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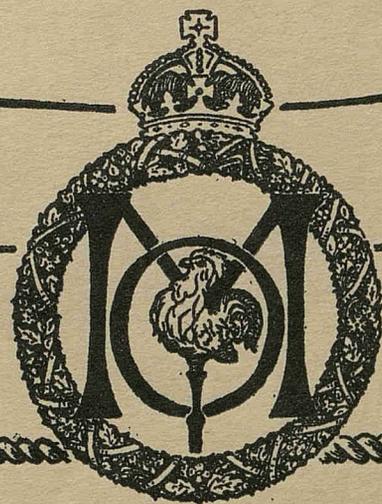
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THE MARINE OBSERVER



Ship "Hotspur."
Capt. H. Toynbee



Admiral R. Fitzroy CB RN
• 1854 — 1865 •

Captain H. Toynbee
• 1867 — 1888 •

Lieut. C. W. Baillie RN
• 1888 — 1899 •

Captain
A. Campbell Hepworth
CB, RD, RNR
• 1899 — 1919 •

VOL. XV
No. 130

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IN CO-OPERATION WITH
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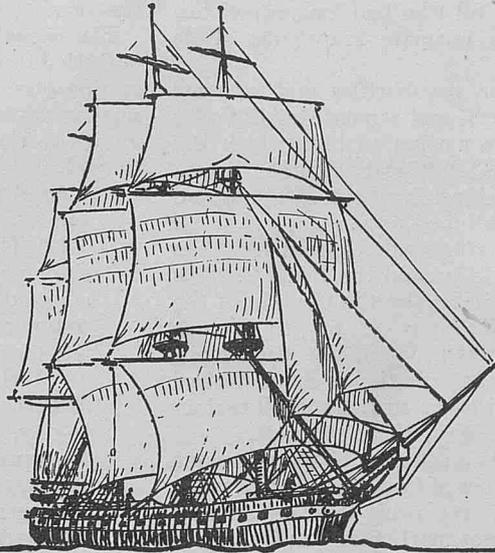
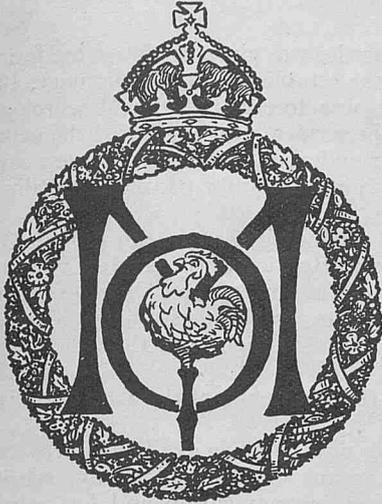
APRIL
1938

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VOL. XV, No 130.

THE MARINE OBSERVER

APRIL 1938.

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THE SURVEY OF THE CURRENTS OF THE OCEANS.

The re-charting and present investigation of the currents of the South Pacific will be completed in about June this year.

Before the work of re-charting the currents in the South Pacific was started, a programme was given in these notes in the April 1935 MARINE OBSERVER, which was modified in 1936; and in the April 1936 number, under the heading of "The Current Matter of Greatest Interest" we indicated the desirability of all who had long experience in navigating the South Pacific and an intimate knowledge of its currents, communicating information.

The information desired is that of the peculiarities and seasonal variations of the main streams, their width, and strength at different distances from the land, and similar information to that which has been obtained in the other oceans from "additional remarks," based upon the experience of the Captains of ships, Harbour Masters, and others, as was indicated in the above-mentioned note.

So far, such information regarding the Humboldt Current has been communicated by the Captains of H.M.S. *Ajax* and the P.S.N.C. ships *Orduna* and *Lobos* in the eastern South Pacific; by the Captain of the Missionary Auxiliary Schooner *John Williams V* for the South Equatorial Current in the region to the northward of the Fiji Islands and near the 180th meridian; but similar information is much desired of the East Australian Coast Current, and other currents in all regions of the South Pacific, to reach us by 31st May, 1938, at latest.

In the preliminary survey of the currents on the routes from Panama to the ports of Australasia in 1928, a number of Captains of ships using these routes sent in "additional remarks" regarding their experiences of currents, including the Equatorial Current, particularly in the region of the Galapagos Islands.

Their subsequent experience might be very helpful in this investigation, if communicated in time.

The Currents of the Mediterranean and North Atlantic Ocean.

The need for modernization and improvement of the published information of the currents of the Mediterranean has long been felt; and the Atlas of Currents for the North Atlantic published in 1930 had great regions left blank. It is intended this year to commence work, and to publish current charts in THE MARINE OBSERVER towards remedying these shortcomings; and all observing ships navigating the Mediterranean and North Atlantic, and particularly upon those routes where published information based on modern observation is lacking, are asked to study those problems which we have been endeavouring to solve since 1924, and which have been constantly dealt with in these notes, and in the articles summarizing the information from the investigations by Mr. E. W. BARLOW.

All information of a general nature—observations of set and drift of current come in as a matter of routine—of currents in the Mediterranean and Black Seas, and the eastern portion of the North Atlantic, south of Latitude 38° N., and east of Longitude 46° W., should be sent in before the end of 1938.

This Atlas of the North Atlantic was the first of the new series, and it was constructed in such a way that not only could blanks be filled in but all information upon it could be revised by the incorporation of new observations without re-working the previous data; thus saving in labour and cost, and consistently extending the period of observation, thereby adding to its reliability.

Warning of Coming Gales through the Ether by Plain Speech.

Weather Signals for the British Isles and the coasts of Northern and Western Europe are given as usual in this April number of THE MARINE OBSERVER.

Included amongst them will be found particulars of the gale warnings broadcast, as occasion demands, by word of mouth at routine times, prefixed by the word *Securité*, through the W/T stations on the British coasts which are maintained mainly for the purpose of communication in connection with safety of life at sea.

Notice of this extension of the service was given in Notice to Mariners some time ago, and the service was established on 1st January, 1938.

On 6th January the first gale was forecast at the Meteorological Office after the establishment of the service, which required the making of such warning by plain speech; and about a week later very severe gales on the British coasts gave opportunity for testing the utility of this service.

The casualties which occurred, including that of the *Suffolk Coast* on 15th January, may serve to draw attention of the corps of voluntary marine observers, who usually have less need than their brethren in smaller craft round the British coasts, to the desirability of making known to those at sea, who may be less enlightened than themselves, the value of—

- (1) A sound knowledge of the rudiments of the Law of Storms; and
- (2) The facilities which may now be made available to coastwise shipping and fishermen by means of Radiotelephony, specially adapted for this purpose of aiding navigation and for ordinary commercial intercourse.

The following is culled from Lloyd's intelligence:—

"15th January.—The master and chief officer of the steamer *Suffolk Coast* were washed overboard and lost in the early hours of to-day, when a huge wave struck the vessel on her voyage from Liverpool to Teignmouth. The missing men are the master, W. J. ROBERTS, and M. J. GALLAGHER, chief officer.

A member of the crew, M. GOSLING, was seriously injured and conveyed to Haverfordwest Hospital.

Off the Smalls, a huge wave struck the bridge and washed it away, taking the master and chief officer with it."

It has since been stated in the press that the second mate took this ship into Milford Haven by steering with the hub of the broken wheel. *Suffolk Coast* is a well deck vessel of 870 tons, built in 1917.

The following is the gale warning which was made by plain speech, through the appropriate coast stations, on the evening of 14th January:

"Gales expected to be severe coasts of Ireland, Irish Sea and West Coasts of Scotland. Very deep depression westward of Ireland moving north-north-east."

All may see in the maps on the Daily Weather Reports for 14th–15th January (International Section), what the forecasters were trying to warn shipping of.

The squall line, trough, or front, passed over the Irish Sea in the first watch of 14th January, and the wind was reported as being S.W., force 10, at 1 a.m. on 15th January at Pembroke, squalls having been experienced at all observation times at that station.

It may often be that receipt of these gale warnings, or indeed of their own information gathered from their own observations, or those received from distant ships and stations, may be of little assistance to mariners in avoiding such disasters.

Nevertheless, experience of seamanship tells us over and over again that foreknowledge of heavy weather, and particularly of heavy gales and the shifts of wind which may be expected, may often be of the greatest value to mariners in taking the correct action to avert or minimize hazard.

If experience of over a quarter of a century of continuous seafaring, followed by 18 years of sifting information of weather and navigation in the Marine Division of the Meteorological Office, can teach anything, then it is plain that this service of warning shipping, and particularly small craft, in Home Waters, of coming gales through the ether by plain speech may be developed into the most effective direct aid of the Meteorological Office to seamen on the British coasts.

The work of these G.P.O. coast stations is not yet sufficiently well known; when it is, there is no doubt that all the services working to reduce distress at sea will be enabled to be even more effective than they are at present. The reputation of the Royal National Lifeboat Institution, the Board of Trade; Rocket Life Saving Service, and the Salvage Services of Great Britain, stand very high.

Good communication by radio-telephony as well as W/T, visual and sound signalling in the Distress Service is the key to succouring distress.

MARINE SUPERINTENDENT.

London.

24th January, 1938.

The Marine Observers' LOG



April, May and June.

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.

A CALL AT THE COCOS OR KEELING ISLANDS.

THE following is an extract from the Meteorological Record of S.S. *Mooltan*. Captain F. E. FRENCH, R.D., R.N.R. London to Australia. Observer, Mr. J. DARLEY STRIKE.

The morning of 29th April found the ship approaching the North Keeling Island, first discovered by Captain WILLIAM KEELING in the year 1608.

The visibility was poor owing to continuous heavy rain, but at 9.30 a.m., low on the starboard bow, we sighted a dark blur which quickly resolved itself into the North Keeling Island. After rounding to the eastward, we proceeded to the main group of islands, some fifteen miles south, and stopped off Direction Island at 11.07 a.m.

The main group are in the form of a horseshoe open to the N.N.E. ward, but several breaks occur, which are navigable by small boats. In the lagoon, which would be admirable as a base for flying-boats, coral grows in great abundance, and only shallow draft vessels may use it. The islands, which never at any point reach more than 20 feet above mean high water springs, are said to be rising slowly, so in time to come, when the coral has forced out the sea, the lagoon may cease to exist.

Two sailing-boats were soon observed to be tacking towards the ship, and were very skilfully handled.

On arriving alongside, a bag of mail, and several barrels containing fresh food, vegetables, papers and magazines, etc., were lowered into them. The crews were composed of one European, and three natives of the island, who appeared to be of excellent physique, and of a Malayan cast of countenance. As the boats were cast off, they all shouted and cheered, and waved their straw-hats, while the English words "good-bye" were distinctly heard. The visit was rather marred by continuous rain and a fairly strong easterly breeze, making the sea very choppy for small boats. At 11.54 a.m. after having swung ship, course was set for Fremantle, and the ship continued on her voyage.

SHIP STRIKES WHALE.

Cape Guardafui.

THE following is an extract from the Meteorological Record of S.S. *Orama*. Captain E. P. CAMERON, R.D., R.N.R., Suez to Colombo. Observer, Lieut.-Commr. G. HERBERT JONES, R.N.R.

On 7th June, 1937, at 1036 G.M.T. a report was made to the bridge that an object was caught on the stem. Upon investigation it was found to be a whale, about 30 feet or more in length, a darkish green in colour with large white markings on its back and white under-side. It was caught across the stem a few feet below the waterline and had been struck just behind the head. The speed of the ship being sufficient to force the head round one side the stem whilst the body trailed alongside the other. The whole carcass being turned half over and held in this position.

The whale could only be seen clearly when the ship rose to the early S.W. Monsoon swell which was then just beginning to be felt.

The ship was stopped, and when headway had been lost the carcass dropped off the stem and sank immediately. The impact of striking the whale was not felt on the bridge, but several members of the crew stated that a distinct thud was noticed in the forecastle.

Position of Ship:—Latitude $11^{\circ} 57' N.$, Longitude $51^{\circ} 35' E.$
Course 100° . Speed 15.5 knots.

VOLCANIC ERUPTION.

New Britain.

THE following is an extract from the Meteorological Log of T.S.S. *Tanda*. Captain E. T. PILCHER. Manila to Rabaul. Observer, Mr. G. E. WALKER, 3rd Officer.

Arriving in Rabaul Harbour on Tuesday, 15th June, 1937, after the eruption of Matupi and Volcano Islands craters, we found the whole of Simpson Harbour choked with a layer of pumice from 2 inches to 3 inches thick. On our port hand entering the harbour, Volcano Island formerly 60 feet high is now 610 feet. To outward appearances it would appear to be composed of pumice as one can see the wind waves on its evidently soft surface, on the top there is a big crater with a smaller hole on the lip, evidently a smaller crater. The whole harbour is littered with rubbish such as coconuts, branches of trees and the residue of civilization. The temperature of water on arrival was $84^{\circ} F.$ and the density was 1026.

WEATHER FORECASTING AT SEA.

S.S. *Westmoreland*. Captain E. R. KEMP.
Observing Officer, Mr. R. S. FROST, 3rd Officer.

THE following remarks accompanied the weather charts London and Plymouth to Curacao.

3rd April, 1937. The Lizard Light was abeam bearing N. 40° W. (T) distant 3 miles. The initial Great Circle Course S. 60° W. (T) was then set to make the Azores.

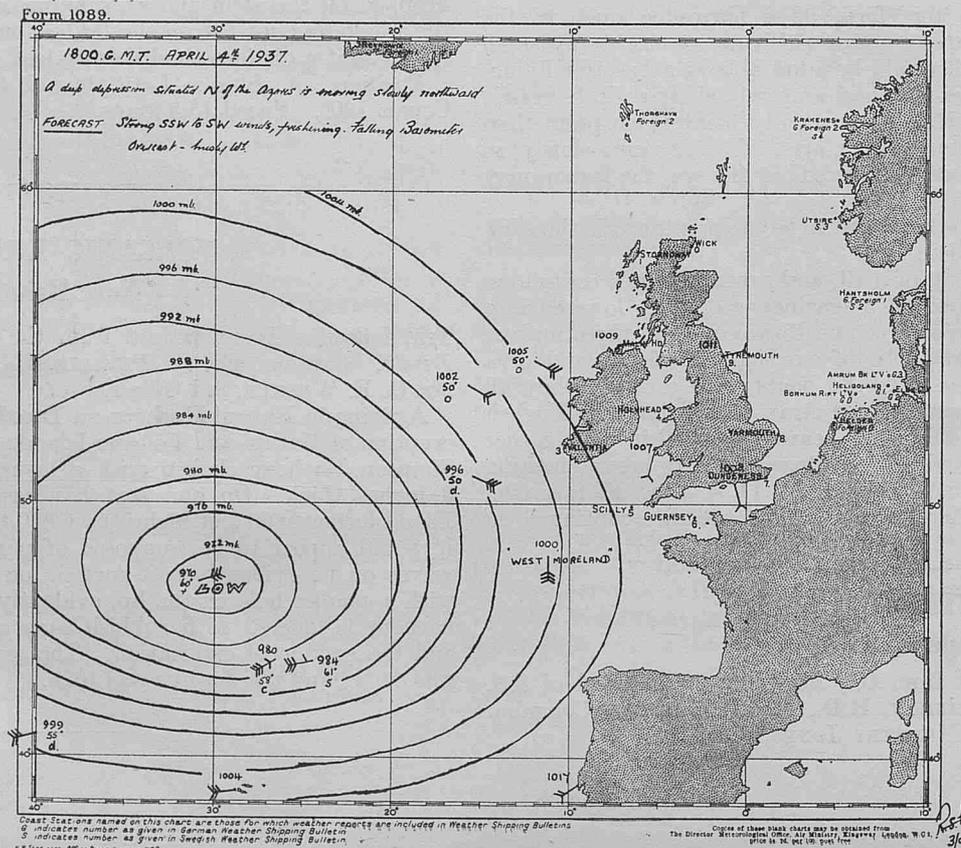
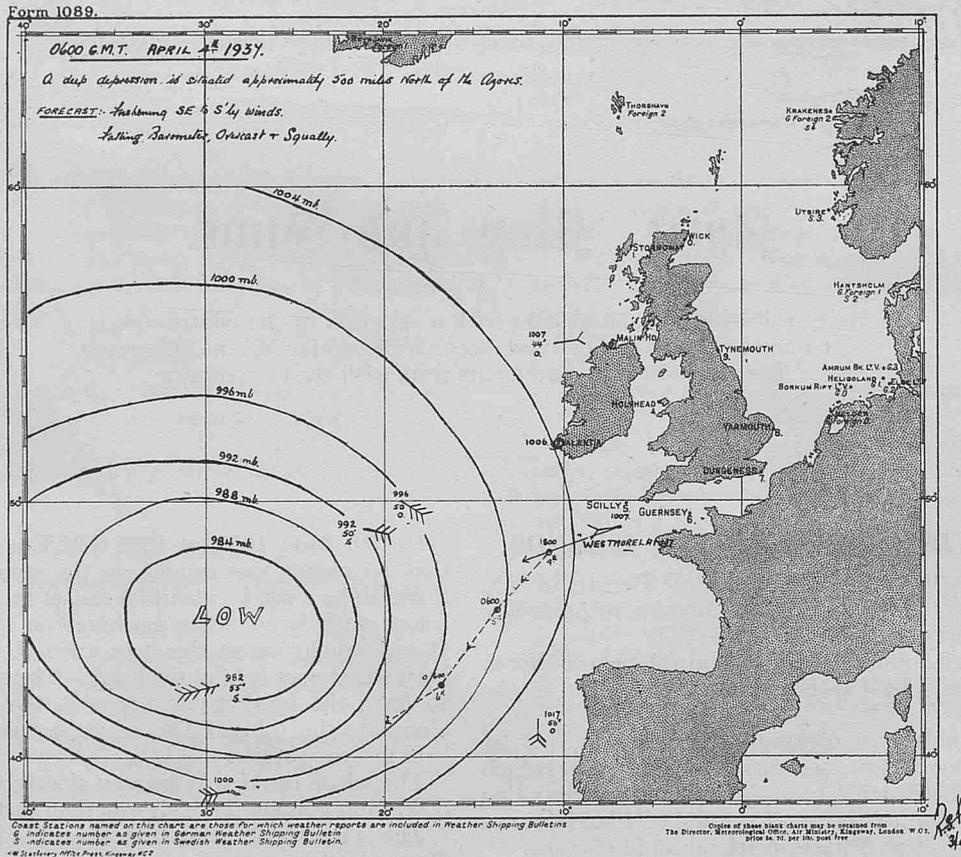
4th April, 1937. A weather chart constructed from observations at 0600 G.M.T. showed that a depression was situated north of the Azores. A second weather chart constructed from observations at 1800 G.M.T. showed that the depression was moving slowly northward. Course was then altered to S. 30° W. (T) which brought the wind and

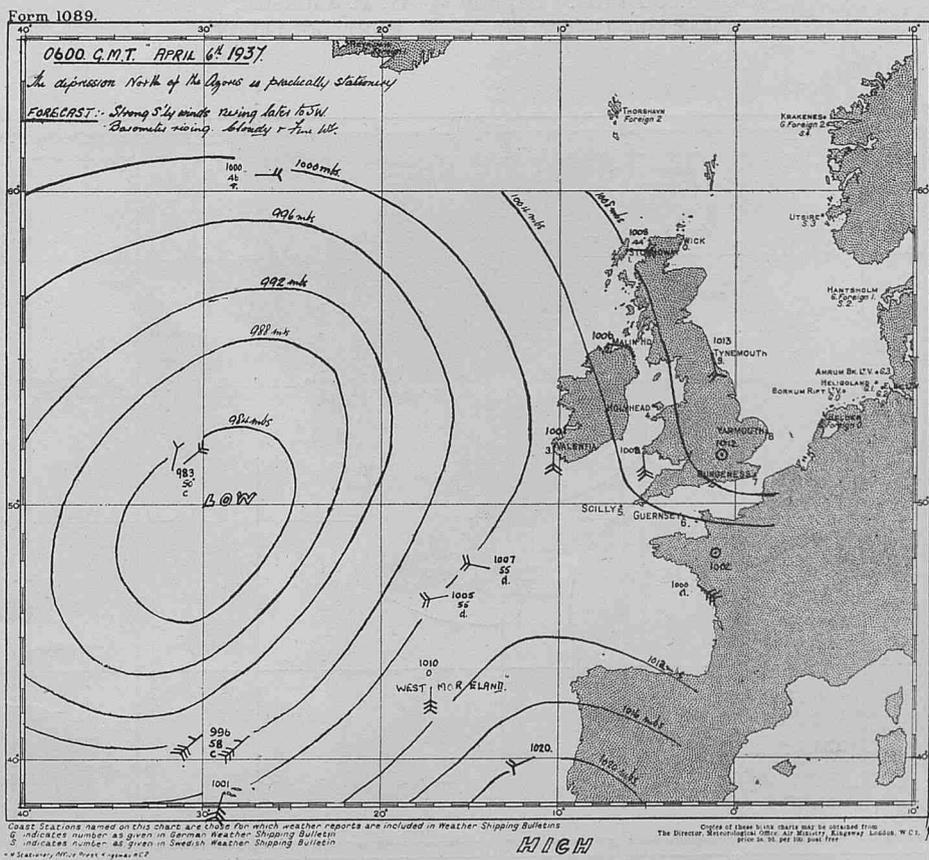
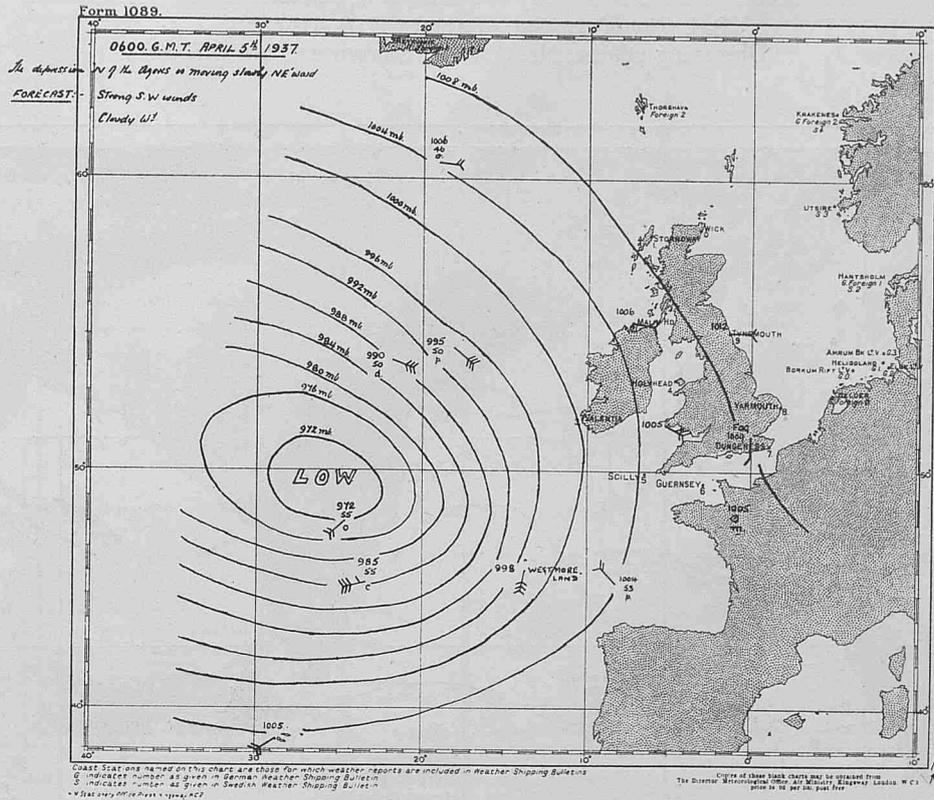
sea nearer ahead and at the same time took the ship farther away from the centre of the depression and so avoided the stronger winds and consequent heavy swell.

5th April, 1937. A third weather chart from observations at 0600 G.M.T. showed that the depression was moving slowly N.E. ward.

6th April, 1937. A fourth weather chart from observations at 0600 G.M.T. showed that *Westmoreland* was well to the southward of the centre of the depression which was filling up and course was resumed to make Ferraria Point in the Azores.

N.B.—The line on the first chart indicates the initial Great Circle course set at the Lizard. The dotted line indicates the subsequent courses steered.

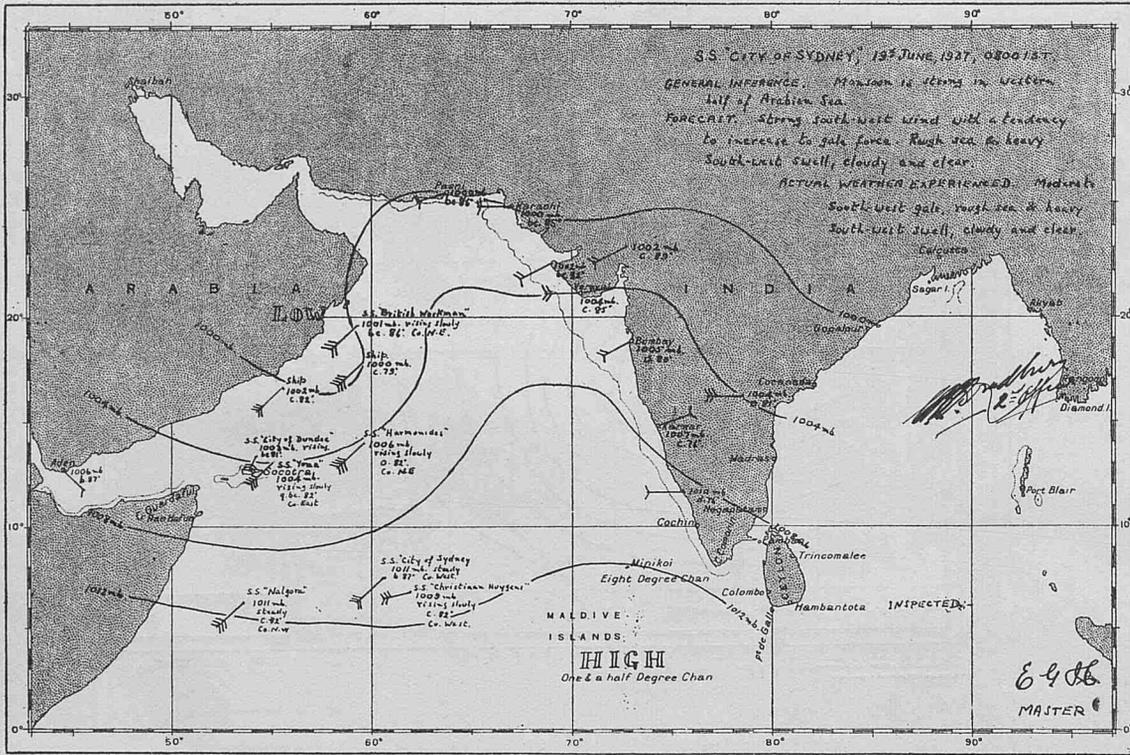




Arabian Sea.

S.S. City of Sydney. Captain E. G. HOPPINS.
Observing Officer, Mr. C. B. P. BRADBURY, 2nd Officer.

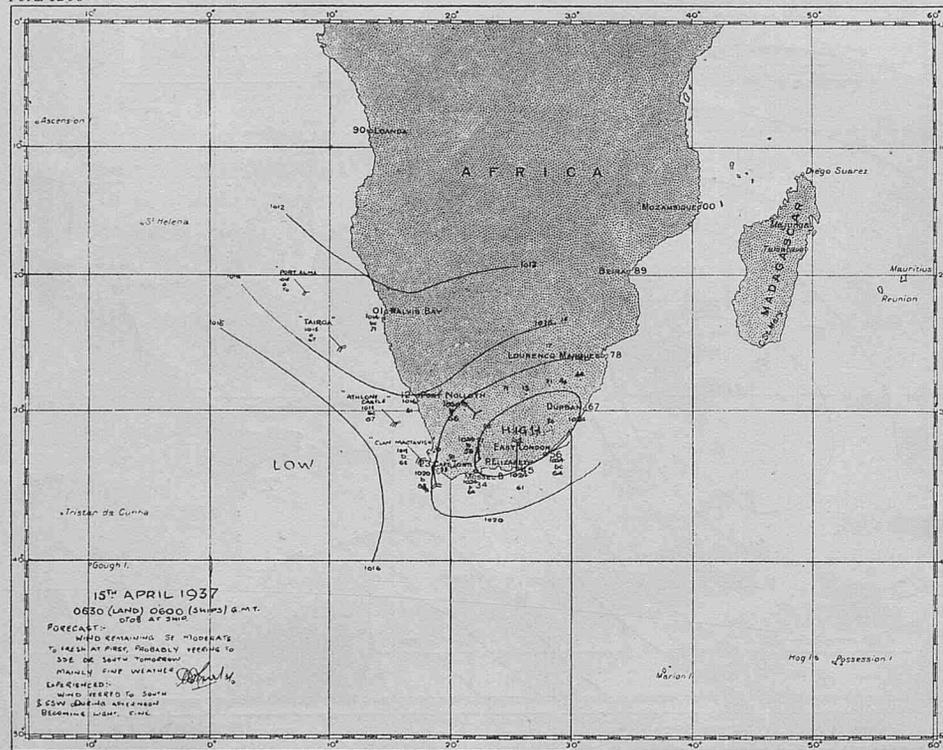
Form 1297.



South African Waters.

S.S. Tairoa. Captain W. H. P. JACKSON.
Observing Officer, Mr. W. P. BURT, 3rd Officer.

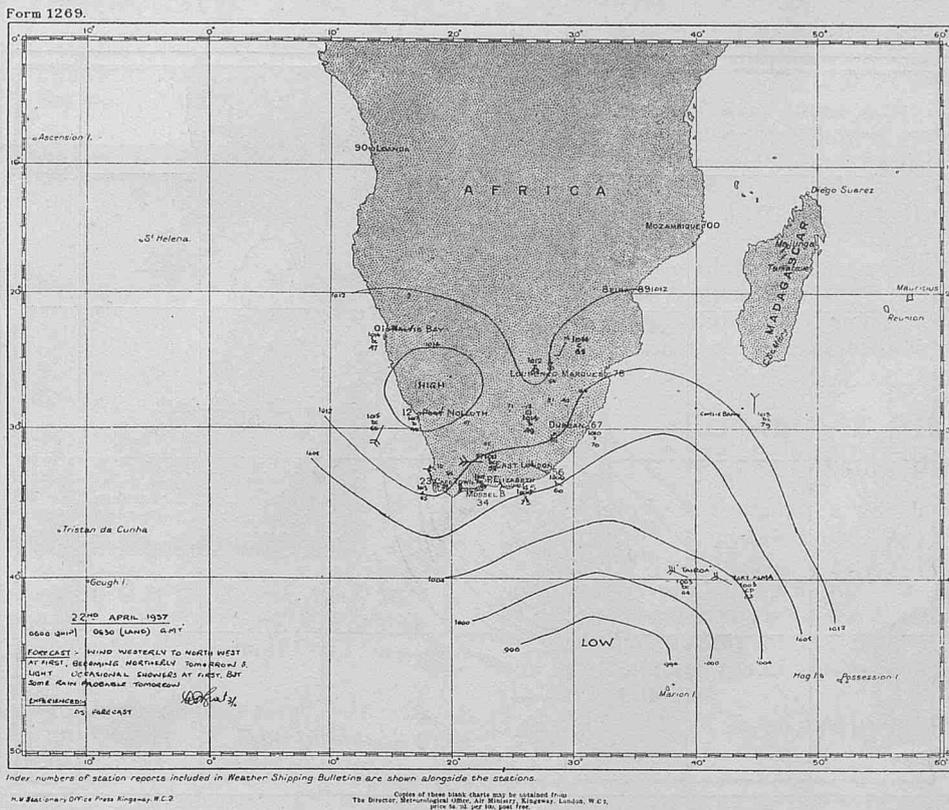
Form 1269



Index numbers of station reports included in Weather Shipping Bulletins are shown alongside the stations

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

Copies of these sheets (charts) may be obtained from The Director, Hydrographical Office, Air Ministry, Whitehall, London, W.C.1. Price 1s. 6d. per 100; post free.



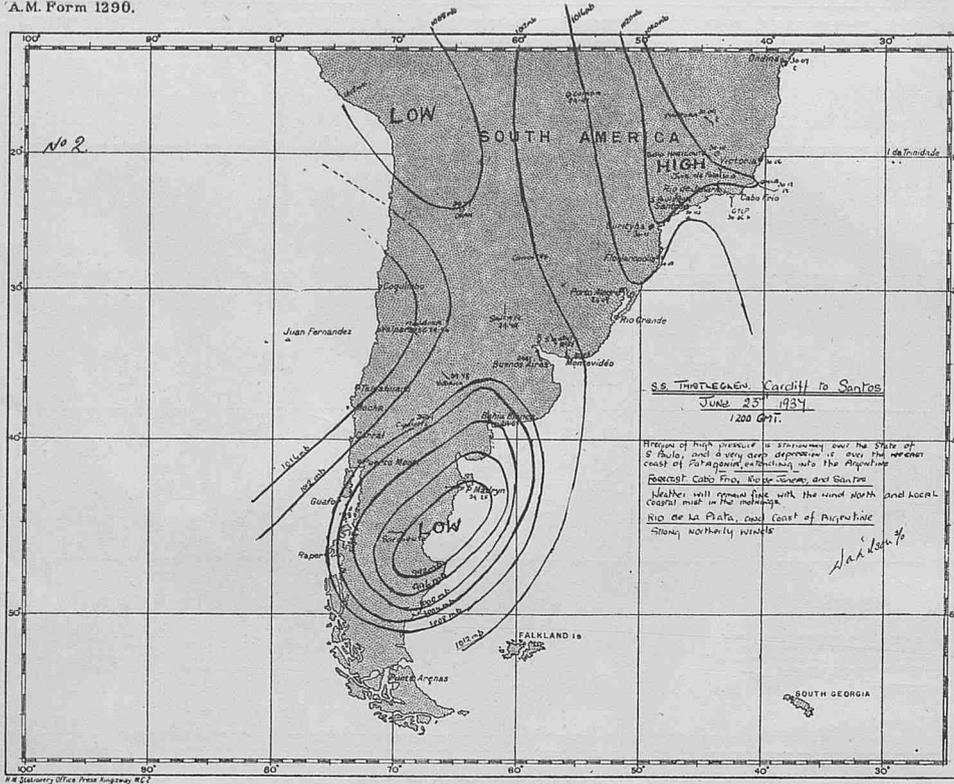
South American Waters.

S.S. *Thistle Glen*. Captain G. A. WHITFIELD, O.B.E.
Observing Officer, Mr. W. A. WILSON, 2nd Officer.

A.M. Form 1290.



