

VOL. V. No. 60.

THE MARINE OBSERVER.

DECEMBER, 1928.

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VOLUME FIVE.

This Number concludes Volume Five and in doing so fulfils the guarantee which we were asked to give before we launched THE MARINE OBSERVER—that with the voluntary help of the Corps of Marine Observers we would fill these pages for five years.

We have been confident of the success of THE MARINE OBSERVER to accomplish its purpose from the first knowing and understanding British Seamen, and now that we have fulfilled our guarantee we look for the continued success of our Journal dependent as it is upon the voluntary efforts of those at sea.

We thank most heartily all those who have contributed to THE MARINE OBSERVER and its success; they have performed a National Service for there is no doubt that the work of British Marine Observers as brought out in THE MARINE OBSERVER has contributed considerably to British prestige in matters of organized marine meteorology, and what is more, its influence has contributed to safety of life at sea.

We do not say this in idle praise but simply state facts which have been made evident at International Conferences and by events at sea.

There is always a danger with success—do not let us forget that—it may breed over-confidence which may be fatal, but that is

not likely to happen with THE MARINE OBSERVER, for, however long it lasts, it will always have failures to record to bring us to our senses. Weather and Ocean Currents are the most doubtful quantities, and none who strive to understand them can remain over-confident for long.

To make sure that we have not become over-confident that THE MARINE OBSERVER is serving those at sea as they should be served, during the year we have taken their opinions and have overhauled the whole question of what information is most desirable at sea. In the first Number of the next Volume the result of that overhauling and the consensus of the opinion of Marine Observers will be made known.

There is one thing that is certain, and that is that everything possible must be done to reduce to a minimum the work of preparation in the Marine Division, and so we again ask Marine Observers to send in their Meteorological Logs, Reports, manuscripts, sketches, charts and photos in the best possible style so that they are ready without undue preparation for publication. THE MARINE OBSERVER will be most successful when the Marine Division is returning the greatest volume of worked-up data to those in the great field of observation at sea, hence the more the Marine Division is relieved of preparation which can be done at sea the more

work can it devote to data extraction, computation and research, and so carry our Journal and its resulting publications further.

As usual, with this Number the title page for the Volume is issued, and in it the Index is published.

Every ship upon the list has been provided monthly with Numbers. It is most desirable that they should be preserved. A suitable cover can be obtained at the Stationery Office.

To bind a volume of THE MARINE OBSERVER the arrangement is as follows:—

The cover, advertisement pages, list of voluntary observing ships and Ice Chart in each Number contain information which is either not permanent or will be repeated; these may be disposed of when binding. When these have been removed there will remain pages numbered in sequence throughout each Number, also pages unnumbered containing lithographic charts which should follow the numbered pages as they were published in the monthly Numbers.

These should be placed in the Volume cover and bound. Unfortunately, a mistake was made in placing the Ice Chart and lithographic charts in the September Number, and care should be taken in binding that the placing of these is rectified.

The Trade Route across the South Pacific between Panama and the Ports of Australasia.

In my note under this heading in the March Number of this year we referred to the routes recommended in the Admiralty publication, "Ocean Passages for the World," determined the approximate extent of the strip of ocean under frequent observation by the British Corps of Marine Observers, described the Wind and Current Charts we were making, showing their limitations as well as their merits, repeated our advice to Marine Observers on all Ocean routes to compare the currents they experienced in corresponding belts and called for their remarks.

A number of Commanders of ships constantly navigating the South Pacific have sent in remarks, a selection of which have appeared in "The Marine Observer's Log," and these represent considered individual experience and opinions, than which there can be no better.

The fact that these opinions—of men whose experience of navigating these routes is second to none—differ, only shows the difficulty of determining which are the best routes to follow. It must always be remembered that we may do ourselves what we would hesitate to recommend to others.

When we investigated the homeward route across the Arabian Sea from Colombo and the East to Perim in the S.W. monsoon season we not only had the opinions of individual Commanders, but we had Meteorological Charts and statistical information worked up from a vast store of information gained from many years' observation, so that the averages were reliable.

In this case we only have constant observation from after the Great War, and, as the charts show, the averages are compiled from a comparatively small number of observations.

In these circumstances it would be unwise to attempt to lay down tracks for the seasons, but meanwhile we would direct attention to certain features of winds and currents which the new charts show and which are dealt with in separate articles in this Number.

We have found nothing to warrant any modification in recommendations made in the Admiralty publication before mentioned.

Reference to the latter part of Mr. BARLOW's article under heading "Summary of the Results," will show:—

(1) That during the Spring, when the South Equatorial Drift is strongest and steadiest, a ship outward bound may gain most from favourable currents by following the recommended route number 501 as far as the longitude of Pitcairn Island. At this time of the year, if any divergence is made homeward bound from route 408 from the same longitude, it should be to the southward, where the South Equatorial Current is weaker, and then on the latter part of the passage when the strength of the current is encountered it will be abeam.

(2) During the Winter, when outward bound, a divergence to the northward of route 501 to the westward of Pitcairn Island might be advantageous to avoid the strength of westerly gales, but the easterly current is then at its greatest strength between the parallels of 28° and 30° S., so that the possible advantage is likely to be negated.

With the current charts for each quarter, the results of our investigation, and the remarks of experienced Commanders before them, navigators have all the information we can give them at present.

It must always be remembered that Mariners are cautioned to pay constant attention to current when navigating amongst the groups, for when near the islands the current is sometimes deflected and always accelerated, most of the islands are low and often impossible to see at night, and the reefs are steep-to, so that no warning may be given by the lead.

This investigation undoubtedly proves the great need for constant observation, logging, extraction, computation and charting of the averages of Winds and Currents and all the more important elements in all parts of the Pacific Ocean.

With the continued voluntary work of Marine Observers as at present, if we are able to devote sufficient time to extraction, we hope, with the aid of the Hollerith system, to produce reliable Charts in another decade. Then it may be possible to lay down seasonal routes across the Pacific; at present there are not sufficient data available to show conclusively that different routes in the different seasons are advantageous.

MARINE SUPERINTENDENT.

London.

September, 1928.

THE MARINE OBSERVER'S LOG.

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

TRADE ROUTES ACROSS THE SOUTH PACIFIC BETWEEN PANAMA AND THE PORTS OF AUSTRALASIA.

Captain H. C. Elford, S.S. "Tainui."

"There seems to be diversity of opinion regarding the best route from Panama to New Zealand. There are a few Commanders who after clearing Cape Mala steer a course to pass to the westward of the Galapagos Islands, thence Great Circle to Rapa, and another Great Circle from there to Wellington. However, we always adopted the more frequently taken track, viz., from Mala to 20 miles E.S.E. of Hood Island (having due regard to that island lying some 3½ miles to the North-eastward of the charted position, as previously reported to you). Thence Great Circle to either

Henderson or Pitcairn Island (Henderson Island I have also found to lay 6½ miles north of its charted position). Thence Great Circle to first New Zealand port.

"**Currents.**—The current that sweeps up the coast of S. America and recurves in Panama Bay, and afterwards flows from there to the S.W., is consistent the whole year round, being strongest from June to October, then attaining a velocity of 1.5 to 2 knots. The remaining months it is weak and seldom attains a velocity of even 0.5 knots. The direction, however, remains the same the whole year round, viz., S.W.'ly from Mala to Galapagos, hauling gradually to the west and dying away in N.W.'ly direction in about 5° South latitude. The currents from 5° south to Pitcairn Island are exceedingly erratic and no dependance can be placed on them, but there is a trend to the N.E. within the limit of the S.E.

trades. From Pitcairn to New Zealand there is a general trend to the Eastward, increasing with the latitude and the strength of the West winds.

"Homeward via Panama.—I adopt the same as the outward passage as far as Pitcairn, but from there gradually steer a little more easterly and passing 150 to 200 miles from Galapagos, and so avoiding the S.W.'ly current altogether. In fact, by making for a position 100 miles west of the S. American Coast on the Equator, one frequently strikes a favourable current carrying vessel into Panama Bay."

DISCOLOURED WATER.

Tasman Sea.

THE following is an extract from the Meteorological Report of S.S. *Ulimaroa*, Captain W. J. WYLIE, Wellington to Sydney, N.S.W. Observer, Mr. A. N. ROBERTSON, 3rd Officer:—

"Whilst crossing the Tasman Sea on a voyage from Wellington, N.Z., to Sydney, N.S.W., in Latitude $35^{\circ} 26'$ S., Longitude $156^{\circ} 31'$ E., A.T.S., 7.51 a.m., on the 19th December, 1927, the weather being ideal with a dead calm and smooth sea, also a very slight easterly swell and a few detached Cumulus clouds on the south-eastern horizon, I observed, covering the whole surface of the ocean, a very thin brown dust-like substance appearing occasionally in large thick patches, the top being frothy.

"The ship steamed through this continuously throughout the day, there being several very large schools of porpoises playing in the vicinity. One thing which was very noticeable during the whole day was the absence of all marine bird life."

COLOUR OF WATER IN SOUTH ATLANTIC.

THE following is an extract from the Meteorological Report of M.V. *Losada*, Captain J. Ross, Bahia Blanca to Port Stanley, Falkland Islands. Observer, Mr. J. T. DENLEY:—

"December 21st, 1927, at 7.44 A.T.S., in Latitude $48^{\circ} 55'$ S., Longitude $58^{\circ} 27'$ W. Barometer 30.21 in., temperature, air 46° , sea 45° . Wind N.N.W. (T), force 4. Slight sea. Sky overcast St.-Cu and Cu. The ship passed from water of a dark blue colour into water which seemed to lie over a coral or white sand bottom and to be of no great depth. This water was a light blue green colour, resembling the water one often sees in Florida Straits when close to the reefs, and with a line of demarcation almost as distinct. This colour extended to the horizon at each side of the ship, and surface temperature and conditions were the same as the dark water previously sailed through. This water also seemed to have been recently disturbed and gave the appearance of holding minute particles or air bubbles in suspension. On sounding to a depth of 97 (ninety-seven) fathoms no bottom was obtained. We continued steaming through water of this light colour a distance of 54 miles to Latitude $49^{\circ} 48'$ S., Longitude $58^{\circ} 12'$ W., when at 1.10 p.m. A.T.S., the sea resumed its normal deep-water appearance. On this south side of the patch the change was gradual and not well defined as to the northward."

MAGNETIC DISTURBANCE.

Spencer Gulf, South Australia.

THE following is an extract from the Meteorological Report of S.S. *Clan Macnaughton*, Captain A. W. SIMPSON, Singapore to Port Pirie. Observer, Mr. D. D. INGRAM:—

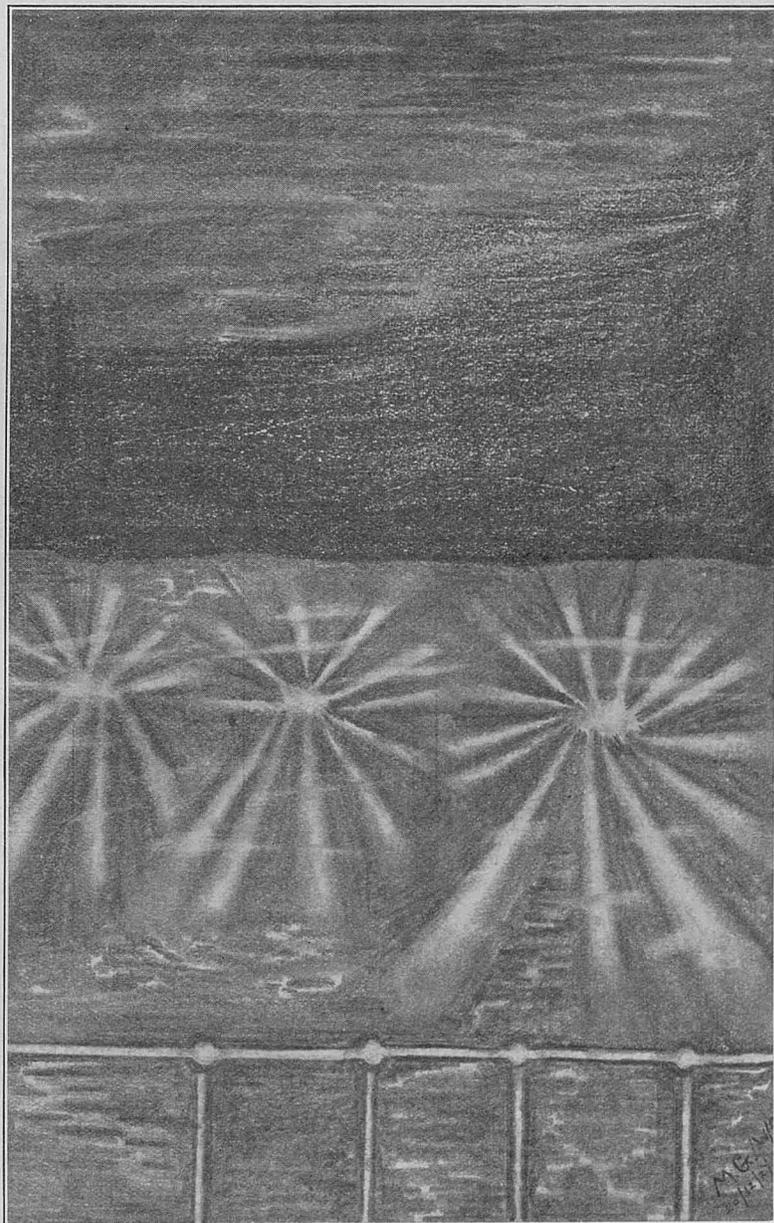
"December 4th, 1927, at 0025 when off Lipari Reef Light (Spencer Gulf) the compass was found to be strongly affected by some local disturbance and was some 9 degrees in error above what was allowed. As soon as the light was passed this disturbance ceased to be felt to any marked degree. Allowed variation $4^{\circ} 15'$ E., deviation $2^{\circ} 45'$ E."

PHOSPHORESCENCE.

Indian Ocean.

THE following is an extract from the Meteorological Log of S.S. *Arracan*, Captain S. SINCLAIR DUNCAN, Rangoon to West Australia. Observer, Mr. J. HENDERSON:—

"19th December, 1927, at 2 p.m. A.T.S., in Latitude $14^{\circ} 23'$ N., Longitude $96^{\circ} 03'$ E., approx., vessel was passing through small clusters of phosphorescent light which gave the appearance of occulting lights on the sea surface. Gradually these clusters of light expanded into bars and commenced to revolve in an anti-clockwise direction, and appeared to pass the bridge, from where they were observed at the rate of one every half-second. This phenomenon was in the form of a catharine wheel, the hub of which could be observed plainly about two hundred yards to the westward of ship's course. At 2.05 a.m. the phosphorescent light failed, and then became brighter, and on this occasion the spokes or beams of light revolved in the opposite direction, i.e., clockwise. At 2.10 a.m. the light faded again, and once more brightened to revolve as on the first occasion, i.e., anti-clockwise. At 2.15 a.m. this phenomenon disappeared. On each occasion the hub of the catharine wheel was visible clearly to the westward of ship. Wind N.E., force 3. Barometer, corrected, 1011.0 mbs. Temperature, air 79° F. Sea Temperature 80° F. Sky cloudless. Sea, N.E., slight. Sketch by M. GOODMAN, Wireless Operator, has been exaggerated in order to show the three phenomena."



North Atlantic.

THE following is an extract from the Meteorological Report of S.S. *Oaklands Grange*, Captain C. N. ST. CLAIR, D.S.C., Montevideo to Liverpool. Observer, Mr. C. F. FOXWELL, 2nd Officer:—

“ At 1.20 a.m., A.T.S. (2.53 a.m., G.M.T.), and again at 1.40 a.m., A.T.S. (3.13 a.m., G.M.T.), on December 29th, 1927, Latitude 14° 07' N. and Longitude 23° 20' W., in the vicinity of the Cape de Verde Islands, vessel passed through two belts of phosphorescent water. Both belts were about eight yards wide, and stretching as far as the eye could discern, in an easterly and westerly (true) direction. The belts appeared to be composed of numerous blobs of phosphorescent light about the size of tennis balls, and although other very small detached patches were seen throughout the night, these two belts were most pronounced in symmetry and luminosity.”

AURORA.

North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Concordia*, Captain J. H. TELFER, Avonmouth to St. John, N.B. Observer, Mr. J. H. BLACKWOOD, 3rd Officer:—

“ December 13th, 1927. Position at Noon, Latitude 47° 24' N., Longitude 50° 28' W. Course S. 63° W. Speed 11

knots. 2150 Cape Race bearing 333° distance 13 miles, altered course S58° W.

“ 2000.—Aurora visible as a pale yellow light showing from behind a bank of cloud (probably St.-Cu).

“ 2200.—Sky appeared to darken as if overcast, though no cloud was visible. Aurora appeared suddenly as a hanging curtain, with folds, stretching right across the northern horizon and giving the impression that a series of waves were rapidly travelling along the curtain, and showing streaks of light from its upper edge which rapidly changed in direction, position and length.

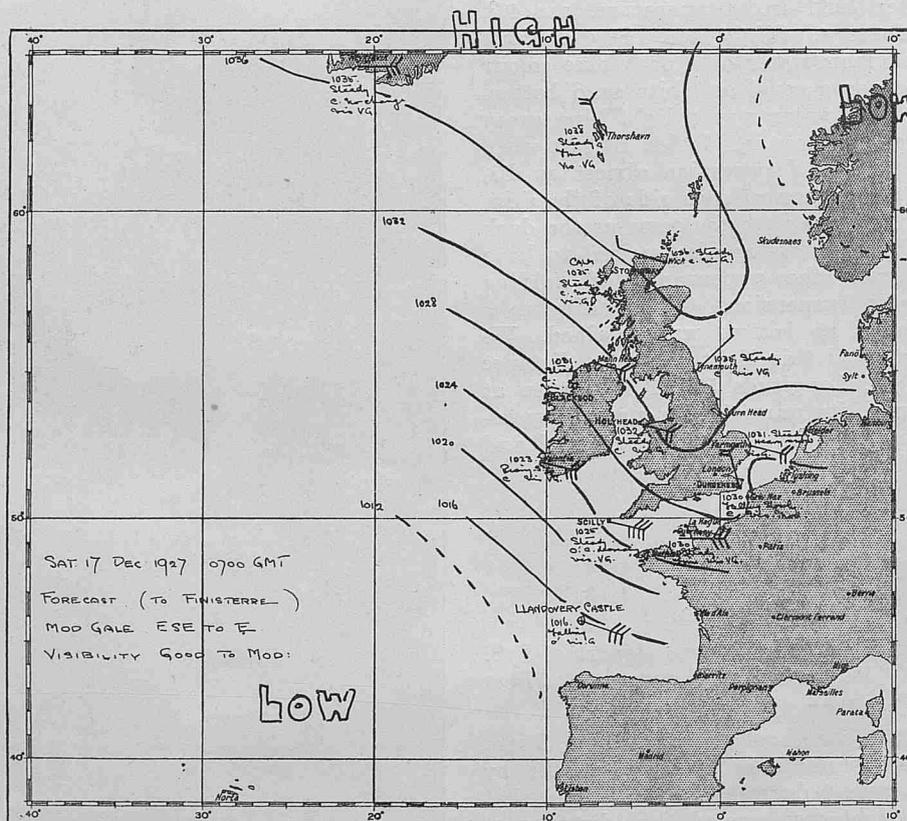
“ **Colour.**—The upper and much larger portion showed as a pale greenish yellow, the green being more marked in the lower part, from which it rapidly changed to a pale yellow—to white light. Below this was a band of reddish light of much greater intensity—so much so that the aurora gave one the impression of a curtain of pale colours and delicate fabric with a band of reddish colour and much stronger material attached to the bottom. The top edge of this band was red—lessening to a watery pink and then rapidly darkening to a deep purple.

“ 2230.—Sky became overcast and aurora suddenly disappeared.”

WEATHER CHARTS MADE AT SEA.

Eastern North Atlantic.

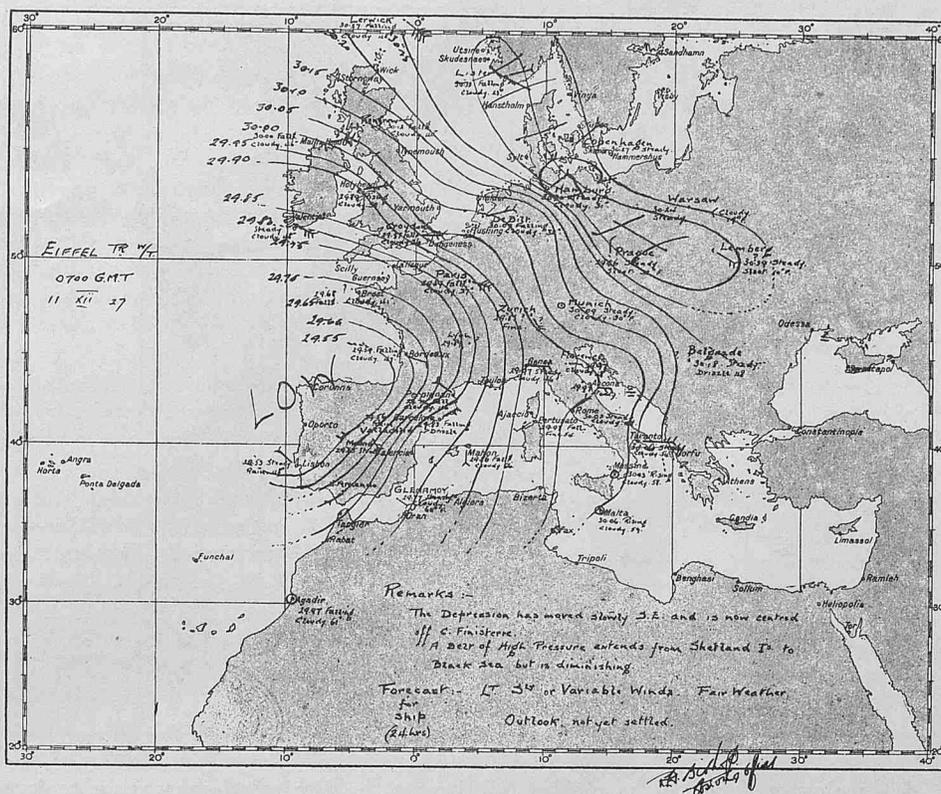
Weather Chart (one of a series) made on board S.S. *Llandoverly Castle*, Captain J. H. KERBEY, London to Cape Town, by Lieutenant C. H. WILLIAMS, R.N.R.



According to *Llandoverly Castle's* Meteorological Log, E.S.E'ly winds, force 7 were experienced during the day, veering to S.S.E. and decreasing to force 4 by midnight. Mist and fog were experienced during the afternoon and evening.

Mediterranean.

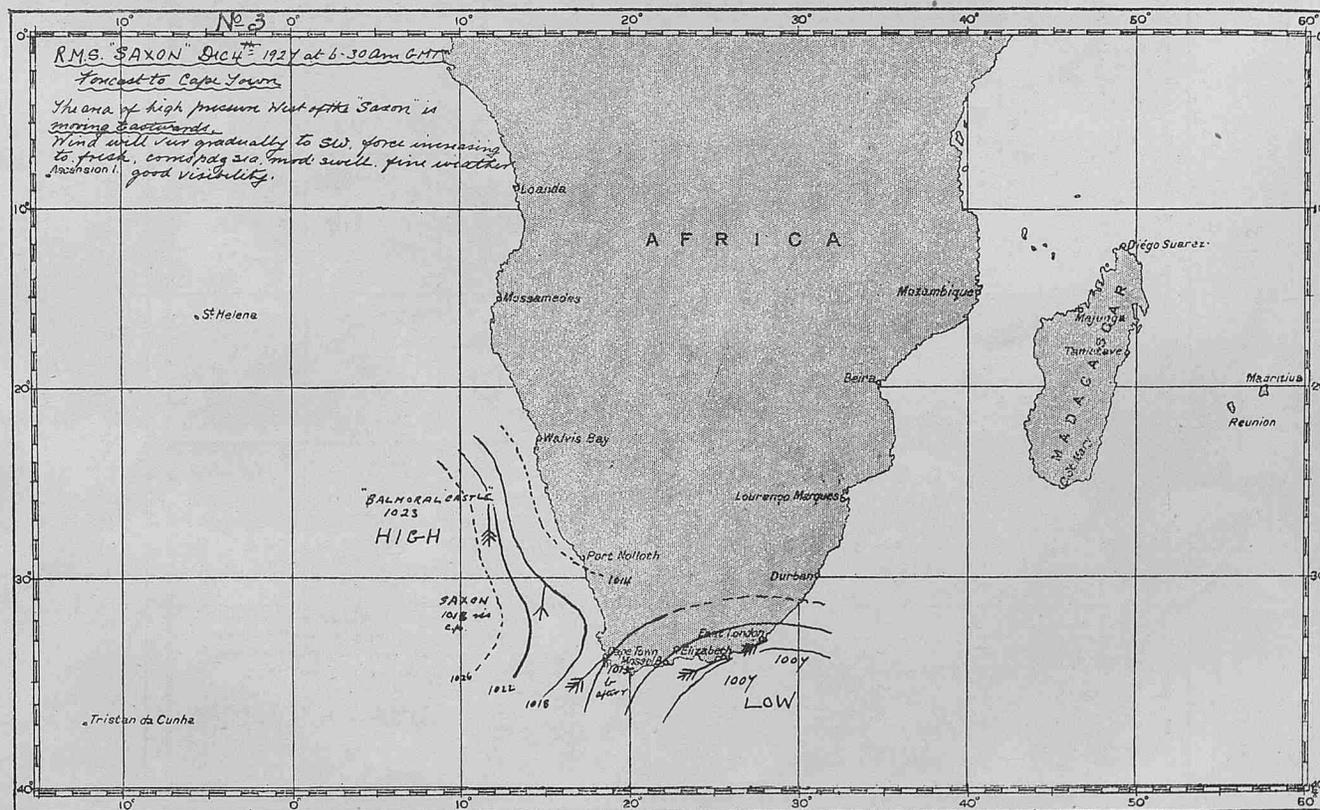
Weather Chart (one of a series) made on board M.V. *Glenamoy*, Captain C. E. HOMAN, London to Port Said, by Mr. R. L. V. BISHOP.



