness Withy ...	Forms 911 & 138 3.11.30 to 7.1.31	12.1.31
077 †† <i>Edinburgh Castle</i> ...	Parkes, C. E. ...	I. E. Miles ...	" M.	British India ...	Form 911 2.2.30 to 10.3.30...	28.4.30
<i>Egort</i> ...	Kerby, J. H. ...	F. A. G. Hunter ...	W.T.	Union Castle ...	" 18.10.30 to 7.12.30	9.12.30
107 †† <i>El Argentino, M.V.</i> ...	Nelson, J. A. ...	J. T. Townson, R. A. Cherry	No. A.	Elder Dempster ...	" 16.9.30 to 3.10.30	6.10.30
	Ellis, F., D.S.C.	W. Findlay, J. Burch, C. G. Adlard.	" M.	Houlder ...	Forms 911 & 138 9.12.30 to 28.1.31	19.2.31

Name of Vessel.	Captain.	Observing Officers.	Meteoro- logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 13.3.31.	Date Received.
090 *† <i>Eldon Park</i> ...	Burns, R. ...	J. Macrae, W. Walker, H. L. Roberts.	No. M.	Denholme S.S. Co. ...	Form 911 10.10.30 to 25.12.30 ...	13.2.31
009 *† <i>Elmworth, M.V.</i> ...	Wilson, T. P. ...	... ..	" M.	R. S. Dalgleish ...	20.12.30 to 1.2.31 ...	26.2.31
158 *† <i>Elpenor</i> ...	Wilson, R. J. ...	E. Roberts, H. Skinns, J. F. Browning.	M.L.	A. Holt ...	Form 915 1.5.30 to 6.2.31 ...	13.2.31
108 *† <i>Elstree Grange</i> ...	Owen, R. ...	P. A. Hawkesworth ...	No. M.	Houlder ...	Forms 911 & 138 9.9.30 to 24.11.30	13.12.30
109 *† <i>El Paraguayo</i> ...	Frost, C. R. ...	G. Fletcher, F. J. G. Rice, R. L. Aldridge.	" M.	" ...	" " 30.11.30 to 7.2.31...	18.2.31
110 *† <i>El Uruguayo</i> ...	McNamara, T. ...	F. E. Hailstone ...	" M.	" ...	20.10.30 to 23.12.30	30.12.30
027 *† <i>Elysia</i> ...	Henderson, F. M. ...	C. Mitchell, J. Herbert, W. A. Beveridge.	M.L.	Anchor ...	Form 915 13.9.30 to 4.1.31 ...	26.1.31
<i>Empire Star</i> ...	Owens, G., R.D., Lieut.-Commr., R.N.R.	... ..	"	Blue Star ...	... ..	...
066 †† <i>Empress of Australia</i>	Griffiths, E. Lieut.-Commr., R.N.R.	A. Jippett, O. F. Pennington, M. William.	W.T.	Canadian Pacific ...	Form 911 16.12.30 to 20.2.31 ...	12.3.31
154 †† <i>Empress of Canada</i>	Hailey, A. J., Lieut.-Commr., R.N.R.	C. W. G. Patterson, G. M. Fawcett, A. M. Barff, A. C. Jones.	M.L.	" " ...	Form 915 7.8.30 to 14.11.30 ...	24.12.30
061 †† <i>Empress of France</i>	Stuart, R. N., V.C., D.S.O., Commr., R.N.R.	... ..	"	" " ...	... ..	...
153 †† <i>Empress of Japan</i>	Robinson, S., C.B.E., R.N.R.	R. Goss, R. Wolfenden, A. Le Maistre.	"	" " ...	Form 915 7.8.30 to 13.1.31 ...	16.2.31
306 *† <i>Essequibo</i> ...	Morgan, D. R. ...	L. Marsland ...	No. M.	R.M.S.P. Co. ...	Forms 911 & 138 20.8.30 to 29.8.30	9.9.30
<i>Eumaeus</i> ...	Hodgson, R. N. ...	R. T. Dryden ...	" A.	A. Holt ...	Form 911 4.11.30 to 1.12.30 ...	5.12.30
078 †† <i>Euripides</i> ...	Cole, N. ...	C. C. Beal, J. Colling, A. Sheridan, R. Morrison, J. Smallwood.	W.T.-M.	Aberdeen Common-wealth	Forms 911 & 138 23.5.30 to 24.9.30	7.10.30
<i>Euryades</i> ...	Ewan, W. B. ...	D. S. Bruce ...	No. A.	A. Holt ...	Form 911 21.1.31 to 26.1.31 ...	17.2.31
<i>Explorer</i> ...	Allan, J. ...	A. Stout ...	" A.	Scottish Fishery Brd.	" 20.2.31 to 27.2.31	5.3.31
067 *† <i>Ferndale</i> ...	Beighton, J. N. ...	... ..	" M.	Aberdeen Common-wealth.	... ..	...
074 *† <i>Fordsdale</i> ...	Thompson, W. J. ...	F. Vaughan, M. Harries, M. Newton.	" M.	Aberdeen Common-wealth	Forms 911 & 138 26.12.30 to 21.1.31	10.3.31
<i>Francisco</i> ...	Scales, H. ...	B. Scholefield ...	" A.	Ellerman Wilson ...	Form 911 27.4.30 to 3.6.30...	11.6.30
030 †† <i>Franconia</i> ...	Irving, R. B. ...	W. M. Stewart, J. H. Kenworthy, R. Pollitt.	W.T.	Cunard ...	" 11.1.31 to 20.1.31 ...	23.1.31
<i>Freya</i> ...	Lamont, A. ...	W. Pirrie ...	No. A.	Scottish Fishery Brd.	15.1.31 to 2.2.31 ...	6.2.31
159 ** <i>Gascoyne</i> ...	Johnson, L. ...	J. S. Macbride, C. O. Melson, W. Uttley.	M.L.	A. Holt & Co. ...	Form 915 2.5.30 to 22.9.30 ...	13.1.31
307 *† <i>Glamorganshire</i> ...	Macphedran ...	T. W. Boleard ...	No. M.	R.M.S.P. Co. ...	Forms 911 & 138 14.12.30 to 6.1.31	13.1.31
125 *† <i>Glenamoy, M.V.</i> ...	Miles, F. R., R.D., Commr., R.N.R.	Homan, C. E. ...	M.L.	Glen Line ...	Form 915 5.5.30 to 5.11.30 ...	18.11.30
<i>Glenbeg, M.V.</i> ...	Newing, L. ...	F. Laycock, G. Morgan, N. B. Jones.	No. A.	" ...	Form 911 2.9.30 to 6.12.30 ...	10.12.30
126 *† <i>Glenagarry, M.V.</i> ...	Angier, J. ...	G. A. C. Barnard ...	" M.	" ...	Forms 911 & 138 12.1.31 to 22.1.31	18.2.31
<i>Gleniffer</i> ...	Baker, W. H. ...	J. Tyler ...	" A.	" ...	Form 911 28.11.30 to 3.2.31	12.3.31
<i>Glenluce, M.V.</i> ...	Kennett, W. H. ...	A. H. D. Shaw ...	" A.	" ...	" 31.8.30 to 24.12.30 ...	30.12.30
<i>Glenishane</i> ...	Martin, V. F. ...	J. A. Evans ...	" A.	" ...	" 27.10.30 to 17.2.31 ...	24.2.31
<i>Glenworth</i> ...	Kilgour, H. A. ...	S. Merrick ...	" A.	" ...	" 1.5.30 to 28.7.30 ...	7.8.30
<i>Gloucester Castle</i> ...	MacMahon, J. ...	A. L. Sanderson ...	" A.	R. S. Dalgleish ...	" 1.11.30 to 1.1.31 ...	3.1.31
<i>Gloxinia</i> ...	Pool, F. G. ...	J. L. Goatley ...	" A.	Union Castle ...	" 6.6.30 to 9.7.30 ...	14.7.30
<i>Governor</i> ...	Windsor, G. R. ...	S. G. Elliott, W. T. Brown ...	" A.	Stag Line ...	... ..	...
