

VOL. V. No. 55.

THE MARINE OBSERVER.

JULY, 1928.

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THE MARINE OBSERVER'S LOG.

MARINE SUPERINTENDENT'S NOTE.

“ But there's so much to learn, with sails and ropes,
 And how the sails look, full or being furled,
 And how the lights change in the troughs and slopes,
 And the sea's colours up and down the world,
 And how a storm looks when the sprays are hurled
 High as the yard (they say) I want to see
 There's none ashore can teach such things to me.”

JOHN MASEFIELD.

When reading the “ Dauber ” recently, from which the above is taken, it struck me that my old *Conway* term mate had put into words what had been in our minds when we decided upon the establishment of THE MARINE OBSERVER: to devote certain pages to the contributions of Mariners, and that responsibility for their statements must rest with themselves.

Yet, as may be seen in my note, “ The Marine Observer Aims and Objects,” Volume I, No. 1, this idea was only referred to in twelve words “ to provide a means whereby Mariners may give their experience to others.”

How exactly JOHN MASEFIELD does express what every true Marine Observer should do, and the last line, “ There's none ashore can teach such things to me,” is most true.

There's our difficulty, we seamen do find a pen a difficult tool to use. And yet MASEFIELD, CONRAD, BULLEN, first-class penmen, were seamen and left school as early in life as we did. JOCK MASEFIELD, after two years in the school ship *Conway*, 1893-1895, roughed it with the rest of us in the half deck of sailing ships. JOSEPH CONRAD, a great master of the English language, not only served many years at sea, but, being of Polish birth, his penmanship was all the more wonderful. And FRANK BULLEN, the writer of the “ Cruise of the *Cashalot* ” and other books wonderfully descriptive of the sea, after being an officer in a whaler served for some time in the Marine Division as one of Captain TOYNBEE's assistants. We cannot aspire to such mastery of the pen, but the example of these seamen writers may help us to set down in writing true and yet attractive descriptions of what is seen at sea.

Looking back, one still sees in one's mind's eye scenes at sea which were impressed upon one's memory right back to one's first voyage to sea, for their beauty or wonder. One remembers a day running towards Cape Horn, in the South Pacific, when looking up from the poop of a clipper ship the great Cape Horn greybeards seemed as if they could not fail to crash down and poop us and then when aloft, finding their approximate height of some 50 feet by sighting their tops with the horizon. Or a few weeks later seeing this beautiful

ship founder in the English Channel after collision, under full sail, there having been only time to back the main yard and get clear in the boats. It was dawn, the sky colouring the sea, the great ship settling by the head and then just at the final plunge, the tarpaulins and hatches of the fore hatch burst and thrown in the air by the pressure in her hold. Her masts seeming to go above the partners as she went to her grave, bow first.

One remembers in steam a particularly beautiful day off the south coast of Western Australia when passing West Cape Howe and Breaksea Island inside Eclipse Island. A fresh southerly breeze, the air so crisp and invigorating, the sky blue and beautified with white Cumuli, the sea a glorious dark blue and green with what young ladies call "white horses" and through it a swell running up from the Antarctic which broke even higher than "Dauber's" yard upon Vancouver Ledge, and the rock-bound coast.

More recently, one remembers during the Great War, on Patrol within the Arctic Circle, peculiar mirages of ships and extraordinary effects of refraction, and fog and ice.

All memories but of little direct value since they are not based upon exact observations recorded in detail at the time, even so the experience may be helpful in showing what one might have done. One should write, draw or photograph such scenes when they are before one if a true picture is to be given.

By observing the effect of the elements upon his ship and her behaviour a Marine Observer may learn much, and if he records his observations and writes true and interesting descriptions of these he will do far more in the cause of Marine Meteorology than if he only records meteorological observations as such in the columns of the Log. Marine Meteorology becomes a dry and exhausting work if it is allowed to become entirely a matter of statistics. What is beautiful and interesting should all be combined in The Work. And then there is the practical side, and particularly the application of **The Work** to navigation. Here is where the Corps of Voluntary Marine Observers are coming to their own.

"The Marine Observer's Log" is becoming more and more interesting and useful and it contains more that is beautiful of the things seen at sea. The "Old Time Marine Observer's Log" of which the second instalment is published in this Number also gives us food for thought and inspiration.

The Corps of Marine Observers in particular and Mariners in general are doing well in provision of material.

As the provision of additional remarks, photographs, Weather Charts, recorded evidence of the practice of Wireless and Weather an Aid to Navigation and sketches increases, so need for method increases.

We therefore appeal to the Corps of Marine Observers to do their utmost to include all that is of the best for the purpose and in doing so to make use of the space which is provided for "Additional Remarks" in the Meteorological Log and the Meteorological Report Form 911. It is a good thing when compiling remarks or an Article to get someone to check it before final entry, and who better than the Captain, or if the Captain himself be the writer, his principal observing officer? In attaching weather charts to the Log when sent in it is sufficient if a selection are given, and if that selection comprises weather charts carefully drawn with indian ink upon the printed outlines provided, they can be better reproduced in publication.

Since writing the above, possibly the most encouraging things ever said of British Seamen about sea terms were said by the Right Honourable STANLEY BALDWIN, Prime Minister, at the banquet of the Honourable Company of Master Mariners, in the presence of the Master, H.R.H. THE PRINCE OF WALES and a great assemblage at the Mansion House. These are his words:—

"Sea Language."

"Talking about sailing ships, I have always been a great lover of the English tongue, and I had hoped that among the activities of your Company you might be able to take steps to see that the picturesque language of the old sailor may not pass from the land. After all, you must remember that layer after layer of our nation's history is embedded in the language of our seamen, much more than we always think or realise. Mr. PEARSON SMITH, who wrote an entrancing essay on this entrancing subject, used this very beautiful phrase:—'Words are like sea shells. They have their voices and are full of old echoes.' The Angles and Saxons, before they came to this country, used to anchor their ships by letting down pieces of rocks with rope and trawling these on the bottom. The Roman sailors taught them the use of the anchor, and taught them the word 'anchor,' and that word 'anchor,' which came to this country by way of the Angles and Saxons, has lasted to this day.

