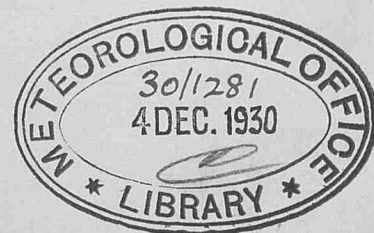


The Marine Observer



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

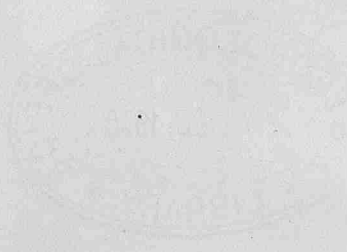
Vol. VIII., 1931.

Published by the Authority of
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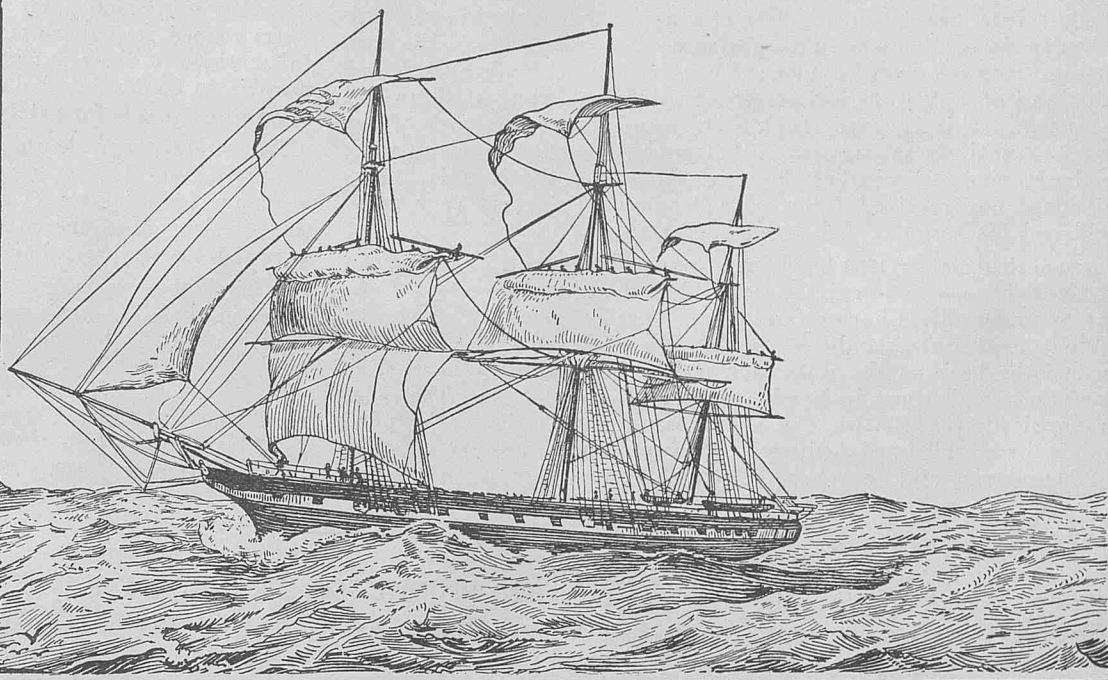
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VOL. VIII. No. 85.

THE MARINE OBSERVER.

JANUARY, 1931.

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FOREWORD TO VOLUME VIII.

By Dr. G. C. SIMPSON, C.B., F.R.S.

On the threshold of a new year it is natural to look back on the old year, to review the progress made and to consider what hopes have been fulfilled and what disappointed.

Such a review of 1930 shows much to be thankful for in the domain of marine meteorology; in fact the year might be called the year of fulfilment.

For several years back the Marine Division has been planning how to co-ordinate the meteorological work of ships of all nations in order to contribute to safety of life at sea, to aid rapid and economical navigation and to add to the interest of the seaman in the wonders and beauties of nature with which he is surrounded. The period of planning came to an end in 1929 with the adoption by the International Conference of Safety of Life at Sea and the

International Meteorological Conference of the main outlines of the British proposals regarding the "Selected Ship" and the universal code for weather messages from ships. The chief occupation during 1930 has been to give effect to these international agreements.

So far as the British Meteorological Office is concerned we have carried out to the full the duties imposed upon us. The British Merchant Navy has responded splendidly to the call and there has been no difficulty whatever in completing our quota of "Selected Ships," all willing, even anxious, to take the observations and to broadcast them for the use of surrounding ships and of coast stations. Other nations are doing their share and it is hoped that in a short time the full thousand selected ships asked for by the International

Meteorological Conference will be actively at work in all parts of the oceans.

The new code for the transmission of ships' observations was brought into use in May. The observers have experienced little difficulty in coding the messages and the choice which the two forms of message gives has made it possible for the needs of different ships and of meteorological services in different parts of the world to be met. This is wonderful progress and makes the work of the year 1930 entirely satisfactory. It has meant hard and trying work in the Marine Division but the loyal help which the Marine Superintendent has received from his colleagues at sea has very much lightened his task.

In another matter 1930 has been a year of fulfilment. I mentioned in my Foreword last year the work which had been done by a Committee under Sir Charles Sanders to specify zones in which the various load lines should be used. The work of this Committee formed the basis of the discussion at the International Load Line Conference which met in London during May and June. The zones proposed by the British Committee were simple, being bounded mainly by parallels of latitude. It was found necessary to alter the boundaries and several new seasonal zones were introduced so

that the chart of the zones finally adopted is much more complicated than the original one. Throughout the protracted and difficult discussion meteorological records were the criterion on which the decisions were made and the work of marine observers for many years reaped its full reward. All seamen have reason to be grateful to those of their numbers who collected the data which made it possible to hold a just balance between the needs for economic loading and the needs for safety.

The coming year should be one of consolidation without change; the main lines of future progress are now laid down and it is only necessary for us to travel along them energetically but steadily. In this we depend on the co-operation of our co-workers at sea and I have not the slightest doubt but that we shall receive it.

I thank most sincerely all those who have helped us in the past, those in the ships, the marine agents and the staff of the Marine Division and I wish one and all a happy and successful New Year.

DIRECTOR.

Meteorological Office,
Air Ministry.
15th November, 1930.

THE MARINE OBSERVER, 1931.

The best of good wishes for 1931 to the British Corps of Voluntary Marine Observers and all at sea whom this journal reaches.

In past years in our opening numbers we have usually expressed hopes, particularly with regard to future organization, but this year we start at any rate with the British complement of "Selected Ships" for Routine Wireless Weather Telegraphy duly organized and established in accordance with Great Britain's proportion of the world's mercantile tonnage.

We wish during the coming year, especially the commanders, officers and W.T. operators of "Selected Ships" success in their work. Out of this work of "Selected Ships" in communicating by Wireless Telegraphy observations of Weather, Currents, and Ice to all ships and certain stations, more may be done in the Merchant Service than by any other branch of Marine Meteorology. When we say this the original work of the Corps of Voluntary Marine Observers and the Marine Division in the production of the Meteorological Ocean Charts and averages should not be forgotten, for that has become even more useful by reason of this later application of Meteorology to navigation. We cannot yet hold out more hopes of producing modern Meteorological Charts of the oceans upon the uniform plan and scale which has been so strongly advocated; but we are continuing our efforts towards that end. With a view to checking the data returned and extracted of late years, keeping before observers at sea the constant need for accurate observation and providing averages which will be useful in navigation where there is much shipping, wind roses with the frequency of the different kinds of weather for the region off the coast of Spain and Portugal will be published month by month. The currents experienced along the trade routes of the South and East Coast of Africa and to Mauritius since 1910 will be charted in the March, June, September and December numbers. Last year the charting of currents observed on the trade routes from Australia to Perim added a good deal of new information regarding the variations of current in the Indian Ocean and it is intended to continue this investigation until all routes traversing that ocean upon which there are sufficient observations have been charted; so that in a few years we may be able to produce another Atlas upon the same lines as that of the North Atlantic published last year.

The recommended routes from Colombo to Perim during the South West Monsoon will be overhauled and if necessary the result of this further examination will be the subject of an article in one of the numbers before next South West Monsoon season. The views of Commanders in Eastern Trades upon this were again invited last year and we hope that all who are interested and have experience of navigating the Arabian Sea will assist in this investigation by sending in their carefully considered opinions as soon as possible.

Charts giving the danger zone and exceptional tracks of Typhoons in the China seas adapted from the work of the Rev. P. E. GHERZI of Zi-Ka-Wei Observatory will appear in each number.

The Southern Ocean Quarterly Ice Chart will be brought up to date and published in the appropriate numbers and each month ice reports received since 1928 from Southern Waters will be continued.

Charts of average fog in the South Atlantic will appear each month.

In the Marine Division we shall write such notes and articles as we are able to and these will be published as usual, but as the work is developed it becomes more and more difficult to find the necessary time, material and information to write of new subjects ashore in an office to those who are at sea seeing for themselves the wonders of nature. We hope that more technical experts will contribute upon matters of interest to seamen. In past years a number of gentlemen provided most useful and interesting articles on a number of subjects including Wireless Telegraphy and Greenwich Time.

It is to the Corps of Voluntary Marine Observers to whom we look chiefly to provide the main source of interest in THE MARINE OBSERVER. In the Marine Observer's Log we look to publish more and more interesting and useful information from the remarks in Meteorological Logs and Records and such papers as those at sea care to send us.

As we said last year in our notes under the heading "The Practical Side of the Work and its Utility to the Merchant Navy" the great thing now is to develop the use of the information broadcast regularly by "Selected Ships" and to make known this utility.

Here is where THE MARINE OBSERVER may be made most interesting and useful in 1931. We ask those at sea who have interesting and useful experiences in the application of this work to the navigation of the ship to report upon them so that first hand information may be included in the Marine Observer's Log.

This morning when examining the Meteorological Log and Register and the report of the Port Meteorological Officer upon a B "Selected Ship", we saw evidence of the great interest and endeavour of a young fourth officer. That log was classed excellent, as it richly deserved, when compared with others; but what struck us was this:—

That youngster had taken tremendous pains: not only had the observations been taken and entered with great care, W.T. weather reports coded and made regularly to all ships in accordance with the correct procedure, and weather charts drawn, but he had also tabulated information received from other ships with a view to comparison as to which had taken the most favourable route.

What was missing was evidence that the valuable knowledge which could be obtained from all this work and information had been applied to the navigation of the ship.

It may have been so applied, in which case it was a pity that this should not have been noted. Possibly this young officer may not have brought the information to the notice of his Commander soon enough. The keenness, adaptability and industry of youth in this work if encouraged, assisted and guided by experience, may reap greater fruits in the future. A young officer may be able to do the meteorological work to perfection, but this cannot be effective unless it is applied by the Commander and senior officers to the navigation of the ship. If this work is to be really useful to reduce cost of propulsion and increase safety, then its application to the navigation of the ship is necessary.

In past years a number of interesting descriptions by Captains and Officers of instruments used or invented by them have been published, and we wish to give every possible encouragement to this sort

P.S.—The commanders and officers of "Selected Ships" will be glad to know that all British Shipowners, with vessels of over 1,600 tons, have been circularized regarding the provision of the Decode, M.O. 329; and many have intimated that they are providing the masters of their ships with this pamphlet, so that "Selected Ships" may rest assured that the information they provide can be generally used.

Several commanders of "Selected Ships" have pointed out the possibilities of short wave long range transmission. The whole question of wireless communication by British "Selected Ships"

of thing, for much good may come by the writing of articles upon matters regarding navigation and seamanship by those at sea even if they are only remotely connected with Marine Meteorology.

Then there are the beauties of nature at sea. We shall publish the best illustrations returned by Marine Observers in the Marine Observers' Log.

We thank the Corps of Marine Observers for all their fine work which has been the making of this journal, and we look to them for the desirable material to maintain and improve it. Our first object is to give them the utmost encouragement and service that we can.

MARINE SUPERINTENDENT.

London.

October 1st, 1930.

is under constant examination in consultation with the Inspector of Wireless Telegraphy of the General Post Office, who has done so much to forward this scheme of communication. When, and if, the time arrives that there are sufficient ships fitted in this manner the necessary steps will be taken.

Meanwhile all commanders of British "Selected Ships" are asked as far as possible to carry out the procedure given in this number, pages 16 to 20.

MARINE SUPERINTENDENT.

November 26th, 1930.

THE MARINE OBSERVER'S LOG.

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

BROKEN WATER.

Off Cape Guardafui.

The following is an extract from the Meteorological Log of S.S. *Margha*, Captain C. G. HUGHES, London to Calcutta, Observer Mr. H. WATKINS, 2nd Officer.

3rd January, 1930, 1 p.m. ship's time, in Latitude $11^{\circ} 57\frac{1}{2}'$ N., Longitude $51^{\circ} 13'$ E., wind N.E. force 4. Sea and swell moderate. Passed through first of four belts of smooth water, separated by belts of water about one mile in width, more broken than would normally be expected, from the prevailing wind. The first, and widest, belt was from 3 to 5 cables wide, running in a N.W. and S.E. direction from horizon to horizon. The three following belts were each as long, but slightly narrower than its predecessor. Presumably these were lines of current, because on entering each belt of smooth water the ship's head which was east at the time, swung suddenly to the southward.

DISCOLOURED WATER.

Off East Coast of Africa.

The following is an extract from the Meteorological Report of S.S. *Modasa*, Captain J. W. GILCHRIST, East Africa to London, via Suez. Observer Mr. B. PAUL, 2nd Officer.

January, 16th, 1930. Noon A.T.S. Latitude $3^{\circ} 07'$ S., Longitude $41^{\circ} 13'$ E. Steering 235° , $9\frac{1}{2}$ knots. Barometer 30.10 in. Temperature air 82° F. Wind E.N.E. force 2. Slight sea and swell. Upper clouds nil. Lower clouds Cu: amount 3. Sea water temperature 78° F. Sea water S.G. 1.031., S.G. three hours later 1.027.

Observed remarkable discoloured water four points on the star-board bow, distance $\frac{1}{2}$ mile, extending for about three miles and approximately 2 cables in breadth. The water had the appearance of a well-emerged sandbank, and was bright yellow in colour. The surface water in the vicinity was varying in colour from dark to

light blue, maintaining undulating contours of definite semicircular character. The water alongside the ship was light in colour and contained small particles of matter not unlike sand. A closer inspection was not obtained. Both previous to and after the appearance of this phenomenon, the sea was a normal blue in colour. Heavy rains had been experienced inland and in the vicinity.

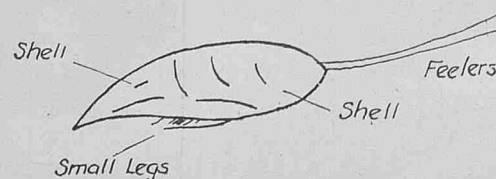
South Atlantic Ocean.

The following is an extract from the Meteorological Report of S.S. *Gloxinia*, Captain F. G. POOL, Rio de Janeiro to South Georgia, Observer Mr. S. G. ELLIOTT.

At 7 p.m. A.T.S., on January 1st, 1930, in Latitude $41^{\circ} 26'$ S., Longitude $39^{\circ} 51'$ W., observed discoloured water ahead, stretching in lanes and patches E.S.E. and W.N.W. and several miles in extent. The water had the appearance of being contaminated by thick blood, and as a large whale was seen amongst the discolouration, it was thought to be a wounded animal. When samples of the water were taken and examined, the discolouration was found to be caused by myriads of small shell fish (see attached sketch) about $1/16$ and $1/32$ of an inch long. The vessel steaming nine knots was over an hour passing through them. Some were in very large patches, but mostly in bands or lanes as described before, which might be due to current. The weather at the time was dull, low nimbus clouds (amount 10) wind E. by N., force 3, slight sea and moderate swell. Barometer 29.88 in. Temperature air 57° dry and 57° wet bulb. Sea surface 58° and, at injection 15 feet below, 55° .

MAGNIFIED.

Actual size.



The whale appeared to be feeding on the animals, and on the approach of the vessel sounded and disappeared. The animals were of a pale transparent pink, and in a bottle of water, moved in a series of convulsive jumps. When seen over side, they extended from the surface to a depth of several feet.

CLOUD PHENOMENON.

Indian Ocean.

THE following is an extract from the Meteorological Log of M.V. *Karama*, Captain A. McINTOSH, Aden to Fremantle, Observer Mr. N. S. MILNE, 4th Officer.

January 1st, 1930. Aden to Fremantle, 5.30 p.m., 1300 G.M.T., Latitude $1^{\circ} 47' N.$, Longitude $68^{\circ} 38' E.$ Barometer 1008.4 mb. Wind N.E., force 3. bc. Temperature, Dry 83° , Wet 78° . Observed cumulus clouds moving from ENE/2 until reaching zenith when they entered what appeared to be an "air-pocket", causing them to whirl partly round and disintegrate, afterwards resuming their Wly. movement, but as Fr.Cu. The upper clouds at the time were cirrus lying in lines SSE. to NNW. to the Southward covering 5/10ths sky. These clouds were apparently stationary, but slowly disintegrating. The northern half of the sky was clear of upper clouds. 5.35 p.m. wind veered to East force 3. 5.45 p.m. Cu/Cu-Nb. moving slowly from Eastward, and slight precipitation observed. After sunset sky cleared slowly till end of watch.

SMOKE PHENOMENON.

Mediterranean Sea.

THE following is an extract from the Meteorological Report of S.S. *British Dominion*, Captain R. J. TAYLOR, Swansea to Port Said, Observer Mr. C. JAMES, 2nd Officer.

January 24th, 1930, at 0910 G.M.T. in Latitude $37^{\circ} 05' N.$, Longitude $1^{\circ} 50' E.$ 40 miles 037° from Cape Tenez. Ship steaming 080° at 11.25 knots. Barometer 1016.5 mb. Temperature, Air 60° , Sea 58° .

Observed isolated puff of fuel oil smoke from funnel, which twirling within itself passed over our port quarter. Within a few seconds the smoke, having descended a little, had taken the form which resembled two curled ostrich feathers, drooping from each other, with a thin film of smoke in fibrous vertical lines extending to the sea surface as if growing therefrom, and casting a whitish shadow on the sea in a N.N.W. direction from it. The remarkable quickness of its formation, and rigid fixity of the mass and fibrous like parts, caused me to keep observation on it up to 0930 G.M.T. No apparent change had taken place, but distance now prevented me from seeing the lower film-like part; its bearing was 276° , i.e., 16° from the aft midship line; and distance $3\frac{3}{4}$ miles, on port quarter. From 0930 to 0943 G.M.T. the smoke gradually became in appearance a stratus like cloud. The last bearing was taken at 0940 G.M.T. 277° , i.e., 17° (from aft) of the port quarter, which suggests a slight northerly drift, its altitude at this time was $40'$ of arc. A steamer eastward of us about 7 miles had a long horizontal line of smoke laying to the northward, the altitude of which was also $40'$ of arc. At this time the sky was heavily clouded, the background to the puff of smoke was A-St with St-Cu above. The sea was calm. Visibility V.G. No rain.

WEATHER CHART MADE AT SEA.

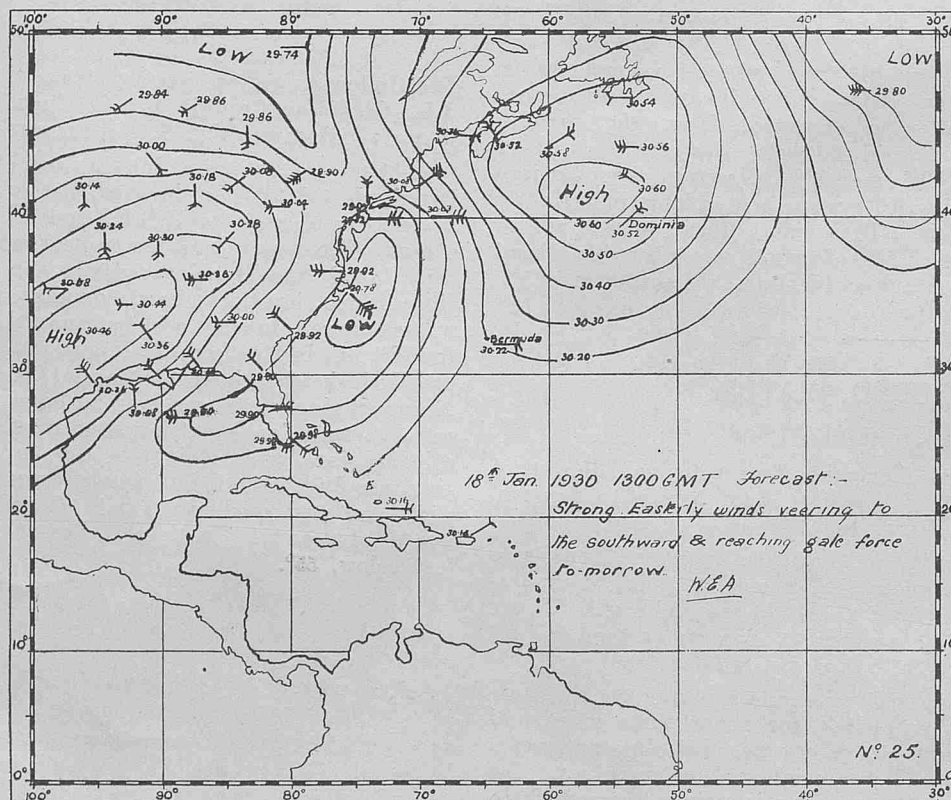
Western North Atlantic.

This chart (No. 25) is one of a series made by Lieutenant W. E. ALLEN, R.N.R., 2nd Officer cable ship *Dominia*, Captain V. CAMPOS, O.B.E. *Dominia* was one of the cable ships engaged during the winter of 1929-1930 in the extensive repairs to Atlantic cables following damage done by earthquake.

In several contributions to THE MARINE OBSERVER, Mr. ALLEN has shown how useful the application of Marine Meteorology to cable work may be, and here he gives more substantial proof.

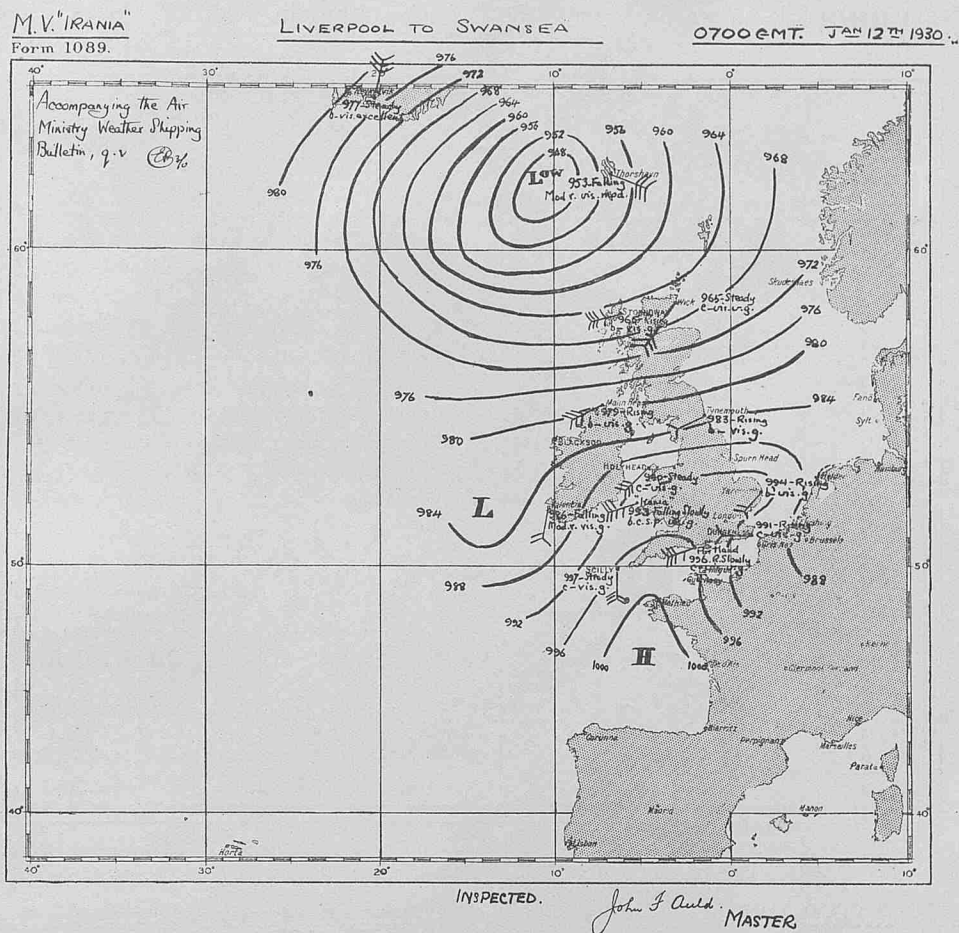
During these repairs in a region, in winter notorious for bad weather, the information gleaned from Wireless and Weather Charts provided fore-knowledge which enabled *Dominia* to take advantage of the spells of comparatively fine weather and to be warned of coming gales.

When in the vicinity of the position of *Dominia* indicated on this Chart No. 25, of 43 weather charts made, 88 per cent gave good forecasts.

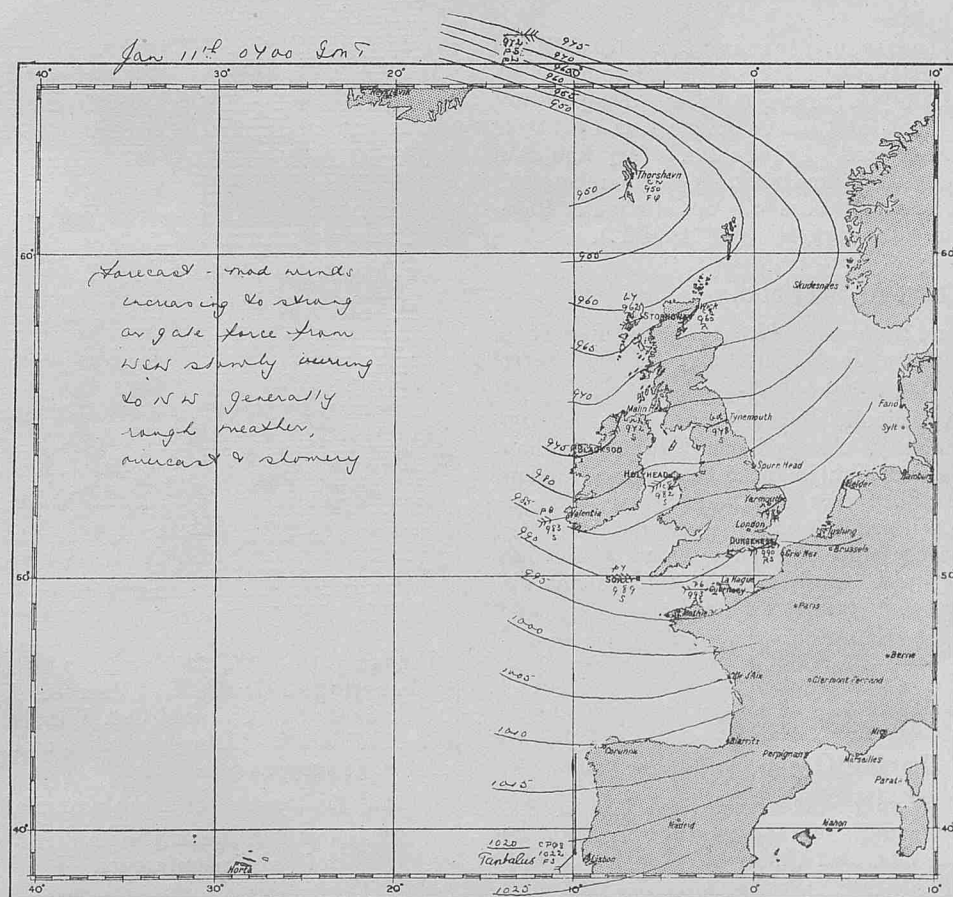


Eastern North Atlantic.

Weather Chart (one of a series) made at sea on board M.V. *Irania*, Captain J. F. AULD, Liverpool to Swansea, by Mr. E. ALLEN, 3rd Officer.



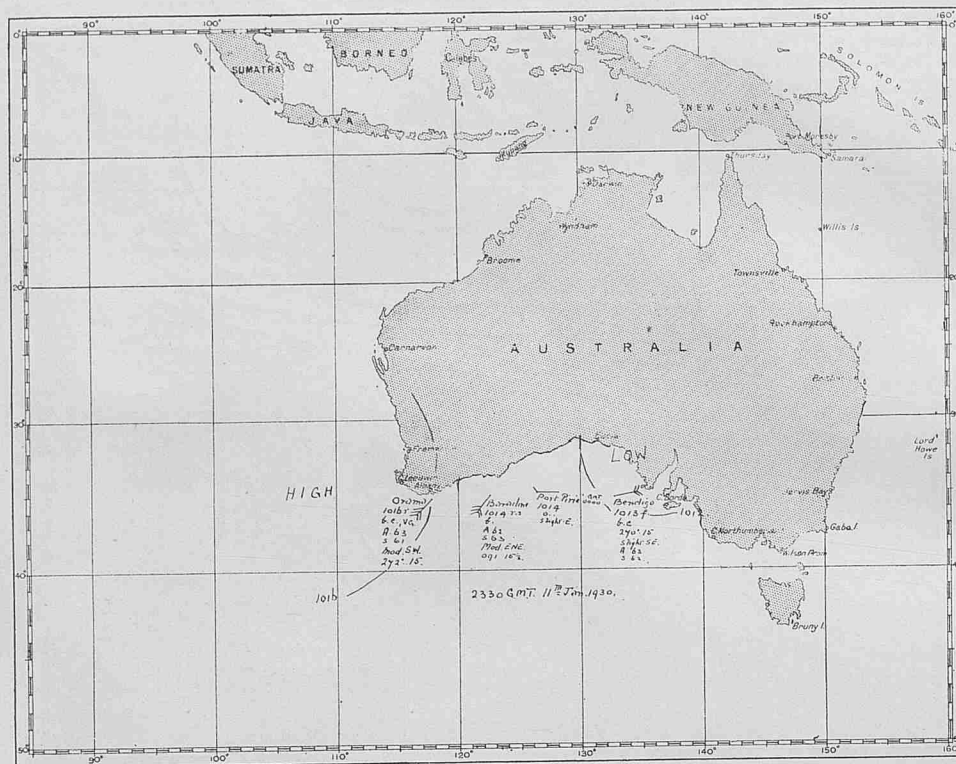
Weather Chart (one of a series) made at sea on board M.V. *Tantalus*, Captain R. DODDS, Fremantle to Dunkirk, via Suez by Mr. F. C. OPPEN.