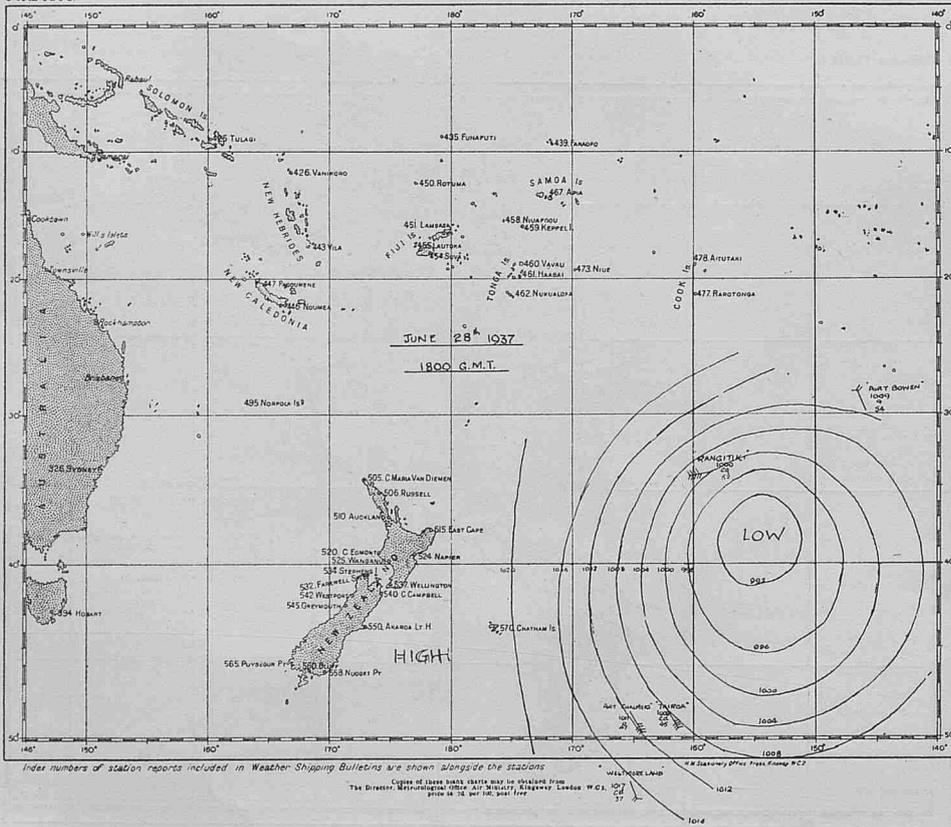
A.M. Form 1290.



South Pacific.

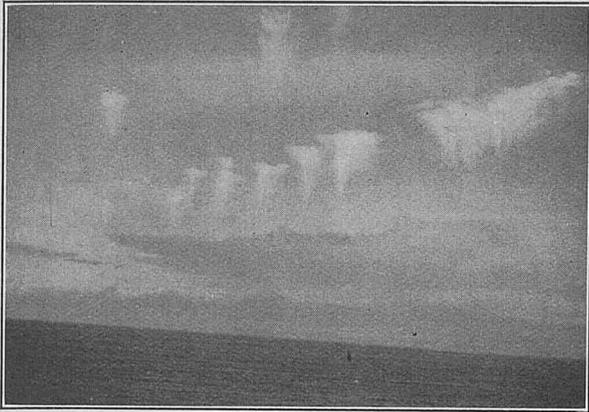
S.S. *Tairoa*. Captain W. H. P. JACKSON.
Observing Officer, Mr. W. P. BURT, 3rd Officer.

Form 1253.



CLOUD PHOTOGRAPH.

THE accompanying photograph has been received from S.S. *Empress of Britain*. Commander G. R. PARRY, R.D., R.N.R., Southampton to Quebec. Observer, Mr. W. A. STANLEY, 6th Officer.



The photograph was taken at 1800 G.M.T. on 20th June, 1937, in Latitude $51^{\circ} 50' N.$, Longitude $15^{\circ} 56' W.$ Wind N.W. force 2; barometer 30.23 in.; air temperature $57^{\circ} F.$; visibility excellent; sea smooth.

NOTE.—This interesting photograph shows high cloud, either Ci. or Alcu., from which snow showers are trailing. It is an unusually well-marked example of this phenomenon.

UNUSUAL VISIBILITY.
South African Waters.

THE following is an extract from the Meteorological Record of M.V. *Cape of Good Hope*. Captain A. T. MCGLASHAN. Capetown to Calcutta. Observer, Mr. R. J. CARNOCHAN.

On the night of 28th–29th April, 1937, while proceeding on a southeasterly course between Cape of Good Hope and Cape Agulhas, unusual visibility was experienced. At 08.30 p.m. in the first watch, the light on Point Danger, normally of an 18-mile range, became visible at a distance of $42\frac{1}{2}$ miles. At 00.33 a.m. with Point Danger light abeam bearing 028° , 11 miles, a cross-bearing was taken with Cape of Good Hope light. Five minutes later at 00.38 a.m. Cape Agulhas light came into sight and cross-bearings were taken of all three. No sooner was the position plotted on the chart than the light on Cape of Good Hope dipped. The distance between the two last-mentioned lights is $80\frac{1}{2}$ miles direct; actually both of them had been visible at the same time for a period of 9 minutes, at a range of 41 and 45 miles respectively. Point Danger Light dipped when $25\frac{1}{2}$ miles distant—6 miles over its normal range. Together with the various cross-bearings, usual 4-point and beam checks were taken and distances-off verified by Echometer. All were found to agree to within a degree, proving that although abnormal refraction was evident there was no horizontal distortion. The night was calm and bright, with a moon three days past the full. 2/10 cirrus at midnight increased to about 6/10 and was later obscured by masses of altocumulus, increasing to 7/10 by 03.45 a.m. Bright moonlight nights as a rule make conditions unfavourable for picking up lights even on their normal range. On this occasion the lights were sighted without effort or use of night-glasses, and maintained a fine clear brilliance throughout until towards 04.00 a.m. when Cape Agulhas light dimmed considerably and was considered normal. At 12.30 a.m. A.T.S., barometer 1013.1 mb; air temperature $63^{\circ} F.$ At 03.30 a.m. A.T.S., barometer 1012.7 mb.; air temperature $65^{\circ} F.$

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Manchester Producer*. Captain T. MAKIN. St. John, N.B., to Liverpool. Observer, Mr. W. H. MOORE.

On 30th May, 1937, at 0430 G.M.T., whilst on passage from St. John, N.B., to Philadelphia, and nearing Nantucket Shoals, Sankaty Head Light was observed bearing 271° .

By observation of distance run between two bearings and later by working back from cross-bearings, this light was found to have been 55 miles distant when first observed, though only a 19 mile light.

The characteristics of the light were easily discernible and the periods of the flashes (one every 15 seconds) could easily be counted, although the light, normally white, showed vivid green or bright red at times. Several bearings were obtained, and all proved its distance off without doubt.

The light dipped at 0712 G.M.T., having been distinctly visible the whole of the time.

Weather at the time:—Calm; smooth sea; cloudless sky; barometer 30.00 in.; air temperature $48^{\circ} F.$, sea $44^{\circ} F.$ Previous to this the vessel had been all day in dense fog, which cleared at 0030 G.M.T.

The next two days were perfectly fine, clear and cloudless.

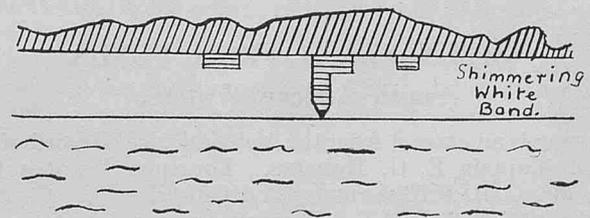
ABNORMAL REFRACTION.

Algoa Bay.

THE following is an extract from the Meteorological Log of S.S. *Adrastus*. Captain A. SHAW. Colombo to Capetown. Observer, Mr. E. A. H. GEPPE, 2nd Officer.

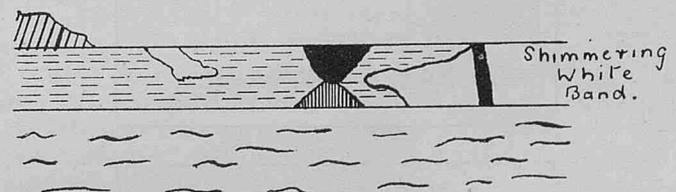
On Saturday, 17th April, 1937, at 11.50 A.T.S. or 1002 G.M.T., a white band appeared above the horizon to the westward, giving the impression of a bank of low fog. By noon this band, which was rapidly extending round the horizon, was observed to be due to abnormal refraction.

FIG. I

BIRD IS. LT. HO. 303° 28 mls.

At 12.14 A.T.S., when the horizon was surrounded by a shimmering white band, to a height of 40 minutes of arc, Bird Island Lighthouse (100 feet) was observed bearing 303° , 28 miles. The lighthouse showed very distinctly, inverted and extending right across the white band (FIGURE I) with hills showing normally in the background above. For 39 minutes this phenomenon was intermittently visible, after which the lighthouse was no longer seen. To the southward, a long, low S.W. swell was producing the unusual effect of belts of low trees, appearing and disappearing above the white band. Various other optical phenomena were observed during the afternoon. A steam trawler appeared on the horizon, first as a large chimney extending across the white band and subsequently as a grove of beech trees.

FIG. II

CAPE RECEIFFE LT. HO. 346° $13\frac{1}{2}$ mls.

At 15.18 A.T.S. Cape Receiffe Lighthouse was observed bearing $346^{\circ} 13\frac{1}{2}'$; its appearance was as shown in FIGURE II. Coincident with a freshening E.N.E. wind, force 3, which had set in by 15.30 A.T.S., the white band was diminished in size, having disappeared to the E. and W. by 16.00 A.T.S. but persisted over Algoa Bay to the S.S.W. until about 16.30 when it finally disappeared. At 13.45 A.T.S.

temperatures were: dry, 79° F., wet 67½° F. and sea 72° F., and at 16.00 A.T.S.: dry 78° F., wet 67° F., sea 71½° F.; wind N.E. by N., force 3; sky cloudless, with very good visibility.

Position of Ship at noon:—Latitude 34° 05' S., Longitude 26° 51' E. Weather: barometer 1015.7 mb. Temperature: dry 80° F., wet 68° F., sea 72° F.; wind S.W., force 0-1; sky cloudless, and visibility excellent.

MIRAGE.

South Pacific Ocean.

THE following is an extract from the Meteorological Log of M.S. *Hauraki*. Captain D. MACDONALD. Suva to Papeete. Observer, Mr. J. H. IBBOTSON, 2nd Officer.

9th May, 1937. At 5.05 p.m. A.T.S. (0321 G.M.T. 10th) the islands of Tahiti, Moorea, Huahine Iti and Raiatea were seen. Only the peaks of Raiatea and Huahine Iti were visible, but Tahiti and Moorea were plainly recognizable. Very heavy rain had been experienced for four hours previously, ceasing at 4.30 p.m. A.T.S. The horizon cleared from east to north and showed with unusual sharpness and clearness some time before the mirage came into being. Tahiti gave the appearance of being 35 miles distant, when in reality Tahiti Peak was 210 miles away. The sky was overcast except that it had cleared from E. to N. above the horizon. The mirage remained constant throughout, lasting for 15 minutes and disappearing at 5.20 p.m. A.T.S. (0336 G.M.T. 10th).

Wind W.S.W., force 1; barometer 1011.3 mb.; air temperature 76.5° F., sea 81° F.

Position of Ship:—Latitude 17° 39½' S., Longitude 153° 09' W.

GREEN FLASH FROM VENUS.

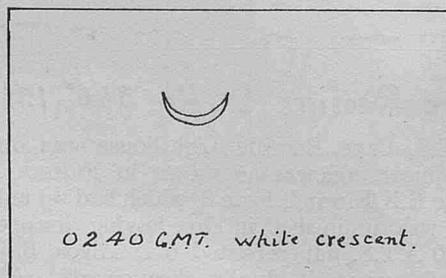
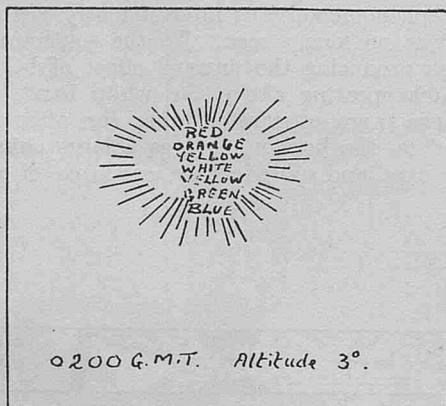
South African Waters.

THE following is an extract from the Meteorological Record of S.S. *City of Sydney*. Captain E. G. HOPPINS. Lourenço Marques to Beira. Observer, Mr. C. B. P. BRADBURY, 2nd Officer.

13th May, 1937, 0200 G.M.T. Observed Venus rising with exceptional brilliance like a great ball of fire, altitude about 3°. Through the ship's telescope it was seen to be coloured red, orange, yellow, white, yellow, green and blue, the red being uppermost and the colours very intense.

VENUS RISING.

13th May, 1937.



At first the planet was too bright to detect its outline, but it appeared to be oval in shape.

At 0240 G.M.T. the colours faded, the planet becoming white and appearing in the shape of a thin crescent (see sketch).

It will be noted that the colours were in the reverse order from those given in the article on the "green flash" in *THE MARINE OBSERVER*, Vol. XIII, page 55; probably due to refraction.

Position of ship:—Latitude 24° 58' S., Longitude 34° 43' E. Barometer 29.93 in.; air temperature 75° F.; sea 74° F.; wind N.N.E. force 4; slightly cloudy.

14th May, 1937, 0154 G.M.T. Observed Venus rising, altitude about 5°. It showed green, white and red for nine seconds, and then the colours faded out. The crescent form was again observed. Position of Ship:—Latitude 20° 24' S., Longitude 35° 10' E. Air temperature 79° F.; sea 80° F.

NOTE.—This is a very interesting observation, but it is difficult to give an explanation of the reversal of the colours. Ordinary and abnormal refraction give the order of colours as stated in the article referred to above, but if double or multiple images of Venus were formed by refraction, combinations of colour might arise, especially if the images were blurred. The crescent form of Venus also makes the question of colour more complex.

AURORA BOREALIS.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Beaverdale*. Captain A. ROTHWELL. Antwerp to Montreal. Observer, Sub.-Lieut. D. H. COUGHLAN, R.N.R., 4th Officer.

27th April, 1937, at 2340 G.M.T. Latitude 49° 25' N., Longitude 34° 08' W. A very clear auroral display was observed a few hours after sunset. Commencing with a faint glow in the northern sky, the illumination rapidly became brighter and took the form of an arc. The centre of the arc bore 340° and was 18° from its upper edge to the horizon. The angular distance between the ends of the arc was 60°. The whole arc was white, with a faint tinge of yellow. At 2345 G.M.T. waves of light emerged from the arc in rapid succession and swept the sky to the zenith. At the same time curtains of pale green light appeared to the westward at an altitude of about 30°. These curtains, moving slowly to the eastward, consisted of closely packed vertical shafts of light which were continually moving, although the separate curtains kept more or less the same shape. There were four very bright curtains with many lesser ones. Occasionally rays of light emerged from the horizon directly under the arc and shot to the zenith. This continued until 0000 G.M.T., when the whole display gradually moved off to the eastward and decreased in intensity, until at 0015 G.M.T. it had entirely disappeared.

At 0025 G.M.T. several of these auroral draperies appeared in the N.W. sky. As before, they were pale green and continually folding. Their upper edges were more or less straight but the lower edges very irregular. These, too, gradually moved to the eastward, and by 0040 G.M.T. had disappeared. This recurrence was by no means as bright.

During the whole of this time no marked effect was noticed on the magnetic compass.

Clear cloudless sky; wind S.S.W., 4; barometer 29.881 in.; air temperature 52° F.

AURORA AUSTRALIS.

South Australian Waters.

THE following is an extract from the Meteorological Record of S.S. *Somerset*. Captain C. R. PILCHER. Liverpool to Australia. Observer, Mr. J. A. C. KNOTT, 3rd Officer.

3rd April, 1937, 1000 G.M.T., 19.30 A.T.S. Whilst on a passage from Hobart to Albany, in D.R. position Latitude 42° 24' S., Longitude 140° 58' E., a striking display of Aurora Australis was observed to the southward. The sky was cloudless and the long beams of multi-coloured light extending upwards to an altitude of approximately 45° closely resembled searchlights. The whole appeared to be constantly changing colour and the beams of light were variable in length. At 20.00 A.T.S. the sky became cloudy and the phenomenon disappeared.

LUNAR RAINBOW. North Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Andania*. Captain F. J. BURD. Montreal to Liverpool. Observer, Mr. J. C. BOYCE, 3rd Officer.

26th May, 1937, 0100 G.M.T. Observed a wonderful lunar rainbow, its bow exhibiting to a very marked degree the several colours of the spectrum, especially the outer rim, which was clear-cut and well-defined. Its arc measured 300° . The moon was full, about 15° above the southern horizon, the sky two-thirds covered with cumulonimbus, the wind moderate N.N.E. Air temperature 48° F. Water 48° F.

Position of Ship :—Latitude $50^{\circ} 50' N.$, Longitude $41^{\circ} 04' W.$

DOUBLE LUNAR RAINBOW. New Zealand Waters.

THE following is an extract from the Meteorological Record of S.S. *Kent*. Captain J. V. WILLIAMS. Plymouth to New Zealand. Observer, Mr. R. EYRE WALKER, 3rd Officer.

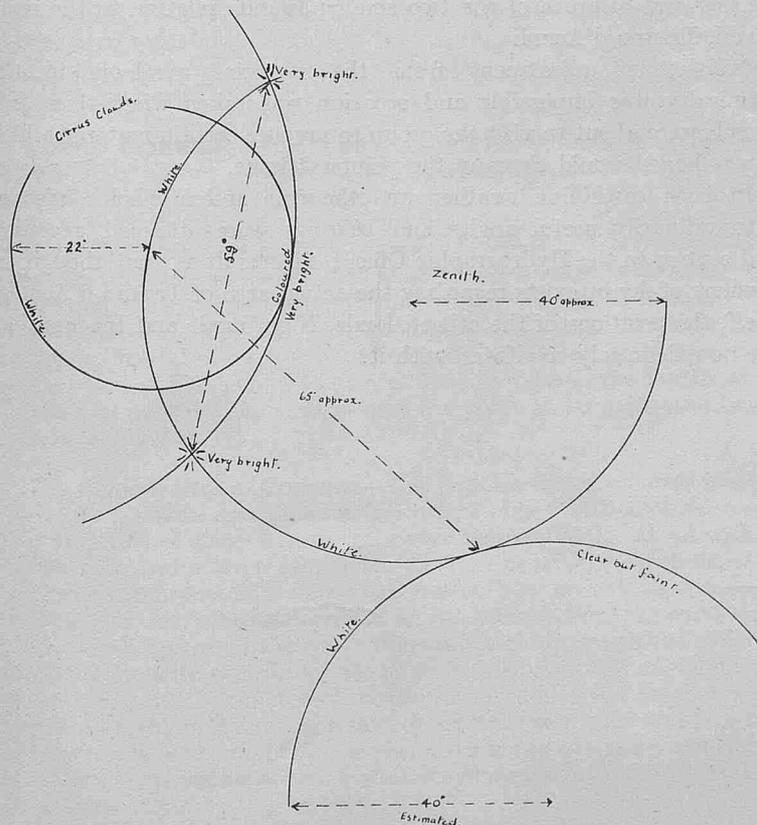
On 24th June, 1937, at 0615 G.M.T., during a strong S'ly gale with frequent heavy rain squalls, an exceptionally fine lunar rainbow was observed. The sky at the time was heavily clouded and a heavy rain squall was passing down the starboard side of the vessel when the full moon, rising and at an altitude of about 20° on the port beam, broke through and shone brightly for about ten minutes. The rainbow was complete and the colours of the spectrum were easily discernible, being nearly as clearly defined as in the average solar bow. At 0620 G.M.T. when at its brightest the arc of a second bow was observed; in this bow the colours although faint could be distinguished, but only remained visible for about two minutes. By 0625 G.M.T. the bow disappeared, the squall having passed.

Position of Ship :—Latitude $40^{\circ} 07' S.$, Longitude $177^{\circ} 29' E.$ Wind S. by E., force 9; barometer 29.62 in.; temperature 52° F.

SOLAR HALO. Mediterranean Sea.

THE following is an extract from the Meteorological Record of S.S. *Clan Morrison*. Captain R. P. GALER, R.D., R.N.R. India to London. Observer, Lieut. F. H. THORNTON, R.N.R., 2nd Officer.

15th May, 1937, at 15.20 A.T.S. an interesting solar halo was observed. The enclosed sketch represents the halo of 22° radius, the arc of contact



and horizontal or mock sun ring. A small portion of the halo was obscured by cirrus clouds. Mock suns were seen where the horizontal ring cut the arc of contact. An interesting feature was the presence of a fourth arc of approximately the same radius as the horizontal ring and touching that ring at an angular distance of about 65° from the sun. The portion of the halo and arc of contact between the mock suns was very well-defined and showed the colours of the spectrum from red to blue, the mock suns being mainly red. The horizontal ring and fourth ring were colourless, the latter appearing faint but quite distinct. The sky at the time was 8/10ths covered with Cist.

Position of Ship :—Latitude $35^{\circ} 50' N.$, Longitude $16^{\circ} 09' E.$

NOTE.—This is a valuable observation, since the white halo of approximately 40° radius touching the mock sun ring is quite exceptional and is not included among the rarer types of halos and arcs generally recognized. Subsequently to the receipt of the above observation, Lieut. THORNTON stated that in future he proposed when observing halos to take sextant angles from the horizon of all well-defined points, such as mock suns, or the tangent point of two halos as a help in the setting out and general accuracy of the observation.

FLASH OF LIGHT. South Pacific Ocean.

THE following is an extract from the Meteorological Record of S.S. *Huntingdon*. Commander A. E. TAYLOR, R.D., R.N.R. Glasgow to New Zealand. Observer, Mr. R. J. WEST, 2nd Officer.

At 02.17 A.T.S. (1121 G.M.T.), on 14th June, 1937, a single flash of light was observed bearing 290° , estimated distance approximately one mile, of such brilliance that whilst lasting for less than a second it temporarily blinded the observer and lit the whole ship up. At first it was thought to be a flash of lightning in close proximity to the ship, but as there was no visible indication, either before or after, of any electrical activity in the sky, it was presumed to have been that of a meteor reaching the earth's surface. The weather at the time was overcast, with Cu. and Stcu. clouds, fine and clear; wind N.N.W., force 6; sea rough with moderate confused swells; barometer 29.90 in. steady.

Position of Ship :—Latitude $28^{\circ} 10' S.$, Longitude $133^{\circ} 34' W.$ (D.R.).

METEOR. Indian Ocean.

THE following is an extract from the Meteorological Record of M.V. *Myrtlebank*. Captain C. S. HOLBROOK. Mombasa to Japan. Observer, Mr. S. J. DOWDESWELL, 3rd Officer.

13th April, 1937, at 1403 G.M.T. (9.48 p.m. A.T.S.). Observed a brilliant orange-coloured meteor. It appeared to rise in the constellation of Orion bearing 248° , approximate altitude 11° , and disappeared in the constellation of Ursa Major, altitude $49^{\circ} 30'$, bearing 032° ; being visible for five or six seconds. I have seen many meteors, but this particular one was outstanding in its brilliancy, being at least four times the magnitude of Sirius. It gave the impression of an immense rocket hurtling across the sky at an unusually low altitude, leaving a trail which appeared to be composed of myriads of tiny stars. Just before disappearing, the meteor burst into minute particles, making an appropriate ending to a spectacular flight.

Position of Ship :—Latitude $17^{\circ} 31' N.$, Longitude $118^{\circ} 02' E.$

South Pacific Ocean.

THE following is an extract from the Meteorological Record of S.S. *Tongariro*. Captain P. B. CLARKE, D.S.O. Liverpool to New Zealand. Observer, Mr. C. C. ENNEVER, 3rd Officer.

On 9th April, 1937, 0615 G.M.T. during the evening watch, a very clear night and a nearly cloudless sky, a meteor of exceptional brilliancy was observed. From behind a small wisp of cumulus cloud, a light of greenish hue appeared growing stronger and brighter until the northern heavens glowed with a brilliancy stronger than a full moon. The meteor then appeared moving very quickly and horizontally to the right and with a white flare-up, burnt out. The trail of greenish-yellow turned white and then red, the last effect looking similar to a red-hot poker. The meteor lasted some 20 seconds (altitude approximately 7°).

Position of Ship :—Latitude $9^{\circ} 05' S.$, Longitude $113^{\circ} 38' W.$

COLLABORATION.

BY REAR-ADMIRAL J. A. EDGELL, C.B., O.B.E., HYDROGRAPHER
OF THE NAVY.

FROM time to time opportunities occur when, without unduly interfering with the normal voyage of a vessel, ships of the Merchant Navy, either of their own initiative, or in response to a request are able to contribute in no small measure to the interests of hydrography and to the scientific knowledge which is utilised in the preparation of material ultimately published for the benefit of seamen.

Of recent years, much work of an extremely useful and interesting nature has been carried out and due acknowledgment of this is made in the Hydrographer's Annual Reports, but the value of the co-operation which has been so marked a feature in the dealings of the Shipping Companies with the Hydrographic Department cannot well be stressed in a conventional and official report.

The requests which are made to the Shipping Companies are many and various and include such items as the determination of selected geographical positions, checking true bearings, heights of islands, the delineation of the 100 fathom line, lines of soundings, rounds of sextant angles and bearings at doubtful positions and the determination of magnetic variation.

In the year 1934 for instance, it was felt that additional soundings were badly needed in the neighbourhood of Cape St. Thomé on the east coast of South America; the existing chart was old and some of the material seemed rather obviously inaccurate; the good offices of the Royal Mail Steamship Company and the Blue Star Line were solicited and in due course much useful information including several long lines of soundings was obtained from the Masters of the *Alcantara*, *Asturias* and *Andalucia Star* and *Highland Brigade* (Royal Mail Lines).

An unsolicited report from the *Dunedin Star* of the Blue Star Line provided a series of most useful and valuable soundings in the neighbourhood of Cape Horn; an unusual feature of this report was the adaptation of graph records made by the echo sounding apparatus to the courses steered by the ship, these combined with land fixes provided a clear picture of the ground covered. Another vessel, the *Hazelwood*, belonging to the J. Constantine Steamship Line took soundings off the Abrolhos rocks.

Finally certain shipping companies, through the instrumentality of

the Marine Superintendent of the Meteorological Office consented to a proposal to check the magnetic variation in the South Indian Ocean.

The loss of the non-magnetic ship *Carnegie* in 1929 occurred at the moment when she was about to set out on a cruise to reoccupy magnetic stations at sea which had been observed at in former years. It was known that rather rapid changes in the value of the variation were taking place but very little definite information was available.

The resulting swings went far to prove the correctness of the changes which had been anticipated and provided very useful data, but perhaps the most valuable part of the whole proceeding was the spirit of co-operation which was manifested, for, when the time required even for a single swing is taken into account, it was asking a great deal of both the shipping companies and the Masters of the ships, to interrupt their voyages in order to provide material which they, themselves, were possibly not in need of.

Another and a particularly interesting piece of work undertaken by the *Empress of Australia* of the Canadian Pacific Steamship Company in 1935 and by the S.S. *Auditor* of Messrs. T. & J. Harrison & Co. in 1936 was the checking of bearings and distances of the islands of the Tristan d'Acunha group.

These seldom visited islands were laid down by the *Challenger* during her famous scientific cruise round the World and it had only recently been found that some unaccountable error existed in the bearing and distance of the two smaller islands relative to the main island, Tristan d'Acunha.

Satisfactory adjustment from the material available in the Admiralty was impossible and occasion was taken when these two vessels were about to visit the group to prepare certain material which it was hoped would clear up the points at issue.

In both cases fine weather was the rule and a whole series of extraordinarily useful angles and bearings were obtained, recorded and sent in to the Hydrographic Office; the result is that though an element of doubt exists regarding the actual area of Tristan d'Acunha itself, the positions of the other islands, Nightingale and Inaccessible, are now definitely co-related with it.

COMETS.

PREPARED IN THE MARINE DIVISION BY E. W. BARLOW, B.Sc.

Historical.—Comets have always been objects of interest to mankind. They appear more or less suddenly and remain visible for days, weeks or sometimes months, thus completely altering the familiar appearance of the heavens for a considerable time. Moreover, a bright comet with a long tail is a very impressive sight. It is hardly to be wondered at that comets were objects of superstition and fear in ancient times and in the Middle Ages. They were associated mainly with wars, pestilences, famines, the fall of kings and all kinds of national and local calamities. This belief still persisted to some extent in the early part of the nineteenth century and may not yet be entirely extinct. There was a celebrated port wine vintage in Portugal in 1811, which was associated with the great comet of that year. Some of this wine was still being sold as "Comet Wine" subsequent to 1880.

In Europe, from the time of ancient Greece and Rome to the Middle Ages, comets were almost universally believed to be luminous appearances in the earth's atmosphere. *SENECA*, in the first century A.D., must, however, have believed them to be celestial objects, for he predicted that in time to come their paths through the sky would be foretold. This prophecy was not fulfilled for 1600 years, after *NEWTON*'s discovery of the law of gravitation. *TYCHO BRAHÉ*, in the sixteenth century, was the first to show by observations at two stations that a comet was at least several times more distant than the moon, and therefore a celestial body. In China and Japan, the successive positions of comets among the stars were better recorded, and these old observations have enabled the orbits of many ancient comets to be calculated in modern times. The earliest comet of which Chinese records survive is that of 611 B.C.

In 1682, two years after the publication of *NEWTON*'s "Principia," a comet was discovered. *HALLEY* calculated its orbit on the lines indicated by *NEWTON*. He then investigated other comets and found that those of 1531 and 1507 had pursued very similar orbits, which led him to predict that the comet was moving in an elliptical orbit and would return at the end of 1758 or beginning of 1759. The comet, since known as Halley's Comet, actually arrived at its nearest point to the sun on 12th March, 1759, 17 years after *HALLEY*'s death. Since then the calculation of cometary orbits has been a regular part of astronomical work, and much has been learnt about these bodies. Much, however, remains unknown.

Comet Names.—While Halley's Comet and Encke's Comet were named after the men who calculated their orbits, all other comets are called by the name of their discoverers. In *THE MARINE OBSERVER*, Vol. XIV, 1937, page 99, an account was published of the observation of Peltier's Comet, 1937*a*, by 13 ships. This comet was discovered by *PELTIER* and is also called 1937*a*, affording a short designation and indicating that it was the first comet discovered in that year. The second comet found in any year is called *b*, and so on. Another designation is illustrated by Morehouse's Comet, 1908*c*, the third discovered in that year. This is now known as 1908 (iv), being the fourth comet in order of date in that year to pass the point on its orbit nearest the sun, or perihelion.

The Appearance of Comets.—The popular idea of a comet is a star with a tail, visible as a more or less bright object without a telescope. The majority of comets, however, never become visible at all without optical aid, and a large proportion of them never develop tails. The apparent brightness of a comet depends on how near it approaches to the sun, also on its actual size and on its distance from the earth when at its nearest point to the sun. Comets which approach the sun very closely shine with such brilliance as to be visible in full daylight; five were so seen in the nineteenth century. A comet, the head of which shines with the brilliancy of a first or second magnitude star is a very fine spectacle in the night sky, especially if it has a well-developed tail. Fainter comets visible without a telescope appear as misty stars, with or without tails.

In a telescope the head of a comet usually shows a small, bright

condensation, which may appear like a star. This is called the nucleus and is the main body of the comet. Round the nucleus is a luminous mass, usually spherical or oval in shape, called the coma. The nucleus and coma together constitute the head; the tail, if there is one, emerges from the coma and extends in a direction pointed away from the sun, gradually decreasing in brightness with distance from the comet. The head of a bright comet may show much interesting structure in the telescope in the form of luminous fans, jets or concentric shells. On the other hand a comet, if at a considerable distance from the earth when first discovered, may appear only a small faint patch of light in a large telescope.

The head of a bright comet often appears of appreciable size, without optical aid; that of the comet of 1652 is said to have covered as much space as the full moon. The tails of comets are usually curved but are sometimes straight, and the length, shape and brightness vary very much in different cases. The tail of a naked-eye comet may be only 2° or 3° long, but often extends for 10° or 20° and occasionally to a much greater length. The tail of the great comet of 1843, when it was visible in the southern hemisphere, had a length of 60°, while those of 1618 and 1861 extended to 100°. The tail may appear different on successive nights and photographs sometimes show rapid changes of form and structure. Some comets have one or more additional tails, usually narrow and fainter than the main one; the great comet of 1744 had six bright tails radiating fanwise from its head.

The Nature of Comets.—The head of a comet is not a solid body like the earth but a loose aggregation of widely separated small solid bodies, ranging perhaps from the size of small stones up to several feet in diameter. These bodies are similar to those which enter our atmosphere daily as meteors and meteorites. A number of observations of different kinds have established that a comet has little mass in proportion to its size. Thus the great comet of 1882, bright enough to be visible in daylight, became quite invisible when it passed in front of the sun's surface. The mass of even a large comet probably never exceeds one-millionth of that of the earth, but in spite of this may amount to millions of tons. The diameter of the nucleus is generally only a few hundred miles, but may reach several thousand miles, then being comparable with the size of the earth. The head as a whole may be very much bigger, and it is estimated that that of the comet of 1652 was 110,000 miles in diameter, while that of the comet of 1811 was at one time larger than the sun, and therefore 800,000 miles or more in diameter. The tails may be of any length up to many millions of miles; that of the comet of 1811 extended for 100 million miles, and that of the comet of 1843 was twice this length.

Formation of the Tail.—Owing to the great elongation of its orbit, a comet is near the sun for only short intervals of time, and for the greater part of its time when the comet is in the depths of space it has no tail at all and is quite invisible from the earth. As the comet approaches the sun it gets gradually hotter and finally some of the substance of the comet is vaporized. Spectrum analysis has shown the presence of gaseous carbon compounds such as cyanogen in the head of the comet, and in some cases also sodium, magnesium and iron vapour. At this stage the comet is shining not only by reflected sunlight but is also self-luminous. These gases form the coma surrounding the nucleus of the comet. The formation of the tail, directed away from the sun, is gradual and points to a repelling action of the sun on the material of the comet. It is well known that light and other forms of radiation exert a repelling force on very small particles of matter which is greater than the attractive force of gravitation. Electrical repulsion probably also takes place. All the evidence goes to show that the tails of comets consist of gases and of very small particles of matter, which may be called dust, ejected from the comet and driven away into space. The amount of matter in a comet's tail is minute in proportion to the great volume of the tail, as is shown by the fact

that stars shine through it with undimmed brilliancy. The earth passed right through the tail of the comet of 1861 and that of Halley's Comet in 1910 with no noticeable effect.

Every time a comet approaches perihelion therefore it is subject to the disruptive action of the sun and loses a small proportion of its substance. Comets are thus gradually wasting away but as in the majority of cases it is hundreds or thousands of years before the same comet returns to the neighbourhood of the sun the process is not usually rapid.

The Orbits of Comets.—The planets which revolve round the sun and form the solar system have slightly elliptical orbits, thus the earth is about three million miles nearer the sun in January than in June. A number of comets have been observed more than once and their orbits are found also to be ellipses, but very much more elongated than in the case of the planets. They are therefore also members of the solar system. Most of these periodic comets are faint objects, their periods ranging from about three years upwards. They have probably suffered much wastage in their frequent passages near the sun. The only conspicuous short-period comet is Halley's comet, the first for which an orbit was calculated. The orbit of this famous comet extends to a little beyond the orbit of the planet Neptune, which was until recently the outermost known planet of the solar system. The period of revolution of Halley's Comet is just under 77 years. Records of it exist for all its appearances, save one, since 240 B.C. and it was last seen in 1910. It is the comet which is shown in the Bayeux Tapestry. The comet which returns most frequently is Encke's, with a period of about three and a third years, which was a bright object in the telescope at the end of 1937 and is now again on its outward journey.

