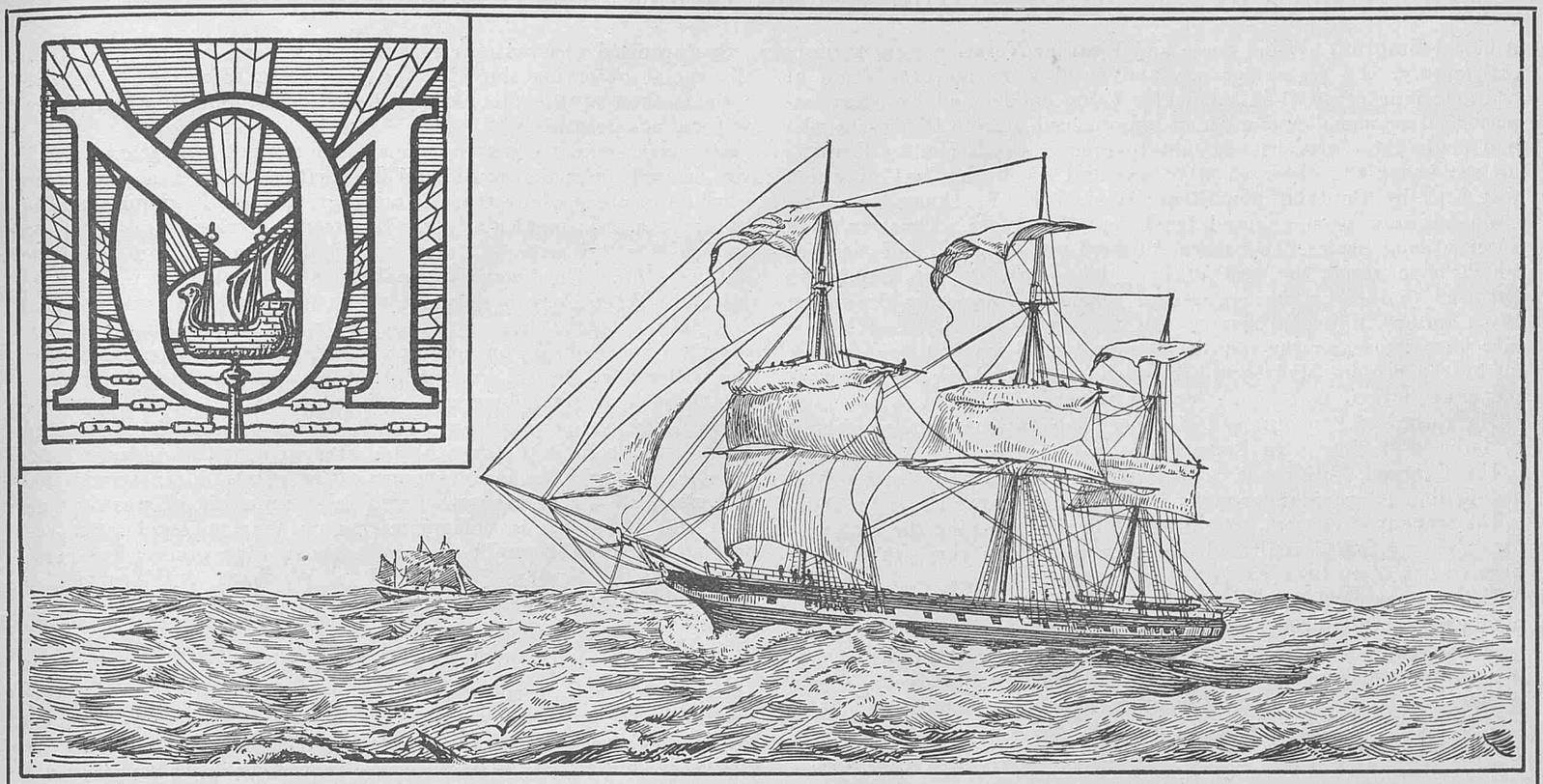
M.O. 262.



VOL. VII. No. 75. THE MARINE OBSERVER. MARCH, 1930.

TABLE OF PRINCIPAL CONTENTS.

DETAILS OF IMPROVEMENTS IN MARINE METEOROLOGICAL WORK FROM MAY 1ST, 1930.

In compiling an account of the experiences of Regular Observing Ships in heavy weather nearly three years ago entitled "A Short Storm with Thunder and Lightning off the South Coast of Spain, April 12th, 1927," which was published in the April, 1928, number of THE MARINE OBSERVER, we stated:—

"When all 'Selected Ships' on our list regularly make Wireless Weather reports to 'all ships' giving observations taken at the correct G.M.Times, and record them at the end of their Logs or Forms 911, we shall be able to reduce the number of observations to be recorded at the end of the Watch and timed Ships' Time. It will always be necessary for a certain number of ships to keep the Meteorological Log as at present, but with information communicated by W.T. and confirmed in writing, real efficiency will be attained and with far less clerical work which is such a trial to all who work at Marine Meteorology afloat and ashore." Then 141 ships were regularly making reports of observations timed correctly—that was according to the Weather Telegraphy times of observations for the nearest coast. Now the returns show that nearly all "Selected Ships" make reports regularly every day when in favourable positions at sea, and no fault attaches to the few remaining "Selected Ships" that do not; because "Selected Ships" have done their work under great difficulty owing to the differences of observation times for Weather Telegraphy which exist under the present arrangement, which is the best we could make, but which makes a schedule for communication in all parts of the World impossible.

That will be changed in British ships from May 1st, 1930, as was announced in the January, 1930, MARINE OBSERVER when we promised that Marine Observers should have information of the necessary revision of logs and forms and other details by special notes in an early number.

These notes redeem that promise.

The Meteorological Log (1930).

This log for recording observations six times daily at the relief of the watch, ship's time, is practically the same as the present edition and in fact is little different to the log drawn up by Captain HENRY TOYNBEE, whose recommendations were adopted by the International Marine Meteorological Commission in 1874.

The only material differences are:—

(1) The Douglas Sea and Swell Scale supersedes the present scale for sea disturbance and scale of characteristic of swell.

(2) The present pages for Weather reports (Wireless Messages sent) will be replaced by pages ruled for recording Synchronised Weather Observations twice daily.

It will be remembered by all who have been familiar with the work that shortly after reorganisation after the Great War, the Captains of Regular Observing Ships were asked their opinions on the scales in use. The concensus of opinion then obtained was that while

(6171—13) Wt. 88—13 1050 & 200 2/30 P. St. G. 4/1

Admiral BEAUFORT'S Wind Scale and Weather Notation were entirely satisfactory, the scales for sea and swell were not, the scale of characteristic of swell in particular being condemned by many experienced seamen. A number of experienced Marine Observers who had made these criticisms sought to remedy the defect by drawing up scales for the observation of sea and swell, the best of which was that by Captain, now Rear Admiral H. P. DOUGLAS. This scale has now been adopted for International use. Thus we have International scales for natural observation of wind and weather which have stood the test of over 120 years. They cannot be bettered to-day for the purpose of seamen. They were drawn up by a former Hydrographer of the British Royal Navy. We now also have scales for the natural observation of sea and swell drawn up by the present Hydrographer which have stood the most searching examination, that of his brother seamen.

The record of Synchronised Weather Observations will be referred to later in dealing with Form 911.

The Original Note Book is drawn up exactly similar to the log, except that it provides for eight months, whereas the log is for four.

The amount of clerical work involved in ships keeping the Meteorological Log remains unaltered, but then it is for a very special purpose as has often been explained in these pages.

The number of M.L. ships of the Merchant Navy is now 115; this number produces more logs than we can extract.

The number of M.L. ships will be further reduced to 100, which will provide sufficient standard data for climatological work, ocean pilotage, and the like, with the other methods which follow.

In 380 ships out of the total 500 the changes which are to be made on 1st May, will produce better results with less clerical work.

Form 911 (1930) Record.

Every ship in the Fleet List in THE MARINE OBSERVER, except Cross Channel packets, which is not detailed for keeping a Meteorological Log, will be expected to keep Form 911 from 1st May, 1930.

Up to the present these forms have been nothing more or less than a make-shift. The observations are recorded on them at 8 a.m. and 8 p.m. ship's time, and "Selected Ships" also record observations according to G.M.T. so that there is necessarily duplication of work, sets of observations often falling within an hour of each other. The observations so returned in writing have been mainly used for constructing Weather Charts in the Marine Division. These have been useful for they not only demonstrated the practicability of Wireless and Weather as an Aid to Navigation, but they showed up the defects of the old system.

Now that International Ships' Wireless Weather Telegraphy Greenwich Mean Times of observation have been adopted for all parts of the World, it is only necessary to record observations at those times for all purposes, other than the oldest branch of **The Work**, for which continuous observations taken regularly according to Ship's Time (A.T.S. or Zone Time) will always be required from a limited number of ships which are best suited for such exacting work.

At present Form 911 is entitled "Ship's Meteorological Report" which has been found unsuitable for it leads to confusion with reports made by W.T. The revised Form 911 to be brought into use on May 1st is designated "Ship's Meteorological Record of Synchronized Observations" which is a true description.

The vertical columns for the different elements are ruled as far as possible in the same order as they were formerly for Ship's Time Observations, but we have made slight rearrangement so that when the observations are coded the task of the observing officer may be easier. That is, the particulars and elements which may be reported in code are given as nearly as possible in the same order as the key letters of the code. The space for recording the set and drift of current remains the same, that for additional remarks is increased; also more space is provided for giving particulars of instruments.

"Selected Ships" will usually report the observations recorded on these forms and in the space provided for the same purpose at the end of the Meteorological Log, immediately by W.T. in accordance with the Schedule given in Form 138 (1930). Regular Observing Ships which are not "Selected Ships" should clearly understand that though they are not required usually to report by W.T. their observations are needed.

Synchronised observations recorded in writing are required from all regular observing ships for the purpose of research by the synoptic method at the Meteorological Office, London, and for International co-operation.

Moreover, regular observing ships which are not "Selected Ships" are desired to make routine W.T. weather reports according to schedule in areas where there is not a great deal of shipping, and in certain seasons, particularly in Hurricane, Cyclone and Typhoon regions (see "Scheme of Communication," pages 22 to 25, Volume VII, No. 73). They may be detailed as "Selected Ships" as required.* When there is only one officer in a watch it is not desired that these observations should be taken at night. Thus the new Form 911 will fulfil its purpose much better than the present edition and will reduce clerical work in about 390 out of 500 regular observing ships. At first observing and recording at fixed Greenwich Mean Times may seem irksome, but as has been proved by "Selected Ships," with a little forethought and arrangement this soon becomes a habit causing little inconvenience. The effect of synchronisation will mean all the difference between false depicting of weather systems and difficulties in communication on the one hand, and true weather charts with rapid communication on the other. For cases illustrating the former, Chapter III of WIRELESS AND WEATHER AN AID TO NAVIGATION may be referred to.

Form 138 (1930) Register.

At present only a certain number of **A Selected Ships** in the Trans North Atlantic trade are supplied with a Register for W.T. Weather Reports. This register has answered its purpose in working up the service in the part of the world where requirements were necessarily at first the most exacting. It is too complicated and requires too much work for service in all parts of the world. Therefore, based on experience with these registers in the North Atlantic and the method used by British "Selected Ships" in all parts of the world, a new Register will be brought into use on May 1st. It consists of a single sheet, on one side of which are given instructions for coding and on the other columns are ruled in which to code the observations and write particulars of ice and current to be reported. This Register for "Selected Ships" Coded Wireless Meteorological Reports is companion to the Record of Synchronized Weather observations and will be supplied to "Selected Ships" only, whether they keep the Meteorological Log or Form 911.

Form 138A (1930) Code Card.

A handy varnished card with code tables has been in use in certain **A Selected Ships** in the Trans North Atlantic trade for about nine years and has been found useful.

From May 1st such a Code Card, Form 138A, which not only gives the code tables complete, but also a copy of the schedule for communication for handy reference on the Bridge, will form part of the equipment of "Selected Ships."

Form 139 (1930) Pad.

A signal pad for the exclusive use of British "Selected Ships" will help to make communication between the officer of the Watch and the W.T. Operator simple, and this will be supplied to all "Selected Ships" with the other stationery.

We have endeavoured by these changes to make things as easy as possible for the Corps of Voluntary Marine Observers and we ask them to do their utmost to make them effective.

A pamphlet will shortly be published giving the necessary information of the "Selected Ship" system of communication, and the Decode for the use of all ships at sea, so that "Selected Ships" will, from May 1st really be able to perform an effective service.

It is to be hoped that the International Ships' Wireless Weather Telegraphy Code will be the means of stopping the changes which of recent years have been so frequent.

MARINE SUPERINTENDENT.

London.
December 16th, 1929.

---

* British "Selected Ships" are only detailed as such by the Marine Division of the Meteorological Office, London, and when so detailed their names appear in the Fleet List in THE MARINE OBSERVER with a number and symbols before them.

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.

SUPPORT OF CHANGES TO BE EFFECTED ON MAY 1ST, 1930.

THE following letter has been received from Captain J. BURTON DAVIES, of the NEW ZEALAND SHIPPING Company's S.S. *Hertford*, who has done much fine work as a pioneer of the "Selected Ship" system of Wireless Weather Telegraphy.

"I duly received the January MARINE OBSERVER last week and after carefully reading your Article and studying the International Wireless Weather Telegraphy Code I feel that as a marine observer of some 17 years standing I should like to write to you both as Marine Superintendent and Editor of THE MARINE OBSERVER and offer my congratulations.

"It seems to me that the Marine Division has achieved a great success in the scheme of communication for British 'Selected Ships' routine for W/T Weather reports.

"Many of us have sent you our views, including those of our W/T Officers, and it appears that, though we may have differed in detail, this scheme represents very truly the wishes and needs of those afloat. That being so we shall the better be able to serve all who require Meteorological information both at sea and ashore.

"It is evident that the Code is a compromise and it is to be regretted that it is not capable of reporting the position, course and speed, with the customary accuracy and that it does not provide for the set and drift of current, ice and navigation dangers. However, it is a great thing to have obtained International agreement and in the interests of uniformity I am sure that all concerned will subordinate their personal views to making this International Code effective.

"I am pleased to note that you reported to the British Empire Meteorological Conference the summarised experience and views of the Corps of Marine Observers and stressed the need for uniformity and simplicity. There is now no greater need for uniformity than in 'Weather Shipping' Bulletins and if only other countries would copy the plan of the British Weather Shipping Bulletin, **not forgetting visibility**, there would be little left regarding Wireless Weather Signals to be done.

"I hope that the British Empire Meteorological Conference realised that those at sea feel strongly that we should get far better co-operation, enabling the observer at sea to give the Meteorologist ashore better service and himself obtain far greater aid from Meteorology, were each Marine Division in the Dominion under the supervision of a Marine Superintendent, who would be fully acquainted with the needs of Seamen also with both their capabilities and their failings.

"Lastly, I strongly support your suggestion for a simple uniform method of entering the weather in the ship's log—the advantages are too obvious to require emphasis."

CURRENT.

Java Sea.

THE following is an extract from the Meteorological Log of S.S. *Marella*, Captain S. MORTIMER, Singapore to Java. Observer Mr. A. G. HILL, 2nd Officer.

"9th March, 1929, the ship experienced an abnormal set for the past 24 hours. Speed, measured by revolutions 11.7 knots. Average speed for 24 hours 13.7 knots. The set followed the trend of the Singapore, Rhio and Banka Straits, but on the open water run from Tanjong Jang to Tanjong Ular, was 180°, 1.8 kts.

Position Noon 8th, by cross bearings, Latitude 1° 04′ N.
Longitude 104° 12′ E.
,, ,, 9th ,, ,, ,, Latitude 3° 16′ S.
Longitude 106° 29′ E.

This set has enabled us to put up a record day's run—328 miles."

Ninigo Group, Pacific Ocean.

THE following is an extract from the Meteorological Report of S.S. *Marsina*, Captain W. MITCHIE, Pacific Islands. Observer Mr. B. W. Thomas.

"March 26th and 27th, 1929. Whilst loading off east side of Suma Suma Island (Ninigo Group), keeping position about quarter mile from shore with engines, there being no anchorage on account of depth, we experienced a Southerly set, of about 1 knot, the whole of the time."

VARIATIONS OF SEA SURFACE TEMPERATURE.

In the Guinea and Equatorial Currents.

THE following is an extract from the Meteorological Log of S.S. *Clan Macwhirter*, Captain A. LOW, Dakar to Cape Town. Observer Mr. F. B. PARKER, 2nd Officer.

"March 15th-18th, 1929. From Latitude 10° 23′ N., Longitude 16° 54′ W. to Latitude 2° 06′ S., Longitude 8° 18′ W., the temperatures of the dry bulb, the sea water, together with the specific gravity, were taken every two hours, with the intention of finding, if possible, when the ship cleared the Guinea and entered the Equatorial Currents.

"March 15th. Noon, Latitude 11° 31′ N., Longitude 17° 42′ W. Specific Gravity 1025 at 8 p.m., and midnight the temperatures of the air and sea were the same, i.e., 70° F.

"March 16th. At 4 a.m. (9° 14′ N., 16° 31′ W.) the air and water showed 77° F., a rise of 7° F., then a gradual rise to Noon (8° 01′ N., 15° 14′ W.), showing air 83° F., sea 80° F. and specific gravity 1022—this gives a rise of 10° F. in 130 mls. Current experienced from Noon to Noon S. 70° E. 10 mls. 4 p.m. (7° 26′ N., 14° 51′ W.), air 81° F., sea 82° F., specific gravity 1022.

"March 17th. 2.00 a.m. (5° 55′ N., 13° 55′ W.). The water reached a maximum temperature of 83° F., against the temperature of the atmosphere, 78° F. The weather conditions were o.q.r. and the air temperature varied between 80°-74½° F., but the water maintained a steady temperature of 83° F. throughout, with specific gravity 1022, e.g., at 8.00 a.m. air showed 74½ F. and the sea 82½ F., a difference of 8° F. From Noon to Noon very little current was experienced, S. 75° E. 3 mls.