"There were also the words 'keel,' 'reef,' 'stern' and 'wake of a ship.' The last was a phrase that was used for the track left through the ice when the Viking ships went from Norway to Greenland. Sailors brought from the Mediterranean Byzantine Greeks the word 'pilot,' which took the place of the old English word 'lodesman.' From Italy came 'brigantine'; from the Dutch, 'skipper,' 'lugger,' and 'smack'; from the Spaniards, 'cargo,' and 'binnacle'; and when our Elizabethan ancestors went to fight the Spaniards on the Spanish Main they came back with 'hurricane,' and 'hammock.' Strangest of all, far away in Malay, was the word 'launch,' which the Portuguese took, and Spanish sailors took from the Portuguese, and the English sailors took from the Spanish. Then, almost in our own literature, descendants of our own name had sent across to this country the familiar words 'schooner' and 'clipper.'

"Now you know why it is that I want the sailors' words and words connected with sailing ships kept in our language, even though the sailing ship may be passing away. Our sailors have exported our terms into nearly every language on earth, and I myself, who have always an immense faith in the plain and simple people of my country, wish indeed that the care of the English language may be left to the sailors to look after. Even in the last generation we have got the good English words 'steamer,' 'battleship,' 'ironclad,' 'dreadnought'—words that hit you like a hammer. Other people are floundering about and inventing words like 'cinematograph' and 'hydroplane.' There is poetry, too, in the names of ships. Take, for example, *Cloak of the Wind*, or Drake's little *Golden Hind*, or, in our own time, the *Cutty Sark*."

Let us see to it that in "The Marine Observer's Log," which is written at sea and by seamen, that true sea terms are used and in this those who are fortunate enough to possess "The Sailors Word Book," by the late ADMIRAL W. H. SMYTH, Captain HENRY TOYNBEE's father-in-law, will find a guide.

MARINE SUPERINTENDENT.

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.

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

THE following is a further reply to the Marine Superintendent's Note published in Volume V, No. 51, under this heading:—

Captain R. Williams, S.S. "Port Victor."

"I am now forwarding the following generalized data taken from this steamer's Abstract Logs covering in all 17 voyages on this route since 1910, up to last year.

"In these records it appears that the Southern Route has been followed practically on all her voyages across from Panama to

both New Zealand and Australia, but on carefully checking these records it is found that the weather experienced on this Route when approaching New Zealand has on most occasions been found to be adverse, and winds up to gale force from N.W. to S.W. have been encountered almost every voyage, and the records show this to be the case once the vessel had come south of Latitude 30° S., and also adverse currents from Longitude 150° W., to within 300 miles of the Australian Coast. These tracks followed are practically those laid down in 'Ocean Passages of the World.'

"Re my own experience I have been departing from this Route, and taking the Northern Track instead, i.e., from Cape Mala, the Great Circle Track to Motu One Island in the Society Group, thence to Cape Moreton by Great Circle, also Great Circle to Sydney from the same point, thus keeping north of Latitude 30° S. all the way to Cape Moreton, and experienced only fine weather and favourable currents throughout the whole track, the most favourable currents being experienced the 3,000 miles from Cape Mala to the Islands, then practically nil until after crossing the 180 Meridian, when further favourable currents are experienced to within about 20 to 30 miles from the Australian Coast.

"In comparing the distances on these two mentioned tracks, it is found that the Northern Track is approximately 35 miles longer to Cape Moreton and about 130 miles longer to Sydney, but the favourable weather and currents experienced on the Northern Route easily cancels the lesser distance on the Southern Route, as the gales experienced on that Route on several occasions gave this vessel a setback of anything from 100 to 300 miles during the last 10 days of the passage.

"In my opinion I certainly recommend the Northern Track, which I shall follow always in the future when making this voyage.

"Re New Zealand to Panama, the Great Circle Tracks as laid down cannot be improved on.

"In compiling this I had the assistance of Mr. R. B. STANNARD, my Second Officer."

NOTES ON CURRENTS EXPERIENCED.

Celebes Sea, East Indies.

THE following is an extract from the Meteorological Log of S.S. *Tanda*, Captain E. T. Pilcher, Thursday Island to Sandakan. Observer, Mr. J. Heddle, 2nd Officer:—

"When bound from Thursday Island to Sandakan, and crossing that part of the Celebes Sea lying between the north-eastern end of Celebes and the Southern part of the Sulu Archipelago, the following sets were experienced between Noon July 29th and Noon July 30th, 1927:—

"Departure taken from reliable cross bearings at Noon on 29th; position, Latitude 2° 18' N., Longitude 124° 28' E. True Course 338°.

"At 6.30 p.m. 29th, position by D.R., Latitude 2° 54' N., Longitude 123° 27' E. Stellar observations put the ship in Latitude 2° 55' N., Longitude 123° 21' E. Set and drift from Noon, 070°, 6 miles.

"At 5.15 a.m., 30th, position by D.R., Latitude 3° 56' N., Longitude 121° 32' E. Stellar observations gave Latitude 3° 44' N., Longitude 121° 20' E. Set and drift from 6.30 p.m. 29th, 225° 17 miles.

"At noon 30th, position by D.R., Latitude 4° 22' N., Longitude 120° 18' E. Position by solar observations and also by cross bearings which agreed exactly with sun sights: Latitude 4° 29' N., Longitude 120° 14' E. Set and drift from morning star position 270° 1 mile.

"The D.R. positions given are all worked up from Noon 29th, using log speed + 4%, this being taken as an average of the log slip for the previous two days.

"During the 24 hours the winds were calms and light airs all the time except for one sharp squall from N.N.W., force 4 and lasting about an hour at 7 a.m. on the 30th.

"On the previous voyage, in this same locality the ship set north 10 miles during 24 hours, and on July 26th, 1926, she set N. 67° W. (T) 19 miles in 24 hours. Every voyage in crossing this part we constantly experience strong sets both in a northerly and a southerly direction, being first set strongly in either direction and then back

in a corresponding manner in the other, almost as though at the influence of a tide."

NOTE.—The tidal streams within this area are liable to interrupt or reverse the normal currents which are mainly due to the action of monsoonal winds, see Admiralty, "Eastern Archipelago Pilot", Vol. II.

CURRENT.

Red Sea.