It is possible for a comet to move in an orbit such that it will come from outer space into the solar system, pass once round the sun and move on out again, never to return, but there is no conclusive evidence that any comet ever observed has pursued such a path, which is the conic section known as a hyperbola.

The great majority of comets are not short-period ones, and these, including all the bright comets except Halley's, appear to move in parabolic orbits, a parabola being the curve followed by a ball thrown up obliquely, or by the jet from a hose or fountain. It is more probable that their orbits are really excessively elongated ellipses. We can only observe a very small portion of one end of the orbit and over this small portion the curvature of the ellipse and the parabola is almost identical. These ellipses extend out to varying distances beyond the confines of the solar system, probably to at least 20 times the distance of Neptune. As this planet has a mean distance from the sun of 2,800 million miles, the size of these great cometary orbits will be appreciated. The periods of revolution of these comets range from hundreds to thousands of years. About equal numbers of them pursue their orbits in anti-clockwise and clockwise directions.

The Speed of Comets.—A comet moves very rapidly as it passes the sun. Then the speed begins to reduce greatly. On the far side of its orbit, if this be a large one, the comet's movement is extremely slow. The speed of the comet near the sun depends on how closely it approaches the sun. Four comets in the nineteenth century passed only 400,000 miles from the sun, almost grazing it, and their speed at that point was about 300 miles per second. Other comets pass perihelion with lesser but still very considerable, speeds. The period for which a comet remains visible from the earth depends on its speed and orbit. The comet of 1811 remained visible for 17 months, but from a few weeks to a few months is the usual time. A comet discovered in the northern hemisphere of the sky usually passes into the southern hemisphere after it has passed the sun and *vice versa*. Thus the ships' observations of Peltier's Comet, referred to above, were all

made in the southern hemisphere at dates after the comet had passed below the horizon of the British Isles.

The Relation between Comets and Meteors.—The study of meteors over many years has shown that the majority of them belong to definite groups, each group moving in its own orbit around the sun and forming an integral part of the solar system. Thus the well-known Perseid meteors which are plentiful in August, especially from the 10th to the 13th, radiate from a point in the constellation of Perseus. The Leonids form another well-known group and appear about 13th November, radiating from a point in the constellation of Leo. It has been found that the Perseid group moves in an orbit identical with that of Comet 1862 (iii) while the Leonid group moves in an orbit identical with that of Comet 1866 (i). The conclusion follows that the meteors are debris of the comet scattered along its path. Three other meteor groups have been found to be associated with other comets. In the case of meteor showers which occur annually with considerable regularity the cometary matter must be scattered fairly evenly round the orbit. When the shower of meteors occurs more strongly after a fixed period of years, the matter must be more concentrated in a definite part of the orbit.

Comets are subject to disintegration not only by the action of the sun but also by the gravitational effect of any planets which they may happen to approach. A comet ends by losing all the gas from its constituent "meteors" and before this happens, a good deal of its material may have been scattered along its path. A few comets have actually been observed to break up into two or more smaller ones. Biela's Comet, discovered in 1826, is a well-known case. At a subsequent return in 1846 it first appeared single and then broke up into two parts. At the next return in 1852 the two parts were again seen but more widely separated. Since then the comet has never been seen, but when the earth crossed its orbit on 27th November, 1872, a magnificent display of meteors occurred. Nothing more serious than this would happen if the head of a comet were to collide with the earth.

The Origin of Comets.—We have no certain knowledge of how comets originated. The theory that they are part of the debris left over when the sun and planets were originally formed seems improbable, since in the great span of time which has since elapsed, all such ancient comets should have disintegrated long ago. There are two theories of the origin of short-period comets. One is that they were originally comets moving in large orbits with long periods and that they were "captured" by one of the major planets, such as Jupiter, passing on some occasion so near that the gravitational attraction of the planet deflected the comet, changing its orbit to a much smaller ellipse. It is found that a great majority of the short-period comets have orbits whose extremities lie near the orbit of Jupiter, while the other large planets, Saturn, Uranus and Neptune, are similarly associated with a few of these comets. Halley's Comet belongs to Neptune's family. The second theory, which also explains the association between comets and planets, is that the material forming such comets is ejected from the planets from time to time. The supply of short-period comets must be maintained in some way on account of their relatively rapid wastage.

It has been stated that no evidence has been found of comets unconnected with the solar system being drawn into it from outside. The time of observation has however been short. We know that aggregations of dust or other forms of matter exist in outer space, visible to us in the form of bright and dark nebulae and also that the solar system is moving as a whole through space. It is possible that at some past time all the comets were drawn from such a source by the attraction of the sun and forced to remain in the solar system by the perturbing effects of the planets.

SIR ERNEST SHACKLETON.

PREPARED BY COMMANDER M. CRESSWELL, R.N.R.

(Continued from page 17.)

NOTWITHSTANDING all SHACKLETON'S work, the honours received by him and the world's applause, the lecture tours did not prove to be the financial success which his fond hopes had imagined they would be. Expenses had been heavy and his liberality had been unchecked, so that the end of 1910 found him in much the same financial position as when he left the *Nimrod*.

For the next three years he engaged in various business ventures, none of which, however, were sufficient to ensure the future of himself and his family. The successful explorer as a man of business found himself in strange and uncongenial environment.

Profiting by SHACKLETON'S experience both SCOTT and AMUNDSEN had set off on what proved to be a race to the South Pole. In February 1913, the *Terra Nova* returned to New Zealand and reported that SCOTT'S party had travelled by the Beardmore Glacier and reached the Pole in 1912, a month after AMUNDSEN; but that EVANS had died on the glacier and the others had been overtaken by a blizzard and died whilst confined in their tent, only 11 miles from the depôt where plenty awaited them. These circumstances were so similar to those which SHACKLETON'S party experienced in 1909 that the contrast in the result must have impressed him profoundly.

From AMUNDSEN'S success, too, SHACKLETON must have had it brought home to him that had he risked a landing on the Barrier itself, as AMUNDSEN did, the shorter distance overland would have enabled his party to have reached the Pole and returned to the base well inside the time actually expended on their journey.

Shortly after the news arrived that AMUNDSEN had reached the

three drawers labelled respectively "Possible," "Hopeless" and "Mad," in which the letters of application had been classified.

The crossing of the continent from the Weddell Sea to the Ross Sea necessitated the use of two ships. The *Aurora* was available in Australia, and the *Polaris*, a Norwegian ship specially built for polar work, was purchased and renamed *Endurance*. Greatly improved equipment was obtained, new rations, more roomy and easier-erected tents, a new motor sledge and 100 big Canadian sledge-dogs—in fact, everything which the light of previous experience could devise.

Of the funds which made the expedition possible, Sir JAMES CAIRD, the Dundee jute manufacturer, and Miss STANCOME-WILLS gave generously, and grants in advance were made by the Government and the Royal Geographical Society.

In the company finally selected for the *Endurance*, WILD was of course, included, and as navigator FRANK A. WORSLEY was appointed. CREAN and CHEETHAM were the other officers. The rest, though mostly new to the Antarctic, were picked men with fine records. Captain MACKINTOSH was to command the *Aurora* and from the Ross Sea lay out a line of depôts to the Beardmore Glacier to assist the return of the trans-continental party from the Weddell Sea.

Preparations were practically completed when on 16th July, 1914, Queen Alexandra paid a visit to the *Endurance* in the South-West Indian Dock. She took the greatest interest in everything connected with the expedition, and presented various souvenirs. At this time the war-clouds were gathering over Europe, but the *Endurance* sailed from London on 1st August, only to anchor off Margate, where SHACKLETON went ashore and, in agreement with his company, sent a telegram to the



Launching the James Caird at Elephant Island.

(Reproduced by permission of Messrs. Wm. Heinemann, Ltd.)

South Pole on 14th December, 1911, SHACKLETON, writing in a newspaper article, said: "The discovery of the South Pole will not be the end of Antarctic exploration. The next work of importance to be done in the Antarctic is the determination of the whole coast-line of the Antarctic continent, and then a trans-continental journey from sea to sea, crossing the Pole."

After his period of bafflement in business, where every hopeful enterprise led only to worry and disappointment, SHACKLETON made plans for, and in *THE TIMES* on 29th December, 1913, publicly announced, that, through the generosity of a friend, the Imperial Trans-Antarctic Expedition was made possible. He received offers of their services from nearly 5,000 people, and some time after in his office at 4, Burlington Street, London, an amused friend noted

Admiralty placing at their disposal the ship, crew and stores. A reply was received from the First Lord, Mr. WINSTON CHURCHILL, thanking the commander and crew, but declining their generous offer, as the Admiralty felt that as the expedition had been organized with the sanction and support of the highest geographical authorities it should not be interfered with.

The *Endurance* accordingly proceeded, SHACKLETON remaining to conclude arrangements. On 4th August he was received by KING GEORGE V, who thanked him for his offer to abandon the expedition and assured him that it might proceed with his approval and best wishes. HIS MAJESTY then presented a silk Union Jack to be carried on the trans-continental journey.

SHACKLETON joined the *Endurance* at Buenos Aires, and she sailed

for the Antarctic on 26th October. At Grytviken, in South Georgia, where they lay for a month, the whalers reported very bad ice conditions in the Weddell Sea. However, on 5th December the *Endurance* sailed from Grytviken and, as anticipated, found the ice conditions altogether abnormal, the sea being covered with dense pack-ice as far north as Latitude 58° 30' S. Progress was slow, an average speed of only 1 knot, and it was not until 8th January, 1915, that the ship cleared the pack in 70° S., having forced her way through for 480 miles.

On 11th January land between Coats Land and Luitpold Land was discovered and named Caird Coast, then on the 16th ice conditions became difficult again, until on 19th January the ship was firmly beset in the ice, which closed in tightly all round her.

The pack, with the ship firmly held, drifted to the south-westward and nothing could be done. SHACKLETON was disappointed but not cast down, for he had decided in any case not to attempt the land journey that summer, but to winter in the ship.

The drift of the floe then trended towards the north and by the end of April they were a whole degree north of their farthest south point. Now the winter came on, and by the end of August the ship was in 70° S., or 240 miles farther north. As the spring wore on the state of the ice became worse. All through the long winter the spirits of all hands had never flagged; they had, as usual, been busy, well fed and comfortable in the ship and able to exercise on the floe.

The ice now commenced ridging up and sometimes splitting with a loud report. Week by week the pressures grew more serious until on 18th October the *Endurance* was lifted bodily up on a rising pressure ridge and dropped back into a pool of open water. This froze over, the floes pressed in and she began to leak badly. On the 25th October pandemonium raged, new pressure ridges rising and rushing at the ship, which was literally torn to pieces and spitted on jagged shafts of ice. She was abandoned after having drifted 1,500 miles in 281 days. Now she was a total wreck, 1,000 miles by sea from South Georgia, the nearest dwelling place of men. A camp was hurriedly made on ice only 6 feet thick which floated over 1,300 fathoms of ocean depth. Great cracks were liable to run across the floe through the camp at any time, so that constant vigilance was necessary. After the warmth and comfort of the ship life on the ice entailed great privations. SHACKLETON'S first step was to select a solid-looking portion of the floe about a mile from the wreck and here all essential stores and the three boats, mounted on sledges, were collected. This settlement was named "Ocean Camp."

On the 21st November SHACKLETON, ever watchful, shouted out "She's going boys," and the party saw their once fine ship dive through the heaving ice and disappear bow first into the depths of the ocean.

The dogs had been kept in good condition and as the drift northward continued SHACKLETON decided to make a march to the west over the ice, with the boats on sledges, in an endeavour to reach Paulet Island, near Joinville Land.

To save time Christmas Day was celebrated on the 22nd December and then the party moved off, but after a week of ceaseless effort, hewing through ridges to let the sledges pass, only 7 miles advance had been made. This was hopeless as the floe was still drifting bodily northward, so on 29th December, "Patience Camp" was made. They drifted across the Antarctic circle during January 1916, with the summer sun hot and strong, air temperature 36° F, the ice melting everywhere and everything soaking wet. Seals commenced to disappear and as seal meat had been their staple food the dogs now had to be shot. The carpenter had raised the gunwales of the boats and decked them in forward in preparation for the voyage through the heavy seas which was to come.

By the beginning of April the massive floe had broken up into fields of ice an acre or so in extent, on one of which stood Patience Camp. The ocean swell made the cakes of ice heave and tremble and in the lanes of water between them the killer whales cruised about, greedy as sharks and far more dangerous.

The position now became highly dangerous as several times their cake of ice cracked and each time became smaller. Some of the men fell into the water, helpless in their sleeping bags and were only rescued with great difficulty. At last it was possible to take to the boats and on the 13th they cleared the pack and were in the open ocean with a heavy sea running. Elephant Island, about one hundred miles away, was the nearest land, and, running before the wind, was reached on the 15th April, after a night spent riding to a sea anchor for fear of being carried past the island in the darkness, when it would have been impossible to beat back against the wind.

The 28 men, now on solid land for the first time in 16 months, were in a desperate plight. A camp was made by Cape Wild on the only scrap of safe beach on the island. All round the rest of the coast the great seas broke against sheer cliffs or the fronts of glaciers which filled every creek and valley.

Knowing that the *James Caird* was the only seaworthy boat capable of a long passage, SHACKLETON decided to make for South Georgia, 800 miles away, taking only a picked crew of six and then, if successful to return and rescue the remaining 22 men on Elephant Island.

The Falkland Islands were nearest, but a boat could not lay a course athwart the westerly winds. MACNEISH, the carpenter, further strengthened the boat by fitting a girder fore and aft, decking over with sledge runners and box sections, the whole being covered with canvas nailed down. SHACKLETON, with WORSLEY as navigator, CREAN, MACNEISH, MACCARTHY and VINCENT formed the crew of this one of the most remarkable boat voyages ever accomplished, in fact the only long one across a part of the Southern Ocean.

It is the writer's intention to include the description of this voyage in a future article so brief mention is only made of it here. Leaving WILD in command, the 22 sped the departure of the *James Caird*, she slipped through a lane in the on-coming pack ice which had been creeping nearer and nearer to the island for days. The voyage started on the 24th April, and on the 8th May, the fine navigation of WORSLEY brought the mountains of South Georgia into view. To take an observation by sextant in a smother of spray, hanging on to the mast of a boat in the Southern Ocean, can be better imagined than described. Fortunately the chronometer watches were still serviceable and accurate.

In the half-darkness on 11th May, SHACKLETON sent the boat between the rocks and beached her in a cove. This was, however, on the farther side of the island from the whaling stations, and the party was so exhausted from their privations in the boat that it took four days to recruit their strength. Young albatross chickens, plump and tender as turkeys, roasted on a fire made from the deck and top-sides of the *James Caird*, served to nourish their starved bodies. The boat was turned bottom up on a wall of turf and stones, creating "Peggotty Camp," and here SHACKLETON left three men, two of them too ill to move, and set off with WORSLEY and CREAN to cross the Allardyce Mountains and obtain help.

After a miracle of mountaineering and without resting between three o'clock in the morning of 19th May to the forenoon of 20th May, three dirty and ragged human beings staggered into Stromness Whaling Station. Two boys and an old man fled in terror at their approach but Mr. SORLLE, the manager, soon had them civilized again with hot baths and new clothes. That same day a little steamer with WORSLEY on board went back to Peggotty Camp to bring in the three men who had remained there, and by the 23rd these were safely in Stromness.

The first attempt to rescue the men left on Elephant Island was made by the *Southern Sky*, a steel whaling steamer, but she could not get within 70 miles of the island on account of the pack-ice and proceeded to Port Stanley, Falkland Islands, where SHACKLETON by cable got the loan of a trawler from the Government of Uruguay. This ship got within 30 miles of Elephant Island, was damaged in the ice and returned baffled to Port Stanley. A third attempt was made in the *Emma*, an old schooner with auxiliary engines, which was chartered but she too could not reach the island, and SHACKLETON and WORSLEY returned to Port Stanley on 3rd August, tired and worried at this succession of failures.

The Chilean Government sent a tug, the *Yelcho*, and in her SHACKLETON made a last dash, knowing that the little steel vessel was incapable of threading the lanes of the ice-pack. This time conditions had entirely changed and the ice was open right up to the shore. Coasting along, WILD'S camp was sighted, a boat was quickly sent ashore and in three trips the 22 men, together with the invaluable records of the expedition, the precious films and photographs, were safely on board the *Yelcho*, and one hour after reaching the camp she was steaming north again for Punta Arenas, where the party landed on 3rd September.

The *James Caird*, the little 22-foot boat which played its part so stoutly, was brought back to England and, after being exhibited, went to Dulwich College, where it lies an inspiring memorial to the boys of SHACKLETON'S old school.

The other section of the expedition in the *Aurora* had carried out the depot laying from the Ross Sea to the Beardmore Glacier, but Captain MACINTOSH and two others perished, and the ship herself had drifted in the pack-ice for 315 days before getting free.

From Punta Arenas the little *Yelcho* took SHACKLETON to Valparaiso whence he travelled to Santiago and was received by the President of the Chilean Republic, whom he sincerely thanked for his kindness and assistance in the rescue of the Elephant Island party. Then on to Monte Video and Buenos Aires, where he was greeted and feted, as if he put it rather touchingly, "he had made a triumph instead of having failed in his expedition."

A wave of enthusiasm was aroused in the three Southern Republics which turned the sympathy of many neutral and of some pro-German South Americans towards the Allies so that it may well be that the men of the *Endurance* served their country better in the frozen south than they could have done in the ordinary course of active service.

By way of New York and San Francisco, SHACKLETON proceeded to Wellington to join the *Aurora* and take part in the rescue of his men from Cape Evans, after their return from laying the depots. Then back to New Zealand where they were greeted with civic receptions, at the earliest moment most of them joined the armed forces of the Empire, eager to take their part in the War.

In the then state of the shipping market, SHACKLETON was able to charter the *Aurora* for a good price, and so repay the loans incurred in New Zealand. At Wellington he commenced to write "South," though it was not possible to publish his book until two years later. The Trans-Antarctic expedition had failed in its main intention but was not entirely barren of results. A great deal was learnt of the difficult art of living under polar conditions and it tested new forms of equipment. Great light was thrown on the drift of ice both in the Ross Sea and the Weddell Sea, which information was later to make possible the now very important Antarctic whaling industry in those seas. The surveying, sounding and meteorological information too were all valuable contributions to existing knowledge.

Having so far settled the affairs of the expedition, SHACKLETON set out on his journey home, there to place his services at the disposal of the Government. Arriving in London in May, 1917, he was received by THE KING, to whom he handed back the flag, which, although it had not crossed Antarctica, had become historical.

SHACKLETON'S first war-time job was to conduct a mission to South America under the Department of Information. His instructions were very wide and he could carry out his investigations in his own way. Before sailing he received a summons to Sandringham, as THE KING wished to hear an account of the *Endurance* expedition and see the films and photographs.

German interests in Chili and the Argentine at this period were very strong indeed and no one better than SHACKLETON could have been chosen for work in the cause of British propaganda. His previous tour of the South American capitals and his great popularity enabled him to improve British prestige and do much useful work there, until the early summer of 1918, when he returned to England in one of the 12 ships of a convoy from New York carrying 25,000 United States troops.

Work more closely akin to his Antarctic experiences was now allotted to SHACKLETON, as he was given a commission as major and placed in charge of the winter equipment for the North Russian expedition. With four of his previous companions, including WORSLEY and STENHOUSE, he now had a job after his own heart, "winter sledging with a light at the end of it."

The Germans at this time had an army in Finland, their objective being to establish a submarine base either at Murmansk or Petchenga.

Allied forces consisted of naval units from warships and a few troops landed at Archangel and Murmansk. Even when strengthened by the enrolment of local recruits the force was woefully weak for the task assigned to it. The Armistice of 11th November, 1918, stopped the great war, but up north there was still active opposition from the Bolsheviks. Through the long, dark winter, SHACKLETON'S cheerful influence did much to keep all ranks free from gloom and depression.

As a second winter would not be passed on the Murman Coast his usefulness with the North Russian Force came to an end and in the spring of 1919 he was at last free to turn to his own affairs. His book "South" was published and proved an immediate success, and the royalties from its sale and the proceeds of a great lecturing season at the Philharmonic Hall, London, finally straightened out the financial tangles of the *Endurance* and *Aurora* expeditions.

By the end of May 1920 SHACKLETON had made 250 appearances at the Philharmonic Hall, and during all that long period he had suffered the strain of virtually living over again and again the long drawn out agony of the final destruction in the ice of the *Endurance*, together with

all his hopes. The little *James Caird* was also on exhibition and never before had an audience seen such moving scenes described by a man who had been the guiding spirit and actually lived through them.

Unable to settle down, SHACKLETON once more commenced to hunt for a benefactor to provide funds in order to carry out his last project, the exploration of the Enderby quadrant of the Antarctic, where no mechanically propelled vessel had ever attempted to penetrate the pack.

Through the generosity of Mr. J. Q. ROWETT and Mr. F. BECKETT the funds were almost assured and so the SHACKLETON-ROWETT EXPEDITION came into being. A little Norwegian sealer, the *Foca I*, was purchased and renamed the *Quest*. She was only 111 feet long, schooner rigged, with auxiliary engines, but never was a small vessel of less than 200 tons crowded with such a wealth of the latest appliances. Gyroscopic compass, a seaplane, wireless installations of the longest range, three large boats, kites for meteorological upper-air observations, sounding machines and, in fact, gear of every kind for the collection of specimens from sea and land. As SHACKLETON wrote to a friend: "Programme in a nutshell: all the oceanic and sub-Antarctic islands, 2,000 miles of Antarctic outline from Enderby Land to Coats Land. Seaplane, kinema, wireless, everything up to date."

Seven of the "Boys" of the *Endurance* expedition rallied round the "Boss" again. He appointed FRANK WILD second in command and FRANK WORSLEY, sailing master. It was as strange a company of Gentlemen Adventurers as ever sailed in one ship, 18 British subjects all told but only one an Englishman, the others being Scots, Irish, Canadian, Australian and New Zealanders. Almost all had been naval or military officers during the war. In the *Quest* they were all on the same level, each putting his hand to any job, irrespective of his title or designation. What a supreme triumph of leadership!

SHACKLETON went about his preparations with the heart of a boy. He had been elected to the Royal Yacht Squadron, and his little vessel therefore flew the white ensign and the burgee of the world's premier yacht club. Before sailing, KING GEORGE V received him and again presented a silk Union Jack to be carried on the expedition.

This time SHACKLETON made the outward voyage in his own ship, and on 24th September, 1921, the *Quest* made her departure from Plymouth. She was found to be a good sea boat but terribly uncomfortable with anything of a sea running. Being very low in the water, with tall masts and heavy yards on the foremast, she would roll and ship water to such an extent that most of the company suffered severely from sea-sickness, two so badly that they had to be landed and sent home from Madeira.

It was during the two days spent at St. Vincent that SHACKLETON contracted what he called suppressed influenza. He appeared to recover, however, as the voyage progressed, although the hot weather at Rio de Janeiro, where repairs were carried out, tried him greatly.

Just before leaving Rio, he wrote to Mr. ROWETT: "110 in the shade! All the work is done, and we are going. The next you will hear will be, please God, success. Should anything happen in the ice it will have nothing to do with anything wrong in the ship. The ship is all right."

Grytviken whaling station was reached on 4th January, 1922, and SHACKLETON, happy and contented that the voyage had really begun, went on shore to see his old friends. In the evening he returned on board apparently quite well, but died suddenly in a heart attack early on the morning of 5th January, 1922.

Gloom and consternation spread through the ship when the news was told. SHACKLETON'S fast moving life of swift succeeding action had, like a ship at the end of its voyage, let go the anchor and then—as the last link of the cable slipped out—silence!

By Lady SHACKLETON'S wish he was buried in the little graveyard at Grytviken, under the shadow of the mountains that he had been the first to cross and with the wailing of the sea birds as his funeral music. At home a memorial service was held in St. Paul's Cathedral, attended by a vast congregation. Representatives of the Royal Family, the Admiralty, the Royal Geographical Society, and other public bodies too numerous to mention, his business and social friends, his family and the great British public all thronged to pay their last tribute to a great explorer.

WILD, who succeeded to the command, carried on with the expedition, knowing that this would be the wish of the leader. Time was then short but much useful work was done, and when the *Quest* returned to Grytviken, WILD and his comrades heaped together a great cairn of stones, cemented into solid rock and surmounted by a cross, as a memorial to their leader. A tribute of devotion built by themselves and untouched by a hireling hand,

On the 9th January, 1932, at the Royal Geographical Society, London, a striking statue of Sir ERNEST SHACKLETON in polar costume was unveiled, and, in accepting the custody, Admiral Sir WILLIAM GOODENOUGH, President of the Society, said:

"It will serve to remind us and all who pass by, of a man who had he lived in the golden age would have been a DRAKE or a RALEIGH; of one among those men whose names encircle this hall as they themselves encircled the world; of one to whom adventure was an inspira-

tion, danger an incentive. Imbued with the true spirit of polar exploration he counted no cost to himself, but was ever mindful of his companions; a great leader of men, beloved and trusted by his followers."

SHACKLETON is remembered, too, amongst those with whom he spent his early days at sea, and in a Liverpool club-room a handsome silver cup bears token from members of his own cloth. It bears this inscription:—

"This very gallant officer of the Merchant Navy served as a Sub-Lieutenant, R.N.R., in *Discovery*, and later commanded expeditions to the Antarctic in *Nimrod*, *Endurance* and *Quest*.

22nd May, 1930.

This Loving Cup was subscribed for by Members of the Royal Naval Reserve Officers' Club in memory of
SIR ERNEST SHACKLETON, C.V.O., O.B.E.

1874-1922."

SUMMARY OF ICE CONDITIONS, WESTERN NORTH ATLANTIC, 1937.

PREPARED IN THE MARINE DIVISION BY COMMANDER J. HENNESSY, R.D., R.N.R.

THE following summary of ice conditions in the Western North Atlantic during the 1937 season is compiled from ice reports returned from those ships of the Voluntary Observing Fleet traversing the Trans-North Atlantic routes, from bulletins issued by the International Ice Patrol Service and from other sources.

January.—In the Western North Atlantic icebergs commenced to drift south across the Trans-Atlantic shipping tracks very early in the season. The first notification of ice came from the S.S. *Lancastria* who on 9th January, when in Latitude 45° 31' N., Longitude 49° 59' W., sighted a berg and a growler. Another berg was sighted on the 14th in Latitude 48° 30' N., Longitude 48° 45' W., after which no ice was reported in the vicinity of the Grand Banks until towards the end of the month when several bergs and growlers were sighted between the 45th and 47th parallels and the 46th and 50th meridians. On the last two days of the month extensive fields of ice were reported extending in a W.S.W. direction across the northern part of the Grand Banks from Latitude 47° N., Longitude 49° W., to Cape Race.

The southernmost ice reported during the month was a berg sighted on the 30th in Latitude 44° 15' N., Longitude 45° 45' W.

February.—The east and south coasts of the Avalon Peninsula from Cape St. Francis to Cape St. Mary were bordered with heavy field ice throughout the greater part of the month. During the first and last weeks of the month, easterly winds driving the ice shorewards filled St. John's Harbour and formed an impenetrable barrier which extended seaward in all directions thereby bringing shipping to a standstill, both within and without the port. Cabot Strait was entirely blocked with ice and ice extended along the east coast of Cape Breton Island to well south of Scatari.

Over that region of the Grand Banks north of Virgin Rocks, extensive fields of heavy ice were reported throughout the month and on the 14th, extended in an almost unbroken line from Cape Race in a north-westerly direction to the 48th parallel. Heavy ice fields were also reported to the south and south-west of Cape Race on the Green and St. Pierre Banks.

Between the 1st and 9th of the month bergs were frequently reported on the eastern side of the Grand Banks between the 43rd and 49th parallels, but during the latter half of the month all bergs reported on or in the vicinity of the Grand Banks were situated west of the 52nd meridian. The southernmost ice reported during the month was a berg sighted on the 1st in Latitude 43° 32' N., Longitude 49° 35' W.

Owing to the drift of ice across the Trans-Atlantic steamship tracks so early in the year, the United States Coast Guard Authorities ordered the cutter *Cayuga* to sail from Boston on 3rd February and make a special ice observation cruise in the vicinity of the Grand Banks. On 9th February, owing to the ice becoming a menace to Track C, ships were diverted to Track B; such a change does not normally come into operation until the 11th April. Upon the completion of the ice

observation cruise carried out by the *Cayuga* that vessel was relieved at sea by the *Champlain* on 21st February, who with the *Mendota* was detailed to conduct the Ice Patrol Service throughout the season.

March.—The Danish Meteorological Institute reported that on the 29th March, off the south-west coast of Greenland, the sea was completely covered by hummocked winter ice, 3 to 6 feet thick, drifting slowly N.E.

Heavy and extensive fields of ice were observed on and in the vicinity of the Grand Banks throughout the month, ships having to make large deviations from their course to keep in clear water. Several vessels bound to or from St. John's, Newfoundland, sustained damage when forcing a way through the ice. Heavy rafted ice was reported in Cabot Strait early in the month and on the 28th a large field of ice was reported to the eastward of Cape Breton on the Misaine Bank.

Numerous bergs were reported throughout the month, which with the exception of a few observed at the end of the month, to the north-east of the Grand Banks, were all situated west of the 50th meridian. They were especially numerous off the east and south coasts of the Avalon Peninsula between Cape Spear and Cape Pine. On one occasion, from a position 12 miles west of Cape Pine eastward to Cape Race, 25 bergs were sighted including three in Trepassey Bay. It is very unusual to observe bergs in this vicinity so close in to the coast.

At the end of the month a Canadian Government icebreaker was detailed to investigate ice conditions within the Gulf of St. Lawrence and carry out ice patrol duties from the opening of navigation until the route clears of ice.

The southernmost ice reported during the month was a growler sighted on 4th March in Latitude 44° 33' N., Longitude 53° 38' W.

April.—On the 6th the Danish Meteorological Institute reported the sea off the south-west coast of Greenland to be three-quarters covered with polar ice, over 10 feet thick, pressing together and hummocking while drifting northward at one knot.

On April 9th the north coast of Cape Breton Island was reported blocked with St. Lawrence ice, also the east coast from Middle Cabot Strait to south of Scatari. On the 14th, however, navigation within the Gulf of St. Lawrence opened and on the 19th the *Duchess of York* arrived at Montreal, her commander receiving a gold-headed cane which is presented each year to the captain of the first over sea vessel to berth in the port.

On and in the vicinity of the Grand Banks numerous reports of bergs and field ice were received throughout the month. The field ice was chiefly observed between the 50th meridian and the Newfoundland coast, and was of a particularly heavy nature close in to the coast. Bergs and growlers infested the entire area lying between the 42nd and 49th parallels and the 46th and 55th meridian, but the large

majority drifted southward along the east coast of the Avalon Peninsula and through the gully around Cape Race.

The southernmost ice reported during the month was a berg sighted on the 28th in Latitude 42° 10' N., Longitude 49° 45' W.

May.—On and in the vicinity of the Grand Banks extensive fields of heavy ice were observed off the east coast of the Avalon Peninsula up to the 16th of the month, after which they became scattered and disappeared. A few bergs made their way south down the east side of the Banks early in the month, but throughout the month numerous bergs continued to drift south in the western branch of the Labrador current into the gully around Cape Race.

The southernmost ice reported during the month was a berg and growler reported on the 5th in Latitude 43° 50' N., Longitude 55° 47' W.

On 3rd May owing to the absence of ice in the Gulf of St. Lawrence the Canadian Ice Patrol was discontinued. Towards the end of the month the Belle Isle Strait became navigable and on the 25th ships using the northern route reported large areas of open field ice on and in the vicinity of the tracks, extending for 110 miles eastward of Belle Isle.

June.—On the 15th the Danish Meteorological Institute reported that off the south-west coast of Greenland the ice extended northwards to Fiskernasset. On the 30th 50 bergs were sighted between Cape Farewell and Julianehaab, where the western edge of ice extended to 40 miles off shore with 18 miles of open coastal water. The ice was very open, unimpeding navigation. On and in the vicinity of the Grand Banks, no field ice was reported during the month and there was a large decrease in the number of bergs. During the first half of the month a few bergs were reported north of the 47th parallel near the north-eastern edge of the Grand Banks, but during the second half of the month all reports referred to bergs drifting south down the east coast of the Avalon Peninsula or through the gully round Cape Race westward to St. Pierre. The southernmost ice reported during the month was a berg observed on the 3rd in Latitude 46° 05' N., Longitude 54° 49' W.

On 19th June the U.S. Coast Guard patrol vessel *General Greene* sailed from St. John's, Newfoundland, to carry out oceanographical and ice observational work in northern waters.

Ships using the Belle Isle route reported large numbers of bergs on both sides of the tracks from the 50th meridian westward to Cape Norman.

July.—With the exception of one berg reported off Cape Spear and three in and to the south of St. Mary's Bay, Newfoundland, during the first week of the month, no other ice was observed south of the 48th parallel. North of the 48th parallel a few bergs drifted down to the north-eastern edge of the Grand Banks but in the region of Belle Isle the tracks were infested with ice from the 50th meridian westward to Point Amour, the bergs being especially numerous when westward of the 54th meridian. Between Belle Isle and Gannet Islands, off the south-east coast of Labrador, hundreds of bergs and growlers were observed on the 13th.

The southern tracks being clear of ice the Ice Patrol was discontinued on 14th July, the cutters having maintained an incessant watch since 3rd February. On 23rd July the *General Greene* completed her ice observation and oceanographical cruise in northern waters.

August.—The Danish Meteorological Institute reported on the 10th, "Free of ice 5 miles off Cape Farewell. Julianehaab Bay free of ice. In Latitude 69° 06' N., Longitude 11° 54' W., sea three-quarters covered with hummocked winter ice about 7 feet thick drifting very slowly south."

In the Western North Atlantic no ice of any description was observed during the month other than on the Belle Isle route, where bergs menaced the tracks eastward from Belle Isle to the 51st meridian.

September.—The Danish Meteorological Institute reported on the 8th, "Free of ice 10 miles off Cape Farewell, bergs in Longitude 42° W. Julianehaab Bay free of ice."

The only ice reported in the Western North Atlantic during the month was a few bergs on the Belle Isle tracks, between the 51st and 55th meridians.

October.—Three bergs were reported during the first week of the month on the Belle Isle tracks between the 53rd and 55th meridian. A few bergs were also observed within Belle Isle Strait during the month.

November.—A few bergs were observed on the Belle Isle tracks west of the 53rd meridian, during the first half of the month.

December.—No ice was reported in the Western North Atlantic throughout the month. On December 8th the last vessel left Montreal, marking the close of navigation in the St. Lawrence for the season.

CHART A shows the monthly limits within which reports of ice have been received by the Meteorological Office during the year 1937, also the monthly limits reached by ice over the period 1901-37.

Particulars of ice observed in exceptional positions in the North Atlantic of which the Meteorological Office have records are given in the following table and their plotted positions are shown on CHART B.

Exceptional positions of ice.

