The Marine Observer

The Review of the Marine Division of the Meteorological Office, in co-operation with Voluntary Marine Observers

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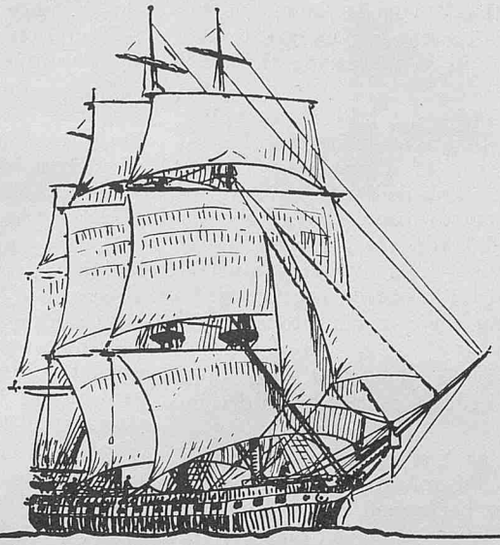

VOL. X. No. 109. THE MARINE OBSERVER. JANUARY 1933.

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THE MARINE OBSERVER, 1933.

THE best of good wishes for 1933 to Marine Observers. We start the new year with this first quarterly number of our journal by freshening the nip.

Through quarterly, instead of monthly publication, we intend to effect a true economy. That is, some reduction in money cost to the exchequer, some better use of time in the Marine Division, and we hope increased interest to our readers, thereby giving greater encouragement to voluntary work at sea and so increasing the value of the work to the nation.

Let us take heart! The depression of trade, laid up shipping, and the distress amongst seamen, if history repeats itself—which it generally does—must be followed by a period of prosperity. The history of the British Merchant Navy is crowded with evidence of this. 1932 has been a year which is likely to prove a great one for the future of British Empire and world trade. It has been a year during which, by reorganization, national economy, and Imperial Agreement, the foundation has been laid for restoring prosperity.

Shipowners are continually organizing their services to suit the conditions of the time.

As the service of marine meteorology is dependent upon and wrapped up in shipping, it is a natural course that we should trim sail accordingly.

The Convention for Safety of Life at Sea being ratified, and embodied in the Merchant Shipping Act, the voluntary services specified in Article 35 and particularly those performed by the corps of voluntary marine observers have a more defined standing than before.

The main purpose of THE MARINE OBSERVER is to encourage, advise, and guide this work and to give some return to those seamen who do it.

The new quarterly number cover of THE MARINE OBSERVER drawn by a seaman is intended to be both symbolical and historical. HENRY TOYNBEE'S observational work at sea, in which he was aided by his talented wife, was outstanding; and when he came ashore no officer of the merchant navy did more than he in building up knowledge of winds, weather and ocean currents. Therefore the *Hotspur*, his last command, a famous ship always associated with his name, is shown before the rising sun, radiating the "light" through THE MARINE OBSERVER.

The names of those seamen who have been responsible for the supervision of collecting data from the sea, and leading the British corps of voluntary marine observers, are written upon a scroll, so recording that this work of seamen has always been conducted by seamen in the British service.

The crest of the Meteorological Office sets the seal of official authority.

A headpiece for the "Marine Observer's Log" is introduced, it being desired to convey the importance which is attached to good additional remarks, and notes or reports by voluntary contributors.

The captains of all British ships are asked to encourage the writing and illustrating of accurate and really good descriptions of unusual phenomena observed at sea; and when they consider these to be of sufficient interest, to forward them with a view to their being published in these pages.

As in the October, 1932, number, we gave under the heading of "The Marine Observer and the Future of the Work" a detailed description of this new quarterly issue, and the Monthly Supplement, it is necessary to add but little here. The available space for Wireless Weather Signals will only permit of particulars being given of a selection of those weather Bulletins, which like that for the British Isles, are specially designed for the specific purpose of aiding navigation. As far as possible information of wireless weather signals which are of practical utility to all merchant shipping, will be given. Special service ships, and ships where there are so many officers that they are able to devote much time to the decoding and plotting of synoptic messages used by the meteorological services, are referred to the Admiralty List of Wireless Signals which gives complete particulars of all wireless signals. No other wireless weather code than the Ships International Wireless Weather Telegraphy Code, 1929, will be given in THE MARINE OBSERVER.

Complete instructions to British Selected Ships, with the names of wireless stations in all parts of the world detailed to receive or intercept their reports, are given, and will be kept up to date in each number, amended if necessary by interim notice in the Monthly Supplement.

This information is not solely intended for the Captains, observing officers, and W.T. operators of British Selected Ships, but also that the Meteorological Services of the world may all and each have information of the guidance, instructions, and particulars given to the Captains of Selected Ships.

The pamphlet DECODE FOR USE WITH THE INTERNATIONAL CODE FOR WIRELESS WEATHER MESSAGE FROM SHIPS, M.O.329, published by His Majesty's Stationery Office, which has been put on board the majority of British Ships by their owners, gives the Merchant Navy in general, information of the Selected Ship service so that it may effectively be used to aid navigation.

In this year's numbers of THE MARINE OBSERVER the current charts for that part of the Southern Indian Ocean, which have not yet appeared in THE MARINE OBSERVER are being published. Anyone who is in the possession of information which will throw light upon the currents of this region, who has not already done so, is asked to forward the information as soon as possible, in order that it may be used in the investigation which is being carried out with the construction of the charts.

We shall commence the computation of current data for charting the Red Sea early in the summer of 1933, and the charts for that region will be published in the 1934 numbers of THE MARINE OBSERVER.

In the Red Sea and Gulf of Aden Pilot it is stated that strong currents occasionally set across the Red Sea, and that these cross currents often occur without apparent cause; further, the Pilot states that excessive refraction is frequent in the Red Sea, which may introduce errors of longitude and latitude in the results of observations.

Those of us who have navigated the Red Sea continuously for years know only too well how unreliable may be positions obtained by running fixes by position lines from solar observations, due to excessive refraction. Indeed it is highly probable that many so called cross currents in the Red Sea never occurred. As long ago as January, 1899, Captain W. H. HOOD, pointed out in the "Nautical Magazine" that many of the alleged cross currents in the Red Sea were really errors in observed position. He produced proof of the faultiness of solar sights for longitude due to refraction in the Red Sea, and that the currents his ship experienced were not cross currents, but more or less oblique to the course up and down the Red Sea.

To do this, for the purpose of ascertaining the set and drift, he ignored all fixes except the first and the last of his run through the Red Sea, thus obtaining the average set and drift over the length of the Red Sea.

The current charts of the Red Sea constructed under the supervision of Lieutenant C. W. BAILLIE, R.N., and published by the Meteorological Office in 1895, indicate that on many occasions, ships logged sets athwart the course up and down the Red Sea.

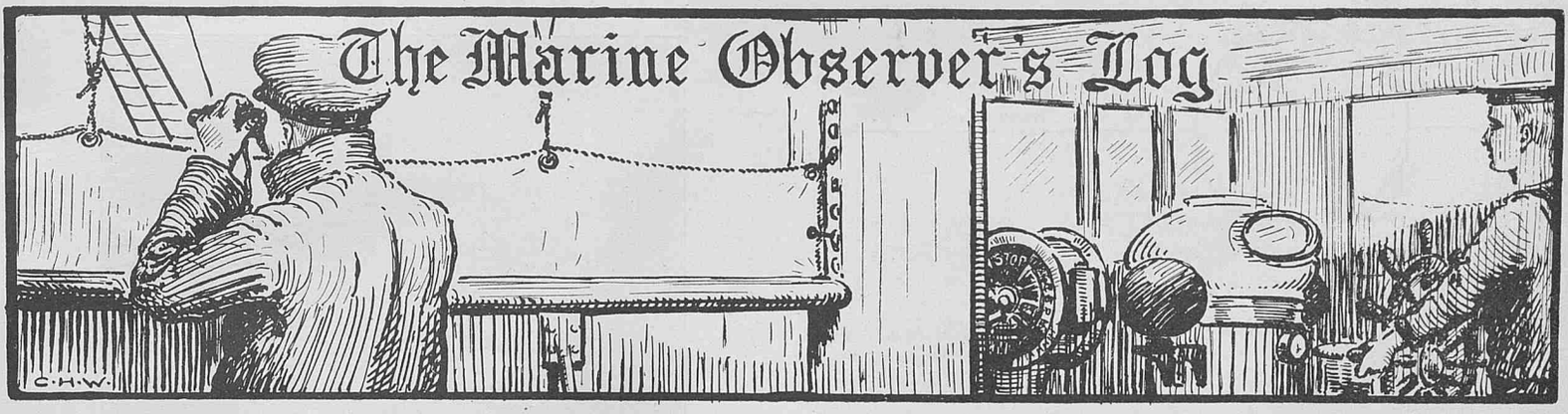
In view of this and of similar reports since the publication of this Atlas, to the known shortcomings of the method of current observation in all parts of the world, and to the fact that a ship's position may be fixed more accurately by simultaneous or nearly simultaneous altitudes of three or four stars on suitable bearings than by observations of the sun, we have consistently urged the use of stellar sights in current observation.

During 1933 the commanders of observing ships using the Red Sea are asked to make every endeavour to ascertain the true set and drift of current.

It cannot be too strongly impressed upon navigators in all parts of the world that generally the best periods for ascertaining the set and drift of current experienced by a ship away from the land are those between dawn and sunset twilight, and between sunset and dawn twilight, at both of which times the best astronomical fixes may be obtained.

MARINE SUPERINTENDENT.

London,
October 18th, 1932.



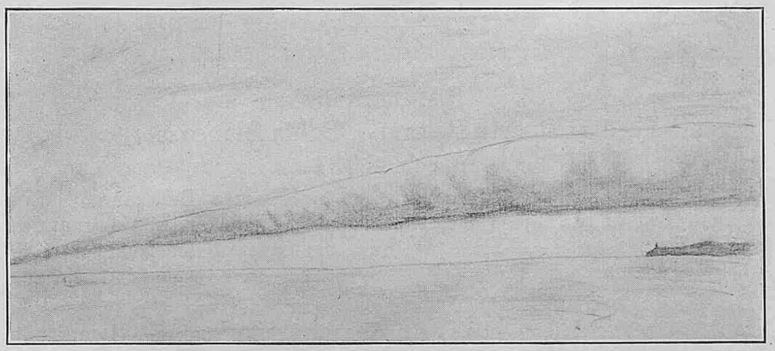
January, February and March.

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

LINE SQUALL CLOUD.

East Coast of Australia.

THE following is an extract from the Meteorological Record of S.S. *Baradine*, Captain H. ELLIOTT SMITH, Brisbane to Sydney. Observer, Mr. G. L. FARNFIELD, 4th Officer.



January 7th, 1932, at 0509 G.M.T., a very well-defined line squall (cloud) was observed as illustrated in the accompanying sketch. A notable feature was a smooth undulating slope of the upper part of the cloud roll. From the northward, whilst the sun was shining on it, the resemblance to a chain of snow-covered hills was most striking. From the southward with the sun behind it, the appearance was that of ordinary Cumulo-Nimbus. A point of interest was the formation of a number of small water-spouts under it, but these were confined to a rotary disturbance of the sea surface and did not develop.

No large changes in the pressure occurred, and owing to a ground swell the barometer was pumping slightly so no small fluctuations could be observed.

About two miles away on the starboard quarter there was another steamer, the smoke from whose funnel was trailing astern until the squall (cloud) passed over her, when it was drawn vertically upwards.

Whilst this phenomenon was passing over us there was a heavy thunderstorm over the land, and shortly afterwards there was lightning accompanied by rain over the sea.

The general direction of the wind was N. by E. force 2, but while the ship was underneath the cloud roll fitful gusts were felt from every point of the compass. The surface of the sea was much disturbed by short cross seas caused by these gusts.

Position of ship off Tacking Point (Latitude 31° 28′ S., Longitude 152° 57′ E.).

LINE SQUALL.

Durban, South Africa.

THE following report and photographs have been received from S.S. *Clan Keith*, Captain J. WATERHOUSE. Observer, Mr. A. H. BLACK, 3rd Officer.

January 15th, 1932, S.S. *Clan Keith* was lying alongside the Point Wharf at Durban.

At 1430 (Zone 2) large masses of extremely well-defined Mammato-Cumulus clouds were observed moving rapidly across the sky from the N.W. Wind E.N.E. 2. Mercurial barometer 1017.3 mb. Air 91° F. At 1510 the sky overhead was completely cloudless, but to northward a bank of Nimbus cloud could be seen apparently stationary. At 1530 a long heavy-looking bank of cloud appeared over the hills stretching from horizon to horizon in a W.S.W.-E.N.E. direction and travelling rapidly to the S.E. (See Photograph No. 1.)

At 1540 the squall rapidly approached, and it was seen to be progressing in a most remarkable fashion, appearing to be rolling along in a contrary manner to its line of progression. (See Sketch.)

The vertical movement of the fore side of the cloud was very rapid and small wisps of cloud were constantly becoming detached from the main body, only to be as quickly engulfed in the larger mass, as can be seen in Photo 2. The ring of cloud shown therein was engulfed almost immediately after the photo was taken. At this time the barometer was 1015.4 mb., thermometer 90° F. The wind had fallen to a flat calm, in the vicinity of the steamer, but light catspaws of wind could be seen ruffling the surface of the water to the northward, caused by the oncoming N.W.'ly wind.

At 1548 the line squall was immediately overhead, and the wind seemed to start to blow without any preliminary puffs, with an intensity of force 8, direction N.W. Barometer 1015.3 mb., thermometer 86° F. There seemed to be a decided uplift to the wind, as dust, pieces of paper and other small objects were blown upwards in a very marked fashion, steamer's tarpaulins also bellied upwards. This phenomenon may be accounted for by the fact that the sheds on the wharf alongside which *Clan Keith* was lying, were considerably higher than our main deck. No rain fell during the passing of the squall which lasted about five minutes. Photo 3 shows the sky immediately overhead after the squall had passed. Fracto-Cumulus in large quantities was whirling and eddying in a most disturbed manner.

At 1600 the wind had eased to force 5 and at 1615 it dropped abruptly to force 2, maintaining its N.W.'ly direction. Barometer 1015 mb., thermometer 83° F.

At 1730 a very severe thunderstorm accompanied by torrential rain and occasional hail, swept the harbour, continuing to 1850.

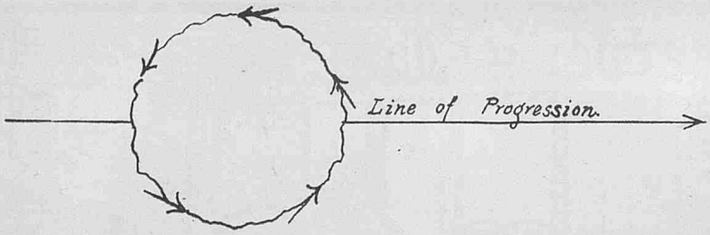
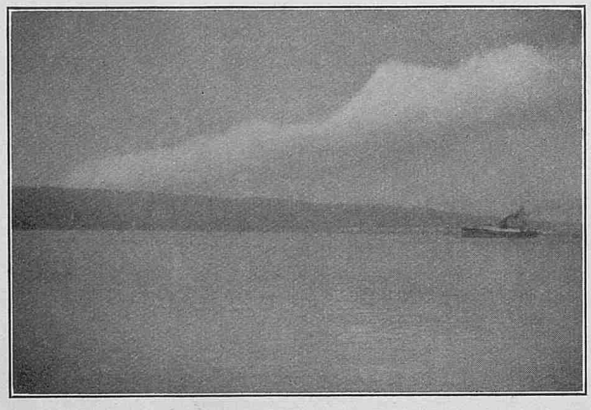
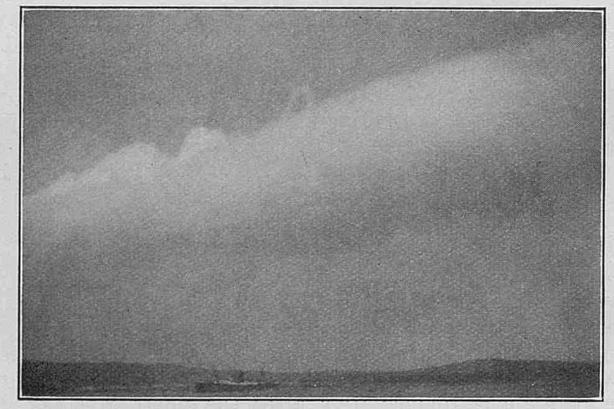


Diagram showing cross section of Line Squall, on 15th Jan. 1932.

Sketch

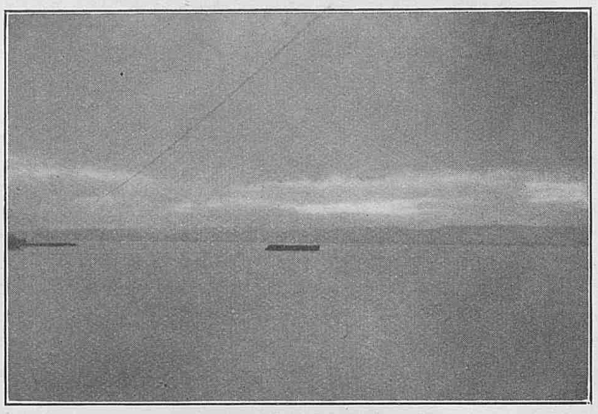


Photograph No. 1.



Photograph No. 2.

Photograph No. 3.



Photograph No. 4.

The forked lightning was fierce, the thunder crashes were deafening; a hot blast of air, likened by the local press to the air from a prairie fire, preceded the thunderstorm. Air temperature at Pinewood was 106° in shade during the afternoon. Motorists approaching Durban had their radiators dried out. Many cattle were killed by lightning, and their attendants had arms torn off and one man's head severed during the storm.

At 1850 the sky cleared rapidly. At 2000 the weather conditions were barometer 1017 mb., thermometer 78° F. Wind N.W. force 2, Weather b.

Photo No. 4 shows the sunset and was taken at 1906 after the storm. It will be seen by the foregoing that whereas the temperature fell 6° F. during the passage of the squall, which was to be expected in a disturbance of this kind, pressure fell 2 mb. which is unusual.

PAMPERO
Experienced at Puerto Belgrano, Bahia Blanca, Argentine. March, 1931.

THE following account of a pampero at Puerto Belgrano, Bahia Blanca, Argentine, has been received from Lieutenant-Commander H. B. F. MOORHEAD, R.N., late Meteorological Officer of H.M.S. *Eagle*. All times are Zone + 3.

On March 5th, 1931, H.M.S. *Eagle* was visiting the Argentine Naval Base at Puerto Belgrano, Latitude 39° 55′ S., Longitude 62° 06′ W. During the previous week the weather at Puerto Belgrano had been settled, although one or two heavy thunderstorms formed inland and moved out to sea between 1600 and 1800 hours. Warning of their approach was given by mid-day when Cumulo-Nimbus cloud was very noticeable inland.

On the day in question there was a light westerly wind at the surface; a pilot balloon ascent at 1100 hours showed that the wind changed to a 15 knot North Westerly wind at 1000 feet, freshening to 30 knots from N.W. at 8000 feet. Up to 1800 hours the sky remained cloudless, but shortly afterwards Cumulo-Nimbus cloud was discernible inland; this gradually increased. At 1900 hours the surface wind veered to East, force 3, and the barometer, which had been falling from noon, now steadied; the temperature fell from 97° F. to 89° F. (See Fig.) At 2020 hours the wind suddenly backed to West and freshened from 5 to 37 knots, the barometer rose 2 mb. in half an hour and the temperature fell 19° F. in a few minutes. The above phenomena were accompanied by heavy rain, thunder and extremely vivid lightning. (See Photo.) Forty minutes later (2100 hours) the barometer steadied and then commenced falling rapidly, 3.0 mb. in 15 minutes, the temperature rose 4° to 6° F. and the wind, which had started veering from West, steadied from the North and reached force 12. (Note.—The velocity recorder scale was not graduated above 61 knots but the recorded speed of the wind seems to have reached about 80 knots for a few minutes.)

The wind speed soon decreased to between 25 and 35 knots but remained very squally throughout the night, steadying up a little

THERMOGRAM FROM H.M.S. EAGLE, AT BAHIA BLANCA. 4th–6th March 1931.

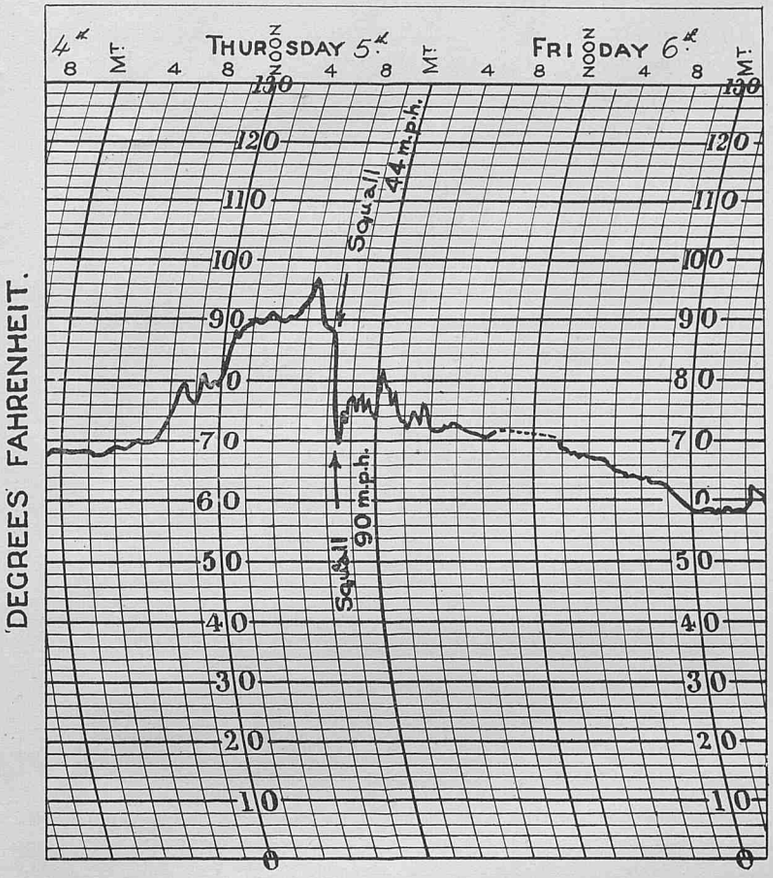


Figure.

at 0400 hours. It continued to blow fairly hard from East for the next two days and gradually veered round to S.S.W. The passage of this storm seemed definitely to mark the end of summer conditions for the year, the subsequent weather being much colder.

DUSTFALL.

West Coast of Africa.

THE following is an extract from the Meteorological Log of S.S. *Denis*, Captain W. GRIFFITHS, Para to Lisbon. Observer, Mr. A. W. HANCHETT.

January 6th, 1932, shortly after 4 p.m. a fine deposit of dust became noticeable on the more exposed surfaces of the bridge, etc.

By the following morning it was much more pronounced, and on examination proved to be of an extremely fine composition and reddish-brown colour.

The deposit is assumed to have taken place between Latitude 13° 50′ N., Longitude 34° 45′ W. and Latitude 16° 18′ N., Longitude 32° 32′ W. during which time the following weather was logged.

Wind East, force 5, rough sea and heavy E.N.E. Swell. Temperature—Air 75°, Sea 76°—Predominating cloud Stratus and Strato-Cumulus with occasional Cirro-Stratus. Visibility moderate throughout.

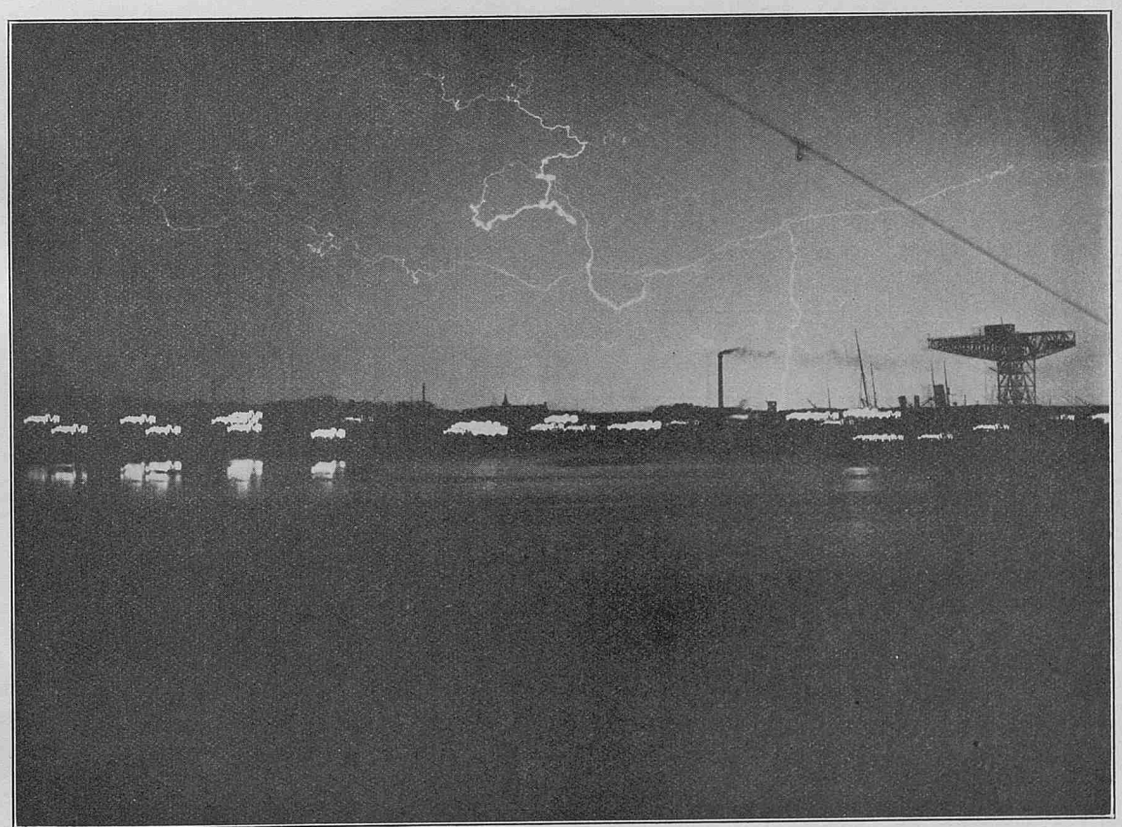
As this dust is believed to be carried on upper air currents, "from the South," it is noteworthy that at the time of observation the nearest points of land were Cape Verde, Africa, roughly East 900 miles and Mocuripe Point, Brazil—S.S.W. 1200 miles.

CLOUD PHOTOGRAPH.

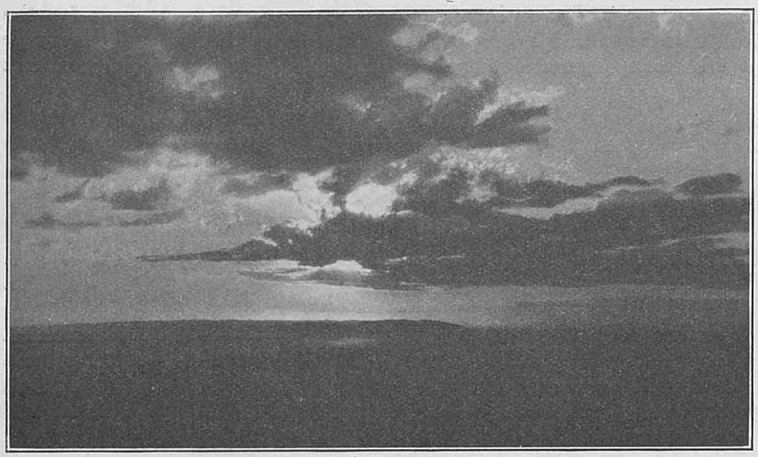
West Indies.

THE accompanying photograph has been received with the Meteorological Record of S.S. *Jamaica Planter*, Captain P. D. ALLEN, at Kingston Harbour, Jamaica. Observer, Mr. G. R. WORTLEY, 4th Officer.

March, 1932. Strato-Cumulus cloud effect over Kingston Harbour, Jamaica. The photograph was taken in the late afternoon from the



Photograph.

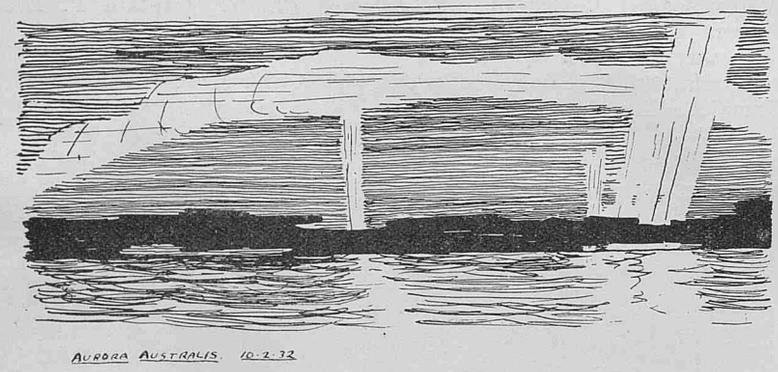


Blue Mountains at an altitude of about 6,000 feet, and facing a W.S.W'ly direction. In the left foreground ships are seen at anchor off Kingston; in the middle distance can be seen the Palisadoes with Port Royal at the end, while in the background are the Hills of Port Henderson and Portland.

AURORA AUSTRALIS.

South Indian Ocean.

THE following is an extract from the Meteorological Record of S.S. *Zealandic*, Captain H. C. ELFORD, Cape Town to Auckland, N.Z. Observer, Mr. J. W. THOMPSON.



February 10th, 1932. About two bells in first watch (1526 G.M.T.) approximate position Latitude 47° 41′ S., Longitude 90° 50′ E.; observed the sky immediately above some dark Stratus cloud on horizon, become illuminated with diffused auroral light. Three minutes later the whole South-East quadrant of the sky, i.e. between 090° and 180°, presented a very interesting appearance.

An elliptical arc formed, the lower end of which extended to the horizon due East and South respectively. The maximum altitude of the concave edge of the arc was found to be 31° and bore S. 50° E. true.

It was followed by shafts of light radiating fanwise from a common centre directly under the highest part of the arc.

Soon a progressive change took place. The fan closed up and the shafts shone above the arc like searchlights and then commenced to travel towards the meridian, all except one which remained stationary.

Twenty minutes after the first appearance, the shafts of light merged with the arc and became part of it. Later the arc itself broke up into patches of isolated shapes which continued to illuminate the sky until the end of the watch.

The sky was cloudless with the exception of some Stratus along Southern horizon and the moon had set before the auroral display commenced.

February 12th, 1932. Since the time of the above phenomenon the magnetic character of the vessel seems to have undergone a change and compasses appreciably affected. Deviation increasing from 3° E. to 9½° E.

I cannot account for any other cause to have effected the change as the compasses of this vessel have at all times been kept under close observation.

MIRAGE.

South African Waters.

THE following is an extract from the Meteorological Record of S.S. *Llanstephan Castle*, Captain C. N. BICKFORD, London to Cape Town. Observer, Mr. H. CLOSE, 4th Officer.

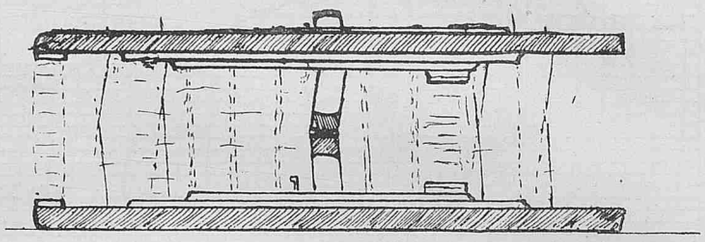


Figure 1.

February 9th, 1932. Between Dassen Island and Robben Island, excessive refraction was experienced.

S.S. *Ceramic* bound Cape Town, was observed, considerably distorted, approximately 4 miles inshore. At 1520 G.M.T. a refracted image was observed, inverted above the actual ship. Subsequently a second refracted image appeared above the first. FIGURE 1. The true and refracted images coalesced and separated at intervals.

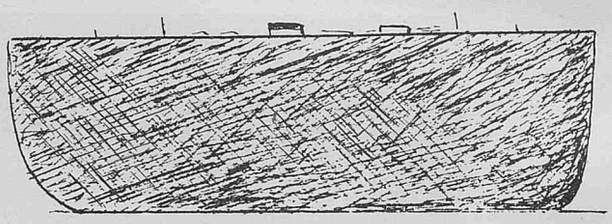


Figure 2.

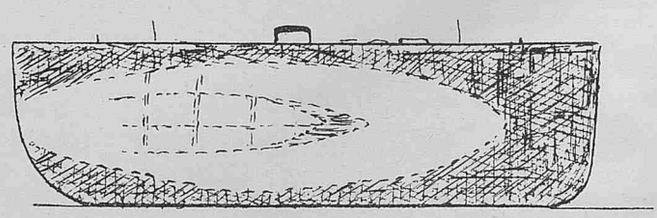


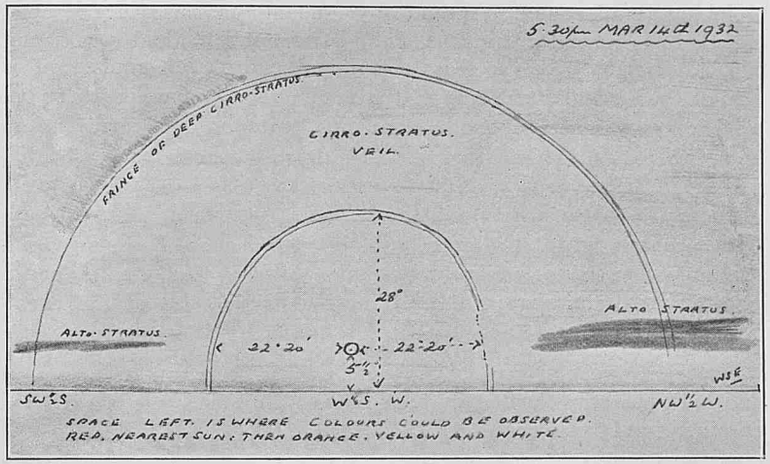
Figure 3.

Ultimately the effect of refraction caused the appearance as shown in FIGURE 2, the wedge in the sketch having a fore and aft continual movement. When off Robben Island, *Ceramic* appeared as in FIGURE 3 and remained like this for some considerable time. There was no apparent distortion of the land, but in the vicinity of Robben Island detached patches of shimmering haze were observed—the sea in the immediate neighbourhood having all the appearance of a waterfall. 1708 G.M.T. Passed Robben Island—all refraction ceased. At 1520 G.M.T. air temperature 68°, sea temperature 63°. At 1728 G.M.T. Arrival Table Bay—air temperature 82° F.

SOLAR HALO.

North Pacific Ocean.

THE following is an extract from the Meteorological Record of S.S. *Planter*, Captain J. T. LING, San Pedro to London, via Panama. Observer, Mr. W. S. EUSTANCE, 3rd Officer.



March 14th, 1932, 5.20 p.m. A.T.S. (2330 G.M.T.) observed solar halo radius 22° 20′ from sun whose altitude was 5½°. The brightest segment of the arc, which was to the northward of sun, about 5° only was level with the sun's lower limb and showed the colours red, orange, yellow, and white, the remainder of the halo being white in colour and not so distinct to southward of sun.

A peculiar feature of this phenomenon was that the vertex of the halo was not directly over the sun but 7° to the right thus giving the halo a slight elliptical effect.

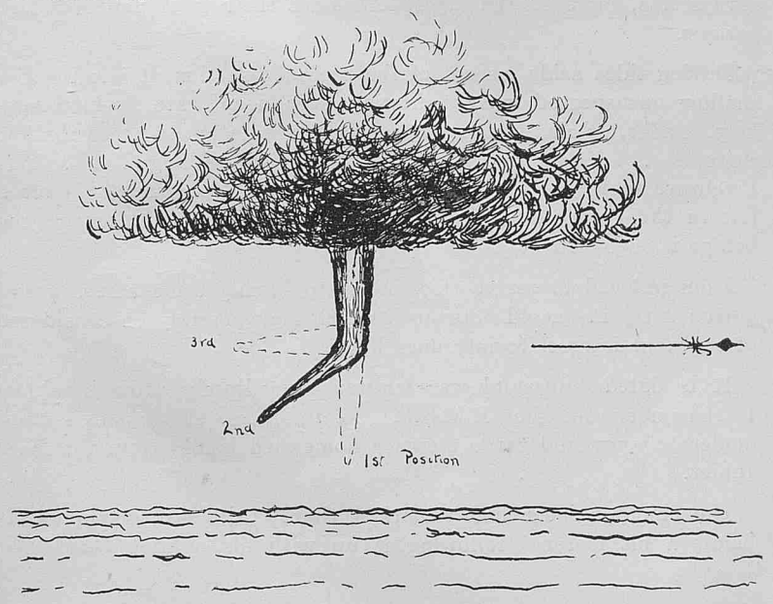
Another halo could be faintly observed at a radius of 45° from the sun forming part of a perfect circle. Coloured white, it was distinct to the northward but could only be faintly seen to the southward, but here its edge was clearly defined by a regular arc of apparently thicker Cirro-Stratus clouds. Cloud, Cirro-Stratus veil over sky with patches of Alto-Stratus and Cirro-Cumulus. During the night the wind moderated, Alto-Cumulus clouds moving quickly from E.S.E. and vivid lightning to S.E. by S.

Position of ship Latitude 8° 20′ N., Longitude 84° 32′ W.

WATERSPOUT.

Mozambique Channel.

THE following is an extract from the Meteorological Log of M.V. *Fresno City*, Captain D. DAVIES, New Orleans to Bombay, via Cape of Good Hope. Observer, Mr. B. E. DUFFIELD, Chief Officer.



March 29th, 1932, 5 p.m., observed waterspout descending from base of heavy mass of Cumulo-Nimbus. Base of Cumulo-Nimbus, approximately 20°. On leaving cloud the waterspout travelled downward in a straight line to about 5° off horizon then suddenly bent in centre and bottom half gradually swung into a horizontal position and the whole body slowly lifted up, being finally lost in heavy downfall of rain.

Light S.E. wind and heavy masses of Cumulo-Nimbus all around the horizon. Barometer 29.93 in. Air 80° F.

Position of Ship, Latitude 17° 40′ S., Longitude 41° 00′ E.

DISCOLOURED WATER.

Queensland Coast.

THE following report with a sample of sea water has been received from S.S. *Largs Bay*, Captain W. M. JERMYN. Observer, Mr. T. B. MARSDEN.

March 2nd, 1932, 11.35 a.m., vessel passed through a quantity of discoloured water about six or seven acres in extent. The particles in the water were so thick that it had every appearance of mud.

Position of ship, South Solitary Light House bearing N.78° W., distance 8½ miles.

The sample has been examined by Mr. F. S. RUSSELL of the Marine Biological Association who was a member of the Great Barrier Reef Expedition in 1929 who remarks:—

The beast in question is a plant; a blue-green alga, *Trichodesmium*; very common in tropical seas. When alive it has a red pigment which dissolves out on death, leaving only the green colouring matter. It is very buoyant—floats on the surface in calm weather to form a reddish brown scum.

Three years ago I was myself on the Queensland Coast on the Great Barrier Reef Expedition and we met with this Trichodesmium in large quantities at certain times of the year. We have records of its occurrence and shall probably publish them in the Reports of the Expedition. At times on the Queensland Coast it is washed up on the beach and creates quite a nuisance with the smell of its decay. When alive it gives the sea a characteristic rather hay-like smell.

CURRENTS OF THE PERSIAN GULF.

THE following is an extract from the Meteorological Record of S.S. *British Dominion*, Captain R. J. TAYLOR.

Referring to your March number, Vol. 9, No. 99 of 1932. I note you state that little is known about the currents in the Northern part of the Persian Gulf. From my own experience of a number of years in this trade I may say that from the Southern extremes, off the Quoins, it is mostly tidal somewhat more or less influenced by the prevailing wind. Cross sets both North and South are experienced, according to state of tide, between Jebel Tunb Island and Sheikh Shuaib. From the latter island to within 15 miles from head of the Gulf, the course set is generally made pretty good, but slightly influenced by wind, and caution is necessary during Shamal season (summer months), when visibility is often poor, in making for the Pilot Vessel.

From information I have received from the Pilots, the flood tide from about 15 miles south of the "Bar", or in the vicinity of the Light Ship, makes from the Eastward two hours after low water and runs from that direction until two hours after High Water, and then makes from the Westward. Tide can be taken out from Admiralty Tide Tables for Shatt al Arab Bar. At Hanjam, the entrance to Persian Gulf, it is H.W. full and change at 1103.

OCEAN CURRENT ANOMALIES.

By Captain W. H. Parker, C.B.E., R.D., R.N.R.

So closely linked are the respective sciences of Meteorology and Oceanography that one may be perhaps excused introducing a brief reference in an elementary way to the former, by way of contrasting it with a special branch of the latter: Ocean Currents.

It will be agreed, and more especially so in recent years since we have enjoyed the advantages of "Wireless" and all it signifies, that at sea, a skilled observer has little or no difficulty (if he wishes to) in predicting with considerable accuracy, the direction of wind or state of weather to expect, many hours before it is experienced.

Also, that to any unskilled first voyager, the weather actually prevailing at any particular moment on the spot must be evident because sea and sky, or fog, is visible to the eye and wind can be felt.

But the case of ocean currents is different; with no sights for position, out of sight of land or soundings, Nature is very sparing in manifesting any sign or evidence that will lead the navigator to suspect their existence. Let alone the direction he is being set.

Tide rips in calm weather often lead one to expect something you don't get. Change of colour, or temperature of the water in some instances, may be a sign. The last certainly will cause one to apprehend a current, or the cessation of one and should never be disregarded; though change of temperature cannot unfortunately be relied upon as an infallible sign that the ship is being swept in any particular direction. It may be due to another cause . . . Ice, for example . . . and while admitting that the presence of ice in the locality is accountable to currents originally, it does not necessarily follow that the navigator (in a fast liner for instance) having passed into, or through a zone of colder, or warmer water during the day's run, will detect any marked divergence of course, or speed made over the ground, worth recording, when her astronomical position is fixed in the ordinary way.

Being on the alert, however, for anything at all, the "expert" . . . who ignores nothing . . . will naturally judge and act accordingly.

I have before me (apropos of difference in water temperatures) a note in my journal of an exceptional example of abnormal current which is worth repeating:—

> "R.M.S. *Olympic*, June 9th, 1929, from **NIDK** (ice patrol). Large berg 41° 38′ N. 48° 56′ W. the patrol vessel investigated the above vicinity, and during two days, near 41° 30′ N. 48° 30′ W. found current setting S.E. true at from 2 to 3 knots."

