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THE MARINE OBSERVER.

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A FURTHER STEP TOWARDS THE ACHIEVEMENT OF THE ORIGINAL PURPOSE OF THE WORK.

In these days when National Economy is the watch word, reduction in the number of observing ships may be looked upon as cheese-paring by those who have not information, whereas it is in fact not only a true economy, but one which may be productive for the whole Merchant Navy. The Meteorological Log, or Weather Book Register as it was then called, was established in 1855 for the purpose of collecting information, with the two-fold object of aiding navigators or making navigation easier as well as more certain and amassing a collection of accurate and *digested* observations for the use of men of science.

It was expected that in the process of years every frequented part of the oceans would be investigated sufficiently to summarize their conditions.

In no less than two years after the commencement of the Work by Admiral FITZ ROY, he reported to Lord STANLEY, then President of the Board of Trade, that he had only been able to discuss and tabulate one-third of the observations received from nearly one hundred ships of the Merchant Navy. That is, two-thirds of the observations remained unextracted from the logs and undigested.

The collection of observations in Meteorological Logs continued on a large scale until the Great War practically stopped it.

All members of the post war corps of voluntary Marine Observers should be familiar with the steps taken since 1920 to regulate the collection of observations and prepare them for the climatic survey of the oceans and the investigation of currents. Those who are not, are referred to the serial notes entitled " Marine Meteorology, History and Progress " in Volume II, and to frequent notes and articles in subsequent volumes. There are sufficient data collected over the greater part of the oceans for establishing their climate, but a very large proportion of the observations collected in Meteorological Logs *must* be extracted.

By reducing the number of ships keeping the Meteorological Logs to not more than 50, in trades covering those parts of the oceans where there are insufficient data we shall be able to concentrate more clerks upon the work of extraction, and collection will be confined to what is necessary to complete the survey.

By reducing the number of " Form " ships so that there will only be sufficient to maintain the national complement of " Selected

Ships," Wireless Weather Work at sea and Ocean Current Work will in no way suffer, but will gain through better attention of the Port Meteorological Officers to advice and instruction; and the work in this connection in the Marine Division will be reduced to the advantage of the original purpose of oceanic and meteorological survey.

In a later number fuller information will be given; meanwhile these brief notes are written as we go to press to give some explanation of the further reductions which are being made, and which the Port Meteorological Officers and Agents will be carrying out by the time this number is published.

We are pressing on with the extraction of observations from Meteorological Logs received since 1855 with every available clerk in the present establishment, and in two years' time if the position justifies, further consideration will be given to a scheme which has long been in existence in the Marine Division, and which we have now been able to crystallize, for summarizing the conditions of all oceans and charting them. We now have a more definite incentive for our work and the Marine Division will not be found wanting. Let this encourage the British Voluntary Corps of Marine Observers.

The system of investigating the currents and charting them established with THE MARINE OBSERVER in 1924 by which means an atlas of currents of the North Atlantic has already been published will be continued.

Good current observation should be one of the foremost objects of every observing ship, be she M.L. or Form.

The Father of Oceanography.

Every navigator knows of the name of RENNELL owing to the current which sometimes sets to the Northward across the mouth of the English Channel, and perhaps most have a hazy idea that this current was so named because a soldier man of that name advanced a theory which for many years was a subject of controversy amongst some seamen. We have nothing to add to what we said in Volume II, pages 171-173, about the RENNELL current when we were charting the currents of the North Atlantic, but it is time that the work of RENNELL was duly recognized amongst modern seamen.

He is in fact the originator of ocean current research and his method of plotting the set and drift from ships' log books and draw-

ing current arrows from these plotted observations by eye held the field until recent years. He did his work by private enterprise and was far in advance of others of his time. MAURY has rightly been called the father of organized marine meteorology, but RENNELL is undoubtedly the father of oceanography and also accomplished much for Marine Meteorology before it was organized.

We publish the story of his life and work in this number; every navigator should read it; he was a seaman, soldier, surveyor, geographer and above all a Man.

The Law of Storms.

The first notes of a series on the history of the development of the Laws of Storms as we know them at sea will also be found in this number. A story of enthralling interest to seamen.

The Laws of Storms were developed during the sailing ship era and it is well that the officers of the Merchant Navy of to-day should know something of the cost to their predecessors in observation work, loss of gear, ships and men, and of the work of the investigators both afloat and ashore and of many trades and professions who have given us the knowledge we have to-day.

This knowledge, with observation and wireless communication, can and should be made a great aid to safe navigation to ships of all sizes and nationalities.

For this reason Articles 34 and 35 were included in the International Convention for the Safety of Life at Sea, 1929, which will have been passed by the British Parliament by the time this is published, and which may be ratified before the present year is ended.

With 1,000 selected ships of all nations making routine weather reports by wireless telegraphy daily in all parts of the world and any ship encountering a dangerous tropical storm reporting by wireless at intervals of 3 hours, there should not only be ample intelligence for navigation but the data made available both afloat and ashore by collection of Wireless Weather reports should provide investigators with long desired material and a new incentive to improve upon the Laws of Storms.

MARINE SUPERINTENDENT.

London.

February 15th, 1932.

THE MARINE OBSERVER'S LOG.

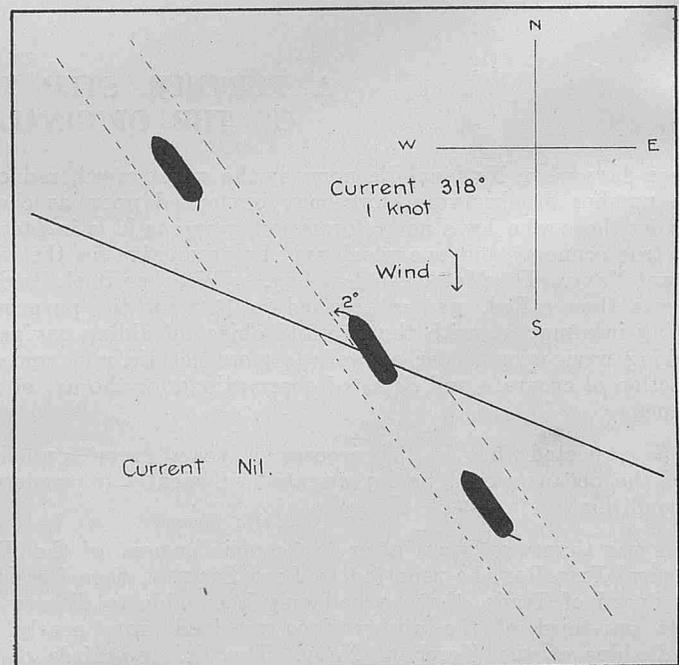
It is hoped that these pages will be filled each month with a selection of the contributions of Mariners in manuscript, or remarks from the Logs and Reports of regular Marine Observers. Responsibility for statements rests with the Contributor.

CURRENT RIP.

North Indian Ocean.

THE following is an extract from the Meteorological Record of S.S. *Port Gisborne*, Captain S. W. HAYTER, Tasmania to Dunkirk via Suez. Observer, Mr. L. J. SKALES, 3rd Officer.

"May 1st, 1931, 0554 G.M.T. 9.29 a.m. A.T.S. Vessel passed through what appeared to be a definite line of division between two currents. Position of ship; Latitude $9^{\circ} 18' N.$, Longitude $53^{\circ} 35' E.$ About 9.25 A.T.S. a line of disturbed water was observed right ahead about one mile distant. At 9.29 A.T.S. vessel crossed this line which stretched as far as the eye could see in a W.N.W.-E.S.E. direction. Its width would be about four hundred feet. On entering it the vessel's head was deflected about 2° to Port by the compass. Until reaching this disturbance the vessel had been carrying Port helm, but after passing through it she carried Starboard helm all the time. When the rip was about a mile astern the vessel's wake was noticeably cut in two as shown in sketch. There was no change in the water temperature on either side. Wind N., force 1. No swell. Air temperature 87° , Water 86° . The current observed from a stellar position at 0151 G.M.T. Latitude $8^{\circ} 31' N.$, Longitude $54^{\circ} 10' E.$, to a position obtained by observation of sun and Venus at 0622 G.M.T. Latitude $9^{\circ} 17' N.$, Longitude $53^{\circ} 32' E.$, was Nil. From the last position to a stellar position at 1502 G.M.T., Latitude $10^{\circ} 51' N.$, Longi-



tude 52° 11' E., the current was observed to set 318° at a rate of 1 knot. True Course N. 37° W.

"The first appreciable fall in the water temperature was noticed at 1700 G.M.T., 8.35 p.m., in Latitude 11° 14' N., Longitude 51° 56' E. Temperature 84°. From then until arrival off C. Guardafui it fell to 79°, rising again after rounding the Cape to 81°."

PHOSPHORESCENCE.

North Atlantic Ocean.

THE following is an extract from the Meteorological Log of S.S. *City of Harvard*, Captain J. McMILLAN, London to South Africa. Observer, Mr. E. BROOK-WILLIAMS, 2nd Officer.

"May 19th, 1931, 2 a.m. A.T.S. (0308 G.M.T.) vessel entered area of peculiar phosphorescence. This took the form of irregular bands and patches, which changed in shape and fluctuated in brightness rapidly as the vessel passed. The phenomenon ceased at 02.25 A.T.S. as suddenly as it had commenced. Wind N.W. force 2, barometer 1013.9 mb., temperature, dry bulb 73° F., wet bulb 71° F., water 72° F., fine and clear weather, partly cloudy (St-Cu).

"Position of ship:—Latitude 13° 04' N., Longitude 17° 34' W. Course 180°, speed 12 knots."

PHYSALIA.

North Pacific Ocean.

THE following is an extract from the Meteorological Log of S.S. *Niagara*, Captain T. V. HILL, Auckland, N.Z., to Victoria, B.C. Observer, Mr. L. P. BOURKE, 3rd Officer.

"At 4 p.m., May 19th, 1931, large numbers of Physalia, commonly known as 'Portuguese Men O'War' were observed. At times they were very numerous, averaging two to a square foot, but usually fairly scattered. These creatures were continually observed until darkness set in about 7 p.m. At daybreak the following day, about 4.30 a.m., they were so thick as to present the appearance of thick scum lying in well-defined lanes in a N.W. and S.E. direction. Throughout the day, they remained very numerous, the sea surface being literally covered with them. At 4 a.m., 21st May, these creatures were still in evidence and remained fairly numerous during the day until 1.30 p.m., when Tatoosh Island bore 072° 17 miles. They disappeared almost as suddenly as they had appeared, probably due to a tidal current setting off and to the southward of the land. During this time the vessel had covered approximately 750 miles, steering N.E. Several specimens were obtained in a draw bucket, and were found to possess three fins, one vertical and two lateral. They appeared to average from half to five inches in length. When caught in the bow wave, they inflated and became globular in shape, and bluish in colour.

"Sea temperatures varied from 59° to 52°, density 1025.5.

"The weather was heavily overcast with light to moderate variable winds.

"Position of ship, Latitude 40° 28' N., Longitude 138° 21' W.

"In regard to fore-going it is of interest to note that on the return voyage we cleared the Straits of Juan de Fuca at 11.54 a.m., May 28th, 1931, just a week later. At 3.30 p.m. when approximately 60 miles from Tatoosh Island, we again observed numerous Physalia. They remained constantly in a probably more dense formation until 10 a.m., May 30th, 1931, when we were in Latitude 40° 26' N., Longitude 138° 22' W., exactly where first observed. Isolated patches were encountered afterwards, but by noon they had completely disappeared and were not again observed.

"Sea temperatures varied from 52° to 59°. Density 1025.5. The weather was generally cloudy with light breezes and calms."

LARGE SHARK

Off Cape Guardafui.

THE following is an extract from the Meteorological Log of S.S. *Peshawur*, Captain A. E. MCBRYDE, Colombo to Suez. Observer, Mr. D. MEIKLE, 3rd Officer.

"May 26th, 1931, at 11.55 a.m. a shark of unusual dimensions was passed on the port side. The Commander, who has been over 35 years at sea, and who sighted the fish, stated that he had never seen a shark of this size or type before.

"At first sight, owing to its bulk, it was thought to be a whale, but on passing closely, it was observed to bear the principal characteristics of the Basking Shark.

"Swimming lazily on the surface of the sea, it appeared to be totally oblivious to the presence of the ship, which gave us the impression that it was dying. On inquiry, however, it would seem that this listless conduct was normal, and in accordance with the habits of the Basking Shark.

"It was heading in a direction at right angles to the ship's course, and before reaching the beam position the mouth was seen to be in the usual position, i.e. well underneath the head, and as we got nearer, this appeared to be unusually large, probably about two feet in width, and greatly resembling that of a cat fish, having the usual whiskery appendages hanging down from the lower jaw or lip.

"The shark was of a reddish-brown colour, and was estimated to be not less than 25 feet long. The ship passed only about 40 feet in front of it, and from here, the full width of the head was thought to be about 4 feet; and, as nearly as we could see, this width extended for a distance of about 8 or 10 feet along the body almost as far as the dorsal fin, which protruded some 5 feet out of the water.

"The top of the head was absolutely flat, and the widely spaced white eyes lent it the characteristic evil appearance of its species.

"Position of ship, Latitude 11° 49' N., Longitude 51° 40' E."

SUBMARINE SHOCK.

North Atlantic.

THE following is an extract from the Meteorological Record of S.S. *Duquesa*, Captain R. OWEN, Liverpool to Montevideo. Observer, Mr. F. D. JONES, 3rd Officer.

"May 20th, 1931, at 1.30 a.m. A.T.S. The vessel was subjected to a severe shock, causing excessive vibration from stem to stern, and lasting about 2 minutes. The sea and swell remained normal, and as the sky was overcast at the time, and the night dark, it was impossible to observe if any discoloration of the sea took place.

"The sensation felt aboard was similar to that experienced by the discharging of a depth charge at close quarters to a vessel.

"Position of ship, Latitude 39° 08' N., Longitude 14° 08' W., bearing from Lisbon 276°, 238 miles."

TORNADO.

Lagos, West Africa.

THE following is an extract from the Meteorological Record of S.S. *Adda*, Captain J. C. SHOOTER, Liverpool to Lagos. Observer, Mr. F. C. LAUGHTON, 4th Officer.

"On May 6th, 1931, a tornado of exceptional violence occurred whilst our vessel was moored alongside the wharf at Lagos. Having experienced intermittent heavy rains and moderate tornadoes from Freetown we berthed in Lagos at 7 a.m. in fine weather, light southerly breezes and cloudless sky, barometer having been steady at 29.85 in. since 3 a.m., thermometer 82° F. Whilst engaged in discharging cargo at 10 a.m. I noticed a decided fall in temperature,

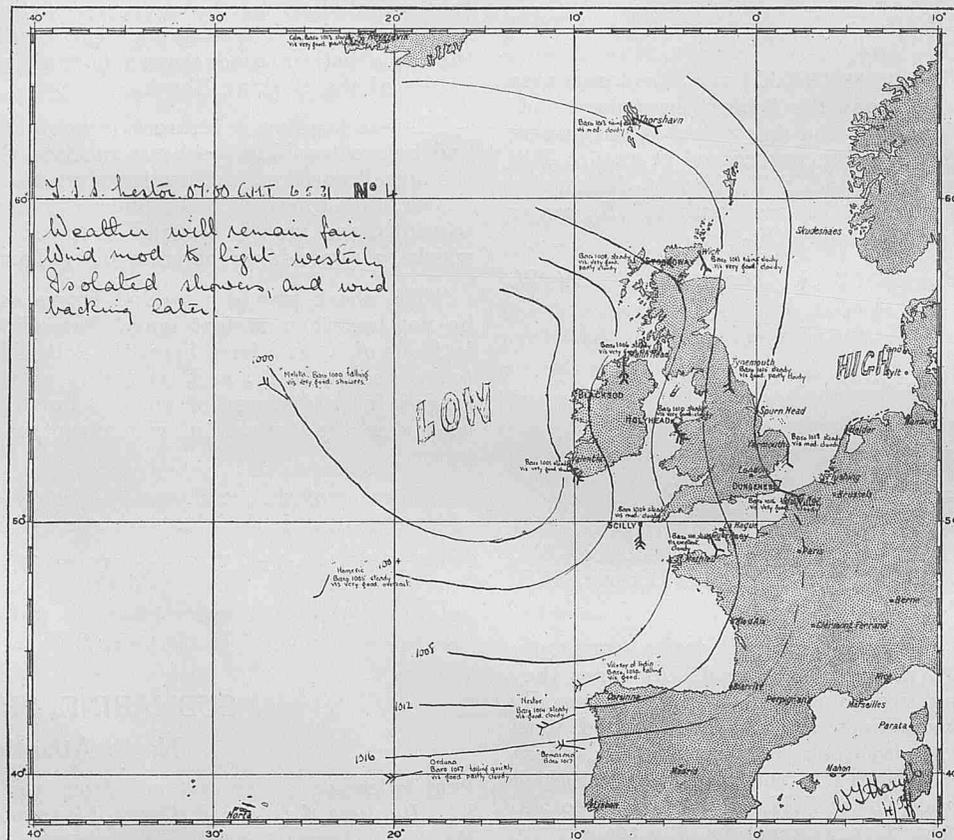
and taking a reading found barometer to have fallen .02 in. A low ominous cloud was visible to Westward rapidly spreading all round the sky to form practically a circle of dense black Cu-Nb, the centre of which appeared to be directly overhead. Taking another reading of the barometer 10 minutes later I found it to have risen .07 in., the reading now being 29.90 in., whilst temperature had fallen to 75° F. The wind was now gale force from all round the compass,

accompanied by slight drizzle. After a further 10 minutes the wind set from the West and the tornado broke one mile approximately to Eastward of us bringing heavy rain lasting one hour. At 11 a.m. the rain gradually ceased and the wind veered round to the Eastward, remaining so for the rest of the day. Barometer remaining steady at 29.90 in. and temperature rising to 84°. Fine weather was experienced for a considerable period after this occurrence."

WEATHER CHART MADE AT SEA.

Eastern North Atlantic.

The accompanying weather chart was made at sea on board S.S. *Nestor*, Captain F. ADCOCK, Cape Town to London, by Mr. W. T. HARRIS, 3rd Officer.



ST. ELMOS FIRE. South Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Baronesa*, Captain R. W. COMPTON, Liverpool to River Plate. Observer, Mr. J. G. FREEMAN, 3rd Officer.

"May 20th, 1931, 0110 G.M.T., Wind N.W., force 7, sky clouded over with Strato-Cumulus and Cumulo-Nimbus, and heavy Cumulo-Nimbus approaching from the N.W., lightning at frequent intervals. 0119 G.M.T. observed aerial and fore truck brilliantly lit up with corposants which lasted five minutes, then a flash of lightning in the zenith cleared the corposants from the truck, and left the aerial lit up in equal patches of light and dark, each about six feet long. This lasted for nearly a minute, and after the last of the corposants had vanished the wind increased to force 8-9, and heavy rain set in. 0220 G.M.T. rain ceased, and wind decreasing, and by 0250 G.M.T. was force 3-4. At 0255 G.M.T. corposants showed up on fore truck and yard arm, but not so brilliant as before, this time phenomenon only lasted three minutes, and was not seen again. Barometer was falling throughout, and did not stop until 0300 G.M.T. 0400 G.M.T. wind increased to gale force and remained so until 1800 G.M.T.

"Position of ship, Latitude 30° 15' S., Longitude 48° 21' W. Course 223°, Speed 13.4 knots."

LUNAR RAINBOWS. South Pacific.

THE following is an extract from the Meteorological Record of S.S. *Huntingdon*, Captain H. G. B. FIELD, Balboa to Auckland, N.Z. Observer, Mr. M. T. D. WALTER, 3rd Officer.

"May 25th, 1931, at 11.07 p.m. A.T.S., after a light passing shower a distinct lunar rainbow formed low over the eastern horizon. The spectrum was fairly visible, although the green and yellow shades were predominant. The moon at the time was westerly with an approximate altitude of 31° 40' (L.L.). The chord subtended by the arc of the rainbow was about 59°, by sextant angle, extending from S.E. by E. to East. The rainbow lasted in its original intensity for about 15 minutes, when it rapidly commenced to fade. At 11.30 p.m. A.T.S. it had completely disappeared.

"Wind N.E. 3. Weather: b.c.p., clouds Cu, A-Cu 5/10. Temperature, Air 74°, Sea 75°.

"Ship's position, Latitude 24° 56' S., Longitude 146° 02' W."

Australian Waters.

THE following is an extract from the Meteorological Log of S.S. *Port Denison*, Captain G. S. HALL, London to Melbourne, via Suez. Observer, Mr. R. A. HOLLOWAY, 3rd officer.

"May 27th, 1931, at 11.30 p.m. A.T.S. A lunar rainbow appeared. The points in contact with the horizon bore 134° and 105° , its highest altitude being about 8° . The inner edge was green in colour gradually diffusing into red at the outer edge. It was brightest near the horizon; at times the bow continued over the water in close vicinity of the ship but without colour. The moon which was 10 days old bore 298° and had an altitude of 37° . The clouds were not close to it. The weather at the time was cloudy, Cu and Cu-Nb clouds with frequent showers of fine misty rain.

"Small colourless bows had previously been visible for short periods.

"Dry bulb, 52° , Wet 50.5° , Sea surface 58° , Wind W. by S. force 4.

"Position of Ship:—Latitude $37^{\circ} 56' S.$, Longitude $130^{\circ} 00' E.$ "

WATERSPOUTS.

West Indies.

THE following is an extract from the Meteorological Record of S.S. *Coronado*, Captain A. W. LEGGE, Avonmouth to Kingston. Observer, Mr. G. BINKS, 3rd officer.

"May 10th, 1931, observed a waterspout bearing W.S.W. approximate distance 10 miles. The spout was vertical and well defined, very dark at the top and the base, becoming lighter in the centre. The sea at the base was very much disturbed and rose up cone-shaped. The spout lasted approximately five minutes finally being dispersed in a heavy rain squall. Half an hour later whilst off Grand Turk another waterspout was observed appearing to lie over the Caicos Islands. This spout was identical in size and shape to the former and lasted about seven minutes finally disappearing in heavy rain. The weather previous to these observations had been fine and settled with light to moderate southerly wind.