No.	Date.	Source of Report.	Position of ice.		Remarks.
			Latitude N.	Longitude W.	
1	14.1.1836	H.M.S. <i>Cove</i> ...	60° 55'	5° 50'	Two bergs.
2	9.1.1913	S.S. <i>Oriflamme</i> ...	48° 37'	34° 42'	Berg 40 ft. high, 400 ft. long.
3	27.1.1916	S.S. <i>Rio Verde</i> ...	33° 34'	70° 32'	Hummock 2 ft. high, 30 ft. in circumference.
4	3.2.1922	S.S. <i>Weehawken</i> ...	41° 42'	58° 59'	Ice (sustained bow damage).
5	24.3.1913	S.S. <i>Floride</i> ...	46° 21'	34° 05'	Berg 60 ft. high, 200 ft. long.
6	20.3.1915	S.S. <i>Wanaby</i> ...	36° 55'	48° 32'	Piece; supposed portion of a berg, 5 ft. high, 60 ft. long.
7	21.3.1920	U.S. Hyd., Bulletin	38° 02'	40° 38'	3 ft. high, 30 ft. long.
8	21.3.1921	S.S. <i>Hollandia</i> ...	37° 50'	47° 23'	Berg.
9	6.4.1909	S.S. <i>Trafalgar</i> ...	35° 54'	31° 47'	Two pieces 18 ins. in diameter.
10	11.4.1914	S.S. <i>Erodiade</i> ...	32° 55'	62° 11'	Apparently river ice about the size of a lifeboat.
11	24.4.1916	S.S. <i>Communipaw</i>	49° 05'	36° 48'	4 ft. high, 50 ft. wide, and 100 ft. long.
12	4.4.1921	S.S. <i>Hollandia</i> ...	43° 35'	35° 57'	Large berg.
13	16.4.1926	Trawler <i>Orizaba</i> ...	61° 03'	10° 30'	Floating ice about 40 ft. long, and 3 ft. high.
14	7.4.1930	S.S. <i>La Crescenta</i>	42° 24'	34° 22'	Small berg about 20 ft. in diameter.
15	27.4.1935	S.S. <i>Cochrane</i> ...	28° 44'	48° 42'	Small berg.
16	20.5.1907	S.S. <i>Lord Landsdowne</i> .	31° 00'	38° 00'	Two small pieces 6 ft. by 6 ft. and 12 ft. by 4 ft. out of water.
17	6.5.1908	S.S. <i>Oceano</i> ...	150-200 miles North of Bermuda.		Pieces.
18	27.5.1909	S.S. <i>Reventazon</i> ...	32° 28'	44° 10'	60 ft. long, 10 ft. high.
19	15.5.1911	S.S. <i>Camillo</i> ...	10 miles East of Nanucket Shoal Lt.-V.		Small berg.
20	11.5.1914	S.S. <i>Indradeo</i> ...	42° 18'	62° 43'	Large slabs of field ice and growlers 100-150 ft. long, 5 ft. out of water.
21	17.5.1915	S.S. <i>Pola</i> ...	38° 16'	61° 50'	Some field ice.
22	15.5.1920	U.S. Hyd., Bulletin	45° 11'	36° 42'	Berg.
23	27.5.1930	S.S. <i>Valperga</i> ...	40° 37'	37° 50'	Iceberg about 16 ft. high with growlers.
24	15.5.1935	M.V. <i>Lochmonar</i> ...	33° 43½'	48° 47'	Growler, 90 ft. by 25 ft. by 3 ft.
25	25.6.1886	Brig. <i>Blanch</i> ...	48° 40'	15° 22'	Large berg.
26	5.6.1907	S.S. <i>Kingswell</i> ...	32° 37'	64° 25'	Several bergs.
27	-6.1907	Bque. <i>Silverstream</i>	80 miles West of Fastnet.		Berg.
28	11.6.1912	S.S. <i>Valetta</i> ...	37° 30'	74° 24'	Three pieces of ice.
29	7.6.1913	S.S. <i>Holtby</i> ...	39° 35'	64° 50'	Berg 10 ft. high.
30	27.6.1915	S.S. <i>Stella</i> ...	36° 28'	57° 45'	Small piece.
31	30.6.1921	U.S. Navy Dept.	33° 20'	49° 16'	Berg 10 ft. high.
32	16.6.1924	S.S. <i>West Irmo</i> ...	38° 03'	63° 20'	Growler.
33	25.6.1926	S.S. <i>Baxtergate</i> ...	30° 20'	62° 32'	Large piece about 30 ft. long and 15 ft. wide, showing about 3 ft. above water.
34	2.6.1934	M.V. <i>Beaulieu</i> ...	30° 50'	45° 06'	Small berg, 20 ft. by 8 ft. by 3 ft. above water.
35	-7.1890	S.S. <i>Slavonia</i> ...	48° 53'	24° 11'	Last remnants of berg.

No.	Date.	Source of Report.	Position of ice.		Remarks.
			Latitude N.	Longitude W.	
36	-7.1902	Two reports by fishermen.	56° 30' (appx.).	6° 30'	40-50 ft. long, 15 ft. wide, 2 ft. 6 ins. out of water.
37	31.7.1909	S.S. <i>Shimosa</i> ...	36° 59'	30° 01'	25 ft. long, 3 to 8 ft. wide.
38	10.7.1913	S.S. <i>Lothian</i> ...	37° 27'	36° 48'	Piece, 6 ft. high, 50 ft. in circumference.
39	18.7.1916	U.S. Hyd., Bulletin	32° 09'	54° 26'	Piece of berg, 3 or 4 ft. out of water.
40	23.7.1916	S.S. <i>San Giorgio</i> ...	42° 09'	63° 24'	Berg 60 ft. long.
41	23.7.1918	U.S. Hyd., Bulletin	44° 25'	35° 01'	Large berg.
42	18.7.1921	" "	44° 30'	39° 26'	Small berg about 15 ft. square.
43	21.7.1921	" "	39° 09'	40° 39'	Berg.
44	31.7.1921	" "	37° 37'	27° 29'	Berg.
45	10.7.1926	S.S. <i>Chelatros</i> ...	42° 42'	36° 45'	Two pieces of ice.
46	16.7.1933	S.S. <i>Rein</i> ...	52° 32'	22° 00'	Small piece of ice about 25 ft. long, 12 ft. wide.
47	12.8.1903	S.S. <i>Saxon Prince</i>	37° 52'	71° 30'	Piece, 3 ft. high, 40 ft long.
48	7.8.1908	S.S. <i>Caronia</i> ...	50° 31'	18° 55'	Two pieces, 10 ft. square and 15 ft. square.
49	2.8.1909	S.S. <i>Shimosa</i> ...	37° 16'	42° 06'	Piece, 18 ft. by 5 ft., 2 ft. out of water.
50	14.8.1912	S.S. <i>Ulstermore</i> ...	43° 55'	39° 16'	Piece.
51	27.8.1912	S.S. <i>Lux</i> ...	42° 30'	15° 26'	50 ft. square, 4 ft. out of water.
52	10.8.1915	S.S. <i>St. Louis</i> ...	41° 02'	48° 00'	Berg.
53	16.8.1915	S.S. <i>St. Leonards</i>	41° 09'	56° 43'	Berg.
54	21.8.1915	S.S. <i>Strathgarry</i> ...	40° 46'	68° 20'	Growler.
55	-8.1915	" "	39° 00'	46° 20'	Piece, 20 ft. long, 4 ft. high.
56	29.8.1920	U.S. Hyd., Bulletin	40° 30'	47° 52'	Berg.
57	2.9.1883	Bque. <i>Olivette</i> ...	35° 40'	30° 00'	Lump of ice.
58	-9.1895	S.S. <i>Gulf of Taranto</i>	36° 35'	71° 36'	Two bergs 30 ft. high 300-400 ft. long, and much field ice over two miles area.
59	19.9.1906	S.S. <i>Lord Landsdowne</i> .	54° 20'	22° 00'	Small berg 20 ft. by 6 ft.
60	10.9.1908	S.S. <i>Deutschland</i> ...	45° 28'	27° 18'	Two small bergs and one large.
61	6.9.1920	U.S. Hyd., Bulletin	47° 10'	38° 04'	Bergs.
62	2.9.1922	S.S. <i>Hällgjerd</i> ...	50° 00'	40° 05'	Berg.
63	15.9.1922	S.S. <i>Empress of Britain</i> .	52° 52'	40° 12'	Large berg.
64	3.9.1923	S.S. <i>Djambi</i> ...	40° 10'	31° 36'	Piece of ice about 30 ft. long, 1½ ft. out of water.
65	15.10.1883	S.S. <i>Elenora</i> ...	37° 00'	18° 00'	Piece of ice.
66	8.10.1912	S.S. <i>Putney Bridge</i>	35° 15'	44° 50'	Small berg 35 ft. long, 6 ft. high.
67	27.10.1916	S.S. <i>Montreal</i> ...	51° 17'	41° 17'	Small berg.
68	2.10.1918	U.S. Hyd., Bulletin	50° 10'	40° 50'	Large berg.
69	19.10.1920	" "	45° 22'	40° 09'	Berg.
70	19.10.1920	" "	45° 24'	40° 07'	Berg.
71	17.10.1921	S.S. <i>Mount Vernon</i>	48° 23'	42° 19'	Berg about 70 ft. high, 400 ft. long.
72	6.10.1922	S.S. <i>Christian Krogh</i> .	50° 43'	40° 42'	Berg 60 ft. high.
73	7.10.1923	S.S. <i>Eastern Dawn</i>	40° 46'	65° 54'	Large growler about 100 ft. square.
74	23.10.1927	Trawler, <i>Grecian Empire</i> .	30 miles of the Outer Skerries, Shetland Islands.	E.S.E.	Piece of ice 100 ft. long, 6 ft. above water.
75	3.10.1934	S.S. <i>Rhexenor</i> ...	36° 53'	29° 13'	Growler, approx. 20 ft. by 4 ft.
76	4.10.1934	S.S. <i>Imperial Valley</i> .	36° 16'	29° 26'	Growler, approx. 15 ft. by 3 ft.
77	7.11.1922	Cape Race, W/T Station.	47° 38'	40° 04'	Berg and growlers.
78	8.11.1936	S.S. <i>Defyros</i> ...	32° 44'	49° 58'	Piece of ice about 60 ft. long, 5 ft. above water.
79	-12.1903	S.S. <i>Lord Antrim</i>	42° 00'	55° 00'	Ice.
80	22.12.1915	S.S. <i>Carolyn</i> ...	42° 53'	57° 39'	Large berg.
81	16.12.1920	S.S. <i>Oriana</i> ...	43° 53'	44° 39'	Berg.
82	16.12.1927	S.S. <i>Ascania</i> ...	47° 52'	40° 50'	Four large bergs.

North Atlantic Tracks.

The suggestion that all ships engaged in the Trans-North Atlantic trade should follow separate routes when eastbound to those used

when westbound, was first made by Commander F. M. MAURY, U.S.N., in 1855, but it was not until 1875 that his suggestion was adopted. The Cunard Company then laid down specified routes which all their ships were ordered to follow.

On the recommendation of the United States Hydrographic Office these routes were amended in 1891, and seven years later the Trans-North Atlantic Conference was formed consisting of the principal International Shipping Companies engaged in the Trans-North Atlantic trade. The conference, working in conjunction with the United States Coast Guard, revise the tracks from time to time in accordance with Article 39 of the International Convention for the Safety of Life at Sea, 1929.

The tracks are shown on Admiralty Route Chart which is published in two sections.

Chart No. 2058 b showing lane routes south of Ireland and English Channel.

Chart No. 2058 c showing lane routes north of Ireland.

The section of the routes running through the ice region in operation for the month is shown on the ice chart published with each quarterly number and monthly supplement of THE MARINE OBSERVER.

The particulars of the routes which were last revised in March, 1931, are as follows:—

United States.

Track "A" (Extra Southern).

Westbound.

Will only be brought into operation when necessity arises.

Steer from Fastnet or Bishop Rock on Great Circle course, but nothing South, **to cross the meridian of 47° 00' W in Latitude 40° 30' North** thence by either rhumb line or Great Circle to Boston Light Vessel or to a position South of Nantucket Light Vessel.

Eastbound.

Will only be brought into operation when necessity arises.

From the position of 70° 00' West and 40° 10' North, or from Boston, steer by rhumb line **to cross the meridian of 47° 00' West in Latitude 39° 30' North**, and from this last position nothing North of the Great Circle to Fastnet or Bishop Rock.

Track "B" (Southern).

Westbound.

From 11th April to 30th June (both days inclusive). Except when ice conditions necessitate the use of "A" Track.

Steer from Fastnet or Bishop Rock on Great Circle course, but nothing South, **to cross the meridian of 47° 00' West in Latitude 41° 30' North**, thence by either rhumb line or Great Circle to Boston Light Vessel, or to a position South of Nantucket Light Vessel.

Eastbound.

From 11th April to 30th June (both days inclusive). Except when ice conditions necessitate the use of "A" Track.

From the position of 70° 00' West in 40° 10', North, or from Boston, steer by rhumb line, **to cross the meridian of 47° 00' West in Latitude 40° 30' North**, and from this last position nothing North of the Great Circle to Fastnet or Bishop Rock.

Track "C" (Northern).

Westbound.

From 1st July to 10th April (both days inclusive). Except when ice conditions necessitate the use of "B" track.

Steer from Fastnet or Bishop Rock on Great Circle course, but nothing South, **to cross the meridian of 50° 00' West in Latitude 43° 00' North**, thence by either rhumb line or Great Circle to Boston Light Vessel, or to a position South of Nantucket Light Vessel.

Eastbound.

From 1st July to 10th April (both days inclusive). Except when ice conditions necessitate the use of "B" Track.

From the position of 70° 00' West in 40° 10' North, or from Boston, steer by rhumb line, **to cross the meridian of 50° 00' West in Latitude 42° 00' North**, and from this last position nothing North of the Great Circle to Fastnet or Bishop Rock.

General Instructions.

Vessels bound to or from United States ports **calling at Halifax** have the option of following either the Canadian or United States Seasonal Tracks to or from that port, passing 40 miles South of Sable Island Westbound and 60 miles South of Sable Island Eastbound when proceeding on U.S. Tracks and Canadian Track "D." When proceeding on Canadian Tracks "E" or "F" via Halifax, ships pass North of Sable Island both Westbound and Eastbound.

(NOTE.—General Instructions Canadian Tracks for vessels bound to or from the North of Ireland.)

Vessels bound direct to Portland (Maine) may follow the Canadian Seasonal Tracks.

When courses are changed at the intersections of meridians any time before or after noon Commanders must note in their logs both distances to and from the meridians that the ship has sailed from noon to noon, and not the distance from the position at noon the day before to the position at noon the day after the meridian is crossed.

The date on which Tracks change is to apply to the meridian of the Fastnet for Westbound steamers and the meridian of 70° 00' West for Eastbound vessels.

Communications on General Track matters between the British Lines will pass through the Cunard-White Star Line. The Holland America Line will communicate with the Continental Lines, excepting that, during the Ice Season, the Cunard-White Star Line will communicate direct with all Lines.

With regard to proposals for any changes in Tracks, owing to prevalence of ice, the Cunard-White Star Line in Liverpool will decide dates on which changes are to become operative, advising Lines by telegraph. Lines undertake to give immediate instructions to their steamers in accordance with such advices.

Canada.**Track "D."**

From 15th February to 10th April (both days inclusive).

Westbound.

Steer from Fastnet, Inishtrahull, or Bishop Rock on Great Circle course **to cross the meridian of 50° West in Latitude 43° North**, thence to Halifax or other Port, passing not less than 40 miles south of Sable Island.

Eastbound.

Steer from Halifax or other port to pass 60 miles south of Sable Island **to cross the meridian of 50° West in Latitude 42° North**, thence on the Great Circle course to Fastnet, Inishtrahull, or Bishop Rock.

Track "E."

From 11th April to 15th May or until the Cape Race Route clear of ice, and December 1st to February 14th.

Westbound.

Steer from Fastnet, Inishtrahull, or Bishop Rock on the Great Circle course **to the meridian of 50° West in 45° 55' North**, thence to Halifax or the Gulf of St. Lawrence.

(NOTE:—The Donaldson Line reserve the right to cross Longitude 45° West in Latitude 45° North on this track.)

Eastbound.

Steer from Halifax or the Gulf of St. Lawrence **to cross the meridian of 50° West in Latitude 45° 25' North** thence on the Great Circle course to the Fastnet, Inishtrahull or Bishop Rock.

Track "F."

From 16th May to the opening of Belle Isle Route and to November 30th when not using the Belle Isle route.

Westbound.

Steer from Fastnet, Inishtrahull, or Bishop Rock, on a course 10 miles North of the Great Circle track until approaching Cape Race, then steer a course to pass 10 miles South of Cape Race, thence to Halifax or the Gulf of St. Lawrence.

Eastbound.

Steer from Halifax or the Gulf of St. Lawrence to a position 25 miles South of Cape Race thence on a course 10 miles south of the Great Circle track until approaching Fastnet, Inishtrahull, or Bishop Rock.

Track "G."

Belle Isle route.—From the opening of the Straits of Belle Isle to November 14th.

Westbound.

Steer from Fastnet, Inishtrahull, or Bishop Rock, on a course 10 miles north of the Great Circle track until approaching Belle Isle.

Eastbound.

Steer from Belle Isle on a course 10 miles South of the Great Circle track until approaching Fastnet, Inishtrahull, or Bishop Rock.

General Instructions.

Vessels bound to or from U.S. ports **from or to the north of Ireland** have the option of following either the U.S. or the Canadian Seasonal Tracks D, E and F, remaining on track F during the operative dates of Track G.

On tracks "E" and "F" vessels passing 40 miles south of Sable Island westbound thence to position south of Nantucket and Eastbound from position 40° 10' North in 70° 00' West to position 60 miles south of Sable Island.

On track "D" westbound proceeding by rhumb line from position 43° 00' North in 50° 00' West to position south of Nantucket and eastbound from position 40° 10' North in 70° 00' West to position 42° 00' North in 50° 00' West.

Commanders on encountering ice have permission to deviate from these tracks and after the end of October to leave the Belle Isle for the more southerly route at their discretion according to weather conditions. Should vessels on Track "C" bound to or from United States be deviated to Track "B" on account of ice, Canadian vessels will remain on Track "D" for the period prescribed but will have the above option of deviating as necessary in the vicinity of ice areas.

The Lines have the option of continuing the use of the Belle Isle route after November 14th should they wish to do so.

SOUTHERN ICE REPORTS.

During the year 1937.

No reports of ice were received during the months of April, May and June.

Reports of ice previous to April, May and June, 1937, will be found in *The Marine Observer*, Volume XIV, No. 126, p. 65.

WIRELESS WEATHER SIGNALS.

I.—SHIPS' WIRELESS WEATHER SIGNALS.

A full description of the world-wide system of voluntary "Selected Ships" routine weather reports with instructions was given on pp. 27-40 of the January number of this volume of THE MARINE OBSERVER.

The list which follows contains the latest information of stations to which "A Selected Ships" should report in accordance with those instructions, and stations detailed to receive reports

from "B Selected Ships" also in accordance with those instructions.

To decode these reports, and for information of the system of communication of "Selected Ships," all concerned are referred to the PAMPHLET, M.O. 329, concerning which special notice to the masters of British ships will be found on pp. 30 and 31, paragraphs (27) and (34) the of January 1938 number of THE MARINE OBSERVER.

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

Request for Information.

THE ATTENTION OF METEOROLOGICAL SERVICES IS DIRECTED TO THE INVITATION GIVEN ON PAGE 27 OF VOL. XV, NO. 129, JANUARY, 1938.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
<i>Column No. 1.</i>	<i>No. 2.</i>	<i>No. 3.</i>	<i>No. 4.</i>	<i>No. 5.</i>	<i>No. 6.</i>	<i>No. 7.</i>	<i>No. 8.</i>	<i>No. 9.</i>	<i>No. 10.</i>
North Atlantic and North Sea.	Portishead.	Lat. 51° 28' 41" N. Long. 2° 47' 30" W.	GKU	149 kc/s. (2013 metres) and 121 kc/s. (2479 metres) simultaneously	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. but not within 300 miles of station. (see Chart of the World.)	Weather London.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	"Selected Ships" chosen to report in given order notified by station daily at 2300, 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. and observations for 0000 and 1800 G.M.T. as convenient.
North Atlantic and Mediterranean.	Gibraltar.	Lat. 36° 08' 32" N. Long. 5° 20' 29" W.	GYW	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	Eastern North Atlantic, South of Lat. 37° N. and Mediterranean Sea.	Meteor Gibraltar.	Weather only. No. 3 Supplementary Groups.	All British "A Selected Ships" within area should report in accordance with Schedule.
North Atlantic.	Horta, Azores.	Lat. 38° 32' N. Long. 28° 38' W.	CTG	125 kc/s. (2400 metres).	125 kc/s. (2400 metres).	Those "A Selected Ships" not in the Roll Call for reporting to Weather London through Portishead, in the Eastern North Atlantic, east of Long. 40° W should report to this station.	Radio Horta.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	"A Selected Ships" in the Eastern North Atlantic not on the roll call made through Portishead (described in these notes for Portishead) should report to Horta in accordance with schedule given in the instructions for British "A Selected Ships."
	Louisburg.	Lat. 46° 09' 16" N. Long. 59° 56' 48" W.	VAS	143 kc/s. (2100 metres).	143 kc/s. (2100 metres).	North Atlantic West of Longitude 40° W.	Weather Toronto.	Weather only, preferably No. 3 Supplementary Groups.	All British "A Selected Ships" within area when bound to or from Newfoundland and Canadian ports or ports to the northward to report through VAS at schedule times and observations for 0000 and 0600 G.M.T. as convenient.
	Chatham Mass. Amagansett (Montauk). Thomaston. Jupiter. Lake Worth.	Lat. 41° 43' N. Long. 70° 47' W. Lat. 41° 00' N. Long. 72° 03' W. Lat. 44° 01' N. Long. 69° 13' W. Lat. 26° 56' N. Long. 80° 06' W. Lat. 26° 38' N. Long. 80° 03' W.	WCC WSL WAG WMR WOE		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.	All British "A Selected Ships" within area when bound to or from United States ports or ports to the southward 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.

WIRELESS STATIONS DETAILED TO RECEIVE ROUTINE CODED WEATHER REPORTS FROM

"A SELECTED SHIPS."

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Frequency and Wavelength.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
Column No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.	No. 10.
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.	Only 0600 G.M.T. observation required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.
Red Sea and Indian Ocean.	Port Sudan.	Lat. 19° 36' 35" N. Long. 37° 13' 28" E.	STP	—	143 kc/s.† (2100 metres).	From Suez to Ras Fartak, Ras Hafun, and western limit of Colombo area.	Weather Khartoum.	Weather only. Four universal groups.	All British "A Selected Ships" within area should report in accordance with Schedule. † Alternatively see particulars on p. 67 and use wavelength and times for "B Selected Ships."
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55' 40" S. Long. 30° 58' 50" 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.	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. 9 Supplementary Groups.	See Section (35), p. 31 of the January 1938 number.
	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. 9 Supplementary Groups.	
	Colombo.	Lat. 6° 55' 14" N. Long. 79° 52' 46" E.	VPB	143 kc/s. (2100 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.	Weather.	Weather only. No. 6 Supplementary Groups preferred.	All British "A Selected Ships" within area should report in accordance with Schedule.
	Mombasa.	Lat. 4° 03' 11" S. Long. 39° 39' 49" E.	VPQ	—	125 kc/s. (2400 metres).	From Ras Hafun to Lat. 20° S. when westward of the Colombo area.	Weather Nairobi.	Weather only. No. 6 Supplementary Groups.	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. 90° and 135° E.; but not within 100 miles of the coast.	Weather Melbourne and Weather Perth.	Weather only. No. 9 Supplementary Groups.	All British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart, p. 29, of the January 1938 number.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12' 39" N. Long. 114° 15' 11" E.	VPS	8330 kc/s. (36 metres) or 500 kc/s. (600 metres).	143 kc/s.* (2100 metres).	China Sea and North Pacific to about 1,500 miles from station.	Royal Observatory	Weather only. No. 9 Supplementary Groups.	All British "A Selected Ships" within area should report in accordance with Schedule. * Alternatively see particulars on p. 68 and use wavelength and times for "B Selected Ships."
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 Melbourne and Weather Sydney.	Weather only. No. 9 Supplementary Groups.	All British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart, p. 29, of the January 1938 number.

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

In cases where routine weather reports made to CQ might not be received by the appropriate station within range, indicated in this list, they should be made to that station by call sign, but so that they may be readily intercepted by all ships. 600 m. is used throughout.

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
<i>Column No. 1.</i>	<i>No. 2.</i>	<i>No. 3.</i>	<i>No. 4.</i>	<i>No. 5.</i>	<i>No. 6.</i>	<i>No. 7.</i>
Norwegian Sea.	Wick.	Lat. 58° 26' 16" N. Long. 3° 05' 53" W.	GKR	Weather London.	Weather in four universal groups.	No roll call. British "B Selected Ships" should report at routine times when North of Lat. 60° N. and eastward of Long. 7° W., and when more than 20 miles from the coasts.
North Sea.	Humber.	Lat. 53° 19' 43" N. Long. 0° 16' 34" E.	GKZ	Weather London.	Weather in four universal groups, optional No. 3 Supplementary Groups.	No roll call. British "B Selected Ships" should report at routine times when more than 20 miles from the coasts.
North Atlantic.	Malin Head.	Lat. 55° 21' 45" N. Long. 7° 20' 30" W.	GMH	Weather London.	Weather in four universal groups, optional No. 3 Supplementary Groups.	Station will indicate at 0805 G.M.T. and when additional reports of 2100 G.M.T. observations are desired, at 2005 G.M.T., with ordinary traffic calls, the names of British "B Selected Ships" and other British ships within range and North of Lat. 54° N., and West of Long. 7° W., who are desired to report weather at routine times. Thus:—Call signs of ships to report weather through G.M.H. See Section (35), p. 31 of the January 1938 number. Station will indicate at 0825 G.M.T. and when additional reports of 2100 G.M.T. observations are desired, at 2025 G.M.T., with ordinary traffic calls, the names of British "B Selected Ships" and other British ships within range, South of Lat. 54° N., and to southward of Ireland West of Long. 7° W., who are desired to report weather at routine times. Thus:—Call signs of ships to report weather through G.C.K. See Section (35), p. 31 of the January 1938 number.
	Valentia.	Lat. 51° 55' 48" N. Long. 10° 20' 54" W.	GCK	Weather London.	Weather in four universal groups, optional No. 3 Supplementary Groups.	
	Belle Isle* St. John's N.F. Cape Race.	Lat. 51° 52' 54" N. Long. 55° 21' 41" W. Lat. 47° 34' 09" N. Long. 52° 41' 04" W. Lat. 46° 39' 25" N. Long. 53° 04' 15" W.	VCM VON VCE	Weather Toronto. Weather Toronto. Weather Toronto.	Weather only, (No. 3 Supplementary Group when convenient). Weather only, (No. 3 Supplementary Groups when convenient). Weather only, (No. 3 Supplementary Groups when convenient).	
North Atlantic and Mediterranean.	Gibraltar.	Lat. 36° 08' 32" N. Long. 5° 20' 29" W.	GYW	Meteor Gibraltar.	Weather in four universal groups only.	
Mediterranean.	Alexandria.	Lat. 31° 11' 53" N. Long. 29° 51' 46" E.	SUH	Meteor Heliopolis	Weather in four universal groups, optional Supplementary Groups.	
South Atlantic.	Salinas.	Lat. 0° 37' 00" S. Long. 47° 23' 00" W.	PPL	Meteoro Rio.	Weather only, including Supplementary Groups.	
	S. Luiz.	Lat. 2° 31' 28" S. Long. 44° 16' 30" W.	PXM			
	Fortaleza.	Lat. 3° 42' 49" S. Long. 38° 30' 56" W.	PPC			
	Natal.	Lat. 5° 45' 27" S. Long. 35° 11' 42" W.	PXN			
	Olinda.	Lat. 8° 00' 55" S. Long. 34° 50' 40" W.	PPO			

*For use during the season when Belle Isle route is open to navigation.

WIRELESS STATIONS DETAILED TO RECEIVE ROUTINE CODED WEATHER REPORTS FROM

“ B SELECTED SHIPS.”

(Continued.)

In cases where routine weather reports made to CQ might not be received by the appropriate station within range, indicated in this list, they should be made to that station by call sign, but so that they may be readily intercepted by all ships. 600 m. is used throughout.

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
Column No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.
South Atlantic (continued).	Amaralina. Abrolhos. Victoria. Rio. Santos. Florianopolis. Juncçao.	Lat. 13° 00' 50" S. Long. 38° 28' 27" W. Lat. 17° 57' 35" S. Long. 38° 42' 00" W. Lat. 20° 18' 52" S. Long. 40° 19' 06" W. Lat. 22° 59' 19" S. Long. 43° 11' 26" W. Lat. 23° 59' 22" S. Long. 46° 18' 18" W. Lat. 27° 35' 22" S. Long. 48° 34' 17" W. Lat. 32° 03' 22" S. Long. 52° 08' 13" W.	PPA PXH PPT PPR PPS PPF PPJ	Meteoro Rio.	Weather only, including supplementary groups.	
Red Sea and Indian Ocean.	Port Sudan.	Lat. 19° 36' 35" N. Long. 37° 13' 28" E.	STP	Weather Khartoum.	Weather only, 4 universal groups.	
Persian Gulf.	Basra.	Lat. 30° 32' 39" N. Long. 47° 47' 04" E.	YIB	Meteor. Basrah.	Weather only, 4 universal groups.	
Indian Ocean.	Jacobs (Durban). Algoa Bay (Port Elizabeth). Calcutta. Rangoon. Madras. Bombay. Karachi. Matara. Mombasa. Dar-es-Salaam. Mauritius. Geraldton. Esperance.	Lat. 29° 55' 40" S. Long. 30° 58' 50" E. Lat. 33° 57' 16" S. Long. 25° 35' 30" E. Lat. 22° 33' 31" N. Long. 88° 20' 16" E. Lat. 16° 45' 57" N. Long. 96° 11' 51" E. Lat. 12° 59' 17" N. Long. 80° 10' 56" E. Lat. 19° 04' 55" N. Long. 72° 49' 54" E. Lat. 24° 51' 05" N. Long. 67° 02' 32" E. Lat. 6° 01' 07" N. Long. 80° 35' 39" E. Lat. 4° 03' 11" S. Long. 39° 39' 49" E. Lat. 6° 50' 38" S. Long. 39° 17' 24" E. Lat. 20° 23' 41" S. Long. 57° 35' 25" E. Lat. 28° 47' 15" S. Long. 114° 36' 24" E. Lat. 33° 52' 40" S. Long. 121° 53' 34" E.	ZSD ZSQ VWC VTR VWM VWB VWK GZP VPQ ZBZ VRS VIN VIE	Met. Met. Weather. Weather. Weather. Weather. Weather. Weather. Weather. Weather Nairobi. Weather Nairobi. Observatory Mauritius. Weather Melbourne and Weather Perth	Weather only, 4 universal groups and first group of No. 6 Supplementary Groups. Weather only, 4 universal groups and first group of No. 6 Supplementary Groups. Weather only, preferably No. 9 Supplementary Groups. Weather only, 4 universal groups and first of No. 6 Supplementary Groups. Weather only, preferably No. 9 Supplementary Groups.	See Section (35), p. 31, of the January 1938 number. See Section (35), p. 31 of the January 1938 number. When east of Long 90° E., but not within 10 miles of the coast

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

(Continued.)

In cases where routine weather reports made to CQ might not be received by the appropriate station within range, indicated in this list, they should be made to that station by call sign, but so that they may be readily intercepted by all ships. 600 m. is used throughout.

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
Column No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.
Indian Ocean and China Sea.	Penaga (Penang). Paya Lebar (Singapore).	Lat. 5° 32' 02" N. Long. 100° 22' 51" E. Lat. 1° 20' 26" N. Long. 103° 53' 20" E.	VPX VPW	Obs. Weather Singapore.	Weather only, preferably No. 9 Supplementary Groups.	
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. 9 Supplementary Groups.	
South Pacific.	Auckland. Wellington. Awarua. Chatham Island. Rarotonga. Apia. Suva. Thursday I. Townsville. Brisbane. Melbourne. Adelaide.	Lat. 36° 50' 37" S. Long. 174° 46' 08" E. Lat. 41° 16' 26" S. Long. 174° 45' 55" E. Lat. 46° 30' 47" S. Long. 168° 22' 24" E. Lat. 43° 57' 28" S. Long. 176° 34' 25" W. Lat. 21° 11' 52" S. Long. 159° 48' 52" W. Lat. 13° 49' 46" S. Long. 171° 45' 20" W. Lat. 18° 08' 43" S. Long. 178° 27' 48" E. Lat. 10° 35' 14" S. Long. 142° 12' 37" E. Lat. 19° 16' 09" S. Long. 146° 49' 47" E. Lat. 27° 25' 34" S. Long. 153° 07' 19" E. Lat. 37° 46' 56" S. Long. 144° 52' 09" E. Lat. 34° 51' 14" S. Long. 138° 31' 55" E.	ZLD ZLW ZLB ZLC ZKR ZMA VRP VII VIT VIB VIM VIA	Weather Wellington. Weather Wellington. Weather Wellington. Weather Wellington. Weather Wellington. Weather Wellington. Weather Wellington. Weather Suva. Weather Melbourne and Weather Brisbane Weather Melbourne Weather Melbourne and Weather Adelaide	Weather only, preferably No. 9 Supplementary Groups. Weather in four universal groups, optional supplementary groups. Weather only, preferably No. 9 Supplementary Groups Weather only, preferably No. 9 Supplementary Groups. Weather only, preferably No. 9 Supplementary Groups. Weather only, preferably No. 9 Supplementary Groups. Weather only, preferably No. 9 Supplementary Groups.	See Section (35), p. 31 of the January 1938 number. When west of Long. 160° E., but not within 100 miles of the coast. When between Long. 90° E. and 160° E., but not within 100 miles of the coast.

II.—WIRELESS WEATHER SIGNALS.

Bulletins.

It is necessary to make careful distinction between wireless weather reports and weather forecasts.

A wireless weather report is a statement, in plain language or code, of the observed conditions prevailing at a place at a given time.

A weather forecast is a statement, usually in plain language, of weather which may be expected at a place or over an area in the near future.

For forecasts issued to shipping by wireless it is usual to publish full descriptions giving abbreviated names of areas with prescribed limits and the length of period; if such published description is not given, the place, or area and the period to which the forecasts apply are included in the message.

BRITISH ISLES.

Development of Weather Bulletins to aid Navigation.

The first weather bulletin for the British coasts broadcast to aid navigation was a message giving a forecast issued by the Admiralty at the end of the Great War.

In 1921 the principle of broadcasting weather reports of observations made at coast stations was first adopted by the Meteorological Office in a message made through Poldhu W/T station in Cornwall, entitled the "Western Seaboard" Message, which gave reports from five coast observing stations in code, and a forecast for the western coasts of the British Isles. A pamphlet was published entitled "Weather Forecasting in the Eastern North Atlantic and Home Waters for Seamen" which explained simply the modern methods of weather forecasting by the use of weather charts, and how to draw isobars.

After obtaining the views of many of the masters, mates and skippers of every type of vessel navigating the eastern North Atlantic, North Sea, and waters adjacent to the British Isles, the British Weather Shipping Bulletin was adopted and brought into use on 1st January, 1924.

At the International Conference on Safety of Life at Sea in 1929, this British Weather Shipping Bulletin was cited by foreign shipmasters as giving the weather information from the shore most desirable to aid navigation.

The station reports in the British Weather Shipping Bulletin, together with routine weather reports received or intercepted direct from Selected Ships, or with the reports broadcast in the Weather Shipping Bulletin of Germany or Sweden, afford the desirable information for constructing weather charts on board ships navigating these waters.

