

VOL. IX. No. 108.

THE MARINE OBSERVER.

DECEMBER, 1932.

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VOLUME IX.

THIS number completes the ninth volume of THE MARINE OBSERVER and is the last monthly number which will be issued, unless at some future time monthly numbers are found to be necessary again.

We thank most heartily all those who have contributed to THE MARINE OBSERVER, not only during the past year, but throughout its publication. They are many, but to none are our thanks so much due as to captains and officers of ships. Without their voluntary work, not only of routine observation, but of writing the descriptions of which the "Marine Observer's Log" is witness, THE MARINE OBSERVER could not have been established.

As usual we remind all concerned that a binding cover may be purchased from the Stationery Office, and we hope that all observing ships will take the precaution of having the past year's numbers bound. Only a limited number of MARINE OBSERVERS are printed, and it is desirable that as many complete volumes as possible should be preserved, whether ship's equipment, private or official property.

To bind the year's twelve numbers to the best advantage it is recommended that in each of the numbers the cover, advertisement page, voluntary observing fleet list and North Atlantic Ice Chart, all containing information which is not permanent or which may be repeated, should be dispensed with.

When these have been removed there will remain pages numbered in sequence throughout each number, also pages un-numbered containing lithographic charts which follow the numbered pages in the monthly numbers. These should be placed in the volume cover and bound.

In the October number it was announced that THE MARINE OBSERVER from next January will be published quarterly with a monthly supplement, and why? All who have not read the notes entitled "The Marine Observer and the future of the Work" in that number are asked to do so.

These numbers are, of course, approximate, and it should be understood that observing ships shown as traversing an ocean may also traverse other oceans and that the majority of observing ships commence and end their voyages from ports in Great Britain.

Only about 35 per cent. of observing ships are at sea at any time.

It is mainly due to the good sense and loyal co-operation of the officers of the British Merchant Navy, and to the constant care and attention of the Port Meteorological Officers and Merchant Navy agents at the ports, that in this most difficult time for shipping we are able to indicate to-day such a well-distributed observing fleet—there has never been a better.

CURRENTS IN THE ARABIAN SEA, BAY OF BENGAL, ETC.

IN this number the charting of the currents in the Persian Gulf, Arabian Sea and Bay of Bengal is completed and the investigation of the currents in this region finished as far as can be, until the whole of the Indian Ocean is dealt with. In the December number last year, in remarking upon the results published then, of the investigation of the Agulhas, Mozambique and East African Coast currents we said:—

“It is remarkable how this investigation proves that the currents change with the prevailing winds.”

This year's investigation clearly shows that in the Arabian Sea and Bay of Bengal—regions where seasonal or monsoon winds prevail with greater force and regularity than any other traversed by

the trade routes—the seasonal change of the set of the main current occurs before the seasonal change of the wind.

What is the explanation? That is the question we should like to answer when the charting of the currents of the Indian Ocean is completed and the new atlas published!

All who navigate the Indian Ocean, indeed navigators the world over, may find interesting information of currents in the article published in this number and those preceding it in this volume.

London.

September 12th, 1932.

MARINE SUPERINTENDENT.

THE MARINE OBSERVER'S LOG.

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

DISCOLOURED WATER.

South Indian Ocean.

THE following is an extract from the Meteorological Log of S.S. *Herminius*, Captain H. P. THURSTON, Cape Town to New Zealand. Observer, Mr. G. MACNAB, 4th Officer.

December 25th, 1931, between positions Latitude 46° 16' S., Longitude 98° 51' E. and Latitude 46° 16' S., Longitude 99° 55' E., during the morning watch of this day, discoloration of the sea was observed in the form of small rusty brown patches, approximately 1 foot to 2 feet in diameter and 20 feet apart.

A similar observation was logged on December 15th between positions Latitude 38° 31' S., Longitude 27° 36' E. and Latitude 38° 42' S., Longitude 27° 58' E. during the same watches lasting from daybreak till about 5.30 a.m.

In this case the discoloration was mostly in long streaks, about 1 foot to 3 feet wide and varying from 10 to 50 feet long, which, instead of being on the surface of the water, like the former observation, had the appearance of being slightly underneath it.

PHOSPHORESCENCE.

South Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Herminius*, Captain H. P. THURSTON, Newcastle to Cape Town. Observer, Mr. A. G. COLLINS, 3rd Officer.

December 7th, 1931, between the hours of 2040 and 2234 G.M.T. observed phosphorescent sea. The night was very dark, although the sky was cloudless and the stars brilliant. The phenomenon covering the whole of the sea all round the horizon to the limits of visibility, gave the effect of the sea being illuminated by some unseen light underneath which was both peculiar and beautiful.

There was no premature disturbance or warning of any description, the vessel running suddenly into a mass of pale, but intense, green sea with silvery-white edges to the waves, somewhat similar in appearance to the illuminated dial of a wrist-watch when observed in the darkness, only of much greater intensity, and on a much larger scale.

The waves, breaking in the distance, gave the appearance of the sails of a small yacht having a beam of light played upon them (as

from a powerful electric torch). As each bow wave broke, the white paintwork of the bridge and vessel's superstructure was brilliantly illuminated, and as the wave settled abaft the beam the contrast between the phosphorescence and the darker or non-phosphorescent water was most marked.

Scattered throughout the sea, in proximity to the vessel, were numerous small balls of phosphorus, giving an illumination of greater intensity.

After about two hours the vessel passed out of this phosphorescent area as quickly as she entered it.

Phosphorescence observed between Latitude 16° 56' S., Longitude 3° 55' E. and Latitude 17° 16' S., Longitude 4° 11' E. Ship's course 143°, speed 12½ knots.

South Pacific.

THE following is an extract from the Meteorological Log of S.S. *Monowai*, Captain A. T. TOTEN, Wellington to Sydney. Observer, Mr. L. B. EHLERT, 3rd Officer.

December 17th, 1931, 2.21 a.m. A.T.S., passed through a line of phosphorescence approximately a mile wide, and as far as the eye could see on either side of ship, which gave the appearance of millions of electric lights about 2 inches in diameter. Weather at time was overcast, with drizzling rain. Wind W.S.W., force 5, sea moderate. After passing through the line not even one piece of phosphorescence was again seen.

Position of ship Latitude 36° 25' S., Longitude 157° 48' E.

Arabian Sea.

THE following is an extract from the Meteorological Record of S.S. *Clan Macphee*, Captain A. W. P. GIBB, Colombo to Aden. Observer, Mr. G. DRAKE, 3rd Officer.

December 29th, 1931, at 8.15 p.m. A.T.S., the ship entered, or was suddenly surrounded by an area of white water. It seemed as though shoal water stretched from horizon to horizon, being of a pale milky appearance, making the sky, already dark with Strato-Cumulus and Fracto-Nimbus clouds, look inky black. The most noticeable feature of the phenomenon was that, although there was a fresh northerly breeze blowing, the previously rough sea and moderate short swell

were appreciably diminished. In point of fact, where there had been breaking seas all over, there were during the hour the white water was visible, very few crests on the sea, as if this luminescence was of an oleaginous quality. Floating objects appeared jet black and two dimensional. A faint haze of light seemed to be cast upward from some depth, causing a strain to the eye.

At 1745 G.M.T. the phenomenon faded, and where the sky had seemed black and the sea almost white the sea now became black and the sky lighter. An examination of a sample of surface water with a low power lens (sextant reader) failed to reveal any specimens of plankton or other marine life from which it was judged that the light came from some depth, an hypothesis apparently supported by its eerie diffused quality. No difference was noted, either in temperature or in density between the white and the surrounding water. Sea temperature 76°, density 1026.2.

Position of ship, Latitude 11° 52' N., Longitude 51° 55' E., speed 12 knots.

BLACK SAND DEPOSITED BY RAIN.

North Atlantic.

THE following is an extract from the Meteorological Record of S.S. *Clan Macbeth*, Captain H. J. GILES, R.D., R.N.R., Algoa Bay to Dunkirk. Observer, Mr. L. W. GIBBONS, 3rd Officer.

December 10th, 1931, at 1450 G.M.T., encountered very heavy rain squalls, accompanied by thunder and lightning, and continuing with little respite until the following morning. At 1720 G.M.T., in Latitude 6° 28' N., Longitude 14° 28' W., it was noticed that the rain

was depositing a fine black sand. This lasted for three minutes, during which time the wind shifted from W.N.W., through N. to S.E. by S. The thunderstorm was then immediately overhead, visibility 2, and very dark. Barometer steady at 29.97 in., Air 78° F., Sea 82° F. Distance from land approximately 120 miles.

BELAT.

South Coast of Arabia.

THE following is an extract from the Meteorological Record of S.S. *Mooltan*, Captain A. J. MORTON, Australia to London, via Suez. Observer, Mr. R. M. RICHARDSON, 2nd Officer.

December 8th, 1931, N.N.W.'ly breezes commenced about 0200 and increased to force 5, easing to force 3 at 0400. Veered to N. by W. and increased to force 6 at 0700, causing a rough sea, the visibility was reduced to 7 by sand haze. Wind veered and decreased during forenoon and by 1200 was E.N.E. 2, no sea and improved visibility.

Approximate position of ship Latitude 14° N., Longitude 50° E.

This wind was apparently the Belat, as described in the Sailing Directions and Ocean Passages for the World, although the ship was outside the limits given.

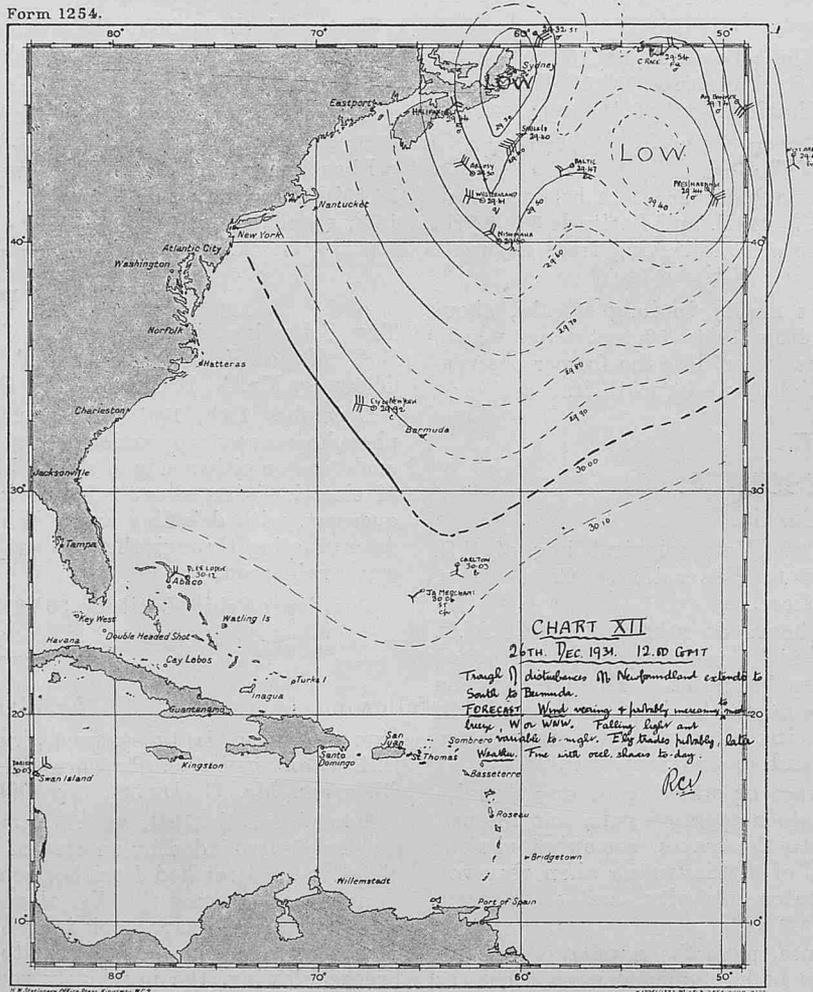
The only indication of its approach was a brick-red sunset the previous evening and slightly increased humidity. The barometer rose sharply 1/10th during the morning watch.

Note.—A description of the Belat is given in the MARINE OBSERVER, 1928, Volume V, page 52.

WEATHER CHARTS MADE AT SEA.

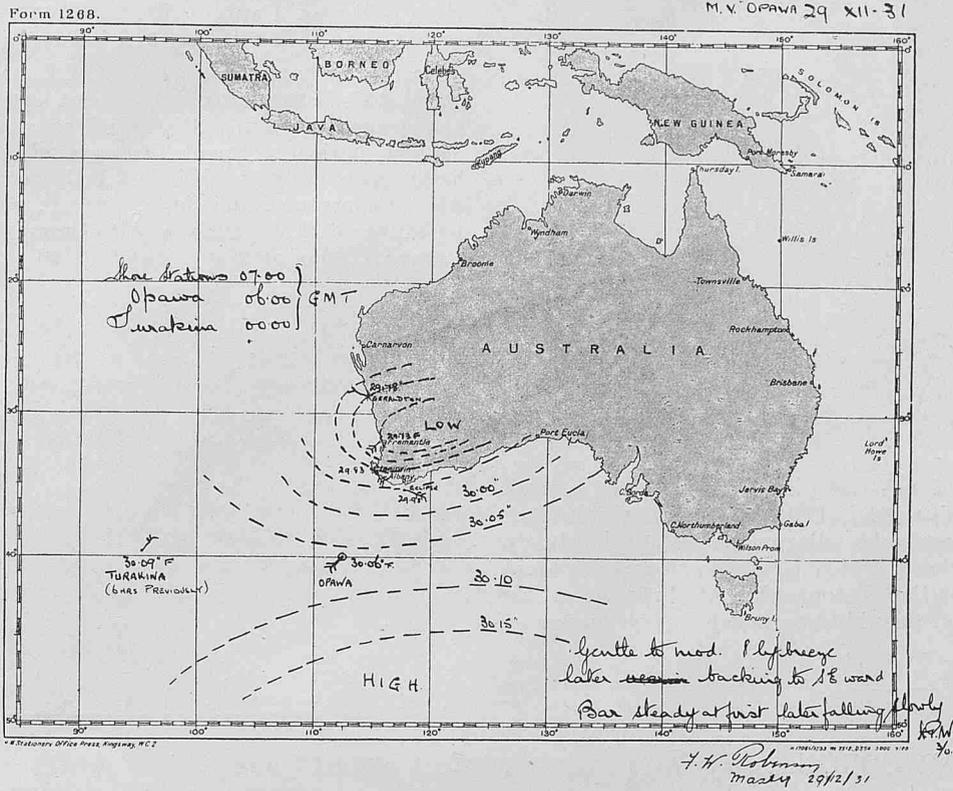
Western North Atlantic.

Weather chart made at sea on board S.S. *Jamaica Merchant*, Captain A. McCOLM, London to Kingston, Jamaica, by Mr. R. C. VIGURS.



Australian Waters.

Weather Chart made at sea on board M.V. *Opawa*, Captain F. W. ROBINSON, Liverpool to Auckland, via Cape of Good Hope, by Mr. H. P. WILLIAMSON.



CLOUD PHOTOGRAPHS.

South Georgia.

THE accompanying photographs were received with the Meteorological Log of R.R.S. *Discovery II*, Commander W. M. CAREY, R.N., at South Georgia. Observer, Mr. R. A. B. ARDLEY, 2nd Officer. The photographs were taken by Mr. A. SAUNDERS.

In Grytviken Harbour, South Georgia, looking to the westward, Mt. Hodges on the left. December 29th, 1931, 8 p.m. ship's time. Wind N.W., light, in harbour, weather bc. Barometer 994.3 mb. steady. System of very strongly defined coarse cirrus in lines converging in N.W. Sky otherwise cloudless, except for Fracto-Cumulus. Fine weather with a fairly steady barometer prevailed during the following three days, but this cloud-effect was obscured by Stratus and Strato-Cumulus within an hour or two.

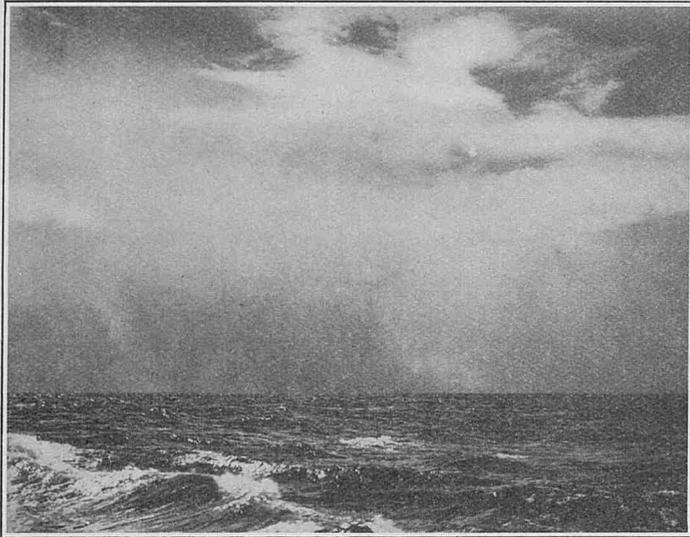


WATERSPOUT.

Mediterranean Sea.

THE following is an extract from the Meteorological Log of M.V. *Port Gisborne*, Captain W. G. HIGGS, London to Port Said. Observer, Mr. L. J. SKAILES, 3rd Officer.

December 23rd, 1931, 0943 G.M.T., observed waterspout bearing about 230° distant 6-7 miles. Spout appeared white in colour against background of rain. Disturbed sea surface was distinctly visible against horizon. Spout disappeared rapidly after 0947, no trace being seen at 0950. Wind N.E./E force 3. Barometer 1023.6 mb. Air temperature, dry bulb, 48.3° F., wet bulb, 46.0° F. Sea temperature 58.0° F. Clouds Alto-Cumulus, Strato-Cumulus, Fracto-Cumulus, amount 9/10. Light drizzle from 0840-0900.



At sea off Northern end of South Georgia, Willis Islands, bearing S.W. distant 15 miles, December 22nd, 1931. 10.30 a.m. ship's time. Wind W. by S., force 4, weather bc. Barometer 994.8 mb. steady. Heavy snow squall over the land, which is visible through a break in the squall, in the centre of the photograph. At this time all the high land of South Georgia was hidden under heavy masses of Cumulus cloud.

LUNAR CORONA.

Indian Ocean.

THE following is an extract from the Meteorological Log of S.S. *Tinkow*, Captain A. SCOBIE, Mauritius to Hong Kong. Observer, Mr. G. W. SETH.

December 24th, 1931, at 9.0 p.m., observed coloured tuft of cirrus cloud directly under moon and very close to it. The colours were as follows: yellow, orange, green, violet and red. The phenomenon lasted two or three minutes, the colours gradually fading as the cloud passed over the moon. Weather at time of observation, fine and clear. Cirrus and Cumulus 2/10, moderate E'ly wind and heavy E'ly swell. Altitude of moon 33°. Position of ship Latitude 14° 30' S., Longitude 62° 50' E. Twenty minutes later observed same phenomenon on larger scale, a complete and very distinct corona forming. The colour of the inner circle was orange-red, which merged into violet and blue, or green, the latter colour may have classed as either. Phenomenon lasted about 15 minutes, gradually fading as cirrus cloud passed over moon.

SETTING OF VENUS.

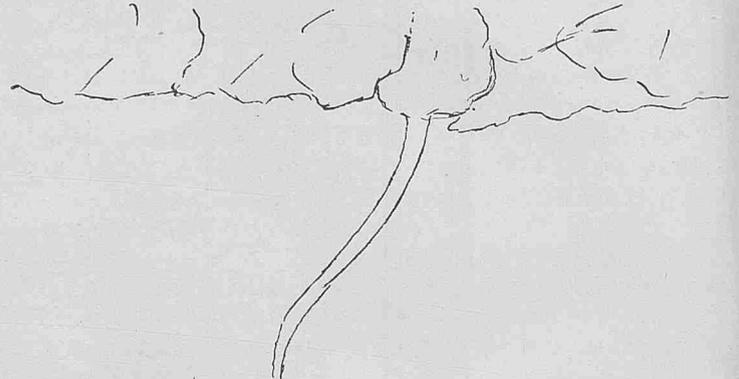
Arabian Sea.