"Position of ship:—Latitude $21^{\circ} 34' N.$, Longitude $71^{\circ} 05' W.$ Approaching Turks Is. passage. Barometer 1012.8 mb. Air Temperature $83^{\circ} F.$ Sea Temperature $83^{\circ} F.$ Clouds Cu, Cu-Nb 2."

Western North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Jamaica Merchant*, Captain L. C. BACH, Kingston, Jamaica to Plymouth. Observer, Mr. S. G. SCRUTTON, 4th officer.

"May 18th, 1931, 05.15 A.T.S. Observed at a distance of 1 cable what appeared to be a whirlwind, a patch of smooth water, approximately 20 feet in diameter, moving slowly in a South-Westerly direction, the outer edge of the patch being rough, and the water whirling round and gradually ascending spirally to about 30 or 40 feet. At 5.16 A.T.S. passed this disturbance at a distance of 50 feet. Sky at the time was clear with the exception of a heavy nimbus cloud directly overhead and a few cumulo-nimbus to the Eastward. As the disturbance passed, a few heavy drops of rain fell. At 5.16½ observed the descent of a tubular form of cloud, forming a waterspout and another smaller waterspout formed about $\frac{1}{4}$ mile further S.W. Both lasted for about five minutes, then gradually subsided. The wind at the commencement of this phenomenon was variable,

force 1, but soon after, a breeze from E.N.E. set in, force 3. Clouds moving S.W. Course 044° , speed 11.6 kts.

"Position of ship:—Latitude $23^{\circ} 40' N.$, Longitude $70^{\circ} 53' W.$ "

PURPLE LIGHT AT NIGHT.

North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Nova Scotia*, Captain S. J. FURNEAUX, Liverpool to St. John's, N.F. Observer, Mr. J. E. WILSON.

"May 24th, 1931. At 0435 G.M.T. Sea and sky were suddenly quite brilliantly lit for about three seconds with a flickering purplish light, which did not appear to emanate from any particular point. Weather at the time was light W.N.W. wind—smooth sea; cloud A-St. amount 10. Shortly before this the wind has been S.W., light and the sky perfectly clear.

"Position of ship:—Latitude $51^{\circ} 24' N.$, Longitude $42^{\circ} 23' W.$ "

NOTE.—As the sky was overcast at the time of observation it seems probable that the light was due to a very bright meteor.

METEORS.

North Indian Ocean.

THE following is an extract from the Meteorological Log of S.S. *Peshawur*, Captain A. E. McBRIDE, Fremantle to Colombo. Observer, Mr. D. MEIKLE.

"May 19th, 1931, 1707 G.M.T. Observed exceptionally bright meteor at a point in the heavens almost due north, in the vicinity of Alioth, which passing across constellation of Ursa Major, disappeared, bearing approximately 320° , between Merak and Regulus.

"The phenomenon was attended by usual tail, and about midway along its track, between the points of origin and dispersion, threw off a second fragment, to follow in its wake. In consequence of its unusual brilliancy, it was first thought to be a signal of distress. Total duration of visibility did not exceed seven seconds.

"Position of ship, Latitude $5^{\circ} 25' N.$, Longitude $80^{\circ} 30' E.$ Ship's Head 310° ."

North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Arracan*, Captain S. THOMSON, Immingham to Fremantle, via Cape. Observer, Mr. G. DAVIDSON, 2nd Officer.

"Sunday, May 10th, 1931, at 2225 G.M.T., observed a very brilliant meteor which illuminated the sky. It appeared to the east at an altitude of 30° in the constellation of Libra. Green in colour, and changed to red with a red tail about 3° long before disappearing to the north-east three seconds later in the vicinity of Vega at an altitude of 10° . Sky cloudless, air temperature 69° .

"Position of ship, Latitude $15^{\circ} 42' N.$, Longitude $17^{\circ} 45' W.$ "

MAJOR JAMES RENNELL.

ONE hundred years ago a book was published, entitled "An Investigation of the Currents of the Atlantic Ocean and of those which prevail between the Indian Ocean and the Atlantic". The author, Major JAMES RENNELL, F.R.S., died in 1830 and the work was published in 1832 by his daughter, Lady JANE RODD, with the assistance of Mr. JOHN PURDY as editor.

This book was particularly remarkable for two reasons. In the first place it gave an account of ocean currents which was far in advance of the general knowledge of currents possessed at the time. In the second place the book and the set of large current charts which accompanied it, and on which thousands of actual current observations were plotted, were privately undertaken.

In 1778 Sir CHARLES BLADGEN in writing about the Gulf Stream stated that "the difficulty of ascertaining currents is well known to be one of the greatest defects in the present state of navigation". The measurement of ocean currents, however, began at about the same time with the introduction of the chronometer for the determination of longitude at sea. Major RENNELL, writing in 1820, commenced his book with the following words:—

"Although the currents of the ocean form a most important part of Hydrography, yet it is only since the introduction of chronometers, and of celestial observations for the longitude at sea, (that is, not much more than forty years ago,) that a competent idea of their direction and force, in any kind of detail, *could* be obtained. For although the differences in northing and southing, between the dead-reckonings and observations, might be pointed out by the observations of latitude, yet the error of longitude, or of easting and westing, would, of course, escape detection altogether: and it happens that in the Atlantic Ocean, which forms the scope of the present inquiry, the streams of current, which most materially affect navigation, both in respect of extent and velocity, run more easterly and westerly than otherwise. To the invention of chronometers then, and to the improved methods of finding the longitude at sea by celestial observations, to check their *rates* of going, navigators are indebted, as well for expediting their passages as for greater safety in the mean time: and the invention, as it respects *currents*, is surely in the next degree of importance to that of showing the ship's place, which may be so much affected by them, during the long intervals that occasionally happen between the celestial observations, and for which a delineation of such streams of current as are prevalent, would prepare the navigator. The progress in the knowledge of this subject has, accordingly, been very great, since the date of the above invention."

It is evident that RENNELL, who had spent the early part of his life in the Navy, fully realised that for the first time in the history of navigation data were being accumulated which would enable an investigation of the speed and direction of ocean currents to be begun. This investigation he undertook as one of the activities of a very busy life. He realised that the winds are the prime movers of the currents and he commenced his book with an account of them, particularly of the Trade Winds and Monsoons. Before considering RENNELL's current work in greater detail, it will be of interest to record the chief facts of his life. These are summarized from an article by the Right Hon. Sir (JAMES) RENNELL RODD, G.C.B., G.C.M.G., etc., published in the *Geographical Journal*, Vol. LXXV, April, 1930, to which due acknowledgment is here made.

RENNELL was born on December 3rd, 1742, at Upcot, near Chudleigh, in Devonshire, on one of two small properties which had been owned for several generations by his family. The name of RENNELL appears to be a variant of REYNELL, borne by an ancient Devonshire family of French origin. His father, Captain JOHN RENNELL, was killed in action in the Low Countries in July, 1747, before JAMES RENNELL was five years old, and his mother was thus left with her son and daughter in such straitened circumstances that the estates had to be sold. One of them was, however, recovered in 1769 after a lawsuit, while RENNELL was in India.

The family found a temporary home with a cousin, the Rector of Drewsteignton, near Exeter, but on the transfer of this Dr. RENNELL to Northamptonshire, Mrs. RENNELL married again. Her husband

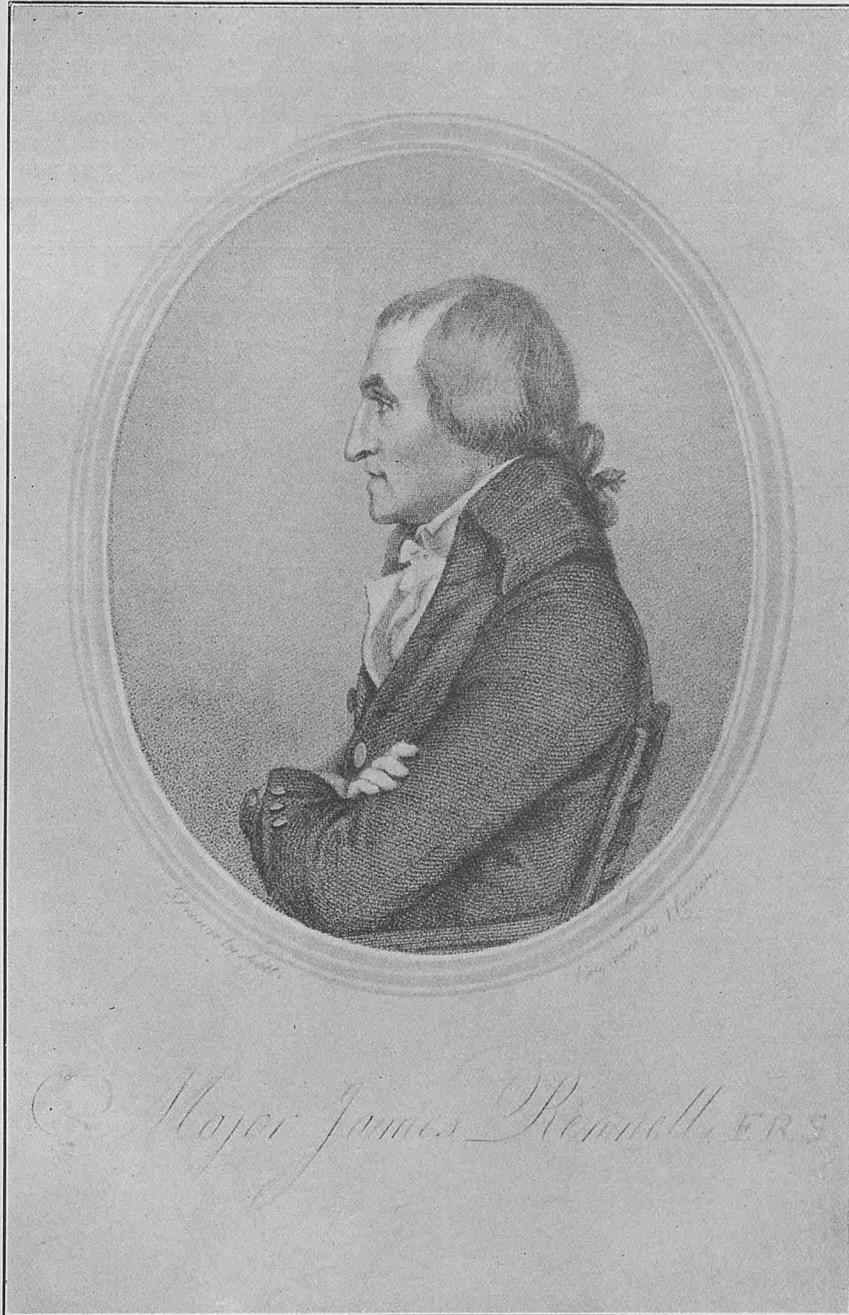
was, however, unable to provide for her two children and young RENNELL at the age of ten found a very happy home with the new Vicar of Chudleigh, the Reverend GILBERT BURRINGTON. The only schooling he had was at the local grammar school but he had the ability to educate himself and read every book he was able to acquire. It is said that in his early years he showed evidence of his future taste for surveying by making a map of the country around Chudleigh.

RENNELL felt the call of the sea and at the age of fourteen an appointment as midshipman was secured for him in the frigate *Brilliant*, under the command of Captain HYDE PARKER, who had served under ANSON in his famous voyage of circumnavigation. Captain HYDE PARKER was interested in all marine problems and he would doubtless have encouraged RENNELL's natural talent for surveying. A month or two later war was declared with France, which lasted for seven years. The first chart made by RENNELL which has been preserved was a careful study of the Bay of St. Cast, dedicated to Lord HOWE. Here he witnessed a disastrous re-embarkation of troops landed for an attack on St. Malo, which had to be abandoned. The *Brilliant*, under a new commander, subsequently captured two French privateers. RENNELL drew a modest share of prize money and was granted leave. It is interesting to note that he spent part of this money on the purchase of books.

On March 6th, 1760, RENNELL sailed as midshipman in the frigate *America* for Madras. The ship was not a happy one but on the voyage which lasted six months RENNELL made plans of harbours and anchorages. At Madras the influence of Captain HYDE PARKER, then in command of the *Grafton*, secured his transfer to that ship which proceeded in a fleet of sixteen ships of the line and six frigates to the blockade of Pondicherry. RENNELL was selected to take part in an expedition to cut out the French frigate *Baleine* and an Indiaman which were lying under the guns of the fort. This object was successfully achieved with relatively small loss. During the rainy season the majority of the ships went to Ceylon and RENNELL surveyed the harbour of Trincomali. He also investigated the chain of sandbanks, known as Adam's Bridge, which connects Ceylon and the Coromandel coast, through which he believed a navigable passage could be maintained by dredging the strait of Ramisseram. After the return of the fleet to Pondicherry a hurricane burst upon them, sinking two ships of the line and an Indiaman and dismasting or driving ashore eight others. Only the *Grafton* and the *Norfolk* saved their masts. The blockade was nevertheless maintained until the capitulation of Pondicherry on March 17th, 1761.

A project for the capture of Bourbon and Mauritius was conceived by Admiral CORNISH, and RENNELL went with the East Indies squadron to Rodriguez. The plan, however, fell through and at the end of seven weeks the fleet returned to Madras. Six years of meritorious service had gained for RENNELL the esteem of his captain, who suggested to him the advantages of entering the navy of the East India Company. He was therefore lent experimentally as surveying officer to one of the Company's warships which was setting out on a cruise to establish trading relations at various places between India and the Philippines. When RENNELL returned to Madras a year later with charts from the Nicobar Islands, Malacca and North-West Borneo he was offered the command of a ship, which in his captain's absence he was unable to accept. In 1763, however, the Seven Year's War ended and the prospect of a naval career being precarious RENNELL decided to enter the Company's service and was discharged from the Royal Navy.

The ship which RENNELL first commanded was destroyed by a hurricane in Madras roads, his life being saved through his being on shore at the time. The Governor of Madras, Mr. (afterwards Sir ROBERT) PALK was a Devonshire man whose home at Haldon was close to Chudleigh. Through his influence RENNELL was appointed to command a small squadron for the transport and landing of troops and stores for the siege of Madura. This work earned for him the thanks of the Madras Government and a donation, and in the intervals of service he executed valuable surveys. At Calcutta came the turning point of RENNELL's life. He met a Mr. TOPHAM, a former messmate who had been his closest friend in the *Brilliant*. Mr. TOPHAM who



had joined the Civil Staff of the Company was intimate with the Governor of Bengal. The Governor, Mr. VANSITTART, was anxious to have his province carefully surveyed and on the recommendations of Mr. TOPHAM and of Captain TINKER who had known RENNELL in the navy he was appointed at the age of twenty-one to carry out this important work. He was given commissioned rank as ensign in the Bengal Engineers, quickly rising to be lieutenant. In 1766 he became a captain and finally on his retirement, a major.

RENNELL's first work on the Ganges was highly commended. Before two years had passed he had come into sight of a great mountain range which he called the Tartarian Mountains, but which we now know as the Himalayas. In 1766 on the Bhutan frontier he nearly lost his life, being very severely wounded on a dangerous expedition, which he had volunteered to join, against a fanatical tribe. In this condition he had to be taken a six-day journey in an open boat before reaching a surgeon at Dacca. RENNELL slowly recovered but his health was permanently affected. Lord CLIVE who had given every encouragement to his work in a difficult and almost unexplored country then created for him the rank of Surveyor-General

and gave orders that he should thereafter always be escorted by a company of Sepoys. The field-work of RENNELL's survey occupied about seven years and in the country east of the Brahmaputra may almost be said to have been carried out at the point of the bayonet. A leopard mauled five of his men before RENNELL killed it with a bayonet driven down its throat. An expedition led by RENNELL against border raiders, as a diversion from his normal duties, entailed a march of 320 miles accomplished in fifteen days, probably a record in such a climate. Malarial fever frequently interrupted his work.

In October, 1772 RENNELL married JANE THACKERAY whom he met at the house of the new Governor of Bengal, Mr. CARTIER. This lady was the sister of WILLIAM MAKEPEACE THACKERAY, the Governor's secretary, whose grandson was the well-known novelist. After his marriage RENNELL was engaged in co-ordinating his previous work and in the preparation therefrom of the Bengal Atlas. In 1777 when the work was nearly complete, he applied for a pension which WARREN HASTINGS in view of his exceptional services recommended should be fixed at £600 per annum. RENNELL whose health had been

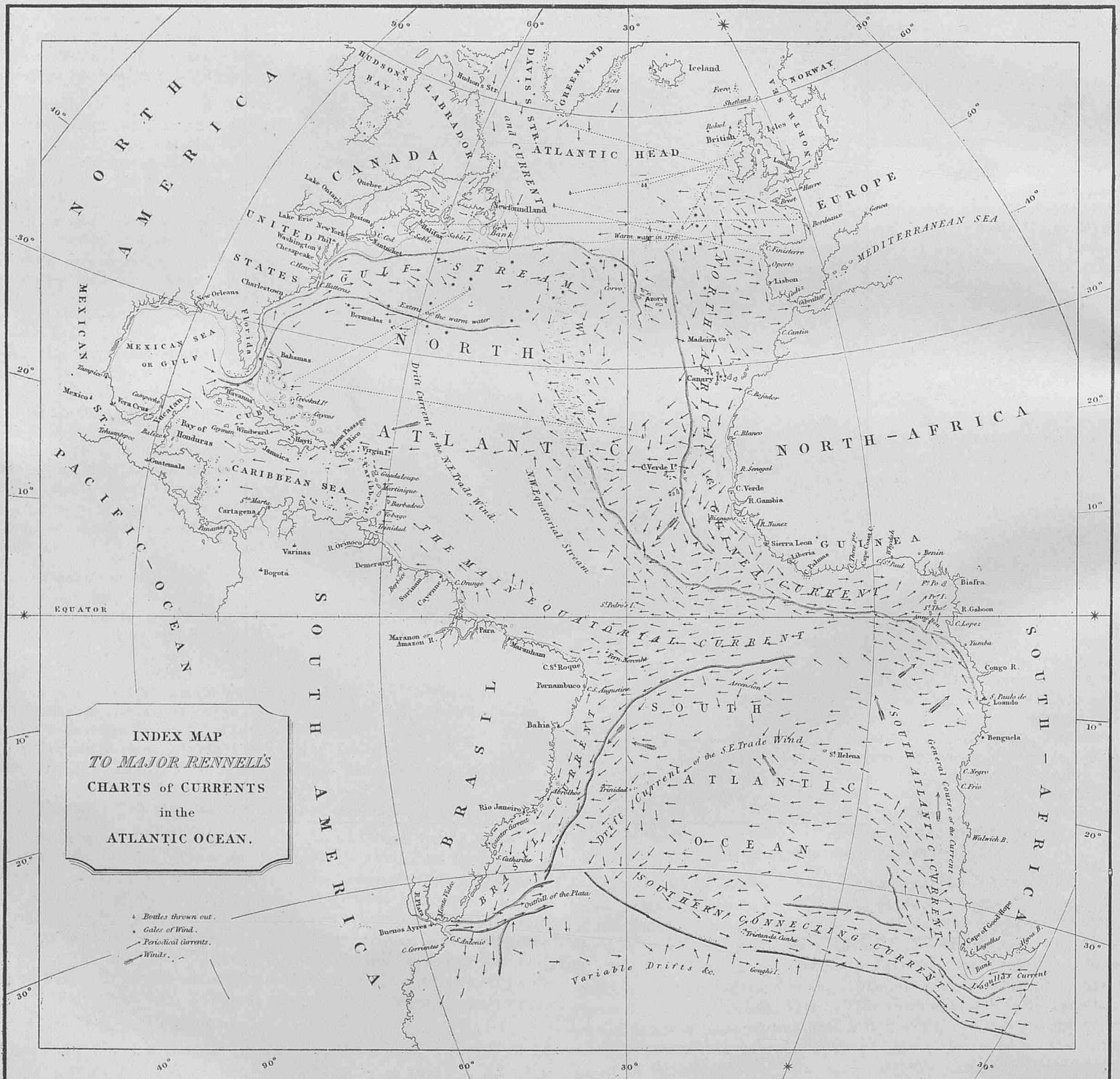


Figure 1.