<i>Guildford Castle</i> ...	Schalefield, H. L. ...	E. Hamlyn ...	" M.	Harrison ...	Form 911 22.4.30 to 10.5.30 ...	10.6.30
<i>Halesius</i> ...	Hawley, F. J. ...	A. S. P. May ...	" A.	Union Castle ...	" 1.9.30 to 25.11.30 ...	28.11.30
111 *† <i>Hardwicke Grange</i>	Fowler, W. H. ...	A. L. Baker, A. D. Seybold, W. E. Ellis.	" M.	R. P. Houston ...	Forms 911 & 138 23.11.30 to 10.12.30	17.1.31
<i>Harmonides</i> ...	Elwell, F. R. ...	L. Pogson, S. C. Robertson, E. McLachlan.	" A.	Houlder ...	Form 911 4.1.31 to 17.1.31 ...	7.2.31
262 ** <i>Hauraki, M.V.</i> ...	Norton, A. T. ...	D. McLeish, A. W. Rabbitts, R. Kendall.	M.L.	R. P. Houston ...	Form 915 15.8.29 to 31.10.30 ...	8.1.31
<i>Hermintus</i> ...	Roberts, T. V. ...	F. W. Gilroy ...	No. A.	Union S.S. Co., N.Z. ...	Form 911 24.8.30 to 5.10.30 ...	17.10.30
<i>Herschel</i> ...	Watson, W. W. ...	M. P. Thompson ...	" A.	Aberdeen Common-wealth.	Form 911 21.3.30 to 16.6.30 ...	24.6.30
253 *† <i>Hertford</i> ...	Burton Davies, J. ...	W. Redwood, G. D. Baldwin, E. Hopkins, P. Shakespeare, E. Block.	M.L.	Lampport & Holt ...	Form 915 16.8.30 to 27.12.30 ...	31.12.30
<i>Hesione</i> ...	McComish, A. B. ...	W. H. Ball ...	No. A.	Lampport & Holt ...	Form 911 15.4.30 to 11.5.30 ...	10.6.30
<i>Hibernia</i> ...	Dudgeon, L. T. ...	A. Marsh ...	C.C.	White Star ...	Form 911 15.1.31 to 31.1.31	9.2.31
182 †† <i>Highland Brigade</i>	Lloyd, H. ...	W. Stephen, N. Hersee, C. Morgan.	No. M.	L.M. & S. Railway ...	Telegraphic Report 7.3.31	7.3.31
116 †† <i>Highland Chieftain, M.V.</i>	Robinson, R. H. ...	W. J. Presland ...	" M.	Nelson ...	Forms 911 & 138 7.11.30 to 22.12.30	5.1.31
099 †† <i>Highland Monarch, M.V.</i>	Ashby Graves, F. ...	R. Polden ...	" M.	" ...	" " 18.12.30 to 4.2.31	9.2.31
079 *† <i>Hildebrand</i> ...	Buck, R. H., R.D., Capt., R.N.R.	W. H. Cross ...	W.T.	" ...	" " 1.12.30 to 21.1.31	26.1.31
075 *† <i>Hobson's Bay</i> ...	Kydd, O. J. ...	J. Worrall, B. F. Moffatt, C. Carroll, C. Campbell, C. C. Good.	M.L.	Booth ...	" " 18.1.30 to 23.2.31	2.3.31
<i>Holbein</i> ...	Gough, W. A. ...	F. Delaney ...	No. A.	Aberdeen Common-wealth.	Form 915 28.5.30 to 9.1.31 ...	5.2.31
054 †† <i>Homeric</i> ...	Bulman, J. B. ...	H. G. Morgan, M. Bennett, W. Poustie.	W.T.	Lampport & Holt ...	Form 911 9.12.30 to 8.1.31...	7.1.31
<i>Hubert</i> ...	Briscoe, W. ...	G. H. Clark ...	No. A.	White Star ...	Forms 911 & 138 15.1.31 to 31.1.31	9.2.31
261 *† <i>Huntingdon</i> ...	Field, H. G. B. ...	W. H. Timberlake ...	W.T.	Booth ...	Form 911 10.12.30 to 26.12.30 ...	7.1.31
289 *† <i>Ingoma</i> ...	Gibbins, W. ...	S. M. Smith, D. D. Kerr, R. Sutcliffe.	No. M.	Federal ...	" 2.8.30 to 9.8.30 ...	18.8.30
160 *† <i>Ixion</i> ...	Dougall, W. T. ...	G. L. Oldrich, W. H. Deans, D. Trail.	M.L.	Harrison ...	Forms 911 & 138 9.12.30 to 17.1.31	26.1.31
<i>Jamaica Merchant</i>	Stewart, J. A. ...	B. W. Smith ...	"	A. Holt ...	Form 915 19.4.30 to 18.9.30 ...	26.11.30
072 ** <i>Jamaica Planter</i> ...	Towell, W. C. ...	J. Quick ...	W.T.	Jamaica Direct Fruit	Form 911 21.11.30 to 27.12.30 ...	13.1.31
<i>Jamaica Producer</i>	Gallop, J. W. ...	A. G. Edwards ...	No. A.	" ...	Forms 911 & 138 10.9.30 to 26.11.30	18.12.30
<i>Javanese Prince, M.V.</i>	Smith, J. ...	S. E. Taylor, C. E. Edney ...	" A.	" ...	Form 911 4.12.30 to 15.12.30 ...	5.1.31
187 *† <i>Jeypore</i> ...	Harris, W. L. ...	T. T. Ferguson, H. Flint, S. Hopkins.	" M.	Prince ...	" 23.9.30 to 11.1.31 ...	26.1.31
188 †† <i>Kaisar-i-Hind</i> ...	Headlam, P. C., R.D., Commr., R.N.R.	M. G. Morris ...	" M.	P. & O. ...	Forms 911 & 138 29.11.30 to 23.2.31	2.3.31
189 *† <i>Kalyan</i> ...	Cooper, C. P., O.B.E., R.D., Capt., R.N.R.	K. D. Fisher, N. S. Milne, C. Sendall, A. S. White.	M.L.	" ...	" " 9.12.30 to 25.1.31	27.1.31
041 *† <i>Karama, M.V.</i> ...	McIntosh, A. ...	S. J. Howe, H. E. Evans, J. B. Walker, H. T. Matthews.	M.L.	Shaw, Savill & Albion	Form 915 15.10.30 to 8.2.31 ...	17.2.31
217 *† <i>Karapara</i> ...	Macleane, A. ...	R. P. Eddy, A. J. Nobbs, P. W. Clark.	No. M.	British India ...	Forms 911 & 138 19.11.30 to 2.1.31	19.1.31
190 *† <i>Kashgar</i> ...	Sudell, F., R.D., Commr., R.N.R.	... ..	" M.	P. & O. ...	" " 26.7.30 to 2.11.30	4.11.30

LIST OF VOLUNTARY OBSERVING SHIPS

v

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 13.3.31.	Date Received.