As this, to me, appeared very abnormal I sent the following for confirmation:—

> "To **NIDK.** Regarding speed of current observed S.E. true 2 to 3 knots. Does this mean between 48 and 72 miles per day, or 2 to 3 miles? "
>
> "Reply:—On June 7th, patrol vessel experienced set due to current alone, towards S.E. at rate of 72 miles per day, and on 8th at rate of 48 miles per day, Stop. This near junction of 48 degrees and 64 degrees surface water temperature in vicinity 41° 30′ N. 48° 30′ W. Stop."

We left New York on June 8th, and reached our nearest position to those above, at noon on the 10th 40° 26′ N. 47° 24′ W., when a current was recorded in log, for the previous 23 hours of S. 64° W. 9.3 miles only. And no current was recorded on the 11th, when the position at noon was 44° 27′ N. 37° 04′ W.

Which tends to show (if we need reminding) how localised, ephemeral, and erratic current eddies can be.

Taking it all round, it practically amounts to this: in the open sea there is no natural means, nor instrumental method of gauging at any moment with the least certainty the direction and speed of any of the irregular currents of the ocean we may happen to be in. That these currents abound in various parts of the world for no apparent reason is well known. Sometimes they can be reasonably explained *afterwards*. Others, independent of gales, and drift deducible to them are totally inexplicable, yet which we must suppose, perhaps act in obedience to, or in consequence of, some seasonable or other variation in the complex laws of the greater ocean currents; still unknown to us. Volcanic disturbance of the ocean bed occasionally may, and does in fact, account for some variability.

Hence all we can find out by comparison between astronomical and D.R. positions is what we have actually *had* since the last fix was obtained, and nothing more.

The only other means of ascertaining what to reasonably expect are the Current Charts. Based on the observations and practical experience of many thousands of our predecessors, as well as present day observers, and meticulously checked and resolved in the Meteorological Office before publication. It goes without saying that these charts are of great value, because they exhibit graphically the well-known established streams, the sub-continuous ones, and the eccentricities of ocean circulation, seasonal or otherwise as far as is known, as well as many lesser eddies.

Excellent though these charts are they still leave a good deal to be desired, a fact . . . it is gathered . . . the Meteorological Committee of the Air Ministry and Hydrographic Department of the Admiralty, are fully aware of. There is good reason to believe that in the not too distant future much more data will be implemented and included in the improvement of the atlases of current charts. In the meantime unremitting vigilance, and intelligent conscientious observations, as before, are necessary for years to come, and then . . . !

The great well-known currents, such as the Agulhas, Equatorial, Gulf Stream, Labrador, Humboldt (or Peruvian), to name only a few besides others more local known to exist, are mostly deep ones and behave as they are expected to *fairly regularly*. In any case they can be allowed for in navigation with some confidence, though seldom it must be admitted, with the precise exactitude we would always like, for even the big fellows have their weak and eccentric periods.

Putting tides aside, as out of the present question, it is often the shallow unsuspected current flowing over deep water, which may help, hinder, or alas wreck a ship. It is in relation to these shallow currents . . . on the principal of ignoring nothing . . . that I venture to revive the familiar assertion that "a current is often felt in the engine room" sometimes before the navigator on the bridge is cognisant of it!

I am induced to revive this, owing to having come across a forgotten entry in an old note book which may possibly be considered of sufficient interest to introduce here.

It is dated 1910, and was written immediately after breakfast I remember in the R.M.S.P. *Catalina*, a small single-screw moderately-powered cargo steamer homeward bound from the West Indies.

The chief engineer had remarked that: "she was getting away below a bit faster" following it up with his opinion that "she

ought to make a good run to-day!" This provoked the usual mess-table argument, as to how that could be etc., in which I took little or no part for the reason, *I will quote*:—

"Nearly every engineer that I have been shipmates with has at some time or another during a voyage, made the remark, 'she is getting away a bit faster' or, 'she is going easier' or, 'she must have a current against her, she's grinding hard.'

"I have noticed also that in most cases their remarks were pretty correct, that is to say: we *had* experienced a favourable, or adverse current, as the case may be, though I cannot recollect any of them passing any remark when the current experienced had been a lateral one.

"At first I was inclined to be sceptical as to all that was to be felt by the engines one way or other with reference to the currents of the ocean when well out in open water.

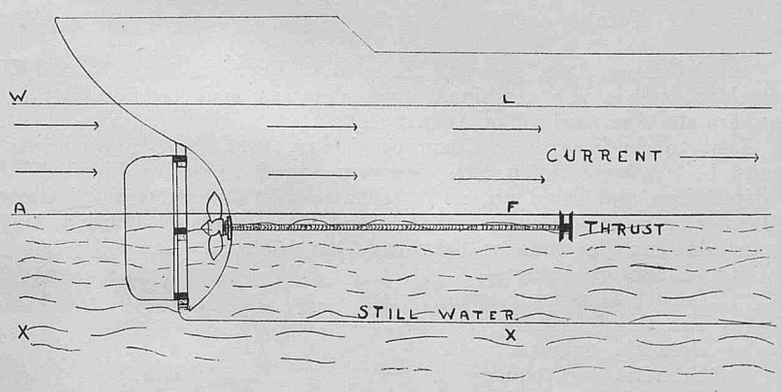
"Constant repetition by successive chiefs of different ships on the same subject in the same strain, has, however, long since convinced me that it is no fancy on their part by any means. It is a fact that often, though not always, the effect of a favourable or adverse current is felt by the engines direct.

"For a long time, at odd moments I have (like many others no doubt) puzzled over it, not being able to see how a ship steaming in a quiet moving body of water should have any different experience to a ship steaming through a stationary one.

"Most engineers eagerly explain that it is 'because the ship being helped along, the strain on the thrust is diminished, and the engines get away faster in consequence!' Overlooking the fact that the ship is being assisted *over the ground, not through the water*. Therefore it is impossible to accept that as a satisfactory explanation.

"The question, how may the engines be affected by currents, can, in my opinion, only be explained on the assumption that: many currents experienced are comparatively superficial, that is to say: merely surface drift extending perhaps from 12 to 20 feet . . . more or less . . . below the surface.

"If we accept this as true, then the explanation becomes simpler. For example, in the figure of a sectional profile of a steamer at about her load line—I reproduce this sketch and argument with due deference to the opinion of others.



"'W L = water line. W A and L F represents a sectional depth of about 12 feet of water moving in the same direction as the ship. A X and F X illustrates a section of still water.'

"The propellor is thus working through two bodies, one moving, the other stationary, which shows that the current W L to A F is not acting so much on the blades of the propellor as on the ship herself, helping her along over the ground and also over and through the lower body of stationary water.

"The diminishing thrust is then caused by the decreased resistance of the lower body on the blades, allowing the engines to revolve faster or 'get away' as it is sometimes called.

"Without taking into consideration, air friction, wind, or sea, which is outside the present argument, it must be obvious that if the propellor was pushing the ship through a mass of water of uniform density and motion, the engines should work normally, without any decrease or increase of thrust.

"If the current contained between W L and A F was in the opposite direction, the effect would be the reverse to that just stated, i.e., the upper body flowing over the lower would increase the resistance of the latter on the lower blades and thus increase the thrust and decrease the revolutions.

"The effect of sail spread to a following breeze would have a parallel effect on the engines, to the favourable current.

"Primarily there are two normal elements to consider; power and resistance, the propellor blades represent the former, the water the latter. In fine weather with a smooth sea, the ship steaming through a huge body of water of uniform condition, the resistance will remain the same, whether that body is moving in the same, or opposite direction, laterally, or remains stationary, and theoretically and practically, no difference should be noticed on the engines. If there is, then the disturbing component must be somewhere between the keel and the truck. But since we know it is not wind, the disturbing factor can only lie between the keel and the water line, such as a surface current assisting or retarding the ship as has been described.

"It might also be mentioned, that in my experience, when a ship is light and the propellor only a little better than half submerged, no effect has been felt on the engines, which tends to accord with the theory that many ocean currents are surface ones.

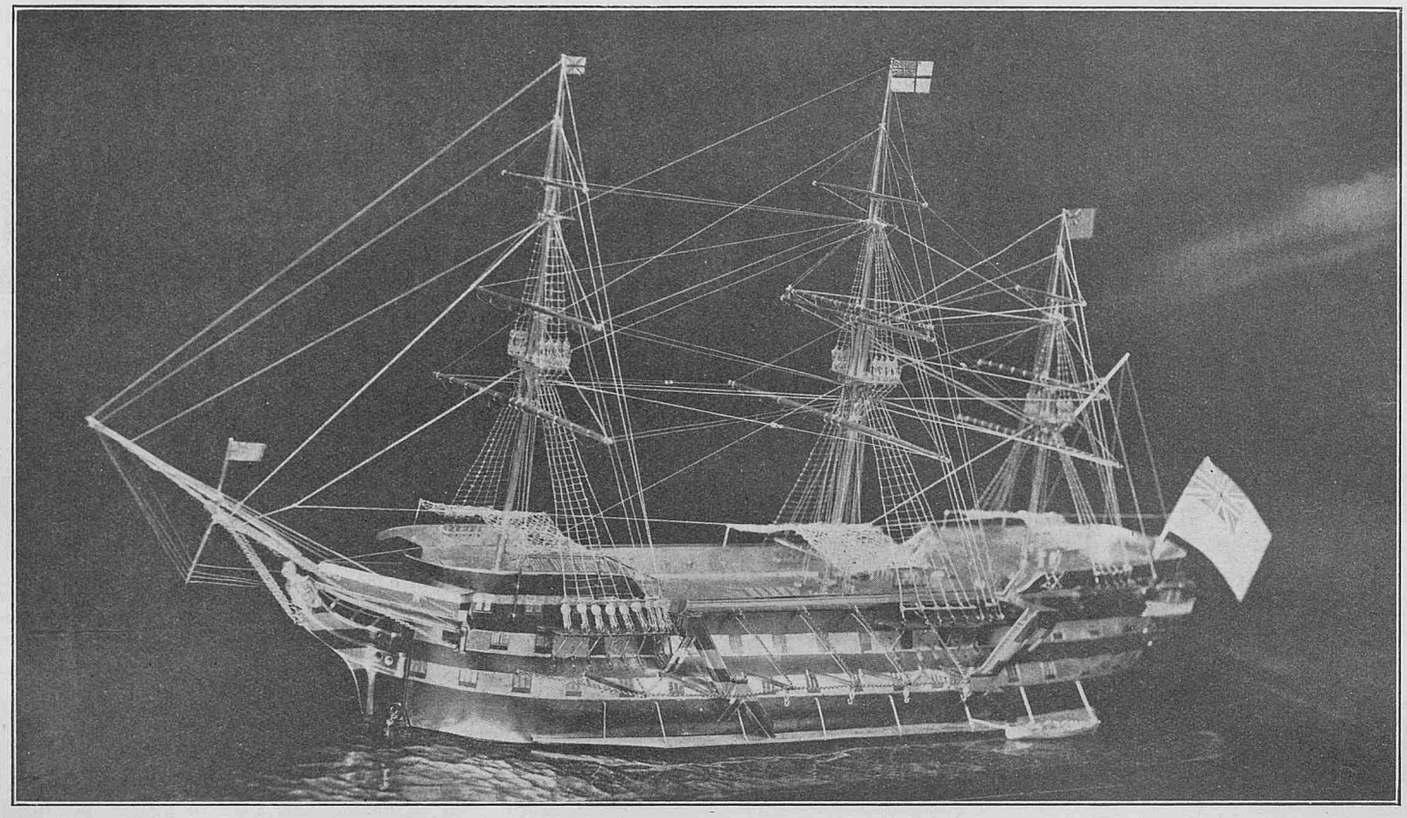
"Again, to revert to temperatures, I have noticed a difference between that at the surface and that obtained in the engine room to vary on occasions as much as five degrees, when a difference in the behaviour of the engines had been felt and a favourable or adverse current had been experienced."

If at first glance, this article may seem extremely rudimentary, I would remind the reader that it is often more beneficial to start, as it were, at the beginning and review a subject in perspective before attempting the solution of its problems. In any case it may evoke from others more talented than the writer, it is hoped, some expression of their views or experience in connection with this interesting subject.

THAMES NAUTICAL TRAINING COLLEGE, H.M.S. "WORCESTER".

Model and some Historical Notes.

We are indebted to Commander G. C. Steele, V.C., Royal Navy (Retired), Captain Superintendent of the *Worcester*, for the following information, and photograph of a silver model of the *Worcester*, formerly *Frederick William*, which was presented by Captain D. Wilson Barker, Captain Superintendent, on behalf of the Committee of the *Worcester* to Her late Majesty, Queen Victoria, at Osborne on August 29th, 1899, in commemoration of Her Diamond Jubilee.



The *Frederick William* was the second ship to be named *Worcester*.

The establishment of a Training Ship in the Thames for Officers of the Mercantile Marine was decided upon in 1861 by several gentlemen who were representatives of the shipping interests of London at that time, and who had much at heart the question of the better general education and the sound technical training of the officers of the Merchant Service. At their request, the Admiralty placed at their disposal, for the carrying out of their scheme a 50-gun frigate, the *Worcester* of those days.

The *Worcester* was 175 feet in length, beam 50 feet and tonnage 1473. She was fitted out to meet the requirements of a school afloat, and in August, 1862, was moored off Blackwall and formally opened to cadets. Later the ship was removed to Erith, and in 1869 was moved down to Southend off the end of the Pier. In 1871 she was towed to Greenhithe, Kent, and moored off Ingress Abbey.

From the first the venture prospered, and before long the *Worcester* was found to be too small to accommodate all comers. In the early seventies, therefore, the Admiralty were induced to substitute for her the *Frederick William*, a second rate screw battleship of 4,725 tons displacement. This ship was laid down at Portsmouth in September 1833 and christened *Royal Sovereign*, but the name was changed to *Royal Frederick* in April, 1839, and to *Frederick William* in January, 1860.

She was launched on March 24th, 1860.

Commissioned July 1st, 1864, and manned with crew of *Colossus*:—

Captain Edward Codd, January 1st, 1864.
Lieutenant Thomas W. Oliver, March 8th, 1864.
Lieutenant Arthur J. Day, December, 18th, 1862.
Lieutenant Geo. S. Graves, May 3rd, 1862.
Staff Comm. John Scott, August 8th, 1863.
1st Lieut.-Mar. George Johnston, December 30th, 1862.
Chaplain Rev. William Holman, January 7th, 1864.
Staff Surgeon Archibald J. Little, February 2nd, 1863.
Paymaster William F. Hnyghe, May 5th, 1864.
Additional Paymaster Benjamin Wickham, March 28th, 1863. (For Service on Shore.)
Chief Engineer Charles Cottew, June 11th, 1860.
2nd Master —
Assist. Surgeon John S. Dobbyn, April 7th, 1864.
Assist. Paymaster William Rogers September 16th, 1863.
Assist. Paymaster James Ray, June 11th, 1860.
Assist. Paymaster George Wooldridge, January 27th, 1863.

Seamen	289
Boys	19
Marines	110
Total	418 in all.

In December, 1866, she was removed to Foyness, River Shannon, Ireland, where she remained until she was sent to Portsmouth, where she was paid off in August, 1868.

Lent to the *Worcester* Committee, May, 1876, when her engines and boilers were taken out. She was towed round to London in September, and fitted up, and her name was changed a third time from *Frederick William* to *Worcester*. The Cadets returned to the new ship for first time on February 24th, 1877.

Her dimensions were:—

Length between perpendiculars	214 feet.
Length of keel for tonnage	174 feet.
Breadth, extreme	60 feet.
Breadth, for tonnage	59.2 feet.
Breadth moulded	58.4 feet.
Depth of hold	24.3 feet.
Burthen in tons	3,240
Draught of water when ready for sea. Fwd.	22.11 feet.
Aft.	26.6 feet.
Armament	74 guns.
Engines	500 horse power.

Year after year since 1877 alterations and improvements have succeeded one another, until the erstwhile "wooden wall of Old England" has become the perfectly appointed and thoroughly up to date Nautical College which to-day lies at her moorings off the Kentish village of Greenhithe.

About 5,500 cadets have passed through the ship.

CAPTAIN J. F. RUTHVEN.

By one of his Officers.

Jocelyn Fitzgerald Ruthven was born in Ireland on the sixth of March, 1849. He was educated at St. Mary's College Bampton, Oxon, where they had one of the earliest Cadet Rifle Volunteer Corps in England, to which he belonged. He wanted to make the army his career, but to the ultimate good luck of the Merchant Navy, finances would not permit, and in February, 1864, he joined H.M. School Ship *Conway* at Rock Ferry, and obtained the Brocklebank Prize for Nautical Astronomy at Midsummer in 1865. Passing out top of the ship in December, 1865, he obtained the highest marks then on record. A well known firm of Liverpool steamship owners offered to apprentice him but he declined saying, "I will not go in any steamer until I have commanded a sailing ship."

After some months of enjoyable holiday at home in Ireland, on July 25th, 1866, young Ruthven was appointed by Messrs. Wilson Cunningham & Co., fifth mate of their ship *White Star*, Captain John Kerr.

He was three years in the *White Star*, being 4th mate during his second year and 3rd Mate during his third year, when the late M. W. Campbell Hepworth, afterwards Marine Superintendent of the Meteorological Office, was fourth.

After serving in the *Victoria Tower* and *Houghton Tower* and passing for 2nd Mate, Ruthven re-joined his old captain John Kerr as 2nd Mate in the ship *Great Victoria* belonging to James Fernie. After a voyage to Melbourne, and thence with horses to Madras and Calcutta, and home to Dundee, he had a spell of leave in Dublin, passed for mate and was promptly promoted Chief Mate—making two voyages as such in the *Great Victoria*. Having passed the Board of Trade for Master he was given command on August 8th, 1874, at the age of 25, of the ship *Whittington* and made two voyages to India, leaving her in February, 1877.

Whilst converting *Whittington* into a barque and seeing her away under his successor, Captain Ruthven made the acquaintance of Captain R. Studdert of the Pacific Steam Navigation Company, who had, in 1866, relieved Henry Toynbee in command of the *Hotspur*. Studdert advised Ruthven to join the P.S.N. Co. and introduced him to Captain Woolcott, the Marine Superintendent.

On March 19th, 1877, Ruthven joined the P.S.N. Co. as 2nd Officer of R.M.S. *John Elder*, Captain George Massey, in which ship he made one voyage to the West Coast of South America. During this voyage the ship was ashore for a short time in Magellan's Straits; they experienced a tidal wave; and during a revolution were stopped on the Peruvian coast by the rebel ram *Huascar*.

At the end of this voyage Ruthven received a commission as a Sub-Lieutenant in the Royal Naval Reserve and put in his drill, after which he had the choice of going in the *Cotopaxi* in the P.S.N. Co.'s South American service or the *Cuzco* in the Australian service under the joint auspices of the P.S.N. Co and Messrs. Anderson & Co. He chose the latter and went in the *Cuzco* with Captain Conlan, Commodore of the P.S.N. Co.'s fleet.

The Orient Steam Navigation Company was formed while Ruthven was on his first voyage in *Cuzco* and they bought *Cuzco*, *Lusitania*, *Chimborazo* and *Garonne*, four beautiful sisters, barque rigged steamers, with clipper bows.

On March 1st, 1878, Ruthven was appointed Chief Officer of *Garonne*, the first steamer to fly the Orient Line's House Flag.

In 1879 after passing for extra master he joined the first steamer specially built for the Orient S.N. Co., the *Orient*, then fitting out at Glasgow.

She was considered a great step in naval architecture, and was a remarkable ship of her time.

After three voyages in the *Orient* with his old friend Captain Studdert and with Captain Hewison, on January 24th, 1881, Ruthven was given command of the *Lusitania* and commanded 9 Orient ships before retiring on February 13th, 1911.

The following are the dates of his appointments in command:—

Lusitania, January 24th, 1881.
Chimborazo, April 1st, 1881.
Lusitania, April 9th, 1886.
Austral, August 23rd, 1887.
Chimborazo, August 21st, 1890.
Garonne, June 23rd, 1891
Ophir, August 1st, 1891.
Omrah, September 3rd, 1898.
Orontes, September 12th, 1902.
Orsova, June 19th, 1909.
Orvieto, November 19th, 1909.
Retired, February 13th, 1911.

From Captain Hewison's retirement in 1888, Captain Ruthven was Commodore of the Orient Line fleet for 23 years. During later years he was affectionately known throughout the Orient Company's service as Pa or Pa Ruthven.

A younger brother of Trinity House from 1885, soon after retirement from active service he was appointed a nautical assessor in the Admiralty Court.

After the commencement of the Great War the officer whom the Orient S.N. Co. had intended to appoint master of the *Ophir*, being an officer of the Royal Naval Reserve, was called up for service in H.M. Fleet, and Captain Ruthven returned to command for another voyage in war time the ship he had commanded when she was the flower of the fleet some 23 years before.

In passing out of the *Conway* in 1865 with the highest marks obtained by any Cadet since she was established in 1859 as a school ship for officers of the Merchant Service, Ruthven showed marked ability and aptitude. His appointment as 5th Officer to such a smart and valuable ship as the *White Star* straight from a harbour training ship and without experience in a sea-going ship was very exceptional if not unique.

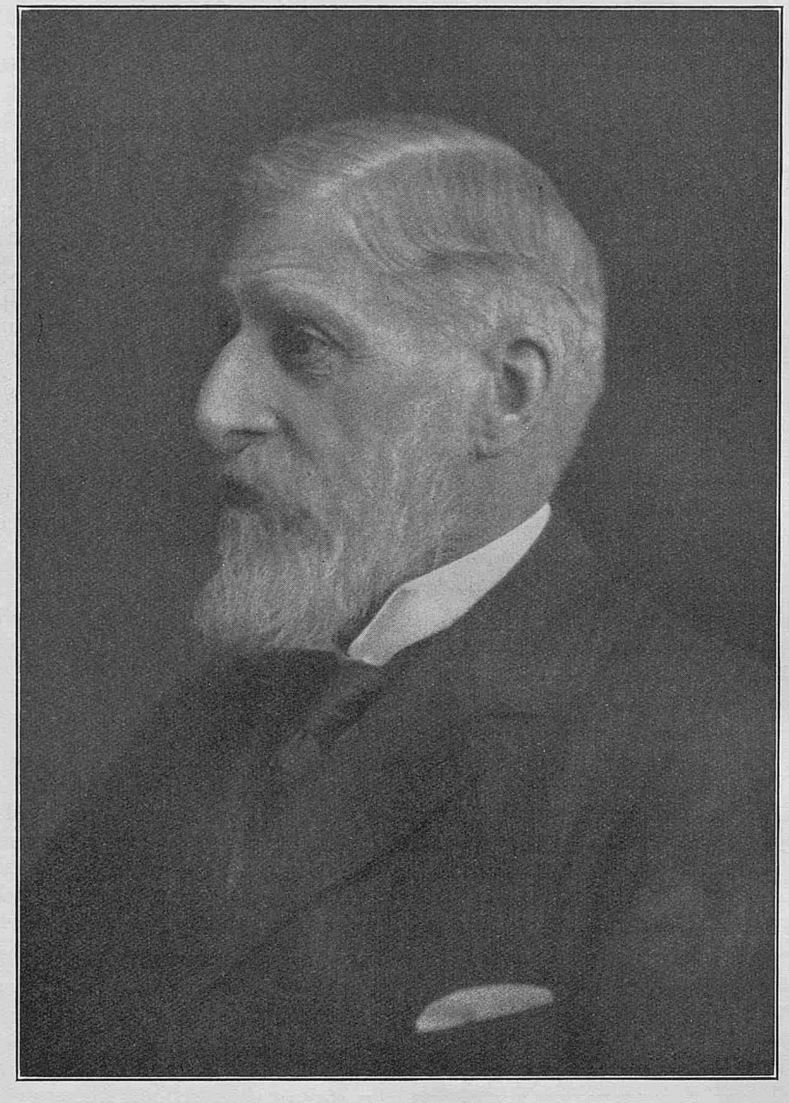
In the Weather Book Register (Meteorological Log) of the Ship *Whittington*, kept in Captain Ruthven's own hand writing, the following entry appears under date of Monday, April 10th, 1876, "8.10 a.m. made Juggernaut Pagodas bearing North 20 miles distant, agreeing to a mile with chronometers as corrected by Lunars." This, after a passage of 118 days from Liverpool round the Cape without seeing land, was a landfall of which any navigator even in these days of Wireless Time Signals might be proud.

During his voyages as an officer in steam Ruthven came to the conclusion that the old sailing ship practice of fixing the position by observations of the sun once a day at noon wanted supplementing. When he got command he made it a practice to fix the ship's position by stellar observations whenever possible at morning and evening twilight, and this custom soon became the invariable rule in Orient ships, a matter of routine.

Ruthven's influence and lead to his officers in employing accurate and sound methods of navigation made themselves felt throughout the Orient Fleet. He made a scientific study not only of navigation but of most branches of seamanship. He evolved a method of measuring the turning circle or tactical diameter in merchant ships in order that he might have the great advantage of the exact knowledge of a ship's behaviour under helm which was usually only possessed in men of war, the navy having studied far more than was possible in the merchant service the manœuvring powers of ships.

In loading sailing ships the knowledge of how to distribute weight to ensure sea kindliness and yet maintain a sufficient margin of stability or stiffness so that a ship would stand up to her canvas, was gained by experience and became a sort of sixth sense to good seamen.

With steamers the consumption of fuel altered the condition of loading during a passage and the problem became involved.



(Reproduced by the courtesy of Messrs. Elliott & Fry, Ltd.)

The Master of the *Orvieto*, 1909-1911.

CAPTAIN J. F. RUTHVEN.

The theory of stability of ships was known to very few seamen up to and even later than the eighties, and it seemed likely to RUTHVEN that some of the early steamers which were reported missing capsized at sea through large rise of their centre of gravity when coal and boiler feed water were consumed. There were books by naval architects explaining the theory of ship stability but no practical rules for seamen to apply this knowledge to loading were available. RUTHVEN devoted his attention to this subject.

When the *Austral* on November 11th, 1882, listed heavily when coaling at the buoy in Neutral Bay, Port Jackson, filled through her ports and sank—she was raised and retrieved her reputation by carrying on successfully in the trans-North Atlantic passenger service and later returning to carry on as a most popular ship for many years in the Australian Service—a great impetus was given to all the executive officers of the Orient Line. Aided by his officers and with data provided by the builders he formulated practical rules and constructed tables for finding the G.M. and distributing the cargo to get the best behaviour in a seaway, out of his ship.

It was largely through RUTHVEN'S practical studies of these problems of loading that it became a matter of regular daily practice in the fine lined steamers of the Orient Line for the officers to calculate exactly the conditions of loading and stability of their ship. A practice which has spread in the Merchant Navy and from which incalculable good results are being obtained.

As Chief Officer RUTHVEN was sent in 1879 to look after the fitting of the *Orient* at Glasgow and in later years he went to each ship, commencing with the *Ophir*, while she was building, attending her trials and commanding in turn each of the Orient Company's Ships when they were new. He made a study of naval architecture and in the *Omrah*, and later the *Orontes* which ship was an improved *Omrah*, the influence of his ideas were to be seen in their design and construction. They were most successful ships, particularly in their day while commanded by RUTHVEN, as were *Orsova*, and *Orvieto* the first and fourth of the five ships built in 1909 when the Orient Company took over an entire fortnightly mail service to Australia which it had formerly carried out jointly with the P.S.N. Co. and later the R.M.S.P. Co.

Captain LECKY in the eighties had advocated the use of revolutions for obtaining the speed of paddle steamers but threw doubt on their value for screw steamers. RUTHVEN had already been using the revolutions for a few years and found that the indications of the Engine Room Counter compared very favourably with those of the Patent Log. He confirmed this later by many years of observation in large fine lined steamers. With fuel supplanting wind, and machinery taking the place of sails, RUTHVEN saw that expert knowledge if possible was more necessary than ever to get the best results, but that it must be directed along the new groove to meet modern requirements and conditions so as to keep in front of our yearly increasing foreign rivals.

During his early days in command he could find little to help him in the way of rules or formulae for speed and coal consumption until given the cube of the speed and two-third power of displacement rule by the late Dr. KIRK—(inventor of the triple expansion engine)—which he worked on and amplified to meet the needs of the navigator.

Many of us have good reason to be thankful to RUTHVEN for his work and teaching and there is no doubt that his early work in what LECKY called *steamanship* has been fruitful in promoting a better understanding of the problems of economical and efficient steam navigation. He was one of the first large steamship navigators to use the southern route across the Indian Ocean during the South West Monsoon, and to strongly advocate its use upon grounds which were disputed by many, but which have been proved to be perfectly sound by many years of experience and comparison between the alternative routes. The track he advocated is practically that which after much research and revision is now officially recommended for medium ships of the present day.

Captain RUTHVEN'S first meteorological log was kept as long ago as 1876 when he was master of the iron ship *Whittington*, his first command. It is written entirely in his own hand and was classed excellent by Captain TOYNBEE. The ships under his command returned 29 Meteorological Logs and he is the senior known surviving member of the British Corps of Voluntary Marine Observers. All who have taken part in the development of the organized application of the Law of Storms to steam and motor navigation with Wireless Communication should be familiar with the examples which have been published of his skilled handling of a steamer in the region of a cyclone before the days of Wireless. According to the Weather Book Register of the *Whittington*, Liverpool to Calcutta, on Sunday, March 5th, 1876, he succeeded in manœuvring that ship clear of a cyclone in the South Indian Ocean under sail.

There are examples of fine seamanship in the early stages of his career and of his work and interests throughout his life, all to his credit, which cannot be recorded in a short memoir. Amongst the publications of which he is author there are the following books :—

Speed and Consumption of Steamships, 1906.
Moxly's Theory of the Tides, 1911.
Take care of the ship, 1924.
Great Circle Sailing, 1925.
Popular Handbook on Tides, 1926.

Captain RUTHVEN was a most successful ship master and much of his success in running free of accidents though thirty years in command of valuable high speed mail and passenger steamers was due to getting the best out of his officers. The first voyage with RUTHVEN was somewhat of an ordeal to a young officer; he put one through a severe test especially as officer of the watch. Once that test was over and you proved to his satisfaction no commander could trust you more than he did. He gave you all the information he could and trusted you to do the right thing.

Not always of robust health for some years during the height of his active sea-going career he fought against and overcame ill-health, though few outside his ship's company could have known it.

The ships he commanded were always popular with the Australian travelling public, with whom he was associated from the time he went to sea in the *White Star*, an emigrant ship. Many distinguished people travelled with RUTHVEN and he numbered many of them amongst his friends. Since retirement from active sea service, Captain RUTHVEN has devoted much of his time to working in the interests of seamen. He has long been a member of the Committee of the Ship-wrecked Mariners' Society of which he was Deputy-Chairman until recently.

At the end of the Great War in 1918, Captain RUTHVEN joined the Committee of the ex-Officers' Employment Bureau and was one of their voluntary interviewers. This Bureau was taken over by the late Field Marshall EARL HAIG when he formed the Officers' Association, and Captain RUTHVEN continued this work in that Association. With his immense experience of men he was instrumental in placing many officers in employment upon demobilization.

One of Captain RUTHVEN'S greatest pleasures is to be in the company of other sailormen and at the annual meeting of the Court at Trinity House on Trinity Monday each year he is still to be seen in the centre of a group of Trinity Brethren many of whom have had the privilege of serving under his Command. A man of extreme modesty, Captain RUTHVEN has always avoided publicity. Though he never condoned neglect of duty or suffered fools gladly, he was the first to make allowance for error of judgment on the part of a seaman, knowing so well, as he did, the uncertainties of the sea and its elements which we have to contend with continually.

This is but a brief outline to place on record something of the service of this grand old man of the sea, so that the Merchant Navy may *know* and thus have inspiration by his example.

If esteem and affection of his brother officers are a reward, he is rewarded, and Captain RUTHVEN can be very happy in the satisfaction of knowing that his professional achievements have benefited the British Merchant Navy.

All who know him wish him continued health and strength.

L.A.B.S.

SOME RECORDED EXTREMES OF METEOROLOGICAL ELEMENTS.

Prepared in the Marine Division by Commander J. Hennessy, R.N.R.

In keeping the Meteorological Log or Record, Marine Observers, from time to time record what appear to be very high or very low values of the different meteorological elements observed. This prompts them to ask: "What is the highest or lowest values which have been so far recorded?"

In the following notes some recorded extremes of the various elements set out in the Meteorological Log are given both for sea and land, gathered from all available sources.

Atmospheric Pressure.—The lowest barometric pressure probably takes place in tornadoes on land but owing to the restricted area in which tornadoes are experienced and to the terrible havoc caused by their intense violence along the narrow path which they traverse, it is not practicable to obtain values of the lowest pressures which occur during these phenomena.

Over the sea one would expect to find the lowest values occurring in the more intense tropical revolving storms, which do not as a rule penetrate far over the land, but as it is the aim of those navigating ships to keep as far as possible from the centre of such storms, records of absolute minimum pressure within their centre are rarely recorded at sea where these storms attain their maximum intensity.

It is probably for this reason that the lowest barometric pressure recorded in a Meteorological Log was experienced in an extra tropical cyclone of the North Atlantic. On February 5th, 1870, R.M.S. *Tarifa*, Captain M. Murphy in Latitude 51° 03′ N., Longitude 23° 59′ W., on passage from Queenstown to Boston, passed through the southern semi-circle of an intense depression. The Mercury fell 2 inches in 14 hours to 925.5 mb. (27.33 in.) corrected, the greatest rate of fall being 16.6 mb. (.49 in.) in 2 hours, ship being hove to at this time. *Tarifa* was using a tested mercurial Barometer supplied by the Meteorological Office, so that full confidence may be placed in this record which is probably the lowest reading ever recorded at sea.

An exceptional fall in pressure closely approaching the above record was reported on December 4th, 1929, in the same region as that in which *Tarifa* 59 years earlier experienced her low barometer. On this date the two American steamships *Westpool* and *Balsam* when in Latitude 50° 47′ N., Longitude 16° 38′ W., and Latitude 52° 07′ N., Longitude 18° 41′ W., were situated one on each side of the centre of a deep depression and recorded synchronous barometer readings of 929.9 mb. (27.46 in.) and 927.9 mb. (27.40 in.) respectively, both readings corrected.

No records comparable with the above values can be found in ships' Meteorological Logs traversing High Latitudes in the Southern Ocean. There the lowest pressures are recorded by the German Exploration Ship *Gauss* in Latitude 66° 02′ S., Longitude 89° 48′ W., and by the British Antarctic Expedition 1910—13 in McMurdo Sound, namely 942.1 mb. (27.82 in.) on August 1st, 1902, and June 23rd, 1912, respectively.

When the centre of a tropical cyclone passed over False Point Lighthouse, River Hooghly, on the 19th September, 1885, pressure fell to 918.9 mb. (27.135 in.). This is the lowest verified barometer reading at sea level that has yet been recorded. The cyclone was attended by a storm wave which reached a height of 22 feet at False Point and destroyed all the houses at that place with great loss of life.

Although the absolute minimum pressure in a cyclone of the temperature regions may equal or fall below that of a tropical cyclone, the rate of fall of pressure is generally much greater in the latter as will be seen from the following instances.

On August 2nd, 1901, S.S. *Laisang*, bound from Hong Kong to Japan, encountered a typhoon when to the Northward of the Formosa Channel. At 8.30 p.m. her barometer read 960 mb. (28.35 in.) and at 9 p.m. had fallen to 926.2 mb. (27.35 in.) showing a fall of 33.8 mb. (1.00 in.) in half an hour.

On September 3rd, 1930, a hurricane visited Santo Domingo, Haiti, causing the death of 2,000 people, injuring 8,000 others and destroying property to the value of about £3,000,000. The American S.S. *Coamo* weathering this storm outside the port passed through its centre and records the following barometer readings.

Time.	Pressure.	Amount of decrease or increase.
11.20 a.m.	997·3 mb. (29·45 ins.)	—
Noon	955·6 mb. (28·22 ins.)	− 41·7 mb. (1·23 ins.)
12.43 p.m.	954·3 mb. (28·18 ins.)	− 1·3 mb. (0·04 in.)
12.45 p.m.	949·9 mb. (28·05 ins.)	− 4·4 mb. (0·13 in.)
12.48 p.m.	943·1 mb. (27·85 ins.)	− 6·8 mb. (0·20 in.)
1.00 p.m.	940·7 mb. (27·78 ins.)	− 2·4 mb. (0·07 in.)
1.01 p.m.	938·0 mb. (27·70 ins.)	− 2·7 mb. (0·08 in.)
2.00 p.m.	958·3 mb. (28·30 ins.)	+ 20·3 mb. (0·60 in.)

As detailed observations of pressure recorded by a ship when in the calm centre of a tropical revolving storm are extremely rare, *Coamo's* observations are of great interest. The ship entered the calm centre at 12.25 p.m. and remained therein until 1.04 p.m. during which time the barometer continued to fall rapidly. From 12.43 p.m. to 1.01 p.m. when in the calm centre pressure decreased 16.3 mb. (0.48 in.). After the centre had passed pressure rose 20.3 mb. (0.60 in.) in 56 minutes.

In Great Britain, the lowest pressure yet recorded is 925.5 mb. (27.33 in.) which was observed at Ochtertyre, Perthshire, on January 26th, 1884.

An abnormal rise in barometric pressure does not attract the same attention, generally, as does an abnormal fall, nevertheless the following instances of abnormal high pressure taken from ships' Meteorological Logs are not without interest.

On January 23rd, 1859, the Barque *Victory*, when in Latitude 40° N., Longitude 29° W., recorded a corrected barometer reading of 1050.1 mb. (31.01 in.). On the same day the ships *City of Calcutta* in Latitude 41° N., Longitude 30° W., and *Robert Pulsford* in Latitude 37° N., Longitude 31° W., recorded corrected barometer readings of 1048.7 mb. (30.97 in.) and 1047.4 mb. (30.93 in.) respectively.

South of the Equator the ships *Brenda* in Latitude 33° S., Longitude 14° W., and *Bracadale* in Latitude 35° S., Longitude 25° W., logged on July 19th, 1890, corrected barometer readings of 1046.4 mb. (30.90 in.) and 1044.3 mb. (30.84 in.) respectively.

In the British Isles the highest readings were all observed in Scotland, and on the same date but in different years. On January 9th, 1820, Leith recorded a pressure of 1051.5 mb. (31.05 in.), in 1895 Ardrossan recorded a pressure of 1052.8 mb. (31.09 in.) and Glasgow 1053.8 mb. (31.12 in.) in 1896.

The highest barometric pressure ever recorded and reduced to sea level is said to be 1075 mb. (31.75 in.) observed at Irkutsk in Siberia on January 14th, 1893.

Wind Velocity.—It is the custom at sea to estimate the force of the wind by the Beaufort Notation, in which Force 12, the highest specification, is termed Hurricane Force, where the velocity is estimated to exceed 65 knots (75 statute miles per hour).

Not infrequently this force is logged in ships' Meteorological Logs, and is generally accompanied with the remark, "Squalls of terrific force," indicating that the wind in them greatly exceeds the run of the wind then blowing.

Nautical history is crammed with incidents where in heavy gales, tropical or otherwise, ships have been lost, or suffered severe damage, both alow and aloft, through the tremendous force of the wind, aided no doubt by the tempestuousness of the sea, but the circumstances are so varied as to render comparison of little use for estimating in which storms the greatest wind velocities have occurred over the open sea.

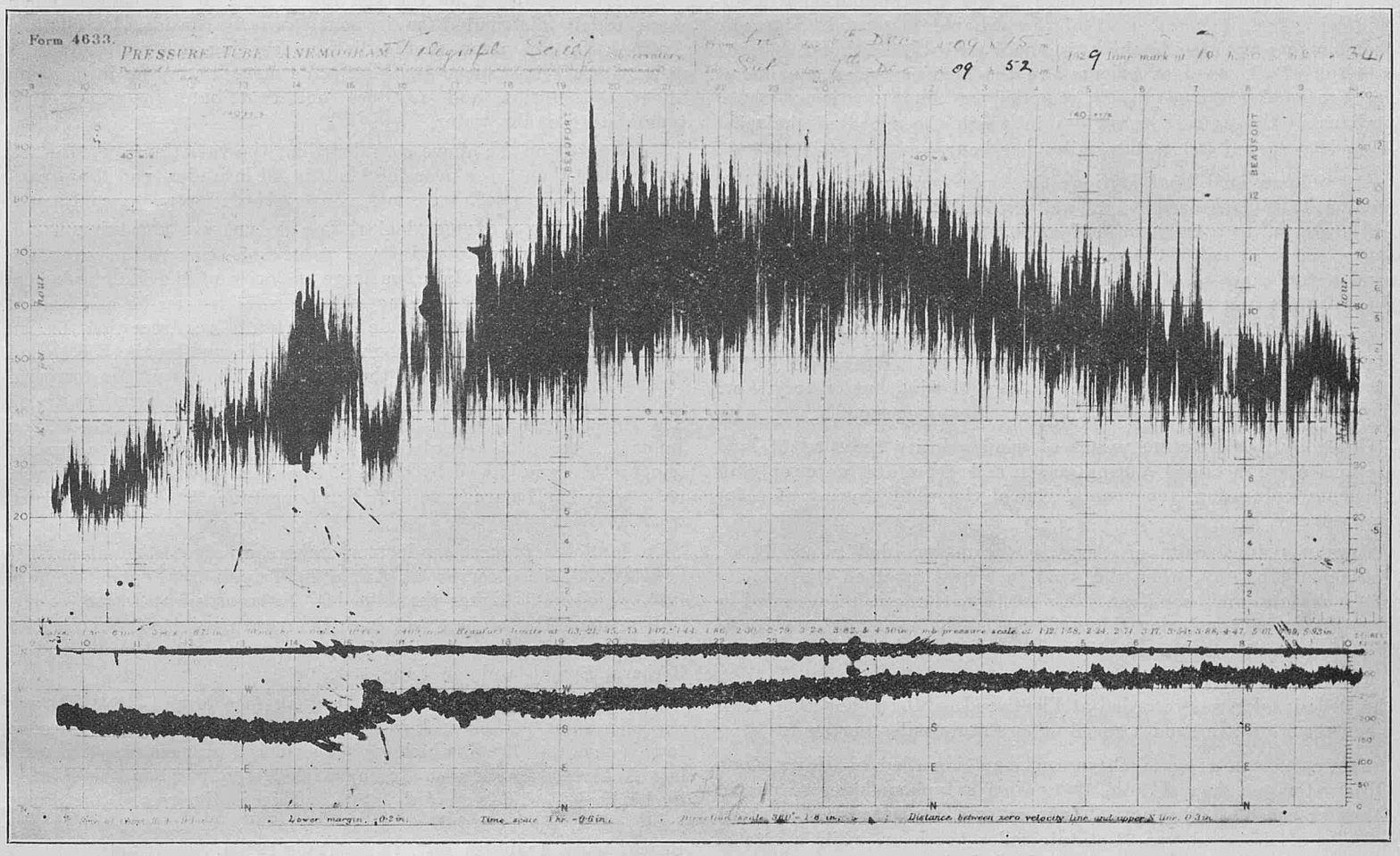


Figure 1.