According to the Meteorological Log of M.V. *Glenamoy*, light southerly winds and calms, with fine weather, were experienced.

South African Waters.

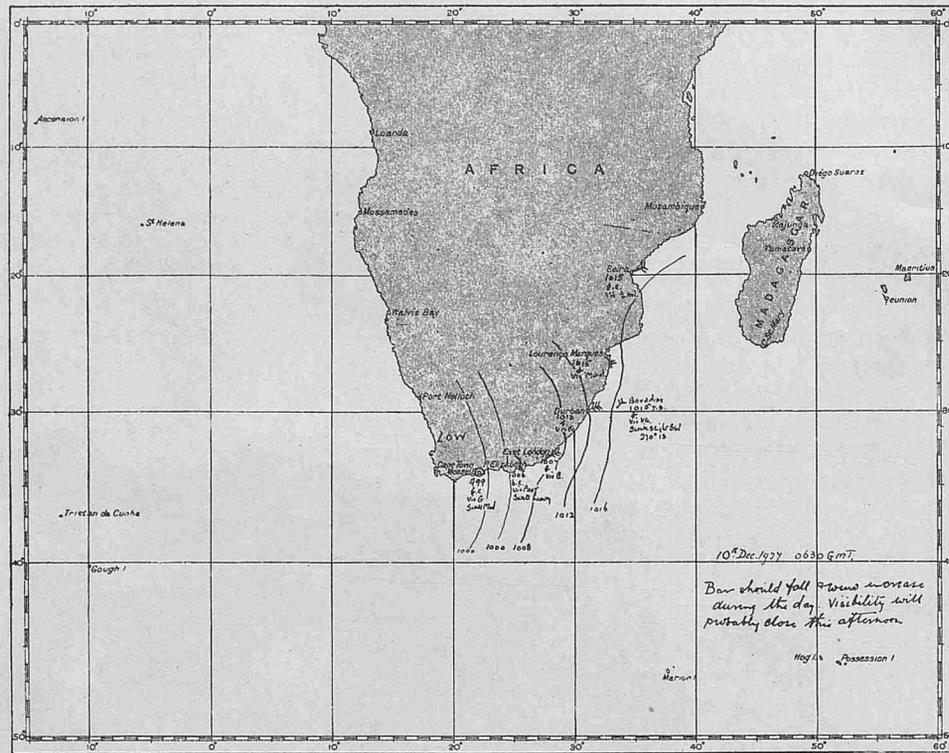
Weather Chart (one of a series) made on board R.M.S. *Saxon*, Captain G. F. GARDNER, O.B.E., R.N.R., Southampton to Cape Town, by Mr. G. H. PICKERING, 4th Officer.



According to *Saxon's* Meteorological Report, the wind was S. by W. force 5 at 8 p.m. 4th, sea S. by W., disturbance 5, swell S.S.W., 6-7, weather b.

South African Waters (continued).

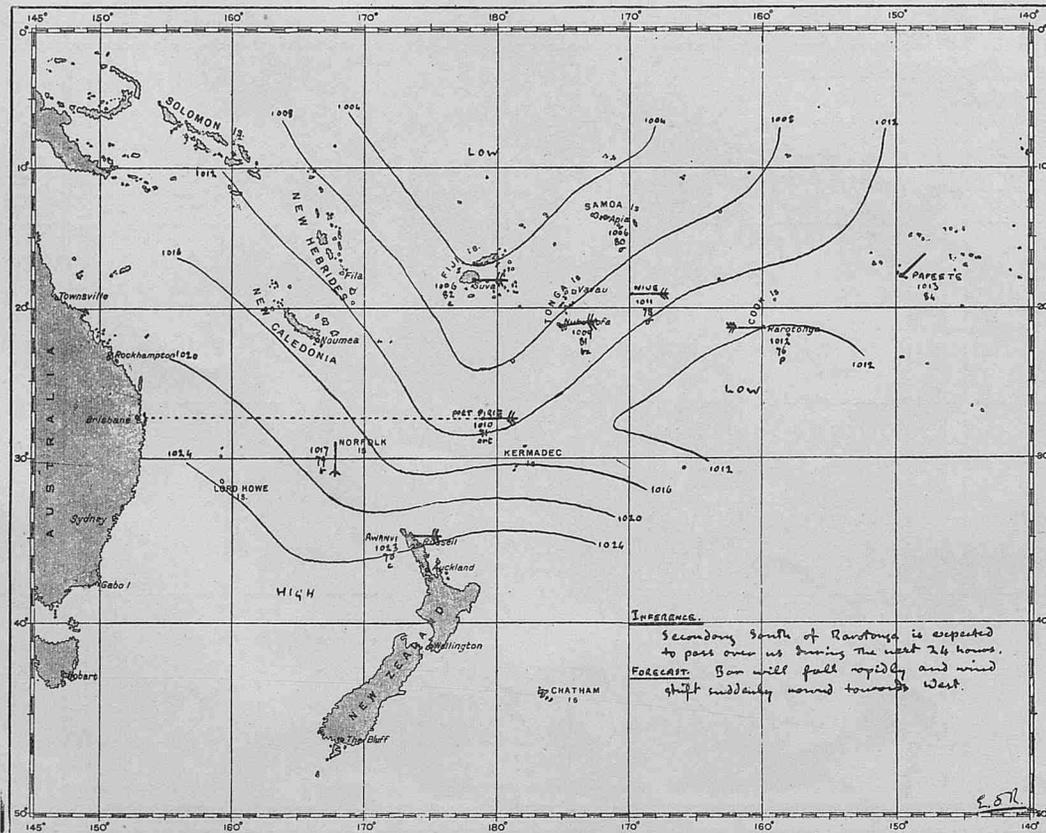
Weather Chart (one of a series) made on board S.S. *Baradine*, Captain W. ROLLO, Fremantle to Durban, by Mr. C. B. ROBE, Chief Officer.



According to *Baradine's* Meteorological Log, the barometer fell during the day, wind increasing to force 7 from N.E. by 4 p.m. Weather at 4 p.m. b.m.

South Pacific.

Weather Chart (one of a series) made on board S.S. *Port Pirie*, Captain T. KIPPINS, Balboa to Brisbane, by Mr. E. O. ROUND, 4th Officer, at 0330 G.M.T., December 10th, 1927.



According to *Port Pirie's* Meteorological Log the barometer fell during the next 24 hours, the wind was variable, coming away from W., force 1-2 at noon.

THUNDERSTORM.

Ship struck by lightning and Compass affected.

Western North Atlantic.

THE following report was received from Commander B. SHILLITOE, R.D., R.N.R., S.S. *Araguaya*, Bermuda to New York:—

"At 8.30 p.m. (N.Y. Time) on December 26th, 1927, Latitude 37° 35' N., Longitude 70° 25' W., wind north, force 4, passing rain squalls, moderate sea. During a squall there was a loud report, sharp and defined like a 6-inch gun with concussion that shook the ship. There had been some lightning during the previous hour, but quite distant. Ship was struck on foremast and enveloped in fierce light, the electric fluid apparently dispersing over the side in a few seconds. The wire halyards hoisting the aerial were burnt through at the block on foremast and the aerial came down on deck.

"Compasses were found to be badly affected—standard was showing west when ship's head was approximately N. 36° W., and the two other compasses on the bridge about the same.

"I attempted to adjust the wheel-house compass when I had obtained a bearing of a star, and found the deviation to be 40° E. on standard; I could get no result with the magnets I had. I was able to steer a course by standard after changing the card. Arrangements were made on arrival at New York for compasses to be adjusted before leaving on our next trip.

"The opinion of the adjuster was that the polarity of the ship's magnetism was changed when ship was struck, and that after a time the magnetism of the hull will return to its normal condition.

"Compasses were adjusted and have remained the same during our round voyage to Bermuda and back to New York.

"Only slight damage was done in the wireless room, filaments burnt out, &c., and we were able to send and receive when aerial rehoisted.

"In a further letter, dated 1st May, 1928, Captain SHILLITOE writes:—'I beg to inform you that the magnetism of the ship has not changed. Compasses settled down to about 5° easterly deviation on S.E. courses and 7° westerly deviation on N.W. courses, and have remained the same ever since (four months).'

UNUSUAL VISIBILITY OF STARS NEAR HORIZON.

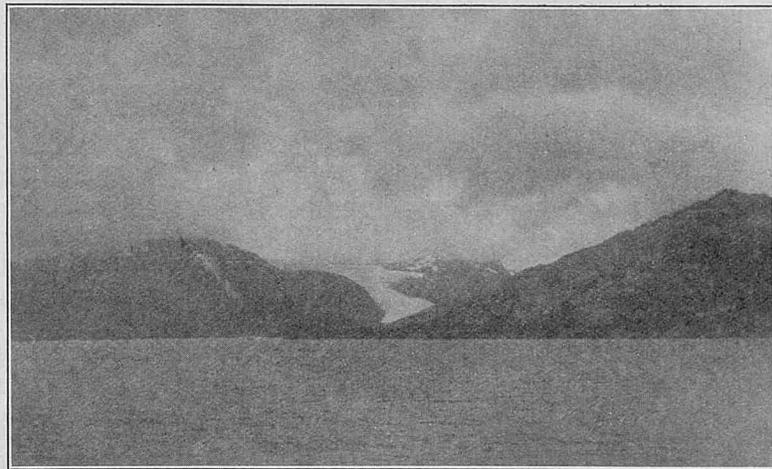
Arabian Sea.

THE following is an extract from the Meteorological Report of S.S. *Llandaff Castle*, Captain W. MORTON BETTS, Aden to Natal. Observers, Messrs. R. F. BAYER, 2nd Officer, and J. M. CASTLE, 4th Officer:—

"On December 30th at midnight G.M.T., rounding C. Guardafui, *Venus* observed rising. Changing of colour was very remarkable from deep red to brilliant white. This continued until planet was about 3 degrees above horizon. Also *Spica* and a *Centauri* were observed rising. The extraordinary brilliance of all stars was remarked upon by the Commander as a sight he has never witnessed before. Stars descending over the high land appeared as small lights from houses scattered over the ridges. New positions of Guardafui and Ras Hafun Lt. Houses verified by Observations and cross-bearings and found to be correct, i.e. = 2½ miles East of charted positions."

CLOUD PHOTOGRAPH.

THE accompanying photograph has been received with the Meteorological Report of M.V. *Loriga*, Captain E. C. CLAPHAM, West Coast South American Ports to London, and was taken by Mr. R. W. GILL, 3rd Officer, on 29th December, 1927, at Glacier Bay, Straits of Magellan:—



Clouds clearing after a squall.

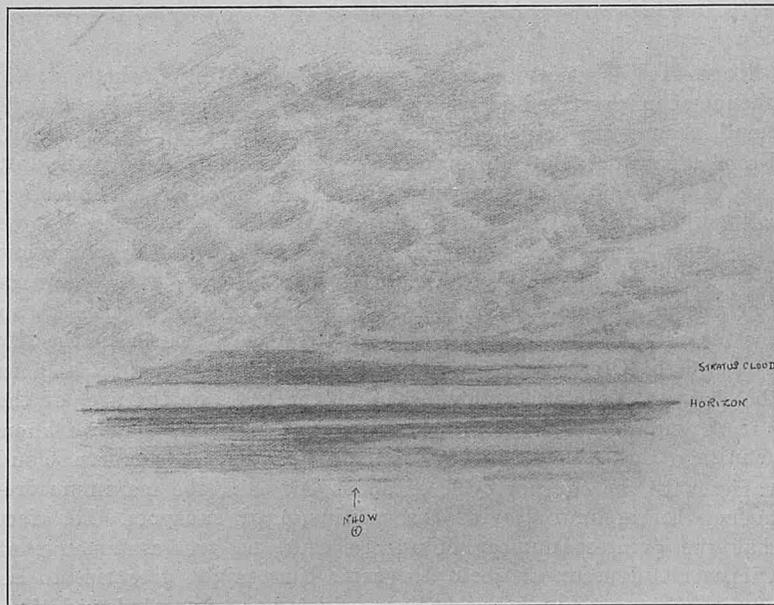
CLOUD FORMATION.

Pacific Ocean.

THE following is an extract from the Meteorological Log of S.S. *Rimutaka*, Captain F. A. HEMMING, Balboa to Wellington, New Zealand. Observer, Mr. G. C. SAUL, 3rd Officer:—

"4th December, 1927, 10.55 p.m., at ship, in position by D.R. Latitude 16° 39' S., Longitude 107° 41' W. Sky overcast (9/10ths) by St-Cu (8/10ths) and Stratus (1/10th). The St-Cu cloud radiated in lines from a point bearing N. 40° W. (T) elevated about 5° above the horizon. The 'lanes' of light, which, to the westward, were well illuminated from behind by the moon, appeared distinctly as the spokes of a wheel—the particles or sections of cloud between enlarging as the distance from the centre point increased. Sky was clear from horizon 5° upward, then a horizontal layer of Stratus and St-Cu as above described.

"Weather at time of observation:—Barometer 1016.1 mb., temperatures, dry 73.8° F., wet 67.2° F., sea 75.2° F., light easterly airs, fine and clear, smooth sea. Slight long S.W.'ly swell."



RADIATING CIRRUS CLOUD OR AURORA.

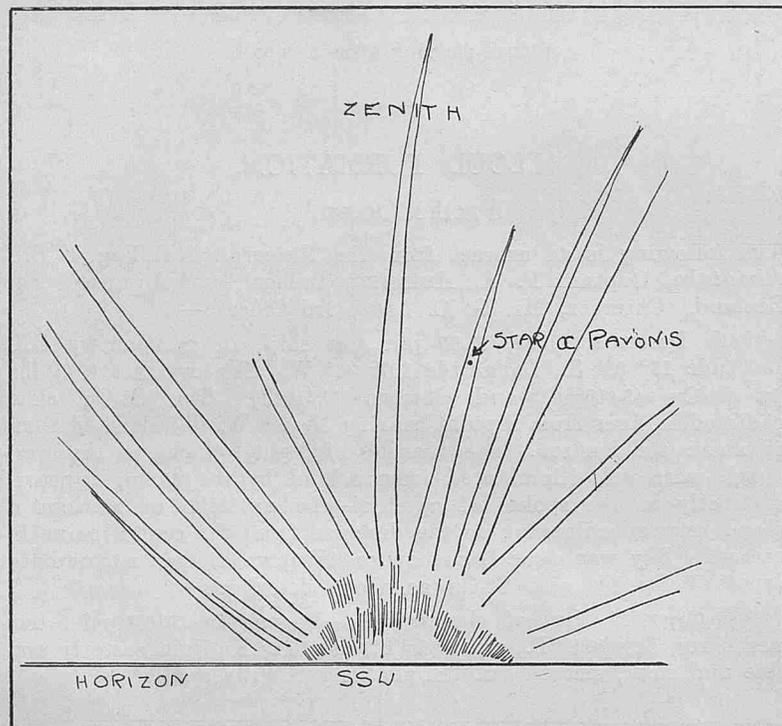
South Pacific.

THE following is an extract from the Meteorological Log of S.S. *Ruapehu*, Captain A. W. MCKELLAR, R.D., R.N.R., Auckland to

London via Panama. Observer, Mr. W. J. GLASSBOROW, 3rd Officer:—

“December 4th, 1927, 8.20 p.m. A.T.S. (G.M.T. = 0505 December 5th), Latitude 29° 26' S., Longitude 131° 49' W.

“Observed remarkably well-defined threads of ‘Cirrus’ emanating from a patch of Ci-St on the horizon to S.S.W. of vessel. This was the only cloud in the sky at the time. The threads extended well past the zenith and seemed to be stationary, appearing and dissolving again without any apparent movement, also stars were observed shining through the threads and appeared undimmed by same. Could this have been a display of ‘Aurora Australis’? The accompanying sketch gives a rough idea of the appearance of the phenomenon, which was obscured at 9.50 p.m. by a bank of heavy Cumulus from N.E.”



NOTE.—It is not possible to say definitely whether the phenomenon described above was the Aurora Australis or Cirrus cloud, though the evidence is rather in favour of the Cirrus cloud. From a considerable number of observations made during the last two centuries it would appear that there is often a connection between auroræ and clouds of upper types, Cirrus, Cirro-Stratus and Cirro-Cumulus. FROBESIUS in 1739 was the first to point out some of these relationships. ANGOT says in his book, “The Aurora Borealis”:—“Sometimes when the aurora borealis disappears in the morning before the light of day, its place is taken in the sky by bands of Cirrus; more often still, these clouds are first seen in the day-time, and the following night the rays, or the arc, of the aurora replace them.” It must, however, be noted that we know definitely that the frequency of both auroræ and Cirrus cloud varies with the sunspot cycle of about 11 years, the maximum frequency corresponding with the maximum of sunspots. The fact that the greatest number of auroræ and the greatest amount of Cirrus cloud occur at about the same time might give rise to an apparent connection between them which has no real foundation. In the absence of a complete theory of the origin of the aurora this question of the relationship with cloud should therefore not be regarded as finally settled, and it would be helpful if Marine Observers who see an aurora would note any apparent connection between the two phenomena or any transformation of the one into the other.

ECLIPSE OF THE MOON.

Indian Ocean.

THE following is an extract from the Meteorological Report of S.S. *Ulysses*, Captain R. D. OWEN, O.B.E., Australia to Durban. Observer, Mr. R. BLAKEY, 3rd Officer:—

“On the night of December 8th, in Latitude 30° 36' S., Longitude 90° 57' E., at about 16 hours 9 mins., G.M.T., I first observed the eclipse of the Moon, but it was not until one-quarter of the Moon's sphere had been covered that the sky cleared and gave me an unobstructed view.

“The shadow gradually moved across the Moon in an approximate S.E. to N.W.'ly direction, the N.W. portion of the Moon being the last to be covered.

“The total eclipse took place at 16 hours 53 mins. 49 secs. G.M.T., and remained so until 17 hours 52 mins. 35 secs., when the shadow gradually passed over to the W.S.W. The first portion of the Moon to become uncovered was the E.N.E. portion, the shadow moving in a W.S.W.'ly direction until it was finally clear at about 19 hours 30 mins. G.M.T.

“At various times clouds obscured the view, thus preventing me from obtaining any accurate times of the phases of the eclipse.

“The colour of the Moon during eclipse varied from light copper colour at the apex to deep red at the base, and no variations in colouring were observed during the whole period the Moon was in the umbra.”

METEOR.

North Pacific Ocean.

THE following is an extract from the Meteorological Log of S.S. *Niagara*, Captain T. V. HILL, Honolulu to Victoria, B.C. Observer, Mr. V. KNIGHT:—

“December 4th, 1927, 2.20 a.m., rain ceased, sky clearing. 2.30 a.m., clear blue sky, stars brilliant. Approximate position, Latitude 27° 30' N., Longitude 152° 30' W., observed meteor becoming visible between *Castor* and *Pollux* travelling with a serpent-like movement towards *Polaris*. Its brilliance was almost blinding and left a trail in the atmosphere visible for at least 20 seconds over an arc of about 14° disappearing near *Dubhe*.”

South Pacific Ocean.

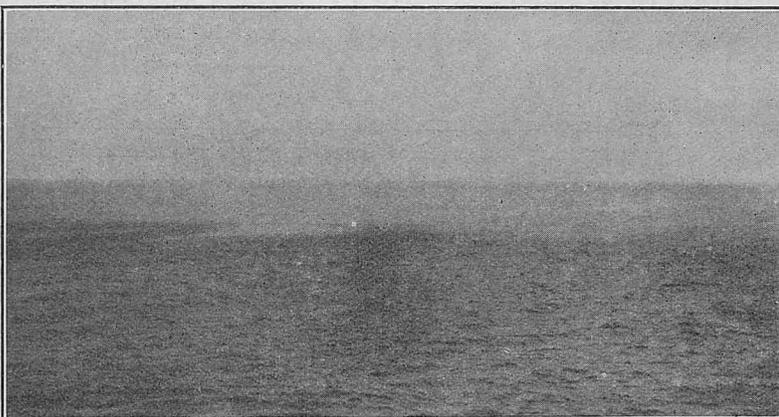
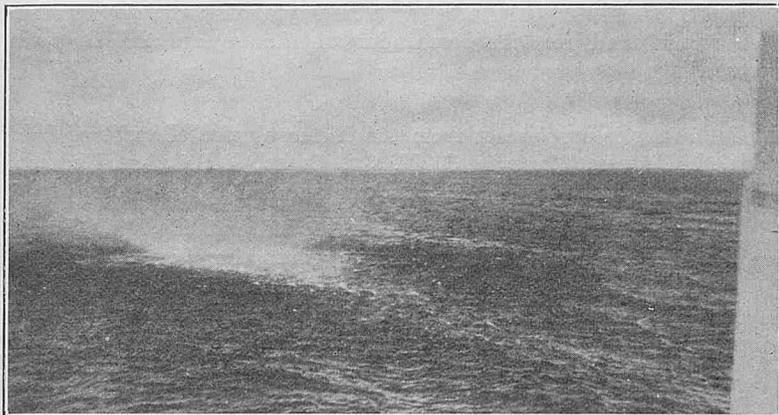
THE following is an extract from the Meteorological Report of S.S. *Hertford*, Captain D. URQUHART, Panama to Auckland. Observer, Mr. J. R. RICKETTS, 3rd Officer:—

“December 27th, 1927, 2.45 a.m., A.T.S., Latitude 31° 08' S., Longitude 150° 25' W., barometer 30.06 in., temperature 67° F. Wind var., force 2, light Cumulus clouds. Observed bright meteor appearing to originate from *Sirius*, bearing W.N.W., altitude 40° and falling to horizon about west, leaving behind a vivid path of flame visible for about 3 seconds. The meteor burst about 6° above the horizon, causing a vivid flash and quite an audible detonation.”

WATERSPOUT.

THE accompanying remarks and photographs have been received from Mr. C. E. BRIDGMAN, and were taken when he was 3rd Officer of the S.S. *British Rose*:—

“The accompanying photographs were taken on December 27th, 1927, at 0800 S.A.T. off the Arabian Coast between Masira Island and Ras al Hadd. They show a waterspout which passed very close to the ship, as it was forming. There was a light N.E. breeze at the time, the sea was calm and the sky was clouded; occasional squalls were experienced during the day. About four waterspouts were observed at the same time as the accompanying photographs were taken; none of them managed to form perfectly, but collapsed before meeting in the middle. The one of which the photograph was taken appeared to be about 40 feet in diameter, and composed



of very heavy spray whipped off the top of the water. It was travelling in the same direction as the wind, and collapsed after about seven minutes."

SKJELLERUP'S COMET (1927k).

THE following reports have been received with the Meteorological Report of S.S. *Canonesa*, Captain W. H. BRODIE, London to South American Ports. Observer, Mr. F. W. KENT, 2nd Officer:—

December 4th, 1927, at 2.27 a.m. Local Standard Time, 0626 G.M.T., lying at anchor in Buenos Aires Roads in Latitude $34^{\circ} 38\frac{1}{2}'$ S., Longitude $58^{\circ} 07\frac{1}{2}'$ W., observed Comet bearing S. 29° E. (True). True Altitude $7^{\circ} 00'$ S. Tail $2\frac{1}{2}^{\circ}$ Long. Angular distance (measured with sextant) from α Centauri = $15^{\circ} 27'$ and from α Triang. Australis = $15^{\circ} 33'$. Right Ascension of Comet 16h. 18 m. Declination $53\frac{3}{4}^{\circ}$ S. Comet only visible from 7.45 p.m., dusk to 8.30 p.m. setting and from 2.0 a.m. rising to 3.30 a.m. dawn. At 8 p.m., 2000 G.M.T., Comet bore S. 27° W., (True), true Altitude $6^{\circ} 57'$.