After the British Weather Shipping Bulletin had been in use for seven years, exhaustive enquiry was made, and the views and experience of a great many masters, mates, skippers, and others, in all types of vessels was again obtained, with the result that but for the addition of a Northern Area and modification of Districts therein, the Bulletin remained practically unaltered.

From time to time, the officers in some larger merchant ships have

advocated a more elaborate synoptic message; but so far as information goes the British Weather Shipping Bulletin, taken in conjunction with the W/T and R/T Gale Warnings, continues to meet the needs of the majority of shipping in Home Waters, and more particularly smaller vessels whose need of weather intelligence from the shore to promote safety of life at sea is greater.

For the purpose of weather forecasting at sea in the Eastern North Atlantic a suitable collective message for Noon G.M.T. observation is under consideration.

In September, 1935, the Admiralty adopted a Fleet Synoptic Message for the Home Station, which is compiled daily at the Meteorological Office, London, and made through the Admiralty W/T. stations at Cleethorpes and Gibraltar.

Full particulars are given in the Admiralty List of W/T Signals and Weekly Notices to Mariners, 5th March, 1938.

Throughout these pages, in the April, July and October numbers of THE MARINE OBSERVER for each maritime country, in geographical order where established, Weather Shipping Bulletins founded on the same principles as the British Weather Shipping Bulletin will be given; and where not available, such Bulletins as are the most appropriate for shipping.

Only the International Ships' Wireless Weather Telegraphy Code is given in THE MARINE OBSERVER.

Those who desire information of the more elaborate bulletins and synoptic messages which are issued for the use of meteorologists in their specialized work, and for aiding aerial navigation and so forth, are referred to the "Admiralty List of W/T Signals" which contains the most complete information of all W/T signals.

In short "Weather Signals" in THE MARINE OBSERVER is an endeavour to provide concise information of the signals which are generally most practical for the purposes of the merchant navy.

"Weather Shipping" Bulletin. Wireless Telegraphy (C.W.)

W/T Station, **Rugby**. Latitude 52° 21' 59" N. Longitude 1° 11' 12" W. Call Sign **G.B.R.**

Wavelength 18,750 metres C.W. (16 kc/s.).

W/T Station, **Greenford**. Latitude 51° 32' 02" N. Longitude 0° 21' 20" W. (Operated London—Air Ministry). Call Sign **G.F.A.** 4100 m. (73.17 kc/s.); 69.77 m. (4,300 kc/s.); 34.88 m. (8,600 kc/s.). Call Sign **G.F.N.** 43.0 m. (6,975 kc/s.) is used if one of the other short wave transmissions fail.

Times of transmission 0910 G.M.T. and 2133 G.M.T.

The message issued at 0910 G.M.T. contains 0700 G.M.T. observations. The message issued at 2133 G.M.T. contains 1800 G.M.T. observations.

During the time of S.O.S. lookout, from 0915 to 0918 G.M.T. there will be a pause in the transmission of the signal.

These messages are preceded by the words "Weather Shipping"

and consist of seven parts. Part II is in code, the remaining parts in plain language.

Part I is a brief general statement which will generally provide information of the atmospheric pressure systems which influence the weather in the region dealt with by this Bulletin.

Part II is a weather report in code giving actual observations at ten British coast stations and two foreign stations.

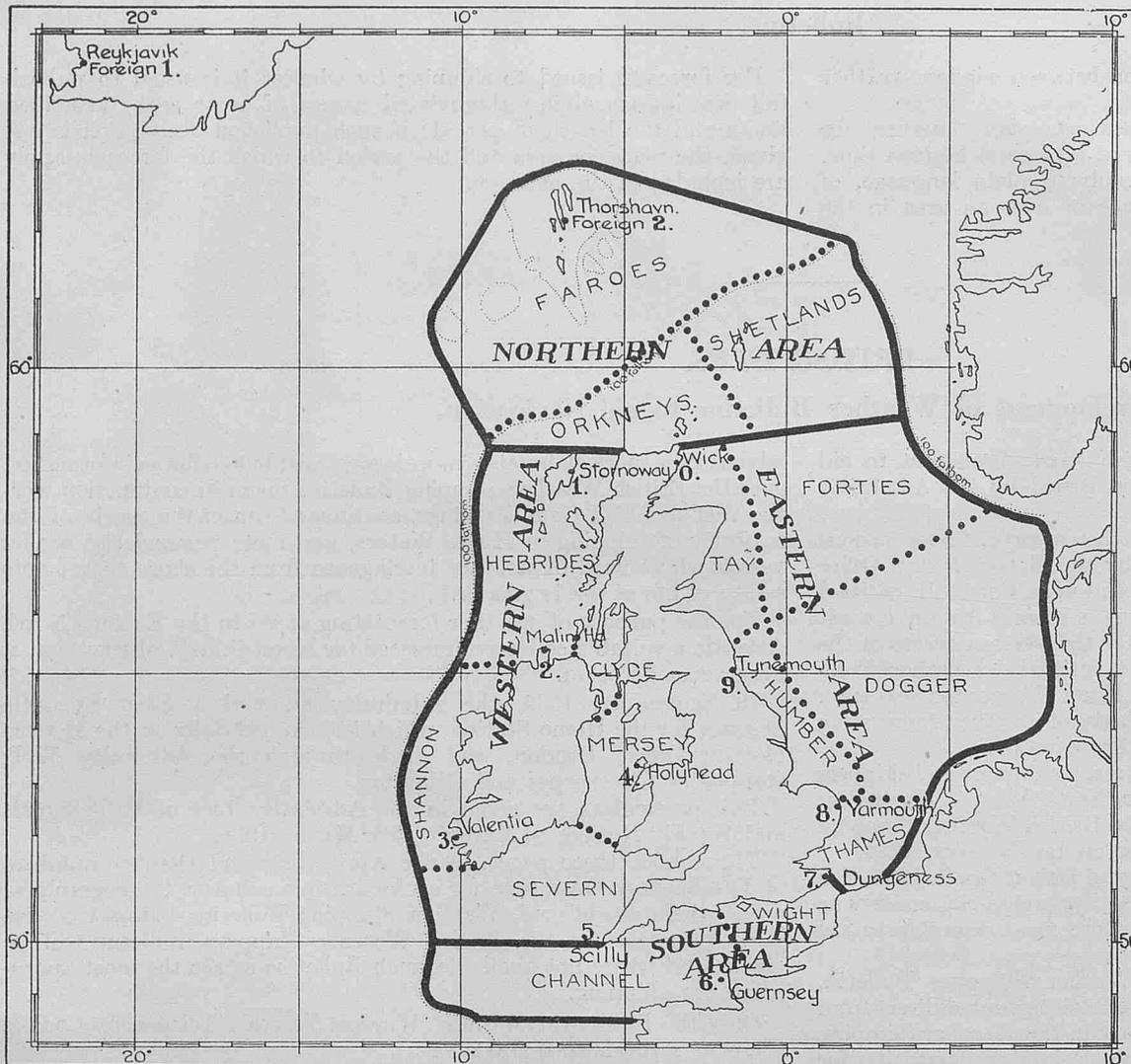
For full information for decoding see next page, also the Pamphlet, M.O. 329, "DECODE FOR USE WITH THE INTERNATIONAL CODE FOR WIRELESS WEATHER MESSAGES FROM SHIPS (Fifth Edition)," obtainable from H.M. Stationery Office, price 6d.

Parts III, IV, V and VI are forecasts of wind and visibility for the 12 hours following the time of shore observations for the areas shown upon the Chart on p. 70.

Part VII commencing "Outlook" is a brief general statement of weather expected after the period of the forecasts.

NOTE.—In order to avoid ambiguity between the words Ireland and Iceland the latter word is always repeated whenever it occurs in Part I.

Chart Showing Stations, Forecast Areas and Districts.



Explanation of Chart.

The numbers alongside the names of the stations indicate their code number (in the event of any station being substituted, the name of the substitute will be given in the message in place of this figure until such time as correction has been adequately made in Notices to Mariners and in THE MARINE OBSERVER).

The boundaries of the areas are defined by the plain black lines and the coast line.

These areas are sub-divided into districts, named after islands, rivers or banks within them, so that they may be readily memorised.

For instance the district in the neighbourhood of the Long Forties is termed "Forties."

The boundaries of these districts should only be taken as an approximate indication of their extent.

These districts are for the purpose of giving information of different weather within an area, without unduly lengthening the wording of a message. When similar weather is expected all over an area, these district names will not be used.

Description of Station Reports given in Part II of the Bulletin and Instructions for Decoding.

These reports only contain an identifying number of the stations from which they originate, and just those elements which are most essential for the purpose of the mariner, viz., the true direction of the wind, and its force, the barometer and how it has recently changed, the visibility to seaward, and the weather.

The observations are made at fixed times, viz., 0700 G.M.T. and 1800 G.M.T.

WESTERN AREA.

The sea and coasts eastward of the 100 fathom line from the latitude of Cape Wrath to Scilly.

DISTRICTS.

- HEBRIDES—That part of Western which lies N. and W. of Bloody Foreland, Rathlin I. and Islay.
- SHANNON—West coast of Ireland from Bloody Foreland to the Fastnet.
- SEVERN—South coast of Ireland Bristol Channel and approaches.
- MERSEY—The Irish Sea and approaches.
- CLYDE—The North Channel and approaches to Clyde.

SOUTHERN AREA.

The English Channel from S. Foreland to the 100 fathom line.

DISTRICTS.

- CHANNEL—West of St. Albans.
- WIGHT—East of St. Albans.

EASTERN AREA.

The North Sea southward of line Duncansby Head to Utsire, to the Straits of Dover.

DISTRICTS.

- THAMES—Thames estuary and its approaches.
- HUMBER—East coast from Haisborough to Longstone.
- TAY—East coast of Scotland, including Moray Firth.
- FORTIES—Eastward to 100 fathom line and N. of Longstone to Naze.
- DOGGER—Eastward to coast of Denmark and S. of line Longstone to Naze.

NORTHERN AREA.

Northward of latitude of Cape Wrath and of line Duncansby Head to Utsire, to the bank of soundings north of the Faroes in the west, and to north east extremity of the 100 fathom line in the east. Westward of the 100 fathom line to Bill Baileys Bank.

DISTRICTS.

- ORKNEYS—Orkneys and north-westward to the 100 fathom line.
- SHETLANDS—Shetlands and eastward to the 100 fathom line.
- FAROEES—That part of the Northern Area to the northward of the 100 fathom line.

Instructions for Decoding.

These reports are made by means of the code tables of the International Code for wireless weather messages from ships, in five figure groups which are paired, each pair of groups giving a complete report for a station.

To decode these stations' reports the tables given in M.O. 329 are required (DECODE FOR USE WITH THE INTERNATIONAL CODE FOR WIRELESS WEATHER MESSAGES FROM SHIPS (Fifth Edition), obtainable from H.M. Stationery Office, price 6d.).

The Key Letters of the International Ships Wireless Weather Telegraphy Code are fully described on page 37 of the January, 1938, number and in M.O. 329.

The following is a brief description of the Key Letters used for the station reports in this bulletin.

First Group of Pair :—I_NAPPV meaning :—

I_N = Station. British stations from 1 to 9 and 0, and foreign stations 1 and 2, prefixed by the word "foreign" (see Chartlet), also page 29 of M.O. 329 (Fifth Edition).

A = Barometric tendency.

PP = Barometric pressure.

V = Visibility. Caution is necessary in the use of these visibility reports owing to the conditions of view to seaward at some stations.

Second Group of Pair is arranged, in accordance with International agreement, similar to the third group of Selected Ships' reports, i.e.—D D F w w meaning :—

DD = Wind Direction. F = Wind force. w w = Weather.

In all cases when a figure cannot be given, a hyphen — is given to preserve the order.

Sample Message.

(28th December, 1930.)

Call Sign :—*CQ CQ CQ GBR GBR GBR (repeated twice).*

Weather Shipping.

General Statement.—Deep depression north of Faroes moving slowly northeast stop Intense depression north-west of Ireland will probably move east-north-east.

Station Reports,

10877 20301 28856 09360 30868 20402 47935 17760 57996
18902 66117 16401 75127 20602 85106 18502 96977 16360
00898 18601 Foreign 12847 08102 22726 22660

Forecast.

Western Area. Hebrides wind moderate to strong south easterly or variable visibility moderate to good Shannon wind south westerly veering fresh to strong visibility good Clyde Mersey Severn southerly gale visibility moderate to good.

Southern Area. Southerly gale whole gale at times visibility moderate to good.

Eastern Area. Visibility moderate to good stop Forties wind southwest strong to gale backing and moderating then increasing remainder Eastern Area wind southerly increasing to gale whole gale in places.

Northern Area. Visibility moderate to good stop Faroes Orkneys wind southwest to west strong to gale then moderating and veering northwest Shetlands wind southwest strong to gale probably backing and moderating then increasing.

Outlook strong winds or gales.

(I.C.W.)

Certain portions of the "Weather Shipping" Bulletin described above are broadcast by coast W/T stations on I.C.W. as follows :—

For the Western Area.

Valentia. Lat. 51° 56' N., Long. 10° 21' W. (approx.), call sign **GCK**, wavelength 600 metres I.C.W. At 0948 G.M.T. and 2048 G.M.T.
Seaforth. Lat. 53° 28' N., Long. 3° 01' W. (approx.), call sign **GLV**, wavelength 600 metres I.C.W. At 0930 G.M.T. and at 2030 G.M.T.

Commencing **Western Area** followed by ten groups of figures which indicate observations made at the five stations numbered 1 to 5 in the "Weather Shipping" Bulletin followed by the word **Forecast**, after which the 12-hour forecast for the Western Area will be given.

For the Southern Area.

Niton. Lat. 50° 35' N., Long. 1° 17' W. (approx.), call sign **GNI**, wavelength 600 metres I.C.W. At 0930 G.M.T. and at 2030 G.M.T.

Commencing **Southern Area** followed by six groups of figures which indicate observations made at the three stations numbered 5, 6 and 7 in the "Weather Shipping" Bulletin, followed by the word **Forecast**, after which the 12-hour forecast for the Southern Area is given.

For the Eastern Area.

Cullercoats. Lat. 55° 02' N., Long. 1° 26' W. (approx.), call sign **GCC**, wavelength 600 metres I.C.W. At 0948 G.M.T. and at 2048 G.M.T.

Commencing **Eastern Area**, followed by eight groups of figures which indicate observations made at the four stations numbered 7, 8, 9 and 0 in the "Weather Shipping" Bulletin, followed by the word **Forecast**, after which the 12-hour forecast for the Eastern Area is given.

Wireless Telephony (R/T).

For the information of small craft unable to receive the foregoing W/T signals, appropriate messages are broadcast by word of mouth, R/T from certain stations of the British Broadcasting Corporation.

During the forenoon, Parts I, III, IV, V, VI and VII of the British Weather Shipping Bulletin.

During the evening a forecast of weather for the regions near the coasts of the British Isles.

Details as to stations, wavelength and times are given in the "Radio Times" and the daily press.

Wireless Gale Warnings.

Wireless Telegraphy (I.C.W.).

Gale warnings are broadcast on a wave of 600 m. (500 kc/s), from the following W/T stations :—

Station.	Call Sign.	Lat. (approx.)	Long. (approx.)	Station.	Call Sign.	Lat. (approx.)	Long. (approx.)
Wick	GKR	58° 26' N.	3° 06' W.	Lands End	GLD	50° 07' N.	5° 40' W.
Humber	GKZ	53° 20' N.	0° 17' E.	Valentia	GCK	51° 56' N.	10° 21' W.
Niton	GNI	50° 35' N.	1° 17' W.	Malin Head	GMH	55° 22' N.	7° 20' W.

The warnings are broadcast from the station or stations appropriate to the area within which the gale is expected immediately upon receipt at the station, and also, when this time is outside the periods of single operator watch, at 18 minutes past the first hour within the next such period. The date and time of origin is given in each warning.

Warnings are preceded by the W/T safety signal **— — — (TTT)** repeated at short intervals three times on full power. The warning is broadcast one minute later.

Example—"Gale Warning Thursday 1230 G.M.T. Easterly Gale south of line Spurn head to Galway and in Dogger district."

Gale Warnings will only be broadcast when winds of gale force (force 8 of the Beaufort Scale) or above are expected; when a "whole gale" (force 10 or above) is expected this will be stated.

Wireless Telephony (R/T).

Gale Warnings are broadcast, as occasion demands, by word of mouth (R/T) on a wave length of 163.3 metres from the following stations, at 0330, 0930, 1530, and 2030 G.M.T.

All warnings are prefixed by the R/T Signal "Sécurité" and are broadcast first at conversational speed and then repeated at dictation speed.

Warnings are broadcast only from the station or stations nearest danger reported.

Station.	Call Sign.	Lat. (approx.)	Long. (approx.)	Area covered by Station.
Wick ...	GKR	58° 26' N.	3° 06' W.	Within a radius of 250 miles (from Vaternish Point, Skye, through north to Scarborough).
Humber ...	GKZ	53° 20' N.	0° 17' E.	Within a radius of 125 miles (from Blyth through east to North Foreland).
North Foreland	GNF	51° 22' N.	1° 25' E.	Within a radius of 125 miles (from Mablethorpe through south to the Needles).
Niton ...	GNI	50° 35' N.	1° 17' W.	Within a radius of 125 miles (from Harwich through south to the Eddystone).
Lands End	GLD	50° 07' N.	5° 40' W.	Within a radius of 125 miles (from Portland Bill through south and west to Fishguard).
Port Patrick	GPK	54° 51' N.	5° 07' W.	Within a radius of 200 miles (from Loch Ewe through west to Swansea).
Malin Head	GMH	55° 22' N.	7° 20' W.	Within a radius of 125 miles (from Neist Point, Skye, through west to Achill Head).
Valentia ...	GCK	51° 56' N.	10° 21' W.	Within a radius of 125 miles (from Achill Head through south to Waterford).

For the information of small craft unable to receive the foregoing Gale Warnings, these messages are broadcast by word of mouth, R/T, from certain of the British Broadcasting Corporation's stations immediately after the Time Signals or with the routine weather messages.

III.—Wireless Time Signals. Wireless Telegraphy (C.W.).

Rugby W/T Station, Lat. 52° 21' 59" N., Long. 1° 11' 12" W. call sign **GBR**, broadcasts Time Signals on a wavelength of 18,750 metres (C.W.) at 1000 and 1800 G.M.T. :—

System Used.—Modified rhythmic type as recommended by the International Time Commission of 1925, consisting of a series of 306 signals emitted in 300 seconds of Mean Time, the concluding signal being the exact hour.

In each series, Signals Nos. 1, 62, 123, 184, 245 and 306 are single dashes (—) of 0.4 sec. duration and commence at the exact minute. Each dash is followed by 60 dots (•) of 0.1 sec. duration.

The commencement of successive signals, whether dot or dash, are equally spaced at intervals of 60/61 parts of one second of Mean Time, *i.e.* :—

G.M.T.			Signal.
h.	m.	s.	
9 or 17	55	00	1st signal a dash (—) followed by 60 dots (•••• etc.).
„	56	00	62nd do. do. do.
„	57	00	123rd do. do. do.
„	58	00	184th do. do. do.
„	59	00	245th do. do. do.
10 or 18	00	00	306th signal, a dash (—).

This type of time signal will enable chronometer comparisons of extreme accuracy to be obtained, the method employed being to count the number of intervals from the first dash (—) until coincidence occurs between one of the rhythmic signals and the beat of the chronometer. (There being two such coincidences, 29½ or 30½ seconds apart, every minute.)

It is not necessary actually to count the signals.

Write down :—

(1) The chronometer time of the tick (whole or half second) immediately preceding the *first* dash.

(2) The chronometer times of coincidences (seconds only need be written down).

The difference between these (the "Elapse Time") increased by 0.5 sec. when it is not a whole number, gives the Rhythmic "Interval Number" from which the corresponding correction can be obtained.

NOTE.—An article entitled "Greenwich Time" describing how these signals are made, of great interest to navigators, will be found on pp. 159-167, Vol. V, No. 56.

Special Service by Payment.

Additional Wireless Telegraphic and Land Line Services which are performed for shipping, with charges.

The following list indicates the information which may be obtained on request, at any time, night or day.

Weather Forecasts.

Special weather forecasts can be made at the Meteorological Office for a period of 24 hours for areas within the region contained between the parallels of 70° N. and 35° N. and between the meridians of 12° W. and the coast of the Continent of Europe.

Procedure for Ships at Sea.—Request weather forecast through the nearest coast W/T station in Great Britain or Ireland, specifying required date and area, and giving ship's name.

Charge.—7s. 6d.

Procedure for Shipowners and Masters of Ships in port about to sail.—Telephone to Meteorological Office (Telephone No. Holborn 3434, Extension 174) or send **reply paid** telegram to Weather, Phone, London (allowing 10 to 20 words as necessary for reply), requesting weather forecast and specifying date and area for which required, and address to which to be sent.

Charges—None, if the information is required immediately and the reply paid telegram covers the telegraphic charges.

If the information is required for a specified day in advance, or for a number of days, a registration fee of 6d. per week (minimum fee 6d.) in addition to cost of telegrams. In this case application for the forecasts may be made by letter.

Procedure for Salvage Officers and others requiring warning of gales or winds from specified directions, or particular kinds of weather.—Write to the Meteorological Office, London, stating the position or locality and the warnings required, with the period.

Charge.—2s. 6d. for each message, plus telegraphic charges.

NOTE.—For Home waters the Areas and Districts used in the British "Weather Shipping" Bulletin may be used with advantage to indicate the localities for which forecasts are required.

Weather Reports.

Information of the actual local weather conditions prevailing at any of the following stations may be obtained :—

Aberdeen.	Hoylake.	Prawle Point.
*Bangor, Co. Down.	Inchkeith.	Southend.
Barry Island.	Kildonan.	Spurn Head.
Beachy Head.	Lizard.	†St. Ann's Head.
*Broughness.	Mersey Hb.	St. Catherine's Point
Cape Wrath.	*Mumbles.	*Stornoway.
†Dover Pier.	Needles.	*Torr Head.
Dunnet Head.	*Rame Head.	†Tynemouth.
*Holyhead.	†Portpatrick.	†Wick.

* These stations cannot give information about barometric pressure.

† Reports from these stations include information as to the state of the sea.

Procedure for Ships at Sea.—Request through nearest W/T coast station in Great Britain or Ireland, specifying the name of the station for which observed weather conditions are required.

Charge.—7s. 6d.

HOLLAND.

II.—Weather Shipping Bulletin.

Wireless Telephony (R/T).

Off Dutch Coast.

Scheveningen R/T Station, approximate Latitude 52° 06' N., Longitude 4° 16' E.

Call sign—**PCF**.

Wavelength—1205 m. R/T.

Times of transmission :—

	Winter.	Summer.
Weekdays	0850 and 1940 G.M.T.	0850 and 1925 G.M.T.
Sundays and Holidays	0910 and 1940 G.M.T.	0810 and 1925 G.M.T.

The message issued in the morning is based on 0700 G.M.T. observations.

The message issued in the evening is based on 1800 G.M.T. observations.

The messages are preceded by the words "Weerbericht voor de scheepvaart" and consist of four parts.

Part I, en clair (Dutch).

Brief description of change of pressure, visibility, wind, and weather.

Part II.

Weather report in code giving actual observations at the stations hereunder :—

List of Observation Stations.

Index Number.	Station.	Position (approx.)	
		Latitude N.	Longitude E.
1	Den Helder	52° 58'	4° 45'
2	Vlissingen	51° 26'	3° 34'
3	Terschellingerbank Lt. V.	53° 27'	4° 47'
4	Maas Lt. V.	52° 02'	3° 53'
5	Noord-Hinder Lt. V.	51° 38'	2° 34'

The key and code used is exactly the same as that used for the British "Weather Shipping" Bulletin, see page 70.

Part III, en clair (Dutch).

Forecast of visibility, wind, and weather, for 12 hours for the Dutch coast areas extending to about 30 miles off the coast :—

North (N. of Kamperduin), Middle (Kamperduin to Hook of Holland)
South (S. of Hook of Holland).

Part IV, en clair (Dutch).

Gale warnings for the Dutch coast divided when necessary into the areas given in Part III above.

Wireless Gale Warnings.

Wireless Telegraphy (I.C.W.).

North Sea.

Scheveningen W/T Station, Latitude 52° 06' N., Longitude 4° 16' E. (approx.), call sign **PCH**, makes gale warnings on receipt and following the end of the next compulsory 3 minutes' silence period, both in Dutch and English, and also at 1230 and 2030 G.M.T. Wavelength used is 600 metres (I.C.W.).

The warning commences with the letters "KNMI," and is transmitted first slowly, and then repeated quickly.

Wireless Telephony (R/T).

Scheveningen R/T Station, call sign **PCF**, makes gale warnings which form Part IV of the Dutch Weather Shipping Bulletin explained above.

IV.—Wireless Ice Warnings.

Wireless Telegraphy (I.C.W.).

Scheveningen W/T Station, call sign **PCH**, broadcasts, when necessary, information of ice conditions in certain Dutch harbours and approaches, daily as follows :—

At 1230 and 2030 G.M.T. after the Storm Warning (if issued). Wavelength 600 metres (I.C.W.).

The ice report is broadcast in a local code and will contain the ice conditions for the following harbours and in the following sequence :—

Delfzijl (Ems).	Helder (Zuider Zee).
Harlingen (Zuider Zee).	Rotterdam (Waterway).
Amsterdam (North Sea Canal).	Dordrecht (North).
Zaandam (Voorzaan).	Dordrecht (Mallegat).

The report commences with the words "Ijsbericht, Ice report."

The broadcast of the ice reports will begin when navigation is closed to small steamers and seagoing motor vessels at any of the harbours mentioned in the list, and will cease when navigation is re-opened.

GERMANY.

II.—Weather Shipping Bulletin.

Wireless Telegraphy (I.C.W.).

North Sea.

Norddeich W/T station approximate Latitude 53° 36' N., Longitude 7° 09' E.

Call sign—**DAN**.

Wavelength—677 m. I.C.W.

Times of Transmission—1020 and 2130 G.M.T.

The message issued at 1020 is based on 0700 G.M.T. observations. The message issued at 2130 is based on 1800 G.M.T. observations.

The messages are preceded by the words "Seewetter Nordsee" and consist of two parts.

Part I is a weather report in code giving actual observations at the stations hereunder.

Station No.	German Station.	Position.	Station No.	Foreign Station.	Position.
0	Borkum Riff Lt.-V.	53° 46' N., 6° 04' E.	0	Helder ...	52° 58' N., 4° 45' E.
1	Heligoland ...	54° 11' N., 7° 54' E.	1	Hanstholm ...	57° 05' N., 8° 35' E.
2	Elbe Lt.-V. No. 1 ...	54° 01' N., 8° 13' E.	2	Krakenes ...	62° 02' N., 4° 59' E.
3	Amrum Bank Lt.-V.	54° 33' N., 7° 53' E.	3	Aberdeen ...	57° 10' N., 2° 06' W.

The foreign stations' observations are preceded by the word 'Ausland' (Foreign). The Key and Code used is exactly the same as that used for the British "Weather Shipping" Bulletin see page 70.

Part II contains a brief statement of weather conditions followed by a forecast for the following 24 hours in German, covering the whole sea area off East and North Frisian coasts including Ostfriesland (between Borkum Riff Lt.-V., Elbe entrance and Heligoland) and Nordfriesland (Elbe entrance northward to Ellenbogen, Sylt).

Western, Middle, and Eastern Baltic.

Rügen W/T Station, approximate Latitude 54° 35' N., Longitude 13° 37' E.

Call sign—**DAS**.

Wavelength—636 m. I.C.W.

Times of transmission—1030 and 2150 G.M.T.

The message issued at 1030 G.M.T. is based on 0700 G.M.T. observations. The message issued at 2150 G.M.T. is based on 1800 G.M.T. observations.

The messages are preceded by the words "Seewetter Rügen" and consist of two parts.

Part I is a weather report in code giving actual observations at the stations hereunder.

Station No.	German Station.	Position.	Station No.	Foreign Station.	Position.
4	Bulk ...	54° 27' N., 10° 12' E.	4	Skagen ...	57° 44' N., 10° 38' E.
5	Fehmarnbelt Lt.-V.	54° 36' N., 11° 09' E.	5	Copenhagen ...	55° 42' N., 12° 37' E.
6	Aldergrund Lt.-V.	54° 50' N., 14° 22' E.	6	Visby ...	57° 39' N., 18° 18' E.
7	Arkona ...	54° 41' N., 13° 26' E.	7	Memel ...	55° 42' N., 21° 10' E.
8	Leba ...	54° 46' N., 17° 33' E.			
9	Brusterort ...	54° 58' N., 19° 59' E.			

The foreign stations' observations are preceded by the word "Ausland" (Foreign).

Key and Code as above.

Part II contains a brief statement of weather conditions followed by a forecast for the following 24 hours in German.

Wireless Gale Warnings.

Gale Warnings are broadcast in German, preceded by the word "Funksturm," giving the nature of the atmospheric distribution with

direction and force of wind for the regions specified by the stations indicated below.

W/T Station	Call Sign.	Position.		Wavelength.	Time of Transmission.	Region.
		Latitude N.	Longitude E.			
Norddeich	DAN	53°36'	7°09'	600 m. I.C.W. 677 m. I.C.W.	On receipt, repeated immediately after next silent period At any two of the following times:— 0520, 1020* 1630, 2130*	North Sea.
Rügen	DAS	54°35'	13°37'	600 m. I.C.W. 636 m. I.C.W.	On receipt, repeated immediately after next silent interval At any two of the following times:— 0530, 1030* 1650, 2150*	Baltic Sea.

* After Weather Bulletin.

IV.—Wireless Ice Warnings. C.W. and I.C.W.

Norddeich W/T Station, call sign **DAN**, broadcasts, when necessary, except Sundays, information of ice conditions along the German coasts in the North Sea and Baltic in a local code.

The message is transmitted at 0950 G.M.T. on a wavelength of 2400 m. C.W.

Rügen W/T Station, call sign **DAS**, broadcasts ice warnings similar to above at 1030 G.M.T. on a wavelength of 636 m. I.C.W.

SWEDEN.

II.—Weather Shipping Bulletin. Wireless Telegraphy (C.W.). North Sea and Baltic.

Karlsborg W/T Station, approximate Latitude 58° 29' N., Longitude 14° 29' E.

Call sign—**SAV**.

Wavelength—6000 m. C.W.

Times of transmission—1050 and 2230 G.M.T.

The message issued at 1050 is based on 0700 G.M.T. observations.

The message issued at 2230 is based on 1800 G.M.T. observations.

The messages are preceded by the words "Weather Report" and consist of four parts.

Part I is a weather report in code giving actual observations at the stations hereunder:—

List of Observation Stations.

Index Number.	Station.	Position (approx.)	
		Latitude N.	Longitude E.
1	Kalmar	56°39'	16°22'
2	Bjurö klubb	64°28'	21°34'
3	Holmögadd	63°35'	20°45'
4	Bremö	62°13'	17°44'
5	Örskär	60°31'	18°22'
6	Sandhamn	59°17'	18°55'

List of Observation Stations (continued).

Index Number.	Station.	Position (approx.)	
		Latitude N.	Longitude E.
7	Visby	57°39'	18°18'
8	Skånör	55°24'	12°49'
9	Kullen	56°18'	12°27'
0	Vinga	57°38'	11°36'
1	Hammershus	55°19'	14°47'
2	Hanstholm	57°07'	8°36'
3	Utsira	59°18'	4°53'
4	Kråkenes	62°02'	4°59'

The key and code used is exactly the same as that used for the British "Weather Shipping" Bulletin, see page 70.

Part II, en clair (English).

A statement of weather conditions in N. and N.W. Europe and adjacent seas.

Part III, en clair (English).

Weather forecasts for 12 hours for the following areas:—

- 1 Eastern part of the North Sea (E. of Longitude 5° E.).
 - 2 Sweden, West Coast (Skagerrak, Kattegat and the Sound).
 - 3 Baltic (Southern Baltic; South Skane, Bleking and Öland; Northern Baltic; East Gotland, Svealand and Gotland).
 - 4 Bothnia Sea
 - 5 Bothnia Bay
- } Gulf of Bothnia.

Part IV, en clair (English).

Gale warnings for areas 2, 3, 4 and 5 (above), particulars as follows.

Wireless Gale Warnings. Baltic.

Karlsborg W/T station broadcasts warnings, *en clair*, English, of gales for the areas 2, 3, 4 and 5 given in Part III of the Swedish Weather Shipping Bulletin.

The warnings commence with the words "Gale Warnings" and are valid for the ensuing 24 hours. They form Part IV of the weather bulletins broadcast by **Karlsborg W/T** at 1050 and 2230 G.M.T., previously explained.

IV.—Wireless Ice Warnings. Swedish Ice Breaker.

Wireless Telegraphy (C.W. and I.C.W.) and Telephony (R/T).

The Swedish Government ice breakers broadcast information in **English** on a wavelength of 600 metres, giving their position, proposed area for ice breaking, and rendering assistance during the ensuing 12 hours. Important local information for mariners will also be broadcast.

The messages are broadcast daily, during the time the vessels are employed on ice-breaking service.

The message will be repeated by wireless telephony on a wavelength of 600 metres R/T, in Swedish and English immediately after the transmission on I.C.W. The repetition will be preceded by the words "Fran svenska statens isbrytarfartyg" (from the Swedish State ice breaking vessel).

Ice breaker "Ymer," call sign **SBPN**, at 0800 and 1045 G.M.T. on weekdays and 1210 G.M.T. on Sundays and holidays.

Ice breaker "Atle," call sign **SBLN**, at 0815 and 1100 G.M.T. on weekdays and 1225 G.M.T. on Sundays and holidays.

NORWAY.

II.—Wireless Gale Warnings.

Wireless Telegraphy (I.C.W.) and Telephony (R/T).

The following stations broadcast gale warnings for the coast of Norway.

Station.	Call Sign.	Position.		Wavelength.	Times of transmission G.M.T.	Region.
		Latitude N.	Longitude E.			
Flekkeroy	LGY	58°04'	8°00'	600m. C.W.	On receipt and at 1025, 1620, 2120	Coast in vicinity of Kristiansand. Lindesnes to Helligsø Lt. Ho.
Utsira ...	LGK	59°18'	4°55'	600m. I.C.W.* 600m. R/T	Following the first silent period after receipt and at 1000, 1600 2100	
Ålesund ...	LGA	62°28'	6°10'	600m. I.C.W.	1205	
Röst ... (1st Dec. to 30th Apr.)	LGR	67°30'	12°05'	600m. R/T	1200 Weekdays	Fjordane, Møre, Trøndelag, Viking Bank, Shetlands, Faero Is, Tampen, Storegga, Frøya Bank and Halten Bank. Lofoten, Helgeland, Salten.

* In English.

DENMARK.

IV.—Wireless Ice Warnings.

Wireless Telegraphy (I.C.W.)

Danish Waterways.

The following W/T stations broadcast a summary of ice conditions in Danish waterways, *en clair* (English). Wavelength 600 metres, I.C.W.

Blaavand W/T station, approximate Latitude 55° 33' N., Longitude 8° 05' E., call sign **AXB**, at 0100 and 1300 G.M.T.

Copenhagen W/T station, approximate Latitude 55° 41' N., Longitude 12° 37' E., call sign **AXA**, at 1100 and 2300 G.M.T.