WEATHER CHARTS MADE AT SEA (continued).

Australian Waters.

Weather Chart (one of a series) made at sea on board S.S. *Baradine*, Captain C. H. C. ALLIN, Fremantle to Adelaide, by Mr. C. B. ROCHE, Chief Officer.



LUNAR RAINBOWS.

South Atlantic Ocean.

THE following is an extract from the Meteorological Report of S.S. *Marquesa*, Captain R. S. SMILES, Montevideo to Liverpool, Observer Mr. K. ROGERS, 3rd Officer.

On January 8th, 1930, at 11.20 p.m. (January 9th, 0150 G.M.T.) bright rainbow appeared in eastern sky. Vessel in Latitude $16^{\circ} 03' S.$, Longitude $37^{\circ} 03' W.$ by D.R. Barometer 30.02 in. Temperature 79° . Wind N.E., force 3. Clouds at time of observation Cu. 6/10 Nb. 2/10. Moon setting in westward, altitude 15° . Very fine rain falling at time, duration about 3 minutes. Altitude of rainbow 35° , diameter 45° ; plainly visible although base was not distinct. Rainbow disappeared at 11.30 p.m. (January 9th, 0200 G.M.T.).

East Coast of Scotland.

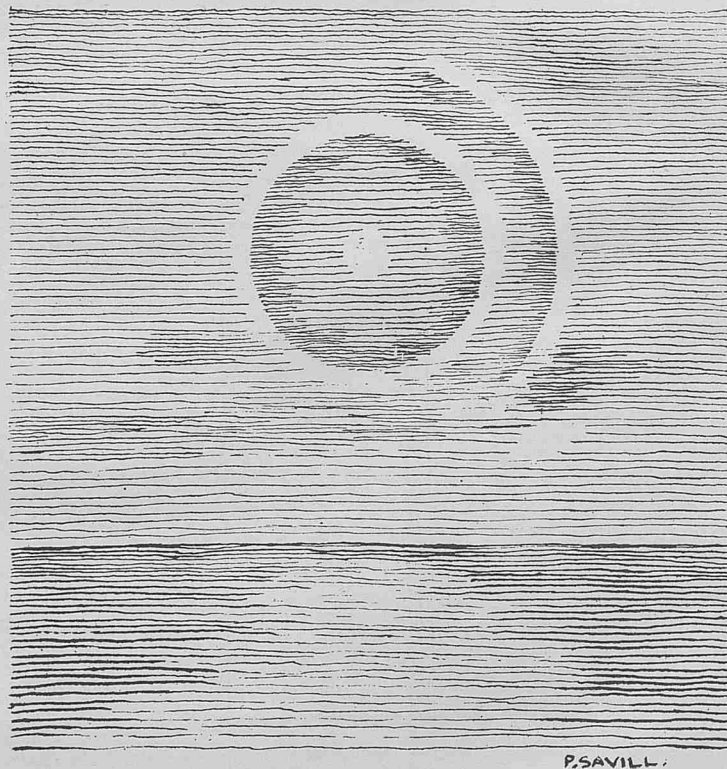
THE following is an extract from the Meteorological Report of Fishery Cruiser *Norna*, Captain J. W. WRIGHT, Fishery Patrol duties. Observer, Mr. T. R. NESS, 2nd Officer.

20th January, 1930, Loch Eriboll, Sutherlandshire. At 0600 G.M.T., while getting under way, observed small lunar rainbow. Moon was at half and bright and high in the S.W. Heavy nimbus, with rain moving from W.S.W. Sky was momentarily clear to S.W'ard and inky black to N.E'ard. Rainbow appeared for a few minutes against the dark background of nimbus cloud and neighbouring hills. The arc was quite small and the colours not distinguishable, but while it lasted it was well-defined.

DOUBLE LUNAR HALO.

South Pacific Ocean.

THE following is an extract from the Meteorological Log of S.S. *Maimoa*, Captain J. W. JOHNSON, New Zealand to London via Panama. Observer, Mr. P. SAVILL, 3rd Officer.



P. SAVILL.

January 21st, 1930, 0230 a.m., in position (D.R.) Latitude $13^{\circ} 47' S.$, Longitude $103^{\circ} 47' W.$ Observed distinct Lunar Halo. Clouds A-Cu., St-Cu., Ci-Cu., and Cu., Wind E., force 2. Altitude of Halo 60° . Radius 22° . Inner edge of halo clear cut and of a white tinge; outer edge very uneven.

0315. Sky became overcast and Halo obscured.

0330. Clouds decreasing, halo faintly visible, but broken in parts of the circumference.

0340. A second arc became visible to eastward of original Halo, about a third of its circumference only being visible, about 10° away from the Halo.

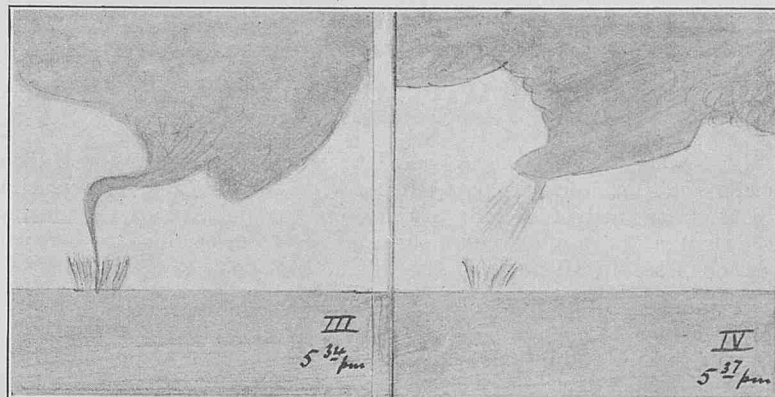
0350. Outer arc disappeared.

GREEN FLASH.

South African Waters.

THE following is an extract from the Meteorological Report of S.S. *City of Palermo*, Captain J. B. PATTISON, London to South Africa, Observer Mr. T. W. WALFORD, 2nd Officer.

January 29th, 1930, in Latitude $32^\circ 43'$ S., Longitude $17^\circ 13'$ E. (Sunset) Observed vivid green flash immediately sun disappeared below horizon, period 2 seconds, visibility being exceptionally good. Nothing unusual was observed before or after sunset. General weather for 24 hours. Fresh S.S.E. wind, rough sea and swell. Fine clear weather. Clouds nil, visibility very good to excellent. Barometer 1016.2 mb. steady. Temperature, Air 65° , Sea 62° .



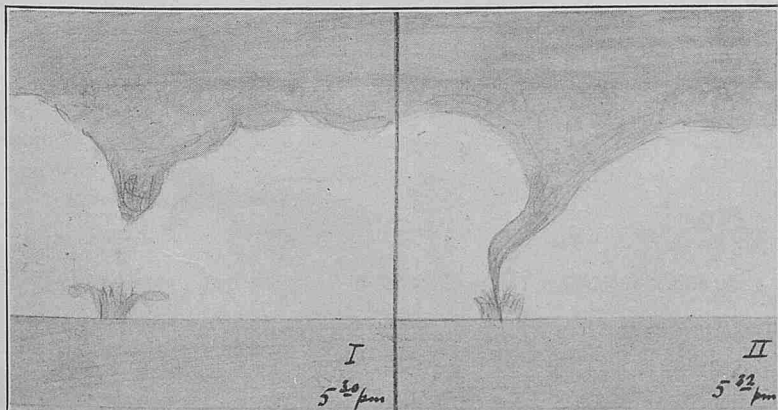
WATERSPOUT.

South Pacific Ocean.

THE following is an extract from the Meteorological Log of S.S. *Wairuna*, Captain J. RYAN, Napier, N.Z., to Vancouver, B.C. Observer, Mr. J. E. WARWICK, Chief Officer.

24th January, 1930. Whilst on passage from Napier to Lautoka, in Latitude $27^\circ 43'$ S., Longitude $178^\circ 39'$ E., a waterspout was observed to form two points on the starboard bow, distance about one mile. Ship steaming North true, 10 knots. Weather conditions for two days previously had been squally, occasional heavy rain; cloudy to overcast, with the wind beginning at N.W., force 5, and backing through S., E. and N. to N.W. again. Some thunder and lightning. Barometer steady at 1002.5 mb.

5.30 p.m. From out the base of heavy Cu-Nb., at between 800 and 1000 feet, there formed the usual dark tongue reaching downwards, and simultaneously with this appearance in the clouds whirling spray was observed about one mile distant, N.N.E., rising to a height of 30 to 35 feet (see FIGURE I). In about one minute, the spray connected with the spout from the clouds (FIGURE II), the whole moving swiftly to the S.E., passing half a mile to 1000 yards from the ship and travelling at about 25 knots. A bulged curve formed in the spout some 200 ft. below the nimbus, quickly becoming a kink (FIGURE III and photograph). The spray appeared to revolve in a clockwise direction. At about 5.37 p.m. the spout broke at 50 ft. above sea-level, quickly retracting into the clouds (FIGURE IV), the sea-surface becoming less agitated and finally normal at 5.38 p.m.



METEOR.

South Indian Ocean.

THE following is an extract from the Meteorological Log of S.S. *Tongariro*, Captain F. S. HAMILTON, Fremantle to Aden. Observer, Mr. A. G. ROBINSON, 3rd Officer.

17th January, 1930, 7.59 p.m., in Latitude $4^\circ 47'$ S., Longitude $74^\circ 31'$ E. Very bright flash of light drew attention to a meteor which commenced near the Belt of Orion and travelled past Sirius. The flash of light was followed by a distinct explosion. The occurrence gave one the impression that a ship very close to us had fired a rocket.

THE SPECIFIC GRAVITY OF THE WATER IN LOADING PORTS IN DIFFERENT PARTS OF THE WORLD.

In November, 1929, we appealed to Marine Observers for Hydro-meter readings when in port, with a view to providing information to all concerned of specific gravity for the purpose of calculating the change of draught upon a ship passing from her loading berth to the open sea in all parts of the world.

A number of regular observing ships have made and returned observations of specific gravity in a number of ports abroad, and these are now published below.

Similar information is desired for loading ports in all parts of the world, and the Corps of Voluntary Marine Observers are asked to observe and record once daily the specific gravity of the water when in port. These observations should be entered at the end of the Meteorological Log or Record. The date, time, port and berth should be given, also the state of the tide, together with information of freshets or other conditions which may temporarily affect the density of the water.

Port.	Berth.	Observing Ship.	Date and Time of Observation.	State of Tide.	Specific Gravity.	Temp. of Sea.	Remarks.
Antwerp	Petroleum Jetty	<i>British Empress</i>	12th Aug., 1930	—	1001	64°	
Casablanca	—	<i>Achilles</i>	26th Aug., 1930—Noon	High Water	1026·5	—	
Naples	Oil Jetty	<i>British Empress</i>	17th June, 1930	—	1021	73°	There had been very heavy rain about three hours before this observation was taken.
Oran	Wharf	<i>Glenamoy</i>	26th Mar., 1930—10 a.m.	—	1027	59°	
Port Said	Buoys	<i>Glenamoy</i>	18th Mar., 1930—3 p.m.	Half Ebb	1026	63°	
Suez	At anchor in bay	<i>Baradine</i>	22nd Dec., 1929—5.15 a.m.	—	1031	63°	
	Bay	<i>Glenamoy</i>	17th Mar., 1930—5 p.m.	Half Ebb	1028·5	64°	
	—	<i>Achilles</i>	17th Aug., 1930—7 a.m.	Half Ebb	1030·5	—	
Port Sudan	Wharf	<i>Glenamoy</i>	14th Mar., 1930—11 a.m.	—	1028	79°	
Colombo	Harbour	<i>Baradine</i>	1st Jan., 1930—10.30 a.m.	—	1019·3	81°	
	No. 4 Buoys	<i>Glenamoy</i>	2nd Mar., 1930—9 a.m.	Low Water	1027	83°	
Penang	Roads	<i>Glenamoy</i>	24th Feb., 1930—Noon	High Water	1027	85°	
	—	<i>Achilles</i>	9th May, 1930—10.30 a.m.	High Water	1017·5	—	
	—	<i>Achilles</i>	9th May, 1930—4.44 p.m.	Low Water	1017	—	
	—	<i>Achilles</i>	31st July, 1930—11.30 a.m.	High Water	1020·2	—	
	—	<i>Achilles</i>	31st July, 1930—7 a.m.	Low Water	1021	—	
Port Swettenham ...	—	<i>Achilles</i>	30th July, 1930—1.30 p.m.	Low Water	1020	—	
	—	<i>Achilles</i>	12th May, 1930—10.45 a.m.	Low Water	1018·5	—	
	—	<i>Achilles</i>	12th May, 1930—4.42 p.m.	High Water	1018·5	—	
Singapore	Roads	<i>Glenamoy</i>	22nd Feb., 1930—3 p.m.	Half Ebb	1027	82°	
	—	<i>Achilles</i>	14th May, 1930—Noon	High Water	1023	—	
	—	<i>Achilles</i>	14th May, 1930—5.15 p.m.	Low Water	1020·5	—	
	—	<i>Achilles</i>	28th July, 1930—6 a.m.	Slack	1018·5	—	
	—	<i>Achilles</i>	28th July, 1930—12.15 p.m.	1 hour before High Water	1021	—	
Hong Kong	Kowloon Wharf	<i>Glenamoy</i>	12th Jan., 1930—2 p.m.	Low Water	1026·5	64°	
	—	<i>Achilles</i>	21st May, 1930—2 p.m.	High Water	1022·5	—	
	—	<i>Achilles</i>	21st May, 1930—8 p.m.	Low Water	1024	—	
Shanghai	C.M.L. Wharf	<i>Glenamoy</i>	22nd Jan., 1930—Noon	Low Water	1000	45°	
	—	<i>Achilles</i>	26th May, 1930—11 a.m.	High Water	1005	—	
	—	<i>Achilles</i>	26th May, 1930—6.30 p.m.	Low Water	1008	—	
	—	<i>Achilles</i>	15th July, 1930—Noon	High Water	1004	—	
	—	<i>Achilles</i>	18th July, 1930—5.30 a.m.	Flood	1008	—	
Chingwangtao ...	Breakwater	<i>Glenamoy</i>	30th Jan., 1930—Noon	Half Flood	1025	32°	
Dairen	Roads	<i>Glenamoy</i>	2nd Feb., 1930—5 p.m.	Half Ebb	1025·2	—	
	—	<i>Achilles</i>	10th July, 1930—5.30 p.m.	Low Water	1022·5	—	
Dalny	—	<i>Achilles</i>	12th July, 1930—11.40 a.m.	High Water	1022	—	
Taku Bor	—	<i>Achilles</i>	13th July, 1930—Noon	High Water	1018	—	
Vladivostok	—	<i>Achilles</i>	30th June, 1930—Noon	Low Water	1024	—	
	—	<i>Achilles</i>	30th June, 1930—5.10 p.m.	High Water	1023·5	—	
Miike	—	<i>Achilles</i>	30th May, 1930—10.20 a.m.	High Water	1023	—	
	—	<i>Achilles</i>	30th May, 1930—5 p.m.	Low Water	1022·5	—	
Moji	Roads	<i>Glenamoy</i>	26th Jan., 1930—9 a.m.	High Water	1026·2	59°	
Nagasaki	Roads	<i>Glenamoy</i>	24th Jan., 1930—10 a.m.	Low Water	1026	61°	
Kobe	—	<i>Achilles</i>	3rd June, 1930—8.10 a.m.	High Water	1022·5	—	
	—	<i>Achilles</i>	3rd June, 1930—5 p.m.	Low Water	1023	—	
Yokohama	—	<i>Achilles</i>	20th June, 1930—6.45 a.m.	Low Water	1024	—	
	—	<i>Achilles</i>	20th June, 1930—12.45 p.m.	High Water	1024·5	—	
Oturu	—	<i>Achilles</i>	28th June, 1930—Noon	High Water	1026	—	
	—	<i>Achilles</i>	28th June, 1930—5.30 p.m.	Low Water	1026·5	—	
Adelaide	N.W. Shed	<i>Cambridge</i>	23rd Nov., 1929—9 p.m.	Ebb	1029	63°	Tide at Semaphore.
	No. 2 Wharf						
	Outer Harbour	<i>Baradine</i>	14th Feb., 1930—11.20 a.m.	1 hour before low	1025·5	76°	
	Outer Harbour	<i>Baradine</i>	19th May, 1930—Noon	—	1027·3	60°	
Melbourne	Vacuum Oil Co. Wharf, Yorrvaville	<i>Cambridge</i>	15th Nov., 1929—10.10 a.m.	Flood	1001	58°	Much heavy rain.
	Vacuum Oil Co. Wharf, Yorrvaville	<i>Cambridge</i>	16th Nov., 1929—7 a.m.	Low Slack	1001	59°	Much heavy rain.

Port.	Berth.	Observing Ship.	Date and Time of Observation.	State of Tide.	Specific Gravity.	Temp. of Sea.	Remarks.
Melbourne ...	No. 6 Victoria Dock	<i>Cambridge</i>	17th Nov., 1929—9.30 a.m.	Flood	1003	63°	Much heavy rain.
	No. 6 Victoria Dock	<i>Cambridge</i>	18th Nov., 1929—9.40 a.m.	Low Slack	1003	62°	Much heavy rain.
	No. 6 Victoria Dock	<i>Cambridge</i>	19th Nov., 1929—3 p.m.	Flood	1010	64°	Dry weather.
	No. 6 Victoria Dock	<i>Cambridge</i>	20th Nov., 1929—10.20 a.m.	Ebb	1009	63°	Dry weather.
Sydney ...	Shed 21 Jones' Bay	<i>Tongariro</i>	20th Nov., 1929—6.30 p.m.	Low Water	1023.5	69°	
	Central Wharf	<i>Baradine</i>	23rd Jan., 1930—4.15 p.m.	—	1025.5	75°	
	Pymont	<i>Baradine</i>	4th Feb., 1930—Noon	—	1023.5	78°	
	Central Wharf	<i>Baradine</i>	5th Feb., 1930—11 a.m.	—	1025.0	76°	
Brisbane ...	Musgrave Wharf	<i>Tongariro</i>	28th Nov., 1929—1.35 p.m.	Low Water	1014.5	78°	
Cairns ...	—	<i>Tongariro</i>	4th Dec., 1929—11.10 a.m.	High Water	1022.5	85°	
Townsville ...	—	<i>Tongariro</i>	10th Dec., 1929—2.20 p.m.	3 hours flood	1023.7	86°	

FISH AND TEMPERATURE OF THE SEA.

LIEUTENANT-COMMANDER J. R. LUMBY R.N. (RETD.), FISHERIES LABORATORY, LOWESTOFT.

Of the multitudinous factors influencing the lives of fishes, temperature is undoubtedly one of the most important. Fishes are what is commonly known as "cold-blooded", as indeed are most of the animals inhabiting the sea, with the exception of the few marine mammals. That is to say, they possess no powers enabling them to regulate the temperature of their bodies and maintain it at a constant level. So far as we know, however, the temperature of fishes is not necessarily exactly the same as that of the water around them; it seems usually to be slightly higher, by $\frac{1}{2}^{\circ}$ C or so. Nevertheless, when the water grows colder or warmer, the temperature of the animal must change accordingly. In this respect then it is at the mercy of its environment and subject to its vagaries.

The dependence of the fish upon the temperature of its surroundings has a particular importance, because it is this factor which governs the rate at which the vital processes take place. The higher the temperature, the faster the animal lives, and the colder it is, the more sluggish life becomes. Broadly speaking, an increase of temperature by 10° C rather more than doubles the rate of metabolism, as measured, for example, by the changes in oxygen consumption, and the production of carbon di-oxide. The breeding of many animals in the sea appears to take place only between rather narrow limits of temperature, and the length of time required for the eggs to hatch is markedly dependent on the temperature of the water. At a temperature of 4° C it requires some $3\frac{1}{2}$ weeks for plaice eggs to hatch and the young to become about $\frac{1}{4}$ inch in length. At 12° C this period diminishes to little more than a week.

Consequently, as one might expect, the distribution of fishes is closely bound up with the distribution of the water temperature. Generally speaking, the kinds of fish populating any region are determined by the temperature, some kinds preferring the warmer, others the colder waters. If the temperature becomes, for some reason or another, very different from that to which the fish are accustomed, then disaster may overtake them. Usually it appears to be excessive cold which is the more harmful, and indeed, judging from the conditions in the Barents Sea, few fish are to be found in water of less than 0° C.

Perhaps the best known case of wholesale destruction of fish due to temperature conditions is that of the tile-fish. In March and April, 1882, ships passing along the east coast of N. America reported having met with enormous numbers of dead or paralyzed fish floating

in the sea. Captain LAWRENCE, of the barque *Plymouth* reported that, when off the George's Bank "... the mate came down into the cabin and said that the barque was passing through a lot of dead codfish, and wanted to know if he should get some of them. I went out on deck and saw that the water all around us and for miles back was covered with these fish. Their gills were red, and upon scooping up some of them I found that they were hard, showing that they had not been dead very long. From 6 o'clock in the morning until 5 o'clock in the evening we were passing through this school of codfish, and as we were sailing at the rate of 6 knots an hour we went through 69 miles of them". "Did you eat them?" enquired the reporter. "No," said Captain LAWRENCE, "not 69 miles of 'em. We ate a few".

A great deal of evidence along similar lines was collected and is discussed in a report by Captain COLLINS (U.S. Comm. of Fish and Fisheries. Commissioners Report for 1882). The region affected appeared to lie along the 100 fathom line off the coast roughly from Delaware Bay to Nantucket Island. It was estimated that the fish affected, which proved to be mainly tile-fish, not cod, must have covered an area of some 7,500 square miles and that their weight amounted to about 10,000,000 cwt.; that is, nearly as much as the total weight of fish landed in England in one year! Although these figures may be a little problematical, there can, however, be no question whatever that the catastrophe was a real one. Search for tile-fish was made on these grounds from September of the same year onwards, and it was not until 10 years later (1892) that the fish returned to its old habitat. Not only were fish injured, but it was remarked by Professor VERRILL that many of the species of animals living on the sea bottom, especially crustacea, which had previously been taken in vast numbers, had either disappeared entirely or were rare.

At the time, naturally enough, a good deal of discussion arose, and many were the reasons advanced for these occurrences. Captain COLLINS gives an example of one such, neatly summarising the situation. "There has been convulsions of nature under the seas. Now, you see, mates, these here loaferlatter lushesses (*i.e. lopholatilus*) is deep-sea fish. There comes the deuce to pay down below—their bladders gits busted, and up they comes like balloons. That's a point no fish-sharp has studied up yet; don't you see?" The opinion which the "fish-sharps" finally obtained, however, was that the

temperature on the grounds had *suddenly* fallen, perhaps by reason of the arrival of an unusual kind of water, colder than the fish could stand. This explanation seems the more likely when it is remembered that the fish were living near the northern limit of their distribution.

Instances of the destruction of fish through cold are quite well known from those waters where ice occurs on this side of the Atlantic also. Frequently in winter fish of one kind or another are seen coming up to the surface and floating there helplessly; sometimes they are found frozen in the ice, or else lying dead and rotting on the bottom of the sea when the ice clears. It seems that death may be caused either by the freezing of the blood, which happens, in certain kinds of fish at least, at a temperature of about -1°C (sea water freezes at about $-1\frac{1}{2}^{\circ}$ to -2° , according to salinity); or the animals may be suffocated by the lack of oxygen, of which the water becomes deprived when cut off from the air by a covering of ice. In very severe winters mortality occurs on a large scale. Not only fish of all kinds—eel, turbot, sole, sprat, plaice, cod and so on—are affected but also crabs, lobsters and shrimps; and in the winter before last (1928-1929), which was the hardest for many years in the Baltic waters, even porpoises were killed. Dr. A. C. JOHANSEN mentions,

in the Report of the Danish Biological Station for 1929, that a cutter fishing east of Bornholm brought up 14 of these dead beasts in one day, and in all several hundred were taken before they finally decayed and disappeared. From a study of the various reports, he came to the interesting conclusion that the kinds of fish which are accustomed to spawn at the higher temperatures suffered from the cold more than the fish spawning in colder water.

In this same winter Dr. BLEGVAD, also of the Danish Biological Station, examined the sea-shores and found that they too were the scene of considerable destruction of life. Almost all the animals inhabiting the surface layers of the sand, such as mussels and other forms of shell fish, were killed, and of those living deeper down, an increasingly smaller proportion were found injured as the depth increased.

One sometimes hears tell of fish which have been found frozen fast in the ice and which, on being gently warmed, begin to swim about without appearing to have suffered any ill effects as a result of their refrigeration. Such cases would seem to be rather rare, however, and may perhaps be restricted to conditions, fresh water for example, in which the ice is formed at a relatively high temperature (0°C) and before the fish is killed. I can vouch for a goldfish, for example,

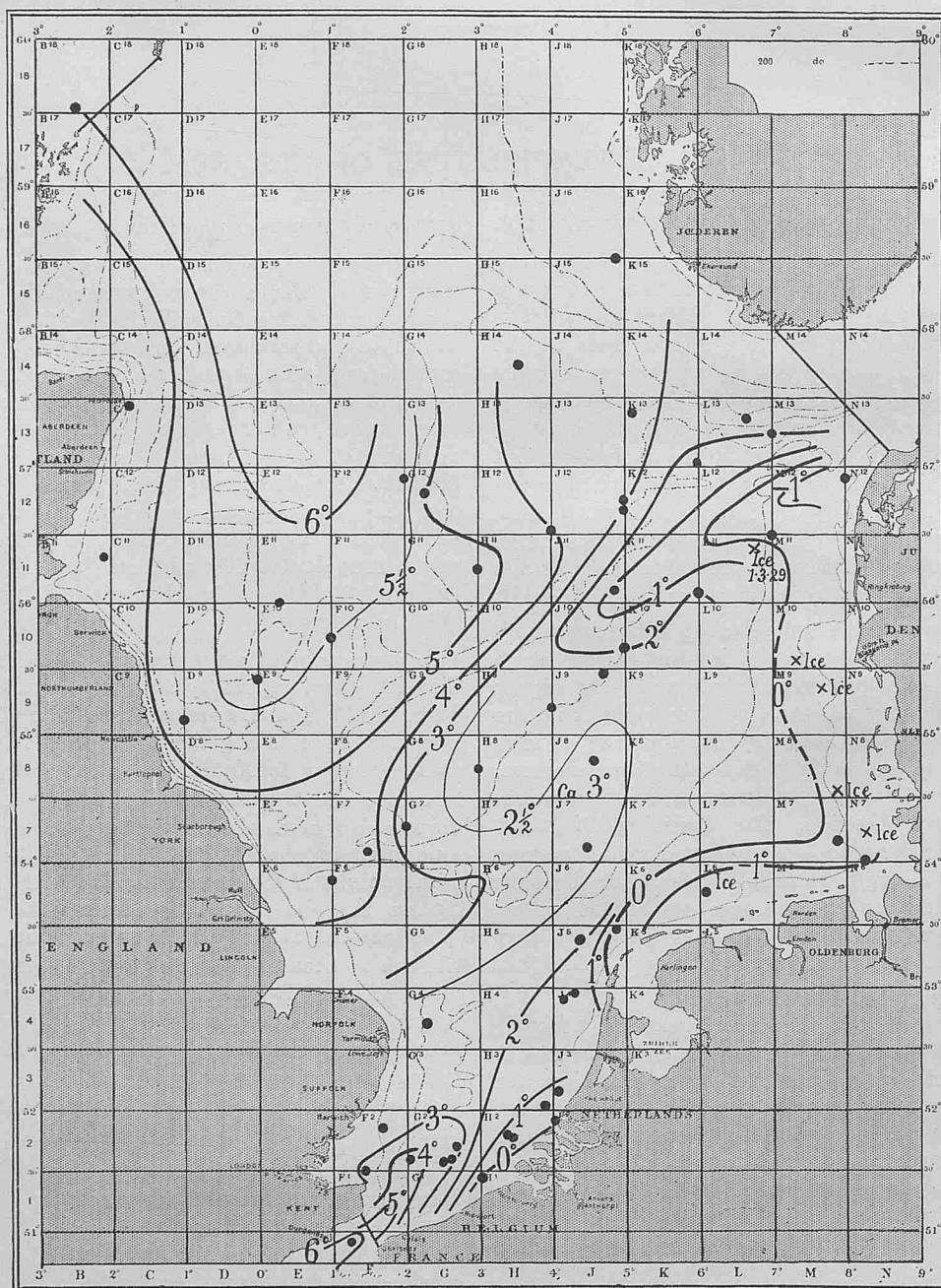


FIGURE 1.—The surface water temperature at the end of February, 1929. In contrast with the conditions on the continental coast the warm water coming from the open ocean will be noticed flowing down the coast of Scotland and also, to a less marked extent, entering through Dover Straits.

being thawed out alive from a block of ice, but an eel which I saw plunged quickly into a brine freezing tank and given a coating of ice, did not recover. Dr. DANNEVIG, of the Flodevig Sea Fish Hatchery, at Arendal, Norway, records an experiment in which some cod fish and lobsters were taken from the sea (temperature 3.5°C) and put in a tank containing water at about 0.6°C , the time being 11.35; the temperature was gradually lowered and at 12.10 (-0.9°C) the animals were evidently distressed. After the lapse of another half-hour, at a temperature of -1.2°C , neither fish nor lobster showed any signs of life. The temperature was then allowed to rise and had reached the value of 4.5°C at 13.00, the animals still appearing to be lifeless. At 15.25 they were removed from the tank and in a few moments the lobsters, happening to be placed near an electric heater, began to stir. Eventually after being placed in a bucket of sea water and gently warmed they completely recovered, and were finally transferred to an aquarium. As no further mention is made of the cod, one supposes that they did not recover.