December 5th, 1927, at 2.27 Local Standard Time, 06h. 26m. 10s. G.M.T. Lying at anchor in Buenos Aires Roads in Latitude $34^{\circ} 38\frac{1}{2}'$ S., Longitude $58^{\circ} 07\frac{1}{2}'$ W., observed Comet bearing S $28\frac{3}{4}^{\circ}$ E. (True). Tail $2\frac{1}{2}^{\circ}$ Long. True Altitude $5^{\circ} 04'$.

"Angular distance (measured with sextant) from α Centauri = $17^{\circ} 06\frac{1}{2}'$, and α Triang. Australis = $17^{\circ} 04\frac{1}{2}'$.

"Right Ascension of Comet 16h. 26m. Declination 52° S. December 5th, dusk (7.45 p.m.), Comet visible, bearing and altitude not taken.

December 8th 1927, at 8.25 p.m., Local Standard Time, 23h. 55m. 29s. G.M.T. Lying at anchor in Monte Video Inner Harbour, in Latitude $34^{\circ} 54\frac{1}{2}'$ S., Longitude $56^{\circ} 13'$ W. Observed Comet, True Altitude $2^{\circ} 57'$. Tail about $2\frac{1}{2}^{\circ}$ long.

"Angular Distances (measured with sextant):—

From <i>Achernar</i> ...	...	$70^{\circ} 05'$	
,, <i>Triang. Australis</i> ...	...	$24^{\circ} 52'$	Giving approximate R.A. 16h. 48m.
,, <i>Centauri</i> ...	...	$26^{\circ} 25'$	
,, <i>Crucis</i> ...	...	$42^{\circ} 12'$	Giving approximate Dec. $44\frac{1}{4}^{\circ}$ S.

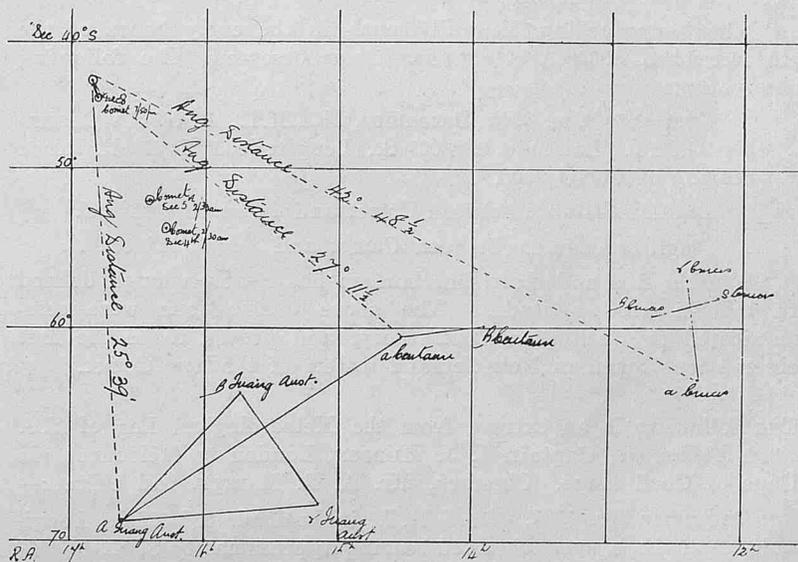
December 9th, 1927, at 3.45 a.m., Local Standard Time, 07h. 16m. 32s. G.M.T. Lying at anchor in Monte Video Inner Harbour, in Latitude $34^{\circ} 54\frac{1}{2}'$ S., Longitude $56^{\circ} 13'$ W. Observed Comet, True Altitude $3^{\circ} 13\frac{1}{2}'$ Tail about $2\frac{1}{2}^{\circ}$ long.

"Angular Distances (measured with sextant):—

From <i>Spica</i> ...	...	$56^{\circ} 27'$	
,, <i>Crucis</i> ...	...	$42^{\circ} 48\frac{1}{2}'$	
,, <i>Centauri</i> ...	...	$27^{\circ} 11\frac{1}{2}'$	Giving approximate R.A. 16h. 52m.
,, <i>Triang. Australis</i> ...	...	$25^{\circ} 39'$	Giving approximate Dec. $43\frac{1}{4}^{\circ}$ S.
,, β Argus ...	...	$57^{\circ} 55'$	

"Positions of previous observations show the direction and speed the Comet is travelling at; direction is about N 28° W.

"On being first observed on December 4th it was of the third magnitude, but becoming brighter each night as it travels to the N.W., which can be seen from the sketch below.



Above is reproduced portion of Bernard's Star Chart showing position of comet.

December 9th, at 7.52 p.m., Local Standard Time (Buenos Aires), 23h. 50m. 45s. G.M.T., in Latitude $35^{\circ} 09\frac{1}{2}'$ S., Longitude $56^{\circ} 58'$ W. Observed Comet, True Altitude $2^{\circ} 30'$.

"Angular Distances (measured with sextant):—

From β Centauri ...	...	$33^{\circ} 23'$	
,, α Pavonis ...	...	$34^{\circ} 45'$	Giving R.A. 16h. 56m.
,, α Triang. Australis ...	...	$27^{\circ} 39'$	
,, Fomalhaut ...	...	$69^{\circ} 10'$	Giving Dec. $41\frac{1}{2}^{\circ}$ S.

December 10th, at 3.43 a.m., Local Standard Time, 07h. 41m. 45s. G.M.T. Lying at anchor in Buenos Aires Roads in Latitude $34^{\circ} 38'$ S., Longitude $58^{\circ} 05'$ W. Observed Comet, True Altitude $2^{\circ} 46'$.

"Angular Distances (measured with sextant):—

From β Argus ...	...	$60^{\circ} 58'$	
,, Spica ...	...	$56^{\circ} 54'$	Giving R. A. 17h. 00m.
,, α Crucis ...	...	$45^{\circ} 50\frac{1}{2}'$	
,, α Triang. Australis ...	...	$28^{\circ} 30\frac{1}{2}'$	Giving Dec. 40° S.
,, α Centauri ...	...	$30^{\circ} 13'$	

December 11th, at 4.0 a.m. Local Standard Time, 07h. 59m. 52s. G.M.T. Lying at anchor off Anglo Meat Works, Zarate, in Latitude approx. $34^{\circ} 06'$ S., Longitude approx. $59^{\circ} 05'$ W. observed Comet (unable to observe altitude).

"Angular Distances (measured with sextant):—

From Planet Venus ...	...	$49^{\circ} 10'$	
,, α Crucis ...	...	$49^{\circ} 00'$	Giving R.A. $17^{\circ} 10'$.
,, α Centauri ...	...	$33^{\circ} 24'$	Giving Dec. $37^{\circ} 00'$ S.

"Comet will not be visible to make any further observations whilst in port owing to its total period above the horizon being in daylight."

THE following is an extract from the Meteorological Log of S.S. *Port Pirie*, Captain T. KIPPINS, Balboa to Brisbane. Observer, Mr. E. O. ROUND:—

“4th December, 1927, 1401 G.M.T., Latitude 24° 33' S., Longitude 148° 57' W. Observed comet bearing 145°. True altitude 7° 36'; having a faint tail extending upwards in a southerly direction inclined about 50° to the vertical, extending some 2° from the comet, where it gradually faded out. At 1427 G.M.T., the comet was last seen bearing 140° True altitude 10° 21', the sky then becoming too bright for further observation owing to approaching sunrise; it appeared to be of about the same brilliancy as a third magnitude star. Ship's position fixed by Stellar Observations at 1435 G.M.T.”

THE following is an extract from the Meteorological Report of S.S. *Port Fremantle*, Captain F. J. KEARNEY, London to New Zealand. Observer, Mr. A. G. RHIND, 2nd Officer:—

“When approaching New Plymouth in the early hours of the 5th December, 1927, a bright comet was observed. The following observations were taken:—

“Time 2.50 a.m., 5th December, N.Z.M.T., 1520, 4th December G.M.T. Latitude 39° 03' S., Longitude 173° 37' E. True bearing of Comet 150°.

“Angular distance between Comet and α Centauri 15° 58'.

“Angular distance between Comet and Venus 55° 32'.

“Weather fine and clear, but horizon not clearly enough defined to take a good altitude. The above observations were communicated to Wellington Observatory, and proved to be the first observations taken in New Zealand waters of the new Comet.”

THE following is an extract from the Meteorological Log of S.S. *Port Melbourne*, Captain J. J. HUDSON, London to Melbourne via Cape of Good Hope. Observer, Mr. A. R. MARTIN, 2nd Officer:—

“December 5th, 1927, 0100 G.M.T., in Latitude 38° 33' S., Longitude 28° 49' E., a comet observed bearing approximately S.W., 160° 50' from α Centauri. The tail of the comet lying in a N.W.'ly direction, and its length was equal to approximately six diameters of the body. Magnitude of the comet about 1.6.

“December 7th, 0030 G.M.T., in Latitude 41° 48' S., Longitude 40° 50' E., the comet observed bearing 147° from the ship with an altitude of 12° above horizon. Its angular distance from α Centauri was 21° 22' and from Venus 53° 27'. The weather was not suitable for further observations until December 17th, when in Latitude 44° S., Longitude 110° E., the comet was not seen, although the sky was cloudless.”

THE following is an extract from the Meteorological Report of S.S. *Cumberland*, Captain D. MACMILLAN, Panama to Auckland, N.Z. Observer, Mr. J. MARKS:—

“On the 6th December, 1927, at 7h. 36m. 51s. G.M.T., in Latitude 36° 12' S., Longitude 172° 44' W., observed a comet bearing S 30° 58' W (T). Altitude of nucleus 6° 45' Length of Tail 1° 10'. Altitude of end of tail 7° 18'. Angle between nucleus and α Centauri 19° 23'. Altitude of α Centauri 7° 51'.

“The weather was perfectly clear at time of observations, but the vessel was rolling easily to a moderately heavy Southerly swell. Clouds were A-St. amount 1. Altitudes are uncorrected. Height of eye 42 feet; no index error to sextant.

“The comet, of which we have no record on board, consisted of a moderately bright nucleus of about the third magnitude and had a tail resembling Bredikine's Second Type, very clearly defined for the first degree of its length, after which it appeared to become very indefinite, although the curvature was quite apparent. It clearly extended ahead of the nucleus and completely surrounded it. The tail, if extended, would pass very near α Argus.

“On the same day at 14h. 9m. G.M.T., it was again observed rising, and bore S 29° E. (T.), altitude 4° 47'. At 15h. 7m. G.M.T.

it bore S. 35° E. (T.), altitude 10° 12'. Daybreak prevented further observations, and for the remainder of the voyage the sky was overcast.”

THE following is an extract from the Meteorological Report of S.S. *Oaklands Grange*, Captain C. N. ST. CLAIR, D.S.C., at Rosario, S. America. Observer, Mr. C. F. FOXWELL, 2nd Officer:—

“While in Rosario between December 6th and 8th, 1927, inclusive, a very brilliant Comet was observed to the West of α and β Centauri. The bearing was S.W. by S., its altitude about 4° above the horizon, and heading W.N.W., the illuminated path or tail being quite an appreciable length. Unfortunately it sank below the horizon less than two hours after sunset.

“In Argentine it was described as the ‘Unknown Comet’ in the leading Dailies. While in Monte Video, between December 10th and 12th, 1927, inclusive, the Comet was observed once, but at sea the weather was very unsettled and prevented further observations.”

THE following is an extract from the Meteorological Report of M. V. *Losada*, Captain J. ROSS, Rio de Janeiro to Monte Video. Observer, Mr. J. T. DENLEY:—

“December 6th, 1927, at 4 a.m. A.T.S., in Latitude 24° 04' S., Longitude 44° 00' W., barometer 29.88 in., temperature 69° F., wind calm. Fine, but 9/10ths cloudy with St-Cu and Cu. Observed what was at first thought to be a star of the 1st Magnitude breaking through the clouds. Then it was seen to be a comet bearing S 40° E. (T) at an altitude of 8°. The tail was lying at an angle of approximately 30° to the horizon and extending about 2 $\frac{3}{4}$ ° (clouds made definite measurement impossible), and the comet appeared to be heading east (True). Unfortunately no stellar angular distances could be obtained, and at 4.04 A.T.S. clouds obscured the comet.

“December 9th, at 11.46 p.m. G.M.T., in Latitude 34° 58' S., Longitude 55° 32' W., barometer 29.83 in., air temperature 67°, wind east (true), force 3, again observed the same comet bearing S 38° W. (T) at an altitude of 2° 14'. Only one angular distance could be obtained, and that 29° 18' from β Centauri, at 11.57 p.m. G.M.T., when the comet had an altitude of 1° 25'. It then disappeared into a bank of cloud. The actual length of tail was not distinguished owing to the brightness of the sky, but 1° 46' was an approximate length. On this occasion the comet appeared to head west about, but no really reliable observations were obtained, and as we could find no mention of such a comet in the Admiralty Almanac we were sorry that we were unable to do more.”

THE following is an extract from the Meteorological Log of M.V. *Port Dunedin*, Captain F. FARMAR, London to Melbourne via Cape of Good Hope. Observers, Mr. H. M. POST, 2nd Officer, and Mr. E. G. JONES, 3rd Officer:—

“December 7th, 1927, 0300 a.m. A.T.S. (6th 2000 G.M.T.), Latitude 43° 10' S., Longitude 105° 25' E., true bearing S 34° E., brilliant Comet. Magnitude of star forming the head about 2.0. Long narrow tail nearly the same length as that between α and β Centauri.

“December 9th, about 8.30 p.m. A.T.S. (1215 G.M.T.), Latitude 42° 34' S., Longitude 124° 55' E., Comet observed. Altitude 5° 44'. Angular distance from α Centauri 27° 10'. True bearing S 32° W. Tail as long as distances α — β Centauri.

“December 10th, about 3.15 a.m. (1835 G.M.T.), Latitude 42° 12' S., Longitude 126° 52' E., Comet observed. Altitude 4° 42'. Angular distances α Centauri 23° 35' Comet 71° 38' Achernar.

“December 11th, about 8.07 p.m. (1058 G.M.T.), Latitude 40° 04' S., Longitude 139° 02' E., Comet observed. Altitude 3° 20'. True bearing S 42° W. Stars too faint for angular distances.”

NOTE.—This great comet was one of the brightest that have appeared for many years. It bears the name of Mr. J. F.

SKJELLERUP, who saw it at Oakleigh, near Melbourne, on the morning of December 4th (local time). He was the first to announce the discovery, and so the comet bears his name, but it was afterwards found to have been previously observed by four people in New Zealand, Victoria and South Africa. The credit of the actual discovery belongs (as far as is known) to Mr. C. O'CONNELL, of Marton, New Zealand, who found the comet on the morning of November 29th (local time). The earliest of the marine observations quoted above, that of S.S. *Canonesa*, was made about half a day after that of Mr. SKJELLERUP. The observation of S.S. *Port Pirie* followed about eight hours later. The comet continued to be independently discovered by Marine Observers and others on December 5th and subsequently, and the latest of these was an observation of the comet in full daylight very near the sun at

Kodaikanal Observatory, Madras, on December 15th. It was also observed in daylight at many American observatories, during which time it was much brighter than the planet *Venus* and must have attained a magnitude of -6 at the very least.

The comet bears the letter *k*, indicating that it was the tenth comet to be found in the year 1927, the letter *i* not being used for this purpose. Some of the previous comets of the year were returns of known periodical comets. 1927*k*, so far as appears at present, is not a return of any periodical comet, but its orbit will not be fully known until the later observations made in the Southern Hemisphere during the comet's passage away from the Sun are worked up. The comet was nearest the Sun on December 18th at a distance of about 16,000,000 miles. It could not be observed in the Northern Hemisphere except in daylight or bright twilight.

NOTES ON CHARTS OF WINDS ON THE TRACKS FROM PANAMA TO NEW ZEALAND AND AUSTRALIA.

PREPARED IN THE MARINE DIVISION BY J. HENNESSY, SENIOR NAUTICAL ASSISTANT.

THE following notes are made from the Charts published in the 1928 Numbers of THE MARINE OBSERVER, shewing the Winds on the Tracks from Panama to New Zealand and Australian Ports. The Charts were published for the months of March, June, September and December, these being the middle months of the quarter for which the current charts were published:—

March:—From Cape Mala to Latitude 5° S. the winds are generally light and variable, coming from any point of the compass with those from the north-eastern quadrant predominating, until the S.E. Trades are picked up, which may be anywhere south of Latitude 2° S.

From the 5th to the 25th southern parallel the S.E. Trade winds are general and moderate in strength. To Latitude 13° South they blow steadily from the S.E., but below the 15th parallel the wind generally backs to a more easterly point, and may come from anywhere between S.E. and N.E.

Between the 25th and 30th parallels the winds are variable in direction and light to moderate in force, those from a north-westerly and south-easterly direction being stronger and more frequent than from elsewhere.

South of the 30th parallel, east of the 140th meridian to the Australian coast the winds are governed by the eastward movement of passing depressions, and may come from any point of the compass. Winds with a westerly component predominate and not infrequently rise to gale force between the 130th meridian and the New Zealand coast.

June:—From Cape Mala to Latitude 5° N. the winds are light and generally from a N.W.'ly to S.W.'ly direction. From Latitude 5° North to 5° South, east of the 85th meridian the winds come from a point within the S.W. quadrant, light at first, gradually increasing to moderate strength as southing is made. Between Latitude 5° N. and the Equator, between the 85th and 90th meridians, the winds are moderate in strength, coming from a point between S.E. and S.W. At this season of the year the S.E. Trades blow to the Equator, and on the tracks under review come steadily from the S.E., backing as southing is made and strengthening sometimes to moderate gale force as far as the 20th parallel. Between the 20th and 25th parallels, east of the 110th meridian to Pitcairn Island, the winds come from between N.N.W. and S.E., light to moderate in force.

South of the 25th parallel and east of the 130th meridian to the Australian coast the winds may be experienced from any point of

the compass, gales being frequent, especially with the wind in the N.W. and S.W. quadrants.

September:—From Cape Mala to the Equator and east of the 85th meridian to Latitude 5° South the prevailing winds are S.W.'ly, light to moderate in strength.

As in June, the S.E. Trades reach to the Equator and blow steadily from the S.E. down to the 10th parallel, after which they gradually back to a more easterly point until on reaching their southern margin in the region of Pitcairn Island the wind may be experienced from anywhere between S.E. and N.N.E.

Between the 25th and 30th parallels and the 130th and 140th meridians the winds are variable in direction, with greatest frequency from the westward. They are generally light to moderate in strength, but winds from W.S.W., of gale force are recorded in this area.

Below the 30th parallel between the 140th and 180th meridians, the prevailing winds come from some point in the western half of the compass, and may rise to gale force, but gales are not nearly so frequent as in June.

December:—As in September, from Cape Mala to the Equator and east of the 85th meridian to Latitude 5° South, the prevailing winds are S.W.'ly, light to moderate in force.

Along the tracks from the Equator to Latitude 10° South the Trades are light and steady from the S.E. Between the 10th and 20th parallels the Trades are a little stronger in force, and when south of the 15th parallel may come from any point between N.E. and S.E.

South of the 20th parallel to Latitude 30° South, the winds are light to moderate in force and variable in direction. Between the 120th and 140th meridians, N.W.'ly winds predominate, but from 140° to 150° West the greatest frequency is from the S.W. quadrant. From 140° West to the 180th meridian the wind may be experienced from any direction, with greatest frequency from S.E. Between the same meridians south of Latitude 35° S., the winds are mostly from a north-westerly direction, which occasionally reach gale force.

From the 180th meridian to the Australian coast, between the parallels of 30° and 40° South, winds, sometimes reaching gale force, may be experienced from any direction, but the greatest frequency is from a S.W.'ly direction to Longitude 170° E., and from there to the Australian coast S.W.'ly and northerly winds are most frequent.

CURRENTS ON THE TRACKS FROM PANAMA TO AUSTRALIAN AND NEW ZEALAND PORTS.

PART II.

In the first part of this article a general account of the currents of the South Pacific Ocean was given, derived from Sailing Directions and other works of reference. This was followed by an account of the currents along the tracks from Panama to Australian and New Zealand Ports, as shown by THE MARINE OBSERVER CHARTS for the two quarters of the year, Autumn (February, March and April) and Winter (May, June and July). In the present article we shall begin by seeing what the charts for Spring (August, September and October) and Summer (November, December and January) show, and how the currents in these quarters compare with those of Autumn and Winter. A difficulty arises in connection with the use of the words Spring, Summer, Autumn and Winter in the case of the current charts we are considering, since in the extreme eastern portion of the charts, between Cape Mala and the Galapagos Islands, the tracks lie to the north of the Equator. For this portion, therefore (Latitude 8° N. to 0°), the words used to denote the quarters should be reversed. Since, however, the seasons as we know them in higher latitudes do not exist in equatorial regions, it has been thought better to retain the names which are applicable to the charts as a whole and not to risk the confusion that might be caused by reversing the names when speaking of the small portion which lies north of the Equator. We will now consider the charts for the first two quarters of the Southern year, taking the three portions into which the charts are divided in turn. The figures given in all cases refer to mean values unless the contrary is clearly stated.

Eastern Portion.—The South Equatorial Current is again well shown in both quarters. Two special points of interest may be observed. In the Spring quarter the current is more uniform in set and is on the whole somewhat stronger than it is during the rest of the year. Moreover, it extends further westward along the region covered by the tracks during this season. The second point which should be noted is that during Summer, south of Latitude 4° S., the set is more to the southward than in the other quarters, and is about W.S.W. on the average. The greatest mean drifts are shown on the Autumn chart, 27.3 miles per day in the region, Latitude 0° to 2° N., Longitude 88° W. to 92° W., and 22.8 miles per day in Latitude 2° N. to 4° N., Longitude 88° W. to 92° W. These figures each depend on only four observations, and are probably higher than the true mean. Excluding them, the highest is 19.9 miles per day (26 observations) in the neighbourhood of Chatham and Hood Islands in the Spring quarter, and this probably represents the highest mean daily drift of the South Equatorial current during the year. A number of mean arrows showing drifts of from 16.0 to 19.7 miles per day in this current in the neighbourhood of the Equator may also be seen on the charts, and these give added support for a maximum value of about 20 miles per day near the Equator. In all seasons the mean strength of the current decreases with increasing south latitude and west longitude, as would be expected, but the decrease is not uniform. As the roses show, there is a considerable variety in the set of individual currents from N. to S., through W. in the Equatorial Current, but sets from N. to S. through E. are infrequent and usually weak. The three observations from which the arrow for the Spring quarter in the region of Latitude 6° S. to 8° S., Longitude 92° W. to 96° W. is drawn give a mean value of S.E., 7.0 miles per day.

In THE MARINE OBSERVER, Volume II, page 191, an account is given of south-easterly sets of about 2 knots experienced by S.S. *Dorset*, Captain C. R. KETTLEWELL, while between Chatham Island and Hood Island on December 14th, 1924. While passing Chatham Island strong sets between W. and N. were experienced, and on nearing Hood Island the westerly set again began to assert itself. This region is in the heart of the South Equatorial Current, and as we saw above it shows in Spring the maximum strength of westerly current for the year. An examination of the 101 actual current observations available for this region (Latitude 0° to 2° S., Longitude 88° W. to 92° W.) shows that only 11 of the currents had an easterly component, and nearly all of these were weak. It

therefore seems probable that the current experienced by S.S. *Dorset* was the result of an eddy due to the presence of Chatham Island in the path of the Equatorial Current. It is not known whether the eddy is "permanent" in the qualified sense in which we use that word when speaking of currents, but this seems not unlikely. Tide rips were also seen by S.S. *Dorset* between the two islands.

In the Winter chart we saw that the Counter-Equatorial Current flowed easterly or south-easterly, with considerable strength, in the region of Latitude 2° N. to 6° N., Longitude 80° W. to 88° W., but was entirely absent from the Autumn chart. This counter-current is also conspicuous in the Spring chart, but almost completely absent from the Summer chart. The Counter-Equatorial Current of this part of the Pacific occupies exactly the same position in regard to the South Equatorial Current that the Guinea Current does to the South Equatorial Current of the Atlantic. The routes from Panama, however, do not cross the Counter-Current in the same relative place that the Cape Route crosses the Guinea Current. In FIGURE 1 the variation of the Pacific Counter-Equatorial Current is shown month by month.

Annual Variation in Velocity of East and West Components of Current in Latitude 2° to 6° N., Longitude 80° to 88° W.

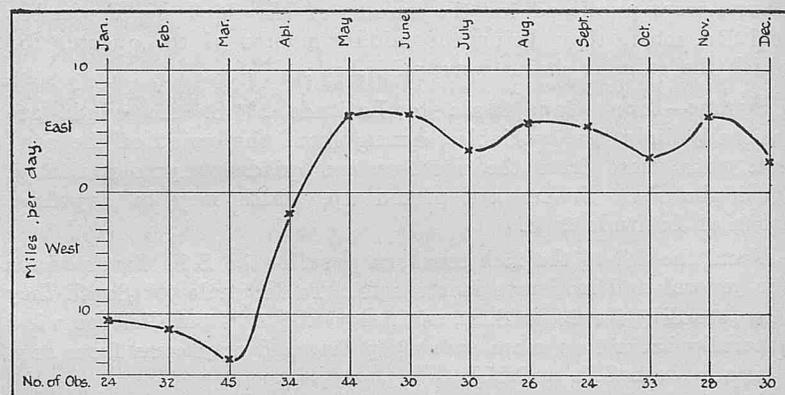


Figure 1.