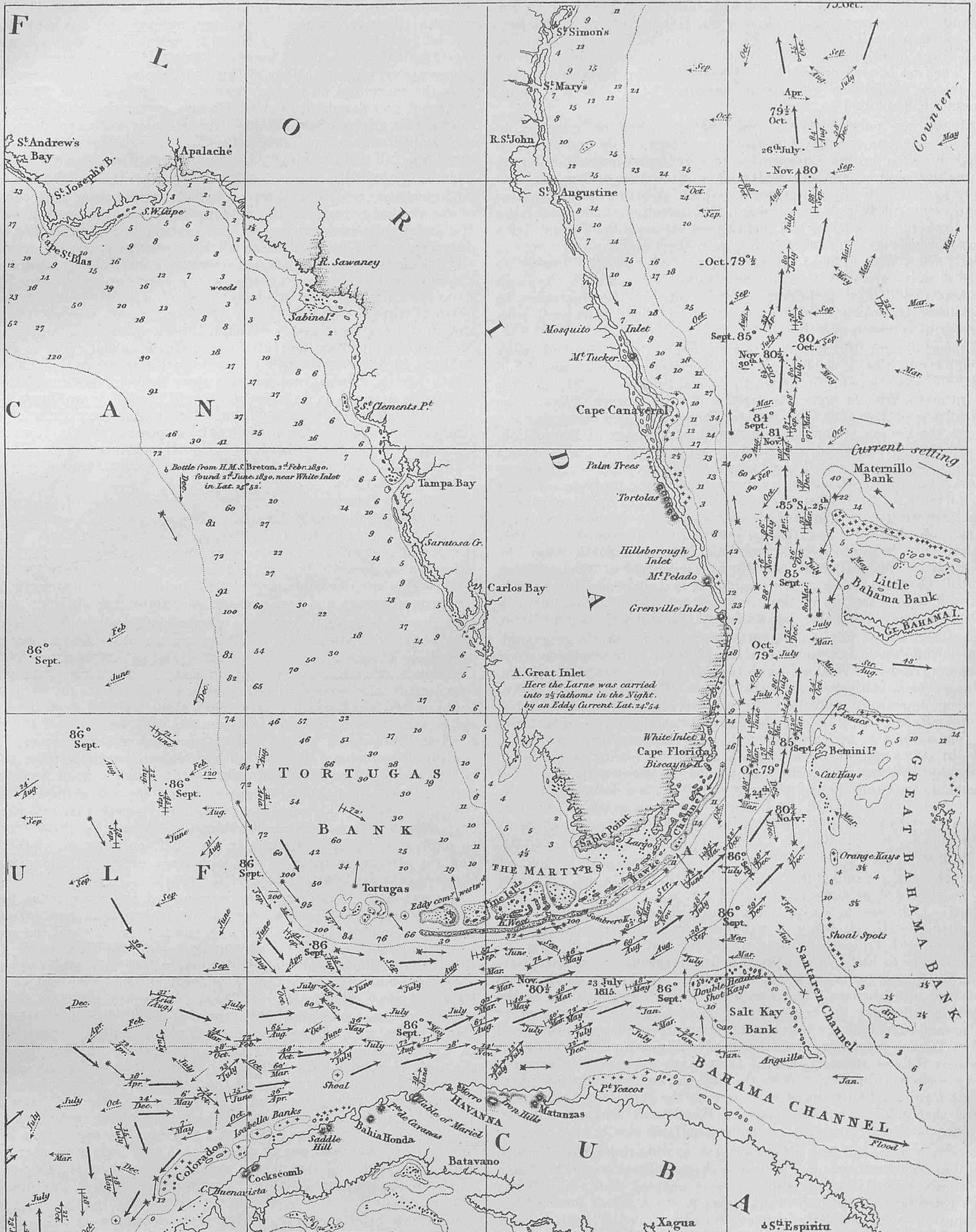


Figure 2.—Portion of Major Rennell's Current Chart of the North Atlantic Ocean. Thin continuous arrows are actual current observations. Thin dotted arrows are actual wind observations. Heavy arrows are the estimated mean flow of current. Heavy upright figures are sea temperatures. Small sloping figures are soundings.

seriously undermined left Calcutta with his wife in March, 1777, for England. The journey was broken at St. Helena, where in October, 1777, his daughter Jane was born, who was to become his active collaborator in after years and who, as we have seen, published his main work on ocean currents after his death. The RENNELLS settled permanently in London where two sons were born. The first child, a daughter, had died in India.

RENNELL was only thirty-six years of age when he returned to England. He was to enjoy fifty-two more years of life and this long period he devoted assiduously to research and co-ordination in geographical and oceanographical work. He is now recognised, and was at the time by his contemporaries both at home and abroad, as the first eminent British geographer. The Directors of the East India Company refused to defray the cost of publication of the Bengal Atlas which was produced by subscription from the Company's servants in India. They also reduced his pension to £400 but after two years raised it to its previous level. RENNELL's unquestioned authority as an oceanographer led to an offer of the post of First Hydrographer to the Admiralty, which he refused as it would have interfered with his work of research.

RENNELL became the friend of many eminent men; he had many charming qualities, notably those of sincerity, simplicity and kindness. He was elected a Fellow of the Royal Society in 1781. Among his intimate friends were its president, Sir JOSEPH BANKS, the naturalist and traveller, the great Whig peer Lord SPENCER, Dr. GILLIES the Scotch historian, MARSDEN the translator of Marco Polo and others. He received universal recognition in foreign countries and he greatly appreciated the visit of the famous Baron HUMBOLDT in 1825 who came to London to consult him on the problem of winds and currents. In his later years FRANKLIN the Arctic explorer, Admiral SMYTH and many others of his intimate friends founded a dining club, the Raleigh, for social intercourse. It was at a meeting of this club, barely two months after RENNELL's death, that the Geographical Society, now the Royal Geographical Society, was founded. RENNELL died in his eighty-eighth year on March 29th, 1830, and was buried in Westminster Abbey. His daughter married in 1809 Captain, afterwards Rear-Admiral, Sir JOHN TREMAYNE RODD.

Space will not permit of detailed reference to RENNELL's geographical achievements here. He had contemplated a comprehensive study of the geography of Western Asia, from the Mediterranean to India, beginning from the earliest records. Parts of this ambitious project were completed and published. He also devoted a considerable time to the study of African geography and published a series of memoirs with maps for the African Association. A contemporary statement made in 1803 maintains that scarcely any work having reference to geography had been published in preceding years which had not been submitted to RENNELL's correction. This indefatigable worker also found time to write on historical or archaeological subjects associated with geography, such as the Marches of the British Army in the Peninsula of India, the Landing of JULIUS CAESAR in Britain, the Shipwreck of St. PAUL and others.

RENNELL was not only the Father of English Geography. He must also be regarded as the originator of the science of oceanography, a word which was probably not established in the language until his systematic co-ordination of winds and currents created the need for it. Apart from the charts which he had prepared from his earliest years to assist navigation his first large work was the Chart of the Bank and Current of Cape Lagullas (now known as Agulhas) which was published in 1778. The revision of this is included in the book referred to at the beginning of this article. In his years at sea he had personally observed the currents of the Atlantic and Indian Oceans, together with the Trade Winds and the Monsoons and their influence upon current. Over many years he had accumulated a mass of information from the logs and experience of his naval friends. This he had reduced to system by the year 1810, forty years before the publication of Maury's Wind and Current Charts. RENNELL continually revised his work until his death.

RENNELL's large current atlas contains five charts, some of which are subdivided into two or more large sheets. These cover the North and South Atlantic Oceans and also that part of the Indian Ocean which extends from south of Madagascar to the Agulhas Bank. They contain many thousands of carefully plotted wind and current arrows, the majority of which show by the kind of arrow used the name of the observer or of the ship. Each arrow is marked with the month of observation and a large proportion have the velocity in miles per day added. Among the current arrows RENNELL drew

occasional large arrows to indicate his idea of the general flow of current. This is essentially the same method that has persisted in the delineation of currents until quite recent times, for example, in the Admiralty Current Charts. RENNELL's charts also show sea temperatures and variations of the compass, together with soundings near the shore and on banks where these were available. A number of named and dated ship tracks are also given, the daily runs being shown. Localities where ice was seen or gales were experienced are also indicated. A portion of the chart of the Gulf Stream is reproduced full size in **Figure 1**, but many regions of the charts are much more crowded with current arrows than in this case.

The charts show that RENNELL had derived a good general idea of the flow of current in the Atlantic Ocean, as we know it to-day. His index map or summary of the currents is reproduced on a reduced scale in **Figure 2**. Here all the essential currents are shown and the circulation in the South Atlantic is indicated in its entirety. The only real difference from the modern charts appears in the North Atlantic. RENNELL had strongly in mind a continuous circulation north-westward from the Cape of Good Hope, passing into the Equatorial Current, thence through the Caribbean Sea and Gulf of Mexico, continued as the Gulf Stream which passed right across the Atlantic into the southerly current down the coasts of Portugal and North Africa. He did not however show the complete circulation of the North Atlantic as we know it. It will be seen from **Figure 2** that the south-westerly flow in the Trade Wind region west of Cape Verde Islands is not shown to continue until it passes into the Equatorial Current. It is interrupted by a north-westerly current flowing between Longitudes 30° and 40° W., which RENNELL called the N.W. Equatorial Stream.

In MARINE OBSERVER, Vol. IV, in our investigation of the currents of the West Indies and Panama tracks we found a counter-current flowing S.W. outside the Gulf Stream. We then remarked that this counter-current did not appear on any previous chart based on observations prior to 1910, but we had not then seen RENNELL's original work. This counter-current is clearly indicated by RENNELL both in the current arrows and by a note written across the chart.

In the book accompanying the charts each main current is dealt with very fully. Details of sea temperature observations are given as well as those of the drift of bottles and other objects. RENNELL attempts to give mean velocities for some of the main currents and occasionally also some indication of seasonal variations. The book contains much information as to navigation and the best tracks for ships, taking winds, storms and currents into account, on the same lines as those which MAURY afterwards developed more fully in his Sailing Directions. RENNELL also deals with such matters as the possibility of sea temperature warnings of the vicinity of ice.

He fully recognised the complexity and the variability of ocean currents. He was the originator of the terms "drift" and "stream" currents which have persisted to recent times, and he also attempted to explain the origin of currents, the drift currents as wind-driven and the stream currents as due to a head of water originating by the flow of a drift current against the coast.

RENNELL also investigated the currents of the approaches to the English Channel and of the Bay of Biscay and read two papers on the subject before the Royal Society, the first in 1793 and the second in 1815. He believed that a current flowed in a north-westerly direction from Ushant past the Scillies and that this after becoming westerly gradually passed into a general southerly current towards Capes Ortegal and Finisterre. Thence it seemed probable that the circulation was completed by a current which flowed eastward off Cape Ortegal and followed the coast of the Bay of Biscay northward to Ushant. The evidence for the north-westerly current, to which the name of Rennell's Current was given, was found in the experiences of ships in the neighbourhood of the Scillies and westwards of these islands which were set out of their course. There had been shipwrecks for which it seemed that this current would account, notably the loss of Sir CLOUDESLEY SHOVEL's flagship and two others of the line in 1707. RENNELL was of opinion that this current is often intermittent or weak and that it was primarily caused by strong westerly winds in the western Atlantic. Modern investigation has not been able to establish the Rennell Current with certainty.

With this brief summary of RENNELL's current work we bring our account of a most useful and indefatigable life to an end. The portrait is reproduced by kind permission of the Royal Geographical Society.

E. W. B.

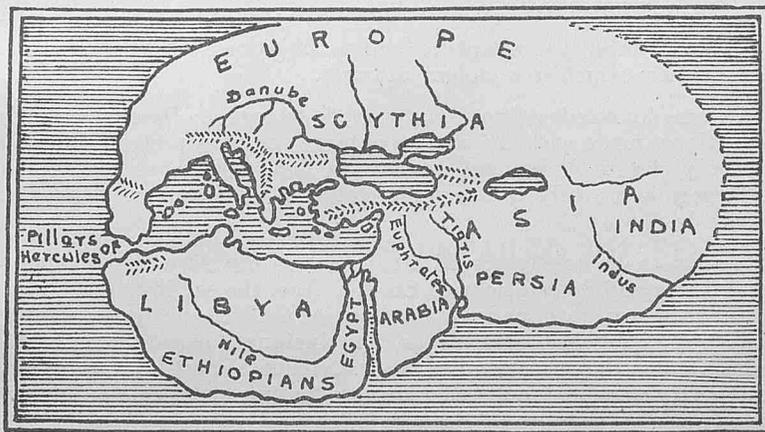
NOTES ON THE HISTORY AND DEVELOPMENT OF THE LAW OF STORMS.

Part I.—From Ancient Times to the end of the Sixteenth Century, A.D.

PREPARED BY M. CRESSWELL, PORT METEOROLOGICAL OFFICER, LIVERPOOL.

A large amount of literature has been written upon the subject of Storms, and within the scope of this article it is only possible to describe in a very brief manner how our knowledge has been compiled. Storms have been and always will be of vital importance to the human race, and the loss of life and property attributable to their agency has been of such magnitude that the great interest in acquiring knowledge of their mysteries is easily understood.

In order to trace our subject from earliest known times, we will first consider the World as known to the Ancients, which comprised the lands bordering the Mediterranean, Red Sea, and the Northern part of the Arabian Sea, or in other words, from the longitude of the Pillars of Hercules, at the Strait of Gibraltar, to the Valley of the Indus.



The World according to Herodotus, about 450 B.C.

Western civilization as we know it dawned in Mesopotamia, a land of abundant food and water supply, between the rivers Tigris and Euphrates, in a country where storms are practically unknown. In contrast to these conditions it is of interest to mention that in regions subject to large numbers of storms we find that human energy has reached its greatest development, as for example in the British Isles.

In ancient times all natural phenomena were regarded as the work of Gods, and in fact even to modern times the phrase "the Act of God" is still used in Charter Parties, Bills of Lading, and many other agreements, as a legitimate plea for exoneration of damages, if the circumstances are so exceptional as to be unforeseen.

In Psalm 107, commencing at verse 23 are written those lines so well known to Sailormen, "They that go down to the sea in ships, that do business in great waters; these see the works of the Lord, and his wonders in the deep. For He commandeth, and raiseth the stormy wind, which lifteth up the waves thereof".

The early Mariners who navigated the Mediterranean and Aegean Seas relied upon charms and sacrifice for deliverance from the tempest. About 450 B.C. the historian HERODOTUS, who was also a great traveller and observer, evidently had considerable doubt as to the means used in his day for countering storms, as the following passage describing one of the voyages in his History shows. "The Storm lasted three days. At length the Magians, by offering victims to the Winds, and charming them with the help of conjurers, while at the same time they sacrificed to Thetis and the Nereids, succeeded in laying the storm four days after it first began; or perhaps it ceased of itself."

The well known story of Jonah is but another early instance of primitive methods of quelling storms, see Chapter 1 of the Book of Jonah, "But the Lord sent out a great wind into the sea, and there was a mighty tempest in the sea, so that the ship was like to be

broken. Then the mariners were afraid, and cried every man unto his god, and cast forth the wares that were in the ship into the sea, to lighten it of them. So they took up Jonah, and cast him forth into the sea: and the sea ceased from her raging".

These early people were undoubtedly keenly observant, and a very scanty examination of ancient literature would appear to bear out in some measure the extraordinary fact that the circular theory of Storms was not unknown to them. In the Odyssey of Homer done into English prose, "The East Wind and the South Wind clashed, and the stormy West, and the North, that is borne in the bright air, rolling onward a great wave". Then in the Book of Job, Chapter 37, Verse 9, "Out of the South cometh the whirlwind". There are numerous other similar instances, but modern translation must of course be taken into account.

The earliest known treatise on the subject of the winds is Aristotle's *Meteorologica*, written about 350 B.C., and for nearly 2,000 years used as a standard text book. It is from this work that the name Meteorology is derived, although ARISTOTLE cites the name as already used by his predecessors.

From the time of ARISTOTLE, and his distinguished successors, THEOPHRASTUS and POSIDONIUS, few writings of storms are available until after the discovery of America by Columbus in A.D. 1492, shortly after which Spanish writers describe the West Indian hurricane. Probably the first hurricane to be recorded was that experienced for three consecutive days by COLUMBUS and his hardy adventurers upon an unknown sea in their tiny *Santa Maria*, in 1493. An account of a hurricane at Santo Domingo on August 3rd, 1508, is given by FERNANDEZ DE OVIEDO, in which he describes the storm as lasting 24 hours. He notes the destruction of houses, the loss of life, and also the immense havoc done in different parts of the Island; he remarks that the wind commenced at North, driving ships from their moorings, and subsequently changed suddenly to an opposite quarter, blowing then from the South as violently and with as much fury as before from the North. He says, the West Indian Natives distinguished these excessively tempestuous storms as "Hurricanes", a word in their language imitative of rushing wind.

The term Typhoon is derived from Ty-foong, a Chinese word indicating a great or mighty wind. In 1697 Captain WILLIAM DAMPIER's remarkable book "A Voyage round the World" appeared, and this great seaman, intelligent observer and careful narrator describes the incidents and phenomena of the Typhoon in the China Seas with an accuracy scarcely to be surpassed, and the following passage is quoted from "Voyages and Descriptions, vol. ii., p. 36":—

"Tuffoons are a particular kind of violent Storms, blowing on the Coast of Tonquin and the neighbouring Coasts in the Months of July, August, and September. They commonly happen near the full or change of the Moon, and are usually preceded by very fair weather, small Winds, and a clear Sky. Those small Winds were from the common Trade of that time of the year, which is here at S.W. and shuffles about to the N. and N.E. Before the Storm comes there appears a boding Cloud in the N.E., which is very black near the Horizon, but towards the upper edge it looks of a dark Copper Colour, and higher still it is brighter, and afterwards it fades to a whitish glaring colour at the very edge of the Cloud. This Cloud appears very amazing and ghastly, and is sometimes seen 12 Hours before the Storm comes. When that Cloud begins to move apace, you may expect the Wind presently. It comes on fierce, and blows very violent at N.E. 12 Hours more or less. It is also commonly accompanied with terrible claps of Thunder, large and frequent flashes of Lightning, and excessive hard Rain. When the Wind begins to abate it dies away suddenly, and falling flat calm, it continues so an hour, more or less; Then the Wind comes about to the S.W., and

it blows and rains as fierce from thence as it did before at N.E. and as long."

DAMPIER being at the S.W. entrance to Canton River, in July, 1687, encountered a Typhoon, and his graphic account of what occurred is also given, as it describes in a seamanlike manner the passage through a tropical storm:—

"It was now the time of the Year for the S.W. Monsoon, but the Wind had been whiffing about from one part of the Compass to another for two or three Days, and sometimes it would be quite calm. This caused us to put to Sea, that we might have Sea-room at least; for such flattering Weather is commonly the forerunner of a Tempest.

"Accordingly we weighed Anchor, and set out; yet we had very little Wind all the next Night. But the Day ensuing, which was the 4th day of July, about Four a-Clock in the Afternoon, the Wind came to the N.E. and freshned upon us, and the Sky looked very black in that quarter, and the black Clouds began to rise apace and move towards us, having hung all the Morning in the Horizon. This made us take in our Top-sails, and the Wind still increasing, about Nine a-Clock we rift our Main-sail and Fore-sail; at Ten we furl'd our Fore-sail, keeping under a Main-sail and Mizzen. At Eleven a-Clock we furl'd our Main-sail, and ballasted our Mizzen; at which time it began to rain, and by Twelve a-Clock at Night it blew exceeding hard, and the Rain poured down as through a Sieve. It thundered and lightned prodigiously, and the Sea seemed all of a Fire about us, for every Sea that broke sparkled like Lightning. The violent Wind raised the Sea presently to a great height, and it ran very short, and began to break in on our Deck. One Sea struck away the Rails of our Head; and our Sheet Anchor, which was stowed with one Flock or bending of the Iron over the Ships Gunnal, and lasht very well down to the Side, was violently washt off, and had like to have struck a hole in our Bow, as it lay beating against it. Then we were forced to put right before the Wind to stow our Anchor again, which we did with much ado; but afterwards we durst not adventure to bring our Ship to the Wind again, for fear of foundering, for the turning the Ship either to or fro from the Wind is dangerous in such violent Storms. The Fierceness of the Weather continued till Four a-Clock that Morning; in which time we did cut away two Canoas that were towing astern.

"After Four a-Clock the Thunder and the Rain abated, and then we saw a Corpus Sant at our Maintop-mast Head, on the very top of the Truck of the Spindle. This sight rejoiced our Men exceedingly, for the height of the Storm is commonly over when the Corpus Sant is seen aloft; but when they are seen lying on the Deck, it is generally accounted a bad sign.

"We continued scudding right before Wind and Sea from Two till Seven a-Clock in the Morning and then the Wind being much abated, we set our Mizzen again, and brought our Ship to the Wind, and lay under a Mizzen till Eleven. Then it fell flat calm, and it continued so for about two Hours; but the Sky looked very black and rueful, especially in the S.W., and the Sea tossed us about like an Egg-shell, for want of Wind. About One a-Clock in the Afternoon the Wind sprang up at S.W. out of the Quarter from whence we did expect it: therefore we presently brailed up our Mizzen, and wore our Ship: but we had no sooner put our Ship before the Wind, but it blew a Storm again, and rain'd very hard, though not so violently as the Night before; but the Wind was altogether as boisterous, and so continued till Ten or Eleven a-Clock at Night.

All which time we scuded and ran before the Wind very swift, though only with our bare Poles, that is, without any Sail abroad. Afterwards the Wind died away by degrees, and before Day we had but little Wind, and fine clear Weather.

"I was never in such a violent Storm in all my life; so said all the Company".

From the foregoing account we note that without instruments or knowledge of Law of Storms, and with observation only to aid him, DAMPIER recognised by the precursory signs that a Typhoon might be expected. Knowing that his Ship would be safer away from the land, he put to sea, but evidently sailed right through the centre of the Storm, and only wonderful seamanship must have prevented his tiny craft from foundering.

DAMPIER in his "Voyages and Descriptions, Vol. ii., part iii.", describes the clouds which precede a Hurricane, but mentioned that he never actually experienced a Hurricane in the West Indies. He then goes on to tell us his conclusions with regard to Storms of different local names in the various Oceans:—

"Tho' I have never been in any Hurricane in the West Indies, yet I have seen the very Image of them in the East Indies, and the effects have been the very same; and for my part, I know no difference between a Hurricane among the Carribee Islands in the West Indies and a Tuffoon on the Coast of China in the East Indies, but only the Name: And I am apt to believe that both Words have one signification, which is a violent Storm".

Modern knowledge has only served to prove DAMPIER's early deductions, made with the concise accuracy to be expected from such a keenly observant Seaman, one of the many who have contributed so largely and freely to our understanding of Storms and Weather generally.

Thus we have briefly traced what has mainly been the Mariners' experiences and descriptions of Storms, from the earliest times, when costly sacrifices were made to the Gods of the Sea, on to the days of such well-established customs as, for instance, buying fair winds from a witch, burning candles to St. NICHOLAS, nailing a horse-shoe to the ship's timbers, and other devices too numerous to mention but well known in the lore of Seamen. The first period in the development of our knowledge of Storms may therefore be said to date from very ancient times until the close of the sixteenth century, A.D. Some useful information had been obtained, especially by Seamen for their own use and benefit, but methods were crude and observations made without instruments. Much of the information was influenced by superstition, while explanations were often fantastic and supernatural.

A new era in Storm investigation commenced in the early part of the seventeenth century with the invention and use of the barometer and thermometer, and this will be the subject of a future article in continuation of the present.

To conclude then with a pleasant charm of the closing period, in a passage from SHAKESPEARE's last work, "The Tempest", written in 1611:—

Prospero—"And promise you calm seas, auspicious gales,
And sail so expeditious, that shall catch
Your royal fleet far off".

SOUTHERN ICE REPORTS.
During the Year 1931—May.