Though the effects of severe cold are well enough known to the Baltic fishermen, an experience of this kind is distinctly rare in the North Sea itself. Indeed, there is no precedent on record for the occurrences which took place in the winter before last. At the end of February, 1929, the cold was so continuous and intense that the sea was frozen for some miles offshore along the North German and Danish coasts. Some of the lightships had to be removed and a report received from s.s. *Spero* stated that drift ice was encountered even as far west as the vicinity of the Little Fisher Bank. During the two months following we began to receive reports from fishermen who had been working the eastern grounds, that they had been bringing up in the trawls considerable numbers of fish, chiefly soles,

which had evidently been some time dead before being caught. These fish did not at first sight seem much different from the rest of the catch, and it was only when one crew, for example, attempted to cook them that they discovered their unwholesome condition, much to the discomfort of all on board! Not only the sole, but brill, cod, conger, dab, plaice and a little fish known as "Miller's Thumb" were affected, and a fair number of dead crabs were found. These experiences were common to the Dutch and Danish fishermen as well as to our own, and there is no doubt that this cold winter was responsible for a mortality on quite a large scale amongst the fish in these regions. Though there is insufficient evidence on which to estimate the extent of the damage done, some idea of the numbers of fish killed is given by the statement of one skipper who said that occasionally after a haul as much as 2 baskets of fish (about $\frac{3}{4}$ cwt.) had to be thrown overboard as unfit for market.

Another interesting effect was shown in the altered distribution of the fish at this time. There were numbers of small sturgeon in the waters off the continental coast, and flounders were caught more frequently well away from the land. This latter is normally an estuarine fish and had evidently been driven out of the rivers by the arctic conditions prevailing on the continent. This habit of fishes to migrate into deeper water in cold weather was particularly well illustrated in the case of the sole also. While the Danish sole fishery off the Jutland coast was a complete failure, vessels fishing in the regions of the Silver Pits (off the south-western end of the Dogger Bank) made tremendous catches of soles—10 times larger than usual. Indeed, so great was the abundance in these waters than one is reminded of the days when this fishery was at its height thirty years and more ago.

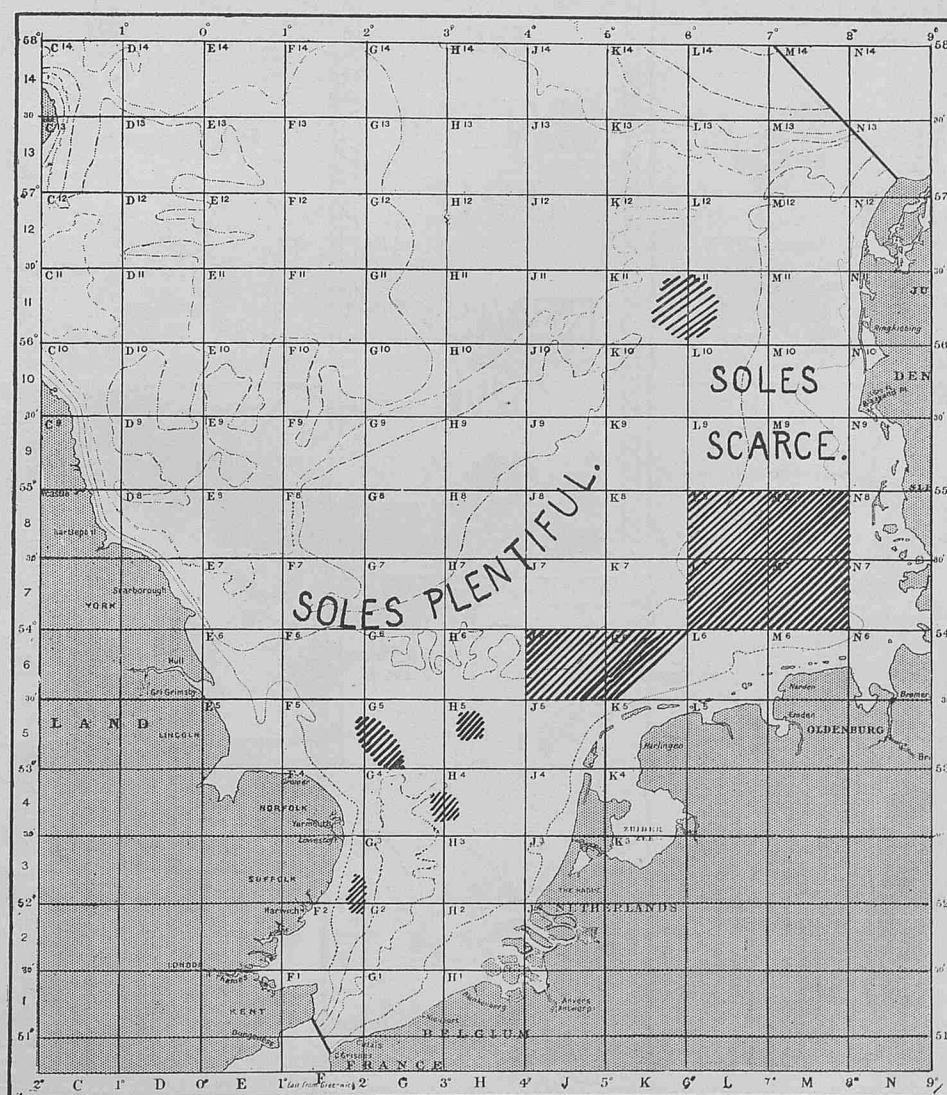
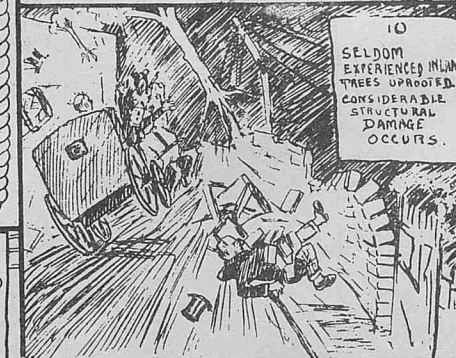
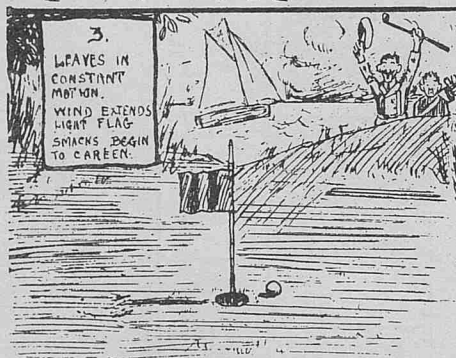
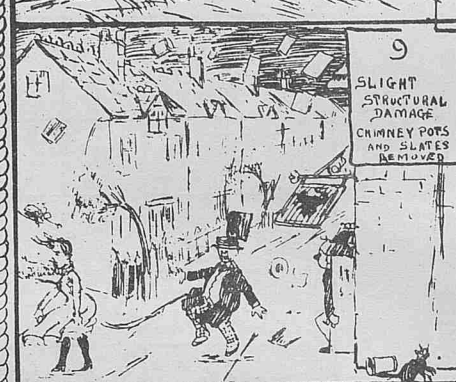
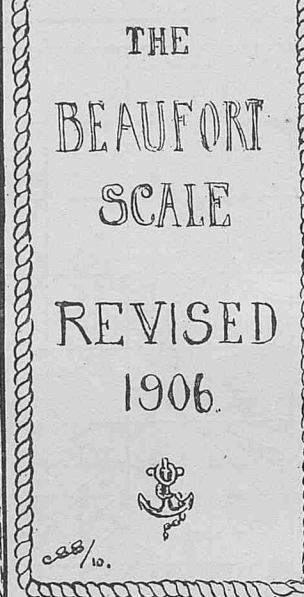
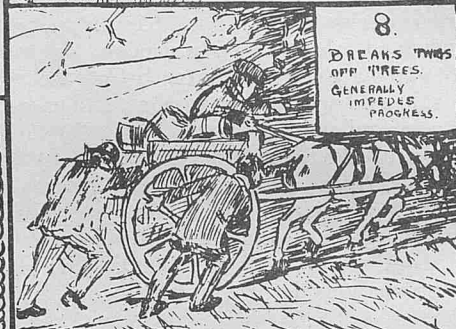
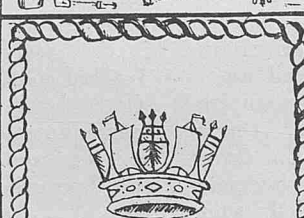
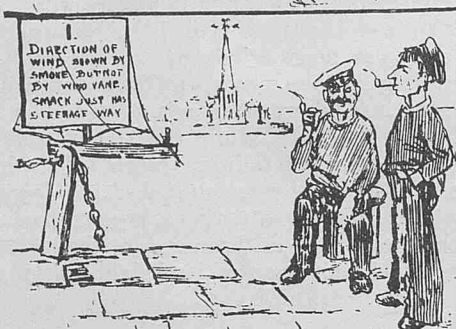


FIGURE 2.—The shaded areas shew the regions in which the dead fish were found in March and April, 1929. The region principally affected evidently lay in the Heligoland Bight, some of the dead fish having perhaps drifted further afield.

THE BEAUFORT SCALE—ILLUSTRATED.



THE BEAUFORT SCALE—ILLUSTRATED.

COMMANDER L. G. GARBETT, R.N. (RETIRED).

In THE MARINE OBSERVER for September 1926 a note appeared on the history of the Beaufort Scales, and in this connection the pictorial illustration on p. 12 may be of interest.

As pointed out in that note the use of Beaufort numbers 0-12 has persisted at sea but his method of specification has been modified to meet modern requirements.*

In 1905 Mr. G. C. SIMPSON (now Dr. G. C. SIMPSON, C.B., F.R.S., the present Director of the Meteorological Office) carried out an exhaustive investigation of the physical effects of the different wind strengths at various ports in the British Isles. In the course of this investigation observers were asked to describe, as nearly as possible, the signs by which their estimates were formed. On

the data thus obtained the specifications shewn below were drawn up enabling observers at land stations to bring their estimates of wind force into relation with those made on the coast.

The revised specifications were introduced in 1906 and a Naval artist appears to have seen the humorous side as depicted opposite.

It is stated in a Meteorological publication that the criteria referred to depend in many cases rather on the effects which the observer perceives on objects round about him than on his own physical sensations—should the observer, however, find himself in a situation such as that shewn in 9, 10, 11 of the pictorial illustration, there would be no doubt about his physical sensations!

Beaufort Numbers.	General Description.	Specification for Estimating on Sea.	Specification for Estimating on Land.
0	Calm	Calm	Calm; smoke rises vertically.
1	Light air ...	Fishing smack just has steerage way.	Direction of wind shown by smoke drift, but not by wind vanes.
2	Light breeze	Wind fills the sails of smacks which then move at about 2 miles per hour.	Wind felt on face; leaves rustle; ordinary vane moved by wind.
3	Gentle breeze	Smacks begin to careen and travel about 4 miles per hour.	Leaves and small twigs in constant motion; wind extends small flag.
4	Moderate breeze	Good workable breeze; smacks carry all canvas with good list. White crests on waves.	Raises dust and loose paper; small branches are moved.
5	Fresh breeze	Smacks shorten sail ...	Small trees in leaf begin to sway; wavelets form on inland waters.
6	Strong breeze	Smacks have double reef in main sail. Care requisite when fishing.	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.

Beaufort Numbers.	General Description.	Specification for Estimating on Sea.	Specification for Estimating on Land.
7	Moderate gale	Smacks remain in harbour and those at sea lie to.	Whole trees in motion; inconvenience felt when walking against wind; umbrellas discarded in exposed places.
8	Fresh gale ...	All smacks make for harbour.	Breaks twigs off trees. Generally impedes progress.
9	Strong gale ...	Steam navigation becomes difficult.	Slight structural damage occurs. (Chimney pots and slates removed).
10	Whole gale ...	Navigation attended with danger.	Seldom experienced on land; trees uprooted; considerable structural damage occurs.
11	Storm ...	Steamers only managed with difficulty.	Very rarely experienced; accompanied by wide-spread damage.
12	Hurricane ...	Hurricane	—

* For the Beaufort Wind Scale as advocated for use at sea, present day, see pages 46-47 Marine Observers' Handbook, 5th Edition.

TYPHOONS OF THE CHINA SEA.

Throughout the 1931 numbers of THE MARINE OBSERVER charts will be published showing the areas frequented by typhoons of the Far East during each month of the year.

The charts are taken from the "Atlas of Typhoons of the China Seas" compiled by the Rev. P. E. GHERZI, S.J. Director of the Zi-Ka-Wei Observatory near Shanghai and the following notes are taken from his remarks accompanying the Atlas and should be consulted when using the charts. Father GHERZI hopes that this work may be taken as an act of his spirit of comradeship trusting that it may prove of practical value to seamen, especially those navigators who venture for the first time into the treacherous China Seas, providing them with a guide, which shows them at a glance the position in each month of the year, of the danger zone in which typhoons may be encountered.

The charts are based on observations made during the years 1882 to 1926 and give the general and most frequented zones as well as exceptional tracks and show those parts of the coast which will in all probability afford complete security from typhoons.

The three principal tracks taken by typhoons which are clearly shown on the charts are as follows:—

(1) Tracks from the Carolines or the Marianne Islands to Cochin China across the Philippines or passing between Luzon and Formosa.

(2) Tracks from the Caroline and or the Marianne Islands over the provinces of China which disperse on the Continent.

(3) Tracks from the Caroline or the Marianne Islands with a point of recurvature to the North and North East, either over China or the Philippines, or near Formosa or the adjacent seas according to the season of the year.

As the method employed of charting the tracks does not allow the point of recurvature to the N. or N.E. taken by typhoons following No. 3 tracks to be shown, the following tables drawn up by the Rev. L. FROC, S.J. will give that information.

REGION I.—SOUTH CHINA SEA AND COAST SOUTH OF HAINAN ISLANDS.

Point of Recurvature.	Month					Yearly Average.
	June	July	Aug.	Sept.	Oct.	
Latitude N. ...	15°	21°	—	20°	16°	17°
Longitude E. ...	112°	107°	—	119°	120°	115°

REGION II.—NORTH PORTION OF SOUTH CHINA SEA AND COAST UP TO SWATOW.

Point of Recurvature.	Month					Yearly Average.
	June	July	Aug.	Sept.	Oct.	
Latitude N. ...	—	21°	22°	24°	18°	21°
Longitude E. ...	—	117°	118°	116°	120°	118°

REGION III.—FORMOSA REGION AND COAST UP TO HIESHAN.

Point of Recurvature.	Month					Yearly Average.
	June	July	Aug.	Sept.	Oct.	
Latitude N. ...	16°	27°	27°	26°	—	24°
Longitude E. ...	119°	121°	119°	118°	—	119°

REGION IV.—EAST CHINA SEA, YELLOW SEA AND COAST FROM HIESHAN TO KOREA.

Point of Recurvature.	Month					Yearly Average.
	June	July	Aug.	Sept.	Oct.	
Latitude N. ...	—	29°	29°	33°	—	31°
Longitude E. ...	—	123°	123°	123°	—	123°

REGION V.—PACIFIC OCEAN NEAR RIU-KIU IS. AND SOUTH COAST OF JAPAN.

Point of Recurvature.	Month					Yearly Average.
	June	July	Aug.	Sept.	Oct.	
Latitude N. ...	37°	29°	27°	26°	24°	27°
Longitude E. ...	136°	127°	129°	127°	128°	129°

REGION VI.—PACIFIC OCEAN IN REGION OF BONIN IS.

Point of Recurvature.	Month					Yearly Average.
	June	July	Aug.	Sept.	Oct.	
Latitude N. ...	22°	25°	24°	24°	23°	22°
Longitude E. ...	123°	126°	132°	134°	134°	130°

A knowledge of the rate of progression of a typhoon is important, for in the last few years attempts made by ships without this knowledge to cross the path of a typhoon in front of centre have had more or less disastrous results. The two following tables compiled by the Rev. L. FROC, S.J. give A:—the mean rate of progression in knots according to the month and the direction (N.W. or N.E.) which the storm is travelling. B:—The maximum velocity so far as is known in the same two directions (N.W. and N.E.).

In both tables the tracks are divided into the six regions given in the above Point of Recurvature tables but in using table A it must be borne in mind that the velocities therein given are means and that variations in the rate of progression of typhoons are sometimes great even within a short period. The great difference in the rate of progression of typhoons when advancing in a westerly direction and after recurvature to the North or N.E. will be noted.

A.—MEAN RATE OF PROGRESSION OF TYPHOONS.

Month.	Region.					
	I.	II.	III.	IV.	V.	VI.
	N.W. N.E.	N.W. N.E.	N.W. N.E.	N.W. N.E.	N.W. N.E.	N.W. N.E.
January ...	11.0	—	—	—	—	23.4
February ...	9.0	—	—	—	13.3	16.0
March ...	6.0	—	—	—	10.0	21.5
April ...	9.7	—	—	—	7.5	20.7
May ...	11.3	—	—	—	9.7	19.2
June ...	10.1	10.0	11.5	18.7	—	14.0
July ...	10.8	8.7	25.0	10.3	19.8	11.4
August ...	10.7	10.2	12.0	11.1	20.2	12.9
September ...	11.0	10.8	—	12.1	22.4	10.6
October ...	10.6	9.9	10.0	13.5	—	21.0
November ...	10.1	8.0	8.8	—	—	16.3
December ...	10.8	12.0	—	—	—	11.0
Yearly Mean	10.2	—	10.1	19.0	11.7	20.3

B.—MAXIMUM RATE OF PROGRESSION OF TYPHOONS.

Month.	Region.					
	I.	II.	III.	IV.	V.	VI.
	N.W. N.E.	N.W. N.E.	N.W. N.E.	N.W. N.E.	N.W. N.E.	N.W. N.E.
January ...	14	—	—	—	—	30
February ...	9	—	—	—	18	18
March ...	6	—	—	—	30	11
April ...	12	—	—	—	8	28
May ...	16	10	—	—	13	25
June ...	15	12	—	—	14	10
July ...	14	13	16	23	16	25
August ...	14	16	12	22	26	20
September ...	17	18	17	34	16	25
October ...	16	12	10	15	—	21
November ...	16	8	8	—	—	15
December ...	16	12	—	—	—	12

Wind Velocity and Pressure. At Guam a velocity of 154 knots was recorded in the gusts before the anemometer broke. On the 18th August 1923 at Hong Kong 130 knots was recorded before the anemometer at that station carried away. In this typhoon the pressure at the centre did not fall below 960 millibars (28.35 in.). In many typhoons steeper gradients than this are recorded, pressure falling to below 946.6 mb. (27.95 in.) and 933.2 mb. (27.56 in.) at the centre.

In typhoons passing over or near Formosa a velocity of 156 knots has been recorded and a pressure of 937 mb. (27.67 in.). The above figures show the terrible strength of these storms and explain the damage sustained by ships encountering them.

Precursory Signs. Generally, swell gives the best warning of the approach of a Typhoon. In the vicinity of Steep Island and at the Southern entrance of the Formosa Straits swell has been known to make itself felt with the storms centre 620 miles distant. Elsewhere along the Chinese coast swell is said to indicate a typhoon less than 500 miles away. Storms have been known to break without a change of weather having been indicated by the barograph, although such cases are rare.

SOUTHERN ICE REPORTS.

During the Years 1929 and 1930.

January.

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1929	16	36° 48' S.	25° 03' E.	3 bergs and numerous growlers	Largest 400 feet long and 150 feet high. In Agulhas recurve, evidently drifting S.S.E. Several smaller bergs to northward also : quantity of loose ice in vicinity.	S.S. <i>Horatius</i> .
	20	Grytviken		Thin coating of ice in harbour		R.R.S. <i>William Scoresby</i> .
	—	52° 30' S.	30° 00' W.	Pack ice and bergs		M.V. <i>Svalder</i> .
	31	45° 35' S.	22° 34' W.	1 berg		M.V. <i>Spinanger</i> .
	31	45° 15' S.	21° 58' W.	3 bergs		do.
	—	50° 20' S.	19° 00' W.	Barrier	Consisting of large icebergs close together and scarcely moving, extending East and West.	M.V. <i>Svalder</i> .
	—	From 57° 15' S. to 60° 00' S.	10° 30' W. to 6° 45' W.	Pack ice		do.

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1930	31	70° 00' S.	100° 39' W.	1 berg	Irregular weathered, about 500 feet by 80 feet. One vertical face heavily impregnated with mud, gravel and stones.	R.R.S. <i>William Scoresby</i> .
	31	70° 00' S.	100° 39' W.	50 bergs, rough pack ice, growlers	Small and moderate, irregular and tabular. Heavy pack ice.	do
	30	70° 02' S.	100° 39' W.	Same ice as above	Small and moderate, irregular and tabular. Steaming around edge of heavy pack.	do.
	30	69° 45' S.	100° 11' W.	50 bergs, rough pack ice, growlers	Small and moderate, irregular and tabular. Heavy loose pack.	do.
	30	69° 32' S.	99° 38' W.	20 bergs, rough pack ice, growlers	Small and moderate, irregular and tabular. Heavy loose pack.	do.
	30	69° 43' S.	99° 38' W.	20 bergs, rough pack ice, growlers	Small and moderate, irregular and tabular. Heavy loose pack.	do.
	29	69° 45' S.	98° 20' W.	40 bergs, pack ice	8 moderate irregular, a few tabular. Very heavy pack..	do.
	29	69° 40' S.	98° 00' W.	12 bergs, many growlers	5 moderate irregular, 7 moderate tabular	do.
	29	69° 35' S.	97° 11' W.	8 bergs, floe ice	3 moderate irregular. 5 moderate tabular (150 to 200 feet high). Floe ice about 15 feet high.	do.
	29	69° 32' S.	96° 54' W.	15 bergs, floe ice	9 moderate irregular (1 about 200 feet), 6 tabular moderate (1 about 200 feet). Floe ice (150 feet by 20 feet).	do.
	29	69° 30' S.	96° 28' W.	18 bergs, floe ice	16 moderate irregular (1 200 feet by 3 miles), 2 tabular (3 miles by 200 feet). Floe ice (150 feet by 20 feet).	do.
	29	69° 26' S.	95° 59' W.	2 bergs, floe ice	Moderate irregular (1 very high). Floes 20 feet high ..	do.
	29	69° 25' S.	95° 35' W.	3 bergs	Large tabular (6 miles by 80 feet) (1 1/2 miles by 80 feet) (3 miles by 80 feet).	do.
	29	Vicinity 69° 20' S.	95° 00' W.	25 bergs, pack ice	Small irregular weathered	do.
	29	69° 26' S.	94° 00' W.	8 bergs	Moderate irregular weathered	do.
	29	69° 15' S.	93° 28' W.	7 bergs, pack ice	Moderate irregular weathered. Arm of pack ice stretching to northward.	do.
	29	69° 23' S.	92° 52' W.	17 bergs, pack ice	Moderate irregular weathered. Following edge of pack. Floes 4 feet to 15 feet all old ice.	do.
	29	69° 23' S.	92° 24' W.	18 bergs	Moderate irregular weathered	do.
	29	69° 22' S.	92° 00' W.	7 bergs	6 moderate irregular weathered. 1 large tabular	do.
	29	69° 20' S.	91° 30' W.	12 bergs	Moderate irregular weathered	do.
	29	Vicinity 69° 20' S.	90° 50' W.	8 bergs	7 moderate irregular, 1 large tabular, 1 1/2 miles by 1 1/2 miles by 80 feet.	do.
	29	69° 35' S.	90° 10' W.	Pack ice	Heavy	do.
	28	Vicinity 69° 10' S.	88° 00' W.	14 bergs and many growlers	12 moderate, small irregular, 2 large tabular	do.
	28	69° 08' S.	87° 00' W.	4 bergs and many growlers	Small irregular	do.
	28	69° 05' S.	86° 00' W.	4 bergs and many growlers	Small irregular, 100 yards by 80 feet	do.
	28	Vicinity 69° 00' S.	85° 30' W.	6 bergs and many growlers	Small irregular	do.
	28	68° 48' S.	83° 45' W.	12 bergs	Moderate irregular	do.
	28	68° 48' S.	83° 45' W.	4 bergs, 3 growlers	2 moderate irregular, 2 moderate tabular, large growlers	do.
	28	Vicinity 68° 50' S.	83° 40' W.	42 bergs and many growlers	Moderate irregular	do.
	28	68° 36' S.	83° 15' W.	5 bergs	3 moderate weathered, 2 moderate tabular about 100 feet high.	do.
	28	68° 34' S.	82° 54' W.	Many growlers	Small weathered	do.
	28	68° 32' S.	82° 30' W.	2 bergs	Small weathered	do.
	28	68° 27' S.	82° 13' W.	3 bergs, a few growlers	Moderate tabular 60 feet high. Note.—Tabular bergs are now noticeably lower and more curved on top.	do.
	28	68° 20' S.	82° 05' W.	2 bergs, pieces and growlers	5 small weathered, 1 large tabular	do.
	28	68° 10' S.	81° 20' W.	6 bergs	Moderate large tabular about 120 feet high	do.
	28	68° 05' S.	80° 40' W.	1 berg	Moderate irregular	do.
	28	67° 52' S.	77° 40' W.	2 bergs, few growlers	Irregular moderate	do.
	28	67° 52' S.	77° 20' W.	1 berg	1 small irregular, 1 large tabular	do.
	27	67° 40' S.	76° 50' W.	2 bergs	Irregular, 1 small, 1 large, 2 moderate	do.
	27	67° 42' S.	76° 42' W.	4 bergs	Irregular moderate	do.
	27	67° 30' S.	76° 32' W.	1 berg	Irregular moderate	do.
	27	67° 15' S.	75° 25' W.	2 bergs	Irregular moderate	do.
	27	67° 20' S.	75° 05' W.	2 bergs	1 moderate irregular, 1 moderate tabular	do.
	27	67° 10' S.	74° 05' W.	1 berg	Tabular moderate	do.
	27	66° 52' S.	73° 40' W.	1 berg	Tabular moderate	do.
	27	66° 50' S.	73° 12' W.	1 berg	Tabular small	do.
	27	66° 30' S.	72° 15' W.	1 berg, 1 growler	Tabular moderate	do.
	27	67° 04' S.	70° 40' W.	Ice pack	Scattered and moving N.E.	do.
	26	66° 28' S.	69° 40' W.	4 bergs and a few growlers	Moderately irregular about 100 feet high	do.
	26	65° 30' S.	68° 30' W.	1 growler	Stranded	do.
	3	Victor Hugo Island		Many bergs	Surrounding island	do.
	3	Howgaard Island		38 bergs and pack ice	Surrounding island	do.
	3	Booth Island		29 bergs and pack ice	Stranded	do.
	3	Wauvermann Island		7 bergs	Small irregular	do.
	3	Bismarck Strait		2 bergs, growlers	Many apparently aground S.E. of C. Astrup	do.
	4	Gerlache Strait		Innumerable bergs (say 500) and growlers	Pyramid, moderate small	do.
	4	Hoseason Island and Hughes Bay		Large quantity of bergs and growlers	Moderate size, tabular	do.
	25	63° 20' S.	61° 40' W.	1 berg	Various sizes	do.
	8	Vicinity Slip Rocks		Few small irregular bergs	2 moderate irregular, 1 small tabular, 1 large tabular 1/2 mile by 160 feet, 1 large tabular 2 miles by 1/2 mile, 162 feet high measured.	do.
	8	62° 12' S.	61° 30' W.	1 berg	Small irregular	do.
	4	Between Hoseason and Trinity Island		48 bergs	Moderate sized tabular	do.
	4	Vicinity Austin Rocks		24 bergs	Large tabular, 3 mile by 150 feet. Appearance of pack ice to southward.	do.
	23	Vicinity 62° 45' S.	59° 40' W.	5 bergs	Moderate irregular, 200 yards by 150 feet	do.
	23	62° 40' S.	58° 50' W.	1 berg	Moderate tabular, 1/2 mile by 150 feet	do.
	23	Vicinity C. Melville		3 bergs	Large tabular, 2 miles by 150 feet	do.
	23	Between Bridgman and C. Melville		2 bergs	Large tabular	do.
	23	Vicinity Bridgman Island		4 bergs	Moderate sized tabular and irregular	do.
	23	62° 20' S.	56° 40' W.	1 berg	4 moderate sized, tabular and weathered, 3 moderate sized irregular, 1 large tabular 3/4 mile, all heights 150-200 feet.	do.
	23	62° 05' S.	56° 35' W.	1 berg	Moderate sized, tabular and weathered, 4 bergs had capsized.	do.
	23	62° 00' S.	56° 30' W.	1 berg	Moderate sized, tabular and small weathered, mostly 100/300 yards long by 80/150 feet high. Four large tabular 1/2 mile to 1 mile in length, 160 feet high.	do.
	23	62° 05' S.	56° 20' W.	1 berg	Moderate sized, weathered, tabular, irregular and pinnacle. Many of these bergs were black on one or more sides.	do.
	23	62° 20' S.	56° 20' W.	1 berg	Moderate sized. Pinnacle	do.
	23	62° 40' S.	56° 20' W.	1 berg	About 200 yards long by 150 feet high. Tabular	do.
	23	62° 10' S.	56° 00' W.	1 berg	About 100 feet long by 60 feet high. Irregular	do.
	23	Off O'Brien Island		1 berg	Tabular, estimated 5 miles long 250 feet high, thought to be aground.	R.R.S. <i>Discovery II</i> .
	23	62° 02' S.	55° 50' W.	2 bergs	Tabular measured 6 1/2 miles long, 135 feet high, thought to be aground.	do.
	23	Vicinity Narrows Island.		3 bergs	Measured 1 1/2 miles long, 120 feet and 200 feet high	do.
	22	Vicinity Cape Bowles, Clarence Island.		14 bergs, many growlers and small ice		
	22	10° S.E. Cape Bowles		8 bergs		
	22	60° 43' S.	52° 30' W.	32 bergs, many growlers		
	22	60° 32' S.	52° 10' W.	20 bergs, many growlers		
	22	60° 22' S.	51° 42' W.	8 bergs, many growlers		
	22	60° 15' S.	51° 29' W.	8 bergs, many growlers		
	22	Vicinity 60° 07' S.	50° 50' W.	41 bergs, many growlers		
	22	Vicinity 59° 53' S.	50° 38' W.	29 bergs, many growlers		
	22	Vicinity 59° 40' S.	50° 03' W.	30 bergs		
	21	58° 42' S.	48° 30' W.	1 berg		
	19	54° 10' S.	38° 53' W.	1 tabular berg		
	19	West Cumberland Bay, S. Georgia		1 small berg		
		53° 40' S.	36° 00' W.	1 berg		
	24 to 25	53° 40' S.	35° 36' W.	1 berg		
		53° 32' S.	25° 24' W.	1 berg		

WEATHER SIGNALS.