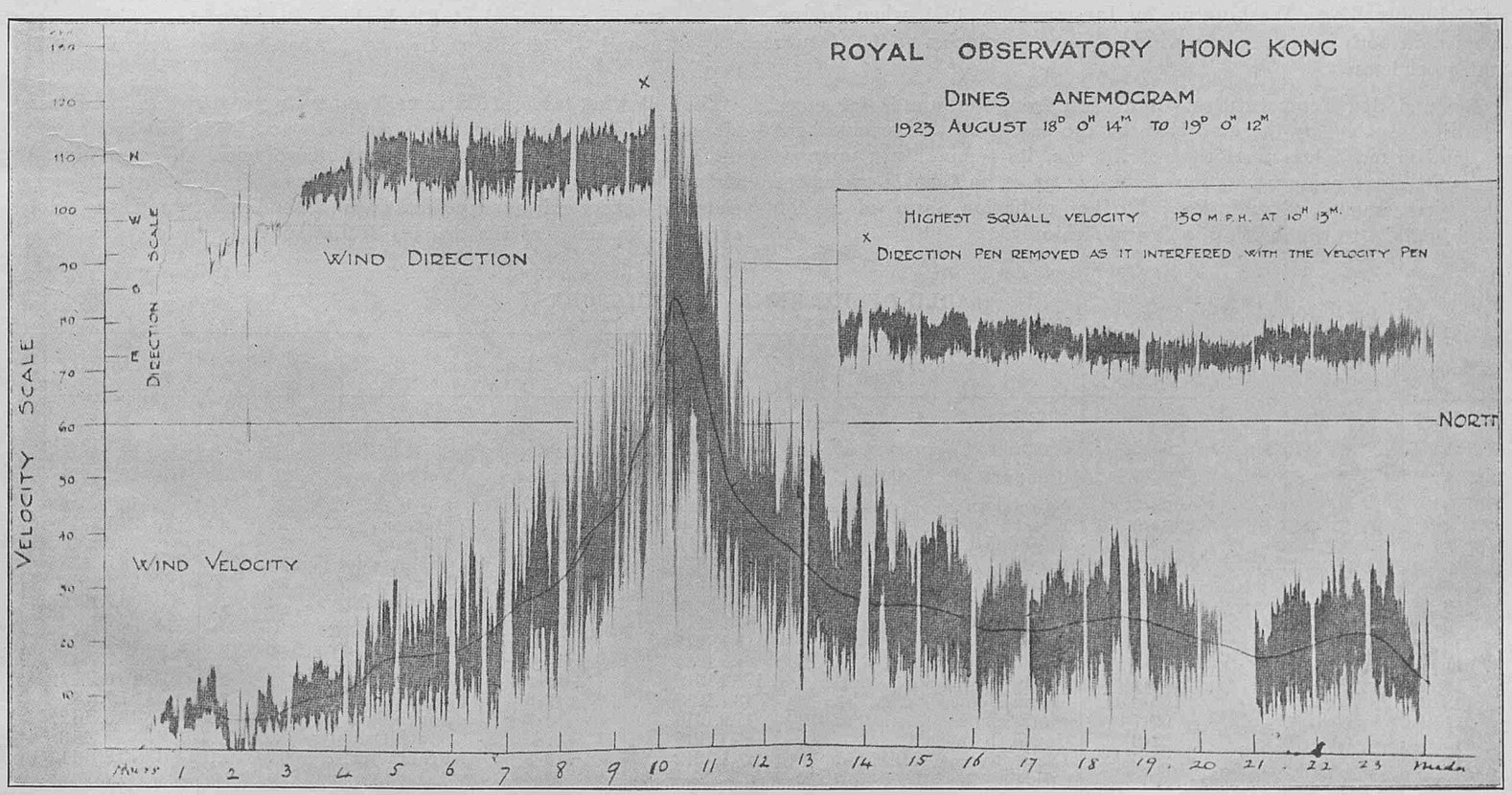


Figure 2.

Extreme values of wind velocities at sea are therefore not available but were it possible to obtain reliable measured values by anemometers mounted in ships, it would probably be found that the true run of the wind experienced in the heaviest gales equalled if not exceeded extreme values recorded at shore stations, except perhaps in the case of tornadoes in which the speed of the wind is said to exceed 200 statute miles per hour.

At well-equipped land stations the true velocity of the wind is automatically measured by a well-exposed pressure tube anemometer erected at a height of 40 feet above the ground. Anemometer traces show, as will be seen in the examples given here, that the wind never blows steadily, its structure being made up of a succession of gusts and lulls.

Gusts must not be confused with squalls. Squalls are prolonged blasts of wind of a greater velocity than the average wind then blowing, while gusts are sudden increases of wind but of very short duration and occur with or without accompanying squalls.

Generally, the extreme values of wind velocity recorded at land stations were attained during gusts and therefore were only of momentary duration, the general run of the wind blowing at a far less velocity.

FIGURE 1 is a copy of the anemogram recorded at Scilly on December 6th, 1929, when the wind in a gust attained the velocity of 111 statute miles per hour. This is the extreme value recorded in the British Isles. During this gale the maximum hourly velocity of the wind was 68 statute miles.

The highest velocity for a hour's run of the wind, ever observed in the British Isles was recorded at Fleetwood on December 22nd, 1894, when the wind averaged a speed of 78 statute miles per hour.

FIGURE 2 is a copy of the anemogram recorded at Hong Kong Observatory on August 18th, 1923, when a typhoon's centre passed 14 miles south of the port. In this case the maximum average velocity of the wind was 83 statute miles per hour, while a rate of 130 statute miles per hour was attained during a gust.

The greatest wind force yet observed is said to have been recorded at Black River, Jamaica, on November 17th, 1912, and at the mouth of Columbia River, Washington, on January 29th, 1921, when during a gust, in both instances, the wind attained a velocity of 150 statute miles per hour.

Air and Sea Temperatures.—Radiation from the sun is far more readily absorbed by the land than by the sea, also, the specific heat of land is much less than that of the sea, its temperature increase per unit mass being about four times as great as that of water for the same amount of radiation. Further radiation absorbed by the land heats it to the depth of a few inches only.

Radiation absorbed by the sea unlike that of the land is much more widely distributed as it penetrates to considerable depths. Again a certain amount of radiation reaching the sea surface is reflected back into space and lost, while more is used up in bringing about evaporation and so does not contribute in raising the temperature of the water.

Consequent on the above considerations the variations over the sea are far less than those over the land, in all latitudes, and the oceans are not subject to such extremes as are recorded over the continents.

Ships keeping a Meteorological Log do not use a maximum and minimum thermometer and these values of temperature over the oceans are not available. The large majority of the Meteorological Logs have not yet been extracted but so far as can be ascertained at present, the highest shade temperature yet recorded by an Observing Ship when on passage is 100° F. logged by the S.S. *Titan* on August 8th, 1920, when in the Red Sea. The lowest air temperature was observed by the S.S. *Baychimo* who when beset by ice off Sea Horne Reef in Latitude 70° 50′ N., Longitude 159° 11′ W., on January 27th, 1932, recorded – 40° F. The maximum sea surface temperature was logged by the S.S. *Frankenfels* who on August 5th, 1924, when in Latitude 26° 13′ N., Longitude 56° 43′ E., recorded 96° F.

On land the highest shade temperature ever recorded at surface level is 136° F. observed at Azizia in Tripoli on September 13th, 1922, which is 2° higher than the 134° F. recorded at Death Valley, California. The highest wet bulb temperature is 100° F. observed at Kamara Island in the Red Sea on September 23rd, 1923, and at Berbera, Somaliland, on June 21st, 1924.

The lowest temperature recorded at surface level, – 94° F., was experienced at Verkhoiansk in Siberia on January 3rd, 1885. Second to this comes – 77° F. which was experienced by members of SCOTT'S last Antarctic Expedition during a sledge journey on the Barrier in Latitude 76° S., on July, 1911. This is the record for Polar exploration, the next lowest being – 74° F. registered at Floeberg Beach, Lady Franklin Bay, in Latitude 82° N.

In the British Isles the highest temperatures recorded at surface level are 100.5° F. at Tunbridge Wells on July 22nd, 1868, and 100° F. at Greenwich on August 9th, 1911. The lowest surface temperatures are – 23° F. registered at Blackadder, Berwickshire, on December 4th, 1879 and – 17° F. at Braemar, Aberdeen, on February 11th, 1895.

The following table of Extreme Temperatures, registered at Réseau Mondial Stations between the years 1910 and 1918, will be found of interest. The Réseau Mondial is a Meteorological Office publication giving monthly and annual summaries of the meteorological elements observed at land stations extending around the globe arranged in zones of ten degrees of Latitude.

TABLE OF EXTREME TEMPERATURES.

Zone.	Lat.	Abs. Max.	Station.	Date.	Abs. Min.	Station.	Date.
		°F.					
1	80°—70° N.	85·5	Gjesvaer	28.7.1915	−56·6	Spitsbergen	28.3.1917
2	70°—60°	97·0	Rampart	21.7.1915 / 26.6.1916	−82·8	Verkhoiansk	28.1.1911
3	60°—50°	103·5	Minnedosa	14.7.1910	−70·4	Eniseisk	10.1.1915
4	50°—40°	109·6	Krasnovodsk	20.7.1916	−47·0	Macleod	31.1.1917
5	40°—30°	122·7	Baghdad	21.7.1917	−24·0	Modena	27.12.1916
6	30°—20°	133·3	Insalah	19.7.1914	3·0	Canadas del Teide ...	2.2.1915
7	20°—10°	120·6	Timbuctoo	13.6.1913	27·0	Mexico	22.1.1910
8	10°—0°	115·0	Wau	16.4.1910	27·1	Nuwara Eliya	8.2.1914
9	0°—10° S.	102·9	Barra do Corda	8.10.1915	34·0	Nairobi	23.7.1916
10	10°—20°	111·9	Daly Waters	4.1.1915	24·8	Sucre	1.7.1916
11	20°—30°	118·9	Boulia	7.2.1915	19·0	Mitchell	23.6.1911
12	30°—40°	120·7	Eucla	17.12.1912	11·7	Heidelberg	26.6.1912
13	40°—50°	106·2	Bahia Blanca	13.1.1913	2·8	Sarmiento	7.7.1918
14	50°—60°	92·7	Santa Cruz	17.2.1916	8·2	South Georgia	13.8.1912
15	60°—70°	52·3	South Orkneys	25.1.1918	−32·8	South Orkneys	6.1913
16	70°—80°	39·9	Cape Evans (McMurdo Sd).	1.1912	−73·3	Framheim	13.8.1911

Abnormal Seas.—Admiral FITZROY the first Director of the Meteorological Office has left on record that he personally measured seas that were 60 feet in height. Waves exceeding this height are exceptional but there are a few cases on record of which the following are instances:—

The highest seas yet recorded, reaching to a height of 80 feet were measured by Sir BERTRAM HAYES and his officers in the R.M.S. *Majestic* during a North Westerly gale of hurricane force, in Latitude 48° 30′ N., Longitude 21° 50′ W., on December 29th, 1922. DR. VAUGHAN CORNISH, the British authority on water waves, in a letter to the Editor of Lloyd's List remarked that he had never met with any other account of waves of such a great height taken under conditions so favourable for observation.

The R.M.S. *Olympic* when bound from Southampton to New York on February 27th, 1925, was struck by a 70 feet wave, during a heavy gale, which badly damaged her navigation bridge, 75 feet above sea level. The R.M.S. *Aquitania* bound from New York to Southampton encountered the same gale during which a heavy sea swept her bridge carrying away a locker and smashing a chronometer and three sextants. *Aquitania's* bridge is 70 feet above sea level.

In 1875 the late Captain KIDDLE of the R.M.S. *Celtic* from reliable measurements determined a height of 70 feet for several waves in Mid Atlantic.

Solitary waves of an exceptional height have been met with unexpectedly in mid ocean which cannot be accounted for by the wind then blowing. These waves are commonly referred to as tidal waves but this is a misnomer; they are in all probability due to submarine seismic disturbances.

In 1881 a solitary wave struck the barque *Rosina* in the North Atlantic sweeping overboard all hands then on deck. In the same year this unfortunate ship encountered another such wave while both watches were engaged shortening sail. On this occasion the whole crew were carried away with the exception of a sick seaman lying in his bunk. He was eventually rescued by a passing steamer.

In 1882 the well known four masted barque *Loch Torridon* when off the Cape of Good Hope encountered an unexpected solitary wave which washed overboard the Captain, Second Mate and the whole watch on deck.

In 1893 the barque *Johann Wilhelm* when 300 miles east of Charleston S.C. had a similar experience to the *Rosina*. A solitary wave struck the vessel and throwing her on her beam ends washed overboard all hands with the exception of one man who was later rescued by the S.S. *Electrician*.

The S.S. *Rheinland* was nearly lost some years ago in the North Atlantic when a solitary wave submerged the vessel for a short interval. Her commander, Captain RANDLE, stated that only the funnel and masts were distinguishable. Every boat was washed away, one man lost overboard, and several of the officers and crew received broken limbs.

Waves of seismal origin may be encountered at great distances from the cause of the upheaval originating them. In this respect the following extract from Lloyd's List of February 21st, 1927, is interesting.

"The earthquake in Herzegovina and Dalmatia on February 14th appears to have extended far seawards, as ships after passing the Straits of Messina encountered convulsive sea clearly indicating submarine upheavals. British destroyers bound for China had to negotiate tempestuous sea which constantly swept their decks, huge waves coming from opposite directions and clashing together with a tremendous roar. A large passenger liner standing high out of water had her top deck swept repeatedly by gigantic seas, and portions of her bulwarks were carried away. Simultaneously very heavy seas were experienced on the Egyptian coasts. The liner *Adriatic* was forced to remain storm tossed outside Alexandria for two days before she was able to enter port, while the cruiser *Dauntless* entering Port Said on February 15th was so heavily swept by seas that many sailors below hurried on deck owing to the inrush of water."

The highest measured seismic wave on record was caused by the great Krakatoa eruption of August, 1883, which inundated the foreshores of Java and Sumatra. At Telok Betong it reached within 6 feet of the top of the hill on which the Residency stands, 78 feet above sea level and was therefore 72 feet high. The Government steamer *Berouw* was swept by this wave over the pier and carried inland for a distance of nearly two miles.

Extreme size of Icebergs.—The size of bergs when observed at sea may be very deceptive and owing to the difficulties with which Observers have to contend, reports of the size of bergs obtained by passing vessels are very frequently overestimated.

In the Southern Ocean the largest bergs are the tabular bergs calved from the Great Ross Barrier in the Ross Sea. They may float with a height above water extending up to 200 feet and are sometimes of an enormous length. On February 23rd, 1930, the Royal Research Ship *Discovery II* in Latitude 55° 07′ S. during heavy weather, coasted along the lee side of a huge ice island which was between 60 and 70 miles in length. This is the largest berg of which we have a record.

In the Arctic the highest bergs are those calved from the Jacobshavn glacier which reach a height of 447 feet above water. Their height decreases rapidly after calving and by the time they reach the North Atlantic shipping routes are not nearly so lofty. The highest berg that has so far been observed by the International Ice Patrol was 262 feet, while the longest berg measured 1,696 feet.

The following publications were used in the preparation of this article:—

U.S. Weather Bureau "Weather of the Oceans," December, 1929, and September, 1930.

British Antarctic Expedition, 1910-1913 Meteorology, Vol. 1.

"Scott's Last Expedition," Vol. 2.

"The Meteorological Magazine," August, 1926, and April, 1932.

"Some Facts about the Weather," W. Marriott.

"Report of the Committee of the Royal Society on the Eruption of Krakatoa and Subsequent Phenomena."

"The Marion Expedition to Davis Strait and Baffin Bay," Part 3.

NOTES UPON THE HISTORY OF THE SURVEY AND CHARTING OF OCEAN CURRENTS.

Prepared in the Marine Division by E. W. Barlow, B.Sc.

Introduction.—In this article an attempt has been made to set out some of the more important historical facts relating to ocean currents, their discovery, survey and charting, as it appears that this has never yet been done. It is believed that the chief facts have been collected together, at any rate as regards the main currents of the oceans, but it cannot be claimed that the account is complete. Much more time than has been available would be necessary for an exhaustive examination of all the possible sources of such information, among which the many published accounts of voyages made from the end of the fifteenth century onwards take a prominent place.

It has been necessary to confine this article entirely to the surface currents as known to navigators. Knowledge of deep currents, whether directly measured or inferred, is not dealt with here. The history of the theories of the causes of ocean currents is also not referred to.

The Early Recognition and Estimation of Current.—As is well-known the year 1765, when Harrison invented the chronometer, marked an epoch in the science of navigation and in the determination of the set and drift of current. Previous to that date the finding of longitude at sea was a laborious and inexact process to most navigators. Hence the method of determining current by the difference of the observed and dead reckoning positions, which still remains the most important one in practical use for current charting, was not available previous to that date. Only the northerly and southerly components of currents could have been measured with any approach to accuracy, by the difference of latitude, observed and D.R. As, in general, currents do not set due north or south, the results were not of much value, particularly in the early explorations of the North Atlantic and North Pacific Oceans where the Equatorial Currents setting westerly would be the chief ones encountered. Let us therefore consider how the old navigators would be able to gain some idea of the set and drift of current.

In the open sea there was always the motion of floating objects such as sea weed but unless there was some object moored to the bottom to compare with, that motion could not be seen.

Information of the presence of current might be obtained from tide rips and weather currents and from lines of demarkation in the sea.

The Dutchman's log has always been available but it is of little use if the ship is not at anchor, and near coasts or islands where a ship can anchor ocean currents may be affected by the shelving of the bottom or the tides.

Old seamen will tell you how they used to find the set and drift of current in the leisurely days of sail by sending away a boat and lowering the deep sea lead with a bucket as a drouge to the bitter end of the deep sea lead line (120 fathoms) and then heaving the log and noting the direction of the ship's head. This gave an approximation only of the surface current compared with that down below.

At the end of a voyage, providing the longitudes of the points of departure and arrival were known with fair accuracy, a rough estimation of the total current experienced on a voyage could be worked out. If a ship made the homeward passage on the same route some information as to current could also be obtained by a comparison of the two passages and this method is referred to by Richard Norwood in his book "Seamen's Practice" published in 1637. The only other indication of current was that corresponding to our modern drifts of derelicts and bottles, when some object evidently of foreign origin, such as a wreck, a tree trunk or a canoe was washed up on a coast.

The North Atlantic Ocean.—It is well-known that the Phoenician seamen visited a considerable portion of the north-west coast of Africa, even beyond Cape Bojador, and it is probable that the Canary Islands were known to them and to the Greeks, Romans and Carthaginians. It seems possible therefore that these early navigators might have acquired some knowledge of the Portugal and Canaries Currents, the sets being southerly. It is also probable that the Trade Wind Currents of the North and South Atlantic similarly revealed themselves to Bartholomeu Diaz de Novaes, the Portuguese navigator, on his voyage down the African coast in the course of which he arrived at the Cape in May, 1487, and to Vasco de Gama in his circumnavigation of Africa and voyage to India during the years 1497-9.

What may be called the first definite discovery of a main current was that of the Equatorial Current of the North Atlantic Ocean by Christopher Columbus in the course of his voyages of discovery to America. The great attention paid by these early navigators to natural phenonema may be seen in the old Spanish accounts of their voyages. Columbus in particular was an acute observer and an enthusiastic lover of the natural beauty of the new lands which he discovered. In the account of his third voyage, 1498-1500, in which he discovered South America, he expresses himself definitely on the subject of the Equatorial Current, saying that:—"I regard it as proved that the waters of the sea move from east to west, as do the heavens, that is to say, like the apparent motion of the sun, moon and stars". Shortly afterwards he states that the current is strongest in the Caribbean Sea. A small pan of tinned iron which was found in the hands of the natives of Guadaloupe was believed by Columbus to have been taken from a wreck borne by the Trade Wind and Equatorial Currents from Spain to the American coast. So impressed was he with the strength and constancy of the Equatorial Current that he considered that the shape of the larger islands of the West Indies, which are elongated in the direction of parallels of latitude, and the general formation of the islands of the Lesser Antilles, was due to the long-continued action of this current.

In his fourth voyage Columbus proceeded further westward to the eastern coasts of Central America. Here he recognised that the Equatorial Current began to set north-westerly or northerly following the trend of the coast. It is worth noting that Columbus also gave us the first description of the Sargasso Sea. Juan Ponce de Leon set out from Porto Rico, of which he had been the Governor, and discovered Florida, landing there on March 27th, 1513. He considerably extended Columbus' knowledge of the currents of the region and probably was the first to encounter the full force of the Gulf Stream. Columbus died in 1506. Anghiera, the geographer and friend of Columbus, survived him sufficiently long to become acquainted with the deflection of the waters of the Atlantic on their whole course from the Equatorial Current to the neighbourhood of Newfoundland, including the rotatory movement in the Gulf of Mexico. In his voyages in the latter half of the sixteenth century Sir Francis Drake was acquainted with the rapid motion of the waters of the Gulf Stream, but not with their high temperature.

Baron Alexander von Humboldt, the naturalist and traveller, (1769-1859), states that many effects of the Gulf Stream had been noticed in Europe long before the discovery of America by Columbus. These effects were produced by the sea washing on shore at the Canaries and the Azores stems of bamboos, trunks of pines, corpses of strange aspect from the Antilles and even living men in canoes. Tropical seeds were also washed ashore on the coasts of Ireland, the Hebrides and Norway. These things were however attributed entirely to the strength of the westerly gales. Humboldt states that towards the end of the fifteenth century two corpses, the features of which indicated a race of unknown men, were cast ashore on the Azores. At about the same time Peter Correa, governor of Porto Santo, Madeira, the brother-in-law of Columbus, found cast up on that island pieces of bamboo of extraordinary size. These finds

attracted the attention of COLUMBUS who conjectured that they came from a continent situated towards the west. HUMBOLDT gives many more such instances up to the end of the eighteenth century and mentions also an interesting case of a drift from Europe to South America. In 1770 a small vessel bound from the island of Lanzarote, Canaries, to Teneriffe was driven out to sea while none of the crew was on board. It subsequently went ashore near Caracas, in Venezuela.

In 1576 was published "A Discourse written by Sir HUMPHREY GILBERT, Knight, to prove a Passage by the North-West to Cathaia and the East Indies" together with a map of the world showing this supposed passage lying to the north of Canada. In this map an antarctic continent is shown extending up to latitude 50° S. to 55° S., as was generally believed at that time. Tierra del Fuego was presumed to be part of the continent, hence the only connection between the South Pacific and South Atlantic was assumed to be the narrow Strait of Magellan. GILBERT believed that the Agulhas Current continued to flow westerly right across the South Atlantic Ocean to the Strait of Magellan, which being narrow impeded the flow of current, forcing the greater part of it to flow up the east coast of South America where it either became the Equatorial Current of the Caribbean or joined with it, proceeding up the east coast of North America as the Gulf Stream as far as Newfoundland. GILBERT argued that a strong current like this could not disappear suddenly and that therefore it must pass up the coast of Labrador and through the supposed north-west passage to the Pacific Ocean where he believed that it continued westerly ultimately passing into the Agulhas Current and so completing the circuit of the globe. This was one of the arguments used to endeavour to persuade QUEEN ELIZABETH to organise an expedition for the discovery of this passage.

At a comparatively early date it was recognised that the temperature of the sea surface was strongly influenced by the currents. As early as the beginning of the seventeenth century, for instance, it was observed that there was a sudden change of temperature on passing from the cold Labrador Current south of the Newfoundland Banks to the adjacent waters of the Gulf Stream.

Captain WILLIAM DAMPIER'S "Voyages", published in 1729, contain a chapter on Tides and Currents, as experienced by him in his voyages made during the latter part of the seventeenth century together with a number of references to the currents at particular places which he visited. For the North Atlantic Ocean he gave an account of the relative strengths of the Equatorial Currents at various places in the Caribbean Sea and he also knew of the easterly counter-current, the Guinea Current, for he wrote "On the Coast of Guinea the Current sets East, except at or near a full Moon".

The first chart of the Gulf Stream was that published in 1770 by Dr. BENJAMIN FRANKLIN. He was connected with the American Postal Service and while visiting England he was asked to investigate the reason why the mail packets going from Falmouth to Boston often took a fortnight longer than ordinary merchantmen trading from London to Providence, Rhode Island. In consultation with Captain FOLGER, a Nantucket whaler, it was discovered that the mail packets kept in the Gulf Stream right across and were thus set back sixty or seventy miles a day while the other vessels avoided the current altogether. Dr. FRANKLIN was able to obtain sufficient data to plot the course and limits of the Gulf Stream, mainly from Captain FOLGER'S knowledge of the whale grounds which existed on either side of the Gulf Stream. In 1776 Sir CHARLES BLAGDEN was engaged in the study of sea temperatures off the North American coast and his results, which were published in 1781, considerably increased the knowledge of this current. According to Major RENNELL the warmth of the Gulf Stream was not generally known until its discovery by Sir CHARLES BLAGDEN. Dr. FRANKLIN had previously known of it but it was kept a secret for some time through political considerations. The thermal properties of the Gulf Stream had a far-reaching effect. HARRISON'S chronometer was still in the experimental stage and the charting of the Gulf Stream meanwhile offered a new method of determining longitude in the North Atlantic by observations of sea temperatures. In 1795 Dr. FRANKLIN in conjunction with Mr. JONATHAN WILLIAMS published a work called "Thermometrical Navigation" at Philadelphia and this work materially assisted safe navigation in subsequent years and considerably shortened ships' passages.

Major RENNELL in his book "An Investigation of the Currents of the Atlantic Ocean and of those which prevail between the Indian Ocean and the Atlantic," published in 1832, after his death, gives much detailed information as to current and temperature observations in the North Atlantic, particularly in and near the Gulf Stream, made near the end of the eighteenth century and in the early years of the nineteenth century. It is evident that the general knowledge of currents in this ocean was making considerable progress at that time.

In 1838 Mr. W. C. REDFIELD investigated the cold counter-current which was known to flow southwards down the North American coast inside the Gulf Stream and the subsequent operations of the United States Coast Survey provided additional data with regard to this current.

The South Atlantic Ocean.—We have referred above to the probability that in their voyages of discovery the early Portuguese navigators recognised the S.E. Trade Wind Current of the South Atlantic Ocean, now known as the Benguella Current. In DAMPIER'S "Voyages" we find the following reference to this current:—"South of the line from Loango to 25d. or 30d. the current sets with the wind from S. to N. except near the Full" (of the Moon).

According to RENNELL the Brazil Current, south of Cape Frio, which THE MARINE OBSERVER charts show to Latitude 40° S., rests on the authority of Lord ANSON'S Journal, Captain COOK and the Russian Captains KRUSENSTERN and LISIANSKY. Of these Lord ANSON made his voyage of circumnavigation in 1740-4 while Captain COOK'S voyages took place later in the eighteenth century. Captain, afterwards Admiral, KRUSENSTERN sailed round the world in 1803-6. The Russian Captains and also Captain TORIN of the East India service found a northerly counter-current south of Cape Frio, in the large bay between it and Santa Catharina Island, presumably near the coast. An easterly current off the Rio de la Plata, supposed to be due to the outfall of the river was noted chiefly by Captain, afterwards Admiral, BEAUFORT, but also by KRUSENSTERN and had been previously observed by Lord ANSON.

The Indian Ocean.—It is probable that the monsoonal currents of the Arabian Sea and Bay of Bengal were known to local navigators in very early times but of this we have no definite knowledge.

VASCO DE GAMA after rounding the Cape sailed up the east coast of Africa to Maliadi, north of Zanzibar, and thence proceeded across the Indian Ocean to the Malabar Coast. On this journey he called at Mozambique in March, 1498. He would thus have encountered the full force of the Agulhas and Mozambique Currents. We may therefore attribute the discovery of these currents to the early Portuguese navigators. They would have been comparatively easy to recognise on account of their essentially southerly sets. The Portuguese navigators gave the name to Cape Agulhas, meaning the Needle's Cape and from this the Agulhas Current took its name. Later variations of this name, such as Lagullas, were corruptions.

DAMPIER knew of the Agulhas Current during his voyages in the seventeenth century and he also states that on the coasts of India the currents set with the Monsoon prevailing according to the season.

In the middle of the eighteenth century, DALRYMPLE and DAVY made observations on the temperature of the equatorial currents during a voyage to the East Indies. In 1778 Major RENNELL published an investigation and chart of the "Bank and Current of Cape Lagullas." This enquiry was due to a suggestion made to him by Captain WAGHORN in 1764. It was published at nearly the same time as FRANKLIN'S and BLAGDEN'S works on the Gulf Stream and these must be considered to be the first scientific investigations of ocean currents. In 1819 and 1820 Captain HAMILTON of the *Bombay* and Captain ALSAGER of the *Waterloo* made current and temperature observations of the Agulhas Current and its neighbourhood. It

was formerly thought that the whole of this current passed round or over the Agulhas Bank into the South Atlantic but these new observations showed that the greater part, after flowing south-westwards along the eastern edge of the Bank, turned S. and then S.E., finally recurring into the easterly current which we now know as the Southern Ocean Drift. Captain HAMILTON also found, on two occasions, an easterly counter-current inside the Agulhas Current between Cape St. Francis and Cape Recife.

In 1853 Lieutenant A. D. TAYLOR, I.N., published a description and chart of the currents of the Arabian Sea during the South-West Monsoon and in 1862 Lieutenant J. A. HEATHCOTE, I.N., did the same for the Bay of Bengal, the materials being derived from the log books of ships of the East India Company. In 1857 an important investigation of the temperatures in and near the Agulhas Current was published by the Utrecht Meteorological Institute. An atlas showing actual current observations and also generalised flow of currents, as well as meteorological data for the ocean district adjacent to the Cape of Good Hope, was prepared under the superintendence of Captain TOYNBEE, then Marine Superintendent of the Meteorological Office, and was published in 1882.

The Pacific Ocean.—The Spanish navigators of the sixteenth century probably recognised the North Equatorial Current of the Pacific Ocean when their galleons voyaged from Acapulco (Mexico) to Manila right through the heart of the current along the fifteenth parallel. There does not appear to be much historical data with regard to the equatorial currents though there are references to them in the early years of the nineteenth century. The Russian explorer KOTZEBUE was drifted by the North Equatorial Current beyond his control, through the Marshall Islands, on a voyage of exploration of the islands of Oceania which commenced in 1815. Captain BEECHEY in his voyage in the *Blossom* in 1825-1828 determined the mean velocity of the South Equatorial Current at 9 miles per day in Latitude 27° S. and 16.5 miles per day between Latitude 18° S. and 4° N.

The Peru or Humboldt Current was known to the Spaniards soon after their conquest of Peru; they utilised the low temperature of this current to cool their drinking vessels in the water of the Bay of Callao. In the seventeenth century DAMPIER found that on the west coast of South America the current set northerly from Latitude 30° S. to the Equator and even to Latitude 3° N. or 4° N. It was first fully described by HUMBOLDT in the autumn of 1802. Captain FITZROY said that in October, 1837, when the *Beagle* was in the Galapagos Archipelago, on one side of Albermarle Island the surface water was found to be 80° F. and on the other side it was less than 60° F., a fact attributed to cold veins of current from the Humboldt Current. A counter-current between the Humboldt Current and the coast was first noticed by Mr. LARTIGUE in *La Clorinde* in 1822-3.

The Cape Horn Current was recognised by the drift of wood, etc., from Tierra del Fuego to the Falkland Islands and beyond. Its existence was nevertheless questioned until established by the observations of Captain FOSTER, in the *Chanticleer*. The southerly current flowing down the eastern coast of Australia was discovered by Captain FLINDERS in his voyage of exploration round the Australian coast in 1795-1803.

In a paper by FINDLAY on Oceanic Currents, written about the middle of the nineteenth century, a chart of the currents of the Atlantic and Pacific Oceans is given. In this paper the well-known author of the Sailing Directions states that two currents of great extent and importance are shown for the first time on this chart. The currents referred to are the Equatorial Counter-Current of the Pacific and the Kuro Shiwo or Japanese Current. FINDLAY states the evidence for the existence of these currents, some of which is given here. As regards the Kuro Shiwo, Captain KING who was with Captain COOK states that the *Resolution* was set at least four miles an hour to the N.E. by N. in Latitude 35° 43′ N., Longitude 141° E. and according to his observations the current was 250 miles broad off this part of the Japanese coast. The wrecks of Japanese junks were found carried by the current, for example, one on the southern end of Kamchatka in 1726, others on Kodiak Island off the Alaska Peninsula, while in 1833 a junk was carried right across the ocean and wrecked near Cape Flattery, Oregon. KRUSENSTERN, BEECHEY and others gradually accumulated knowledge of this current during the early years of the nineteenth century, and it was also found that Japanese charts were in existence clearly showing an easterly current between Fatisio and the south part of Nippon. Although the dimensions of the current are here small, not more than 15 miles wide between these islands, the chart stated that "in winter and spring it is difficult to navigate, but in summer and autumn vessels can pass it."

FINDLAY describes the Equatorial Counter-Current of the Pacific as "a great belt of water, lying under the zone of equatorial calms between the trade-winds, which extends across the entire breadth of the Pacific." Knowledge of this current was gradually built up during the first half of the nineteenth century by Captain BEECHEY, Captain KRUSENSTERN, Captain (afterwards Admiral) DU PETIT THOUARS of the French frigate *La Vénus* and others. Captain BEECHEY in his "Voyage to the Pacific" stated that in both the Atlantic and Pacific Oceans there is "a north-easterly current between the Trade Winds" and estimated the strength as 13 miles per day for the Atlantic Ocean and 23 miles per day for the Pacific Ocean.

As showing how imperfect the knowledge of the currents of the North Pacific Ocean was at the middle of the nineteenth century the case of the barque *Emily* may be quoted from FINDLAY. She left Panama for San Francisco on March 7th, 1852, and after being out for 95 days put into San Blas with 19 of the passengers dead from starvation. The remaining passengers were then transferred to the *Archibald Gracie* and were 65 days more on passage to San Francisco during which 18 more persons died. The *Emily* steered a course which took her beyond the influence of the shore current and land wind by which alone she could have made progress.

The Arctic Ocean.—As stated above the Labrador Current was known, at any rate in the neighbourhood of Newfoundland, at the beginning of the seventeenth century. The outflow from the Arctic Ocean to the North Atlantic Ocean was known to Master ANTHONIE JACKSON who had a disputation with Sir HUMPHREY GILBERT in the presence of QUEEN ELIZABETH on the subject of a north-east passage to Cathay. He asserted that there came a continual swift stream or current through the Glacial Sea which bore to the westward.

According to RENNELL, the southerly set to the west of Spitsbergen which we now call the East Greenland Current was clearly established by the fate of the Dutch fleet in 1777, by the observations of Captain SCORESBY in 1804-17 and by the observations of Captain PARRY in 1818. In confirmation of a general westerly current along the north coasts of Siberia and Russia, RENNELL quotes the case of a Russian ship which was found cast away undamaged on the south coast of Spitsbergen in 1739. It appears highly probable that this was the ship of Lieutenant LAPTIEU who was on a voyage of discovery in 1739 and whose ship was frozen in and abandoned near the mouth of the River Indigirka in north-eastern Siberia.

Non-existent and Doubtful Currents.—With the knowledge that is now being accumulated as to the constant variations to which all currents are subject it is not surprising to find cases of supposed currents which have not stood the test of time. Too much reliance may have been placed on the observations of a single voyage or even on one or two isolated observations of strong current. As an example the ship *Mentor* in October, 1828, found easterly sets between Latitudes 21° S. and 26° S. in the South Pacific Ocean west of the region of the Humboldt Current. This supposed current, flowing to the south of and in opposition to the South Equatorial Current of the Pacific Ocean, was named the Mentor's Counter Current.

As an example of a doubtful current we may refer to the RENNELL Current which was supposed to flow in a north-westerly direction from Ushant past the Scillies. Major RENNELL brought forward a

considerable amount of evidence in favour of the existence of this current, at any rate as an intermittent flow, but modern investigation has not established it with certainty.

Certain names given in the early stages of current survey have become obsolete. Thus the name ROSSEL'S Drift was given by BERGHAUS in the early part of the nineteenth century to the north-westerly current flowing past the New Hebrides and New Caledonia. This current has now no special name being part of the South Equatorial Current of the Pacific Ocean.

General Current Charts.—Humboldt, when he started on his voyage to South America in 1799 was aware of the complete general circulation of the North Atlantic Ocean as we know it to-day. The first comprehensive account published of currents, those of the Atlantic Ocean and also the Agulhas Current, was given in Major RENNELL'S book published in 1832, referred to above. The book was accompanied by a set of large current charts. These charts contain many thousands of carefully plotted wind and current arrows, together with occasional large arrows placed to indicate the general flow of current. The direction of the current arrow shows the set, and the drift is given in figures. This method of delineating currents has persisted to quite recent times. As regards both the charts and the account of the currents given in the book, this work was far in advance of the general knowledge of currents at that time. It was also the first general current atlas. An account of Major RENNELL'S life and work will be found in THE MARINE OBSERVER, May, 1932, page 94. In that article a section of the chart of the North Atlantic Ocean was reproduced, showing the Gulf Stream in the neighbourhood of Florida. The index chart showing the general circulation of the Atlantic Ocean was also reproduced. In this chart all the main currents are shown essentially as we know them to-day and the circulation in the South Atlantic is indicated in its entirety. The only real differences from modern charts appear in the North Atlantic where the south-westerly flow in the Trade Wind region west of Cape Verde Islands is not shown as passing gradually into the Equatorial Current. It is interrupted by a north-westerly current flowing between Longitudes 30° W. and 40° W. which RENNELL called the N.W. Equatorial Stream. The Gulf Stream flowing eastwards across the ocean as the North Atlantic Drift is shown as ending west of the Azores. The circulation of the ocean is therefore incomplete. In the book, besides the descriptions of the main currents, various counter-currents are referred to, such as those of the Gulf Stream and Agulhas Currents.

Lieutenant M. F. MAURY, U.S.N., was appointed in charge of the U.S. Depot of Charts and Instruments in 1841, from which department the U.S. Naval Observatory and the Hydrographic Office were developed. In 1845 and succeeding years MAURY issued the well-known Wind and Current Charts. On these charts actual currents observed were shown by current arrows, with the drift in figures, as in the case of RENNELL'S charts, the entire track of each ship being also shown. RENNELL showed only a few ship tracks. MAURY'S charts cover all the main oceans but the mean sets are not indicated by larger arrows in the way that RENNELL did on his charts.

In the Admiralty Current Charts, published at the end of the nineteenth century, the same method was used but many more observations were plotted and no ship tracks shown. This work was carried out in the Marine Division of the Meteorological Office. Estimated mean sets were shown by small arrows but the number of these is so great that it is difficult in many regions to follow the flow of the main currents. Drifts were indicated by giving the extreme values, thus "0-25," "10-40," etc.

The United States Pilot Charts of the various oceans show the mean flow of current by arrows and for a part of the North Atlantic and North Pacific Oceans drift and variations.

In the Dutch Oceanographical and Meteorological Charts now being issued by the Koninklijk Nederlandsch Meteorologisch Instituit, more definite information is given, derived by statistical methods. There are two charts for each ocean monthly. On one is given, for areas of 2° square, the mean set and the approximate mean drift and on the other roses for larger areas showing the percentage of current flowing in different directions. The mean velocity of the current flowing in any given direction is indicated in the roses by the thickness of the arrows. These charts are compiled from the observation of Dutch ships with a proportion of ships of other countries for the years 1870-1922.

THE MARINE OBSERVER Charts and new style of atlas, publication of which was begun in 1924, carry the exact charting of currents a stage further. While the general plan of showing mean resultant current by arrows on one chart and the variability of current by roses on another chart is the same, there are several differences from the Dutch charts. The lengths of the mean arrows are proportional to the mean drifts and the mean drifts are exactly indicated by figures, as also is the number of observations. Furthermore the current roses instead of giving merely the mean drift of all current flowing in a certain direction, show the percentages of current of different strength flowing in that direction. Information of actual maximum drifts observed is also given.

General Summary.—In conclusion it will be interesting to recapitulate briefly the six main landmarks in the history of the survey and charting of ocean currents:—

1. The first definite discovery and description of an important current was that of the North Equatorial Current of the Atlantic Ocean by COLUMBUS at the end of the fifteenth century.

2. The invention of the chronometer by HARRISON in 1765.

3. FRANKLIN'S and BLAGDEN'S work on the Gulf Stream and RENNELL'S work on the Agulhas Current, towards the end of the eighteenth century, were the first current investigations of a scientific character.

4. The current charts of Major RENNELL, published in 1832, in the preparation of which the collection of a large number of current observations was made for the first time.

5. The current and wind charts of Lieut. MAURY which were the first produced by the organised work of a state service and also the first which were distributed to seamen on an extended scale, in return for the provision of observations.

6. THE MARINE OBSERVER Current Charts and new style of atlas which gave for the first time information of both the mean current and the variation of current in each area, but it must always be remembered that owing to the unavoidable inaccuracies of observation of current in the only method now available to any extent these variations may in fact be less or greater than indicated.

SOUTHERN ICE REPORT.

During the Year 1932.

January.