"March 18th. At 5.05 a.m. Position per Obs., 1° 52′ N., 11° 09′ W. giving a current setting S. 50° E. 16 mls., i.e., 1 kt. from Noon 17th, the water maintained a temperature of 82° F., but the specific gravity dropped to 1021. 6.00 a.m., 1° 45′ N., 11° 02′ W., air 78° F., sea 82½° F., specific gravity 1023. The sky was overcast and no A.M. or Noon observations were obtained, but at 1.38 p.m., in Latitude 00° 03′ N., Longitude 10° 14′ W., D.R. Longitude by chronometer, gave, 10° 28′ W. (A. and B. corr. .07), a set of 14 mls. to the Westward since 5.05 a.m. 4.00 p.m., air 75° F., sea 81° F., specific gravity 1022. It was whilst the ship was experiencing this Westerly set that the temperature of the water showed signs of falling. 6.35 p.m., position by stars, Latitude 00° 11′ N., Longitude 10° 07′ W., giving a current of N. 56° W., 21 mls., i.e., 1.5 kts. from 5.05 a.m. 8 p.m., air 80° F., sea 81° F., specific gravity 1023. Midnight, air 80° F., sea 80° F., specific gravity 1023. From 6.35 p.m. to Noon, 19th, 2° 08′ S., 8° 18′ W., very little current was experienced, being North 3 mls.

"When steering to the Southward from C. Verde, the rise in the sea temperature is a good indication of entering the Easterly set (previous day, set S. 25° W. 10 mls.). When the steamship cleared the Guinea Current and entered the Equatorial, the change in the temperature of the water and the specific gravity, being very small, was a poor indication of the entry into the Equatorial Current.

"No current rips were seen, as the ship entered the Westerly set about 4.30 to 5.30 a.m., March 18th."

NOTE.—Marine Observers are referred to the Charts of Currents on the tracks from Cape Blanco to Table Bay and accompanying articles which were published in Volume I of THE MARINE OBSERVER.

CURRENT RIPS.

North Pacific Ocean.

THE following is an extract from the Meteorological Report of S.S. *Tainui*, Captain H. C. ELFORD, Balboa to Wellington, Observer Mr. L. J. HOPKINS, 3rd Officer.

"March 18th, 1929, from 9.35 a.m. (A.T.S.) in Latitude 6° 28′ N., Longitude 80° 50½′ W., till dark, vessel passing through well-defined current rips, during the forenoon they appeared to be setting in a W. by N. to N.W. direction, but later in the day were very confused. Wind N.E. force 1, sea smooth, slight S.W.'ly swell. Course from 9h. 35m. a.m. to noon S. 46° W. (T), speed 13.77 knots, course from noon S. 48° W. (T), speed 14 knots."

THE following is an extract from the Meteorological Log of S.S. *Cambridge*, Captain R. WILLIAMS, Curaçoa to Colon, Observer Mr. R. A. BELFIELD, 3rd Officer.

"21st March, 1929. From 8 a.m. position Latitude 2° 43′ N., Longitude 89° 22½′ W. to 4 p.m. position Latitude 1° 51½′ N., Longitude 91° 06′ W. several current rips were observed. They appeared in lines running in a S.E.'ly and N.W.'ly direction, the disturbance being in the form of waves coming from the S.S.W. The lines were less than a cable in width and sometimes as many as four followed in quick succession The wind was S.E. force 2."

Indian Ocean.

THE following is an extract from the Meteorological Report of S.S. *Benalder*, Captain J. J. FAIRWEATHER, Sabang to Suez, Observer Mr. D. T. MACCULLUM, 2nd Officer.

"March 17th, 1929, Noon, Latitude 6° 01′ N., Longitude 91° 28′ E., from Noon till 6 p.m., Course 270°, speed 11½ knots, passed through numerous well defined patches of confused water with current apparently setting W.S.W. During this time wind backed from N.W. to W.S.W. so that at 3 p.m. wind W.S.W. force 3 was in direct opposition to apparent set of current, thus causing a broken sea. By 6 p.m wind had veered to N.N.E. and broken water had disappeared. Weather from noon till 6 p.m. was cloudy with frequent passing showers. 3 p.m., Temperature Air 87° F., Sea 85° F., Barometer 29.83 in. Steady.

"Stellar observations at 6.22 p.m. showed that current had set S. 77° W. true, 1.4 knots."

DISCOLOURED WATER.

South Atlantic Ocean.

THE following is an extract from the Meteorological Report of M.V. *Lautaro*, Captain R. W. LEYNE, Liverpool to East Coast of South America, Observer Mr. J. T. DENLEY, 3rd Officer.

"Wednesday, 13th March, 1929, at 2.55 p.m. Observed patch of discoloured water extending about 1 mile around ship. Approximate position Latitude 12° 02′ S., Longitude 37° 02′ W. Water seemed muddy and was not caused by fish food or spawn."

North Pacific Ocean.

THE following is an extract from the Meteorological Report of S.S. *Tainui*, Captain H. C. ELFORD, Panama to Wellington.

"March 18th, 1929, Latitude 6° 05′ N., Longitude 81° 16′ W., 12.30 A.T.S. Steering 226°, 14 knots. Observed ahead a large patch of discoloured water. This water was a decided red rust colour. The vessel passing through it, it became broken up, and the colour changed to a browner tint. It caused much interest to all on board, and it was at first thought that the sea in this vicinity was dyed with blood owing to the conflict with probably a whale and sword fish

"Three hours later, several other patches were observed of the same red colour and which dispelled the above theory. There is an account in 'The Cruise of the Beagle' when cruising off the East Coast of South America she went through similar patches of red water. The vessel was stopped and two samples of the water put through two microscopic analyses. It was then found on that occasion that the red colour was caused by Formanifera or minute marine life. The above is doubtless a phenomenon rarely observed at sea.

"Temperature of air 79° F. Surface temperature of sea 83° F. Density 1021."

North Pacific Ocean.

THE following is an extract from the Meteorological Log of R.M.S. *Rotorua*, Captain F. W. ROBINSON, Southampton to Auckland, New Zealand, Observer Lieutenant GRIFFITHS, R.N.R.

"March 31st, 1929, at 1940 G.M.T. in Latitude 6° 25′ N., Longitude 80° 46′ W., observed stream of deep reddish brown coloured water extending as far as the eye could see in a north and south direction. This stream appeared to be about two miles in breadth. A sample was taken, the temperature found to be 82° F., and specific gravity 1022.2. The temperature of the sea water taken immediately after passing through the discoloured stream was also 82° F., but the specific gravity was now 1024.0. Weather was fine and clear, with light E.S.E. breeze, clear sky, smooth sea and very slight confused swell. Previous to this, vessel had passed through frequent tide rips running in a N.N.E. and S.S.W. direction."

COLOUR OF SEA.

Western Mediterranean.

THE following is an extract from the Meteorological Report of S.S. *Highland Prince*, Captain F. TAYLOR, Malta to Manchester, Observer Mr. J. M. HARRISON, 2nd Officer.

"March 3rd, 1929, at 3.30 p.m. A.T.S., Latitude 37° 16′ N., Longitude 3° 49′ E. A distinct change was noted in colour of sea, from dark blue to a very light green with a width of approximately four miles running in a N.N.W. and S.S.E. direction as far as could be seen. Temperatures at the observation being, Sea dark blue 55° F., light green 59° F., falling to 54° F. entering dark blue again. Air before entering 65° F. rising to 67° F. Barometer 30.12 in. falling slowly. Sky 8c, Cirrus and Cirro-Stratus in the E. and S. changing to Stratus in the W., blue sky to the N."

PHOSPHORESCENCE.

Java Sea.

THE following is an extract from the Meteorological Log of S.S. *Marella*, Captain S. MORTIMER, East Indies to Australia, Observer Mr. A. G. HILL, 2nd Officer.

"13th March, 1929, from about 7 p.m. 12th to daylight 13th the ship passed through several isolated areas of brilliant phosphorescence. The areas were larger and closer together in the vicinity of Mandalike Island (North Coast, Java) which was abeam at 7.55 p.m. 12th and gradually became smaller and more isolated as the vessel proceeded to the E.S.E'rd. Around Mandalike, the bow wave presented an unbroken line of vivid green fire, extending both sides to the limit of the disturbing effect of the wave.

"During the Middle Watch, the patches of prosphorescence were infrequent, and did not have the continuous appearance of the preceding watches, being of a broken and patchy nature, still, however, retaining their exceptionally brilliant character, which was accentuated by the glassy surface of the sea.

"Although phosphorescence is a fairly common sight in these waters, the above phenomenon was the most vivid that had been seen for some considerable time."

Gulf of Panama.

THE following is an extract from the Meteorological Report of S.S. *Orduna*, Captain T. DANIEL, West Coast of South America to Europe viâ Panama, Observer Mr. R. ECKFORD, 3rd Officer.

"8th March, 1929, 20.30 at ship (2530 G.M.T.) in Gulf of Panama, Latitude 07° 36′ N., Longitude 79° 53′ W., Course 020°., 15½ knts. Weather—no wind. No sea. No swell. A few cirriform clouds and bright starlight.

"Observed phosphorescence at the edges of the broken water alongside. The phenomenon occurred only where the sea was curling.

Porpoises, of which there were many, left a trail of diffused light beneath the sea surface.

"21.00 at ship, patches of diffused light varying from 3 to 15 ft. in diameter and spaced some 100 to 200 ft. apart were passing, which, when disturbed, increased their brilliance considerably and shot out radial rays. Several times we steamed through streaks of light-coloured matter, trending W.S.W-E.N.E., which may have been fish spawn, since the resemblance was striking. Meeting the bow-wave these streaks broke into thousands of tiny bright scintillating lights.

"Wavelets caused by occasional zephyrs turned the sea into a field of sparkling jewels, beyond our ability to describe.

"At 21.40 a light breeze sprung up from N.N.W. and gradually increased in strength, when the phenomenon slowly waned, but remained in a much lesser and decreasing degree till we passed Bona Island."

New Zealand Waters.

THE following is an extract from the Meteorological Log of H.M. Cable Ship *Iris*, Captain H. R. HUGHES, Auckland to Wellington and Cook Strait.

"March 17th, 1929. During the early part of a cyclonic disturbance between 8 and 8.30 p.m. the amount of phosphorescence observed was remarkable.

"The pieces varied in shape and size, some like the 'Cuttle Fish Bone,' the majority of them, however, being round and about 12″ in diameter.

"It was heavily overcast with rain, even so, the illumination from the phosphorescence made everything about the ship as visible as one would expect it to be on a bright moonlight night.

"We steamed a distance of approximately 12 miles through this most remarkable sea.

"(Position 8 p.m. off Cape Runaway.)"

SAND CARRIED WITH WIND AND RAIN.

Malta Channel, Mediterranean.

THE following report has been received from Mr. J. N. SHIPTON, Chief Officer, S.S. *Benvorlich*, London to Penang.

"During the night of 26th-27th March, 1929, in the Malta Channel, Latitude 36° 22′ N., Longitude 14° 10′ E., Wind E. by N., force 6-7. Barometer 29.80 in. Temperature 65° F. Course S. 68° E. true, average speed 4 knots. A heavy confused head sea and swell was running, torrential rain and hard squalls prevailed throughout the night; at daylight on the 27th it was noticed that the ship was coated with fine mud, on spars, houses, decks, etc., and later on when the rain ceased the mud dried into fine earth of which enclosed is a sample. It would be extremely interesting to know if Mount Etna was active about this time, although I think the ship was a little too far east for that, and imagine a disturbance somewhere about the vicinity of the Island of Morea would be more likely from the direction of the wind at the time of the phenomenon."

THE following is an extract from the Meteorological Log of H.M.S. *Enterprise*, Captain H. D. PRIDHAM WIPPELL, C.V.O., R.N., Observer Lieutenant-Commander C. W. A. G. HAMLEY, R.N.

"On 25th March, whilst between Galita Light and Pantalaria (see body of Log), with a high Easterly wind and heavy rain, a heavy sandy deposit was observed on all exposed surfaces. It was very noticeable next day when dry and consisted of very fine yellowish sand."

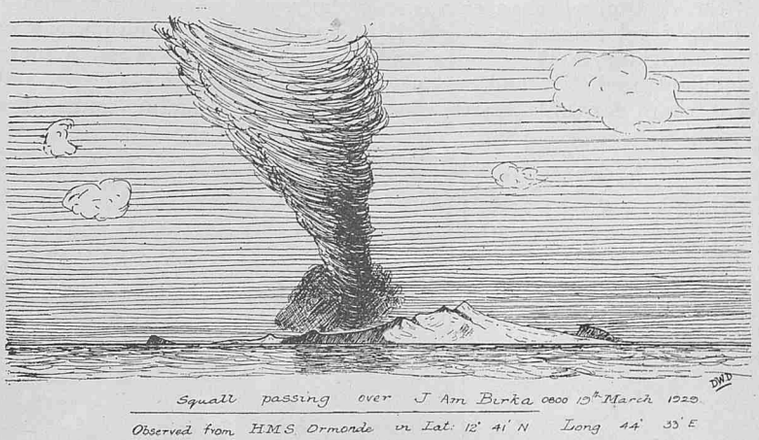
NOTE.—The sand deposits observed by S.S. *Benvorlich* and H.M.S. *Enterprise* probably came from the Sahara or from the coastal regions of Tripoli. On both 25th and 26th March pressure was high over N.W. and Central Europe, and an area of low pressure lay over the Mediterranean to the South of Malta and extending over Tripoli. The winds connected with this depression were strong, and there was a strong Northerly wind blowing from the coast of Africa Eastward of Tripoli. In the neighbourhood of Latitude 36° N. the winds were Easterly, this being the Northern part of the depression.

SQUALL.

Gulf of Aden.

THE following is an extract from the Meteorological Log of H.M.S. *Ormonde*, Commander W. V. RICE, D.S.O., D.S.C., R.N., Observer Lieutenant D. W. DEANE, R.N.

"19th March, 1929, at 07.55 (0455 G.M.T.) observed squall in Latitude 12° 41′ N., Longitude 44° 33′ E., stretching in a line between ship and Jebel Am Birka. Attached sketch shows appearance of same. Practically no disturbance of atmosphere was felt in ship. Weather:—Wind E. by N., force 4. Barometer 1013.0 mb. Temperature:—Dry Bulb 81° F., Wet Bulb 77° F.; Sea 80° F. Cumulus 4/10 (mostly to eastward)."



WEATHER CHARTS MADE AT SEA.

Far Eastern Waters—November to March.

By MR. R. L. V. BISHOP, 2nd Officer, M.V., *Glenamoy*.

"In November, the great Asiatic Anticyclone is established and the N.E. Monsoon holds sway over the China Coast and the China Sea. In this month, therefore, there faces the navigator the probability of a strong monsoon, or, further north, N.W. gales following the passage of depressions E.N.E. across Korea and Japan.

"The considerable delays experienced by ships are well known in this season, and it is of benefit to follow the weather bulletins available in plenty, and to trace the trend of developments, if possible, by the aid of weather charts.

"As the N.E. Monsoon advances into January, the possibility of disturbances emanating from the Pacific becomes more remote, and the observer can confidently confine himself to watching the activities of the anticyclone and depressions mentioned above. The advantage of weather charts to the navigator seems to be that the isobaric gradients can be determined and expectations formed of probable increase or decrease in monsoon strength, while the changes induced by the track of a depression, can to a measure be counteracted by prompt action and sound decision.

"It has been found advantageous to proceed from Takao (S.W. Formosa) to Shanghai in *Glenamoy* viâ S. and E. of Formosa rather than Formosa Strait. By the indirect route, better weather and a favourable current replaced the adverse monsoon and poor visibility of the other, and the vessel reached port 12 hours in advance of Agents' expectations based on other vessels' performances.

WEATHER CHARTS MADE AT SEA (*continued*).

Far Eastern Waters.

" There are, however, certain disadvantages which cannot be overcome at present in the daily plotting of synoptic data. The bulletin from Hong Kong with the early station reports is not available till midday and international synchronisation is not yet achieved. The bulletins thrice daily from the Japanese Observatories are more promptly to hand, but are lacking the important detail of Barometer Tendency.

" Therefore the observer is left to his own resources and has to rely on the process of (very often) bitter experience. The absence of ships' reports is also a serious handicap. It is noted further that the Japanese Observatories give no forecast in detail for areas, such as is the practice elsewhere, and this is perhaps due to the swift and remarkable changes occurring in and around these Islands, which render anything but a general inference impossible.

" For instance, on 26th February, *Glenamoy's* weather chart predicted—' Winds N.E. or N. Strong to a Gale at first. Moderating later Fair to Cloudy. Vis. Good.' The actual weather was briefly a N.N.E. gale from 9 a.m., moderating to N. by E. 6 at noon, while at 2 p.m. there was a flat calm. Lt. airs followed, and at 7.30 p.m. the wind backed N. by W. 4—at midnight being N. by W. 2, veering again.

" Whether the sudden gale was due to the ' crowding ' of the isobars in the mountainous country intervening between the ship and advancing High Pressure, is not known, for the barometer remained steady or nearly so throughout the day, commencing to rise after 8 p.m.

" It was interesting to note that the rate of the Kuro Siwo appeared undiminished by the opposing wind, i.e., 1-2 knots, but no reliable observations can be stated owing to leeway, etc.

" The opinion is advanced that generally the Eastern side of Japan provides complications which indicate the need for a closer study of the atmospheric changes occurring daily, and, to be fully cognisant of the developments, a single daily weather chart is insufficient to the navigator in the months under notice. On the West, a more confident prediction and outlook can be formed by single chart, and that chart for 18th March, shows *Glenamoy* steaming south of a disturbance, and the anticyclone to the Eastward causing a cessation and reversal of the N.E. monsoon along the China Coast. In contrast, the chart for 25th February shows conditions familiar to observers in these waters, with a Low passing over the Kuriles, causing N.N.W. or N.W. gales in N. Japan Sea, the High moving slowly East over Manchuria and a Gentle Monsoon over the China Sea.

" There was found the same necessity (as outlined by Lt. ALLEN in a recent MARINE OBSERVER) to obtain the gradient and prediction of wind force from the chart and not according to indications at some coast stations where local peculiarities occur.