UNDER Weather Signals it is intended to publish particulars and concise descriptions of Signals and Code used for reporting Weather, Ice, and Time in four sections.

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

The International Ships' Wireless Weather Telegraphy Code and Decode which came into force on May 1st, 1930, are given on pp. 23-31.

- I. Ships' Wireless Weather Signals.
- II. Wireless Weather Signals made from the shore to ships.
(Bulletins, Wireless storm, and ice warnings.)
- III. Wireless Time Signals.
- IV. Visual Weather Signals made at the Coast. (Gale and hurricane warnings.)

Request for Information to Meteorological Services of Maritime Countries.

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

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

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

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

Reports from "B selected ships" may be intercepted by shore stations as required.—see pp. 16 and 31.

(1) The name of the receiving W/T Station, (C.W.), with call sign, latitude, and longitude and particulars on similar lines to that given on page 19 for Portishead, as far as applicable and with a view to covering the largest area as possible, see Chart II (lithographic).

In order that all concerned may know what stations in different parts of the world are detailed to receive reports from "B selected ships", information similar to that given in the list on pages 21 and 22 is desired.

I. SHIPS' WIRELESS WEATHER SIGNALS.

VOLUNTARY.

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

Commenced May 1st, 1930.

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

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

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

"Selected Ships" fitted for long range transmission to address their reports to the appropriate shore station and use

the wave length allotted to that station; Berne and all concerned being notified that the information may be intercepted and used by all ships.

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

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

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

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

(Vessels over 100 tons, Lloyd's Register Book, 1930-31)

and Number of Selected Ships required for making W.T. Weather Reports, in all oceans, World Wide.

Country.	Steamers and Motor Vessels.		Percentage of World Tonnage.	Number of "Selected Ships" required.	Number of Ships fitted for C.W. transmission. (Long Wave).
	Number	Gross Tons.			
Great Britain and Ireland.	7,856	20,321,920	31.2	312	194
Australia and New Zealand.	603	677,981	1.0	10	—
Canada (excluding Lakes).	629	919,464	1.4	14	16
Hong Kong ...	121	286,845	0.4	4	—
India and Ceylon	147	182,313	0.3	3	—
South Africa and Other Colonies*	490	406,338	0.6	6	4
British Empire	9,846	22,794,861	34.9	349	214
America (United States) (excluding Lakes).	2,975	10,744,692	16.4	164	334
Argentina ...	292	297,564	0.5	5	1
Belgium ...	238	546,002	0.8	8	8
Brazil ...	346	543,613	0.8	8	10
Chile ...	120	184,973	0.3	3	—
China ...	210	314,817	0.5	5	—
Danzig ...	36	134,961	0.2	2	—
Denmark ...	643	1,071,521	1.7	17	19
Estonia ...	79	60,982	0.1	1	—
Finland ...	244	243,112	0.4	4	—
France ...	1,501	3,470,591	5.3	53	16
Germany ...	2,138	4,199,096	6.4	64	41
Greece ...	546	1,390,899	2.1	21	—
Holland ...	1,381	3,079,000	4.7	47	26
Italy ...	1,105	3,261,922	5.0	50	54
Japan ...	2,060	4,316,804	6.6	66	173
Jugo-Slavia ...	161	302,481	0.5	5	—
Norway ...	1,905	3,663,237	5.6	56	12
Portugal ...	174	238,669	0.4	4	12
Russia (Soviet Union).	344	529,095	0.8	8	9
Spain ...	795	1,207,093	1.9	19	18
Sweden ...	1,306	1,594,313	2.4	24	3
Turkey ...	190	177,199	0.3	3	—
Other Countries	704	883,489	1.4	14	1
Total ...	29,339	65,250,986	100.0	1,000	737

* Including Dominion of Newfoundland.

The main points are as follows:—

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

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

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

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

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

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

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

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

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

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

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

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

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

Schedule.

All times are G.M.T.

Zones between Greenwich Meridians.	FIRST WEATHER REPORT.			SECOND WEATHER REPORT.		
	Times of observations.	Times of reporting by Type A1 (C.W.) Ships.	Times of broadcasting by Type A2 (I.C.W.) and Type B (Spark) Ships.	Times of observations.	Times of reporting by type A1 (C.W.) Ships.	Times of broadcasting by Type A2 (I.C.W.) and Type B (Spark) Ships.
30° W.—30° E.	0600	{ 0618 0818 }	0830	1200	1218	1230
30° E.—80° E.	0600	{ 0618 0818 }	0630 0830 }	1200	1218	1230
80° E.—160° E.	0000	0018	0030	0600	{ 0618 0818 }	0830
160° E.—140° W.	0000	0018	0030	1800	{ 1818 2018 }	2030
140° W.—70° W.	0000	0018	0030	1800	{ 1818 2018 }	{ 1830 2030 }
70° W.—30° W.	1200	1218	1230	1800	{ 1818 2018 }	2030

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

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

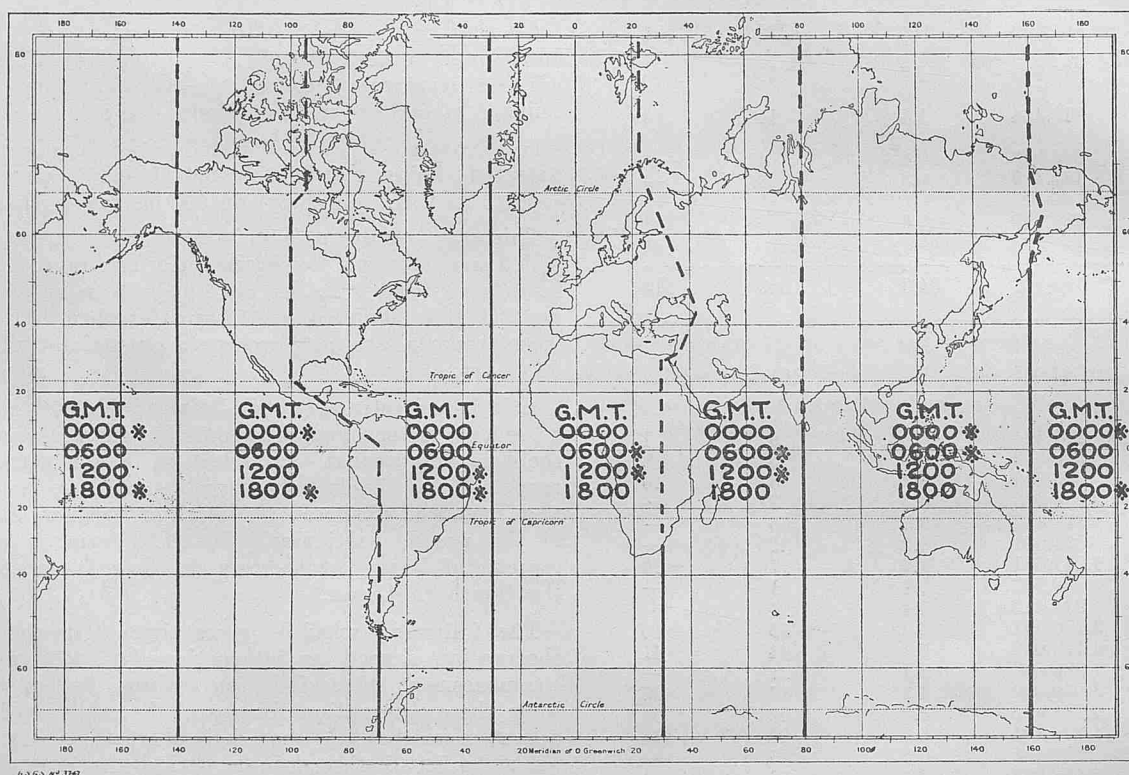
repeating for the benefit of ships with one operator during the second period.

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

CHART I.—SHIPS' WIRELESS WEATHER SIGNALS.

International Observation Times for Weather Telegraphy at Sea.

* Indicates usually daylight hours.



In further explanation of this scheme.

There are 3,235 British ships fitted with W/T. The proportion fitted with Type A1 apparatus is about 1 to every 20 fitted with Type A2 or Type B apparatus.

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

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

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

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

With regard to (5), in the case of "A Selected Ships" in the Eastern North Atlantic the Meteorological Office, London, will furnish Portishead Wireless Station (at 1230 G.M.T.) with the names

of chosen "Selected Ships" every day; and Portishead will call up those ships at 2230, 0330 and 1030 G.M.T. daily and indicate the order in which they should make their reports, thus ensuring a minimum of signalling and the best distribution of reported observations.

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

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

Information of stations in different parts of world detailed to work in this scheme are given on pages 19-22 and these are revised and repeated monthly in THE MARINE OBSERVER.

Until such information is available "A Selected Ships" should broadcast their reports in parts of the world not covered by such long range stations, at schedule times on 2,100 metres wave length.

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

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

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

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

The schedule was worked out in consultation with wireless expert to overcome the confusion, jamming and waste, which disheartened all concerned. It is not necessary that reporting ships only should know when to signal meteorological reports, but that all ships should know when to listen and when to refrain from communication which jams them, and all are asked to help in making this scheme a success.

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

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

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

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

2. In "Selected Ships" immediately code these observations on Form 138 and write out message on Form 139. In the case of "Selected Ships" fitted for C.W. long range transmission address the report to the appropriate Meteorological Centre. The report should be sent through the appropriate W./T. station indicated in the list on pages 19 and 20, which will be repeated monthly in THE MARINE OBSERVER until further notice, on the wave length indicated for that station, in the order of ships indicated for the day by the station and according to the schedule above which is also given on Code Card Form 138A.

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

3. Instructions for observing and recording observations are given in THE MARINE OBSERVERS' HANDBOOK, 5th Edition. Instructions for coding are given on pp. 23 and 24 and on Form 138. The decode tables are given on pp. 28-31.

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

Information regarding the procedure for Urgent Meteorological reports, and reports of dangers to navigation are given on pages 31 and 32.

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

Request for Information.

THE ATTENTION OF METEOROLOGICAL SERVICES IS INVITED TO THE INVITATION GIVEN ON PAGE 16.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
North Atlantic and North Sea.	Portishead.	Lat. 51° 28' 41" N. Long. 2° 47' 30" W.	GKU.	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. and North of Latitude 38° N., but not within 300 miles of station. (see Chart II).	Weather London.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	Control system. "Selected Ships" chosen to report in given order notified by station daily at 2230, 0330, and 1030 G.M.T. Roll call thus—Weather begins—Call signs of chosen "Selected Ships"—Weather ends.
	Chatham Mass.	Lat. 41° 42' N. Long. 70° 00' W.	WCC.		142.9 kc/s. (2098 metres).	North Atlantic West of Longitude 40° W.	Observer Washington.	Weather only. First four groups of observations taken at 0000 and 1200 GMT only required.	No control. All British "A Selected Ships" within area to address their 0000 and 1200 G.M.T. observations to Observer Washington and their 1800 G.M.T. observations to CQ in accordance with schedule.
	Horta, Azores.	Lat. 38° 32' N. Long. 28° 38' W.	CTH.		125 kc/s. (2400 metres).	North Atlantic South of Latitude 38° N. and East of Longitude 40° W.	Radio Horta.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule.

(Continued.)

[illegible]

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

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Atlantic.	Horta, Azores.	Lat. 38° 32' N. Long. 28° 38' W.	CTH.	Radio Horta	Weather only, up to 7 groups, preferably No. 3 Supplementary Groups.	
Indian Ocean.	Calcutta.	Lat. 22° 33' 31" N. Long. 88° 20' 16" E.	VWC.	Weather.	Weather only up to 6 groups, No. 6 Supplementary Groups preferred.	
	Rangoon.	Lat. 16° 45' 57" N. Long. 96° 11' 51" E.	VTR.			
	Madras.	Lat. 12° 59' 17" N. Long. 80° 10' 56" E.	VWM.			
	Bombay.	Lat. 19° 04' 55" N. Long. 72° 49' 54" E.	VWB.			
	Karachi.	Lat. 24° 51' 05" N. Long. 67° 02' 32" E.	VWK.			
	Matara.	Lat. 6° 01' 07" N. Long. 80° 35' 39" E.	GZP.			
	Mauritius.	Lat. 20° 23' S. Long. 57° 35' E.	VRS.	Observatory Mauritius.	Weather 4 universal groups and first of No. 6 Supplementary Groups.	

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

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12' 39" N. Long. 114° 15' 19" E.	VPS.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	
South Pacific.	Auckland.	Lat. 36° 50' 36" S. Long. 174° 46' 08" E.	ZLD.	Weather Wellington.	Weather only, up to 7 groups.	Apia, Rarotonga and Chatham Island relay to New Zealand. Rarotonga keeps watch 0630 to 1330 G.M.T. Chatham Island 0430 to 1230 G.M.T. Remainder cover schedule. Reports desired through nearest station when "B Selected Ships" are within 1,000 miles of New Zealand.
	Wellington.	Lat. 41° 16' 26" S. Long. 174° 01' 00" E.	ZLW.			
	Awarua.	Lat. 46° 30' 27" S. Long. 168° 22' 21" E.	ZLB.			
	Chatham Island.	Lat. 43° 57' 02" S. Long. 176° 31' 04" W.	ZLC.			
	Rarotonga.	Lat. 21° 11' 54" S. Long. 159° 48' 51" W.	ZKR.			
	Apia.	Lat. 13° 15' 17" S. Long. 170° 49' 42" W.	ZMA.			

INTERNATIONAL SHIPS' WIRELESS WEATHER TELEGRAPHY CODE

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

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

Code and Instructions for Coding Messages.

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

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

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

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

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

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

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

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

Universal Groups.

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

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

From the Code Card Form 138A.

„ 7.—Code the Direction of the Wind. Table III...	DD
„ 8.—Code the Force of the Wind, forces 9 and above are entered as 9 but if 10, 11 or 12, add the words Gale, Storm, or Hurricane at the end of the message. Table V. ...	F

KEY
LETTERS.

Column 9.—Code the Present Weather. Table VI ...	ww
„ 10.—Code the corrected barometer reading by entering the two last whole figures if a millibar barometer, or coding, if inches, by Table VIII ...	BB
„ 11.—Enter the Visibility by Scale. Table XII ...	V
„ 12.—Enter the Air Temperature in whole degrees Fahrenheit, omitting the initial 1, if over 100° ...	TT

No. 3 Supplementary Groups.

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

KEY
LETTERS.

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

No. 6 Supplementary Groups.

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

KEY
LETTERS.

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

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

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

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

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

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

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

Write out the message on the signal pad (Form 139) provided and send to the wireless operator for despatch in accordance with instructions given in Scheme of Communication for British Selected Ships' Routine Wireless Weather Telegraphy, pages 16 to 19, schedule for which is also given on Code Card Form 138A.

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

Day and Position.

Table I.

P.—Day of the Week.

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

Table II.

Q.—Octant of the Globe.

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

Compass.

Table III.

DD.—Compass Table for Wind Direction to points.

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

Table IV.

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

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

Wind.

Table V.

F.—Wind Force, Beaufort Scale.

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

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

Weather.

Table VI.

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

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

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

Table VII.

W.—Past Weather.

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

Barometer.

Table VIII.

BB.—Code Table for corrected barometer readings in millibars and inches.
(Adapted for British Ships.)

Mb.	In.	Code Figs.	Mb.	In.	Code Figs.	Mb.	In.	Code Figs.	Mb.	In.	Code Figs.
925	27.32	25	960	28.35	60	995	29.38	95	1025	30.27	25
926	27.35	26	961	28.38	61	996	29.41	96	1026	30.30	26
927	27.38	27	962	28.41	62	997	29.44	97	1027	30.33	27
928	27.41	28	963	28.44	63	998	29.47	98	1028	30.36	28
929	27.44	29	964	28.47	64	999	29.50	99	1029	30.39	29
930	27.46	30	965	28.50	65	1000	29.53	00	1030	30.42	30
931	27.49	31	966	28.53	66	1001	29.56	01	1031	30.45	31
932	27.52	32	967	28.56	67	1002	29.59	02	1032	30.48	32
933	27.55	33	968	28.59	68	1003	29.62	03	1033	30.51	33
934	27.58	34	969	28.62	69	1004	29.65	04	1034	30.53	34
935	27.61	35	970	28.65	70	1005	29.68	05	1035	30.56	35
936	27.64	36	971	28.67	71	1006	29.71	06	1036	30.59	36
937	27.67	37	972	28.70	72	1007	29.74	07	1037	30.62	37
938	27.70	38	973	28.73	73	1008	29.77	08	1038	30.65	38
939	27.73	39	974	28.76	74	1009	29.80	09	1039	30.68	39
940	27.76	40	975	28.79	75	1010	29.83	10	1040	30.71	40
941	27.79	41	976	28.82	76	1011	29.86	11	1041	30.74	41
942	27.82	42	977	28.85	77	1012	29.89	12	1042	30.77	42
943	27.85	43	978	28.88	78	1013	29.92	13	1043	30.80	43
944	27.88	44	979	28.91	79	1014	29.94	14	1044	30.83	44
945	27.91	45	980	28.94	80	1015	29.97	15	1045	30.86	45
946	27.94	46	981	28.97	81	1016	30.00	16	1046	30.89	46
947	27.97	47	982	29.00	82	1017	30.03	17	1047	30.92	47
948	28.00	48	983	29.03	83	1018	30.06	18	1048	30.95	48
949	28.03	49	984	29.06	84	1019	30.09	19	1049	30.98	49
950	28.05	50	985	29.09	85	1020	30.12	20	1050	31.01	50
951	28.08	51	986	29.12	86	1021	30.15	21	1051	31.04	51
952	28.11	52	987	29.15	87	1022	30.18	22	1052	31.07	52
953	28.14	53	988	29.18	88	1023	30.21	23	1053	31.10	53
954	28.17	54	989	29.21	89	1024	30.24	24	1054	31.13	54
955	28.20	55	990	29.24	90						
956	28.23	56	991	29.26	91						
957	28.26	57	992	29.29	92						
958	28.29	58	993	29.32	93						
959	28.32	59	994	29.35	94						

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

Table IX.

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

(Adapted for British Ships.)

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

	In 2 hours.	In 3 hours.	In 4 hours.	Code Figure.
Barometer steady—Has not risen or fallen more than	0.3 mb. (.01 in.)	0.5 mb. (.01 in.)	0.7 mb. (.02 in.)	0
Barometer rising slowly—Has risen.	0.7–1.0 mb. (.02–.03 in.)	1.0–1.5 mb. (.03–.05 in.)	1.3–2.0 mb. (.04–.06 in.)	1
Barometer rising—Has risen	1.4–2.4 mb. (.05–.07 in.)	2.0–3.5 mb. (.06–.10 in.)	2.8–4.8 mb. (.08–.14 in.)	2
Barometer rising quickly—Has risen.	2.6–4.0 mb. (.08–.12 in.)	4.0–6.0 mb. (.12–.18 in.)	5.2–8.0 mb. (.15–.24 in.)	3
Barometer rising very rapidly—Has risen.	over 4.0 mb. (.12 in.)	over 6.0 mb. (.18 in.)	over 8.0 mb. (.24 in.)	4
Barometer falling slowly—Has fallen.	0.7–1.0 mb. (.02–.03 in.)	1.0–1.5 mb. (.03–.05 in.)	1.3–2.0 mb. (.04–.06 in.)	5
Barometer falling — Has fallen	1.4–2.4 mb. (.05–.07 in.)	2.0–3.5 mb. (.06–.10 in.)	2.8–4.8 mb. (.08–.14 in.)	6
Barometer falling quickly —Has fallen.	2.6–4.0 mb. (.08–.12 in.)	4.0–6.0 mb. (.12–.18 in.)	5.2–8.0 mb. (.15–.24 in.)	7
Barometer falling very rapidly—Has fallen.	over 4.0 mb. (.12 in.)	over 6.0 mb. (.18 in.)	over 8.0 mb. (.24 in.)	8

Barograph.

Table X.

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

(Adapted for British Ships.)

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

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

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

Table XI.

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

(Adapted for British Ships.)

Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.
Mbs.	Inches.		Mbs.	Inches.		Mbs.	Inches.		Mbs.	Inches.	
0.2	.01	01	4.6	.14	23	9.0	.27	45	13.4	.40	67
0.4	.01	02	4.8	.14	24	9.2	.28	46	13.6	.41	68
0.6	.02	03	5.0	.15	25	9.4	.28	47	13.8	.41	69
0.8	.02	04	5.2	.16	26	9.6	.29	48	14.0	.42	70
1.0	.03	05	5.4	.16	27	9.8	.29	49	14.2	.43	71
1.2	.04	06	5.6	.17	28	10.0	.30	50	14.4	.43	72
1.4	.04	07	5.8	.17	29	10.2	.31	51	14.6	.44	73
1.6	.05	08	6.0	.18	30	10.4	.31	52	14.8	.44	74
1.8	.05	09	6.2	.19	31	10.6	.32	53	15.0	.45	75
2.0	.06	10	6.4	.19	32	10.8	.32	54	15.2	.46	76
2.2	.07	11	6.6	.20	33	11.0	.33	55	15.4	.46	77
2.4	.07	12	6.8	.20	34	11.2	.34	56	15.6	.47	78
2.6	.08	13	7.0	.21	35	11.4	.34	57	15.8	.47	79
2.8	.08	14	7.2	.22	36	11.6	.35	58	16.0	.48	80
3.0	.09	15	7.4	.22	37	11.8	.35	59	16.2	.49	81
3.2	.10	16	7.6	.23	38	12.0	.36	60	16.4	.49	82
3.4	.10	17	7.8	.23	39	12.2	.37	61	16.6	.50	83
3.6	.11	18	8.0	.24	40	12.4	.37	62	16.8	.50	84
3.8	.11	19	8.2	.25	41	12.6	.38	63	17.0	.51	85
4.0	.12	20	8.4	.25	42	12.8	.38	64	17.2	.52	86
4.2	.13	21	8.6	.26	43	13.0	.39	65	17.4	.52	87
4.4	.13	22	8.8	.26	44	13.2	.40	66			

Visibility.

Table XII.

V.—Visibility.

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

Clouds.

Table XIII.

C_L.—Form of Low Cloud.

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

Table XIV.

C_M.—Form of Middle Cloud.

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

Table XV.

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

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

Table XVI.

C.—Predominating Form of Cloud.

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

Table XVII.

N. and (N_L).—Amount of Cloud.

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

Temperatures.

Table XVIII.

t₁.—Difference between Air and Sea Surface Temperature.

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

Swell.

Table XIX.

K.—Swell.

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

Speed.

Table XX.

f.—Speed of Ship.

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

DECODE.

GG = Greenwich Mean Time of observation (06 = 6 a.m.,
12 = noon, &c.).

ww = The actual weather at the time of observation. (See Table VI.)

KEY: PQLLL llGG DDF_{WW} BBVT 3 C_L C_M C_H N t_dKdWN_L
d_sfabb 6KdCN t_dsAWC_H.

Write the figures of the messages in the order received, down the columns, taking great care to put the first figure of the fifth group in its proper place so that the supplementary groups may be correctly decoded.

[illegible]

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

Day and Position.

Table I.

P.—Day of the Week.

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

Table II.

Q.—Octant of the Globe.

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

Compass.

Table III.

DD.—Compass Table for Wind Direction to points.

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

Table IV.

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

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

Wind.

Table V.

F.—Wind Force, Beaufort Scale.

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

When force 10, 11 or 12, figure 9 transmitted, words "gale," "storm" or "hurricane" respectively, added at end of the message.

Weather.

Table VI.

ww.—Present Weather.

00-19 Abbreviated description of sky and special phenomena.

00	Cloudless.
01	Partly cloudy.
02	Cloudy.
03	Overcast.
04	Fog over the Sea.
05	Haze (but visibility greater than 2000 metres).
06	Dust devils seen.
07	Distant lightning.
08	Mist.
09	—
10	Precipitation within sight.
11	Thunder, without precipitation at the station.
12	—
13	Ugly, threatening sky.
14	Squally weather.
15	Heavy squalls
16	Waterspouts seen } in last three hours.
17	—
18	Signs of tropical storm forming.
19	Signs that tropical storm has formed.

20-29 Precipitation in last hour but not at time of observation.

20	Precipitation (rain, drizzle, hail, snow or sleet)	} In last hour but not at time.
21	Drizzle	
22	Rain	
23	Snow	
24	Sleet	
25	Rain shower(s).	}
26	Snow shower(s).	
27	Hail or rain and hail shower(s).	
28	Slight thunderstorm.	
29	Heavy thunderstorm.	

30-39 Dust storms and storms of drifting snow (visibility less than 1000 metres).

- 30 Dust or sand storm.
 31 Dust or sand storm has decreased.
 32 Dust or sand storm no appreciable change.
 33 Dust or sand storm has increased.
 34 Line of dust storms.
 35 Storm of drifting snow.
 36 Slight storm of drifting snow }
 37 Heavy storm of drifting snow } generally low.
 38 Slight storm of drifting snow }
 39 Heavy storm of drifting snow } generally high.

40-49 Fog or thick dust haze (visibility less than 1000 metres).

- 40 Fog.
 41 Moderate fog in last hour.
 42 Thick fog in last hour.
 43 Fog, sky discernible } has become thinner during last
 44 Fog, sky not discernible } hour.
 45 Fog, sky discernible } no appreciable change during
 46 Fog, sky not discernible } last hour.
 47 Fog, sky discernible } has become thick during last
 48 Fog, sky not discernible } hour.
 49 Fog in patches.

50-59 Precipitation at time of observation.

- 50-59 Drizzle (precipitation consisting of numerous minute drops).
 50 Drizzle.
 51 Intermittent } slight drizzle.
 52 Continuous }
 53 Intermittent } moderate drizzle.
 54 Continuous }
 55 Intermittent } thick drizzle.
 56 Continuous }
 57 Drizzle and fog.
 58 Slight or moderate } drizzle and rain.
 59 Thick }

60-69 Rain.

- 60 Rain.
 61 Intermittent } slight rain.
 62 Continuous }
 63 Intermittent } moderate rain.
 64 Continuous }
 65 Intermittent } heavy rain.
 66 Continuous }
 67 Rain and fog.
 68 Slight or moderate } rain and snow.
 69 Heavy }

70-79 Snow.

- 70 Snow or sleet.
 71 Intermittent } slight snow in flakes.
 72 Continuous }
 73 Intermittent } moderate snow in flakes.
 74 Continuous }
 75 Intermittent } heavy snow in flakes.
 76 Continuous }
 77 Snow and fog.
 78 Granular snow.
 79 Ice crystals.

80-89 Shower(s).

- 80 Shower(s).
 81 Shower(s) of slight or moderate } rain.
 82 " " heavy }
 83 " " slight or moderate }
 84 " " heavy } snow.
 85 " " slight or moderate } rain and snow.
 86 " " heavy }
 87 " " granular snow.
 88 " " slight or moderate } hail, or rain and hail.
 89 " " heavy }

90-99 Thunderstorm.

- 90 Thunderstorm.
 91 Rain at time } thunderstorm during last hour, but
 92 Snow or sleet at time } not at time of observation.
 93 Thunderstorm, slight, without hail or soft hail, }
 but with rain or snow }
 94 " slight, with soft hail }
 95 " moderate, without hail, but with } at time
 rain (or snow) } of
 96 " moderate, with soft hail } observation.
 97 " heavy, without hail, but with }
 rain (or snow) }
 98 " combined with dust storm }
 99 " heavy, with hail }

Table VII.

W.—Past Weather.

Code
Figure.

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

Barometer.**Table VIII.**

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

Code Figs.	Mb.	In.	Code Figs.	Mb.	In.	Code Figs.	Mb.	In.	Code Figs.	Mb.	In.
25	925	27.32	60	960	28.35	95	995	29.38	25	1025	30.27
26	926	27.35	61	961	28.38	96	996	29.41	26	1026	30.30
27	927	27.38	62	962	28.41	97	997	29.44	27	1027	30.33
28	928	27.41	63	963	28.44	98	998	29.47	28	1028	30.36
29	929	27.44	64	964	28.47	99	999	29.50	29	1029	30.39
30	930	27.46	65	965	28.50	00	1000	29.53	30	1030	30.42
31	931	27.49	66	966	28.53	01	1001	29.56	31	1031	30.45
32	932	27.52	67	967	28.56	02	1002	29.59	32	1032	30.48
33	933	27.55	68	968	28.59	03	1003	29.62	33	1033	30.51
34	934	27.58	69	969	28.62	04	1004	29.65	34	1034	30.53
35	935	27.61	70	970	28.65	05	1005	29.68	35	1035	30.56
36	936	27.64	71	971	28.67	06	1006	29.71	36	1036	30.59
37	937	27.67	72	972	28.70	07	1007	29.74	37	1037	30.62
38	938	27.70	73	973	28.73	08	1008	29.77	38	1038	30.65
39	939	27.73	74	974	28.76	09	1009	29.80	39	1039	30.68
40	940	27.76	75	975	28.79	10	1010	29.83	40	1040	30.71
41	941	27.79	76	976	28.82	11	1011	29.86	41	1041	30.74
42	942	27.82	77	977	28.85	12	1012	29.89	42	1042	30.77
43	943	27.85	78	978	28.88	13	1013	29.92	43	1043	30.80
44	944	27.88	79	979	28.91	14	1014	29.94	44	1044	30.83
45	945	27.91	80	980	28.94	15	1015	29.97	45	1045	30.86
46	946	27.94	81	981	28.97	16	1016	30.00	46	1046	30.89
47	947	27.97	82	982	29.00	17	1017	30.03	47	1047	30.92
48	948	28.00	83	983	29.03	18	1018	30.06	48	1048	30.95
49	949	28.03	84	984	29.06	19	1019	30.09	49	1049	30.98
50	950	28.05	85	985	29.09	20	1020	30.12	50	1050	31.01
51	951	28.08	86	986	29.12	21	1021	30.15	51	1051	31.04
52	952	28.11	87	987	29.15	22	1022	30.18	52	1052	31.07
53	953	28.14	88	988	29.18	23	1023	30.21	53	1053	31.10
54	954	28.17	89	989	29.21	24	1024	30.24	54	1054	31.13
55	955	28.20	90	990	29.24						
56	956	28.23	91	991	29.26						
57	957	28.26	92	992	29.29						
58	958	28.29	93	993	29.32						
59	959	28.32	94	994	29.35						

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

Table IX.