THE following is an extract from the Meteorological Record of S.S. *Mongolia*, Captain H. R. RHODES, London to Bombay. Observer, Mr. H. TEE, 3rd Officer.

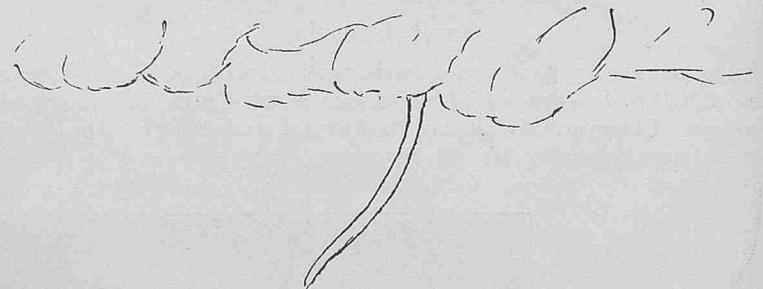
December 13th, 1931, at 1905 to 1920 A.T.S., the planet Venus, having previously been scintillating with more than usual brilliance, commenced, at an altitude of 5°, to occult a vivid red, blue, green and white, each colour showing by chronometer timing for a space of 1½ seconds, giving the appearance of a powerful alternating, occulting shore light. This continued to the actual moment of the dipping of the planet below the horizon.

The sun had set at 1740 ship's time, and there were no clouds of any kind. The moon's altitude was 25°, bearing S.W., the planet bearing W.S.W. Barometer 30.03, Air 74°, Sea 73°, Wind N.E. 3.

Position of ship Latitude 13° N., Longitude 50° E.



9 43 AM



9. 47. A.M.

SUMMARY OF OBSERVATIONS FOR ABNORMAL REFRACTION, 1930-1932.

THE following remarks were forwarded with the Meteorological Log of S.S. *Tainui*, Captain A. McINTOSH. Observer, Mr. G. A. HARVEY, 3rd Officer.

As the result of observations for Abnormal Refraction:—

By the Back Horizon Prism, by observation of Green Flash, and exact time of Sunset, taken or superintended by Commander C. H. LUSH, R.N., during the periods shown below, from which he has drawn the following conclusions:—

Periods.

July 15th-August 28th, 1930, on board M.V. *Port Hobart*, during passage from London to Sydney, via Suez Canal.

September 5th, 1930-June 24th, 1932, while serving on board H.M.A.S. *Australia* and *Canberra*, on the Australian Station.

July, 1st-August 8th, 1932, on board R.M.S. *Tainui*, during passage from New Zealand to Southampton, via Panama Canal.

Conclusions.

Back Horizon Prism.

After plotting 144 Observations, taken during the above periods, the following conclusions have been reached:—

The best height at which to observe altitudes of heavenly bodies, when abnormal refraction is suspected, appears to be about 50 feet. At this height the "Dip Correction" for abnormal refraction seems to be a minimum for various conditions of sea and air temperatures; being nearer zero just below 50 ft., when the sea is colder than the air, and just above 50 ft., when the sea is warmer than the air.

At heights other than 50 feet the "Dip Correction" for abnormal refraction is more irregular, being, in general, + to the Dip at low heights and — to the Dip at greater heights, especially if the sea is colder than the air.

For all differences of sea and air temperature the arithmetical difference in the "Dip Correction" for abnormal refraction for any two given heights appears to be constant, i.e., about 0.7' for the heights 18 and 48 feet. The zero correction varies just above or below 50 ft., as stated in (1) above.

The maximum "Dip Correction" obtained was 1.0' + to the Dip, and occurred on July 27th, 1932, in the Caribbean Sea, at a height of 19 ft. above sea level, with sea temperature 83° F.

and air temperature 82°. The corresponding correction at 49 ft. on this occasion was 0.2' +.

On the outward voyage from London to Sydney in 1930 the maximum "Dip Correction" was 0.9' +, and occurred in the Eastern Mediterranean, sea temperature 89°, air temperature 89°, and also in the Red Sea, sea temperature 84°, air temperature 90°, both at a height of 35 ft., in July, 1930.

The table of Abnormal Refraction given in the prefacing remarks to Inman's Tables of the 1927 Edition, though bearing some resemblance to the plotted results obtained, are incorrect in many details; on the whole the corrections given in the table seem to be very much exaggerated.

The results obtained seem to show that excessive errors in displacement of the horizon, due to abnormal refraction do not exist, which is contrary to previous supposition; and that on nearly all occasions the effect of differences in sea and air temperatures on the displacement of the horizon are so small as to be negligible.

"Green Flash" and Sunset Observations.

These were insufficient in number to permit of any general conclusions being drawn, but plotted results indicate that the total refraction correction at very low altitudes shows a tendency to decrease when the sea is warmer than the air, and to increase when the sea is colder than the air.

CURRENTS IN THE PERSIAN GULF, NORTHERN PORTION OF THE ARABIAN SEA, BAY OF BENGAL, ETC.

III.—The N.E. Monsoon Period and General Summary.

In this article a description of the currents shown on the MARINE OBSERVER Charts for the two quarters November to January and February to April is given. This will be followed by a general summary showing the seasonal variation of the currents throughout the year and also the result of an investigation of the currents off the east coast of Ceylon. The N.E. Monsoon is at its height during the quarter November to January and is still comparatively strong during February, decreasing in March. April is a transition month.

Currents of the Persian Gulf.—There is no definite system of currents in the Persian Gulf during the N.E. Monsoon period, and the mean currents are weak. The strongest currents that have been experienced, as shown by the roses, set N. and also W. during November to January, and E.N.E. during February to April.

The maximum drift observed in the Persian Gulf for the period 1910 to 1931 was at the rate of 42 miles per day, N., recorded by H.M.S. *Crocus* on November 23rd, 1929, in Latitude 26° 57' N., Longitude 52° 35' E. This is also the maximum drift for the whole year.

An average of eight days observations by one of H.M. ships in the neighbourhood of Jezirat Tunb, in the entrance to the Persian Gulf, in April, 1930, communicated by the Hydrographer, shows a current running into the Gulf at the rate of six miles per day.

Currents of the North Arabian Sea.—The mean currents are weak in both quarters. Of the actual current observations the maximum drift for the period 1910 to 1931 was that recorded by S.S. *Frankenfels* on December 12th, 1920, S.74° W., 43 miles per day in Latitude 14° 05' N., Longitude 49° 26' E. The mean currents do not indicate such a regular circulation as that of the S.W. Monsoon period. The most definite current is that flowing down the west coast of India from Bombay to Cape Comorin during the quarter February to April. During the height of the N.E. Monsoon in November to January this current flows the reverse way, northward up the coast. A similar reversal is seen on the south-east coast of Arabia from Latitude 18° N. to Ras al Hadd. In November to January the current here flows south-westerly, in February to April north-easterly.

The most useful statement that can be made about the currents of the North Arabian Sea during the N.E. Monsoon is that during

the height of the Monsoon there is on the mean a weak westerly circulation, the current flowing north-westerly up the west coast of India, westerly across the head of the sea and south-westerly down the Arabian coast south of Ras al Hadd. Across the middle of the sea the mean flow is westerly. This circulation is shown in Figure 2. During the quarter February to April, during part of which the N.E. Monsoon is still blowing, the circulation of the North Arabian Sea is reversed, the mean current passing clockwise round the head of the sea, with north and north-easterly sets up the Arabian Coast, and south-easterly sets down the west coast of India. This circulation is shown in Figure 3 and is in the same direction as that of the S.W. Monsoon period. In other words, the S.W. Monsoon circulation is established in the North Arabian Sea, in a weak but definite form, while the N.E. Monsoon is still blowing. No explanation can be offered at present of this striking and interesting fact. Reference to the Monthly Meteorological Charts of the East Indian Seas will show that there is little decrease in the strength of the N.E. Monsoon in February as compared with January and the S.W. Monsoon does not blow at all in the Arabian Sea during the quarter.

Taking the region above referred to, south of Ras al Hadd, Latitude 18° N. to 22° N., coast of Arabia to Longitude 60° E., Table 1 has been compiled and shows the reversal of current between January and March.

TABLE 1.

Reversal of Current off the South East Coast of Arabia, Latitude 18° N. to 22° N., during the N.E. Monsoon.

Month.	Total Number of Current Observations.	Number of Currents with southerly component.	Number of Currents with northerly component.
December ...	16	11	5
January ...	9	8	1
February ...	8	1	7
March ...	8	2	6

Table 2 is a similar table for the current off the west coast of India.

TABLE 2.

Reversal of Current off the West Coast of India, Latitude 10° N. to 18° N., during the N.E. Monsoon.

Month.	Total Number of Current Observations.	Number of Currents with southerly component.	Number of Currents with northerly component.
December ...	19	6	13
January ...	18	7	11
February ...	5	2	3
March ...	16	14	2

We thus see that on both sides of the Arabian Sea the current in March is reversed from that of January, February being a transition month in the eastern part of the Sea.

In order to show the change in the current off the west coast of India from normal S.W. Monsoon conditions to normal N.E. Monsoon conditions Table 3 is given.

TABLE 3.

Reversal of Current off the West Coast of India, Latitude 10° N. to 18° N. from the S.W. Monsoon to the N.E. Monsoon.

Month.	Total Number of Current Observations.	Number of Currents with southerly component.	Number of Currents with northerly component.
August ...	18	18	0
September ...	31	26	5
October ...	19	12	7
November ...	14	2	12

Currents of the Bay of Bengal (including the Burma or Andaman Sea).—In the second article it was stated that the mean currents of the Bay of Bengal were weaker than those of the Arabian Sea during the S.W. Monsoon period. We now find that the reverse is the case during each of the two quarters of the N.E. Monsoon period, the mean currents in the Bay of Bengal being stronger than those of the Arabian Sea. The mean currents of the Bay of Bengal, as shown on the charts, are however weaker and much less regular than those of the S.W. Monsoon period, but a distinct circulation

INDIAN OCEAN.

General flow of Main Current during the S.W. Monsoon Season (Northern Summer) Charted in 1929 to 1932.

(To be completed as investigation proceeds.)

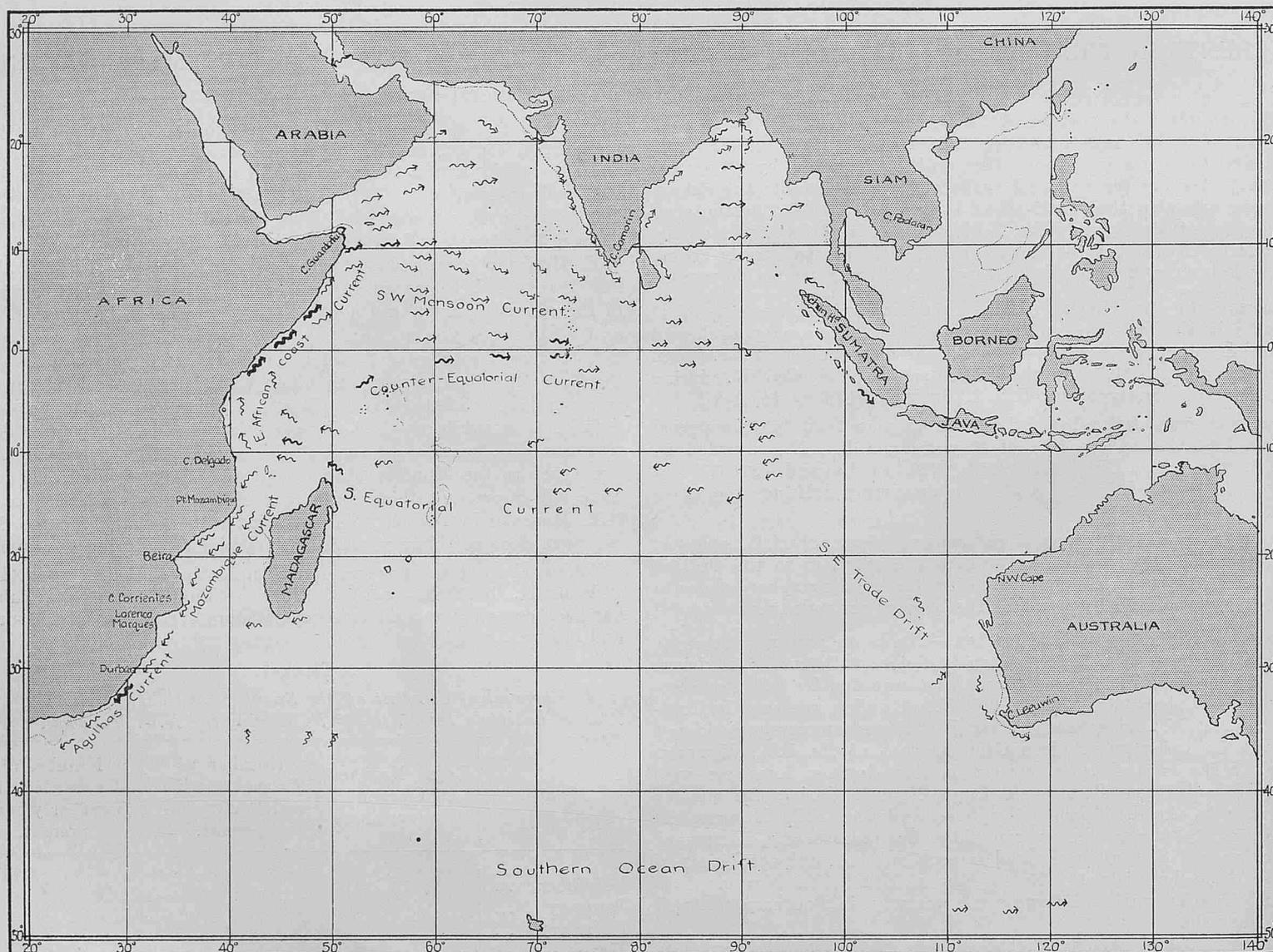


Figure 1.

INDIAN OCEAN.

General flow of Main Current during the N.E. Monsoon Season (Northern Winter) Charted in 1929 to 1932.

(To be completed as investigation proceeds.)

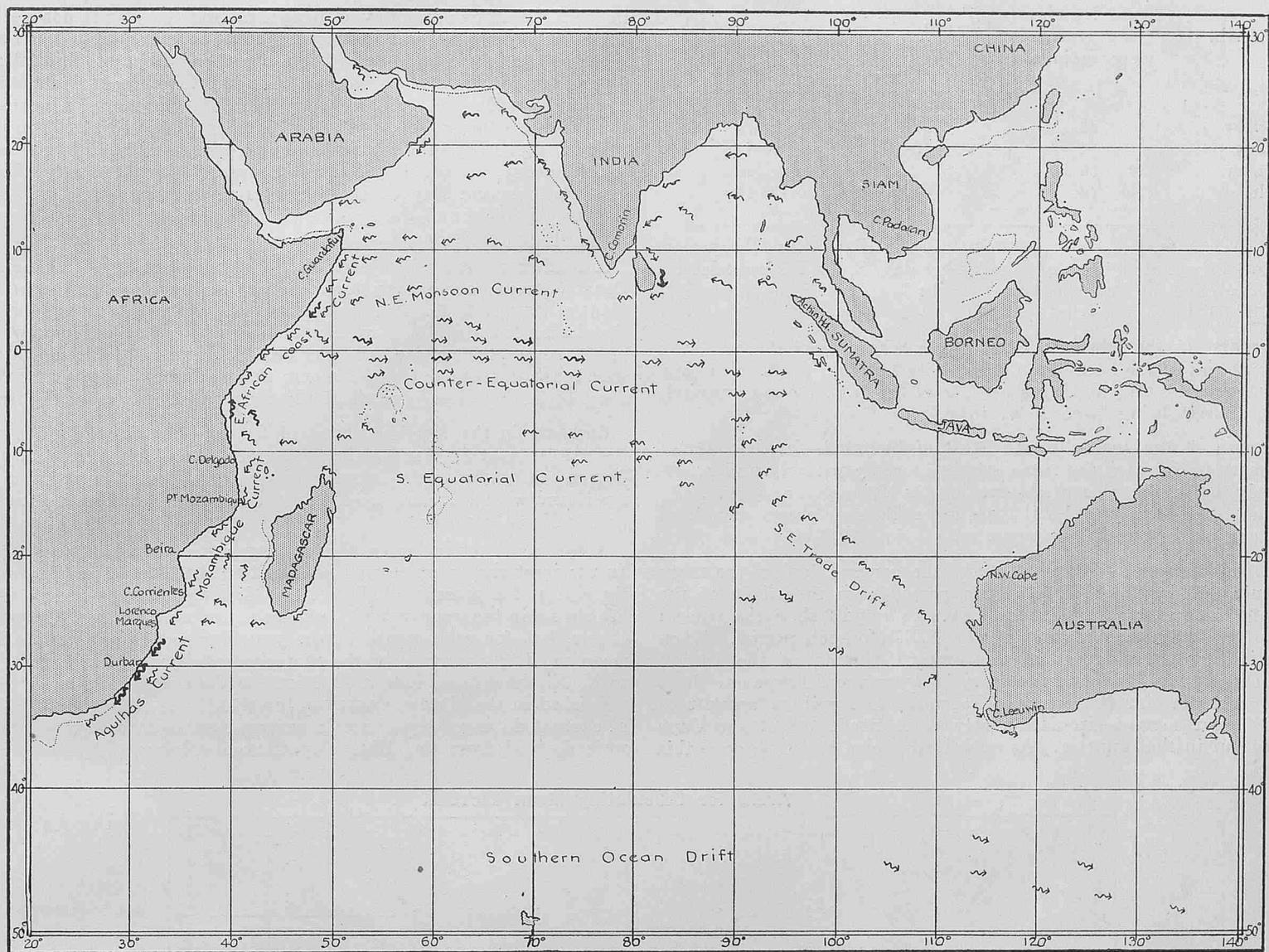


Figure 2.

nevertheless occurs. As in the case of the Arabian sea the circulation in the Bay of Bengal differs in the two quarters of the N.E. Monsoon period.

In the quarter November to January, when the N.E. Monsoon is at its height, there is a well-marked westerly mean set between Latitudes 4° N. and 8° N., from the Malay coast to Ceylon. From the head of the Bay to the south of Ceylon the mean flow of current is down the east coast of India and nearly parallel to it, the mean sets being successively W., S.W. and S. Over the east and centre of the Bay the mean sets, though irregular, lie mainly between N.W. and S.W. There is thus a definite westerly flow over the whole of the Bay as shown in Figure 2. The strongest mean current is found off the east coast of Ceylon, between Latitudes 6° N. and 8° N., 22.8 miles per day, S. 12° W.

In the quarter February to April the westerly mean current in the southern part of the Bay continues to flow, but from Latitude 8° N., off the east coast of Ceylon, the current passes up the east coast of India to the head of the Bay, thus showing a complete reversal. Over the east and centre of the Bay the mean currents as a whole are south-westerly, so that there is no essential change in these regions from the quarter November to January. This circulation is shown in Figure 3. The strongest mean current in this quarter is 24.0 miles per day, N. 40° E., between Latitudes 16° N. and 18° N., from the east coast of India to Longitude 84° E.

Here again we have the reversal of the current occurring while the N.E. Monsoon is still blowing. It is true that S.W. winds blow

off the east coast of India between Latitude 15° N. and the head of the Bay in March and April, but an examination of the actual currents again shows that the reversal of current commences in January, and is fully established at the beginning of February. Taking, for example, the region of Latitude 14° N. to 18° N., east coast of India to Longitude 84° E., the information given in Table 4 will make the reversal quite clear.