In this diagram the value of the resultant east or resultant west component of current is plotted for each month from the actual current observations available. The total number of observations is 380, and the figures at the bottom of the diagram show the number for each month. We see that the Counter-Current flows from May to December, inclusive, and is replaced during January to March by sets which have a strong Westerly component. April and December are the months of transition. The curve shows decided minimum values of the Counter-Equatorial Current during the months of July and October, with a three-monthly periodicity over the half-year, May to October. This periodicity is merely put forward as a suggestion, which may be found erroneous when a larger number of observations become available. There can be no doubt, however, about the alternation of the Equatorial and Counter-Equatorial Current in this region.

The S.S.W. sets out of the Bay of Panama and to the westward of Cape Mala, which are of considerable strength in the Autumn chart, are distinctly weaker in the Winter chart. These drifts are shown in Table I.

Table I.

Mean Drifts in the neighbourhood of Panama (Miles per day).

	Feb.-April.	May-July.	Aug.-Oct.	Nov.-Jan.
In Panama Bay ...	13.8	10.3	13.8	15.6
West of Cape Mala ...	14.7	6.6	4.7	6.4

It will be noticed that in the Bay the current is strongest during November to January, while outside Cape Mala, the months February to April show the greatest drift.

In the region of Latitude 0° to 2° N., Longitude 80° W. to 84° W., off Galera Point, Ecuador, the mean current is S. from May to October, and is N.W. during the rest of the year. The mean drift is, however, small throughout, its greatest value being 7.9 miles per day in February to April. In August to October the slight southerly set off Galera Point is continued by a S.S.E. set of 2.5 miles per day to the southward, off Cape San Lorenzo. During May to July the mean positions of the observations available for this region (Latitude 0° to 2° S., Longitude 80° W. to 84° W.) is further seaward, and shows a continuation of the Peru current with set N.N.W., 9.3 miles per day.

The maximum drifts experienced in the Eastern Portion during the period 1910-1926 were one at the rate of 99 miles per day, S 22° W., recorded by S.S. *Rimutaka* on March 3rd, 1925, in Latitude 3° 29' N., Longitude 81° 53' W., and one at the rate of 65 miles per day, N 75° W., recorded by S.S. *Port Stephens* on March 4th, 1923, in Latitude 0° 25' S., Longitude 88° 35' W. Table II is compiled from the tables of maximum drifts which are published on the current rose charts.

Table II.

Occurrence of Actual Drifts of 40 miles per day or more in the South Equatorial Current of the Pacific, for the period 1910-26.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Whole Period.
N. of Equator...	1	3	7	1	0	1	0	0	0	0	0	0	13
S. of Equator...	1	1	2	1	1	1	3	7	0	1	0	1	19

Only two of the drifts in this table have an easterly component, one in March, north of the Equator, and one in May, south of the Equator. It will be seen that more large drifts have been experienced in March than in any other month, chiefly in the region north of the Equator. The explanation of this is that while the South Equatorial Current as a whole has its greatest mean strength in August to October, the currents with westerly components north of the Equator have their greatest mean strength during the months February to April.

Middle Portion.—The mean currents are weak and of varying set during this portion of the tracks throughout the whole year. In Spring slight south-westerly mean sets from the Equatorial Current extend nearly to Pitcairn Island. Although actual currents of considerable strength are experienced from time to time in this portion, there are, with one exception, no steady sets over an extended area clear of islands which the navigator need take into account. The exception referred to is an easterly current in Latitude 28° S. to 30° S., to the westward of, and in the neighbourhood of Rapa and Bass Islands, which was mentioned in the first article. In the Winter chart this set is of considerable strength between Longitudes 168° W. and 156° W., with drifts of from 8.5 to 12.4 miles per day. It extends with some variation of direction, and with weaker drift, up to Longitude 132° W. The charts for the other seasons are all partially blank, but the easterly set does not appear in Autumn. During Spring and Summer the set is distinct but weak.

The maximum drift recorded in the Middle Portion is 44 miles per day S. 82° W., by Bgtne. *S.F. Tolmie*, on July 13th, 1924, in Latitude 26° 00' S., Longitude 128° 13' W. On August 6th, 1922, a current of 38 miles per day, N. 65° E., was recorded by S.S. *Whakatane* in Latitude 31° 30' S., Longitude 146° 48' W.

Western Portion.—There are fewer blank squares in the Summer chart than in those for Spring and Autumn, and the East Australian coast current is well shown. It is not possible to determine any seasonal variation of this current from the charts, since, as stated in the first article, the current is mainly inshore, while the mean positions of the arrows in the charts are at varying distance seaward. We have seen above that the chart for the Eastern Portion for Winter showed an easterly current in Latitude 28° S.

to 30° S. from the limits of the chart, Longitude 168° W. The Winter chart for the Western Portion shows that this current flows from at least as far as Longitude 172° W., the next square, Longitude 178° W. to 172° W., being blank. This chart also shows that for the Longitude of 172° W. to 168° W. the easterly flow is continued southward to Latitude 38° S. In the larger region, Latitude 28° S., to 36° S., Longitude 176° E. to 168° W., there are 16 subdivisions, but 5 of these are blank; the remaining 11 arrows set between N.E. and E.S.E. In the other quarters the sets in this part of the ocean are much less uniform.

The charts for the Spring and Summer, like those for Autumn and Winter, do not show any striking evidence of a completion of the East Australian Current circulation by a north-easterly flow up the west coast of New Zealand, nor of a similar set up the east coast of these islands, as shown by the old current charts. The region of Latitude 38° S. to 40° S., Longitude 168° W., to 172° W., in Summer, however, shows an N. set, 12.7 miles per day, that for the square immediately to the south being N., 7.0 miles per day. To the north of North Cape, New Zealand, the region of Latitude 32° S. to 34° S., Longitude 172° E. to 176° E., shows an easterly set in Spring, Summer and Autumn, no observations for Winter being available. The greatest mean drift is 16.6 miles per day in Spring, when the square to the westward, Latitude 32° S. to 34° S., Longitude 168° E. to 172° E., also shows an easterly set of 13.0 miles per day. In the region of Latitude 38° S. to 40° S., Longitude 148° E. to 152° E., south of Cape Howe, New South Wales, the charts for Summer and Autumn show a weak set to N.E., which possibly marks the extreme north of the Southern Ocean General Drift at this point. No information is available for the rest of the year.

The maximum drift recorded in the Western Portion during the years 1910-26 is that experienced by S.S. *Makambo* on May 26th, 1923, N. 74° E., 72 miles per day in Latitude 32° 53' S., Longitude 154° 21' E. This and the two next largest drifts show great variety of set, S.S. *Port Sydney*, S. 15° W., at the rate of 63 miles per day, on February 14th, 1922, in Latitude 30° 33' S., Longitude 153° 17' E., and S.S. *Benalder*, N. by E., at the rate of 60 miles per day on December 8th, 1924, in Latitude 28° 13' S., Longitude 154° 02' E.

Seasonal Variation of the South Equatorial Current.—An investigation of the seasonal variation of the South Equatorial Current has been carried out. For this purpose the region covered by the charts for the Eastern Portion has been divided into four sections, as shown in FIGURE 2. Of these, Section I is that in which the Counter-Equatorial Current appears for part of the year, and Section II is the area where the Equatorial Current is stronger than it is over the rest of the chart. The results of the

South Pacific.

Mean Currents on the Tracks from Panama to Australasian Ports.

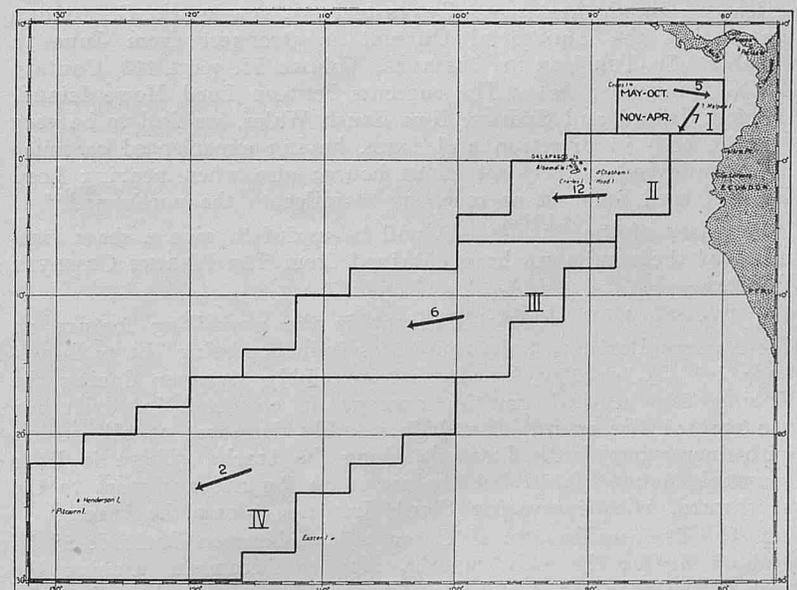


Figure 2.

investigation are shown in Table III, where the mean set and drift for each section is given by seasons. In the case of Section I, two half-yearly values are given instead of a mean current for the year.

Table III.

South Equatorial Current.

Mean Quarterly Resultant Current (Drift in Miles per Day.)

Section.	Spring.		Summer.		Autumn.		Winter.		Year.	
	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.	Mean Set and Drift.	Number of Observations.
I	S. 81° E. 4	83	S. 6° W. 1	82	S. 58° W. 11	111	S. 80° E. 6	104	May-Oct. S. 81° E. 5	187
II	W. 15	179	S. 86° W. 11	198	S. 77° W. 11	185	N. 88° W. 11	186	Nov.-Apr. S. 34° W. 7	193
III	S. 88° W. 6½	255	S. 64° W. 5	296	S. 82° W. 5	257	S. 82° W. 6	275	S. 87° W. 12	748
IV	S. 68° W. 4	321	S. 39° W. 2	356	S. 87° W. 2	348	N. 63° W. 1	306	S. 71° W. 2	1083
										1331

The annual values from the last column are inserted in FIGURE 2, and the arrows plainly show, by the uniform increase of southerly set, the mean flow of the water in a direction which if continued would complete the circulation of the Peru Current. The figures for Section I show that the mean set of the Counter-Equatorial Current is constant during the Winter and Spring Quarters. In Section II we see that the South Equatorial Current is markedly stronger in Spring than during the rest of the year, with a mean set due W. The mean drift for the rest of the year is constant. In Sections III and IV Spring is also the season of strongest drift, while the drift in each season decreases very similarly as we pass from Section II to Section IV. The greatest change of set is shown by Section III in Summer. The chart for the Autumn quarter (Eastern Portion), and also FIGURE 2, show that when the Counter-Equatorial Current is not flowing in Section I the currents from Panama Bay and Cape Mala pass directly into the Equatorial Current by successive clockwise changes of set.

The interesting notes on currents which have been received from Commanders, and published in "The Marine Observer's Log" in the present Volume, have been compared with THE MARINE OBSERVER Charts, and on the whole show a good agreement with them. There are one or two references to the Equatorial Counter-Current, and Captain D. URQUHART states on page 151 that the strong favourable sets fail on a Mercator course from Cape Mala to Hood Island for a month in the late Autumn. Captain F. A. HEMMING on the same page points out that the sets, after passing Pitcairn Island, are generally easterly. Captain H. G. ELFORD states that the Equatorial Current is strongest from June to October. In THE MARINE OBSERVER, Volume II, page 113, Captain T. M. BROWN writes: "The currents between Lord Howe Island, Norfolk Island and Sydney, New South Wales, we find to be very erratic, both in direction and force, having experienced as much as 92 miles of easterly set in 24 hours; also when nearing Lord Howe Island been set as much as 25 miles to the northward."

Summary of the Results.—It will be useful to give a short summary of the results we have obtained from THE MARINE OBSERVER Charts:—

1. The South Equatorial Current is the prevailing feature on the Eastern Portion of the routes, its influence being felt to Longitude 120° W. or 130° W. It is appreciably stronger during the Spring season, and on the average is constant in drift for the rest of the year. The drift steadily decreases at all seasons with increasing South Latitude along the tracks. There is little seasonal change of set, but the set is on the average more to the southward, with increasing South Latitude along the tracks.

2. The Counter-Equatorial Current flows between Latitude 2° N. and 6° N. for the eight months, May to December. During the rest of the year the Equatorial Current extends northward to fill this area.

3. South-westerly currents flow out of the Bay of Panama at all seasons.

4. During the Winter the sets between Pitcairn Island and North Cape, New Zealand, are in general easterly, particularly along the parallel 28° S. to 30° S. For the rest of the year there is some preponderance of easterly sets over parts of this region.

5. The most definite current on the western side of the Pacific within the limits of the tracks is the East Australian Coast Current.

6. Elsewhere currents are generally variable, and of weak or moderate drift.

As was stated in the first part of this article, the charts as a whole depend on fewer observations than was the case in the Atlantic charts previously published, and this must be carefully borne in mind, but care has been taken in this article not to make general statements upon insufficient observations. The largest number of observations are naturally found in the Eastern Portion, where the tracks converging upon Panama lie closer together, and the consistency of the results shown in Table III affords good cause for the belief that the information contained therein is reliable. The older current charts available for the Pacific Ocean indicate the same general current sets that we have derived from THE MARINE OBSERVER Charts. The older charts show also a more definite and regular set to N.E. up both the east and west coasts of New Zealand at all seasons than THE MARINE OBSERVER Charts do, but there are a good many blank squares on the latter in this region. They also show a definite westerly set in Summer (January) to the North of Latitude 30° S., between Longitudes 158° E. and 173° E., which is not confirmed by the partial information available on THE MARINE OBSERVER Charts for this season.

Comparison of the Pacific and Atlantic Currents.—It is interesting to consider briefly whether the sections of the Pacific currents dealt with in this article agree in their essential characteristics with similar sections or belts of the corresponding Atlantic currents. It must, however, be borne in mind that the tracks from Panama cross the Pacific Counter-Equatorial and South Equatorial Currents in a more easterly and inshore point of the circulation than that at which the Cape Route crosses the corresponding Atlantic Currents. The difference is 10° or 15° of Longitude in the case of the Counter-Equatorial, and about half this in the case of the South Equatorial.

The Guinea Current is continuous with the Counter-Equatorial Current of the Atlantic during the Northern Summer, and flows with its greatest mean strength, 15 miles per day, during this season. The Pacific Counter-Equatorial extends far enough to the eastward to cross the tracks from Panama in the Northern Summer and Autumn, with a mean strength of 6 miles per day during Summer. A point of disagreement is that in the Atlantic easterly sets occur with greatest frequency south of the Equator in October. In the Pacific the corresponding period is February to April.

In the article which summarised the currents in the North Atlantic Ocean, published in THE MARINE OBSERVER, Volume IV, No. 48, the relative seasonal strengths of various current sections were shown in Table I. The section chosen for the South Equatorial was from Latitude 3° N. to 6° S. In the following Table the strengths of this current are compared with those found for Section II of the South Equatorial Current of the Pacific in the present article. The seasons refer to the Southern Hemisphere.

Table IV.

Mean Drifts of the South Equatorial Currents of the Atlantic and the Pacific (Miles per day).

—	Spring.	Summer.	Autumn.	Winter.
Atlantic Ocean 3° N. to 6° S. (Cape Route.)	8	8	7	12
Pacific Ocean 2° N. to 6° S.	15	11	11	11

It thus appears that the Pacific current is stronger than that of the Atlantic, and reaches its maximum strength three months later. The constancy of the mean drift of each current for nine months of the year will be seen.

On the back of the Monthly Meteorological Chart of the East Indian Seas for September, 1923, an article by Mr. C. S. DURST was published, entitled "Ocean Currents North of the Equator on the Track Fiji to Honolulu," in which observations made between 1893 and 1910 and 1920 and 1922 were utilised. It is interesting to note that the Counter-Equatorial Current on this track was found to be strongest during August to October, while the Atlantic Counter-Current is strongest during July and August. Here again there is evidence of a seasonal lag in Pacific currents, when compared with those of the Atlantic, but it is not safe to generalise on these isolated facts at the present stage of current investigation, especially as we have seen above that the eastern extremity of the

parison. It will be seen that in both oceans a maximum mean velocity of the westerly component of rather less than 30 miles per day occurs, but is three months earlier in the case of the Pacific. The Pacific curve has not such a decided secondary maximum as that shown by the Atlantic.

FIGURE 3 confirms the result suggested by Table II, that the south Equatorial Current north of the Equator has its maximum strength in March. It will also be seen that a secondary maximum occurs during the season when the Equatorial Current as a whole is strongest. The agreement of the second highest mean drift in FIGURE 3 with the maximum of large actual drift south of the Equator in Table II, both occurring in August, seems to show that the south Equatorial as a whole is stronger in August than in any other month.

The Holy Child Current.—This interesting inshore current, an account of which was given in THE MARINE OBSERVER, Volume III,

Annual Variation in Velocity of West Component of the South Equatorial Current of the Pacific between Latitude 0°-2° N. The pecked curve shows the corresponding variation of the South Equatorial Current of the Atlantic.

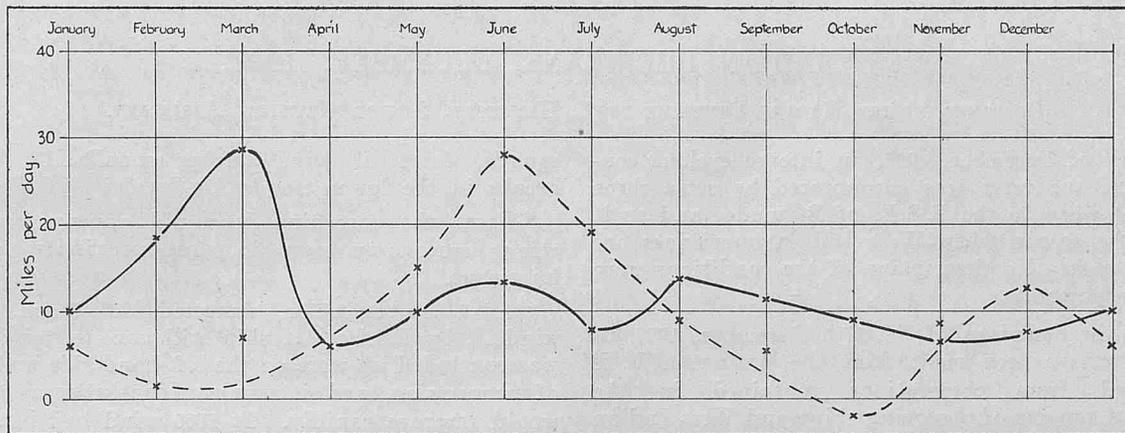


Figure 3.

Pacific Counter-Equatorial Current reaches its maximum drift at the same time as the Guinea Current.

A chart published as an inset in the Current Chart for August to October, Cape Blanco to Table Bay, at the end of THE MARINE OBSERVER, Volume I, No. 7, showed the annual variation in westerly velocity of the South Equatorial Current of the Atlantic between Latitude 0° and 2° N. A similar investigation has been made for the South Equatorial Current of the Pacific for the same Latitude, and for Longitude 84° W. to 92° W. This region lies immediately south of that in which the Counter-Equatorial Current appears. The result is given in FIGURE 3 as a full curve, the pecked curve being that for the Atlantic current shown for com-

No. 26, page 23, and No. 27, page 40, lies outside the region covered by THE MARINE OBSERVER Charts. It is said to flow only about every seven years as a warm southerly current from the Gulf of Guayaquil down the coast of Peru, and therefore between the Peru current and the shore. It derives its name ("Corriente del Nino") because it usually begins to flow about the time of Christmas. Earlier in the present article we saw that weak southerly currents flowed at some distance offshore from Galera Point during Winter and Spring, and close inshore at Cape San Lorenzo in Spring. Cape San Lorenzo lies to the north of the Gulf of Guayaquil, and the currents shown on the charts may therefore have some connection with the Holy Child Current.

MEAN SEA SURFACE TEMPERATURES.

INDIAN OCEAN.

PREPARED IN THE MARINE DIVISION BY H. KEETON, PRINCIPAL CLERICAL ASSISTANT.

The following notes draw attention to some of the outstanding features disclosed by an examination of the monthly sea surface temperature charts of the Indian Ocean which have appeared in this Journal during the present year.

The deviations of sea isotherms, over all oceans, from an east to west direction are mainly due to the existence of warm and cold surface currents. In most of the oceans of the globe, these currents are of a more or less permanent character, but in the North Indian Ocean, owing to its geographical features and monsoonal winds, the currents vary with the seasons, and effect the distribution of sea surface temperature accordingly.

During the North-East monsoon season, October to February, a south-westerly drift of surface water is set up in the Arabian Sea and Bay of Bengal, and this is reflected in the trend of the sea

isotherms during these months, relatively cool water being carried down the East coast of Africa as far as Latitude 5° S. Similar conditions prevail in the China Sea, where the cool water off the Chinese coast during the winter months is brought down by the North-East monsoon drift, the effect being apparent on these charts as far south as the Equator.

During the South-West monsoon season, when sea surface temperature is at its lowest in the South Indian Ocean, and highest in the North Indian Ocean, the current in the Arabian Sea sets in a north-easterly direction, carrying relatively cool water up the western side of the Arabian Sea, the mean temperature here during this season being 7° to 8° lower than on its eastern side.

In the South Indian Ocean the surface current circulates round the permanent high-pressure area. On the northern side of this area flows the westerly Equatorial current, which on striking the

African coast turns southward and sweeps down the coast as the Mozambique Current, and is reinforced by another branch of the Equatorial current flowing across from the southern coast of Madagascar. This current continues down the South-East African coast as the Agulhas Current, and carries warm water well to the southward of the Cape. Where the southern edge of the Agulhas Current is deflected and mingles with the cold easterly Antarctic Drift, there are large variations of mean sea temperature, the change amounting to as much as 29° F. in 10° of latitude.

The crowding together of the sea isotherms in this region, between Latitude 36° and 45° S., and from the Longitude of the Cape to 60° E., is a marked feature of the charts throughout the year, and large and rapid changes of sea temperature are frequently experienced in this vicinity.

The change in mean sea temperature over the Indian Ocean month by month varies considerably in different areas. In the more southern latitudes, the temperature does not undergo any

very important change during the year, the temperature near Kerguelen being approximately 40° F. in all months. Further north, as far as Latitude 30° S., there is greater variation, the maximum difference between summer and winter mean temperature (February and August) being about 12° F.

North of Latitude 30° S. the seasonal variation of temperature progressively decreases, until between Latitude 5° S. and 5° N., where in the central portion of the ocean the monthly mean does not fluctuate more than 3° or 4° throughout the year.

In the Red Sea the difference between summer and winter mean sea temperature is from 12° to 15°, while in the Persian Gulf, where the highest mean temperature is recorded, 92° F. in August and September, the range is 28°. In the China Sea the difference between summer and winter temperatures reaches as much as 32° F.

In the northern ends of the Bay of Bengal and Arabian Sea, the seasonal range of mean sea temperature is from 8° to 9°.

WEST INDIAN HURRICANE, DECEMBER, 1927.

PREPARED IN THE MARINE DIVISION BY J. HENNESSY, SENIOR NAUTICAL ASSISTANT.

During the last week of December, 1927, an intense cyclone containing winds of hurricane force was encountered by some ships of the Observing Fleet when to the E.S.E. of Bermuda, and as it occurred long after the season when West Indian hurricanes are expected, requests for a detailed description of the conditions were received from Marine Observers.

Weather Charts for the mornings of the 27th December, 1927, to the 1st January, 1928, have been made from the Arlington W/T Weather reports and from observations contained in the meteorological logs and reports of observing ships and West Indian Lighthouse Stations. They show that the storm was of tropical origin, developing on the 27th in the vicinity of Haiti, and subsequently moving in a N.E.'ly direction, deepened to hurricane intensity.

WEATHER CHART XXV, 0800, DECEMBER 27TH, 1927, shows that a trough of low pressure exists S.E. of Bermuda in a position normally occupied by the Azores or North Atlantic High. The existence of a small low in the vicinity of Haiti is indicated by the winds recorded by Port *Darwin*, Captain I. R. SAWBRIDGE, and *Polycarp*, Captain T. H. JACKSON.