LATVIA.

IV.—Wireless Ice Warnings.

Wireless Telephony (R/T).

The broadcasting station at Riga, Latitude 56° 57' N., Longitude 24° 02' E., call sign **YLZ**, broadcasts in winter on a wavelength of 238.5 metres R/T, ice reports at 0650, 1035 and 2000 G.M.T. The reports contain information concerning ice and navigation conditions for the Latvian coast. They are broadcast in the Latvian, ENGLISH and German languages.

ESTONIA.

IV.—Wireless Ice Warnings.

Wireless Telegraphy (C.W.)

Tallinn W/T Station, approximate Latitude 58° 56' N., Longitude 23° 32' E., call sign **ESA**, broadcasts, on the first appearance of ice, information of ice conditions in Estonian waters in a local code.

The message is transmitted at 0940 G.M.T. on a wavelength of 3508m. C.W.

FINLAND.

II.—Wireless Gale Warnings.

Wireless Telegraphy (I.C.W.) and Telephony (R/T).

The following stations broadcast Gale Warnings when necessary *en clair*, in **English**, at the times and wavelengths given below, the message commencing with the International Safety Signal "TTT Gale Warning."

Station.	Call Sign.	Position.		Wavelength.	Times of Transmission G.M.T.
		Latitude N.	Longitude E.		
Viipuri (Viborg)	OHP	60° 43'	28° 45'	600m. I.C.W.	1230 and 2030
Hanko (Hangö)	OHN	59° 50'	22° 56'	142.2m. R/T	1205 and 1750
Vaasa	OHX	63° 07'	21° 37'	90m. R/T	1220 and 1755

Example of message—"TTT Gale Warning. Southwest gale expected up to about next morning between Aland and Helsinki."

IV.—Wireless Ice Warnings.

Wireless Telegraphy (C.W.)

Helsinki-Helsingfors W/T Station, approximate Latitude 60° 09' N., Longitude 25° 02' E., call sign **OHA**, broadcasts, when necessary, information of ice conditions for the coasts of Finland in a local code.

The messages are transmitted at 1030 and 1410 G.M.T. on a wavelength of 3750m. C.W.

FRANCE.

II.—Wireless Gale Warnings.

Wireless Telegraphy.

The following W/T stations broadcast gale warnings concerning the areas "Manche," "Bretagne," "Océan," and "Gascogne":—

Cherbourg-Rouges Terres ...	Approximate Latitude 49° 37' N., Longitude 1° 36' W., call sign FUC .
Brest-Mengam ...	Approximate Latitude 48° 21' N., Longitude 4° 35' W., call sign FUE .
Lorient-Pen-Mané	Approximate Latitude 47° 44' N., Longitude 3° 21' W., call sign FUN .
Rochefort-Soubise	Approximate Latitude 45° 56' N., Longitude 0° 59' W., call sign FES .

The following W/T stations broadcast storm warnings concerning the areas "Roussillon," "Provence," "Rhône," and "Corse":—

Toulon-Mourillon	Approximate Latitude 43° 07' N., Longitude 5° 55' E., call sign FUT .
Ajaccio-Aspretto	Approximate Latitude 41° 56' N., Longitude 8° 46' E., call sign FUI .

The W/T stations transmit the warning on the 600 metre wavelength as soon as it is received. The International Safety Signal — — (TTT) is first sent out, followed by D.E. and station call sign. This transmission commences towards the end of one of the international three-minute silent periods and the nature of the warning is sent immediately after the end of the silent period. The message is repeated after several minutes.

When the time of sending falls outside a single operator watch on board ship the message is repeated at the commencement of the succeeding watch.

(C.W.)

Eiffel Tower W/T Station, approximate Latitude 48° 51' N., Longitude 2° 18' E., call sign **FLE**, broadcasts wireless gale warnings on a wavelength of 7,200 m. C.W.

The warnings are broadcast if the forecasts indicate that the wind force is likely to exceed 7 on the Beaufort scale.

The signals refer to the following French coastal areas :—

Manche, Bretagne, Océan, Gascogne, Roussillon, Rhône, Provence, Corse.

The limits of the areas mentioned above are as follows :—

"Manche"	...	Belgian frontier to and including Carteret.
"Bretagne"	...	From and including Cherbourg to estuary of Loire.
"Océan"	...	From and including Lorient to the Gironde.
"Gascogne"	...	From and including Ile de Ré to Spanish frontier.
"Roussillon"	...	From Spanish frontier to and including Cette.
"Rhône"	...	From and including Cette to Camarat.
"Provence"	...	From and including Camarat to Italian frontier.
"Corse"	...	All the coasts of Corsica.

Form of Message.

The warnings are sent *en clair* in French, and are valid for 24 hours from the time indicated in the message.

They commence with the name of the day of the week, the time from which the validity of the warning is reckoned, the name of area threatened followed by the word "Tempête" and the probable direction from which the gale may be expected.

Example.

"Jeudi 15 heures Manche tempête, Nord-Ouest (N.W.)."

Explanation.

From Tuesday until 1500 to-morrow a gale (Force 7 or over Beaufort) and from a direction between North and West will threaten all parts of the coast between the Belgian frontier and Carteret.

PORTUGAL.

II.—Wireless Weather Bulletins.

Wireless Telegraphy (I.C.W.) and Telephony (R/T.)
Containing meteorological conditions at Madeira and Azores.

Monsanto W/T Station, approximate Latitude 38° 44' N., Longitude 9° 11' W., call sign **CTV**, broadcasts a meteorological report *en clair*, in Portuguese and English at 1130 and 2300 G.M.T. on a wavelength of 760 metres (I.C.W.) and at 1155 and 2325 G.M.T. on a wavelength of 760 metres (R/T), giving :—

A brief statement of weather conditions followed by observations of barometric pressure in millibars wind and swell, also a forecast for the next 24 hours of wind and swell for the coast of Portugal. The coast is divided as follows :—

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

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

MOROCCO.

II.—Wireless Gale Warnings.

Wireless Telegraphy (Spark).

Casablanca—Médiounah W/T Station, approximate Latitude 33° 27' N., Longitude 7° 31' W., call sign **CNM**, broadcasts gale warnings at 1530 G.M.T. on 600 m. spark. They are broadcast *en clair* in French and repeated at the commencement of the following watch for single operators. The area affected is given in the message.

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

AZORES.

II.—Wireless Weather Bulletin.

Wireless Telegraphy (C.W. and I.C.W.).

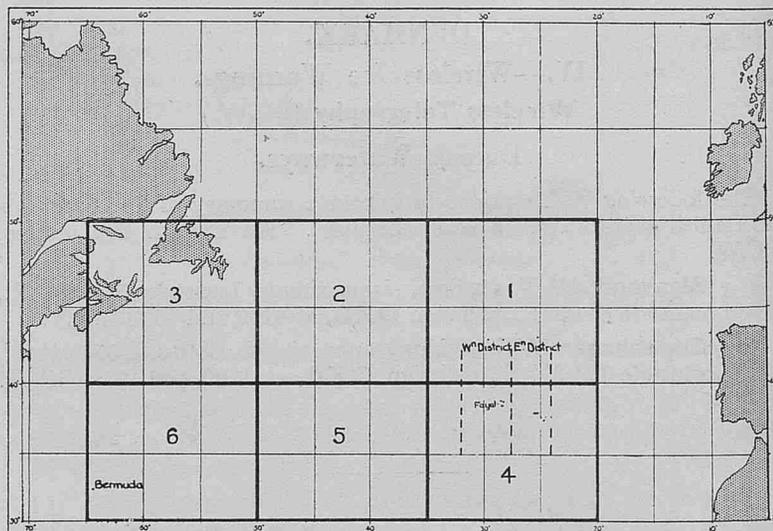
Horta W/T Station, Latitude 38° 32' N., Longitude 28° 38' W. (approx.), call signs :—

CTH, Wavelength 770 m. I.C.W. Times of transmission 2000 and 2030 G.M.T.

CTG, Wavelength 2400 m. C.W. Time of Transmission 1745 G.M.T.

A general statement of weather and a 24 hours' Forecast for the Zones 1 to 6 and the Azores, based on 1300 G.M.T. observations and weather conditions at Bermuda and Fayal, are sent *en clair* in English.

The zones referred to are indicated in the chart below.



PERSONNEL.

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

APPOINTMENT.

Commander G. D. Williams, D.S.O., R.D., R.N.R., Vice-President of the Maritime Services Board since its formation in 1936, has been appointed President of the Board in succession to Mr. E. W. AUSTIN, by the New South Wales Government.

Commander WILLIAMS who was for some years Merchant Navy Agent to the Meteorological Office at Sydney has had an interesting career, a summary of which may be found in No. 122, Vol. XIII of this Journal.

J. H.

RETIREMENTS.

Captain A. W. McKellar, R.D., R.N.R., has retired from the service of the New Zealand Shipping Company after over 50 years with the firm.

ARTHUR WILLSON MCKELLAR was born in Christchurch, New Zealand. He first went to sea as an apprentice in the sailing ships under the well-known New Zealand Shipping Company's house flag.

In 1892, after six years in sail, as apprentice, 3rd mate, and 2nd mate, he was transferred to the Company's steamer *Kaikoura* as a junior officer. By 1895 he was 2nd officer and was chief officer in 1898. As an R.N.R. officer he did a long course of training in the Royal Navy, including 12 months' sea service, in 1899-1900.

Captain MCKELLAR obtained his first command in 1904. After one voyage in each of the ships *Paparoa*, *Tongariro* and *Kaipara*, he was 10 years (1906-1916) in the *Kaikoura*, and 13 years (1916-1929) in the *Ruapehu*.

In 1929 he was appointed to command of the Company's new motor vessel *Rangitane* and remained in her until he retired in February this year.

For many years the names of the ships under Captain MCKELLAR'S command have appeared in the Voluntary Observing Fleet List.

C. H. W.

Captain F. W. L. Midgley, commander of the S.S. *Yorkshire* and Commodore of the Bibby Line fleet has retired from the sea.

Commencing his sea career at the age of 17 he served in the sailing ships *Alcedo* and *Ladakh*. On obtaining his Master's Certificate he transferred to steam and spent three years in the coast service of the Pacific Steam Navigation Company before joining the Bibby Line in 1903.

Since obtaining command in 1917 Captain MIDGLEY has had charge of several units in the Bibby Lines fleet, and served in his last ship the *Yorkshire* for ten years.

J. H.

Commander Arnold O. Morgan, R.D., R.N.R., Rtd., has retired from the service of the Union Castle Line.

Captain A. O. MORGAN first went to sea in 1889 in the sailing ship *Swanmore*, owned by Messrs. Meyers & Co.

He finished his time in the same Company's *Damson Hill* and was then 3rd Mate of that ship until 1896. From then until 1899 he was with Messrs. Elder Dempster & Co.

In 1899 he joined the service of the Union Steamship Co. as 4th Officer of the S.S. *Trojan*, a transport in the South African War. He was promoted through the various ranks in the passenger ships of the Company and was Chief Officer of the *Goorkha* at the outbreak of war in 1914.

As an officer in the Royal Naval Reserve Captain MORGAN served with the Royal Navy throughout the war and until December, 1919, when he returned to the Union Castle Line and received his first command in the Company that year in S.S. *Hunts Castle*. Since then he has commanded many of the Company's ships, including the *Crawford Castle*, *Ripley Castle*, *Dunluce Castle*, *Llandoverly Castle*, *Garth Castle*, *Edinburgh Castle*, *Armada Castle* and *Stirling Castle*, all of which named vessels were in the Fleet List of Voluntary Observing Ships.

C. H. W.

Commodore R. V. Peel, R.D., R.N.R., commander of the R.M.S. *Queen Mary* and Commodore of the Cunard White Star Line, has retired from active service afloat.

Commodore PEEL received his early training in the school ship *Conway*, a vessel his grandfather had commanded when H.M.S. *Nile*, a ship-of-the-line.

On leaving the *Conway* a Queen's Medallist, he served his apprenticeship in the four-masted barque *Fannie Kerr* and then joined the P. & O. Line as a junior officer. After obtaining his master's certificate, he transferred to the Cunard Line in 1900, and was appointed to his first command, the *Lycia*, in 1913.

At the outbreak of war Captain PEEL was serving as Staff Captain of the *Aquitania*, and when this ship was taken over by the Admiralty he remained in her. Since the war he has commanded many of the great Atlantic liners, including the *Mauwretania*, *Olympic*, *Berengaria* and *Queen Mary*.

Captain PEEL was promoted to the rank of Commodore Royal Naval Reserve in 1933 and made Commodore of the Cunard White Star Line in 1936.

J. H.

Captain B. M. Stone, commander of the London & North Eastern Railway Company's R.M.S. *Amsterdam* has retired after 50 years' sea service, of which 46 years were spent in coastal waters.

On commencing his sea career Captain STONE served for some time in coastal schooners before sailing in Devitt and Moores well-known ship *Macquarie* on Australian voyages.

In 1894 he returned to the coasting trade, joining the then Great Eastern Railway Steamship Service in which he rose to command in 1919. In 1928 he was appointed to a mail and passenger ship on the Harwich-Hook of Holland route and continued on this run up to the time of his retirement.

J. H.

OBITUARY.

WITH deep regret we record the following :—

Captain S. N. Braithwaite, M.B.E., who as recently as 31st December last retired from the post of Marine Superintendent and Commercial Assistant to Royal Mail Lines, Ltd., at Southampton, died at his home at Ashurst on 16th February.

Captain BRAITHWAITE served his apprenticeship in the ship *Thirlmere* and later served in the Bucknall Line and in the cable-ship *Dacia* before joining the R.M.S.P. Company in 1899 as a 5th Officer.

Rising through the different grades he attained command in 1914 his first ship being the *Teviot*. When commanding the troopship

Cardiganshire he was present at the Gallipoli landing, was mentioned in despatches, and awarded the M.B.E.

In 1917 the R.M.S.P. Company appointed him to the post of Marine Superintendent at Southampton, since when he has been a member of the Southampton Harbour Board, a director of the Southampton Chamber of Commerce, deputy-chairman of the Standing Committee for the Dock Labour Employers' Association and up to the time of his death was chairman of the Sub-Commissioners of Pilotage for the Isle of Wight district.

J. H.

THE STATE OF TEXAS,
COUNTY OF _____

Know all men by these presents, that _____

do hereby certify that _____

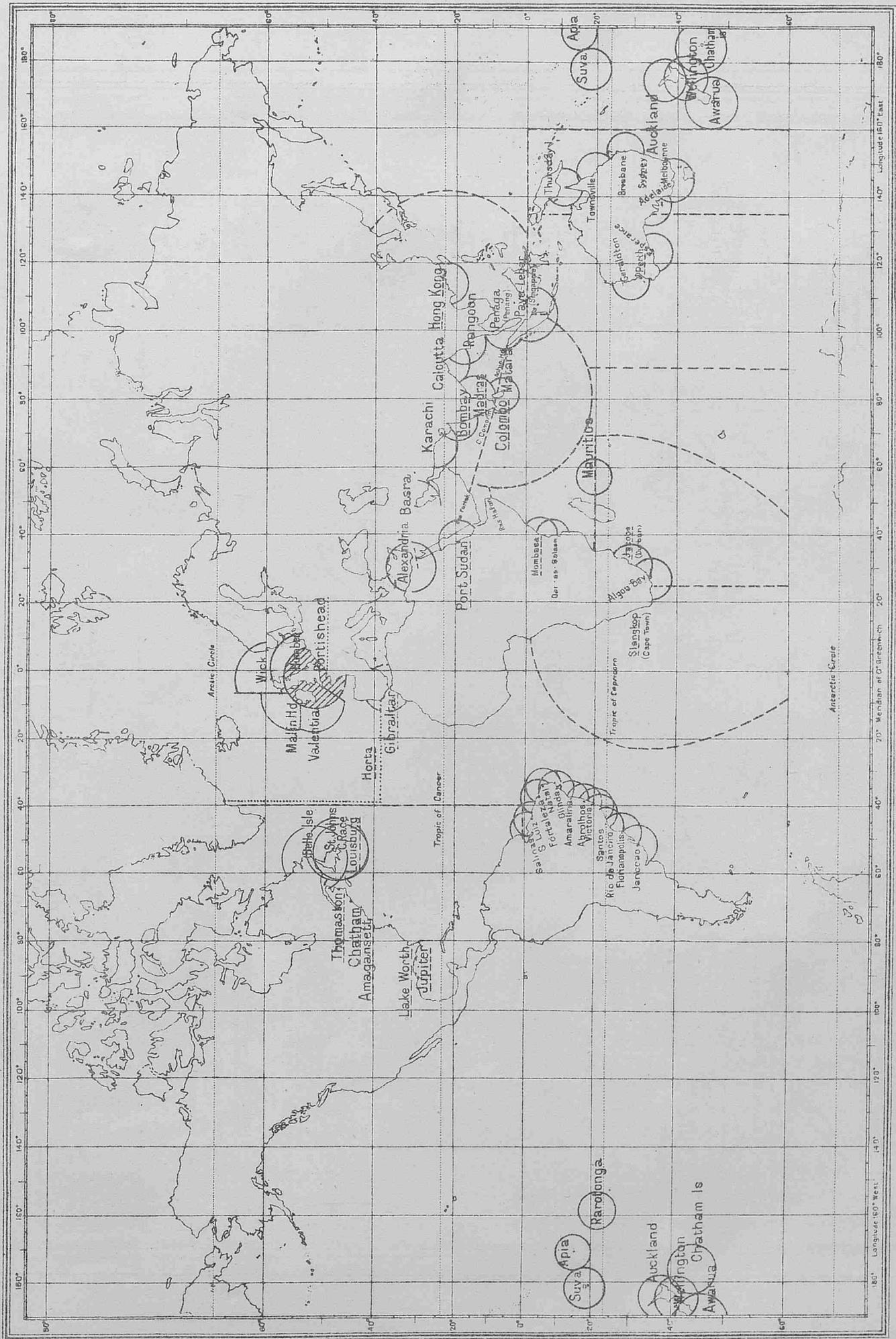
is the true and correct copy of _____

as the same appears from the _____

records of the _____

SHIPS' WIRELESS WEATHER SIGNALS. CHART OF THE WORLD.

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 Fortishead

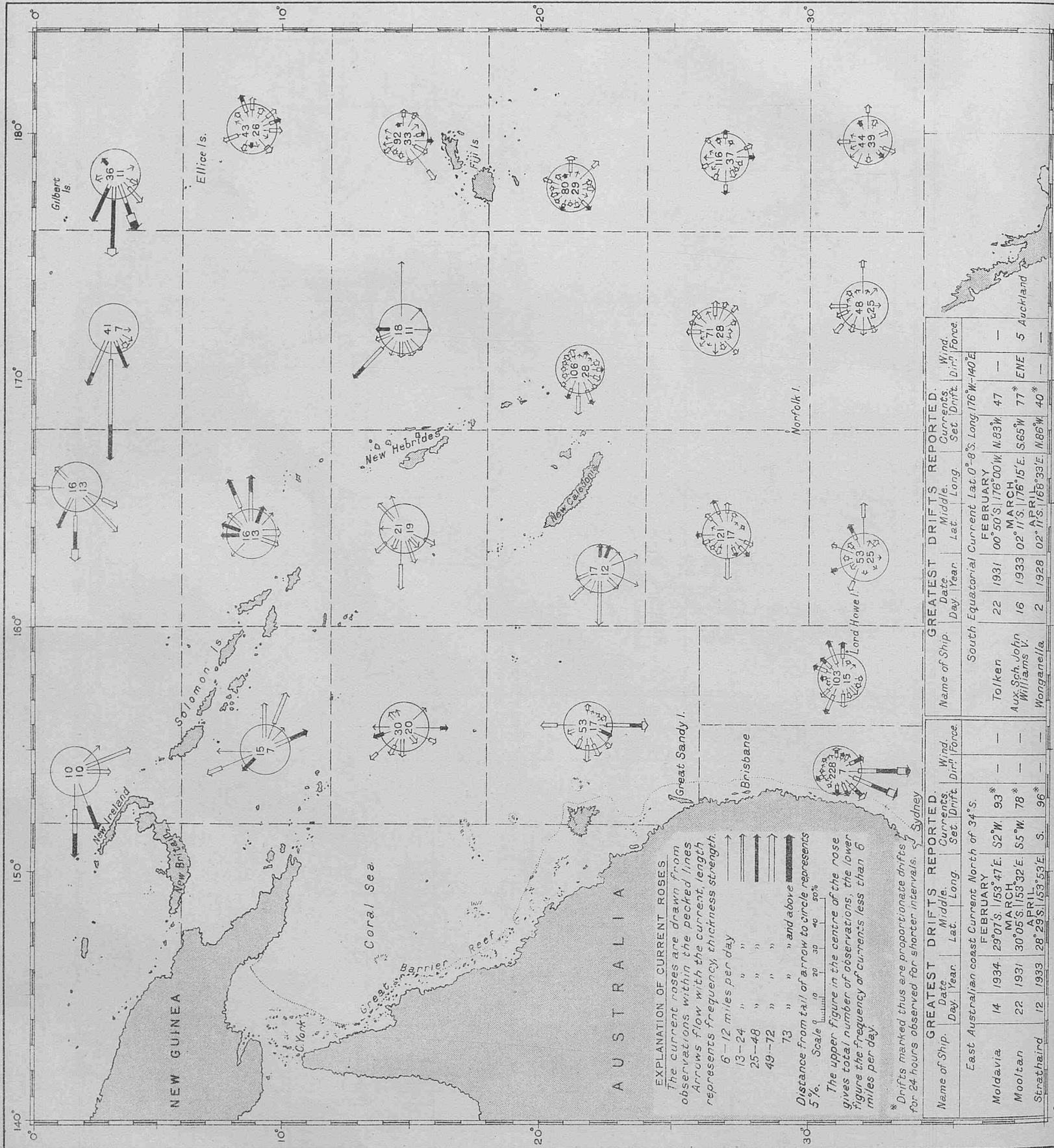
A pecked line indicates the reporting area round stations in other countries to which British A Selected Ships should report. The names of such stations being underlined with a pecked line

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.

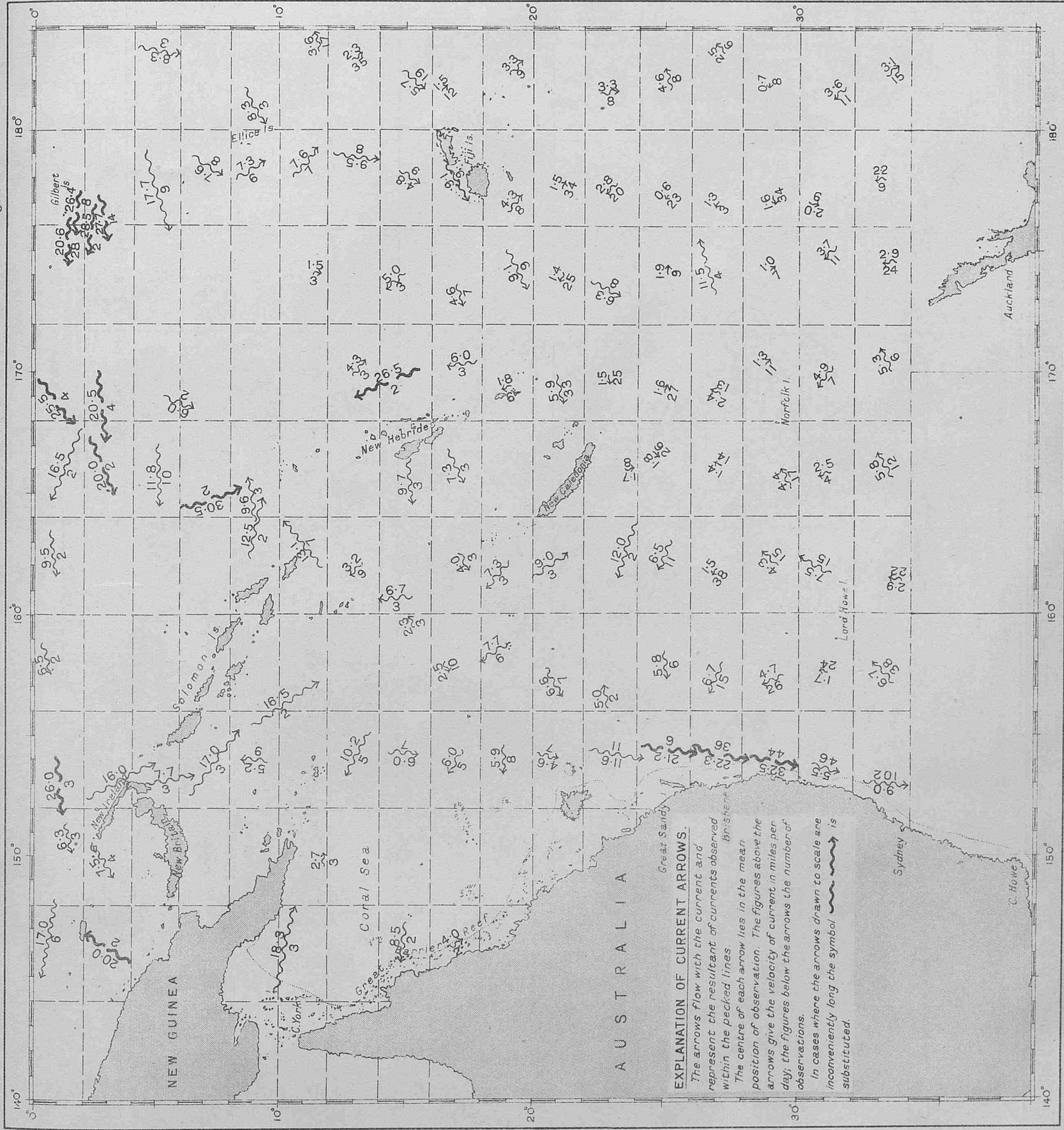


CURRENTS IN THE WESTERN PORTION OF THE SOUTH PACIFIC. North of Latitude 34° S.
 FEBRUARY MARCH and APRIL. Observations of ships regularly observing for the British Meteorological Office, 1910-1937.



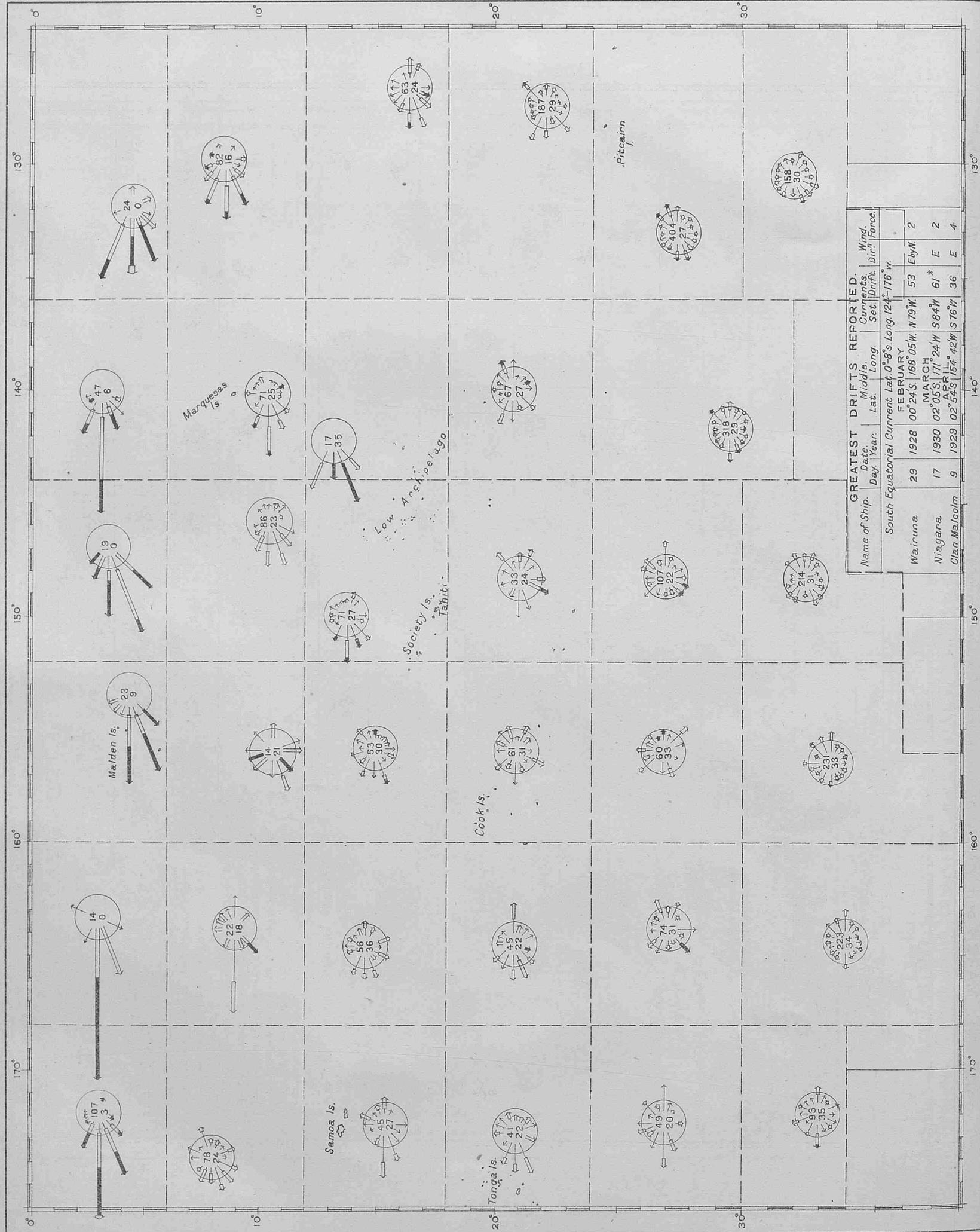
GREATEST DRIFTS REPORTED.				GREATEST DRIFTS REPORTED.			
Name of Ship.	Date	Middle.	Long.	Name of Ship.	Date	Middle.	Long.
East Australian coast North of 34° S.				South Equatorial Current			
Moldavia	14 1934.	29°07' S.	153° 47' E.	FEBRUARY	22 1931.	00° 50' S.	176° 00' W.
Mooltan	22 1931.	30° 05' S.	153° 32' E.	MARCH	16 1933.	02° 11' S.	176° 15' E.
Strathfield	12 1933.	28° 29' S.	153° 53' E.	ENE	2 1928.	02° 16' S.	168° 33' E.
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CURRENTS IN THE WESTERN PORTION OF THE SOUTH PACIFIC. North of Latitude 34°S.
FEBRUARY MARCH and APRIL. Observations of ships regularly observing for the British Meteorological Office, 1910-1937.



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.

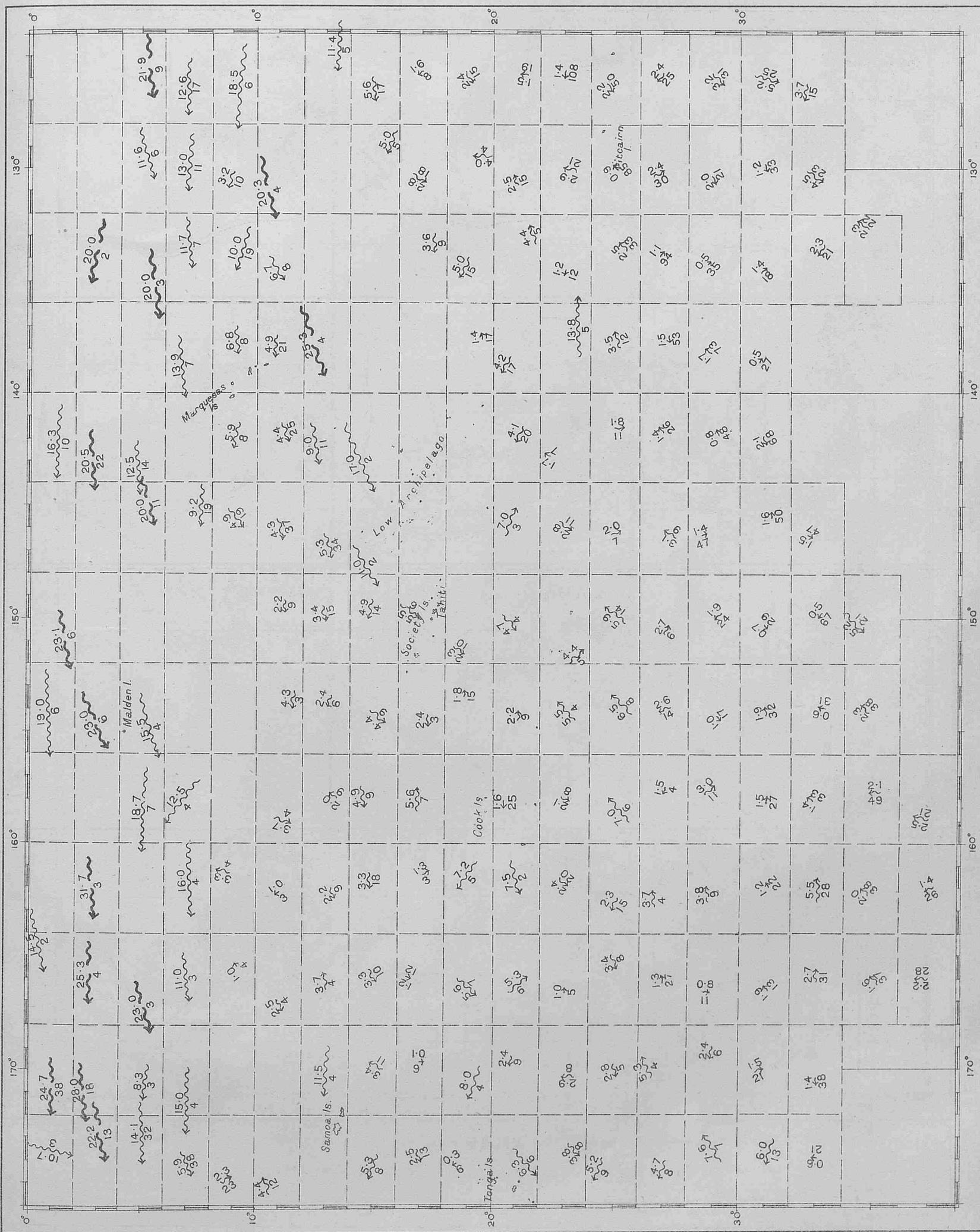
CURRENTS IN THE CENTRAL PORTION OF THE SOUTH PACIFIC. NORTH OF LATITUDE 34°. FEBRUARY MARCH and APRIL. Observations of ships regularly observing for the British Meteorological Office, 1910-1937.



GREATEST DRIFTS REPORTED.

Name of Ship.	Date.	Middle.	Wind.
	Day.	Lat.	Dir.
South Equatorial Current Lat. 0° S. Long. 124°-176° W.			
Wairuna	29	FEBRUARY	53 E by N 2
Niagara	17	MARCH	61* E 2
Clan Malcolm	9	APRIL	36 E 4

CURRENTS IN THE CENTRAL PORTION OF THE SOUTH PACIFIC. North of Latitude 34° S.
FEBRUARY MARCH and APRIL. Observations of ships regularly observing for the British Meteorological Office 1910-1937.