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1931	22	59° 17' S.	120° 45' W.	1 berg	Estimated 200 feet high and 500 feet long	Aux. Bq. <i>Discovery</i> .
				Bergy bit	Estimated 40 feet high and 60 feet long	do.
	18	56° 16' S.	116° 06' W.	Small berg .. .. .	.. .. .	S.S. <i>Port Nicholson</i> .

Reports of Ice previous to May, 1931, will be found in The Marine Observer, Volume VIII, No. 89, p. 107.

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 28 and 29, Vol. IX, No. 97.

For full particulars of "Selected Ships" Routine Meteorological Reports with Schedule for Communication, see pages 13 to 16, Vol. IX, No. 97.

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 15, Vol. IX, No. 97 (January, 1932, 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 103 and 104. The procedure given on pages 13 to 16, Vol. IX, No. 97, 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 13 OF VOL. IX, NO. 97, 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 VI.)	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., Sayville N.Y. or West Palm Beach.	Lat. 41° 42' N. Long. 70° 00' W. Lat. 40° 45' N. Long. 73° 06' W. Lat. 26° 42' N. Long. 80° 02' W.	WCC. WSL. WMR.	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.	GTH.							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.

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

(Continued.)

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.				
Mediterranean and Red Sea.									
South Atlantic.									
Indian Ocean.	Bombay.	Lat. 19° 04' 55" N. Long. 72° 49' 54" E.	VWB	—	143 kc/s. (2100 metres).	Arabian Sea N. of line C. Comorin to Ras Fartak.	Weather.	Weather only. No. 6 Supplementary groups.	All British "A Selected Ships" are requested, when convenient, to report 0000 G.M.T. observations commencing at 0018 G.M.T. in addition to schedule times.
	Madras.	Lat. 12° 59' 17" N. Long. 80° 10' 56" E.	VWM	—	143 kc/s. (2100 metres).	Bay of Bengal N. of line C. Comorin to Achin Head.	Weather.	Weather only. No. 6 Supplementary groups.	All British "A Selected Ships" are requested, when convenient, to report 1200 G.M.T. observations commencing at 1218 G.M.T. in addition to schedule times.
	Colombo.	Lat. 6° 55' 14" N. Long. 79° 52' 46" E.	VPB	130 kc/s. (2300 metres).	143 kc/s. (2100 metres).	Indian Ocean South of a line Ras Fartak, C. Comorin and Achin Head, and within a range of about 1500 miles.	Obs.	Weather only. No. 6 Supplementary groups preferred.	No control — all British "A Selected Ships" within area should report in accordance with Schedule.
	Mombasa.	Lat. 4° 03' 11" S. Long. 39° 39' 51" E.	VPQ	—	125 kc/s. (2400 metres).	From Ras Hafun to Lat. 20° S. when westward of the Colombo area.	Weather Nairobi.	Weather only. No. 6 Supplementary groups.	No control — all British "A Selected Ships" within area should report 0600 G.M.T. observations.
	Perth.	Lat. 32° 01' 51" S. Long. 115° 49' 31" E.	VIP	—	125 kc/s. (2400 metres).	Indian Ocean and Southern Ocean between Long. 105° and 135° E.; but not within 100 miles of station.	Weather.	Weather only. No. 6 Supplementary groups.	No control — all British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart L, p. 15, Vol. IX. No. 97 (January).
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12' 39" N. Long. 114° 15' 11" E.	VPS.	—	125 kc/s. (2400 metres).	China Sea and North Pacific to about 1,500 miles from station.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	No control — all British "A Selected Ships" within area should report in accordance with Schedule.
South Pacific.	Sydney.	Lat. 33° 46' 00" S. Long. 151° 03' 09" E.	VIS	—	125 kc/s. (2400 metres).	S. Pacific, Coral and Tasman Seas and Southern Ocean between Long. 135° and 160° E.; but not within 100 miles of station.	Weather.	Weather only. No. 6 Supplementary groups.	No control — all British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart L, p. 15, Vol. IX. No. 97 (January).

WIRELESS STATIONS DETAILED TO INTERCEPT 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.			
South Atlantic.	Salinas	Lat. 0° 35' 00" S. Long. 47° 18' 45" W.	PPL.	Meteoro Rio.	Weather only, including supplementary groups.			
	S. Luiz	Lat. 2° 31' 48" S. Long. 44° 16' 51" W.	PXM.					
	Fortaleza	Lat. 3° 46' 21" S. Long. 38° 32' 26" W.	PPC.					
	Natal	Lat. 5° 46' 41" S. Long. 35° 18' 24" W.	PXN.					
	F. Noronha	Lat. 3° 50' 24" S. Long. 32° 24' 48" W.	PXF.					
	Olinda	Lat. 8° 00' 35" S. Long. 34° 51' 00" W.	PPO.					
	Amaralina	Lat. 13° 00' 12" S. Long. 38° 30' 45" W.	PPA.					
	Abrolhos	Lat. 17° 57' 30" S. Long. 38° 41' 05" W.	PXH.					
	Victoria	Lat. 20° 10' 00" S. Long. 40° 17' 46" W.	PPT.					
	Rio	Lat. 22° 53' 42" S. Long. 43° 13' 24" W.	PPR.					
	Santos	Lat. 23° 56' 27" S. Long. 46° 19' 28" W.	PPS.					
	Florianopolis.	Lat. 27° 36' 00" S. Long. 48° 30' 18" W.	PPF.					
	Juncçao	Lat. 32° 04' 00" S. Long. 52° 07' 00" W.	PPJ.					
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.					
	Mombasa.	Lat. 4° 03' 11" S. Long. 39° 39' 51" E.	VPQ				Weather Nairobi.	
	Dar-es-Salaam.	Lat. 6° 50' 38" S. Long. 39° 17' 24" E.	ZBZ					Weather Nairobi.
	Mauritius.	Lat. 20° 23' S. Long. 57° 35' E.	VRS.				Observatory Mauritius.		Weather 4 universal groups and first of No. 6 Supplementary Groups.
	Geraldton.	Lat. 28° 47' 15" S. Long. 114° 36' 24" E.	VIN				Weather.	Weather only, including No. 6 Supplementary Groups.
	Perth.	Lat. 32° 01' 51" S. Long. 115° 49' 31" E.	VIP					
	Esperance.	Lat. 33° 52' 40" S. Long. 121° 53' 34" E.	VIE					

WIRELESS STATIONS DETAILED TO INTERCEPT 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' 11" 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	
	Wellington.	Lat. 41° 16' 26" S. Long. 174° 45' 55" 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.			
	Thursday I.	Lat. 10° 35' 14" S. Long. 142° 12' 43" E.	VII	Weather	Weather only, including No. 6 Supplementary Groups.	
	Townsville	Lat. 19° 16' 09" S. Long. 146° 49' 47" E.	VIT			
	Brisbane	Lat. 27° 25' 34" S. Long. 153° 07' 19" E.	VIB			
	Sydney	Lat. 33° 46' 00" S. Long. 151° 03' 09" E.	VIS			
Melbourne	Lat. 37° 46' 56" S. Long. 144° 52' 09" E.	VIM				
Adelaide	Lat. 34° 51' 14" S. Long. 138° 31' 55" E.	VIA				

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° 44' N., Longitude 9° 11' W., call sign **CTV**, broadcasts a meteorological report *en clair*, in Portuguese and English, at 1130 and 2300 G.M.T. on a wavelength of 1,000 metres (Spark) and at 1155 and 2325 G.M.T. on a wavelength of 1,000 metres (R/T), giving:—

Observations of wind and swell, also a forecast for the next 24 hours of wind and swell for the coast of Portugal. The coast is divided as follows:—

- Zona Norte** ... From River Minho to Cape Mondego.
- Zona Centro** ... From Cape Mondego to Cape St. Vincent.
- Zona Sul** ... Cape of Algarve (southern coast).

The messages are based upon observations of 0700 and 1800 G.M.T. respectively.

AZORES.

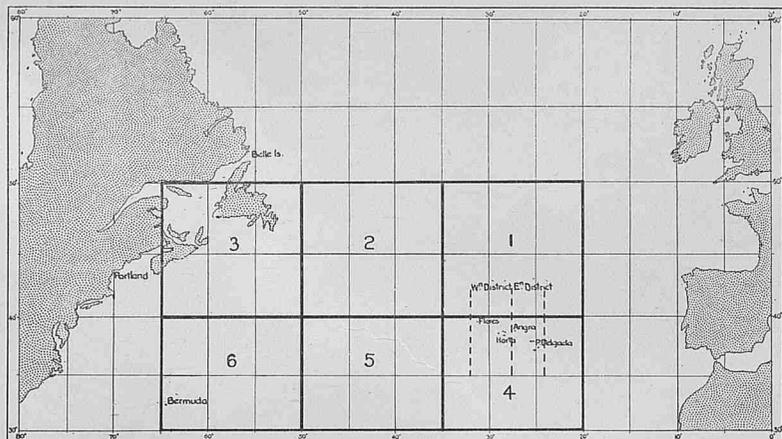
C.W. and Spark Issues.

Horta W/T Station, Latitude 38° 32' N., Longitude 28° 35' W. (approx.), call sign **CTH**—

Wavelength 600 m. spark. Time of transmission 2000 G.M.T.
Wavelength 2400 m. C.W. Time of transmission 2030 G.M.T.

This weather bulletin is sent *en clair* in Portuguese and repeated in English, the time of observation upon which the forecasts are based being stated in the message.

The zones referred to are indicated in the chart below.



WIRELESS STORM WARNINGS.

MOROCCO.

Spark Issues.

Casablanca — Chetaba W/T Station, approximate Latitude 33° 37' N., Longitude 7° 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) — — —.

ITALY.

Sardinia and Sicily.

I.C.W. Issues.

The following stations issue storm warnings which form Part II of the Weather Bulletins sent at the times shown below.

The warnings are sent *en clair* on a wavelength of 750 m. I.C.W., commencing with the words "Avvisi Tempesta."

Station.	Call Sign.	Times of transmission,		Position of Station.	
		G.M.T.		Lat.	Long.
Derna ...	ICO	0815, 1315, 1815	32° 23' N.	23° 10' E.	
Maddalena ...	ICH	0805, 1305, 1805	41° 13' N.	9° 25' E.	
Vittoria ...	ICV	0810, 1310, 1810	36° 57' N.	14° 31' E.	
Toranto ...	ICT	0820, 1320, 1820	40° 28' N.	17° 18' E.	
Ancona ...	ICA	0825, 1325, 1825	43° 32' N.	13° 32' E.	

III. WIRELESS TIME SIGNALS.

SPAIN.

C.W. and R/T Issues.

Cadiz W/T Station, Latitude 36° 27' 42" N., Longitude 6° 12' 20" 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.) and (R/T).

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° 43' 47" N., Longitude 9° 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	CQ Time Signal from Lisbon Observatory (in Portuguese) (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	CQ Time Signal from Lisbon Observatory (in Portuguese) (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	Signal.
		CQ Time Signal from Lisbon Observatory (in Portuguese).
9.59.00 to 9.59.49		— — — — — (MST) (repeated 15 times).
10.00.00	„ 10.04.58	A series of continuous dots at every second.
10.05.00		■ (Time signal).
10.06.00	„ 10.10.58	A series of continuous dots at every second.
10.11.00		■ (Time signal).
10.12.00	„ 10.16.58	A series of continuous dots at every second.
10.17.00		■ (Time signal).

The above time signal is not broadcast without previous warning.

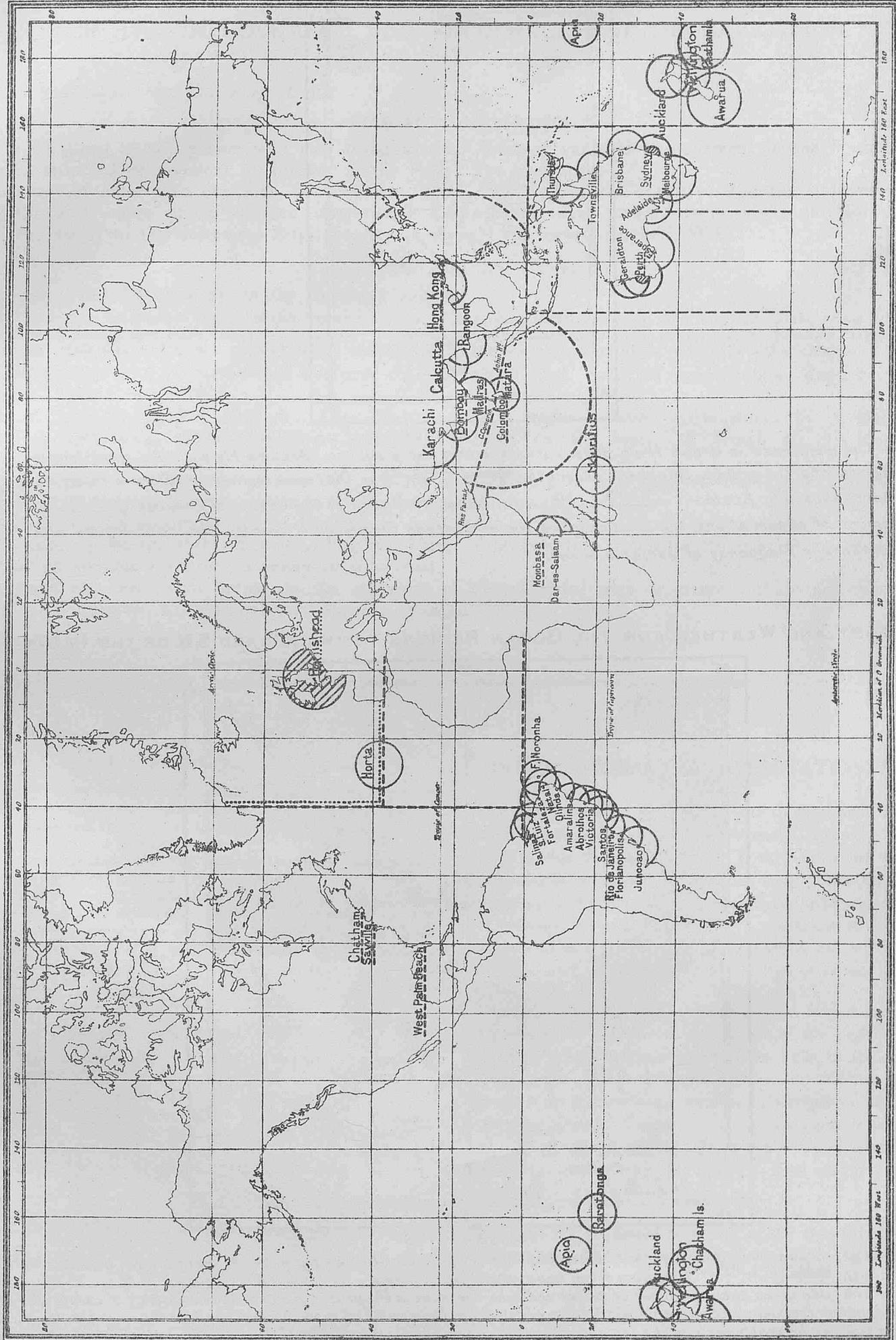
NOTE.—The time signals are controlled from **Lisbon Observatory** (Latitude 38° 42' 30·5'' N., Longitude 9° 11' 10·2'' W.). The duration of a dot = 1/7 sec. and that of a dash 3/7 sec.

Special Notices Regarding Personnel.

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

Chart VI.— SHIPS' WIRELESS WEATHER SIGNALS.

Stations for Reception of Routine Wireless Weather Reports from "Selected Ships."



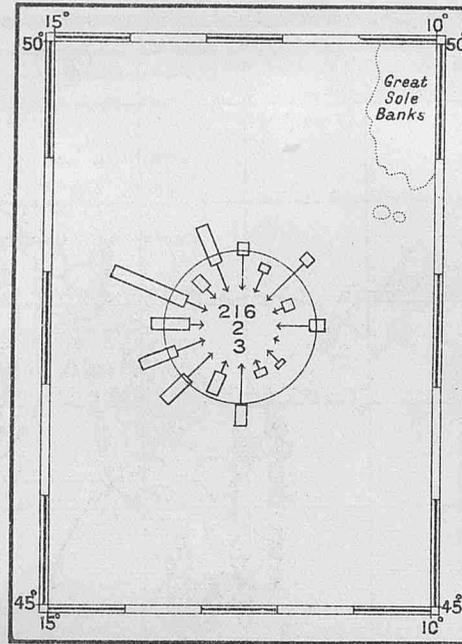
The dotted line indicates the area in which British "A" Selected Ships report under control to Port-ishead.

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 underlined with a pecked line.

The small shaded areas round stations detailed to receive reports from "A" Selected Ships indicate where these ships should not report on account of congestion.

The full circles indicate the areas round islands and coast stations which are detailed to intercept "B" Selected Ships reports made to C.Q. on 600 metres.

MAY
WIND FOR THE OCEAN REGION ADJACENT TO THE S.W. APPROACHES TO GREAT BRITAIN.



EXPLANATION.

The wind rose is drawn from observations within the 5° square. Arrows fly with the wind, length represents frequency, thickness strength.

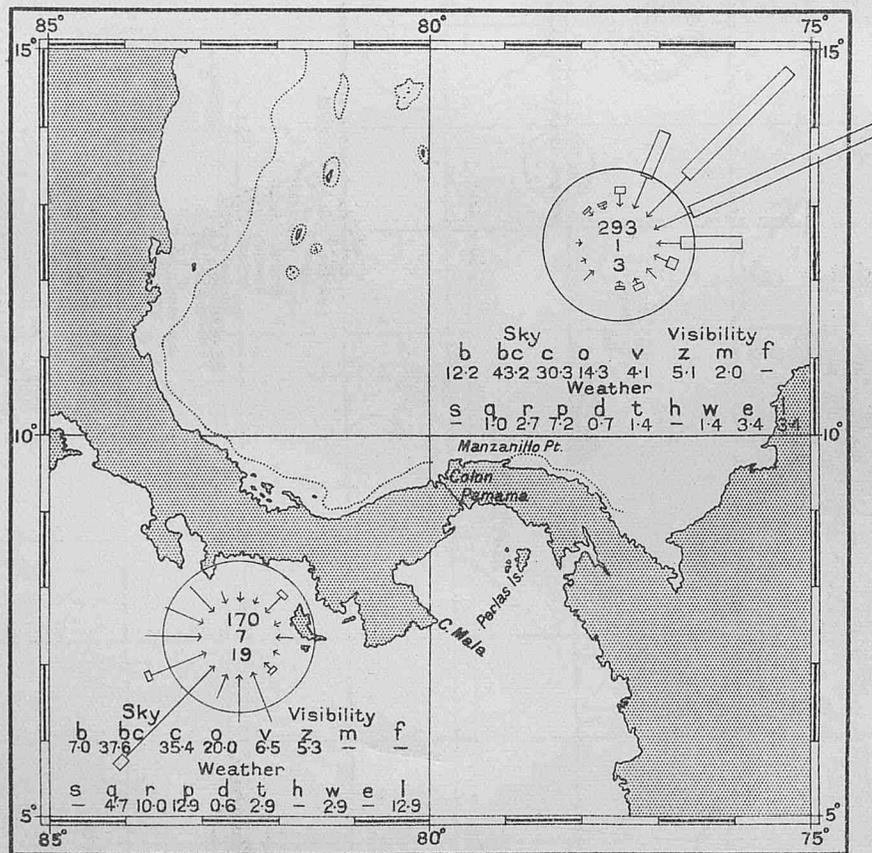
GALE	MODERATE	LIGHT
8-12	4-7	1-3

 Distance from head of arrow to circle represents 5%, Scale:-

10%	20%
-----	-----

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

WIND, FOG, MIST AND WEATHER FOR THE OCEAN REGIONS TO THE N.E. AND S.W. OF THE PANAMA CANAL.



EXPLANATION.

The wind roses are drawn from Sea observations within the 5° squares. Arrows fly with the wind, length represents frequency, thickness strength.

GALE	MODERATE	LIGHT
8-12	4-7	1-3

 Distance from head of arrow to circle represents 5%. Scale:-

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 5° to 10°N, Longitude 80° to 85°W, c was logged 25 times in every 100 observations while v was logged 15 times.

Compiled from observations of British Ships received since the adoption of the Hollerith system of extraction covering the years 1921-1930.

THOMAS GRAY MEMORIAL TRUST
PRIZES OFFERED IN 1932
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 1931 and 1932.

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, 1932, 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 rescue, by another vessel, of passengers and crew of a sinking vessel, (a) when they are still on the vessel and while she is still afloat, (b) when they have taken to the boats. Particular attention should be given to improvements which might be effected in life-saving appliances, and to the navigation and manœuvring of the rescuing vessel under varying weather conditions.”

Competitors must send in their essays not later than December 31st, 1932, to the Secretary, Royal Society of Arts, John Street, Adelphi, London, W.C.2.

The essays must be typed in English. 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.

Both competitions are open to persons of any nationality, but, in the case of the Essay Competition only, competitors must be past or present members of the seafaring profession.

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 or essays, but do not claim any rights in respect of any invention to which a prize may be awarded.

G. K. MENZIES,
Secretary.

ICE REPORTS.

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

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

“Selected Ships” on the Trade Routes of the Southern Ocean are requested to add to their routine Wireless Weather reports information of floating ice seen or reported within the last 24 hours so that this information may be disseminated to the utmost advantage of all concerned.

POSTAL ARRANGEMENTS.

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

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

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

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

INTERNATIONAL ICE OBSERVATION SERVICE

For the purpose of carrying on the International Ice Observation Service provided for by the International Convention for the Safety of Life at Sea, London, 1929, the U. S. Coast Guard vessel *General Greene* has been detailed. She sailed from Boston on March 4, 1932, proceeding to the vicinity of the Grand Banks to locate the ice fields and icebergs; to keep in touch with the situation; to make such observations as practicable on the quantities of ice, its kind, extent, and drift; and to obtain other information of value.