WEATHER CHART XXVI, 0800, DECEMBER 28TH, 1927, shows the storm to be well developed and having moved in a N.E.'ly direction is centred in about Latitude 27° 30' N., Longitude 55° 30' W. The following remarks taken from the Meteorological Log of *Culebra*, Captain C. E. RATHKINS, for this day show that the storm was of an intense character:—

“0619 A.T.S., stellar observations, Latitude 28° 05' N., Longitude 59° 39' W. Between 0600 and 0800 fierce wind and rain squalls experienced, with the wind veering from N.W. by W. to N.W. by N., rapidly increasing in force, and by 0920 had developed to a storm, force 10-11, with frequent heavy rain squalls. At 1005 wind veered to north and increased to hurricane force, barometer, corrected, fell to 999.6 mb. (29.52 in.), dry 61½°, wet 59½°, high, rising N.W. by W. sea and heavy N.N.W. swell, sky overcast. Ship was now hove to, heading N. by E.

“At 1030 wind backed to N.N.W. and decreased to force 8. Barometer commenced to rise. Proceeded full speed, course 62°, 1100, barometer, corrected, 1000.7 mb. (29.55 in.), patches of blue sky seen eastward. Ten minutes later wind again increased to hurricane force and at 1150 veered to N. by E. Ship again hove to, heading N. ½ E.

“1200, Latitude 28° 26' N., Longitude 58° 58' W., ship hove to. Wind N. by E., force 12, heavy squalls, visibility nil. Very high sea, estimated height 35 feet, length from crest to crest 250 feet, wind altering slowly to right. At 1400 wind had decreased to a whole gale, and by 1600 was N.N.E., 9, overcast with frequent rain

squalls, force of wind during squalls 11. Through occasional breaks in the lower clouds Alt-St and Ci-Cu were observed.

“From the foregoing it would appear that although in the wrong season we were in close proximity to the centre of a hurricane.

“At 1700, barometer, corrected, 1006.7 mb. (29.73 in.), rising, wind N. by E., force 9, ship still hove to, wind altered to left; it was concluded we were on the left-hand side and in rear of the line of progression, and it was confidently expected that the weather would improve rapidly. At 2000 wind had backed to north, force 8 to 9, and remained more or less steady in that direction. Very strong N.'ly and N.N.E. winds prevailed for two days, however, and were pretty general over a wide area, as W/T messages received indicate.”

WEATHER CHART XXVII, 0800, DECEMBER 29TH, 1927. The storm is now centred in about Latitude 30° 30' N., Longitude 46° 00' W., having moved during the past 24 hours in an approximate E.N.E. direction at the rate of 22 miles an hour. The storm has spread and now covers a large area, within which heavy gales are reported

Orita, Captain E. E. DUNCAN, from Vigo to Havana, was, at 1200 on the 28th, in Latitude 32° 11' N., Longitude 51° 29' W., barometer 1003.1 (29.62 in.). Wind N.E., force 8, steady in direction. Steering S. 74° W., 9 knots, the weather gradually grew worse as the ship, keeping wind and sea on starboard quarter, ran to avoid the storm's centre. At 2000, barometer 999.8 (29.52 in.), the wind, steady from N.E., increased to force 11, accompanied by frequent squalls of hurricane force. Ship was kept before wind and sea and speed reduced. The wind maintained force 11 until 2400, when it decreased to force 8, barometer 1001 mb. (29.56 in.). At 0400 on the 29th the wind again increased to force 10, and at 1200 backed to north. During the afternoon watch the wind, steady in direction, eased to force 9, but the sea was so heavy that ship was hove to at 1700 until 0300 on the 30th, when the wind had decreased to force 7 and barometer had risen to 1010.6 mb. (29.84 in.).

At 1600 on the 29th *Corinthic*, Captain F. HART, bound from Colon to Southampton, was hove to in Latitude 34° 09' N., Longitude 49° 31' W., barometer 993.9 mb. (29.35 in.), wind N.E. by N., force 10, when she shipped a sea, stoving in and flooding the wheel house 42 feet above sea level, smashing the barometer, which gives some indication of the force of the sea running.

WEATHER CHART XXVIII, 0800, DECEMBER 30TH, 1927. The storm now centred in about Latitude 32° 00' N., Longitude 41° 00' W., has maintained an E.N.E. direction during the past twenty-four hours, but its rate of progression has decreased to about 11 miles an hour. Observations are insufficient to show conditions pre-

vailing in the eastern semi-circle of the storm, but N.W.'ly winds of hurricane force were recorded by vessels in the western semi-circle on this day.

WEATHER CHART XXIX, 0800, DECEMBER 31ST, 1927. The storm has moved during the past twenty-four hours in a N. by E. direction, and as is seen from the chart appears to have developed two

centres and become less intense, but strong gales are still reported by ships in the western semi-circle.

WEATHER CHART XXX, 0800, JANUARY 1ST, 1928. The storm has become practically stationary during the past twenty-four hours and appears to be filling in. No winds of gale force are recorded on this day.

WEATHER SIGNALS.

SOUTH AMERICA.

II.—WIRELESS WEATHER BULLETINS.

The Key and Decode Tables of the International Weather Telegraphy Code will be found on pages 20 to 23 of Volume V No. 49. (The January, 1928, Number.)

The method of decoding station weather reports made in code was described in the British "Weather Shipping" Bulletin, on pages 37 and 38 of Volume V No. 50. (The February, 1928, Number.)

The same method of decoding weather reports applies in all cases where the International Code is used.

The letters given in the descriptions which follow give the key to the tables for decoding the figures.

Where other than International code tables are used they are published along with the signals described and an explanation is given.

CHILE.

Spark Issues.

Valparaiso W/T Station, approximate Latitude 33° 01' S., Longitude 71° 39' W., call sign **CCE**, broadcasts a weather bulletin in special code commencing with the letters OMC (Oficina Meteorologica de Chile) at 0130 and 1730 G.M.T. on a wave-length of 1,000 metres (spark).

The message gives observations from the following stations:—

Indicator Letter.	Station.	Position (approx.).	
		Latitude.	Longitude.
V	Valparaiso	33° 06' S.	71° 40' W.
T	Talcahuano	36° 43' S.	73° 08' W.
C	Corral	39° 53' S.	73° 35' W.
J	Juan Fernandez	33° 42' S.	78° 45' W.
M	Mocha	38° 25' S.	74° 00' W.
G	Guafo (or Huafo)	43° 35' S.	74° 45' W.
R	Raper	46° 50' S.	75° 38' W.
P	Punta Arenas	53° 08' S.	70° 56' W.
O	Puerto Montt	41° 30' S.	72° 58' W.
Q	Coquimbo	29° 57' S.	71° 20' W.

The observations are contained in one group, consisting of a key letter and four figures for each station.

The first two figures give barometer corrected in whole millimetres, the initial 7 being omitted (see Table LIX to convert to mbs. and ins.).

The third figure gives wind direction:—

- 1 = N. 3 = E. 5 = S. 7 = W.
- 2 = N.E. 4 = S.E. 6 = S.W. 8 = N.W.

The fourth figure gives wind force by Beaufort scale. When this is greater than 9 it will be given in words thus:—

Diez = 10, once = 11, and doce = 12.

When necessary the following words will be added:—

- Temporal = gale. Neblina = fog.
- Lluvia = rain. Sol = sunny.

An "X" will replace the figure for any missing observation, but if all the values for any station are missing, the word "No" will precede the key letter, thus "No T."

The bulletin at 0100 G.M.T. will also contain a summary of the weather changes that have taken place during the day.

Each bulletin will conclude with a meteorological forecast, and a statement regarding the probable approach of bad weather.

ARGENTINA.

Spark Issue.

Buenos Aires-Dársena Norte W/T Station, approximate Latitude 34° 36' S., Longitude 58° 22' W., call sign **LIH**, broadcasts a weather bulletin, *en clair*, in Spanish, at 0205 G.M.T., on a wave-length of 1,000 metres (spark). The bulletin will contain a weather forecast for the ensuing 24 hours for the Rio de la Plata.

BRAZIL.

Spark Issues.

(a) Wireless Weather Reports on the Brazilian Coast.

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*, and owing to uniformity can be easily understood by ships of other nationalities.

W/T Station.	Position (approx.).		Call Sign.	Times of Sending. G.M.T.
	Latitude.	Longitude.		
Belém (Para)	1° 27' S.	48° 30' W.	SPB	0245, 0645, etc., etc.
S. Luiz (Maranhã)	2° 32' S.	44° 17' W.	SOM	0300, 0700, etc., etc.
Natal	5° 47' S.	35° 18' W.	SNR	0330, 0730, etc., etc.
Olinda (Pernambuco)	8° 01' S.	34° 51' W.	SPO	0345, 0745, etc., etc.
Amaralina (Bahia)	13° 01' S.	38° 28' W.	SPA	0315, 0715, etc., etc.
Fernando Noronha	3° 51' S.	32° 25' W.	PNG	0315, 0715, etc., etc.
Abrolhos	17° 58' S.	38° 45' W.	SNN	0320, 0720, etc., etc.
Santos	23° 56' S.	46° 20' W.	SPS	0245, 0645, etc., etc.
Florianopolis	27° 36' S.	48° 30' W.	SPF	0315, 0715, etc., etc.
Junçãõ (Rio Grande do Sul)	32° 04' S.	52° 07' W.	SPJ	0345, 0745, etc., etc.
Rio	22° 54' S.	43° 10' W.	SOH	0000, 1200, 1500, 2100.

The wave-length used by the above stations for the transmission of the messages is 600 metres (spark), except Belém, which is 1,800 metres.

(b) Special Messages, including forecasts for the South Coast of the State of Rio Janeiro, the remainder of the Southern Brazilian Coast, and to Buenos Aires.

Ilha do Governado—Rio de Janeiro—W/T Station, approximate Latitude 22° 48' S., Longitude 43° 13' W., call sign **SOH**, broadcasts daily two special weather bulletins at 1800 and 0100 G.M.T., both on 1,800 metres (spark).

These bulletins are divided into three parts; the first part contains respectively the 1200 and 2100 G.M.T. observations in International 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*, expressed in a small collection of terms which can be easily understood by ships of other nationalities.

Temperatures are transmitted in whole degrees C. (To convert to Fahrenheit see Table LX.)

SPECIAL WEATHER TELEGRAPHY TABLES.
NOT NEW INTERNATIONAL CODE.

Indicator Number.	Station.	State.	Position (approx.).	
			Latitude.	Longitude.
01	Ondina	Bahia	13° 00' S.	38° 31' W.
02	Caetité	"	14° 03' S.	42° 37' W.
03	Victoria	Esp. Santo ...	20° 10' S.	40° 18' 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.	56° 12' W.
27	Buenos Aires	Buenos Aires	34° 36' S.	58° 22' W.
28	Oran	Salta	23° 06' S.	64° 20' W.
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	P. Madryn	Chubut... ..	42° 49' S.	64° 58' W.
37	Sarmiento	"	45° 30' S.	69° 00' W.
38	16 de Outubro	"	42° 12' S.	71° 08' W.

Table LIX.

Conversion of Millimetres to Millibars and Inches.

Mm.	Mb.	In.	Mm.	Mb.	In.	Mm.	Mb.	In.
695	926.6	27.37	743	990.6	29.25	759	1011.9	29.88
700	933.2	27.56	744	991.9	29.29	760	1013.2	29.92
705	939.9	27.76	745	993.2	29.33	761	1014.6	29.96
710	946.6	27.95	746	994.6	29.37	762	1015.9	30.00
715	953.2	28.15	747	995.9	29.41	763	1017.2	30.04
720	959.9	28.35	748	997.2	29.45	764	1018.6	30.08
725	966.6	28.54	749	998.6	29.49	765	1019.9	30.12
730	973.2	28.74	750	999.9	29.53	766	1021.2	30.16
735	979.9	28.94	751	1001.2	29.57	767	1022.6	30.20
736	981.2	28.98	752	1002.6	29.61	768	1023.9	30.24
737	982.6	29.02	753	1003.9	29.65	769	1025.2	30.28
738	983.9	29.06	754	1005.2	29.69	770	1026.6	30.32
739	985.2	29.10	755	1006.6	29.73	775	1033.2	30.51
740	986.6	29.13	756	1007.9	29.76	780	1039.9	30.71
741	987.9	29.17	757	1009.2	29.80	785	1046.6	30.91
742	989.2	29.21	758	1010.6	29.84			

Table LX.

Conversion of Centigrade Temperatures to Fahrenheit.

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

* 50 is added to the amounts to indicate minus temperatures Centigrade.

1800 G.M.T. Bulletin.

First part of Bulletin (observations of 1200 G.M.T.) in International Code represented by "Key Letters" as follows:—

- Brazilian Stations (01-24) I_n I_n BBBDD, FwwTT,
- Uruguayan ,, (25-26) I_n I_n BBBDD,
- Argentine ,, (27-38) I_n I_n BBBDD

Second Part of Bulletin sent in code preceded by the word "Pilot" contains upper air observations.

Third Part of Bulletin contains weather forecasts and is preceded by the word "Previsão"

0100 G.M.T. Bulletin.

The First Part of the Bulletin contains the 2100 G.M.T. observations (in code) of stations 08, 09, 11, 17, 22 and 24, in exactly similar form as for stations 01-24 in the 1800 G.M.T. Bulletin.

Second Part of Bulletin contains upper air observations in code and is preceded by the word "Temp Alegrete."

Third Part of Bulletin contains weather forecasts for the following day for the south coast of the State of Rio de Janeiro, remainder of the Brazilian coast and to Buenos Aires, in Portuguese *en clair*, preceded by the word "Previsão."

NOTE.—Missing figures are replaced by hyphens.

Barometric readings are transmitted in millimetres and tenths. (To convert to mbs. and ins. see Table LIX.)

WIRELESS STORM WARNINGS.

SOUTH AMERICA.

CHILE.

Spark Issues.

Valparaiso W/T Station, call sign CCE, broadcasts storm warnings when necessary, after the weather bulletins at 0130 and 1730 G.M.T. on a wave-length of 1,000 metres (spark).

III.—WIRELESS TIME SIGNALS.

CHILE.

Spark Issue.

W/T Station.	Call Sign.	Wave-length Metres.	G.M.T.
Valparaiso Lat. 33° 01' 04" S. Long. 71° 39' 27" W.	CCE	1,000 (spark).	^h ^m ^s ^h ^m ^s 00 55 00-01 00 00

SYSTEM.—The Time Signal commences at 00h 55m 00s G.M.T. and continues for 5 min. During this period every beat (represented by a dot) of the Standard clock at the even second is transmitted *except* the 29th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th and 59th.

The dot at the final second of each minute is the Time Signal (which ends at 01h 00m 00s G.M.T.).

NOTES.—(1) Sent daily except Sundays.

(2) Time Signal controlled by the Hydrographic Office.

(3) In the event of failure or irregularities in the Time Signal the word "Senal nula" (Signal annulled) will be made three times in succession, one minute after 0100 G.M.T.

BRAZIL.

I.C.W. Issues.

W/T Station.	Call Sign.	Wave-length Metres.	G.M.T.
Rio de Janeiro—Arpoador Lat. 22° 59' 19" S. Long. 43° 11' 26" W.	SPY	600 (I.C.W.).	^h ^m ^s 14 00 00 and 24 00 00

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:—

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

$$\left. \begin{matrix} 14h \\ 24h \end{matrix} \right\} 00m 00.2s, \text{ G.M.T.}$$

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

IV.—VISUAL STORM WARNINGS, SOUTH AMERICA.

CHILE.

Valparaiso.

From 15th April to 15th October, annually.—The following signals are exhibited from the Maritime Government Building:—

By day.	By night.	Barometer.	Signification.
Flag D (Int.), close up ...	—	30.05	} Fine weather.
Flag D (Int.), half-mast...	—	30.00	
Flag D (Int.), low down...	—	29.95	
One ball, close up ...	One blue light ...	29.94	} Variable.
One ball, half-mast ...	Two blue lights ...	29.90	
One ball, low down ...	Three blue lights...	29.85	
Two balls, close up ...	One red light ...	29.74	} Storms or bad weather.
Two balls, half-mast ...	Two red lights ...	29.65	
Two balls, low down ...	Three red lights ...	29.60	
No day signal ...	(One red light and one blue light, hoisted in a vertical line.)		Barometer falling rapidly.

ARGENTINA.

Buenos Aires.

The following storm signals for the Rio de la Plata are exhibited, when necessary, from a flagstaff on the roof of the Ministry of Agriculture, situated near Dock No. 1:—

Signals for Local Gales—Probable up to the Next Day.

By day.	By night.	Meaning.
		Gale from N.W. quadrant.
		Gale from S.W. quadrant.
 		Gale from N.E. quadrant.
 		Gale from S.E. quadrant.
 		Hurricane.
		Caution. Gales predicted are imminent or may occur on same day.
		

URUGUAY.

Montevideo.

The following signals are exhibited from a flagstaff at the north-west angle of the Custom House to indicate the approach of storms or bad weather:—

- By day.—Red and white flag hoisted *under* the national flag.
- By night.—Red light in place of the flag.

The following signals are exhibited as necessary from the **Observatory semaphore**, 137 feet above mean sea level:—

By day.	By night.	Meaning.
		Fair weather.
		Changeable.
		Bad weather.
		Southerly winds, strong.
		Northerly winds, strong.
		Southerly gale.
		Northerly gale.

BRAZIL.

The following system of Visual Storm Signals is in operation at Brazilian seaports, the symbols being hoisted when necessary:—

By day.	By night.	Meaning.
		Wind from any quarter, dangerous for small craft.
		Strong winds from S.E.
		Strong winds from N.E.
		Strong winds from N.W.
		Strong winds from S.W.

At Rio de Janeiro the signals are exhibited from the Time Signal Tower at the Observatory daily, also at Copacabana Fort, on the western side of the approach to the harbour, and from Ilha das Cobras; at Santos from the signal station on Monte Serrat; and at Cape Frio, from the signal station.

Special Notices regarding Personnel.

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

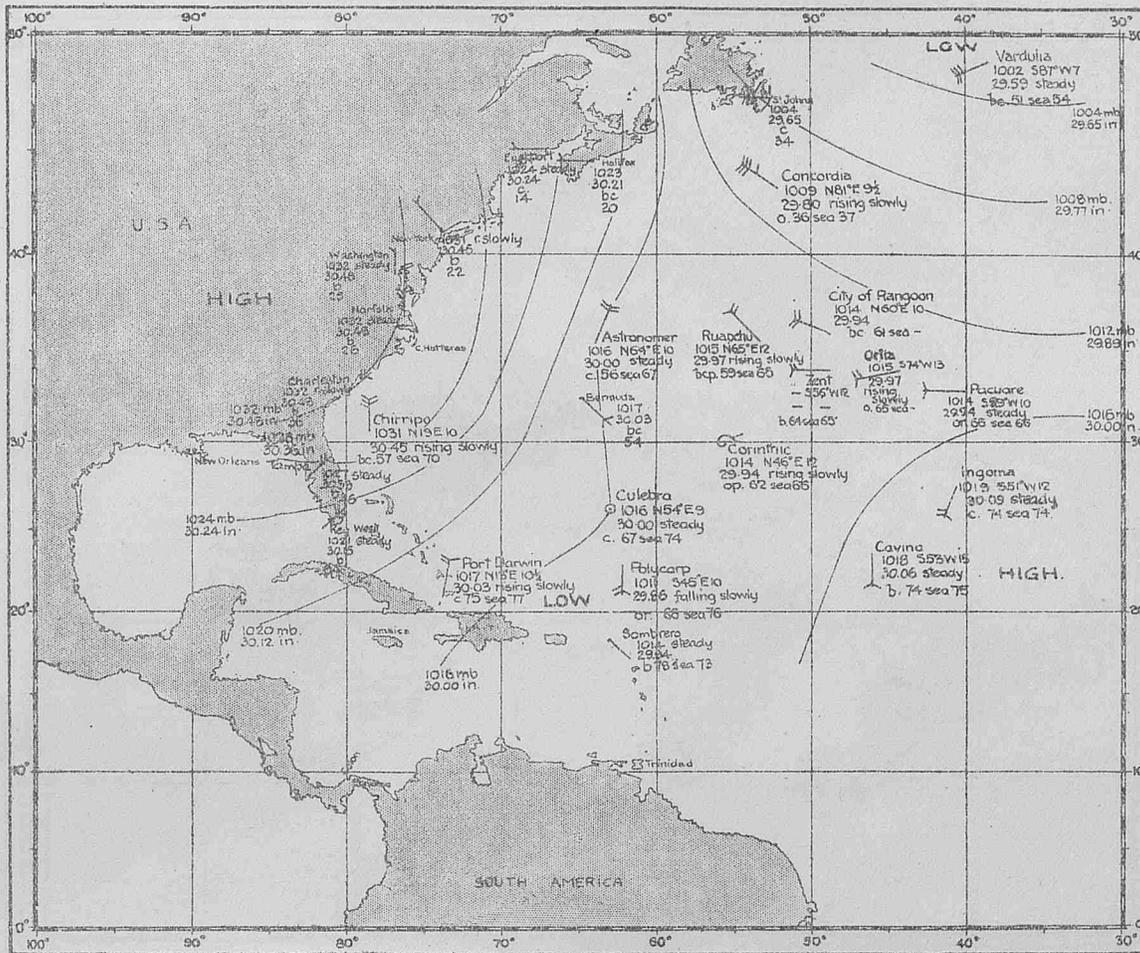
Obituary.

The death of Commander S. BOLTON, D.S.C., R.D., R.N.R., which occurred recently at Liverpool, is noted with regret.

After serving his time, Captain BOLTON served as an officer in the ELDER DEMPSTER COMPANY, the PRINCE LINE, and DOMINION LINE, transferring to the WHITE STAR LINE when the latter Company was absorbed by them.

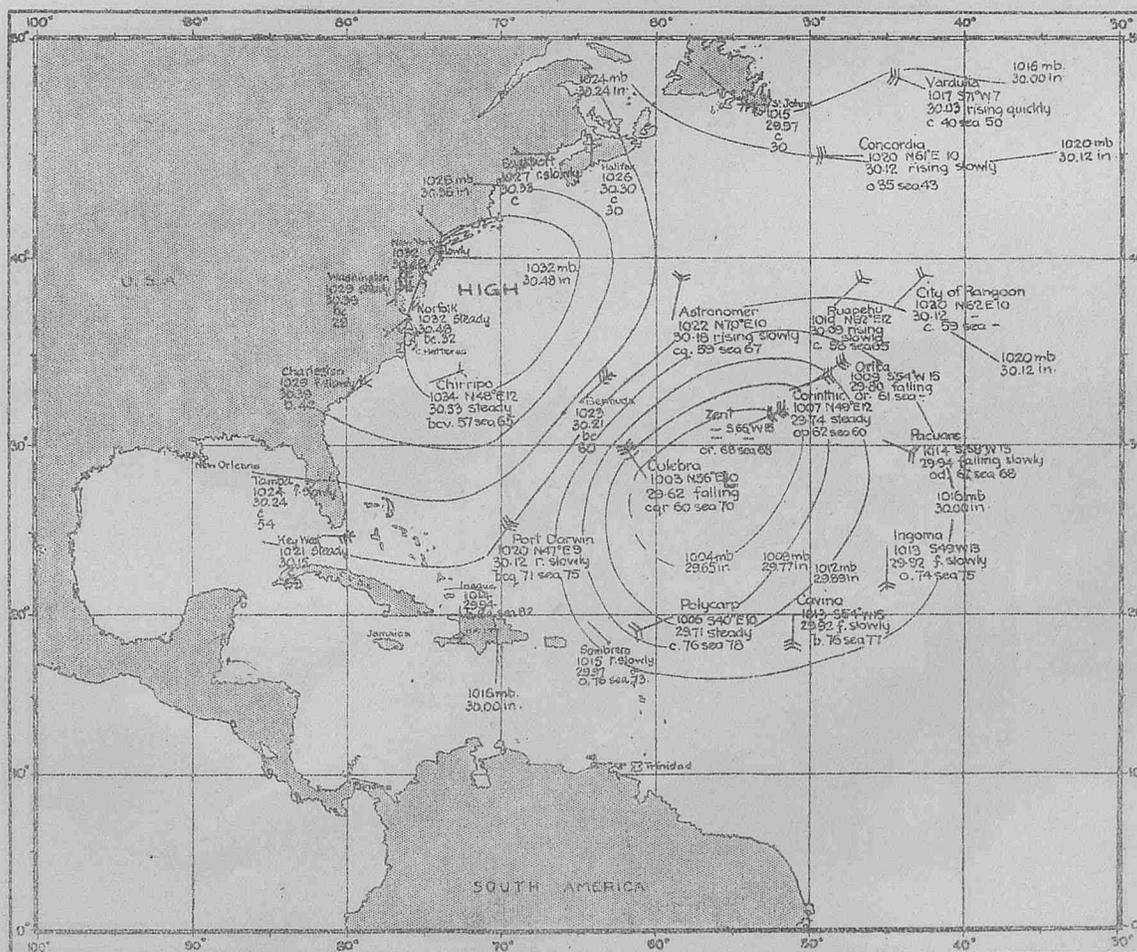
During the War, Captain BOLTON received the Distinguished Service Cross for his services in "Q" ships. On completion of hostilities he returned to the service of the WHITE STAR LINE and had been employed chiefly in command of their big ships in the Canadian Trade, his last ship being R.M.S. *Doric*, which he was too ill to rejoin when she sailed for Montreal on September 21st last.