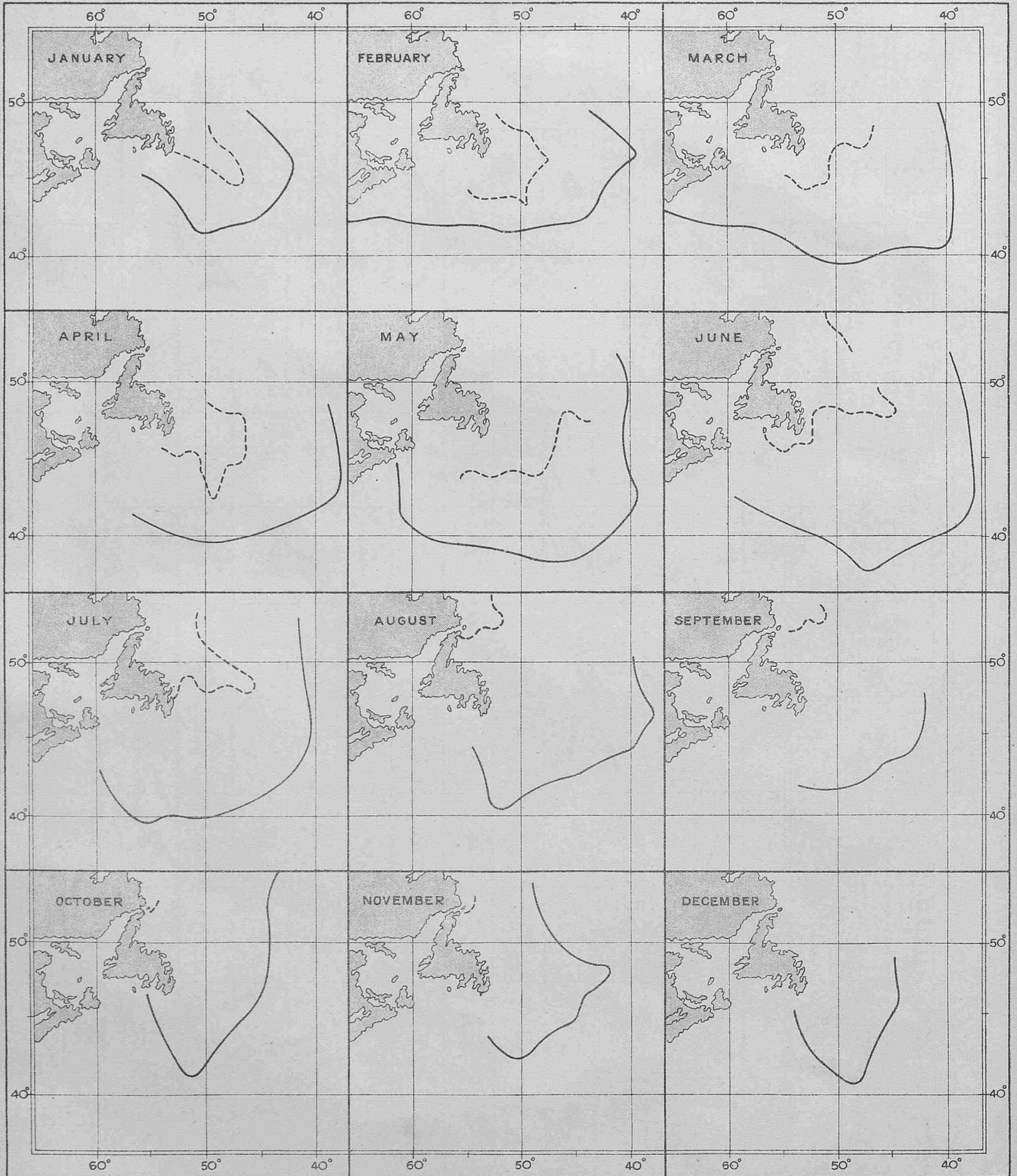


CHART A

LIMITS OF ICE, WESTERN NORTH ATLANTIC.

Limit from 1901 to 1937 shown thus _____

Limit for 1937 shown thus - - - - -

EXCEPTIONAL POSITIONS OF ICE.

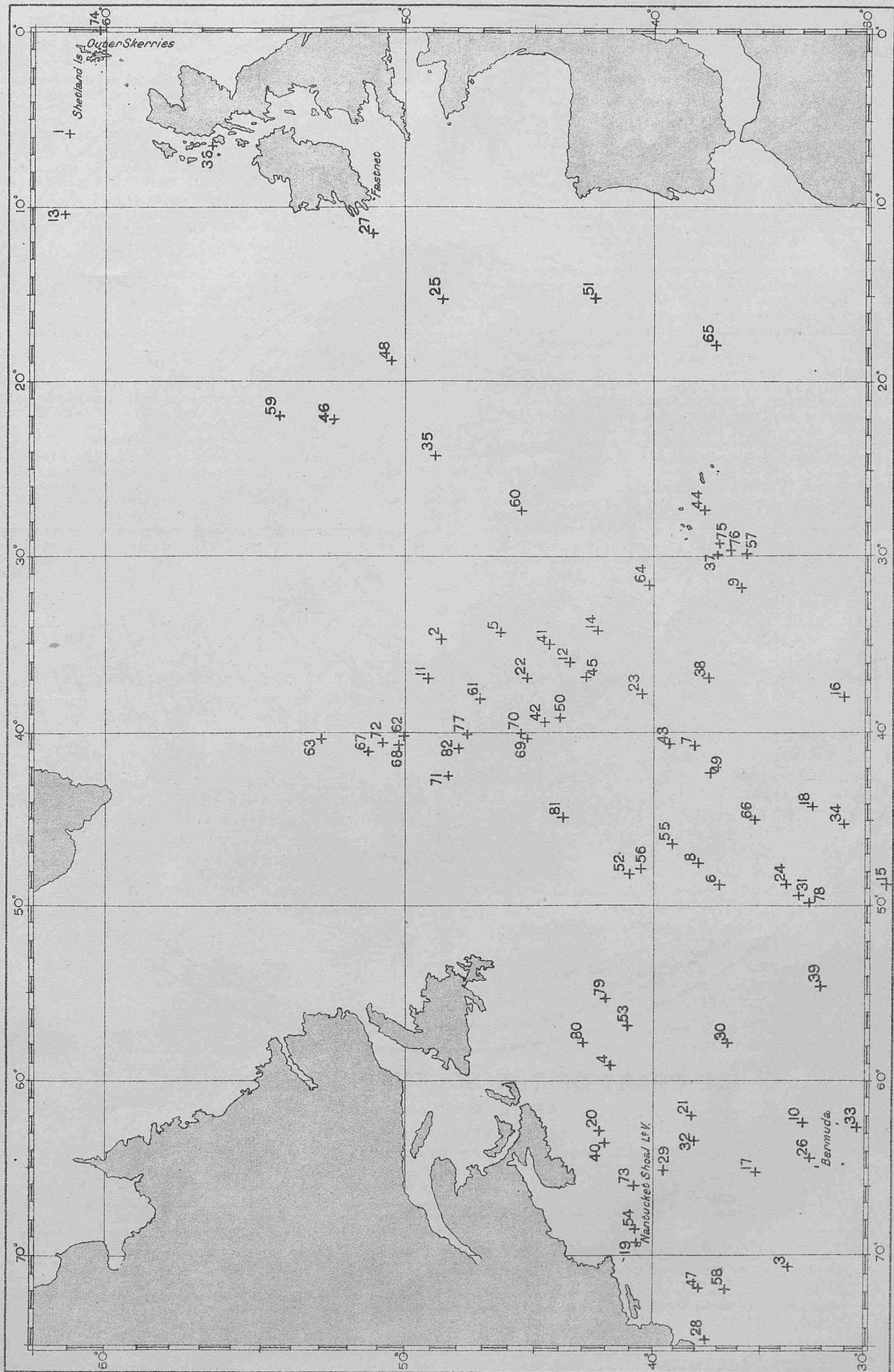
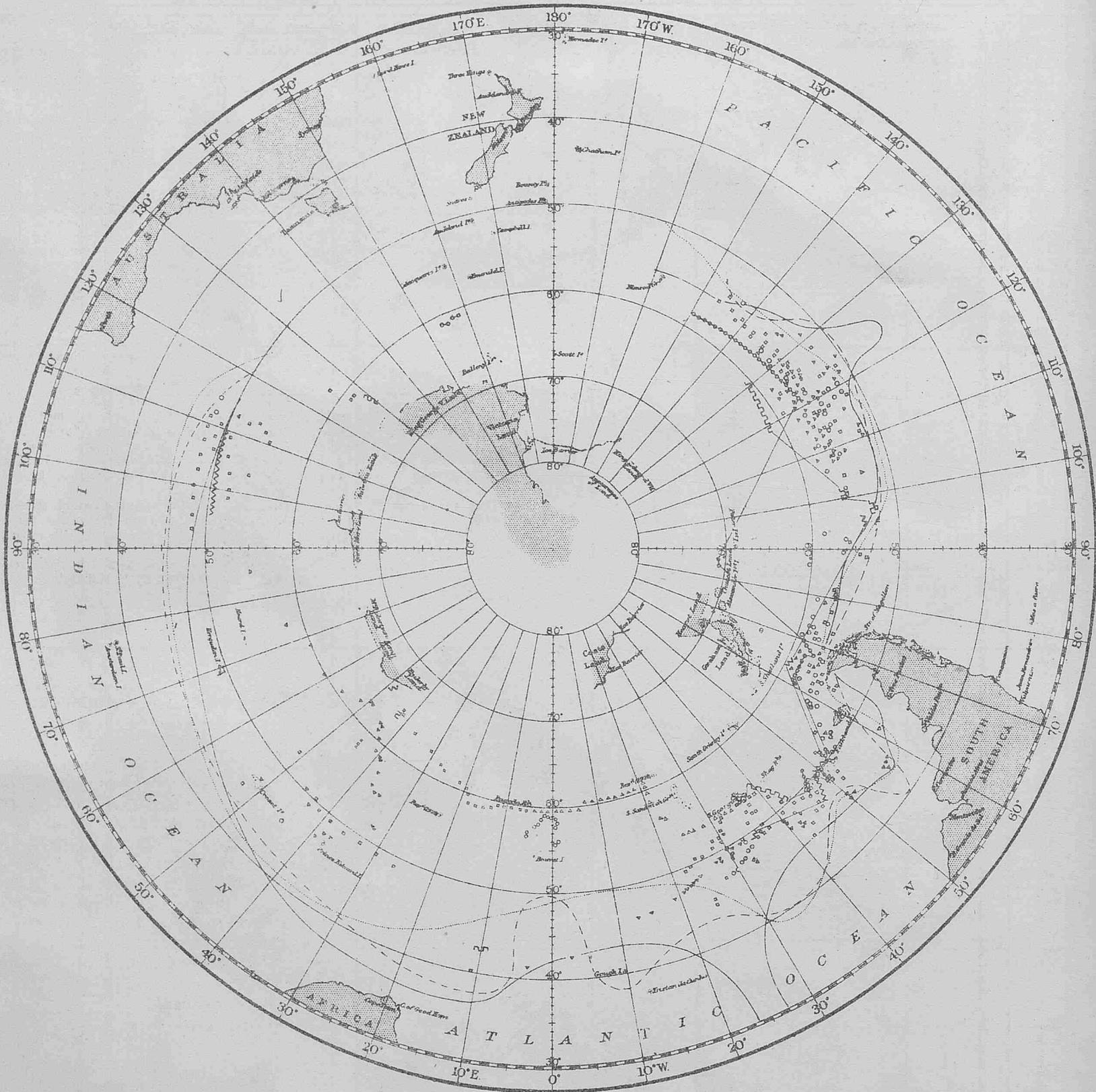


Chart B.



**ICE CHART OF THE SOUTHERN HEMISPHERE,
APRIL MAY and JUNE.**

EXPLANATION.

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

		<i>Bergs, 1902-1937.</i>	<i>Position of northernmost pack ice actually observed 1885-1937.</i>	<i>Extreme limit of all ice, 1772-1937.</i>
April	△		~~~~~	—————
May	□		~~~~~	—————
June	○		○-○-○-○	—————

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

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 regularly 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 350 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.

The Organization of Voluntary Meteorological Observation at sea is described in Chapter VII of THE MARINE OBSERVER'S HANDBOOK, sixth edition.

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 the wireless operators. The Captains of observing ships are also supplied on request with charts, and atlases, according to trade, if available, as meteorological equipment.

To ensure the accuracy of data collected for the purpose of research and for weather forecasting, ashore and afloat, and to provide a pattern which may be copied with advantage to all concerned for general use in merchant ships, sufficient tested instruments are lent by the Meteorological Office to the Captains of observing ships.

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 each of 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 instruments in Meteorological log ships half-yearly, and in other observing ships quarterly, when possible; and they will replace as necessary any gear lent by the Meteorological Office. These officers will also check the accuracy of barometers, etc., 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.

The masters of all British ships fitted with wireless telegraphy are asked to assist in this service in aid of navigation by making routine wireless weather reports in accordance with the Selected Ship scheme where and when there are not Selected Ships carrying out the service.

With a view to stimulating this supplementary service of making weather reports in the Selected Ship service when and where there are not Selected Ships, a supplementary list of British Weather Reporting Ships is being made.

Only British ships suitably fitted with wireless telegraphy, and who have been visited by the Merchant Navy Agents to the Meteorological Office, and whose masters have then undertaken to perform this service, are included in this list, which is not published, but which is sent for information to stations working a roll call.

The masters of all British ships are advised to procure the pamphlet M.O.329, DECODE FOR USE WITH THE INTERNATIONAL CODE FOR WIRELESS WEATHER MESSAGES FROM SHIPS, published and sold by H.M. Stationery Office, through any bookseller, price 6d.

M.O. 379, a HANDBOOK OF WEATHER, CURRENTS, AND ICE FOR SEAMEN, gives guidance in weather forecasting, also published by H.M. Stationery Office, price 4s. 0d.

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

LONDON ...	... Captain L. A. BROOKE SMITH, R.D., R.N.R., Marine Superintendent. Commander J. HENNESSY, R.D., R.N.R., Senior Nautical Assisiant. Room 205, Victory House, Kingsway, W.C.2. (Telephone No. : Holborn 3434 Extension 421.) Nearest station, Temple, District Railway.	Agents—(contd.).
THAMES...	... Commander C. H. WILLIAMS, R.N.R., Port Meteorological Officer, P.L.A. Building, King George V Dock (south side), London, E.16. (Telephone No. : Albert Dock 2659. Telegraphic Address : Barometric Aldock, London.)	CLYDE Captain W. HENDERSON, 80, Buchanan Street, Glasgow, C.I. (Telephone No. : Central 3775.)
MERSEY ...	... Commander M. CRESSWELL, R.N.R., Port Meteorological Officer, Dock Office, Liverpool. (Telephone No. : Bank 8959. Telegraphic Address : Meteorite, Liverpool.)	FORTH Captain G. MORE, Chief Dock Master's Office, Leith. (Telephone No. : Leith 35481.)
BRISTOL CHANNEL.	Captain EDWARD HALL, 21, Dowlais Buildings, West Bute Street, Cardiff. (Telephone No. : Cardiff 1268.)	HONG KONG, China. Lieut. Commander K. W. KIRBY, R.N., Chart Depot, H.M. Dockyard. (Telephone No. : 108 Dockyard.)
	Agents.	HUMBER ... W. H. CARR, Esq., Master Mariner, Ferensway Chambers, Ferensway, Hull. (Telephone No. : Hull 16063.)
		SOUTHAMPTON Captain Sir BENJAMIN CHAVE, K.B.E. Room 35, Royal Mail House.
		SYDNEY, New South Wales. Captain N. G. ROSKRUGE. Captain G. B. MERCER. Customs House. (Telephone No. : B6421.)
		TYNE Captain F. B. WEST, Customs House Chambers, Quayside, Newcastle upon Tyne, 1. (Telephone No. : Newcastle 23203.)

LATE NOTICE.

Special attention is directed to the additions and amendments made to the Canadian and Australian stations in the "List of Stations Detailed to receive Weather Reports from Selected Ships" given in this number on pages 64 to 68.

Special attention is invited to section (25) of the "Instructions to Selected Ships" in the January 1938 number of the "Marine Observer". Only stations detailed in these lists, in the latest number of the "Marine Observer", should be used by British Selected Ships for making weather reports to the shore meteorological services, and these stations, which are indicated in a similar list in the Admiralty List of Wireless Signals, kept up to date by Admiralty Notices to Mariners, should be used by British Supplementary Weather Reporting Ships.

CHART OF THE WESTERN NORTH ATLANTIC.

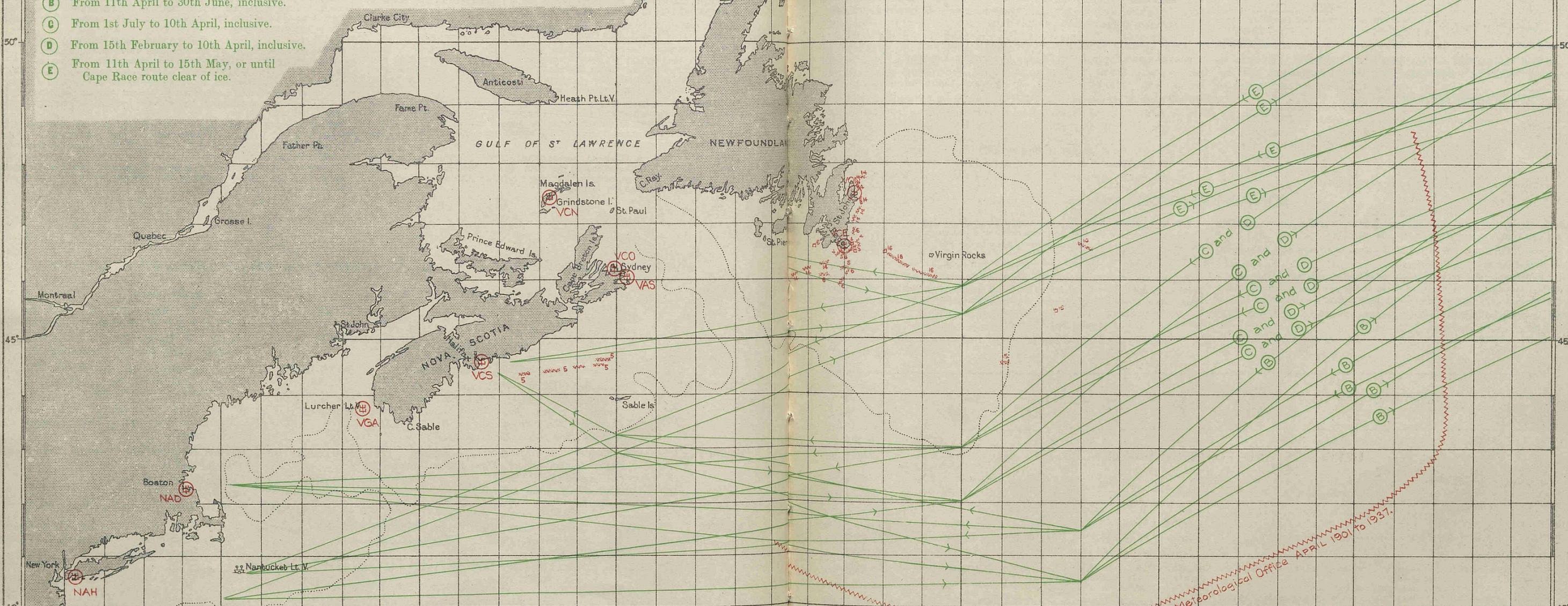
Showing the North Atlantic Lane Routes in force during APRIL as laid down by the Trans-Atlantic Track Convention. If at any time, owing to abnormal ice conditions, any alteration to the usual tracks is considered advisable by the track convention, particulars will be published on this chart. For full information concerning the North Atlantic Lane Routes see pages 62 and 63 of this number.

The periodic boundary within which ice has been observed is shown and a list of exceptional positions of ice observed in the North Atlantic during APRIL is given. Ice sighted between MARCH 1st and 25th, 1938 is indicated by symbol in the position reported, the figure giving the day of the month in March. 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 \oplus .

Ice symbols used on the chart: \triangle Iceberg, \square growler, $\dots\dots$ Field or other flat ice.

LANE ROUTES IN FORCE DURING APRIL.

- \textcircled{B} From 11th April to 30th June, inclusive.
- \textcircled{C} From 1st July to 10th April, inclusive.
- \textcircled{D} From 15th February to 10th April, inclusive.
- \textcircled{E} From 11th April to 15th May, or until Cape Race route clear of ice.



EXCEPTIONAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position.		Remarks.
		Lat.	Long.	
April 6, 1909	S.S. Trafalgar ...	35°54'N.	31°47'W.	2 pieces 18 in. in diameter.
" 11, 1914	S.S. Erodiade ...	32°55'N.	62°11'W.	Apparently river ice about the size of a lifeboat.
" 24, 1916	S.S. Communipaw ...	49°05'N.	36°48'W.	4 ft. high 50 ft. wide, and 100 ft. long.
" 4, 1921	S.S. Hollandia ...	43°35'N.	35°57'W.	Large berg.
" 16, 1926	Trawler Orizaba ...	61°03'N.	10°30'W.	Floating ice, about 40 ft. long, and 3 ft. high.
" 7, 1930	S.S. La Cresenta ...	42°24'N.	34°22'W.	Small berg, about 20 ft. diameter.
" 27, 1935	S.S. Cochrane ...	28°44'N.	48°42'W.	Small berg.

NOTICES TO MARINE OBSERVERS.

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.

DESPATCH OF INFORMATION

REQUIRED IMMEDIATELY FOR THE CONDUCT OF THE WORK AT SEA.

Shipowners, Marine Superintendents and all concerned in the despatch of mails to Ships abroad are asked to kindly facilitate the despatch and delivery of postal matter received at their offices from the Meteorological Office and Air Ministry Publication Depot to their Ships abroad.

This matter addressed to the Commanders of Ships contains information which is required for the Conduct of Marine Meteorological Work at Sea and is most effective if received by the Commanders at the earliest possible date.

Much of the information referred to is published in the *MARINE OBSERVER* and Supplements, and is of a seasonal nature. This journal also contains advice to Regular Observing Ships which enables them to perform voluntary service by Wireless Communication for the benefit of all shipping.

ICE OBSERVATION.

Drifting ice, derelicts, and other floating dangers to navigation are reported by all the means of communication at the disposal of the master.

See Appendix III, pages 106 to 108 of the *MARINE OBSERVER'S HANDBOOK*, Sixth Edition.

It is also desirable that more detailed information than can be given in a TTT wireless message should be available to the Meteorological Office for the purpose of research, and for the Admiralty Charts and Sailing Directions.

Marine observers will greatly assist by noting the conditions of ice, either drifting or fast.

For this purpose Form 912 is supplied direct to all regular observing ships using regions where ice may be encountered and this Form may be supplied to the Captain of any British ship on application to the Port Meteorological Officers and Merchant Navy Agents.

Regular observing ships using the Trans-North Atlantic tracks are requested to send in these Forms, not only when ice is encountered, but also when they have passed through the ice region during the ice season without encountering ice, in which case a "nil" report; since it is desirable as far as possible to determine when tracks have been clear of ice.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.	Date.	Position.		Description.
	Latitude.	Longitude.			Latitude.	Longitude.	
NORTH SEA				INDIAN OCEAN			
5.3.38	52°31'N.	4°25'E.	Wreck floating about 4 ft. above water.	3.3.38	5°44'N.	85°20'E.	Big tree trunk.
ENGLISH CHANNEL.				NORTH ATLANTIC.			
7.3.38	140°15m. from St. Catherine Lt.		Iron cylinder, new painted red, 14 ft. long, 6ft. high marked <i>CH</i> .	3.3.38	41°15'N.	64°34'W.	A spar apparently attached to submerged wreckage.
17.3.38	49°22'N.	3°15'W.	Black conical buoy marked <i>ROST</i> .	8.3.38	38°44'N.	72°58'W.	Red nun buoy.
20.3.38	8m. south of Start Point.		Drifting buoy painted red, white top, marked <i>ART</i> .	10.3.38	47°48'N.	5°51'W.	Red conical buoy with topmark.
21.3.38	50°05'N.	1°35'W.	Abandoned sailing boat marked <i>CH2959</i>	GULF OF MEXICO			
MEDITERRANEAN.				NORTH PACIFIC			
6.3.38	41°25'N.	6°11'E.	Red buoy topped by light.	11.3.38	28°16'N.	90°W.	Three logs each about 50ft. long and 2 to 3 ft. in diameter.
9.3.38	43°44'N.	8°02'E.	Wreck, 35 metres long.	4.3.38	43°41'N.	124°55'W.	Tree trunk about 2 ft. in diameter projecting vertically 10 ft. out of water.
12.3.38	36°59'N.	11°51'E.	Small rusty conical buoy.	6.3.38	33°45'N.	118°39'W.	Tree trunk about 20 ft. long and 10 ft. in diameter.
15.3.38	34°14'N.	21°42'E.	Conical buoy with cage topmark.	9.3.38	46°55'N.	124°51'W.	A log 2 ft. in diameter projecting 10 ft. above water.

FLEET LIST

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteoro-logical Instrument Equip-ment.	Owners.	Logs, Registers, or Records Contributed. 5.12.37 to 9.3.38	Date Last Return Received.
139 †† <i>California</i> ...	R. W. Smart ...	H. D. Campsie, J. D. Mackenzie, D. Barclay.	D. J. Lomson ...	S.	Anchor Line, Ld.	Fms. 911 & 138 21.11.37 to 14.2.38	16.2.38
*† <i>Cambria</i> ...	E. B. Turner ...	T. E. Williams ...	J. Pritchard ...	"	L.M. & S. Rly. ...	" " 30.10.37 to 12.2.38	17.2.38
223 *† <i>Cambridge</i> ...	C. R. Pilcher ...	R. J. Olsen, G. E. Mason. ...	A. C. Taylor ...	"	Federal S.N. Co., Ld.	" " 20.6.37 to 16.11.37	1.12.37
042 †† <i>Cameronia</i> ...	G. B. Kelly ...	D. G. Barr, J. George, R. Caldwell.	W. Ness ...	"	Anchor Line, Ld.	" " 19.2.38 to 26.2.38	3.3.38
252 *† <i>Camito</i> ...	R. J. Bostock ...	A. W. King, H. C. Cruick-shank.	R. E. Blizzard ...	"	Elders & Fyffes, Ld.	Fm. 912 6.2.38 to 26.2.38	3.3.38
*† <i>Cape Barfleur</i> , S.T.	W. J. Jonsen ...	W. J. Jonsen ...	"	"	Hudson Bros. Trawlers, Ltd.	" " 22.11.37 to 1.2.38	12.2.38
117 *† <i>Cape of Good Hope</i> M.S.	A. T. McGlashan ...	R. J. Carnochan, P.A. Wallace	G. W. Pragnell...	"	Lyle Shipping Co., Ld.	" " 28.9.37 to 21.12.37	14.2.38
†† <i>Capetown Castle</i> , M.S.	A. Barron ...	"	"	"	Union Castle Mail SS. Co. Ltd.	"	"
266 †† <i>Carinthia</i> ...	P. A. Murchie, O.B.E., R.D., Capt., R.N.R.	J. Tone, W. L. P. Carr, A. Thompson.	R. F. Watson ...	"	Cunard White Star, Ld.	Fm. 912 9.12.37 to 24.1.38	3.2.38
155 †† <i>Carthage</i> ...	H. M. Jack ...	M. Greasley ...	F. Rose ...	M.-S.	P. & O. S.N. Co.	Fms. 911 & 138 28.8.37 to 30.11.37	20.12.37
184 †† <i>Cathay</i> ...	H. R. Rhodes ...	D. West, F. Squires, F. H. J. Orton.	E. L. Boyce ...	"	"	" " 27.1.38 to 2.3.38	4.3.38
<i>Cato</i> ...	J. E. Robinson ...	C. Newton ...	"	M.L.	Ellerman's Wilson Line, Ld.	Fm. 915 17.7.37 to 29.11.37	6.12.37
127 *† <i>Cavina</i> ...	W. T. Forrester, O.B.E.	W. G. Chanter, D. A. Braid	A. N. Taylor ...	S.	Elders & Fyffes, Ld.	Fms. 911 & 138 1.2.38 to 27.2.38	2.3.38
011 †† <i>Ceramic</i> ...	H. C. Elford ...	G. F. Cresswell, M. Foster, W. J. Stranger.	W. M. Ross ...	"	Shaw, Savill & Albion Co., Ld.	Fm. 912 20.10.37 to 8.12.37	13.12.37
029 *† <i>Cheshire</i> , M.S.	P. H. Potter ...	J. B. Quinn, A. N. Williamson, W. Fitch.	F. W. Greaves ...	"	Bibby Bros. & Co.	Fms. 911 & 138 12.9.37 to 24.9.37	8.11.37
191 *† <i>Chindwin</i> ...	M. Wiles ...	G. Kennedy, J. A. Anderson, W. D. Tulloch.	C. Q. Marks ...	"	P. Henderson & Co.	" " 7.11.37 to 11.1.38	14.1.38
067 *† <i>Chinese Prince</i> , M.S.	W. Finch ...	E. T. Cleaver, A. H. Kent, E. J. Roberts.	D. T. de Witt ...	M.L.	Furness Lines Ld.	Fm. 915 17.6.37 to 26.9.37	17.11.37
192 †† <i>Chitral</i> ...	H. Elliott Smith, R.D., Lt.-Commr., R.N.R.	C. E. Lord ...	W. B. Goodsell	M.-S.	P. & O. S.N. Co.	Fms. 911 & 138 8.8.37 to 10.11.37	15.11.37
051 *† <i>City of Auckland</i>	H. G. Jenkins, O.B.E.	E. G. O'Driscoll, D. C. Hamilton	G. B. Cleland ...	S.	Ellerman Lines, Ld.	" " 23.9.37 to 29.10.37	22.11.37
135 *† <i>City of Bareslona</i>	W. Hill ...	R. A. Jones, W. Reid, H. G. Williams.	R. Duggan ...	M.	"	" " 11.12.37 to 16.2.38	23.2.38
265 *† <i>City of Baroda</i>	A. V. Radcliffe, R.D., Commr., R.N.R.	R. S. Steel, W. L. Smith, J. R. Roland.	"	S.	"	" " 10.11.37 to 11.1.38	21.1.38
057 †† <i>City of Benares</i> ...	A. Lee ...	H. H. Asher, R. L. Pallister, H. A. Hazell.	B. Coyle ...	M.-S.	"	" " 23.1.38 to 11.2.38	7.3.38
158 *† <i>City of Cairo</i> ...	A. N. Hogg ...	B. Postlethwaite, S. E. Britt, J. A. Boyce, E.T. O'Driscoll.	A. B. Olson ...	M.	"	" " 11.10.37 to 23.12.37	29.12.37
215 *† <i>City of Canberra</i>	H. R. Jackson ...	A. Travis, A. Westlake, J. Beighton.	T. Tolland ...	"	"	" " 6.2.38 to 15.2.38	8.3.38
033 *† <i>City of Canton</i> ...	E. Scrymgeour...	M. W. Tyrrell, W. E. Fletcher, T. L. Vaughan.	L. J. Delaney ...	"	"	Fm. 912 31.3.37 to 19.8.37	2.9.37
157 *† <i>City of Delhi</i> ...	F. W. Penberthy ...	W. Nimmo, T. Lovell, J. Wotherspoon.	T. A. Walker ...	S.	"	Fms. 911 & 138 2.12.37 to 24.12.37	28.1.38
030 *† <i>City of Dieppe</i>	W. J. Merchant ...	J. F. Mitchell, E. A. Chapman, F. Wilson.	R. H. Hallam...	"	"	" " 9.11.37 to 10.1.38	28.1.38
049 *† <i>City of Evansville</i>	D. O. Evans ...	F. P. Monkton, A. G. Freeman, F. W. Woods.	F. J. Glynn ...	M.	"	" " 22.9.37 to 7.11.37	14.12.37
220 †† <i>City of Exeter</i> ...	D. L. Lloyd ...	P. C. Wilson, R. Webber, P. G. Pye.	L. Hugo ...	S.	"	" " 23.9.37 to 28.11.37	21.12.37
089 *† <i>City of Hereford</i>	R. A. Grove ...	I. McBeath, W. R. Carr ...	"	M.	"	" " 6.12.37 to 27.12.37	11.1.38
237 †† <i>City of London</i> ...	J. G. Brown ...	W. J. Nixon, W. McMillan, D. J. Inglis.	O. A. Read ...	S.	"	" " 15.11.37 to 23.1.38	26.1.38
256 *† <i>City of Lyons</i> ...	E. Mason ...	J. W. Cubbon, H. E. Roberts, W. James.	W. R. Beynon ...	M.	"	" " 10.10.37 to 6.1.38	28.1.38
066 †† <i>City of Nagpur</i> ...	N. McNeil, O.B.E.	E. H. H. Walton, S. G. Findlam, W. Dick.	A. E. Dove ...	S.	"	" " 8.11.37 to 26.12.37	30.12.37
074 †† <i>City of Paris</i> ...	L. Nicol ...	W. G. Stubbs, A. J. Barnett, C. Clark.	G. Fenton ...	"	"	" " 14.12.37 to 13.2.38	21.2.38
271 *† <i>City of Roubaix</i>	H. Spencer, D.S.C.	H. Nish, T. V. Birkett, A. H. G. Jones.	L. Andrew ...	M.	"	" " 14.12.37 to 1.2.38	28.2.38
272 *† <i>City of Singapore</i>	T. R. Watkins ...	K. B. James, G. Mathias, R. H. Broadbent.	J. J. Stephenson	"	"	" " 27.10.37 to 8.12.37	24.1.38
035 *† <i>City of Sydney</i> ...	E. Myles ...	E. P. B. Bradbury, E. M. Robertson, R. M. Hall.	D. Uttley ...	"	"	" " 12.11.37 to 12.12.37	30.12.37
167 *† <i>City of Tokio</i> ...	G. Burton ...	J. H. Aldridge, L. Hernan, R. K. Walker.	G. J. Manson ...	S.	"	Fms. 911 & 138 27.11.37 to 12.12.37	30.12.37
136 *† <i>City of Winchester</i>	W. S. Coughlan ...	H. Laird, W. Scott-Craig, H. Lewis.	R. Ellison ...	"	"	" " 24.10.37 to 5.1.38	8.1.38
125 *† <i>City of Windsor</i>	E. E. Bulkeley ...	G. D. B. Davies, N. Bradley, L. E. Smith.	R. Ellison ...	"	"	Fm. 911 17.11.37 to 8.2.38	18.2.38
027 *† <i>Clan Farquhar</i> ...	A. Low ...	J. Browne, J. Napier, H. S. Pengelly, J. H. Hillman.	S. J. Harris ...	"	"	Fms. 911 & 138 13.2.38 to 28.2.38	5.3.38
050 *† <i>Clan Macalister</i>	R. W. Mackie...	M. Bruce, J. Hubbard, S. M. Warrey, —, Easterbrook	A. C. Gavin ...	M.	Clan Line Steamers, Ld.	" " 21.10.37 to 20.1.38	26.1.38
222 *† <i>Clan Macdougall</i> , M.S.	L. M. Redford, R.N.R.	B. Griadley, H. F. Town, T. O. Craze.	C. J. Andrews ...	S.	"	" " 17.11.37 to 23.12.37	25.1.38
101 *† <i>Clan Macfarlane</i>	W. J. Hughes ...	G. A. Fox, R. F. Carter, C. Matheson.	H. A. Croft ...	"	"	" " 17.11.37 to 8.1.38	28.2.38
118 *† <i>Clan Macindoe</i> ...	H. Andrews ...	E. H. Pyett, A. S. Palethorpe-May, K. C. Simpson	D. Cormack ...	"	"	" " 5.10.37 to 9.12.37	16.12.37
082 *† <i>Clan Macnair</i> ...	R. J. W. Bennett ...	J. B. Sparkes, A. H. Tobin, T. O. Man.	D. C. Munro ...	"	"	" " 25.1.38 to 12.2.38	7.3.38
255 *† <i>Clan Macneil</i> ...	H. E. G. Scott Smith, O.B.E., R.D., Lieut.-Commr., R.N.R.	W. R. Thomas, D. Devall ...	L. Jones ...	"	"	" " 18.11.37 to 5.1.38	12.1.38
001 *† <i>Clan Macphee</i> ...	H. C. Simpson ...	G. S. Bullock, B. Browne, R. N. Johnson.	W. Hayes ...	"	"	" " 11.9.37 to 15.12.37	18.12.37
168 *† <i>Clan Mactaggart</i>	C. C. Parfitt ...	N. F. Stewart, J. de Garis, T. Gillies.	W. Scott ...	"	"	" " 27.11.37 to 15.12.37	1.1.38
261 *† <i>Clan Mactavish</i>	H. M. Rodger ...	J. McIvor, G. Stronach, S. R. Woods.	J. G. Wood ...	"	"	" " 6.2.38 to 26.2.38	3.3.38
002 *† <i>Clan Macwhirter</i>	E. E. Arthur ...	A. Woodall, J. V. Findlay, T. P. Cranwill.	A. M. Forbes ...	"	"	" " 17.11.37 to 5.2.38	8.2.38
109 *† <i>Clan Morrison</i> ...	B. A. Hardinge ...	B. Grindley, J. W. Rennie, F. B. Fairweather.	J. Marshall ...	"	"	" " 13.1.38 to 18.1.38	19.2.38
*† <i>Clement</i> ...	W. E. Griffiths, Lt.-Commr., R.N.R.	T. E. Williams, G. G. Roberts.	C. Asheroft ...	"	Booth S.S. Co., Ld.	" " 2.11.37 to 23.11.37	3.1.38
			M. J. Kenny ...	"		" " 12.2.38 to 27.2.38	5.3.38