Code Figure.	A.—Barometric Tendency.
0	Barometer steady. (The barometer has not fallen or risen more than $\frac{1}{2}$ millibar in 3 hours.)
1	Barometer rising slowly. (The barometer has risen 1 to $1\frac{1}{2}$ millibars (.03-.04 in.) in last 3 hours.)
2	Barometer rising. (The barometer has risen 2 to $3\frac{1}{2}$ millibars (.06-.10 in.) in last 3 hours.)
3	Barometer rising quickly. (The barometer has risen 4 to 6 millibars (.12-.18 in.) in last 3 hours.)
4	Barometer rising very rapidly. (The barometer has risen over 6 millibars (.18 in.) in last 3 hours.)
5	Barometer falling slowly. (The barometer has fallen 1 to $1\frac{1}{2}$ millibars (.03-.04 in.) in last 3 hours.)
6	Barometer falling. (The barometer has fallen 2 to $3\frac{1}{2}$ millibars (.06-.10 in.) in last 3 hours.)
7	Barometer falling quickly. (The barometer has fallen 4 to 6 millibars (.12-.18 in.) in last 3 hours.)
8	Barometer falling very rapidly. (The barometer has fallen over 6 millibars (.18 in.) in last 3 hours.)

Barograph.

Table X.

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

(Adapted for British Ships.)

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

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

For illustration of these characteristic changes and guidance, see MARINE OBSERVERS' HANDBOOK, 5TH EDITION.

Table XI.

bb.—Amount of Rise or Fall of the Barometer in the last three hours. (In fifths of Millibars.)

Code Figs.	Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.		Code Figs.	Amount of Rise or Fall.	
	Mbs.	Ins.		Mbs.	Ins.		Mbs.	Ins.		Mbs.	Ins.
01	0.2	.01	23	4.6	.14	45	9.0	.27	67	13.4	.40
02	0.4	.01	24	4.8	.14	46	9.2	.28	68	13.6	.41
03	0.6	.02	25	5.0	.15	47	9.4	.28	69	13.8	.41
04	0.8	.02	26	5.2	.16	48	9.6	.29	70	14.0	.42
05	1.0	.03	27	5.4	.16	49	9.8	.29	71	14.2	.43
06	1.2	.04	28	5.6	.17	50	10.0	.30	72	14.4	.43
07	1.4	.04	29	5.8	.17	51	10.2	.31	73	14.6	.44
08	1.6	.05	30	6.0	.18	52	10.4	.31	74	14.8	.44
09	1.8	.05	31	6.2	.19	53	10.6	.32	75	15.0	.45
10	2.0	.06	32	6.4	.19	54	10.8	.32	76	15.2	.46
11	2.2	.07	33	6.6	.20	55	11.0	.33	77	15.4	.46
12	2.4	.07	34	6.8	.20	56	11.2	.34	78	15.6	.47
13	2.6	.08	35	7.0	.21	57	11.4	.34	79	15.8	.47
14	2.8	.08	36	7.2	.22	58	11.6	.35	80	16.0	.48
15	3.0	.09	37	7.4	.22	59	11.8	.35	81	16.2	.49
16	3.2	.10	38	7.6	.23	60	12.0	.36	82	16.4	.49
17	3.4	.10	39	7.8	.23	61	12.2	.37	83	16.6	.50
18	3.6	.11	40	8.0	.24	62	12.4	.37	84	16.8	.50
19	3.8	.11	41	8.2	.25	63	12.6	.38	85	17.0	.51
20	4.0	.12	42	8.4	.25	64	12.8	.38	86	17.2	.52
21	4.2	.13	43	8.6	.26	65	13.0	.39	87	17.4	.52
22	4.4	.13	44	8.8	.26	66	13.2	.40			

Visibility.

Table XII.

V.—Visibility.

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

Clouds.

Table XIII.

CL.—Form of Low Cloud.

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

Table XIV.

CM.—Form of Middle Cloud.

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

Table XV.

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

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

Table XVI.

C.—Predominating Form of Cloud.

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

Table XVII.

N. and N₁.—Amount of Cloud.

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

Temperatures.

Table XVIII.

t_a.—Difference between Air and Sea Surface Temperatures.

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

Swell.

Table XIX.

K.—Swell

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

Speed.

Table XX.

f.—Speed of Ship.

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

DANGER TO NAVIGATION SIGNALS FOR ALL SHIPS.

The following are extracts from the International Convention for Safety of Life at Sea, to come into force, July 1st, 1931, when ratified:—

Article 34.

The master of every ship which meets with dangerous ice, a dangerous derelict, a dangerous tropical storm or any other direct danger to navigation is bound to communicate the information, by all the means of communication at his disposal, to the ships in the vicinity, and also to the competent authorities at the first point of

the coast with which he can communicate. It is desirable that the said information be sent in the manner set out in Regulation XLVI.

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

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

ANNEXE 1.

REGULATION XLVI.

TRANSMISSION OF INFORMATION.

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

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

INFORMATION REQUIRED.

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

(a) ICE, DERELICTS AND OTHER DIRECT DANGERS TO NAVIGATION.

- (1) the kind of ice, derelict or danger observed;
- (2) the position of the ice, derelict or danger when last observed;
- (3) the time and date when the observation was made.

(b) TROPICAL STORMS.—(Hurricanes in the West Indies, Typhoons in the China Seas, Cyclones in Indian Waters, and storms of a similar nature in other regions.)

(1) A STATEMENT THAT A TROPICAL STORM HAS BEEN ENCOUNTERED.—This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical storm exists in his neighbourhood.

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

- (a) barometric pressure (millibars, inches or millimetres);
- (b) change in barometric pressure (the change during the previous two to four hours);
- (c) wind direction (true, not magnetic);
- (d) wind force (Beaufort or decimal scale);
- (e) state of the sea (smooth, moderate, rough, high);
- (f) swell (slight, medium, heavy), and the direction from which it comes.

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

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

All directions should be true, not magnetic.

(3) TIME AND DATE AND POSITION OF THE SHIP.—These should be for the time and position when the meteorological observations reported were made, and not when the message was prepared or despatched. The time used in all cases should be Greenwich Mean Time.

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

EXAMPLES.

ICE.

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

DERELICT.

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

DANGER TO NAVIGATION.

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

TROPICAL STORM.

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

TTT Storm. Appearances indicate approach of hurricane. Barometer, corrected, 2964 inches, falling. Wind N.E., force 8. Swell medium from N.E. Frequent rain squalls. Course 035, 9 knots. 2200 N., 7236 W. 1300 G.M.T. September 14th.

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

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

Special Notices Regarding Personnel.

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

Obituary.

Lieutenant Commander Wilfred Charters, R.N.R.

Captain WILFRED CHARTERS died on July 25th 1930. He had until recently commanded S.S. *Lahore* and was a member of the Corps of Voluntary Marine Observers.

Our first recollection of WILFRED CHARTERS was when he joined H.M.S. *Heroic* as First Lieutenant towards the end of the Great War—a splendid executive officer; always unperturbed, and of a kindly disposition.

His loss is keenly felt by all who knew him.

Captain F. O. Seaborne, D.S.C.

The death of Captain FRED OWEN SEABORNE, Commander of S.S. *City of Bedford*, on August 4th, 1930, at the Riverside Hospital, Newport News, U.S.A., is noted with deep regret.

Captain SEABORNE was for some time a member of the Corps of Voluntary Marine Observers.

Lieutenant Commander William Colbeck, R.N.R.

Captain WILLIAM COLBECK died on 19th October 1930. In 1902 Captain COLBECK commanded the ship *Morning* which was relief ship to the Antarctic Expedition under Captain SCOTT, and during that time was a member of the Corps of Voluntary Marine Observers. His death is much regretted and the Corps of Voluntary Marine Observers will unite with the Marine Division in sympathising with his family, including his son Mr. W. R. COLBECK who is at present principal observing officer in the Auxiliary Barque *Discovery*, Captain SCOTT's old ship, now employed by the DOUGLAS MAWSON EXPEDITION.

Captain T. Mander.

The death of Captain THOMAS MANDER, which took place on October 28th, 1930, at his residence, 4, Salisbury Road, New Brighton, is noted with regret.

Captain Mander, before his retirement in June, 1929, from the service of the P.S.N. Company, was a member of the Corps of Voluntary Marine Observers during the time he commanded that Company's steamships *Laguna*, *Oriana* and *Orcomo*.

Commander F. M. Tuke, R.N.R.

Captain FRANCIS MELVILLE TUKE, late Marine Superintendent of the Orient Line, died at his home in Gravesend on November 7th, 1930.

Born at Swinford, in Kent, in 1856, he was educated at Wye College, at Weybridge, and was trained in H.M.S. *Worcester*. He was in Green's Blackwall service from 1872 to 1882 as a midshipman and an officer.

In 1882 he joined the Orient Company and had speedy promotion commanding the *Chimborazo*, *Gironde*, *Orient*, *Austral*, and *Ormuz*, and was appointed Marine Superintendent in 1897, retiring in 1920.

Captain TUKE was of the old school, a fine, courtly, lovable, English gentleman, who endeared himself to all with whom he came in contact; and was always encouraging to the young officer.

During the time that he commanded R.M.S. *Ormuz* he was a member of the Corps of Voluntary Marine Observers, and his ship contributed four excellent meteorological logs.

Captain L. A. Millard.

The death of Captain LEWIS AUSTIN MILLARD took place at Southampton on November 22nd 1930.

Captain MILLARD joined the old Union Line in 1899 and attained command in 1903 when he was appointed Master of the *Cluny Castle*. Since then he has commanded several of the ships of the Union Castle Line including the *Armadale Castle*, *Norman*, *Kenilworth Castle*, *Arundel Castle* and *Edinburgh Castle*.

Owing to ill-health Captain MILLARD was compelled to retire from active service in November 1926 up to which time he had been associated with the Voluntary Corps of Marine Observers dating back to 1904.

Special Notices Regarding Personnel—continued.

Captain Duncan Forbes.

Captain D. FORBES retired from the post of Merchant Navy Agent to the Meteorological Office at Southampton on the 30th September 1930.

Captain FORBES is one of the few surviving master mariners who served in tea clippers, having been for a time in the famous *Titanica*.

In 1888 Captain HENRY TOYNBEE saw the need for a live master mariner to promote marine meteorological work in ships using the port of Southampton, and in March of that year Captain DUNCAN FORBES was appointed agent to the Marine Division.

He carried on, with the exception of the years 1914 to 1921 (when the work was taken over by Board of Trade Examiners and Nautical Surveyors of the port), thus serving as agent for a period of no less than 35 years. This is the longest period ever served by an Agent, and Captain FORBES' work has been of inestimable value to the Merchant Navy and the Marine Division of the Meteorological Office.

Captain FORBES has won the affection and respect of a very great number of officers in the merchant navy. Not only has he shown many how to do marine meteorological work to their own advantage and that of their service, but he has taught a great many officers, including in their number some of the leading commanders of the present day, the science of nautical astronomy and navigation at his nautical academy.

We wish him and his wife (who has assisted him in the work, and at times of special need has actually performed ship visiting duties on his behalf) good health and happiness.

We thank them for their many years of devoted work.

Captain R. Craven.

Captain RICHARD CRAVEN, late commander of the Commonwealth Dominion M.V. *Port Fairy*, has retired after over forty-seven years' service afloat.

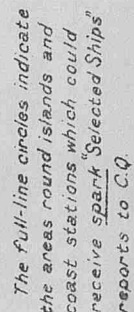
He commenced his apprenticeship in 1883 in the well known Dale line of sailing ships trading between Liverpool and Frisco and served later as an officer in the *Langdale* and *Borrowdale*.

Transferring to steam Captain CRAVEN first served as an officer in both the Johnston and Nelson Lines, later joining the Federal Line in which company he was holding command when they merged into the Commonwealth Dominion Line and the ships' names changed to Ports. Since then he has commanded several ships of the Port Line generally employed in the U.K.-Australasian trade, and when in command of the *Port Hobart* and *Port Gisborne* was a member of the Voluntary Corps of Marine Observers, who join with the Marine Division in wishing Captain CRAVEN long life and happiness in his well earned retirement.

Captain C. E. Homan.

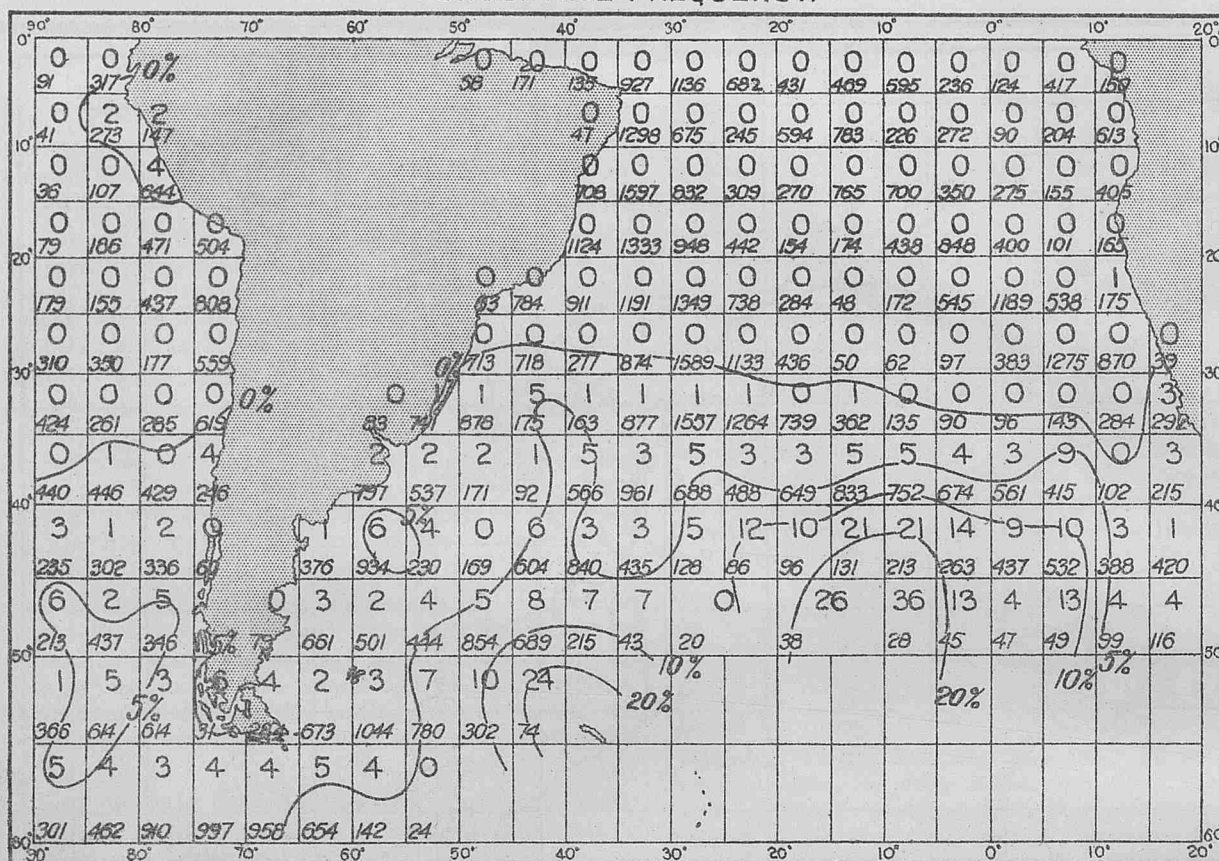
Captain C. E. HOMAN, commander of M.V. *Glenamoy*, has been elected an Elder Brother of Trinity House.

Captain HOMAN has been a member of the Corps of Voluntary Marine Observers since 1926, since when the *Glenamoy* has contributed several meteorological logs attaining the Excellent classification. The Corps of Marine Observers join with the Marine Division in heartily congratulating Captain HOMAN upon gaining a position which is honoured throughout the Sea Services.



JANUARY

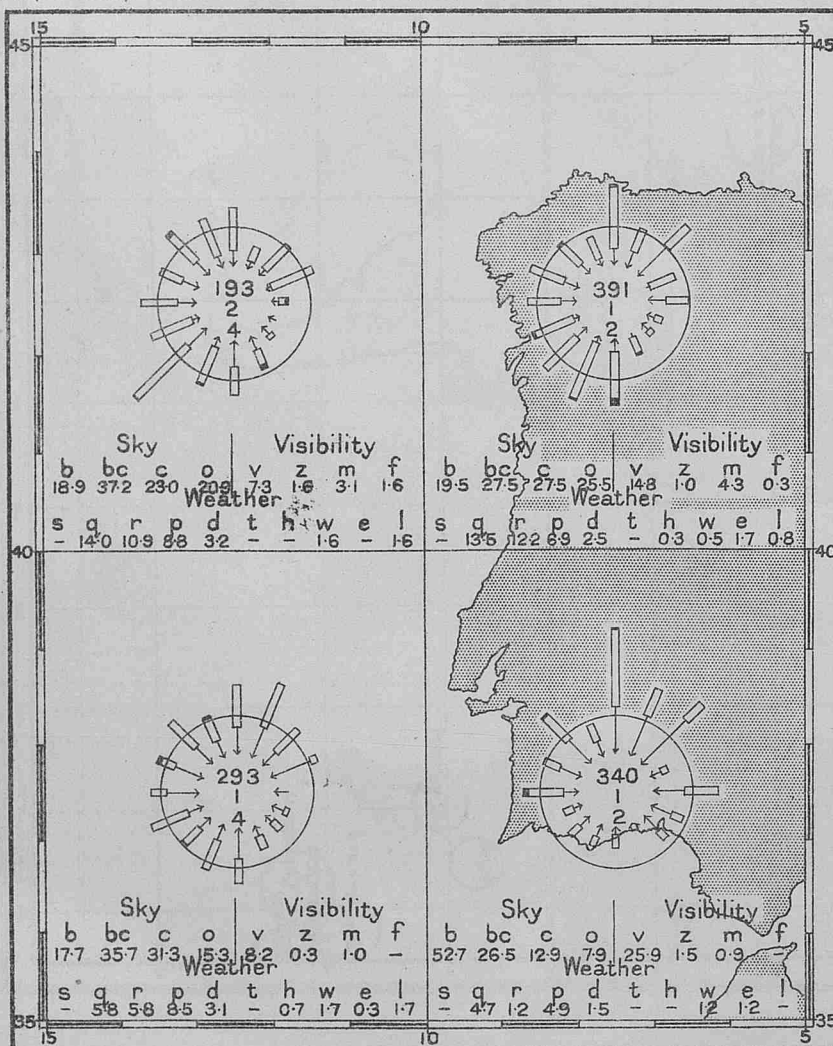
FOG IN THE SOUTH ATLANTIC AND VICINITY OF WEST COAST OF SOUTH AMERICA, PERCENTAGE FREQUENCY.



The upper figures in the 5° squares give the percentage frequency of occasions upon which Fog was logged, the lower figures the total number of observations. Lines are drawn for 0, 5, 10 and 20%. The chart is compiled from observations from British Ships for the period 1855 to 1899.

JANUARY.

WIND, FOG, MIST AND WEATHER FOR THE REGION OFF THE COAST OF PORTUGAL.



EXPLANATION.

The Wind roses are drawn from Sea observations within the 5° squares.

Arrows fly with the wind, length represents frequency, thickness strength.

Gales. Moderate. Light.
8-12 4-7 1-3

Distance from head of arrow to circle represents 5%,

Scale: 0 10 20%

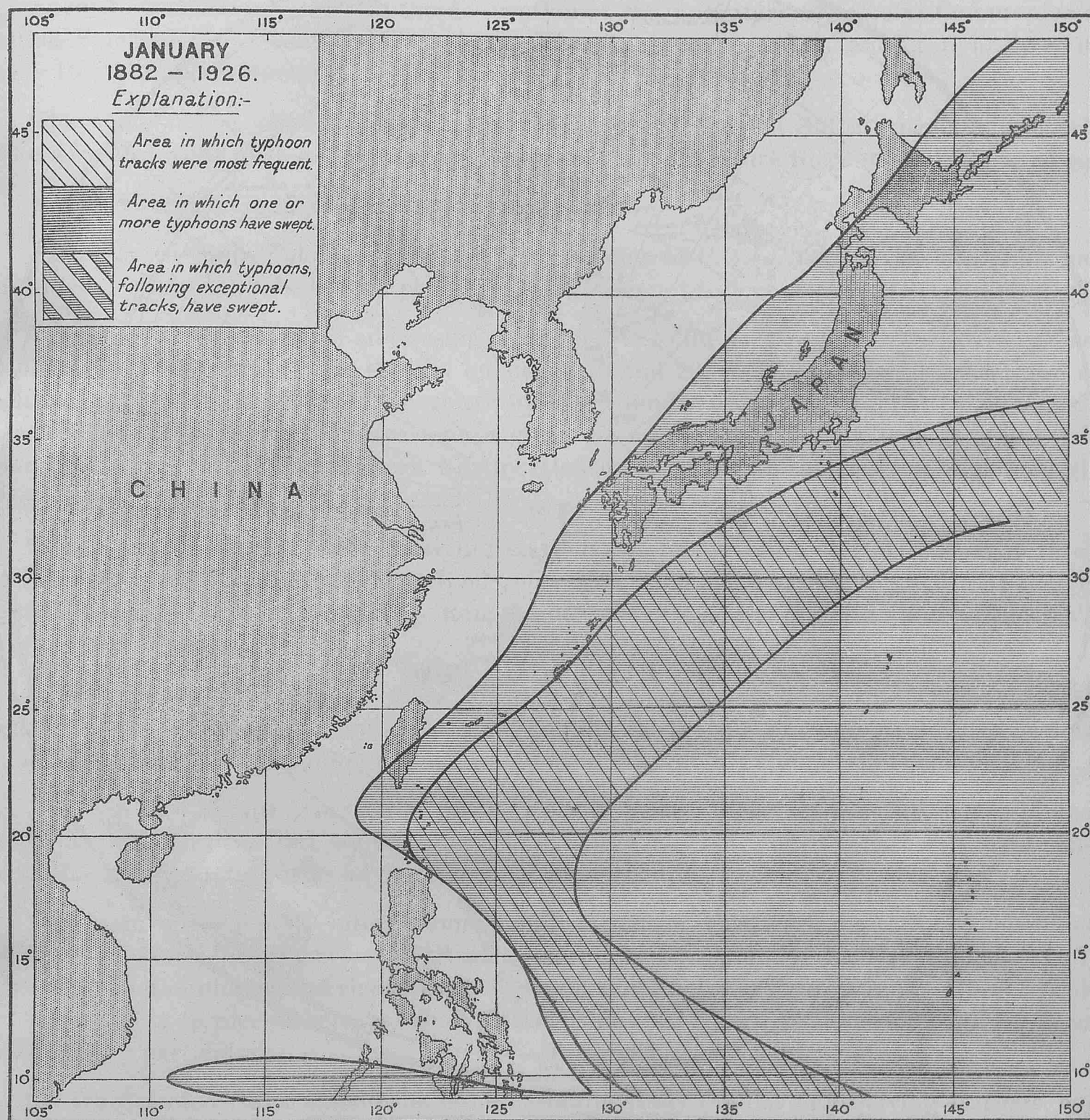
The upper figure in the centre of the rose gives total number of observations, the middle figure the percentage frequency of calms and the lower figure the percentage frequency of variable winds.

The percentage frequency of types of weather are shown in the lower half of each 5° square by the figures beneath each of the letters of the Beaufort weather notation.

For example, in the 5° square Latitude 40° to 45° N. Longitude 5° to 10° W. was logged 19 times in every 100 observations while f was logged in the proportion of 3 in every 1,000.

Compiled from observations of British Ships received since the adoption of the Hollerith system of extraction, covering the years 1921-1928.

TYPHOONS IN THE FAR EAST DURING 45 YEARS.



JANUARY - Single chart: 32 observations of typhoons.

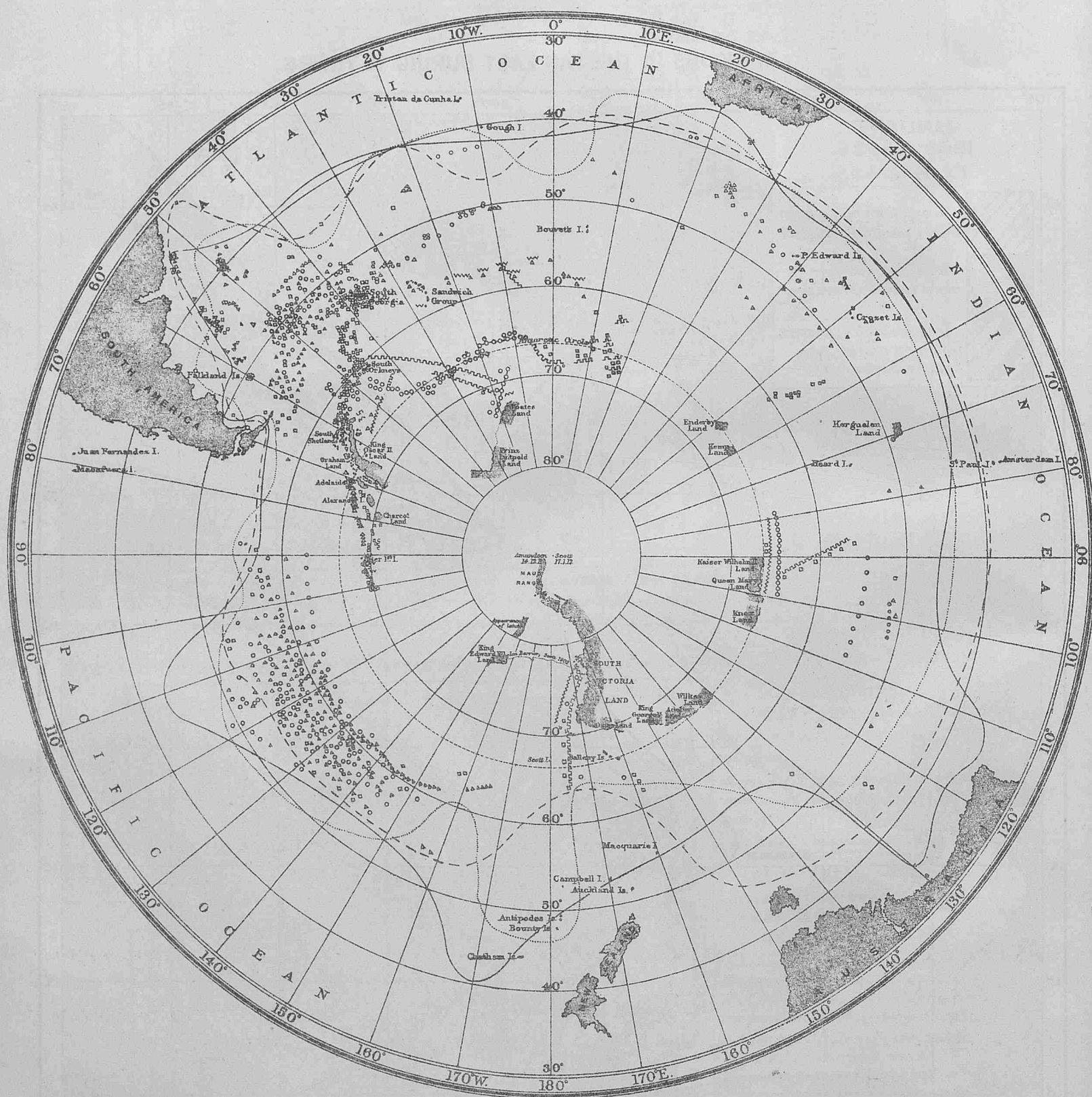
Remarks:- The coast of China and the East China and Yellow Seas as well as the Sea of Japan are free from typhoons. There are a few instances of typhoons crossing the Island of Palawan towards Cochin China.

Principal Track.- from the Ballintang Channel, East. of the Riu-Kiu islands and between Honshiu and the Bonin islands.

It must not be forgotten that the winter monsoon prevails on the coast of China at this season interrupted by continental depressions followed by violent gusts of wind from N.W. to N.E. There are also blizzards over the Yellow Sea and Sea of Japan.

Starting point: between Guam and Yap.

(From Atlas of the Typhoons of the China Seas, 1882 to 1926, by the Rev. P.E. Gherzi S.J., Director Zi-ka-wei Observatory, near Shanghai, China.)



ICE CHART OF THE SOUTHERN HEMISPHERE, 1902-1930. JANUARY, FEBRUARY and MARCH.

EXPLANATION.

The symbols used to distinguish the records of each of the three months represented during the period 1902-1930. are as follows:—January, bergs Δ , pack ice \sim ; February, bergs \square , pack ice \sim ; March, bergs \circ , pack ice \sim . Extreme limits are given thus:—January, ———; February, - - - - -; March,; these include ice reported since 1772.

A list of Southern Ice Reports during the years 1929-1930 for the month of January, will be found on p.14 of this Number.