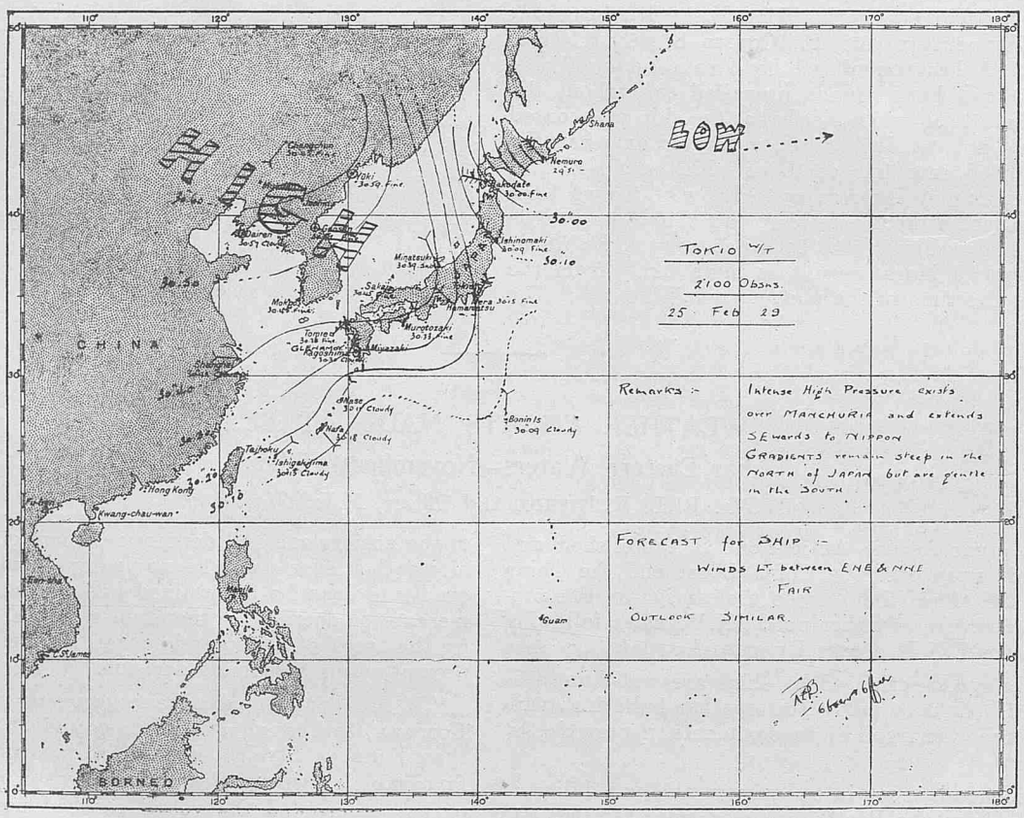
" The question of visibility forms a similar problem to be solved from the chart since no fog or mist may be indicated by station reports from (e.g.) Shanghai or Amoy, but yet the Approaches to the Yangtsekiang or the Formosa Strait may have such visibility as will prevent or impede navigation.

" Further, it was borne out (as remarked in WIRELESS AND WEATHER) that the long straight isobars with corresponding line of discontinuity, are generally favourable to the formation of depressions.

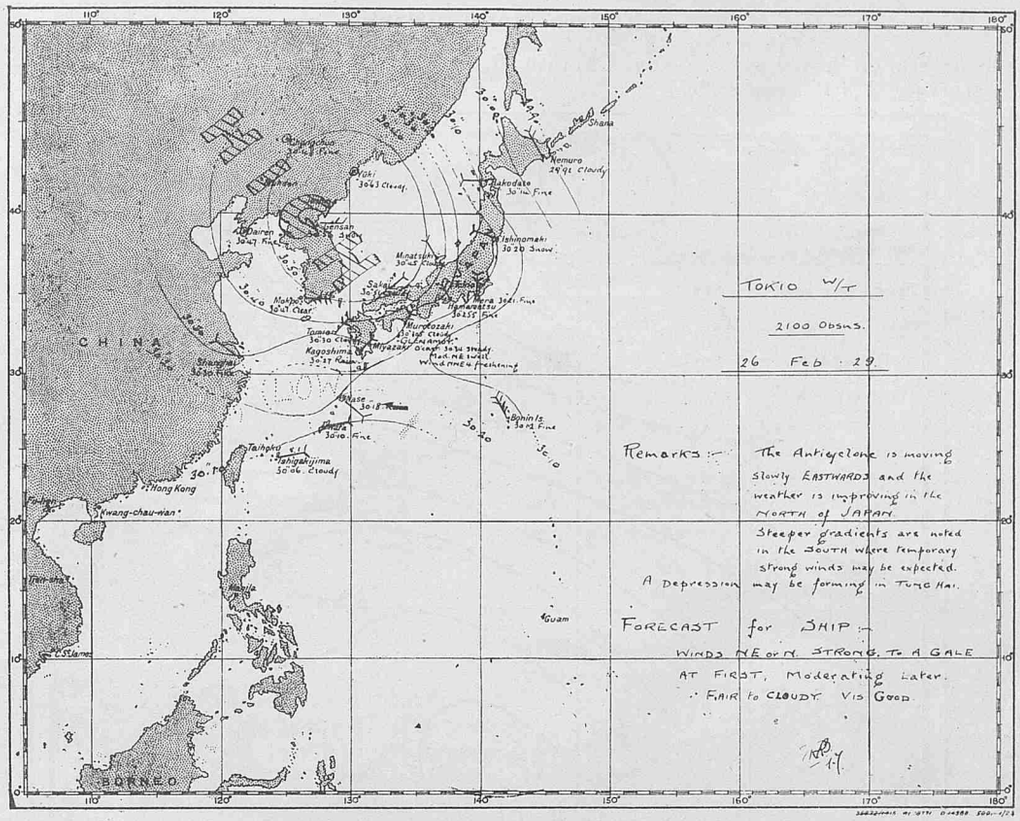
" It is well known that the depressions have marked effects on the Tidal Streams and Currents around the Chusan Archipelago, in the Yellow Sea, as well as elsewhere. As the relation between weather and current can only be determined by ships' observations, the absence of such reports, as previously noted, is an additional handicap and one, which may, on occasion, prove a vital factor when the navigator is making an important landfall.

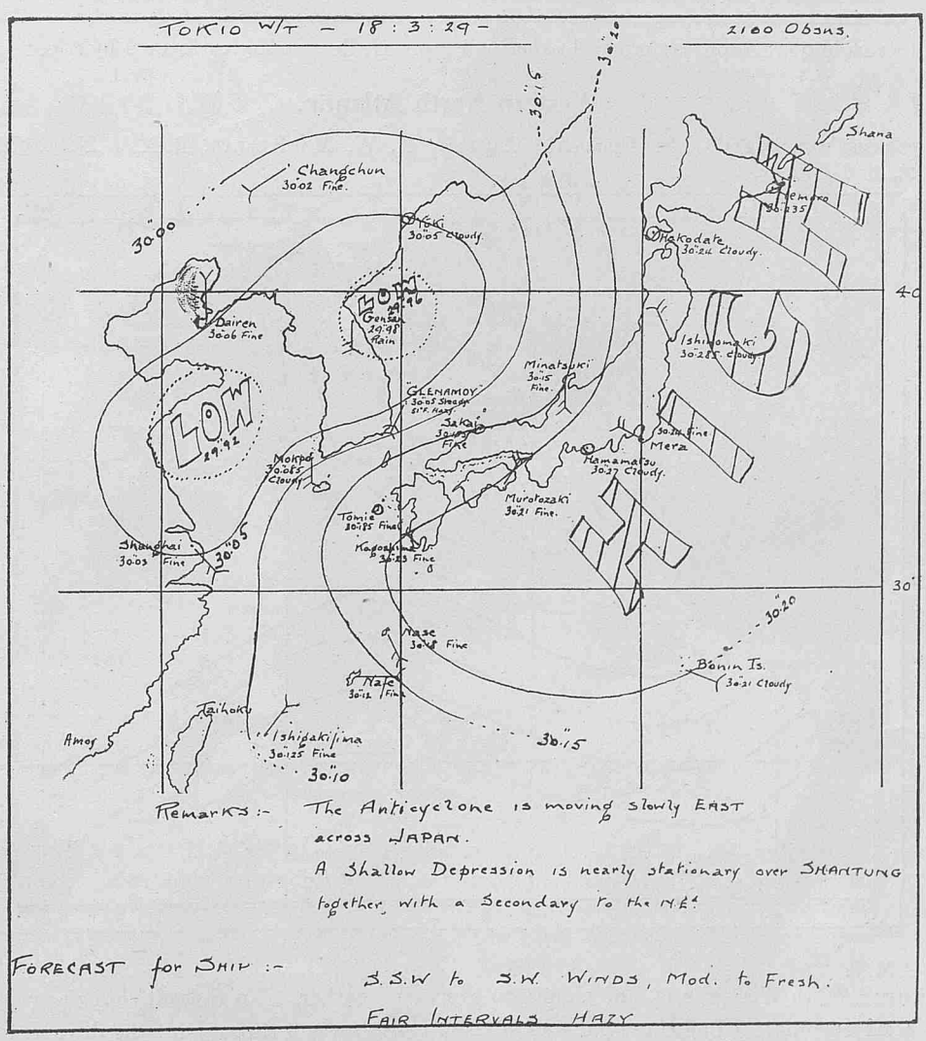
" To possess the detailed knowledge supplied by synoptic charts is to be forewarned and forearmed, and the mariner can satisfy himself that he is neglecting nothing which may avoid delay and bring him to port with efficiency and despatch.

" When reliable weather reports from ships of all nations are available daily, sudden disturbance or danger will find no ship unaware and unprepared. Abnormal Current or Atmospheric Variation will be detected and the mariner will guarantee for himself an insurance policy in all the oceans."



Far Eastern Waters (*continued*).

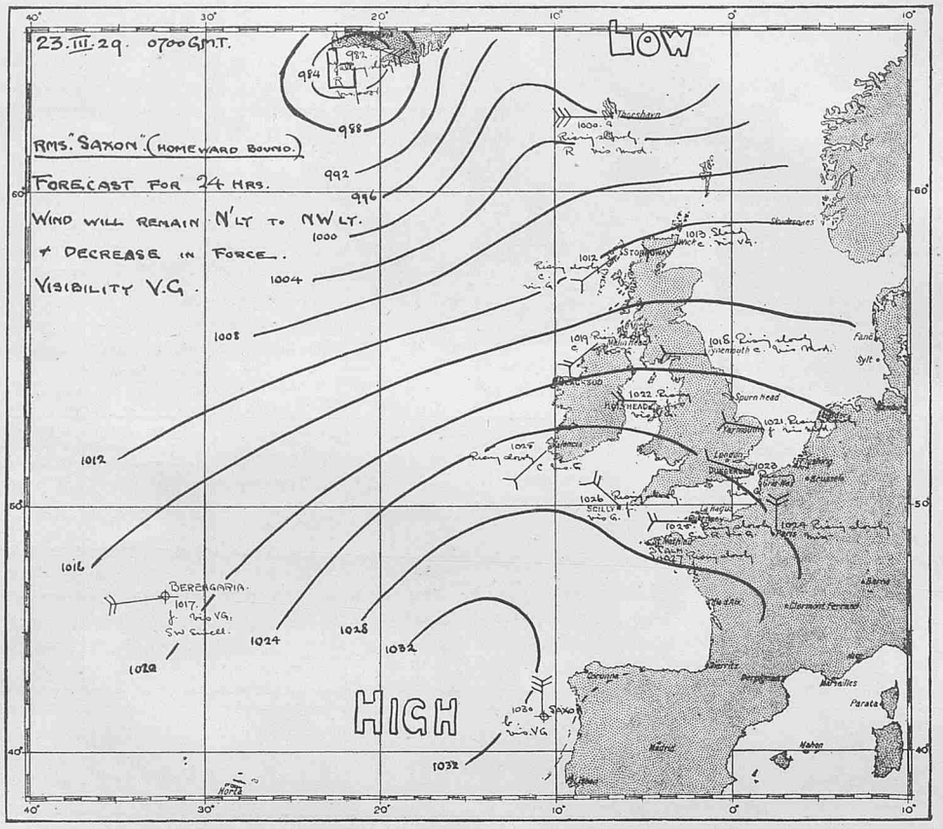




WEATHER CHARTS MADE AT SEA (*continued*).

Eastern North Atlantic.

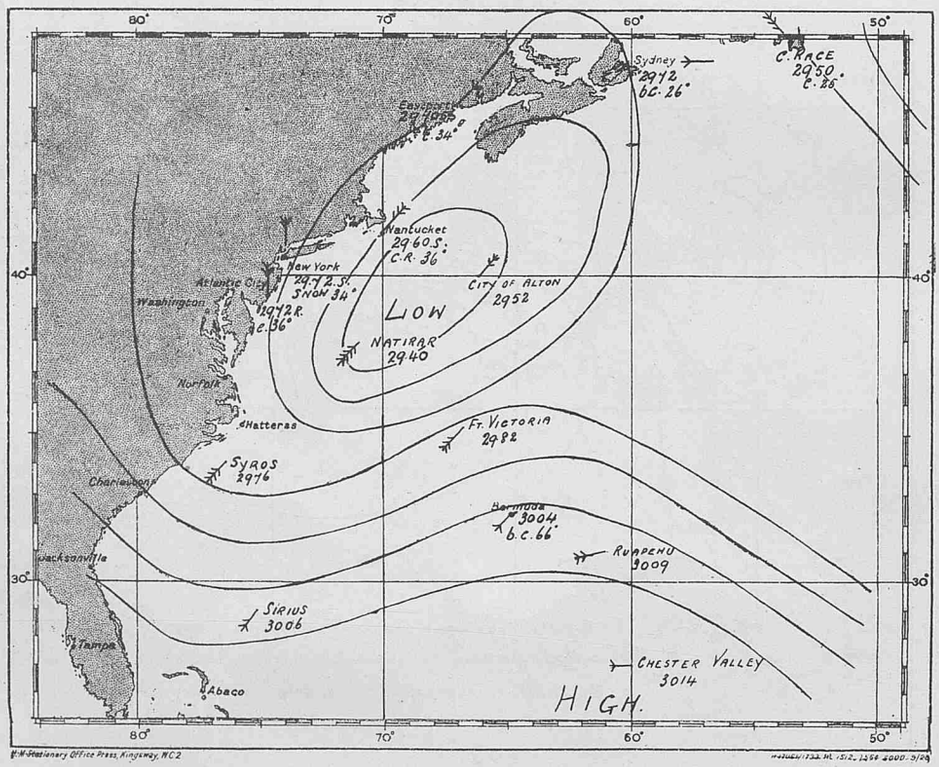
Weather chart made at sea on board S.S. *Saxon*, Captain R. G. SHILSTON, R.D., R.N.R., Cape Town to Southampton, by Lieutenant C. H. WILLIAMS, R.N.R., 2nd Officer.



According to *Saxon's* Meteorological Report, the wind remained from N. decreasing to force 2 by 8 p.m.

Western North Atlantic.

Weather Chart made at sea on board S.S. *Ruapehu*, Captain A. W. MACKELLAR, R.D., R.N.R., Colon to Southampton, by Mr. L. F. MALCOURONNE, 3rd Officer.



1st March, 1929, 0100 G.M.T.
Forecast: Fresh to strong S.W. to West winds, fine cloudy to overcast weather. No radical change probable during next 24 hours.
According to *Ruapehu's* Meteorological Log the wind was W.S.W. to W. force 5 throughout the day, weather fine and cloudy.

CLOUD PHENOMENON.

North Atlantic Ocean.

THE following is an extract from the Meteorological Report of M.S. *Lautaro*, Captain R. W. LEYNE, Liverpool to East Coast of South America. Observer Mr. J. T. DENLEY, 3rd Officer.

"Wednesday, 6th March, 1929, 11.32 p.m. A.T.S. (0130 G.M.T.) in Latitude 14° 20′ N. Longitude 26° 37′ W. Barometer corrected 29.94 in. Temperature air 71° F. Surface wind, light variable northerly airs. Observed Cu-Nb. and Cu. clouds, moving slowly from W. by N. (T.), to be losing speed and finally stopping.

"These clouds—which were in the zenith—then slowly began to move back again from E. by S. Other similar clouds with an altitude of 30° and bearing S.S.W. (T), seemed to be rising, becoming thin and finally dispersing in Fracto Cumulus. At midnight a more northerly drift was observed, clouds moving from E.N.E. At 0530 G.M.T., 7th March, the wind steadied at N.E. (T) and developed into—belated—N.E'ly trades."

AURORA.

North Pacific Ocean.

THE following is an extract from the Meteorological Log of R.M.S. *Empress of France*, Captain S. ROBINSON, Vancouver to Yokohama. Observer Mr. A. G. SIMMONS.

"March 11th, 1929, 9.0 p.m. Observed brilliant display of Aurora, an arc extending from the zenith to the horizon in the W.N.W. and to the horizon in the E.S.E. At the same time, in the northern sky, diffused Auroral lights were observed. The arc was visible for about half an hour, varying in brilliancy and gradually fading away altogether although the Auroral lights in the North were observed for about an hour longer. Wind West 6. Barometer 1002.3 mb. Clouds Cu. and Cu-Nb. Proportion 4. (D.R. Position at 8 p.m. 51° 41′ N. 144° 12′ W.)."

AURORA AUSTRALIS.

New Zealand Waters.

THE following is an extract from the Meteorological Log of S.S. *Mataroa*, Captain W. A. R. KERSHAW, New Zealand Ports. Observer Mr. J. J. NICOLL, 3rd Officer.

"12th March, 1929, off New Zealand coast between Black Head and Castle Point, Latitude 40° 10′ S. to Latitude 41° 00′ S. Barometer 30.28 in. Temperature 61° F. Wind S. by E. force 4. Between South and S.W. Sky lit up at frequent intervals and beams of light radiating upwards from horizon. Low lying Stratus at horizon."

Australian Waters.

THE following is an extract from the Meteorological Log of S.S. *Port Darwin*, Captain I. R. SAWBRIDGE, Perim to Melbourne. Observers Messrs. H. PINKNEY and N. MUZZELL, 2nd and 3rd Officers.

"12th March, 1929, 11.30 p.m. A.T.S. Latitude 37° 48′ S. Longitude 129° 55′ E. At 11.15 p.m. the sky to the Southward began to glow in a similar manner to that which just precedes the rising of the full moon. 11.30 p.m. Bright rays visible over Cu. which covered this portion of the horizon. These rays resembled searchlights and reached an altitude of 13° above the horizon.

"Each ray remained visible for about 5 minutes. 11.35 p.m. A faint tint of red appeared around the outside of the arc formed by the glow and a yellowish green tint towards the centre. 11.40 p.m. Red and green tints disappeared and glow and rays commenced to grow faint.