The object of the Ice Observation Service is primarily to ascertain the location and progressive movement of the limiting lines of the regions in which icebergs and field ice exist in the vicinity of the Grand Banks and the dissemination of the information so ascertained for the guidance and warning of navigators, and coordinately with these primary duties, in making oceanographical and meteorological observations as will form a contribution toward the knowledge of the causes why the limiting lines assume their observed locations.

Mariners are requested to report to the *General Greene* any field ice or icebergs sighted or reported sighted. Her call letters are NRLS.

When the ice has moved southward so as to make a constant patrol necessary the U. S. Coast Guard cutters *Tampa* and *Pontchartrain* will begin the International Ice Patrol Service. These two vessels will alternate on this duty.

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 80 and 81 of Vol. IX, No. 100, April, 1932 Number.

SYMBOLS USED ON THE CHART.

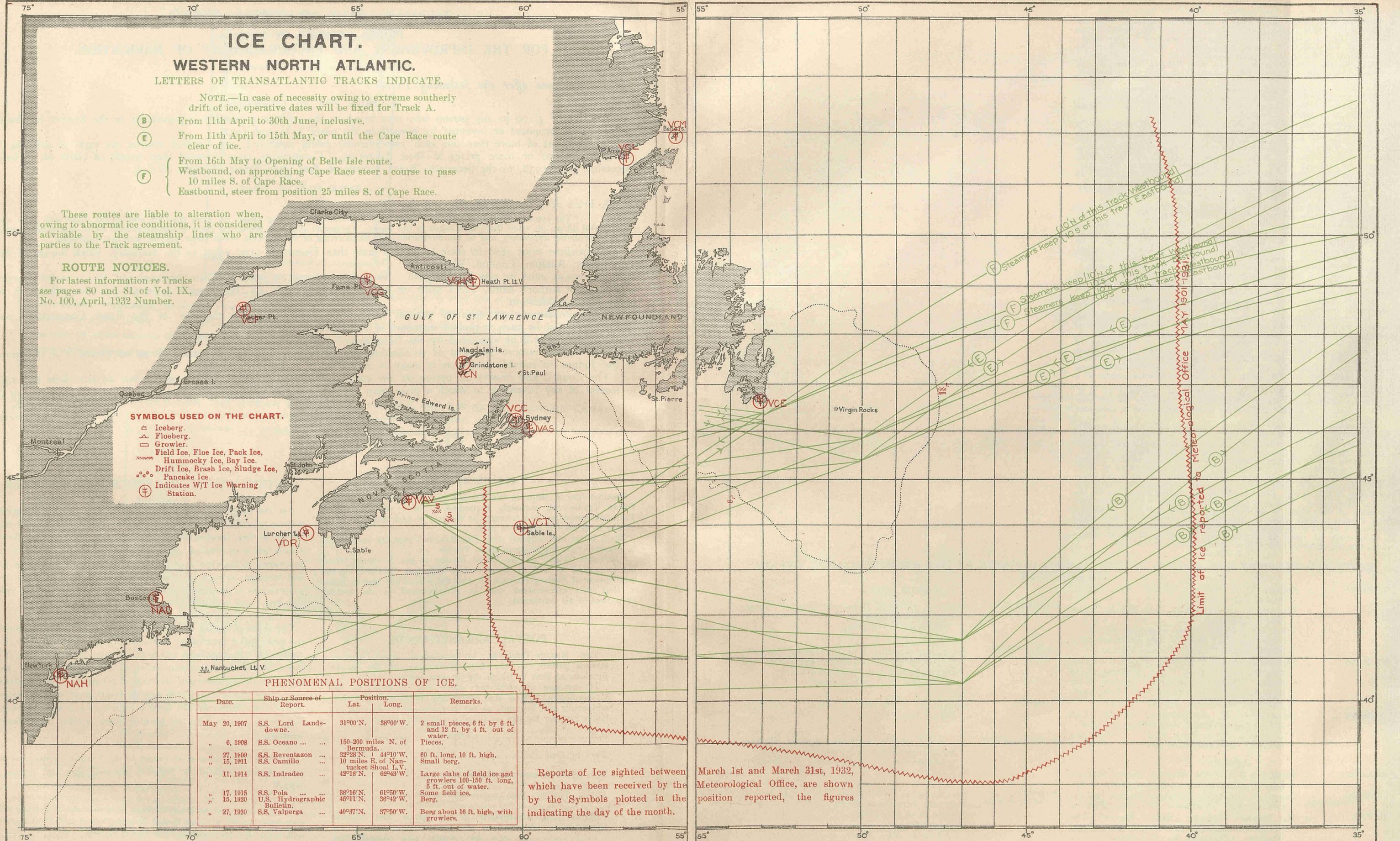
- ▣ Iceberg.
- △ Floeberg.
- Growler.
- Field Ice, Floe Ice, Pack Ice, Hummocky Ice, Bay Ice.
- Drift Ice, Brash Ice, Sludge Ice, Pancake Ice.
- ⊕ Indicates W/T Ice Warning Station.

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 ...	39°28'N. 144°10'W.	60 ft. long, 10 ft. high.
" 16, 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	46°11'N. 36°42'W.	Berg.
" 27, 1930	S.S. Valperga ...	40°37'N. 37°50'W.	Berg about 16 ft. high, with growlers.

Reports of Ice sighted between March 1st and March 31st, 1932, which have been received by the Meteorological Office, are shown by the Symbols plotted in the position reported, the figures indicating the day of the month.

March 1st and March 31st, 1932, Meteorological Office, are shown by the Symbols plotted in the position reported, the figures indicating the day of the month.



CO-OPERATION OF SHIPOWNERS, MASTERS AND MATES.

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. 6d., 2s. 8d. 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.	
ENGLISH CHANNEL.			
2.3.32	50°08'N.	1°30'W.	Wooden wreckage, partially submerged, covered with marine growth, 20 ft. long, 3 ft. wide. Dangerous to navigation.
MEDITERRANEAN.			
10.3.32	40°28'N.	3°39'E.	Piece of wood 20 metres long and 3 metres wide: dangerous to navigation.
NORTH ATLANTIC.			
1.3.32	28°40'N.	79°40'W.	Derelict motor boat No. 412055.
2.3.32	47°50'N.	6°18'W.	Wreck, dangerous to navigation.
4.3.32	38°40'N.	67°40'W.	Spherical red buoy marked <i>SCI</i> over <i>AE</i> .
4.3.32	28°12'N.	80°20'W.	Buoy.
5.3.32	27°25'N.	74°21'W.	Obstruction apparently a derelict, about 100 ft. long, bottom up and showing about 4 ft. out of water.
6.3.32	43°30'N.	68°09'W.	Large whistle buoy with black and white superstructure and marked <i>2C</i> .
7.3.32	40°22'N.	48°50'W.	Two logs about 25 ft. long, lashed together.
8.3.32	40°25'N.	71°45'W.	Barge adrift marked <i>Bouker Contracting Company, State Street, New York</i> .
9.3.32	40°31'N.	73°25'W.	Wreckage consisting of part of a barge, bottom up.
9.3.32	35°44'N.	75°07'W.	Grey painted waterlogged fishing boat: no name on side or stern.
9.3.32	48°31'N.	30°—'W.	Large red conical buoy.
9.3.32	35°45'N.	74°37'W.	Grey dory marked <i>DIC 2</i> , also a quantity of wreckage.
10.3.32	40°25'N.	70°45'W.	Derelict awash.
10.3.32	34°52'N.	75°27'W.	Derelict awash, probably a barge.
12.3.32	35°15'N.	71°38'W.	Wreckage.
12.3.32	35°21'N.	71°29'W.	Heavy wreckage.
13.3.32	40°08'N.	73°40'W.	Large partly submerged house lighter.
GULF OF MEXICO.			
3.3.32	29°30'N.	93°24'W.	Submerged tree trunk about 50 ft. long and 3 ft. in diameter.
3.3.32	28°30'N.	88°28'W.	Log about 60 ft. long and 3 ft. in diameter.
3.3.32	28°19'N.	90°27'W.	Tree trunk about 22 ft. long and 3 ft. in diameter.
4.3.32	26°36'N.	85°57'W.	Log about 35 ft. long and 3 ft. in diameter.
7.3.32	27°10'N.	84°37'W.	Very large tree trunk about 25 ft. long, partly submerged.
7.3.32	28°05'N.	94°35'W.	Tree trunk about 20 ft. long and 2 ft. in diameter with roots and branches projecting 5 ft. out of water.
8.3.32	28°54'N.	89°01'W.	Two tree trunks about 3 ft. in diameter.
12.3.32	24°29'N.	82°59'W.	Heavy broken spar floating upright and projecting about 10 ft. out of water, apparently attached to wreckage.
NORTH PACIFIC.			
8.3.32	22°10'N.	157°50'W.	Motor launch awash.

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

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 (Telephone No.: B6421).

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

LIST OF VOLUNTARY OBSERVING SHIPS

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; S.T. = Steam Trawler.

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.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 11.3.32.	Date Received.
122 †† <i>Acera</i> , M.V. ...	Shooter, J. C. ...	R. B. Ellis, E. Arber ...	W.T.-M.	Elder-Dempster ...	Forms 911 & 138 16.12.31 to 24.1.32	20.1.32
155 *† <i>Achilles</i> ...	Cosker, W. ...	C. Broad, J. Simpson ...	M.L.	A. Holt ...	Form 915 5.9.31 to 19.1.32	23.1.32
055 *† <i>Actor</i> ...	Whyte, D. L. ...	G. Penston, E. Pearce, P. Harrow.	No. M.	Harrison ...	Forms 911 & 138 27.11.31 to 31.1.32	19.2.32
123 †† <i>Adda</i> , M.V. ...	Lawson, J. H. ...	J. Boyd, F. C. Langton ...	W.T.-M.	Elder Dempster ...	" " 31.12.31 to 5.2.32	11.2.32
050 †† <i>Adriatic</i> ...	Freeman, C. P., R.D., Commr., R.N.R.	G. Szele, T. Holmes, A. Cherry.	W.T.	White Star ...	" " 1.2.32 to 20.2.32	23.2.32
090 *† <i>Aeneas</i> ...	Wallace, W. K. ...	W. Williams, R. A. Hanney, P. Dunsire.	"	A. Holt ...	" " 7.12.31 to 4.1.32	15.2.32
166 *† <i>Agamemnon</i> ...	Beswick, W., D.S.C., Commr., R.N.R.	W. K. Hole, W. G. Harrison, C. Thomas.	"	" ...	" " 1.1.32 to 15.1.32	8.2.32
127 *† <i>Albion Star</i> ...	Hall, J. B. ...	T. Gilchrist ...	No. M.	Blue Star ...	Form 911 8.7.31 to 29.10.31	25.11.31
080 †† <i>Alcantara</i> , M.V. ...	Clarke, E., R.D., Commr., R.N.R.	W. W. Dovell ...	W.T.	R.M.S.P. ...	Forms 911 & 138 20.11.31 to 5.1.32	18.1.32
178 *† <i>Alipore</i> ...	Lyndon, E. P., R.D., Lt.-Commr., R.N.R.	J. P. McArthur ...	No. M.	P. & O. ...	Form 911 5.1.32 to 1.2.32	7.3.32
175 †† <i>Almanzora</i> ...	Shillitoe, B., R.D. Commr., R.N.R.	E. W. Martin, F. J. Brett, T. G. Scott.	W.T.	R.M.S.P. ...	" 22.1.32 to 8.3.32	9.3.32
012 †† <i>Almeda Star</i> ...	Turner Russell, W ...	H. Metcalf, E. Russell, C. L. Williams.	No. M.	Blue Star ...	Forms 911 & 138 11.1.32 to 24.2.32	1.3.32
<i>Alondra</i> ...	Scott, L. S. ...	E. W. Thomas, P. Hamilton.	" A.	Yeoward ...	Form 911 7.2.32 to 27.2.32	2.3.32
<i>Alynbank</i> ...	Robertson, J. ...	A. Hunter ...	" A.	A. Weir & Co. ...	" 14.1.32 to 20.1.32	25.2.32
103 †† <i>Andaluca Star</i> ...	Vernon, R. ...	W. Cumming, P. Clarke, J. A. Coldwell.	" M.	Blue Star ...	Forms 911 & 138 29.12.31 to 9.2.32	24.2.32
079 *† <i>Antiochus</i> ...	Dougall, W. T. ...	C. F. Lock ...	W.T.	A. Holt ...	Form 911 10.12.31 to 5.2.32	7.3.32
209 †† <i>Aorangi</i> , M.V. ...	Spring-Brown, J. F. ...	E. Anderson, D. H. Richards, J. S. Madden.	M.L.	Canadian- Australasian	" 915 23.7.31 to 5.11.31	7.1.32
120 †† <i>Apapa</i> , M.V. ...	Beith, A. ...	V. H. Thomas ...	W.T.-M.	Elder Dempster ...	Forms 911 & 138 14.1.32 to 18.2.32	22.2.32
029 †† <i>Appam</i> ...	Draper, J. M. ...	W. M. M. Hutchings, O. Owens, L. Collings.	W.T.	" ...	" " 27.1.32 to 8.3.32	10.3.32
017 †† <i>Aquitania</i> ...	Irving, R. B., O.B.E., R.D., A.D.C., Capt., R.N.R.	G. F. Jeffries, S. Payne, G. V. Locke.	"	Cunard ...	" " 28.1.32 to 10.2.32	15.2.32
<i>Araby</i> ...	Lee, J., D.S.C. ...	H. Haigh ...	No. A.	MacIver ...	Form 911 28.9.31 to 10.12.31	14.12.31
115 †† <i>Arandora Star</i> ...	Moulton, E. W. ...	H. F. Partridge, F. Graham R. T. Holes.	" M.	Blue Star ...	Forms 911 & 138 24.1.32 to 8.3.32	11.3.32
<i>Architect</i> ...	Mowat, I. ...	G. Dewar ...	" M.	Harrison ...	" " 2.3.31 to 29.10.31	16.11.31
293 *† <i>Ariguani</i> ...	Scudamore, J. H. H., D.S.C., R.D., Commr., R.N.R.	B. E. Druce, A. F. Moss, J. S. Bell.	W.T.	Elders & Fyffes ...	Form 915 7.9.31 to 28.1.32	9.2.32
144 †† <i>Arlanza</i> ...	Huff, G. F. ...	S. A. Gammon, H. V. Todd, W. J. Wrake.	"	R.M.S.P. ...	Forms 911 & 138 19.12.31 to 1.2.32	3.2.32
091 †† <i>Armada Castle</i> ...	Harvey, H. B. ...	W. Pace, A. H. Parry C. L. Lloyd.	"	Union Castle ...	" " 18.1.32 to 6.3.32	8.3.32
296 *† <i>Arracan</i> ...	Thomson, S. ...	G. Davidson, H. H. Brown, J. P. Anderson.	M.L.	P. Henderson ...	Form 915 5.9.31 to 15.11.31	14.12.31
<i>Arundel</i> ...	Shaw, B. ...	E. Hill ...	C.C.	Southern Rly. ...	Telegraphic Report 11.3.32	11.3.32
095 †† <i>Arundel Castle</i> ...	Stuart, C. E., R.D., Capt., R.N.R.	G. L. Clarke, H. Baty	W.T.	Union Castle ...	Forms 911 & 138 22.11.31 to 10.1.32	22.1.32

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Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 11.3.32.	Date Received.
280 *† <i>Astronomer</i> ...	Richards, J. ...	W. P. Baker, R. Williams, E. B. Stephens.	No. M.	Harrison ...	Forms 911 & 138 5.7.31 to 7.10.31	13.10.31
065 †† <i>Asturias</i> M.V. ...	LeBrecht, H. A. ...	H. G. Whittle, S. J. Hill, T. W. Stevens.	W.T.	R.M.S.P. Co. ...	" " 9.1.32 to 22.2.32	24.2.32
281 *† <i>Auditor</i> ...	Owen, W. T. ...	L. Richardson ...	No. M.	Harrison ...	" " 2.8.30 to 29.9.31...	14.10.31
212 *† <i>Australia</i> ...	Scutt, W. ...	H. Falkiner, E. H. Lidstone, L. Smith.	" M.	British India ...	Form 915 5.9.31 to 19.1.32	3.2.32
124 †† <i>Avila Star</i> ...	Thomas, R. J. ...	W. J. Stratton, C. Barratt, R. C. Freaker.	" M.	Blue Star ...	Forms 911 & 138 7.12.31 to 20.1.32	25.1.32
068 †† <i>Balmoral Castle</i> ...	Barron, A. ...	J. C. Brown, A. G. C. Price, G. F. Oakley	W.T.	Union Castle ...	Forms 911 & 138 19.12.31 to 7.2.32	9.2.32
179 *† <i>Balranald</i> ...	Short, C. E. ...	J. A. Stewart...	No. M.	P. & O. Branch	" " 6.2.32 to 13.2.32	29.2.32
051 †† <i>Baltic</i> ...	Hume, R. ...	R. M. Porter, H. Boden, G. Law.	W.T.	White Star ...	" " 14.2.32 to 6.3.32	9.3.32
248 *† <i>Banffshire</i> ...	Page, W. J. ...	A. Banks ...	No. M.	Turnbull Martin ...	" " 16.12.31 to 19.1.32	22.2.32
180 *† <i>Baradine</i> ...	Elliot Smith, H. ...	G. L. Farfield ...	" M.	P. & O. Branch	Form 911 25.11.31 to 20.2.32	25.2.32
037 *† <i>Baronesa</i> ...	Compton, R. W. ...	H. N. Sherwell, F. W. Kent, J. G. Freeman.	" M.	Houlder ...	Forms 911 & 138 16.11.31 to 15.1.32	20.1.32
213 *† <i>Barpeta</i> ...	Partridge, H. ...	D. Clundison ...	" M.	British India ...	Form 911 7.1.32 to 6.2.32	7.3.32
181 *† <i>Barrabool</i> ...	Sheepwash, J. S. ...	F. N. Mosey, G. Hussey, J. Jones.	" M.	P. & O. Branch	Forms 911 & 138 12.9.31 to 18.12.31	29.12.31
070 †† <i>Bayano</i> ...	Legge, A. W. ...	G. Milne ...	W.T.	Elders & Fyffes	Form 911 1.12.31 to 4.1.32	11.1.32
<i>Beaverburn</i> ...	McCombie, G. F. ...	L. L. Thornton, W. J. P. Roberts, W. E. Halberd.	M.L.	Canadian Pacific	Form 915 1.11.31 to 7.3.32	10.3.32
059 †† <i>Belgenland</i> ...	Morehouse, W. A. ...	F. Good, J. Mackie, J. R. Loe.	W.T.	Red Star ...	Forms 911 & 138 3.11.31 to 21.11.31	24.11.31
183 †† <i>Bendigo</i> ...	Wyatt, F. N. ...	H. Morgan, R. S. Frost, G. C. Forrest.	No. M.	P. & O. Branch	" " 7.12.31 to 14.2.32	15.2.32
<i>Bengore Head</i> ...	Kane, G. ...	C. J. Rea ...	" A.	Ulster S.S. Co.	Form 911 10.2.32 to 16.2.32	19.2.32
237 †† <i>Berengaria</i> ...	Murchie, P. A., O.B.E.	J. A. Croasdaile, D. M. Maclean, E. A. Divers.	W.T.	Cunard ...	Forms 911 & 138 4.2.32 to 22.2.32	25.2.32
145 *† <i>Berwickshire</i> ...	Evens, E. H. ...	E. Coulthart, J. O. Woodall, R. Frankish.	"	Turnbull Martin ...	" " 22.10.31 to 22.1.32	28.1.32
057 †† <i>Britannic</i> M.V. ...	Summers, F. F., R.D., Commr., R.N.R.	G. N. Jones, H. P. Grindrod, A. J. Fisher.	W.T.	White Star ...	" " 14.12.31 to 20.12.31	4.1.32
269 *† <i>British Admiral</i> ...	Putt, R. O. ...	H. J. Were, W. Barnsfield ...	No. M.	British Tankers	" " 29.1.32 to 1.3.32	27.2.32
283 *† <i>British Dominion</i> ...	Taylor, R. J. ...	J. E. Jones, F. Hall, C. Leach.	" M.	"	" " 10.11.31 to 22.3.32	11.2.32
249 *† <i>Buteshire</i> ...	Westropp, T. G. ...	P. McMillan, S. W. Brown, F. C. Doyle.	W.T.	Turnbull Martin ...	Form 915 " 22.6.31 to 7.2.32	10.3.32
031 †† <i>Caledonia</i> ...	Collie, A. ...	R. Blake, J. Green, R. Macfee	W.T.	Anchor ...	Forms 911 & 138 13.12.31 to 22.12.31	4.1.32
139 †† <i>California</i> ...	Smart, R. W. ...	D. Morrison, A. C. Johnston, J. F. Adams.	"	"	" " 22.6.31 to 6.12.31	10.12.31
<i>Cambria</i> ...	Copland, C. P. ...	O. W. Ll. Jones ...	C.C.	L.M. & S. Rly...	Telegraphic Report 5.3.32	5.3.32
190 *† <i>Cambridge</i> ...	Williams, R. ...	T. Farrar ...	M.L.	Federal ...	Form 911 17.7.31 to 10.11.31	23.11.31
266 †† <i>Cameronia</i> ...	Gemmell, W. ...	"	W.T.	Anchor ...	"	"
295 †† <i>Camito</i> ...	Forrester, W. T., O.B.E.	C. P. Hopper, H. J. Perrett, W. Ireland.	"	Elders & Fyffes	Form 915 24.6.31 to 18.10.31	23.10.31
<i>Cape of Good Hope</i> ...	Jacobson, T. A. ...	W. R. Carling ...	No. A.	Lyle S.S. Co. ...	Form 911 16.12.31 to 7.2.32	27.2.32
282 †† <i>Carinthia</i> ...	Townley, J. C., R.D., Capt., R.N.R.	J. Chapman, A. B. Fasting, G. S. Hutchinson.	W.T.	Cunard ...	Forms 911 & 138 12.10.31 to 17.10.31	3.11.31
092 †† <i>Carnarvon Castle</i> M.V.	Morton Betts, W. ...	G. F. Pettitt, E. Clancy ...	"	Union Castle ...	" " 25.12.31 to 13.2.32	16.2.32
273 *† <i>Carnarvonshire</i> ...	Gulston, H. S. ...	S. W. Spencer ...	No. M.	Glen ...	" " 23.12.31 to 22.1.32	29.2.32
184 †† <i>Cathay</i> ...	Daziell Riven, J. ...	A. J. McHatlie ...	" M.	P. & O. ...	" " 28.11.31 to 28.1.32	1.2.32
<i>Cavina</i> ...	Forrester, W. T. ...	B. R. Coe ...	" A.	Elders & Fyffes	Form 911 26.1.32 to 29.2.32	4.3.32
157 *† <i>Centaur</i> M.V. ...	Ward Hughes, J. ...	B. L. Brind, D. R. Bannerman, F. Widdows.	M.L.	A. Holt & Co. ...	Form 915 28.1.31 to 16.11.31	28.12.31
056 †† <i>Ceramic</i> ...	Jackson, W. H. ...	E. E. Burt ...	W.T.	White Star ...	Form 911 25.1.32 to 9.2.32	1.3.32
<i>Cerinthus</i> M.V. ...	Ramsay, N. ...	E. Allen, C. L. Seaman, G. B. Williams.	M.L.	Hadley Shipping	Form 915 19.10.31 to 5.2.32	9.2.32
<i>Changuinota</i> ...	Bostock, R. J. ...	O. H. Pulman ...	No. A.	Elders & Fyffes	Form 911 12.10.31 to 23.10.31	27.10.31
191 *† <i>Chindwin</i> ...	Paterson, G. ...	J. A. Wilson ...	W.T.	Henderson ...	" " 29.8.31 to 11.11.31	1.12.31
<i>Chinese Prince</i> ...	Uncles, H. ...	"	M.L.	Furness Withy	"	"
<i>Chitripo</i> ...	Carden, H. ...	W. Hannah ...	No. A.	Elders & Fyffes	" " 26.1.32 to 27.2.32	5.3.32
192 †† <i>Chitral</i> ...	Siggers, O. ...	T. D. Forbes, S. N. Gerrans, W. S. Jolliffe	" M.	P. & O. ...	Forms 911 & 138 2.1.32 to 2.3.32	4.3.32
265 *† <i>City of Baroda</i> ...	Bremner, D. M. ...	H. G. Williams, E. Bonfield, R. W. Leese.	W.T.	Ellerman ...	Form 915 22.11.31 to 29.1.32	8.2.32
<i>City of Cambridge</i> ...	Ewing, W. ...	H. H. Asher ...	No. A.	"	Form 911 5.12.31 to 12.1.32	25.1.32
061 †† <i>City of Exeter</i> ...	Nichol, L. ...	H. Burns, J. Fyfe, W. V. Mighton.	W.T.	"	Forms 911 & 138 30.10.31 to 1.1.32	9.1.32
274 *† <i>City of Harvard</i> ...	MacMillan, J. ...	E. Brook-Williams ...	"	"	Form 911 19.2.32 to 2.3.32	10.3.32
089 *† <i>City of Hereford</i> ...	Ricketts, R. J. ...	F. Tibbetts, J. H. T. Vizer ...	No. M.	"	Forms 911 & 138 5.12.31 to 14.2.32	23.2.32
026 †† <i>City of London</i> ...	Brown, J. G. ...	A. J. Barnett, E. Gillies, C. MacPherson.	W.T.	"	" " 2.12.31 to 20.12.31	22.12.31
<i>City of Nagpur</i> ...	McNiel, N. ...	J. W. Wotherspoon, J. Campbell, W. Kerr.	"	"	" " 27.9.31 to 18.10.31	21.12.31
300 †† <i>City of Paris</i> ...	McMillan, J. ...	J. Cook, E. A. Davidson, W. Charlton.	"	"	" " 11.10.31 to 1.11.31	4.1.32
271 *† <i>City of Roubaix</i> ...	Radcliffe, A. V., R.D., Lt.-Commr., R.N.R.	L. C. Davies, J. L. Robertson, A. N. G. Jones	No. M.	"	Form 138 15.10.31 to 31.12.31	4.1.32
272 *† <i>City of Singapore</i> ...	Kendall, J. W. ...	F. Wrigley, C. C. Collard ...	" M.	"	Forms 911 & 138 12.8.31 to 22.11.31	19.12.31
035 *† <i>City of Sydney</i> ...	Mason, E. ...	C. H. S. Wills, C. S. Humphries, H. G. Griffith.	" M.	"	" " 10.12.31 to 4.2.32	8.2.32
027 *† <i>Clan Keith</i> ...	Waterhouse, J. ...	W. N. Tudman, A. H. Black, D. W. Gibbons.	W.T.	Clan ...	" " 21.1.32 to 15.2.32	18.2.32
<i>Clan Macalister</i> ...	Stenson, F. J., A.D.C., R.D., Capt., R.N.R.	J. L. Jones ...	" A.	"	Form 911 17.10.31 to 6.1.32	11.1.32
<i>Clan Macbeth</i> ...	Giles, H. J., R.D., R.N.R.	I. Cape Scott, L. W. Gibbons.	No. A.	"	" " 29.11.31 to 22.12.31	30.12.31
<i>Clan Macfarlane</i> ...	Redford, L. F., Lt.-Commr., R.N.R.	W. H. Simpson ...	" A.	"	" " 21.7.31 to 17.10.31	19.10.31
<i>Clan Macindoe</i> ...	Scott-Smith, H. E. G., O.B.E., R.D., Lt.-Commr., R.N.R.	J. C. Dunphy ...	" A.	"	" " 14.11.31 to 7.12.31	11.1.32