THE following remarks were received with the Meteorological Log of S.S. *Port Sydney*, Captain W. G. HIGGS, Australia to Dunkirk, via Suez:—

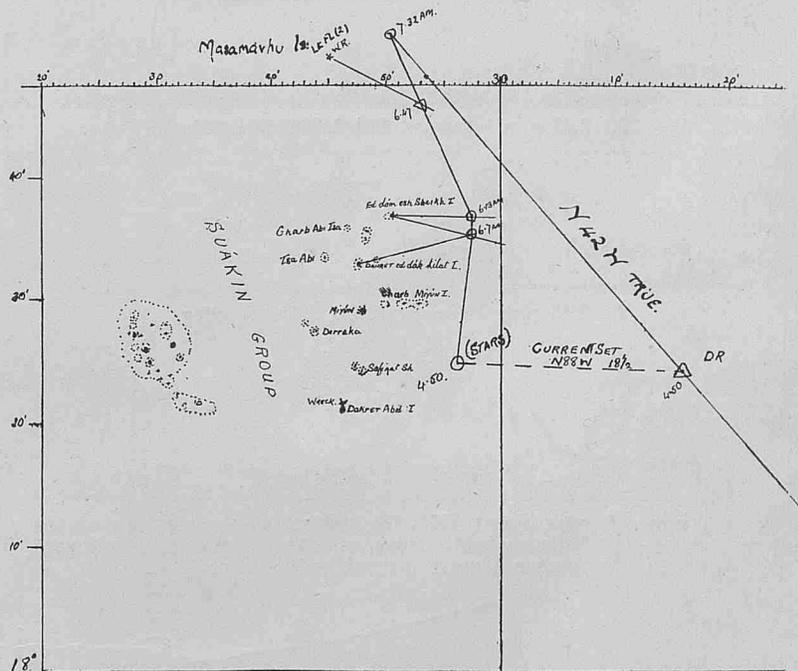
"Seamen are all familiar with the caution printed on each Red Sea Sheet, to the effect that:—

'Strong currents occasionally set across the Red Sea. The Mariner should therefore give a good birth to all outlying reefs and shoals.'

"That this warning is justified and very necessary is borne out by a recent experience of my own, of which I append a condensed account for your information.

"*Port Sydney*, bound from Australia to Port Sudan, was found by good stellar observations at 6.48 p.m. A.T.S. on July 30th, 1927, to be in Latitude 17° 4½' N., Longitude 40° 31' E. From this position a course N. 42° W. True, was steered; if made, this would take the ship 10' off Ed dom esh Sheik Is. (131 mls) and 6' off Masamarhu Is. (145 mls).

"At 4.52 a.m. on July 31st, good stellar observations were obtained, placing the vessel in Latitude 18° 25' N., Longitude 38° 56' E. D.R. position at that time was Latitude 18° 24' N., Longitude 39° 16' E. Thus, during the ten hours between p.m. and a.m. stars she had been set N. 88° W., 18½ mls—over 1.8 knots."



SEA TEMPERATURE.

Gulf Stream.

THE following is an extract from the Meteorological Report of S.S. *Dundrum Castle*, Captain H. E. WELLER, Algoa Bay to New York. Observer, Mr. H. H. F. TREW, 3rd Officer:—

"July 15th, 1927, at 8 a.m. A.T.S. in Latitude 37° 46' N., Longitude 70° 24' W., vessel presumed to be in the Gulf Stream, the surface temperature of the sea water was 79° F. At the same time water drawn into the engine-room from a depth of 15 feet below the surface had a temperature of 72° F.

"Later, at noon, in Latitude $38^{\circ} 16'$ N., Longitude $71^{\circ} 00'$ W., the surface temperature was 73° F., as was the temperature 15 feet below the surface. The vessel was at this time presumed to be out of the Gulf Stream."

MIRAGE.

In the Straits of Gibraltar.

THE following remarks from Captain B. T. Cox accompanied the Meteorological Report of S.S. *Knight Companion*, Port Said to Havre:—

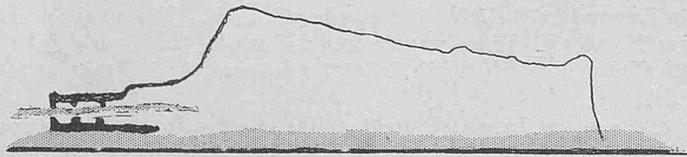
"July 22nd, 1927, from 1.30 p.m. there appeared to be a dense fog bank in the Straits extending all round the horizon except between N. and N.W. to a height of $0^{\circ} 25\frac{1}{2}'$, and sharply defined.

"The tops of the hills on either side of the Strait were clear and sharply defined, the lower slopes as far down as the apparent fog bank slightly hazy.

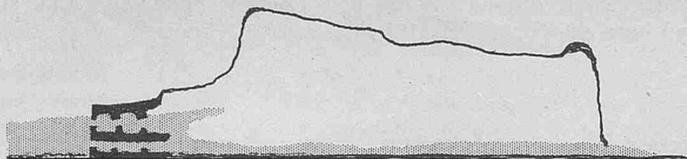
"By 2.25 p.m. this apparent white fog bank was seen to be the effect of refraction; in the Straits of Gibraltar at all events.

"The accompanying rough sketches, made at the time illustrate in some degree the appearance of Europa Pt. particularly between 2.25 p.m. and 3.25 p.m. when it appeared normal.

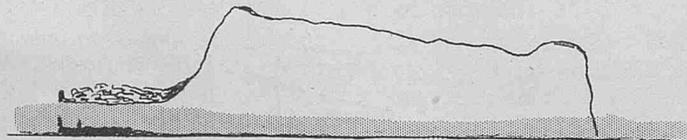
"From 5.15 a.m. to 9.35 a.m. we had experienced thick fog on this day, just before passing Sacratif, N. 5 miles, until the Longitude of Malaga."



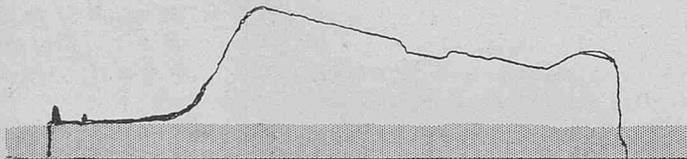
1. 2.30 p.m. Europa Point $236^{\circ} 18\frac{1}{2}$ miles.



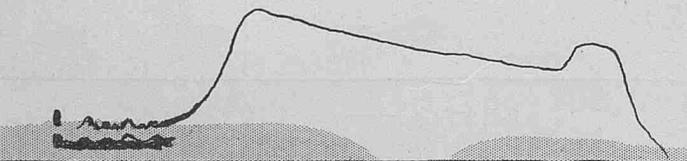
2. 2.45 p.m. Europa Point $234^{\circ} 15\frac{1}{2}$ miles.