General flow of Current during the months of February to April.

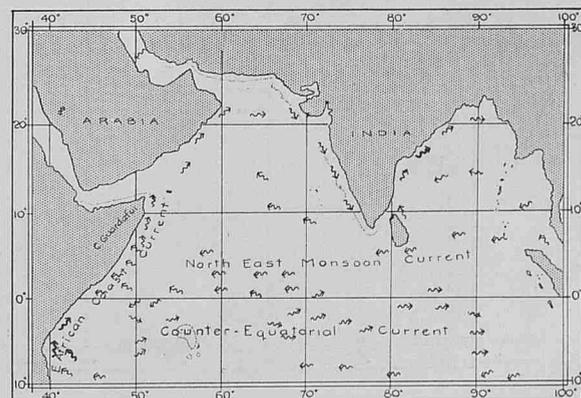


Figure 3.

TABLE 4.

Reversal of Current off the East Coast of India (Latitude 14° N. to 18° N.) during the N.E. Monsoon.

Month.	Total Number of Current Observations.	Number of Currents with southerly component.	Number of Currents with northerly component.
December ...	25	22	3
January ...	24	9	15
February ...	16	2	14
March ...	14	1	13

The maximum drift observed in the Bay of Bengal for the period 1910 to 1931 was at the rate of 88 miles per day, S. 21° W., recorded by S.S. *Hatarana* on December 5th, 1924, in Latitude $7^{\circ} 45'$ N., Longitude $82^{\circ} 26'$ E.

Currents of the Malacca Strait.—The charts include only the northern end of the Strait as far south as Latitude 4° N. The flow of current is westerly during the whole of the N.E. Monsoon period, the mean sets being from N.W. to S.W.

Currents in the Indian Ocean West of Sumatra.—In the quarter November to January the mean sets are mainly westerly and south-westerly, but the number of observations in the region are small. In the quarter February to April there are still fewer observations and the mean sets are weak and irregular.

General Summary.—Figure 1 shows the general flow of the main currents during the S.W. Monsoon period over the whole of the Indian Ocean so far investigated. Figures 2 and 3 show the general flow of the main currents during the N.E. Monsoon period. When investigating the currents in the western portion of the Indian Ocean in 1931 it was found necessary to draw a small separate chart of general flow for the quarters February to April on account of the different current circulation between Latitude 10° S. and Cape Guardafui in that quarter. As explained above, the work done this

year has shown that this chart (Figure 3), for February to April, must be extended to include the whole of the Arabian Sea and the Bay of Bengal, in each of which two distinct circulations occur during the N.E. Monsoon period.

We thus arrive at the interesting result that the change of current in the Arabian Sea and Bay of Bengal during the year is not merely a change from the N.E. Monsoon system of currents to the S.W. Monsoon system of currents. There are three different circulations during the course of the year:—(i) The S.W. Monsoon or clockwise circulation (May to October); (ii) the N.E. Monsoon or counter-clockwise circulation (November to January); (iii) a transition circulation occurring in February to April, while the N.E. Monsoon is still blowing, in which the flow of current in the south of the Arabian Sea and Bay of Bengal remains westerly as in (ii), but the circulation round the heads of the Sea and the Bay is reversed, being clockwise as in (i).

A further point of interest is that the change in the East African Coast current for the quarter February to April as shown in the MARINE OBSERVER for 1931 agrees perfectly with the change in the circulation found in the North Arabian Sea. The clockwise flow which passes round the head of the Arabian Sea and continues down the west coast of India to Cape Comorin therefore commences on the east coast of Africa closely north of the equator, as shown in Figure 3.

Currents in the Neighbourhood of Ceylon.—As was stated in the first article of this year's series the currents to the east and south of Ceylon are particularly interesting on account of the situation of the island where, broadly speaking, the Arabian Sea, Bay of Bengal, and Indian Ocean meet.

A special examination of these currents has therefore been made. In the inset charts which will be found in the lithographic pages at the end of the present number of the MARINE OBSERVER the currents are shown in the same manner as those on the main MARINE OBSERVER charts, but for each month of the year, instead of quarterly. The mean monthly currents for the southernmost square, Latitude 4° N. to 6° N., have been computed from the data used in the currents published in the MARINE OBSERVER for 1930. The changes in the flow of current during the year are in general agreement with those which were derived from the Admiralty Current Charts and summarised

Areas for Calculating Mean Current.

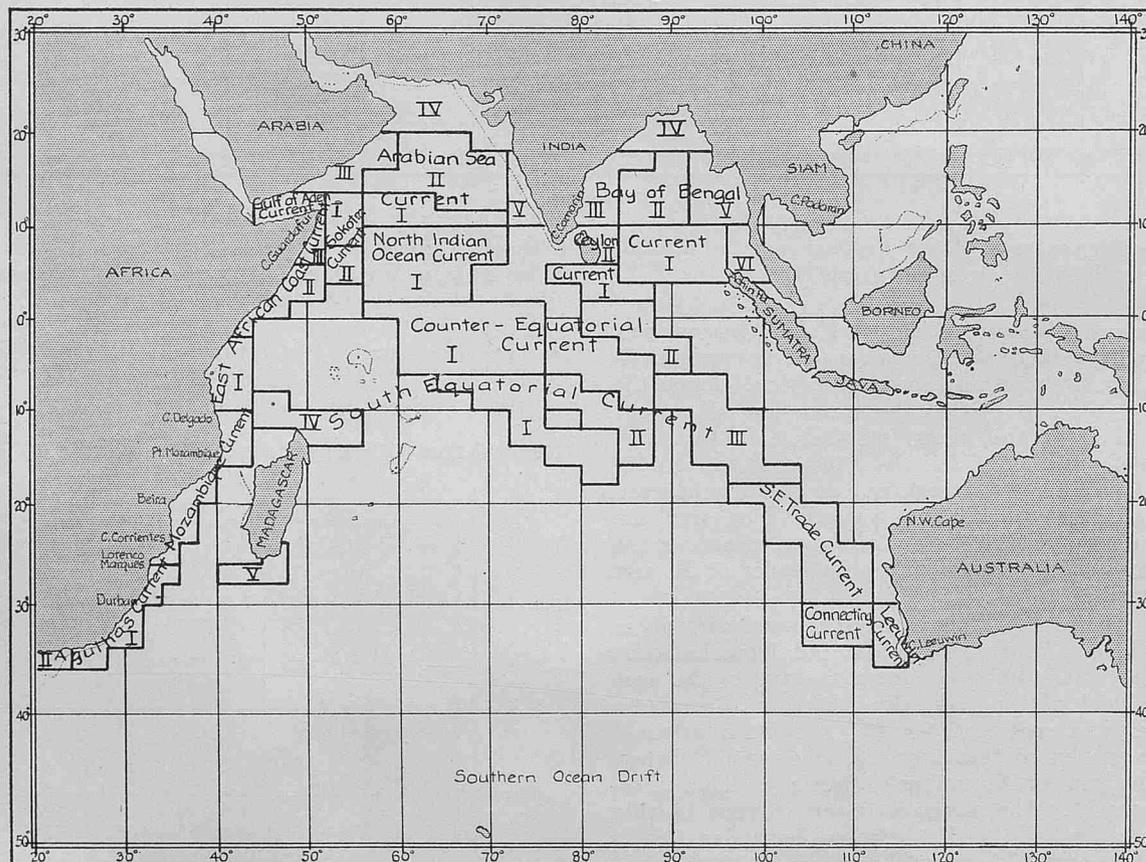


Figure 4.

TABLE 5.

Indian Ocean (Arabian Sea, Bay of Bengal, etc.).

Mean Quarterly Currents (drift in miles per day).

Current.	February to April. (N.E. Monsoon.)		May to July. (S.W. Monsoon.)		August to October. (S.W. Monsoon.)		November to January. (N.E. Monsoon.)	
	Mean Set and Drift.	Number of Observations.	Mean Set and Drift.	Number of Observations.	Mean Set and Drift.	Number of Observations.	Mean Set and Drift.	Number of Observations.
Persian Gulf	S. 28° W. 1	27	S. 77° W. 3	31	S. 49° W. 3	27	N. 68° W. 3	24
Arabian Sea I	N. 70° W. 3	792	N. 77° E. 9	544	N. 82° E. 8	534	S. 84° W. 8	569
Arabian Sea II	N. 20° W. 1	392	N. 80° E. 8	369	N. 69° E. 7	360	N. 88° W. 3	431
Arabian Sea III	N. 1° E. 2	235	N. 63° E. 16	405	N. 61° E. 11	319	S. 86° W. 5	305
Arabian Sea IV	S. 59° E. 2	162	S. 88° E. 6	244	S. 76° E. 5	195	N. 77° W. 2	217
Arabian Sea V	S. 25° E. 6	44	S. 36° E. 9	86	S. 24° E. 10	75	N. 22° W. 5	56
Ceylon II	N. 75° W. 6	158	S. 23° E. 10	210	S. 58° E. 9	185	S. 6° W. 17	235
Bay of Bengal I	W. 10	575	S. 85° E. 8	571	S. 73° E. 5	513	N. 73° W. 8	536
Bay of Bengal II	S. 74° W. 4	320	S. 88° E. 5	311	S. 86° E. 3	323	N. 59° W. 5	329
Bay of Bengal III	N. 33° E. 8	191	N. 56° E. 9	215	S. 73° E. 5	266	S. 74° W. 5	306
Bay of Bengal IV	N. 60° E. 10	94	N. 72° E. 2	136	S. 11° W. 2	124	S. 78° W. 4	155
Bay of Bengal V	S. 24° W. 5	81	N. 75° E. 5	83	S. 78° E. 2	76	S. 79° W. 4	62
Bay of Bengal VI	N. 79° W. 7	96	N. 53° W. 4	97	N. 38° E. 1	80	N. 71° W. 11	92

in the first article. The main features shown in the inset chart are as follows:—The easterly current of the S.W. Monsoon period flows south of Ceylon from May to October, the westerly current of the N.E. Monsoon period flowing from November to March. April is the transition month. From February to April the current off the north-east coast of Ceylon flows north-westerly, being the starting point of the main clockwise circulation round the Bay of Bengal in that quarter. In May and June the same current is found, the starting point of the clockwise circulation round the Bay of Bengal during the first months of the S.W. Monsoon period. From July to October the northerly current is not shown on these charts for, as we saw in the second article, the clockwise circulation weakens and starts further north. The counter-clockwise circulation of the N.E. Monsoon is shown in the months of October to December when the southerly current is strong off the east coast of the island. In December particularly it forms a strong sweep of current round the island into the westerly current of the Indian Ocean.

In the months of May and June it is obvious that there is a definite point of division of the northerly and southerly currents in about Latitude 10° N. In order to determine this point more exactly the charts for May, June and July were computed in one-degree squares, and these are shown in the inset charts. It will be seen that the separation of the northerly and southerly currents is different in each month and also differs for varying longitudes in the same month.

Seasonal Variations of the Currents in the Arabian Sea, Bay of Bengal, etc.—As stated in previous years, the Indian Ocean is being divided into sections for the purpose of computing mean seasonal currents. Twelve sections have been added in this year's work, as shown in Figure 4. The mean set and drift for each quarter have been computed for every section, the results being given in Table 5. The figures for Arabian Sea I are reproduced from THE MARINE OBSERVER, 1930, in order to complete the Arabian Sea.

Table 5 shows the considerable reduction in strength of the currents in the later S.W. Monsoon period August to October, compared with those of May to July. The two circulations of the N.E. Monsoon are more clearly shown by the changes of set in this table than by examination of the current charts, owing to their grouping into areas larger than the two by four degree squares of the charts. It will be seen that the areas of strongest mean current are the small region east of Ceylon (Ceylon II), 17 miles per day, during the height of the N.E. Monsoon, and the region off the south-east coast of Arabia (Arabian Sea III), 16 miles per day, during the height of the S.W. Monsoon.

Summary of Main Differences from Previous Knowledge.—These are four in number:—

(i) The mean currents of the Arabian Sea and Bay of Bengal conform to more regular systems, or circulations, than the older charts show. The circulations during the N.E. Monsoon period are, however, mainly weak.

(ii) It was not recognised before that there are two different circulations of opposite character in the two quarters of the N.E. Monsoon period. This applies to both the Arabian Sea and the Bay of Bengal. The Admiralty charts do, however, show the second of these circulations, that which occurs in the quarter February to April, in the case of the Bay of Bengal, very clearly in the months of February and March.

(iii) The existence of the small counterclockwise circulation at the head of the Bay of Bengal during the whole of the S.W. Monsoon period.

(iv) The investigation of the currents experienced at the head of the Bay of Bengal before and after cyclones gives proof that the strengthening of westerly sets in this region is not an infallible indication of the advent of a cyclone.

SOUTHERN ICE REPORT.

During the Year 1931—December.

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1931	5	50° 15' S.	49° 00' E.	Berg and growlers	Passed 1 large rugged berg and numerous growlers ...	S.S. <i>Southern King</i> .
	4	53° 30' S.	55° 40' E.	Growler	Passed 1 small growler	do.
	2	56° 30' S.	64° 15' E.	Growlers	Passed 4 heavy growlers in this position	do.
	1	59° 56' S.	71° 12' E.	Large bergs	Vessel steaming towards Cape of Good Hope, passed a few large bergs.	do.
	3	53° 28' S.	115° 03' W.	Berg	Sighted one berg	M.V. <i>Coptic</i> .
	3	53° 28' S.	114° 50' W.	Berg	One berg	do.
	2	52° 47' S.	49° 17' W.	Berg	Tabular and well-preserved, sea worn round waterline. Square in plan and sloping from 150 to 204 ft. in height. Dimensions measured by vertical angle and angle of depression at waterline from $\frac{1}{4}$ mile distance. Length was 1,150 feet.	R.R.S. <i>Discovery II</i>
	2	53° 03' S.	49° 10' W.	Berg	180 feet high and 1,000 feet long. Tabular but more weathered. Dimensions estimated.	do.
	5	58° 53' S.	48° 42' W.	Berg	Large, about 1,000 feet long, but height indeterminable in fog. Brash and several small growlers in vicinity.	do.
	7	From 60° 21' S. to 60° 39' S.	48° 40' W. to 48° 44' W.	23 bergs, pack, growlers and brash ...	Bergs passed within 10 miles of track. About half of these were large tabulars between 1,000 and 2,000 feet long, the rest being generally of moderate size and weathered or seaworn. At 0210 encountered very heavy broken pack, rafted and hummocked, and evidently fairly old. It extended fairly to the South, and to the East and West, and course was altered to the Northward. The sea in the vicinity of the pack edge was littered with growlers, brash, and remnants of heavy old floes.	do.
	5	59° 05' S.	48° 41' W.	Berg	Small and weathered. Brash 2 miles North and South of this.	do.
	6	From 59° 43' S. to 60° 21' S.	48° 31' W. to 48° 40' W.	13 Bergs	Between these positions, and within 10 miles of track. 9 of these were large tabulars, between 1,000 and 2,500 feet long; the rest being generally of moderate size, irregular and sea-worn, evidently capsized. The tabulars were well-preserved. About 30 growlers and bergy bits, of various sizes, were also passed.	do.
	6	59° 12' S.	48° 25' W.	Berg	180 feet high and 2,000 feet long. Tabular and well preserved.	do.
	7	From 60° 26' S. to 60° 09' S.	48° 38' W. to 48° 04' W.	4 bergs and several growlers	2 bergs large and tabular, the larger about $\frac{1}{4}$ mile long, and 2 small and tabular, only about 30 feet high. A number of growlers and bergy bits passed. All ice within 5 miles of track.	do.
	7	From 60° 09' S. to 59° 55' S.	48° 04' W. to 47° 11' W.	About 40 bergs; pack-ice, drift-ice and brash.	Bergs within 2 miles of track, the bulk of them to the Southward and embedded in pack. 8 tabulars, between 80 and 100 feet high and up to 1,500 feet long were seen, the remaining bergs being mainly of moderate size and much weathered. The edge of pack-ice was met at 0930, and thereafter skirted on various N.E.'ly courses. This pack was very heavy but much broken up at the edge. It was full of floebergs and growlers and the sea in the offing was littered with fragments of very heavy old floes, and patches of brash. The ice edge trended roughly N.E.	do.
	7	From 59° 55' S. to 59° 46' S.	47° 11' W. to 47° 08' W.	11 Bergs, pack and drift ice	Bergs within 5 miles of track, mainly small and moderate sized, and weathered. Between these positions the vessel was worked on various N.'ly. courses through drift-ice consisting of broken-down heavy floes irregularly dotted about the sea, and here and there compact enough to form loose and ragged streams. In the first position the main body of pack was to the S.E. and South, and strong blink showed it to be fairly solid. In the second position a clear sea to the eastward and northward was met, and vessel proceeded E.N.E. rapidly losing sight of sea-ice of any sort.	do.
	7	59° 45' S.	46° 47' W.	Berg	160 feet high and 1,500 feet long. Tabular and well preserved.	do.
	16	50° 37' S.	45° 10' W.	Berg	About 300 feet high and 700 feet long. (Water temperature 40° F., air 48° F.)	S.S. <i>West Cusseta</i> .
	16	50° 47' S.	45° 05' W.	Berg	About 200 feet high and 1,000 feet long	do.
	8	From 59° 46' S. to 59° 38' S.	45° 30' W. to 44° 30' W.	5 Bergs	Within 7 miles of track. All small and weathered ...	R.R.S. <i>Discovery II</i> .
	8	From 59° 38' S. to 59° 46' S.	44° 30' W. to 43° 38' W.	4 Bergs	Within 10 miles of track. 2 large and tabular, about 1,500 feet long and 180 feet high, the other 2 of moderate size and weathered.	do.
	8	59° 51' S.	43° 35' W.	Pack ice and 2 small bergs	Came to the Northern edge of pack-ice, extending roughly East and West. This ice was lighter than that previously encountered to the Westward, and was much broken up. In the main it consisted of moderate, unpressured ice, but a number of old, hummocked floes were included in it.	do.
	8	From 59° 47' S. to 59° 44' S.	43° 17' W. to 43° 02' W.	Detached heavy floes	Between these positions drift ice, in the form of detached, heavy, much eroded floes, was navigated. Probably about 100 of these sea-ice "growlers" were passed.	do.
	8	From 59° 44' S. to 59° 41' S.	43° 02' W. to 42° 44' W.	8 bergs, pack and drift ice	Bergs within 1 mile of track, all of moderate size and weathered, except 1 which was large and tabular. In second position met a line of pack-ice extending from South to N.E., and altered course to North. Throughout this time the sea was littered with growlers and fragments of heavy old floes, and occasional streams and patches of brash were met. In the third position the weather cleared and strong blink was observed extending from S.E. to S.W.	do.
	8	59° 30' S.	42° 38' W.	6 bergs	Within an 8 mile radius of position, 2 of these were tabulars of moderate size, the remainder mainly small and much weathered. The sea was thinly strewn with detached floes and fragments in this position.	do.
	9	From 59° 30' S. to 59° 17' S.	42° 38' W. to 42° 35' W.	5 bergs and pack ice	Bergs passed within 3 miles of track, all of moderate size and much weathered. In the second position met the edge of heavy, much broken pack ice, extending to the Northeastward, and from there to third position skirted the edge of it.	do.
9	From 59° 02' S. to 58° 49' S.	42° 30' W. to 42° 20' W.	... ..	Bergs within 5-6 miles of track. 4 of these were large tabulars, averaging 160 feet high and 1,500 feet long, of which 2 were much covered and appeared to be very old. The remainder were all of moderate size or small, and weathered and broken down, though several still gave indications of tabular original form. Between these positions the vessel was navigated in drift ice, usually sparse, and consisting of remains of heavy floes. Patches of brash, and fragments were frequently met.	do.	
9	58° 40' S.	42° 14' W.	2 bergs	Small and weathered	do.	
9	58° 33' S.	42° 08' W.	3 bergs	Within a 1-mile radius of ship. 1 small tabular 80 feet high, the other 2 small and much seaworn.	do.	
17	49° 20' S.	41° 38' W.	Berg	About 150 feet high and 400 feet long	S.S. <i>West Cusseta</i> .	