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 11.3.32.	Date Received.
33 *† <i>Clan Mackellar</i> ...	Lyall, A. B. ...	A. V. Howard, G. S. Bullock, E. E. Arthur.	W.T.	"	Forms 911 & 138 10.11.31 to 26.1.32	16.2.32
001 *† <i>Clan Macphee</i> ...	Gibb, A. W. P. ...	E. H. Stone, G. Drake S. M. W. Easterbrook.	"	"	Form 911 19.12.31 to 15.1.32 ...	2.2.32
004 *† <i>Clan MacNair</i> ...	Holman, W. G. ...	F. H. Petheridge A. Woodrow, J. F. Vooght.	"	"	Forms 911 & 138 22.11.31 to 15.2.32	17.2.32
002 *† <i>Clan Macwhirter</i> ...	O'Bryne, C. E. ...	M. J. Lewis, H. Whitehead, C. Rodger.	"	"	Form 915 11.6.31 to 30.10.31 ...	7.11.31
003 *† <i>Clan Malcolm</i> ...	George, L. S. ...	A. Lynch, H. Hind, R. W. Cook.	"	"	" 27.8.31 to 6.1.32 ...	14.1.32
<i>Clan Morrison</i> ...	Porterfield, W. M., Lt-Commr., R.N.R.	H. W. Peletier, W. Leck, A. G. Beynon.	No. A.	"	Form 911 5.2.32 to 15.2.32 ...	7.3.32
<i>Clan Sinclair</i> ...	Cater, H. ...	D. Mc Allister ...	" A	"	" 17.11.31 to 5.12.31 ...	21.12.31
<i>Colonial</i> ...	Harrendon, W. E. ...	W. Moore, A. P. Brown, A. Smart.	" M	Harrison	" 26.12.31 to 23.1.32 ...	15.2.32
298 *† <i>Comedian</i> ...	Cadogan, A. ...	F. M. Bales, W. G. Ellis ...	" M	"	" 22.10.31 to 17.12.31 ...	22.12.31
185 †† <i>Comorin</i> ...	Cartright, C.W., D.S.C.	R. E. Tucker, E. G. North, Y. Sinclair.	" M	P. & O.	" 16.12.31 to 18.2.32 ...	22.2.32
198 *† <i>Contractor</i> ...	Owen, W. J. ...	W.G. Neill, L. Siddon, R. Myles	" M	Harrison	Forms 911 & 138 16.12.31 to 15.2.32	22.2.32
049 ** <i>Coptic, M.V.</i> ...	Williams, G. ...	J. G. James, P. Saville, W. Burt.	W.T.	Shaw, Savill & Albion	" " 26.11.31 to 27.12.31	1.1.32
100 *† <i>Cornwall</i> ...	Reilly, H. E. ...	H. Hopkins, C. Saul, R. S. Miller.	M.L.	Federal	Form 915 16.8.31 to 12.12.31 ...	27.1.32
006 †† <i>Coronado</i> ...	Thorburn, R. A. ...	J. Bell, H. Holmes, T. G. Roberts.	W.T.	Elders & Fyffes ...	Forms 911 & 138 6.1.32 to 5.2.32 ...	8.2.32
214 *† <i>Counsellor</i> ...	Jackson, J. ...	G. C. Heaton, J. Davidson, J. L. Curle.	No. M.	Harrison	" " 26.9.31 to 12.11.31	27.11.31
301 *† <i>Culebra</i> ...	Goble, C. J. ...	H. D. Hooper, T. Davies, H. A. Wright.	M.L.	R.M.S.P. Co.	Form 915 11.5.31 to 29.9.31 ...	14.10.31
036 *† <i>Cumberland</i> ...	Maltby, T. L. ...	S. R. Leggett, J. Brooke Smith, F. R. F. Wilson.	"	Federal	" 18.10.31 to 20.2.32 ...	1.3.32
285 *† <i>Custodian</i> ...	O'Connor, T. ...	W. H. Corlett, J. L. Williams, J. Glen.	No. M.	Harrison	Forms 911 & 138 30.7.31 to 1.11.31	9.11.31
302 †† <i>Darro</i> ...	Green, J. ...	A. J. Barff ...	W.T.-M.	R.M.S.P. Co.	Forms 911 & 138 29.10.31 to 13.12.31	22.12.31
<i>Davisian</i> ...	Thomas, R. ...	J. Stevenson ...	No. A.	Leyland	Form 911 24.1.32 to 6.2.32 ...	23.2.32
<i>Dents</i> ...	Griffiths, W. ...	A. W. Hanchett, J. H. Stoker, S. Pollock.	M.L.	Booth	Form 915 14.11.31 to 21.1.32 ...	26.1.32
304 †† <i>Deseado</i> ...	Buret, J. F. C. ...	T. Jeyes ...	W.T.-M.	R.M.S.P. Co.	Forms 911 & 138 8.11.31 to 31.12.31	4.1.32
117 †† <i>Desna</i> ...	Schlanbusch, O. V. ...	H. Lang, W. Lowe, L. T. Peterson.	"	"	" " 7.12.31 to 28.1.32	2.2.32
252 *† <i>Devon</i> ...	Clarke, P. B. ...	G. Chaplin, J. D. Marks, M. Willanott.	No. M.	Federal	" " 17.12.31 to 24.1.32	2.2.32
<i>Dieppe</i> ...	Lidbetter, W. ...	E. A. Biles ...	C.C.	Southern Railway ...	Telegraphic Report 10.3.32 ...	10.3.32
284 *† <i>Director</i> ...	Worthington, B. ...	M. G. O'Brien, A. E. Rogers, H. W. Jones.	No. M.	Harrison	Forms 911 & 138 15.9.31 to 30.11.31	15.12.31
138 *† <i>Discovery II., R.R.S</i>	Carey, W. M., Lt-Commr., R.N.	R. A. B. Ardley, A. L. Nelson, L. C. Hill.	M.L.	Falkland Is. Govt. ...	Form 915 6.10.31 to 22.12.31 ...	23.2.32
<i>Dorelian</i> ...	Hugan, C. ...	A. F. Wood ...	No. A.	Leyland	Form 911 12.2.32 to 26.2.32 ...	11.3.32
136 *† <i>Doric Star</i> ...	Mills, D. H. ...	L. Vernon, H. Butt, J. McLean	No. M.	Blue Star	" 2.11.31 to 25.1.32 ...	11.2.32
275 *† <i>Dramatist</i> ...	Meek, A. J. ...	G. H. Howard, I. W. Page ...	" M	Harrison	Forms 911 & 138 18.1.32 to 2.2.32 ...	18.2.32
142 †† <i>Duchess of Atholl</i> ...	McQueen, D.S. ...	G. Mowatt, C. D. Watt, E. Glennie.	W.T.-M.	Canadian Pacific ...	" " 11.2.32 to 15.2.32 ...	17.2.32
152 †† <i>Duchess of Bedford</i>	Sibbons, H. ...	J. Roche, A. Antrobus, F. Stell.	"	"	" " 20.11.31 to 18.12.31	24.12.31
151 †† <i>Duchess of Richmond</i>	Freer, A., R.D., Capt., R.N.R.	J. B. Saunders, G. S. Hewson, E. N. Lloyd.	"	"	" " 24.1.32 to 1.3.32 ...	10.3.32
143 †† <i>Duchess of York</i> ...	Stuart, R. N., V.C., D.S.O., Commr., R.N.R.	D. Parsons, S. W. Keary ...	"	"	" " 23.1.32 to 12.2.32...	4.3.32
098 †† <i>Dunbar Castle, M.V</i>	Vincent, E. S., R.D., Commr., R.N.R.	J. Daziel, P. G. MacIver, H. A. Causton.	W.T.	Union Castle	" " 26.1.32 to 12.2.32...	16.2.32
<i>Dunrobin</i> ...	Ramsay, J. D. ...	W. R. Holt, J. Y. Butt ...	No. A.	Glen & Co.	Form 911 12.11.31 to 2.1.32 ...	14.1.32
052 *† <i>Dunster Grange</i> ...	Wilson, G. F. ...	J. Allerton, E. G. Raynor, D. Murray.	" M.	Houlder	Forms 911 & 138 11.10.31 to 15.12.31	18.12.31
102 *† <i>Duquesa</i> ...	Frost, C. R. ...	R. Rushton, C. W. Denman, F. D. Jones.	" M.	Furness Withy	" " 30.11.31 to 28.1.32	2.2.32
15 *† <i>Durenda, M.V.</i> ...	Blencowe, J. ...	T. R. Jackson, G. H. Davies...	" M.	British India	" " 30.11.31 to 12.2.32	19.2.32
077 †† <i>Edinburgh Castle</i> ...	Gilbert, E. F. ...	L. H. Farrow ...	W.T.	Union Castle	Form 911 3.1.32 to 21.2.32 ...	23.2.32
107 *† <i>El Argentino, M.V.</i>	Ellis, F., D.S.C. ...	W. Findlay, J. Burch, C. G. Adlard.	No. M.	Houlder	Forms 911 & 138 8.12.31 to 9.2.32	18.2.32
009 *† <i>Elmworth, M.V.</i> ...	Dick, J. ...	J. Macfarlane, F. Vose, F. Scott.	" M.	R. S. Dalgleish	Form 911 22.1.32 to 1.2.32 ...	27.2.32
158 *† <i>Elpenor</i> ...	Wilson, R. J. ...	J. Macfarlane, F. Vose, F. Scott.	W.T.	A. Holt	Form 915 23.8.31 to 3.1.32 ...	11.1.32
108 *† <i>Elstree Grange</i> ...	Williams, W. E. ...	P. A. Hawkesworth, E. W. Ekins.	No. M.	Houlder	Forms 911 & 138 9.9.31 to 2.12.31	9.1.32
109 *† <i>El Paraguayo</i> ...	Owen, R. ...	G. Fletcher, R. L. Aldridge...	" M.	"	" " 13.12.31 to 5.2.32	12.2.32
110 *† <i>El Uruguayo</i> ...	McNamara, T. ...	F. E. Hailstone ...	" M.	"	" " 2.11.31 to 5.1.32 ...	13.1.32
088 *† <i>Empire Star</i> ...	Owen, G., R.D., Lt-Commr., R.N.R.	R. Thorne, R. McKraith, P. H. Hunt.	M.L.	Blue Star	Form 915 31.8.31 to 3.1.32 ...	30.1.32
006 †† <i>Empress of Australia</i>	Griffiths, E. ...	A. Tippet, A. H. Pigott, R. Newsom.	W.T.	Canadian Pacific	Forms 911 & 138 23.12.31 to 10.1.32	8.2.32
34 †† <i>Empress of Britain</i>	Latta, R. G. ...	J. R. Bubb ...	"	"	Form 911 2.1.32 to 17.1.32 ...	20.2.32
154 †† <i>Empress of Canada</i>	Hailey, A. J., Lt-Commr., R.N.R.	G. O. Baugh, E. H. Foley, H. Kennedy, G. W. R. Graves.	M.L.	"	Form 915 19.7.31 to 16.12.31 ...	18.1.32
153 †† <i>Empress of Japan</i>	Douglas, L. D., Lieut-Commr., R.N.R.	R. Goss, R. Walfenden, E. Newell.	"	"	" 5.2.31 to 24.7.31 ...	18.2.32
011 †† <i>Euripides</i> ...	Robinson, S., C.B.E., R.D., Commr., R.N.R.	R. H. Shaw, D. Don, J. H. Campbell.	W.T.-M.	White Star	Forms 911 & 138 23.12.31 to 28.1.32	1.2.32
<i>Explorer</i> ...	Vaughan, P. R., D.S.C., R.D., Commr., R.N.R.	A. Stout ...	No. A.	Scottish Fishery Brd.	Form 911 2.11.31 to 24.11.31 ...	2.12.31

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 11.3.32.	Date Received.
067 *† <i>Ferndale</i>	Beighton, J. N.	L. J. Hopkins, H. C. Howie, D. W. Campbell.	No. M.	Aberdeen Common-wealth.	Forms 911 & 138 3.9.31 to 8.10.31	26.11.31
074 *† <i>Fordsdale</i>	Avern, J., Commr. R.N.R.	E. Hickling, F. Davies, M. Harrier.	" M.	Shaw, Savill and Albion.	" " 26.9.31 to 27.12.31	21.1.32
030 †† <i>Franconia</i>	Gibbons, G., R.D., Capt., R.N.R.	J. Ashcroft, C. Taylor, R. Pollitt.	W.T.	Cunard	Form 911 28.12.31 to 1.1.32 ...	15.1.32
159 *† <i>Fresno City</i>	Davies, D.	F. W. P. Davies	M.L.	Sir W. Reardon Smith and Sons Ltd.	" " " " " " " "	"
125 *† <i>Glenamoy</i> , M.V. ...	Ings, W. J.	F. Laycock, L. Eccles, A. C. Radley.	W.T.	Glen Line	Form 915 22.6.31 to 27.10.31 ...	2.11.31
126 *† <i>Glengarry</i> , M.V. ...	Angier, J.	G. Morgan, I. G. Neill, S. W. Bell.	No. M.	"	Forms 911 & 138 19.6.31 to 4.10.31	9.10.31
085 *† <i>Governor</i>	Windsor, G. R.	A. Watson, J. Stanhope ...	" M	Harrison	" " 3.11.31 to 31.1.32	4.2.32
111 *† <i>Hardwicke Grange</i>	Fowler, W. H.	W. L. Baker, A. W. Seybold, W. E. Ellis.	" M.	Houlder	Forms 911 & 138 2.8.31 to 7.10.31	13.10.31
<i>Harmonides</i>	Elwell, F. R.	L. Pogson	" A.	R. P. Houston	Form 911 24.11.31 to 24.12.31 ...	29.12.31
262 ** <i>Hawaki</i> , M.V. {	Norton, A. T.	D. W. Blacklaws, D. McLeish, H. A. Brockett.	M.L.	Union S.S. Co., N.Z. ...	Form 915 8.12.30 to 16.7.31 ...	28.9.31
206 *† <i>Herminius</i>	Thurston, H. P.	F. W. Gilroy	"	Shaw, Savill & Albion	Form 911 9.7.31 to 1.11.31 ...	9.11.31
253 *† <i>Hertford</i>	Burton Davies, J.	P. Shakespeare, W. H. Timberlake, P. Block.	"	Federal	Form 915 18.11.31 to 28.2.32 ...	5.3.32
<i>Hibernia</i>	Williams, E. R.	C. A. Marsh	C.C.	L.M. & S. Railway ...	Telegraphic Report 11.3.32 ...	11.3.32
182 †† <i>Highland Brigade</i>	Lloyd, H.	W. Stephen, N. Hersee, C. Morgan.	No. M.	Nelson	Forms 911 & 138 25.12.31 to 16.2.32	23.2.32
116 †† <i>Highland Chieftain</i> , M.V.	Robinson, R. H.	W. J. Presland, L. Irving, J. E. Pink.	W.T.—M.	"	" " 29.11.31 to 19.1.32	25.1.32
099 †† <i>Highland Monarch</i> , M.V.	Ashby Graves, F.	R. Polden	No. M.	"	" " 16.11.31 to 4.1.32	11.1.32
250 †† <i>Highland Princess</i> , M.V.	Collings, D.	C. E. Leech, J. H. Fitton, T. W. Seabrook.	" M.	"	" " 27.12.31 to 1.2.32	15.2.32
<i>Hilary</i>	Jones, W. C. H., R.D., Commr., R.N.R.	W. H. Cross, G. Wayman, R. Rashley.	M.L.	Booth	Form 915 16.10.31 to 1.2.32 ...	6.2.32
075 *† <i>Hobson's Bay</i>	Roberts, T. V., R.D., Lt.-Commr., R.N.R.	F. L. Gross, C. G. Smith, C. Carroll.	No. M.	Aberdeen Common-wealth.	" 9.7.31 to 11.10.31 ...	19.16.31
<i>Hubert</i>	Briscoe, W.	R. Parry, G. G. Westhorp, L. A. Sterling.	M.L.	Booth	" 17.5.31 to 25.7.31 ...	28.7.31
261 *† <i>Huntingdon</i>	Field, H. G. B.	P. S. Calcutt, H. F. Wilkinson, M. T. D. Walter.	W.T.	Federal	Forms 911 & 138 26.4.31 to 15.8.31	27.8.31
200 *† <i>Huntsman</i>	Russell, H.	J. Richardson, D. H. Goddard	No. M.	Harrison	Form 911 15.8.31 to 2.11.31 ...	13.11.31
289 *† <i>Inanda</i>	Gibbins, W. H.	D. C. Brown, R. L. Williams, T. W. Kent.	" M.	Harrison	Forms 911 & 138 6.12.31 to 14.1.32	25.1.32
<i>Ingoma</i>	Richardson, R.	D. D. Kerr	" M.	"	Form 911 4.1.32 to 10.2.32 ...	24.2.32
160 *† <i>Ixon</i>	Stewart, J. A.	C. S. Pope, G. Collier, F. G. Brown.	M.L.	A. Holt	Form 915 11.4.30 to 9.9.31 ...	16.11.31
072 ** <i>Jamaica Planter</i> ...	P. D. Allen	G. R. Wortley	W.T.	Jamaica Direct Fruit	Forms 911 & 138 5.1.32 to 5.2.32 ...	16.2.32
203 ** <i>Japanese Prince</i> ...	Hardcastle, E.	" " " " " " " "	M.L.	Prince	" " " " " " " "	"
<i>Javanese Prince</i> , M.V.	Smith, J.	C. E. Edney	No. A.	" " " " " " " "	Form 911 24.10.31 to 7.11.31 ...	20.11.31
187 *† <i>Jeypore</i>	Harris, W. L.	A. G. Edwards	" M.	P. & O.	Forms 911 & 138 23.12.31 to 25.1.32	22.2.32
188 †† <i>Kaisar-i-Hind</i>	Headlam, P. C., R.D., Commr. R.N.R.	J. D. Strike, H. M. Flint, L. Irons.	" M.	P. & O.	Forms 911 & 138 3.1.32 to 24.2.32	27.2.32
041 *† <i>Karamea</i> , M.V.	Kenworthy, V.	N. S. Milne, C. Sendall, P. Campbell.	M.L.	Shaw, Savill & Albion	Form 915 17.7.31 to 1.11.31 ...	4.11.31
217 *† <i>Karapara</i>	White, R. W.	J. B. Walker, A. W. Clarke, L. J. Jones.	No. M.	British India	Forms 911 & 138 21.11.31 to 11.1.32	8.2.32
114 *† <i>Kenya</i>	Miller, A. C.	H. Evans, P. Lusher, G. Spedding.	" M.	" "	" " 31.12.31 to 11.2.32	7.3.32
218 *† <i>Khandalla</i>	Eadie, J. D.	D. W. Dix, A. J. Woodcock	" M.	" "	" " 17.12.31 to 29.1.32	29.2.32
186 *† <i>Kidderpore</i>	Wright, C. S., R.D., Commr., R.N.R.	J. Collard	" M.	P. & O.	" " 13.10.31 to 19.12.31	18.1.32
169 ** <i>Kwangchow</i>	Stringer, C. B. L.	B. C. Finch, F. H. Smith ...	M.L.	China Nav. Co.	Form 915 10.5.31 to 17.10.31 ...	13.1.32
147 †† <i>Laconia</i>	Hawkes, W. R. D., Capt. R.N.R.	J. D. Archer	W.T.	Cunard	Forms 911 & 138 30.11.31 to 19.12.31	29.12.31
<i>Laguna</i> , M.V.	Dunn, R. E., O. B. E.	W. Billington	No. A.	Pacific S.N. Co.	Form 911 16.5.31 to 2.6.31 ...	5.6.31
193 *† <i>Lahore</i>	Hollow, J. H.	J. G. K. Gregory, F. Hull, S. R. Eva.	" M.	P. & O.	Forms 911 & 138 8.11.31 to 5.2.32	11.2.32
167 †† <i>Lancastria</i>	Bond, H. A. L. R.D., Commr., R.N.R.	" " " " " " " "	W.T.	Cunard	" " " " " " " "	"
082 *† <i>La Paz</i> , M.V.	Morgan, D. R.	G. Pattison	No. M.	Pacific S.N. Co.	Form 911 14.11.31 to 24.11.31 ...	11.2.32
134 †† <i>Lapland</i>	Harvey, H.	L. Williams, H. Patterson, R. M. Farmer.	W.T.	Red Star	Forms 911 & 138 19.10.31 to 24.10.31	10.11.31