MORNING OF DECEMBER 27TH, 1927.



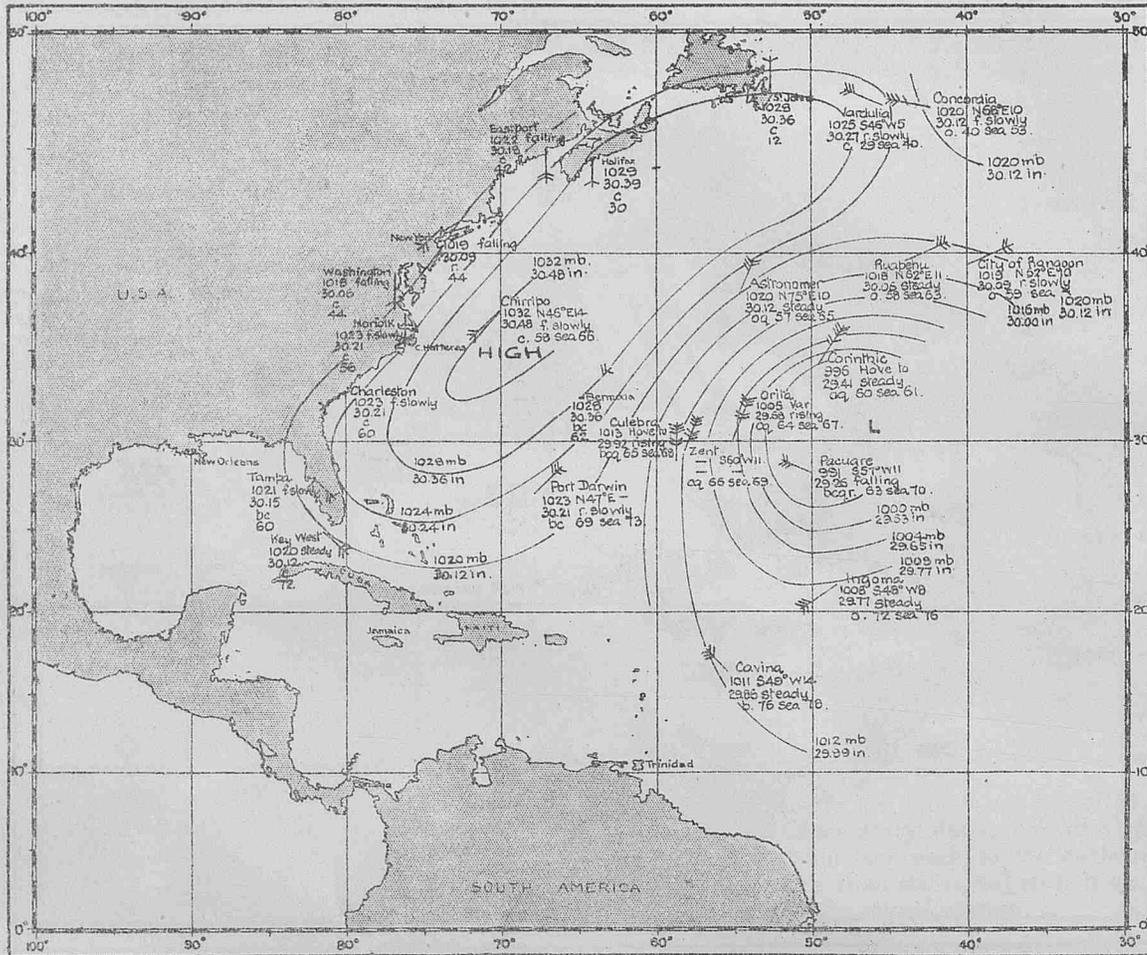
Weather Chart XXV.

MORNING OF DECEMBER 28TH, 1927.



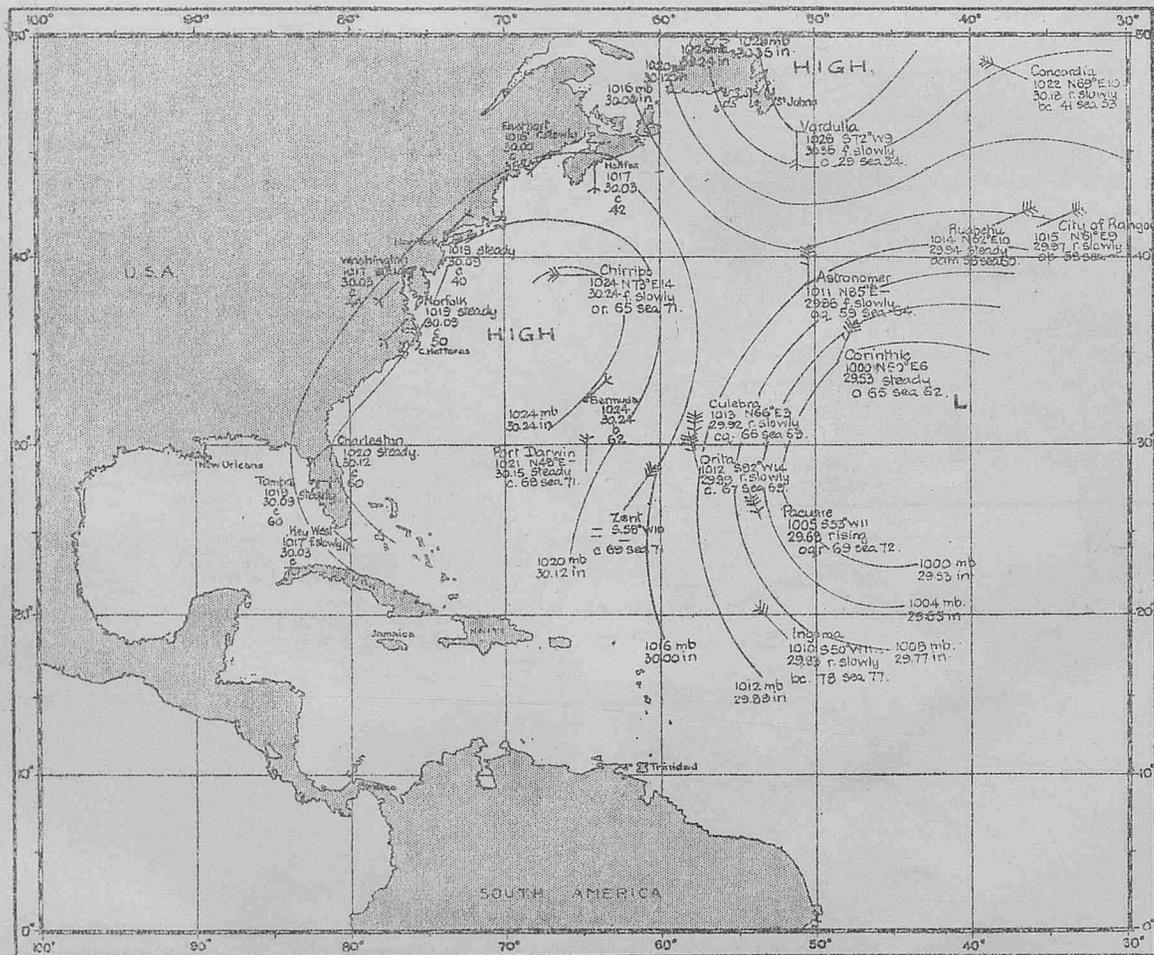
Weather Chart XXVI.

MORNING OF DECEMBER 29TH, 1927.



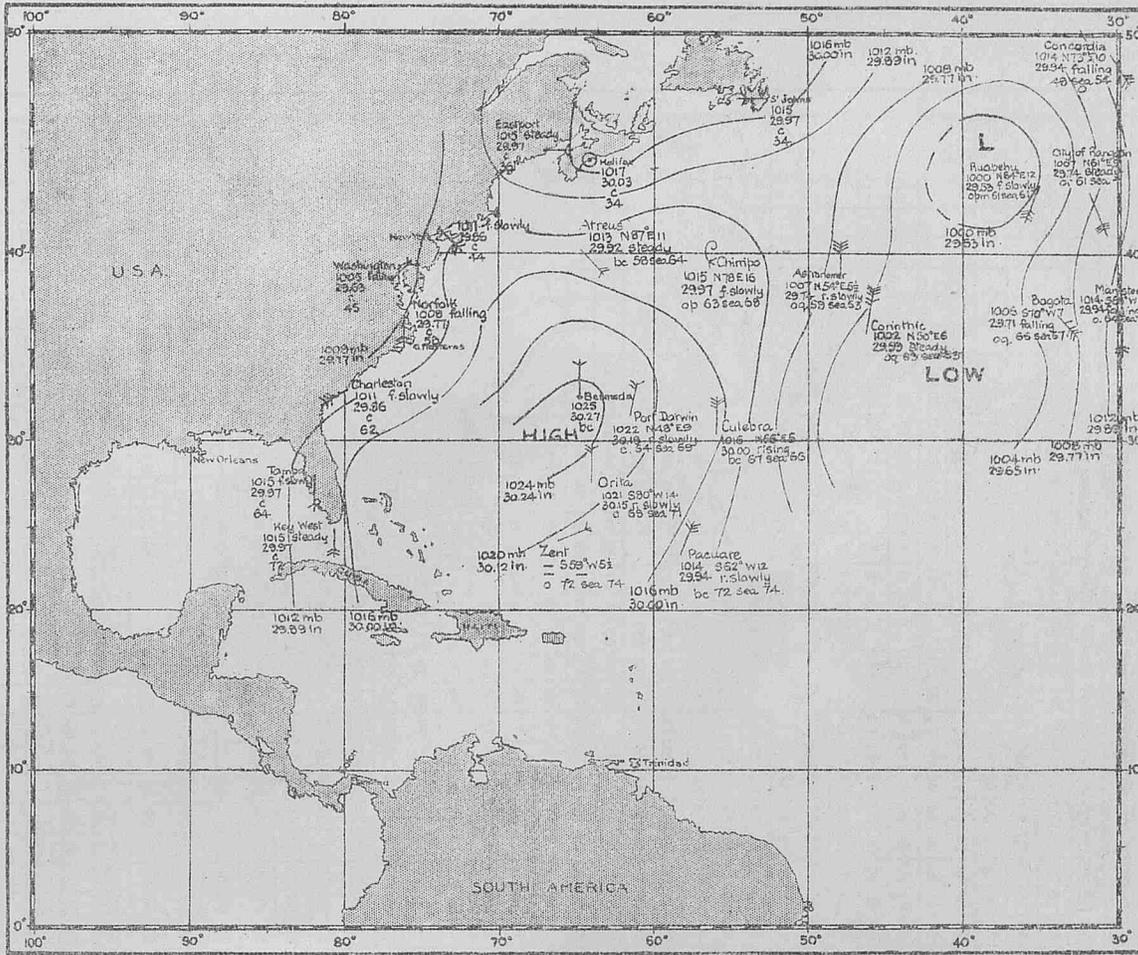
Weather Chart XXVII.

MORNING OF DECEMBER 30TH, 1927.



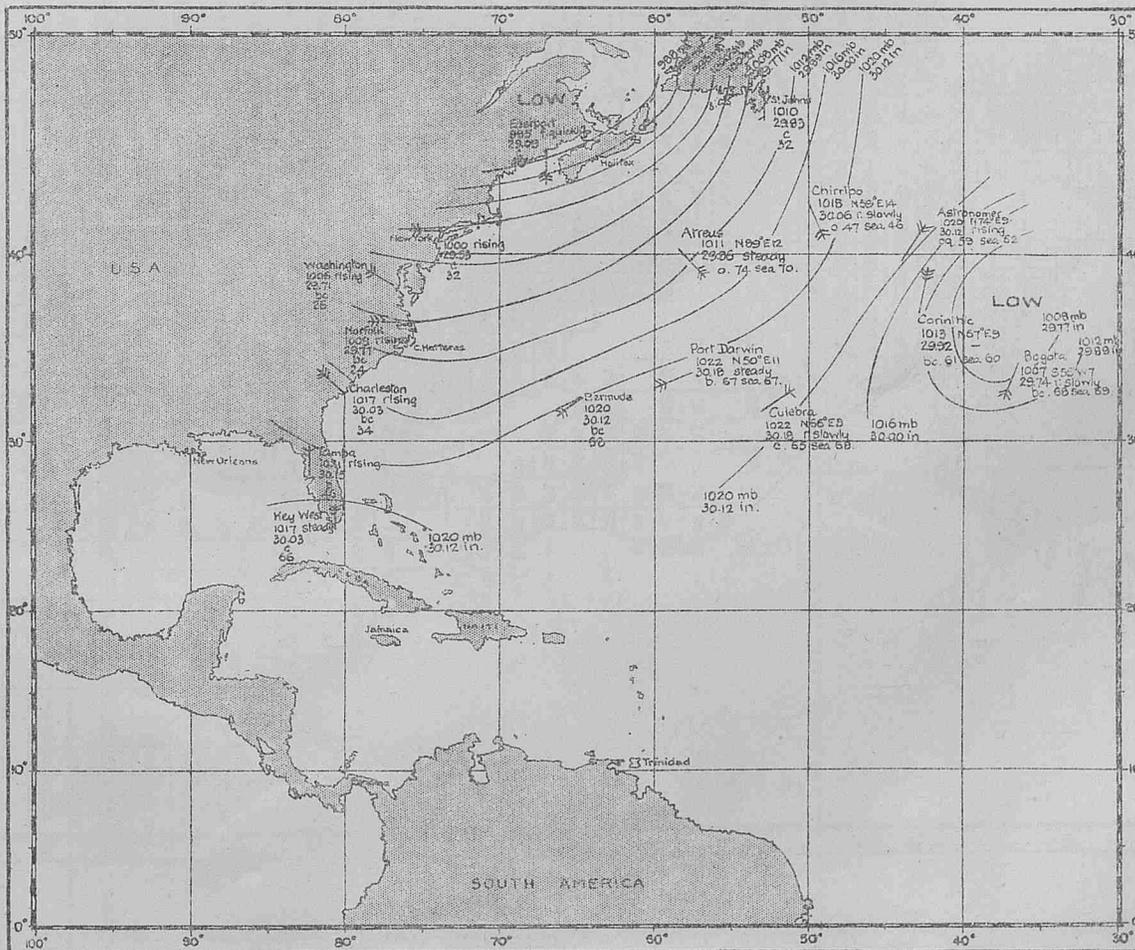
Weather Chart XXVIII.

MORNING OF DECEMBER 31st., 1927.



Weather Chart XXIX.

MORNING OF JANUARY 1st., 1928.



Weather Chart XXX.

INDIAN OCEAN. MEAN SEA SURFACE TEMPERATURES FOR MONTH OF DECEMBER

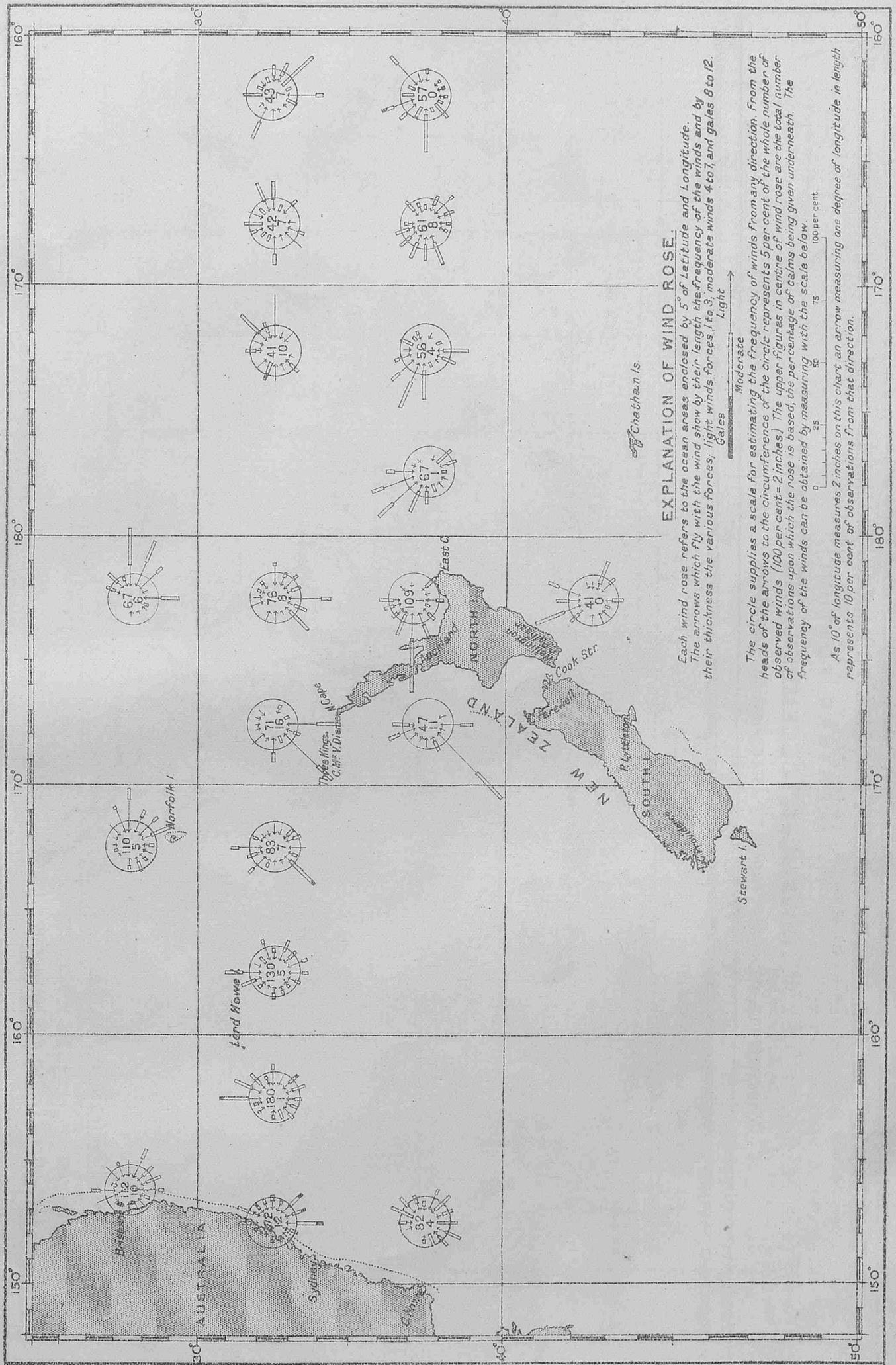


Computed from observations of British Ships during the years 1855 to 1917 except south of Latitude 30° S. and eastward of Longitude 40° E. where the observations are for the years 1855 to 1895, and south of Latitude 30° S. and westward of Longitude 40° E. 1855 to 1878.

SOUTH PACIFIC. WINDS ON THE TRACKS FROM PANAMA TO AUSTRALIAN AND NEW ZEALAND PORTS. (WESTERN PORTION.)

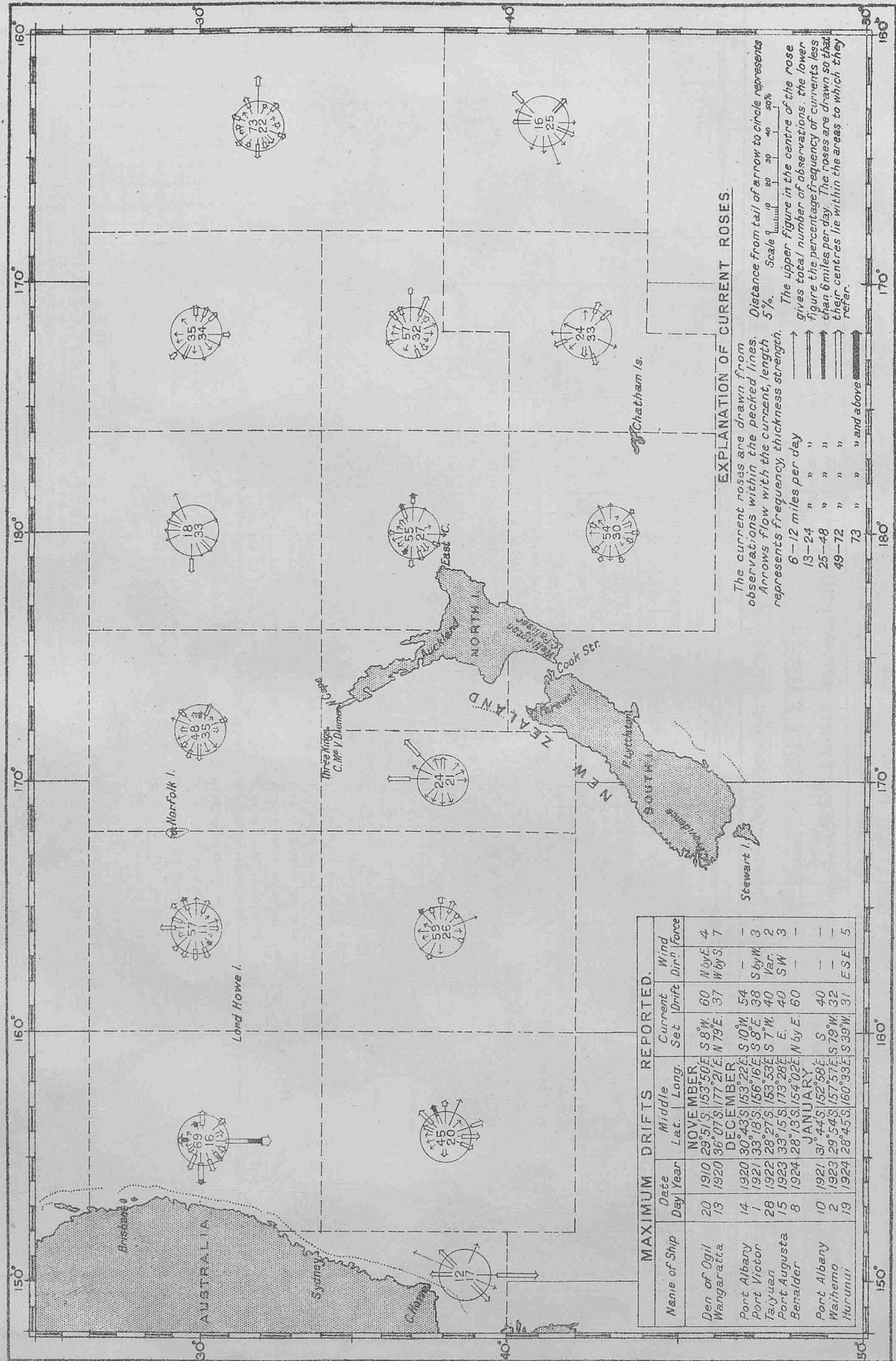
DECEMBER

Observations of ships regularly observing for the British Meteorological Office 1920-1926.



SOUTH PACIFIC.
CURRENTS ON THE TRACKS FROM PANAMA TO AUSTRALIAN AND NEW ZEALAND PORTS.
(WESTERN PORTION.)
NOVEMBER, DECEMBER AND JANUARY.

Observations of ships regularly observing for the British Meteorological Office 1910-1926.



EXPLANATION OF CURRENT ROSES.

The current roses are drawn from observations within the pecked lines. Arrows flow with the current, length represents frequency, thickness strength.

6-12 miles per day
 13-24 " " "
 25-48 " " "
 49-72 " " "
 73 " " " and above

Distance from tail of arrow to circle represents 5%. Scale 0 10 20 30 40 50%.

The upper figure in the centre of the rose gives total number of observations, the lower figure the percentage frequency of currents less than 6 miles per day. The roses are drawn so that their centres lie within the areas to which they refer.

Name of Ship	Date Day Year	Middle		Current Set	Current Drift	Wind Dir ⁿ	Wind Force
		Lat.	Long.				
Den of Ogil Wanganatta	20	1910	29° 51' S, 153° 50' E	S 8° W.	60	N by E.	4
	13	1920	36° 07' S, 177° 21' E	N 79° E.	37	W by S.	7
	14	1920	30° 43' S, 153° 22' E	S 10° W.	54	-	-
Port Albany	1	1921	33° 18' S, 156° 16' E	S 8° E.	38	S by W.	3
Port Victor	28	1922	28° 27' S, 153° 53' E	S 7° W.	40	Var.	2
Taiyuan	15	1923	33° 15' S, 173° 28' E	E.	40	SW	3
Port Augusta	8	1924	28° 13' S, 154° 02' E	M by E.	60	-	-
Benalder	10	1921	31° 44' S, 152° 55' E	S.	40	-	-
Port Albany	2	1923	29° 54' S, 157° 51' E	S 79° W.	32	-	-
Mathemo	19	1924	28° 45' S, 160° 33' E	S 39° W.	31	ESE	5

MAXIMUM DRIFTS REPORTED.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
1900													
1901													
1902													
1903													
1904													
1905													
1906													
1907													
1908													
1909													
1910													
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MAY 19 1964
U.S. DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

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ERRATA.