"13th March, 1929. Midnight A.T.S. Glow continues centre bearing approximately S. (mag.). Maximum altitude about 11° above the horizon, but continues to grow fainter. 1.20 a.m. Glow just perceptible. 2 a.m. Glow increased slightly. 2.50 a.m. Advanced clock 7 min. 3 a.m. Glow increased and two white rays bearing S. by E. and S. by W. (mag.) made their appearance. These two rays remained steady and reached an altitude of 28° above the horizon. They closely resembled the beams of searchlights, but were considerably less bright. 3.20 a.m. As above, but much fainter. 4 a.m. Glow and rays almost imperceptible. 4 a.m. Latitude 37° 51′ S. Longitude 131° 12′ E."

MIRAGE.

Off Cape Town.

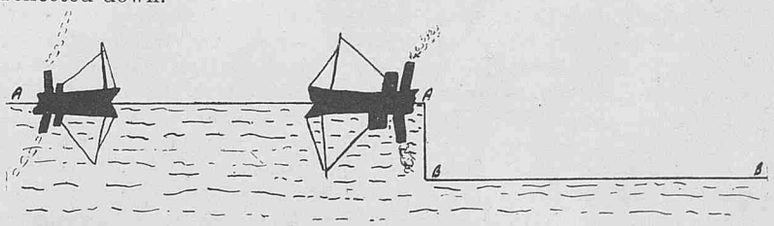
THE following is an extract from the Meteorological Report of S.S. *Clan Ross*, Captain G. A. NEILL, Cape Town to New York, via Barbados. Observer Mr. A. G. BEYNON, 3rd Officer.

"16th March, 1929, 10 a.m. A.T.S. Latitude 33° 41′ S. Longitude 17° 43′ E. Visibility high. bc. Wind N.N.W. force 2. Slight sea. Moderate swell.

"Observed a curious effect on horizon to Southward either refraction or mirage. Two distinct horizons were seen, A and B (see sketch). A horizon took the form of very distinct white cliff, while two steam trawlers were reflected most clearly in the water. This phenomenon lasted about 30 minutes when the two horizons became continuous again."

AA = False horizon.
BB = Real horizon.
AB = Vertical distance between two horizons.

The two steam trawlers were seen on the false horizon and then reflected down.

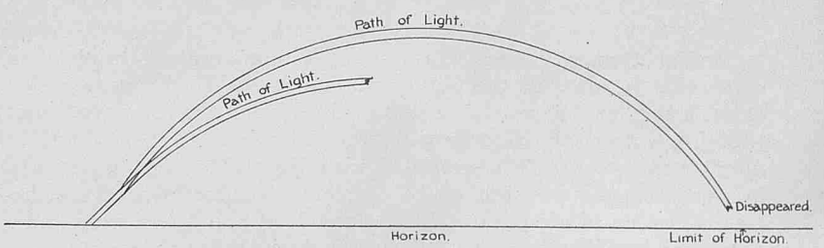


LIGHT RAYS AT NIGHT.

North Pacific Ocean.

THE following is an extract from the Meteorological Report of S.S. *Sheaf Mount*, Captain C. A. GROVES, Japan to Vancouver, B.C. Observer Mr. A. MACARTHUR, 2nd Officer.

"11th March, 1929, 10 p.m. A.T.S. in Latitude 49° 10′ N. Longitude 134° 40′ W. Wind S.S.W. force 4. Barometer 29.80 in. Temperature Air 45° F., Sea 47° F. From behind Fracto Nimbus cloud stretching from horizon to a height of 11° and bearing S. 75° E. True, a shaft of light appeared, making an angle of 45° with the horizon and following a straight line 45′ wide for a distance of 60°; in the sky the light broke off into two curved sections passing through the zenith and finishing 3° above the horizon bearing N. 75° W. True. The straight portion of the phenomenon had the appearance of a gigantic searchlight. The whole streak of light was motionless over its arc of 166° and commenced fading away at 10.20 p.m. and finally disappeared entirely ten minutes later. Fracto Nimbus and Cumulus clouds in S.W. portion of sky lit up by reflection of light."



NOTE.—It is possible that this was some kind of auroral ray. Another explanation is that it was the trail of a meteor, but if, as the description seems to imply, the ray was seen at first to progress across the sky, the bright head of the meteor would have been seen.

DOUBLE SOLAR HALO.

Indian Ocean.

THE following is an extract from the Meteorological Log of S.S. *Wangaratta*, Captain W. SCUTT, Melbourne to Suez. Observer Mr. A. G. BROOKS, 3rd Officer.

"3rd March, 1929, 8.12 a.m. Latitude 3° 18′ S. Longitude 65° 22′ E. At 10.12 a.m. observed two solar halos 22° and 46°. The inner one almost a complete circle, the outer being little more than a semi-circle. The colours of each were pronounced and easily distinguished in the following order:—Red, orange, yellow, green and blue. The smaller halo was actually well defined, and the colours of good intensity, those of the outer ring were, whilst being easily discernable, fainter and not so well defined.

LUNAR RAINBOW.

Off Coast of Queensland.

THE following is an extract from the Meteorological Log of S.S. *Arafura*, Captain A. S. GORDON, Brisbane to Townsville. Observer Mr. H. NUZUM, 3rd Officer.

"March 29th, 1929, off Lady Elliot Island, Latitude 23° S., Longitude 153° E. (approximately), 9.30 p.m. With the moon practically at the full, a very distinct rainbow was observed, extending over an arc of the horizon of 84° and rising at its summit to a height of 20°. No rain was falling at the time though heavy banks of Cu-Nb were low down on the horizon.

"Colours were plainly visible for about ten minutes and a milky appearance remained for about five minutes longer.

"The centre of the rainbow was directly the reverse of the moon's bearing."

METEOR.

Gulf of Aden.

THE following is an extract from the Meteorological Report of S.S. *Macharda*, Captain R. G. HANNA, Liverpool to Calcutta via Suez. Observer Mr. H. M. RUSSELL, 4th Officer.

"March 12th, 1929, in Latitude 12° 11′ N., Longitude 48° 38′ E., at 0057 G.M.T., the wind being E. by S. force 3, weather b, barometer 29.827 in. and visibility 8. Observed a bright and very fast meteor shoot from near Altair. Its altitude when first seen was approximately 36° bearing East, disappearing in about eight seconds in altitude 9° bearing E.S.E. Its magnitude seemed about three times as great as that of Altair, fading gradually and leaving a bright pure white tail visible for several seconds after the meteor had finally disappeared."

FOG AT SEA—I.

PREPARED IN THE MARINE DIVISION BY E. W. BARLOW, SENIOR PROFESSIONAL ASSISTANT.

THE present article forms the first of a series of two in which it is intended to give a general account of sea fog. In the first article a short summary will be given of the modes of formation of sea fog as explained in detail in the article on Fog by H. KEETON, which was published in THE MARINE OBSERVER, Volume VI, May, 1929, and these will be extended by short descriptions of other occasional modes of formation of sea fog. Other questions, such as the occurrence of fog in strong winds, will be discussed and the article will conclude with an account of the general distribution of fog over the oceans and remarks on some individual fog areas and their causes. In the second article the distribution in detail and the frequency of fog over the oceans will be given as far as information allows, together with what is known about the relation of wind direction and fog occurrence.

Such matters as visibility scales, fog signals and their vagaries of audibility, and the distinction between fog and mist do not come within the scope of these articles. The occurrence of bad visibility due to other miscellaneous causes such as desert dust haze, volcanic dust haze, smoke haze, flying spray ("spoondrift") are also not referred to.

General Remarks.—Fog consists of minute water droplets in suspension in air, but the actual water content of the densest fog is much smaller than might be supposed. During the investigation of the U.S. cutter *Seneca* over the Grand Banks of Newfoundland in May, 1915, a fog which restricted visibility to 100 feet was found by measurement to contain 20,000 droplets per cubic inch. Nevertheless, a section of air 100 feet long, 6 feet high and 3 feet wide under these conditions was found to contain less than one-seventh of a glass of liquid water, distributed among 60 thousand million drops. Furthermore, it was shown that in the thickest fog met with in this notoriously foggy region only 8 per cent. of the water in the atmosphere was condensed into liquid form.

Three essentials are necessary for fog formation, dust, moisture in the air and some cooling process of the air and many meteorological conditions therefore enter into the matter. Atmospheric pressure, temperature, humidity, dust content of the air and wind force are the chief factors. Fog is an unstable phenomenon and a delicate balance of factors is necessary to produce it, though in suitable conditions it may be very persistent. W. E. HURD, in his article on "Fog at Sea," written for the U.S. Pilot Charts, says:—"Fogs seem to cover the sea upon the slightest of physical provocations, while as readily they disappear. A temperature fall of 2 degrees Fahrenheit is often sufficient to produce a fog, a corresponding rise, to dispel it. A simple example of this dispelling action has been doubtless observed by many a seaman on the deck of his vessel. The craft being in dense fog, the air temperature over it is likely to be slightly higher than at the corresponding height above the sea. In this higher temperature it will frequently be seen that the fog has thinned considerably." Sometimes the balance is so delicate that fog has been seen to thicken, dissipate and even disappear in unchanged conditions of dew-point, temperature and wind, as shown by instrumental observations.

As stated above, some kind of dust must be present in the atmosphere to act as nuclei for the condensation of the droplets of water. This subject is too technical to consider here in detail, but it is probable that the chief substance comprising such nuclei is common sea salt present in the air in finely divided state, assisted also by ordinary dust of all types and smoke particles, which, while much more numerous over land areas, are by no means lacking even in the open ocean owing to dispersion by the winds.

The Modes of Formation of Fog at Sea.—It must not be supposed that our knowledge of the modes of formation of fog at sea is complete. It is a difficult and complex subject. The first scientific investigation of the causes of sea fog, using upper air observations, was that undertaken by G. I. TAYLOR as part of the work carried out by S.S. *Scotia* in the Newfoundland area in 1913, as a result of the loss of S.S. *Titanic* by ice in the previous year, and this was followed two years later by the *Seneca* expedition already mentioned.

Five modes of formation of fog in the open sea will be referred to in the present article, but it is possible that others also exist:—

(i) Fog formed during the passage of air over water which is cooler than the air.

(ii) Fog formed during the passage of air over water which is warmer than the air.

(iii) Fog caused by the mixing of two air currents of different temperatures.

(iv) Fog formed at the warm front of a cyclonic depression.

(v) Fog formed in connection with hygroscopic sea salt at relatively low humidities.

This classification brings out the great importance of wind in fog formation at sea, as opposed to typical land fog (radiation fog), which normally takes place in the presence of calm or very light winds. We will now briefly consider the above five types in order.

Fog formed by the passage of warm air over cooler water may be described as normal sea fog. It is much the most frequent kind and it has been estimated that about 80 per cent. of all sea fogs are produced in this way. As a typical example the fog of the Grand Banks may be given, but it should be noted that fogs produced in other ways may occur in that region. For details of the way in which this fog is formed, with examples, reference should be made to Mr. KEETON'S article. Briefly stated, the moist relatively warm air is cooled to the dew-point, but the process is complex and depends on turbulence or eddy motion in the lowest layers of the atmosphere due to the friction of the sea surface. Layers of air of different temperatures and humidities are thus brought together and mixed. There is always a temperature inversion above a region of fog so produced. The fog may be extremely shallow or may reach as high as two or three thousand feet above the sea surface. It should be noted that the warm air necessary to the process may have more than one kind of origin. It may be warm air blowing off the land, "continental air," or it may be air which has been warmed in its passage over a warm sea current, such as the Gulf Stream, or again it may be air of tropical origin coming from lower latitudes. Normal sea fog is in general most frequent in the spring and early summer, when the neighbouring land masses are becoming rapidly warmed, so that sea temperature lags behind that of the air. Hence sea fogs may normally be regarded as summer fogs, though fog formed in other ways may occur in winter. This mode of formation is least frequent in winter when the air temperature is normally lower than that of the sea.

Normal sea fog is often very local in character and may exist in streaks or patches, as, for example, where offshoots from the cold Labrador current penetrate the region of the Gulf Stream, forming lanes of cold water between areas of warmer water. Apart from such a case it has been observed that this type of fog tends to lie in dense banks with clearer intervals between when the winds are light. This is the case, for example, in the fogs of the Norwegian Sea and Scandinavian coast, where the fog banks tend to extend at right angles to the direction of the wind.

We now come to the second method of fog formation, where the temperature of the air is lower than that of the sea. This method of formation is not infrequent in suitable localities and seasons but, as stated above, it is of far less importance than normal sea fog. This method of formation was referred to in Mr. KEETON'S article, but is by no means fully understood. The most favourable circumstances occur with air extremely cold and with light winds, and fog formed in this way is most frequent in the open sea near the edge of the polar ice. The appearance of this type of fog is that of mist rising from the water, just as if it were boiling. In extreme cases the mist may rise in such clouds as to resemble the smoke clouds of conflagration. Fog of this type has been observed in temperate latitudes, chiefly, as regards the Atlantic Ocean, in the Bay of Fundy and its neighbourhood. It has also been observed in the Baltic Sea and in the English Channel. While it occurs normally during light winds it has also been observed after a blizzard when the wind was still high. It occurs in the Norwegian Fjords and is there called "Frost Smoke." It has been observed both in the Arctic and Antarctic regions and is then generally referred to as "Arctic Smoke." In such cases, and also in the Norwegian Fjords, the fog consists of ice crystals. TAYLOR observed three cases of fog in the Newfoundland region with air temperature slightly cooler than that of the sea. The following examples are taken from ALLINGHAM'S "Marine Meteorology," 3rd Edition:—

"On 27th January, 1898, in 38° N. lat., 60° W. long., the four-master *Buckingham*, Captain SCOTT, had air temperature of 43° F. and sea temperature of 69° F. The latter had risen 17° F. in four hours. A heavy fog, just like steam condensing from boiling water, rose from the sea surface. During part of the time the lower part of the mizen-mast was not visible from the poop. A similar formation of fog was noticed at Halifax, N.S., by the steamship *Minia* on 14th December, 1898, when the air temperature was 8° F. and the sea 33° F. A very dense fog prevailed for about 3 feet above the water. Sitting in an open boat the moisture was deposited on the clothes in the form of fine snow. The weather was fine and clear."

Fog caused by the mixing of two air-currents at different temperatures occurs occasionally. Thus on 14th February, 1923, the convergence of cold easterly winds from high-pressure areas over north-western Europe and warm moist westerly winds from a depression centred to the north-west of the British Isles gave fog over the eastern part of the English Channel and adjacent land areas. In such a case where extensive air-currents exist the fog will be more or less uniform, but where the mixing fog is due to more local air currents it may be streaky, with irregular tongues and patches.

Fog is sometimes, though not generally, formed at the warm front of a cyclonic depression. For an explanation of the warm front reference should be made to Chapter IX of WIRELESS AND WEATHER, AN AID TO NAVIGATION. A deterioration in visibility usually accompanies the passage of a well-marked warm front and occasionally just sufficient mixing occurs between the warm air and the cold air to produce surface fog at the line of meeting. As the production of rain is the normal accompaniment of the passage of the warm front, rain or drizzle may fall through fog formed in this way. Fog at the warm front of a depression is thus likely to be occasionally experienced in certain regions, for example, in the temperate latitudes of the North Atlantic and in the Roaring Forties. As an example the following particulars are taken from entries in the meteorological log of S.S. *Port Darwin*, Captain I. R. SAWBRIDGE, London to Melbourne. On 27th and 28th February, 1927, the ship encountered a depression, the D.R. position at noon on the 27th being Latitude 48° 13′ S., Longitude 46° 30′ E. Mist was recorded at 4 and 8 a.m., A.T.S., with wind of force 4; fog was recorded at noon, 4 p.m., 8 p.m. and midnight with wet air, and at midnight rain in addition. The wind increased throughout the day to force 7 at midnight. The cold front of the depression passed the ship at 4.40 p.m. on the 28th, with the usual line-squall phenomena, and no fog or mist was seen afterwards. It should be noted that the warm front fog is really a special case of the fog described in the previous paragraph, both types being caused by mixing of two distinct air-currents.

A high relative humidity of the air is an essential condition of fog formation, but generally speaking fog is not a condition of complete saturation of the air. F. W. PROCTOR in his study of the summer fogs of Buzzards Bay, Massachusetts, states that a relative humidity of 100 per cent. was shown only in two fogs out of 54 observed during two seasons. Exceptional cases of fogs with relatively low humidities have been observed. The fifth of the methods of formation of fog at sea given in the present article depends on the fact, ascertained by Dr. J. S. OWENS, that particles of sea salt, as actually present in the air over or near the sea, are so hygroscopic that they become drops of liquid in air which has a humidity of only 75 per cent. Fogs may be caused by this process in circumstances which do not appear likely to produce fog. Fogs formed in this way have been observed by Dr. OWENS on the west coast of Spain and they also occur on the North-West Indian Coast, for example in the neighbourhood of Karachi. The following examples are quoted by Sir NAPIER SHAW in his "Manual of Meteorology," Volume II, in this connection.

"Walfisch Bay to Orange River. A thick haze generally hangs over the whole of this coast during the early part of the day, particularly at the distance of from four to six miles off-shore; but it generally clears off about 3 or 4 p.m. The breakers on the beach are frequently seen under the haze, while the land is barely discernible.

"There is no rain during the Southerly winds, but generally very heavy dews at night, with occasionally a very dense fog, with

large drops of dew-like heavy rain. A thick fog-bank on the Western horizon, with a well-defined line between it and the sky, is a sure indication of a strong Southerly gale. (Africa Pilot, Part II, Sixth edition, 1910, p. 327.)

" Caribbean Sea. A peculiar phenomenon which has spread over the whole Caribbean from Barbados to St. Kitts and extending South almost to Demerara has been the prevalence of a low-hanging mist which has shut off the horizon. For some time the idea prevailed that it was due to volcanic eruption, but this was removed by the reports from vessels arriving, and from advice from the neighbouring islands.

" Captains trading in these waters for years state that they have never before experienced such continued low visibility at this time of the year. No scientific explanation of the phenomenon has yet been offered. (Barbados Advocate, May 23, 1929.) "

We will conclude this section by a few remarks on the formation of coastal fogs. Fogs in narrow and coastal waters may be either sea fogs formed in one of the above-mentioned ways or land fog which drifts over the sea. There are also true coastal fogs, in which the coast-line assists the formation. The most common cause of true coastal fog is the blowing of warmer air from the sea over the colder air on the coast after a spell of cold weather. Another cause which operates in certain localities is the mixing of warm and cold sea currents near the coast owing to the cold under-current being forced to the surface in passing over shoals or in approaching the coast. The fifth method of fog formation referred to above in which the salt particles become hygroscopic at relatively low humidities is perhaps mainly a coastal fog, the air becoming heavily charged with salt owing to the breaking of swells on rocky shores.