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Meteorological Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 11.3.32.	Date Received.
076 † <i>Largs Bay</i> ...	Jermyn, W. M. ...	F. B. Marsden ...	No. M.	Aberdeen Commonwealth.	Forms 911 & 138 15.10.31 to 25.11.31	15.2.32
112 † <i>La Rosarina Lassell</i> ...	Webb, C. ...	W. S. Hamblin, S. W. Hawell ...	" M.	Houlder ...	" " 11.1.32 to 13.3.32	7.3.32
064 † <i>Laurentic</i> ...	Lindsay, J. M. ...	" " " " ...	" A.	Lampport & Holt ...	Form 911 " 24.8.31 to 13.11.31	16.12.31
083 † <i>Lautaro, M.V.</i> ...	Binks, J. W. ...	F. M. Murphy, A. Thompson ...	W.T.	White Star ...	Forms 911 & 138 23.2.32 to 24.2.32	1.3.32
254 † <i>Limerick</i> ...	Kite, E. ...	J. Lloyd Jones, J. Williams, C. Stowe ...	No. M.	Pacific S.N. Co. ...	" " 8.1.32 to 10.2.32	27.2.32
093 † <i>Llandaff Castle</i> ...	Molyneux, P. L. ...	J. Trotter, N. A. Thomas ...	" M.	Federal ...	" " 1.9.31 to 15.10.31	21.10.31
097 † <i>Llangibby Castle, M.V.</i> ...	Linklater, H. ...	J. M. Goode ...	W.T.	Union Castle ...	" " 4.12.31 to 7.2.32	11.2.32
094 † <i>Llandoverly Castle</i> ...	Nicholl, D. ...	G. W. Lloyd ...	"	" " ...	" " 1.1.32 to 4.3.32	10.3.32
216 † <i>Llanstephan Castle</i> ...	Morgan, A. O., R.D., Commr., R.N.R.	R. C. J. Hatt ...	"	" " ...	" " 21.11.31 to 2.1.32	20.1.32
084 † <i>Lobos, M.V.</i> ...	Bickford, C. N. ...	J. B. Duncan, G. H. Pickering, S. Smith ...	"	" " ...	Forms 911 & 138 28.6.31 to 28.8.31	3.9.31
137 † <i>Logician</i> ...	Good, W. T. ...	R. H. Sissons, J. Kerr, E. Potter ...	No. M.	Pacific S.N. Co. ...	" " 3.10.31 to 4.1.32	9.1.32
008 † <i>Losada</i> ...	Herschel, R. J. ...	E. L. Stockley, J. Wallis, W. R. Mackenzie ...	" M.	Harrison ...	" " 1.11.31 to 8.2.32	15.2.32
013 † <i>Macharda</i> ...	Ridyard, A. ...	L. W. Hutchinson ...	" M.	Pacific S.N. Co. ...	" " 25.11.31 to 20.12.31	1.2.32
232 † <i>Madura</i> ...	Hanna, R. G. ...	C. Lindsay Miller, C. Parry, G. A. Jackson ...	No. M.	Brocklebank ...	Forms 911 & 138 17.1.32 to 15.2.32	7.3.32
078 † <i>Magician</i> ...	Wright, J. A. ...	A. Usher, W. Bain ...	" M.	British India ...	" " 4.12.31 to 11.2.32	17.2.32
141 † <i>Mahia</i> ...	Bury, E. R. ...	W. E. Shotton, J. Johnson ...	" M.	Harrison ...	" " 30.10.31 to 5.1.32	21.1.32
140 † <i>Mahratta</i> ...	Andrews, C. M. ...	G. Sangwin, M. P. Congdon, J. Jackson ...	W.T.	Shaw, Savill & Albion ...	" " 22.7.31 to 19.11.31	23.11.31
014 † <i>Mahronda</i> ...	Columbine, T. T. ...	T. C. Eddy, H. F. Scoins, J. Wilson ...	No. M.	Brocklebank ...	" " 6.1.32 to 7.2.32	28.2.32
015 † <i>Mahsud</i> ...	Sharpe, G. ...	W. Le Brocq, M. Melville, H. Wellington ...	" M.	" " ...	" " 20.11.31 to 21.1.32	26.1.32
016 † <i>Maidan</i> ...	Kershaw, R. W. ...	S. Richardson, J. R. Paisley ...	" M.	" " ...	" " 2.10.31 to 22.1.32	1.2.32
042 † <i>Maimoa</i> ...	Ison, W. A. ...	F. Moore, F. L. Attwood, L. E. Jeans ...	" M.	" " ...	" " 26.2.31 to 8.5.31	12.5.31
054 † <i>Majestic</i> ...	Johnson, J. W. ...	A. Winton, D. O. V. Pickersgill, W. A. Rogers ...	M.L.	Shaw, Savill & Albion ...	Form 915 19.6.31 to 29.10.31	3.11.31
018 † <i>Makalla</i> ...	Trant, E. L., R.D., Commr., R.N.R.	R. B. O'Brien, H. N. McGill, W. H. Stewart ...	W.T.	White Star ...	Forms 911 & 138 12.2.32 to 25.2.32	27.2.32
225 † <i>Makura</i> ...	Maughan, J. W. ...	A. C. Hocking, J. Richardson ...	No. M.	Brocklebank ...	" " 9.12.31 to 20.2.32	25.2.32
019 † <i>Malakuta</i> ...	MacDonald, D. ...	A. P. Cousin, S. H. Crawford, H. McRae ...	M.L.	Canadian-Australasian ...	Form 915 16.4.31 to 1.8.31	1.10.31
020 † <i>Malancha</i> ...	Adamson, F. L. ...	H. Simpson ...	No. M.	Brocklebank ...	Forms 911 & 138 11.5.31 to 2.12.31	29.1.32
209 † <i>Malaya Prince</i> ...	Cochran, G. N. ...	L. F. Dodson ...	" M.	" " ...	" " 25.11.31 to 22.12.31	29.12.31
195 † <i>Maloja</i> ...	Holloway, J. ...	D. Macfarlane, F. M. Ben-castle, K. K. Boyd ...	M.L.	Prince ...	" " " " " " " "	" " " " " " " "
053 † <i>Manaar</i> ...	Denne, G. H. A. ...	R. E. Baldwin - Wiseman, C. H. Hand, G. R. Peters, P. G. Lawrence ...	" M.	British India ...	Forms 911 & 138 18.10.31 to 12.1.32	15.1.32
Manchester Brigade	Browning, J. B., R.D., Commr., R.N.R.	A. W. Blair, D. Pemberton, A. G. W. Thomas ...	" M.	P. & O. ...	" " 17.10.31 to 21.1.32	25.1.32
Manchester Commerce	Stott, C. H. ...	E. E. Bonnaud, J. Eccles, G. L. Southern ...	M.L.	Manchester Liners ...	Form 915 8.8.31 to 15.2.32	19.2.32
Manchester Hero	Linton, P. ...	" " " " " " " "	"	" " " " " " " "	" " " " " " " "	" " " " " " " "
028 † <i>Mandala</i> ...	Mitchell, G. M. ...	R. O. Jones, J. N. Emmitt, M. Barnes ...	"	" " " " " " " "	Form 915 27.6.31 to 4.10.31	21.10.31
146 † <i>Mandasor</i> ...	Stockwell, H. ...	E. Ashby, A. Pyatt, G. Singer ...	No. M.	British India ...	Forms 911 & 138 18.11.31 to 25.1.32	8.2.32
220 † <i>Manela</i> ...	Richardson, T. ...	H. Fosbrooke, F. C. Madden, J. B. Leigh ...	" M.	Brocklebank ...	" " 1.11.31 to 24.11.31	30.11.31
022 † <i>Manipur</i> ...	Maples, S. H. ...	W. F. Solly, T. M. Robertson, A. E. Gwyn ...	" M.	British India ...	" " 31.1.32 to 6.3.32	9.3.32
221 † <i>Manova</i> ...	Fuleber, H. D. ...	J. L. Rodger ...	" M.	Brocklebank ...	" " 27.11.31 to 28.12.31	2.1.32
177 † <i>Mantola</i> ...	Hudson, H. T., R.D., Commr., R.N.R.	A. F. Baber, W. Brawn, J. W. Elcoat ...	" M.	British India ...	" " 25.10.31 to 29.11.31	4.12.31
197 † <i>Mantua</i> ...	James, D. F. ...	S. Henderson, G. B. Potts, H. T. Fisher ...	" M.	" " " " " " " "	" " 23.11.31 to 16.12.31	22.12.31
299 † <i>Marella</i> ...	Hignett, R.D., Commr., R.N.R.	J. D. Homidge, J. A. Wild, E. J. Sparling ...	W.T.-M.	P. & O. ...	" " 22.8.31 to 9.11.31	2.12.31
Marengo	Donaldson, A. ...	A. W. Blair, D. Pemberton, A. G. W. Thomas ...	M.L.	Burns Philp ...	Form 915 3.6.31 to 23.10.31	7.1.32
222 † <i>Margha</i> ...	Sibree, J. S. ...	F. Brown, C. Newton, J. E. Dobson ...	"	Ellerman Wilson ...	" " 26.3.31 to 29.10.31	6.11.31
104 † <i>Marquesa</i> ...	Kitson, G. A. ...	L. F. Watkins, J. Small, P. Wright ...	W.T.	British India ...	Forms 911 & 138 21.1.32 to 25.1.32	15.2.32
021 † <i>Masula</i> ...	Smiles, R. S. ...	J. Wetherall ...	No. M.	Furness Houlder ...	" " 22.12.31 to 25.2.32	2.3.32
251 † <i>Matakana</i> ...	Fitt, W. H. ...	J. L. Richardson, W. G. Jones ...	" M.	British India ...	" " 31.12.31 to 22.1.32	27.1.32
044 † <i>Mataroa</i> ...	Gordon, H. R. ...	H. Thompson, D. L. G. Turner, G. C. Allen ...	W.T.	Shaw, Savill & Albion ...	Form 915 10.11.31 to 2.2.32	9.3.32
023 † <i>Matheran</i> ...	Gaskell, J. H., R.D., Lt.-Commr., R.N.R.	H. A. Hill, F. C. Charnley, K. Owen ...	M.L.	" " " " " " " "	" " 6.11.31 to 15.2.32	23.2.32
223 † <i>Matiana</i> ...	Mulcahy, J. J. ...	S. S. Slade, J. F. Butterworth, W. Cowrie ...	No. M.	Brocklebank ...	Forms 911 & 138 14.1.32 to 27.2.32	2.3.32
032 † <i>Mawretania</i> ...	Green, F. V. ...	L. A. Bunn, P. M. Wilson ...	" M.	British India ...	" " 13.1.32 to 29.1.32	22.2.32
101 † <i>Melita</i> ...	Cornish, N. P. ...	" " " " " " " "	" M.	Brocklebank ...	" " 18.8.31 to 3.12.31	9.12.31
278 † <i>Middlesex</i> ...	Peel, R. V., R.D., Capt., R.N.R.	R. H. C. Crawford, L. R. Sharpe, G. Duguid ...	W.T.	Cunard ...	" " 18.2.32 to 2.3.32	5.3.32
Minderoo	Stewart, A. ...	C. E. Duggan, H. W. Saunders, A. M. Watt ...	W.T.-M.	Canadian Pacific ...	" " 31.1.32 to 20.2.32	22.2.32
224 † <i>Modasa</i> ...	Almond, J. G. ...	J. R. Ricketts, E. G. Henry, L. G. Gould ...	M.L.	Federal ...	Forms 911 & 138 16.10.31 to 31.12.31	7.1.32
194 † <i>Moldavia</i> ...	Johnson, L. ...	A. J. Perry ...	"	Western Australian S.N. Co. ...	Form 911 18.10.31 to 28.11.31	4.1.32
199 † <i>Mongolia</i> ...	Gilchrist, J. W. ...	E. Hale ...	No. M.	British India ...	Forms 911 & 138 26.10.31 to 11.1.32	18.1.32
260 † <i>Monowai</i> ...	Allin, C. H. C. ...	T. E. Heath, J. K. Krone, E. J. Kerridge ...	W.T.-M.	P. & O. ...	" " 9.1.32 to 20.1.32	29.2.32
	Rhodes, H. R. ...	H. Fee, H. C. Slinn, G. K. Fox ...	No. M.	" " " " " " " "	" " 21.12.31 to 26.2.32	29.2.32
	Spring-Brown, J. F. ...	L. B. Elhert, E. W. Gibson, D. W. Richards ...	M.L.	Union S.S. of N.Z. ...	Form 915 28.5.31 to 19.11.31	17.2.32
	Toten, A. T. ...	" " " " " " " "	"	" " " " " " " "	" " " " " " " "	" " " " " " " "

THE MARINE OBSERVER

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed Received up to 11.3.32.	Date Received
148 †† <i>Montcalm</i> ...	Rothwell, A. ...	W. P. Haines, T. L. Gillette, A. Mackie.	W.T.-M.	Canadian Pacific ..	Forms 911 & 138 7.2.32 to 27.2.32	29.2.32
149 †† <i>Montclare</i> ...	Turnbull, J., C.B.E., R.D., Capt. R.N.R.	J. Shearer, J. Sharples, J. Soames.	W.T.	" " ...	" " 14.2.32 to 5.3.32	9.3.32
150 †† <i>Montrose</i> ...	Dott, J. F. ...	R. Fegan, K. Hutchings, N. Duck.	W.T.-M.	" " ...	" " 7.2.32 to 12.2.32	15.2.32
164 †† <i>Mooltan</i> ...	Morton, A. J. ...	R. M. Richardson, J. L. Dunkley, A. D. Dennis.	No. M.	P. & O. ...	" " 19.9.31 to 23.12.31	2.1.32
226 †† <i>Mulbera</i> ...	Caffyn, F. ...	W. G. Donald ...	" M.	British India ...	" " 20.11.31 to 22.12.31	29.12.31
290 †† <i>Musician</i> ...	Bostock, O. ...	K. H. Davies, H. Philpott, S. H. Diamond.	" M.	Harrison ...	" " 7.12.31 to 29.2.32	3.3.32
073 †† <i>Nagara</i> ...	Womersley, H. ...	E. N. Giller, T. Fraser, G. Bonner.	" M.	R.M.S.P. Co. ...	Forms 911 & 138 30.8.31 to 21.10.31	26.10.31
201 †† <i>Naldera</i> ...	Harrison, R., D.S.O., R.D., Capt. R.N.R.	...	W.T.	P. & O. ...	Form 915 6.9.31 to 10.10.31	12.12.31
121 †† <i>Nankin</i> ...	Gordon, A. S. ...	F. R. Miller, J. M. Friend, F. G. Harvey.	No. M.	" ...	" 2.10.31 to 29.12.31	18.2.32
286 †† <i>Natia</i> ...	Womersley, H. ...	F. Thacker, J. E. P. Matthews	" M.	R.M.S.P. ...	Forms 911 & 138 20.12.31 to 10.2.32	15.2.32
227 †† <i>Nardana</i> ...	Reilly, J. V. ...	L. D. Macfadyen, H. Goater, H. Grace.	M.L.	British India ...	Form 915 25.4.31 to 21.8.31	24.8.31
118 ** <i>Narenta</i> ...	Miles, F. R. ...	R. N. Fletcher, C. K. Brown, M. W. Weeks.	No. M.	R.M.S.P. Co. ...	Forms 911 & 138 16.9.31 to 10.12.31	16.12.31
202 †† <i>Narkunda</i> ...	Cadiz, F. G., D.S.C. ...	J. Travis ...	W.T.-M.	P. & O. ...	Form 911 23.12.31 to 3.1.32	25.1.31
305 †† <i>Nebraska</i> ...	Bridges, A. E. ...	H. Collinson, P. R. Cocks, R. S. Find.	No. M.	R.M.S.P. Co. ...	Forms 911 & 138 2.10.31 to 24.12.31	1.1.32
162 †† <i>Nestor</i> ...	Adecock, F. ...	G. Edge, P. Elder, W. Pearse.	W.T.	A. Holt ...	Form 915 26.7.31 to 30.11.31	10.12.31
210 ** <i>Niagara</i> ...	Hill, T. V. ...	G. H. Kime, D. A. Menlove, L. P. Bourke.	M.L.	Canadian-Australasian Federal ...	" 20.8.31 to 4.12.31	3.2.32
256 †† <i>Norfolk</i> ...	Howell-Price, J., D.S.O., D.S.C.	G. C. Hocart, H. Cockerell, H. Dash.	"	" ...	" 4.4.31 to 11.7.31	21.7.31
297 †† <i>Northumberland</i> ...	Upton, H. L., D.S.C., R.D., Commr., R.N.R.	H. Rogers, G. B. Cathie, H. I. Phillips.	No. M.	" ...	Forms 911 & 138 27.9.31 to 25.1.32	2.2.32
267 †† <i>Novara</i> ...	Roche, C. B. ...	N. W. Leach ...	" M.	P. & O. ...	" " 17.1.32 to 5.2.32	29.2.32
231 †† <i>Nuddea</i> ...	Beeching, P. H. ...	D. A. Jones, T. Hougkinson, B. Emmerson.	" M.	British India ...	" " 7.2.32 to 18.2.32	26.2.32
294 †† <i>Olympic</i> ...	Binks, J. W., R.D., Lt.-Commr., R.N.R.	W. Delvin, O. N. Tugwell, G. Brooks.	W.T.	White Star ...	Forms 911 & 138 31.12.31 to 18.1.32	21.1.32
243 †† <i>Opawa, M.V.</i> ...	Robinson, F. W. ...	J. W. Pring, H. P. Williamson, R. H. Chapman.	M.L.	New Zealand S.S. Co.	" " 24.5.31 to 21.9.31	25.9.31
170 †† <i>Orana</i> ...	Matheson, C. G., D.S.O., R.D., Capt. R.N.R.	R. W. Roberts, R. Galpin, C. H. Denton.	W.T.	Orient ...	" " 26.10.31 to 26.1.32	3.2.32
086 †† <i>Oreoma</i> ...	Benson, E. W. ...	T. R. Scott, H. J. Jones, H. D. Dillon.	W.T. M.	Pacific S.N. Co. ...	" " 2.8.31 to 30.9.31	7.10.31
087 †† <i>Orduna</i> ...	Galloway, M. ...	P. L. Hockey, F. W. Hockey, F. W. McKie.	"	" " ...	" " 22.12.31 to 26.2.32	3.3.32
258 †† <i>Oregon Star</i> ...	Lewis, G. ...	E. T. Blackland ...	No. M.	Blue Star ...	" " ...	"
171 †† <i>Orford</i> ...	Owens, A. L., Commr. R.D., R.N.R.	C. B. Hubert, G. B. H. Jones, C. H. Denton.	" M.	Orient ...	Form 911 19.10.30 to 12.1.32	15.1.32
174 †† <i>Ormonde</i> ...	James, L. V., D.S.C.	T. L. Shurrock, N. Smith, C. Blake.	W.T.	" ...	Forms 911 & 138 9.11.31 to 9.2.32	17.2.32
172 †† <i>Cronsay</i> ...	Cameron, E. P., R.D., Commr., R.N.R.	E. M. Mackay, D. Madeley	"	" ...	" " 21.6.31 to 22.9.31	5.10.31
173 †† <i>Orontes</i> ...	O'Sullivan, F. R. ...	J. M. Swanson ...	No. M.	" ...	" " 13.9.31 to 15.12.31	19.12.31
105 †† <i>Orsova</i> ...	Thorne, G. G., R.D., Commr., R.N.R.	R. B. Stannard ...	W.T.	" ...	" " 16.8.31 to 17.11.31	26.11.31
156 †† <i>Otranto</i> ...	Staunton, H. G., C.B.E., R. D. Commr., R.N.R.	A. E. Coles, A. Addison, E. M. McKay.	W.T.-M.	Orient ...	" " 28.1.32 to 8.3.32	10.3.32
287 †† <i>Pacific Enterprise, M.V.</i> ...	Holland, C. E. ...	W. Edmonds ...	M.L.	Furness Withy ...	Form 915 9.9.31 to 3.12.31	28.12.31
279 †† <i>Pacific Exporter</i> ...	Holland, C. E., R.D., Commr., R.N.R.	W. Edmonds ...	W.T.	" " ...	Forms 911 & 138 22.10.31 to 14.1.32	9.2.32
<i>Pacific Shipper, M.V.</i> ...	Nuttall, E. L. ...	S. Porter ...	No. A.	" " ...	Form 911 16.6.31 to 16.9.31	21.9.31
<i>Paneras</i> ...	Barlow, F. P. ...	L. A. Sayers, S. Adams ...	M.L.	Booth ...	Form 915 9.2.31 to 16.7.31	29.7.31
<i>Paris</i> ...	Hill, A. ...	T. Mahoney ...	C.C.	Southern Rly. ...	Telegraphic Report. 3.12.31	3.12.31
<i>Patia</i> ...	Sapsworth, S. A. ...	R. O. Laycock, R. S. Howlett.	No. A.	Elders & Fyffes ...	Form 911 6.10.31 to 7.11.31	14.11.31
<i>Patrician</i> ...	Lowe, J. ...	W. E. Williams ...	" M.	Harrison ...	" " 18.10.31 to 20.12.31	22.1.32
058 †† <i>Pennland</i> ...	Making, V. L. ...	C. H. Otterson, G. T. Boyle, J. Cross.	W.T.	Red Star ...	Forms 911 & 138 1.2.32 to 20.2.32	25.2.32
204 †† <i>Peshawur</i> ...	Roche, C. B. ...	P. Hawthorth, J. A. Hunter, A. Nicklen.	No. M.	P. & O. ...	Form 915 2.8.31 to 2.12.31	7.12.31
238 †† <i>Plako</i> ...	Aslin, E. P. C. ...	A. D. Wilson, A. W. Marshall, R. H. Carter.	"	New Zealand S.S. Co.	Forms 911 & 138 11.6.31 to 30.7.31	13.8.31
039 †† <i>Planter</i> ...	Ling, J. T. ...	W. S. Eustance, J. J. Devereux, W. H. Slaughter.	"	Harrison ...	" " 30.8.31 to 4.12.31	7.12.31
040 †† <i>Port Adelaide</i> ...	Williams, R. ...	F. W. Elger, D. F. Morgan, D. Chamberlain.	W.T.	Commonwealth & Dominion.	" " 27.9.31 to 18.1.32	26.1.32
255 †† <i>Port Alma</i> ...	Hayter, S. W. ...	G. Dean, E. Wheeler, J. Moate.	M.L.	" " ...	Form 915 11.7.31 to 4.12.31	9.12.31
128 †† <i>Port Auckland</i> ...	Robinson, C. A. ...	A. Brown ...	"	" " ...	" " 15.7.31 to 29.10.31	11.11.31
288 †† <i>Port Bowen</i> ...	Brown, A. H. ...	F. R. Gorman, T. L. Kidwell, T. Soans.	W.T.	" " ...	" " 1.7.31 to 13.10.31	28.10.31
129 †† <i>Port Campbell</i> ...	Gregory, S. E. A. ...	J. C. Goddard, N. M. Muzzell, C. Midwinter.	"	" " ...	" " 1.8.31 to 29.11.31	14.12.31