Year.	Day.	Position of Ice. Latitude.	Position of Ice. Longitude.	Description.	Remarks.	Name of Ship reporting.
1932	16	52° 13′ S.	87° 37′ E.	Berg	125 feet high, 680 feet long	M.V. *Otaio*.
	16	52° 15′ S.	88° 21′ E.	Berg and growlers	Berg 175 feet high, with growlers to the eastward ...	do.
	16	52° 10′ S.	89° 23′ E.	Berg	... ...	do.
	16	52° 12′ S.	90° 45′ E.	Berg	... ...	do.
	16	52° 01′ S.	92° 04′ E.	Berg and growlers	Berg 60 feet high, 360 feet long, with growlers to the eastward.	do.
	17	52° 17′ S.	93° 11′ E.	Berg and growlers	Berg 300 feet high, with growlers to the northward ...	do.
	17	52° 32′ S.	95° 14′ E.	Berg	300 feet high	do.
	28	From 58° 12′ S. to 56° 55′ S.	36° 10′ W. 36° 04′ W.	40 bergs	Within 10 miles of track. One large tabular, about 1,500 feet long. Of the remainder, 6 were moderate-sized tabulars, and all the rest much weathered and seaworn, and of moderate size or small.	R.R.S. *Discovery II*.
	28	From 59° 29′ S. to 58° 12′ S.	36° 07′ W. 36° 10′ W.	49 bergs	Within 10 miles of track. Nine tabulars, none of them very large and several breaking down in places. One berg was very high, about 280 feet with three square towers rising from a low base. Of the rest, the majority were small and much seaworn or weathered.	do.
	27	From 60° 34′ S. to 59° 29′ S.	36° 06′ W. 36° 07′ W.	19 bergs	Within 10 miles of track. Three moderate sized tabulars, the remainder small and much sea-worn. One small totally bottle-green berg was seen, and one half green and half white.	do.
	27	From 61° 23′ S. to 60° 34′ S.	36° 04′ W. 36° 06′ W.	Drift ice and 5 bergs	Several straggling streams and loose patches of drift ice were passed, consisting of remains of very heavy old floes, of which most were deeply overcut and stood several feet out of the water. The sea was generally studded with detached floes. North of the last position no more drift ice was seen. Bergs were of moderate size, and three of them tabulars about 120 feet high.	do.
	28	From 56° 55′ S. to 56° 09′ S.	36° 04′ W. 35° 57′ W.	5 bergs	Within one mile of track. All of moderate size, one tabular, the remainder irregular and weathered.	do.
	5	From 54° 08′ S. to 54° 00′ S.	36° 00′ W. 35° 02′ W.	9 bergs	Within 12 miles of track, on either side. Two broken-down tabulars, all the remainder irregular, and all of moderate size.	do.
	29	From 56° 09′ S. to 55° 33′ S.	35° 57′ W. 35° 52′ W.	5 bergs	Within 2 miles of track. One moderate sized tabular, remainder all small and weathered.	do.
	29	Within 30 mile radius of S. Eastern end of S. Georgia.		66 bergs	Several large tabulars, the remainder usually irregular and waterworn. The number of bergs in this vicinity is considerably fewer than the number seen here in the middle of December.	do.
	27	From 61° 47′ S. to 61° 24′ S.	35° 54′ W. 36° 03′ W.	Pack-ice, drift-ice and 3 bergs	Between these positions, light pack and drift were worked through. The pack consisted of a few old floes bound together with sheets of young ice a few inches thick, with frequent leads and pools. Bergs were on the last position, and were wall-sided with irregular top surfaces, and all of moderate size.	do.
	29	From 15 miles N.E. of Cape Charlotte. to 2 miles N. of Larsen Pt.		10 bergs	Off the coast. Half of moderate size and half small and all weathered, seaworn and irregular.	do.
	26	From 62° 21′ S. to 61° 47′ S.	35° 21′ W. 35° 54′ W.	Pack-ice	From the first position to Lat. 62° 13′ S., Long. 35° 45′ W., vessel was worked through heavy close pack, consisting of large old hummocked floes bound together with large sheets of young ice, where the nature of the ice changed, and smaller, closely packed floes of very heavy ice were met. Some of these floes stood 4 to 6 feet out of the water, and were more than 20 feet thick. After passing Lat. 62° 00′ S., Long. 35° 51′ W., lighter and looser pack was met with frequent patches of thin young ice and more workable leads. No bergs seen to-day.	do.
	6	From 54° 00′ S. to 53° 52′ S.	35° 02′ W. 34° 05′ W.	5 bergs	Within 5 miles of track. Two large tilted tabulars, each about 1,500 feet long, the remainder broken down tabulars of moderate size.	do.
	25	From 62° 58′ S. to 62° 24′ S.	34° 26′ W. 35° 12′ W.	Heavy pack-ice and 4 bergs	Ice to-day of a similar nature to yesterday's. Vessel stopped in a lead at last position. Bergs within a 10 mile radius of position. Two moderate-sized tabulars and two small seaworn bergs.	do.
	6	From 53° 52′ S. to 53° 49′ S.	34° 05′ W. 33° 02′ W.	15 bergs	Within 10 miles of track. Two large tabulars. 9 bergs of moderate size, 3 of them tabular, and 4 small and seaworn.	do.
	24	From 63° 35′ S. to 63° 14′ S.	33° 41′ W. 34° 02′ W.	Heavy pack-ice and 6 bergs	Vessel was worked through leads in heavy consolidated pack ice till last position, when stopped in a short lead for rudder repairs. The floes comprising this pack were very large, some several miles in extent, and usually much hummocked and pressured. During the day, pancake ice formed at the edges of the floes in the lead in which the ship lay. Bergs were within 10 miles of track. Two of them were tabular, about 60 feet high, and the remainder of moderate size and seaworn.	do.
	6	From 53° 49′ S. to 53° 44′ S.	32° 56′ W. 32° 11′ W.	12 bergs	Within 10 miles of track. Two broken-down tabulars, the remainder weathered and irregular. All of moderate size.	do.
	23	From 64° 56′ S. to 63° 35′ S.	32° 46′ W. 33° 41′ W.	Pack ice and 12 bergs	Vessel was worked through pack ice, generally heavy. Until Lat. 64° 10′ S., Long. 33° 12′ W., the pack was mostly compact and leads few and short, and the floes cemented together by young ice a few inches thick. After this, the nature of the ice changed; heavy unbroken floes, hummocked in places, and often several square miles in area, prevailing. Leads were plentiful and broad, and usually connected. Bergs were within 5 miles of track. All of them were of moderate size, low, and of old appearance. Two tabulars, about 40 feet high, were passed.	do.
	6	From 53° 44′ S. to 53° 44′ S.	32° 11′ W. 31° 02′ W.	40 bergs	Within 12 miles of track. 5 large, well-preserved tabulars, all about 150 feet high, and 3 of them ½ to ¾ of a mile long; 15 bergs of moderate size, mainly broken-down tabulars, and the remainder small and much weathered.	do.
	6	53° 45′ S.	30° 56′ W.	Berg	160 feet high, 2,000 feet long, and tabular	do.
	7	From 53° 46′ S. to 53° 47′ S.	29° 02′ W. 28° 16′ W.	5 bergs	Within 5 miles of track. One large tabular, two moderate-sized weathered bergs, two small. Several growlers passed.	do.
	22	From 65° 45′ S. to 65° 33′ S.	28° 47′ W. 31° 24′ W.	Drift ice	An almost ice-free sea was traversed, only occasional thin streams of drift, usually to southward, being met.	do.
	22	From 65° 33′ S. to 65° 01′ S.	31° 24′ W. 32° 31′ W.	11 bergs, pack ice and drift	Vessel was worked through pack-ice, of varying quality, but generally close and with very few leads. This pack consisted of a skeleton of scattered heavy floes, bound together by young ice, some about 2 feet thick and some of very recent origin, probably only a few days old, and about 4 inches thick. Bergs were within 3 miles of track. Eight were small and seaworn, and three tabular, the largest being in sight at noon. This berg was a mile long, and 120 feet high, and was moving E.N.E. with the current at the rate of about 1½ knots, churning up and pressuring the sea-ice and leaving a broad wake behind it.	do.

Year.	Day.	Position of Ice. Latitude.	Position of Ice. Longitude.	Description.	Remarks	Name of Ship reporting.
1932	7	From 53° 47′ S. to 54° 14′ S.	28° 04′ W. 27° 46′ W.	10 Bergs	Within 8 miles of track. One large tabular, well-preserved, two tabulars of moderate size; 4 moderate-sized, and three small, irregular, and weathered bergs.	R.R.S. *Discovery II.*
	7	From 54° 14′ S. to 54° 47′ S.	27° 46′ W. 27° 41′ W.	13 bergs	Within 7 miles of track. Three large well-preserved tabulars the largest about 2,000 feet long; two tilted tabulars of moderate size; the remainder mainly small and much weathered.	do.
	8	From 54° 44′ S. to 54° 47′ S.	27° 20′ W. 26° 12′ W.	14 bergs	Within 2-5 miles of track. Three moderate-sized and broken-down tabulars; the rest mainly small and much weathered and seaworn.	do.
	21	From 67° 13′ S. to 65° 45′ S.	26° 17′ W. 28° 47′ W.	84 bergs, drift-ice and loose pack ...	The vessel was worked through alternating belts of loose pack and drift ice. Navigable water was usually available and good speed was maintained, the ice being strung out in streams and straggling patches, here and there forming compact fields. Floes were variable in character, but mainly moderately heavy. A good percentage of floes of young ice a few inches thick were in the streams, and a number of old, pressured floes. Bergs were within 10 miles of track, to Lat. 66° 15′ S. Long. 27° 00′ W., none being seen after. Three of them were low tabulars, 50 feet high and of moderate area, and the remainder nearly all small and seaworn. At the last position an almost ice-free sea to the North and West was met, only a few straggling thin streams and some detached floes being in sight.	do.
	8	54° 46′ S.	24° 55′ W.	Berg	140 feet high and 1,200 feet long, and irregular	do.
	8	54° 44′ S.	24° 30′ W.	6 bergs	Within a 4 mile radius of position, mainly to Northward. Nearly all small.	do.
	9	From 54° 45′ S. to 54° 42′ S.	24° 30′ W. 24° 09′ W.	4 bergs	Within one mile of track. One small, three of moderate size and all much weathered.	do.
	20	From 69° 14′ S. to 67° 13′ S.	24° 28′ W. 26° 17′ W.	168 bergs, drift ice and loose pack ...	The vessel traversed leads in drift ice and loose pack, on various courses. At first the ice was very open and straggling, but afternoon became more compact, and lay in streams and broad fields irregularly disposed all around. All the sea ice encountered to-day was much lighter than that met further south and a fair percentage of the floes were unpressured. A considerable quantity of very young ice, varying in thickness from an inch to four inches or so, was noted. Bergs were within 12 miles of track, fairly evenly distributed. None of them was very large. About one-third were tabulars, varying in height from thirty to seventy feet and of old appearance.	do.
	9	From 54° 40′ S. to 54° 34′ S.	23° 37′ W. 22° 28′ W.	15 bergs	Within 3 miles of track. Two moderate-sized tabulars, 6 moderate sized and 7 small, weathered bergs.	do.
	11	From 53° 44′ S. to 54° 22′ S.	23° 20′ W. 23° 17′ W.	18 bergs	Within 12 miles of track. Five large tabulars, averaging 800 feet in length, and two of them of great height estimated 280 to 300 feet, three large irregulars, and the remainder all of moderate size and weathered.	do.
	11	From 54° 22′ S. to 54° 46′ S.	23° 17′ W. 22° 38′ W.	40 bergs	Within 12 miles of track. 4 tabulars, none of any great size. Of the remainder, about half were of moderate size and half, small, and all weathered and irregular. One berg was half bottle-green and half white.	do.
	15	From 61° 29′ S. to 63° 06′ S.	23° 16′ W. 23° 00′ W.	Drift ice and 7 bergs	Throughout the day, the ship was worked through leads and pools in drift-ice, rather denser than that met yesterday, and occasionally packed into fields several miles across. Leads were broad and frequent, however. The floes composing this drift were of very varying quality, but none were very heavy, though floes several acres in extent were numerous. Only seven bergs were seen within 5 miles of track all day, and they were all of moderate size, weathered, and of very old appearance.	do.
	19	From 69° 27′ S. to 69° 14′ S.	23° 15′ W. 24° 28′ W.	Drift ice, consolidated pack and 143 bergs	Drift ice became more compact, though still with leads, to Lat. 70° 01′ S., Long. 22° 53′ W., when the edge of consolidated pack was encountered. The field stretched away to the southward, unbroken as far as the eye could see, and several miles of its edge were examined, and did not show any signs of a crack or lead. The ice was very heavy, and its surface was a perfect maze of pressure ridges and hummocks. From Lat. 70° 00′ S. Long. 24° 20′ W., devious courses were steered in leads among large floes, some of them several miles in extent, to Lat. 69° 40′ S. Long. 25° 26′ W., and then loose drift-ice, in irregular ragged streams and detached floes, was traversed. Bergs seen to-day were within 10 miles of track. About 20 were tabular, although only one of new appearance. One tabular was 6 miles long and 60 feet in height. The remainder were nearly all small and weathered, and seaworn.	do.
	14	61° 29′ S.	23° 07′ W.	Berg	Berg weathered and worn of moderate size	do.
	16	From 63° 06′ S. to 64° 56′ S.	23° 00′ W. 23° 13′ W.	Drift ice and 137 bergs	Throughout the day, leads and pools in drift ice were traversed. Ice was of a similar nature to that observed yesterday. At times broad stretches of open sea several miles across were met, and leads were generally frequent and open. Within 10 miles of track, 137 bergs were seen during the day, fairly evenly distributed. The majority of these were small, broken down, and very old but eight tabulars were seen, of which none was more than 800 feet long, and they were very uniform in height—about 80 feet. Some of the sea-ice seen during the day, though not very heavy, showed signed of pressure, some floes being considerably rafted and hummocked.	do.
	17	From 64° 58′ S. to 66° 57′ S.	23° 00′ W. 22° 38′ W.	Drift ice and 291 bergs	Between these positions, drift ice was navigated, in similar circumstances to that met on the 16th. A southerly wind had broken up the streams, which were very ragged, and the clear water was littered with loose floes. The majority of the floes seen to-day though not very heavy, had been subjected to pressure. Bergs were within 10 miles of track, and most of them were small and weathered. About 30 tabulars were seen, mainly low bergs about 30 feet high, and the largest half a mile long. Several quite large sea-worn irregular bergs were observed.	do.
	18	From 66° 56′ S. to 69° 27′ S.	22° 41′ W. 23° 15′ W.	Drift ice and 88 bergs	Drift ice of a similar nature to yesterday's was traversed to Lat. 68° 09′ S., Long. 22° 02′ W. After noon, open sea was met, but the sea was thinly dotted with detached floes, most of them heavy. After passing Lat. 68° 54′ S., Long. 22° 34′ W., ice became more frequent, and the floes were compacted in streams and patches, though broad open leads were plentiful. This ice was heavier than that met hitherto, and many of the floes were rafted by pressure to a height of 10 feet or more. Bergs were within 10 miles of track, mainly small and weathered. Several moderate sized, low tabulars were observed.	do.
	11	From 53° 25′ S. to 53° 44′ S.	22° 48′ W. 23° 20′ W.	9 bergs	Within 7 miles of track. All these bergs were small, weathered and water-worn; none over 150 feet in length.	do.

Year.	Day.	Position of Ice. Latitude.	Position of Ice. Longitude.	Description.	Remarks.	Name of Ship reporting.
1932	11	From 54° 46′ S. to 55° 08′ S.	22° 38′ W. 21° 49′ W.	57 bergs	Within 12 miles of track. One large tabular, half-a-mile long; six tabulars of moderate size. All the remainder were weathered and irregular, and about half of them were moderate size, and half small.	R.R.S. *Discovery II.*
	9	From 54° 33′ S. to 54° 28′ S.	22° 25′ W. 21° 28′ W.	19 bergs	Within 6 miles of track. One large tabular, one large, high, pinnacled berg. Of the remainder, 7 were of moderate size and 10 small, and all irregular, weathered, and sea-worn. Two bottle-green growlers were passed and one small low, light-green berg. One small sea-worn berg had a band of dark yellow-green discoloration, 6 feet wide, across its middle.	do.
	14	From 60° 03′ S. to 60° 59′ S.	22° 22′ W. 22° 31′ W.	11 bergs and drift ice	Bergs within 2 miles of track. Two old, moderate-sized tabulars, the remainder all small. Drift ice, in streams and irregular patches, on either hand throughout the day; ice of very varying quality. Some floes were very heavy and deeply snow-covered, some of moderately heavy ice, and a large number of young, soft ice only 6 or 9 inches thick and often of considerable area.	do.
	10	From 53° 28′ S. to 53° 25′ S.	22° 05′ W. 22° 48′ W.	7 bergs	Within 4 miles of track. Three moderate sized and irregular, the remainder not clearly visible, but none of any great size.	do.
	13	From 59° 21′ S. to 59° 54′ S.	21° 57′ W. 22° 20′ W.	59 bergs and drift ice	Bergs within 7 miles of track. Five large tabulars, none over 120 feet in height or half-a-mile in length. Several other tabulars of moderate size, but the majority of bergs were weathered and broken down, and small or of moderate size. One small bottle-greeny seen. Throughout the day, the ship, on a general southerly course, traversed broad sheets of open water between loose streams and patches of drift ice. This ice mainly consisted of fairly heavy, unpressured floes, some of them of considerable area.	do.
	11	From 55° 08′ S. to 55° 30′ S.	21° 49′ W. 21° 02′ W.	82 bergs	Within 12 miles of track. Several large tabulars, the largest about a mile long. Two remarkable, large bergs were passed in the first position. In both these bergs, from broad, low, bases about 20 feet above sea level, rose two great square flat-topped towers, 230 feet high. Of the rest, about half were tabular and half irregular and weathered, and mainly of moderate size. All the bergs passed this watch were of newer appearance than those observed previously during the day.	do.
	13	From 58° 49′ S. to 59° 21′ S.	21° 42′ W. 21° 57′ W.	113 bergs and drift-ice	Bergs within 12 miles of track. Four large tabulars, averaging 1,200 feet in length, most of the remainder small. All bergs towards the end of the watch, were small. Three bottle-greenies were seen—one having two green strata contained in an associated white portion.	do.
	13	From 57° 55′ S. to 58° 38′ S.	21° 37′ W. 21° 39′ W.	60 bergs and drift ice	Bergs within 12 miles of track. Eight large tabulars, averaging 180 feet in height, though none over half a mile in length. most of the remainder fairly small, and weatherworn and waterworn. One small bottle-greeny.	do.
	9	From 54° 28′ S. to 54° 26′ S.	21° 28′ W. 21° 06′ W.	15 bergs	Within 8 miles of track. One large tabular, about 120 feet high and 1,200 feet long; four bergs of moderate size and 10 small—all these being irregular and weathered. One small low bottle-greeny 15 feet high and 80 feet long was passed.	do.
	13	From 57° 31′ S. to 57° 55′ S.	21° 23′ W. 21° 37′ W.	71 bergs and drift ice	Bergs within 12 miles of track. Mainly small and broken down; only one large tabular seen. Two small bottle-greenies. During the watch on a S. by W. course, drift ice, of a similar nature to that encountered last watch, but more thickly distributed, was traversed.	do.
	10	From 53° 43′ S. to 53° 28′ S.	21° 09′ W. 22° 05′ W.	44 bergs	Within 10 miles of track. Six tabulars, all the rest weathered and irregular. Ten of these bergs were fairly large, the largest about 1,000 feet long; all the remainder of moderate size, or small.	do.
	9	From 54° 26′ S. to 54° 20′ S.	21° 06′ W. 20° 06′ W.	3 bergs	Within 6 miles of track. One large weathered berg; two small and seaworn.	do.
	12	From 55° 30′ S. to 55° 53′ S.	21° 02′ W. 20° 16′ W.	38 bergs	Within 12 miles of track. Five large tabulars, the largest about a mile long; the remainder of various sizes and shapes, mainly moderate sized irregulars.	do.
	12	From 57° 06′ S. to 57° 27′ S.	20° 48′ W. 21° 29′ W.	106 bergs and drift-ice	Bergs within 12 miles of track. Only one large tabular, the remainder being all of moderate size or small, and mainly weathered and irregular. 6 small bottle-greenies were seen. Throughout the watch, on various S.W.'ly courses, the track lay through drift ice, consisting of detached patches and loose streams, the clear water also being studded with detached floes. The floes comprising this drift ice were in nearly all cases heavy, unpressured, and deeply overcut, with a deep covering of hardened snow. In spite of the heaviness of the ice, there were no indications of previous screwing or rafting to be seen.	do.
	12	From 55° 53′ S. to 56° 41′ S.	20° 16′ W. 20° 38′ W.	119 bergs	Within 12 miles of track. About a third of these bergs were tabular though none of any great size. The remainder were half of moderate size and half small, and weathered and waterworn. Two were small bottle-greenies, and two white bergs, with bottle-green portions, the customary sharp line of demarcation being present.	do.
	12	From 56° 41′ S. to 57° 06′ S.	20° 38′ W. 20° 48′ W.	95 bergs	Within 15 miles of track. Ten large tabulars, between 1,000 and 4,000 feet long, and averaging 180 feet in height, two of them deeply caverned and of very old appearance. The remainder of various sizes and shapes, usually weathered and irregular. Three small bottle-greenies were passed. Several of the older bergs had weathered to a deep blue in places.	do.
	10	From 53° 56′ S. to 53° 43′ S.	20° 15′ W. 21° 09′ W.	29 bergs	Within 10 miles of track. Two large tabulars both about 1,000 feet long; 3 moderate sized tabulars; 15 moderate sized, and 9 small, irregular bergs.	do.
	10	From 54° 20′ S. to 54° 15′ S.	20° 06′ W. 19° 11′ W.	7 bergs	Within 8 miles of track. One large tabular, about 1,200 feet long; the rest all small and weathered.	do.
	10	From 54° 13′ S. to 53° 56′ S.	19° 18′ W. 20° 15′ W.	33 bergs	Within 10 miles of track. Two large, weathered bergs; 10 of moderate size, all the rest small. Only two tabulars were passed, and they were much broken-down; all the rest were water-worn and weathered in various forms.	do.

Reports of Ice previous to January, 1932, will be found in the Marine Observer, Vol. IX, No. 97, p. 12.

February, 1932.

Year.	Day.	Position of Ice. Latitude.	Position of Ice. Longitude.	Description.	Remarks.	Name of Ship reporting.
1932	20	52° 37′ S.	44° 25′ W.	Berg	Of moderate size, the first berg seen bound East	R.R.S. *Discovery II.*
	10	52° 34′ S.	44° 51′ W.	Berg	150 feet high, 300 feet long, broken down tabular	do.
	10	52° 39′ S.	43° 48′ W.	Berg	120 feet high, 400 feet long, and tabular	do.
	20	From 52° 48′ S. to 52° 59′ S.	43° 04′ W. to 41° 49′ W.	33 bergs	At first position, met a mass of bergs, about 20 in all, bunched together. They were much broken down in grinding together, but several had been tabulars. They occupied about 3 square miles. The remaining 13 bergs were passed within 2 miles of track. Two were moderate sized tabulars, the remainder all small and weathered. After this, fog prevailed all day.	do.
	10	From 52° 48′ S. to 52° 41′ S.	42° 45′ W. to 43° 40′ W.	5 bergs	Within 10 miles of track. Three of moderate size, two small and all broken down.	do.
	10	From 52° 56′ S. to 52° 48′ S.	41° 50′ W. to 42° 45′ W.	11 bergs	Within 10 miles of track. Five of these were tabular, and two about one mile in length, and one about 5 miles square and 130 feet high estimated. The remaining six were of moderate size and irregular.	do.
	10	From 53° 00′ S. to 52° 56′ S.	41° 24′ W. to 41° 50′ W.	3 bergs	Within one mile of track. Character inderterminable in thick weather, but none of any great size.	do.
	9	From 53° 08′ S. to 53° 00′ S.	40° 35′ W. to 41° 24′ W.	28 bergs	Within 10 miles of track. The majority of these were broken down tabulars, none of any great area, though several were about 200 feet high.	do.
	9	From 53° 15′ S. to 53° 08′ S.	39° 48′ W. to 40° 35′ W.	8 bergs	Within 6 miles of track. Three broken down tabulars of moderate size, 3 large irregular bergs and 2 small.	do.
	9	53° 20′ S.	39° 15′ W.	Berg	Of moderate size. Broken down tabular	do.
	9	53° 16′ S.	39° 42′ W.	Berg	160 feet high, 700 feet long and much weathered	do.
	21	From 53° 37′ S. to 53° 33′ S.	38° 14′ W. to 37° 45′ W.	4 bergs	Within 2 miles of track. One high peaked berg, the remainder small and much weathered. None over 200 feet in length.	do.
	9	53° 30′ S.	38° 08′ W.	Berg	Of moderate size and irregular	do.
	9	53° 24′ S.	38° 48′ W.	Berg	Of moderate size and pinnacled	do.
	9	53° 37′ S.	37° 16′ W.	Berg	Small and weathered	do.
	22	From 54° 06′ S. to 53° 51′ S.	36° 11′ W. to 35° 30′ W.	3 bergs	Within 2 miles of track. One small, two moderate-sized broken down tabulars.	do.
	23	53° 36′ S.	34° 43′ W.	Berg	Weathered and irregular	do.
	23	From 53° 24′ S. to 52° 57′ S.	34° 09′ W. to 32° 54′ W.	15 bergs	Within 12 miles of track. Two large tabulars, the larger about one mile long and 140 feet high; the remainder nearly all small and much weathered and broken down.	do.
	23	From 52° 57′ S. to 52° 38′ S.	32° 54′ W. to 31° 59′ W.	6 bergs	Within 12 miles of track. Four large tabulars between ½ and one mile in length, and two weathered bergs of moderate size, breaking down and littering the sea in their vicinity with growlers and brash ice.	do.
	23	From 52° 38′ S. to 52° 17′ S.	31° 59′ W. to 31° 01′ W.	7 bergs	Within 12 miles of track. Two large tabulars, both about 1,500 feet long. Of the remainder, three were of moderate size and two small, and all much weathered.	do.
	23	52° 11′ S.	31° 30′ W.	Berg	50 feet high and 150 feet long and weathered	do.
	24	From 52° 05′ S. to 51° 23′ S.	30° 27′ W. to 28° 34′ W.	6 bergs	Within 10 miles of track. Two tabulars of moderate size, all the rest small and much weathered.	do.
	24	51° 19′ S.	28° 20′ W.	Berg	120 feet high and 500 feet long and tabular	do.
	24	51° 09′ S.	27° 51′ W.	Berg	Irregular and broken down	do.
	24	From 51° 03′ S. to 50° 40′ S.	27° 38′ W. to 26° 28′ W.	7 bergs	Within 12 miles of track. Three moderate sized tabulars, two weathered bergs of moderate size, and two small pinnacled bergs.	do.
	25	49° 59′ S.	24° 07′ W.	Berg	Large, weathered and irregular	do.
	25	49° 42′ S.	23° 38′ W.	Berg	Of moderate size and irregular	do.
	25	49° 27′ S.	22° 55′ W.	Berg	60 feet high, 120 feet long. Pinnacled and small. The last berg seen.	do.

Reports of Ice sighted in the month of February in years previous to 1932 which have not previously been published in The Mariner Observer.

1930	11	53° 52′ S.	35° 28′ W.	Ice in vicinity		R.R.S. *Discovery II.*
	8	55° 20′ S.	34° 37′ W.	Several bergs		do.
	10	53° 49′ S.	34° 03′ W.	Many bergs		do.
	23	55° 32′ S.	33° 28′ W.	Ice island	4 a.m. 2 miles distant from E.N.E. through S.E. to S.W. end in 5.15 a.m. Entire watch spent coasting along ice island.	do.
	23	55° 10′ S.	32° 41′ W.	Ice island	8 a.m. In lee of berg	do.
	23	55° 07′ S.	32° 12′ W.	Ice island	Noon. Sheltering in lee of ice island 60–70 miles long	do.
	23	55° 07′ S.	32° 12′ W.	Ice island and bergs	4 p.m. In lee of ice island and surrounded by bergs 1–5 miles distant.	do.
	23	55° 07′ S.	32° 12′ W.	Ice island	8 p.m. In lee of ice island	do.
	24	55° 07′ S.	32° 12′ W.	Ice island	8 a.m. Continued in lee of ice island	do.
	24	55° 55′ S.	32° 33′ W.	Large tabular berg		do.
	25	From 55° 55′ S. to 55° 57′ S.	32° 33′ W. to 31° 57′ W.	Many bergs		do.
	24	55° 17′ S.	32° 18′ W.	Many bergs		do.
	25	55° 57′ S.	31° 57′ W.	Loose pack ice	Sheet of loose pack ice to Southward	do.
	25	55° 58′ S.	31° 38′ W.	Large tabular berg	1 mile long, others in vicinity	do.
	25	56° 00′ S.	29° 47′ W.	Several icebergs		do.

Reports of Ice previous to February, 1932, will be found in The Marine Observer, Vol. IX, No. 98, p. 40.

March, 1932.

None received.

Reports of Ice sighted in the month of March in years previous to 1932 which have not previously been published in The Marine Observer.

1930	22	55° 43′ S.	41° 39′ W.	Several bergs		R.R.S. *Discovery II.*
	21	57° 47′ S.	40° 49′ W.	Many bergs in vicinity		do.
	21	57° 52′ S.	38° 49′ W.	Many bergs		do.
	20	57° 58′ S.	36° 16′ W.	Several bergs		do.
	20	From 57° 59′ S. to 57° 59′ S.	34° 46′ W. to 35° 36′ W.	Many bergs		do.
	17	E. of Vindication Island.		Several bergs in vicinity		do.
	13	Off Northern end of Bristol Island.		26 bergs	Stranded off Northern end of island	do.
	5	59° 22′ S.	27° 09′ W.	Many bergs in vicinity		do.
	9	59° 17′ S.	26° 57′ W.	Many bergs		do.
	2	57° 03′ S.	26° 46′ W.	Many bergs and small ice in vicinity		do.
	11	59° 00′ S.	26° 32′ W.	Many bergs		do.

Reports of Ice previous to March, 1932, will be found in The Marine Observer, Vol. IX, No. 99, p. 61.

MARINE METEOROLOGY AND SAFE NAVIGATION.

Extracts from Merchant Shipping (Safety and Load Line Conventions) Act, 1932.

First Schedule.

International Convention for the Safety of Life at Sea, 1929.

Article 33.

Application.

The provisions of this Chapter referring to ships, unless otherwise expressly provided, apply to all ships on all voyages.

Article 34.

Danger Messages.

The master of every ship which meets with dangerous ice, a dangerous derelict, a dangerous tropical storm or any other direct danger to navigation is bound to communicate the information by all the means of communication at his disposal, to the ships in the vicinity, and also to the competent authorities at the first point of the coast with which he can communicate. It is desirable that the said information be sent in the manner set out in Regulation XLVI.*

Each Administration will take all steps which it thinks necessary to ensure that when intelligence of any of the dangers specified in the previous paragraph is received, it will be promptly brought to the knowledge of those concerned and communicated to other Administrations interested.

The transmission of messages respecting the dangers specified is free of cost to the ships concerned.

Article 35.

Meteorological Services.

The Contracting Governments undertake to encourage the collection of meteorological data by ships at sea, and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation.

In particular, the Contracting Governments undertake to co-operate in carrying out, as far as practicable, the following meteorological arrangements:—

(*a*) To warn ships of gales, storms and tropical storms, both by the issue of wireless messages and by the display of appropriate signals at coastal points:

(*b*) To issue daily, by radio, weather bulletins suitable for shipping, containing data of existing weather conditions and forecasts:

(*c*) To arrange for certain selected ships to take meteorological observations at specified hours, and to transmit such observations by wireless telegraphy for the benefit of other ships and of the various official meteorological services; and to provide coast stations for the reception of the messages transmitted:

(*d*) To encourage all ship-masters to inform surrounding ships whenever they experience wind force of 10 or above on the Beaufort scale (force 8 or above on the decimal scale).

The information provided for in paragraphs (*a*) and (*b*) of this Article will be furnished in form for transmission in accordance with Article 31, sections 1, 3 and 5, and Article 19, section 25, of the General Regulations annexed to the International Radiotelegraph Convention, Washington, 1927, and during transmission "to all stations" of meteorological information, forecasts and warnings, all ship stations must conform to the provisions of Article 31, section 2, of those General Regulations.

Weather observations from ships addressed to national meteorological services will be transmitted with the priority specified in Article 3, Additional Regulations, International Radiotelegraph Convention, Washington, 1927.

Forecasts, warnings, synoptic and other meteorological reports intended for ships shall be issued and disseminated by the national service in the best position to serve various zones and areas, in accordance with mutual arrangements made by the countries concerned.

* See page 27.

Every endeavour will be made to obtain a uniform procedure in regard to the international meteorological services specified in this Article, and, as far as is practicable, to conform to the recommendations made by the International Meteorological Organization, to which organization the Contracting Governments may refer for study and advice any meteorological questions which may arise in carrying out the present Convention.

Article 36.

Ice Patrol. Derelicts.

The Contracting Governments undertake to continue a service of ice patrol and a service for study and observation of ice conditions in the North Atlantic. Further, they undertake to take all practicable steps to ensure the destruction or removal of derelicts in the northern part of the Atlantic Ocean east of the line drawn from Cape Sable to a point in latitude 34° N., longitude 70° W., if this destruction or removal is considered necessary at the time.

The Contracting Governments undertake to provide not more than three vessels for these three services. During the whole of the ice season they shall be employed in guarding the south-eastern, southern and south-western limits of the regions of icebergs in the vicinity of the Great Bank of Newfoundland for the purpose of informing trans-Atlantic and other passing vessels of the extent of this dangerous region; for the observation and study of ice conditions in general; for the destruction or removal of derelicts; and for the purpose of affording assistance to vessels and crews requiring aid within the limits of operation of the patrol vessels.

During the rest of the year the study and observation of ice conditions shall be maintained as advisable, and one vessel shall always be available for the search for, and destruction or removal of derelicts.

Article 37.

Ice Patrol. Management and Cost.

The Government of the United States is invited to continue the management of these services of ice patrol, study and observation of ice conditions, and derelict destruction and removal. The Contracting Governments specially interested in these services, whose names are given below, undertake to contribute to the expense of maintaining and operating these services in the following proportions:—

	Per cent.
Belgium	2
Canada	3
Denmark	2
France	6
Germany	10
Great Britain and Northern Ireland	40
Italy	6
Japan	1
Netherlands	5
Norway	3
Spain	1
Sweden	2
Union of Socialist Soviet Republics	1
United States of America	18

Each of the Contracting Governments has the right to discontinue its contribution to the expense of maintaining and operating these services after the 1st September, 1932. Nevertheless, the Contracting Government which avails itself of this right will continue responsible for the expense of working up to the 1st September following the date of giving notice of intention to discontinue its contribution. To take advantage of the said right it must give notice to the other Contracting Governments at least six months before the said 1st September; so that, to be free from this obligation on the 1st

September, 1932, it must give notice on the 1st March, 1932, at the latest, and similarly for each subsequent year.

If, at any time, the United States Government should not desire to continue these services, or if one of the Contracting Governments should express a wish to relinquish responsibility for the pecuniary contribution defined above, or to have its percentage of obligation altered, the Contracting Governments shall settle the question in accordance with their mutual interests.

The Contracting Governments which contribute to the cost of the three above-mentioned services shall have the right by common consent to make from time to time such alterations in the provisions of this Article and of Article 36 as appear desirable.

Article 38.

Speed Near Ice.

When ice is reported on, or near, his course, the master of every ship at night is bound to proceed at a moderate speed or to alter his course so as to go well clear of the danger zone.

Article 39.

North Atlantic Routes.

The practice of following recognised routes across the North Atlantic in both directions has contributed to safety of life at sea, but the working of these routes should be further investigated and studied with a view to the introduction of such variations as experience may show to be necessary.

The selection of the routes and the initiation of action with regard to them is left to the responsibility of the steamship companies concerned. The Contracting Governments will assist the companies, when requested to do so, by placing at their disposal any information bearing on the routes which may be in the possession of the Governments.

The Contracting Governments undertake to impose on the companies the obligation to give public notice of the regular routes which they propose their vessels should follow, and of any changes made in these routes; they will also use their influence to induce the owners of all vessels crossing the Atlantic to follow, so far as circumstances will permit, the recognised routes, and to induce the owners of all vessels crossing the Atlantic bound to or from ports of the United States via the vicinity of the Great Bank of Newfoundland to avoid, as far as practicable, the fishing banks of Newfoundland north of latitude 43° N. during the fishing season, and to pass outside regions known or believed to be endangered by ice.

The Administration managing the ice patrol service is requested to report to the Administration concerned any ship which is observed not to be on any regular, recognised or advertised route, or which crosses the above-mentioned fishing banks during the fishing season, or which, when proceeding to or from ports of the United States, passes through regions known or believed to be endangered by ice.

Regulation XLVI.

Transmission of Information.

The transmission of information regarding ice, derelicts, tropical storms or any other direct danger to navigation is obligatory. The form in which the information is sent is not obligatory. It may be transmitted either in plain language (preferably English) or by means of the International Code of Signals (Wireless Telegraphy Section). It should be issued CQ to all ships, and should also be sent to the first point of the coast to which communication can be made with a request that it be transmitted to the appropriate authority.

All messages issued under Article 34 of the present Convention will be preceded by the safety signal TTT followed by an indication of the nature of the danger, thus: TTT Ice; TTT Derelict; TTT Storm; TTT Navigation.

Information Required.

The following information is desired, the time in all cases being Greenwich Mean Time:—

(*a*) *Ice, Derelicts and other Direct Dangers to Navigation.*

(1) the kind of ice, derelict or danger observed;

(2) the position of the ice, derelict or danger when last observed;

(3) the time and date when the observation was made.

(*b*) *Tropical Storms.* (Hurricanes in the West Indies, Typhoons in the China Seas, Cyclones in Indian waters, and storms of a similar nature in other regions.)

(1) *A Statement that a Tropical Storm has been Encountered.*

This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical storm exists in his neighbourhood.

(2) *Meteorological Information.*

In view of the great assistance given by accurate meteorological data in fixing the position and movement of storm centres, each shipmaster should add to his warning message as much of the following meteorological information as he finds practicable:—

(*a*) barometric pressure (millibars, inches or millimetres);

(*b*) change in barometric pressure (the change during the previous two to four hours);

(*c*) wind direction (true not magnetic);

(*d*) wind force (Beaufort or decimal scale);

(*e*) state of the sea (smooth, moderate, rough, high);

(*f*) swell (slight, medium, heavy) and the direction from which it comes.

When barometric pressure is given the word "Millibars", "inches" or "millimetres", as the case may be, should be added to the reading, and *it should always be stated whether the reading is corrected or uncorrected.*

When changes of the barometer are reported the course and speed of the ship should also be given.

All directions should be true, not magnetic.

(3) *Time and Date and Position of the Ship.*

These should be for the time and position when the meteorological observations reported were made and not when the message was prepared or despatched. The time used in all cases should be Greenwich Mean Time.

(4) *Subsequent Observations.*

When a master has reported a tropical storm it is desirable, but not obligatory, that other observations be made and transmitted at intervals of three hours, so long as the ship remains under the influence of the storm.

Examples.

Ice.

TTT Ice. Large berg sighted in 4605 N., 4410 W., at 0800 G.M.T. May 15.

Derelict.

TTT Derelict. Observed derelict almost submerged in 4006 N., 1243 W., at 1630 G.M.T. April 21.

Danger to Navigation.

TTT Navigation. Alpha lightship not on station. 1800 G.M.T. January 3.

Tropical Storm.

TTT Storm. Experiencing tropical storm. Barometer corrected 994 millibars, falling rapidly. Wind N.W., force 9, heavy squalls. Swell E. Course E.N.E., 5 knots. 2204 N., 11354 E. 0030 G.M.T. August 18.

TTT Storm. Appearances indicate approach of hurricane. Barometer corrected 29.64 inches falling. Wind N.E., force 8. Swell medium from N.E. Frequent rain squalls. Course 35°, 9 knots. 2200 N., 7236 W. 1300 G.M.T. September 14.

TTT Storm. Conditions indicate intense cyclone has formed. Wind S. by W., force 5. Barometer uncorrected 753 millimetres, fell 5 millimetres last three hours. Course N. 60 W., 8 knots. 1620 N., 9302 E. 0200 G.M.T. May 4.

TTT Storm. Typhoon to south-east. Wind increasing from N. and barometer falling rapidly. Position 1812 N., 12605 E. 0300 G.M.T. June 12.

WIRELESS WEATHER SIGNALS.

UNDER Weather Signals it is intended to publish particulars and concise descriptions of Signals and Code used for reporting Weather, Ice, and Time, in conformity with the International Convention of Safety of Life at Sea, in four sections.

I. Ships' Wireless Weather Signals.

II. Wireless Weather Signals made from the shore to ships. (Weather Bulletins and Storm Warnings.)

III. Wireless Time Signals.

IV. Wireless Ice Signals.

Sections II and III will be published as far as possible in geographical order, so that the most suitable of these signals for all parts of the world may be as complete as possible in each year's Numbers of THE MARINE OBSERVER.

The International Ships' Wireless Weather Telegraphy Code which came into force on May 1st, 1930, are given on pp. 35-38.

Request for information to Meteorological Services of Maritime Countries.

Invitation is hereby given to send concise descriptions of Weather Signals made for the information of shipping and seamen in all parts of the World, in accord with the International Convention of Safety of Life at Sea, 1929, with a view to publication in the appropriate number of "The Marine Observer." Only limited space is available.

Request for Information to the Weather Services desiring British Selected Ships' Routine Wireless Weather Reports.

Meteorological Services desiring to receive coded weather reports made by "A selected ships" in the Fleet List in this Journal, are invited to forward the following information in order that it may be included in the instructions to British "Selected Ships":—

(1) The name of the receiving W/T Station, (C.W.), with call sign, latitude, and longitude and particulars on similar lines to that given on page 31 for Portishead, as far as applicable and with a view to covering the largest area as possible, see Chart II (lithographic).

(2) The Telegraphic address of the service desiring to receive these Selected Ships' reports, and the groups of the Universal International Ships' Wireless Weather Telegraphy Code desired.

Reports from "B selected ships" may be intercepted by shore stations as required.—see pp. 33 and 34.

In order that all concerned may know what stations in different parts of the world are detailed to receive reports from "B selected ships", information similar to that given in the list on pages 33 and 34 is desired.

I. SHIPS' WIRELESS WEATHER SIGNALS.

VOLUNTARY

SCHEME OF COMMUNICATION FOR BRITISH SELECTED SHIPS' ROUTINE WIRELESS WEATHER TELEGRAPHY.

Commenced May 1st, 1930.

Based on the experience of British "Selected Ships" in making Meteorological reports by Wireless to all ships and certain shore stations and in view of the difficulties experienced through not having a world-wide system including definite times for reporting by W/T, following Art. 35 of the International Convention of Safety of Life at Sea, 1929, a scheme was submitted for the consideration of the International Meteorological Organisation at Copenhagen in September, 1929.

This recommendation could not be adopted until a trial had been made, and the British Meteorological Office was invited to carry out a trial as soon as possible, the results of which have been satisfactory.

This scheme provides on a voluntary basis for a system by which "Selected Ships," when at sea, make meteorological observations at fixed times G.M.T., and subsequently report these observations at fixed times G.M.T., to certain coast stations and to all ships; the main principles being that:—

"Selected Ships" fitted for long range transmission to address their reports to the appropriate shore station and use a wave length allotted to that station; Berne and all concerned being notified that the information may be intercepted and used by all ships.

"Selected Ships" not fitted for long-range transmission to address their reports to **C.Q.** (all ships) using wave length 600 metres spark, shore stations within range intercepting them as required.

"Selected Ships" be limited to a certain total, the complement to be maintained by each maritime country party to the Convention of Safety of Life at Sea to be according to their proportion of the world's tonnage, steam and motor, of vessels of over 100 tons.

The following table gives the world's tonnage and the number of selected ships at present desired for each maritime country of the world, including those that are not yet party to the Convention of Safety of Life at Sea.

Total Merchant Tonnage approximate (Steam and Motor) of the World

(Vessels over 100 tons, Lloyds Register Book, 1932-33)

and Number of Selected Ships required for making W.T. Weather Reports,

in all Oceans, World Wide.