Drift Fogs.—Fog formed in any way at sea may be carried by the wind into regions where fog would not directly form and where its presence would be otherwise inexplicable. Such fog banks may sometimes drift to a considerable distance from the region of their origin. Examples of drift fogs are given in Mr. KEETON'S article. They may cover an extensive area or be small and patchy.

Dispersion of Fog.—It is often impossible to know what cause is responsible for the clearing of a fog. A ship may pass out of a bank of fog or a bank drifting with the wind may have left the ship, or again the fog may actually dissipate by evaporation. We have seen that sea fog may disappear without observable change in instrumental readings. It might also be supposed that fog which has been formed by the passage of warm air over cooler water would be dissipated when blown by the wind over adjacent warmer water. TAYLOR'S observations however showed that fog blown over warmer water does not always disappear and it may be that the second method of fog formation given above, the passage of cool air over warmer water, comes into operation and so prevents the dissipation. He however observed one or two cases where a change of wind direction, by which the fog was blown over warmer water, caused it to evaporate. The chief cause of the evaporation of fog is probably an increase of wind force and this will be referred to in the next paragraph.

Fog and Wind Force.—There has been considerable discussion as to the strength of wind most conducive to fog formation, other factors being similar. We have seen that mixing of the air by turbulence is an essential part of the process of formation of normal sea fog and this mixing is undoubtedly facilitated by light winds. Winds of forces 2 to 4 are generally considered as being most favourable for the thorough mixing of the layers of air over the sea. Winds of gale force in general act as dissipators of fog. In this connection TAYLOR derived some interesting results. Out of 141 fogs observed the greatest number was 46 with wind of force 3, below force 3 he observed 53 fogs and above force 3 42 fogs. Of these 26 were with force 4, 12 with force 5, three with force 6 and one with force 7. On July 14th, 1913, a fog which was present at 2 a.m. with wind force 2 disappeared later with wind forces 5 and 6 and reappeared in the afternoon with wind forces 3 and 4. From his upper air observations TAYLOR found that the degree of wind necessary to cause evaporation of fog depends on the height of the fog. Thus wind of force 5 was sufficient to dissipate a fog 750 feet high, but a wind of force 6 was not sufficient to dissipate a fog 2,000 to 3,000 feet high.

In a paper by the Deutsche Seewarte published in 1904 the results of an investigation of the frequency of fog with winds of different strengths are given and Tables 1 and 2 are taken from this source.

TABLE 1.

FREQUENCY OF FOG WITH DIFFERENT WIND STRENGTHS.

——	Beaufort Wind Force.										
	0	1	2	3	4	5	6	7	8	9	10
	Frequency of Fog in Percentages.										
Rügenwaldermünde (Baltic)	9·2	27·7	21·3	22·9	12·1	6·3	3·7	2·1	0·5	0·2	—
Helder (North Sea) ...	2·3	70·2	13·7	7·1	3·8	2·1	0·5	0·1	0·1	0·1	—
Scilly Islands	1·6	14·8	16·7	24·9	26·7	12·0	2·8	0·4	0·1	—	—
N. Atlantic Ocean (Latitude 40°–50° N., Longitude 10°–70° W.)	7·3	7·4	14·2	20·2	19·8	15·5	8·8	4·1	1·7	0·6	0·4

The number of observations on which Table 1 is based is not stated but it will be seen that the most favourable wind force shown for fog in the North Atlantic Ocean is the same as that found by TAYLOR for the Newfoundland region, force 3.

TABLE 2.

SEASONAL RELATION OF FOG TO WIND STRENGTH. (PERCENTAGES.)

North Atlantic Ocean, Latitude 40° to 50° N.

Longitude.	Beaufort Wind Force.					
	0–3	4–7	8 and over.	0–3	4–7	8 and over.
	October to March.			April to September.		
10°–30° W.	46·1	49·3	4·6	50·4	48·2	1·4
30°–50° W.	32·4	58·8	8·8	42·7	54·8	2·5
50°–70° W.	36·8	55·6	7·6	59·0	40·0	1·5

In Table 2 we have the relation of fog to wind strength for the summer and winter half-years set out separately for eastern, central and western longitudes of the North Atlantic Ocean. It will be seen that in mid-ocean throughout the year the percentage of fog with wind of forces 4-7 is larger than that with forces 0-3, there being a greater difference for the winter half-year. In the eastern and western parts of the ocean the percentage with forces 4-7 is also greater than that with forces 0-3 during the winter half-year but is distinctly less during the summer half-year. Tables 1 and 2 also show that a small but definite percentage of fogs have been recorded with wind forces 8 or more.

Meteorological logs of British ships contain observations of fog in conjunction with relatively strong winds. Six examples are given below, three in the North Atlantic Ocean and three in the Southern Ocean. These were selected at random and it is possible that a more extended search would reveal cases of stronger winds with fog. Fog was experienced by S.S. *Graciana*, Captain J. T. YEOMAN, Dundee to Philadelphia, almost continuously on the 3rd to 6th June, 1922. At 4 a.m. on 5th June the wind increased to force 7 W.S.W., without dissipation of the fog (visibility 0-2) and was still blowing force 6 with fog at 8 a.m. Ship's D.R. position at noon on the 5th was Latitude 44° 24′ N., Longitude 57° 48′ W. From 4 a.m. to 4 p.m. on June 12th, 1921, S.S. *Bosworth*, Captain A. STEWART, London to Montreal, had fog with S.S.W. wind of force 6, the D.R. position at noon being Latitude 46° 24′ N., Longitude 56° 53′ W. At 4 p.m. on June 22nd, 1923, S.S. *Bolingbroke*, Captain A. H. SARGENT, Antwerp to Montreal, had fog (visibility 1) with wind N.W. by W. of force 6, which disappeared when the wind later increased to force 9.

Of the Southern Ocean examples, that of S.S. *Port Darwin* has been given above in connection with fog formation. On February 21st, 1928, T.S.S. *Pakeha*, Captain W. P. CLIFTON-MOGG, R.N.R., London to Melbourne via the Cape, observed that fog formed and

disappeared several times, rain being also intermittent during the day. Fog (visibility 2) was present with rain at noon, the wind being N.N.W. force 7. Poor visibility (5) was present with drizzle at 4 p.m., the wind being N.N.W., force 8. Ship's D.R. position at noon was Latitude 47° 55′ S., Longitude 97° 21′ E. On July 10th, 1924, S.S. *Port Sydney*, Captain W. H. Lea, Dover to Melbourne, experienced mist (visibility 4) with rain at noon, the wind being N.W. by W., force 6. At 4 p.m. the visibility had decreased to 2, the wind remaining at W.N.W., force 6.

W. E. Hurd in the article previously referred to quotes three interesting cases of fog with high winds, which are reproduced here.

"On the 4th and 5th of April, 1926, the American S.S. *Wheatland Montana* was near Latitude 47° N., Longitude 170° to 172° E., on the North Pacific Ocean. During a whole south-east gale, which changed to a south-west hurricane, she experienced frequent sleet and snow squalls, accompanied by banks of persistent passing fog which had not been present in advance of the gale. During the great norther which overspread the Gulf of Mexico on the 12th and 13th of February, 1899, the cold northerly air current, which was of strong gale to hurricane force over an extensive area, while accompanied by rain and hail throughout much of the central and western Gulf, also in places brought up considerable and long-continued banks of fog. Similarly, on December 19 and 20, 1924, also during a heavy norther, the bays outside of Corpus Christi, Tex., were covered with dense fog, driven by the strong gale and caused by the continued though rapid contact of the chilling winds with the warm surface water. In September, 1911, the Dutch S.S. *Zaandijk*, Pentland Firth to Cape Race, steamed through a thick fog, 'with strong gale blowing from south-south-east for a few hours at the start of a hurricane.'

"From the 16th to the 30th of October, 1926, there existed in the North Atlantic Ocean the powerful West Indian Hurricane which devasted Habana on the 20th, passed thence to the eastward, and during the week of the 23rd to 29th described an extensive and most remarkable loop in mid-ocean. The Dutch S.S. *Alcor*, Rotterdam to Norfolk, encountered the storm at the easternmost portion of its loop at noon of the 24th, in Latitude 37° 08′ N., Longitude 43° 11′ W. At 8 a.m. of the 25th, quoting from the report of the second officer, Mr. E. Mulder, the weather conditions were: 'Barometer 29.35 in., wind N.W. by N., force 9, overcast, rain and fog, and a very high sea. At noon, barometer 29.19 in., wind N.W., force 10, heavy rain and fog.' This unusual appearance of a fog in a tropical storm, driving in a gale over a part of the ocean well below the average southern limit of fog for any part of the year in this longitude, is worthy of special record. Whether the fog was caught up in the whirl from a place of formation in higher latitude, or whether it formed by reason of conditions within the gale itself, is not apparent from any observation at hand.

"These casual instances sufficiently prove that dense fog can persist, and even form, in the very teeth of a tempest, whether in harbour or in open sea."

The General Distribution of Fog at Sea.—Generally speaking, fog decreases in frequency from the polar regions towards the equator and fog, apart from coastal fog, is rarely seen at sea between the parallels of 30° N. and S. We have seen that the main cause of sea fog is the passage of warm air over cooler water and these conditions do not usually occur in equatorial regions owing to the high sea temperatures prevailing there. Sea fog is therefore infrequent and light. From an examination of 265,304 days' observations in ships' logs Maury found that the foggiest latitudes between 60° N. and S. were between the parallels of 45° to 50° N. and between those of 50° and 55° S. He also determined the frequency of fog in Latitude 45° to 50° N. or S. compared with that in Latitude 5° N. to 5° S. to be in the proportion of 102 to 1. It it interesting to note that he found the corresponding figures for gales to be practically the same, 103 to 1. The polar regions are particularly foggy during the summer months when the warmer winds from temperate regions reach more northerly latitudes and blow over colder water or over the ice.

In those parts of the oceans normally traversed by shipping the two outstanding foggy areas are the Grand Banks of Newfoundland and a similar region in nearly the same latitude off the Pacific Coast of Northern Asia, between the Aleutian and the Kuril Islands.

Individual Fog Areas.—We shall conclude the first article by referring to some markedly foggy areas, indicating the chief causes of the fog experienced in them.

(i) The Newfoundland Banks. The cold Labrador current maintains very low sea temperatures in this region and to the northward of it, both because of the cold water comprising the current and the icebergs carried by it. In summer this area is surrounded on three sides by warmer regions, on the west by the American continent and on the east and south by the warm water of the Gulf Stream. Winds therefore from any of these directions blowing on to the cold water of the Banks produce fog, which in the summer months occurs on over 50 per cent. of the days. Fog does not penetrate inland in Newfoundland to any appreciable extent. The prevailing early summer winds here are south-westerly and consequently warm. Another very prominent cause of the fogs of this region is the S. or S.W. wind related to the advance of a depression. Proctor points out that the fog when charted monthly shows as "a few separate areas which from time to time extend and contract their limits, but which tend to be persistent over certain definite regions, viz., over the Banks of Newfoundland, the Sable Island Banks, Georges and Nantucket shoals, and along the United States coast southward. These loci of maximum fog occurence are all in the comparatively shoal waters inside the 100-fathom curve, and are divided from one another by arms of deeper water extending shoreward from the adjacent ocean deeps."

(ii) The fog of the corresponding Pacific Ocean area referred to in the preceding paragraph and lying to the south-west of Kamchatka is of similar origin and here also the frequency of fog exceeds 50 per cent. of summer days.

(iii) On the New England coast, especially from Cape Cod northward there exists in the late spring and early summer a marked temperature contrast between air and water which causes much fog in this region.

(iv) On the United States Atlantic coast, generally, there is a considerable amount of fog which has been ascribed to the temperature difference between the Gulf Stream and the cold southward-flowing current between the Gulf Stream and the coast.

(v) Summer fog conditions occur along the west coast of North America where the Californian Current produces low sea temperatures. The percentage of foggy days is as much as 25 in the summer months.

(vi) In the Gulf of Mexico cold air reaching the southern part of the Gulf in the form of northers cools the warm humid air which prevails there, giving fog.

(vii) An investigation carried out in the Marine Division of the Meteorological Office on the fogs of the South Atlantic Ocean showed that a very large majority of the observed fogs occurred with northerly winds and with air warmer than the sea.

(viii) The coastal fogs of the North Sea, for example at Yarmouth, are mostly of the winter land type. The north and west coasts of the British Isles have summer maxima of true sea fogs. A line from Scilly to Leith roughly separates these regions.

(ix) The fogs of the Scandinavian Peninsula in summer are due to the flow of warm continental air westward over the cooler water of the sea.

(*To be continued.*)

WEATHER SIGNALS.

I.—SHIPS' WEATHER SIGNALS.

With reference to the Voluntary Scheme of communication for British "Selected Ships" Routine Wireless Weather Telegraphy, Trial to commence 1st May, 1930, given on pages 22-24, Volume VII, No. 73, MARINE OBSERVER, the list below gives information of those stations which have been detailed, up to the time of going to press, to receive on C.W., reports from **A Selected Ships**, and Chart IV herewith illustrates this, also spark stations which may intercept reports from **B Selected Ships**, addressed to **CQ**.

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

Request for Information.

THE ATTENTION OF METEOROLOGICAL SERVICES IS INVITED TO THE INVITATION GIVEN ON PAGE 14 OF VOL. VII, No. 73, JANUARY MARINE OBSERVER.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
North Atlantic and North Sea.	Portishead.	Lat. 51° 28′ 41″ N. Long. 2° 47′ 30″ W.	GKU.	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	Eastern North Atlantic and North Sea to about 1,500 miles from Station, but not within 300 miles of station (see Chart IV).	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 0430 and 1030 G.M.T. Roll call thus—Weather begins—Call signs of chosen "Selected Ships"—Weather ends.
Mediterranean and Red Sea.									
South Atlantic.									
Indian Ocean.									
North Pacific.									
South Pacific.									

II.—WIRELESS WEATHER SIGNALS.

WIRELESS WEATHER BULLETINS.

The method of decoding station weather reports made in code from shore stations intended for shipping was described in the British "Weather Shipping" Bulletin, on page 52 of Volume VII, No. 74. (The February, 1930 Number.)

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

SWEDEN.

North Sea and Baltic.

C.W. Issues.

Karlsborg W/T station, Latitude 58° 29′ N., Longitude 14° 29′ E. (approx.), call sign **SAJ**, broadcasts weather bulletins for shipping, daily as follows:—

at 1050 G.M.T. and at 2200 G.M.T. } Wavelength 4,275 metres (C.W.).

The bulletins are similar in arrangement to the British "Weather Shipping" message which was explained in Vol. VII, No. 74, pp. 51-2, of this Journal. **The two bulletins combined provide complete weather information in a simple form for the coasts of N.W. Europe, and on this account are strongly recommended to Mariners.**

The 1050 G.M.T. bulletin is based upon observations made at 0700 G.M.T., and that broadcast at 2200 G.M.T. upon observations made at 1800 G.M.T.

The bulletins commence with the words "Weather Report," and are divided into five parts.

Part I, in code.

Contains observations made at nine Swedish and four Danish and Norwegian coast stations (*see* following List) and from ships in the North Sea.

Coast Stations' observations are broadcast in two five-figure groups for each station*.

List of Observation Stations.

Index Number.	Station.	Position (approx.). Latitude N.	Longitude E.
2	Bjurö klubb	64° 28′	21° 34′
3	Holmögadd	63° 35′	20° 45′
4	Bremö	62° 13′	17° 44′
5	Örskär	60° 31′	18° 22′
6	Sandhamn	59° 17′	18° 55′
7	Visby	57° 39′	18° 18′
8	Skanör	55° 24′	12° 49′
9	Kullen	56° 18′	12° 27′
0	Vinga	57° 38′	11° 36′
1	Hammeren	55° 17′	14° 47′
2	Hanstholm	57° 07′	8° 36′
3	Utsire	59° 18′	4° 53′
4	Kinn	61° 34′	4° 47′

Observations from ships in the North Sea follow the Coast Stations' reports*.

Part II, en clair (English).

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

Part III, en clair (English).

Weather forecasts for 12 hours for the following areas:—

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

* No information is available up to time of going to press as to changes of Key Letters or Code, following the Conference of Safety of Life at Sea, 1929, and the International Meteorological Conference at Copenhagen, 1929.

Part IV, en clair (English).

Gale warnings for areas 2, 3 and 4 (above) for particulars, *see* p. 72.

Part V.

Navigation and Ice Warnings.

GERMANY.

North Sea.

Spark Issues.

Norddeich W/T station, approximate Latitude 53° 36′ N., Longitude 7° 08′ E., call sign **DAN,** broadcasts on a wavelength of 750 metres spark, at 1015 and 2130 G.M.T. weather bulletins, *en clair*, containing the 0700 and 1800 G.M.T. observations, respectively, of wind direction and force, state of the sea, clouds, rain, mist, fog, etc., of the following stations:—

	Latitude (approx).	Longitude (approx.).
Borkum Riff Light vessel	53° 45′ N.	6° 04′ E.
Amrum Bank Light vessel	54° 33′ N.	7° 53′ E.
Utsire	59° 18′ N.	4° 53′ E.
Tynemouth	55° 01′ N.	1° 25′ W.

followed by information concerning atmospheric pressure, and a 12 hours' weather forecast for the North Sea.

Western and Middle Baltic.

I.C.W. Issues.

Swinemünde W/T station, approximate Latitude 53° 55′ N., Longitude 14° 16′ E., call sign **DAS,** broadcasts on a wavelength of 715 metres, I.C.W., at 1030 and 2145 G.M.T. weather bulletins *en clair*, containing the 0700 and 1800 G.M.T. observations, respectively, of wind direction and force, state of the sea, etc.—as for Norddeich, of the following stations:—

	Latitude (approx.).	Longitude (approx.).
Bülk	54° 27′ N.	10° 12′ E.
Adlergrund Light vessel	54° 50′ N.	14° 22′ E.
Skagen	57° 45′ N.	10° 38′ E.
Visby	57° 39′ N.	18° 18′ E.

followed by a general review of the weather, and a 12-hour forecast for the western and middle Baltic.

Eastern Baltic.

I.C.W. Issues.

Pillau W/T station, approximate Latitude 54° 39′ N., Longitude 19° 53′ E., call sign **DBP,** broadcasts on a wavelength of 740 metres, I.C.W., at 1130 G.M.T., a weather bulletin, *en clair*, containing the 0700 G.M.T. observations of wind direction and force, state of the sea, etc., as for Norddeich, of the following stations:—

	Latitude (approx.).	Longitude (approx.).
Pillau	54° 39′ N.	19° 53′ E.
Brusterort	54° 56′ N.	19° 56′ E.
Memel	55° 42′ N.	21° 10′ E.
Visby	57° 39′ N.	18° 18′ E.