Volume V, No. 53, page 97.

Column 1, eleventh line from bottom, for rate read ratio.

Volume V, No. 57, page 179.

Column 2, thirteenth line from bottom, for *Highland Prince* read *Highland Pride*.

Volume V, No. 57, pages 195 and 196.

These two pages were incorrectly bound between the Ice Chart, Western North Atlantic, and page i of List of Voluntary Observing Ships in this Number. When placing the pages in the Volume cover for binding, pages 195 and 196 should follow page 194, and the lithographic charts following page 196.

Volume V, No. 58.

South Pacific, Currents on the Tracks from Panama to Australian and New Zealand Ports (Eastern Portion), November, December and January, chart showing current arrows.

In the area Latitude 0° to 2° S., Longitude 88° to 92° W., the

current near Chatham Island, given thus

1.3
27

 should

be

12.9
27

 (S 85° W., 12.9 miles per day, 27 observations).

NOTICES. IMPORTANT.

The special attention of Marine Observers is invited to the list of Agents overleaf, also to the notice headed "Marine Meteorology."

The Agencies exist for the purpose of assisting in the collection and dissemination of Marine Meteorological information and to encourage the practical application of meteorology in the Merchant Navy.

Much time and correspondence may be saved by consulting the Agents at ports where Agencies exist.

Ships using ports where there are Agencies should hand their Meteorological Logs, Form 915, to the Agents. Wireless Registers Form 138 and Ships' Meteorological Form 911 should in all cases be sent direct to the Meteorological Office in London.

The Agents have all Forms, including Logs and Outline Charts required for the work at sea and have the necessary gear for equipping ships for keeping the Meteorological Log and replacing defective instruments. It is hoped that greater use will be made of the advantages now offered at the Agencies for the benefit of shipping and seamen.

The Captains and Officers of regular observing ships are requested to refer intending Marine Observers to the appropriate Marine Agent, Port Meteorological Officer or to the Marine Superintendent in London. Ports with Agencies are allotted an appropriate number of places in the list of regular observing ships, and it is intended that the observing fleet should be well and fairly distributed, not only in the different trades so as to maintain the best geographical distribution of observations, but also amongst ships sailing from different ports and amongst the different types and owners so that the number of ships to which we are limited shall be the best possible representation of the British Merchant Navy.

Those observing ships which have the most suitable equipment are detailed as "Selected Ships" for the purpose of Organised Ships' Weather Telegraphy, see List of Voluntary Observing Ships.

COVER FOR MARINE OBSERVER.

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

The arrangement for assembling the numbers for binding is described in this Number, page 244.

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.

POSTAL ARRANGEMENTS.

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

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

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

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

ICE CHART. WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE.

- (C) From 1st September to 31st January, 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 73-4, Vol. V. No. 52 of this Journal.

SYMBOLS USED ON THE CHART.

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

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position.		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°52' N.	40°50' W.	Four large Bergs.
		(Approximate).		

Reports of Ice sighted between October 1st and October 31st, 1928, which have been received by the Meteorological Office, are shown by the Symbols plotted in this chart. In addition reported, the figures indicating the day of the month.

Co-operation of Shipowners, Masters and Mates.

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

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

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

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

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

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

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

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

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

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

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

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

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

Ships on the List of Voluntary Observers to the Meteorological Office which have a mercurial barometer are indicated by the letters M.L., W.T. and M.

These are selected ships for reporting weather observations made at specified times by W/T to "All Ships," and they are invited to perform this service, which is for the benefit of all shipping fitted for W/T reception.

For sample weather report message see Chapter I. of "Wireless and Weather an Aid to Navigation," page 6, and page 18 of Vol V., No. 49, of this Journal.

THE MARINE OBSERVER is sent monthly to all ships regularly contributing Logs, Forms and W/T Registers to the Meteorological Office. It is hoped that each ship will preserve all her copies. Personal copies of Numbers are sent to those whose special contributions are published in them. A suitable cover may be obtained from H.M. Stationery Office, price 2s.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
NORTH SEA.			
1.10.28	53°44'N.	0°28'E.	Capsized vessel, presumed to be a wooden fishing smack. Apparently a fishing coble, waterlogged and adrift.
10.10.28	55°16'N.	1°28'W.	
IRISH SEA.			
24.10.28	52°40'N.	5°34'W.	Drifting barge.
25.10.28	S.40°E., 20 m. from S. Stack.		Lighter <i>James</i> , adrift, dangerous to navigation.
BRISTOL CHANNEL.			
14.10.28	51°20'N.	4°42'W.	Abandoned ketch, drifting with two anchors down and no lights.
ENGLISH CHANNEL.			
22.10.28	50°21'N.	1°34'W.	Fisherman's brown lifeboat, dangerous to navigation.
MEDITERRANEAN.			
8.10.28	43°02'N.	4°50'E.	Buoy, dangerous to navigation.
19.10.28	36°56'N.	12°47'E.	Large spar, 6 feet out of water, dangerous to navigation.
NORTH ATLANTIC.			
1.10.28	32°31'N.	76°13'W.	Large cylindrical tank about 25 feet long, 7 feet diameter.
1.10.28	17°44'N.	67°44'W.	Freshly painted red gas buoy with two lights and flag coloured black at top, yellow in middle and white at bottom.
2.10.28	48°31'N.	23°34'W.	Log about 25 feet long, 3 feet diameter, covered with marine growth, dangerous to navigation.
2.10.28	25°27'N.	79°53'W.	Tree trunk about 50 feet long and 2 feet diameter.
2.10.28	40°10'N.	70°45'W.	Spar about 7 feet, 3 feet in diameter apparently, attached to submerged wreckage.
3.10.28	38°00'N.	53°37'W.	Dark conical buoy with cage.
4.10.28	35°33'N.	75°18'W.	Piece of wreckage about 60 feet long, only small piece showing above water, apparently part, of wooden hull.
4.10.28	28°34'N.	62°05'W.	Black conical buoy showing about 6 feet out of water.
5.10.28	45°50'N.	17°02'W.	Rusty conical shaped buoy projecting about 8 feet above water.
6.10.28	33°34'N.	76°25'W.	Pontoon about 18 feet long and 3.5 feet in diameter, rusty and showing about 3 feet out of water.
7.10.28	36°10'N.	74°59'W.	Piece of wreckage about 20 feet long by 12 feet wide with piling projecting 3 feet out of water.
7.10.28	20°05'N.	74°10'W.	Tree trunk about 25 feet long, 3 feet diameter, roots attached.
7.10.28	37°02'N.	71°43'W.	Upright spar about 18 inches in diameter, projecting about 3 feet out of water, apparently attached to submerged wreckage.
7.10.28	26°34'N.	74°28'W.	Partly submerged lifeboat marked <i>Sunderland</i> , adrift.
9.10.28	35°43'N.	74°07'W.	Two steel tanks attached to wooden structure upside down, tanks about 20 feet long, 5 feet diameter.
9.10.28	33°23'N.	75°26'W.	Large cylindrical tank about 30 feet long, 12 feet diameter.
11.10.28	45°57'N.	39°18'W.	Large black gas and whistle buoy with red lantern, light extinguished but whistle working.
11.10.28	43°12'N.	49°50'W.	Heavy spar, about 30 feet long.
13.10.28	20°47'N.	74°28'W.	Tree trunk about 80 feet long and partly submerged.
15.10.28	29°55'N.	14.44'W.	Spar 25 feet long.
16.10.28	30°20'N.	54°21'W.	Light whistle buoy.
GULF OF MEXICO.			
1.10.28	23°24'N.	82°18'W.	Large tree stump projecting about 10 feet out of water.

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(Telephone No. : Seymour 3309).

Agents (contd.).

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line	Last Log, Register, or Report Contributed. Received up to 19.10.28.	Date Received.
<i>Atrius</i> ...	Rundle, G. G. ...	H. Nicholas ...	No. A.	A. Holt ...	Form 911 19.7.28 to 28.9.28 ...	2.10.28
<i>Atsuta Maru</i> ...	Narui, N. ...	Y. Osada ...	" A.	Nippon Yusen Kaisha	" 18.5.28 to 18.9.28 ...	24.9.28
<i>Auditor</i> ...	Owen, W. T. ...	" ...	" M.	Harrison	" 15.5.28 to 10.8.28 ...	23.8.28
<i>Autolytus</i> ...	Dunlop, J. K. ...	" ...	" A.	A. Holt ...	" 26.7.28 to 11.8.28 ...	24.9.28
<i>Avon</i> ...	Spriddell, F. G., R.D., Commr., R.N.R.	R. H. East ...	" M.	R.M.S.P.	" 17.2.28 to 28.3.28 ...	29.3.28
<i>Balmoral Castle</i> ...	Chave, Sir B., K.B.E.	" ...	" A.	Union Castle ...	6.4.28 to 23.4.28 ...	24.4.28
<i>Balranald</i> ...	Townshend, W. P., Capt., R.N.R.	H. Stinn, G. Owen, F. Ward,	M.L.	P. & O. Branch	Met. Log. 31.3.28 to 5.8.28 ...	16.8.28
51 <i>Baltic</i> ...	Binks, J. W., R.D., Lt-Commr., R.N.R.	T. F. Pratt, W. R. Wilkinson, E. P. Hughes.	W.T.	White Star ...	W.T. Reg. 3.9.28 to 29.9.28 ...	25.9.28
<i>Bampton Castle</i> ...	Hutchings, A. H. ...	E. Hamlyn ...	No. A.	Union Castle ...	Form 911 3.9.28 to 22.9.28 ...	25.9.28
<i>Banffshire</i> ...	Wynne, R. H. ...	W. D. E. Campbell ...	" A.	Turnbull Martin	" 28.4.28 to 4.8.28 ...	23.8.28
<i>Baradine</i> ...	Rollo, W. ...	C. B. Roche, B. H. Pollitt, D. F. Lambard, G. C. Case.	M.L.	P. & O. Branch	Met. Log. 26.1.28 to 1.6.28 ...	4.6.28
<i>Barpeta</i> ...	Chandler, H. V. ...	B. R. Faithfull ...	No. M.	British India ...	Form 911 22.8.28 to 18.9.28 ...	8.10.28
<i>Barrabool</i> ...	Rhodes, H. R. ...	T. G. Davies ...	" M.	P. & O. Branch	" 8.9.28 to 22.9.28 ...	15.10.28
<i>Baychimo</i> ...	Cornwall, S. A. ...	" ...	" A.	Hudson's Bay Co.	" 7.7.28 to 20.9.28 ...	19.10.28
59 <i>Belgenland</i> ...	Morehouse, W. A. ...	F. Good, F. Clitty, C. H. Otterson.	W.T.	Red Star ...	W.T. Reg. 16.9.28 to 6.10.28 ...	8.10.28
<i>Beltana</i> ...	Allin, C. H. C. ...	D. M. Stafford ...	No. M.	P. & O. Branch	Form 911 24.6.28 to 9.8.28 ...	13.8.28
<i>Benalder</i> ...	Fairweather, J. J. ...	L. A. Sayers ...	" A.	Ben Line	" 22.5.28 to 8.7.28 ...	18.7.28
<i>Benalla</i> ...	Sheepwash, J. ...	J. E. Hills ...	" M.	P. & O. Branch	" 28.7.28 to 13.8.28 ...	3.9.28
<i>Bendigo</i> ...	Nicholl, R. N. C. ...	G. G. Mason ...	" M.	"	" 8.8.28 to 28.9.28 ...	18.9.28
<i>Benefactor</i> ...	Jones, C. W. ...	" ...	" M.	Harrison	" 25.4.28 to 26.5.28 ...	14.6.28
<i>Bengloe</i> ...	McCorquodale, A. ...	G. Davidson ...	" A.	Ben Line	" 11.4.28 to 21.5.28 ...	8.6.28
31 <i>Berengaria</i> ...	Prothero, W. ...	J. A. Davies, W. C. A. Robson, S. A. T. Bullock.	W.T.	Cunard ...	W.T. Reg. 10.9.28 to 25.9.28 ...	27.9.28
<i>Berrima</i> ...	Short, C. E. ...	G. H. Durrant ...	No. M.	P. & O. Branch	Form 911 30.9.28 to 16.10.28 ...	19.10.28
<i>Brenda</i> ...	Lamont, A. ...	N. Ross ...	" A.	Scottish Fishery Brd.	" 25.5.28 to 3.6.28 ...	27.8.28
<i>Brighton</i> ...	Hill, A. ...	Mr. Munton ...	C.C.	Southern Railway	Telegraphic Report 3.10.28 ...	8.10.28
<i>British Colonel</i> ...	Taylor, R. J. ...	F. W. Sherlock ...	No. M.	British Tankers	Form 911 29.6.28 to 27.9.28 ...	3.10.28
<i>British Consul</i> ...	Putt, R. O. ...	C. H. Humphries ...	" M.	"	" 29.6.28 to 17.7.28 ...	20.7.28
<i>Bronte</i> ...	Crappier, J. S. ...	J. B. Scott ...	" A.	Lampport & Holt	" 25.9.28 to 26.4.28 ...	8.6.28
<i>Bruyere</i> ...	Birch, A. ...	" ...	" A.	"	" 12.7.28 to 1.8.28 ...	23.8.28
<i>Bulysses M.V.</i> ...	Head, B. P. ...	A. J. Clatworthy ...	" M.	Anglo-Saxon Petroleum Co	" 23.8.28 to 2.9.28 ...	18.9.28
<i>Cambria</i> ...	Copland, C. P. ...	O. W. Ll. Jones ...	C.C.	L.M. & S. Rly ...	Telegraphic Report 19.10.28 ...	19.10.28
<i>Cameronia</i> ...	Gemmill, W. ...	" ...	M.L.	Anchor	Form 911 25.3.28 to 16.4.28 ...	18.4.28
<i>Camito</i> ...	Forrester, W. T., O.B.E.	H. H. Dunning, W. E. Grant, G. M. Roberts.	"	Elders & Fyffes	Met. Log. 5.6.28 to 3.10.28 ...	9.10.28
<i>Canadian Importer</i> ...	Forson, A. ...	" ...	No. A.	Canadian Gov. Mer- cantile Marine.	Form 911 2.8.28 to 2.9.28 ...	14.9.28
<i>Canadian Inventor</i> ...	Boulton, F. W. ...	O. D. Alcorn ...	" A.	"	" 17.9.27 to 30.10.27 ...	19.11.27
<i>Canadian Winner</i> ...	McConechy, W. G. ...	J. M. Lang ...	" M.	"	" 8.9.28 to 15.9.28 ...	3.10.28
<i>Canonesa</i> ...	Brodie, W. H. ...	T. Wetherall ...	" M.	Furness Houlder ...	" 13.2.28 to 3.4.28 ...	11.4.28
<i>Cape of Good Hope</i> ...	Lamont, J. ...	W. S. Bartlett ...	No. A.	Lyle S.S. Co. ...	" 19.8.28 to 22.9.28 ...	19.10.28
35 <i>Carmania</i> ...	Brown, F. G., R.D., Capt., R.N.R.	W. M. Stewart, E. R. Taylor, E. Gleave.	W.T.	Cunard	W.T. Reg. 3.9.28 to 21.9.28 ...	24.9.28
<i>Carnarvon Castle</i> ...	Stanley, W. F., R.D., Commr., R.N.R.	W. G. Smith, T. C. Goldstone, J. B. Reynolds.	M.L.	Union Castle	Met. Log. 9.3.28 to 1.7.28 ...	17.7.28
34 <i>Caronia</i> ...	Hossack, W. H., R.D., Capt., R.N.R.	H. G. Hayward, D. McMillan, T. Parry.	W.T.	Cunard ...	W.T. Reg. 17.9.28 to 5.10.28 ...	10.10.28
<i>Casanare</i> ...	Browne, S. ...	" ...	No. A.	Elders & Fyffes	Form 911 17.9.28 to 5.10.28 ...	25.8.28
<i>Cavina</i> ...	Riseley, A. D. ...	R. L. Stevenson ...	" A.	"	" 13.7.28 to 19.8.28 ...	3.9.28
52 <i>Cedric</i> ...	Smith R. G. ...	W. Walker, N. E. Banks, D. W. Chamberlain.	W.T.	White Star ...	W.T. Reg. 27.8.28 to 1.11.28 ...	5.10.28
53 <i>Celtic</i> ...	Berry, G. ...	J. Law, D. K. Crawford, A. R. Stevens.	"	"	Form 911 9.9.28 to 29.9.28 ...	3.10.28
<i>Centaur</i> ...	Rose, A. F. ...	E. D. Potts, N. L. Thompson, J. Cockburn.	M.L.	A. Holt & Co.	W.T. Reg. 27.8.28 to 15.9.28 ...	18.9.28
<i>Ceramic</i> ...	Musgrave, T. ...	" ...	No. A.	White Star ...	Form 911 24.9.28 to 14.10.28 ...	18.10.28
<i>Chanqte</i> ...	Gambrill, F. O. ...	— Thomas, — Tyer, — Allan.	M.L.	Yull & Co. ...	Met. Log. 21.8.27 to 6.2.28 ...	26.4.28
<i>Chanquinola</i> ...	Thorburn, R. A., R.D., Commr., R.N.R.	W. G. Chanter ...	No. A.	Elders & Fyffes	Form 911 22.1.28 to 10.5.28 ...	15.5.28
<i>Chindwin</i> ...	Paterson, G. ...	" ...	" A.	Henderson ...	Met. Log. 16.12.27 to 6.4.28 ...	16.5.28
<i>Chinkiang</i> ...	Stringer, C. B. L. ...	R. J. Powerie ...	M.L.	China Navigation Co	Form 911 24.8.28 to 26.9.28 ...	29.9.28
<i>Chirripi</i> ...	McCorm, F. ...	" ...	No. A.	Elders & Fyffes	Form 911 20.8.28 to 21.9.28 ...	27.9.28
<i>City of Baroda</i> ...	McMillan, J. ...	A. Beaton, T. C. Hodgkinson.	M.L.	Ellerman	Met. Log. 5.3.28 to 20.5.28 ...	6.6.28
<i>City of Benares</i> ...	Anderson, W. W. ...	F. Forsyth ...	No. A.	"	Form 911 15.3.28 to 16.4.28 ...	19.4.28
<i>City of Brisbane</i> ...	Seaborne, F. O., D.S.C.	R. Jones ...	" A.	"	" 3.2.28 to 1.4.28 ...	10.4.28
<i>City of Canterbury</i> ...	Oleson, E. ...	E. H. Hodgson ...	" A.	"	" 25.7.28 to 10.10.28 ...	13.10.28
<i>City of Carlisle</i> ...	Mordue, J. A. ...	" ...	" A.	"	" 6.9.28 to 15.9.28 ...	13.10.28
<i>City of Chester</i> ...	Letton, F. W. ...	C. C. Duncan, A. J. Barnett, R. Mowbray.	M.L.	"	Met. Log. 31.3.28 to 27.8.28 ...	30.8.28
<i>City of Edinburgh</i> ...	Wyper, J. ...	G. H. Hummell ...	No. M.	"	Form 911 18.5.28 to 6.6.28 ...	27.8.28
<i>City of Hong Kong</i> ...	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	H. Saunders ...	" A.	"	" 31.8.28 to 10.9.28 ...	17.9.28
<i>City of London</i> ...	Parker, F. W., R.D., Commr., R.N.R.	H. H. Asher ...	No. A.	"	Form 911 4.2.28 to 22.4.28 ...	27.4.28
<i>City of Osaka</i> ...	Smith, W. H. ...	R. K. Walker ...	No. M.	"	" 10.8.28 to 2.9.28 ...	10.10.28
<i>City of Rangoon</i> ...	Jones, P. ...	E. R. Wildermuth, R. H. Stewart, F. E. Broadbent.	M.L.	"	Met. Log. 28.3.28 to 9.7.28 ...	1.8.28
<i>City of Venice</i> ...	Lee, A. ...	" ...	No. A.	Ellerman	Form 911 18.2.28 to 1.3.28 ...	12.3.28
<i>City of Yokohama</i> ...	Singleton, J. G. ...	R. Willott Leese ...	" A.	"	" 21.6.28 to 29.7.28 ...	21.8.28
<i>Clan Alpine</i> ...	Lyall, A. B. ...	P. Sargent ...	" A.	Clan	" 5.8.28 to 29.8.28 ...	17.9.28
<i>Clan Kenneth</i> ...	Young, A. H., Commr., R.D., R.N.R.	F. H. Turton ...	" A.	"	" 1.8.28 to 4.10.28 ...	8.10.28
<i>Clan Lamont</i> ...	Urquhart, P., D.S.C.	P. de Gruchy ...	" A.	"	" 25.1.28 to 27.4.28 ...	8.5.28
<i>Clan Lindsay</i> ...	Giles, H. J., R.D., Commr., R.N.R.	E. P. Smith ...	" A.	"	" 8.6.28 to 26.8.28 ...	3.9.28
<i>Clan MacBean</i> ...	Worthington, J. H. ...	J. E. Clayton ...	" A.	"	" 5.8.28 to 1.8.28 ...	4.9.28
<i>Clan Macbeth</i> ...	Horn, R. ...	T. A. Watkinson ...	" A.	"	" 1.4.28 to 7.4.28 ...	21.5.28