191 *† Kashmir ...	Mallalue, R., Lt.-Commr., R.N.R.	H. M. Webb, F. C. Fairburne	No. M.	P. & O. ...	Forms 911 & 138 19.12.30 to 22.2.31	26.2.31
114 †† Kenya ...	Grant, W. E. ...	L. Y. Ken. E. Lord, A. Ralph	" M.	British India ...	" " 25.1.31 to 10.2.31	2.3.31
218 *† Khandalla ...	Baird, S. K. ...	W. Gordon Jones ...	" M.	" " ...	" " 1.1.31 to 13.2.31...	10.3.31
283 *† Khiva ...	Dawson, E. E. N. ...	E. V. Lewis ...	" M.	P. & O. ...	" " ...	"
186 *† Kidderpore ...	Woodroffe, S. Y. ...	R. H. Hand ...	" M.	" " ...	Forms 911 & 138 24.9.30 to 29.11.30	22.12.30
169 *† Kwangchow ...	Stringer, C. B. L. ...	O. Fox ...	M.L.	China Nav. Co. ...	Form 915 1.5.30 to 1.11.30	6.1.31
147 †† Laconia ...	Doyle, M. ...	" " ...	W.T.	Cunard ...	" " ...	"
Laguna, M.V. ...	Dunn, R.E., O.B.E. ...	" " ...	No. A.	Pacific S.N. Co. ...	" " ...	"
193 *† Lahore ...	Hollow, T. H. ...	J. G. K. Gregory, F. Hull, S. R. Ewa.	" M.	P & O. ...	Forms 911 & 138 21.9.30 to 11.2.31	17.2.31
Lalande ...	Symons, P. ...	C. Legg ...	" A.	Lamport & Holt ...	Form 911 30.1.30 to 24.2.31	4.3.31
Lancashire ...	Fountain, C. ...	W. H. Campe ...	" A.	Bibby ...	" " 13.3.30 to 9.4.30...	22.4.30
036 †† Lancastria ...	Oram, B. B., R.D., Commr., R.N.R.	H. V. Clarke, J. S. Glendenning, F. Drake.	W.T.	Cunard ...	Forms 911 & 138 19.1.31 to 7.2.31	12.2.31
Laomedon ...	Watson, C. J. ...	A. E. Martin ...	No. A.	A. Holt ...	Form 911 23.10.30 to 7.12.30	29.12.30
082 *† La Paz, M.V. ...	Morgan, D. R. ...	R. W. Hanoon, J. Sutherland, G. Pattison.	" M.	Pacific S.N. Co. ...	" " 24.12.30 to 15.1.31	5.2.31
Laplace ...	Hickman, V. G. ...	R. H. Sneddon ...	" A.	Lamport & Holt ...	" " 21.9.30 to 31.12.30	28.1.31
134 †† Lapland ...	Harvey, H. ...	" " ...	W.T.	Red Star ...	" " ...	"
076 *† Largs Bay ...	Jermyn, W. M. ...	F. B. Marsden ...	No. M.	Aberdeen Common-wealth.	Forms 911 & 138 11.10.29 to 3.11.30	29.12.30
112 *† La Rosarina ...	Webb, C. ...	W. S. Hamblin ...	" M.	Houlder ...	" " 25.12.30 to 21.2.31	27.2.31
Lassell ...	Leicester, F. S. ...	W. H. Chapman ...	No. A.	Lamport & Holt ...	Form 911 7.9.30 to 21.11.30	24.12.30
064 †† Laurentic ...	Hume, R. ...	C. Cochrane, —, Hawkins, R. Conway.	W.T.	White Star ...	Forms 911 & 138 19.1.31 to 8.2.31	11.2.31
083 *† Lautaro, M.V. ...	Leyne, R. W. ...	G. A. Thexton ...	No. M.	Pacific S.N. Co. ...	" " 4.11.30 to 22.2.31	2.3.31
Leicestershire ...	Griffiths, C. A. ...	E. D. Brand, H. Kerbyson, A. Thomson.	" A.	Bibby ...	Form 911 21.9.30 to 27.11.30	4.12.30
254 *† Limerick ...	Molyneux, P. L. ...	A. M. Downman, N. A. Thomas	" M.	Federal ...	Forms 911 & 138 16.11.30 to 22.12.30	26.1.31
093 *† Llandaff Castle ...	Attwood J. ...	T. H. Watley ...	W.T.	Union Castle ...	Form 911 18.7.30 to 22.9.30	27.9.30
097 †† Llangibby Castle, M.V. ...	Harvey, H. B. ...	H. S. Warren ...	"	" " ...	Forms 911 & 138 8.11.30 to 11.1.31	20.1.31
094 *† Llandoverly Castle ...	Morgan, A. O., R.D., Commr., R.N.R.	L. H. Farrow, T. C. Goldstone, F. R. Pope.	M.L.	" " ...	Form 915 20.9.30 to 24.11.30	3.12.30
216 *† Llanstephan Castle ...	Bickford, C. N. ...	T. Campbell, H. Bunn, I. Duncan.	W.T.	" " ...	Form 911 15.11.30 to 18.1.31	22.1.31
084 *† Lobos, M.V. ...	Grant, F. H. ...	R. W. Gill ...	No. M.	Pacific S.N. Co. ...	Forms 911 & 138 27.12.30 to 16.2.31	21.2.31
Loch Katrine ...	Cocks, A. ...	M. A. Murch ...	" A.	R.M.S.P. Co. ...	Form 911 5.11.30 to 26.9.30	4.12.30
Lochmonar, M.V. ...	Schlanbusch, O. ...	F. G. Dawson, A. Yeatman, E. Smith.	" A.	" " ...	" " 2.10.30 to 22.12.30	22.1.31
London Exchange ...	Griffiths, J. ...	C. T. V. Rixham ...	" A.	Furness Withy ...	" " 17.1.31 to 21.2.31	24.2.31
Lord Antrim ...	Jarvis, F. E. ...	C. A. Milligan ...	" A.	Ulster S.S. Co. ...	" " 21.9.30 to 4.10.30	7.10.30
Loriga, M.V. ...	Large, E. H., R. D., Commr., R.N.R.	J. W. Gordon ...	" A.	Pacific S.N. Co. ...	" " 16.10.30 to 10.1.31	13.1.31
194 †† Macedonia ...	Dickenson, C. C. ...	R. A. B. Kempton ...	W.T.-M.	P. & O. ...	Forms 911 & 138 21.9.30 to 10.12.30	13.12.30
013 *† Macharda ...	Hanna, R. G. ...	A. C. Hocking ...	No. M.	Brocklebank ...	Form 911 9.11.30 to 6.12.30	10.12.30
232 *† Madura ...	Parker, A. A. ...	A. Usher ...	" M.	British India ...	" " 28.12.30 to 8.1.31	26.1.31
048 *† Mahana ...	Cameron, J. M. ...	H. C. Smith, A. E. Masters, M. G. Stuart.	M.L.	Shaw, Savill & Albion	Form 915 13.9.30 to 5.1.31	8.1.31
141 *† Mahia ...	Andrews, C. M. ...	G. Sangwin, M. P. Congdon, J. Jackson.	W.T.	" " ...	Forms 911 & 138 17.9.30 to 18.1.31	26.1.31
014 *† Mahronda ...	Sharpe, G. ...	A. Melville, H. Willington, W. Le Brocq.	No. M.	Brocklebank ...	" " 23.11.30 to 12.12.30	29.12.30
015 *† Mahsud ...	Kershaw, R. W. ...	S. Richardson, E. Walker, J. R. Paisley.	" M.	" " ...	" " 18.8.30 to 7.11.30	11.11.30
016 *† Maidan ...	Ison, W. A. ...	F. Moore, F. L. Attwood, L. E. Jeans.	" M.	" " ...	" " 16.1.31 to 9.2.31	2.3.31
017 *† Maihar ...	Charlton, W. L. ...	C. Cadwallar, H. Gillespie, A. D. Spring.	M.L.	" " ...	Form 915 6.7.30 to 25.9.30...	4.11.30
042 *† Maimoa ...	Johnson, J. W. ...	J. W. Hart, A. Winton, E. Sainsbury, J. F. H. Stroud	"	Shaw, Savill & Albion	" " 22.9.30 to 8.12.30	30.12.30
Maimyo ...	Smith, G. C. ...	J. L. Rodgers ...	No. A.	Brocklebank ...	Form 911 13.1.31 to 15.2.31	10.3.31
018 *† Makalla ...	Maughan, J. W. ...	E. Williams ...	" M.	" " ...	Forms 911 & 138 22.9.30 to 4.12.30	29.12.30
225 *† Makura ...	Macdonald, D. ...	J. W. S. Madden, A. P. Cousin, S. H. Crawford, M. V. Langdale, R. B. Denniston.	M.L.	Canadian-Australasian	Form 915 4.9.30 to 20.12.30	19.2.31
298 *† Malabar, M.V. ...	Donaldson, A. ...	A. Campbell, L. Millar, G. Rothery, S. ...	"	Burns, Philp & Co. ...	" " 9.4.30 to 21.9.30	20.11.30
019 *† Malakuta ...	Adamson, F. L. ...	H. Simpson ...	No. M.	Brocklebank ...	Forms 911 & 138 24.5.30 to 11.10.30	22.10.30