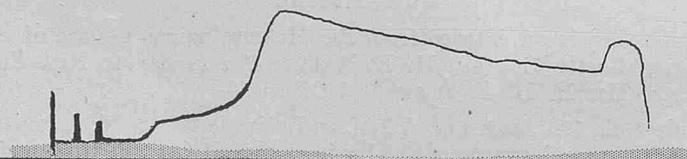
3. 2.55 p.m. Europa Point $236^{\circ} 13$ miles.



4. 3.0 p.m. Europa Point $236^{\circ} 13\frac{1}{2}$ miles. Upper portions of the hills on both sides of Straits and to northward appeared quite normal and distinct.



5. 3.15 p.m. Europa Point $234^{\circ} 10\frac{3}{4}$ miles.



6. 3.18 p.m. Lighthouse and other objects hazy in outline and thrown up very much out of proportion. Shaded portions appear like white fog banks.

NOTE.—There is frequently an association between mirage and fog. The presence of a layer of fog or mist over the sea surface usually implies that the temperature of the fog-laden air is warmer than that above it. The top of this temperature inversion marks the upper limit of the fog. The presence of the warm layer of air gives rise to some of the known varieties of mirage. Sometimes, however, when there is no actual fog or mist a reflection of the bright sky is produced by the layer of warm air giving rise to a misty whitish line or narrow band just above the horizon. Where land is being observed this band is at the base of the land and is accompanied by looming of the land.

ABNORMAL REFRACTION.

Coast of Brazil.

THE following is an extract from the Meteorological Report of S.S. *Deseado*, Captain A. PURVIS, River Plate to Liverpool:—

"On July 20th, 1927, at 0045 hrs. G.M.T., whilst proceeding from Rio to Lisbon, in a position by cross bearings, Latitude $22^{\circ} 45'$ S., Longitude $41^{\circ} 37'$ W., observed the distant loom of St. Thome Light bearing 036° dist. 54 miles. The weather at the time was lightly overcast, and the moon not having yet risen the night was fairly dark. At the moment of observation the temperature of sea water, and air were taken, in order to account for abnormal refraction, but they were both found to be 70° F. and the difference between the wet and dry bulbs 4° F.

"Continuous cross bearings were taken of the loom, and Santa Anna Light until the former was eventually raised at 0314 hrs. G.M.T., distant 23 miles. Ship's course and speed was 051° , 13.0 kts. throughout."

LINE SQUALL.

Off S.W. Coast of Australia.

THE following is an extract from the Meteorological Log of S.S. *Wangaratta*, Captain W. SCUTT, Sydney to Suez. Observer, Mr. S. R. MILLARD, 2nd Officer:—

"Saturday, July 23rd, 1927. Noon position, Latitude $32^{\circ} 29'$ S. Longitude $110^{\circ} 53'$ E. Barometer 1007.8 mb. Wind N.N.E., force 3. Temperature, dry bulb 63.5° , wet bulb 61.5° . Sea 62.5° F. Cloud A-Cu/St.Cu; Cu-Nb; Cu., amount 9.

"A weather chart was made from 9.0 a.m. West Australian S.T. (0100 G.M.T.) data received from Perth W/T Station, which gave evidence of an approaching depression from the westward, and a forecast for ship was given for wind to back to S.W. during ensuing twenty-four hours, with squally weather and rain.

"For the previous twenty-four hours the wind had been between north and N.E., force 3-4, with a falling barometer; an anticyclone being situated over Southern and Western Australia, moving slowly eastward, and, during the forenoon watch, light rain had been experienced.

"From 9.30 a.m. till noon occasional breaks in the lower clouds had shown Ci/Ci-St., and ill-defined Ci-Cu in small proportion.

"Shortly after noon, light rain commenced, the wind backing to N.W., and Fracto-Stratus was noted at a very low altitude, travelling rapidly west to east.

"At 1.30 p.m. the sky cleared from the westward and the rain ceased, leaving a small proportion of Ci-St in zenith and heavy Cu-Nb. low on the S.W. horizon, which at 2.0 p.m. was seen to be a line squall front, rapidly approaching.

"At 2.15 p.m. the line squall crossed the ship, and the wind backed suddenly W.S.W., freshening to force 5; the cloud formation stretched from horizon to horizon, in a perfect north and south line, a narrow strip of Cu-Nb. black based with Cumulus top.

"As this was occurring exactly at the time of P.M. observations for Western Australia (0700 G.M.T.), a coded weather report was despatched to Perth. Barometer, 1007.5 mb. Temperature, dry bulb 61° , wet bulb 59.5° .

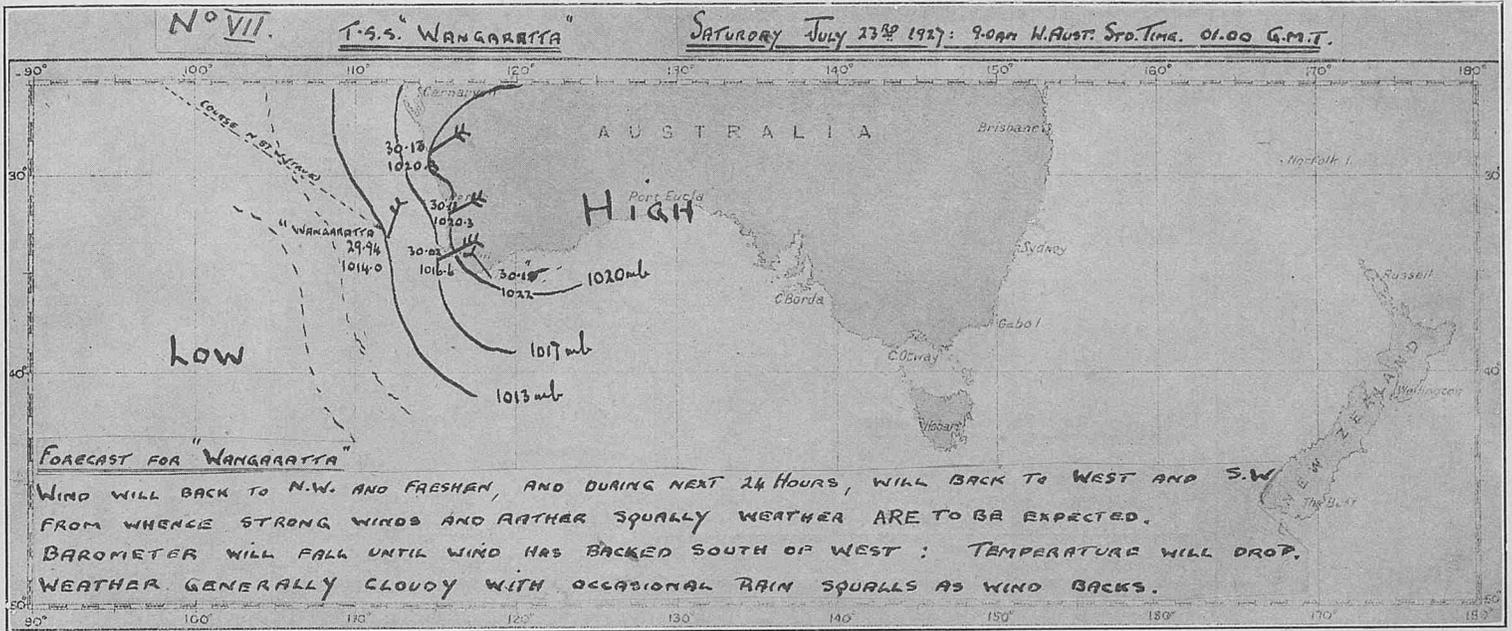
"By 2.30 p.m. the wind had backed to S.W. and very low Fracto-Stratus was moving rapidly across the sky; there was no rain.