Country.	Steamers and Motor Vessels.		Percentage of World Tonnage.	Number of "Selected Ships" required.	Number of Ships fitted for C.W. Long Wave Transmission (August 1932).
	Number	Gross Tons.			
Great Britain and Ireland.	7,592	19,562,143	29·9	299	177
Australia and New Zealand.	569	639,734	1·0	10	—
Canada (excluding Lakes).	638	950,846	1·4	14	23
Hong Kong ...	117	260,950	0·4	4	—
India and Ceylon	154	185,584	0·3	3	1
South Africa and Other Colonies*	535	509,341	0·8	8	3
British Empire Total.	9,605	22,108,598	33·8	338	204
America (United States)(excluding Lakes).	2,812	10,374,720	15·8	158	411
Argentine ...	304	312,485	0·5	5	1
Belgium ...	237	533,014	0·8	8	9
Brazil	296	491,647	0·7	7	10
Chile	108	174,497	0·3	3	3
China	244	369,396	0·6	6	—
Danzig	46	287,071	0·4	4	—
Denmark ...	702	1,171,275	1·8	18	26
Finland... ...	233	262,530	0·4	4	1
France	1,518	3,507,525	5·4	54	25
Germany ...	2,135	4,142,920	6·3	63	44
Greece	551	1,470,064	2·2	22	—
Holland ...	1,424	2,957,195	4·5	45	26
Italy	1,091	3,331,304	5·1	51	73
Japan	1,964	4,255,014	6·5	65	233
Jugo-Slavia ...	185	381,045	0·6	6	—
Latvia	106	187,238	0·3	3	—
Norway ...	2,001	4,163,836	6·3	63	15
Panama ...	43	137,741	0·2	2	2
Portugal ...	172	245,005	0·4	4	15
Russia (Soviet Union).	446	682,143	1·0	10	11
Spain	793	1,250,128	1·9	19	22
Sweden... ...	1,353	1,691,253	2·6	26	3
Turkey	189	178,053	0·3	3	—
Other Countries	668	833,671	1·3	13	5
Total	29,226	65,499,368	100·0	1,000	1,139

* Including Dominion of Newfoundland.

The main points are as follows:—

(1) The number of messages required for this service is **comparatively** small, if **efficiently organized.**

(2) If not efficiently organized and limited the result has proved to be congestion of communication, wasted energy, expense and consequent loss of efficiency.

(3) The Marine Meteorological code or form of message used must be universal throughout this Marine Meteorological service, simple and concise, giving only essential information.

(4) There are two main classes of "Selected Ships" to be considered:—

(*a*) Ships fitted with long range, Type A1 apparatus, mostly mail liners, sailing and arriving at dates fixed by mail contract; termed "**A Selected Ships.**"

(*b*) Ships fitted with short range A2 or Type B apparatus including many passenger and cargo liners sailing according to an advertised programme; also a number of cargo vessels whose movements are irregular, termed "**B Selected Ships.**"

(5) "**A Selected Ships**" should work a definite **schedule** under the control of specified coast wireless stations in parts of the world where there is congestion.

(6) The movements of a number of "**B Selected Ships**" are uncertain, and in some areas there may be more than are required to report, when the full number of "Selected Ships" of all nations has been reached. Control from coast wireless stations is impracticable; moreover, in some areas where there is not a great deal of shipping, and in certain seasons, it will be necessary for **other ships as well as "Selected Ships"** to make reports, and this applies particularly to Hurricane, Cyclone and Typhoon regions.

All that can be said is that at present, on the most frequented mail liner routes, notably the Trans-North Atlantic, no routine wireless meteorological reports are necessary from "**B Selected Ships,**" at certain shore stations, except in cases of urgency.

In all parts of the world which cannot be adequately served by "**A Selected Ships,**" "**B Selected Ships**" should broadcast their reports to **C.Q.** (all ships) on 600 metres spark **at schedule times.**

This may result in interference, but at least ships and stations which are anxious to obtain information at no great range will be able to receive it, for obviously those on the spot will arrange matters of communication within the schedule times laid down, and when reports are not received, repetition will be asked for as necessary.

This broadcasting by "**B Selected Ships**" on 600 metres spark, of routine meteorological reports has its weak points, but at present there is no alternative; and it is of the utmost importance that reports from "Selected Ships" should be available to all ships and meteorological centres through certain stations in all parts of the world, particularly in the hurricane regions, and in the regions of heavy weather on the less frequented trade routes of the Southern Ocean.

The following schedule gives times (Greenwich Mean Time) of observation agreed to internationally and times (G.M.T.) of the commencement of periods for transmission of these reports, based upon these observation times and the established periods of wireless operator watches. It should be noted that they follow immediately after the S.O.S. three-minute period of silence.

Schedule.

All times are G.M.T.

Zones between Greenwich Meridians.	First Weather Report.			Second Weather Report.		
	Times of observations.	Times of reporting by Type A1 (C.W.) Ships.	Times of broadcasting by Type A2 (I.C.W.) and Type B (Spark) Ships.	Times of observations.	Times of reporting by type A1 (C.W.) Ships.	Times of broadcasting by Type A2 (I.C.W.) and Type B (Spark) Ships.
30° W.–30° E.	0600	0618 0818	0830	1200	1218	1230
30° E.–80° E.	0600	0618 0818	0630 0830	1200	1218	1230
80° E.–160° E.	0000	0018	0030	0600	0618 0818	0830
160°E–140° W.	0000	0018	0030	1800	1818 2018	2030
140°W.–70° W.	0000	0018	0030	1800	1818 2018	1830 2030
70° W.–30° W.	1200	1218	1230	1800	1818 2018	2030

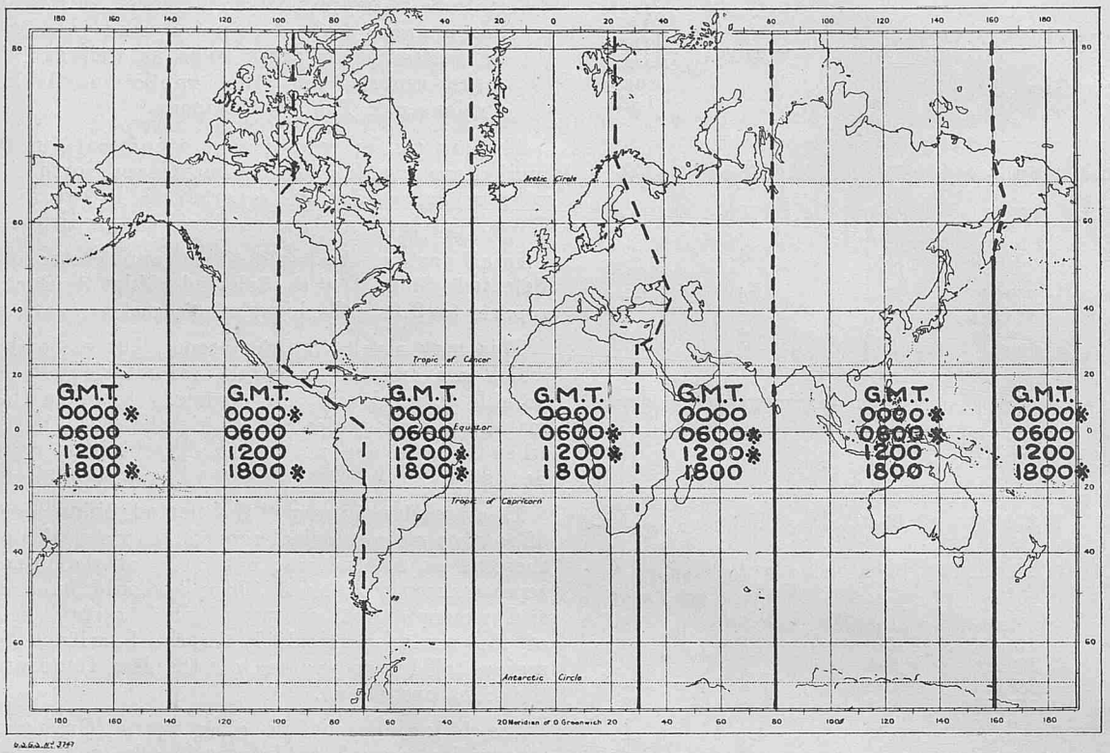
Chart I below gives the W/T operator zones and times of observation, those being starred which are usually during daylight.

It will be noted that against some of the observation times there are two times of commencement of periods for transmitting. The second of these times, where two occur, are for single operator ships to report, in cases where they would not be keeping wireless watch following the observation hour. It should be remembered that a large proportion of " Selected Ships " carry two or three operators, and they should use the earlier periods for transmission, also repeating for the benefit of ships with one operator during the second period.

Relaying on the wave lengths given in this Schedule should not be resorted to ; but every endeavour should be made for the reports in areas in which the French S.S. *Cuba* international W/T link type of ships are working, to reach those ships, who will relay them to special shore stations for the information of Meteorological Offices on a special short wave for long range.

CHART I.—SHIPS' WIRELESS WEATHER SIGNALS,
International Observation Times for Weather Telegraphy at Sea.

* Indicates usual daylight hours.



In further explanation of this scheme.

There are 3,641 British ships fitted with W/T. The proportion fitted with Type A1 apparatus is about 1 to every 20 fitted with Type A2 or Type B apparatus.

Of 3,641 British ships fitted with Wireless Telegraphy,

177 are so fitted for sending Long Wave C.W.
115 ,, ,, ,, Short Wave C.W.
64 ,, ,, ,, both Long and Short Wave C.W.

Of these, 51 for Short Wave only and 113 for Long Wave only. At present, Long Wave C.W. is found to be the most satisfactory means of communicating " Selected Ships " Routine Wireless Weather Reports.

" Selected Ships " are selected from those whose commanders have volunteered to carry out regular Meteorological work at sea, according to their sailing schedule and trade to provide distribution ; according to their wireless apparatus to ensure efficient communication ; and according to the capacity and keenness of their officers to ensure the most accurate information.

At present about **1 in every 3** British " Selected Ships " has Type A1 apparatus, that is, there is one **" A Selected Ship "** to every two **" B Selected Ships."**

It is obvious that **" A Selected Ships "** whose approximate position on certain dates can be foreseen, can be informed in what order to report, **when in areas where there are more " Selected Ships " than are necessary to supply the number and distribution of reports required.**

It is equally obvious that a number of **" B Selected Ships "** cannot be so treated.

With regard to (5), in the case of **" A Selected Ships "** in the Eastern North Atlantic the Meteorological Office, London, will furnish Portishead Wireless Station (at 1230 G.M.T.) with the names of chosen " Selected Ships " every day ; and Portishead will call up those ships at 2230, 0330 and 1030 G.M.T. daily and indicate the order in which they should make their reports, thus ensuring a minimum of signalling and the best distribution of reported observations.

It has not been found necessary for **" A Selected Ships "** to be controlled in the same way by stations in parts of the world where there are not likely to be many **" A Selected Ships "** within range.

The Chart II of the World, to be found at the end of this number (lithographic), is intended to illustrate the scheme. It gives coast wireless stations in all parts of the world, which receive or intercept these reports. It is revised quarterly in THE MARINE OBSERVER.

Information of stations in different parts of world detailed to work in this scheme are given on pages 31 to 34 and these are revised and repeated quarterly in THE MARINE OBSERVER.

In parts of the world where information and particulars of stations detailed to receive reports from **" A Selected Ships "** are not given in the latest number of THE MARINE OBSERVER **" A Selected Ships "** should broadcast their reports at schedule times on 2,100 metres wave length.

The value of Selected Ships' reports made on 2,100 metres wave length, with a range of about 1,500 miles, is considerable to all ships at sea, distant information being an essential for the purpose of Wireless and Weather as an Aid to Navigation.

Chart I above gives the International times of observation and the wireless watch zones, those observation times in each wireless watch zone which generally fall during daylight being starred.

Many **" A Selected Ships "** and **" B Selected Ships "** only have one officer in each watch. The first essential for safe navigation is a good look-out kept by the officer of the watch, as well as the look-out men. In the Merchant Navy the officer of the watch is responsible for meteorological observation and the accuracy of reports. If the officer of the watch at night goes into the lighted charthouse to take meteorological observations and draft a report, not only does he leave his post of look-out, but he returns to the bridge momentarily blinded. Hence Wireless Meteorological Reports at night should not be required as a matter of routine.

There are a number of " Selected Ships " which carry two watch-keeping officers for each watch, and in such ships it is desired that observations should be made and reported at all four times. Those made at the times not starred being reported as soon as convenient.

The schedule was worked out in consultation with wireless experts to overcome the confusion, jamming and waste, which disheartened all concerned. It is necessary that reporting ships should know when to signal meteorological reports, also that all ships should know when to listen and when to refrain from communication which jams. All are asked to help in making this voluntary scheme a success.

No charges are made for "Selected Ships" Routine Wireless Meteorological Reports broadcast to all ships or addressed in accordance with these instructions to the Meteorological Centres given in the list of Wireless Stations detailed to receive routine coded Weather Reports from British Selected Ships published quarterly in THE MARINE OBSERVER.

Ships' Wireless Weather reports addressed to Meteorological Centres not conforming to these instructions may be liable to charges.

Brief Instructions for convenience and guidance of Marine Observers and W/T Operators.

1. At 0, 6, 12 and 18 hours G.M.T. record observations on Form 911 or in Form 915. When there are not two officers in the watch omit these observations during darkness.

2. In "Selected Ships" immediately code these observations on Form 138 and write out message on Form 139. In the case of "Selected Ships" fitted for C.W. long range transmission address the report to the appropriate Meteorological Centre. The report should be sent through the appropriate W/T. station indicated in the list on pages 31 and 32, which will be repeated quarterly in THE MARINE OBSERVER until further notice, on the wave length indicated for that station, in the order of ships indicated for the day by the station and according to the schedule above which is also given on Code Card Form 138A.

In the case of "Selected Ships" fitted for spark transmission, address the report to **C.Q.** and broadcast according to schedule. In regions not covered by long range C.W. stations indicated in the list C.W. "Selected Ships" should broadcast to all ships on 2100 m. at times given in schedule.

3. Instructions for observing and recording observations are given in THE MARINE OBSERVERS' HANDBOOK, 5th Edition. Instructions for coding are given on pp. 35 and 36 and on Form 138. The decode tables are given in a pamphlet M.O. 329 obtainable from H.M.S.O., price 3d.

Information and guidance for the use of Wireless Weather reports received in ships at sea is given in WIRELESS AND WEATHER, AN AID TO NAVIGATION, published and sold by H.M. Stationery Office.

Information regarding the procedure for *Urgent* Meteorological reports, and reports of dangers to navigation are given on page 27, i.e., Regulation XLVI of the International Convention of Safety of Life at Sea.

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

Request for Information.

THE ATTENTION OF METEOROLOGICAL SERVICES IS INVITED TO THE INVITATION GIVEN ON PAGE 28 OF THIS NUMBER.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length. For Station to call up "Selected Ships."	Frequency and Wave Length. For "Selected Ships" to report to Station.	Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
North Atlantic and North Sea.	Portishead.	Lat. 51° 28′ 41″ N. Long. 2° 47′ 30″ W.	GKU.	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. and North of Latitude 38° N., but not within 300 miles of station. (see Chart II.)	Weather London	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	Control system. "Selected Ships" chosen to report in given order notified by station daily at 2230, 0330, and 1030 G.M.T. Roll call thus—Weather London—call sign of chosen "Selected Ships" to report through GKU at schedule times on 2100 m. Radio Horta—call sign of ships to report through CTH at schedule times on 2400 m.
	Chatham Mass.,	Lat. 41° 42′ N. Long. 70° 00′ W.	WCC.		142·9 kc/s. (2098 metres).	North Atlantic West of Longitude 40° W.	Observer Washington.	Weather only. First four groups of observations taken at 0000 and 1200 G.M.T. only required.	No control. All British "A Selected Ships" within area to address their 0000 and 1200 G.M.T. observations to Observer Washington and their 1800 G.M.T. observations to CQ in accordance with schedule.
	Sayville N.Y.	Lat. 40° 45′ N. Long. 73° 06′ W.	WSL.						
	Rockland.	Lat. 44° 09′ N. Long. 69° 13′ W.	WAG.						
	West Palm Beach.	Lat. 26° 42′ N. Long. 80° 02′ W.	WMR.						
	Palm Beach.	Lat. 26° 42′ N. Long. 80° 02′ W.	WOE.						
	Horta, Azores.	Lat. 38° 32′ N. Long. 28° 38′ W.	CTH.	125 kc/s. (2400 metres).	125 kc/s. (2400 metres).	"A Selected Ships" indicated by roll call made through Portishead to report to Horta—E'n. N. Atlantic, east of long. 40° W. and N. of lat. 38° N. "A Selected Ships" S. of lat. 38° N.—N. Atlantic from lat. 10° to 38° N. eastward of long. 40° W.	Radio Horta.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	"A Selected Ships" in the E'n. N. Atlantic, N. of lat. 38° N., chosen to report to Horta will be indicated by a special roll call made through Portishead daily at 2230, 0330 and 1030 G.M.T. immediately following the roll call of selected ships chosen to report to Weather London. These ships should report to CTH in the order indicated in accordance with schedule and on 2400 m. S. of 38° N., no control all British "A Selected Ships" within area should report in accordance with schedule.

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

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length. For Station to call up "Selected Ships."	Frequency and Wave Length. For "Selected Ships" to report to Station.	Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
Mediterranean and Red Sea.									
South Atlantic.	Slangkop (Cape Town)	Lat. 34° 08′ 46″ S. Long. 18° 19′ 18″ E.	ZSC	—	143 kc/s. (2100 metres).	South Atlantic Westward of 25°E. and within a range of about 2,000 miles of station.	Met.	Weather only. Four universal groups and first group of No. 6 Supplementary groups.	No control. Only 0600 G.M.T. observation required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 51″ S. Long. 30° 58′ 38″ E.	ZSD	—	143 kc/s. (2100 metres).	Indian Ocean S. of 20°S. and Eastward of 25°E. and within a range of about 2,000 miles of station.	Met.	Weather only. Four universal groups and first group of No. 6 Supplementary groups.	No control. Only 0600 G.M.T. observations required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.
	Bombay.	Lat. 19° 04′ 55″ N. Long. 72° 49′ 54″ E.	VWB	—	143 kc/s. (2100 metres).	Arabian Sea N. of line C. Comorin to Ras Fartak.	Weather.	Weather only. No. 6 Supplementary groups.	All British "A Selected Ships" are requested, when convenient, to report 0000 G.M.T. observations commencing at 0018 G.M.T. in addition to schedule times.
	Madras.	Lat. 12° 59′ 17″ N. Long. 80° 10′ 56″ E.	VWM	—	143 kc/s. (2100 metres).	Bay of Bengal N. of line C. Comorin to Achin Head.	Weather.	Weather only. No. 6 Supplementary groups.	All British "A Selected Ships" are requested when convenient, to report 1200 G.M.T. observations commencing at 1218 G.M.T. in addition to schedule times.
	Colombo.	Lat. 6° 55′ 14″ N. Long. 79° 52′ 46″ E.	VPB	130 kc/s. (2300 metres).	143 kc/s. (2100 metres).	Indian Ocean South of a line Ras Fartak, C. Comorin and Achin Head, and within a range of about 1500 miles.	Obs.	Weather only. No. 6 Supplementary groups preferred.	No control — all British "A Selected Ships" within area should report in accordance with Schedule.
	Mombasa.	Lat. 4° 03′ 11″ S. Long. 39° 39′ 51″ E.	VPQ	—	125 kc/s. (2400 metres).	From Ras Hafun to Lat. 20° S. wher westward of the Colombo area.	Weather Nairobi.	Weather only. No. 6 Supplementary groups.	No control — all British "A Selected Ships" within area should report 0600 G.M.T. observations.
	Perth.	Lat. 32° 01′ 51″ S. Long. 115°49′31″ E.	VIP	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	Indian Ocean and Southern Ocean between Long. 105° and 135° E.; but not within 100 miles of the coast.	Weather.	Weather only. No. 6 Supplementary groups.	No control — all British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart I., p. 15, Vol. IX. No. 97 (January).
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long. 114° 15′ 11″ E.	VPS.		125 kc/s. (2400 metres).	China Sea and North Pacific to about 1,500 miles from station.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	No control — all British "A Selected Ships" within area should report in accordance with Schedule.
South Pacific.	Sydney.	Lat. 33° 46′ 00″ S. Long. 151°03′09″ E.	VIS	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	S. Pacific, Coral and Tasman Seas and Southern Ocean between Long. 135° and 160° E.; but not within 100 miles of the coast.	Weather.	Weather only. No. 6 Supplementary groups.	No control — all British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart I., p. 15, Vol. IX. No. 97 (January).

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

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Atlantic.	Horta, Azores.	Lat. 38° 32′ N. Long. 28° 38′ W.	CTH.	Radio Horta	Weather only, up to 7 groups, preferably No. 3 Supplementary Groups.	
South Atlantic.	Salinas	Lat. 0° 35′ 00″ S. Long. 47° 18′ 45″ W.	PPL.	Meteoro Rio.	Weather only, including supplementary groups.	
	S. Luiz	Lat. 2° 31′ 48″ S. Long. 44° 16′ 51″ W.	PXM.			
	Fortaleza	Lat. 3° 46′ 21″ S. Long. 38° 32′ 26″ W.	PPC.			
	Natal	Lat. 5° 46′ 41″ S. Long. 35° 18′ 24″ W.	PXN.			
	F. Noronha	Lat. 3° 50′ 24″ S. Long. 32° 24′ 48″ W.	PXF.			
	Olinda	Lat. 8° 00′ 35″ S. Long. 34° 51′ 00″ W.	PPO.			
	Amaralina	Lat. 13° 00′ 12″ S. Long. 38° 30′ 45″ W.	PPA.			
	Abrolhos	Lat. 17° 57′ 30″ S. Long. 38° 41′ 05″ W.	PXH.			
	Victoria	Lat. 20° 10′ 00″ S. Long. 40° 17′ 46″ W.	PPT.			
	Rio	Lat. 22° 53′ 42″ S. Long. 43° 13′ 24″ W.	PPR.			
	Santos	Lat. 23° 56′ 27″ S. Long. 46° 19′ 28″ W.	PPS.			
	Floriano-polis.	Lat. 27° 36′ 00″ S. Long. 48° 30′ 18″ W.	PPF.			
	Juncçao	Lat. 32° 04′ 00″ S. Long. 52° 07′ 00″ W.	PPJ.			
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 51″ S. Long. 30° 58′ 38″ E.	ZSD	Met.	Weather only, 4 universal groups and first group of No. 6 Supplementary groups.	
	Algoa Bay (Port Elizabeth).	Lat. 33° 57′ 16″ S. Long. 25° 35′ 30″ E	ZSQ	Met.	Weather only, 4 universal groups and first group of No. 6 Supplementary groups.	
	Calcutta.	Lat. 22° 33′ 31″ N. Long. 88° 20′ 16″ E	VWC.	Weather.	Weather only up to 6 groups, No. 6 Supplementary Groups preferred.	
	Rangoon.	Lat. 16° 45′ 57″ N. Long. 96° 11′ 51″ E	VTR.			
	Madras.	Lat. 12° 59′ 17″ N. Long. 80° 10′ 56″ E.	VWM.			
	Bombay.	Lat. 19° 04′ 55″ N. Long. 72° 49′ 54″ E	VWB.			
	Karachi.	Lat. 24° 51′ 05″ N. Long. 67° 02′ 32″ E.	VWK.			
	Matara.	Lat. 6° 01′ 07″ N. Long. 80° 35′ 39″ E.	GZP.			
	Mombasa.	Lat. 4° 03′ 11″ S. Long. 39° 39′ 51″ E.	VPQ	Weather Nairobi.		
	Dar-es-Salaam.	Lat. 6° 50′ 38″ S. Long. 39° 17′ 24″ E.	ZBZ	Weather Nairobi.		
	Mauritius.	Lat. 20° 23′ S. Long. 57° 35′ E.	VRS.	Observatory Mauritius.	Weather 4 universal groups and first of No. 6 Supplementary Groups.	
	Geraldton.	Lat. 28° 47′ 15″ S. Long. 114° 36′ 24″ E.	VIN	Weather.	Weather only, including No. 6 Supplementary Groups.	
	Esperance.	Lat. 32° 01′ 51″ S. Long. 121° 53′ 34″ E.	VIE			

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

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteoro-logical Centre desiring information.	Information desired.	Notes.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long. 114°15′11″E.	VPS.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	
South Pacific.	Auckland.	Lat. 36° 50′ 36″ S. Long. 174°46′08″E.	ZLD.	Weather Wellington.	Weather only, up to 7 groups	
	Wellington.	Lat. 41° 16′ 26″ S. Long. 174°45′55″E.	ZLW.			
	Awarua.	Lat. 46° 30′ 27″ S. Long. 168°22′21″E.	ZLB.			
	Chatham Island.	Lat. 43° 57′ 02″ S. Long. 176°31′04″W.	ZLC.			
	Rarotonga.	Lat. 21° 11′ 54″ S. Long. 159°48′51″W.	ZKR.			
	Apia.	Lat. 13° 15′ 17″ S. Long.170′49′42″W.	ZMA.			
	Thursday I.	Lat. 10° 35′ 14″ S. Long.142°12′43″E.	VII	Weather	Weather only, including No. 6 Supplementary Groups.	
	Townsville	Lat. 19° 16′ 09″ S. Long.146°49′47″E.	VIT			
	Brisbane	Lat. 27° 25′ 34″ S. Long.153°07′19″E.	VIB			
	Melbourne	Lat. 37° 46′ 56″ S. Long.144°52′09″E.	VIM			
	Adelaide	Lat. 34° 51′ 14″ S. Long.138°31′55″E.	VIA			
	Talcahuano	Lat. 36° 41′ 27″S. Long. 73° 06′ 19″W.	CCT	Meteo, Santiago.	Weather only, including supplementary groups.	
	Llanquihue	Lat. 41° 08′ 00″S. Long. 73° 02′ 00″W.	CCW			
	Juan Fernandez.	Lat. 33° 38′ 09″S. Long. 78° 47′ 50″W.	CCJ			
	Magallanes	Lat. 53° 10′ 00″S. Long. 70° 54′ 00″W.	CCN			

INTERNATIONAL SHIPS' WIRELESS WEATHER TELEGRAPHY CODE

formulated by the International Commission for Synoptic Meteorology and adopted by the International Meteorological Organization at Copenhagen, September, 1929.

Brought into use in British Selected Ships, May 1st, 1930.

Code and Instructions for Coding Messages.

The International Ships' Wireless Weather Code is a figure code, arranged in groups of five figures.

The first four groups are universal and the remaining groups are in two alternative or supplementary sets of groups. The first figure in the fifth group of message (or first supplementary group) indicates which set of supplementary groups is used.

The first four universal groups should always be used, and the supplementary sets of groups may be omitted, or abbreviated by omitting the last group or groups of the set; that is, the code figure message may be shortened as necessary, but the order of the figures and groups must always be strictly maintained, otherwise the message is not decodable.

If an observation or element is not available, an X (or the appropriate number of Xs) (▬ • • ▬) should take its place in order to maintain the sequence of figures in the groups.

Having entered synchronized weather observations and particulars of set and drift of current and ice in the Ship's Meteorological Record, Form 911, or the Meteorological Log, Form 915 (specially ruled pages at end of book), the observations should be coded, thus—

First. From the list of wireless stations detailed to receive routine coded weather reports from "Selected Ships," ascertain the number of groups and the supplementary groups desired by the shore meteorological services from ships in the part of the world that the ship is in, remembering that the seventh group can only be given completely by ships having a special barograph; and decide on the information to be sent, not forgetting the desirability of information of the set and drift of current, ice, and navigational obstructions being included in reports intended for "all ships," but not through C.W. stations for certain meteorological centres. In such cases brevity being desirable only the first four or universal groups should be given in code.

Thus ensuring the necessary brevity and information for the meteorological centre, and the necessary information for ships at sea. Do not include information in C.W. reports addressed to meteorological centres which they do not require.

Second. On Form 138, the register for coded "Selected Ships" wireless meteorological reports, in No. 1 column write the address of the Meteorological Centre if your ship is fitted for C.W. transmission, but "All Ships' Weather" if Spark.

Universal Groups.

With the Code Card, Form 138A, from synchronized weather observations entered on Form 911 or 915, code as follows:—

		Key Letters.
Column	2.—Code the Day of the Week. Table I	P
,,	3.—Code the Octant of the Globe. Table II ...	Q
,,	4.—Code the Latitude by entering the **whole degrees** (prefixing 0 if necessary to make up two figures); and dividing the minutes by six, neglecting the remainder. Enter the result	LLL
,,	5.—Code the Longitude by entering the whole degrees (prefixing 0 if necessary to make up two figures, or omitting the initial 1 if Longitude is 100° or over). Divide the minutes by six, neglecting the remainder. Enter the result	lll
,,	6.—Enter the hours of the Greenwich Mean Time of Observation	GG

From the Code Card Form 138A.

,,	7.—Code the Direction of the Wind. Table III...	DD
,,	8.—Code the Force of the Wind, forces 9 and above are entered as 9 but if 10, 11 or 12, add the words Gale, Storm, or Hurricane at the end of the message. Table V. ...	F
Column	9.—Code the Present Weather. Table VI ...	ww
,,	10.—Code the corrected barometer reading by entering the two last whole figures if a millibar barometer, or coding, if inches, by Table VIII	BB
,,	11.—Enter the Visibility by Scale. Table XII ...	V
,,	12.—Enter the Air Temperature in whole degrees Fahrenheit, omitting the initial 1, if over 100°	TT

No. 3 Supplementary Groups.

If these groups have been decided upon, in Column 13 enter "3" as distinguishing number for the remainder of the coded message.

		Key Letters.
Column	14.—Code type of Lower Cloud. Table XIII ...	C_L
,,	15.—Code type of Middle Cloud. Table XIV ...	C_M
,,	16.—Code type of Upper Cloud. Table XV ...	C_H
,,	17.—Code the total amount of sky covered. Table XVII	N
,,	18.—Subtract the lesser from the greater of the Air and Sea Temperatures and code the result with Table XVIII	t_d
,,	19.—Enter the Swell by Scale. Table XIX ...	K
,,	20.—Code the True Direction of Swell. Table IV	d
,,	21.—Code the Past Weather. Table VII	W
,,	22.—Code the proportion of sky covered with Lower Cloud. Table XVII	N_L
,,	23.—Code the course of ship. Table IV	d_s
,,	24.—Code the speed of the ship. Table XX ...	f
,,	25.—Code the characteristic of the Tendency of the Barometer, as shown by barograph. Table X	a
,,	26.—Code the Amount of rise or fall of the Barometer in the last 3 hours. Table XI	bb

No. 6 Supplementary Groups.

If these groups have been decided upon, in Column 27 enter "6" as distinguishing number for the remainder of the coded message.

		Key Letters.
Column	28.—Enter the Swell by Scale. Table XIX ...	K
,,	29.—Code the True Direction of the Swell. Table IV	d
,,	30.—Code the Predominating type of Cloud. Table XVI	C
,,	31.—Code the total amount of sky covered. Table XVII	N
,,	32.—Subtract the lesser from the greater of the Air and Sea Temperatures and code the result. Table XVIII	t_d
,,	33.—Code the Course of the Ship. Table IV ...	d_s
,,	34.—Code the recorded change of the barometer in the last two, three, or four hours. Table IX	A
,,	35.—Code the Past Weather. Table VII	W
,,	36.—Code type of Upper Cloud. Table XV ...	C_H

For messages which are to be broadcast to **C.Q.** or made to shore services indicated in the list of W/T. stations in THE MARINE OBSERVER as requiring such information, in Column 37, enter briefly in plain language the set and drift of current experienced, with position **from** and **to**, Ice or other navigational obstructions.

On no account should such information be entered in messages for shore services that do not require it.

The ship's call sign should be given in the usual way in sending the report.

In Column 38.—After the message has been despatched enter the call sign of the station through which it was sent, with wave length, or **C.Q.**, as the case may be.

In Column 39.—After the message is sent enter the exact time (G.M.T.) of despatch.

Be sure that your message is correctly coded, and that you have not duplicated the Supplementary Groups.

Write out the message on the signal pad (Form 139) provided and send to the wireless operator for despatch in accordance with instructions given in Scheme of Communication for British Selected Ships' Routine Wireless Weather Telegraphy, pages 28 to 31, schedule for which is also given on Code Card Form 138A.

CODE TABLES FOR W/T WEATHER REPORTS FROM SHIPS AT SEA TO ALL SHIPS AND SHORE STATIONS.

Day and Position.

Table I.

P.—Day of the Week.

	Code Figure.		Code Figure.
Sunday	1	Thursday	5
Monday	2	Friday	6
Tuesday	3	Saturday	7
Wednesday	4		

Table II.

Q.—Octant of the Globe.

	Longitude.	Code Figure.
North Latitude.	0° W. — 90° W.	0
	90° W. — 180° W.	1
	180° E. — 90° E.	2
	90° E. — 0° E.	3
South Latitude.	0° W. — 90° W.	5
	90° W. — 180° W.	6
	180° E. — 90° E.	7
	90° E. — 0° E.	8

Compass.

Table III.

DD.—Compass Table for Wind Direction to points.

True Direction.	Code Figures.	True Direction.	Code Figures.
Calm	00	S. by W.	17
N. by E.	01	S.S.W.	18
N.N.E.	02	S.W. by S.	19
N.E. by N.	03	S.W.	20
N.E.	04	S.W. by W.	21
N.E. by E.	05	W.S.W.	22
E.N.E.	06	W. by S.	23
E. by N.	07	W.	24
E.	08	W. by N.	25
E. by S.	09	W.N.W.	26
E.S.E.	10	N.W. by W.	27
S.E. by E.	11	N.W.	28
S.E.	12	N.W. by N.	29
S.E. by S.	13	N.N.W.	30
S.S.E.	14	N. by W.	31
S. by E.	15	N.	32
S.	16		

Table IV.

d and d_s.—Compass Table to Half Cardinal Points.

True Direction.	Code Figure.
No Sea or Swell; or Ship hove to	0
N.E.	1
E.	2
S.E.	3
S.	4
S.W.	5
W.	6
N.W.	7
N.	8
No observation or no information	9

Wind.

Table V.

F.—Wind Force, Beaufort Scale.

Beaufort Number.		Code Figure.
Nought.	Calm	0
One.	Light airs	1
Two.	Light breeze	2
Three.	Gentle breeze	3
Four.	Moderate breeze	4
Five.	Fresh breeze	5
Six.	Strong breeze	6
Seven.	Moderate gale	7
Eight.	Fresh gale	8
Nine.	Strong gale	9
Ten.	Whole gale	9 Gale*
Eleven.	Storm	9 Storm*
Twelve.	Hurricane	9 Hurricane*

* These words to be written at end of weather message.

Weather.

Table VI.

ww.—Present Weather. (Abridged for British Ships.)

	Code Figures.
Cloudless	00
Partly cloudy	01
Cloudy	02
Overcast	03
Haze (but visibility greater than one mile)	05
Distant Lightning	07
Mist	08
Precipitation within sight	10
Thunder, without precipitation at the ship or station	11
Ugly threatening appearance of sky	13
Squally weather	14
Heavy Squalls in last three hours	15
Waterspout seen in last three hours	16
Signs of a tropical storm forming	18
Signs that a tropical storm has formed	19
Precipitation (rain, drizzle, hail, snow or sleet) in last hour, but not at time of observation	20
Dust or Sand storm	30
Fog	40
Moderate fog in last hour	41
Thick fog in last hour	42
Fog in patches	49
Drizzle	50
Drizzle and Fog	57
Slight or moderate drizzle and rain	58
Thick drizzle and rain	59
Rain	60
Rain and fog	67
Slight or moderate rain and snow	68
Heavy rain and snow	69
Snow or Sleet	70
Shower or showers	80
Showers of slight or moderate hail, or rain and hail	88
Showers of heavy hail, or rain and hail	89
Thunderstorm	90

Preference should be given to 18 and 19 when they apply, otherwise to the largest number of this code which applies to the weather at the position of the ship at the time of observation.

Table VII.

W.—Past Weather.

	Code Figure.
Fair (clear or slightly clouded)	0
Variable sky	1
Mainly overcast	2
Fog or thick dust haze (visibility less than five cables)	3
Drizzle	4
Rain	5
Snow or sleet	6
Showers	7
Sandstorm or duststorm	8
Thunderstorm	9

Barometer.

Table VIII.

BB.—Code Table for corrected barometer readings in millibars and inches.

(Adapted for British Ships.)

Mb.	In.	Code Figs.	Mb.	In.	Code. Figs.	Mb.	In.	Code Figs.	Mb.	In.	Code Figs.
925	27·32	25	960	28·35	60	995	29·38	95	1025	30·27	25
926	27·35	26	961	28·38	61	996	29·41	96	1026	30·30	26
927	27·38	27	962	28·41	62	997	29·44	97	1027	30·33	27
928	27·41	28	963	28·44	63	998	29·47	98	1028	30·36	28
929	27·44	29	964	28·47	64	999	29·50	99	1029	30·39	29
930	27·46	30	965	28·50	65	1000	29·53	00	1030	30·42	30
931	27·49	31	966	28·53	66	1001	29·56	01	1031	30·45	31
932	27·52	32	967	28·56	67	1002	29·59	02	1032	30·48	32
933	27·55	33	968	28·59	68	1003	29·62	03	1033	30·51	33
934	27·58	34	969	28·62	69	1004	29·65	04	1034	30·53	34
935	27·61	35	970	28·65	70	1005	29·68	05	1035	30·56	35
936	27·64	36	971	28·67	71	1006	29·71	06	1036	30·59	36
937	27·67	37	972	28·70	72	1007	29·74	07	1037	30·62	37
938	27·70	38	973	28·73	73	1008	29·77	08	1038	30·65	38
939	27·73	39	974	28·76	74	1009	29·80	09	1039	30·68	39
940	27·76	40	975	28·79	75	1010	29·83	10	1040	30·71	40
941	27·79	41	976	28·82	76	1011	29·86	11	1041	30·74	41
942	27·82	42	977	28·85	77	1012	29·89	12	1042	30·77	42
943	27·85	43	978	28·88	78	1013	29·92	13	1043	30·80	43
944	27·88	44	979	28·91	79	1014	29·94	14	1044	30·83	44
945	27·91	45	980	28·94	80	1015	29·97	15	1045	30·86	45
946	27·94	46	981	28·97	81	1016	30·00	16	1046	30·89	46
947	27·97	47	982	29·00	82	1017	30·03	17	1047	30·92	47
948	28·00	48	983	29·03	83	1018	30·06	18	1048	30·95	48
949	28·03	49	984	29·06	84	1019	30·09	19	1049	30·98	49
950	28·05	50	985	29·09	85	1020	30·12	20	1050	31·01	50
951	28·08	51	986	29·12	86	1021	30·15	21	1051	31·04	51
952	28·11	52	987	29·15	87	1022	30·18	22	1052	31·07	52
953	28·14	53	988	29·18	88	1023	30·21	23	1053	31·10	53
954	28·17	54	989	29·21	89	1024	30·24	24	1054	31·13	54
955	28·20	55	990	29·24	90						
956	28·23	56	991	29·26	91						
957	28·26	57	992	29·29	92						
958	28·29	58	993	29·32	93						
959	28·32	59	994	29·35	94						

NOTE.—It will be seen that the code figures may represent two values of barometric pressure, but this only takes place with a very high or a very low barometer, so that recipients of a message will be able to decide which value is intended.

Table IX.

A—Change of Barometer in last 2, 3 or 4 hours.

(Adapted for British Ships.)

(The change in 3 hours should be given if possible.)

	In 2 hours.	In 3 hours.	In 4 hours.	Code Figure.
Barometer **steady**—Has not risen or fallen more than	0·3 mb. (·01 in.)	0·5 mb. (·01 in.)	0·7 mb. (·02 in.)	0
Barometer **rising slowly**—Has risen.	0·7–1·0mb. (·02–·03 in.)	1·0–1·5 mb. (·03–·05 in.)	1·3–2·0 mb. (·04–·06 in.)	1
Barometer **rising**—Has risen	1·4–2·4 mb. (·05–·07 in.)	2·0–3·5 mb. (·06–·10 in.)	2·8–4·8 mb. (·08–·14 in.)	2
Barometer **rising quickly**—Has risen.	2·6–4·0 mb. (·08–·12 in.)	4·0–6·0 mb. (·12–·18 in.)	5·2–8·0 mb. (·15–·24 in.)	3
Barometer **rising very rapidly**—Has risen.	over 4·0 mb. (·12 in.)	over 6·0 mb. (·18 in.)	over 8·0 mb. (·24 in.)	4
Barometer **falling slowly**—Has fallen.	0·7–1·0 mb. (·02–·03 in.)	1·0–1·5 mb. (·03–·05 in.)	1·3–2·0 mb. (·04–·06 in.)	5
Barometer **falling** — Has fallen	1·4–2·4 mb. (·05–·07 in.)	2·0–3·5 mb. (·06–·10 in.)	2·8–4·8 mb. (·08–·14 in.)	6
Barometer **falling quickly** —Has fallen.	2·6–4·0 mb. (·08–·12 in.)	4·0–6·0 mb. (·12–·18 in.)	5·2–8·0 mb. (·15–·24 in.)	7
Barometer **falling very rapidly**—Has fallen.	over 4·0 mb. (·12 in.)	over 6·0 mb. (·18 in.)	over 8·0 mb. (·24 in.)	8

Barograph.

Table X.

a.—Characteristic of changes of the Barometer in the last three hours.

(Adapted for British Ships.)

	Description of Changes.	Code Figure.
Net result, Barometer same or higher.	Barometer rising at first, then falling by a smaller or like amount	0
	Barometer rising at first, then steady or rising less quickly	1
	Barometer unsteady, but generally rising or stationary	2
	Barometer steady or rising	3
	Barometer falling or steady at first, then rising by the same or larger amount	4
	Barometer rising, at an increasing rate	4
Net result, Barometer lower.	Barometer falling at first, then rising by a smaller amount	5
	Barometer falling at first, then steady or falling less quickly	6
	Barometer unsteady, but falling	7
	Barometer falling	8
	Barometer steady or rising at first, then falling by a larger amount	9
	Barometer falling, at an increasing rate	9

NOTE.—These changes can generally only be given by ships which have special barographs on board.

For illustration of these characteristic changes and guidance see MARINE OBSERVERS HANDBOOK, 5th Edition.

Table XI.

bb.—Amount of Rise or Fall of the Barometer in the last three hours.

(Adapted for British Ships.)

Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code. Figs.	Amount of Rise or Fall.		Code Figs.
Mbs.	Inches.		Mbs.	Inches.		Mbs.	Inches.		Mbs.	Inches.	
0·2	·01	01	4·6	·14	23	9·0	·27	45	13·4	·40	67
0·4	·01	02	4·8	·14	24	9·2	·28	46	13·6	·41	68
0·6	·02	03	5·0	·15	25	9·4	·28	47	13·8	·41	69
0·8	02	04	5·2	·16	26	9·6	·29	48	14·0	·42	70
1·0	·03	05	5·4	·16	27	9·8	·29	49	14·2	·43	71
1·2	·04	06	5·6	·17	28	10·0	·30	50	14·4	·43	72
1·4	·04	07	5·8	·17	29	10·2	·31	51	14·6	·44	73
1·6	·05	08	6·0	·18	30	10·4	·31	52	14·8	·44	74
1·8	·05	09	6·2	·19	31	10·6	·32	53	15·0	·45	75
2·0	·06	10	6·4	·19	32	10·8	·32	54	15·2	·46	76
2·2	·07	11	6·6	·20	33	11·0	·33	55	15·4	·46	77
2·4	·07	12	6·8	·20	34	11·2	·34	56	15·6	·47	78
2·6	·08	13	7·0	·21	35	11·4	·34	57	15·8	·47	79
2·8	·08	14	7·2	·22	36	11·6	·35	58	16·0	·48	80
3·0	·09	15	7·4	·22	37	11·8	·35	59	16·2	·49	81
3·2	·10	16	7·6	·23	38	12·0	·36	60	16·4	·49	82
3·4	·10	17	7·8	·23	39	12·2	·37	61	16·6	·50	83
3·6	·11	18	8·0	·24	40	12·4	·37	62	16·8	·50	84
3·8	·11	19	8·2	·25	41	12·6	·38	63	17·0	·51	85
4·0	·12	20	8·4	·25	42	12·8	·38	64	17·2	·52	86
4·2	·13	21	8·6	·26	43	13·0	·39	65	17·4	·52	87
4·4	·13	22	8·8	·26	44	13·2	·40	66			

Visibility.

Table XII.

V.—Visibility.

	Code Figure.
Dense fog. Objects not visible at 50 yards	0
Thick fog. Objects not visible at 1 cable	1
Fog. Objects not visible at 2 cables	2
Moderate fog. Objects not visible at ½ mile (nautical)	3
Mist or haze, or very poor visibility. Objects not visible at 1 mile (nautical)	4
Poor visibility. Objects not visible at 2 miles (nautical)	5
Moderate visibility. Objects not visible at 5 miles (nautical)	6
Good visibility. Objects not visible at 10 miles (nautical)	7
Very Good visibility. Objects not visible at 30 miles (nautical)	8
Excellent visibility. Objects visible more than 30 miles (nautical)	9

Clouds.

Table XIII.

C_L.—Form of Low Cloud.

Form of Cloud.	Code Figure.
No low clouds	0
Cumulus of fine weather	1
Cumulus (Large, without anvil)	2
Cumulo-Nimbus	3
Strato-Cumulus (spread from Cumulus)	4
Stratus or Strato-Cumulus (in layer)	5
Nimbus	6
Cumulus **and** Strato-Cumulus of fine weather	7
Cumulus, large (or Cumulo-Nimbus) **and** Strato-Cumulus	8
Cumulus, large (or Cumulo-Nimbus) **and** Nimbus	9

Table XIV.

C_M.—Form of Middle Cloud.

Form of Cloud.	Code Figure.
No middle cloud	0
Alto-Stratus, typical thin	1
Alto-Stratus, typical thick (Sun or Moon invisible)	2
Alto-Cumulus or high Strato-Cumulus, single layer	3
Alto-Cumulus, in bands, decreasing	4
Alto-Cumulus, in bands, increasing	5
Alto-Cumulus, spread out from Cumulus	6
Alto-Cumulus with Alto-Stratus; or Alto-Stratus with parts resembling Alto-Cumulus	7
Alto-Cumulus Castellatus (Alto-Cumulus in ragged fragments)	8
Alto-Cumulus in several layers, generally with fibrous veils and chaotic appearance of sky	9

Table XV.

C_H.—Form of Upper Cloud (Cirrus Cloud).

Form of Cloud.	Code Figure.
No upper clouds (cirrus type)	0
Cirrus, fine, not increasing: scarce	1
Cirrus, fine, not increasing: plentiful, but not a continuous layer	2
Cirrus, anvil	3
Cirrus, fine, increasing	4
Cirrus or Cirro-Stratus increasing, below 45° altitude	5
Cirrus or Cirro-Stratus increasing, and reaching above 45° altitude	6
Cirro-Stratus, veil covering whole sky	7
Cirro-Stratus, not increasing, and not covering whole sky	8
Cirro-Cumulus predominating, and a little Cirrus	9

Table XVI.

C.—Predominating Form of Cloud.

Form of Cloud.	Code Figure.
Cirrus	1
Cirro-Stratus	2
Cirro-Cumulus	3
Alto-Cumulus	4
Alto-Stratus	5
Strato-Cumulus	6
Nimbus	7
Cumulus or Fracto-Cumulus	8
Cumulo Nimbus	9
Stratus or Fracto-Stratus	0

Table XVII.

N. and (N_L).—Amount of Cloud.

Proportion of Sky covered, in tenths.	Code Figure.
0	0
Less than 1	1
1	2
2 to 3	3
4 to 6	4
7 to 8	5
9	6
More than 9, but with openings	7
10, completely covered	8
Sky obscured by fog, duststorm or other phenomenon	9

Temperatures.

Table XVIII.

t_L.—Difference between Air and Sea Surface Temperature.

	Code Figure.
Air Temperature **higher** than Sea Temperature.	
More than 9° Fahrenheit	0
6° to 9° ,,	1
3° to 6° ,,	2
1° to 3° ,,	3
0° to 1° ,,	4
Air Temperature **lower** than Sea Temperature.	
0° to 1° Fahrenheit	5
1° to 3° ,,	6
3° to 6° ,,	7
6° to 9° ,,	8
More than 9° ,,	9

Swell.

Table XIX.

K.—Swell.

	Code Figure.
No swell	0
Low swell, short or average length	1
Low swell, long	2
Moderate swell, short	3
Moderate swell, average length	4
Moderate swell, long	5
Heavy swell, short	6
Heavy swell, average length	7
Heavy swell, long	8
Confused swell	9

Speed.

Table XX.

f.—Speed of Ship.

Speed in Knots.	Code Figure.
Ship stopped	0
1 to 3 knots	1
4 to 6 ,,	2
7 to 9 ,,	3
10 to 12 ,,	4
13 to 15 ,,	5
16 to 18 ,,	6
19 to 21 ,,	7
22 to 24 ,,	8
More than 24 knots	9

SPECIAL NOTICE TO THE MASTERS OF BRITISH SHIPS.

For the convenience of the Masters of all British ships a pamphlet is published entitled :—

DECODE

for use with the International Code for Wireless Weather messages from ships. M.O. 329.

Price 3d.

Obtainable from His Majesty's Stationery Office or through any bookseller.

In this pamphlet will be found an abridged description of the scheme of communication for British Selected Ships, together with the decode, with which all shipping may make full use of this world-wide system of weather intelligence in aid of safe navigation.

"In some areas where there is not a great deal of shipping and in certain seasons it will be necessary for other ships as well as 'Selected Ships' to make reports, and that applies particularly to Hurricane, Cyclone and Typhoon regions."

Masters of Ships registered in the Ports of Great Britain and Northern Ireland which are not detailed as "Selected Ships" in THE MARINE OBSERVER are invited by the British Meteorological Office when in regions where there are not sufficient Selected Ships to maintain a sufficient service of routine Wireless Weather reports and reports are desired by the Meteorological service of the nearest country, to assist in this service. They can do so by making routine reports in the Ships' International Wireless Weather Code in accordance with the schedule for British Selected Ships, addressing their reports to CQ or to the appropriate Coast WT station *where such are indicated by notice to mariners as being detailed to receive Weather reports from ships other than selected ships, free of charge.*

The special attention of masters of all British ships is invited to Article 34 of the Convention for Safety of Life at Sea and to Regulation XLVI which are reproduced for convenience on pages 26 and 27.

PERSONNEL.

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

Captain F. S. Hannam.

Captain HANNAM of R.M.S. *Asturias* retired in August, 1932, after 44 years service in the Merchant Navy.

He went to sea as an apprentice in June, 1888, in the Ship *Madagascar*, passed for 2nd mate in 1892 and was 3rd and 2nd mate of the ship *Chiltonford* before going into steam. After four years as an officer in the Clan Line, upon passing for Master he joined the service of the Royal Mail Steam Packet Company in June, 1898.

Captain HANNAM was appointed to his first command S.S. *Kennet* on station in the West Indies in 1907 and has commanded a number of the R.M.S.P. Co.'s ships including *Nariva*, *Deseado*, *Avon*, *Arlanza*, *Almanzora* and *Asturias*. He has been a member of the Corps of Voluntary Marine Observers since May, 1921.

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

Captain R. L. Daniel, R.D., R.N.R.

Captain DANIEL, Chief Marine Superintendent of the Royal Mail Steam Packet Company, retired from that post on September 30th, 1932.

After serving eight years in sailing ships, he joined the Royal Mail Steam Packet Company as Fifth Officer on October 1st, 1891. Captain DANIEL'S first command was the S.S. *Arno*, to which ship he was appointed Acting Commander on March 26th, 1901, when she was stationed in the West Indies. He also commanded the *Spey* on the same station. On leaving *Spey* in April, 1904, he reverted to Chief Officer.

He was finally appointed Commander in the R.M.S.P. Company's service on April 17th, 1906, and commanded the following ships :—

Tyne, *Marima*, *Caroni*, *Carmarthenshire*, *Magdalena*, *Monmouthshire*, *Caribbean*, *Agadir*, *Carnarvonshire*, *Ekaterinoslav*, *Asturias*, *Deseado*, and *Orotava*.

He was appointed Marine Superintendent of the Company on April 11th, 1921.

During the re-organization of voluntary marine meteorological service in the Merchant Navy after the War, Captain DANIEL paid his first visit to the Marine Division of the Meteorological Office. He had had proposals put before him, in which individuals claimed that they could advise the masters of ships by wireless telegraphy of regions of bad weather in the North Atlantic which would enable ships to dodge depressions.

That this was quite impracticable, if not impossible, in middle and high latitudes, where intense depressions sometimes have wind circulations of 1,000 miles in diameter, and of this diameter (athwart the line of progression) one third covered by winds of storm and hurricane force, the whole system advancing eastward at up to 1200 miles a day, he was of course aware.

He sought for information of the aims of the British State voluntary system; and having learned that the intention was to develop the work along scientific practical seamanlike lines, so that seamen could judge for themselves, he gave his full support, and was ever ready to encourage reasonable voluntary work upon such lines amongst the officers of his Company.

We are glad of this opportunity to acknowledge the moral support and help which Captain DANIEL has given in building up the present system of British Selected Ships, and wish him many years of health and happiness in his retirement.

Commander F. G. Spriddell, R.D., R.N.R.

Captain SPRIDDELL, Assistant Marine Superintendent of the Royal Mail Lines Ltd., has been appointed to succeed Captain DANIEL as Chief Marine Superintendent.

He was first a Member of the Corps of Voluntary Marine Observers, when second officer of S.S. *Severn* in 1907, and ships under his command, including *Somme*, *Nariva*, *Glamorganshire*, and *Avon* have been regular observing ships in the post-war organization.

We first made Captain SPRIDDELL'S personal acquaintance in 1917 when he took over command of H.M. Boarding Steamer *Carron*, and our good wishes are with him in his responsible position of supervising the Royal Mail Lines fleet.

Chart II — SHIPS' WIRELESS WEATHER SIGNALS.

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

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

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

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

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

CURRENTS ON THE TRADE ROUTES IN THE SOUTHERN INDIAN OCEAN.

FEBRUARY MARCH and APRIL.

Observations of ships regularly observing for the British Meteorological Office, 1910 – 1932.

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dir^{n}	Wind Force
Between Longitude 56°E. and Longitude 108°E.								
FEBRUARY.								
Niwaru	27	1910	44°58'S.	72°06'E.	N.88°E.	36	—	—
Peshawur	28	1931	38°54'S.	57°10'E.	S.36°E.	35*	N.W.by W.	5

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dir^{n}	Wind Force
MARCH.								
Durenda	6	1931	23°51'S.	66°34'E.	S.57°W.	36	—	—
APRIL.								
Berwickshire	1	1931	37°41'S.	77°36'E.	N.5°W.	36*	—	—

* Drifts marked thus are proportionate drifts for 24 hours observed for shorter intervals.

For Currents to Northward see Marine Observer Vol. VII. No 74.

For Currents to Eastward see Marine Observer Vol. VI. No 63.

Mauritius

Reunion

St. Paul I.

Kerguelen I.

60° 70° 80° 90° 100° 110°

20° 30° 40° 50°

51 35

51 39

87 40

50 26

54 20

82 27

42 33

37 21

64 39

42 31

61 39

73 26

52 25

61 30

93 25

57 30

66 33

73 44 25

28 14

30 10

37 16

35 31

25 56

29 24

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 miles per day ⟹, 25–48 " " " ", ⟶, 49–72 " " " ⟹, 73 miles per day and above ⟹.

Distance from tail of arrow to circle represents 5%. Scale 0 1p 2p 3p 4p 5p%

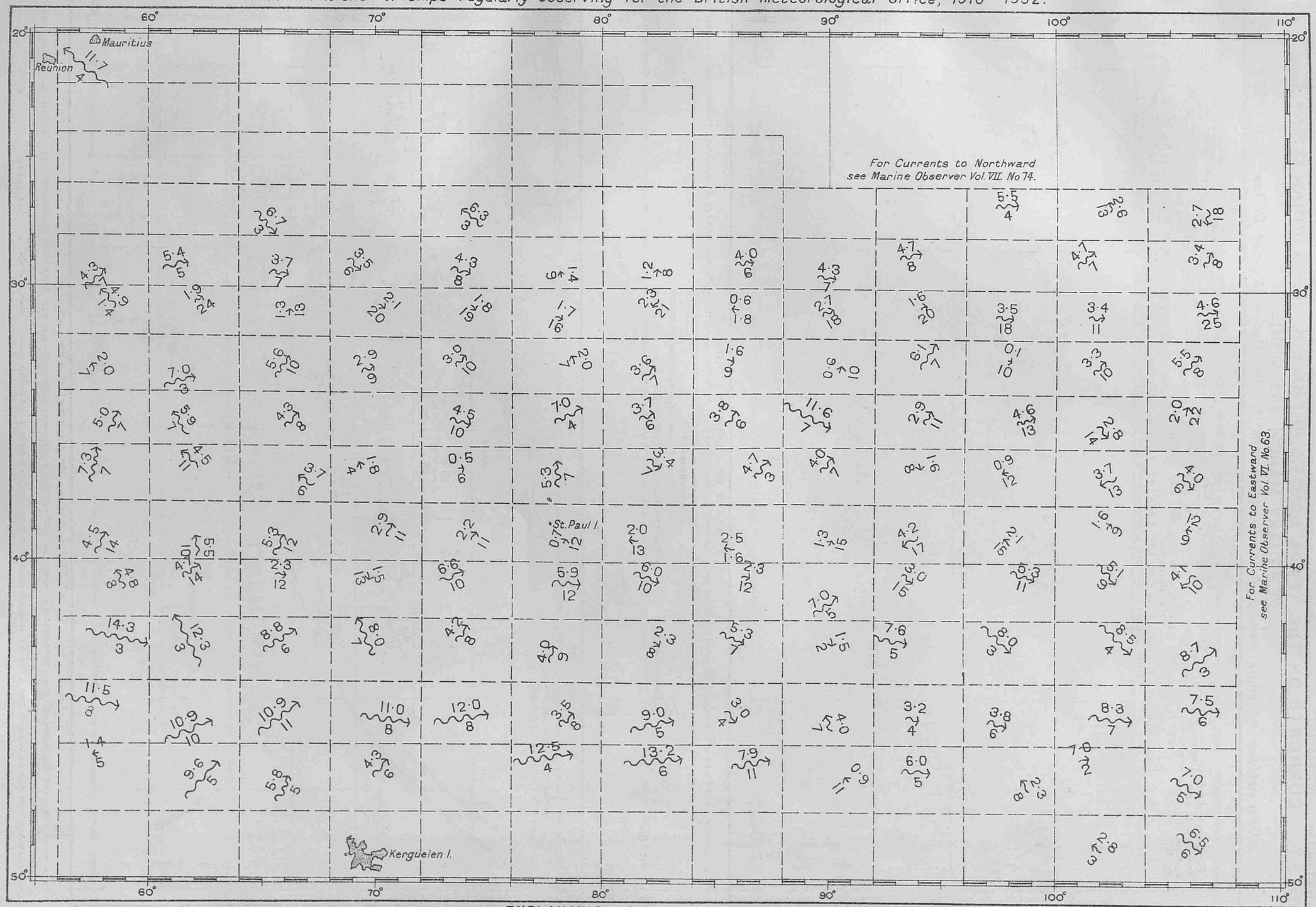
The upper figure in centre of rose gives total number of observations, the lower figure the percentage frequency of currents less than 6 miles per day.

CURRENTS ON THE TRADE ROUTES IN THE SOUTHERN INDIAN OCEAN.

Vol. X. No. 109.

FEBRUARY MARCH and APRIL.

Observations of ships regularly observing for the British Meteorological Office, 1910 – 1932.



EXPLANATION OF CURRENT ARROWS.

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

CURRENTS ON THE TRADE ROUTES IN THE SOUTHERN INDIAN OCEAN.

FEBRUARY MARCH and APRIL.

Observations of ships regularly observing for the British Meteorological Office, 1910–1932.

For Currents to Northward see Marine Observer Vol. VIII, No. 87.

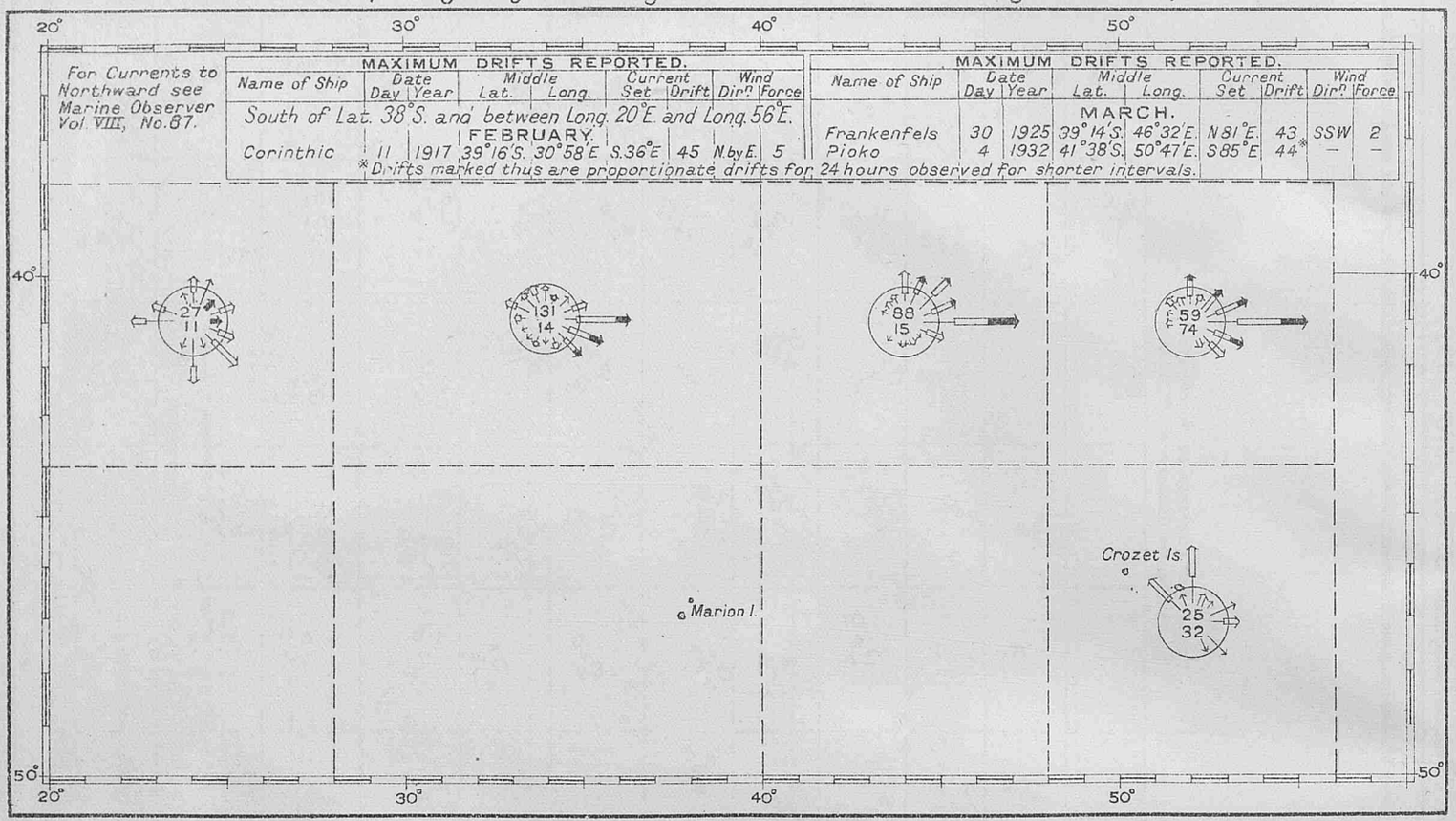
MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dir?	Wind Force
South of Lat. 38°S. and between Long. 20°E. and Long. 56°E.								
FEBRUARY.								
Corinthic	11	1917	39°16'S.	30°58'E	S.36°E	45	N.by E.	5

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dir?	Wind Force
MARCH.								
Frankenfels	30	1925	39°14'S.	46°32'E.	N81°E.	43	SSW	2
Pioko	4	1932	41°38'S.	50°47'E.	S85°E.	44*	—	—

*Drifts marked thus are proportionate drifts for 24 hours observed for shorter intervals.



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,:–

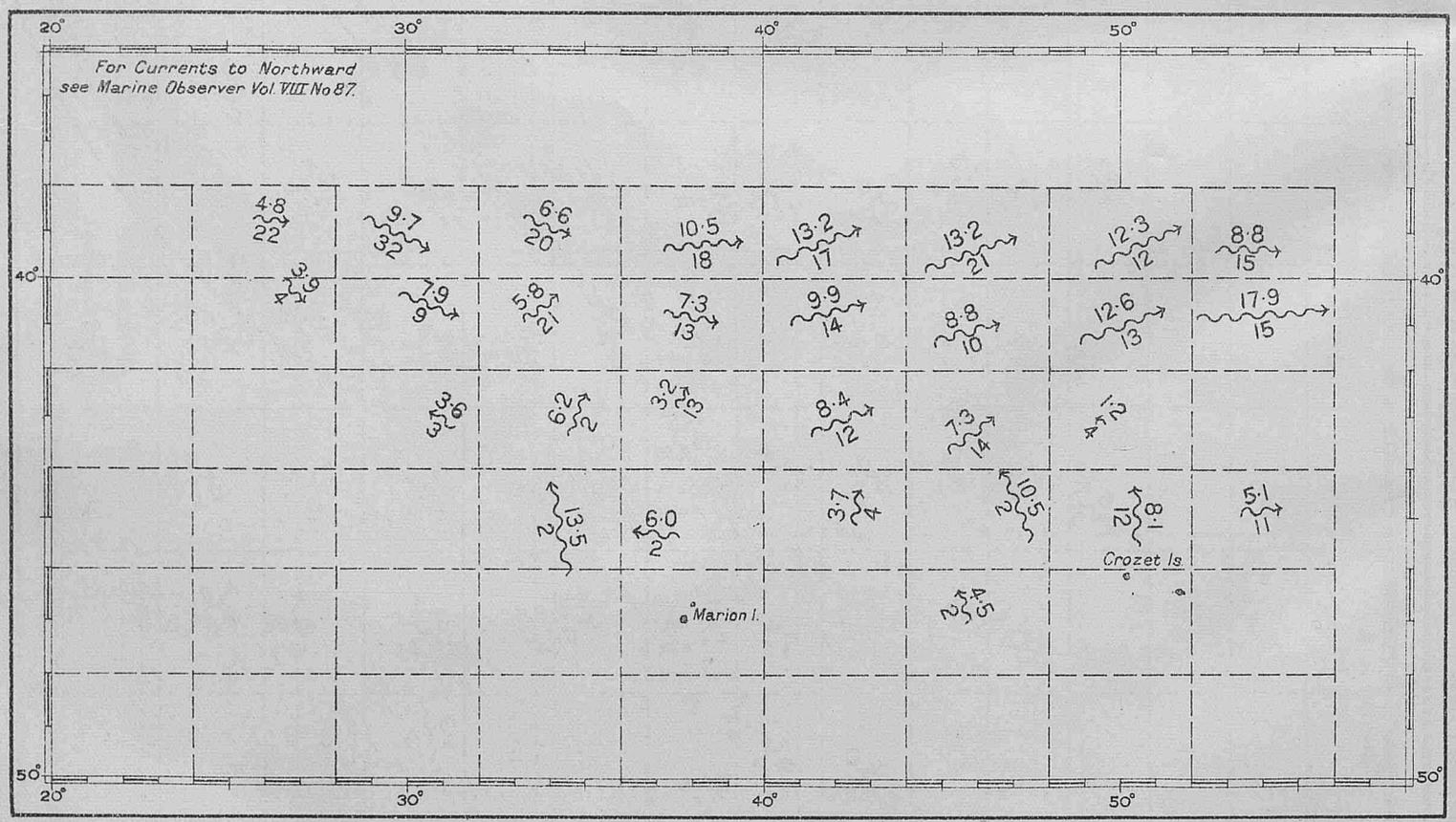
6–12 miles per day, ⟶, 13–24 miles per day ⟹,

25–48 " " " , ⟶, 49–72 " " " ⟹,

73 miles per day and above ⟹.

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

The upper figure in centre of rose gives total number of observations, the lower figure the percentage frequency of currents less than 6 miles per day.



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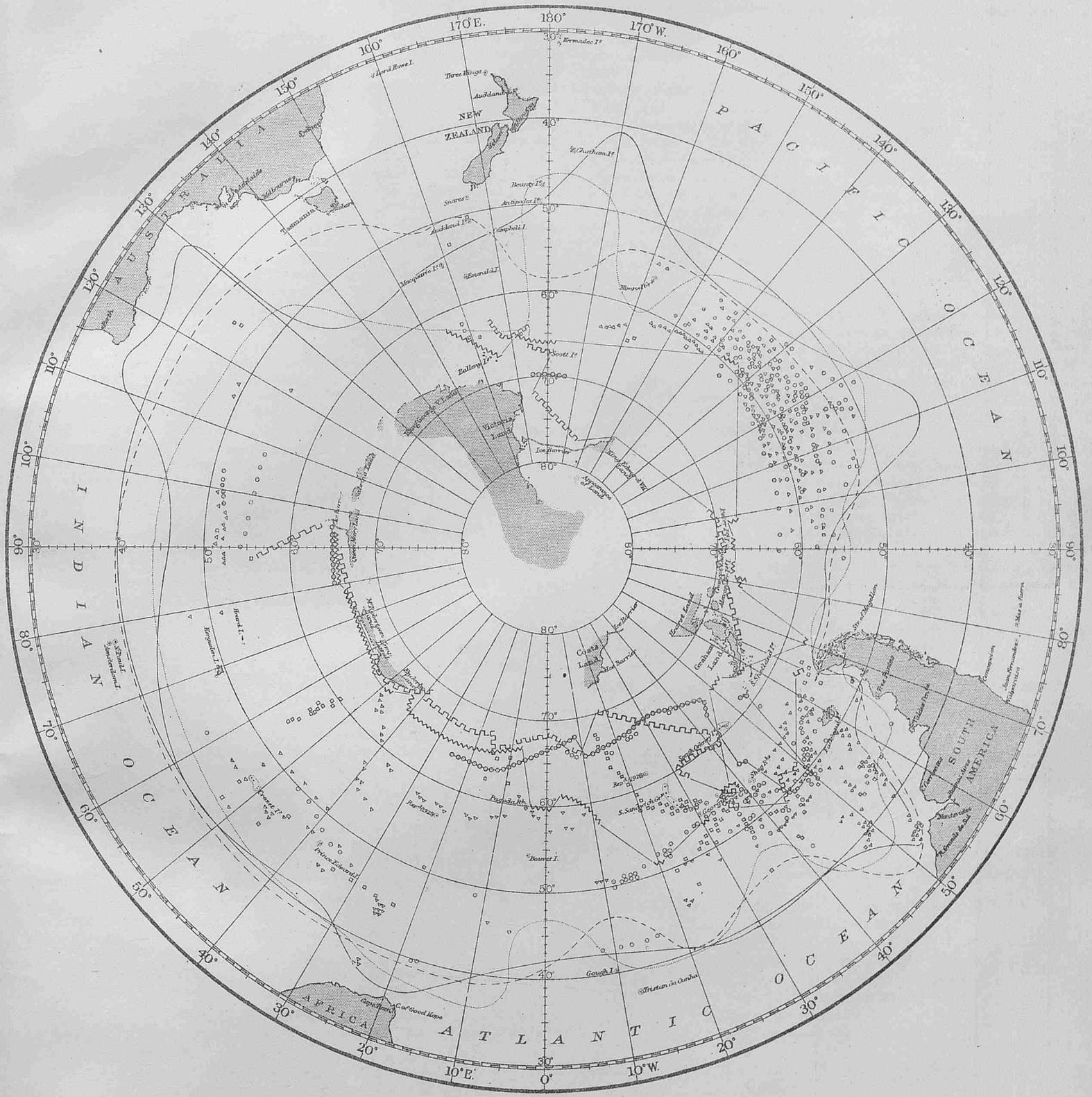

ICE CHART OF THE SOUTHERN HEMISPHERE,

JANUARY, FEBRUARY and MARCH.

EXPLANATION.

The symbols used to distinguish the ice of each of the three months are as follows:-

	Bergs, 1902-1932.	Position of northernmost pack ice actually observed 1885-1932.	Extreme limit of all ice, 1772-1932.
January.	△	~~~~~~~~~~~~	————
February.	□	⊓⊓⊓⊓⊓⊓⊓⊓⊓⊓⊓⊓	– – – – – – – – – – – –
March.	○	-○-○-○-○-○-○-○-	.....

NOTE — The symbols for pack ice are joined by hair line where desirable.

The coast line of the Antarctic continent as shown on this chart is not completely corrected to accord with the latest survey information. It is intended in a later volume of The Marine Observer, after the Admiralty Ice chart of the Southern Hemisphere No 1241 has been revised, to again publish this chart in The Marine Observer with coast lines as complete as possible and to bring the ice information up to date annually.

H.M.Stationery Office Press: Kingsway. W.C.2.

P.s.608/2515 W.6 76 A. 0.29 & 908. 1300. 12/32

MARINE METEOROLOGY.

Co-operation of Shipowners, Masters and Mates.

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

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

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

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

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

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

A general description of marine meteorological work, including the particulars desired from intending marine observers, is given in Chapter I of THE MARINE OBSERVER'S HANDBOOK, 5th Edition, which is supplied to all observing ships, and may also be obtained from H.M. Stationery Office, direct, or through any bookseller, price 2s. 6d.

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

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

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

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

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

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

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

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

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

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

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

All ships fitted with W/T are advised to procure the DECODE for use with the International Code for Wireless Weather Messages from Ships, M.O. Pubn. 329, which can be obtained from H.M. Stationery Office, price 3d. This gives a description of the system of communication of "Selected Ships," as well as the DECODE.

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

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

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Commander J. HENNESSY, R.D., R.N.R., Senior Nautical Assistant.
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(*Telephone No.: Holborn 3434 Extension 421*).
Nearest station Temple, District Railway.

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Agents.

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BRISTOL CHANNEL Captain T. JOHNSTON, Technical College, Cathays Park, Cardiff. (*Telephone No.: Cardiff 6813*).

CLYDE ... ... Mr. ROBERT CLEARY, Master Mariner, The Clutha Stevedoring Co., Ltd., Princes Dock, Glasgow. (*Telephone No.: 513 Ibrox*).

Agents (*contd.*).

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(*Telephone No.: 108 Dockyard*).

HUMBER ... ... Captain A. M. BROWN, Ellerman Wilson Line Office, Hull. (*Telephone No.: Central 2180*).

SOUTHAMPTON Captain Sir BENJAMIN CHAVE, K.B.E. Room 35 Royal Mail Buildings.

SYDNEY, New South Wales. Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation.
Captain R. G. BLAYNEY.
Customs House.
(*Telephone No.: B 6421*).

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

DERELICTS AND FLOATING WRECKAGE.

Date.	Position. Latitude.	Position. Longitude.	Description.
ENGLISH CHANNEL.			
12.12.32	48°53′N.	4°38′W.	Red conical buoy.
BRISTOL CHANNEL.			
3.12.32	51°24′N.	3°45′W.	Spar floating vertically, about 3 ft. above water, apparently sailing vessel's mast.
NORTH ATLANTIC.			
1.12.32	36°32′N.	74°50′W.	Capsized barge awash.
2.12.32	37°09′N.	73°56′W.	Wreckage consisting of timbers 28 ft. long and 8 inches square, bolted together.
12.12.32	48°15′N.	11°20′W.	Red buoy without light.
12.12.32	42°49′N.	52°32′W.	Schooner *Frank Baxter* abandoned, on fire.
GULF OF MEXICO.			
6.12.32	26°02′N.	86°33′W.	Piece of wreckage about 15 ft. long, 6 ft. wide and 18 inches thick; this obstruction was covered for about half its length with metal.
NORTH PACIFIC.			
1.12.32	16°13′N.	98°56′W.	Dead tree trunk about 50 ft. long, with one branch projecting 20 ft. out of water.

CHART OF THE WESTERN NORTH ATLANTIC.

Showing the North Atlantic Lane Routes in force during JANUARY as laid down by the Trans-Atlantic Track Convention. If at any time, owing to abnormal ice conditions, any alteration to the usual tracks is considered advisable by the track convention, particulars will be published on this chart. For full information concerning the North Atlantic Lane Routes see Vol. IX, No. 100, April 1932, Marine Observer, pages 80 and 81.

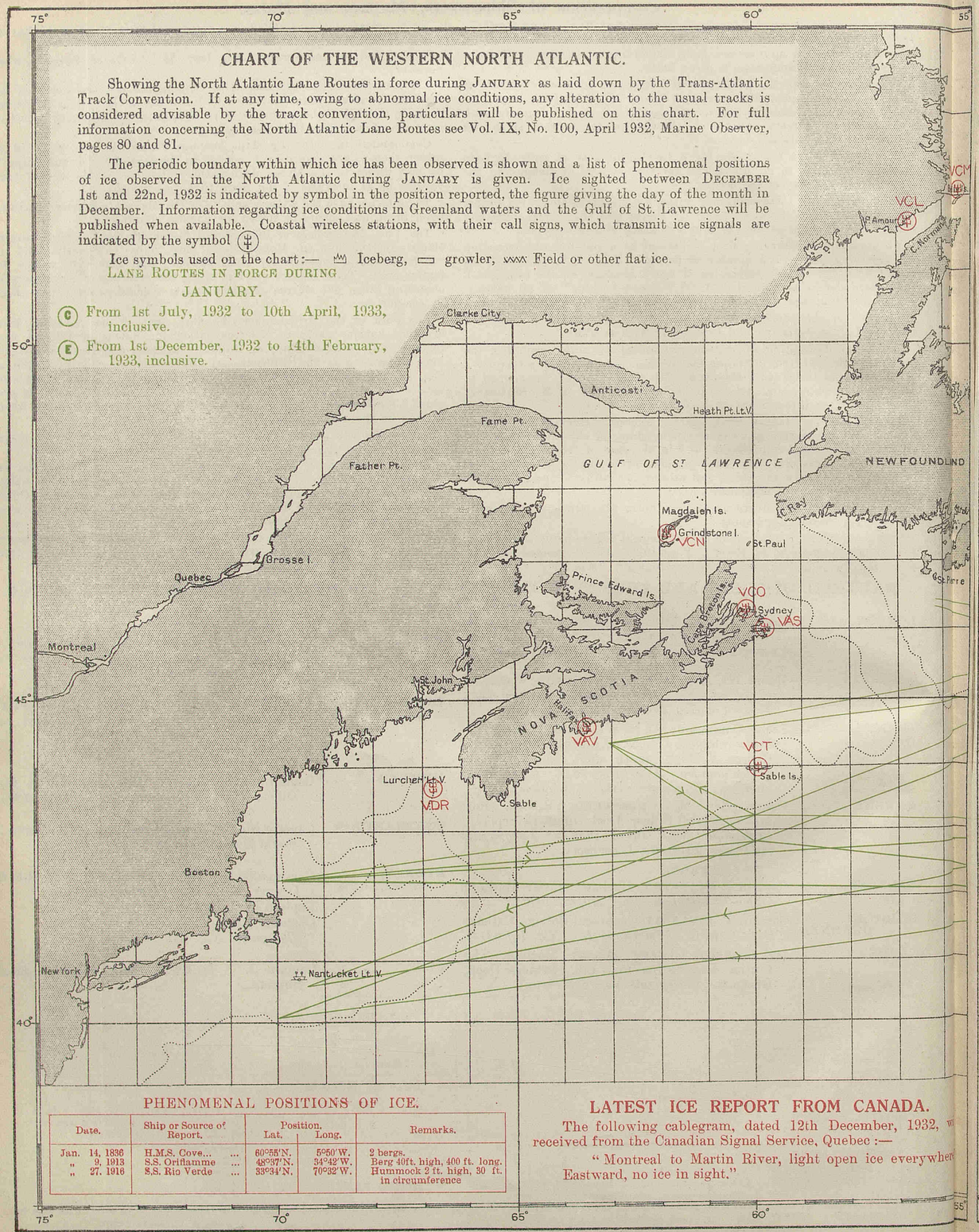
The periodic boundary within which ice has been observed is shown and a list of phenomenal positions of ice observed in the North Atlantic during JANUARY is given. Ice sighted between DECEMBER 1st and 22nd, 1932 is indicated by symbol in the position reported, the figure giving the day of the month in December. Information regarding ice conditions in Greenland waters and the Gulf of St. Lawrence will be published when available. Coastal wireless stations, with their call signs, which transmit ice signals are indicated by the symbol (Ψ)

Ice symbols used on the chart:— Iceberg, growler, Field or other flat ice.

LANE ROUTES IN FORCE DURING JANUARY.

(C) From 1st July, 1932 to 10th April, 1933, inclusive.

(E) From 1st December, 1932 to 14th February, 1933, inclusive.



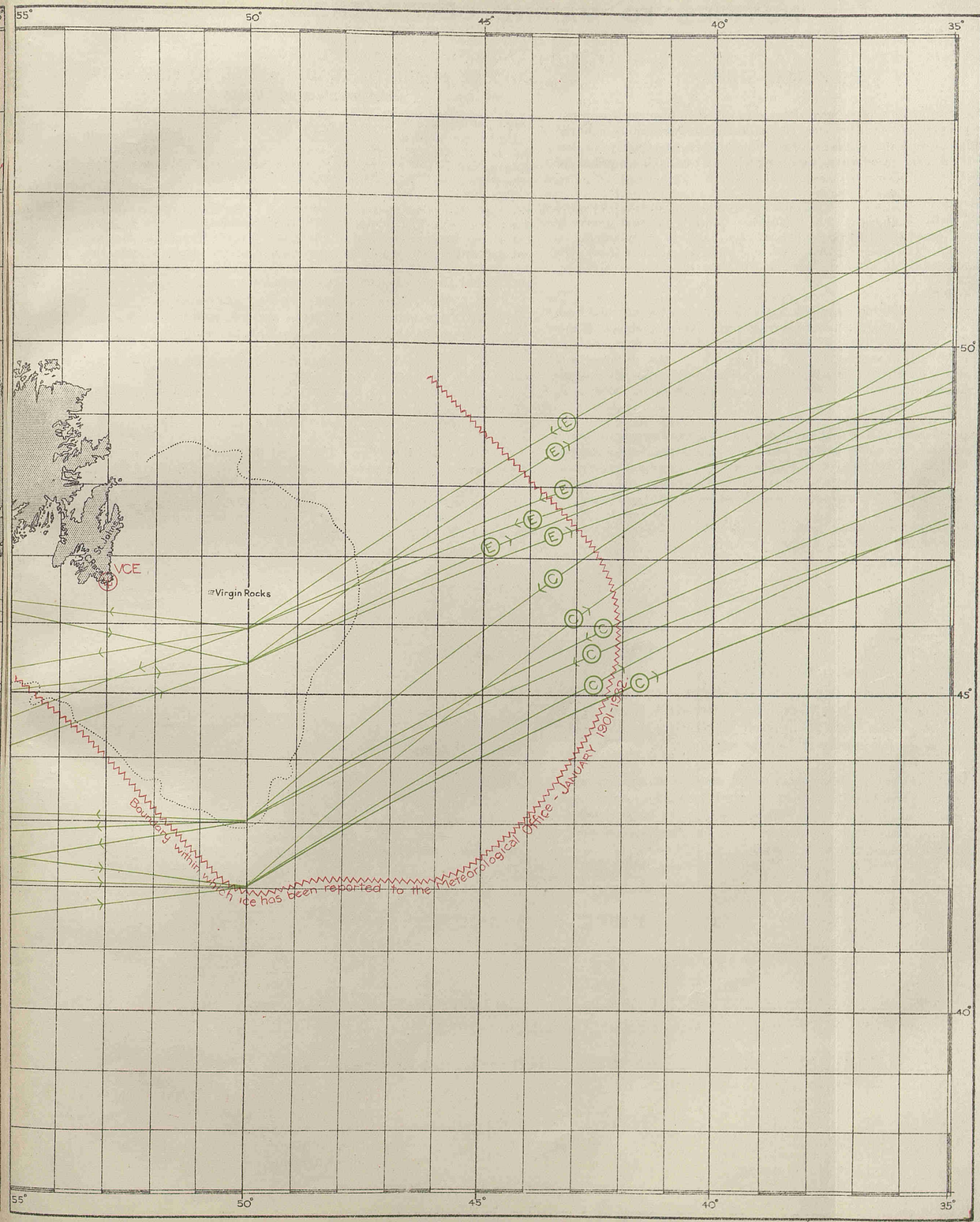
PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat.	Position. Long.	Remarks.
Jan. 14, 1836	H.M.S. Cove... ...	60°55'N.	5°50'W.	2 bergs.
,, 9, 1913	S.S. Oriflamme ...	48°37'N.	34°42'W.	Berg 40ft. high, 400 ft. long.
,, 27, 1916	S.S. Rio Verde ...	33°34'N.	70°32'W.	Hummock 2 ft. high, 30 ft. in circumference

LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 12th December, 1932, was received from the Canadian Signal Service, Quebec:—

"Montreal to Martin River, light open ice everywhere. Eastward, no ice in sight."



H.M. Stationery Office Press, Kingsway W.C.2.

JANUARY M.O., 1933.

Pa.608/2815 Wt.74A.D.29.Gp.908.1000.12/32.