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed. 5.12.37 to 9.3.38.	Date Last Return Received.
041 *† <i>Clydebank</i> , M.S.	W. Broome	C. W. Haycraft, J. R. Mahon, E. W. Dibble.	A. J. Lamont ...	S.	A. Weir & Co. ...	Fms. 911 & 138 10.12.37 to 9.1.38	21.2.38
084 †† <i>Clydefield</i> , M.S. (tank)	D. A. Low	H. L. Humphries, J. Walters, H. H. Hooker.	W. R. Gillies ...	"	Hunting & Son, Ld.	" " 15.11.37 to 17.2.38	22.2.38
016 *† <i>Comliebank</i> , M.S.	V. Harper	H. S. Brown, S. I. Pethurst, F. W. More.	C. R. H. Jarmy ...	"	A. Weir & Co. ...	" " 17.12.37 to 11.2.38	5.3.38
185 †† <i>Comorin</i> ...	C. W. Cartwright, D.S.C.	P. C. Reid, N. H. Thompson, E. J. Spurling.	E. Howard ...	M.-S.	P. & O. S.N. Co.	" " 14.9.37 to 15.12.37	21.12.37
*† <i>Consuelo</i> ...	J. L. Sibree	F. Ellison, J. B. Dunkley, R. Taxtan.	J. Greer ...	S.	Ellerman Wilson Line, Ltd.	Fm. 911 19.12.37 to 13.1.38	17.1.38
198 *† <i>Contractor</i> ...	H. Collins	R. H. Platts, W. H. Allen, R. Ledger.	G. I. Gilling ...	M.	T. & J. Harrison	Fms. 911 & 138 1.2.38 to 20.2.38	28.2.38
258 †† <i>Corfu</i>	J. K. Chaplin, R.D., Capt., R.N.R.	J. S. Sutherland, W. T. C. Lethbridge, H. V. Williamson.	R. V. McCreath ...	M.-S.	P. & O. S.N. Co.	" " 1.8.37 to 3.11.37	19.11.37
214 *† <i>Counsellor</i> ...	A. H. Frew	J. Haycocks, D. Perty.	W. Fox... ..	M.	T. & J. Harrison	" " 14.12.37 to 9.2.38	17.2.38
*† <i>Crispin</i>	S. N. White, R.D., R.N.R.	J. Whayman, A. A. Gerrard	J. Tynan ...	S.	Booth S.S. Co., Ld.	" " 11.11.37 to 7.1.38	13.1.38
036 *† <i>Cumberland</i> ...	E. A. Burton	K. A. Vasey, D. H. Chadwick, D. C. M. Campbell.	E. D. Slater ...	"	Federal S.N. Co., Ld.	" " 25.2.37 to 7.7.37	29.7.37
274 *† <i>Custodian</i> ...	D. A. McCallum ...	W. G. Ellis, G. F. Heator	D. J. Murphy ...	M.	T. & J. Harrison	" " 11.10.37 to 16.12.37	7.1.38
219 *† <i>Dearne</i>	T. H. Woodhead ...	W. Thompson, H. M. Collier	R. D. Akers ...	S.	L.M. & S. Rly. ...	" " 13.12.37 to 8.1.38	26.1.38
194 *† <i>Deebank</i>	A. S. Reed	E. J. Normoyle	" " " " " "	"	A. Weir & Co. ...	" " 25.9.37 to 17.1.38	27.1.38
204 †† <i>Derbyshire</i> , M.S.	G. L. English	A. Beharrel, G. Meggitt, G. Mordaunt.	D. McLellars ...	"	Bibby Bros. & Co.	" " 26.9.37 to 2.12.37	6.12.37
061 *† <i>Devon</i>	J. Blencowe	H. C. Turner, H. Watkins, K. Margerrison.	W. B. Charlton ...	M.	British India S.N. Co., Ld.	" " 14.11.37 to 29.12.37	3.1.38
*† <i>Diplomat</i>	J. J. Egerton	D. H. Bryant, G. McGuiness, R. Sutcliffe.	A. Griffin ...	"	T. & J. Harrison	" " 22.10.37 to 19.12.37	29.12.37
072 *† <i>Director</i>	E. Pearce	J. F. Tooth, A. A. Johnson, T. B. Littlechild.	F. E. Bayack ...	"	" " " "	" " 5.6.37 to 4.8.37	27.8.37
115 *† <i>Discovery II</i> , R.R.S.	L. C. Hill, O.B.E., Lieut., R.N.R.	H. Kirkwood, D. D. Bone, M. G. Mackendrick.	A. E. Morris ...	M.L.	Discovery Committee.	Fm. 915 8.10.37 to 30.1.38	7.3.38
096 *† <i>Don</i>	C. E. Tree	L. A. White	J. Orifill ...	S.	Associated Humber Lines.	Fms. 911 & 138 30.10.37 to 18.12.37	23.12.37
058 *† <i>Dorset</i> , M.S. ...	C. Matthews	K. H. Barclay, T. M. Devitt, E. G. Ott.	J. H. Dance ...	M.	Federal S.N. Co., Ld.	" " 29.9.37 to 23.1.38	24.2.38
142 †† <i>Duchess of Atholl</i>	W. B. Coyle, R.D., Commr., R.N.R.	A. D. Morison, E. A. Pennington, W. R. Thorburn.	E. Murphy ...	M.-S.	Canadian Pacific Steamships, Ld.	{ Fms. 912 10.10.37 to 10.2.38 Fms. 911 & 138 13.6.37 to 1.7.37 Fm. 912 13.2.38 to 4.3.38	15.2.38 7.7.37 8.3.38
152 †† <i>Duchess of Bedford</i>	A. R. Meikle, R.N.R....	E. J. Oatridge, E. Roberts, C. Morris.	A. O'Sullivan ...	"	" " " "	{ Fm. 912 13.2.38 to 4.3.38 Fms. 911 & 138 6.12.37 to 21.12.37	8.3.38 24.12.37
151 †† <i>Duchess of Richmond</i>	H. A. Moore, R.D., Capt., R.N.R.	R. McKillop, F. Kicks, J. Soames.	I. F. Yorston ...	S.	" " " "	{ Fm. 912 4.12.37 to 22.12.37 Fms. 911 & 138 2.1.38 to 1.2.38	24.12.37 21.2.38
143 †† <i>Duchess of York</i>	C. Richardson	C. H. Belton, W. Ashcroft	J. W. Potts ...	M.-S.	" " " "	{ Fm. 912 14.2.38 to 18.2.38 Fms. 911 & 138 18.11.37 to 28.1.38	21.2.38 7.2.38
*† <i>Duke of Argyll</i> ...	J. W. Richmond ...	W. Bleakley, W. S. Morrow.	G. Poulton ...	S.	L.M. & S. Rly. ...	" " " "	" " " "
*† <i>Duke of Lancaster</i>	E. B. Sergeant	W. Cole, W. N. Greenwood...	C. J. Seed ...	"	" " " "	" " 2.12.37 to 30.1.38	3.2.38
*† <i>Duke of Rothesay</i>	F. C. Raven	A. E. Willmott, J. Abram ...	G. Pilling ...	"	" " " "	" " 28.11.37 to 11.2.38	16.2.38
098 †† <i>Dunbar Castle</i> , M.S.	A. E. Castle	G. W. Lawrenson, J. Pownal Applin.	P. P. Williams... ..	"	Union-Castle Mail S.S. Co., Ld.	" " 7.11.37 to 10.1.38	13.1.38
*† <i>Dunedin Star</i> , M.S.	D. Owen	J. Byrne	" " " " " "	M.	Blue Star Line, Ld.	Fm. 911 28.8.37 to 17.12.37	23.12.37
193 †† <i>Dunnottar Castle</i> , M.S.	R. W. Goodacre ...	G. E. Stephenson, E. E. Cooper.	R. Batchelor ...	S.	Union-Castle Mail S.S. Co. Ld.	Fms. 911 & 138 23.10.37 to 13.2.38	15.2.38
043 †† <i>Dunvegan Castle</i> , M.S.	E. H. Thornton, R.D., R.N.R.	N. K. Boyd	F. W. Santillo... ..	"	" " " "	" " 8.1.38 to 26.2.38	2.3.38
064 *† <i>Durham</i> , M.S. ...	H. L. Upton, D.S.C., R.D., Capt., R.N.R.	J. Knott, J. F. Clement, E. Porter.	J. V. Stockman ...	M.	Federal S.N. Co., Ld.	" " 14.6.37 to 15.10.37	27.10.37
*† <i>Eastern Coast</i> ...	W. Quirk	R. E. Holt, P. A. Johnson ...	" " " " " "	M.L.	Coast Lines, Ld.	Fm. 915 1.1.37 to 26.7.37	30.9.37
077 †† <i>Edinburgh Castle</i>	C. Ayles, R.D., Commr., R.N.R.	W. F. Palmer, D. Robertson	R. Brew ...	S.	Union-Castle Mail S.S. Co., Ld.	Fms. 911 & 138 4.12.37 to 23.1.38	26.1.38
107 *† <i>El Argentino</i> , M.S.	F. Ellis, D.S.C. ...	H. N. Sherwell, J. Allerton, H. Butler.	A. Goodman ...	M.	Furness Lines ...	" " 10.2.38 to 2.3.38	5.3.38
183 †† <i>Empress of Australia</i>	C. H. Sapsworth ...	R. Newsan, J. B. Saunders, R. N. Miller.	J. Butler ...	S.	Canadian Pacific Steamships, Ld.	" " 25.12.37 to 31.12.37	20.1.38
034 †† <i>Empress of Britain</i>	W. G. Busk-Wood, R.D., Commr., R.N.R.	W. A. Stanley, W. S. Main, D. Dunn.	" " " " " "	"	" " " "	{ Fms. 911 & 138 18.12.37 to 21.12.37 Fm. 912 8.9.37 to 8.11.37	20.1.38 13.11.37
119 †† <i>Erin</i>	R. N. Shore	W. A. Phillips, V. Hill, W. M. N. Faichney.	L. F. Haslam ...	"	Erin S.S. Co., Ld.	{ Fms. 911 & 138 29.10.37 to 8.1.38 Fm. 912 14.5.37 to 24.7.37 Fms. 911 & 138 28.11.37 to 5.2.38	22.1.38 29.7.37 10.2.38
010 *† <i>Eros</i> (t-e) ...	J. Matthews	J. T. Vigurs, H. T. Green, H. E. Lascelles.	S. Alston ...	"	" " " "	" " " "	" " " "
160 *† <i>Essex</i> , M.S. ...	F. N. Wyatt	J. R. Griffiths, R. J. Olsen, N. N. Lawson.	F. W. Ward ...	M.	Federal S.N. Co., Ld.	" " 9.12.37 to 20.12.37	1.1.38
*† <i>Etrickbank</i>	T. Watkins	" " " " " "	" " " " " "	S.	A. Weir & Co., Ld.	" " " " " "	" " " "
*† <i>Explorer</i>	D. C. Sandison ...	T. R. Ness, J. Craig ...	" " " " " "	M.L.	Scottish Fishery Board	Fm. 915 15.6.37 to 21.12.37	29.12.37
239 *† <i>Foytebank</i> , M.S.	H. J. Smith	W. Blakeney, J. E. Allen, E. Bolton.	A. J. Locke ...	S.	A. Weir & Co. ...	Fms. 911 & 138 7.2.37 to 22.4.37	31.5.37
173 †† <i>Franconia</i>	G. R. Dolphin, R.D., Commr., R.N.R.	E. W. Kent, J. C. Boyce, B. Harrison.	J. Harvey ...	"	Cunard White Star, Ld.	{ Fm. 912 6.9.37 to 24.10.37 Fms. 911 & 138 4.6.37 to 28.8.37	1.11.37 2.9.37
186 †† <i>Georgic</i> , M.S. ...	B. B. Oram, R.D., Commr., R.N.R.	N. Kingscote, R. V. Wood, R. O. Price.	A. Schofield ...	"	" " " "	{ Fms. 911 & 138 12.12.37 to 16.12.37 Fm. 912 12.12.37 to 16.12.37	31.12.37 31.12.37
234 *† <i>Glaucus</i>	B. T. Batho, J. P. Phillips	R. L. Claingbowl, R. E. Wilks, L. R. Hill, E. Greenwood.	A. Dunn ...	M.L.	A. Holt & Co. ...	Fm. 915 29.7.37 to 8.11.37	29.12.37
026 *† <i>Glenbank</i> , M.S.	J. Macdonald	W. J. H. Pearce, D. Morrison	H. Row ...	S.	A. Weir & Co. ...	Fms. 911 & 138 8.8.37 to 24.10.37	22.11.37
218 *† <i>Harmonides</i> ...	F. R. Elwell	T. Paxton, J. L. Jones,	E. C. Turner ...	"	Houston Line, Ld.	" " 23.8.37 to 13.11.37	16.11.37
262 *† <i>Hauraki</i> , M.S.	D. Macdonald	D. E. Grantham, F. Young, D. Cochrane.	A. A. Lindsay ...	M.L.	Union S.S. Co., of N.Z., Ld.	Fm. 915 14.8.37 to 13.12.37	7.2.38
171 *† <i>Hertford</i>	J. C. Tuckett	J. Cree, H. K. Cockerill, I. M. Norrie	P. Moroney ...	S.	Federal S.N. Co., Ld.	Fms. 911 & 138 29.10.37 to 9.12.37	14.12.37
*† <i>Hibernia</i>	J. R. Bulmer, M.B.E....	W. E. Meade	D. T. Rockey ...	"	L.M. & S. Railway	" " 9.10.37 to 17.1.38	26.1.38
182 †† <i>Highland Brigade</i> , M.S.	R. G. Clayton, D.S.C., R.D., Capt., R.N.R.	F. J. Swallow, N. Seaton, T. Fraser, J. T. Slee.	E. A. Reynolds... ..	M.-S.	Royal Mail Lines, Ld.	" " 12.10.37 to 6.1.38	10.2.38

FLEET LIST

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed. 5.12.37 to 9.3.38.	Date Last Return Received.
177 *† Port Wellington	H. Jeffrey	K. D. Morgan, R. G. Russell, R. A. Wight.	R. D. Waterhouse	S.	Port Line Ld.	Fms. 911 & 138 11.9.37 to 27.1.38	1.2.38
003 *† Port Wyndham, M.S.	W. Gilling	C. J. Gorley, D. F. Morgan, C. Stone.	R. Colbourne	"	" " "	" " 9.7.37 to 5.11.37	30.11.37
*† Prague	C. Baxter	F. Woods, H. Wright	A. Potter	"	L. & N.E. Rly. ...	" " 2.12.37 to 5.2.38	8.2.38
063 *† Queen City	J. C. Cornwell	M. Williams, D. Beynon	J. Moore	"	Sir Wm. Reardon Smith & Partners, Ld.	" " 13.7.37 to 28.1.38	17.2.38
263 †† Queen Mary	R. B. Irving, O.B.E., R.D., Capt., R.N.R.	B. L. Butcher, A. C. Janson, E. A. Divers.	A. H. Farman	"	Cunard White Star, Ld.	" " 17.2.38 to 27.2.38	1.3.38
165 *† Radnorshire, M.S.	D. E. Evans	T. R. Walker, J. A. A. Evans, H. Andrews.	I. T. Davies	"	A. Holt & Co.	" " 15.2.38 to 26.2.38	9.3.38
205 †† Rajputana	W. A. Cotching	J. Green, A. B. E. Bishop, E. D. Kerridge.	W. Banbury	M.-S.	P. & O. S.N. Co.	" " 10.10.37 to 12.1.38	19.1.38
228 †† Ranchi	J. A. Smith	G. M. Farniloe, J. MacArthur	W. Stevenson	"	" " "	" " 25.11.37 to 21.2.38	23.2.38
224 †† Rangitane, M.S.	A. W. McKellar, R.D., Capt., R.N.R.	H. J. Brownings, J. R. Vincent, F. W. Newman.	N. J. Hallet	"	New Zealand Shipping Co., Ld.	" " 14.11.37 to 19.2.38	2.3.38
217 †† Rangitata, M.S.	E. Holland	R. A. Belfield, A. McD. Hannah, S. Andrews.	H. R. Dedman	"	" " "	" " 17.10.37 to 22.1.38	27.1.38
105 †† Rangitiki, M.S.	H. Barnett	H. C. R. Dell, I. B. Rose	L. Horn	"	" " "	" " 19.9.37 to 19.12.37	24.12.37
207 †† Ranpura	J. M. Legg	J. Collingwood, C. H. Stokes, G. Randall.	"	"	P. & O. S.N. Co.	" " 6.7.37 to 6.10.37	25.10.37
071 †† Rawalpindi	M. G. Draper, R.D., Commr., R.N.R.	L. A. Hill, M. G. Morris, A. P. Godfrey.	S. W. Sharp	"	" " "	" " 7.11.37 to 10.2.38	12.2.38
247 *† Recorder	W. Baird	G. M. Jones, L. Seddon	J. Hallgall	M.	T. & J. Harrison	" " 19.8.37 to 21.10.37	1.11.37
132 *† Reina del Pacifico, M.S.	A. Ridyard, O.B.E.	H. Matthews, G. H. Price, J. P. Edwards.	J. B. Stone	"	Pacific S.N. Co.	" " 7.11.37 to 29.12.37	3.1.38
276 †† Remuera	C. B. Lamb	J. D. Bennett, R. S. Warren, J. D. Paterson.	E. Lawrence	S.	New Zealand Shipping Co., Ld.	" " 20.8.37 to 4.12.37	15.12.37
*† Robert F. Hand (tank).	J. A. Collie	J. R. Macartney	"	"	Anglo - American Oil Co., Ltd.	" " 11.12.37 to 1.2.38	7.2.38
*† Rockflower S.T.	L. D. Romyne	L. D. Romyne	J. H. Senior	"	Yorkshire Steam Fishing Co., Ld.	{ " " " 6.2.38 to 3.3.38 " " " 9.2.38 to 3.3.38	5.3.38 7.3.38
032 *† Rotorua	A. E. Lettington	E. J. Ormsby	"	M.	New Zealand Shipping Co., Ld.	{ " " " 7.5.37 to 19.8.37 Fm. 911	16.9.37
*† Royal Sceptre	J. L. Williams	"	"	S.	Hall Bros.	" " " " " " " " " " " "	"
231 *† Ruahine	G. Kinnell	J. E. Clarke, C. W. Roberts, J. A. Matthews.	"	"	New Zealand Shipping Co., Ld.	Fm. 911 28.2.37 to 13.6.37	22.7.37
*† St. Cathan, S.T.	J. H. Ellis	J. H. Ellis	M. E. Sandell	"	Thos. Hamling & Co. Ltd.	Fms. 911 & 138 14.2.38 to 26.2.38	2.3.38
*† St. Helier	R. Pitman	V. Newton, W. B. Williams	L. Wilmot	"	G.W. Railway	Fms. 912 11.2.38 to 28.2.38	24.2.38
*† St. Julien	L. Richardson	J. D. Thomas	E. Trapnell	"	"	Fms. 911 & 138 2.9.37 to 30.9.37	1.10.37
*† St. Patrick	H. C. Bond	T. D. Thomas	L. M. Wilmott	"	"	" " 28.9.37 to 28.9.37	2.10.37
100 †† Samaria	J. McRostie	S. W. Howell, H. Hudson, A. B. Fasting	R. A. J. Owlett	"	Cunard White Star, Ld.	{ " " " 14.11.37 to 21.2.38 " " " 21.8.37 to 23.10.37	23.2.38 10.11.37
*† San Adolfo, M.S. (tank)	P. Johnston	A. Skinner, W. Farrell, F. White.	A. Julius	M.-S.	Eagle Oil & Shipping Co., Ld.	Fm. 911 25.1.38 to 13.2.38	5.3.38
108 *† San Alberto, M.S. (tank)	C. Vidot	H. Shotton, J. Shaw, W. Scoebel.	R. E. Evans	M.	"	Fms. 911 & 138 31.1.38 to 14.2.38	8.3.38
*† San Alvaro, M.S. (tank)	F. A. Kennett	H. Harrington, J. S. Munday.	A. Rankin	M.-S.	"	Fm. 911 12.10.37 to 5.1.38	15.1.38
703 *† San Arcadio, M.S. (tank)	S. Perry	J. H. Gay, M. A. Connel, J. S. Burgess.	J. McManus	M.	"	Fms. 911 & 138 27.1.38 to 12.2.38	3.3.38
159 *† San Casimiro, M.S. (tank)	H. Paterson	"	"	"	"	" " " " " " " " " "	"
*† San Cirilo	A. Riddell, R.D., Capt., R.N.R.	E. Dellow	"	"	"	Fm. 911 4.12.37 to 12.1.38	15.1.38
*† Scotia	W. T. Griffith	N. Lloyd Williams	J. H. Rockey	S.	L.M. & S. Railway	Fms. 911 & 138 13.9.37 to 29.10.37	2.11.37
170 †† Seythia	J. G. Bisset, R.D., R.N.R.	P. A. Read, R. E. Patchett, R. G. Roberts.	R. Greenall	"	Cunard White Star, Ld.	{ " " " 28.2.38 to 6.3.38 " " " 27.2.38 to 7.3.38	9.3.38 9.3.38
211 *† Shropshire, M.S.	R. S. Evans, O.B.E.	A. E. Young, A. E. Evans, G. Washington.	G. C. Talbot	"	Bibby Bros. & Co.	Fms. 911 & 138 10.10.37 to 16.12.37	22.12.37
121 *† Siamese Prince, M.S.	E. Hardcastle	R. Jones, E. A. Parfitt, C. Blakey, G. Lindsay.	A. Frazer	M.L.	Furness Lines	Fm. 915 18.8.37 to 10.12.37	7.2.38
*† Silversandal	R. H. Woodrow	R. W. Cherry, Bonnywell, Whiston.	H. Williams	"	S. & J. Thompson, Ltd.	" " " " " " " " " "	"
*† Silverwalnut, M.S.	J. Smith	H. J. Pursey, J. Eccleston, C. U. S. Butlers.	D. H. Walker	"	"	Fm. 915 23.8.37 to 14.12.37	7.2.38
141 *† Somerset	C. A. J. Williams	H. Hill, C. C. Wilson, R. M. Roberts	S. G. Peeling	S.	Federal S.N. Co., Ld.	Fms. 911 & 138 15.7.37 to 15.11.37	14.12.37
052 *† Spero	W. A. Dossar	W. S. Hepton, J. A. Atkinson, E. Gould.	A. Fairbairn	"	Ellerman Wilson's Line, Ld.	" " 4.2.38 to 27.2.38	1.3.38
*† Staffordshire, M.S.	W. L. Foster	A. A. Mackenzie, H. Kerbyson, H. J. Inman.	F. E. C. Blinco	"	Bibby Bros. & Co.	Fm. 911 24.10.37 to 30.12.37	13.1.38
134 †† Stirling Castle, M.S.	A. O. Morgan, R.D., Commr., R.N.R.	P. H. Grieves	G. Scour	"	Union-Castle Mail S.S. Co., Ld.	Fms. 911 & 138 13.11.38 to 25.11.37	5.1.38
020 *† Stirlingshire, M.S.	A. Mackinlay	G. Bowen, R. E. Smallbone, D. E. H. Hawkins.	L. L. F. Reed	"	Turnbull, Martin & Co., Ld.	" " 3.1.38 to 24.1.38	15.2.38
*† Stockport	H. S. Brown	H. S. Brown, W. Davies	G. Hawkins	"	L. & N.E. Rly	" " 9.9.37 to 28.11.37	30.11.37
270 †† Strathaird (t-e)	J. M. M. Tickell	G. R. Peters, H. F. O. Bush, M. Ken.	A. Morris	"	P. & O. S.N. Co.	" " 30.10.37 to 2.2.38	7.2.38
†† Strathallan	J. H. Biggs, R.D., Commr., R.N.R.	"	"	M.-S.	" " "	" " " " " " " " " "	"
238 †† Stratheden	R. Harrison, D.S.O., R.D., R.N.R.	C. V. Legassick, J. O. Briggs, J. A. Mason.	H. S. Horne	"	" " "	" " 14.1.38 to 24.1.38	28.2.38
277 †† Strathmore	F. E. French	B. H. Pollitt, S. Edmundson, K. S. Renshaw, J. Toulouse.	S. W. Mitchell	"	" " "	" " 2.10.37 to 6.1.38	8.1.38
059 †† Strathnaver (t-e)	E. P. Lyndon, R.D., Lt.-Commr., R.N.R.	B. H. G. Rind, A. J. McHattie, P. Hopkins.	P. R. Hobbs	"	" " "	" " 24.10.37 to 1.12.37	4.12.37
229 *† Tactician	A. J. Meek	L. Harriman, R. Myles, R. H. Morris.	M. B. Yeo	M.	T. & J. Harrison	" " 12.11.37 to 4.2.38	9.2.38
021 †† Tamaroa	W. Dawson	G. Simmers, G. Hawley, T. K. Clarkson.	P. Maloney	M.-S.	Shaw Savill & Albion Co., Ld.	" " 2.10.37 to 8.1.38	11.1.38
264 *† Tanda	E. T. Pilcher, Lt.-Cmr., R.N.R.	G. D. Clark, A. Krummee, R. N. Coluin.	W. H. Harris	M.L.	Eastern and Australasian S.S. Co., Ld.	Fm. 915 14.7.37 to 27.9.37	20.12.37
047*† Taranaki, M.S.	W. West	D. W. Campbell, A. J. Tillott, D. MacLean.	A. J. Rice	S.	Shaw, Savill & Albion Co., Ld.	Fms. 911 & 138 17.4.37 to 6.8.37	21.8.37

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed. 5.12.37 to 9.3.38.	Date Last Return Received.
048 †† <i>Themistocles</i> ...	C. Wood, D.S.C. ...	R. F. Hamilton, J. G. Lindhardt, J. K. Downs.	V. Murphy ...	M.-S.	Shaw, Savill & Albion Co., Ltd.	Fms. 911 & 138 21.7.37 to 15.11.37	29.11.37
*† <i>Thistleleglen</i> ...	G. A. Whitfield, O.B.E.	W. A. Wilson, L. C. Forth, L. H. Williams.	T. C. Rodgers ...	M.	Allan, Black & Co.	Fm. 911 10.8.37 to 15.1.38	22.1.38
161 *† <i>Titan</i> ...	P. J. Pycraft ...	V. M. Ragg ...	...	S.	A. Holt & Co. ...	Fms. 911 & 138 13.11.37 to 30.12.37	7.2.38
242 *† <i>Tongariro</i> ...	P. B. Clarke, D.S.C. ...	J.S. Hough, N. A. Thomas, N. W. Piercy.	J. F. McNeill ...	"	New Zealand Shipping Co., Ltd.	" " 1.1.38 to 4.2.38	2.3.38
<i>Torcello</i> ...	A. Hinchliff ...	H. Grunnill ...	...	M.L.	Ellerman's Wilson Line, Ltd.	Fm. 915 15.6.37 to 21.12.37	29.12.37
025 †† <i>Transylvania</i> ...	D. W. Bone ...	R. L. Robertson, A. Colquhoun, H. Brown.	J. McDonald ...	S.	Anchor Line, Ltd.	Fms. 911 & 138 12.12.37 to 19.12.37	30.12.37
104 †† <i>Tuscania</i> ...	J. B. Caithness ...	H. A. P. Martin-Ross, F. Caldwell, J. George.	J. Harvey ...	"	Anchor Line, Ltd.	Fms. 911 & 138 6.6.37 to 21.8.37	24.8.37
221 †† <i>Tynefield</i> , M.S. (tank)	L. B. Carr	T. Mallom, R. F. Murray, P. McLusky.	G. Binch ...	"	Hunting & Son, Ltd.	Fms. 911 & 138 1.1.38 to 22.1.38	27.1.38
176 *† <i>Vancouver City</i> , M.S.	T. S. Dixon ...	E. Senior, H. David, G. H. Harvey.	C. M. Watson ...	"	Sir Wm. Reardon Smith & Partners, Ltd.	Fms. 911 & 138 28.6.37 to 26.8.37	2.9.37
088 †† <i>Vandyck</i> ...	P. Symons ...	J. A. Baragwanagh, A. N. Blundell.	W. Smith ...	"	Lampport & Holt, Ltd.	" " 20.10.37 to 16.1.38	22.1.38
079 †† <i>Viceroy of India</i> (t-e)	E. A. J. W. Carter ...	R. B. Nowell, R. H. Hand ...	H. S. Horn ...	M.-S.	P. & O. S.N. Co.	" " 21.12.37 to 4.1.38	7.1.38
*† <i>Vienna</i> ...	H. Pickering ...	D. A. Williams, R. Greenfield	G. Madle ...	S.	L. & N.E. Rly. ...	" " 9.10.37 to 5.12.37	5.1.38
004 †† <i>Waipawa</i> , M.S.	J. W. Johnson ...	N. E. Wood, R. Barns, J. W. Paine.	H. A. Bloxham ...	"	Shaw, Savill & Albion Co., Ltd.	" " 2.2.38 to 28.2.38	3.3.38
254 †† <i>Wairangi</i> , M.S.	H. R. Gordon ...	I. Collins, E. Sainsbury, I. Wildsmith.	E. W. Simmons ...	"	" " "	" " 24.9.37 to 8.1.38	11.1.38
225 *† <i>Wairuna</i> ...	A. Reed ...	J. L. Hughes, D. Champion, G. Kent.	S. Waters ...	M.L.	Union S.S. Co. of N.Z., Ltd.	" " 29.1.38 to 28.2.38	3.3.38
212 †† <i>Waiwera</i> , M.S.	W. C. Meek ...	M. S. Newton, R. G. James, A. M. Whiteford.	A. H. Coxhead ...	S.	Shaw, Savill & Albion Co., Ltd.	Fm. 915 21.5.37 to 2.9.37	20.12.37
056 *† <i>Westmoreland</i> ...	E. R. Kemp ...	J. M. Taylor, R. C. Robinson, B. H. C. Crowhurst.	R. Glover ...	"	New Zealand Shipping Co., Ltd.	Fms. 911 & 138 8.12.37 to 5.1.38	26.2.38
075 †† <i>William Scoresby</i> , R.R.S.	R. C. Freaker, Lt., R.N.R.	...	...	M.L.	Discovery Committee	" " 27.8.37 to 24.1.38	7.2.38
208 †† <i>Winchester Castle</i> , M.S.	A. H. Blackman ...	A. O. Wilkins ...	A. G. Blow ...	S.	Union-Castle Mail S.S. Co., Ltd.	Fms. 911 & 138 16.10.37 to 6.2.38	16.2.38
005 †† <i>Windsor Castle</i> ...	Basil Ray ...	...	...	"	" " "	" " 25.9.37 to 16.12.37	21.12.37
053 *† <i>Worcestershire</i> , M.S.	R. P. Mann ...	T. H. Lowe, J. H. Barwick, J. McAuseland.	J. Leech ...	"	Bibby Bros. & Co.	Fms. 911 & 138 22.11.37 to 27.1.38	13.2.38
*† <i>Worthing</i> ...	B. Shaw ...	E. Balcombe ...	L. Shepherd ...	"	Southern Railway	" " 22.11.37 to 20.12.37	24.12.37
244 *† <i>Yoma</i> ...	J. A. Wilson ...	N. McFadyen, W. C. Wilson, P. D. Barr.	R. S. Wilson ...	M.	P. Henderson & Co.	" " 19.9.37 to 1.12.37	4.12.37
012 *† <i>Yorkshire</i> ...	V. C. P. Smalley ...	T. A. Gibson, H. Davies, W. Tector.	R. C. Wilde ...	S.	Bibby Bros. & Co.	" " 28.1.38 to 22.2.38	26.2.38
<i>Conway</i> , H.M.S.	T. M. Goddard, Commr., R.N.R.	The Senior Cadets ...	...	Cadets M.L.	...	Cadets Met. Log. 19.9.37 to 13.12.37	16.12.37
<i>Pangbourne Nautical College</i> .	A. B. Greig, O.B.E., D.S.C., Capt., R.N.	" " ...	...	"	...	" " 24.9.37 to 18.12.37	29.12.37
<i>Worcester</i> , H.M.S.	G. C. Steele, V.C., Commr., R.N.	" " ...	...	"	...	" " 25.9.37 to 16.12.37	21.12.37
<i>Watling Island</i>	...	The Keepers ...	...	Lighthouse Register	...	Lighthouse Register 1.1.37 to 10.7.37	27.9.37
<i>Cape Pembroke</i> ... (Falkland Is.)	...	" " ...	...	"	...	" " 1.7.37 to 31.12.37	9.2.38

SHIPS WATER SAMPLING THE NORTH ATLANTIC. FISHERIES LABORATORY, LOWESTOFT.

Name of Vessel.	Captain.	Observing Officer.	Owners.	Received at Government Chemist, London.
<i>Dakarian</i> ...	A. D. Brown ...	W. P. Baker ...	T. & J. Harrison ...	30 Water Samples, 21.1.38
<i>Darian</i> ...	W. Rowberry ...	R. F. Hart ...	" " ...	30 " " —4.38
<i>Daytonian</i> ...	J. M. Crowley ...	S. Richardson ...	" " ...	30 " " 31.12.37
<i>Hilary</i> ...	L. Evans ...	H. Sapsworth ...	Booth S.S. Co. Ltd. ...	60 " " 3.12.37

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