020 *† Malancha ...	Whitham, F. ...	R. Humble, H. B. Kelly ...	" M.	" " ...	" " 26.7.30 to 30.10.30	6.11.30
219 *† Malda ...	Denne, G. H. A. ...	D. B. Latin, G. W. P. King, E. B. Cutlack.	" M.	British India ...	Form 138 " 25.10.30 to 15.1.31	29.1.31
195 †† Maloja ...	Browning, J. B., R.D., Commr. R.N.R.	R. H. Turner, C. H. Hand, R. E. Baldwin-Wiseman.	" M.	P. & O. ...	Forms 911 & 138 1.12.30 to 26.1.31	23.2.31
196 †† Malwa ...	Britten, P. O. ...	P. J. Lawrence ...	" M.	" " ...	" " 11.8.30 to 13.11.30	21.11.30
Mamilius ...	Cole, N. ...	" " ...	" A.	White Star ...	" " ...	"
Manaar ...	Thowless, E. ...	A. L. Harrop ...	" M.	Brocklebank ...	" " ...	"
Manchester Brigade ...	Stott, C. H. ...	J. H. Round, E. E. Bonnaud, J. Gregory.	M.L.	Manchester Liners ...	Form 915 10.5.30 to 25.11.30	5.12.30
Manchester Hero ...	Mitchell, G. M. ...	R. O. Jones ...	No. A.	" " ...	Form 911 11.11.30 to 16.12.30	11.1.31
Manchester Producer ...	Struss, F. D. ...	T. J. Boyd ...	" A.	" " ...	" " 1.6.30 to 3.7.30	23.7.30
028 †† Mandala ...	Whittingham, A. G., R.D., Capt. R.N.R.	W. E. F. Powell ...	" M.	British India ...	" " ...	"
146 *† Mandasor ...	Richardson, T. ...	F. C. Madden, T. S. Cullen, J. Alexander.	" M.	Brocklebank ...	Forms 911 & 138 18.12.30 to 1.3.31	10.3.31
220 *† Manela ...	Maples, S. H. ...	T. M. Robertson, L. W. Kerton, O. R. Polinghorne.	" M.	British India ...	" " 30.12.30 to 22.2.31	26.2.31
021 *† Mangalore ...	Mallett, R. ...	J. McGilvray, G. E. Jones, A. M. Parry.	" M.	Brocklebank ...	" " 17.12.30 to 26.12.30	1.1.31
022 *† Manipur ...	Cochran, G. N. ...	L. F. Dodson, R. Penston, A. Hill.	" M.	" " ...	" " 5.12.30 to 1.1.31	3.1.31
294 *† Manistee ...	Edwards, A. C. ...	" " ...	M.L.	Elders & Fyffes	" " ...	"
221 *† Manora ...	Hudson, H. T., R.D., Commr., R.N.R.	F. Woolgar, W. Brown, D. D. Bangay.	No. M.	British India ...	Forms 911 & 138 13.1.31 to 12.2.31	10.3.31
197 †† Mantua ...	Hignett, R.D., Commr. R.N.R.	F. R. N. Greasley, C. Hayward, H. J. Cholerton.	W.T.-M.	P. & O. ...	" " 3.1.31 to 25.2.31	2.3.31
299 *† Marella ...	Donaldson, A. ...	M. Pemberton, W. D. Colquhoun, A. G. W. Thomas.	M.L.	Burns Philp ...	Form 915 2.9.30 to 21.12.30	19.2.31
Marengo ...	Aspinall, A. E. ...	H. Bryan, G. W. Revell, W. L. Hepson.	"	Ellerman Wilson ...	" " 5.6.30 to 6.10.30	10.10.30
222 †† Margha ...	Pitcairn, C. M. ...	P. Wright, H. Watkins ...	"	British India ...	" " 24.8.30 to 14.11.30	19.11.30
104 *† Marquesa ...	Hemmings, W. H. ...	J. Wetherall ...	No. M.	Furness Houlder ...	Forms 911 & 138 15.12.30 to 13.2.31	17.2.31
Masula ...	Smiles, R. S. ...	E. B. Cutlack ...	" M.	British India ...	" " ...	"
044 †† Mataroa ...	Fitt, W. A. ...	F. Eadon, H. A. Hill, F. C. Chamby, L. B. Miller.	M.L.	Shaw, Savill & Albion	Form 915 15.8.30 to 23.11.30	27.11.30

Name of Vessel	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed Received up to 13.3.31.	Date Received
023 *† Matheran ...	Mulcahy, J. J. ...	S. S. Slade, W. F. Harris, C. B. Rogers.	No. M.	Brocklebank ...	Forms 911 & 138 8.1.31 to 8.2.31	10.2.31
223 *† Matiana ...	Green, F. V. ...	L. A. Burn, P. M. Wilson ...	" M.	British India...	" " 29.1.31 to 9.2.31	10.3.31
024 *† Matra ...	Cornish, N. P. ...	C. Shaw, W. Robertson, O. Jones, J. Campbell.	" M.	Brocklebank ...	" " 29.1.31 to 20.2.31	27.2.31
032 †† Mauretania...	McNeil, S. G. S., R.D., Capt., R.N.R.	W. C. A. Robson, J. Wiseman, K. J. Roper.	W.T.	Cunard ...	" " 5.2.31 to 16.2.31	21.2.31
287 †† Melita ...	Stewart, A. ...	L. N. Outram, S. W. Keay ...	" A.	Canadian Pacific ...	" " 25.1.31 to 13.2.31	16.2.31
Melmore Head	Moore, J. R. ...	" " " " " " " "	No. A.	Ulster S.S. Co. ...	" " " " " " " "	" " " " " " " "
071 *† Meltonian ...	Carnon, J. R. ...	W. Lawton ...	" M.	Leyland ...	Forms 911 & 138 1.12.30 to 3.1.31	13.1.31
Mercian ...	Hughan, C. ...	" " " " " " " "	" A.	" " " " " " " "	Form 911 28.7.30 to 30.9.30	8.10.30
Meriones ...	Hannay, T. W. ...	J. G. Jones ...	" A.	A. Holt ...	" " 13.12.30 to 2.1.31	9.2.31
255 *† Middlesex ...	Clarke, P. B. ...	J. Lunnon, J. Ricketts, R. Stephens, J. Halliday.	" M.	Federal... ..	Forms 911 & 138 8.7.30 to 12.8.30	20.11.30
Minna ...	Mackenzie, G. G. ...	A. M. Campbell ...	" A.	Scottish Fishery Brd.	Form 911 10.2.31 to 4.3.31	10.3.31
068 †† Minnetonka ...	Gates, T. F., C.B.E. ...	H. E. D. McCartney, R. Everard, J. W. Grier.	" M.	Atlantic Transport...	Forms 911 & 138 27.10.30 to 13.12.30	16.12.30
069 †† Minnewaska ...	Claret, F. H., C.B.E., Commr., R.N.R.	E. Pengelly, D. Davies, F. Mummery.	W.T.-M.	" " " " " " " "	" " 9.12.30 to 28.12.30	31.12.30
Mississippi, M.V. ...	Finch, E. ...	L. C. Hill ...	No. A.	" " " " " " " "	Form 911 21.10.30 to 26.11.30	8.12.30
224 *† Modasa ...	Gilchrist, J. W. ...	W. Ascroft, H. C. Pearson, B. H. Pollitt.	" M.	British India ...	Forms 911 & 138 8.1.31 to 13.2.31	19.2.31
198 †† Moldavia ...	Allin, C. H. C. ...	C. S. Pirie, E. J. Kerridge ...	" M.	P. & O. ...	" " 21.12.30 to 4.3.31	11.3.31
199 †† Mongolia ...	Rhodes, H. R. ...	M. R. Wood, G. K. Fox, W. N. Eade.	" M.	" " " " " " " "	" " 7.9.30 to 10.12.30	24.12.30
Monowai ...	Toten, A. T. ...	" " " " " " " "	M.L.	Union S.S. of N.Z. ...	" " " " " " " "	" " " " " " " "
††148 Montcalm ...	Rothwell, A. ...	T. L. Gillette, A. Mackie, A. Vaughan	W.T.	Canadian Pacific ...	Forms 911 & 138 15.2.31 to 7.3.31	11.3.31
149 †† Montclare ...	McCombie, J. ...	E. A. Shergold, J. Sharples, J. Soames, R. M. A. Stapleton.	"	" " " " " " " "	" " 4.1.31 to 23.1.31	27.1.31
150 †† Montrose ...	Dott, J. F. ...	K. Hutchings, J. M. Roche R. Stapleton, C. L. De H. Bell.	W.T.-M.	" " " " " " " "	" " 8.2.31 to 27.2.31	3.3.31
164 †† Mooltan ...	Morton, A. J. ...	R. M. Richardson ...	No. M.	P. & O. ...	" " " " " " " "	" " " " " " " "