Year	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1931	9	From 58° 23' S. to 58° 11' S.	41° 51' W. 41° 16' W.	13 bergs	Within 7 miles of track. The majority of these were small, broken down, and seaworn bergs, but 2 seen near the second position were very large tabulars, both about 1/2 mile square and 130 feet high. They appeared fairly old and were breaking down in places. No sea-ice seen.	R.R.S. <i>Discovery II.</i>
	17	49° 08' S.	40° 48' W.	Berg	About 200 feet high and 400 feet long (water temperature 38° F., Air 47° F.).	S.S. <i>West Cusseta.</i>
	10	From 58° 08' S. to 57° 56' S.	40° 57' W. 39° 47' W.	6 bergs	Within 7 miles of track. 2 of these were large and tabular—the larger about 2 miles long. The remainder were irregular and of moderate size. Several growlers were passed, one completely bottle green.	R.R.S. <i>Discovery II.</i>
	21	From 54° 00' S. to 53° 58' S.	40° 24' W. 40° 03' W.	22 bergs	Within 10 miles of track. 7 tabulars, only 2 of which were large. Of the remainder, about half were small and half of moderate size, and all much weathered.	do.
	21	From 54° 14' S. to 54° 00' S.	39° 47' W. 40° 24' W.	18 bergs	Within 10 miles of track. 4 large tabulars; the remainder mainly of moderate size several of them being high, square, broken-down tabulars.	do.
	21	53° 58' S.	39° 55' W.	4 bergs	Within a 7 mile radius of position. All of moderate size and irregular.	do.
	22	From 53° 57' S. to 53° 56' S.	39° 43' W. 39° 07' W.	13 bergs	Within 7 miles of track, 4 large tabulars, of fairly new appearance; the remainder moderate sized or small, and irregular.	do.
	21	From 54° 29' S. to 54° 14' S.	38° 54' W. 39° 47' W.	14 bergs	Within 10 miles of track. 2 of these were very large tabulars, both about a mile long and 120 feet high. Of the rest, 4 were large tabulars averaging 1,500 feet in length, and the remainder of moderate size and much weathered.	do.
	10	From 57° 56' S. to 57° 50' S.	39° 47' W. 38° 39' W.	24 bergs	Within 10 miles of track, fairly evenly distributed. 2 large and tabular, the remainder nearly all of moderate size and mainly irregular and weathered. One small bottle-green was passed, and one weathered berg had a diagonal stratum of perfectly black ice.	do.
	22	From 53° 56' S. to 53° 54' S.	39° 07' W. 38° 28' W.	14 bergs	Within 10 miles of track. Only one tabular of moderate size; all the rest irregular and mainly small.	do.
	22	From 53° 54' S. to 5 miles N. of Right Whale Bay.	38° 28' W.	20 bergs	Within 10 miles of track, evenly distributed on either side. 2 large tabulars off Willis Is. and 3 moderate sized tabulars. 8 bergs aground inshore between Willis Is. and Bight Whale Bay, mainly small. The remainder to seaward, all of moderate size, of which three were broken down tabulars and 4 irregular and weathered.	do.
	21	From 54° 45' S. to 54° 30' S.	37° 52' W. 38° 51' W.	12 bergs	Within 8 miles of track. All tabular except 3 moderate sized irregular bergs. 2 of the tabulars were large, about 1,000 ft. long, the remainder varying between 400 and 1,000 ft. in length.	do.
	10	From 57° 50' S. to 58° 19' S.	38° 39' W. 37° 50' W.	19 bergs	Within 10 miles of track. 3 of these were very large tabulars, each about a mile long, but only 100 ft. high, and of fairly old appearance. Of the remainder, about half were tabular and the rest weathered and sea-worn. None of them were of new appearance; the tabulars being nearly all caverned and breaking down.	do.
	21	From 55° 00' S. to 54° 45' S.	36° 58' W. 37° 52' W.	7 bergs	Within 4 miles of track, 3 irregular, and all fairly large	do.
	10	From 58° 19' S. to 58° 44' S.	37° 50' W. 36° 59' W.	18 bergs	Within 10 miles of track. Several large tabular bergs, the remainder of moderate size and irregular. A remarkable variegated berg was passed. It was 24 ft. high and 100 ft. long, and one half was pure bottle-green ice, while the other was mainly white, irregularly banded with perfectly straight, clean-cut strata of bottle-green ice.	do.
	16	52° 09' S.	37° 23' W.	Berg	40 ft. high and 150 ft. long. Small and pinnacled.	do.
	16	From 52° 04' S. to 51° 19' S.	37° 21' W. 37° 22' W.	14 bergs	Within 10 miles of track, fairly evenly distributed on either side. All these bergs were of moderate size or small, much weathered and broken down. 3 had been tabular but were crumbling away irregularly.	do.
	15	53° 38' S.	37° 21' W.	3 bergs	Evidently grounded. High tabulars, breaking down; the largest about 1,000 ft. long.	do.
	22	53° 53' S.	37° 18' W.	Berg	Of moderate size and much weathered	do.
	16	53° 00' S.	37° 15' W.	2 growlers	Small	do.
	16	52° 21' S.	37° 10' W.	Berg	Of moderate size and much weathered	do.
	16	52° 04' S.	37° 10' W.	Berg	Of moderate size and irregular	do.
	13	53° 40' S.	37° 04' W.	Berg	50 ft. high and 800 ft. long. Weathered and waterworn	do.
	22	Welcome Is. to C. Saunders.		Bergs	About 15 bergs were observed inshore, aground, between the Welcome Is. and C. Saunders. These were nearly all small and broken down.	do.
	10	58° 51' S.	36° 54' W.	Pack ice and 29 bergs	Came up to the edge of loose, broken-up pack ice, hummocky and moderately heavy and running East and West, at this position. Strong blink to the Southward. The bergs were within a 10-mile radius of the position mainly to the Southward. 3 were very large tabulars, each about a mile in length, but only 40 feet high. Several more smaller tabulars in the vicinity were also about this height; and it is possible that they were calved originally from the Larsen Barrier. The remaining bergs were all of moderate size or small, many of them embedded in the pack ice. None of these bergs were of recent appearance, the low tabulars, particularly, being very much caverned.	do.
	10	From 58° 51' S. to 58° 24' S.	36° 54' W. 36° 49' W.	14 bergs	Within 7 miles of track. Nearly all these bergs were small and much weathered, about half of them being low tabulars about 25 feet high. Strong blink was in evidence to the eastward.	do.
	11	From 58° 24' S. to 57° 52' S.	36° 49' W. 36° 52' W.	23 bergs and drift ice	Bergs within 10 miles of track. Three of them were fairly large tabulars, and the rest mainly small, irregular, and weathered. Between these positions several ragged streams and patches of drift ice were met, and the sea was generally thinly studded with detached floes. The floes were very variable in character, some being very heavy and thickly snow-covered, and others of quite young ice.	do.
	11	From 57° 52' S. to 57° 12' S.	36° 52' W. 36° 48' W.	33 bergs and drift ice	Bergs within 10 miles of track. About half of them were tabular, none of any great size, and the highest 200 feet in height. The remainder were nearly all of moderate size, weathered and irregular. Drift ice similar to that described in the last report was occasionally met.	do.
	18	50° 09' S.	36° 50' W.	Bergy bit	Large	do.
	11	57° 03' S.	36° 47' W.	10 bergs and drift ice	Within a 10-mile radius of position. A number of detached floes were dotted about in the vicinity, most of them fairly heavy.	do.
	22	53° 57' S.	36° 43' W.	Berg	Of moderate size and weathered	do.
	11	From 57° 03' S. to 56° 29' S.	36° 47' W. 36° 37' W.	14 bergs	Within 10 miles of track. 4 tabulars, of moderate size, the remainder irregular and of moderate size. These bergs were all much broken down. Half an hour after first position a thin stream of drift ice, of very heavy hard floes, was passed.	do.
	15	54° 02' S.	36° 39' W.	Berg	40 feet high and 150 feet long. Small and weathered	do.
	11	56° 22' S.	36° 36' W.	5 bergs	Within 10 miles of position. 3 of these were broken down tabulars of moderate size, the largest being 200 feet high, and about 700 feet long. The other two were small and waterworn.	do.

Year.	Day	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1931	20	From 7 miles S. of C. Disappointment.		19 bergs	Within 7 miles of track. About half of these were broken down tabulars, the remainder irregular and much weathered. 3 large, the rest irregular and of moderate size. 4 over 200 feet in height.	R.R.S. <i>Discovery II</i> .
	11	55° 00' S.	36° 55' W.	Berg	180 feet high and 600 feet long. Tabular and fairly well preserved.	do.
	18	56° 11' S.	36° 32' W.	Berg	50 feet high and 200 feet long. Of moderate size and irregular. Dimensions roughly estimated.	do.
	22	50° 32' S.	36° 30' W.	Berg	50 feet high, 250 feet long, and of sugar loaf shape	do.
	13	In Cumberland and Stromness Bays.		Bergs	3 small bergs grounded in the bays	do.
	12	54° 05' S.	36° 23' W.	Berg	Both tabular and of moderate size	do.
	12	55° 28' S.	36° 20' W.	2 bergs	Within a 15-mile radius of position. All these bergs were tabulars, and all fairly high, the highest being 260 feet.	do.
	12	55° 17' S.	36° 17' W.	5 bergs	They were breaking down round the sides and surrounded by brash. One berg was of typical "piano" shape, a tilted tabular with a long low sea-worn foot running out from its higher side.	do.
	18	50° 52' S.	36° 16' W.	2 bergs	Both small and about 30 feet high	do.
	20	From 20 miles E. of Cape Vakop to 7 miles S. of C. Disappointment.		114 bergs	Rounding the S.E. end of South Georgia, these bergs were seen within 7 miles of track between the positions. About 40 of these were on the North Eastern side of the island, of which most were small and much broken down. 40 more were inshore between Cooper Island and Cape Disappointment, evidently aground, and the remainder were to seaward. Many of these were high, between 200 and 300 feet, but none were very large in plan. They were nearly all broken-down tabulars, and several of the older-looking bergs were of a uniform pale blue colour.	do.
	12	S.E. coast of S. Georgia between Cooper Id. and C. Disappointment.		49 bergs	Of these, 42 were grounded off the shore, the remaining 7 being to seaward, and, being all of small size, probably afloat. Of the grounded bergs, most were small, much weathered and seaworn, but one or two fairly large tabulars were noted. To the west of C. Disappointment 6 large tabulars had grounded, and one was of extraordinary height. It was not approached closely enough for measurements to be made, but by comparison with a tabular of normal height near it, it was estimated to be at least 400 feet high. In form it was a square tower supported on a broad base sloping up from water level to the tower like a buttress. This is a perfectly characteristic form assumed by grounded tabulars as they weather away and is explained by the fact that, as the sides of the berg above water break down, the berg lightens and drifts further up on the "continental shelf" so that grounded bergs are often seen with a central tower of great height.	do.
	18	From 51° 02' S. to 52° 03' S.	36° 06' W. to 35° 20' W.	14 bergs	Within 10 miles of track, evenly distributed on either side. About half of these were of moderate size, and half small, and all of them were irregular, weathered, and broken down. One tabular, about 80 ft. high, was seen.	do.
	20	From 54° 26' S. to 54° 27' S.	35° 12' W. to 35° 48' W.	7 bergs	Within 8 miles of track, on either side. All of these bergs were small—none over 200 feet in length, and all rounded or pinnacled.	do.
	19	52° 17' S.	35° 15' W.	Berg	20 feet high and 100 feet long. Small and weathered	do.
	20	54° 31' S.	35° 00' W.	2 bergs	Of moderate size and much weathered	do.
	19	From 52° 49' S. to 53° 15' S.	34° 56' W. to 34° 40' W.	7 bergs	Within 6 miles of track. 2 large tabulars, both about 1,000 feet long; the remainder all small and much weathered. The tabulars were of old appearance.	do.
	19	53° 41' S.	34° 19' W.	2 bergs	One tabular of moderate size; one small pinnacled berg	do.
	19	53° 48' S.	34° 19' W.	Berg	Large but waterworn and broken down	do.
	20	45° 25' S.	25° 25' W.	5 bergs	A berg about 200 feet high and 500 feet long with smaller bergs in the vicinity (water temperature 45°-46° F.).	S.S. <i>West Cusseta</i> .
	20	45° 17' S.	24° 29' W.	Berg	A berg about 235 feet high and 350 feet long (water temperature 47° F., air 53° F.).	do.
		Around S. Georgia.			The iceberg conditions around S. Georgia this year are heavier than during the last two Decembers. About twice as many bergs were met to the southward, and to the north-westward of the island than in two previous seasons.	R.R.S. <i>Discovery II</i> .

Reports of Ice previous to December, 1931, will be found in the Marine Observer, Vol. VIII, No. 96, p. 260.

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

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 XIII.

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 reports to C.Q. on 600 m. spark, and these may be intercepted by the stations ringed in on Chart XIII. 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 233 and 234. 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 XIII.)	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 London—call sign of chosen "Selected Ships" to report through GKU at schedule times on 2100 m. Radio Horta—call sign of ships to report through CTH at schedule times on 2400 m.
	Chatham Mass.,	Lat. 41° 42' N. Long. 70° 00' W.	WCC.	142.9 kc/s. (2098 metres).		North Atlantic West of Longitude 40° W.	Observer Washington.	Weather only. First four groups of observations taken at 0000 and 1200 G.M.T. only required.	No control. All British "A Selected Ships" within area to address their 0000 and 1200 G.M.T. observations to Observer Washington and their 1800 G.M.T. observations to CQ in accordance with schedule
	Sayville N.Y.	Lat. 40° 45' N. Long. 73° 06' W.	WSL.						
	Rockland.	Lat. 44° 09' N. Long. 69° 13' W.	WAG.						
West Palm Beach.	Lat. 26° 42' N. Long. 80° 02' W.	WMR.							
	Horta, Azores.	Lat. 38° 32' N. Long. 28° 38' W.	CTH.	125 kc/s. (2400 metres).	125 kc/s. (2400 metres).	"A Selected Ships" indicated by roll call made through Portishead to report to Horta—E'n. N. Atlantic, east of long. 40° W. and N. of lat. 38° N. "A Selected Ships" S. of lat. 38° N.—N. Atlantic from lat. 10° to 38° N. eastward of long. 40° W.	Radio Horta.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	"A Selected Ship—" in the E'n. N. Atlantic, N. of lat. 38° N., chosen to report to Horta will be indicated by a special roll call made through Portishead daily at 2230, 0330 and 1030 G.M.T. immediately following the roll call of selected ships chosen to report to Weather London These ships should report to CTH in the order indicated in accordance with schedule and on 2400 m. S. of 38° N., 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.	Slangkop (Cape Town)	Lat. 34° 08' 46" S. Long. 18° 19' 18" E.	ZSC	—	143 kc/s. (2100 metres).	South Atlantic Westward of 25° E. and within a range of about 2 000 miles of station.	Met.	Weather only. Four universal groups and first group of No. 6 Supplementary groups.	No control. Only 0600 G.M.T. observation required. All British "A Selected Ships" within area should report, commencing at 06 8 G.M.T.
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55' 51" S. Long. 30° 58' 38" E.	ZSD	—	143 kc/s. (2100 metres).	Indian Ocean S. of 20° S. and Eastward of 25° E. and within a range of about 2,000 miles of station.	Met.	Weather only. Four universal groups and first group of No. 6 Supplementary groups.	No control. Only 0600 G.M.T. observations required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.
	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).	143 kc/s. (2100 metres).	Indian Ocean and Southern Ocean between Long. 105° and 135° E.; but not within 100 miles of the coast.	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 I, 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).	143 kc/s. (2100 metres).	S. Pacific, Coral and Tasman Seas and Southern Ocean between Long. 135° and 160° E.; but not within 100 miles of the coast.	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 I, 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.	PP0.			
	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.	Jacobs (Durban).	Lat. 29° 55' 51" S. Long. 30° 58' 38" E.	ZSD	Met.	Weather only, 4 universal groups and first group of No. 6 Supplementary groups.	
	Algoa Bay (Port Elizabeth).	Lat. 33° 57' 16" S. Long. 25° 35' 30" E.	ZSQ	Met.	Weather only, 4 universal groups and first group of No. 6 Supplementary groups.	
	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.	
	Esperance.	Lat. 32° 01' 51" 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			
	Melbourne	Lat. 37° 46' 56" S. Long. 144° 52' 09" E.	VIM			
	Adelaide	Lat. 34° 51' 14" S. Long. 138° 31' 55" E.	VIA			
	Talcahuano	Lat. 36° 41' 27" S. Long. 73° 06' 19" W.	CCT			Meteo, Santiago.	Weather only, including supplementary groups.
	Llanquihue	Lat. 41° 08' 00" S. Long. 73° 02' 00" W.	CCW			
Juan Fernandez.	Lat. 33° 38' 09" S. Long. 78° 47' 50" W.	CCJ				
Magallanes	Lat. 53° 10' 00" S. Long. 70° 54' 00" W.	CCN				

II.—WIRELESS WEATHER SIGNALS.

WIRELESS WEATHER BULLETINS.

The method of decoding station weather reports made in code from shore stations intended for shipping was described in the British "Weather Shipping" Bulletin, on page 47 of Volume IX, No. 98 (The February, 1932, Number.)

The same method of decoding weather reports applies in all cases where the International Code is used having regard to the Key figures given in each case where they differ from the British Weather Shipping Bulletin.

Chile.

C.W. Issues.

Santiago Central, W.T. Station.—Approximate Latitude 33° 26' S., Longitude 70° 38' W.

Call Sign.—CCS.

Wave length.—3000 metres C.W.

Times of transmission.—0130, 1430 and 2030 G.M.T.

The message issued at 0130 G.M.T. is based upon 2300 G.M.T. observations, the 1430 G.M.T. message is based on the 1200 G.M.T. observations, and the 2030 G.M.T. message is based on the 1800 G.M.T. observations. They consist of three parts.

Part I.—General Inference, "en clair" (Spanish).

Part II.—Report in code giving actual observations with station numbers at a selection of the following coast stations:—

Code No.	Station.	Latitude.	Longitude.
019	Arica	18° 28' S.	70° 20' W.
020	Iquique	20° 12' S.	70° 11' W.
021	Tocopilla	22° 05' S.	70° 12' W.
022	Mejillones	23° 05' S.	70° 30' W.
023	Antofagasta	23° 39' S.	70° 25' W.
024	Taltal	25° 25' S.	70° 34' W.
025	Caldera	27° 03' S.	70° 53' W.
026	Huasco	28° 27' S.	71° 14' W.
027	Coquimbo	29° 57' S.	71° 22' W.
028	Los Vilos	31° 54' S.	71° 32' W.
029	Zapallar... ..	32° 32' S.	71° 30' W.
030	Quintero	32° 46' S.	71° 32' W.
031	Valparaiso	33° 01' S.	71° 38' W.
032	Juan Fernandez	33° 37' S.	78° 50' W.
033	Más Afuera	33° 45' S.	80° 51' W.
034	Constitución	35° 21' S.	72° 26' W.
035	Pta. Carranza	35° 36' S.	72° 38' W.
036	Talcahuano	36° 43' S.	73° 07' W.
037	Tumbes	36° 37' S.	73° 06' W.
038	Lavapié	37° 08' S.	73° 33' W.
040	Pto. Dominguez	38° 54' S.	73° 14' W.
041	Valdivia... ..	39° 48' S.	73° 14' W.
042	Corral	39° 52' S.	73° 25' W.
043	Pta. Galera	40° 01' S.	73° 44' W.
044	Co. Quedal	41° 03' S.	73° 58' W.
045	Pto. Montt	41° 28' S.	72° 57' W.
046	Maullin	41° 37' S.	73° 35' W.
047	Ancud (Corona)	41° 47' S.	73° 52' W.
048	Guafo	43° 34' S.	74° 45' W.
049	Guamblin	44° 55' S.	75° 05' W.
050	Aysen	45° 25' S.	72° 45' W.
051	C. Raper	46° 50' S.	73° 35' W.
052	S. Pedro... ..	47° 43' S.	74° 58' W.
053	Pto. Bories	51° 42' S.	72° 41' W.
054	Evangelistas	52° 24' S.	75° 06' W.
055	B. Félix	52° 27' S.	74° 38' W.
056	Magallanes	53° 10' S.	70° 54' W.
057	Porvenir	53° 18' S.	70° 21' W.
058	S. Isidro... ..	53° 47' S.	70° 58' W.
059	Navarino	55° 10' S.	67° 30' W.