Similar lists for the months of February, and March, will be published in the appropriate issues, Numbers 86 and 87 of this Volume.

NOTICES.

VERY IMPORTANT.

Special attention is invited to the description of the Voluntary Scheme of Communication for British Selected Ships Routine Wireless Weather Telegraphy, revised and brought up to date on pages 16 to 19 of this number.

The commanders, officers, and wireless operators of Selected Ships especially are asked to make a careful study of these pages, and to carry out the procedure therein given as far as possible.

Special attention is invited to the following points:—

“B Selected Ships” should broadcast their reports to C.Q. on 600 m. spark at and soon after the times given in the schedule on page 17, taking care not to jam other “B Selected Ships.”

“A Selected Ships” when addressing their reports to the meteorological services and sending them to the stations given in the list on pages 19 and 20, should remember that these reports though addressed to a particular shore station are intended to be intercepted by all ships. It is therefore necessary to use the wave length given (on which other ships will be listening in), and when in the roll call in the Eastern North Atlantic to adhere to the order of reporting given in the Roll Call.

In parts of the world where receiving stations are not given in the list on pages 19 and 20, “A Selected Ships” should broadcast their reports on 2,100 metres C.W., in order that they may be received at ranges up to 1,500 miles. Range up to this distance is of great value to those who can receive the information.

In order that these reports from “B Selected Ships” broadcast to C.Q. should be of the greatest utility in aiding navigation they may contain the first four or universal coded groups only, whenever reliable information of the set and drift of current, ice and derelicts can be added.

“A Selected Ships” in parts of the world where their reports are not addressed to meteorological services but to C.Q. may also abbreviate the coded weather groups and add navigational information with advantage to all concerned.

The main principle of international co-operation in this work is that arrangements for voluntary meteorological service in all parts of the world should be made with masters of ships only by the meteorological service of the country in which ships are registered. All meteorological services desiring to receive reports from British Ships have been invited (see page 16) to provide the necessary particulars.

British Selected Ships should therefore carefully study the list of receiving stations, which is brought up to date and published monthly in the “Marine Observer.”

All requests to British Selected Ships for routine Wireless weather reports to services and stations not included in this list, should be referred to the Marine Division of the Meteorological Office, London, and those making such requests may also be referred to this Notice and the invitation referred to on page 16.

ICE CHART. WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE.

- (C) From 1st September to 31st March, inclusive.
- (E) From 1st December to 14th February, inclusive.

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

SYMBOLS USED ON THE CHART

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

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position.	Remarks.
Jan. 14, 1836	H.M.S. Cove...	60°55' N. 59°50' W.	2 bergs.
" 9, 1913	S.S. Oriflamme	48°37' N. 34°42' W.	Berg 40 ft. high, 400 ft. long.
" 27, 1916	S.S. Rio Verde	33°34' N. 70°32' W.	Hummock 2 ft. high, 30 ft. in circumference

No Reports of Ice, sighted in the month of November, 1930, have been received at the Meteorological Office.

LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 12th November, 1930, was received from the Canadian Signal Service, Quebec:—

"All points, no ice in sight."

CO-OPERATION OF SHIPOWNERS, MASTERS AND MATES

Captains and officers who wish to co-operate regularly with the Meteorological Office should apply to the appropriate Port Meteorological Officers or Agents, a list of these gentlemen with addresses given below. A general description of Marine Meteorological Work, including the particulars desired from intending Marine Observers, is given in Chapter I of THE MARINE OBSERVER'S HANDBOOK 5TH EDITION which may be obtained from H.M. Stationery Office direct, or through any booksellers, price 2s. 6d.

The names of vessels regularly observing for the Meteorological Office, London, together with their Commanders and Observing Officers, are given monthly in THE MARINE OBSERVER, which may be obtained from H.M. Stationery Office, price 2s., 2s. 2d. post free.

The Captains and Officers of regular observing ships constitute the Corps of Voluntary Marine Observers. For certain branches of this work tested instruments are lent to the Captains of British ships registered at ports in Great Britain. A certain number of Regular Observing ships are detailed as "Selected Ships" for the purpose of the World Wide Scheme of Routine Ships' Wireless Weather Telegraphy Reporting. These "Selected Ships" are indicated monthly in the "Fleet List" in THE MARINE OBSERVER by a number.

Only ships registered at Ports in Great Britain will, in future, be included in the Meteorological Office, London, "Fleet List."

Marine Observers are asked to send in their Meteorological Log through the appropriate Port Meteorological Officer or Agent (accompanied by Form 138 in the case of "Selected Ships") at intervals of not more than six months. The Meteorological Record Form 911 (accompanied by Form 138 in the case of "Selected Ships") should be posted direct to the Meteorological Office, London, at the end of each voyage.

When sending in the Meteorological Log or Record, Regular Observing ships will render great assistance if they will notify the Port Meteorological Officer or Agent of their requirements.

The Port Meteorological Officers and Agents inspect official instruments at regular intervals, replacing those which are defective.

Where ships' instruments are found by comparison to be reliable they may be used for the work of "Selected Ships." A reliable mercurial barometer is essential as part of the equipment of a "Selected Ship."

A copy of THE MARINE OBSERVER is sent monthly to the Captain of every observing ship for the information and guidance of the officers doing this work. He is also supplied with THE MARINE OBSERVER'S HANDBOOK and such charts and atlases as are considered necessary as Meteorological equipment for The Work of a Regular Observing ship in a particular trade.

WIRELESS AND WEATHER AN AID TO NAVIGATION, published by H.M. Stationery Office, which affords information and guidance for the practical application of Marine Meteorology to Navigation, may be purchased through any bookseller, price 5s.

Returns made by Regular Observing ships are acknowledged monthly in THE MARINE OBSERVER, and a list of those Commanders and Officers who have performed specially fine work is published yearly in THE MARINE OBSERVER and Excellent Awards are made to them.

The work done by Regular Observing Ships in making written returns, and by "Selected Ships" in broadcasting routine information by W/T, together with "Weather Shipping" Bulletins broadcast from the shore, conforming with the recommendations of the International Convention of Safety of Life at Sea, 1929, provide the necessary information for the use of all shipping. Thus by shipowners encouraging the specialist work in those of their ships whose names appear in THE MARINE OBSERVER, this Voluntary Work under the supervision of the Meteorological Office provides a service to all shipping at minimum cost to the National funds.

Shipowners are asked to facilitate the forwarding of postal matter from the Air Ministry addressed to the Captains of their ships.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
BALTIC.			
5.11.30	54°42'N.	16°10'E.	Wreck of wooden vessel, with propeller, floating bottom up.
ENGLISH CHANNEL.			
2.11.30	50°12'N.	2°42'W.	French fishing smack <i>Ma Gondole</i> of Paimpol, in sinking condition. Danger to navigation.
12.11.30	48°55'N.	5°23'W.	Wreck of tunny fishing vessel: dangerous to navigation.
BAY OF BISCAY.			
4.11.30	47°12'N.	6°16'W.	Vertical mast on submerged wreckage.
11.11.30	46°18'N.	2°15'W.	Large light buoy with green light adrift.
NORTH ATLANTIC.			
1.11.30	29°12'N.	69°41'W.	Unlighted gas buoy with black superstructure and red lantern, the buoy was apparently in good condition but evidently has been in the water for a long time.
4.11.30	48°06'N.	6°54'W.	Mast with red and white flag: danger to navigation.
5.11.30	43°12'N.	41°12'W.	Cylindrical tank about 30 ft. long and 5 ft. in diameter.
6.11.30	27°57'N.	79°42'W.	Derelict motor boat, about 40 ft. long, painted green and numbered 4-18342 on bow.
8.11.30	47°40'N.	4°31'W.	Large buoy adrift.
9.11.30	49°15'N.	70°25'W.	Wooden stringer, 20 ft. long and 2 ft. square.
9.11.30	39°53'N.	73°49'W.	Spar projecting vertically 3 ft. out of water and apparently attached to submerged wreckage; the spar was between 1½ and 2 ft. in diameter..
12.11.30	49°10'N.	10°35'W.	Large drifting buoy, painted red and black, light extinguished.
15.11.30	39°20'N.	10°29'W.	Deck of wheelhouse of vessel named <i>Fito</i> attached to it.
15.11.30	48°07'N.	5°30'W.	Three drifting conical buoys, two painted red and one painted green.
18.11.30	42°56'N.	18°53'W.	Black buoy, about 8 ft. in diameter.
21.11.30	42°08'N.	9°29'W.	Black and white buoy adrift: dangerous to navigation.
22.11.30	49°46'N.	9°44'W.	Big buoy laying on its side with <i>S</i> painted on side. Dangerous to navigation.

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

LONDON ... Captain L. A. BROOKE SMITH, R.D., R.N.R., Marine Superintendent.
 Commander J. HENNESSY, R.D., R.N.R., Senior Nautical Assistant.
 Room 319, Adastral House, Kingsway, W.C.2.
 (Telephone No.: Holborn 3434 Extension 421).
 Nearest station Temple, District Railway.

THAMES ... Lieut. C. H. WILLIAMS, R.N.R., Port Meteorological Officer, Royal Albert Docks, E.16.
 (Telephone No.: Albert Docks 2659. Telegraphic Address: Barometric Aldock, London).

MERSEY ... Lieut. Commander M. CRESSWELL, R.N.R., Port Meteorological Officer, Dock Office, Liverpool.
 (Telephone No.: Bank 8959. Telegraphic Address: Meteorite, Liverpool).

Agents.

BELFAST ... Captain J. MCINTYRE, Harbour Master, Harbour Office. (Telephone No.: Belfast 4090).

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

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

FREMANTLE ... Captain J. J. AIREY, Deputy Director of Navigation, Customs House.
 W. Australia. (Telephone No.: B 1391).

Agents (contd.).

HONG KONG, China. Lieut. Commander R. G. H. MILLIGAN, R.N., Superintendent, Admiralty Chart and Chronometer Depot, H.M. Dockyard.
 (Telephone No.: 108 Dockyard).

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

LEITH ... Captains G. BLACK and C. G. BONNER, V.C., D.S.C., Leith Salvage and Towage Co., Ltd., 2, Commercial Street.

SOUTHAMPTON Mr. R. I. T. MCEWAN, Master Mariner, Gilchrist Navigation School, 5, Union Bank Chambers, 1, Bernard Street. (Telephone No. Southampton 4277).

SYDNEY, New South Wales. Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation.
 Captain C. LINDBERGH.
 Customs House.
 (Telephone No.: B6421).

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

VANCOUVER, British Columbia. Mr. T. S. H. SHEARMAN, 61, Leigh Spencer Building, 553, Granville Street.
 (Telephone No.: Seymour 3309).

FLEET LIST.

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

The numbers preceding the names of ships are for identification purposes, when observations are re-transmitted in synoptic messages by wireless or cable, and are not intended for use at sea.

Selected Ships.

Those ships in this list which have a number and symbols indicating W/T apparatus before their names are "Selected ships" invited to make by W/T, reports of observations taken at arranged G.M. Times to "All Ships."

 a

Name of Vessel.	Captain.	Observing Officers.	Meteoro- logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 14.11.30.	Date Received.	
095 † <i>Arundel Castle</i> ...	Morton Betts, W. ...	...	M.L.	Union Castle	Form 911 30.5.30 to 15.6.30 ...	18.6.30
280 † <i>Astronomer</i> ...	Richards, J. ...	T. R. Hill ...	No. M.	Harrison	Forms 911 & 138 8.9.30 to 30.9.30 ...	20.10.30	
065 † <i>Asturias M.V.</i> ...	LeBrecht, H. A. ...	...	W.T.	R.M.S.P. Co. ...	...	...
156 † <i>Ascantus</i> ...	Wilson, C. A. ...	J. T. Collin, W. J. E. Wright, C. B. Reeder.	M.L.	A. Holt ...	Form 915 1.5.30 to 9.8.30 ...	13.8.30	
<i>Atlantian</i> ...	Masters, W. ...	...	No. A	Leyland	Form 911 2.8.30 to 7.11.30 ...	14.10.30
<i>Atreus</i> ...	Wilcox, J. H. ...	E. A. H. Gepp ...	" A.	A. Holt ...	" 4.3.30 to 28.6.30 ...	2.8.30	
281 † <i>Auditor</i> ...	Owen, W. T. ...	D. O. Percy ...	" M.	Harrison	" 1.3.30 to 27.4.30 ...	5.5.30	
<i>Ausonia</i> ...	Murchie, P.A., R.D., Capt. R.N.R.	E. R. Taylor ...	" A.	Cunard	" 19.10.30 to 8.11.30 ...	12.11.30	
212 † <i>Australia</i> ...	Scutt, W. ...	P. McDougal, E. H. Lidstone, A. G. Brooks.	M.L.	British India	Form 915 25.7.30 to 1.8.30... ..	16.8.30	
282 † <i>Author</i> ...	Whyte, D. L. ...	J. D. Page ...	No. M.	Harrison	Form 911 28.4.30 to 2.6.30... ..	11.6.30	
124 † <i>Avila Star</i> ...	Hopper, G.E....	A. Rouse ...	" M.	Blue Star	Forms 911 & 138 12.7.30 to 25.8.30 ...	29.8.30	
<i>Balmoral Castle</i> ...	Gilbert, E. F....	H. Baty ...	" A.	Union Castle	" 21.3.30 to 7.5.30 ...	14.5.30	
179 † <i>Balrarnald</i> ...	Short, C. E. ...	H. P. Mallet, G. E. Owen, E. R. Physick.	" M.	P. & O. Branch	Forms 911 & 138 2.8.30 to 10.8.30 ...	15.9.30	
051 † <i>Baltic</i> ...	Trant, E. L., R.I.D., Commr., R.N.R.	J. W. Grace, J. H. Walker, J. Law.	W.T.	White Star	" " 5.10.30 to 25.10.30 ...	27.10.30	
<i>Bampton Castle</i> ...	James, J. S., D.S.C	H. R. Graham ...	No. A.	Union Castle	Form 911 31.8.30 to 27.9.30 ...	4.11.30	
<i>Banbury Castle</i> ...	Aylen, C. E. H.	E. Hamlyn, R. C. J. Watt, C. J. B. Thompson.	" A.	"	" 13.8.30 to 6.9.30... ..	7.10.30	
248 † <i>Banffshire</i> ...	Westropp, T. G. ...	A. Banks, N. Stewart	" M.	Turnbull Martin	Forms 911 & 138 28.8.30 to 19.9.30 ...	25.9.30	
180 † <i>Baradine</i> ...	Elliot Smith, H. ...	C. B. Roche, A. G. Jenkins, L. A. Hill, C. F. Halliday, G. L. Farnfield.	M.L.	P. & O. Branch	Form 915 1.8.30 to 6.11.30 ...	11.11.30	
037 † <i>Baronessa</i> ...	Compton, R. W. ...	P. Liston ...	No. M.	Houlder	Form 911 17.9.30 to 11.10.30 ...	18.10.30	
<i>Baron Forbes</i> ...	Cairns, W. ...	J. H. Pool, C. S. Gallaway, J. H. Davis.	" A.	H. Hogarth & Sons...	Forms 911 & 138 16.7.30 to 13.8.30 ...	8.9.30	
213 † <i>Barpeta</i> ...	Partridge, H. ...	J. Paice ...	" M.	British India	" " 17.6.30 to 14.8.30 ...	19.8.30	
181 † <i>Barrabool</i> ...	Jack, H. M. ...	W. E. Butcher ...	" M.	P. & O. Branch	" " 21.9.0 to 22.10.30 ...	30.10.10	
070 † <i>Bayano</i> ...	Swain, F. H. ...	Cornwell, S. A. ...	W.T.	Elders & Fyffes	Form 911 8.7.30 to 29.9.30 ...	6.11.30	
<i>Baychimo</i> ...	Cornwell, S. A. ...	J. R. Lee ...	No. A.	Hudson Bay Co	Forms 911 & 138 6.10.30 to 25.10.30 ...	30.10.30	
059 † <i>Belgenland</i> ...	Morehouse, W. A. ...	E. D. Copeman ...	W.T.	Red Star	Form 911 10.3.30 to 18.4.30 ...	24.4.30	
<i>Benalder</i> ...	Fairweather, J. J. ...	J. G. Davies, J. K. Krone, F. Jones.	No. A	Ben Line	Forms 911 & 138 12.7.30 to 10.10.30 ...	22.10.30	
183 † <i>Bendigo</i> ...	Wyatt, F. N. ...	C. J. Rea ...	" M.	P. & O. Branch	Form 911 23.10.30 to 27.10.30 ...	31.10.30	
<i>Bengore Head</i> ...	Milligan, J. ...	Evens, E. H. ...	" A.	Ulster S.S. Co.	Form 911 3.1.30 to 30.10.30 ...	4.11.30	
233 † <i>Berwickshire</i> ...	Lamont, A. ...	N. Ross ...	W.T.	Turnbull Martin	Telegraphic Report 4.10.30 ...	4.10.30	
<i>Brenda</i> ...	Munton, G. ...	H. L. Smith ...	No. A.	Scottish Fishery Bnd.	Forms 911 & 138 28.9.30 to 19.10.30 ...	21.10.30	
<i>Brighton</i> ...	Summers, F. F., R.D., Commr., R.N.R.	J. W. Peters, F. Patchett, A. Thompson.	C.C.	Southern Railway	" 13.8.20 to 4.10.30 ...	10.11.30	
057 † <i>Britannic</i> ...	Putt, R. O. ...	J. E. Jones ...	W.T.	White Star	Forms 911 & 138 19.10.30 to 30.10.30 ...	8.10.30	
269 † <i>British Consul</i> ...	Taylor, R. J. ...	P. O. Davis, E. R. B. Freeman, J. D. Archer.	" M.	British Tankers	" " 13.8.20 to 4.10.30 ...	8.10.30	
311 † <i>British Dominion</i> ...	Penton, P. M. ...	G. P. Hansard ...	" M.	"	Forms 911 & 138 2.7.30 to 10.9.30 ...	22.9.30	
067 † <i>British Empress</i> ...	Head, B. P. ...	P. McMillan, S. W. Brown, F. C. Doyle.	" M.	Anglo-Saxon	Petroleum Co.	Form 915 20.4.30 to 24.8.30 ...	12.9.30
308 † <i>Bulysses M.V.</i> ...	Gibb, A. W. P. ...	M. J. Harvey, B. S. Leiper ...	M.L.	Turnbull Martin	Form 911 28.10.30 to 2.11.30 ...	12.11.30	
249 † <i>Buteshire</i> ...	Collie, A. ...	O. W. Li Jones ...	W.T.	Anchor	Telegraphic Report 8.11.30 ...	8.11.30	
031 † <i>Caledonia</i> ...	Copland, C. P. ...	H. C. Fryer, F. Pover, D. H. Chadwick, H. Mackillican.	M.L.	L.M. & S. Rly	Form 915 1.5.30 to 9.8.30 ...	12.8.30	
250 † <i>Cambria</i> ...	Williams, R. ...	D. C. Shedden ...	"	Federal	Forms 911 & 138 19.10.30 to 9.11.30 ...	11.11.30	
026 † <i>Cameronia</i> ...	Gemmell, W. ...	H. H. Dunning, G. M. Roberts, C. E. Stocker, E. F. Witchell, A. H. Peacock, R. R. Taylor.	W.T.	Anchor	Elders & Fyffes	" 30.5.29 to 24.9.30 ...	30.9.30
295 † <i>Camito</i> ...	Forrester, W. T. O.B.E.	N. Parsons ...	M.L.	Elders & Fyffes	Form 911 31.7.30 to 30.8.30 ...	12.9.30	
101 † <i>Canonesa</i> ...	Brodie, W. H. ...	W. R. G. Carling ...	No. M.	Cunard	Forms 911 & 138 29.9.30 to 17.10.30 ...	21.10.30	
<i>Cape of Good Hope</i> ...	Jacobson, T. A. ...	P. O. Davis, E. R. B. Freeman, J. D. Archer.	" A.	"	Form 915 6.6.29 to 29.9.30... ..	8.10.30	
035 † <i>Carmania</i> ...	Townley, J. C. ...	E. Clancy, B. Sangster, G. Willis, M. S. Hodgson.	"	Union Castle	Forms 911 & 138 13.10.30 to 1.11.30 ...	4.11.30	
092 † <i>Carnarvon Castle</i> ...	Owens, G. ...	W. B. Tanner, C. B. Osborne, R. D. McCallum.	"	Cunard	Form 911 9.10.30 to 7.11.30 ...	10.11.30	
034 † <i>Caronia</i> ...	Brown, F. G., R.D., Capt., R.N.R.	H. Holmes ...	"	"	Forms 911 & 138 15.6.30 to 10.9.30 ...	15.9.30	
<i>Casanare</i> ...	Browne, S. ...	W. Fitzroy ...	No. A.	Elders & Fyffes	Form 911 7.9.30 to 11.10.30 ...	15.10.30	
184 † <i>Cathay</i> ...	Niven, J. D. ...	B. R. Coe ...	" M.	P. & O ...	Forms 911 & 138 13.10.30 to 2.11.30 ...	4.11.30	
<i>Cavina</i> ...	Riseley, A. D. ...	H. Denison, G. T. Kavanagh, J. Farrell.	" A.	Elders & Fyffes	Met. Log. 19.2.29 to 21.7.30 ...	7.10.30	
052 † <i>Cedric</i> ...	Smith, R. G. ...	J. Cockburn, B. L. Brind, D. M. McAdam.	W.T.	White Star	Form 911 12.4.30 to 19.5.30 ...	20.5.30	
157 † <i>Centaur M.V.</i> ...	Ward Hughes, J. ...	S. H. Jones ...	M.L.	A. Holt & Co.	" 1.8.30 to 3.9.30 ...	5.9.30	
056 † <i>Ceramic</i> ...	Jackson, W. H. P. ...	H. K. Houghton ...	W.T.	White Star	" 17.2.30 to 24.4.30 ...	19.5.30	
<i>Changuinola</i> ...	Thorburn, R. A. ...	W. S. Keith ...	No. A.	Elders & Fyffes	" 25.7.30 to 10.10.30 ...	16.10.30	
<i>Chindwin</i> ...	Paterson, G. ...	S. Waddington ...	" A.	Henderson	Form 915 13.5.30 to 19.10.30 ...	31.10.30	
<i>Chirripo</i> ...	Sapsworth, S. A. ...	T. D. Forbes ...	" A.	Elders & Fyffes	Form 911 5.8.30 to 15.8.30 ...	1.9.30	
192 † <i>Chitral</i> ...	Siggers, O. ...	H. G. Williams, J. E. Jenkins, R. W. Leese, A. G. Daniells.	" M.	P. & O. ...	" 8.9.30 to 1.10.30 ...	27.10.30	
265 † <i>City of Baroda</i> ...	McMillan, J. ...	R. W. Kellie ...	M.L.	Ellerman	" 13.10.30 to 2.10.30 ...	27.10.30	
<i>City of Benares</i> ...	Bremner, D. M. ...	H. H. Asher ...	" A.	"	Met. Log. 29.3.30 to 27.4.30 ...	26.5.30	
<i>City of Cambridge</i> ...	Wyper, J. ...	P. R. Winship, E. W. Nelson, W. V. Highton.	No. A.	"	Form 911 5.8.30 to 15.8.30 ...	1.9.30	
<i>City of Carlisle</i> ...	Wilson, E. G. ...	J. Andrews, H. Burns ...	" A.	"	" 8.9.30 to 1.10.30 ...	27.10.30	
268 † <i>City of Chester</i> ...	Mordue, J. A. ...	H. Saunders ...	" A.	"	" 13.10.30 to 2.10.30 ...	27.10.30	
<i>City of Exeter</i> ...	Letton, F. W. ...	W. H. Matthews, A. J. Barrett, E. Gillies.	M.L.	"	Form 911 6.1.30 to 21.3.30... ..	24.3.30	
266 † <i>City of Exeter</i> ...	Nicholl, L. ...	T. W. Walford ...	"	"	" 26.2.30 to 8.5.30 ...	12.5.30	
<i>City of Hong Kong</i> ...	Walton, H. L., O.B.E., R.D. Commr., R.N.R.	B. H. Constable, S. A. Martyn, B. McLennan.	No. A.	"	Form 915 14.6.30 to 6.9.30... ..	20.9.30	
286 † <i>City of London</i> ...	Brown, J. G. ...	J. A. Williams, J. L. Robertson, A. N. G. Jones.	W.T.	"	Forms 911 & 138 2.10.30 to 13.10.30 ...	31.10.30	
274 † <i>City of Nagpur</i> ...	Elliot, A. J. ...	F. Wrigley ...	"	"	Form 911 18.9.30 to 17.10.30 ...	12.11.30	
275 † <i>City of Palermo</i> ...	Pattison, J. B. ...	A. Travis ...	No. M	"	Forms 911 & 138 2.7.30 to 18.7.30 ...	11.8.30	
267 † <i>City of Paris</i> ...	Miller, R. S. ...	J. Kinky, N. Dawson, H. Nish.	W.T.	"	Form 911 5.8.30 to 8.9.30 ...	4.10.30	
270 † <i>City of Rangoon</i> ...	Jones, P. ...	S. S. Stammwitz ...	M.L.	"	" 2.9.30 to 22.9.30 ...	13.10.30	
271 † <i>City of Roubaix</i> ...	Radcliffe, A. V., R.D., Lt-Com., R.N.R.	...	No. M.	Clan	"		
272 † <i>City of Singapore</i> ...	Kendall, J. W. ...	...	" M.	"	"	
273 † <i>City of Valencia</i> ...	Anderson, W. W. ...	...	" M.	"	"	
<i>City of Yokohama</i> ...	Singleton, J. G. ...	...	" A.	"	"	
<i>Clan Alpine</i> ...	Waterhouse, J. ...	...	" A.	"	"	