226 †† Mulbera ...	Caffyn, F. ...	J. M. Peters, C. J. Davidson, C. Furze.	" M.	British India ...	Forms 911 & 138 23.11.30 to 28.12.30	3.1.31
200 *† Nagoya ...	Cooper, C. P., O.B.E., R.D., Capt. R.N.R.	F. D. Shaw ...	" M.	P. & O. ...	" " 21.2.30 to 23.4.30	25.4.30
201 †† Naldara ...	Harrison, R., D.S.O., R.D., Capt. R.N.R.	J. O. Divers, C. W. Mayne, M. F. Shute, H. J. Mann.	M.L.	" " " " " " " "	Form 915 23.8.30 to 27.11.30	4.12.30
227 *† Nardana ...	Reilly, J. V. ...	H. Goater, H. Grace, A. Woodward, R. D. Macfadyen.	"	British India ...	" " 1.11.30 to 1.3.31	4.3.31
118 *† Narenta ...	Falconer, A. C. ...	W. A. Chamberlain, G. S. Grant, L. M. Smith.	No. M.	R.M.S.P. Co. ...	Forms 911 & 138 24.11.30 to 9.12.30	22.12.30
202 †† Narkunda ...	Parker, J. J. W., R.D., Commr. R.N.R.	C. H. Moulton, A. H. Wing ..	" M.	P. & O. ...	" " 21.1.31 to 1.2.31	23.2.31
136 *† Navigator ...	Curphey, E. B. ...	" " " " " " " "	W.T.	Harrison ...	" " " " " " " "	" " " " " " " "
305 *† Nebraska ...	Bridges, E. A. ...	A. Frogbrook ...	No. M.	R.M.S.P. Co. ...	Forms 911 & 138 27.12.30 to 22.1.31	26.1.31
203 †† Nellore ...	Gordon, A. S. ...	L. J. Dixon, J. F. M. Heddle, H. E. Nuzum, J. Kavanagh.	M.L.	E. & A. S.S. Co. ...	Form 915 31.10.30 to 28.1.31	28.2.31
162 *† Nestor ...	Adeock, F. ...	W. L. Harris, A. E. Stephenson, P. Elder.	"	A. Holt ...	" " 6.7.30 to 10.11.30	15.11.30
Nevisian ...	McCormick, J. ...	" " " " " " " "	No. A.	Leyland ...	Form 911 4.4.30 to 5.7.30	10.7.30
Newfoundland ...	Foxworthy, A. W. ...	R. F. Handley, E. Sainty, J. L. Macklin.	M.L.	Furness Withy ...	Form 915 18.9.30 to 1.2.31	14.2.31
210 *† Niagara ...	(Hill, T. V. ...	G. H. Kime, D. A. Menlove S. P. Bourke.	"	Canadian-Australasian	" " 20.8.30 to 8.11.30	8.1.31
Ningchow ...	Beale, H. E. ...	E. Butler ...	No. A.	A. Holt... ..	Form 911 5.1.31 to 16.1.31	23.1.31
229 *† Nirvana ...	Ayres, R. M. ...	S. H. Kinson, J. B. Hore, A. H. Baird.	" M.	British India ...	Forms 911 & 138 17.6.30 to 6.7.30	29.7.30
256 *† Norfolk ...	Mead, G. F. ...	G. H. Letts, P. L. Shakespeare, L. Hill.	M.L.	Federal ...	Form 915 3.7.30 to 8.8.30	16.8.30
Norna ...	Angus, W. ...	T. R. Ness ...	No. A.	Scottish Fishery Brd	Form 911 2.2.31 to 9.3.31	12.3.31
100 *† Norseman, C.S.	Hammond, S. M. ...	R. Moss ...	" M.	Western Tel. Co. ...	" " 13.7.30 to 6.8.30	28.8.30
Northland ...	Williams, J. T. ...	F. Bottom ...	" A.	Northland, Ltd. ...	" " " " " " " "	" " " " " " " "
297 *† Northumberland ...	Upton, H. L., D.S.C., R.D., Commr. R.N.R.	" " " " " " " "	" M.	Federal... ..	" " " " " " " "	" " " " " " " "
Nova Scotia	Furneaux, S. J. ...	J. E. Wilson ...	M.L.	Furness Withy ...	Form 911 3.9.30 to 29.9.30	2.10.30
230 *† Novshera ...	Longhurst, J. H. ...	R. Burch, B. H. Bentall	No. M.	British India ...	" " 5.5.30 to 23.8.30	1.12.30
231 *† Nuddea ...	Beechings, P. H. ...	D. A. Jones, W. Monk, W. G. Pitcher.	" M.	" " " " " " " "	Forms 911 & 138 4.2.31 to 15.2.31	23.2.31
Oaklands Grange ...	Phillips, A. G. M. ...	J. C. Thomas ...	" A.	Houlder Bros. ...	Form 911 30.5.30 to 18.9.30	4.10.30
170 †† Orama ...	Staunton, H. G., C. B. E., R. D., Commr., R.N.R.	W. Eliot, K. Morrison, R. W. Roberts.	W.T.	Orient ...	Form 915 13.10.30 to 13.1.31	21.1.31
Oranian ...	Gittings, R. P. ...	H. O. Quinn ...	No. A.	Leyland ...	Form 911 26.11.30 to 17.1.31	29.1.31
309 †† Orbita ...	Roberts, E. ...	E. C. Hicks, C. C. Gibson, J. E. Smithson.	W.T.-M.	Pacific S.N. Co. ...	Forms 911 & 138 4.11.30 to 12.1.31	19.1.31
086 †† Orcoma ...	Harvey, J. G. ...	W. J. Butler, G. H. Pilling, W. Pearce.	"	" " " " " " " "	" " 2.12.30 to 9.2.31	19.2.31
087 †† Orduna ...	Ridyard, A., O.B.E. ...	T. J. Naylor, R. F. A. Cox, R. B. Bryant.	"	" " " " " " " "	" " 3.10.30 to 16.12.30	22.12.30
171 †† Orford ...	Owens, A. L., Commr. R.D., R.N.R.	S. C. K. Dowding ...	No. M.	Orient ...	" " 11.11.30 to 27.1.31	2.2.31
088 †† Orita ...	Benson, C. W. ...	J. D. Richards, H. Matthews, S. Woodman.	W.T.-M.	Pacific S.N. Co. ...	" " 7.2.31 to 24.2.31	4.3.31
174 †† Ormonde ...	James, L. V., D.S.C.	T. L. Shurrock, N. Smith, C. Pinckney.	W.T.	Orient ...	" " 17.8.30 to 18.11.30	28.11.30
172 †† Cronsay ...	Cameron, E. P., R.D., Commr., R.N.R.	E. M. Mackay. ...	"	" " " " " " " "	" " 28.9.30 to 31.12.30	8.1.31
173 †† Orontes ...	O'Sullivan, F. R. ...	J. M. N. Swanson, S. Burnand, W. McKay.	No. M.	" " " " " " " "	" " 5.10.30 to 17.12.30	22.12.30
085 *† Oropesa ...	Ross, J. ...	E. J. Thomas ...	" M.	Pacific S.N. Co. ...	" " " " " " " "	" " " " " " " "
089 *† Oroya ...	Galloway, M. ...	J. M. Forsyth, J. Ayland, E. S. Jones.	" M.	" " " " " " " "	Forms 911 & 138 20.8.30 to 28.10.30	1.11.30
105 †† Orsova ...	Thorne, G. G., R.D., Commr., R.N.R.	" " " " " " " "	W.T.	Orient ...	" " " " " " " "	" " " " " " " "
290 *† Otaio ...	Mead, G. F. ...	" " " " " " " "	No. M.	New Zealand S.S. Co.	" " " " " " " "	" " " " " " " "
237 *† Otaki ...	Maltby, T. L. ...	A. V. Pearce, N. Baddeley, J. H. Underwood.	M.L.	" " " " " " " "	Form 915 31.8.30 to 6.2.31	17.2.31
177 †† Otranto ...	Matheson, C. G., D.S.O., R.D., Capt. R.N.R.	F. Goodman, A. E. Coles, G. R. Grandase.	W.T.	Orient ...	Forms 911 & 138 12.1.31 to 10.2.31	13.2.31
279 *† Pacific Exporter ...	Nuttall, E. L. ...	A. Knapp ...	"	Furness Withy ...	" " 17.11.30 to 11.2.31	16.2.31
Pacific Shipper, M.V.	Goodwin, J. ...	S. Porter ...	No. A.	" " " " " " " "	Form 911 1.11.30 to 2.2.31	6.2.31
176 *† Pakeha ...	Elford, H. C. ...	A. J. Tillott ...	M.L.	Shaw, Savill & Albion	" " 9.1.31 to 13.1.31	26.2.31
Puracas ...	Barlow, F. P. ...	L. A. Sayers, S. Adams ...	"	Booth ...	Form 915 13.12.30 to 2.2.31	13.2.31

LIST OF VOLUNTARY OBSERVING SHIPS

vii

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 13.3.31.	Date Received.