The Key and Code used is the same as that used for the British Weather Shipping Bulletin given in the February number and in the Pamphlet, M.O. 329.

Part III.—Weather Forecast.

No information as to the area for which these forecasts are intended is available.

Argentina.

C.W. Issue.

Buenos Aires-Dársena Norte W/T Station, approximate Latitude 34° 36' S., Longitude 58° 22' W., call sign LOL, broadcasts a weather bulletin, "en clair," in Spanish, at 0230 G.M.T., on a wave-length of 1,053 metres C.W. The bulletin will contain a weather forecast for the ensuing 24 hours for the Rio de la Plata.

Brazil.

The Brazilian W/T coast stations given in the list below transmit, every four hours, the state of weather and sea, as well as the force and direction of the wind. The elements so transmitted are direct observations made at the W/T stations. They are sent in Portuguese "en clair."

W/T Station.	Position (approx.).		Call Sign.	Times of Sending. G.M.T.
	Latitude.	Longitude.		
S. Luiz (Maranhã)	2° 31' S.	44° 17' W.	PXM	0300, 0700, etc., etc.
Natal	5° 47' S.	35° 16' W.	PXN	0330, 0730, etc., etc.
Olinda (Pernambuco)	8° 01' S.	34° 51' W.	PPO	0345, 0745, etc., etc.
Amaralina (Bahia)...	13° 01' S.	38° 28' W.	PPA	0315, 0715, etc., etc.
Fernando Noronha...	3° 51' S.	32° 25' W.	PXF	0315, 0715, etc., etc.
Santos	23° 59' S.	46° 18' W.	PPS	0245, 0645, etc., etc.
Florianopolis	27° 36' S.	48° 34' W.	PPF	0315, 0715, etc., etc.
Juncão (Rio Grande do Sul)	32° 03' S.	52° 08' W.	PPJ	0345, 0745, etc., etc.

The wave-length used by the above stations for the transmission of the messages is 600 metres.

Rio de Janeiro W/T station, approximate Latitude 22° 59' S., Longitude 43° 11' W., call sign PPR, broadcasts weather reports similar to the above stations at 1200, 1500 and 2100 G.M.T. on 600 metres

This station also broadcasts daily two special weather bulletins at 0100 and 2100 G.M.T. on 600 metres.

These bulletins are divided into three parts; the first part contains 1200 G.M.T. observations in code* of various Brazilian, Uruguayan and Argentine meteorological stations given below; the second part contains upper air observations in code; the third part contains detailed weather forecasts in Portuguese, "en clair."

Indicator Number.	Station.	State.	Position (approx.).	
			Latitude.	Longitude.
01	Ondina	Bahia	13° 00' S.	38° 30' W.
02	Caetité	"	14° 02' S.	42° 37' W.
03	Victoria	Esp. Santo	20° 10' S.	40° 17' W.
04	Bello Horizonte	Minas Geraes	19° 55' S.	43° 56' W.
05	Uberaba	"	19° 45' S.	47° 57' W.
06	Pirapora	"	17° 18' S.	44° 57' W.
07	Juiz de Fora	"	21° 45' S.	43° 20' W.
08	Rio de Janeiro	Rio de Janeiro	22° 54' S.	43° 10' W.
09	Cabo Frio	"	22° 52' S.	42° 01' W.
10	S. Paulo... ..	São Paulo	23° 33' S.	46° 38' W.
11	Santos	"	23° 56' S.	46° 19' W.
12	S. Paulo dos Agudos	"	22° 28' S.	49° 00' W.
13	Cuyaba	Matto Grosso... ..	15° 35' S.	56° 05' W.
14	Coxim	"	18° 28' S.	54° 45' W.
15	Tres Lagoas	"	20° 47' S.	41° 42' W.
16	Curityba	Paraná	25° 25' S.	49° 16' W.
17	Florianopolis	S. Catharina... ..	27° 36' S.	48° 30' W.
18	Palmas	Paraná	26° 28' S.	51° 58' W.
19	Porto Alegre	Rio G. Sul	30° 01' S.	51° 13' W.
20	Uruguayana	"	29° 45' S.	57° 05' W.
21	S. Luiz das Missões	"	28° 23' S.	54° 58' W.
22	Rio Grande	"	32° 01' S.	52° 05' W.
23	Bagé	"	31° 20' S.	54° 06' W.
24	S. Victoria do Palmar	"	33° 31' S.	53° 21' W.
25	Sta. Izabel	Uruguay	32° 45' S.	56° 32' W.
26	Montevideo	"	34° 54' S.	53° 12' W.
27	Buenos Aires	Buenos Aires	34° 36' S.	53° 22' W.
28	Oran	Salta	23° 06' S.	64° 20' W.

* The code used is not the International Ships' Wireless Weather Code referred to on page 20, Vol. IX, No. 97, January Marine Observer.

Indicator Number.	Station.	State.	Position (approx.)	
			Latitude.	Longitude
29	Adalgala ...	Catamarca ...	27° 30' S.	66° 26' W.
30	Corrientes ...	Corrientes ...	27° 27' S.	58° 49' W.
31	Santa Fé ...	Santa Fé ...	31° 40' S.	60° 42' W.
32	Mendoza ...	Mendoza ...	32° 53' S.	68° 49' W.
33	Victorica ...	Pampa Central ...	36° 10' S.	65° 21' W.
34	Cipoletti ...	Rio Negro ...	38° 56' S.	68° 08' W.
35	Bahia Blanca ...	Buenos Aires... ..	38° 45' S.	63° 15' W.
36	Puerto Madryn ...	Chubut... ..	42° 49' S.	64° 58' W.
37	Sarmiento ...	„ ...	45° 30' S.	69° 00' W.
38	I. de Octubre ...	„ ...	42° 12' S.	71° 08' W.

Brazil.

I.C.W. Issues.

W/T Station.	Call Sign.	Wave-length Metres.	G.M.T. of Time Signal.
Rio de Janeiro—Arpoador Lat. 22° 59' 19" S. Long. 43° 11' 26" W.	PPR	1,000 (I.C.W.).	^h 14 ^m 00 ^s 00 and 24 00 00

WIRELESS STORM WARNINGS.

South America.

Chile.

I.C.W. Issue.

Valparaiso W/T Station, call sign **CCE**, broadcasts storm warnings when necessary, on a wave length of 600 metres (I.C.W.).

The Time Signals are relayed from Rio de Janeiro Observatory in accordance with the New International system of W/T Time Signals.

The procedure is as follows:—

III.—WIRELESS TIME SIGNALS.

Chile.

C.W. Issue.

W/T Station.	Call Sign.	Wave-length Metres.	G.M.T. of Time Signal.
Valparaiso Lat. 33° 01' 03" S. Long. 71° 39' 25" W.	CCL	2,150 (C.W.).	^h 00 ^m 55 ^s 00—01 00 00

G.M.T.	Signal.	Meaning.
^h 13 ^m 23 } 56 ^s 05 to { ^h 13 ^m 23 } 56 50	— — — every alternate 5 seconds.	
57 00 ,, 57 49	— — — — — etc.	
57 55 ,, 58 00	55 56 57 58 59 60	Time Signal.
58 08 ,, 58 10	— —	
58 18 ,, 58 20	— —	
58 28 ,, 58 30	— —	
58 38 ,, 58 40	— —	
58 48 ,, 58 50	— —	
58 55 ,, 59 00	55 56 57 58 59 60	Time Signal.
59 06 ,, 59 10	— — —	
59 16 ,, 59 20	— — —	
59 26 ,, 59 30	— — —	
59 36 ,, 59 40	— — —	
59 46 ,, 59 50	— — —	
^h 13 ^m 23 } 59 55 ,, { ^h 14 ^m 24 } 00 00	55 56 57 58 59 60	Time Signal.

SYSTEM.—The Time Signal commences at 00h. 55m. 00s. G.M.T. and continues for 5 mins., and consists of a series of dots which represent each second, except that the dots at the 29th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th and 59th seconds of each of the five minutes are omitted. The dot at the 60th second of each minute is the time signal.

The duration of the dash is one second, and that of the dot 0.2 of a second. The final dot, therefore, terminates at

14h } 00m 00.2s, G.M.T.
24h }

- NOTES.**—(1) Sent daily except Sundays and holidays.
(2) Time Signal controlled by the Hydrographic Office.
(3) In the event of failure or irregularities in the Time Signal the word "Señal nula" (Signal annulled) will be made three times in succession, one minute after 0100 G.M.T.

In the event of failure, the time signals are transmitted thirty minutes later—the word "Correção" being sent in conjunction with this series of signals.

NOTE.—Sent daily except Sundays and public holidays.

Special Notices Regarding Personnel.

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

Vice-Admiral H. P. Douglas, C.B., C.M.G.

Admiral DOUGLAS, Hydrographer of the Navy since October 1st, 1924, retired from that post on September 30th, 1932. During his service afloat Admiral DOUGLAS was a member of the Corps of Marine Observers, dating back to 1898 when he was serving as a Sub-Lieutenant in H.M.S. *Stork*. In addition to Meteorological Logs he has contributed several interesting reports upon meteorological phenomena. He devised the Douglas Sea and Swell scale which was adopted for International use at the conference of the International Meteorological Organization held at Copenhagen in September, 1929.

When Assistant Hydrographer Admiral DOUGLAS directed the Admiralty Weather Forecast and Meteorological Service, which after the war was merged into the Meteorological Office of the Air Ministry. As Hydrographer he represented the Admiralty on the Meteorological Committee and served on the Sub-Committee for Marine Meteorology in which he took much interest. We wish him many years health and happiness in his retirement.

 Captain J. A. Edgell, O.B.E., R.N.

Captain J. A. EDGELL, O.B.E., R.N., Assistant Hydrographer of the Navy has been appointed to succeed Admiral DOUGLAS as Hydrographer of the Navy. Like his predecessor he is an old member of the Corps of Marine Observers and kept Meteorological Logs for the Marine Division, up to July, 1930, when His Majesty's Ships commenced keeping a special Meteorological Record of their own.

We wish Captain EDGELL all success in his responsible position as head of the Hydrographic Department of the Admiralty, to which both the Royal and Merchant Navies look for Charts, sailing directions, and hydrographic information for navigating the seas and oceans of the world.

 Captain Sydney Marmery.

Captain MARMERY, of R.M.S. *Worthing*, retired from active service in July, 1932, after nearly 33 years' service in Cross Channel steamers, and 45 years at sea altogether.

He went to sea in 1887, serving his apprenticeship with Messrs. Foley and Aikman in the Colonial and West Coast trades. Remaining in sail for 10 years he was in the *Mairi Bhan*, *Bayard*, *Alastor*, *Hesperus*, and *Loch Torridon*.

Captain MARMERY has commanded a number of the Southern Railway Company's Cross Channel Packets, including *Dieppe* and *Worthing*.

He has been a member of the corps of voluntary marine observers since May, 1920.

We wish him many years of health and happiness in his retirement.

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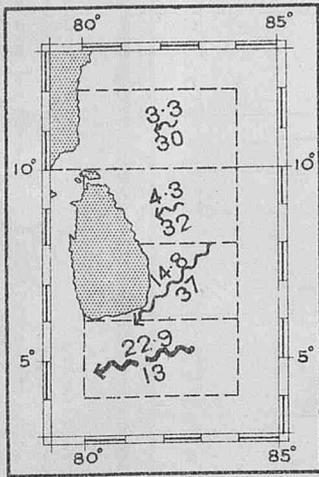
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CHARTS OF MONTHLY MEAN CURRENTS, EAST COAST OF CEYLON.

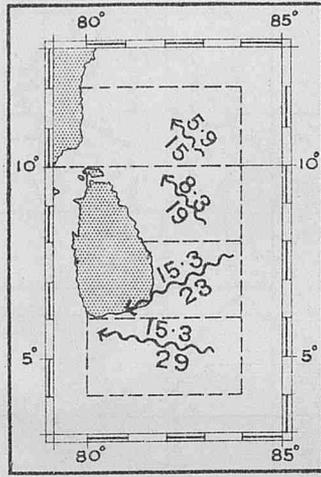
Companion Charts to Charts of Currents on the Trade Routes in the Persian Gulf, Northern Portion of the Arabian Sea, Bay of Bengal and in the Region of Sumatra.

Computed from observations of British Ships during the years 1910-1931.

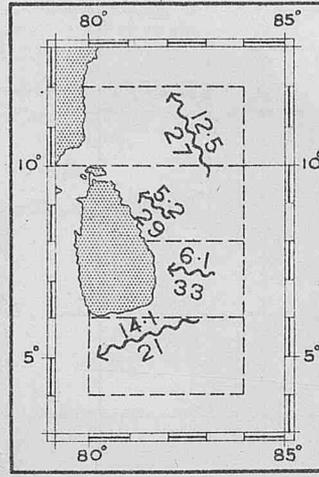
JANUARY



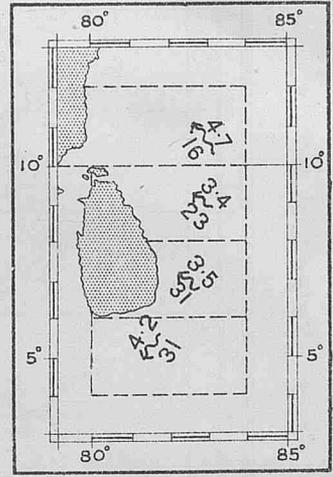
FEBRUARY



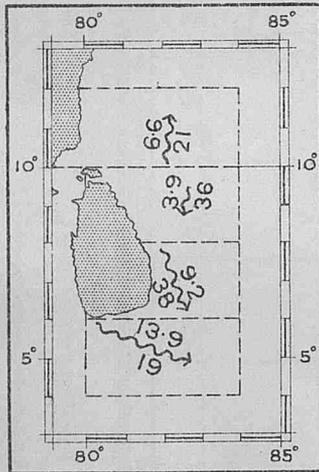
MARCH



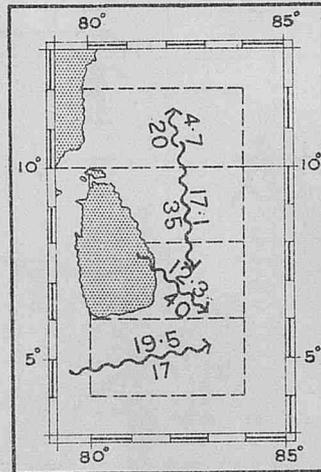
APRIL



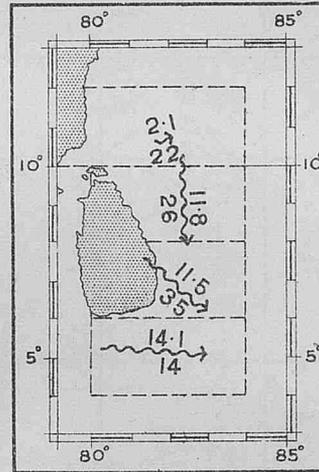
MAY



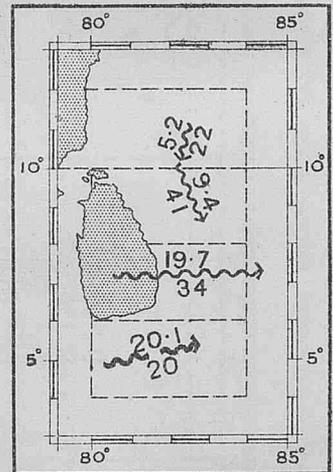
JUNE



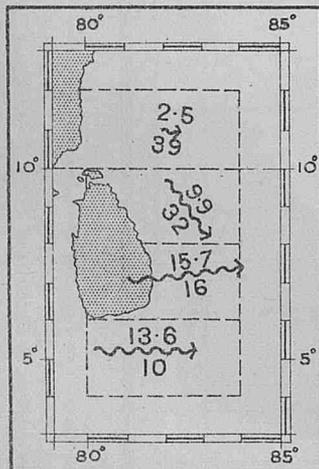
JULY



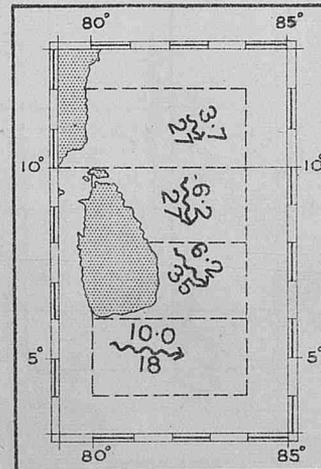
AUGUST



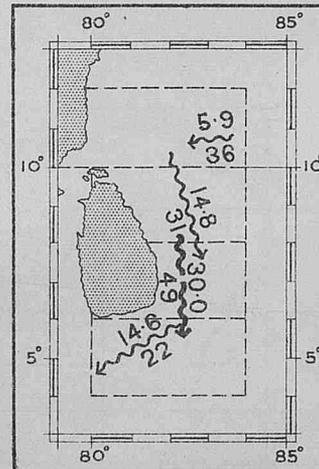
SEPTEMBER



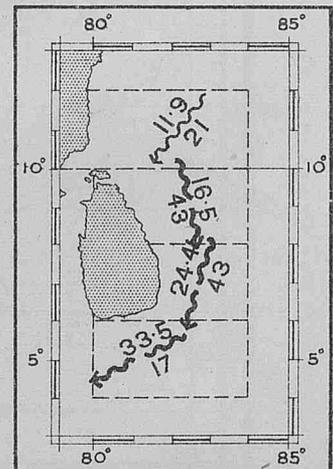
OCTOBER



NOVEMBER



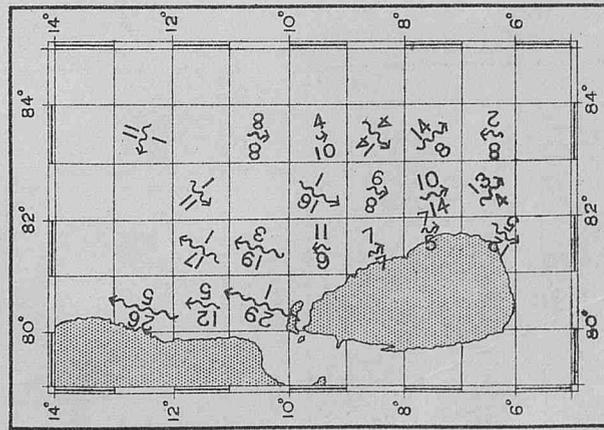
DECEMBER



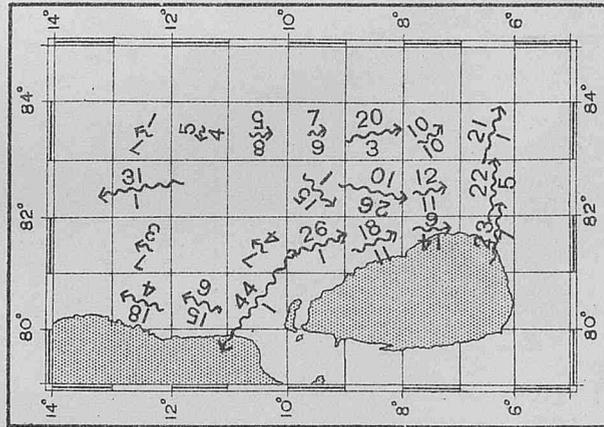
CHARTS OF MONTHLY MEAN CURRENTS IN ONE-DEGREE SQUARES SHOWING REGION OF DIVISION OF NORTHWARD AND SOUTHWARD CURRENTS, EASTWARD OF CEYLON.