LIST OF VOLUNTARY OBSERVING SHIPS

iii

Name of Vessel.	Captain.	Observing Officers.	Meteoro- logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 14.11.30.	Date Received.
<i>Clan Kenneth</i> ...	Young, A. H., R.D., Commr., R.N.R.	H. C. Carter	No. A.	Clan	Form 911 28.7.30 to 25.8.30 ...	29.8.30
<i>Clan Lindsay</i> ...	Malpas, J. H. ...	T. P. Milne	" A.	"	" 24.7.30 to 27.8.30 ...	1.9.30
<i>Clan Macalister</i> ...	Stenson, F. J., A.D.C., R.D., Capt., R.N.R.	"	" A.	"	"	"
<i>Clan MacBean</i> ...	Boag, J. ...	G. W. Spiller	" A.	"	Form 911 14.9.30 to 6.10.30 ...	10.11.30
<i>Clan Macbeth</i> ...	Worthington, C. D. ...	W. R. Woodruffe, A. G. Beynon, H. J. M. Watkins.	" A.	"	" 15.10.30 to 7.11.30 ...	11.11.30
<i>Clan Macfadyen</i> ...	Laird, C. ...	W. C. Dazell	" A.	"	" 21.9.30 to 22.10.30 ...	4.11.30
<i>Clan Macfarlane</i> ...	Redford, L. F. ...	W. H. Simpson, H. F. Town ...	" A.	"	" 22.9.30 to 12.10.30 ...	17.10.30
<i>Clan Macgillivray</i> ...	Mackinlay, A. ...	S. R. J. Woods	" A.	"	" 8.7.30 to 3.9.30 ...	12.9.30
<i>Clan Macindoe</i> ...	Scott-Smith, H. E. G.	J. W. Thompson	" A.	"	" 8.6.30 to 27.6.30 ...	7.8.30
<i>Clan Mackellar</i> ...	Lyall, A. B. ...	A. V. Howard	" A.	"	" 6.10.30 to 14.10.30 ...	20.10.30
001 *† <i>Clan Macphee</i> ...	Gourlay, J. B. ...	E. H. Stone, T. Cornelius, A. Pollock.	M.L.	"	Form 915 6.7.30 to 3.10.30 ...	8.11.30
004 *† <i>Clan MacNair</i> ...	Holman, W. G. ...	"	W.T.	"	"	"
<i>Clan Macnaughton</i> ...	Clark, J. ...	R. C. Steel	No. A.	"	Form 911 18.5.30 to 19.6.30 ...	28.6.30
<i>Clan Macquarrie</i> ...	West, W. F. ...	J. S. Thorpe	" A.	"	" 19.8.30 to 2.9.30 ...	29.9.30
002 *† <i>Clan Macwhirter</i> ...	Low, A. ...	T. G. Mitchell, A. J. Jenkins, G. Broughton ...	M.L.	"	Met. Log. 27.10.29 to 29.4.30 ...	5.5.30
003 *† <i>Clan Malcolm</i> ...	George, L. S. ...	A. Lynch, J. W. Jones, B. Hind, W. E. Baker	"	"	Forms 911 & 138 12.3.30 to 24.6.30 ...	12.7.30
<i>Clan Morrison</i> ...	Porterfield, W. M. Lt.- Commr., R.N.R.	B. J. Brittain	No. A.	"	Form 911 27.8.30 to 13.9.30 ...	20.10.30
<i>Clan Murdoch</i> ...	Wynne, R. H. ...	R. B. Linsley, J. A. Dennis, L. W. Gibbins.	" A.	"	" 4.7.30 to 5.8.30 ...	"
<i>Clan Ranald</i> ...	Douglas, R. ...	J. W. Rennie	" A.	"	" 7.8.30 to 30.8.30 ...	13.10.30
<i>Clan Ross</i> ...	Neill, G. A. ...	H. J. Makepeace	" A.	"	" 6.7.30 to 8.9.30 ...	23.9.30
<i>Clan Sinclair</i> ...	Cater, H. ...	L. Thomson	" A.	"	" 19.4.30 to 28.7.30 ...	5.8.30
312 †† <i>Clydefield</i> ...	Love, J. S. ...	W. J. Brooks, E. Holmes ...	W.T.	Hunting & Son, Ltd.	Forms 911 & 138 28.9.30 to 4.11.30 ...	6.11.30
185 †† <i>Comorin</i> ...	Cartwright, C. W. D.S.C.	E. J. R. Worth, H. van Milligen, H. E. James.	No. M.	P. & O.	" 21.8.30 to 30.10.30 ...	3.11.30
049 *† <i>Coptic, M.V.</i> ...	Williams, G. ...	R. E. Nicholson, T. Davies, W. Burt ...	W.T.	Shaw, Savill & Albion	" 20.8.30 to 17.9.30 ...	20.10.30
040 †† <i>Cortinthic</i> ...	Bowan, H. ...	R. Crangle, A. Mackie, E. Burt	"	White Star	" 21.6.30 to 5.10.30 ...	10.10.30
<i>Cornwall</i> ...	Mac Rae, A. B. ...	"	No. A.	Federal	Form 911 12.11.29 to 1.12.29 ...	20.1.30
006 †† <i>Cornado</i> ...	Martin, G. ...	W. J. Dodd	W.T.	Elders & Fyffes	Forms 911 & 138 6.9.30 to 8.10.30 ...	10.10.30
301 *† <i>Culebra</i> ...	Goble, C. J., R.D., Commr., R.N.R.	B. A. Gammon, H. E. Sang, F. S. Deveson, R. J. Finch.	M.L.	R.M.S.P. Co. ...	Form 915 17.3.30 to 9.8.30 ...	15.8.30
251 *† <i>Cumberland</i> ...	Macmillan, D. ...	A. Taylor, F. Pring, J. K. Macdonald, F. R. J. Wilson.	"	Federal	" 1.6.30 to 18.10.30 ...	24.10.30
285 *† <i>Custodian</i> ...	O'Connor, T. ...	J. Johnson	No. M.	Harrison	Forms 911 & 138 10.3.30 to 13.6.30 ...	16.7.30
<i>Cyclops</i> ...	Cosker, W. ...	R. A. Hanney	" A.	A. Holt	Form 911 17.5.30 to 14.7.30 ...	5.8.30
<i>Dakotian</i> ...	Atkinson, W. H. ...	R. J. S. Pope	" A.	Leyland	" 29.8.30 to 24.10.30 ...	28.10.30
<i>Dardanus</i> ...	Christie, W. ...	J. S. Ogilvie	" A.	A. Holt	" 23.8.30 to 2.10.30 ...	22.10.30
<i>Darian</i> ...	Hannafor, W. ...	A. S. Holland	" A.	Leyland	" 27.9.30 to 8.10.30 ...	14.10.30
302 †† <i>Darro</i> ...	Green, J. ...	F. J. S. Wallow, G. B. Medleycott, A. W. Finny.	W.T.M.	R.M.S.P. Co. ...	Forms 911 & 138 15.9.30 to 5.11.30 ...	11.11.30
<i>Davision</i> ...	Trickey, J. ...	P. M. Ralston	No. A.	Leyland	Form 911 29.8.30 to 22.10.30 ...	28.10.30
053 *† <i>Delphic</i> ...	Hodgson, W. S. ...	J. V. Jones	" M.	White Star	" 23.2.30 to 31.3.30 ...	11.4.30
303 †† <i>Demerara</i> ...	Matthews, G. P. ...	T. Deveson, E. N. Gillet, F. Crankshaw.	W.T.M.	R.M.S.P. Co. ...	Forms 911 & 138 17.8.30 to 9.10.30 ...	13.10.30
073 †† <i>Demosthenes</i> ...	Ogilvy, A. ...	S. A. Fergusson	No. M.	Aberdeen Common- wealth.	" 29.3.30 to 12.5.30 ...	15.5.30
003 *† <i>Denis</i> ...	Barlow, F. P. ...	R. A. Broad, C. W. Smethurst	W.T.	Booth	Form 911 19.7.30 to 29.8.30 ...	10.9.30
304 †† <i>Desado</i> ...	Schlanbusch, O. V., R. B. Hall.	"	W.T.M.	R.M.S.P. Co. ...	" 11.5.30 to 2.7.30 ...	16.7.30
117 †† <i>Desna</i> ...	Huff, G. ...	G. N. Elliott	W.T.M.	"	Forms 911 & 138 4.8.30 to 23.9.30 ...	8.10.30
252 *† <i>Devon</i> ...	Kinnell, G. ...	C. H. Belton	No. M.	Federal	" 18.6.30 to 25.8.30 ...	1.9.30
<i>Dieppe</i> ...	Lidbetter, W. ...	E. A. Biles	C.C.	Southern Railway ...	Telegraphic Report 14.11.30 ...	14.11.30
284 *† <i>Director</i> ...	Worthington, B. ...	R. W. Baldwin	No. M.	Harrison	Forms 911 & 138 29.5.30 to 29.8.30 ...	9.9.30
080 *† <i>Discovery, Auxy.</i> Barque.	King Davis, J. ...	W. R. Colbeck	M.L.	Douglas Mawson Expedition.	"	"
081 †† <i>Discovery II, R.R.S.</i>	Carey, W. M. Commr. R. N.	J. Irving, A. N. Nelson, R. A. B. Ardley.	"	Falkland Islands Government.	Met. Log. 15.12.29 to 8.5.30 ...	11.9.30
214 *† <i>Domala, M.V.</i> ...	Kitson, A. G. ...	E. Powell, A. G. East, J. H. Pratt.	No. M.	British India	Form 911 9.3.30 to 15.5.30 ...	21.5.30
<i>Dominia, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr., R.N.R.	W. E. Allen, A. S. Muir, W. F. Anderson.	M.L.	Telegraph Construc- tion & Maintenance.	Form 915 4.5.30 to 24.6.30 ...	25.6.30
<i>Dominic</i> ...	Griffith, W. ...	F. W. Boden	No. A.	Booth	Form 911 2.4.30 to 19.4.30 ...	26.5.30
<i>Dorelian</i> ...	Hugan, C. ...	"	" A.	Leyland	"	"
061 †† <i>Doric</i> ...	Jackson, W. W. P. ...	A. Fisher, R. Hawkins, D. Crakat.	W.T.	White Star	Forms 911 & 138 19.10.30 to 8.11.30 ...	11.11.30
<i>Dorington Court</i> ...	Adamson B. ...	G. E. C. Garrick	No. A.	Haldin & Co. ...	Form 911 31.7.29 to 17.2.30 ...	27.3.30
<i>Dromore Castle</i> ...	Heanly, T. W. ...	P. Swan	" A.	Union Castle ...	" 18.1.30 to 3.7.30 ...	9.9.30
142 †† <i>Duchess of Atholl</i> ...	McQueen, D. S. ...	W. W. J. Ewens	W.T. M.	Canadian Pacific	Forms 911 & 138 12.10.30 to 31.10.30 ...	8.11.30
152 †† <i>Duchess of Bedford</i>	Gibbons, H. ...	J. Stewart, A. M. Watt, J. Tudor.	"	"	" 19.10.30 to 6.11.30 ...	11.11.30
151 †† <i>Duchess of</i> <i>Richmond</i> .	Freer, A., R.D., Capt. R.N.R.	F. H. Stell	"	"	" 5.2.30 to 22.10.30 ...	25.10.30
143 †† <i>Duchess of York</i> ...	Stuart, R. N., V.C., D.S.O., Commr., R.N.R.	N. Scallan	"	"	" 27.9.30 to 16.10.30 ...	21.10.30
098 †† <i>Dunbar Castle, M.V.</i>	Vincent, E. S., R.D., Commr., R.N.R.	G. Moon	W.T.	Union Castle ...	"	"
<i>Dunluce Castle</i> ...	Hutchings, A. H. ...	"	No. A.	"	Form 911 16.5.30 to 22.7.30 ...	24.7.30
<i>Dunrobin</i> ...	Ramsay, J. D. ...	W. R. Holt, J. J. Butt ...	" A.	Glen & Co. ...	" 9.10.30 to 27.10.30 ...	12.11.30
102 *† <i>Duquesa</i> ...	Williams, W. E. ...	F. D. Jones	" M.	Furness Withy	Forms 911 & 138 7.7.30 to 12.9.30 ...	16.9.30
215 *† <i>Durenda, M.V.</i> ...	Parkes, C. E. ...	J. E. Miles	" M.	British India ...	Form 911 2.2.30 to 10.3.30 ...	28.4.30
<i>Edinburgh Castle</i> ...	Kerbey, J. H. ...	F. A. G. Hunter	" A.	Union Castle ...	" 16.8.30 to 5.10.30 ...	9.10.30
<i>Egori</i> ...	Nelson, J. A. ...	J. T. Townson R. A. Cherry	" A.	Elder Dempster	" 16.9.30 to 3.10.30 ...	6.10.30
107 *† <i>El Argentino, M.V.</i>	Ellis, F., D.S.C. ...	W. Findlay, J. Burch, C. G. Adlard.	" M.	Houlder	Forms 911 & 138 25.5.30 to 31.7.30 ...	23.8.30
090 *† <i>Eldon Park</i> ...	Burns, R. ...	J. Macrae	" M.	Denholme S.S. Co. ...	Form 911 23.5.30 to 11.9.30 ...	2.10.30
099 *† <i>Elmucorth, M.V.</i> ...	Wilson, T. P. ...	"	" M.	R. S. Dalgleish	Form 911 14.3.30 to 31.3.30 ...	22.4.30
158 *† <i>Elpenor</i> ...	Wilson, R. J. ...	E. Roberts, H. Skinnis, A. Pope.	M.L.	A. Holt	Met. Log. 27.10.29 to 3.3.30 ...	11.3.30
108 *† <i>Elstree Grange</i> ...	Owen, R. ...	P. A. Hawkesworth	No. M.	Houlder	Forms 911 & 138 1.5.30 to 22.7.30 ...	6.8.30
109 *† <i>El Paraguay</i> ...	Frost, C. R. ...	W. Palmer	" M.	"	" 23.8.30 to 17.10.30 ...	21.10.30
110 *† <i>El Uruguayo</i> ...	McNamara, T. ...	F. E. Hailstone	" M.	"	Forms 911 & 138 29.6.30 to 18.8.30 ...	21.8.30

LIST OF VOLUNTARY OBSERVING SHIPS

v

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 14.11.30.	Date Received.
<i>Lalande</i> ...	Major, T. W. ...	A. N. Blundell ...	No. A.	Lampport & Holt ...	Form 911 9.10.30 to 1.11.30 ...	14.11.30
<i>Lancashire</i> ...	Fountain, C. ...	W. H. Campe ...	" A.	Bibby ...	" 13.3.30 to 9.4.30 ...	22.4.30
036 †† <i>Lancastria</i> ...	Oram, B. B. R.D., Commr., R.N.R.	H. V. Clarke, P. L. Williams, P. S. Britten.	W.T.	Cunard ...	Forms 911 & 138 6.10.30 to 25.10.30	29.10.30
<i>Laomedon</i> ...	Watson, C. J. ...	W. K. Hole ...	No. A.	A. Holt ...	Form 911 3.8.30 to 24.9.30 ...	29.9.30
082 †† <i>La Paz, M.V.</i> ...	Benson, C. W. ...	G. Patt, P. H. Ray ...	" M.	Pacific S.N. Co. ...	" 30.3.30 to 29.4.30 ...	3.5.30
<i>Laplace</i> ...	Hickman, V. G. ...	" ...	No. A.	Lampport & Holt ...	" 3.5.30 to 19.8.30 ...	27.8.30
076 †† <i>Largs Bay</i> ...	Jermyn, W. M. ...	F. B. Marsden ...	No. M.	Aberdeen Common-wealth.	Forms 911 & 138 28.11.29 to 11.7.0	23.8.30
112 †† <i>La Rosarina</i> ...	Webb, C. ...	W. S. Hamblin ...	" M.	Houlder ...	" " 11.4.30 to 24.7.30	26.7.30
<i>Lassell</i> ...	Leicester, F. S. ...	" ...	No. A.	Lampport & Holt ...	" " 15.6.30 to 23.8.30	"
064 †† <i>Laurentic</i> ...	Quinn, W. S. ...	C. Cochrane, H. G. Williams, R. Coaway.	W.T.	White Star ...	Forms 911 & 138 4.10.30 to 24.10.30	27.10.30
083 †† <i>Lautaro, M.V.</i> ...	Leyne, R. W. ...	G. A. Thexton ...	No. M.	Pacific S.N. Co. ...	Form 911 12.5.30 to 16.9.30 ...	19.9.30
<i>Leicestershire</i> ...	Griffiths, C. A. ...	E. D. Brand, H. Kerbyson, A. Thomson.	" A.	Bibby ...	" 15.6.30 to 23.8.30	29.8.30
254 †† <i>Limerick</i> ...	Molyneux, P. L. ...	J. Hamblyn, G. Shepherd, C. W. Roberts, C. H. Pett.	" M.	Federal ...	Forms 911 & 138 24.5.30 to 19.6.30	26.9.30
093 †† <i>Llandaff Castle</i> ...	Attwood J. ...	T. H. Watley ...	W.T.	Union Castle ...	Form 911 18.7.30 to 22.9.30 ...	27.9.30
097 †† <i>Llangibby Castle</i> ...	Harvey, H. B. ...	H. Warren ...	W.T.	" " ...	Forms 911 & 138 16.8.30 to 18.10.30	23.10.30
094 †† <i>Llandovery Castle</i> ...	Morgan, A. O., R.D., Commr., R.N.R.	L. H. Farrow, R. F. Pembury, S. Goldstone.	M.L.	" " ...	Form 915 30.5.30 to 6.8.30	12.8.30
216 †† <i>Llanstephan Castle</i> ...	Jackson, C. R. ...	J. D. Crombie ...	W.T.	" " ...	Form 911 6.9.30 to 29.9.30 ...	1.10.30
084 †† <i>Lobos, M.V.</i> ...	Grant, F. H. ...	J. M. Bain ...	No. M.	Pacific S.N. Co. ...	Forms 911 & 138 19.8.30 to 8.9.30	6.10.30
<i>Loch Katrine</i> ...	Womersley, W. H. ...	M. A. Murch ...	" A.	R.M.S.P. Co. ...	Form 911 1.5.30 to 24.7.30	28.7.30
<i>Lochmonar, M.V.</i> ...	Miles, A. G. ...	F. G. Dawson ...	" A.	" " ...	" " " " " " " "	"
290 †† <i>Logician</i> ...	Herschel, R. F. ...	T. Winstanley ...	" M.	Harrison ...	Form 911 10.10.29 to 1.1.30	10.1.30
<i>London Exchange</i> ...	Griffiths, J. ...	" ...	" A.	Furness Withy ...	" " " " " " " "	"
<i>Lord Antrim</i> ...	Jarvis, F. E. ...	C. A. Milligan ...	" A.	Ulster S.S. Co. ...	Form 911 21.9.30 to 4.10.30	7.10.30
<i>Loriga, M.V.</i> ...	Large, E. H., R. D., Commr., R.N.R.	J. W. Gordon ...	" A.	Pacific S.N. Co. ...	" 26.9.30 to 14.10.30	31.10.30
194 †† <i>Macedonia</i> ...	Morton, A. J. ...	R. S. Kerridge ...	" M.	P. & O. ...	" 19.7.30 to 10.9.30	20.9.30
013 †† <i>Macharda</i> ...	Hanna, R. G. ...	A. G. Hocking, C. Miller, C. Parry.	" M.	Brocklebank ...	Forms 911 & 138 4.8.30 to 31.8.30	22.9.30
232 †† <i>Madura</i> ...	Wright, J. ...	C. Cairns ...	" M.	British India ...	" " " " " " " "	"
048 †† <i>Mahana</i> ...	Cameron, J. M. ...	H. C. Smith, A. E. Masters, M. G. Stuart.	M.L.	Shaw, Savill & Albion	Form 915 11.4.30 to 4.8.30	9.8.30
141 †† <i>Mahia</i> ...	Andrews, C. M. ...	G. Sangwin ...	W.T.	" " " " " " " "	" " " " " " " "	"
014 †† <i>Mahronda</i> ...	Sharpe, G. ...	A. S. Bain, H. Willington, W. Le Broeg.	No. M.	Brocklebank ...	Forms 911 & 138 8.8.30 to 7.9.30	27.9.30
015 †† <i>Mahsud</i> ...	Kershaw, R. W. ...	S. Richardson, E. Walker, J. R. Paisley.	" M.	" " " " " " " "	" " 18.8.30 to 7.11.30	11.11.30
016 †† <i>Maidan</i> ...	Ison, W. A. ...	F. Moore, F. L. Attwood, L. E. Jeans.	" M.	" " " " " " " "	" " 3.8.30 to 27.8.30	13.10.30
017 †† <i>Maihar</i> ...	Charlton, W. L. ...	C. Cadwallar, H. Gillespie, A. D. Spring.	M.L.	" " " " " " " "	Form 915 6.7.30 to 25.9.30	4.11.30
042 †† <i>Maimoa</i> ...	Johnson, J. W. ...	P. Savill, H. G. Withell, A. E. Lockhart.	"	Shaw, Savill & Albion	" 15.3.30 to 16.6.30	23.6.30
<i>Maimyo</i> ...	Smith, G. C. ...	J. L. Rodgers ...	No. A.	Brocklebank ...	Form 911 14.9.30 to 16.10.30	10.11.30
018 †† <i>Makalla</i> ...	Maughan, J. W. ...	E. Williams ...	" M.	" " " " " " " "	Forms 911 & 138 11.5.30 to 5.8.30	20.8.30
225 †† <i>Makura</i> ...	MacDonald, D. ...	A. P. Cousin, S. H. Crawford, N. H. Pearson, M. V. Langdale.	M.L.	Canadian-Australasian	Form 915 20.5.30 to 30.8.30	31.10.30
298 †† <i>Malabar, M.V.</i> ...	Donaldson, A. ...	" " " " " " " "	" M.	Burns, Philp & Co. ...	Met. Log. 10.10.29 to 10.3.30	28.5.30
019 †† <i>Malakuta</i> ...	Adamson, F. L. ...	H. Simpson ...	No. M.	Brocklebank ...	Forms 911 & 138 24.5.30 to 11.10.30	22.10.30
020 †† <i>Malancha</i> ...	Whitham, F. ...	R. Humble, H. B. Kelly ...	" M.	" " " " " " " "	" " 26.7.30 to 30.10.30	6.11.30
219 †† <i>Malda</i> ...	Denne, G. H. A. ...	J. W. White ...	" M.	British India ...	" " 1.5.30 to 5.6.30	26.6.30
195 †† <i>Maloja</i> ...	Browning, J. B., R.D., Commr. R.N.R.	R. H. Turner, C. H. Hand, E. J. Spurling.	" M.	P. & O. ...	" " 26.4.30 to 10.7.30	16.7.30
196 †† <i>Malwa</i> ...	Britten, P. O. ...	P. J. Lawrence ...	" M.	" " " " " " " "	" " 9.6.30 to 31.7.30	5.8.30
114 †† <i>Manchester Brigade</i> ...	Stott, C. H. ...	J. H. Round, E. E. Bonnaud, J. Gregory.	M.L.	Manchester Liners ...	Met. Log. 2.3.30 to 29.4.30	23.5.30
<i>Manchester Hero</i> ...	Mitchell, G. M. ...	R. O. Jones ...	No. A.	" " " " " " " "	Form 911 31.8.30 to 11.10.30	3.11.30
<i>Manchester Producer</i> ...	Struss, F. D. ...	T. J. Boyd ...	" A.	" " " " " " " "	" " 1.6.30 to 3.7.30	23.7.30
023 †† <i>Mandala</i> ...	Whittingham, A. G., R.D. R.N.R.	W. E. F. Powell ...	" M.	British India ...	" " " " " " " "	"
220 †† <i>Manela</i> ...	Maples, S. H. ...	F. N. Woolger ...	" M.	" " " " " " " "	Forms 911 & 138 6.10.30 to 17.10.30	22.10.30
021 †† <i>Mangalore</i> ...	Mallett, R. ...	J. McGilvray ...	" M.	Brocklebank ...	" " 7.7.30 to 31.7.30	25.8.30
022 †† <i>Manipur</i> ...	Cochran, G. N. ...	L. F. Dodson, R. Penston, A. Hill.	" M.	" " " " " " " "	" " 4.10.30 to 13.10.30	22.10.30
294 †† <i>Manistee</i> ...	Edwards, A. C. ...	" " " " " " " "	M.L.	Elders & Fyffes	" " " " " " " "	"
221 †† <i>Manora</i> ...	Hudson, H. T., R.D., Commr., R.N.R.	J. W. Grant, C. J. Davidson, T. A. Morris.	No. M.	British India ...	Form 911 4.5.30 to 17.9.30	25.9.30
197 †† <i>Mantua</i> ...	Hignett, A. H. ...	H. J. Cholerton, F. F. Cox, C. T. O. Richardson.	" M.	P. & O. ...	Forms 911 & 138 23.3.30 to 26.6.30	19.7.30
299 †† <i>Marella</i> ...	Mortimer, S. ...	J. Cummings, M. Pemberton, W. D. Colquhoun.	M.L.	Burns Philp ...	Met. Log. 3.2.30 to 18.4.30	20.6.30
276 †† <i>Marengo</i> ...	Aspinall, A. E. ...	H. Bryan, G. W. Revell, W. L. Hepson.	"	Ellerman Wilson ...	Form 915 5.6.29 to 6.10.30	10.10.30
222 †† <i>Margha</i> ...	Hughes, C. G. ...	P. Wright, H. Watkins, G. Hardy.	"	British India ...	" 19.4.30 to 13.7.30	19.7.30
104 †† <i>Marquesa</i> ...	Beaumont, H. E. S. ...	J. Wetherall ...	No. M.	Furness Houlder ...	Forms 911 & 138 12.5.30 to 18.7.30	22.7.30
044 †† <i>Mataroa</i> ...	Smiles, R. S. ...	F. Eadon, H. A. Hill, F. C. Chamby, L. B. Miller.	M.L.	Shaw, Savill & Albion	Form 915 28.3.30 to 2.7.30	4.7.30
023 †† <i>Matheran</i> ...	Mulcahy, J. J. ...	S. S. Slade ...	No. M.	Brocklebank ...	" " 18.7.30 to 10.9.30	12.9.30
223 †† <i>Matiana</i> ...	Green, F. V. ...	L. V. Kerton, L. A. Bunn, B. M. Wilson, J. W. Daly.	" M.	British India ...	" " 21.6.30 to 8.10.30	16.10.30
024 †† <i>Matra</i> ...	Cornish, N. P. ...	C. Shaw, W. Robertson, O. Jones.	" M.	Brocklebank ...	" " 10.8.30 to 18.10.30	21.10.30
032 †† <i>Mauretania</i> ...	McNeil, S. G. S., R.D., Capt., R.N.R.	J. W. Counce, J. G. Wiseman, A. Bridgewater.	W.T.	Cunard ...	Form 138 27.10.30 to 10.11.30	13.11.30
<i>Melmore Head</i> ...	Moore, J. R. ...	" ...	No. A.	Ulster S.S. Co. ...	" " " " " " " "	"
071 †† <i>Meltonian</i> ...	Carnon, J. R. ...	G. Bonfield, W. R. Vaughan, W. Lawton.	" M.	Leyland ...	Forms 911 & 138 4.8.30 to 17.9.30	22.9.30
<i>Mercian</i> ...	Hughan, C. ...	" " " " " " " "	" A.	" " " " " " " "	Form 911 28.7.30 to 30.9.30	8.10.30
<i>Meriones</i> ...	Hanney, T. W. ...	" " " " " " " "	" A.	A. Holt ...	" " " " " " " "	"
146 †† <i>Metagama</i> ...	" ...	J. Soame ...	W.T.	Canadian Pacific ...	W.T. Reg. 31.3.30 to 18.4.30	23.4.30
255 †† <i>Middlesex</i> ...	Wilde, H. ...	H. J. Phillips ...	No. M.	Federal ...	Forms 911 & 138 17.3.30 to 14.5.30	16.5.30
<i>Minna</i> ...	Mackenzie, G. G. ...	A. M. Campbell ...	" A.	Scottish Fishery Brd.	Form 911 18.10.30 to 29.10.30	3.11.30
147 †† <i>Minnedosa</i> ...	Jones, D. T. Carr ...	H. M. Sanders, C. Duggan, D. Ewing.	W.T.	Canadian Pacific ...	Forms 911 & 138 28.9.30 to 17.10.30	25.10.30
068 †† <i>Minnetonka</i> ...	Gates, T. F., C.B.E. ...	H. E. D. McCartney, ...	No. M.	Atlantic Transport ...	" " 29.9.30 to 2.10.30	22.10.30