<i>Parora</i>	Evans, J. O.	C. Parry	No. A.	"P" Steamers, Ltd.	Form 911 15.7.30 to 6.8.30 ...	23.9.30
<i>Paris</i>	Cook, C. L.	Mr. Biles	G.C.	Southern Rly.	Telegraphic Report. 19.1.31 ...	19.1.31
<i>Patia</i>	Sapsworth, S. A. ...	R. O. Laycock, R. S. Sutherland, R. S. Howlett.	No. A.	Elders & Fyffes	Form 911 6.1.31 to 8.2.31 ...	16.2.31
<i>Peisander</i>	Read, J. W.	C. T. Morgan	" A.	A. Holt...	" 1.9.30 to 23.11.30 ...	16.12.30
058 †† <i>Pennland</i>	Making, V. L.	J. C. Flett. - Otterson, - Cross.	W.T.	Red Star	Forms 911 & 138 15.1.31 to 9.2.31	16.2.31
204 *† <i>Peshawur</i>	McBryde, A. M.	D. Meikle, J. T. Sheffield, T. E. Wrigley, M. P. Fyrth, G. A. Nixon.	M.L.	P. & O.	Form 915 1.8.30 to 5.12.30 ...	9.12.30
238 *† <i>Piako</i>	Aslin, E. P. C.	A. D. Wilson, A. W. Marshall, R. H. Carter.	No. M.	New Zealand Co. ...	Forms 911 & 138 6.12.30 to 24.1.31	7.2.31
<i>Polycarp</i>	Elliott, A.	H. W. Taggart	" A.	Booth	Form 911 19.9.30 to 5.10.30 ...	14.10.30
127 *† <i>Port Adelaide</i>	Williams, R.	J. G. A. Dunn, F. W. Elgar, D. Morgan, E. N. Lawrey.	M.L.	Commonwealth & Dominion.	Form 915 9.9.30 to 1.1.31 ...	20.1.31
128 *† <i>Port Auckland</i>	Durham, R. S., D.S.C.	W. Craig, A. Brown, E. Mickleburgh.	"	" " "	" 31.7.30 to 4.12.30 ...	13.1.31
129 *† <i>Bowen</i>	Hearn, G. W.	F. R. Gorman	No. A.	" " "	Form 911 24.6.30 to 19.11.30 ...	2.12.30
129 *† <i>Campbell</i>	Gregory, S.	J. C. Goddard, N. M. Muzzell, C. Midwinter.	M.L.	" " "	Form 915 7.10.30 to 25.1.31 ...	31.1.31
136 *† <i>Caroline</i>	Brown, A. H.	V. G. Battle, E. W. R. Young, R. E. Garner.	"	" " "	" 4.7.30 to 19.11.30 ...	25.11.30
131 *† <i>Darwin</i>	Sawbridge, I. R.	W. L. Lynd, L. C. Asser, E. Wheeler, A. McClounan.	"	" " "	" 9.4.30 to 8.8.30 ...	12.8.30
132 *† <i>Denison</i>	Ferris, J.	A. A. Cooper, A. G. Newbury, R. A. Holloway, T. Milburn.	"	" " "	" 6.5.30 to 15.9.30 ...	27.9.30
133 *† <i>Dunedin, M.V.</i>	Mason, W. S., D.S.C.	H. M. Post, C. A. Hodson, T. Soanes.	"	" " "	" 18.4.30 to 21.8.30 ...	9.9.30
" <i>Fairy</i>	Farmar, F.	J. Stannard, W. G. Jones, P. J. Howe.	No. A.	" " "	Form 911 20.11.30 to 5.2.31 ...	12.3.31
" <i>Fremantle, M.V.</i>	Gilling, W.	A. Naismith	" A.	" " "	" 3.12.30 to 5.1.31 ...	10.3.31
" <i>Gisborne, M.V.</i>	Hayter, S. W.	L. J. Skailles	" A.	" " "	" 6.9.30 to 10.10.30 ...	17.10.30
" <i>Hobart, M.V.</i>	Cottell, S. C.	E. R. Rowlands, G. Jinman, L. Copeland.	M.L.	" " "	Form 915 15.7.30 to 2.11.30 ...	26.11.30
135 *† <i>Hunter</i>	Higgs, W. G.	G. T. C. Harris, C. R. Townshend, W. M. Clough, P. A. Manday.	"	" " "	" 7.10.30 to 29.1.31 ...	5.2.31
137 *† <i>Nicholson</i>	Gregory, S. E. A. ...	E. N. Rogerson, R. D. Elson, E. N. Howard, S. Ward.	"	" " "	" 7.9.30 to 8.1.31 ...	15.1.31
138 *† <i>Pirie</i>	Jack, J.	G. W. Horton, H. E. Braine, R. C. H. Webb.	"	" " "	" 27.9.30 to 1.11.30 ...	7.11.30
140 *† <i>Victor</i>	Hall, G. S.	F. G. L. Jones, J. L. Porter, R. C. Pocock.	"	" " "	" 14.6.30 to 28.10.30 ...	7.11.30
" <i>Wellington</i>	Jones, C. N.	W. B. Hopkins	No. A.	" " "	Form 911 24.10.30 to 12.2.31 ...	16.2.31
106 *† <i>Princesa</i>	Friend, A. B.	E. Loughheed, A. M. Tilsley, F. Poulson.	" M.	Houlder "	Forms 911 & 138 4.1.31 to 21.1.31	13.2.31
163 *† <i>Protesilaus</i>	Holden, W. R. F. ...	J. Cooper, J. Holden, H. N. Hardie.	M.L.	A. Holt	Form 915 17.5.30 to 30.11.30 ...	2.2.31
<i>Pyrrhus</i>	Wilkinson, T. G. ...	J. C. Podmore	No. A.	" " "	Form 911 23.1.31 to 19.2.31 ...	24.2.31
205 †† <i>Rajputana</i>	Cadiz, F. G., D.S.C.	G. A. Wild, D. Hockley, D. B. Beeckley.	" M.	P. & O.	Forms 911 & 138 7.12.30 to 29.1.31	2.2.31
063 *† <i>Rancher</i>	McCullum, J.	G. Harvey, C. F. Minshall, A. L. Lewis.	" M.	Harrison	" 27.11.30 to 17.2.31	21.2.31
228 †† <i>Ranchi</i>	Brooks, C. D.S.O., R.D., Capt. R.N.R.	T. A. Sergeant, R. J. F. Paice	" M.	P. & O.	" 2.11.30 to 4.2.31	7.2.31
236 †† <i>Rangitane M.V.</i>	McKellar, A. W. R.D. Capt. R.N.R.	J. J. Youngs, A. Brown, C. Edgecombe.	M.L.	New Zealand S.S. Co.	Form 915 26.9.30 to 9.1.31 ...	15.1.31
257 †† <i>Rangitata M.V.</i>	Hunter, J. L. B.	J. Oxnard, L. Griffiths, D. Chadwick, W. Jarvis.	W.T.-M.	" " "	Forms 911 & 138 30.8.30 to 10.12.30	1.1.31
240 †† <i>Rangitiki M.V.</i>	Barnett, H.	L. F. Malcouronne, H. K. Cockerill, R. J. Coffey.	"	" " "	" 5.7.30 to 18.10.30	25.10.30
207 †† <i>Ranpura</i>	Furlong, G. H. S. ...	J. Strike	No. M.	P. & O.	" 21.12.30 to 11.2.31	16.2.31
247 *† <i>Recorder</i>	Egerton, J. J.	G. Morrice	"	Harrison	" 12.10.30 to 2.1.31	8.1.31
239 *† <i>Remuera</i>	Holland, E. A.	A. J. Angell, A. T. H. Weatherall, J. R. Vincent, H. N. Lawson.	M.L.	New Zealand S.S. Co.	Form 915 24.10.30 to 8.2.31 ...	14.2.31
<i>Rhexenor</i>	Stout, G. L.	C. Anderson	No. A.	A. Holt	Form 911 30.12.30 to 23.1.31 ...	20.2.31