Computed from observations of British Ships during the years 1910-1931.

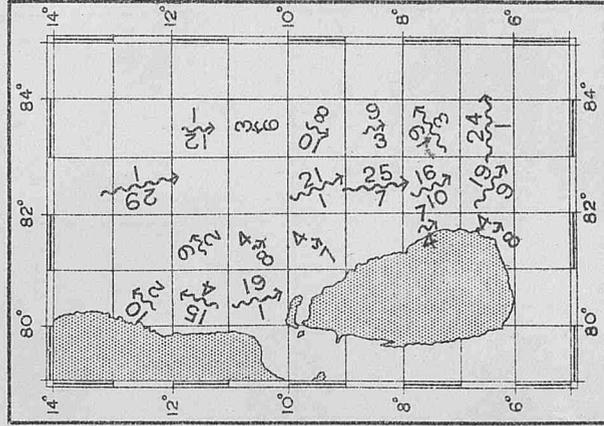
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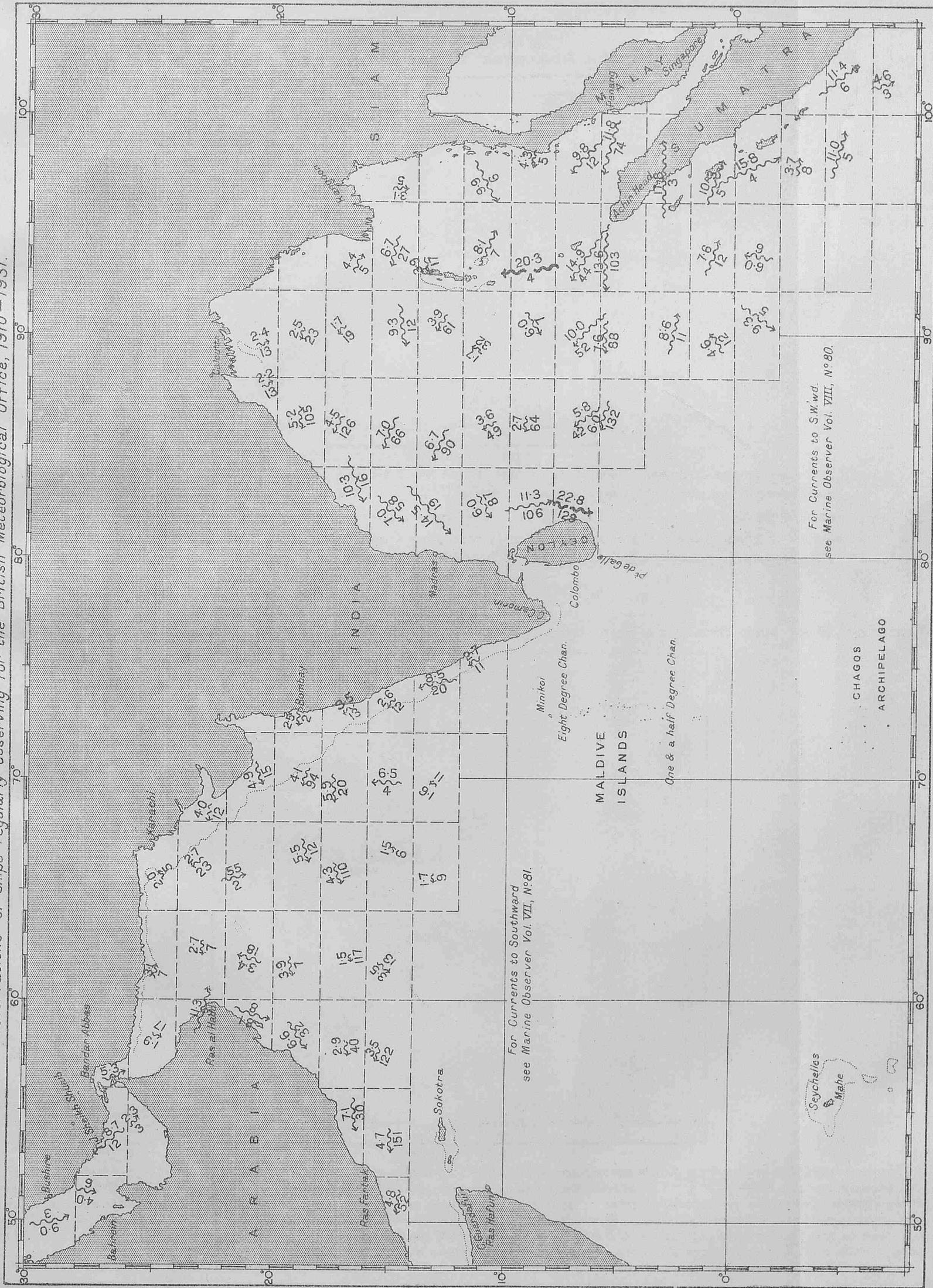
JULY



CURRENTS ON THE TRADE ROUTES IN THE PERSIAN GULF, NORTHERN PORTION OF THE ARABIAN SEA, BAY OF BENGAL, AND IN THE REGION OF SUMATRA.

NOVEMBER DECEMBER, and JANUARY

Observations of ships regularly observing for the British Meteorological Office, 1910-1931.



For Currents to Southward see Marine Observer Vol. VII, No. 81.

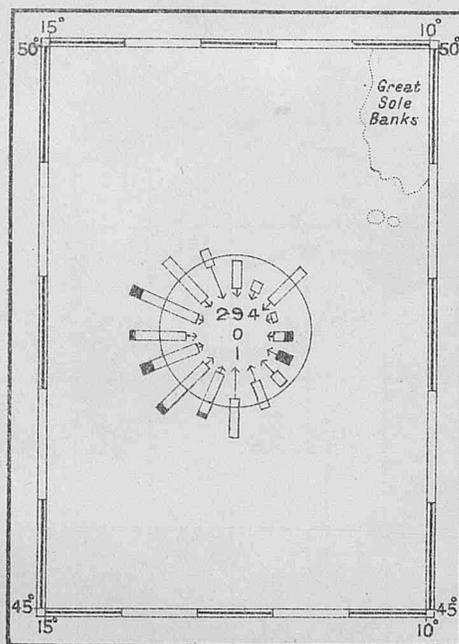
For Currents to S.W. wd. see Marine Observer Vol. VIII, No. 80.

EXPLANATION OF CURRENT ARROWS.

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

DECEMBER.

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.

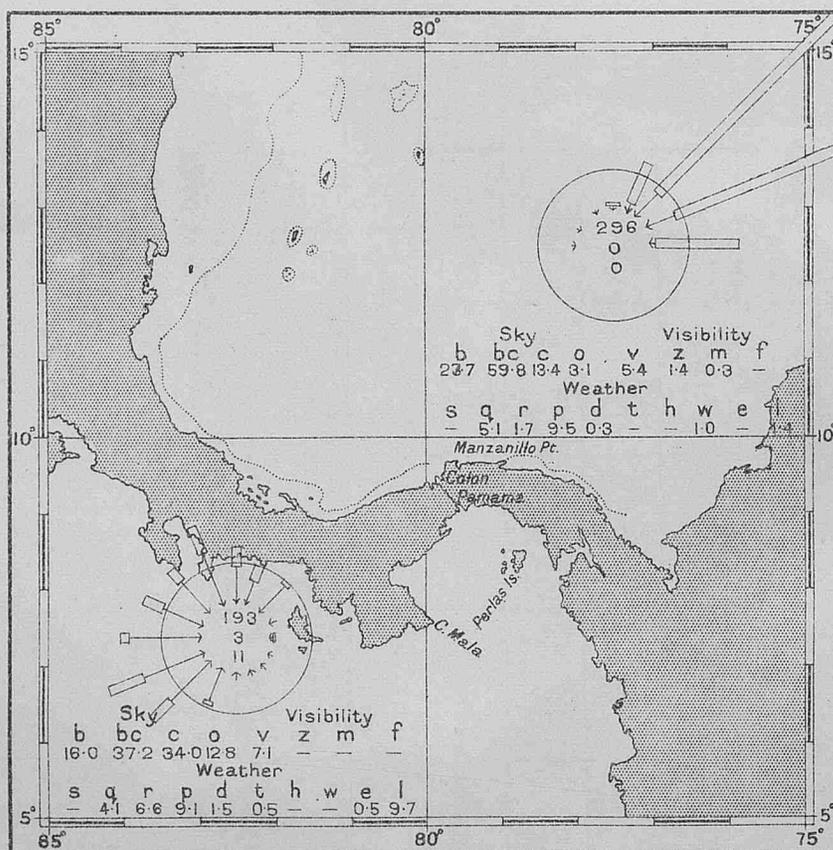
GALE	MODERATE	LIGHT
8-12	4-7	1-3

 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.

GALES	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 37 times in every 100 observations while q was logged 4 times. Compiled from observations of British Ships received since the adoption of the Hallerith system of extraction covering the years 1921-1930.

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THE WATER SUPPLY OF THE CITY OF BOSTON IS MAINTAINED BY THE BOSTON WATER DEPARTMENT

THE BOSTON WATER DEPARTMENT HAS THE HONOR TO ACKNOWLEDGE THE RECEIPT OF THE FOLLOWING ORDER FOR THE SUPPLY OF WATER

THE BOSTON WATER DEPARTMENT HAS THE HONOR TO ACKNOWLEDGE THE RECEIPT OF THE FOLLOWING ORDER FOR THE SUPPLY OF WATER

MARINE METEOROLOGY.

Co-operation of Shipowners, Masters and Mates.

Captains and Officers of ships registered in Great Britain and Northern Ireland, who wish to co-operate regularly with the Meteorological Office should apply to the appropriate Port Meteorological Officer or Agent, a list of whom, with addresses, is given below.

In accordance with the International Convention for Safety of Life at Sea, the Meteorological Office arranges for certain "Selected Ships" to take meteorological observations at specified hours, and to transmit such observations by wireless telegraphy, for the benefit of other ships and the various meteorological services.

Arrangements are also made for a limited number of ships to keep meteorological logs in certain trades for the purpose of completing the meteorological survey of the oceans.

Ships performing these voluntary duties are known as Observing Ships; the whole as the Voluntary Observing Fleet; and the commanders and officers of these ships as the Corps of Voluntary Marine Observers.

At present the observing fleet is limited to a number not exceeding 366 observing ships. The number of British "Selected Ships" is determined upon the British proportion of world tonnage, on the assumption that there should be a total of 1,000 "Selected Ships" of all nations.

The observing fleet list indicating which are "Selected Ships," with the names of commanders, officers, and other particulars, is published in THE MARINE OBSERVER and kept up to date monthly.

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 is supplied to all observing ships, and may also be obtained from H.M. Stationery Office, direct, or through any bookseller, price 2s. 6d.

THE MARINE OBSERVER is sent monthly to the captain of every observing ship, for the information and guidance of his observing officers, and in the case of "Selected Ships," the wireless operators also. The Captains of observing ships are also supplied on request with charts, and atlases, according to trade, if available, as meteorological equipment.

Ships keeping the Meteorological Log, Form 915, are lent a complete set of official tested instruments.

"Selected Ships," other than meteorological log keeping ships, keep the Ships' Meteorological Record, Form 911. All "Selected Ships" also keep the Ships' Wireless Weather Register, Form 138.

No observing ship is detailed as a "Selected Ship" unless she has on board a reliable mercurial barometer.

Official tested instruments are lent to "Selected Ships" when necessary.

The commanders of observing ships keeping the meteorological log are requested to return it (accompanied by Form 138 in the case of "Selected Ships") through the appropriate Port Meteorological Officer or Agent at intervals of not more than five months.

Commanders of observing ships keeping Forms 911 are requested to return them (accompanied by Form 138 in the case of "Selected Ships") by post direct to the Meteorological Office, London, at the end of each voyage, or at intervals of not more than two months.

These forms have the address and "On His Majesty's Service" printed upon them, and should be folded for posting accordingly.

The Port Meteorological Officers and Merchant Navy Agents inspect official instruments in Meteorological log ships half-yearly, and in "Selected Ships" quarterly, when possible; and they will replace defective gear. These officers will also check the accuracy of barometers in observing ships, but marine observers should themselves frequently check by comparison.

The work of the British observing fleet, that of the observing fleets of other nations party to the Convention for Safety of Life at Sea, together with Weather Shipping Bulletins and Gale and Hurricane Warnings conforming to the International Convention for Safety of Life at Sea, provide the necessary information for shipping. Thus a world wide service for all shipping, at the minimum cost to national funds, is provided. Shipowners are asked to facilitate this voluntary work which is done by the commanders and officers of their ships.

Shipowners will greatly assist by facilitating the forwarding of postal matter from the Air Ministry addressed to the Captains of ships.

Ships which are not regular observing ships are advised to procure the DECODE for use with the International Code for Wireless Weather Messages from Ships, M.O. Pubn. 329, which can be obtained from H.M. Stationery Office, price 3d. This gives a description of the system of communication of "Selected Ships," as well as the DECODE.

For guidance in the practical use of wireless weather intelligence, WIRELESS AND WEATHER AN AID TO NAVIGATION may be obtained from H.M. Stationery Office, through any bookseller, price 5s.

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

LONDON	Captain L. A. BROOKE SMITH, R.D., R.N.R., Marine Superintendent. Commander J. HENNESSY, R.D., R.N.R., Senior Nautical Assistant. Room 324, Adastral House, Kingsway, W.C.2. (Telephone No.: Holborn 3434 Extension 421). Nearest station Temple, District Railway.	Agents (contd.).	FORTH	Captains C. G. BONNER, V.C., D.S.C., and D. AITCHISON, Leith Salvage and Towage Co., Ltd., 2, Commercial Street, Leith.
THAMES	Lieut. Commander C. H. WILLIAMS, R.N.R., Port Meteorological Officer, P.L.A. Building, King George V Dock (south side), London, E.16. (Telephone No.: Albert Dock 2659. Telegraphic Address: Barometric Aldock, London).	HONG KONG, China.	Lieut. Commander G. B. R. RUDYERD-HELPMAN, R.N., Superintendent, Admiralty Chart and Chronometer Depot, H.M. Dockyard. (Telephone No.: 108 Dockyard).	
MERSEY	Commander M. CRESSWELL, R.N.R., Port Meteorological Officer, Dock Office, Liverpool. (Telephone No.: Bank 8959. Telegraphic Address: Meteorite, Liverpool).	HUMBER	Captain A. M. BROWN, Ellerman Wilson Line Office, Hull. (Telephone No.: Central 2180).	
	Agents.	SOUTHAMPTON	Captain Sir BENJAMIN CHAVE, K.B.E. Room 35 Royal Mail Buildings	
BELFAST	Captain J. MCINTYRE, Harbour Master, Harbour Office. (Telephone No.: Belfast 4090).	SYDNEY, New South Wales.	Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation. Captain R. G. BLAYNEY. Customs House. (Telephone No.: B6421).	
BRISTOL CHANNEL.	Captain T. JOHNSTON, Technical College, Cathays Park, Cardiff. (Telephone No.: Cardiff 6813).	TYNE	Captain J. J. MCEWAN, Marine School, South Shields.	
CLYDE	Mr. ROBERT CLEARY, Master Mariner, The Clutha Stevedoring Co., Ltd., Princes Dock, Glasgow. (Telephone No.: 513 Ibrox).			

ICE CHART. WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE.

- (C) From 1st July to 10th April, inclusive.
- (E) From 1st December to 14th February, inclusive.

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

ROUTE NOTICES.

For latest information *re* Tracks see pages 80 and 81 of Vol. IX, No. 100, April, 1932, Number

SYMBOLS USED ON THE CHART.

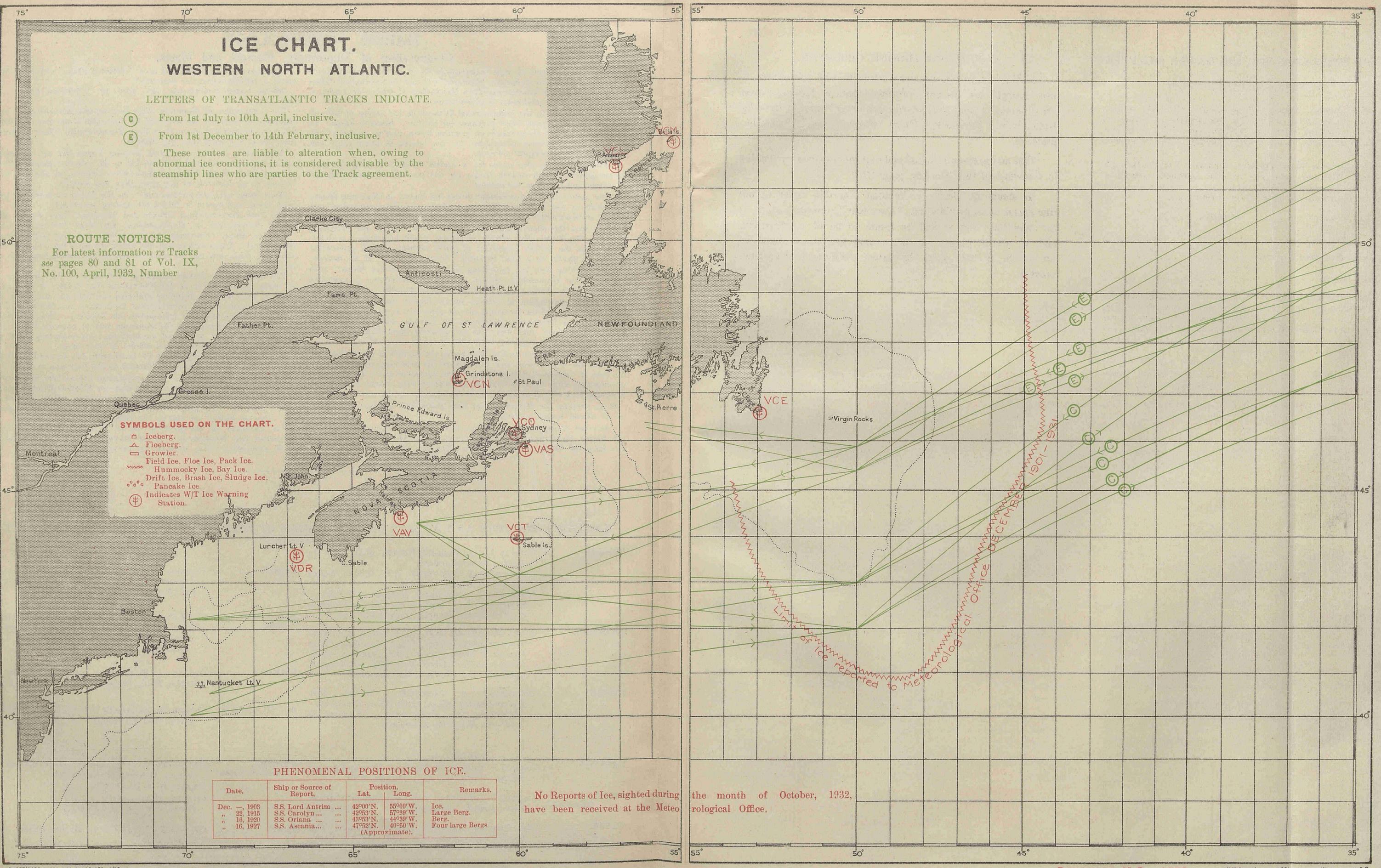
- ▣ Iceberg.
- △ Floeberg.
- ◻ Growler.
- Field Ice, Floe Ice, Paok Ice, Hummocky Ice, Bay Ice.
- Drift Ice, Brash Ice, Sludge Ice.
- °°°° Pancake Ice.
- ⊕ Indicates W/T Ice Warning Station.