NOTICES TO MARINE OBSERVERS.

SELECTED SHIPS.

The Commanders of Selected Ships are asked to impress upon their Observing Officers and Wireless Operators that it is absolutely essential for efficient work that they should make themselves thoroughly familiar with the scheme of communication which is given in this number for the year.

The lists of stations detailed to receive reports from British "Selected Ships" will be repeated and brought up to date in each quarterly number, corrections being given in the monthly supplements as necessary. It is essential that W/T. operators should see these lists as soon as possible after the Marine Observer has been received on board.

It cannot be too strongly impressed upon all concerned both afloat and ashore in all parts of the world that the first object of this voluntary service of British "Selected Ships" is to aid navigation in accordance with Section (c) of Article 35 of the International Convention of Safety of Life at sea. That is to transmit meteorological observations by W/T for the benefit of other ships *and* of the various meteorological services.

By adhering to one World wide scheme with fixed times and specified wave lengths and reporting weather, currents and ice in a manner suitable for the purpose of navigation all other services as well as shipping will benefit more than if special and different arrangements were made for the various services in different parts of the world.

Throughout the coming year, British "Selected Ships" are asked by their example to set the highest standard.

COPY OF BOARD OF TRADE NOTICE TO MARINERS.

Helm or Steering Orders.

CHANGE TO DIRECT SYSTEM—1ST JANUARY, 1933.

Under the Merchant Shipping Act, 1932, which comes into force on the 1st of January, 1933, the present indirect system of helm or steering orders will no longer be permissible, and all helm or steering orders are to be given in the direct sense as explained below.

The various associations representing ships' officers, seamen, etc., who have been consulted by the Board of Trade are all of the opinion that the words STARBOARD and PORT should continue to be used for giving helm or steering orders in the British Mercantile Marine, but that in order to emphasise the change to the direct system the warning word "wheel" should be used with the order for a short period after the change comes into operation.

On and after 1st January 1933, the Order

"STARBOARD" must only be given when it is intended that the wheel, the rudder blade and the head of the ship should go to starboard.

"PORT" must only be given when it is intended that the wheel, the rudder blade and the head of the ship should go to port.

The orders to be used temporarily during the period immediately after the 1st January, 1933, would be :—

"Wheel to starboard" and "Wheel to port"

or

"Starboard the wheel" and "Port the wheel".

(The former alternative is considered preferable by the Board of Trade).

On vessels steered by hand-tiller, the order "STARBOARD" must only be given if the rudder blade and head of the vessel are to move to starboard, and the order "PORT" must only be given if the rudder blade and the head of the vessel are to move to port.

(1st Oct. (23/87).)

POSTAL ARRANGEMENTS.

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

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

S.S. ..... *Captain*.....

Port of Call.....

Date of Homeward Departure.....

Postal Address.....

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

LATE NOTICES

THE FEBRUARY SUPPLEMENT WILL BE PUBLISHED ON JANUARY 25TH, 1933 AND THE MARCH SUPPLEMENT ON FEBRUARY 22ND, 1933.

THE APRIL NUMBER WILL BE PUBLISHED ON MARCH 29TH, 1933.

VOLUNTARY OBSERVING SHIPS' FLEET LIST.

The following is a complete list of British observing ships regularly carrying out voluntary services of marine meteorology with the guidance of the Marine Division of the Meteorological Office.

The names of the Captains and observing officers of observing ships, and the Senior Wireless Operators of Selected Ships are given, as ascertained from the last written return received.

Meteorological Logs, Records, and W/T Weather Registers received between the dates specified at the head of the seventh column are acknowledged by Form number, with commencing and ending dates of period covered by the returns; the date when the last return was received being given in the eighth column.

The Captains of observing ships are requested to take this acknowledgment in cordial thanks and grateful recognition to them and their observing officers and wireless operators for the returns made and the voluntary service rendered in all parts of the world.

The classification of meteorological logs and Selected Ships' records and registers will be notified to the Captains by post card Form 1343. Only in exceptional cases will individual letters be sent to the Captains of observing ships.

The Port Meteorological Officers and Merchant Navy Agents at the ports are advised as necessary, and they will, as necessary, communicate such advice verbally by personal call upon the Captain.

Excellent Awards will be made at the end of the financial year. The names of the Captains and Principal Observing officers gaining these awards will be published in a special list in the Marine Observer.

It is requested that prior notification of changes of service, probable periods of lay up, transfer of Captains, or other circumstances which may prevent the continuance of voluntary meteorological service at sea, may be made to the appropriate Port Meteorological Officer or Merchant Navy Agent.

Ships not making the appropriate written returns within a reasonable period will be removed from the list, steps taken to recover any instruments lent, and the free issue of the Marine Observer discontinued.

The number of voluntary observing ships is limited to a maximum total of 366.

The number of Selected Ships detailed to carry out the voluntary service provided for in Clause (C) of Article 35 of the Convention for Safety of Life at Sea, Merchant Shipping (Safety and Load Line Conventions) Act, 1932, is determined by the British proportion of the world's tonnage; and is at present 299.

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

Explanation of Abbreviations.

The number appearing before the name of an observing ship in this list is her number for the time being as a British Selected Ship.

†† indicates fitted with wireless telegraphic apparatus for long range, long wave, continuous wave transmission and reception.

*† indicates fitted with wireless telegraphic apparatus for transmission and reception; fitted for reception only of long range, long wave, continuous wave.

** indicates fitted with wireless telegraphic apparatus for transmission and reception: but not fitted for long range, long wave, continuous wave transmission or reception.

M.V. = Motor Vessel.

S.T. = Steam Trawler.

Ships having no such letters after their names are steamships.

M.L. = Equipped with a complete set of tested instruments lent by the Meteorological Office for keeping the meteorological log.

M. = Ships' own mercurial barometer, found to be sufficiently accurate and reliable for the purpose of observation for making wireless weather reports.

S. = Partly or wholly equipped with tested instruments lent by the Meteorological Office for the purpose of carrying out the duties of a Selected Ship, when detailed to do so.

A. = Ships' own aneroid.

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 15.10.32 to 7.12.32.	Date Last Return Received.
122 †† *Accra*, M.V. ...	Shooter, J. C.	R. B. Ellis	G. Arrowsmith...	M.-S.	Elder Dempster	Fms. 911 & 138 21.9.32 to 29.10.32	18.11.32
055 *† *Actor*	Chapman, T.	G. Penston, E. Pearce, P. Vaughan.	P. Smythe ...	M.	Harrison ...	,, ,, 25.8.32 to 9.11.32	15.11.32
123 †† *Adda*, M.V. ...	Lawson, J. H.	E. Moore, S. Baker	A. J. L. Edwards	M.-S.	Elder Dempster	,, ,, 6.10.32 to 12.11.32	16.11.32
273 *† *Adrastus* ...	Lloyd, R.	S. R. Evans, J. P. Makepeace, F. E. Jackson.	J. H. Nightingale	M.L.	A. Holt	Fm. 915 12.5.32 to 15.9.32	9.11.32
090 *† *Aeneas*	Wallace, W. K. ...	G. H. Smith, W. Williams, R. A. Hanney.	T. C. Burninghem	S.	,,	Fms. 911 & 138 11.9.32 to 16.10.32	21.11.32
166 *† *Agamemnon* ...	Beswick, W., D.S.C., Commr., R.N.R.	W. K. Hole, W. G. Harrison, O. Thomas.	A. C. Nevin ...	,,	,,	,, ,, 24.10.32 to 2.11.32	14.11.32
Aidan	Barlow, F. P.	... ...	... ...	M.L.	Booth	... ...	—
Akaroa	Hartman, W. H. ...	... ...	... ...	,,	Shaw Saville ...	... ...	...
Alban	Evans, L.	... ...	... ...	,,	Booth	... ...	...
127 *† *Albion Star* ...	Hopper, G. E.	R. White, W. H. Gore ...	... ...	M.	Blue Star ...	Fms. 911 & 138 18.12.31 to 6.3.32	21.6.32
178 *† *Alipore* ...	Carter, E. A. J. W., R.D., Commr., R.N.R.	J. A. Hunter, C. Hucq ...	R. Stone ...	,,	P. & O.	,, ,, 16.9.32 to 2.11.32	5.12.32
175 †† *Almanzora* ...	Buret, T. J. C. ...	E. W. Martin, F. J. Brett, H. E. Sang.	W. Smith ...	S.	Royal Mail ...	,, ,, 25.9.32 to 8.11.32	9.11.32
012 †† *Almeda Star* ...	Turner Russell, W. ...	L. S. Hassell	R. Austin ...	M.	Blue Star ...	,, ,, 12.9.32 to 27.10.32	7.11.32
Alynbank ...	Gillies, —.	... ...	... ...	M.L.	A. Weir	... ...	...
103 †† *Andalucia Star*	Fisher, J.	R. H. K. Bartley, F. Graham, M. O'Hare.	E. E. Ash ...	M.	Blue Star ...	Fms. 911 & 138 21.8.32 to 4.10.32	12.10.32
079 *† *Antilochus* ...	Dougall, A. T. ...	B. L. Parker, W. Murray, C. F. Lock.	S. A. T. Dunderdale.	S.	A. Holt	,, ,, 30.6.32 to 6.9.32	8.9.32

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 15.10.32 to 7.12.32.	Date Last Return Received.
209 ††	*Aorangi*, M.V. ...	Spring-Brown, J. F. ...	E. Anderson, D. H. Richards, S. H. Crawford.	G. M. Power ...	M.L.	Canadian-Australasian.	Fm. 915 3.3.32 to 17.6.32	18.8.32
120 ††	*Apapa*, M.V. ...	Beith, A.	V. E. Thomas, C. E. Evans...	J. Rea	M.-S.	Elder Dempster	Fms. 911 & 138 20.10.32 to 26.11.32	5.12.32
029 ††	*Appam*	Draper, J. M.	W. M. M. Hutchings, R. K. Palmer, B. C. Haigh.	R. J. Dowling ...	S.	,, ,,	,, ,, 7.9.32 to 17.10.32	18.10.32
017 ††	*Aquitania* ...	Irving, R. B., O.B.E., R.D., Capt., R.N.R.	G. Jeffries, L. R. Sharp, E. A. Divers.	J. N. Cragg ...	,,	Cunard	,, ,, 2.10.32 to 10.11.32	12.11.32
115 ††	*Arandora Star* ...	Moulton, E. W. ...	J. L. Anderson, R. Freaker, H. F. Partridge.	C. W. Herbert	M.-S.	Blue Star	,, ,, 8.10.32 to 29.10.32	31.10.32
							Fm. 912 23.6.32 to 29.7.32	30.7.32
	Architect ...	Mowat, I.	G. Dewar	... ...	M.	Harrison ...	Fm. 911 9.5.31 to 16.9.32	30.9.32
293 *†	*Ariguani* ...	Scudamore, D. S. C., R.D., Commr, R.N.R.	G. McKee, A. Crone, A. Sandham.	T. Horne ...	S.	Elders & Fyffes	Fms. 911 & 138 19.10.32 to 20.11.32	1.12.32
144 ††	*Arlanza* ...	Huff, G. F.	B. A. Gammon, A. E. Randle, H. V. Todd.	G. Hunt ...	,,	Royal Mail ...	,, ,, 22.10.32 to 5.12.32	7.12.32
091 ††	*Armadale Castle*	Harvey, H. B. ...	C. Lloyd, L. G. May, J. W. J. Brooks.	E. Haslan ...	,,	Union Castle ...	,, ,, 23.9.32 to 13.11.32	15.11.32
296 *†	*Arracan*... ...	Thomson, S.	J. A. C. MacCall, M. M. Ramsay, J. J. Allen.	F. Fox	,,	P. Henderson ...	,, ,, 17.8.32 to 13.11.32	18.11.32
	Arundel ...	Munton, C. G. G. ...	E. Balcombe, A. K. Dewdney	C. Kelley ...	,,	Southern Rly. ...	Telegraphic Report 7.12.32 ...	7.12.32
095 ††	*Arundel Castle*	Stuart, C. E., R.D., Capt. R.N.R.	G. L. Clarke	... ...	,,	Union Castle ...	Fm. 911 24.1.32 to 12.3.32	19.3.32
280 *†	*Astronomer* ...	Richards, J.	W. P. Baker, R. Williams, E. B. Stephens.	... ...	M.	Harrison ...	Fms. 911 & 138 18.4.32 to 7.7.32	20.7.32
065 ††	*Asturias* M.V.	Shillitoe, B., R.D., Commr., R.N.R.	H. G. Whittle, S. J. Hill, T. W. Stevens.	G. Pott ...	S.	Royal Mail ...	,, ,, 11.9.32 to 23.10.32	25.10.32
281 *†	*Auditor* ...	Windsor, G. R. ...	L. Richardson, A. H. Thompson.	... ...	M.	Harrison ...	,, ,, 8.3.32 to 27.5.32	6.7.32
212 *†	*Australia* ...	Scutt, W.	E. H. Lidstone, L. Smith, F. M. Jenvey.	C. Cunningham	,,	British India ...	Fm. 915 29.3.32 to 16.8.32	1.9.32
124 ††	*Avila Star* ...	Thomas, R. J. ...	F. N. Johnson, W. Hall, E. Lowndes.	B. King... ...	,,	Blue Star ...	Fms. 911 & 138 2.10.32 to 16.11.32	22.11.32
068 ††	*Balmoral Castle*	Barron, A.	A. C. G. Price, G. F. Oakley, H. Bunn.	J. Sharp ...	S.	Union Castle ...	Fms. 911 & 138 26.8.32 to 16.10.32	18.10.32
179 *†	*Balranald* ...	Short, C. E.	E. R. Physick, F. M. Pearce, H. P. Mallett.	J. F. Arthurs ...	M.	P. & O. Branch	,, ,, 17.10.32 to 3.11.32	28.11.32
248 *†	*Banffshire* ...	Gibb, A. W. P. ...	R. F. Buckley, A. Hunter, A. Banks.	J. Braugh ...	,,	Turnbull Martin	,, ,, 28.9.32 to 5.10.32	22.10.32
180 *†	*Baradine* ...	Elliot Smith, H., R.D., Lt.-Commr., R.N.R.	H. V. Williamson, G. W. Wood, G. E. Owen.	J. Murphy ...	,,	P. & O. Branch ...	,, ,, 7.8.32 to 8.11.32	15.11.32
037 *†	*Baronesa* ...	Compton, R. H. ...	J. R. Faulkner, F. W. Kent, J. J. Freeman.	F. Amott ...	,,	Houlder	,, ,, 21.8.32 to 19.10.32	24.10.32
213 *†	*Barpeta* ...	Wardingham, T. W. ...	G. E. Hopkins, J. Patterson, R. W. Davis.	J. Grey ...	,,	British India ...	,, ,, 11.8.32 to 7.9.32	26.9.32
181 *†	*Barrabool* ...	Shcepwash, J. S. ...	W. Elvy, D. Swabey, A. Gething.	R. Rowley ...	,,	P. & O. Branch ...	,, ,, 17.5.32 to 18.8.32	23.8.32
070 ††	*Bayano* ...	Legge, A. W. ...	J. C. Thomas, S. A. Ray ...	R. E. Blizzard ...	S.	Elders & Fyffes	,, ,, 14.10.32 to 14.11.32	18.11.32
059 ††	*Belgenland* ...	Morehouse, W. A. ...	F. Good, J. Mackie, J. R. Loe	... ...	,,	Red Star ...	Fms. 911 & 138 3.11.31 to 21.11.31	24.11.31
183 ††	*Bendigo* ...	Wyatt, F. N. ...	H. T. Rigden, G. C. Forrest, T. Hopkins.	F. W. Rose ...	M.-S.	P. & O. Branch ...	,, ,, 10.7.32 to 11.10.32	13.10.32
237 ††	*Berengaria* ...	Britten, E. T., R.D., Capt., R.N.R.	J. Croasdaile, W. A. Robson, G. Duguid.	A. Farman ...	S.	Cunard	,, ,, 9.10.32 to 1.12.32	3.12.32
145 *†	*Berwickshire* ...	Evens, E. H.	E. Coulthart, J. C. Robertson, S. R. J. Wood.	H. Southgate ...	,,	Turnbull Martin...	,, ,, 2.8.32 to 14.11.32	28.11.32
	Birchbank ...	Skelly, E. H.	... ...	... ...	M.L.	A. Weir	... ...	...
	Bradfyne ...	O'Neil, J.	... ...	... ...	S.	Reardon Smith	... ...	...
057 ††	*Britannic* M.V....	Freeman, C. P., R.D., Commr., R.N.R.	A. J. Fisher, G. N. Jones O. V. Lucas.	— Stone ...	,,	White Star ...	Fms. 911 & 138 10.10.32 to 25.11.32	29.11.32
269 *†	*British Admiral*	Putt, R. O.	H. J. Were, C. Finch ...	G. Bourne ...	M.	British Tankers	,, ,, 30.8.32 to 17.11.32	28.11.32
249 *†	*Buteshire* ...	Westropp, T. G. ...	P. McMillan, S. W. Brown, J. D. Elvish.	T. Prenton ...	S.	Turnbull Martin	,, ,, 24.8.32 to 10.10.32	21.11.32
031 ††	*Caledonia* ...	Collie, A.	J. J. Walmsley, J. K. McMillan, R. Blake.	J. Harvey ...	,,	Anchor ...	Fms 911 & 138 18.9.32 to 5.11.32	21.11.32
							Fm. 912 14.6.32 to 19.6.32	19.7.32
139 ††	*California* ...	Smart, R. W.	D. Morrison, J. F. Adams, R. L. Robertson.	D. Thompson ...	,,	,, ...	Fms. 911 & 138 20.10.32 to 25.11.32	1.12.32
							Fm. 912 19.6.32 to 9.7.32	12.7.32
	Cambria ...	Copland, C. P. ...	O. W. Ll. Jones	... ...	S.	L.M. & S. Rly. ...	Telegraphic Report 8.10.32 ...	8.10.32
190 *†	*Cambridge* ...	Williams, R.	H. Fryer, R. Belfield, T. M. Devitt.	... ...	M.L.	Federal ...	Fm. 915 8.2.32 to 24.5.32	4.6.32
266 ††	*Cameronia* ...	Gemmell, W.	D. Blair, E. Stormont, D. Bone.	J. Fleming ...	S.	Anchor ...	Fms. 911 & 138 2.10.32 to 27.11.32	30.11.32
							Fm. 912 15.5.32 to 5.6.32	9.6.32
295 ††	*Camito*	Jack, D. A.	C. R. Hodder, R. King, A. S. Hardy.	L. Fudge ...	,,	Elders & Fyffes ...	Fms 911 & 138 30.9.32 to 29.10.32	1.11.32
	Canonesa ...	Brodie, W. H.	H. N. Sherwill, F. F. Flint, E. J. L. Stone.	... ...	M.	Houlder ...	Fm. 911 23.9.32 to 29.11.32	6.12.32
	Cape of Good Hope	Jacobson, T. A. ...	A. McGregor	... ...	A.	Lyle S.S. Co. ...	,, 7.8.32 to 25.9.32	17.10.32
282 ††	*Carinthia* ...	Murchie, P. A., O.B.E., R.D., Capt. R.N.R.	G. S. Hutchinson, J. Chapman, A. Mackellar.	J. Doyle ...	S.	Cunard ...	Fms. 911 & 138 12.9.32 to 1.10.32	4.10.32
							Fm. 912 21.6.32 to 9.7.32	3.8.32
092 ††	*Carnarvon Castle* M.V.	Kerbey, J. H. ...	G. F. Pettitt, E. Clancy ...	J. Hodgson ...	,,	Union Castle ...	Fms. 911 & 138 4.9.32 to 22.10.32	25.10.32
155 ††	*Carthage* ...	Jack, H. M.	C. T. O. Richardson, D. Buckley, G. Sparks.	A. Macbeth ...	M.-S.	P. & O.	,, ,, 7.8.32 to 9.11.32	15.11.32
184 ††	*Cathay*	Dalzell Niven, J. ...	A. J. McHattie, ...	S. W. Sharpe	,,	,, ...	Fms. 911 & 138 29.9.32 to 3.11.32	5.11.32
011 ††	*Ceramic* ...	Cole, N....	R. Conway, F. H. Leigh, R. H. Morris.	W. M. Ross ...	S.	White Star ...	,, ,, 3.9.32 to 8.10.32	21.11.32
	Cerinthus, M.V.	Ramsay, N.	E. Allen, C. L. Seaman, J. B. Williams.	... ...	M.L.	Hadley Shipping	Fm. 915 6.6.32 to 4.9.32	15.9.32
191 *†	*Chindwin* ...	Paterson, G.	D. M. Wilkie, J. G. Aitkin, K. J. Macleod.	A. C. Headley ...	S.	Henderson ...	Fms. 911 & 138 1.8.32 to 11.10.32	17.10.32
067 *†	*Chinese Prince*	Irvine, —.	... ...	... ...	M.L.	Furness Withy ...	... ...	...
192 ††	*Chitral*	Siggers, O.	... ...	... ...	M.	P. & O.	Fm. 911 22.10.32 to 11.11.32	28.11.32
265 *†	*City of Baroda*	Percival, H.	J. L. Robertson, H. G. Williams, F. Hofmeyer.	W. R. Bain ...	S.	Ellerman... ...	Fms. 911 & 138 12.9.31 to 22.11.32	29.11.32
	City of Cairo ...	Hoppins, E. G. ...	J. F. Macauly, H. Laird ...	... ...	M.	,, ...	Fm. 911 10.10.32 to 2.11.32	14.11.32
013 *†	*City of Cambridge*	Jackson, —.	H. H. Asher	... ...	S.	,, ...	,, 25.5.32 to 3.7.32	6.7.32
	City of Canberra	Robinson, T.	... ...	... ...	M.L.	,, ...	... ...	...

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 15.10.32 to 7.12.32.	Date Last Return Received.
157 *† *City of Delhi* ...	Wyper, J.	A. Travis	... ...	S.	Ellerman... ...	Fm. 911 27.7.32 to 27.9.32	4.11.32
City of Dieppe	Cartwright, H. ...	... ...	... ...	M.L.	,, ...	... ...	...
City of Evansville	O'Halloran, G. P. M. ...	F. W. Woods	... ...	M.	,, ...	Fm. 911 22.10.32 to 14.11.32	5.12.32
274 *† *City of Harvard*	MacMillan, J.	E. Brook-Williams	C. V. Robson ...	S.	,, ...	Fms. 911 & 138 3.10.32 to 27.10.32	21.11.32
089 *† *City of Hereford*	Baker, J.	J. S. Mackie, J. H. T. Vizer ...	L. W. Perrin ...	M.	,, ...	,, ,, 26.5.32 to 29.8.32	13.9.32
City of Lincoln	Readwin, E.	... ...	... ...	,,	,, ...	... ...	...
203 †† *City of Nagpur*	McNeil, N., O.B.E. ...	... ...	... ...	S.	,, ...	... ...	...
271 *† *City of Roubaix*	Phillip, A. J.	J. S. Stevenson, L. C. Rithy, B. S. Roberts.	R. Allan ...	M.	,, ...	Fms. 911 & 138 16.9.32 to 26.11.32	29.11.32
272 *† *City of Singapore*	Gardner, A.	D. R. Pufford, D. G. Lister ...	J. D. Carroll ...	,,	,, ...	,, ,, 29.9.32 to 16.10.32	25.10.32
035 *† *City of Sydney* ...	Mason, E.	W. A. Rogerson, L. H. Edmunds, H. G. Griffith.	P. J. Forde ...	,,	,, ...	,, ,, 24.9.32 to 23.10.32	29.10.32
187 *† *City of Valencia*	Nicholl, L.	C. Duncan, A. Hamilton, M. McGregor.	R. McGee ...	S.	,, ...	,, ,, 13.11.32 to 24.11.32	5.12.32
125 *† *City of Windsor*	Hammersley, — ...	... ...	... ...	,,	,, ...	... ...	...
220 *† *City of Yokohama*	Jenkins, D.	H. Nish	... ...	,,	,, ...	Fm. 911 21.9.32 to 16.11.32	28.11.32
050 *† *Clan Macalister*	Stenson, F. J., R.D., A.D.C., Capt., R.N.R.	G. Drake	... ...	,,	Clan	,, 27.8.32 to 27.10.32	9.11.32
241 *† *Clan Macbeth*	Andrews, H.	W. R. Woodriffe, J. C. Scott, R. D. Helme.	C. Kerridge ...	,,	,, ...	Fms. 911 & 138 26.6.32 to 20.9.32	28.9.32
287 *† *Clan Macfarlane*	Redford, L. F., Lt.-Commr, R.N.R.	W. W. Simpson, J. R. Moss	S. Woods ...	,,	,, ...	,, ,, 16.9.32 to 22.11.32	6.12.32
118 *† *Clan Macindoe*	Scott-Smith, H. E. G., O.B.E., R.D., Lt.-Commr., R.N.R.	J. C. Dunphy	N. Bayliss ...	,,	,, ...	,, ,, 4.9.32 to 7.10.32	11.10.32
233 *† *Clan Mackellar*...	Haynes, N. J.	J. J. Stormont, E. E. Arthur, W. C. Dazell.	E. Woolhouse ...	,,	,, ...	,, ,, 18.9.32 to 28.9.32	21.11.32
004 *† *Clan Macnair*...	Holman, W. G. ...	F. H. Petheridge, A. Woodrow, J. F. Vooght.	J. C. Hodgkin ...	,,	,, ...	,, ,, 16.7.32 to 6.10.32	8.10.32
001 *† *Clan Macphee* ...	Giles, H. J., R.D., Capt., R.N.R.	R. G. Bagnall, J. L. Jones, S. W. Easterbrook.	L. Gledhill ...	,,	,, ...	,, ,, 6.10.32 to 1.11.32	28.11.32
168 *† *Clan Mactaggart*	West, W. F.	J. B. Parker, F. H. Houghton, H. Lockyer.	J. Bandfield ...	,,	,, ...	,, ,, 26.8.32 to 18.9.32	24.9.32
002 *† *Clan Macwhirter*	O'Bryne, C. E.... ...	M. J. Lewis, B. Hardinge, K. Simpson.	W. Scott ...	,,	,, ...	,, ,, 4.9.32 to 19.10.32	21.11.32
003 *† *Clan Malcolm* ...	George, L. S.	A. Lynch, K. Banks, N. N. Birtley.	W. B. Caldwell	,,	,, ...	,, ,, 3.10.32 to 10.10.32	2.11.32
283 *† *Clan Morrison*...	Porterfield, W. M., Lt. Commr., R.N.R.	A. Hambley, E. Croucher, A. G. Beynon.	C. T. Verchere...	,,	,, ...	,, ,, 27.9.32 to 17.10.32	15.11.32
259 *† *Clan Sinclair* ...	Cater, H.	R. R. Baxter, R. H. Pape ...	J. Stewart ...	,,	,, ...	,, ,, 28.9.32 to 19.10.32	25.10.32
Colonial... ...	Harrendon, W. E. ...	W. Moore, A. P. Brown, A. Smart.	... ...	M.	Harrison ...	Fm. 911 6.8.32 to 31.10.32	2.11.32
298 *† *Comedian* ...	Bostock, O.	... ...	... ...	,,	,, ...	Fms. 911 & 138 11.7.32 to 25.9.32	30.9.32
185 †† *Comorin* ...	Cartwright, C. W., D.S.C.	R. E. Tucker, D. Meikle, D. S. Charles.	W. Stevenson ...	M.-S.	P. & O.	,, ,, 2.10.32 to 25.10.32	5.12.32
198 *† *Contractor* ...	Owen, W. T.	N. F. O'Neill, L. Siddon, R. Myles.	J. Pickles ...	M.	Harrison ...	,, ,, 22.9.32 to 30.9.32	22.10.32
049 ** *Coptic*, M.V. ...	Williams, G.	J. G. James, P. Saville, W. Burt.	M. Evans ...	S.	Shaw, Savill & Albion.	,, ,, 417.32 to 6.8.32	9.8.32
						Fm. 912 4.7.32 to 6.8.32	9.8.32
258 †† *Corfu*	French, F. E., R.D., Captain, R.N.R.	R. S. Kerridge, D. Fitzgerald Lombard, E. L. Jones.	A. Macfarlane ...	M.-S.	P. & O.	Fms. 911 & 138 18.9.32 to 19.10.32	21.11.32
100 *† *Cornwall* ...	Reilly, H. E.	R. S. Miller, C. Saul, G. V. Harrison.	... ...	M.L.	Federal	Fm. 915 1.2.32 to 26.5.32	1.7.32
006 †† *Coronado* ...	Thorburn, R. A., R.D., Commr., R.N.R.	A. F. Moss, H. J. Parrett, H. Coffey.	R. A. Oakley ...	S.	Elders & Fyffes ...	Fms. 911 & 138 15.9.32 to 15.10.32	17.10.32
214 *† *Counsellor* ...	Jackson, J.	A. A. Heaton, J. Davidson, E. B. Simmons.	J. Cunningham...	M.	Harrison ...	,, ,, 10.8.32 to 19.11.32	23.11.32
036 *† *Cumberland* ...	Maltby, T. L.	D. Chadwick, W. Evans, J. McCulloch.	T. C. Bryant ...	S.	Federal ...	,, ,, 8.7.32 to 31.10.32	15.11.32
						Fm. 912 4.5.32 to 14.6.32	20.6.32
285 *† *Custodian* ...	O'Connor, T.	W. H. Slaughter, L. F. Harrison, J. L. Williams.	H. Matthews ...	M.	Harrison ...	Fms. 911 & 138 4.8.32 to 17.10.32	22.10.32
169 *† *Dalgoma* ...	Beeching, P. H. ...	C. F. Okill	P. Corkery ...	M.	British India ...	Fms. 911 & 138 9.10.32 to 2.11.32	21.11.32
016 †† *Darro*	Schlanbusch, O. V. ...	L. T. Petersen	P. Cummins ...	M.-S.	Royal Mail ...	,, ,, 11.9.32 to 3.11.32	5.11.32
Defender ...	Kinloch, R.	A. M. Dewar	... ...	M.	Harrison ...	Fm. 911 4.9.32 to 28.11.32	6.12.32
Designer ...	Hansen, W. A.... ...	— Wolstenholm	... ...	,,	,, ...	... ...	...
117 †† *Desna*	Turner, E. A.	W. Eddington, — Davies ...	W. Davey ...	M.-S.	Royal Mail ...	Fms. 911 & 138 13.10.32 to 30.11.32	5.12.32
252 *† *Devon*	Clarke, P. B., D.S.C.	G. Chaplin, J. D. Marks, R. Coen.	J. J. McCarthy...	M.	Federal	,, ,, 1.8.32 to 9.9.32	31.10.32
Dieppe	Shaw, B.	E. Hill	A. Jones ...	S.	Southern Railway	Telegraphic Report 14.10.32	14.10.32
Diplomat ...	Brown, H. L.	J. H. Roberts	... ...	M.	Harrison ...	Fm. 911 15.10.32 to 19.11.32	5.12.32
284 *† *Director* ...	Worthington, B. ...	A. E. Rogers, H. W. Jones,	E. A. Rix ...	,,	,, ...	Fms. 911 & 138 9.7.32 to 25.9.32	14.10.32
Discoverer ...	Rowberry, W.	... ...	... ...	,,	,, ...	... ...	—
138 *† *Discovery II.*, R.R.S.	Carey, W. M., Commr., R.N.	R. A. B. Ardley, A. L. Nelson, F. E. C. Davies.	F. Brewer ...	M.L.	Falkland Is. Govt.	Fm. 915 8.4.32 to 4.7.32	29.9.32
136 *† *Doric Star* ...	Mills, D. H.	L. Vernon, H. Butt, J. McLean	... ...	M.	Blue Star ...	Fm. 911 2.11.31 to 25.1.32	11.2.32
275 *† *Dramatist* ...	Meek, A. J.	R. L. Bryde, W H. Howard, C. W. Watts.	M. G. Griffith ...	,,	Harrison ...	Fms. 911 & 138 11.9.32 to 18.11.32	29.11.32
142 †† *Duchess of Atholl*	McQueen, D. S. ...	A. E. Shergold, C. E. Duggan, E. V. Glennie.	E. Murphy ...	M.-S.	Canadian Pacific	,, ,, 9.10.32 to 10.11.32	28.11.32
						Fm. 912 11.9.32 to 29.9.32	1.10.32
152 †† *Duchess of Bedford.*	Sibbons, H.	L. Outram, F. Stell	C. H. Sinclair ...	,,	,, ,, ,,	Fms. 911 & 138 16.10.32 to 29.11.32	2.12.32
						Fm. 912 16.10.32 to 29.11.32	2.12.32
151 †† *Duchess of Richmond.*	Freer, A., R.D., Capt., R.N.R.	J. B. Hewson, N. C. H. Scallon.	— Yorstan ...	,,	,, ,, ,,	Fms. 911 & 138 2.10.32 to 17.11.32	21.11.32
						Fm. 912 2.10.32 to 17.11.32	21.11.32
143 †† *Duchess of York*	Stuart, R. N., V.C., D.S.O., R.D., Commr., R.N.R.	D. Parsons, S. W. Keary, R. M. Stapleton.	J. Potts ...	,,	,, ,, ,,	Fms. 911 & 138 25.9.32 to 10.11.32	16.11.32
						Fm. 912 28.8.32 to 15.9.32	19.9.32
098 †† *Dunbar Castle*, M.V.	Nicholl, D.	M. H. Williams, R. C. Longman, J. A. Ferguson.	R. A. Bernard ...	S.	Union Castle ...	Fms. 911 & 138 30.9.32 to 4.12.32	6.12.32
052 *† *Dunster Grange*...	Wilson, G. F.	J. Allerton, E. G. Raynor, D. Murray.	C. Smith ...	M.	Houlder	,, ,, 31.7.32 to 5.10.32	10.10.32
102 *† *Duquesa* ...	Frost, C. R.	A. McEwan, E. W. Denman, F. D. Jones.	H. Francis ...	,,	Furness Withy ...	,, ,, 10.7.32 to 7.9.32	20.9.32
215 *† *Durenda*, M.V....	Blencowe, J.	T. R. Jackson, G. H. Davies	... ...	,,	British India ...	,, ,, 30.11.31 to 12.2.32	19.2.32

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 15.10.32 to 7.12.32.		Date Last Return Received.
077 †† *Edinburgh Castle*	Barron, A.	L. H. Farrow	A. Blow ...	S.	Union Castle ...	Fms. 911 & 138	10.9.32 to 31.10.32	4.11.32
107 *† *El Argentino*, M.V.	Ellis, F., D.S.C. ...	W. Findlay, J. Burch, C. G. Adlard.	E. Lovelock ...	M.	Houlder	,, ,,	6.6.32 to 9.8.32	12.9.32
009 *† *Elmworth*, M.V.	Dick, J.	... ...	... ...	,,	R. S. Dalgleish ...	,, ,,	24.5.32 to 8.6.32	25.7.32
158 *† *Elpenor* ...	Wilson, R. J.	J. Macfarlane, F. Vose, F. Stott.	... ...	S.	A. Holt	,, ,,	18.2.32 to 23.6.32	29.6.32
108 *† *Elstree Grange*...	Williams, W. E. ...	P. A. Hawkesworth	... ...	M.	Houlder	,, ,,	16.2.32 to 28.4.32	12.5.32
109 *† *El Paraguayo* ...	Owen, R.	G. Fletcher, F. Rice, R. L. Aldridge.	A. W. Brackston	,,	,, ...	,, ,,	25.7.32 to 15.9.32	31.10.32
110 *† *El Uruguayo* ...	McNamara, T.	F. E. Hailstone	R. H. Hallam ...	,,	,, ...	,, ,,	3.9.32 to 1.11.32	8.11.32
088 *† *Empire Star* ...	Owen, G., R.D., Lt.-Commr., R.N.R.	R. Thorne, R. McStraith, P. H. Hunt.	C. Castle ...	S.	Blue Star ...	,, ,,	9.8.32 to 1.11.32	12.11.32
066 †† *Empress of Australia.*	Griffith, E., Lt.-Commr., R.N.R.	D. F. Pennington, E. Roberts, A. H. Pigott.	J. B. Butler ...	,,	Canadian Pacific	,, ,,	24.9.32 to 14.10.32	17.10.32
034 †† *Empress of Britain.*	Latta, R. G.	W. P. Phillips, J. H. Tudor, N. W. Duck.	L. B. Cleary ...	,,	,, ,, ,,	,, ,, Fm. 912	9.10.32 to 19.10.32 11.9.32 to 21.9.32	22.10.32 24.9.32
154 †† *Empress of Canada.*	Hailey, A. J., Lt.-Commr., R.N.R.	C. F. Altree, G. W. R. Graves, W. C. Halliday.	W. O. Thomas...	M.L.	,, ,,	Fm. 915	3.6.32 to 20.9.32	9.11.32
153 †† *Empress of Japan*	Douglas, L. D., R.D., Lt.-Commr., R.N.R.	R. Goss, R. Walfenden, A. Le Maistre.	F. Pierce ...	,,	,, ,,	,,	7.1.32 to 29.6.32	10.9.32
Explorer ...	Allan, J.	A. Stout, F. O. Sheeley ...	... ...	,,	Scottish Fishery Brd.	,,	1.6.32 to 16.11.32	6.12.32
074 *† *Fordsdale* ...	Avern, J., Commr., R.N.R.	W. Thompson, S. Reeve, R. H. Jones.	T. Holder ...	M.	Aberdeen Commonwealth.	Fms. 911 & 138	10.7.32 to 3.11.32	23.11.32
030 †† *Franconia* ...	Gibbons, G., R.D., A.D.C., Capt., R.N.R.	P. G. Britten, J. Ashcroft, W. B. Tanner.	— Harvey ...	S.	Cunard	,, ,,	6.11.32 to 12.11.32	24.11.32
159 *† *Fresno City* ...	Davies, D.	F.W. P. Davies, B. E. Duffield, R. E. Shilstone.	E. Torr ...	M..L	Reardon Smith ...	Fm. 915	22.8.32 to 18.11.32	24.11.32
186 †† *Georgic* ...	Summers, F. F., R.D., Commr., R.N.R.	J. H. Walker, S. V. Boden, H. Morgan.	H. S. Reid ...	S.	White Star ...	Fms. 911 & 138	26.9.32 to 12.11.32	14.11.32
234 *† *Glaucus* ...	Beale, H. E.	P. S. Atkins	G. T. B. Pearce	M.L.	A. Holt	Fm. 915	1.2.32 to 25.8.32	9.11.32
126 *† *Glengarry*, M.V.	Angier, J.	R. W. Brooks, P. G. Neill, S. W. Bell.	W. Harris ...	M.	Glen	Fms. 911 & 138	9.5.32 to 31.8.32	10.10.32
085 *† *Governor* ...	Windsor, G. R. ...	A. Watson, J. Stanhope ...	... ...	,,	Harrison ...	,, ,,	3.11.31 to 31.1.32	4.2.32
111 *† *Hardwicke Grange*	Fowler, W. H. ...	W. L. Baker, A. O. Seyvold, W. E. Ellis.	... ...	M.	Houlder ...	Fms. 911 & 138	8.11.31 to 27.7.32	2.8.32
294 *† *Harmonides* ...	Elwell, F. R.	J. H. Kirkwood, H. G. McPherson, T. G. Mitchell.	... ...	S.	R. P. Houston	Fm. 911	22.8.32 to 25.9.32	5.10.32
262 ** *Hauraki*, M.V.	Norton, A. T.	J. Warwick, J. Thompson, E. R. Pate.	S. Stafford ...	M.L.	Union S.S. Co., N.Z.	Fm. 915	4.2.32 to 25.7.32	3.10.32
253 *† *Hertford* ...	Burton Davies, J. ...	P Shakespeare, W. H. Timberlake, P. Block.	P. Maroney ...	,,	Federal ...	,,	24.3.32 to 29.7.32	8.8.32
Hibernia ...	Williams, E. R. ...	R. Woodall	... ...	S.	L.M & S. Railway	Telegraphic Report 7.12.32 ...		7.12.32
182 †† *Highland Brigade*	Miles, F. R., R.D. Capt., R.N.R.	F. J. Jeyes	— Grieve ...	M.	Royal Mail ...	Fms. 911 & 138	6.10.32 to 21.11.32	26.11.32
116 †† *Highland Chieftain* M.V.	Simmonds, P. C. ...	H. Chamberlain	J. C. Evans ...	M.-S.	,, ...	,, ,,	8.9.32 to 23.10.32	5.11.32
099 †† *Highland Monarch* M.V.	Clayton, R. G., D.S.C., R.D., Commr., R.N.R.	E. Card	E. J. Atkin ...	M.	,, ...	,, ,,	22.8.32 to 12.10.32	15.10.32
230 †† *Highland Patriot*	Robinson, R. H. ...	... ...	... ...	,,	,, ...	... ...	... ...	...
250 †† *Highland Princess* M.V.	Collings, D.	C. E. Leech, J. H. Fitton, D. Seabrook.	N. H. Aldesley	M.-S.	,, ...	Fms. 911 & 138	13.7.32 to 28.8.32	5.9.32
075 *† *Hobson's Bay* ...	Roberts, T. V., R.D., Commr, R.N.R.	F. L. Grose	— Porter ...	M.	Aberdeen Commonwealth.	,, ,,	24.7.32 to 19.10.32	2.11.32
026 †† *Homeric* ...	Frank, F. A., D.S.O., R.D., Commr., R.N.R.	B. Harrison, A. Dyer, J. Waltaire.	F. A. Bradley ...	S.	White Star ...	,, ,,	9.10.32 to 21.10.32	26.10.32
261 *† *Huntingdon* ...	Field, H. G. B. ...	C. W. Roberts, T. K. Macdonald, A. R. Rae.	A. Mugridge ...	,,	Federal ...	,, ,,	30.4.32 to 17.8.32	27.8.32
200 *† *Huntsman* ...	Russell, H. ...	J. Richardson	J. Young ...	M.	Harrison ...	,, ,,	30.5.32 to 5.10.32	8.10.32
235 *† *Hurunui* ...	Pretty, F. C., D.S.C. ...	R. Dunning, T. Farrar, J. C. Cordran.	C. Beadell ...	S.	New Zealand Shipping.	,. ,,	19.6.32 to 14.11.32	17.11.32
289 *† *Inanda* ...	Gibbings, W. H. ...	D. C. Brown, R. L. Williams, L. G. Potter.	E. J. Cook ...	M.	Harrison ...	Fms. 911 & 138	10.9.32 to 18.10.32	22.10.32
Ingoma	Richardson, R. ...	D. D. Kerr	... ...	,,	,, ...	Fm. 911	10.10.32 to 17.11.32	5.12.32
160 *† *Ixion* ...	Davis, A. L.	F. C. Oppen, F. Gray, W. D. Smith.	A. E. Morgan ...	M.L.	A. Holt	Fm. 915	10.3.32 to 16.8.32	20.10.32
072 ** *Jamaica Planter*	P. D. Allen	D. Y. Sharrock, J. Robins, I. L. Jones.	L. C. Cullimore	S.	Jamaica Direct Fruit.	Fms. 911 & 138	10.10.32 to 2.12.32	7.12.32
226 *† *Javanese Prince*, M.V.	Smith, J.	W. M. Henry, V. C. Palmer, E. S. Oberdorf.	F. Compton ...	M.L.	Prince	Fm. 915	9.5.32 to 6.10.32	28.11.32
188 †† *Kaisar-i-Hind* ...	Cotching, W. A. ...	J. Travis, C. H. Stokes, J. K. Wright.	J. Dowie ...	M.	P. & O.	Fms. 911 & 138	13.8.32 to 28.9.32	3.10.32
041 *† *Karamea*, M.V.	Dawson, W.	N. S. Milne, C. Sendall, P. Campbell.	W. L. Starr ...	M.L.	Shaw, Savill & Albion.	Fm. 915 Fm. 912	29.4.32 to 21.8.32 23.5.32	25.8.32 14.7.32
217 *† *Karapara* ...	White, R. W.	C. Jackman, H. Pearson, W. H. Williams.	L. C. Cox ...	M.	British India ...	Fms. 911 & 138	3.9.32 to 24.10.32	14.11.32
Kemmendine ...	Plage, W. C. C. ...	... ...	... ...	,,	Henderson ...	... ...	... ...	...
114 *† *Kenya* ...	Miller, A. C.	G. E. Stephenson	A. W. Box ...	,,	British India ...	Fms. 911 & 138	11.8.32 to 22.9.32	17.10.32
218 *† *Khandalla* ...	Bannerh, V. O. ...	H. F. Stott, P. G. Sims, T. E. Evans.	J. Kerridge ...	,,	,, ,, ...	,, ,,	20.8.32 to 10.10.32	31.10.32
147 †† *Laconia* ...	Hawkes, W. A., R.D., Capt., R.N.R.	J. D. Archer, M. Boston, G. Noonan.	R. Forsyth ...	S.	Cunard	Fms. 911 & 138	20.9.32 to 3.12.32	6.12.32
193 *† *Lahore*	Hollow, J. H.	J. G. K. Gregory, F. Hull, H. M. Fawcett.	R. H. Martin ...	M.	P. & O.	,, ,,	25.7.31 to 13.10.32	19.11.32