<i>Rhodesian Transport</i>	Bowen, A. C.	H. S. Butler	" A.	Houlder Bros. ...	" 17.10.30 to 1.2.31 ...	17.2.31
<i>Ripley Castle</i>	Goodacre, R. W. ...	A. G. Malan	" A.	Union Castle ...	" 11.12.30 to 28.1.31 ...	10.3.31
<i>Rother</i>	Woodhead, T. H. ...	A. E. Willmott	" A.	Goole Steam Shipping	" 24.1.31 to 14.2.31 ...	2.3.31
241 *† <i>Rotorua</i>	Lamb, C. B.	G. O. Saul, L. W. Fulcher, H. Hill, A. I. Robertson.	M.L.	New Zealand S.S. Co.	Form 915 4.10.30 to 14.2.31 ...	19.2.31
062 *† <i>Royal Star</i>	Walsh, W.	R. A. Beifield, E. G. Henry, A. Hocken, J. B. Styron.	No. M.	Blue Star	Forms 911 & 138 16.8.30 to 1.12.30	3.12.30
246 *† <i>Ruahine</i>	Urquhart, D.	T. S. Farrar, H. I. Phillips, F. Cooke.	W.T.	New Zealand S.S. Co.	Forms 911 & 138 2.8.30 to 19.11.30	26.11.30
242 *† <i>Ruapehu</i>	Robinson, F. W. ...	F. O. Colvin, C. Stratford, H. Nuzum.	M.L.	" " "	Form 915 2.8.30 to 19.11.30 ...	26.11.30
300 *† <i>St. Albans</i>	Diamond, S. L.	J. Goodchild, J. Braye ...	"	Eastern and Australian.	Met. Log. 4.4.30 to 8.6.30 ...	21.8.30
<i>St. Helier</i>	Skinner, M. B.	E. A. Hawkyard, H. D. Freeman.	C.C.	G.W. Railway ...	Telegraphic Report 12.3.31	12.3.31
<i>St. Julien</i>	Pitman, R.	F. E. Martin	"	" " "	" 14.2.31 ...	14.2.31
<i>St. Patrick</i>	Richardson, L.	A. MacKellar, F. G. Watts, J. A. Myles.	"	" " "	" 10.9.30 ...	10.9.30
038 †† <i>Samaria</i>	Malin, R. G., Lieut.-Commr. R.N.R.	H. S. Butler	W.T.	Cunard	Forms 911 & 138 22.1.31 to 2.3.31 ...	9.3.31
<i>Sangate Castle</i>	Aylen, C. E. H.	H. P. Clegg, W. S. Allan ...	No. A.	Union Castle ...	Form 911 25.1.31 to 15.2.31 ...	10.3.31
<i>Sardinian Prince</i>	Pearson, F. T.	C. G. Cuthbertson	" A.	Prince	" 3.1.31 to 22.2.31 ...	24.2.31
<i>Saxon</i>	Jackson, C. R.	J. Richardson	" A.	Union Castle ...	Forms 911 & 138 12.2.30 to 20.2.31	27.2.31
291 *† <i>Scholar</i>	Peterkin, A. G.	W. H. Hughes	" M.	Harrison	Telegraphic Report 10.3.31	10.3.31
<i>Scotia</i>	O'Neill, J.	C. W. W. Hill, F. P. Collins, J. S. Wardman, A. Bridge-water.	C.C.	L.M. & S. Railway	Forms 911 & 138 9.2.31 to 1.3.31 ...	4.3.31
033 †† <i>Scythia</i>	Gibbons, G., R.D., R.N.R.	P. Curley	W.T.	Cunard	" 10.9.30 ...	10.9.30
<i>Sea Victory</i>	Gammon, G. H.	R. Cumming, C. F. Hicks, A. D. Quayle, E. W. Jefferies.	No. A.	Dover Navigation ...	Form 915 3.10.30 to 12.12.30 ...	13.12.30
211 *† <i>Shropshire, M.V.</i>	English, G. L.	F. J. Muttitt	M.L.	Bibby	Form 911 25.10.30 to 25.1.31 ...	2.2.31
<i>Silksworth</i>	Blacklock, G.	D. Hughes, H. M. Knight, M. I. D. Walters, T. E. Davies.	No. A.	R. S. Dalgleish ...	Form 915 19.7.30 to 23.11.30 ...	28.11.30
258 *† <i>Somerset</i>	Pilcher, C. R.	H. W. Vickers, A. Kirk ...	M.L.	Federal	" 27.9.30 to 26.12.30 ...	31.12.30
277 *† <i>Spero</i>	Montgomery, H.	J. Whayman, D. H. Daniels	"	Booth	Form 911 17.10.30 to 12.12.30 ...	29.12.30
<i>Stephen</i>	Jones, W. C. H., R.D., Commr. R.N.R.	R. Rees, D. J. Murray, C. A. Cremin, W. Coates.	"	" " "	Form 915 2.5.30 to 9.9.30 ...	26.9.30
259 *† <i>Surrey</i>	Almond, J. G.	Matthews, S.	No. A.	Federal	" 10.1.31 to 10.2.31 ...	13.2.31
<i>Sutherland Grange</i>	MacDonald, W.	J. Johnson	" A.	Houlder Bros. ...	Form 911 13.9.30 to 26.12.30	30.12.30
045 †† <i>Sylvanfield, M.V.</i>	Clifton Mogg, W. P., Lieut. - Commr. R.N.R.	G. A. Harvey, E. Baker, A. G. Collins.	M.L.	Hunting & Son ...	" " "	" " "
<i>Tatnui</i>	" " "	" " "	"	Shaw, Savill & Albion	" " "	" " "

THE MARINE OBSERVER

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 13.3.31.	Date Received.
234 *† <i>Talma</i> ...	Harley, G. ...	M. H. Vincent ...	No. M.	British India ...	Forms 911 & 138 19.10.30 to 14.12.30	12.1.31
046 †† <i>Tamaroa</i> ...	Hartman, W. H. ...	L. R. Bull, F. Altwood, R. R. Roseman, B. D. Atkin.	W.T.-M.	Shaw, Savill & Albion	" " 11.10.30 to 18.1.31	20.1.31
264 ** <i>Tanda</i> ...	Pilcher, E. T., Lieut.-Commr., R.N.R.	H. M. Sanders, R. Lloyd-Harry, B. M. Dun, G. Chadwick-Smith.	M.L.	E. & A. S.S. Co. ...	Form 915 5.9.30 to 2.12.30	4.3.31
165 *† <i>Tantalus</i> , M.V. ...	Dodds, R. ...	F. C. Oppen, R. M. Gray, W. J. Ryan.	"	A. Holt ...	" 6.9.30 to 8.1.31	16.1.31
047 *† <i>Taranaki</i> , M.V. ...	Wood, C., D.S.C. ...	G. Campbell, W. D. Pim, K. A. Gordon, S. P. Wallis.	"	Shaw, Savill & Albion	" 26.7.30 to 11.11.30	17.11.30
<i>Tarantia</i> ...	Caithness, J. B. ...	J. M. Cherry ...	No. A.	Anchor ...	Form 911 18.12.30 to 5.1.31	19.1.31
<i>Tasmania</i> ...	Williams, J. V. ...	" ...	" A.	New Zealand S.S. Co.	Form 911 9.10.30 to 26.12.30	31.12.30
<i>Tetrestas</i> ...	Wilkinson, W. H. ...	F. Stott ...	" A.	A. Holt & Co. ...	Forms 911 & 138 26.1.31 to 7.2.31	4.3.31
243 *† <i>Tekoa</i> ...	McNish, R., D.S.O., Lieut.-Commr., R.N.R.	J. G. Phillips, R. Aldridge, E. Mason.	" M.	New Zealand S.S. Co.		