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 11.3.32.	Date Received.
130 *† Port Caroline ...	Hearn, G. W. ...	V. G. Battle, E. W. R. Young, R. E. Garner.	W.T.	Commonwealth and Dominion.	Form 915 17.6.31 to 8.10.31 ...	19.10.31
131 *† Port Darwin ...	Hudson, J. J. ...	R. D. Morgan, H. R. Hill, H. Duckling.	"	" " "	" 6.10.31 to 28.1.32 ...	20.2.32
132 ** Port Denison ...	Hall, G. S. ...	A. G. Newbury, R. A. Hollo-way, H. Duckling.	"	" " "	" 23.4.31 to 26.8.31 ...	3.9.31
133 *† Port Dunedin, M.V.	Mason, W. S., D.S.C.	H. M. Post, C. A. Hodson, R. Betters.	M.L.	" " "	" 5.10.31 to 29.1.32 ...	2.2.32
010 *† Port Fremantle, M.V.	Gilling, W. ...	A. Naismith ...	"	" " "	Form 911 12.8.31 to 17.9.31 ...	21.9.31
176 *† Port Gisborne, M.V.	Higgs, W. G. ...	R. B. Linklater, L. J. Skailles, L. E. Ring.	"	" " "	Form 915 19.7.31 to 24.10.31 ...	30.10.31
135 *† Port Hunter ...	Durham, R. S., D.S.C.	G. T. C. Harris, C. R. Townshend, P. A. Mundy.	"	" " "	" 6.9.31 to 27.12.31 ...	31.12.31
Port Wellington ...	Jones, C. N. ...	W. B. Hopkins ...	No. A.	" " "	Form 911 26.8.31 to 4.1.32 ...	11.1.32
106 *† Princessa ...	Friend, A. B. ...	F. Poulson, E. Lougheed, O. Sheard.	" M.	Houlder " ...	Forms 911 & 138 24.1.32 to 10.2.32	5.3.32
163 *† Protesilaus ...	Rundle, G. G. ...	W. C. McGugan ...	M.L.	A. Holt ...	Form 915 28.5.31 to 14.9.31 ...	23.10.31
205 †† Rajputana ...	Holland, R. ...	G. Aspinall, H. M. Askin, C. F. Wright.	" M.	P. & O. ...	Forms 911 & 138 11.10.31 to 6.1.32	15.1.32
063 *† Rancher ...	McCullum, J. ...	G. Harvey ...	" M.	Harrison ...	" " 26.10.31 to 14.1.32	19.1.32
228 †† Ranchi ...	Brooks, C., D.S.O., R.D., Commr., R.N.R.	T. A. Sergeant ...	" M.	P. & O. ...	" " 22.11.31 to 13.1.32	18.1.32
236 †† Rangitane M.V. ...	McKellar, A. W. R.D., Capt., R.N.R.	A. Brown, R. C. Aldridge, C. J. P. Guille.	W.T.-M.	New Zealand S.S. Co.	" " 20.11.31 to 3.3.32	9.3.32
257 †† Rangitata M.V. ...	Hunter, J. L. B. ...	J. Oxnard, D. Chadwick, S. Leggett.	"	" " "	Forms 911 & 138 24.10.31 to 3.2.32	11.2.32
240 †† Rangitiki M.V. ...	Barnett, H. ...	H. Hill, L. F. Malcouronne, J. V. Halliday.	"	" " "	" " 30.8.31 to 9.12.31	14.12.31
207 †† Ranpura ...	Furlong, G. H. S., R.D., Capt. R.N.R.	F. Ferguson, R. A. Perry, H. Toon.	No. M.	P. & O. ...	" " 20.12.31 to 10.2.32	19.2.32
071 †† Ravalpindi ...	Stringer, O. B. E., R.D., Commr., R.N.R.	H. G. M. Perry, D. E. C. Otter, W. R. Stockglen.	W.T.-M.	" " "	" " 1.11.31 to 3.2.32	8.2.32
247 *† Recorder ...	Egerton, J. J. ...	A. S. Milne, H. C. Blyth, W. Weatherall.	No. M.	Harrison ...	" " 20.10.31 to 8.12.31	11.12.31
306 *† Reina del Pacifico, M.V.	Roberts, E. ...	W. A. Hearle, R. Bridson, J. K. Campbell.	" M.	Pacific S.N. Co. ...	" " 15.11.31 to 4.1.32	11.1.32
239 *† Remuera ...	Wilde, H. J. ...	A. J. Angell, J. R. Vincent, H. Vernon.	M.L.	New Zealand S.S. Co.	Form 915 31.7.31 to 5.11.31 ...	11.11.31
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Rhodesian Trans- port.	Bowen, A. C. ...	H. S. Butler ...	" A.	Houlder Bros. ...	" " 5.4.31 to 5.7.31 ...	20.7.31
189 *† Rother ...	Woodhead, T. H. ...	H. Robinson, H. L. Marshall	W.T.	Goole Steam Shipping	Form 911 & 138 23.1.32 to 13.2.32	16.2.32
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062 *† Royal Star ...	Walsh, W. ...	A. F. Day, J. Higgin, J. W. McHugh.	No. M.	Blue Star ...	" 6.9.31 to 30.11.31 ...	7.12.31
246 *† Ruahine ...	Kinnell, G. ...	A. Hocken, R. Warren, L. Mercer.	W.T.	New Zealand S.S. Co.	Forms 911 & 138 26.9.31 to 31.12.31	11.1.32
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St. Julien ...	Richardson, L. ...	A. E. Ricketts, H. D. Freeman.	"	" " "	" " 27.2.32 ...	27.2.32
St. Minver, S.T. ...	Hatton, A. ...	C. Shaw, W. Robertson, G. Henshaw.	No. A.	Bunch Steam Fish- ing Co.	Form 911 20.1.32 to 20.2.32 ...	25.2.32
St. Patrick ...	"	F. E. Martin ...	C.C.	G. W. Railway ...	Telegraphic Report 15.9.31 ...	15.9.31
038 †† Samaria ...	Malin, R. G., Lt.- Commr., R.N.R.	F. G. Watts, J. A. Myles, H. Hudson.	W.T.	Cunard ...	Forms 911 & 138 18.1.32 to 23.1.32	25.2.32
291 *† Scholar ...	Peterkin, A. G. ...	A. Robertson, R. J. Mackinnon	No. M.	Harrison ...	" " 15.10.31 to 22.12.31	20.12.31
Scotia ...	O'Neill, J. ...	W. H. Hughes ...	C.C.	L.M. & S. Railway ...	Telegraphic Report 20.2.32 ...	20.2.32
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230 *† Somerset ...	Pilcher, C. R. ...	C. Edgecombe, H. M. Knight, H. V. G. Hastings.	M.L.	Federal ...	" 16.8.31 to 14.11.31 ...	19.11.31
277 *† Spero ...	Montgomery, H. ...	H. W. Vickers, A. Kirk ...	"	Ellerman Wilson ...	Form 915 28.3.31 to 3.10.31 ...	7.10.31
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270 †† Strathaird ...	Townsend, W. P. ...	R. H. Hand ...	W.T.-M.	P. & O. ...	" " " " " " " "	"
259 *† Surrey ...	Lettington, A. E. ...	R. Rees, D. J. Murray, H. H. Mackillican.	M.L.	Federal... ..	Form 915 17.5.31 to 16.9.31 ...	26.9.31
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Tacoma City ...	Paul, H. ...	H. Small ...	" A.	Reardon Smith ...	Form 911 7.8.31 to 25.11.31 ...	1.12.31
229 *† Tactician ...	Trinick, F., O.B.E. ...	E. P. Simmons ...	" M.	Harrison ...	" 19.7.31 to 7.10.31 ...	10.10.31
045 †† Tainui ...	McIntosh, A. ...	G. A. Harvey, A. G. Collins, J. Worrall.	M.L.	Shaw, Savill & Albion	Form 915 27.6.31 to 9.10.31 ...	11.11.31
081 *† Tairoa ...	Grayston, E. T., D.S.C., R.D., R.N.R.	G. L. Almond, W. Thowless, L. B. Miller.	"	" " "	" 30.10.31 to 24.2.32 ...	3.3.32
234 *† Talma ...	Harley, G. J. ...	M. H. Vincent, R. Potter, R. H. Weatherseed.	W.T.-M.	British India ...	Forms 911 & 138 17.5.31 to 21.9.31	12.10.31
046 †† Tamaroa ...	Hartman, W. H. ...	L. R. Bull, R. R. Roseman, F. Lutyen.	"	Shaw, Savill & Albion	" " 11.9.31 to 17.12.31	24.12.31
264 ** Tanda ...	Pilcher, E. T., Lt.- Commr., R.N.R.	B. W. Dun, F. O. Colvin, R. Milne.	M.L.	E. & A. S.S. Co. ...	Form 915 3.9.31 to 30.11.31 ...	12.2.32
165 *† Tantalus M.V. ...	Melling, C. F. ...	A. C. H. Jones, J. J. Daniell, W. C. Angus.	W.T.	A. Holt ...	" 1.7.31 to 25.10.31 ...	29.10.31
047 *† Taranaki, M.V. ...	Wood, C., D.S.C. ...	R. Bitmead, S. P. Wallis, A. M. Whiteford.	M.L.	Shaw, Savill & Albion	" 29.8.31 to 15.12.31 ...	28.12.31
Tarantia ...	Caithness, J. B. ...	J. M. Cherry ...	No. A.	Anchor ...	Form 911 12.12.31 to 5.1.32 ...	8.2.32
069 *† Tekoa ...	McNish, R. H. L., D.S.O., Lt.-Commr., R.N.R.	C. W. Roberts ...	" M.	New Zealand S.S. Co.	" 30.12.31 to 25.1.32 ...	15.2.32
Tetela ...	Brice, E. H. ...	J. D. Paterson ...	" A.	Elders & Fyffes ...	" " 7.9.31 to 9.10.31 ...	15.10.31
048 †† Themistocles ...	Young, A. D. ...	" " " " " "	W.T.-M.	Aberdeen Common- wealth.	" " " " " " " "	"
007 *† Thistleglen ...	Whitfield, G.A., O.B.E.	S. B. Davis, H. B. Meek, G. L. Hetherington.	No. M.	Allan Black & Co. ...	Form 915 15.10.31 to 11.1.32 ...	19.1.32

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 11.3.32.	Date Received
235 *† <i>Tilawa</i>	Coleborn, E.	E. Cullerne, F. B. Cutlack, R. A. Spiers.	No. M.	British India... ..	Forms 911 & 138 14.11.31 to 12.1.32	1.2.32
168 *† <i>Tinhow</i>	Scobie, A.	G. W. Seth, P. Aydon, C. H. Smith.	W.T.	A. Weir & Co.	„ „ 21.7.31 to 12.10.31	23.11.31
161 *† <i>Titan</i>	Elford, W. J.	F. B. Smith, A. K. Sanderson, W. H. Deans.	„	A. Holt	Form 915 23.5.31 to 29.9.31	7.10.31
244 *† <i>Tongariro</i>	Hamilton, F. S.	E. A. Quick, D. Baldwin, H. Dawson.	M.L.	New Zealand S.S. Co.	„ 27.7.31 to 1.12.31	7.12.31
025 †† <i>Transylvania</i>	Bone, D. W.	A. Middleton, J. O. Dunn, J. A. Lefevre.	W.T.	Anchor	Forms 911 & 138 16.1.32 to 3.2.32	11.2.32
288 *† <i>Traveller</i>	Barrow, W. T. C.	R. Ledger	No. M.	Harrison	„ „ 4.6.30 to 14.8.31	24.8.31
<i>Treacarrell</i>	Old, E. G.	W. E. McEwan, G. A. Solly	„ A.	Hain S.S. Co.	Form 911 26.3.31 to 29.4.31	19.5.31
119 *† <i>Trojan Star</i>	Griffin, G. A.	L. S. Hassell, K. Griffiths, D. W. Marshall.	No. M.	Blue Star	Forms 911 & 138 9.10.31 to 30.12.31	29.1.32
245 *† <i>Turakina</i>	Laird J.	A. Weatherall, E. G. Williams, J. Reeve.	„ M.	New Zealand S.S. Co.	„ „ 4.3.31 to 12.6.31	17.6.31
276 †† <i>Tuscania</i>	Rome, W. B.	G. Noble	W.T.	Anchor... ..	„ „ 29.11.31 to 21.12.31	24.12.31
<i>Uffington Court</i>	Clarke, E. J.	T. Glover	No. A.	Haldin & Co.	Form 911 25.3.31 to 8.6.31	23.6.31
113 *† <i>Upwey Grange, M.V.</i>	Goodrick, H. P.	A. Bradbury, G. T. Hurst, P. J. Walker.	„ M.	Houlder	Forms 911 & 138 14.9.31 to 30.11.31	8.12.31
292 †† <i>Viceroy of India</i>	Thornton, E. J., R.D., Capt., R.N.R.	W. R. B. Noall, F. Shute, J. S. Smith.	W.T.-M.	P. & O.	Forms 911 & 138 9.11.31 to 31.12.31	2.1.32
242 ** <i>Waiotapu</i>	Hender, W. H.	„ „ „ „ „ „	M.L.	Union S.S. Co. of N.Z.	„ „ „ „ „ „	„ „
263 ** <i>Wairuna</i>	Stewart, A. R.	S. E. Gaskin, D. Williams, H. M. Hughes.	„	„ „	Form 915 8.7.31 to 9.10.31	28.12.31
005 †† <i>Warwick Castle</i>	Owens, G.	P. Clissold, W. D. Roach, A. J. Tweddell.	W.T.	Union Castle	Form 911 12.12.31 to 31.1.32	2.2.32
060 †† <i>Westernland</i>	Doughty, J. H.	J. R. Loe, J. H. A. Mackie, G. McLaren.	„	Red Star	Forms 911 & 138 15.2.32 to 6.3.32	8.3.32
<i>William Scoresby, R.R.S.</i>	Joliffe, T. A., Commr., R.N.	W. A. Ellison, F. E. C. Davies	M.L.	Falkland Islands Government.	Form 915 1.4.31 to 30.7.31... ..	5.10.31
208 †† <i>Winchester Castle M.V.</i>	Gardner, G. F., O.B.E., Lt.-Commr., R.N.R.	G. F. Moon, A. G. Parey	W.T.	Union Castle	Forms 911 & 138 9.1.32 to 28.2.32	1.3.32
096 †† <i>Windsor Castle</i>	Kerbey, J. H.	F. Hunter, E. H. Dixey, J. Trayner	„	„ „	„ „ 6.12.31 to 24.1.32	8.2.32
<i>Worthing</i>	Marmery, S.	C. Munton, E. Balcombe	C.C.	Southern Railway	Telegraphic Report 22.2.32	22.2.32
043 ** <i>Zealandic, M.V.</i>	Elford, H. C.	P. Horwood, J. Thompson, B. Morris.	W.T.	Shaw, Savill & Albion	Forms 911 & 138 3.11.31 to 8.12.31	11.12.31
<i>Zent</i>	Bower, H. C.	F. W. Harris.	No. A.	Elders & Fyffes	Form 911 24.1.32 to 24.2.32	27.2.32
<i>Conway, H.M.S.</i>	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets	Cadets' M.L.	... ..	Cadets' Met. Log. 20.9.31 to 9.12.31	12.12.31
<i>Pangbourne Nautical College</i>	Tracy, A. F. G., Commr., R.N.	„ „ ... ..	„	... ..	Cadets' Met. Log. 27.9.31 to 13.12.31	18.12.31
<i>Worcester, H.M.S.</i>	Steele, G. C., V.C., Commr., R.N.	„ „ ... ..	„	... ..	Cadets' Met. Log. 25.9.31 to 16.12.31	20.12.31
<i>Abaco</i> ... ..	... ..	The Keepers	Lighthouse Register.	... ..	Lighthouse Register 1.7.31 to 31.12.31	27.2.32
<i>Cay Lobos</i> ... ..	... ..	„ ... ..	„	... ..	Lighthouse Register 1.7.31 to 31.12.31	27.2.32
<i>Double Headed Shot</i>	... ..	„ ... ..	„	... ..	Lighthouse Register 1.7.31 to 31.12.31	27.2.32
<i>Inagua</i> ... ..	... ..	„ ... ..	„	... ..	Lighthouse Register 26.2.31 to 5.9.31	5.10.31
<i>Sombrero</i> ... ..	... ..	„ ... ..	„	... ..	Lighthouse Register 1.7.31 to 31.12.31	28.1.32
<i>Watling Island</i>	„	„	Lighthouse Register 17.7.31 to 31.12.31	27.2.32
<i>Cape Pembroke (Falkland Is.)</i>	„	„	Lighthouse Register 1.7.31 to 31.12.31	18.2.32

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<i>Dakartan</i>	Brown, W.	A. A. Johnson	Leyland	Water Samples	29.12.31
<i>Darlan</i>	Hannaford, W.	W. R. Vaughan	„ „	„ „	18.9.31
<i>Darro</i>	Green, J.	A. J. G. Barff	R.M.S.P. Co.	„ „	19.12.31
<i>Davistan</i>	Thomas, R.	F. Steventon	Leyland	„ „	16.1.32
<i>Dorellan</i>	Hughan, C.	A. W. Wood	„ „	„ „	4.2.32
<i>Hildebrand</i>	Buck, R. H., R.D., Capt. R.N.R.	H. Sapsworth	Booth	„ „	27.2.32

May, M.O., 1932.

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