"At 3.0 p.m. the Fracto-Stratus cleared suddenly, and the Ci/Ci-St. was noted passing away in the east, whilst shortly after, Cu/St.-Cu/Fr-Cu. was seen moving west to east.

"During the approach, and the passing of the line squall the temperatures were carefully watched, but there was no fluctuation, this giving the observer reason to expect that the wind would veer again before long, and at 7.30 p.m. the sky clouded from W.N.W. the wind veering to that direction shortly after."

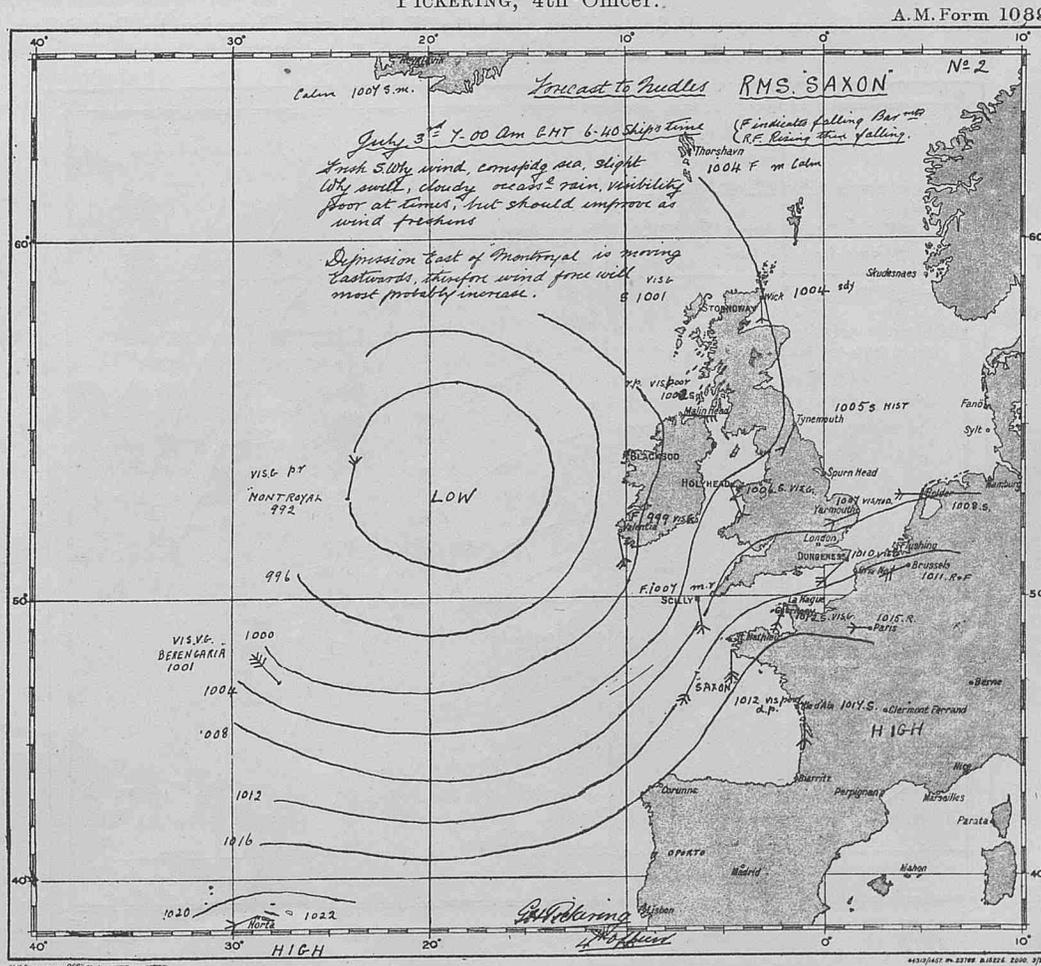
WEATHER CHARTS MADE AT SEA.
Off the Coast of Australia.

Weather Chart made at sea off the coast of Australia on board S.S. *Wangaratta*, Captain W. SCUTT, by Mr. S. R. MILLARD, 2nd Officer, on July 23rd, 1927, accompanying note on line squall.