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.10.28.	Date Received.
<i>Clan Macfadayen</i> ...	Stenson, F. J. R.D., Capt. R.N.R.	A. Dowds	No. A.	Clan	Form 911 30.4.28 to 18.5.28	8.6.28
<i>Clan Macfarlane</i> ...	Redford, L. F. ...	T. A. Pearson	" A.	"	" 4.8.28 to 3.10.28	6.10.28
<i>Clan Macgillivray</i> ...	Mackinlay, A. ...	J. Garis	" A.	"	" 19.7.28 to 23.8.28	20.9.28
<i>Clan Macindoe</i> ...	Holman, W. G. ...	"	" A.	"	" 17.8.28 to 19.9.28	26.9.28
<i>Clan Mackellar</i> ...	Smith, W. P. ...	A. Woodrow	" A.	"	" 21.6.28 to 29.7.28	25.8.28
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	G. Short, B. Edgar, E. Mowatt.	M.L.	"	Met. Log. 21.11.27 to 18.4.28... ..	17.5.28
<i>Clan Macnaughton</i> ...	Simpson, A. W. ...	J. A. Watkinson	No. A.	"	Form 911 21.8.28 to 18.9.28	8.10.28
<i>Clan Mactaggart</i> ...	Makepeace, F. ...	E. A. Hewson	" A.	"	" 1.9.28 to 19.9.28	15.10.28
<i>Clan Macwhirter</i> ...	Waterhouse, J. ...	W. A. Robbie, E. A. Brown, S. W. Brown.	M.L.	"	Met. Log. 1.10.27 to 26.4.28	30.4.28
<i>Clan Malcolm</i> ...	George, L. S. ...	R. L. Ranford, J. F. Hubbard, P. Evans.	"	"	" 23.2.28 to 9.6.28	29.6.28
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	H. R. Crosscombe	No. A.	"	Form 911 24.6.28 to 26.7.28	25.8.28
<i>Clan Murdoch</i> ...	Neill, G. A. ...	W. J. Jones	" A.	"	" 7.8.28 to 24.8.28	8.9.28
<i>Clan Ranald</i> ...	Fraser, R. K. ...	R. Cameron	" A.	"	" 19.7.28 to 20.8.28	25.8.28
<i>Clan Ross</i> ...	Openshaw, L. G. ...	"	" A.	"	" 29.7.28 to 22.8.28	17.9.28
<i>Clan Sinclair</i> ...	Taylor, P. V. ...	J. H. Dennis	" A.	"	" 17.8.28 to 21.8.28	17.9.28
<i>Clan Urquhart</i> ...	Baker, E. W. ...	R. Silk	" A.	"	" 24.8.28 to 27.9.28	24.9.28
<i>Colonial</i> ...	Worthington, B. ...	"	" M.	T. & J. Harrison	"	"
<i>Comorin</i> ...	Borland, J. M.C.L., C.B., D.S.O., R.D., Capt. R.N.R.	E. C. White	" M.	P. & O.	" 13.7.28 to 23.8.28	10.10.28
<i>Corinthic</i> ...	Lloyd, W. ...	E. M. Burt, M. Bennett, I. A. Macnaughton.	M.L.	White Star	Met. Log. 4.2.28 to 18.5.28	22.5.28
<i>Cornwall</i> ...	Wilde, H. J. ...	H. M. Knight	No. A.	Federal	Form 911 27.3.28 to 9.5.28	15.5.28
<i>Crawford Castle</i> ...	Morgan, A. O., R.D., Commr. R.N.R.	J. A. Wilson	" A.	Union Castle	" 30.10.27 to 1.12.27	15.12.27
<i>Culebra</i> ...	Goble, C. J. R.D., Commr. R.N.R.	K. Paterson, R. N. Fletcher, W. S. Thomas.	M.L.	R.M.S.P. Co.	Met. Log. 20.7.28 to 19.9.28	25.9.28
<i>Cumberland</i> ...	Macmillan, D. ...	G. C. Saul, P. Shakespear, J. Marks.	"	Federal... ..	Form 911 29.4.28 to 30.8.28	24.9.28
<i>Cyclops</i> ...	Cosker, W. ...	K. A. Owens	No. A.	A. Holt	" 27.6.28 to 30.8.28	4.9.28
<i>Daga</i> ...	Wiles, N. ...	A. Olding... ..	No. M.	P. Henderson... ..	" 19.5.28 to 6.7.28	13.8.28
<i>Dakotian</i> ...	Robb, J. ...	W. R. Atkinson... ..	" A.	Leyland	" 30.3.28 to 24.6.28	2.7.28
<i>Dararnus</i> ...	Clarke, J. W. ...	"	" A.	A. Holt	" 10.6.28 to 29.7.28	17.9.28
<i>Darian</i> ...	Masters, W. ...	"	" A.	Leyland	" 12.11.27 to 24.11.27	5.12.27
<i>Darro</i> ...	Matthews, G. P. ...	"	" M.	R.M.S.P. Co.	" 9.8.28 to 25.9.28	1.10.28
<i>Delphic</i> ...	Evans, W. ...	"	" M.	White Star	"	"
<i>Demerara</i> ...	Willan, F. G. L., R.D., Capt. R.N.R.	F. Jeyes	" M.	R.M.S.P. Co.	" 9.7.28 to 13.9.28	18.9.28
<i>Demosthenes</i> ...	Ogilvy, A. ...	H. Phillips	" M.	Aberdeen	" 6.7.28 to 13.8.28	24.9.28
<i>Denis</i> ...	Harris, F. C. P. ...	A. Blewett	" A.	Booth	" 7.8.28 to 28.8.28	30.8.28
<i>Desado</i> ...	Buret, T. ...	"	" A.	R.M.S.P. Co.	" 18.8.28 to 13.10.28... ..	15.10.28
<i>Desna</i> ...	Green, J. ...	R. Wilson	" M.	"	" 12.6.28 to 30.7.28	14.8.28
<i>Deucalion</i> ...	Melling, C. F. ...	R. F. Dryden	" A.	A. Holt	" 23.9.28 to 4.10.28	10.10.28
<i>Devon</i> ...	Kinnell, G. ...	D. Clegg... ..	" M.	Federal	" 5.8.28 to 24.8.28	11.9.28
<i>Dieppe</i> ...	Marmery, S. ...	Mr. Parsons	" C.C.	Southern Railway	Telegraphic Report 18.10.28... ..	18.10.28
<i>Dimboola</i> ...	Brotherton, R. W. ...	H. L. Price	No. A.	Melbourne S.S. Co.	Form 911 22.7.28 to 15.8.28	24.9.28
<i>Domala, M.V.</i> ...	Kitson, A. G. ...	H. Robertson	" M.	British India	" 19.4.28 to 26.5.28	26.6.28
<i>Dominia, C.S.</i> ...	Campus, V., O.B.E., Lt.-Commr. R.N.R.	H. Hutchins, T. J. C. Dexter, J. Dyer.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 4.1.28 to 24.1.28	1.3.28
<i>Dominic</i> ...	Saxton, C. ...	J. A. Moon	No. A.	Booth	Form 911 14.3.28 to 1.5.28	8.5.28
<i>61Doric</i> ...	Jones, W. H. ...	G. T. Kavanagh	W.T.	White Star	" 26.8.28 to 13.10.28... ..	15.10.28
<i>Dorington Court</i> ...	Clarke, E. J. ...	P. Jones	No. A.	Haldin & Co.	" 28.6.28 to 6.7.28	16.8.28
<i>Dromore Castle</i> ...	MacMahon, J., R.D., Commr. R.N.R.	"	" A.	Union Castle	" 23.6.28 to 18.7.28	4.9.28
<i>Dryden</i> ...	Major, T. W. ...	"	" M.	Lampport & Holt	" 3.6.28 to 7.9.28	18.9.28
<i>Dunaff Head</i> ...	Milner, T. F., R.D., Lt.-Commr. R.N.R.	S. Duff	" A.	Ulster S.S. Co.	" 18.7.28 to 7.9.28	8.9.28
<i>Dundrum Castle</i> ...	Goodacre, R. W., R.D., Commr. R.N.R.	A. R. J. Tilston	" A.	Union Castle	" 13.4.28 to 11.5.28	21.5.28
<i>Dunluce Castle</i> ...	Morgan, A. O. ...	F. O. Wilbraham	" A.	"	" 19.8.28 to 7.9.28	11.9.28
<i>Dunrobin</i> ...	Ramsay, J. D. ...	C. H. Kendall	" A.	Glen & Co.	" 20.7.28 to 22.8.28	8.9.28
<i>Duquesa</i> ...	Owen, R. ...	"	" M.	Furness Withy	" 18.7.28 to 11.9.28	29.9.28
<i>Durenda, M.V.</i> ...	Beeching, P. H. ...	F. E. Liles	" M.	British India	" 21.6.28 to 22.7.28	7.8.28
<i>Edinburgh Castle</i> ...	Gardener, G. F., O.B.E., Lt.-Commr. R.N.R.	G. W. F. Lloyd	" A.	Union Castle	" 21.7.28 to 9.9.28	11.9.28
<i>Egori</i> ...	Sola, P., D.S.O. ...	R. W. Pattinson	" A.	Elder Dempster	" 17.8.28 to 6.10.28	18.10.28
<i>Eldon Park</i> ...	Burns, R. ...	"	" M.	Denholm S.S. Co.	"	"
<i>Ellora</i> ...	Baird, S. K. ...	W. M. Bain	" M.	British India... ..	" 28.8.28 to 16.9.28... ..	8.10.28
<i>El Paraguayo</i> ...	Fletcher, G. ...	F. F. Feint, D. Murray	" M.	Houlder Bros.	Form 911 23.10.27 to 15.12.27	20.12.27
<i>Elpenor</i> ...	Gordon, A. L. ...	C. Kavanagh, J. E. Cliff	M.L.	A. Holt	Met. Log. 5.2.28 to 29.5.28	18.6.28
<i>Elysia</i> ...	Duncan, A. R. ...	A. Laidlaw, G. S. Sinclair, H. M. Sanders.	"	Anchor	" 12.5.28 to 15.7.28	24.7.28
<i>Empress of Asia</i> ...	Hailey, A. J., Lt.- Commr. R.N.R.	L. C. Hogg	"	Canadian Pacific	" 25.2.28 to 15.6.28	14.7.28
<i>Empress of Canada</i> ...	Robinson, S., C.B.E., R.D., Commr. R.N.R.	A. G. Simmons	"	"	" 17.3.28 to 28.6.28	15.8.28
<i>Empress of France</i> ...	Griffiths, E. ...	O. F. Pennington, E. Roberts, L. Outram.	"	"	" 19.5.28 to 4.9.28	1.10.28
<i>Empress of Russia</i> ...	Hosken, A. J. ...	L. C. Barry, R. A. Leicester, J. S. Clarke, J. H. Reid.	"	"	" 7.4.28 to 19.7.28	13.9.28
<i>Endeavour</i> ...	Law, E. F. B., Commr. R.N.R.	C. S. E. Lansdown, P. Barlow, W. H. Dickinson.	"	His Majesty's Ship	" 14.3.28 to 11.7.28	16.7.28
<i>Essequibo</i> ...	Kirkwood, J. H. ...	J. H. E. Evans	No. M.	R.M.S.P. Co.	Form 911 17.5.28 to 2.7.28	28.7.28
<i>Eumæus</i> ...	Read, J. W. ...	"	" A.	A. Holt	" 11.7.28 to 16.7.28	21.8.28
<i>Euryades</i> ...	Findlay, J. ...	W. K. Holb	No. A.	A. Holt	" 24.8.28 to 9.9.28	15.10.28
<i>Explorer</i> ...	Ling, J. T. ...	H. W. Gustage	" M.	Harrison	" 27.4.28 to 25.8.28	28.8.28
<i>Explorer</i> ...	Allan, J. ...	A. Stout	" A.	Scottish Fishery Board.	" 3.9.28 to 28.9.28	2.10.28
<i>Ferndale</i> ...	Thompson, W. ...	R. S. Hartrick	No. M.	Aberdeen Common- wealth.	" 7.7.28 to 5.8.28	23.8.28
<i>Flandria</i> ...	Maars, L. ...	S. R. Hemmes	" M.	Holland Lloyd	" 29.6.28 to 14.8.28	18.8.28
<i>Fordsdale</i> ...	Richardson, A. V. ...	"	" M.	Aberdeen Common- wealth.	" 25.7.28 to 13.8.28	4.9.28

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.10.28.	Date Received.
Largs Bay ...	Clifford, —	...	No. M.	Aberdeen Commonweath.	...	...
64 Laurentic ...	Trant, E. L., R.D., Commr. R.N.R.	J. W. Peters	"	White Star ...	W.T. Reg. 16.9.28 to 6.10.28	10.10.28
Lautaro, M.V. ...	Leyne, R. W. ...	J. T. Denley	No. M.	Pacific S.N. Co. ...	Form 911 16.9.28 to 6.10.28	10.10.28
Leicestershire ...	de Legh, P. ...	R. S. Evans H. G. Walton, C. F. Hicks, A. Thomson.	M.L.	Bibby ...	Met. Log. 12.5.28 to 15.8.28	8.9.28
Leighton, M.V. ...	Lindesay, J. M. ...	...	No. A.	Lampart & Holt ...	Met. Log. 14.7.28 to 22.9.28	26.9.28
Lebrim ...	Robertson, A. ...	S. J. Woodhouse	" A.	Dowie, J., & Co. ...	Form 911 1.5.28 to 20.5.28	19.6.28
Limerick ...	Molyneux, P. L. ...	F. J. Schibild	" M.	Federal ...	" 4.8.28 to 22.9.28	25.9.28
Llandaff Castle ...	Gilbert, E. F. ...	R. Bayer	" A.	Union Castle ...	" 10.5.28 to 5.7.28	11.9.28
Llandoverly Castle ...	Stuart, G. E., R.D., Capt. R.N.R.	C. H. Williams, G. Moon, P. Clissold.	M.L.	" ...	Met. Log. 19.4.28 to 8.5.28	9.6.28
Lobos, M. V. ...	Pape, E. R. ...	...	No. M.	Pacific S.N. Co. ...	Met. Log. 26.7.28 to 4.10.28	6.10.28
Loch Katrine ...	Schlanbusch, O. V. ...	D. A. Mallinson	No. A.	R.M.S.P. Co. ...	Form 911 1.5.28 to 20.5.28	19.6.28
Logician ...	Gibbins, W. ...	A. G. S. Madrell	No. M.	Harrison ...	" 4.8.28 to 22.9.28	25.9.28
London Importer ...	Fowler, W. H. ...	F. F. Feint, J. H. Metcalfe, J. G. Freeman.	M.L.	Furness Withy ...	Met. Log. 22.6.28 to 15.10.28	19.10.28
Lord Antrim ...	Jarvis, F. E. ...	...	No. A.	Ulster S.S. Co. ...	Form 911 8.1.28 to 31.3.28	14.4.28
Loriga, M.V. ...	Clapham, E. C. ...	D. P. Morgan	" A.	Pacific S.N. Co. ...	Form 911 23.8.28 to 5.9.28	17.9.28
Losada, M.V. ...	Ross, J. ...	D. Beamer	" M.	"	" 6.9.28 to 24.9.28	21.8.28
					Met. Log. 15.8.28 to 31.8.28	18.9.28
Macedonia ...	Harrison, R. ...	C. J. L. Hayward	" M.	P. & O. ...	" 9.9.28 to 18.9.28	27.9.28
Macharda ...	Hanna, R. G. ...	T. Johnston	" M.	Brocklebank ...	" 25.6.28 to 9.8.28	21.8.28
Mahronda ...	Addy, M. J. ...	J. Kettlewell	No. M.	"	" 7.5.28 to 13.7.28	17.7.28
Mathar ...	Charlton, W. L. ...	J. W. B. Robertson, C. Cadwallader, S. S. Slade.	M.L.	"	Met. Log. 27.1.28 to 21.4.28	7.6.28
Maimoa ...	Johnson, J. W. ...	...	No. A.	Shaw, Savill & Albion	Form 911 5.11.27 to 15.6.28	7.8.28
Maimyo ...	Smith, G. C. ...	H. M. Drummond	No. A.	Brocklebank ...	W.T. Reg. 6.9.28 to 20.9.28	22.9.28
58 Majestic ...	Hume, R. ...	W. W. Pearson, J. Clarke, W. T. Fitz Gerald, A. H. Young.	W.T.	White Star ...	" 27.9.28 to 11.10.28	15.10.28
	Marshall, W. C.B., D. S. O., R. D., Commodore R.N.R.	...				
Makalla ...	Mangham, J. W. ...	J. B. Newman	No. M.	Brocklebank ...	Form 911 4.8.28 to 8.9.28	15.10.28
Makambo ...	Middleton, J. ...	...	M.L.	Burns Philp ...	Met. Log. 1.2.28 to 22.6.28	25.9.28
Makura ...	McLean, J. ...	...	"	Canadian-Australasian	" 26.1.28 to 11.5.28	11.7.28
	Spring Brown, J. F. ...	W. A. Todd, D. Burgess, A. Gell.	"	Burns, Philp & Co. ...	" 28.12.27 to 13.4.28	4.7.28
Malabar, M.V. ...	Donaldson, A. ...	K. Morris	No. M.	Brocklebank ...	Form 911 23.5.28 to 20.6.28	17.7.28
Malakuta ...	Adamson, F. L. ...	N. Grayson	" M.	"	" 3.4.28 to 19.6.28	30.6.28
Malancha ...	Whitham, F. ...	R. Humble, F. Moore	" M.	British India ...	" 25.6.28 to 5.7.28	1.8.28
Maida ...	Gray, T. N. ...	S. G. James	" M.	P. & O. ...	" 25.6.28 to 7.9.28	11.9.28
Maloja ...	Ohlson, B. J., D.S.O., R.D., Commr. R.N.R.	A. D. Dennis	" M.	"	" 21.7.28 to 13.9.28	21.9.28
Malwa ...	Norman, W. A. ...	G. C. Case	" M.	Manchester Liners ...	Met. Log. 3.3.28 to 14.8.28	29.8.28
Manchester Brigade ...	Stott, C. H. ...	W. S. Eustace, E. E. Bonnaud, W. R. Cullen.	M.L.	"	Form 911 20.7.28 to 31.8.28	8.9.28
Manchester Corporation ...	Makin, T. ...	...	No. A.	"	Met. Log. 6.9.27 to 18.2.28	23.2.28
Manchester Hero ...	Riley, J. E. ...	H. Anderton, J. H. Emmett, A. W. Hanchett.	M.L.	"	Form 911 29.7.28 to 27.8.28	8.9.28
Manchester Producer ...	Struss, F. D. ...	J. W. Moss	No. A.	"	" 4.2.28 to 9.3.28	14.3.28
Manchester Regiment ...	Foale, J. R. ...	P. D. Barr	" A.	"	" 18.6.28 to 9.8.28	23.8.28
Manipur ...	Cochran, G. N. ...	R. Penston, G. B. Falconer	No. M.	Brocklebank ...	Met. Log. 17.6.28 to 20.7.28	9.8.28
Manistee ...	Edwards, A. E. ...	J. D. Patterson, A. Sandham, W. E. A. Duff.	M.L.	Elders & Fyffes ...	Form 911 29.4.28 to 13.7.28	21.8.28
Manora ...	Hudson, H. T., R.D., Commr. R.N.R.	W. H. Cruse	No. M.	British India ...	" 5.8.28 to 26.9.28	6.10.28
Mantua ...	Davis, H. C., D.S.C., Commr. R.N.R.	...	" M.	P. & O. ...	Met. Log. 3.2.28 to 2.6.28	5.10.28
Marella ...	Mortimer, S. ...	A. G. Hill, C. Edmonds, A. G. Thomas.	M.L.	Burns Philp ...	" 27.3.28 to 30.6.28	6.7.28
Marengo ...	Curle, J. ...	H. Bryan, J. Ford, F. Barnard, S. Butcher.	"	Ellerman Wilson ...	Form 911 3.5.28 to 19.5.28	9.6.28
Maresfield ...	Berry, V. ...	T. Connolly	No. A.	Woods, Tyler & Brown	Met. Log. 15.7.28 to 5.10.28	12.10.28
Margha ...	Hughes, C. G. ...	P. Wright, B. Ludgate	M.L.	British India ...	Form 911 1.9.28 to 19.9.28	24.9.28
Marquesa ...	Smiles, R. S. ...	L. Owen	No. M.	Furness Houlder ...	Form 911 5.7.28 to 24.7.28	18.9.28
Marsina ...	Williams, G. E. ...	J. C. Reid	No. A.	Burns' Philp & Co. ...	" 11.8.28 to 7.10.28	15.10.28
Matakana ...	Thurston, H. P. ...	J. J. Finn, J. Dickson, C. E. Mavor.	M.L.	Shaw, Savill & Albion	Met. Log. 6.8.28 to 26.8.28	29.8.28
Mataram ...	Vay, W. ...	R. M. Blunt	No. A.	Burns, Philp & Co. ...	Form 911 21.7.28 to 7.9.28	15.10.28
Mataroa ...	Kershaw, W. A. R. ...	...	M.L.	"	" 5.9.28 to 24.9.28	5.10.28
Matheran ...	Ison, W. A. ...	J. Richardson	No. M.	Brocklebank ...	Form 911 20.12.27 to 12.2.28	20.2.28
Matiana ...	Green, F. V. ...	J. R. Precious	" M.	British India ...	" 22.8.28 to 29.9.28	13.10.28
Matra ...	Cornish, N. P. ...	W. Gibson, Hodgson, G. G. ...	" M.	Brocklebank ...	" 28.4.28 to 7.7.28	23.7.28
Maunganui ...	Toten, A. T. ...	C. R. Carlyon, A. J. Herbert	" M.	Union S.S. Co. of N.Z.	Form 911 16.9.28 to 1.10.28	5.10.28
32 Mauretania ...	Aldwell, B. M. ...	...			
	McNeil, S.G.S., R.D., Capt. R.N.R.	R. H. C. Crawford, C. B. Osborne B. J. P. Tuck.	W.T.	Cunard ...	Form 911 16.7.28 to 2.8.28	13.8.28
Megantic ...	Kearney, J. ...	F. E. Patchett	No. A.	White Star ...	W.T. Reg. 9.9.28 to 27.9.28	1.10.28
22 Melita ...	Stewart, A. ...	J. Shearer, T. Gillette	W.T.	Canadian Pacific ...	Form 911 28.8.28 to 7.9.28	17.9.28
Memnon ...	Watson, C. J. ...	J. A. C. McGregor	No. A.	A. Holt ...	W.T. Reg. 1.9.28 to 19.9.28	24.9.28
21 Metagama ...	McQueen, D. S. ...	A. Watt, J. Harrison	W.T.	Canadian Pacific ...	Form 911 5.7.28 to 24.7.28	18.9.28
Middlesex ...	Wilde, H. ...	D. J. Murray	No. M.	Federal ...	" 11.8.28 to 7.10.28	15.10.28
Minna ...	Mackenzie, G. G. ...	A. M. Campbell	" A.	Scottish Fishery Brd.	" 6.8.28 to 26.8.28	29.8.28
Minnesota ...	Finch, E., R. D., Commr. R.N.R.	...	" M.	Atlantic Transport ...	" 9.9.28 to 29.9.28	3.10.28
Minnetonka ...	Gates, T. F., C.B.E. ...	H. E. McCartney	" M.	"	" 30.7.28 to 18.8.28	23.8.28
Minnewaska ...	Claret, F. H., C.B.E., Commr. R.N.R.	...	" M.	"	" 13.2.28 to 18.3.28	10.4.28
Mirror, C.S. ...	Jones, T., M.B.E. ...	J. G. West	" M.	Eastern Tel. Co. ...	Form 911 18.9.28 to 30.9.28	13.10.28
Mississippi ...	Wylie, J. T. J. ...	W. M. Shoesmith	No. A.	Atlantic Transport ...	" 10.6.28 to 28.8.28	18.9.28
Modasa ...	Gilchrist, J. W. ...	A. E. Baker, E. Crozier	" M.	British India ...	" 23.7.28 to 4.10.28	11.10.28
Moeraki ...	Day, P. H. ...	...	No.	Union S.S. Co. of N.Z.	Form 911 8.8.28 to 17.9.28	24.9.28
Moldavia ...	Stringer, R.H., O.B.E., R.D., Commr. R.N.R.	C. B. Holmes	No. M.	P. & O. ...	"	
Mongolia ...	Furlong, G. H. S., R.D., Capt. R.N.R.	A. H. Cole	" M.	"	"	

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 19.10.28.	Date Received.
24 <i>Montcalm</i> ...	Landy, E. ...	F. H. Steel, M. Williams, L. Thornton.	W.T.	Canadian Pacific ...	W.T. Reg. 16.9.28 to 4.10.28 ...	10.10.28
25 <i>Montclare</i> ...	Griffiths, J. N. ...	A. Mansey, F. E. Bevis, C. Draper.	"	" " ...	" 2.9.28 to 20.9.28 ...	25.9.28
<i>Montoro</i> ...	Williams, D. J. ...	J. Campbell ...	M.L.	Burns, Philp & Co. ...	Form 911 31.1.28 to 6.3.28 ...	10.4.28
26 <i>Montrose</i> ...	Nottley, A. H., R.D., Commr. R.N.R.	J. A. Coldwell ...	W.T.	Canadian Pacific ...	W.T. Reg. 21.7.28 to 4.9.28 ...	7.9.28
20 <i>Montroyal</i> ...	Freer, A., R.D., Capt., R.N.R.	A. Mackie ...	"	" " ...	" 6.9.28 to 21.9.28 ...	24.9.28
<i>Moresby</i> ...	Henderson, D. A., Commr. R.N.	S. F. Bolton, G. A. Gould ...	M.L.	His Majesty's Australian Ship.	Met. Log. 17.4.28 to 14.8.28 ...	12.10.28
<i>Morvada</i> ...	Mills, T. L., O.B.E., R.D., Commr. R.N.R.	H. J. O'Donohoe ...	No. M.	British India ...	Form 911 23.5.28 to 18.6.28 ...	21.6.28
<i>Mulbera</i> ...	Caffyn, F. ...	J. Rose ...	" M.	" ...	" 12.6.28 to 16.7.28 ...	28.7.28
<i>Nagara</i> ...	Miles, F. R., R.D., Capt. R.N.R.	G. Elliott ...	" M.	R.M.S.P. Co. ...	" 26.7.28 to 20.9.28 ...	25.9.28
<i>Nagoya</i> ...	Bedwell, L. A. ...	S. Gerrans ...	" M.	P. & O. ...	" 26.5.28 to 19.8.28 ...	23.8.28
<i>Naldera</i> ...	Randell, G. G. ...	C. H. Hand, D. Meikle, M. F. Saute.	M.L.	" ...	Met. Log. 14.7.28 to 3.10.28 ...	9.10.28
<i>Nardana</i> ...	Moth, F. L. ...	S. C. T. Smith, F. G. Sharps, D. J. Pemberton, C. C. Appleby.	No. M.	British India ...	Form 911 3.6.28 to 14.7.28 ...	24.9.28
<i>Narkunda</i> ...	Collyer, R. M. M., R.D., Commr. R.N.R.	M. Boyd ...	" M.	P & O ...	" 17.8.28 to 5.9.28 ..	15.10.28
<i>Nellore</i> ...	Hignett, A. B., R.D., Lt.-Commr. R.N.R.	A. J. Brown ...	" M.	P. & O. ...	" 25.5.28 to 14.6.28 ...	12.7.28
<i>Nerbudda</i> ...	Williams, B. N. ...	W. R. Cox, G. A. Farley, S. Henderson.	" M.	British India ...	" 10.7.28 to 18.9.28 ...	15.10.28
<i>Nestor</i> ...	Houghton, G. K. ...	A. Caird, N. Anderson, R. T. Dryden.	M.L.	A. Holt ...	Met. Log. 8.1.28 to 13.5.28 ...	24.5.28
<i>Newby Hall</i> ...	Storey, J. K.	"	Ellerman ...	" 13.10.27 to 21.3.28...	20.6.28
<i>Newfoundland</i> ...	Zeal, R. C. ...	R. F. Handley, E. Sainty, E. B. Burke, D. Hetherington.	"	Furness Withy ...	" 28.2.28 to 23.7.28 ...	28.7.28
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<i>Tetrestias</i> ...	Wilkinson, W. H. ...	R. Blakey ...	" A.	A. Holt & Co. ...	" 22.7.28 to 19.8.28 ...	17.9.28
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CHARLES A. BEAMAN, M.A., F.R.S.E.

Author of 'The History of the British Empire'

and 'The History of the United States'

London: George G. Harrington & Co., Ltd.

1917

Printed and Published by George G. Harrington & Co., Ltd.

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and 10, South Molton Street, London, W. 1

and 10, South Molton Street, London, W. 1