<i>Telamon</i> ...	Brown, R. ...	G. Edge ...	" A.	A. Holt ...	Form 911 26.10.30 to 23.11.30	10.12.30
<i>Tetela</i> ...	Brice, E. H. ...	F. P. Inch, G. Roberts, J. W. Tene.	" A.	Elders & Fyffes	" 11.1.31 to 7.2.31	13.2.31
<i>Teucer</i> ...	Davies, J. ...	C. C. L'Estrange, L. C. Podmore.	" A.	A. Holt ...	" 19.12.30 to 14.1.31	5.2.31
<i>Thesius</i> ...	Carron, C. G. ...	P. Dunsire ...	" A.	A. Holt ...	Form 911 14.1.31 to 16.2.31	18.2.31
007 *† <i>Thistleglen</i> ...	Whitfield, G.A., O.B.E.	W. H. Gould, S. B. Davis, E. W. Kent.	M.L.	Allan Black & Co. ...	Form 915 28.4.30 to 29.9.30	2.10.30
235 *† <i>Tilawa</i> ...	Coleborn, E. ...	F. R. B. Langdon, A. S. Jones, J. W. Walker.	No. M.	British India ...	Forms 911 & 138 22.11.30 to 19.1.31	9.2.31
168 *† <i>Tinhov</i> ...	Chicken, W. E. ...	G. W. Seth, P. Aydon, E. Swith.	"	A. Weir & Co. ...	" 6.8.30 to 12.11.30	16.12.30
161 *† <i>Titan</i> ...	Power, J. J. ...	C. C. L'Estrange ...	M.L.	A. Holt ...	Form 911 10.2.30 to 21.5.30	27.5.30
244 *† <i>Tongarivo</i> ...	Hamilton, F. S. ...	F. S. Cashmore, G. Dibley, W. Redwood, D. Baldwin, E. G. Williams.	"	New Zealand S.S. Co.	Form 915 27.9.30 to 29.1.31	5.2.31
025 †† <i>Transylvania</i> ...	Bone, D. W. ...	A. Middleton, J. A. Leferre, D. I. Chamberlain.	W.T.	Anchor ...	Forms 911 & 138 1.12.30 to 21.12.30	29.12.30
288 *† <i>Traveller</i> ...	Barrow, W. T. C. ...	A. D. Morison ...	No. M.	Harrison ...	Form 911 14.11.30 to 14.1.31	19.1.31
<i>Trecarrell</i> ...	Hunt, D. ...	W. E. McEwan, G. A. Solly.	" A.	Hain S.S. Co. ...	" 4.2.31 to 6.3.31	13.3.31
005 *† <i>Trematon</i> ...	Mill, C. R. ...	J. Jenkin, C. M. Quick, R. Stittson, W. B. Paul, T. M. Meakin, R. S. Davies.	M.L.	"	Met. Log. 16.9.29 to 8.3.30	25.3.30
119 *† <i>Trojan Star</i> ...	Griffin, G. A. ...	A. Emerson, L. S. Hassell ...	No. M.	Blue Star ...	Forms 911 & 138 12.8.30 to 13.12.30	6.1.31
245 *† <i>Turakina</i> ...	Laird, J. ...	A. E. Bainforth, H. Smith, J. Gould.	" M.	New Zealand S.S. Co.	" 12.10.30 to 7.2.31	12.2.31
276 †† <i>Tuscania</i> ...	Rome, W. B. ...	J. R. C. Evans, M. J. Case, W. F. Lochead, E. B. Sandon.	W.T.	Anchor ...	Form 915 24.6.30 to 2.12.30	3.2.31
167 *† <i>Tyndareus</i> ...	Findlay, J. ...	"	M.L.	A. Holt ...		
<i>Uffington Court</i> ...	Clarke, E. J. ...	E. V. Quickenden ...	No. A.	Haldin & Co. ...	Form 911 29.3.30 to 2.5.30	6.5.30
113 *† <i>Upwey Grange</i> ...	Goodrick, H. P. ...	A. Bradbury, G. T. Hurst ...	" M.	Houlder ...	Forms 911 & 138 22.12.30 to 26.2.31	2.3.31
039 ** <i>Valacia</i> ...	Gronow, S. ...	J. Kettlewell ...	" M.	Cunard ...	" 9.5.30 to 19.6.30	5.7.30
292 †† <i>Viceroy of India</i> ...	Thornton, E. J., R.D., Capt., R.N.R.	W. R. B. Neall ...	" M.	P. & O. ...	Form 911 17.1.31 to 30.1.31	16.2.31
<i>Vigilant</i> ...	Simpson, E. S. S. ...	J. Wilson ...	" A.	Scottish Fishery Bd.	" 1.2.31 to 28.2.31	3.3.31
206 ** <i>Waioapu</i> ...	Hender, W. H. ...	"	" M.	Union S.S. Co. of N.Z.	" 16.11.30 to 10.12.30	28.1.31
263 ** <i>Watuma</i> ...	Stewart, A. R. ...	J. E. Warwick, C. T. Robb, G. M. Coote.	M.L.	"	Form 915 4.7.30 to 6.10.30	28.11.30
<i>Warfield</i> ...	Steel, R. ...	A. J. K. Collins ...	No. A.	Red Star ...	Form 911 29.10.30 to 9.11.30	20.11.30
060 †† <i>Westernland</i> ...	Trant, A. W., O.B.E.	W. L. Wood, C. Clark ...	W.T.	Federal ...	Forms 911 & 138 10.11.30 to 13.12.30	16.12.30
260 *† <i>Westmoreland</i> ...	Reilly, H. E. ...	J. D. Marks, D. Clegg, J. Reeve.	M.L.	"	Form 915 21.9.30 to 30.1.31	6.2.31
<i>William Scoresby</i> , R.R.S.	Irving, J. J. C., Lieut. Commr., R.N.	"	"	Falkland Islands Government.		
208 †† <i>Winchester Castle</i> , M.V.	Gardner, G. F., O.B.E., Lieut.-Commr., R.N.R.	"	W.T.	Union Castle ...		
096 †† <i>Windsor Castle</i> ...	Bickford, C. N. ...	W. S. Byles, E. H. Dixey, J. Traigner.	M.L.	"	Form 915 1.5.30 to 7.9.30	10.9.30
043 ** <i>Zealandic</i> ...	Chave, Sir B., K.B.E.	P. Horwood, J. Thompson, B. Morris.	W.T.	Shaw, Savill & Albion	Forms 911 & 138 21.12.30 to 23.1.31	26.2.31
<i>Zent</i> ...	Gaskell, J. H., R. D., Lieut. Commr., R.N.R.	W. A. Phillips, R. J. Holt Hobson.	No. A.	Elders & Fyffes	Form 911 7.1.31 to 9.2.31	16.2.31
<i>Conway</i> , H.M.S. ...	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets ...	Cadets' M.L.		Cadets' Met. Log. 21.9.30 to 13.12.30	18.12.30
<i>Pangbourne Nautical College</i> ...	Tracy, A. F. G., Commr., R.N.	"	"		Cadets' Met. Log. 24.9.30 to 16.12.30	20.12.30
<i>Worcester</i> , H.M.S. ...	Steele, G. C., V.C., Lieut.-Commr., R.N.	"	"		Cadets' Met. Log. 26.9.30 to 17.12.30	19.12.30
<i>Abaco</i> ...	"	The Keepers ...	Lighthouse Register.		Lighthouse Register 1.7.29 to 31.12.29	24.3.30
<i>Cay Lobos</i> ...	"	"	"		Lighthouse Register 13.11.29 to 23.5.30	26.1.31
<i>Double Headed Shot</i> ...	"	"	"		Lighthouse Register 1.1.30 to 30.6.30	26.1.31
<i>Inagua</i> ...	"	"	"		Lighthouse Register 4.2.30 to 14.8.30	26.1.31
<i>Sombrero</i> ...	"	"	"		Lighthouse Register 1.7.30 to 31.12.30	28.1.31
<i>Watling Island</i> ...	"	"	"		Lighthouse Register 1.1.30 to 30.6.30	26.1.31
<i>Cape Pembroke</i> (Falkland Is.)	"	"	"		Lighthouse Register 1.7.30 to 31.12.30	19.2.31

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 26.2.31.	Date Received
<i>Darian</i> ...	Hannaford, W. ...	D. G. Longmuir ...	Leyland	Water Samples ...	16.1.31
<i>Darro</i> ...	Green, J. ...	G. B. Medleycott ...	R.M.S.P. Co. ...	" " ...	23.1.31
<i>Davistan</i> ...	Trickey, J. ...	J. Holman ...	Leyland	" " ...	16.1.31
<i>Dorellan</i> ...	Hugan, C. ...	G. H. Jolly ...	"	" " ...	15.12.30
<i>Hildebrand</i> ...	Buck, R. H., R.D. Capt.	W. H. Cross ...	Booth ...	" " ...	8.1.31
<i>Mercian</i> ...	Hughan, C. ...	W. Parry ...	Leyland	" " ...	7.10.30
<i>Nevisian</i> ...	McCormick, J. ...	T. J. Jones ...	"	Water Samples ...	24.11.30

May, M.O., 1931.