This bulletin also contains a general review of the weather, and a forecast for the eastern Baltic.

WIRELESS STORM WARNINGS.

SWEDEN.

Baltic.

C.W. Issues.

Karlsborg W/T station broadcasts warnings, *en clair*, English, of strong winds or gales for the following areas:—

(*a*) Sweden, West Coast (Skagerrak, Kattegat and the Sound).
(*b*) Baltic (Southern Baltic; South Skane, Bleking and Oland; Northern Baltic; East Gotaland, Svealand and Gotland).
(*c*) Gulf of Bothnia (Bothnia Sea; Bothnia Bay).

The warnings commence with the words " Gale Warnings " and are valid for the ensuing 24 hours. They form Part IV of the weather bulletins broadcast by **Karlsborg W/T** at 1050 and 2200 G.M.T., explained on p. 71.

GERMANY.

North Sea.

Spark Issues.

Norddeich W/T station, call sign **DAN,** broadcasts storm warnings, for the North Sea, on 600 metres, spark, on receipt, twice in succession. Warnings are also broadcast on 750 metres, spark, at 0515, 1015 (after the weather bulletin), 1630 and 2130 (after the weather bulletin) unless previously cancelled. All times are G.M.T. Warnings broadcast *en clair* and preceded by the word " Funksturm."

The Warnings will contain information as to the type of disturbance, together with the direction and force of the wind.

Western and Central Baltic.

Spark and I.C.W. Issues.

Swinemünde W/T station, call sign **DAS,** broadcasts storm warnings for the coast from Flensburg to Leba, preceded by the word " Funksturm " on 600 metres, spark, on receipt, three times successively. Warnings are also broadcast on 1100 metres I.C.W. at 0530, 1030 (after the weather bulletin), 1650 and 2145 (after the weather bulletin) unless previously cancelled. All times are G.M.T. Warnings broadcast *en clair.*

The warnings are also broadcast on request.

Eastern Baltic.

Spark and I.C.W. Issues.

Pillau W/T station, call sign **DBP,** broadcasts storm warnings for the Eastern Baltic, preceded by the words " Storm Warnungen für die Ostliche Ostsee " on 600 metres, spark, on receipt. Warnings are also broadcast on 740 metres, I.C.W., at 1130 G.M.T. (after the weather bulletin) and on request.

HOLLAND.

North Sea.

I.C.W. Issues.

Scheveningen W/T station, Latitude 52° 06′ N., Longitude 4° 16′ E. (approx.), call sign **PCH,** transmits storm warnings on receipt and following the end of the next compulsory silent period, both in Dutch and English, and also at 1230 and 2030 G.M.T. Wavelength used is 600 metres (I.C.W.).

The warnings are transmitted, first at the rate of 15 words per minute, and then repeated twice, quickly.

NOTE.—If the storm warning is sent on request a charge will be debited to the ship concerned.

WIRELESS ICE WARNINGS.

Sweden.

Swedish Ice Breaker.

I.C.W. and R/T Issues.

The Swedish Government ice breaker, call sign **SBLN** broadcasts information in **English** on a wavelength of 600 metres (I.C.W.), giving her position, proposed area for ice breaking and rendering assistance during the ensuing 12 hours. Important local information for mariners will also be broadcast.

The message is broadcast daily, during the time the vessel is employed on ice-breaking service, at 0800 and 1045 G.M.T. on weekdays and at 0800 and 1210 G.M.T. on Sundays.

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

Denmark.

Danish Waters.

Spark Issues.

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

Blaavand W/T station, approximate Latitude 55° 33′ N., Longitude 8° 05′ E., call sign **OXB,** at 0100 and 1300 G.M.T.

Copenhagen W/T station, approximate Latitude 55° 41′ N., Longitude 12° 37′ E., call sign **OXA** at 1100 and 2300 G.M.T.

Ice Breakers.—The Danish Government's ice breaker *Isbjorn* (call sign **OXP**) listens continuously. No charge is made for this service.

Germany.

North Sea and Baltic Sea Areas.

C.W. Issues.

Norddeich W/T station, approximate Latitude 53° 36′ N., Longitude 7° 08′ E., call sign **DAN,** broadcasts ice information daily during the winter at 0950 G.M.T. on a wavelength of 2,440 metres, C.W., in the following code:—

JJ′ JJ′ JJ′ JJ′ JJ′ JJ′ JJ′ JJ′ JJ′

Sub-groups 1 2 3

Main Group AA &c., &c.

J = Ice Conditions. J′ = Effect on Navigation.

Code Figure.	Ice Conditions.	Code Figure.	Navigation.
0	No ice	0	Navigation unobstructed.
1	Loose sludge and young ice.	1	Navigation possible for steamers; difficult for sailing vessels.
2	Solid ice	2	Navigation difficult for low-powered steamers; closed to sailing vessels.
3	Drift ice	3	Navigation possible for powerful steamers.
4	Close sludge or bands of packed ice.	4	Navigation possible only for vessels constructed to withstand ice.
5	Lane in the ice parallel to the west.	5	Navigation kept open by ice-breakers.
6	Thick solid ice ...	6	Channel open through the ice.
7	Heavy drift ice ...	7	Navigation temporarily closed.
8	Close packed ice ...	8	Navigation closed.
9	Screwing in the ice...	9	Not known owing to bad visibility.
		X	Not known.

List of Observation Stations.

Main Groups.	Sub-groups.	Area affected.
AA	1	Memel harbour.
		Pillau harbour.
		Königsberg sea canal to Königsberg.
	2	Danzig harbour.
		Stolpmünde harbour.
		Kolberg harbour.
	3	Swinemünde harbour.
		Stettin Bay.
		Stralsund to Thiessow.
BB	1	Off Arkona.
		Barhöft, Bodden.
		Warnemünde, Warnow.
	2	Channel to Wismar.
		Travemünde up to Lübeck.
		Off Marienleuchte.
	3	Off Bülk.
		Friedrichsort, Holtenau to Labö.
		Kiel inner harbour.
CC	1	Rendsburg (Eider).
		Flensburg, Innenförde.
		Ellenbogen and Listertief.
	2	Tönning Eider.
		Cuxhaven, harbour and entrance.
		Off Brunsbüttelkoog (Elbe).
	3	Gluckstadt (Elbe).
		Hamburg.
		Harburg (Elbe).
DD	1	Hoheweg (Weser).
		Bremerhaven (Weser).
		Bremen (Weser).
	2	Wangeroog, Aussenjade.
		Wilhelmshaven, Innenjade.
		Wilhelmshaven entrance.
	3	Borkum, Wester Ems.
		Nesserland, New sea lock.
		Nesserland harbour entrance.
EE (Kaiser Wilhelm Canal).	1	Brunsbüttelkoog: canal road and entrance.
		Canal from Brunsbüttelkoog to Rendsburg,
		Canal from Rendsburg to Holtenau.
		Holtenau: canal road and entrance.

If ice and navigation conditions are the same in one of the main groups, *i.e.* if in group AA all stations are free of ice and navigation unaffected, the following abbreviation will appear in the telegram: AA01.

If conditions are the same in several of the main groups, *e.g.* if in groups BB, CC, DD and EE free of ice, navigation unaffected, the following abbreviation will appear in the telegram: BB, CC, DD, EE 01.

Latvia.

Wireless Telephony (R/T Issues).

The broadcasting station at Riga, Latitude 56° 57′ N., Longitude 24° 07′ E., call sign **YLZ**, broadcasts in winter, on a wavelength of 526.3 metres R/T, ice reports at 0650, 1035 and 2000 G.M.T. The reports contain information concerning ice and navigation conditions for the Latvian coast. They are broadcast in the Latvian, English and German languages.

Holland.

I.C.W. Issues.

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

at 1230 and 2130 G.M.T. after the Storm Warning (if issued).

Wavelength 600 metres (I.C.W.).

The ice report which is broadcast in code will contain the ice conditions for the following harbours:—

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

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

The code consists of two four-figure groups.

The ice information for the harbours is always broadcast in the order given in the foregoing list.

Each code figure therefore gives by its position the navigational conditions existing in the different harbours.

Code.

Code Figure.	Navigational Conditions.
1	Navigation practicable.
2	,, difficult for sailing vessels.
4	,, closed to sailing vessels; but still possible for steamers.
6	,, closed to small steamers and motor vessels.
8	,, closed.

Example.

Ijsbericht, ice report 4611 1111

Meaning.—**Delfzijl.** Navigation closed to sailing vessels; but still possible for steamers.

Harlingen.—Navigation closed to small steamers and motor vessels.

For the remaining localities navigation is practicable.

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

Ice reports are transmitted twice: first at the rate of 15 words per minute, and then quickly.

IV. VISUAL GALE WARNINGS.

Sweden.

Day Signals.	Night Signals.	Explanation.
▲	R / R	Gale (Force 7 to 9) is expected between N. and W.
▼	W / W	Gale (Force 7 to 9) is expected between S. and W.
▲ ▲	R / W	Gale (Force 7 to 9) is expected between N. and E.
▼ ▼	W / R	Gale (Force 7 to 9) is expected between S. and E.
▲ ▼	R	Gale of which the direction is not indicated.
● ▲	R / R	Storm (Force 10 to 12) is expected between N. and W.
● ▼	W / W	Storm (Force 10 to 12) is expected between S. and W.
▲ ●	R / W	Storm (Force 10 to 12) is expected between N. and E.
▼ ●	W / R	Storm (Force 10 to 12) is expected between S. and E.
▲ ▼	R	Storm of which the direction is not indicated.

R = Red. W = White.

Norway.

Day Signals.

Signal.	Meaning.	Signal.	Meaning.
	Indicates that a gale is expected, or is probable from S.W.		Indicates that a gale is expected, or is probable from N.W.
	Indicates that a gale is expected, or is probable from S.E.		Indicates that a gale is expected, or is probable from N.E.
	"Atmospheric disturbance, be alert and look out for further information."		

One flag displayed with any of the above signals indicates that the wind may be expected to *veer* during the gale.

Two flags displayed with any of the above signals indicate that the wind may be expected to *back* during the gale.

Night Signals.

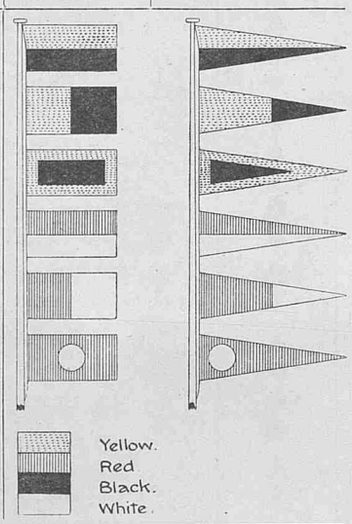
Signal.	Meaning.
Three *white* lights, triangle point up	Gale from N.W.
Three *white* lights, triangle point down	Gale from S.W.
Four *white* lights, triangle point up (one light above)	Gale from N.E.
Four *white* lights, triangle point down (one light below)	Gale from S.E.
One *red* light	"Atmospheric disturbance, be alert and look out for further information."

Denmark.

The system of day gale warning signals in force at Danish ports is the same as that explained for Norway. By night a red light is hoisted in place of any of the day gale warning signals.

Additional Gale Signals.

When a gale is blowing at Blaavands Huk, Hanstholm, the Skaw, Fornæs, Gjedser or Hammeren, the signals below are displayed at Aalborg, Tuborg and Copenhagen. The place and force of the wind, according to the Beaufort scale, are indicated by coloured flags, as follows:—

Place.	Force of the Wind.	
	7–9.	10–12.
Blaavands Huk		
Hanstholm		
The Skaw		
Fornæs		
Gjedser		
Hammeren		

These signals are usually made between 0900 and sunset.

Germany.

Day Signals.

Signal.	Meaning.
	Indicates that a gale is expected, or is probable from S.W.
	Indicates that a gale is expected, or is probable from S.E.
	Indicates that a gale is expected, or is probable from N.W.
	Indicates that a gale is expected, or is probable from N.E.
	Indicates the probability of a gale of which the direction of approach is not indicated.

One flag displayed with any of the above signals indicates that the wind may be expected to *veer* during the gale.

Two flags displayed with any of the above signals indicate that the wind may be expected to *back* during the gale.

Displayed for the benefit of fishing vessels and small craft. It denotes that the wind is expected to increase in strength to force 6–7 (Beaufort scale).

Night Signals.

By night a *red* light is hoisted in place of any of the Day Signals; at certain stations, however, the following signals, known as amplified signals, are hoisted:—

Signal.	Meaning.
Two *white* lights vertical... ...	Gale probable from S.W'd.
Two *red* lights vertical	Gale probable from N.W'd.
A *white* light over a *red* light ...	Gale probable from S.E'd.
A *red* light over a *white* light ...	Gale probable from N.E'd.
One *red* light	Indicates the probability of a gale of which the direction of approach is not indicated.

The *red* light also constitutes a warning to fishing vessels and small craft that the wind is expected to increase in strength to force 6-7 (Beaufort scale).

In addition to the above night signals, storm signals are made at certain stations by searchlight directed towards the sky at an elevation of about 35°, and are repeated in various directions at two-hour intervals, commencing at the first even-numbered hour after dusk.

The day storm signals, indicated by cones, are made by long and short flashes. A short flash of about *three seconds'* duration corresponds with the point of the cone, and a long flash of about

nine seconds' duration corresponds with the base of the cone; thus the day storm signals, indicated by cones, are made as follows:—

One cone point down ▬ ▪
Two cones points down ▬ ▪ ▬ ▪
One cone point up ▪ ▬
Two cones points up ▪ ▬ ▪ ▬
Two cones bases towards each other ▪ ▬ ▬ ▪

The day storm signal, indicated by a red flag, is made by a circular movement of the beam of light on the sky in a clockwise direction.

The day storm signal, indicated by two red flags, is made by a circular movement of the beam of light on the sky in an anti-clockwise direction.

The day storm signal, indicated by a ball, is made by a circular movement of the beam of light on the sky in a direction alternately clockwise and anti-clockwise.

The cone signal is preceded and followed by the flag signal. When no flag signal is made, the cone signal is preceded and followed by the ball signal, indicating that no direction of shift of wind can be given.

The warnings hold good for a distance of about 50 miles from the vicinity of the signal station; they continue in force until the evening of the day following the day of issue.

Holland.

The system of day gale warning signals in force at places on the coasts of Holland is the same as that explained for Norway. Night gale warning signals are similar to those used by Germany with the exception of the *red* light, which indicates "Atmospheric disturbance, be alert, and look out for further information."

Belgium.

The system of day gale warning signals in force at Belgian ports is the same as that explained for Norway.

Night Signals.

At Ostende, Nieuport, Blankenberghe and Zeebrugge, night gale warning signals are made by *red* lights as follows:—

Signal	Meaning.
A triangle of *red* lights	Gale probable from N.W.
One *red* light over a triangle of *red* lights.	Gale probable from N.E.
An inverted triangle of *red* lights ...	Gale probable from S.W.
One *red* light below an inverted triangle of *red* lights.	Gale probable from S.E.
One *red* light over an inverted triangle of *red* lights.	Gale probable, direction uncertain.

Special Notices Regarding Personnel.

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

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

Captain W. H. PARKER, Master of R.M.S. *Olympic* has retired after 48 years service afloat.

He commenced his sea career in 1882 serving his time in the Barque *Loweswater* of Liverpool.

Passing for 2nd mate in 1887, he served as such in Barque *Lobo* and on obtaining his mates certificate served as 2nd mate of the Ships *Jessomene* and *Southern Chief* and as 1st Mate of the Barque *Bells* and Brig *Loge*, also as 2nd and 1st mate of the Barque *Anglo Norman*.

Passing for Master in 1892, Captain PARKER joined the ASIATIC STEAM NAVIGATION COMPANY, but after one year in steamships returned to sail as 1st mate of the Four masted Barque *Cairniehill*.

In 1894 he joined the PACIFIC STEAM NAVIGATION COMPANY as a junior officer and in 1906 when serving as Chief Officer of R.M.S. *Oroya* transferred with the ship to the service of the ROYAL MAIL STEAM PACKET COMPANY when he was promoted to command.

Captain PARKER subsequently commanded several of the R.M.S.P. Co's Fleet and was in April 1927 commanding R.M.S. *Ohio* when that ship was transferred to the WHITE STAR LINE and re-named *Albertic*, Captain PARKER retaining his command. In December of the same year he was transferred to the *Homeric* and in September 1928 to the *Olympic*, the command of which he has recently relinquished on attaining the age limit.

Captain PARKER has also performed considerable Naval Service as an R.N.R. Officer and saw Active Service both during the Boxer rising in 1900 and in the Great War. A member of the Corps of Voluntary Marine Observers, Captain PARKER has given valuable support in the modernizing process to which the work has been subject during post-war years.

Captain T. E. Musgrave.

Captain T. E. MUSGRAVE, master of the R.M.S. *Ceramic*, has retired after 46 years service afloat.

Captain MUSGRAVE was apprenticed to Messrs. EDWARD BATES AND SONS in 1884, serving his time in their full rigged ships trading between the Mersey and Indian and Australian ports.

On passing for 2nd mate he sailed in the Barque *Camana* and on securing his mates certificate, made voyages in the Barquentine *Lenora Troncosa* and the Barque *Trinidad*.

In 1895 Captain MUSGRAVE left sail for steam and after serving for two years with the AFRICAN STEAMSHIP COMPANY transferred to the BEAVER LINE and later to the AMERICAN LINE. When the DOMINION and WHITE STAR LINES entered the combine he was appointed to the WHITE STAR LINE where he rose to command in 1913, his first ship being the *Cufic*. Since then Captain MUSGRAVE has commanded several of the WHITE STAR FLEET including *Celtic*, *Laurentic*, *Arabic* and *Ceramic*. He has been a member of the Voluntary Corps of Marine Observers since 1920.

Marine Observers join with the Marine Division in wishing these Officers long life and happiness in their retirement.

Captain P. G. Shilston, R.D., R.N.R.