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position.	Remarks.
		Lat. Long.	
Dec. —, 1903	S.S. Lord Antrim ...	42°00' N. 55°00' W.	Ice.
" 22, 1915	S.S. Carolyn ...	42°53' N. 57°39' W.	Large Berg.
" 16, 1920	S.S. Oriana ...	43°53' N. 44°39' W.	Berg.
" 16, 1927	S.S. Ascania ...	47°32' N. 40°50' W.	Four large Bergs.
		(Approximate).	

No Reports of Ice, sighted during the month of October, 1932, have been received at the Meteorological Office.

the month of October, 1932, have been received at the Meteorological Office.



NOTICES.

NEW PROGRAMME FOR THE MARINE OBSERVER.

POSTAL ARRANGEMENTS.

The quarterly numbers of the MARINE OBSERVER will in future be published on the last Wednesdays of December, March, June and September, while the monthly supplements will be published on the last Wednesday of the intervening months.

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 or supplement 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 or Supplement will be addressed to the Commanding Officer, S.S....., c/o the owners, and captains are requested to make their own arrangements for forwarding.

COVER FOR MARINE OBSERVER.

Marine observers, regular recipients and subscribers to this Journal are hereby informed that a binding cover for Volume IX of "The Marine Observer" may be obtained from H.M. Stationery Office through any bookseller, price 2s.

The arrangements for assembling the numbers for binding is described in this Number, page 217

It should be clearly understood that this cover is not the cover used for binding "Excellent" awards, which is far superior; but it will be found to be of good quality and a useful means of preserving the yearly numbers, for which a title page is issued with each December number

As the January, 1933, Marine Observer will not be published until December 28th, 1932, instead of on December 7th, 1932, as would have been the case under the old monthly arrangements, an additional supply of the appropriate forms for observation work are being circulated to observing ships with this number.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.	Date.	Position.		Description.
	Latitude.	Longitude.			Latitude.	Longitude.	
NORTH SEA.				BAY OF BISCAY.			
3.10.32	{ ¼ mile bearing W.N.W. of Cross Sands Light Vessel.		Floating derelict.	3.10.32	{ 5 miles off C. Mayor, Santander Province.		Large buoy, dangerous to navigation. Derelict steamer <i>Scheldestad</i> setting E.S.E. 2 knots. Also abandoned lifeboat. Dangerous to navigation.
3.10.32		51°12'N.	1°42'E.	Drifting black can buoy marked <i>London and B</i> with green flag.		10.10.32		45°35'N.	7°28'W.
6.10.32		52°10'N.	3°36'E.				
16.10.32		52°41'N.	4°18'E.				
19.10.32	{ 2½ miles 215° from E. Goodwin Light Vessel.		Drifting, spherical-shaped buoy, red and rusty, with chain attached, apparently anchored. Dangerous to navigation.	NORTH ATLANTIC.			
19.10.32				26 miles N.E. by ¼ N. of Newarp Lt. Vessel (53°07'N. 2°17'E. approx.).	1.10.32	27°41'N.	79°51'W.	Small capsized vessel (small yacht), 40 ft. long, 8 ft. beam, painted red and light green.
5.10.32	ENGLISH CHANNEL.		Raft 20 ft. long.	4.10.32	40°13'N.	43°17'W.	Iron conical red buoy, drifting.
17.10.32	{ 4 miles, 347° off St. Catherine's Point.		Ship's empty lifeboat.	6.10.32	40°32'N.	73°—'W.	Tree trunk 25 ft. long and 1½ ft. in diameter.
21.10.32				S. 50°W. 4 miles from Needles.	7.10.32	40°46'N.	39°49'W.	Large red round drifting buoy, marked CAAA in white letters.
IRISH SEA.				14.10.32	39°09'N.	12°26'W.	Large conical buoy adrift, painted red, dangerous to navigation.
10.10.32	52°54'N.	5°59'W.	Section of a hull of a wooden vessel, 30 ft. long.	19.10.32	53°03'N.	28°41'W.	French fishing vessel <i>L'Essor</i> abandoned, waterlogged, and set on fire. Dangerous to navigation. Boat(s) adrift in vicinity.
				CARIBBEAN SEA.			
				1.10.32	18°13'N.	67°10'W.	Submerged barge, 50 ft. long, 2 ft. above water, painted red.
				10.10.32	16°10'N.	64°21'W.	Floating wreckage (raft or boat-house).
				NORTH PACIFIC.			
				1.10.32	7°08'N.	80°40'W.	Spar (30 ft. long).

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 366.

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.	Meteorological Equipment.	Line	Last Log, Register, or Record Contributed. Received up to 14.10.32.	Date Received.
122 †† <i>Acva</i> , M.V.	Shooter, J. C.	R. B. Ellis	W.T.-M.	Elder Dempster	Forms 911 & 138 27.7.32 to 2.9.32	6.9.32
155 *† <i>Achilles</i>	Cosker, W.	C. Broad, R. Martin	W.T.	A. Holt	" " 18.4.32 to 14.8.32	3.10.32
055 *† <i>Actor</i>	Whyte, D. L.	G. Penston, E. Pearce, P. Harrow.	No. M.	Harrison	" " 27.11.31 to 31.1.32	19.2.32
123 †† <i>Adda</i> , M.V.	Lawson, J. H.	E. Moore, G. Baker	W.T.-M.	Elder Dempster	" " 11.8.32 to 17.9.32	22.9.32
273 *† <i>Adrastus</i>	Lloyd, R.	S. R. Evans, J. P. Makepeace, F. E. Jackson.	M.L.	A. Holt	Form '915 3.3.32 to 4.4.32	24.6.32
090 *† <i>Aeneas</i>	Wallace, W. K.	G. H. Smith, W. Williams, R. A. Hanney.	W.T.	"	Forms 911 & 138 25.5.32 to 13.8.32	17.8.32
166 *† <i>Agamemnon</i>	Beswick, W., D.S.C., Commr., R.N.R.	W. K. Hole, W. G. Harrison, O. Thomas.	"	"	" " 20.7.32 to 22.9.32	28.9.32
<i>Alban</i>	Evans, L.	"	M.L.	Booth	"	"
127 *† <i>Albion Star</i>	Hopper, G. E.	R. White, W. H. Gore	No. M.	Blue Star	Forms 911 & 138 18.12.31 to 6.3.32	21.6.32
080 †† <i>Alcantara</i> , M.V.	Clarke, E., R.D., Commr., R.N.R.	W. W. Dovell, T. Davies, R. Smith.	W.T.	Royal Mail	" " 14.8.32 to 25.9.32	6.10.32
178 *† <i>Alipore</i>	Carter, E. A. J. W., R.D., Commr., R.N.R.	J. A. Hunter	No. M.	P. & O.	" " 4.9.32 to 14.9.32	10.10.32
175 †† <i>Almanzora</i>	Buret, T.	E. W. Martin, F. J. Brett, J. G. Scott.	W.T.	Royal Mail	" " 31.7.32 to 12.9.32	14.9.32
012 †† <i>Almeda Star</i>	Turner Russell, W.	L. S. Hassell, O. G. Russell, C. N. Williams.	No. M.	Blue Star	" " 11.7.32 to 24.8.32	31.8.32
103 †† <i>Andalucia Star</i>	Fisher, J.	R. H. K. Bartley, F. Graham, M. O'Hare.	" M.	"	" " 21.8.32 to 4.10.32	12.10.32
079 *† <i>Antiloehus</i>	Dougall, A. T.	B. L. Parker, W. Murray, C. F. Lock.	W.T.	A. Holt	" " 30.6.32 to 6.9.32	8.9.32
209 †† <i>Aorangi</i> , M.V.	Spring-Brown, J. F.	R. Anderson, D. H. Richards, S. H. Crawford.	M.L.	Canadian-Australasian	Form 915 3.3.32 to 17.6.32	18.8.32
120 †† <i>Apapa</i> , M.V.	Beith, A.	V. E. Thomas, S. S. Franklin	W.T.-M.	Elder Dempster	Forms 911 & 138 29.6.32 to 3.8.32	8.8.32
029 †† <i>Appam</i>	Draper, J. M.	W. M. M. Hutchings, R. K. Palmer, B. C. Haigh.	W.T.	"	" " 13.7.32 to 21.8.32	23.8.32
017 †† <i>Aquitania</i>	Townley, J. C., R.D., Capt., R.N.R.	G. Jeffries, E. A. Divers, J. V. Locke.	"	Cunard	" " 11.9.32 to 27.9.32	29.9.32
115 †† <i>Arandora Star</i>	Moulton, E. W.	J. L. Anderson, F. Gudgin, R. Hales.	W.T.-M.	Blue Star	" " 21.9.32 to 30.9.32	4.10.32
<i>Architect</i>	Mowat, I.	G. Dewar	No. M.	Harrison	Form 912 23.6.32 to 29.7.32	30.7.32
293 *† <i>Ariguaní</i>	Bostock, R. J.	G. McKee, A. Crone, A. Sandham.	W.T.	Elders & Fyffes	Form 911 9.5.31 to 18.9.32	30.9.32
144 †† <i>Arlanza</i>	Huff, G. F.	B. A. Gammon, A. E. Randle, H. V. Todd.	"	Royal Mail	Forms 911 & 138 7.9.32 to 9.10.32	13.10.32
091 †† <i>Armada Castle</i>	Harvey, H. B.	W. Pace, A. H. Parry, L. G. May.	"	Union Castle	" " 27.8.32 to 10.10.32	12.10.32
					" " 23.7.32 to 11.9.32	13.9.32

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Meteorological Equipment.	Line.	Last Log, Register, or Record Contributed Received up to 14.10.32.	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</i> ...	Webb, C. ...	W. S. Hamblin, T. C. Townsend, S. W. Howell.	" M.	Houlder ...	" " 6.8.32 to 30.9.32	5.10.32
267 *† <i>Lassell</i> ...	Leicester, F. S. ...	A. N. Blundell, — Sweeney, — Christie.	W.T.	Lampton & Holt ...	" " 3.5.32 to 28.7.32	3.8.32
064 †† <i>Laurentic</i> ...	Jackson, W. H. P. ...	H. Solomon, J. Dray, A. Thompson.	"	White Star ...	Forms 911 & 138 4.9.32 to 24.9.32	26.9.32
083 *† <i>Lautaro, M.V.</i> ...	Kite, E. ...	J. Lloyd Jones, J. Williams, C. Stowe.	No. M.	Pacific S.N. Co. ...	Forms 911 & 138 8.1.32 to 10.2.32	27.2.32
254 *† <i>Limerick</i> ...	Molyneux, P. L. ...	J. Trotter, N. A. Thomas ...	" M.	Federal... ..	" " 12.7.32 to 21.8.32	26.9.32
093 *† <i>Llandaff Castle</i> ...	Hutchings, A. H. ...	J. M. Goode ...	W.T.	Union Castle ...	" " 20.5.32 to 25.7.32	29.7.32
097 †† <i>Llangibby Castle, M.V.</i>	Linklater, H. ...	G. W. Lloyd ...	"	" " ...	" " 18.6.32 to 21.8.32	23.8.32
094 *† <i>Llandoverly Castle</i>	Morgan, A. O., R.D., Commr., R.N.R.	H. S. Warren ...	"	" " ...	" " 19.7.32 to 19.9.32	26.9.32
216 *† <i>Llanstephan Castle</i>	Bickford, C. N. ...	I. A. Wilson, S. Smith ...	" M.	" " ...	" " 2.5.32 to 30.6.32	5.7.32
084 *† <i>Lobos, M.V.</i> ...	Good, W. T. ...	J. Williams ...	No. M.	Pacific S.N. Co. ...	" " 18.7.32 to 2.8.32	18.8.32
137 *† <i>Logician</i> ...	Herschel, R. J. ...	E. L. Stockley, J. Wallis, W. R. Mackenzie.	" M.	Harrison ...	" " 10.7.32 to 10.10.32	12.10.32
008 *† <i>Losada, M.V.</i> ...	Ridyard, A. ...	L. W. Hutchinson ...	" M.	Pacific S.N. Co. ...	" " 18.5.32 to 16.8.32	22.8.32
232 *† <i>Madura</i> ...	Caffyn, F. ...	A. Usher, W. Bain, L. G. Tol-free.	No. M.	British India... ..	Forms 911 & 138 3.7.32 to 30.9.32	4.10.32
078 *† <i>Magician</i> ...	Bury, E. R. ...	W. E. Shotton, R. F. Hart ...	" M.	Harrison ...	" " 20.6.32 to 6.8.32	16.8.32
141 *† <i>Mahia</i> ...	Andrews, C. M. ...	G. Sangwin, M. P. Congdon, J. Jackson.	W.T.	Shaw, Savill & Albion	" " 24.12.31 to 14.4.32	18.4.32
140 *† <i>Mahratta</i> ...	Colombine, T. F. ...	T. C. Eddy, H. F. Scoins, W. J. Wilson.	No. M.	Brocklebank ...	" " 29.7.32 to 19.8.32	12.9.32
014 *† <i>Mahronda</i> ...	Whitham, F. ...	W. Le Brocq, M. Melville, H. Willington.	" M.	" " ...	" " 13.7.32 to 6.8.32	28.8.32
015 *† <i>Mahsud</i> ...	Kershaw, R. W. ...	S. Richardson, J. R. Paisley, H. Gillespie.	" M.	" " ...	" " 7.3.32 to 31.5.32	6.6.32
042 *† <i>Maimoa</i> ...	Johnson, J. W. ...	M. Bennett, E. J. Baker, W. R. Rogers.	M.L.	Shaw, Savill & Albion	Form 915 8.2.32 to 24.5.32	2.6.32
054 †† <i>Majestic</i> ...	Trant, E. L., R.D., Commr., R.N.R.	F. Murphy, R. Barry, E. A. Stuart.	W.T.	White Star ...	Forms 911 & 138 17.9.32 to 29.9.32	3.10.32
018 *† <i>Makalla</i> ...	Maughan, J. W. ...	A. C. Hocking, J. Richardson	No. M.	Brocklebank ...	" " 3.8.32 to 28.8.32	19.9.32
225 ** <i>Makura</i> ...	MacDonald, D. ...	A. P. Cousin, J. Billingham, J. H. Johnson.	M.L.	Canadian- Australasian	Form 915 23.12.31 to 2.5.32	5.7.32
019 *† <i>Malakuta</i> ...	Adamson, F. L. ...	H. Simpson ...	No. M.	Brocklebank ...	Forms 911 & 138 11.5.31 to 2.12.31	29.1.32
236 ** <i>Malayan Prince</i> ...	Holloway, J. ...	R. M. Dennis, G. P. Freeman, C. Dunford.	M.L.	Prince ...	Form 915 16.2.32 to 27.6.32	9.9.32
219 *† <i>Malda</i> ...	Denne, G. H. A. ...	D. Macfadyen, F. M. Ben-castle, K. K. Boyd.	No. M.	British India ...	Forms 911 & 138 18.10.31 to 12.1.32	15.1.32
195 †† <i>Malaja</i> ...	Browning, J. B., R.D., Commr. R.N.R.	J. D. Green, A. O. Walne, J. R. Brown.	W.T.-M.	P. & O. ...	" " 4.6.32 to 30.8.32	12.9.32
196 †† <i>Malwa</i> ...	Britten, P. O. ...	F. E. Berner ...	No. M.	" " ...	Form 911 30.4.32 to 17.6.32	23.6.32
053 *† <i>Manaar</i> ...	Thowless, E. ...	A. L. Harrop, J. Robinson, R. G. Widdon.	" M.	Brocklebank ...	Form 911 & 138 20.7.31 to 9.10.31	21.10.31
<i>Manchester Brigade</i>	Stott, C. H. ...	E. E. Bonnaud, L. A. Muir, M. E. Bewley.	M.L.	Manchester Liners {	Form 915 16.4.32 to 26.8.32	7.9.32
<i>Manchester Commerce.</i>	Linton, P. ...	T. Makin, F. L. Osborne, R. W. Pickersgill.	"	" " {	Form 912 16.4.32 to 26.8.32	30.8.32
028 †† <i>Mandala</i> ...	Parkin, J. W. ...	J. F. Hole, J. Toms ...	W.T.-M.	British India... ..	Forms 911 & 138 13.8.32 to 25.8.32	3.10.32
146 *† <i>Mandasor</i> ...	Richardson, T. ...	F. C. Madden, J. B. Leigh, E. C. Shore.	No. M.	Brocklebank ...	" " 8.8.32 to 3.9.32	12.9.32
022 *† <i>Manipur</i> ...	Fulcher, H. D. ...	J. L. Rodger ...	" M.	" " ...	" " 6.2.32 to 8.3.32	4.4.32
177 *† <i>Maniola</i> ...	James, D. F. ...	W. R. Day, S. Henderson, H. I. Fisher.	" M.	British India... ..	" " 12.5.32 to 22.7.32	29.7.32
197 †† <i>Mantua</i> ...	Hignett, A. H., R.D., Commr. R.N.R.	C. S. Pirie, J. A. Wilde, G. du Fosse.	W.T.-M.	P. & O. ...	" " 29.5.32 to 2.9.32	6.9.32
299 ** <i>Marella</i> ...	Mortimer, S. ...	A. W. Blair, D. Pemberton, A. G. W. Thomas.	M.L.	Burns Philp ...	Form 915 7.11.31 to 21.2.32	5.7.32
222 †† <i>Margha</i> ...	Kitson, G. A. ...	J. Small, G. Wright, P. Vaughan.	W.T.	British India... ..	Forms 911 & 138 25.6.32 to 7.7.32	22.7.32
104 *† <i>Marquesa</i> ...	Smiles, R. S. ...	J. Wetherell ...	No. M.	Furness Houlder ...	" " 18.7.32 to 21.9.32	27.9.32
021 *† <i>Masula</i> ...	Fitt, W. A. ...	N. W. West, J. Jackson, W. Mitchell.	" M.	British India ...	" " 19.8.32 to 14.9.32	21.9.32
251 *† <i>Matakana</i> ...	Gordon, H. R. ...	H. Thompson, D. L. G. Turner, J. G. Allin.	W.T.	Shaw, Savill & Albion	" " 14.32 to 10.7.32	13.7.32
<i>Mataroa</i> ...	Gaskell, J. H., R.D., Lt. Commr., R.N.R.	... ..	M.L.	" " ...	... ..	...
023 *† <i>Matheran</i> ...	Mulcahy, J. J. ...	S. S. Slade, J. F. Butterworth, W. Cowrie.	No. M.	Brocklebank ...	Forms 911 & 138 1.9.32 to 5.9.32	26.9.32
223 *† <i>Matiana</i> ...	Green, F. V. ...	J. S. Thomson, W. Solly, H. Wright.	" M.	British India... ..	" " 15.8.32 to 4.9.32	11.10.32
024 *† <i>Matra</i> ...	Cornish, N. P. ...	G. Shaw, W. Robertson, G. Henshaw.	" M.	Brocklebank ...	" " 31.7.32 to 11.8.32	5.9.32
032 †† <i>Mawretania</i> ...	Peel, R. V., R.D., Capt., R.N.R.	R. H. C. Crawford, E. W. Connell, L. R. Sharpe.	W.T.	Cunard... ..	" " 4.9.32 to 9.10.32	11.10.32
101 †† <i>Melita</i> ...	Stewart, A. ...	G. Mowatt, C. D. Watt, F. W. S. Roberts.	W.T.-M.	Canadian Pacific ...	" " 5.9.32 to 16.9.32	20.9.32
278 *† <i>Middlesex</i> ...	Almond, J. G. ...	G. C. Hocart, J. R. Ricketts, J. Clarke.	W.T.	Federal ...	Form 915 8.2.32 to 5.6.32	11.6.32
194 †† <i>Moldavia</i> ...	Allin, C. H. C. ...	T. E. Heath, J. K. Crone, E. J. Kerridge.	W.T.-M.	P. & O. ...	Forms 911 & 138 10.7.32 to 4.8.32	9.8.32
199 †† <i>Mongolia</i> ...	Rhodes, H. R. ...	H. Tee, H. C. Slinn, G. K. Fox.	"	" " ...	" " 10.9.32 to 22.9.32	7.10.32
260 *† <i>Monowai</i> ...	Toten, A. T. ...	L. B. Ehlert, E. W. Gibson, L. P. Bourke.	M.L.	Union S.S. of N.Z. ...	Form 915 25.11.31 to 8.4.32	1.6.32
148 †† <i>Montcalm</i> ...	Martin, W. ...	W. P. Haines, T. L. Gillette	W.T.-M.	Canadian Pacific {	Forms 911 & 138 13.8.32 to 2.9.32	5.9.32
149 †† <i>Montclare</i> ...	Rothwell, A. ...	Turnbull, J., C.B.E., R.D., Capt. R.N.R.	W.T.	" " {	Forms 911 & 138 2.9.32 to 6.10.32	11.10.32
					Form 912 29.5.32 to 30.6.32	4.7.32