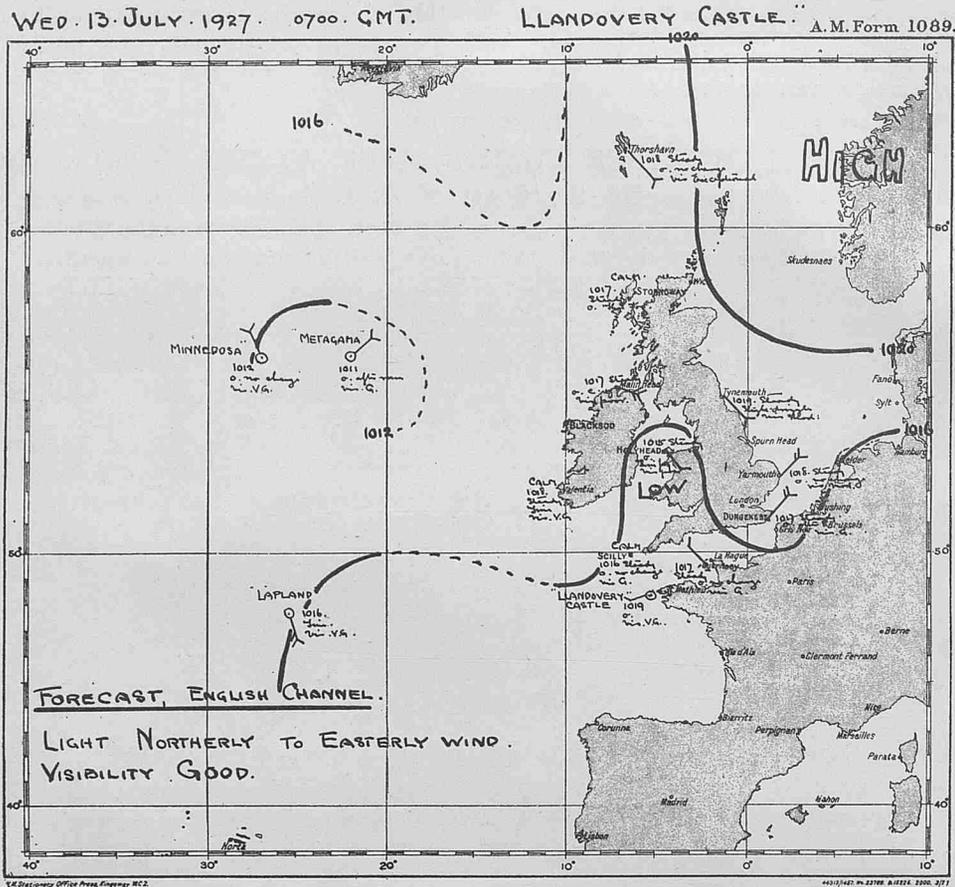
In the Eastern North Atlantic.

Weather Chart (one of a series) made on board S.S. *Saxon*, Captain T. M. LANG, Cape Town to Southampton, by Mr. G. H. PICKERING, 4th Officer.



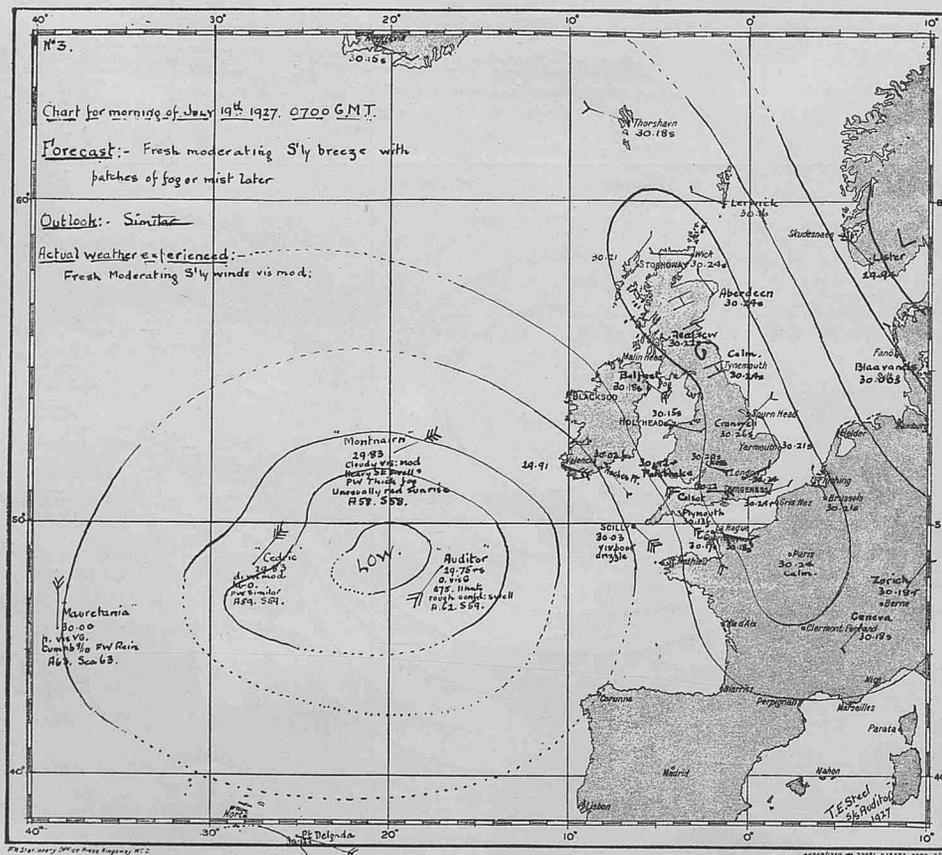
According to *Saxon's* Meteorological Report, the wind at 8 p.m., 3rd July, was south, force 4, weather overcast and gloomy.

Weather Chart (one of a series) made on board S.S. *Llandoverly Castle*, Captain G. OWENS, Marseilles to London, by Lieutenant C. H. WILLIAMS, R.N.R., 2nd Officer, at 0700 G.M.T., 13th July, 1927.



According to *Llandoverly Castle's* Meteorological Log, the wind dropped to calm at 8 p.m., on 13th, and came away from the N.E., force 3 during the morning of the 14th. Mist and rain experienced during the night of 13th.

Weather Chart (one of a series) made on board S.S. *Auditor*, Captain W. T. OWEN, Tampico to Rotterdam, by Mr. T. E. STEEL, 3rd Officer, at 0700 G.M.T., on 19th July, 1927.



"When making large alterations of course by gyro compass the effect of retentive magnetism on the magnetic compass can be clearly seen, the magnetic compass course altering as much as 2° in an hour after coming on to the new course. This has been brought to the writer's notice on successive voyages down Channel after loading cargoes in London and also very recently when rounding Cape St. Vincent, although in the latter case there is a suspicion of local magnetic attraction, which perhaps readers of this Journal may have noticed. When steering by gyro and the ship's course cuts the lines of magnetic variation at a comparatively rapid rate, the magnetic compass course can be plainly seen altering from watch to watch; hence it is obvious that under such circumstances a better course is made by gyro than by the magnetic compass.

"Up to the present time the gyro compass has been chiefly installed in liners, but it would be of equal or greater value in cargo vessels whose voyages are wide world, for whatever the cargo carried, be it steel rails or cotton, it has no effect on the gyro, whereas the magnetic compass is influenced by the different kinds carried from voyage to voyage. The deviation of a magnetic compass has been known to completely change its sign and value on discharging a load of iron and copper; and under such conditions, especially when leaving port after discharging such cargoes, it is necessary to obtain azimuths which, as every seaman knows, are not always forthcoming when most required.