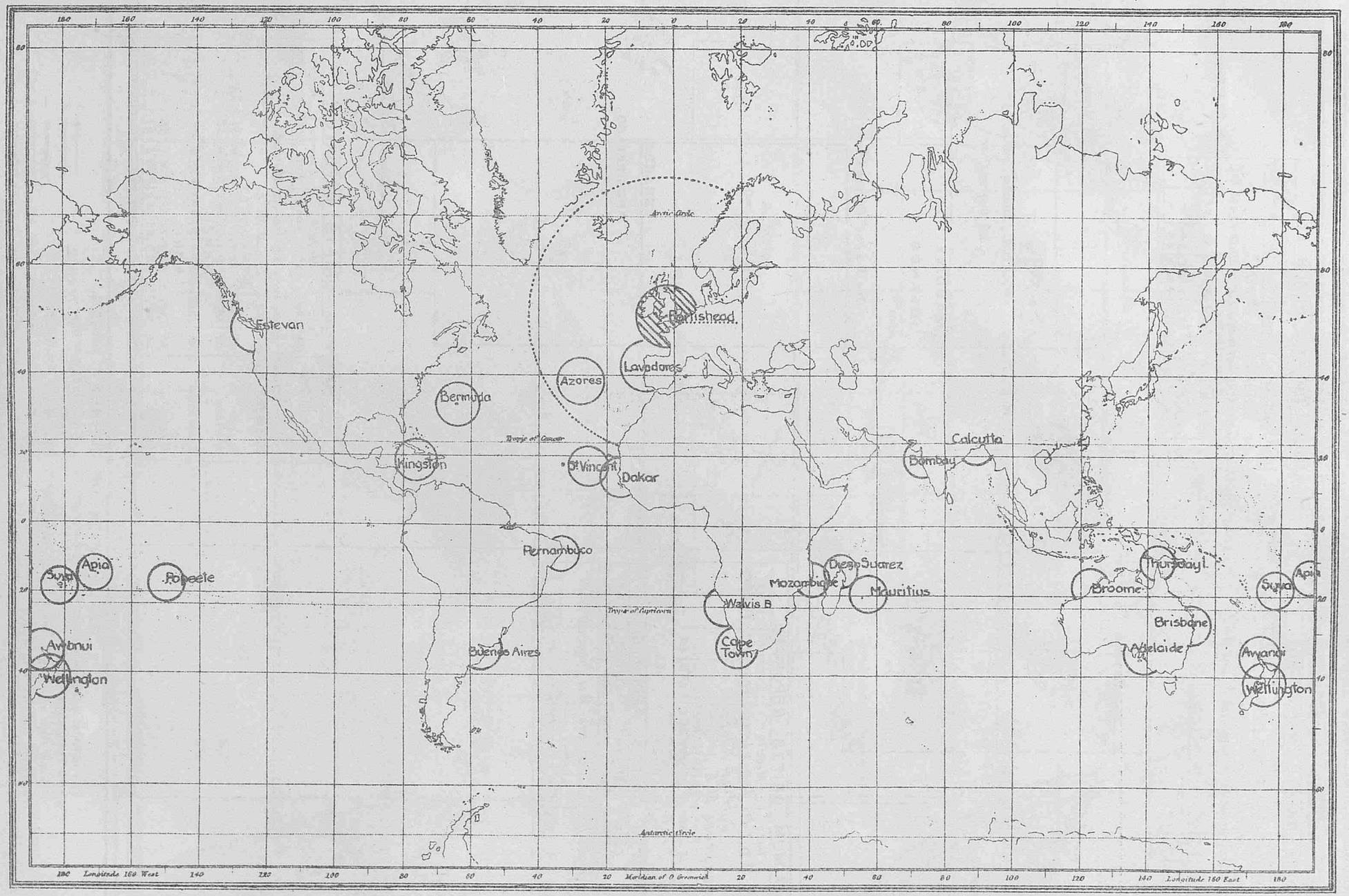
Captain P. G. SHILSTON of the UNION CASTLE STEAMSHIP COMPANY has retired from active service afloat owing to ill health, after 44 years sea service, of which 35 years were spent in the service of the UNION CASTLE LINE.

Joining the Cadet Ship *Conway* in 1884, Captain SHILSTON commenced his apprenticeship two years later in the Liverpool firm of Messrs. MCDEARMID and GREENSHIELDS, remaining with them until 1891 when he joined the B.I.S.N. Company. In 1895 he transferred to the old UNION STEAMSHIP Company which later amalgamated with the CASTLE LINE. Captain SHILSTON passing through the different grades obtained his first command in 1914, and has commanded several of the UNION CASTLE LINE Fleet, his last ship being the *Saxon*.

He was a member of the Corps of Voluntary Marine Observers, who join with the Marine Division in wishing Captain SHILSTON a speedy recovery to health in his retirement.

Chart IV.— SHIPS' WIRELESS WEATHER SIGNALS.

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



The dotted circle indicates the area in which British ships would report to Portishead. The small shaded circle indicates the area from which reports are prohibited to Portishead.

The full-line circles indicate the areas round islands and coast stations which could receive spark selected ships' reports to C.Q.

CURRENTS ON THE TRACKS FROM CAPE LEEUWIN TO PERIM, DIRECT AND VIA COLOMBO, (WESTERN PORTION).

FEBRUARY, MARCH AND APRIL.

Observations of ships regularly observing for the British Meteorological Office 1910-1928.

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dirn	Wind Force
Route Colombo to Perim. Tracks North of Sokotra between Longitude 51° and 64° E.								
APRIL								
Clan Ross	23	1923	12° 15' N.	56° 19' E.	S. 75° E.	32	–	–

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dirn	Wind Force
Route Colombo to Perim. Tracks South of Sokotra between Longitude 51° and 76° E.								
FEBRUARY.								
Clan Macintosh	15	1913	8° 01' N.	73° 21' E.	N 84° W.	51	NE	4
APRIL.								
Clan Ross	26	1922	8° 45' N.	71° 14' E.	N. 78° E.	54	–	–
Banffshire	7	1926	11° 08' N.	52° 33' E.	N. 54° W.	49	–	–

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dirn	Wind Force
Gulf of Aden. West of Longitude 51° E.								
FEBRUARY.								
Herefordshire	15	1922	12° 07' N.	49° 30' E.	S 49° W.	44	–	–

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dirn	Wind Force
All Routes, Latitude 6° N. to C. Guardafui W. of Longitude 51° E.								
APRIL.								
Clan Mackinnon	16	1925	7° 06' N.	49° 06' E.	N 29° E.	61	S.E. NW/N.	2 1

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dirn	Wind Force
Route Leeuwin to Perim direct. Between Longitude 51° E. and 76° E.								
FEBRUARY.								
Teucer	13	1917	1° 18' S.	61° 02' E.	N. 88° W.	51	SW	1
Orestes	27	1927	1° 00' N.	66° 49' E.	S. 86° W.	58	–	–
MARCH.								
Trematon	9	1923	0° 32' N.	67° 49' E.	N. 78° W.	44	NE by N.	2
APRIL.								
Poona	25	1922	1° 54' N.	70° 03' E.	N. 74° E.	58	–	–
Poona	26	1922	0° 42' N.	68° 45' E.	N. 89° E.	57	–	–

EXPLANATION OF CURRENT ROSES.

The current roses are drawn from observations within the pecked lines.

Arrows flow with the current, length represents frequency, thickness strength.

6-12 miles per day ... ...

13-24 " " " ... ...

25-48 " " " ... ...

49-72 " " " ... ...

73 " " " and above ...

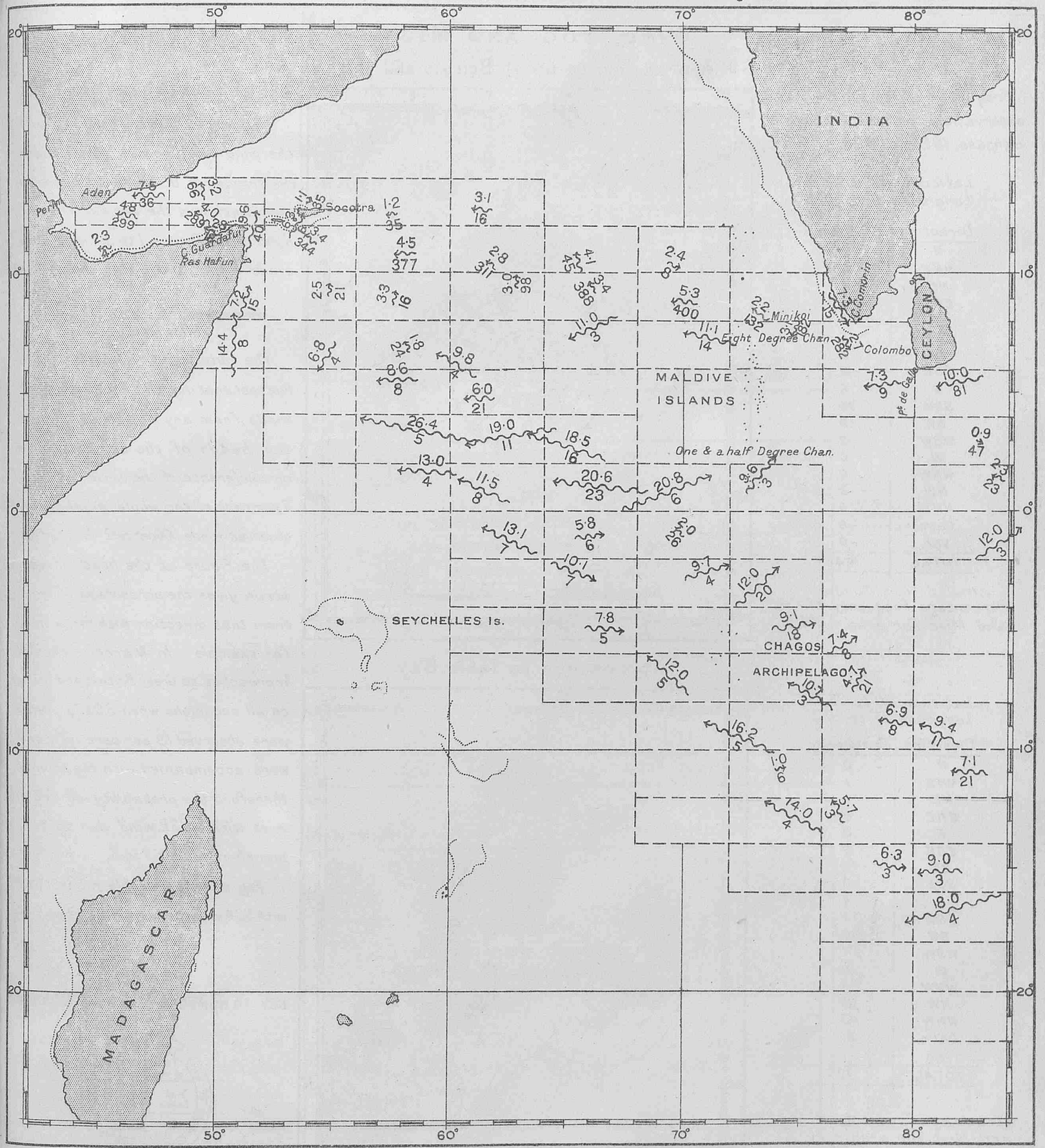
Distance from tail of arrow to circle represents 5%. Scale 0 10 20 30 40 50%

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

CURRENTS ON THE TRACKS FROM CAPE LEEUWIN TO PERIM, DIRECT AND VIA COLOMBO, (WESTERN PORTION).

FEBRUARY, MARCH AND APRIL.

Observations of ships regularly observing for the British Meteorological Office 1910-1928.



EXPLANATION OF CURRENT ARROWS.

The arrows flow with the current and represent the resultant of currents observed within the pecked lines. The centre of each arrow lies in the mean position of observation. The figures above the arrows give the velocity of current in miles per day; the figures below the arrows the number of observations.

MARCH

WIND, FOG AND MIST.

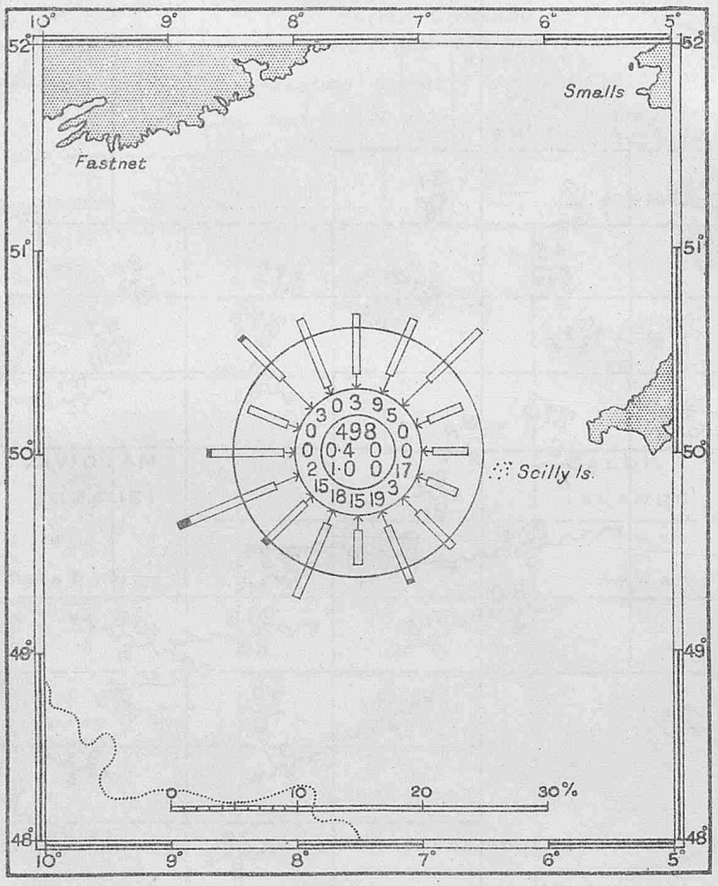
S.W. Approaches to Great Britain and Ireland

Frequency of fog per thousand observations for each 2 points of compass, 1921 to 1928.

Latitude 48° to 52° N.
Longitude 5° to 10° W.

Direction.	Frequency.
N	2
NNE	6
NE	4
ENE	0
E	0
ESE	6
SE	2
SSE	12
S	6
SSW	14
SW	8
WSW	2
W	0
WNW	0
NW	2
NNW	0
Calm	0
Var.	0
TOTAL	64

Percentage Frequency of Fog and Mist for area = 6·4 %.

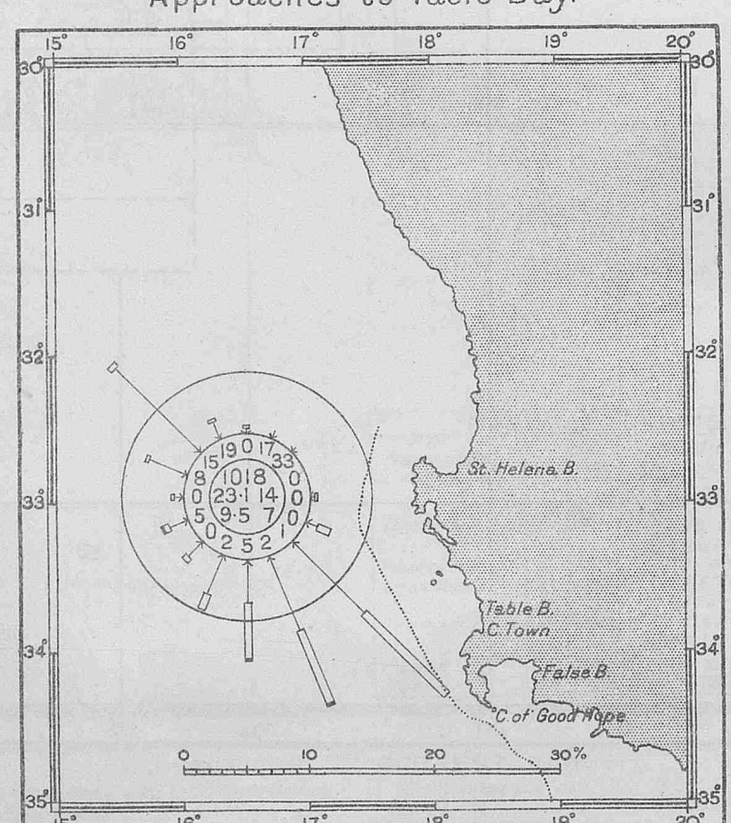


Approaches to Table Bay.

Latitude 30° to 35° S.
Longitude 15° to 20° E.

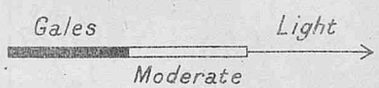
Direction.	Frequency.
N	0
NNE	1
NE	1
ENE	0
E	0
ESE	0
SE	2
SSE	3
S	4
SSW	1
SW	0
WSW	1
W	0
WNW	3
NW	15
NNW	3
Calm	31
Var.	7
TOTAL	72

Percentage Frequency of Fog and Mist for area = 7·2 %.



EXPLANATION.

The arrows in the roses fly with the wind and show by their length the frequency of the winds and by their thickness the various forces, light winds forces 1 to 3, moderate winds 4 to 7 and gales 8 to 12.

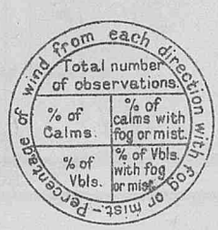


The outer circle supplies a scale for estimating the frequency of winds from any direction. From the heads of the arrows to the circumference of the circle represents 5 per cent of the whole number of observed winds. (100 per cent = 10° longitude).

The figure at the head of the arrow gives the percentage of wind from that direction with fog or mist, for example:- In March in the S.W. Approaches to Great Britain and Ireland on all occasions when S.S.E'ly winds were observed 19 per cent of them were accompanied with fog or mist, therefore the probability of fog or mist with a S.S.E. wind during this month is about 1 in 5.

Fog is most probable in this month with S.S.W. winds the percentage being 14.

KEY TO NUMBERS IN CENTRE OF ROSES.