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 14.10.32.	Date Received.
010 *† Port Fremantle, M.V.	Gilling, W.	A. Naismith, G. F. Parnett, E. J. H. Gorley.	M.L.	Commonwealth and Dominion.	Form 915 6.5.32 to 20.8.32	7.9.32
176 *† Port Gisborne, M.V.	Higgs, W. G.	R. B. Linklater, L. J. Skailes, C. E. Midwinter.	"	" " " "	Form " 16.1.32 to 28.7.32	4.8.32
135 *† Port Hunter	Durham, R. S., D.S.C.	G. T. C. Harris, C. R. Townshend, P. A. Mundy.	"	" " " "	Form 915 27.5.32 to 14.9.32	17.9.32
129 *† Port Wellington	Jones, C. N.	W. B. Hopkins, ...	W.T.	" " " "	Form 911 12.7.32 to 17.8.32	19.9.32
106 *† Princessa	Friend, A. B.	E. Loughheed, O. Sheard.	No. M.	Houlder	Forms 911 & 138 28.8.32 to 15.9.32	5.10.32
163 *† Protesilaus	Williams, J. P.	A. Anderson, W. C. McGugan, E. R. Owen.	M.L.	A. Holt	Form 915 6.10.31 to 11.4.32	24.6.32
205 †† Rajputana	Headlam, P. C., R.D., Commr., R.N.R.	G. Aspinall, H. M. Askin, C. F. Wright.	W.T.-M.	P. & O.	Forms 911 & 138 15.5.32 to 17.8.32	26.8.32
063 *† Rancher	McCullum, J.	G. Harvey, C. F. Minshall, A. O. Lewis.	No. M.	Harrison	" " 29.2.32 to 12.5.32	17.5.32
228 †† Ranchi	Brooks, C., D.S.O., R.D., Commr., R.N.R.	J. Paice	" M.	P. & O.	Form 911 24.7.32 to 4.8.32	22.8.32
244 †† Rangitane	Mackellar, A. W., R.D., Capt., R.N.R.	" " " " " "	W.T.-M.	New Zealand Shipping	" " " " " "	" " " " " "
257 †† Rangitata, M.V.	Hunter, J. L. B.	J. Oxnard, D. Chadwick, L. Griffith.	"	" " " "	Forms 911 & 138 12.3.32 to 13.6.32	23.6.32
240 †† Rangitiki, M.V.	Barnett, H.	H. Hill, L. F. Malcouronne, T. E. Davies.	"	" " " "	Form 912 11.3.32 to 21.3.32	23.6.32
207 †† Ranpura	Furlong, G. H. S., R.D., Capt. R.N.R.	H. Toon, G. Maclean, J. Summerville.	"	P. & O.	" " 26.6.32 to 29.9.32	5.10.32
071 †† Rawalpindi	Stringer, R.H., O.B.E., R.D., Commr., R.N.R.	E. C. White, D. West, W. A. Stockglen.	"	" " " "	" " 12.6.32 to 16.9.32	29.9.32
247 *† Recorder	"	A. S. Milne, H. C. Blyth, A. Robertson.	No. M.	Harrison	" " 22.5.32 to 12.8.32	19.8.32
132 *† Reina del Pacifico, M.V.	Kite, E.	W. A. Hearle, R. Bridson, J. K. Campbell.	" M.	Pacific S.N. Co.	" " 28.6.32 to 17.8.32	22.8.32
239 *† Remuera	Wilde, H. J.	F. Cooke, A. J. Angell, A. D. Wilson.	M.L.	New Zealand Shipping	Form 915 6.5.32 to 13.8.32	17.8.32
Rhexenor	Stout, G. L.	G. Edge	No. A.	A. Holt	Form 911 12.6.32 to 26.7.32	3.8.32
189 *† Rother	Sherwood, R. H.	H. L. Marshall, W. Cole	W.T.	Goole Steam Shipping	Forms 911 & 138 17.9.32 to 9.10.32	11.10.32
062 *† Royal Star	Walsh, W.	A. F. Day, J. Higgin, J. W. McHugh.	No. M.	Blue Star	Form 915 24.12.31 to 16.3.32	23.3.32
246 *† Ruahine	Kinnell, G.	A. Hocken, R. Warren, L. Mercer.	M.L.	New Zealand Shipping	Forms 911 & 138 25.8.32 to 4.10.32	7.10.32
St. Helier	Pitman, R.	E. Hicks	C.C.	G.W. Railway	Telegraphic Report 20.9.32	20.9.32
St. Julien	Richardson, L.	H. O. Freeman	"	"	" " 13.10.32	13.10.32
St. Minver, S.T.	Hatton, A.	" " " "	No. A.	Bunch Steam Fishing Co.	Form " 22.8.32 to 20.9.32	23.9.32
St. Patrick	Sanderson, C. W.	T. D. Thomas	C.C.	G.W. Railway	Telegraphic Report 13.7.32	13.7.32
038 †† Samaria	Malin, R. G., Lt.-Commr., R.N.R.	E. Gleave, J. A. Myles, H. Hudson.	W.T.	Cunard	Forms 911 & 138 29.8.32 to 17.9.32	20.9.32
061 *† Saxon Star	Griffiths, G. A.	K. Griffiths	"	Blue Star	Form 912 4.7.32 to 22.7.32	26.7.32
291 *† Scholar	Peterkin, A. G.	T. E. Steel, D. O. Percy	No. M.	Harrison	Forms 911 & 138 24.4.32 to 13.6.32	20.6.32
Scotia	O'Neill, J.	W. H. Hughes	C.C.	L.M. & S. Railway	Telegraphic Report 14.10.32	14.10.32
033 †† Scythia	Oram, B. B., R.D., Commr., R.N.R.	W. H. Stewart, A. Bridgewater, H. L. Pryse.	W.T.	Cunard	Forms 911 & 138 5.9.32 to 25.9.32	3.10.32
211 *† Shropshire, M.V.	English, G. L.	D. Hetherington, I. D. Minto, G. W. Dobson.	"	Bibby	Form 912 13.6.32 to 2.7.32	8.7.32
121 *† Siamese Prince	Jones, E. E.	" " " "	M.L.	Prince	Forms 911 & 138 15.5.32 to 23.7.32	26.7.32
277 *† Spero	Montgomery, H.	H. W. Vickers, A. Kirk	"	Ellerman Wilson	Form 915 12.3.31 to 4.9.32	10.9.32
Stephen	Barlow, F. P.	J. Whayman, G. H. Daniels, W. W. Torkington.	"	Booth	" " 18.1.32 to 21.6.32	2.7.32
270 †† Strathaird	Townshend, W. P., R.D., Capt. R.N.R.	R. H. Hand, H. Fitzmarsh, W. J. Alington.	W.T.-M.	P. & O.	Forms 911 & 138 4.7.32 to 24.9.32	29.9.32
044 *† Tacoma City	Paul, H.	T. J. Paull	M.L.	Reardon Smith	Form 911 24.12.31 to 2.6.32	9.6.32
229 *† Tactician	Trinick, F., O.B.E.	E. P. Simmons, A. Frew, S. Leyland.	No. M.	Harrison	Forms 911 & 138 10.4.32 to 20.7.32	26.7.32
045 †† Tainui	McIntosh, A.	G. A. Harvey, J. Worrall, D. Pickersgill.	M.L.	Shaw, Savill & Albion	Form 915 23.4.32 to 6.8.32	16.8.32
081 *† Tairoa	Grayston, E. T., D.S.C., R.D., Commr., R.N.R.	G. L. Almond, W. Thowless, L. B. Miller.	W.T.	" " "	" " 26.3.32 to 28.6.32	7.7.32
046 †† Tamaroa	Hartman, W. H.	F. Lutyens, M. Bennett, H. Pin.	W.T.-M.	" " "	Forms 911 & 138 18.6.32 to 22.9.32	5.10.32
264 ** Tanda	Pilcher, E. T., Lt.-Commr., R.N.R.	F. O. Colvin, G. Chadwick, Smith, A. Wilcox.	M.L.	E. & A. S.S. Co.	Form 915 4.3.31 to 22.6.32	8.9.32
165 *† Tantalus, M.V.	Melling, C. F.	E. Saville, W. B. Hailstone, L. A. Munday.	W.T.	A. Holt	Forms 911 & 138 9.8.32 to 5.9.32	3.10.32
047 *† Taranaki, M.V.	Wood, C., D.S.C.	A. C. Jones, B. M. Morris, C. Stewart.	"	Shaw, Savill & Albion	" " 26.8.32 to 30.9.32	4.10.32
020 *† Tasmania	Williams, J. W.	" " " "	W.T.	New Zealand Shipping	" " " " " "	" " " " " "
069 *† Tekoa	McNish, R. H. L., D.S.O., Lt.-Commr., R.N.R.	C. W. Roberts	No. M.	"	Form 911 30.12.31 to 25.1.32	15.2.32
048 †† Themistocles	Elford, H. C.	L. Hopkins, H. Davies, H. Last.	W.T.-M.	Aberdeen Commonwealth.	Forms 911 & 138 10.7.31 to 3.3.32	20.4.32
007 *† Thistleglen	Whitfield, G.A., O.B.E.	S. B. Davis, G. L. Hetherington.	No. M.	Allan Black & Co.	" " 7.7.32 to 6.8.32	5.9.32

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 14.10.32.	Date Received.
161 *† <i>Titan</i>	Rundle, G. G.	F. B. Smith, G. Roberts, E. Butler.	W.T.	A. Holt	Forms 911 & 138 24.6.32 to 20.7.32	22.8.32
244 *† <i>Tongarivo</i>	Hamilton, F. S.	G. D. Baldwin, G. W. Pring, H. Dawson.	M.L.	New Zealand Shipping	Form 915 29.5.32 to 10.9.32... ..	28.9.32
025 †† <i>Transylvania</i>	Bone, D. W.	A. Middleton, J. Lefevre, J. O. Dunn.	W.T.	Anchor	Forms 911 & 138 3.7.32 to 30.9.32	3.10.32
288 *† <i>Traveller</i>	Barrow, W. T. C.	R. Ledger	No. M.	Harrison	Form 912 5.6.32 to 26.6.32	28.6.32
119 *† <i>Trojan Star</i>	Griffin, G. A.	L. S. Hassell, K. Griffiths, D. W. Marshall.	" M.	Blue Star	Forms 911 & 138 5.6.32 to 4.8.32... ..	8.8.32
245 *† <i>Turakina</i>	Laird, J.	H. G. Letts, E. G. Williams, J. Reeve.	" M.	New Zealand Shipping	" " 14.5.32 to 22.8.32	6.10.32
276 †† <i>Tuscania</i>	Rome, W. B.	J. Noble, G. Squires, G. Robertson.	W.T.	Anchor... ..	" " 27.8.32 to 18.9.32	21.9.32
					Form 912 27.8.32 to 18.9.32	21.9.32
113 *† <i>Upwey Grange, M.V.</i>	Goodrick, H. P.	A. Bradbury, G. T. Hurst, P. J. Walker.	No. M.	Houlder	Forms 911 & 138 5.7.32 to 22.8.32	29.8.32
292 †† <i>Viceroy of India</i>	Thornton, E. J., R.D., Capt., R.N.R.	R. H. Turner, M. F. Shute, E. R. Physick.	W.T.-M.	P. & O.	Forms 911 & 138 8.5.32 to 8.6.32... ..	13.6.32
242 *‡ <i>Waiotapu</i>	Davis, — ... ..	... ..	M.L.	Union S.S. Co. of N.Z.	... ..	... ..
263 *‡ <i>Wairuna</i>	Hender, W. H.	J. B. Williams, R. E. Suckling.	"	" "	Form 915 7.12.31 to 3.3.32	5.5.32
005 †† <i>Warwick Castle</i>	Owens, G.	P. Clissold, W. D. Roach, J. Wilson.	W.T.	Union Castle	Forms 911 & 138 20.8.32 to 9.10.32	11.10.32
060 †† <i>Westernland</i>	Doughty, J. H.	J. H. Mackie, J. L. McLaren, W. P. Godwin.	"	Red Star	Form 912 12.9.32 to 1.10.32	4.10.32
056 *† <i>Westmoreland</i>	Holland, E.	D. Clegg, A. L. Hill, G. Webster.	"	New Zealand Shipping	Forms 911 & 138 19.6.32 to 9.7.32	11.7.32
208 †† <i>Winchester Castle M.V.</i>	Morton Betts, W.	G. F. Moon, A. G. Patey	"	Union Castle	Forms 911 & 138 15.5.32 to 17.9.32	22.9.32
096 †† <i>Windsor Castle Worthing</i>	Gilbert, E. F.	H. Close	C.C.	" " Railway	" " 16.7.32 to 3.9.32	6.9.32
	Hill, A.	A. Smith, A. K. Dewdney	"	Southern Railway	" " 14.8.32 to 2.10.32	4.10.32
					Telegraphic Report 29.9.32	29.9.32
<i>Yoma</i>	Wilson J. ... ..	... ..	No. M.	Henderson ... ..	... ..	... ..
043 *‡ <i>Zealandic, M.V.</i>	Summers, W. G.	C. A. Meyers, J. Steele, G. Campbell.	W.T.	Shaw, Savill & Albion	Forms 911 & 138 23.5.32 to 22.8.32	31.8.32
<i>Conway, H.M.S.</i>	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets	Cadets' M.L.	... ..	Cadets' Met. Log. 24.4.32 to 25.7.32	2.8.32
<i>Pangbourne Nautical College</i>	Tracy, A. F. G., Commr., R.N.	" " ... ..	"	... ..	Cadets' Met. Log. 21.4.32 to 16.7.32	29.7.32
<i>Worcester, H.M.S.</i>	Steele, G. C., V.C., Commr., R.N.	" " ... ..	"	... ..	Cadets' Met. Log. 6.5.32 to 27.7.32	3.8.32
<i>Abaco</i> ... ..	... ..	The Keepers	Lighthouse Register.	... ..	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
<i>Cay Lobos</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
<i>Double Headed Shot</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
<i>Inagua</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
<i>Sombrero</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 22.9.31 to 27.3.32	9.9.32
<i>Watling Island</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 1.1.32 to 30.6.32	28.7.32
<i>Cape Pembroke (Falkland Is.)</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
					Lighthouse Register 1.1.32 to 30.6.32	27.9.32

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

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., received up to 30.9.32.	Date Received.
<i>Dakarlan</i>	Hannaford, W.	A. A. Johnson	Leyland	Water Samples	10.6.32
<i>Darro</i>	Matthews, G. P.	F. R. Jeyes	Royal Mail	" "	18.8.32
<i>Davisian</i>	Thomas, R.	H. B. Peters	Leyland	" "	27.6.32
<i>Dorelian</i>	Hughan, C.	A. F. Wood	" "	" "	12.7.32
<i>Hilary</i>	Buck, R. H., R.D., Capt., R.N.R.	F. H. Good	Booth	" "	6.8.32

LIST OF SOME OF THE PUBLICATIONS PUBLISHED BY THE AUTHORITY OF
THE METEOROLOGICAL COMMITTEE AND BY THE HYDROGRAPHIC DEPARTMENT
OF THE ADMIRALTY.

MARINE METEOROLOGY, ATLASES, BOOKS AND MEMOIRS.

CHARTS:—

ATLANTIC (NORTH AND SOUTH):—

Monthly Current Charts for the Atlantic Ocean, from information collated and prepared in the Meteorological Office. (No. 132, 1897) ($22\frac{1}{2} \times 18$ in.) (Published by the Admiralty.)

Charts of Meteorological Data for the Nine 10° Squares of the Atlantic which lie between 20° N. and 10° S., and extend from 10° to 40° W., with accompanying Remarks, ending with the Best Routes across the Equator. (No. 27, 1876) 24s. (17×20 in.)

ATLANTIC (NORTH):—

Atlas of Currents on the Main Trade Routes of the North Atlantic. (No. 323, 1930. 6s. 6d.) ($29\frac{1}{4} \times 19\frac{1}{2}$ in.)

Meteorological Charts of the North Atlantic for each month of the year, giving normals of Pressure, Air and Sea Surface Temperature and Ocean Currents, with Frequencies of Winds, also Ice Limits. (No. 149A, 1923.) 1s. each ($35 \times 22\frac{1}{2}$ in.). Sold by J. D. Potter, 145, Minories, E.1.

Synchronous Weather Charts of the North Atlantic and the adjacent Continents, 1st August, 1882, to 3rd September, 1883. Parts I to IV (33 sheets each). (No. 71, 1886) 17s. each Part. (26×22 in.)

Charts of Meteorological Data for Square 3, Lat. 0° - 10° N., Long. 20° - 30° W. ($20 \times 13\frac{1}{2}$ in.) and Remarks to accompany the Monthly Charts, which show the Best Routes across the Equator for each Month, &c. ($17 \times 16\frac{1}{2}$ in.) (No. 20, 1874). 20s.

Discussion of the Meteorology of that Part of the Atlantic lying North of 30° N., for the eleven days ending 8th February, 1870. With Charts (No. 13, 1872). 5s. (4to.)

ATLANTIC (SOUTH):—

Wind Charts for the Coastal Regions of South America, from information collated and prepared in the Meteorological Office. (No. 159, 1902.) ($27 \times 20\frac{1}{2}$ in.) (Published by the Admiralty.)

The relation between Pressure, Temperature, and Air Circulation over the South Atlantic Ocean. By M. W. Campbell Hepworth, C.B., R.D., Captain R.N.R., Marine Superintendent. (No. 177, Second Edition, 1917.) 1s. (8vo.)

BAFFIN BAY AND DAVIS STRAIT:—

Monthly Meteorological Charts of Baffin Bay and Davis Strait. (No. 221, 1917.) 8s. ($30 \times 25\frac{1}{2}$ in.)

CHARTS:—*continued.*

INDIAN OCEAN:—

Meteorological Charts of the East Indian Seas for each month of the year, giving Normals of Pressure, Air and Sea Temperatures and Ocean Currents, with Frequencies of Winds. (No. 181A, 1923.) 1s. each. ($35 \times 22\frac{1}{2}$ in.) Sold by J. D. Potter, 145, Minories, E.1.

Monthly Current Charts for the Indian Ocean, from information collated and prepared in the Meteorological Office. (No. 124, 1896.) ($20 \times 24\frac{1}{2}$ in.) (Published by the Admiralty.)

PACIFIC OCEAN:—

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