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed Received up to 14.11.30.	Date Received
069 †† <i>Minnewaska</i> ...	Claret, F. H., C.B.E., Commr., R.N.R.	E. Pengelly, D. Davies, F. Mummery.	No. M.	Atlantic Transport...	Forms 911 & 138 13.10.30 to 2.11.30	4.11.30
Mississippi, M.V. ...	Finch, E. ...	J. L. McLaren ...	" A.	"	Form 911 25.8.30 to 4.10.30	8.10.30
224 *† <i>Modasa</i> ...	Gilchrist, J. W. ...	L. Tracey, W. Ascroft, F. Everett.	" M.	British India ...	Forms 911 & 138 7.8.30 to 20.10.30	23.10.30
198 †† <i>Moldavia</i> ...	Allin, C. H. C. ...	C. S. Pirie, E. J. Kerridge, R. H. Pollitt.	No. M.	P. & O. ...	Forms 911 & 138 31.8.30 to 21.9.30	3.11.30
199 †† <i>Mongolia</i> ...	Rhodes, H. R. ...	R. Wood ...	" M.	"	" 18.5.30 to 20.8.30	25.8.30
148 †† <i>Montcalm</i> ...	Rothwell, A. ...	T. L. Gillette, W. Maine.	W.T.	Canadian Pacific ...	" 18.10.30 to 5.11.30	8.11.30
149 †† <i>Montclare</i> ...	McCombie, G. ...	I. Vaughan.	W.T.	"	" 5.10.30 to 22.10.30	25.10.30
		E. A. Shergold, P. S. Thompson, J. Sharples, A. J. Mackenzie.				
150 †† <i>Montrose</i> ...	Dott, J. F. ...	"	No. M.	"	Form 911 16.3.30 to 30.4.30	3.5.30
226 †† <i>Mulbera</i> ...	Cafryn, F. ...	E. W. E. Furze ...	" M.	British India ...	Forms 911 & 138 21.7.30 to 24.8.30	4.9.30
200 *† <i>Nagoya</i> ...	Cooper, C. P., O.B.E., R.D., Capt. R.N.R.	F. D. Shaw ...	" M.	P & O. ...	" 21.2.30 to 23.4.30	25.4.30
201 †† <i>Naldera</i> ...	Harrison, R., D.S.O., R.D., Capt. R.N.R.	J. C. Davies, C. W. Mayne, M. F. Shute, G. S. Pring.	M.L.	"	Form 915 3.5.30 to 7.8.30	21.8.30
227 *† <i>Nardana</i> ...	Reilly, J. V. ...	H. Goater, R. Bamforth, R. Lord, H. Grace.	"	British India ...	Met. Log. 23.11.29 to 3.9.30	8.9.30
118 *† <i>Narenta</i> ...	Clayton, R. G. ...	C. E. Mason ...	No. M.	R.M.S.P. Co. ...	"	"
202 †† <i>Narkunda</i> ...	Parker, J. J. W., R.D., Commr. R.N.R.	C. H. Moulton, A. E. Clay, I. K. Wing	" M.	P. & O. ...	Forms 911 & 138 1.10.30 to 12.10.30	3.11.30
305 *† <i>Nebraska</i> ...	Bridges, E. A. ...	J. Phillips ...	No. M.	R.M.S.P. Co. ...	Forms 911 & 138 31.5.30 to 25.8.30	1.9.30
203 *† <i>Nellore</i> ...	Gordon, A. S. ...	L. J. Dixon, J. F. Moodie-Heddle, R. Milington, J. Kavanagh	M.L.	E. & A. S.S. Co. ...	Form 915 2.5.30 to 31.7.30	20.9.30
		J. Makepeace, W. T. Harris, A. E. Stevenson.	"	A. Holt ...	Met. Log. 10.12.29 to 19.4.30	3.5.30
162 *† <i>Nestor</i> ...	Christie, W. ...	"	"	"	"	"
Nevisian ...	McCormick, J. ...	"	No. A.	Leyland ...	Form 911 4.4.30 to 5.7.30	10.7.30
105 *† <i>Newfoundland</i> ...	Foxworthy, A. W. ...	R. F. Handley, E. Sainty, L. Macklin.	M.L.	Furness Withy ...	Form 915 1.5.30 to 11.9.30	20.9.30
210 *† <i>Niagara</i> ...	(Hill, T. V. ...	G. H. Kime, R. N. Turner, D. A. Menlove, J. Billingham, S. P. Bourke.	"	Canadian-Australasian	" 1.5.30 to 14.8.30	3.9.30
	Brown, J. F. S. ...	"	"	"	"	"
Ningchow ...	Beale, H. E. ...	E. Butler ...	No. A.	A. Holt ...	Form 911 12.9.30 to 15.10.30	8.11.30
229 *† <i>Nirvana</i> ...	Ayres, R. M. ...	S. H. Kinson, J. B. Hore, A. H. Baird.	" M.	British India ...	Forms 911 & 138 17.6.30 to 6.7.30	29.7.30
256 *† <i>Norfolk</i> ...	Mead, G. F. ...	G. H. Letts, P. L. Shakespeare, L. Hill.	M.L.	Federal ...	Form 915 3.7.30 to 8.8.30	16.8.30
Norna ...	Wright, J. W. ...	"	No. A.	Scottish Fishery Brd	Form 911 2.10.30 to 30.10.30	1.11.30
100 *† <i>Norseman, C.S.</i> ...	Hammond, S. M. ...	R. Moss ...	" M.	Western Tel. Co. ...	" 13.7.30 to 6.8.30	28.8.30
Northland ...	Williams, J. T. ...	F. Bottom ...	" A.	Northland, Ltd. ...	"	"
297 *† <i>Northumberland</i> ...	Upton, H. L., D.S.C., R.D., Commr. R.N.R.	"	" M.	Federal ...	"	"
Nova Scotia ...	Furieux, S. J. ...	J. E. Wilson ...	M.L.	Furness Withy ...	Form 911 3.9.30 to 29.9.30	2.10.30
230 *† <i>Nowshera</i> ...	Parker, A. A. ...	W. Ascroft ...	No. M.	British India ...	" 22.1.30 to 24.2.30	14.3.30
231 *† <i>Nuddea</i> ...	Beeching, P. H. ...	W. Monk, D. A. Jones, W. G. Pilcher.	" M.	"	Forms 911 & 138 19.8.30 to 22.9.30	27.10.30
Oaklands Grange ...	Phillips, A. G. M. ...	J. C. Thomas ...	" A.	Houlder Bros. ...	" 30.5.30 to 18.9.30	4.10.30
170 †† <i>Orama</i> ...	Staunton, H. G., C. B. E., R. D., Commr. R.N.R.	C. K. Blake, K. Morrison, R. W. Roberts.	M.L.	Orient ...	Form 915 23.6.30 to 23.9.30	7.10.30
Oranlian ...	Gittings, R. P. ...	A. Quinn ...	No. A.	Leyland ...	"	"
309 †† <i>Orbita</i> ...	Roberts, E. ...	E. Hicks, J. C. Clark, J. E. Smithson	W.T.M.	Pacific S.N. Co. ...	Forms 911 & 138 5.8.30 to 13.10.30	20.10.30
086 †† <i>Orcoma</i> ...	Harvey, J. G. ...	W. J. Rutter, J. W. Coxon, G. H. Pilling.	W.T.M.	"	" 2.9.30 to 9.11.30	13.11.30
087 †† <i>Orduna</i> ...	Ridyard, A., O.B.E. ...	T. J. Naylor, R. F. A. Cox, R. B. Bryant.	W.T.M.	"	Forms 911 & 138 4.7.30 to 19.9.30	23.9.30
171 †† <i>Orford</i> ...	Owens, A. L., Commr. R.D., R.N.R.	G. B. H. Jones ...	No. M.	Orient ...	Form 911 20.1.30 to 21.4.30	24.4.30
088 †† <i>Orila</i> ...	Pape, E. R. ...	G. Gerety ...	W.T.M.	Pacific S.N. Co. ...	" 23.4.30 to 21.5.30	27.5.30
174 †† <i>Ormonde</i> ...	James, L. V., D.S.C.	T. L. Shurrock ...	W.T.	Orient ...	"	"
172 †† <i>Cronsay</i> ...	Shelford, W. S. ...	O. C. Davies, I. P. Wright, E. M. Mackay.	"	"	Form 915 1.5.30 to 28.8.30	2.9.30
173 †† <i>Orontes</i> ...	O'Sullivan, F. R. ...	R. W. Roberts ...	No. M.	"	Forms 911 & 138 17.2.30 to 20.5.30	28.5.30
089 *† <i>Oroya</i> ...	Galloway, M. ...	J. M. Forsyth, J. Ayland, E. S. Jones.	" M.	Pacific S.N. Co. ...	" 20.8.30 to 28.10.30	1.11.30
175 †† <i>Orvieto</i> ...	Sarson, M. J. ...	L. J. Vesty, W. Elliott, C. D. Lane, E. V. Bilger.	M.L.	Orient ...	Form 915 27.4.30 to 29.7.30	31.7.30
237 *† <i>Otaki</i> ...	Clarke, P. B., D.S.C.	D. Hughes, H. M. Knight, R. A. Belfield, G. D. Moir.	"	New Zealand S.S. Co.	" 12.12.29 to 26.5.30	29.5.30
177 †† <i>Otranto</i> ...	Matheson, C. G., D.S.O., R.D., Capt. R.N.R.	A. E. Coles, G. R. Grandase.	No. M.	Orient ..	Forms 911 & 138 23.9.30 to 22.10.30	24.10.30
279 *† <i>Pacific Exporter</i> ...	Holland, C.E., R.D., Commr. R.N.R.	A. Knapp ...	W.T.	Furness Withy ...	Form 911 13.7.30 to 5.10.30	9.10.30
Pacific Shipper, M.V.	Goodwin, J. ...	R. Roberts ...	No. A.	"	" 2.7.30 to 30.9.30	3.10.30
011 *† <i>Pakeha</i> ...	Elford, H. C. ...	W. Thowless ...	" A.	Shaw, Savill & Albion	" 1.4.30 to 20.5.30	27.5.30
<i>Paneras</i> ...	Jackson, T. H. ...	L. A. Sayers, N. Caris ...	M.L.	Booth ...	Form 915 7.5.30 to 23.9.30	6.10.30
<i>Pareora</i> ...	Evans, J. O. ...	C. Parry ...	No. A.	" P" Steamers, Ltd.	Form 911 15.7.30 to 6.8.30	23.9.30
<i>Paris</i> ...	Cook, C. L. ...	Mr. Biles ...	C.C.	Southern Rly.	Telegraphic Report. 1.9.30	1.9.30
<i>Patia</i> ...	Bower, H. C. ...	D. M. Baker, R. O. Laycock, E. W. Harvey.	No. A.	Elders & Fyffes	Form 911 15.9.30 to 20.10.30	27.10.30
Peisander ...	Read, J. W. ...	"	" A.	A. Holt ...	" 4.7.30 to 14.7.30	21.7.30
058 †† <i>Pennland</i> ...	Making, V. L. ...	L. A. Williams, J. Flett, G. Boyle.	W.T.	Red Star ...	Forms 911 & 138 12.10.30 to 13.11.30	4.11.30
204 *† <i>Peshawur</i> ...	McBryde, A. M. ...	D. Meikle, J. T. Sheffield, T. E. Wrigley, P. Fyrth, J. W. Lintott.	M.L.	P. & O. ...	Form 915 19.1.30 to 29.5.30	11.6.30
238 *† <i>Piako</i> ...	Laird, J. ...	A. D. Wilson ...	No. M.	New Zealand Co. ...	Forms 911 & 138 12.6.30 to 27.7.30	31.7.30
<i>Polycarp</i> ...	Elliott, A. ...	H. W. Taggart ...	"	Booth ...	Form 911 19.9.30 to 5.10.30	14.10.30
127 *† <i>Port Adelaide</i> ...	Williams, R. ...	J. G. A. Dunn, F. W. Elgar, D. Morgan.	M.L.	Commonwealth & Dominion.	Form 915 25.3.30 to 19.7.30	22.7.30
128 *† <i>" Auckland</i> ...	Durham, R. S., D.S.C.	J. G. Lewis, W. Craig, A. Brown, E. Mickleburgh ...	"	"	" 20.2.30 to 17.6.30	24.6.30
<i>" Bowen</i> ...	Hearn, G. W. ...	H. B. Walker ...	No. A.	"	Form 911 28.1.30 to 14.5.30	19.5.30
129 *† <i>" Campbell</i> ...	Swan, L. H. ...	G. T. C. Harris, J. G. Thom, J. C. Goddard, C. J. Gorley.	M.L.	"	Form 915 8.3.30 to 17.7.30	7.8.30
130 *† <i>" Caroline</i> ...	Brown, A. H. ...	V. G. Battle, R. Forrest, R. C. Garner.	"	"	Met. Log 15.1.30 to 15.5.30	19.5.30

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Name of Vessel.			Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 14.11.30.			Date Received.
131	†	" Darwin ...	Sawbridge, I. R. ...	W. L. Lynd, L. C. Asser, E. Wheeler, A. McClounan.	M.L.	Commonwealth & Dominion.	Form 915	9.4.30 to 8.8.30 ...	12.8.30	
132	**	" Denison ...	Ferris, J. ...	A. A. Cooper, A. G. Newbury, R. A. Holloway, T. Milburn.	"	" " " "	"	6.5.30 to 15.9.30... ..	27.9.30	
133	†	" Dunedin, M.V. ...	Mason, W. S., D.S.C.	H. M. Post, C. A. Hodson, T. Soanes.	"	" " " "	"	18.4.30 to 21.8.30 ...	9.9.30	
		" Fairy ...	Farmar, F. ...	J. Stannard ...	No. A.	" " " "	Form 911	4.5.30 to 8.6.30 ...	17.6.30	
		" Fremantle, M.V. ...	Gilling, W. ...	A. Naismith ...	" A.	" " " "	"	4.8.30 to 6.9.30 ...	9.9.30	
		" Gisborne, M.V. ...	Hayter, S. W. ...	L. J. Skailles ...	" A.	" " " "	"	6.9.30 to 10.10.30 ...	17.10.30	
134	†	" Hobart, M.V. ...	Cottell, S. C. ...	E. R. Rowlands ...	M.L.	" " " "	Met. Log.	11.2.30 to 15.6.30 ...	19.6.30	
135	†	" Hunter ...	Higgs, W. G. ...	" " " "	"	" " " "	"	" " " "	"	
		" Huon ...	Compton, J. E. ...	F. J. Lavers ...	No. A.	" " " "	Form 911	25.1.30 to 1.3.30... ..	12.3.30	
136	†	" Melbourne ...	Kippins, T., D.S.C. ...	L. M. R. Bayly, L. B. Philpot, F. R. Gorman.	M.L.	" " " "	Met. Log.	1.1.30 to 8.5.30 ...	14.5.30	
137	†	" Nicholson ...	Jack, J. ...	H. S. Datson, E. E. Roswell, A. G. Starkey, C. Green.	"	" " " "	Form 915	25.2.30 to 14.7.30 ...	18.7.30	
138	†	" Pirie ...	Jack, J. ...	G. W. Horton, H. E. Braine, R. C. H. Webb.	"	" " " "	"	27.9.29 to 1.11.30 ...	7.11.30	
139	†	" Sydney ...	Higgs, W. G. ...	E. N. Rogerson, D. Tillett, R. Bettess.	"	" " " "	"	22.3.30 to 27.6.30 ...	4.7.30	
140	†	" Victor ...	Hall, G. S. ...	F. G. L. Jones, J. L. Porter, R. C. Pocock.	"	" " " "	"	14.6.30 to 28.10.30 ...	7.11.30	
		" Wellington ...	Jones, C. N. ...	H. Duckling ...	No. A.	" " " "	Form 911	9.4.30 to 29.6.30... ..	1.7.30	
	†	" Princess ...	Friend, A. B. ...	E. Lougheed, A. Tilsley ...	" M.	Houlder " " "	Forms 911 & 138	12.8.30 to 23.8.30	2.9.30	
	†	" Protesilaus ...	Holden, W. R. F. ...	J. Cooper, J. Holden, H. N. Hardie.	M.L.	A. Holt... ..	Met. Log.	27.1.30 to 8.5.30 ...	10.7.30	
		" Pyrrhus ...	Wilkinson, T. G. ...	J. C. Podmore ...	No. A.	" " " "	Form 911	31.5.30 to 24.9.30 ...	9.10.30	
205	††	" Rajputana ...	Carter, E. A. J. W., R.D., Commr., R.N.R.	G. A. Wild, H. Lee, H. M. Askin.	" M.	P. & O. ...	Forms 911 & 138	15.6.30 to 29.8.30	22.9.30	
063	†	" Rancher ...	McCullum, J. ...	" " " "	" M.	Harrison ...	"	" " " "	"	
228	††	" Ranchi ...	Brooks, C., D.S.O., R.D., Capt. R.N.R.	T. A. Sergeant ...	" M.	P. & O. ...	Forms 911 & 138	16.8.30 to 8.10.30	13.10.30	
236	††	" Rangitane M.V. ...	McKellar, A. W., R.D., Capt. R.N.R.	A. W. Marshall, J. J. Youings, A. Brown.	M.L.	New Zealand S.S. Co.	Form 915	9.5.30 to 20.8.30 ...	23.8.30	
257	††	" Rangitata M.V. ...	Hunter, J. L. B. ...	— Brown ...	W.T.M.	" " " "	Forms 911 & 138	5.7.30 to 18.10.30	25.10.30	
240	††	" Rangitiki M.V. ...	Barnett, E. ...	L. F. Malcouronne, H. K. Cockerill, R. J. Coffey.	"	" " " "	"	" " 2.8.30 to 22.9.30 ...	6.10.30	
207	††	" Ranpura ...	Furlong, G. H. S. ...	J. Strike ...	No. M.	P. & O. ...	"	" " 2.8.30 to 22.9.30 ...	6.10.30	
		" Recorder ...	Egerton, J. J. ...	" " " "	"	Harrison ...	"	" " " "	"	
239	†	" Remuera ...	Wilde, H. J. ...	A. Angel, T. S. Marchington, F. Bishop, G. C. Hoeart.	M.L.	New Zealand S.S. Co.	Form 915	1.5.30 to 8.10.30 ...	14.10.30	
		" Rhexenor ...	Stout, G. L. ...	C. Anderson ...	No. A.	A. Holt... ..	Form 911	4.10.30 to 19.10.30 ...	31.10.30	
		" Rhodesian Transport.	Bowen, A. C. ...	H. S. Butler ...	" A.	Houlder Bros. ...	"	17.5.30 to 29.8.30 ...	13.9.30	
		" Ripley Castle ...	Goodacre, R. W. ...	R. G. Rogers ...	" A.	Union Castle... ..	"	11.7.30 to 10.8.30 ...	15.9.30	
		" Rother ...	Woodhead, T. H. ...	F. Wright ...	" A.	Goole Steam Shipping	"	4.10.30 to 25.10.30 ...	11.11.30	
241	†	" Rotorua ...	Lamb, C. B. ...	G. C. Saul, H. F. C. Wilkinson, L. W. Fulcher.	M.L.	New Zealand S.S. Co.	Form 915	6.6.29 to 20.9.30... ..	23.9.30	
062	†	" Royal Star... ..	Walsh, W. ...	" " " "	No. M.	Blue Star ...	"	" " " "	"	
246	†	" Ruahine ...	Urquhart, D. ...	R. A. Belfield ...	W.T.	New Zealand S.S. Co.	"	" " " "	"	
242	†	" Ruapehu ...	Robinson, F. W. ...	R. S. Cox, H. N. Lawson, T. S. Farrar.	M.L.	" " " "	Form 915	19.2.30 to 11.6.30 ...	19.6.30	
300	**	" St. Albans ...	Diamond, S. L. ...	H. M. Sanders, G. C. Smith, F. O. Colvin.	"	Eastern and Australian.	Met. Log.	4.4.30 to 8.6.30 ...	21.8.30	
		" St. Andrew ...	Bearpark, E. W. ...	J. Meade ...	No. A.	Rankin Gilmour ...	Form 911	26.11.29 to 14.2.30 ...	22.2.30	
		" St. Helier ...	Pitman, R. ...	J. Goodchild, J. Braye ...	C.C.	G.W. Railway ...	Telegraphic Report	13.11.30	13.11.30	
		" St. Julien ...	Sanderson, C. W. ...	" " " "	"	" " " "	"	9.10.30 ...	9.10.30	
		" St. Patrick ...	Richardson, L. ...	F. E. Martin ...	"	" " " "	"	10.9.30 ...	10.9.30	
038	††	" Samaria ...	Malin, R. G., Lieut-Commr., R.N.R.	A. MacKellar, E. J. R. Pollitt, F. G. Watts.	W.T.	Cunard... ..	Forms 911 & 138	3.9.30 to 20.9.30	23.9.30	
		" Sardinian Prince ...	Pearson, F. T. ...	G. A. Davies ...	No. A.	Prince ...	Form 911	12.9.30 to 12.10.30	22.10.30	
		" Saxon ...	Stuart, C. E., R.D., Capt. R.N.R.	C. G. Cuthbertson ...	" A.	Union Castle ...	"	24.8.30 to 12.10.30 ...	14.10.30	
291	†	" Scholar ...	Peterkin, A. G. ...	J. Richardson ...	" M.	Harrison ...	"	1.9.30 to 21.10.30 ...	25.10.30	
		" Scotia ...	O'Neill, J. ...	W. H. Hughes ...	C.C.	L.M. & S. Railway ...	Telegraphic Report	14.11.30	14.11.30	
033	††	" Scythia ...	Gibbons, G., R.D., R.N.R.	C. W. W. Hill, W. C. A. Robson, E. Cleave.	W.T.	Cunard... ..	Forms 911 & 138	20.10.30 to 9.11.30	13.11.30	
		" Sea Victory ...	Gammon, G. H. ...	P. Curley... ..	No. A.	Dover Navigation ...	"	" " " "	"	
010	†	" Senator ...	Curphey, E. B. ...	F. Davies ...	No. M.	Harrison ...	Forms 911 & 138	14.3.30 to 23.5.30	28.5.30	
211	†	" Shropshire, M.V. ...	English, G. L. ...	T. L. Owen, C. F. Hicks, A. D. Quayle, E. W. Jefferies.	M.L.	Bibby ...	Form 915	28.6.30 to 7.9.30 ...	9.9.30	
		" Silksworth ...	Blacklock, G. ...	F. J. Muttitt ...	No. A.	R. S. Dalglish ...	Form 911	2.10.30 to 18.10.30 ...	25.10.30	
258	†	" Somerset ...	Howell Price, J., D.S.O., D.S.C.	A. Bamforth, H. Smith, F. Langton, F. Reeve, L. Carter.	M.L.	Federal... ..	Met. Log.	31.10.29 to 14.5.30 ...	17.5.30	
		" Southern King ...	Rice, N. ...	J. S. Gardner ...	No. A.	Southern Whaling & Sealing Co.	Form 911	11.12.29 to 30.12.29 ...	21.1.30	
277	†	" Spero ...	Montgomery, H. ...	H. W. Vickers, A. Kirk ...	M.L.	Ellerman Wilson ...	Form 915	1.5.29 to 29.9.30 ...	26.9.30	
292	†	" Statesman ...	Mowat, J. ...	C. V. Watts ...	No. M.	Harrison ...	Form 911	15.5.30 to 19.7.30 ...	24.7.30	
		" Stephen ...	Jones, W. C. H. ...	C. W. Mead ...	" A.	Booth ...	"	6.7.30 to 27.8.30 ...	1.9.30	
259	†	" Surrey ...	Almond, J. G. ...	R. Rees, D. J. Murray, C. A. Cremin, W. Coates.	M.L.	Federal... ..	Form 915	2.5.30 to 9.9.30... ..	26.9.30	
		" Sutherland Grange Sutton Hall Sylvafield, M.V. ...	Matthews, S. ...	" " " "	No. A.	Houlder Bros. ...	"	" " " "	"	
			Halloran, O. ...	G. A. Simmers ...	" A.	Ellerman ...	Form 911	28.11.29 to 27.12.29	21.1.30	
			MacDonald, W. ...	J. Johnson ...	" A.	Hunting & Son ...	"	10.10.30 to 10.11.30 ...	12.11.30	
045	††	" Tainui ...	Clifton Mogg, W. P., Lieut. Commr., R.N.R.	G. A. Harvey, E. Baker, A. G. Collins.	M.L.	Shaw, Savill & Albion	Form 915	26.4.30 to 3.8.30 ...	9.8.30	
234	†	" Talma ...	Harley, G. ...	M. H. Vincent, J. F. Twite, R. F. Weatherseed.	No. M.	British India ...	Forms 911 & 138	25.7.30 to 29.9.30	27.10.30	
164	†	" Talthybius ...	Flynn, G. A. ...	D. McFarlane, N. Anderson, R. H. Clibborn.	M.L.	A. Holt... ..	Met. Log.	5.10.29 to 21.3.30 ...	15.5.30	
046	††	" Tamara ...	Hartman, W. H. ...	A. J. Galvin ...	No. M.	Shaw, Savill & Albion	Forms 911 & 138	30.7.30 to 1.9.30	4.9.30	
264	**	" Tanda ...	Pilcher, E. T., Lieut-Commr., R.N.R.	V. C. Lette, R. Lloyd-Harry, B. W. Dun, G. Chadwick-Smith.	M.L.	E. & A. S.S. Co. ...	Form 915	6.6.30 to 3.9.30 ...	31.10.30	
165	†	" Tantalus, M.V. ...	Dodds, R. ...	F. C. Oppen, R. M. Gray, W. J. Ryan.	"	A. Holt... ..	"	1.5.30 to 6.9.30 ...	22.9.30	
047	†	" Taranaki, M.V. ...	Wood, C., D.S.C. ...	A. C. Jones, G. Campbell, W. Balfour.	"	Shaw, Savill & Albion	"	19.3.30 to 2.7.30 ...	8.7.30	
		" Tarantia ...	Caithness, J. B. ...	J. M. Cherry ...	No. A.	Anchor ...	Form 911	16.9.30 to 5.10.30 ...	20.10.30	

Name of Vessel.	Captain.	Observing Officers.	Meteoro-logical Equipment.	Line.	Last Log, Register, or Record Contributed. Received up to 14.11.30.	Date Received.
243 *† <i>Tetresias</i>	Wilkinson, W. H. ...	F. Stott	No. A	A. Holt & Co.	Form 911 21.8.30 to 7.10.30... ..	10.11.30
<i>Tekoa</i>	McNish, R.	J. G. Phillips, R. Aldridge, E. Mason.	" M.	New Zealand S.S. Co.	Forms 911 & 138 1.10.30 to 1.11.30	8.11.30
<i>Telamon</i>	Brown, R.	G. Edge	" A.	A. Holt	" " 29.7.30 to 18.8.30	29.9.30
<i>Tetela</i>	Brice, E. H.	A. S. Hardy	" A.	Elders & Pyffes	" " 4.9.30 to 4.10.30	9.10.30
<i>Teucer</i>	Davies, J.	C. C. L'Estrange	" A.	A. Holt	" " 13.9.30 to 8.10.30	25.10.30
077 †† <i>Themistocles</i>	Young, A. D.	E. Johansen	W.T. M.	Aberdeen Common-wealth	" " 17.5.30 to 10.7.30	14.7.30
<i>Theseus</i>	Carnon, C. G.	P. Dunsire	No. A.	A. Holt	Form 911 12.7.30 to 18.8.30	27.8.30
007 †† <i>Thistleglen</i>	Whitfield, G.A., O.B.E.	W. H. Gould, S. B. Davis, E. W. Kent.	M.L.	Allan Black & Co. ...	Form 915 26.4.29 to 29.9.30	2.10.30
235 *† <i>Tilawa</i>	Colborn, E.	F. K. Langdon, P. Allerton, A. Rotton.	No. M.	British India... ..	Forms 911 & 138 10.7.30 to 13.8.30	22.9.30
168 *† <i>Tinhov</i>	Newton, C. S.	G. W. Seth	"	A. Weir & Co.	" " 24.4.30 to 18.7.30	25.8.30
161 *† <i>Titan</i>	Power, J. J.	C. C. L'Estrange	M.L.	A. Holt	Form 911 " 10.2.30 to 21.5.30	27.5.30
244 *† <i>Tongarivo</i>	Hamilton, F. S.	F. S. Cashmore, P. S. Calcutt, E. G. Williams, A. G. Robinson.	"	New Zealand S.S. Co.	Form 915 6.4.30 to 5.8.30	21.8.30
025 †† <i>Transylvania</i>	Bone, D. W.	A. Middleton, J. A. Leferre, D. I. Chamberlain.	W.T.	Anchor	Forms 911 & 138 5.10.30 to 26.10.30	30.10.30
288 *† <i>Traveller</i>	Barrow, W. T. C. ...	W. E. McEwan, G. A. Solly... ..	No. M.	Harrison	" " " " " " " "	" " " "
<i>Tracarrell</i>	Hunt, D.	J. Jenkyn, C. M. Quick, R. Stinson, W. B. Paul, T. M. Meakin, R. S. Davies.	" A.	Hain S.S. Co.	Form 911 27.3.30 to 18.9.30	9.10.30
005 *† <i>Trematon</i>	Mill, C. R.	A. G. Sampson	M.L.	" " " " " " " "	Met. Log. 16.9.29 to 8.3.30... ..	25.3.30
119 *† <i>Trojan Star</i>	Griffin, G. A.	" " " " " " " "	No. M.	Blue Star	Forms 911 & 138 1.5.30 to 12.6.30	19.6.30
245 *† <i>Turakina</i>	Ashworth, F.	V. V. Johnston	" M.	New Zealand S.S. Co.	" " 4.7.30 to 7.8.30	11.8.30
167 *† <i>Tyndareus</i>	Findlay, J.	J. A. Evans, R. L. Holdstock, M. J. Case, H. Pierpoint.	M.L.	A. Holt	Met. Log. 7.1.30 to 1.6.30	20.6.30
<i>Uffington Court</i>	Clarke, E. J.	E. V. Quickenden	No. A.	Haldin & Co.	Form 911 29.3.30 to 2.5.30	6.5.30
176 *† <i>Ulysses</i>	Owen, R. D., O.B.E.	J. W. Prior	W.T.	A. Holt	" " 1.5.30 to 14.6.30	17.6.30
113 *† <i>Upwey Grange</i>	Goodrick, H. P.	A. Bradbury	No. M.	Houlder	Forms 911 & 138 8.6.30 to 14.8.30	18.8.30
039 ** <i>Valacia</i>	Gronow, S.	J. Kettlewell	" M.	Cunard	" " " " 9.5.30 to 19.6.30	5.7.30
<i>Viceroy of India</i>	Olson, B. J., D.S.O., R.D., Commr. R.N.R.	A. G. Stansfield... ..	" M.	P. & O.	" " " " " " " "	" " " "
<i>Vigilant</i>	Simpson, E. S. S. ...	J. Wilson	" A.	Scottish Fishery Board.	Form 911 1.10.30 to 31.10.30	5.11.30
206 ** <i>Waiotapu</i>	Hender, W.	J. L. Russell	" M.	Canadian - Austra- lasian, Union S.S. Co. of N.Z.	Forms 911 & 138 7.9.30 to 15.10.30	3.11.30
263 ** <i>Wairuna</i>	Ryan, J.	J. E. Warwick, A. Morris, L. B. Thomas	M.L.	" " " " " " " "	Met. Log. 22.1.30 to 12.4.30	20.6.30
<i>Warfield</i>	Steel, R.	A. W. Collins	No. A.	Red Star "	Form 911 2.10.30 to 10.10.30	27.10.30
060 †† <i>Westernland</i>	Trant, A. W., O.B.E.	F. Clitty, J. Cross, W. L. Wood.	W.T.	" " " " " " " "	14.4.30 to 2.5.30... ..	5.5.30
260 *† <i>Westmoreland</i>	Reilly, H. E.	J. D. Marks, K. M. Lloyd Jones, H. Hill.	M.L.	Federal... ..	W.T. Reg. 14.4.30 to 2.5.30... ..	5.5.30
<i>William Scoresby, R.R.S.</i>	Irving, J. J. C., Lieut. Commr. R.N.	" " " " " " " "	"	Falkland Islands Government.	Form 915 22.5.30 to 26.8.30	2.9.30
096 †† <i>Windsor Castle</i>	{ Bickford, C. N., { Chave, Sir B., K.B.E.	W. S. Byles, E. H. Dixey, J. Traigner.	"	Union Castle	Form 915 1.5.30 to 7.9.30	10.9.30
043 ** <i>Zealandic</i>	Gaskell, J.	G. Almond	W.T.	Shaw, Savill & Albion	Forms 911 & 138 2.8.30 to 4.9.30... ..	8.10.30
<i>Zent</i>	Robinson, H. J.	J. Hillman	No. A.	Elders & Pyffes	Form 911 17.9.30 to 17.10.30	27.10.30
<i>Conway, H.M.S.</i>	Richardson, F. A., D.S.C., Commr. R.N.	The Senior Cadets	Cadets' M.L.	" " " " " " " "	Cadets' Met. Log. 11.5.30 to 22.7.30	30.7.30
<i>Pangbourne Naut-ical College</i>	Tracy, A. F. G., Commr. R.N.	" " " " " " " "	"	" " " " " " " "	Cadets' Met. Log. 30.4.30 to 24.7.30	29.7.30
<i>Worcester, H.M.S.</i>	Steele, G. C., V.C., Lieut.-Commr. R.N.	" " " " " " " "	"	" " " " " " " "	Cadets' Met. Log. 9.5.30 to 30.7.30	1.8.30
<i>Abaco</i>	" " " " " " " "	The Keepers	Lighthouse Register.	" " " " " " " "	Lighthouse Register 1.7.29 to 31.12.29	24.3.30
<i>Cay Lobos</i>	" " " " " " " "	" " " " " " " "	"	" " " " " " " "	Lighthouse Register 13.9.28 to 12.11.29	16.12.29
<i>Double Headed Shot</i>	" " " " " " " "	" " " " " " " "	"	" " " " " " " "	Lighthouse Register 1.7.29 to 31.12.29	24.3.30
<i>Inagua</i>	" " " " " " " "	" " " " " " " "	"	" " " " " " " "	Lighthouse Register 1.7.29 to 7.1.30	24.3.30
<i>Sombrero</i>	" " " " " " " "	" " " " " " " "	"	" " " " " " " "	Lighthouse Register 1.1.30 to 30.6.30	28.7.30
<i>Watling Island</i>	" " " " " " " "	" " " " " " " "	"	" " " " " " " "	Lighthouse Register 1.7.29 to 31.12.29	24.3.30
<i>Cape Pembroke</i>	" " " " " " " "	" " " " " " " "	"	" " " " " " " "	Lighthouse Register 1.1.30 to 30.6.30	18.8.30
(Falkland Is.)	" " " " " " " "	" " " " " " " "	"	" " " " " " " "	" " " " " " " "	" " " "

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

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., received up to 31.10.30.	Date Received
<i>Darian</i>	Hannaford, W.	D. G. Longmuir	Leyland	Water Samples	17.10.30
<i>Darro</i>	Green, J.	F. J. Swallow	R.M.S.P. Co.	" " " " " "	17.9.30
<i>Davistan</i>	Trickey, J.	J. Holman	Leyland	" " " " " "	31.10.30
<i>Dorelian</i>	Hugan, C.	" " " " " "	" " " " " "	" " " " " "	" " " "
<i>Hildebrand</i>	Buck, R. H.	R. D. Thomas	Booth	" " " " " "	9.7.30
<i>Mercian</i>	Hughan, C.	W. Parry	Leyland	" " " " " "	7.10.30
<i>Nevisian</i>	McCormick, J.	J. M. Hayde	" " " " " "	Water Samples	14.7.30