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

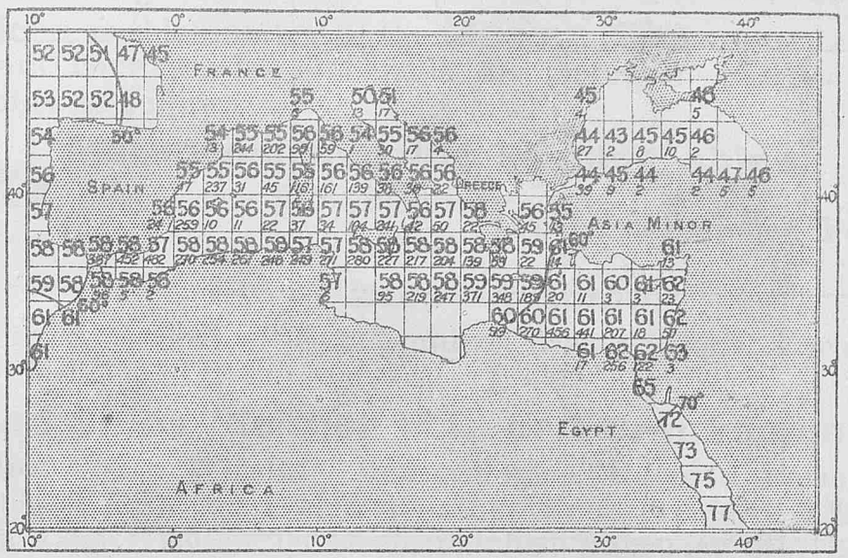
H.M. Stationery Office Press, Kingsway W.C.2.

Ps 1570/2030. Wt. 684. D.13 1250. 1/30

MEDITERRANEAN SEA

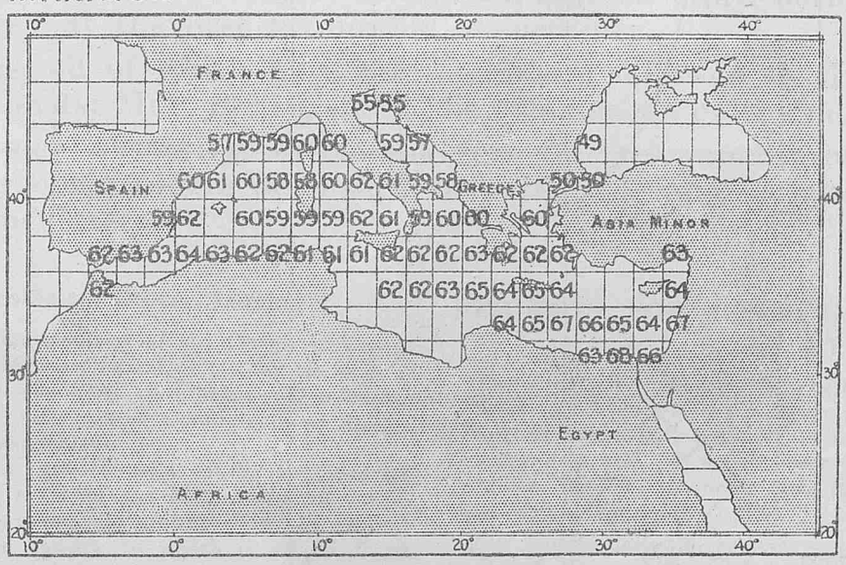
SEA SURFACE TEMPERATURES

MEAN. MARCH

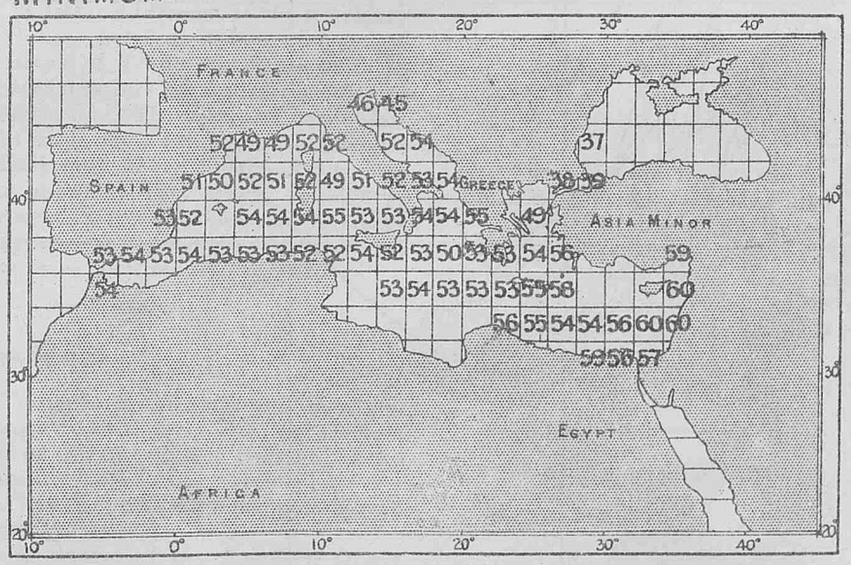


Small figure gives number of observations.

MAXIMUM.



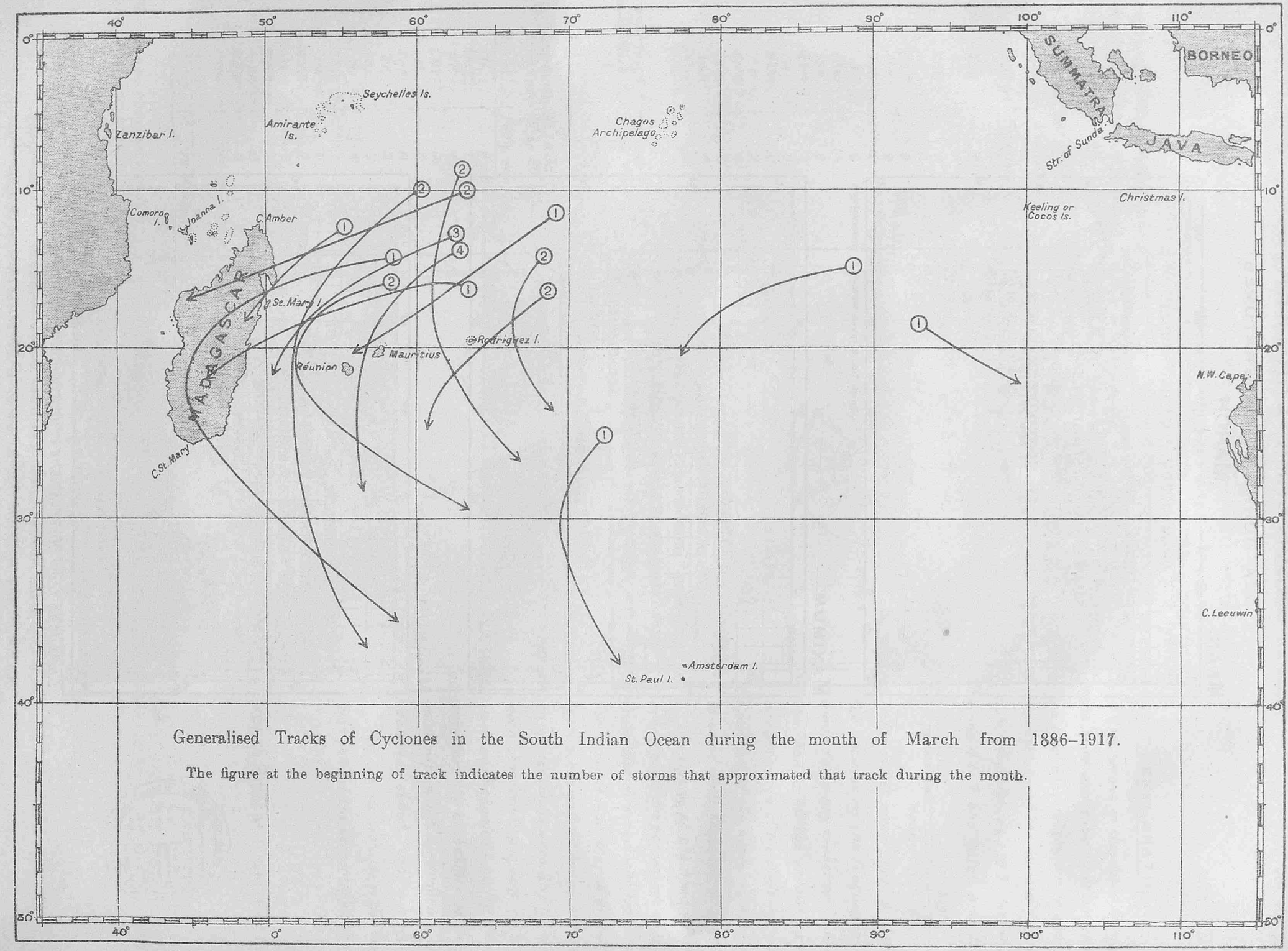
MINIMUM.



Computed from observations of British Ships during the years 1900-1914 in the Mediterranean and Black Seas.

Maximum and Minimum figures are not shown unless the Mean Temperature has been computed from not less than 12 observations.

CYCLONE TRACKS OF THE SOUTH INDIAN OCEAN.



Generalised Tracks of Cyclones in the South Indian Ocean during the month of March from 1886–1917.

The figure at the beginning of track indicates the number of storms that approximated that track during the month.

IMPORTANT.

STATIONERY FOR EFFECTING CHANGES ON 1st MAY, 1930.

To the same address as this number of the **Marine Observer,** revised meteorological logs, records, registers, code cards, and pads are being despatched to the Captains of regular observing ships as follows:—

Meteorological log keeping ships.

The Meteorological Log, Form 915 (1930).
The Original Note Book, Form 916 (1930). } To be despatched February 19th.

Form keeping ships.

Ship's Meteorological Record of Synchronized Observations, Form 911 (1930). To be despatched February 5th.

"Selected Ships" (either M.L. or Form keeping ships).

Register for Ships' Coded Wireless Meteorological Reports, Form 138 (1930).
Pad, British "Selected Ships" Coded Weather Reports, Form 139 (1930).
Code Card, Form 138A (1930). To be despatched February 5th.

The commanders of all regular observing ships are asked to discontinue the present edition of these logs, forms and registers at midnight on April 30th, 1930, and to return them in the usual way at the first favourable opportunity.

The new editions, all of which have Form numbers followed by (1930), and are headed "To come into force on 1st May, 1930", should be commenced on the morning of that day.

Should any regular observing ships not receive their appropriate stationery within reasonable time their commanders are asked to notify the appropriate Port Meteorological Officer or Agent immediately.

Appointment of Port Meteorological Officer, London.

Applications are invited from members of the Corps of Voluntary Marine Observers to the Meteorological Office for the post of Port Meteorological Officer in the Port of London. Candidates must possess a Board of Trade Certificate of Competency as Master for a foreign-going ship, or its equivalent.

The selected officer will be graded as a senior Professional Assistant on the Departmental scale of the Meteorological Office. The basic salary of that grade is £250 per annum, rising by annual increments of £15 to £350 per annum, to which is added Civil Service Cost of Living Bonus. At the present rate of bonus, the commencing salary is £361 per annum. The appointment will be pensionable under the Federated Universities Superannuation Scheme. Application should be by letter addressed to the Secretary (S.I.), Air Ministry, Adastral House, London, W.C. 2, and should state age, number and grade of Board of Trade certificate, rank in R.N.R., if any, and should give particulars of sea service and of experience in meteorological observation. The names of two references to whom application may be made should be given, and copies of not more than two testimonials may be enclosed. Applicants should also state the earliest date on which they would be able to commence duty, if appointed, or alternatively the amount of notice required to obtain release from present engagements. Applications should reach the Air Ministry not later than March 1st, 1930.

ICE REPORTS.

Commanders of ships in the Trans-North Atlantic and Southern Ocean Trades are earnestly requested to have the Ice Report Form 912 completed and returned at the end of each passage. A nil return is desired if no ice is seen.

These forms are supplied with THE MARINE OBSERVER each month to regular observing ships in these Trades.

"Selected Ships" on the Trade Routes of the Southern Ocean are requested to add to their routine Wireless Weather reports information of floating ice seen or reported within the last 24 hours so that this information may be disseminated to the utmost advantage of all concerned.

REQUESTS FOR REPLACEMENTS OF INSTRUMENTS, ETC.

The attention of Marine Observers is invited to the list of Nautical Officers and Agents of the Marine Division, overleaf.

Correspondence, delay and inconvenience may be saved if the Commanders and Officers of observing ships will kindly make their requests for replacements of instruments, logs, etc., to the appropriate Agency.

The Agents have the necessary gear, information and instruction to supply the needs of regular observing ships and to give advice upon questions of Marine Meteorology to any officers of the Merchant Navy who may desire it.

POSTAL ARRANGEMENTS.

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

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

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

Port of Call.....

Date of Homeward Departure.....

Postal Address.....

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

ICE CHART.

WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE.

NOTE.—In case of necessity owing to extreme southerly drift of ice, operative dates will be fixed for Track A.

(C) From 1st September to 31st March, inclusive.

(D) From 15th February to 10th April, 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, Hummocky Ice, Bay Ice.
- Drift Ice, Brash Ice, Sludge Ice, Pancake Ice.
- Indicates W/T Ice Warning Station.

Clarke City
Anticosti
Heath Pt. Lt. V.
Fame Pt.
Father Pt.
GULF OF ST LAWRENCE
NEWFOUNDLAND
C. Ray
Magdalen Is.
Grindstone I.
St. Paul
Grosse I.
Quebec
Prince Edward Is.
Cape Breton Is.
Montreal
St. John
NOVA SCOTIA
Halifax
Lurcher Lt. V.
C. Sable
Sable Is.
Boston
New York
Nantucket Lt. V.
St. Pierre
Virgin Rocks
St. John's
Belle Isle
C. Norman
P. Amour

VCL VCO VCN VAS VAR VAV VAU VDR VCT VCE HYS NAH NAD

Limit of Ice reported to Meteorological Office March 1901 - 1929

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat.	Position. Long.	Remarks.
March 24, 1913	S.S. Florida	48°21'N.	34°05'W.	Berg 60 ft. high, 200 ft. long.
„ 20, 1915	S.S. Wanaby	38°55'N.	48°32'W.	Piece—supposed portion of a berg 5 ft. high, 60 ft. long.
„ 21, 1920	U.S. Hyd. Bulletin ...	38°02'N.	40°38'W.	3 ft. high, 30 ft. long.
„ 21, 1921	S.S. Hollandia ...	37°50'N.	47°23'W.	Berg.

No reports of Ice sighted during the month of January, 1930, have been received at the Meteorological Office.

Ps. 1570/2030. Wt. 88A. D.13. 1100. 1/30.

H.M.S.O. Press, Kingsway, W.C.2.

NOTICES.

MARINE METEOROLOGY.

Co-operation of Shipowners, Masters and Mates.

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

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

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

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

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

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

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

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

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

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

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

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

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

The instrumental equipment on board each regular observing ship is indicated in the "Fleet List" in THE MARINE OBSERVER. "Selected Ships," i.e., those ships which are detailed for Voluntary Routine Wireless Weather Telegraphy, are indicated by a number and symbols in the "Fleet List" in THE MARINE OBSERVER.

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

LATE PRESS.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position. Latitude.	Position. Longitude.	Description.
	NORTH SEA.		
4.1.30	52°35′N.	1°58′E.	Drifting derelict barge.
15.1.30	4 m. N.W. by W. of E. Dudgeon Lt. V.		Unlighted buoy.
17.1.30	12 m. S.E. Humber Lt. V.		Large buoy.
18.1.30	54°46′N.	7°12′E.	Lifeboat marked *HERMINE-Wilhelmshaven.*
	ENGLISH CHANNEL.		
8.1.30	50°36′N.	0°22′W.	Red cone-shaped buoy, small ring on top, dangerous to navigation.
13.1.30	50°34′N.	0°07′W.	Iron cylinder 35 feet long, 6 feet diameter, dangerous to navigation.
18.1.30	7½ m. 93° from Royal Sovereign Lt. V.		Broken mast, dangerous to navigation, floating vertical 4 feet above water.
27.1.30	15 m. S.S.E. of Eddystone Lt. H.		Black bell buoy, no marks visible, drifting in traffic route.
	IRISH SEA.		
1.1.30	54°53′N.	5°19′W.	Derelict.
14.1.30	52°54′N.	5°10′W.	Red conical buoy.
19.1.30	54°09′N.	4°58′W.	Drifting buoy, black bottom, red top.
	NORTH ATLANTIC.		
3.1.30	36°42′N.	13°30′W.	Large red conical buoy about 9 feet high.
4.1.30	48°50′N.	43°56′W.	Small spar about 2 feet diameter, floating horizontal.
5.1.30	44°48′N.	40°44′W.	Red gas and whistle buoy, showing white flash every 5 secs.
6.1.30	49°37′N.	11°57′W.	Wreckage.
6.1.30	47°03′N.	56°31′W.	Red spherical buoy with staff and flag.
6.1.30	30°21′N.	74°09′W.	Large gas buoy with black superstructure and showing a flashing white light.
6.1.30	44°29½′N.	55°22′W.	Red conical buoy with skeleton superstructure.
6.1.30	43°42′N.	55°21′W.	Red balloon-shaped cable buoy with staff and flag, small red buoy one mile to W.
6.1.30	43°06′N.	56°42′W.	Red balloon-shaped cable buoy with staff and blue square flag.
7.1.30	48°43′N.	5°41′W.	Round black buoy with square lantern on steel tripod frame about 10 feet high, dangerous.
7.1.30	40°02′N.	72°04′W.	White gas buoy marked *A*.
10.1.30	29°23½′N.	74°26′W.	Red gas buoy with light functioning, triangular superstructure.
14.1.30	39°37′N.	55°07′W.	Large gas buoy marked *O* showing an irregular flash.
15.1.30	42°10′N.	51°17′W.	Drifting buoy showing a flashing light every 5 seconds.
20.1.30	50°29′N.	5°24′W.	Floating mast with three blue balls, dangerous.
	GULF OF MEXICO.		
9.1.30	24°20′N.	88°22′W.	Mast.
	CARIBBEAN SEA.		
5.1.30	19°48′N.	83°43′W.	Can buoy.
	NORTH PACIFIC.		
3.1.30	32°45′N.	124°33′W.	Small drifting buoy with yellow flag.
8.1.30	42°41′N.	124°53′W.	Log about 20 feet long, 4 feet diameter.
8.1.30	39°36′N.	124°04′W.	Log about 40 feet long, 8 feet diameter.

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 ... ...

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

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 ... ... Captain W. E. SOMMERVILLE, Messrs. H. Hogarth & Son's Office, 120, St. Vincent Street, Glasgow
(*Telephone No.: 8707 Central*).

FREMANTLE, W. Australia. Captain J. J. AIREY, Deputy Director of Navigation, Customs House.
(*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 Captain D. FORBES, Nautical Academy, 1, Albion Place.

SYDNEY, New South Wales. Captain C. LINDBERGH.
Commander C. D. MATHESON, R.D., R.N.R., Acting Deputy Director of Navigation.
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*).