"It is noticed that Quartermasters prefer to steer by gyro compass as they are able to keep a much steadier course with the use of less helm, this applies particularly to rough weather, when the ship's rolling and pitching causes the magnetic card to oscillate; there is no trace of such oscillation on the gyro compass, all the movement shown at the lubber line being due to the actual movement of the ship's head. As a test a comparison was taken during rough weather and it was found that the magnetic card oscillated four and five degrees each side of the lubber line without any actual movement of the ship's head from her course.

"It has been said by one ship's Captain that the gyro compass has proved that most currents do not exist. This no doubt is an exaggeration, but it cannot be denied that when dealing with a variable quantity such as the course steered by a magnetic compass, the results of currents so obtained are less reliable than those calculated from a course steered by gyro compass. In future meteorological logs it might be useful to denote the type of compass in use, whether gyro or magnetic, so that in future years, after enough data has been collected, a comparison could be made of the currents calculated by vessels using the respective compasses.

"For wireless direction-finder work the gyro compass is essential and perhaps in the not far distant future we may, with the help of these two modern inventions, be able to locate the centre of cyclonic disturbances by the direction of the static associated with such areas of low pressure."

OLD TIME MARINE OBSERVER'S LOG.

Below are reproduced extracts of records and sketches made at sea over fifty years ago. Marine Observers of the present day are invited to compare these with their own experience, and should they know of surviving old time Marine Observers whose remarks appear, it is hoped that they will bring these to their notice.

INTERESTING PHENOMENA AND OCCURRENCES AT ZANZIBAR.

THE following is an extract under the above heading taken from the Meteorological Register No. 319, kept on board H.M.S. *Frolic* Commander NOLLOTH, R.N., at Zanzibar, under date 14th November, 1855:—

"A foreign merchant supplied me with the following account drawn up by himself and some friends who, with him, had witnessed the phenomenon from the top of his house—a place of evening resort.

'On Thursday, 25th October last, at 6.20 p.m., we saw a Meteor in the direction from S.E. to N.W. (about) on the northern horizon about 20° high like a rocket of enormous size burning an unusual bright light of a bluish-yellow colour. Suddenly it opened like a tulip and separated in two parts, of which the head, like a reddish ball, afterwards remained on the sky about 10 minutes gradually diminishing, while the tail remained to appear like white smoke. The noise on passing was like a rocket, and we saw the Meteor at least three seconds before it separated.'

"It may be mentioned as indicative of the extraordinary appearance presented by this Meteor that some of the most intelligent Arabs in Zanzibar—in the opinion common among Mahometans—that rare celestial phenomena portend great political events, such as the fall of States or Dynasties, seriously inquired of the Consul-General whether the Meteor had fallen towards Russia? and an educated Persian (a Moonshee) who had witnessed it, on being asked to describe any details observed by him, replied—who can observe such things? thus suddenly will come upon us the day of Resurrection!

"North-westward of Zanzibar, and visible in clear weather, is the Pagany range of hills, the southernmost extreme of which is marked 2,000 feet in Owen's Survey, and to the southward of this, elevated ground is shown about 33 miles distant from Zanzibar town. May not the above-described appearances, the long apparent

rest in the sky at about 7° altitude and the subsequent burning out during 11 minutes, have been caused by a Meteoric stone falling on the high coast opposite and igniting a patch of dry tropical jungle? It is true that great velocity would be required on this supposition, for only a few seconds elapsed between the hearing of the hissing or whistling noise and the Meteor coming to a stand apparently in the air. It is not likely that any search will be made on the coast for a Meteoric stone now, it having been supposed at the time to have vanished in the atmosphere.

"I was informed by the European Apothecary attached to the Consulate, who has kept a register at Zanzibar for several years, that the average fall of rain annually is from 84 to 100 inches, and that the range of the thermometer throughout the year is from 71° to 90° F.

"November 19th:—A Brahmen Kyte, the first seen this season by the inhabitants. The residents say that they invariably make their first appearance two or three weeks before the setting in of the N.E. Monsoon, increasing in number day by day as the time for the Monsoon approaches and that they gradually disappear, commencing their departure two or three weeks before the N.E. Monsoon ceases.

"During our stay at Zanzibar increasing rains and occasional light winds from N.W., sometimes in the morning, but more frequently in the afternoon, were said to be sure indications of the approach of the N.E. Monsoon, these winds invariably increasing in strength till the N.E. Monsoon itself usually denotes its arrival by a heavy breeze accompanied by copious showers, when generally a number of Arab small craft and boats are cast on the beach, before which event the proper precautions (which are not required during the almost perpetual light weather of the S.W. Monsoon) are seldom taken.

"The European residents of Zanzibar consider that the N.E. Monsoon seldom, if ever, sets in there decidedly till about the 15th December, which agrees with a statement I received at Johanna from an intelligent European trader (who had visited most parts of the Mozambique Channel and Coast to the northward), that

according to his experience the N.E. Monsoon always reached the Comero Islands about a fortnight after its arrival at the Latitude of Zanzibar, and that it had never set in with strength in the neighbourhood of the former before the 24th December, on which day its first decided blow had occurred on three successive years of the seven years of his residence at Johanna or voyaging in the Channel and its vicinity."

NOTES ON WEATHER AT THE CAPE.

THE following extract is taken from the Meteorological Register No. 1358B kept on board the Wooden Ship, *Marlborough*, 1,293 tons, Captain HENRY TOYNBEE, from Madras to Cape Town, under date 18th to 21st February, 1861:—

"Daylight close in with the land. A moderate southeaster blowing, kept a fair distance from the land to avoid the calm near Green Point. Saw the ships in the Bay riding to a N.W. wind. Out reefs of topsail, and kept the hands on deck trimming to most variable airs.

"10 a.m. The ships in the Bay swung to a southeaster which freshened quickly into a gale, there was no cloud on Table Mountain. We lay nearly becalmed within about 300 yards of the southeaster which was gradually approaching us. Lowered the topsails and took two reefs in one, before it caught us, stowed the jib and double-reefed the driver. We had kept reefs in our courses in case the southeaster came on, a precaution I strongly recommend. Stood boldly on, the breeze freshening every minute as we crept to the eastern side of the Bay until at last the gusts were furious, luffed up to meet their strength, a ship unable to deal with the southeaster had brought up ahead of us so we were compelled to make a short tack. Stood to the westward close in to Mouille Point, six ships were working in with us, two crowded with troops from China. Tacked and made a long leg across the Bay, the wind freshening as we went to the eastward, another ship brought up ahead of us being unable to tack, just weathered him and stood on to within a mile of the eastern shore, tacked and fetched into the anchorage. Only one other ship succeeded in getting into the anchorage. The ships which had not reefed their courses could not manage them, the fact is the gusts of the southeaster are too strong for whole courses, besides, they are master of a small crew and will blow to pieces before the sheets can be hauled aft.