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 15.10.32 to 7.12.32.		Date Last Return Received.
167 †† *Lancastria* ...	Dolphin, G. R., R.D., Commr., R.N.R.	R. V. Youd, D. M. Maclean, J. C. Dawsons.	R. M. Shore ...	S.	Cunard	Fms. 911 & 138	18.8.32 to 17.9.32	20.9.32
082 *† *La Paz*, M.V. ...	Hough, R. J. ...	G. Pattison	W. A. McAskill	M.	Pacific S.N. Co.	,, ,,	5.6.32 to 18.9.32	21.9.32
134 †† *Lapland* ...	Harvey, H.	F. Good, —. Wood, W. A. Fletcher.	... ...	S.	Red Star ...	,, ,,	1.5.32 to 26.6.32	25.6.32
076 *† *Largs Bay* ...	Jermyn, W. M. ...	F. B. Marsden	... ...	M.	Aberdeen Commonwealth.	,, ,,	15.10.31 to 25.11.31	15.2.32
112 *† *La Rosarina* ...	Webb, C.	W. S. Hamblin, T. C. Townsend, S. W. Howell.	A. H. Bransby...	,,	Houlder	,, ,,	6.8.32 to 30.9.32	5.10.32
267 *† *Lassell*	Leicester, F. S. ...	A. N. Blundell, — Sweeney. — Christie.	... ...	S.	Lamport & Holt	,, ,,	3.5.32 to 28.7.32	3.8.32
064 †† *Laurentic* ...	Jackson, W. H. P.	H. Soloman, J. Dray, A. Thompson.	W. Davies ...	,,	White Star	,, ,,	4.9.32 to 24.9.32	26.9.32
						Fm. 912	23.8.32 to 27.8.32	29.8.32
083 *† *Lautaro*, M.V. ...	Kite, E.	J. Lloyd Jones, J. Williams, C. Stowe.	... ...	M.	Pacific S.N. Co....	Fms. 911 & 138	8.1.32 to 10.2.32	27.2.32
254 *† *Limerick* ...	Molyneux, P. L. ...	J. Trotter, N. A. Thomas ...	E. K. Roberts ...	,,	Federal	,, ,,	8.10.32 to 13.11.32	28.11.32
093 *† *Llandaff Castle*...	Northwood, H. R. ...	J. E. R. Wilford	H. W. Langshaw	S.	Union Castle ...	,, ,,	11.8.32 to 18.10.32	21.10.32
097 †† *Llangibby Castle*, M.V.	Linklater, H.	G. W. Lloyd	T. Gilbert ...	,,	,, ,, ...	,, ,,	10.9.32 to 12.11.32	15.11.32
094 *† *Llandovery Castle*	Morgan, A. O., R.D., Commr., R.N.R.	H. S. Warren	A. E. Hunter ...	,,	,, ,, ...	,, ,,	19.7.32 to 19.9.32	26.9.32
216 *† *Llanstephan Castle*	Bickford, C. N. ...	G. Willis, S. Smith, J. A. Bowden.	A. Sutton ...	,,	,, ,, ...	,, ,,	7.8.32 to 5.10.32	17.10.32
084 *† *Lobos*, M.V. ...	Good, W. T.	J. Williams, E. F. Pottes ...	G. I. Gilling ...	M.	Pacific S.N. Co....	,, ,,	26.9.32 to 13.10.32	20.10.32
137 *† *Logician* ...	Herschel, R. J. ...	E. L. Stockley, J. Wallis, W. R. Mackenzie.	W. T. Sharpe ...	,,	Harrison ...	,, ,,	10.7.32 to 10.10.32	12.10.32
008 *† *Losada*, M.V. ...	Ridyard, A.	L. W. Hutchinson	R. J. Robertson	,,	Pacific S.N. Co....	,, ,,	18.5.32 to 16.8.32	22.8.32
232 *† *Madura* ...	Caffyn, F.	A. Usher, W. Bain L. G. Tolfree.	R. L. Salway ...	M.	British India ...	Fms. 911 & 138	3.7.32 to 30.9.32	4.10.32
078 *† *Magician* ...	Bury, E. R.	W. E. Shotton, R. F. Hart ...	J. L. Jones ...	,,	Harrison ...	,, ,,	12.9.32 to 1.12.32	5.12.32
141 *† *Mahia*	Andrews, C. M. ...	C. C. Good, M. P. Congdon, J. Jackson.	C. A. Wight ...	S.	Shaw, Savill & Albion.	,, ,,	21.5.32 to 10.9.32	15.10.32
140 *† *Mahratta* ...	Colombine, T. F. ...	T. C. Eddy, H. F. Scoins, W. J. Wilson.	H. Henshaw ...	M.	Brocklebank ...	,, ,,	21.10.32 to 25.11.32	28.11.32
014 *† *Mahronda* ...	Hanna, R. G.	W. Le Brocq, M. Melville, H. Willington.	W. Ritch ...	,,	,, ...	,, ,,	6.9.32 to 8.11.32	16.11.32
242 *† *Mahseer* ...	Tyson, T. A.	H. M. Drummond	... ...	,,	,, ...	Fm. 911	15.11.32 to 24.11.32	1.12.32
015 *† *Mahsud* ...	Kershaw, R. W. ...	H. Gillespie, J. R. Paisley, C. A. Jackson.	G. D. Plank ...	,,	,, ...	Fms. 911 & 138	16.8.32 to 5.11.32	14.11.32
042 *† *Maimoa* ...	Thurston, H. P. ...	A. D. Masters, W. A. Rogers, J. A. McNab.	C. Barrett ...	S.	Shaw, Savill & Albion.	Fm. 915	18.7.32 to 24.11.32	1.12.32
054 †† *Majestic* ...	Trant, E. L., R.D., Commr., R.N.R.	F. Murphy, R. B. O'Brien, E. A. Stuart.	J. R. Thomson...	,,	White Star ...	Fms. 911 & 138	7.10.32 to 16.11.32	21.11.32
018 *† *Makalla* ...	Maughan, J. W. ...	A. C. Hocking, J. Richardson	B. J. Smith ...	M.	Brocklebank ...	,, ,,	29.9.32 to 5.12.32	1.12.32
225 ** *Makura* ...	MacDonald, D. ...	A. P. Cousin, J. Billingham, J. H. Johnson.	... ...	M.L.	Canadian-Australasian	Fm. 915	23.12.31 to 2.5.32	5.7.32
019 *† *Malakuta* ...	Adamson, F. L. ...	H. Simpson	... ...	M.	Brocklebank ...	Fms. 911 & 138	11.5.31 to 2.12.31	29.1.32
236 ** *Malayan Prince*	Holloway, J.	R. M. Dennis, G. P. Freeman, C. Dunford.	J. J. O'Callaghan	M.L.	Prince	Fm. 915	16.2.32 to 27.6.32	9.9.32
219 *† *Malda*	Maples, S. H.	D. Macfadyen	... ...	M.	British India ...	Fm. 911	24.9.31 to 6.10.32	31.10.32
195 †† *Maloja*	Browning, J. B., R.D., Commr., R.N.R.	J. D. Green, A. O. Walne, J. R. Brown.	P. T. Darby ...	M.-S.	P. & O.	Fms. 911 & 138	4.6.32 to 30.8.32	12.9.32
196 †† *Malwa*	Britten, P. O.	F. E. Berner	... ...	M.	,, ...	Fm. 911	30.4.32 to 17.6.32	23.6.32
028 †† *Mandala* ...	Parkin, J. W.	J. F. Hole, J. Toms	... ...	M.-S.	British India ...	Fms.911 & 138	13.8.32 to 25.8.32	3.10.32
146 *† *Mandasor* ...	Richardson, T.... ...	F. C. Madden, J. B. Leigh, E. C. Shore.	R. H. Jones ...	M.	Brocklebank ...	,, ,,	8.8.32 to 3.9.32	12.9.32
Manela	Gilchrist, J. W. ...	W. B. James	... ...	,	British India ...	... ...	... ...	...
022 *† *Manipur* ...	Fulcher, H. D. ...	J. L. Rodger	... ...	,,	Brocklebank ...	Fms. 911 & 138	6.2.32 to 8.3.32	4.4.32
177 *† *Mantola* ...	James, D. F.	W. R. Day, S. Henderson, C. R. B. Mumford.	J. A. Vallance ...	,,	British India ...	,, ,,	31.8.32 to 20.11.32	28.11.32
197 †† *Mantua* ...	Hignett, A. H., R.D., Commr., R.N.R.	J. L. Dunkley, T. G. Wilde, G. du Fosse.	E. L. Docker ...	M.-S.	P. & O.	,, ,,	11.9.32 to 2.11.32	9.11.32
299 ** *Marella* ...	Mortimer, S.	A. W. Blair, W. Wilding, K. Morris.	... ...	M.L.	Burns Philp ...	Fm. 915	7.3.32 to 18.8.32	2.11.32
222 †† *Margha* ...	Kitson, G. A.	J. Small, P. Wright, P. Vaughan.	C. Harris ...	S.	British India ...	Fms. 911 & 138	3.9.32 to 25.9.32	28.10.32
104 *† *Marquesa* ...	Smiles, R. S.	J. Wetherell	T. Mawson ...	M.	Furness Houlder	,, ,,	18.7.32 to 21.9.32	27.9.32
021 *† *Masula*	Fitt, W. A.	N. W. West, J. Jackson, W. Mitchell.	C. H. Dracott ...	,,	British India ...	,, ,,	19.8.32 to 14.9.32	21.9.32
251 *† *Matakana* ...	West, W. G.	A. G. Collins, H. Thompson, A. Warren.	H. Bond ...	S.	Shaw, Savill & Albion	,, ,,	8.8.32 to 16.11.32	28.11.32
221 †† *Mataroa* ...	Gaskell, J. H., R.D., Lt. Commr., R.N.R.	... ...	... ...	M.L.	,, ,, ,,	... ...	... ...	...
023 *† *Matheran* ...	Mulcahy, J. J. ...	S. S. Slade, J. F. Butterworth, W. Cowrie.	P. Neeson ...	M.	Brocklebank ...	Fms. 911 & 138	12.9.32 to 23.9.32	17.10.32
223 *† *Matiana* ...	Green, F. V.	J. S. Thomson, W. F. Solly,	J. S. Skinner ...	,,	British India ...	,, ,,	20.9.32 to 27.10.32	31.10.32
024 *† *Matra*	Cornish, N. P.	G. Shaw, W. Robertson, G. Henshaw.	H. Parsons ...	,,	Brocklebank ...	,, ,,	20.6.32 to 25.10.32	8.11.32
032 †† *Mauretania* ...	Peel, R. V., R.D., Capt., R.N.R.	R. H. C. Crawford, E. W. Connell, L. R. Sharpe.	A. H. Farman ...	S.	Cunard	,, ,,	4.9.32 to 9.10.32	11.10.32
101 †† *Melita*	Stewart, A.	G. Mowatt, C. D. Watt, F. W. S. Roberts.	W. Campbell ...	M.-S.	Canadian Pacific	,, ,,	5.9.32 to 16.9.32	20.9.32
278 *† *Middlesex* ...	Almond, J. G.	S. Butler, G. C. Hocart, J. R. Ricketts.	E. Lawrence ...	S.	Federal	,, ,,	18.6.32 to 15.10.32	21.10.32
194 †† *Moldavia* ...	Allin, C. H. C.	T. E. Heath, J. K. Crone, E. J. Kerridge.	K. G. Barber ...	M.-S.	P. & O.	,, ,,	25.8.32 to 16.11.32	29.11.32
199 †† *Mongolia* ...	Rhodes, H. R. ...	H. Tee, H. C. Slinn, P. G. Lawrence.	A. Morris ...	,,	,, ...	,, ,,	23.9.32 to 5.10.32	28.11.32
260 *† *Monowai* ...	Toten, A. T.	L. B. Ehlert, F. W. Gibson, G. H. Edwards.	F. N. Davidson...	M.L.	Union S.S. of N.Z.	Fm. 915	14.4.32 to 25.8.32	24.11.32

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 15.10.32 to 7.12.32.		Date Last Return Received.
148 ††	*Montcalm* ...	Rothwell, A.	W. P. Haines, T. L. Gillette, M. Chodzko.	J. Biggins ...	M.-S.	Canadian Pacific	Fms. 911 & 138	30.10.32 to 18.11.32	21.11.32
							Fm. 912	30.10.32 to 18.11.32	21.11.32
149 ††	*Montclare* ...	Turnbull, J., C.B.E., R.D., Capt., R.N.R.	J. Soames, H. M. Saunder ...	S. Whitehill ...	S.	,, ,,	Fms. 911 & 138	2.9.32 to 6.10.32	11.10.32
							Fm. 912	29.5.32 to 30.6.32	4.7.32
150 ††	*Montrose* ...	Dott, J. F.	A. C. Harrison, K. Hutchings	D. E. Pearson	M.-S.	Canadian Pacific	Fms. 911 & 138	16.10.32 to 3.12.32	6.12.32
							Fm. 912	16.10.32 to 3.12.32	6.12.32
164 ††	*Mooltan*... ...	Morton, A. J.	J. M. Sinclair, A. Denis, N. Thompson.	J. E. Marsh ...	,,	P. & O.	Fms. 911 & 138	11.9.32 to 23.11.32	28.11.32
290 *†	*Musician* ...	Cadogan, A.	K. H. Davies, H. Philpott, J. L. Curle.	P. Dillon ...	M.	Harrison ...	,, ,,	19.8.31 to 12.11.32	16.11.32
073 *†	*Nagara*	Falconer, A. C. ...	F. B. Collinson	W. Guthrie ...	M.	Royal Mail ...	Fms. 911 & 138	14.7.32 to 8.9.32	12.9.32
201 ††	*Naldera* ...	Harrison, R., D.S.O., R.D., A.D.C., Capt. R.N.R.	E. J. R. North, R. D. W. Mackay, E. V. Lewis.	R. T. Soans ...	S.	P. & O.	,, ,,	9.9.32 to 17.11.32	26.11.32
286 *†	*Natia*	Weller, S.	F. A. C. Thacker, P. A. Yeatman, C. C. Dingle.	G. W. Durrant...	M.	Royal Mail ...	,, ,,	28.8.32 to 22.10.32	25.10.32
227 *†	*Nardana* ...	Reilly, J. V.	T. Warland, H. Goater, A. Woodward.	R. Rawcliffe ...	,,	British India ...	,, ,,	9.5.31 to 7.11.32	17.11.32
202 ††	*Narkunda* ...	Sudell, F., R.D., Commr., R.N.R.	C. H. Moulton, J. O. V. Young, G. Randall.	W. Banbery ...	M.-S.	P. & O.	,, ,,	31.8.32 to 20.10.32	24.10.32
027 *†	*Nebraska* ...	Miles, F. R., R.D., Capt. R.N.R.	C. K. Brown, P. R. Cocks, R. J. Finch.	... ...	M.	Royal Mail ...	,, ,,	24.1.32 to 19.4.32	27.4.32
162 *†	*Nestor*	Adcock, F.	A. V. Potter, P. Elder, W. Pearse.	C. F. Townsend	S.	A. Holt	,, ,,	13.8.32 to 19.9.32	31.10.32
210 **	*Niagara*... ...	Hill, T. V.	G. H. Kime, D. A. Menlove, J. W. S. Madden.	C. F. G. Taylor	M.L.	Canadian-Australasian.	Fm. 915	31.3.32 to 16.7.32	8.9.32
256 *†	*Norfolk*	McNish, R. L. H., D.S.O., Lt.-Comm., R.N.R.	J. Lunnon, K. M. L. Jones, G. E. Mason.	B. G. Wheeler	,,	Federal ...	,,	18.4.32 to 26.7.32	8.8.32
297 *†	*Northumberland*	Upton, H. L., D.S.C., R.D., Commr., R.N.R.	H. S. Cashmore, G. B. Cathie, H. I. Phillips.	M. Savage ...	,,	,, ...	Fms. 911 & 138	7.6.32 to 2.10.32	6.10.32
							Fm. 912	21.4.32 to 8.5.32	2.6.32
231 *†	*Nuddea* ...	Cockburn, M.	D. A. Jones, T. Hodgkinson, B. Emmerson.	A. Aspain ...	M.	British India ...	Fms. 911 & 138	20.9.32 to 24.10.32	21.11.32
	Observer ...	De Legh, A. L. ...	J. Hamden	... ...	M.	Harrison ...	Fm. 911	7.10.32 to 22.10.32	14.11.32
243 *†	*Opawa*, M.V. ...	Robinson, F. W. ...	H. D. Horwood, H. P. Williamson, R. H. Chapman.	F. W. Fowler ...	,,	New Zealand Shipping.	Fm. 915	23.4.32 to 27.7.32	25.8.32
							Fm. 912	8.5.32 to 9.7.32	25.8.32
170 ††	*Orama*	Thorne, G. G., R.D., Commr., R.N.R.	B. W. Gordon, C. H. Denton, L. Sly.	J. Willson ...	S.	Orient	Fms. 911 & 138	27.6.32 to 26.9.32	5.10.32
080 *†	*Orari*	Ashworth, F. ...	J. H. Underwood	... ...	M.	New Zealand Shipping.	... ...	... ...	...
086 ††	*Orcoma*	Ross, J....	H. E. H. Croft, A. C. Taylor, P. H. Hockey.	W. G. Sutherland	M.-S.	Pacific S.N. Co.	Fms. 911 & 138	17.5.32 to 13.10 32	20.10.32
087 ††	*Orduna*	Galloway, M.	P. L. Hockey, W. Horsfall, H. B. Reece.	... ...	,,	,, ,,	,, ,,	15.3.32 to 19.5.32	27.5.32
171 ††	*Orford*	Owens, A. L., R.D., Capt. R.N.R.	C. B. Hubert	... ...	,,	Orient	Fm. 911	8.4.32 to 10.5.32	17.5.32
174 ††	*Ormonde* ...	James, L. V., D.S.C.	T. L. Shurrock, N. Smith, C. Blake.	... ...	S.	,, ...	Fms. 911 & 138	6.3.32 to 7.6.32	16.6.32
172 ††	*Oronsay* ...	Cameron, E. P., R.D., Capt., R.N.R.	R. B. Stannard, C. W. Pinckney.	B. Baxter ...	,,	,, ...	,, ,,	24.7.32 to 26.10.32	2.11.32
173 ††	*Orontes* ...	O'Sullevan, F. R. ...	F. S. Gray, J. M. Swanson, W. L. Mackay.	S. G. Boons ...	M.-S.	,, ...	,, ,,	18.6.32 to 25.8.32	14.9.32
105 ††	*Orsova* ...	Thorne, G. G. ...	J. L. Skilling, J. D. Birch, E. V. Bilger.	R. Knights ...	S.	,, ...	,, ,,	30.5.32 to 30.8.32	8.9.32
206 *†	*Otira*	Johnson, J. W. ...	A. J. Turnbull, K. Miller, D. Campbell.	G. Walters ...	M.	Shaw, Savill & Albion.	,, ,,	9.7.32 to 4.11.32	21.11.32
156 ††	*Otranto* ...	Staunton, H. G., C.B.E., R.D., Commr., R.N.R	A. E. Coles, A. Addison, C. R. Grandage.	J. Curry ...	M.-S.	Orient	,, ,,	4.9.32 to 26.11.32	5.12.32
051 *†	*Pacific Enterprise*	Newman, G. W. A. ...	S. C. White, A. C. Bailey, R. B. Garner.	W. Evans ...	S.	Furness Withy ...	Fm. 915	15.6.32 to 7.9.32	8.10.32
279 *†	*Pacific Exporter*	Holland, C. E., R.D., Commr., R.N.R.	W. Edmonds	C. North ...	,,	,, ,, ...	Fms. 911 & 138	15.7.32 to 5.10.32	1.11.32
	Paris	Lidbetter, W.	T. Mahoney, E. A. Biles ...	C. Kelly ...	,,	Southern Rly. ...	Telegraphic Report. 6.12.32 ...		6.12.32
	Patrician ...	Lowe, J.	J. H. Diamond, W. E. Williams.	... ...	M.	Harrison ...	Fm. 911	24.7.32 to 17.9.32	28.9.32
058 ††	*Pennland* ...	Morehouse, W. A. ...	F. Good, C. H. Otterson, R. M. Fairnie.	R. Hammond ...	S.	Red Star	Fms. 911 & 138	25.9.32 to 12.11.32	15.11.32
							Fm. 912	6.6.32 to 25.6.32	27.6.32
204 *†	*Peshawur* ...	Biggs, J. H.	R. A. B. Kempton, A. Nicklen, G. V. Legassick.	S. J. Evans ...	M.	P. & O.	Fms. 911 & 138	14.9.32 to 8.10.32	24.11.32
	Phemius ...	Dodds, R.	... ...	... ...	M.L.	A. Holt	... ...	... ...	...
238 *†	*Piako*	Aslin, E. P. C. ...	A. E. Williams, C. A. Cremin, J. F. Clement.	L. H. Leggett	M.	New Zealand Shipping.	Fms. 911 & 138	14.7.32 to 16.11.32	28.11.32
							Fm. 912	14.7.32 to 16.11.32	28.11.32
039 *†	*Planter* ...	Ling, J. T.	W. S. Eustance, J. J. Devereux, W. H. Slaughter.	... ...	,,	Harrison ...	Fms. 911 & 138	8.5.32 to 13.7.32	16.7.32
040 *†	*Port Adelaide* ...	Williams, R.	E. N. T. Lawrey, F. W. Elgar, D. F. Morgan.	... ...	S.	Commonwealth & Dominion.	,, ,,	28.2.32 to 13.6.32	18.6.32
255 *†	*Port Alma* ...	Hayter, S. W.	E. E. Roswell, E. Wheeler, J. Moate.	H. McKinley ...	,,	,, ,, ,,	,, ,,	16.6.32 to 26.9.32	4.10.32
							Fm. 912	16.6.32 to 26.9.32	4,10.32
128 *†	*Port Auckland*...	Robinson, C. A. ...	A. G. Rhind, G. C. Langford, A. Brown.	... ...	,,	,, ,, ,,	Fm. 915	21.12.31 to 21.5.32	9.6.32
268 *†	*Port Bowen* ...	Needham, R. ...	F. R. Gorman, T. L. Kidwell, P. R. Bradnee.	C. Holmes ...	,,	,, ,, ,,	Fms. 911 & 138	5.5.32 to 2.9.32	27.9.32
130 *†	*Port Caroline* ...	Hearn, G. W.	E. W. R. Young, J. G. Thorn, V. N. Ford.	G. F. Price ...	,,	,, ,, ,,	Fm. 915	21.4.32 to 4.8.32	20.8.32
131 *†	*Port Darwin* ...	Steele, H.	K. D. Morgan, G. W. Horton, L. B. Philpotts.	... ...	,,	,, ,, ,,	Fms. 911 & 138	24.3.32 to 6.7.32	14.7.32
	Port Denison ...	Hale, G. S.	... ...	... ...	M.L.	,, ,, ,,	... ...	... ...	...
133 *†	*Port Dunedin*, M.V.	Mason, W. S., D.S.C. ...	G. Lovegrove, W. Eastoe, H. Duckling.	... ...	,,	,, ,, ,,	Fm. 915	4.3.32 to 16.7.32	29.7.32

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 15.10.32 to 7.12.32.		Date Last Return Received.
010 *†	*Port Fremantle*, M.V.	Gilling, W.	A. Naismith, G. F. Parnett, E. J. H. Gorley.	H. West ...	M.L.	Commonwealth and Dominion	Fm. 915	6.5.32 to 20.8.32	25.8.32
176 *†	*Port Gisborne*, M.V.	Higgs, W. G.	R. B. Linklater, L. J. Skailes, C. E. Midwinter.	W. G. Broom ...	,,	,, ,, ,,	,,	16.4.32 to 28.7.32	4.8.32
135 *†	*Port Hunter* ...	Durham, R. S., D.S.C.	G. T. C. Harris, C. R. Townshend, P. A. Mundy.	C. F. O'Sullivan	,,	,, ,, ,,	Fm. 912	16.4.32 to 4.7.32	5.8.32
129 *†	*Port Wellington*	Jones, C. N.	W. B. Hopkins	... ...	S.	,, ,, ,,	Fm. 915	27.5.32 to 14.9.32	17.9.32
106 *†	*Princesa* ...	Friend, A. B.	E. Longheed, O. S. Sheard, F. Poulson.	J. Heath ...	M.	Houlder	Fm. 911	12.7.32 to 17.8.32	19.9.32
163 *†	*Protesilaus* ...	Williams, J. P. ...	W. Dods, A. Anderson, A. S. Brotherton.	F. C. Wall ...	M.L.	A. Holt	Fms. 911 & 138	28.10.32 to 15.11.32	21.11.32
							Fm. 915	5.5.32 to 11.10.32	3.12.32
205 ††	*Rajputana* ...	Headlam, P. C., R.D., Commr., R.N.R.	G. Aspinall, H. M. Askin, C. F. Wright.	A. F. Edwards...	M.-S.	P. & O.	Fms. 911 & 138	15.5.32 to 17.8.32	26.8.32
063 *†	*Rancher*... ...	McCullum, J.	G. Harvey, C. F. Minshull, A. O. Lewis.	... ...	M.	Harrison ...	,, ,,	29.2.32 to 12.5.32	17.5.32
228 ††	*Ranchi*	Brooks, C., D.S.O., R.D., Commr., R.N.R.	J. Paice, J. P. McArthur, C. B. Holmes.	H. S. Hoyn ...	M.-S.	P. & O.	,, ,,	4.8.32 to 17.11.32	24.11.32
224 ††	*Rangitane* ...	Mackellar, A. W., R.D., Capt., R.N.R.	... ...	... ...	,,	New Zealand Shipping	... ...	... ...	...
257 ††	*Rangitata*, M.V.	Hunter, J. L. B. ...	L. Griffiths, J. Clarke, S. Leggett.	C. E. Terry ...	,,	,, ,, ,,	Fms. 911 & 138	2.7.32 to 6.10.32	17.10.32
240 ††	*Rangitiki*, M.V.	Barnett, H.	H. Hill, L. F. Malcouronne, T. E. Davies.	L. V. Horn ...	,,	,, ,, ,,	Fm. 912	11.3.32 to 21.3.32	23.6.32
207 ††	*Ranpura* ...	Furlong, G. H. S., R.D., Capt. R.N.R.	H. Toon, G. Maclean, J. Summerville.	G. Bailey ...	,,	P. & O.	Fms. 911 & 138	4.6.32 to 5.9.32	9.9.32
071 ††	*Rawalpindi* ...	Stringer, R. H., O.B.E., R.D., Commr., R.N.R.	E. C. White, D. West, W. A. Stockglen.	J. D. Roll ...	,,	,, ...	,, ,,	26.6.32 to 29.9.32	5.10.32
247 *†	*Recorder* ...	Egerton, J. J.	A. S. Milne, H. C. Blyth, A. Robertson.	P. N. Fisher ...	M.	Harrison ...	,, ,,	2.10.32 to 16.11.32	25.11.32
132 *†	*Reina del Pacifico*, M.V.	Ross, J....	W. A. Hearle, R. Bridson, J. K. Campbell.	S. Hewitt ...	,,	Pacific S.N. Co....	,, ,,	25.9.32 to 3.12.32	6.12.32
239 *†	*Remuera* ...	Wilde, H. J.	F. Cooke, A. J. Angell, A. D. Wilson.	H. Dedman ...	M.L.	New Zealand Shipping	,, ,,	6.9.32 to 27.10.32	1.11.32
	Rhexenor ...	Stout, G. L.	G. Edge	... ...	A.	A. Holt	Fm. 915	6.5.32 to 13.8.32	17.8.32
189 *†	*Rother*	Woodhead, T. H. ...	H. L. Marshall, H. Robertson,	P. Hornby ...	S.	Goole Steam Shipping	Fm. 911	12.6.32 to 26.7.32	3.8.32
	Rotorua ...	Lamb, C. B.	... ...	... ...	M.L.	New Zealand Shipping	Fms. 911 & 138	15.10.32 to 4.12.32	6.12.32
062 *†	*Royal Star* ...	Walsh, W.	A. F. Day, J. Higgin, J. W. McHugh.	... ...	M.	Blue Star ...	... ...	... ...	...
246 *†	*Ruahine* ...	Kinnell, G.	A. Hocken, R. Warren, L. Mercer.	F. G. Bedford ...	M.L.	New Zealand Shipping	Fm. 915	24.12.31 to 16.3.32	23.3.32
							Fms. 911 & 138	25.8.32 to 4.10.32	7.10.32
	St. Helier ...	Pitman, R.	E. Hicks	... ...	S.	G.W. Railway ...	Telegraphic Report	6.12.32	6.12.32
	St. Julien ...	Richardson, L.... ...	H. O. Freeman	... ...	,,	,, ,, ...	,,	13.10.32	13.10.32
	St. Minver, S.T.	Hatton, A.	... ...	... ...	A.	Bunch Steam Fishing Co.	Fm. 911	27.9.32 to 25.11.32	29.11.32
							Fm. 912	27.9.32 to 19.10.32	27.10.32
	St. Patrick ...	Sanderson, C. W. ...	T. D. Thomas	... ...	S.	G.W. Railway ...	Telegraphic Report	13.7.32	13.7.32
038 ††	*Samaria* ...	Malin, R. G., Lt.-Commr., R.N.R.	F. P. Collins, G. S. Hutchinson, H. V. Clarke.	G. H. Sellars ...	,,	Cunard ...	Fms. 911 & 138	26.9.32 to 26.11.32	30.11.32
							Fm. 912	4.7.32 to 22.7.32	26.7.32
061 *†	*Saxon Star* ...	Williams, T.	K. Griffiths	J. Moore ...	,,	Blue Star ...	Fms. 911 & 138	10.7.32 to 24.10.32	7.11.32
291 *†	*Scholar*	Whyte, D. L.	A. E. Jackson, D. O. Percy...	W. Ronaldson...	M.	Harrison ...	,, ,,	21.8.32 to 18.10.32	22.10.32
	Scotia	O'Neill, J.	W. H. Hughes	... ...	S.	L.M. & S. Railway	Telegraphic Report	2.12.32	2.12.32
033 ††	*Scythia*	Oram, B. B., R.D., Commr., R.N.R.	W. M. Stewart, A. Bridgewater, H. L. Pryse.	H. E. Chamberlain.	,,	Cunard ...	Fms. 911 & 138	3.10.32 to 22.10.32	28.11.32
							Fm. 912	13.6.32 to 2.7.32	8.7.32
211 *†	*Shropshire*, M.V.	English, G. L.	D. Hetherington, J. D. Minto, G. W. Dobson.	D. McLellan ...	,,	Bibby	Fms. 911 & 138	21.8.32 to 26.10.32	3.11.32
121 *†	*Siamese Prince*	Jones, E. E.	J. P. Wedgwood, P. F. Owens, R. A. Brock.	A. Simpson ...	M.L.	Prince	Fm. 915	7.4.32 to 16.8.32	20.10.32
277 *†	*Spero*	Montgomery, H. ...	H. W. Vickers, A. Kirk ...	J. W. Dring ...	,,	Ellerman Wilson	,,	12.3.31 to 4.9.32	10.9.32
	Stephen ...	Barlow, F. P.	J. Whayman, G. H. Daniels, W. W. Torkington.	... ...	,,	Booth	,,	18.1.32 to 21.6.32	2.7.32
270 ††	*Strathaird* ...	Townshend, W. P., R.D., Capt., R.N.R.	R. H. Hand, H. Fitzmarshall, W. J. Alington.	F. W. Helmer ...	M.-S.	P. & O.	Fms. 911 & 138	4.7.32 to 24.9.32	29.9.32
	Surrey	Matthews, C.	J. R. Vincent	... ...	M.	Federal	... ...	... ...	...
044 *†	*Tacoma City* ...	Paul, H.	T. J. Paull	... ...	M.L.	Reardon Smith...	Fm. 911	24.12.31 to 2.6.32	9.6.32
229 *†	*Tactician* ...	Trinick, F., O.B.E. ...	E. P. Simmons, A. Frew, S. Leyland.	... ...	M.	Harrison ...	Fms. 911 & 138	10.4.32 to 20.7.32	26.7.32
045 ††	*Tainui*	McIntosh, A.	G. A. Harvey, J. Worrall, D. Pickersgill.	A. Bloxham ...	M.L.	Shaw, Savill & Albion	Fm. 915	23.4.32 to 6.8.32	16.8.32
081 *†	*Tairoa*	Grayston, E.T., D.S.C., R.D., Commr., R.N.R.	G. L. Almond, W. Thowless, L. B. Miller.	J. B. Cleave ...	S.	,, ,, ,,	Fms. 911 & 138	18.7.32 to 3.11.32	9.11.32
046 ††	*Tamaroa* ...	Williams, G.	F. Lutyens, M. Bennett, H. Pin.	A. Lund ...	M.-S.	,, ,, ,,	,, ,,	18.6.32 to 22.9.32	5.10.32
264 **	*Tanda*	Pilcher, E. T., Lt.-Commr., R.N.R.	F. O. Colvin, G. Chadwick Smith, A. Wilcox.	W. Harris ...	M.L.	E. & A. S.S. Co....	Fm. 915	4.3.31 to 22.6.32	8.9.32
165 *†	*Tantalus*, M.V....	Melling, C. F.	E. Saville, W. B. Hailstone, L. A. Munday.	J. Clarkson ...	S.	A. Holt	Fms. 911 & 138	18.9.32 to 11.10.32	29.10.32
047 *†	*Taranaki*, M.V.	Wood, C., D.S.C. ...	A. C. Jones, B. M. Norris, C. Stewart.	A. A. Grundy ...	,,	Shaw, Savill & Albion.	,, ,,	26.8.32 to 30.9.32	4.10.32
020 *†	*Tasmania* ...	Williams, J. W. ...	... ...	... ...	,,	New Zealand Shipping	... ...	... ...	...
069 *†	*Tekoa*	McNish, R. H. L., D.S.O., Lt.-Commr., R.N.R.	C. W. Roberts	... ...	M.	,, ,,	Fm. 911	30.12.31 to 25.1.32	15.2.32
048 ††	*Themistocles* ...	Elford, H. C.	T. H. Davies, D. S. Anthes...	N. Rutter ...	M.-S.	Aberdeen Commonwealth	Fms. 911 & 138	23.9.31 to 30.10.32	4.11.32
007 *†	*Thistleglen* ...	Whitfield, G. A., O.B.E.	S. B. Davis, G. L. Hetherington.	... ...	M.	Allan Black & Co.	Fm. 911	14.2.32 to 5.6.32	9.6.32

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 15.10.32 to 7.12.32.	Date Last Return Received.
161	*† *Titan*	Rundle, G. G. ...	F. B. Smith, G. Roberts, E. Butler.	H. A. Cox ...	S.	A. Holt	Fms. 911 & 138 26.7.32 to 25.10.32	4.11.32
244	*† *Tongariro* ...	Hamilton, F. S. ...	G. D. Baldwin, G. W. Pring, H. Dawson.	E. G. Stride ...	M.L.	New Zealand Shipping.	Fm. 915 29.5.32 to 10.9.32	28.9.32
025	†† *Transylvania* ...	Bone, D. W.	A. Middleton	W. Stewart ...	S.	Anchor ...	Fms. 911 & 138 7.10.32 to 1.11.32 Fm. 912 5.6.32 to 26.6.32	5.11.32 28.6.32
288	*† *Traveller* ...	Barrow, W. T. C. ...	R. Ledger	... ...	M.	Harrison ...	Fms. 911 & 138 5.6.32 to 4.8.32	8.8.32
119	*† *Trojan Star* ...	Griffin, G. A.	L. S. Hassell, K. Griffiths, D. W. Marshall.	... ...	,,	Blue Star ...	,, ,, 9.10.31 to 30.12.31	29.1.32
245	*† *Turakina* ...	Laird, J.	H. G. Letts, E. G. Williams, J. Reeve.	N. Hallett ...	,,	New Zealand Shipping.	,, ,, 14.5.32 to 22.8.32	6.10.32
276	†† *Tuscania* ...	Rome, W. B. ...	J. Noble, G. Squires, E. Richardson.	J. McDonald ...	S.	Anchor ...	,, ,, 12.10.32 to 30.11.32 Fm. 912 27.8.32 to 18.9.32	1.12.32 21.9.32
113	*† *Upwey Grange*, M.V.	Goodrick, H. P. ...	A. Bradbury, G. T. Hurst, P. J. Walker.	N. G. Whitelaw	M.	Houlder ...	Fms 911 & 138 5.7.32 to 22.8.32	29.8.32
292	†† *Viceroy of India*	Thornton, E. J., R.D., Capt., R.N.R. ...	R. H. Turner, F. E. Cox, M. F. Shute.	J. A. K. Smith	M.-S.	P. & O.	Fms. 911 & 138 19.9.32 to 24.10.32	27.10.32
263	** *Wairuna* ...	Hender, W. H. ...	J. B. Williams, R. E. Suckling.	... ...	M.L.	Union S.S. Co. of N.Z.	Fm. 915 7.12.31 to 3.3.32	5.5.32
005	†† *Warwick Castle*	Owens, G.	P. Clissold, W. D. Roach, J. Wilson.	W. Pitt ...	S.	Union Castle ...	Fms. 911 & 138 20.8.32 to 9.10.32	11.10.32
060	†† *Westernland* ...	Harvey, H.	W. Hesketh, L. Williams, J. H. Mackie.	J. Eustice ...	,,	Red Star	,, ,, 9.10.32 to 26.11.32 Fm. 912 19.6.32 to 9.7.32	29.3.32 11.7.32
056	*† *Westmoreland* ...	Holland, E.	D. Clegg, A. L. Hill, G. Webster.	R. Glover ...	,,	New Zealand Shipping.	Fms. 911 & 138 15.5.32 to 17.9.32	22.9.32
208	†† *Winchester Castle*, M.V.	Morton Betts, W. ...	G. F. Moon, A. G. Patey ...	W. A. Smith ...	,,	Union Castle ...	,, ,, 17.9.32 to 6.11.32	8.11.32
096	†† *Windsor Castle*	Gilbert, E. F.	W. S. Byles	G. Scurr ...	,,	,, ,,	,, ,, 15.10.32 to 4.12.32	6.12.32
	Worthing ...	Hill, A.	A. Smith, A. K. Dewdney ...	S. Wood ...	,,	Southern Railway	Telegraphic Report 6.12.32 ...	6.12.32
	Yoma	Wilson, J.	... ...	... ...	M.	Henderson ...	... ...	...
043	** *Zealandic*, M.V.	Summers, W. G. ...	C. A. Meyers, J. Steele, G. Campbell.	R. E. Jones ...	S.	Shaw, Savill & Albion.	Fms. 911 & 138 23.5.32 to 22.8.32	31.8.32
	Conway, H.M.S.	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets	... ...	Cadets M.L.	... ...	Cadets' Met. Log. 24.4.32 to 25.7.32	2.8.32
	Pangbourne Nautical College.	Tracy, A. F. G., Commr., R.N.	,, ,, ...	... ...	,,	... ...	,, ,, 21.4.32 to 16.7.32	29.7.32
	Worcester, H.M.S.	Steele, G. C., V.C., Commr., R.N.	,, ,, ...	... ...	,,	... ...	,, ,, 6.5.32 to 27.7.32	3.8.32
	Abaco	... ...	The Keepers	... ...	Lighthouse Register	... ...	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
	Cay Lobos ...	... ...	,, ,, ...	... ...	,,	... ...	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
	Double Headed Shot.	... ...	,, ,, ...	... ...	,,	... ...	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
	Inagua ...	... ...	,, ,, ...	... ...	,,	... ...	Lighthouse Register 22.9.31 to 27.3.32	9.9.32
	Sombrero ...	... ...	,, ,, ...	... ...	,,	... ...	Lighthouse Register 1.1.32 to 30 6.32	28.7.32
	Watling Island	... ...	,, ,, ...	... ...	,,	... ...	Lighthouse Register 1.1.32 to 30.6.32	4.8.32
	Cape Pembroke... (Falkland Is.)	... ...	,, ,, ...	... ...	,,	... ...	Lighthouse Register 1.1.32 to 30.6.32	27.9.32

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Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., received up to 30.11.32.	Date Received.
Dakartan	Hannaford, W.	A. A. Johnson	Leyland	Water Samples	5.10.32
Darro	Schlanbusch, O. V.	L. T. Peterson	Royal Mail	,, ,, ...	11.11.32
Davisian	Thomas, R.	A. F. Wood	Leyland	,, ,, ...	17.10.32
Dorelian	Hughan, C.	H. B. Peters	,, ...	,, ,, ...	29.10.32
Hilary	Buck, R. H., R.D., Capt., R.N.R.	F. H. Good	Booth	,, ,, ...	5.10.32

January, M.O., 1933.

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