"The extreme cold of the surface water on the Aghullas Bank, more especially on its western edge, gives the material for some interesting research. By referring to the Weather Book of our outward passage it will be noticed that with one exception we experienced the coldest surface water in about Latitude 40° South and between the meridian of Greenwich and Longitude 14° East; there the temperature was nearly down to 47° and the current was easterly, but in Longitude 14° E. the temperature suddenly rose to 62°. This would lead one to suppose that a current to the N.E. originates here and runs parallel to the S.W. current coming down the Mozambique Channel; this is supported by the fact that on September 2nd, 1860, in Longitude 10° E. the current was to the northeastward and on September 5th, after having had the sea water 67° for nearly 24 hours, the current had been S.W. so that we may suppose South Africa to be (as it were) wrapt up in a cushion of cold water brought from the parallel of 40° South which most materially affects its climate; one cannot doubt that the low temperature of Table Bay is a great boon to Cape Town, built as it is in the midst of the reflected and radiated heat of Table Mountain.

"This also accounts for the fogs brought into Table Bay by west winds, one of which we experienced on the 21st instant. When about 12 miles to the westward of Table Bay the surface temperature was 58°, the wind was westerly and there was a dense fog, but after proceeding about 35 miles to the W.N.W. the surface water was 65.8°; here was a difference of nearly 8° in the temperature of the surface water and we had a corresponding decrease in the amount of fog. Hence we may conclude that because the sea far west of Table Bay is much warmer than that near the land and because the warm air over that sea is capable of holding a large quantity of water in suspension, which it is obliged to give out when the west wind brings

it in contact with the colder water, therefore fogs will come with west winds; experience proves this to be the case. As we sailed into the warmer water the fog lifted into streaky clouds. May not this amount of condensed moisture be the material from which is manufactured the great quantity of clouds which is so common in this part of the S.E. Trades? In Longitude 20° West and between Latitude 1° 27' South and the Equator we met with a current 4° colder than the sea south of it (this was in July, 1859); it was 6° colder than the water north of it. May not this have been the same cold water after having travelled North along the West coast of Africa?

"Before closing this remark I would call attention to the single instance on our outward voyage when the water was colder than between Longitude 0° and 14° E.; September 14th, 6 a.m., the surface temperature was 44.5°; there was no mistake, for all the thermometers were affected by it. On the previous day the sea had been 61.5°; in three hours it rose from 44.5° to 54.5°; the sea was literally boiling with confusion and rolled away our main Top Gallant mast. This took place in Latitude 41° S. and Longitude 51° E., a little east of Madagascar, but, one would think, too far south for the warm water to be a current from its eastern edge. Besides, I am not aware that ships experience anything of this current during their homeward voyages from India. The warm water we met with, September 8th, in Latitude 40° S. and Longitude 32° E., was inhabited by tropical creatures, and must (one would think) have come down the Mozambique, but this may not be the origin of all the warm water found in these latitudes. The confused sea and warm water might, I suppose, have a subterranean origin. The extreme cold water may have been the effect of an iceberg or the formation of the bottom may have driven a cold under-current to the surface in this place. By referring to my notebooks I find that on November 23rd and 24th, 1858, in Latitude 41° S. and from Longitude 49° E. to 54° E. we had the surface water 12° and 13° colder than it was just before and just after coming to this part of the sea, though the Latitude was the same throughout. The current was strong to the eastward. A few more logs may help in this research."

NOTE.—The above remarks serve to show how keen the Commanders of the old clipper ships were in studying the winds and currents on their routes in order to get the best out of their ships. In later years it fell to Captain TOYNBEE, when Marine Superintendent of the Meteorological Office, to investigate the prevailing weather conditions over the ocean districts adjacent to the Cape of Good Hope, the result of which shows that the conclusions he arrived at in the above remarks were mainly correct.

CLOUD NOMENCLATURE.

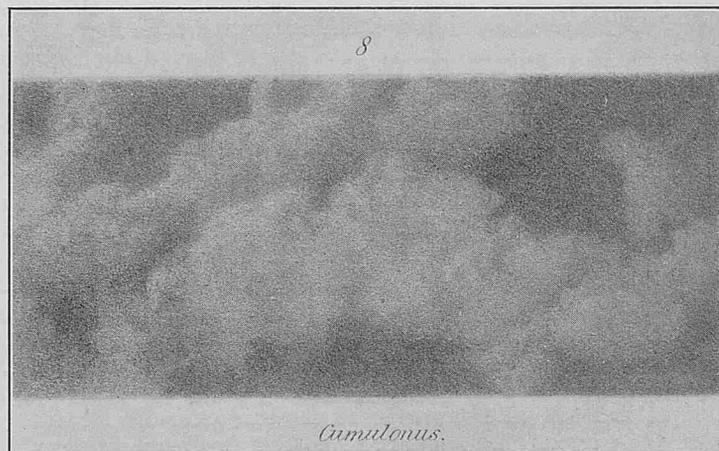
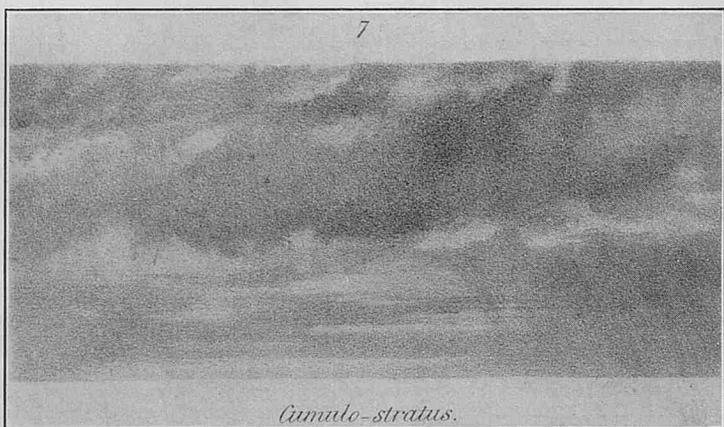
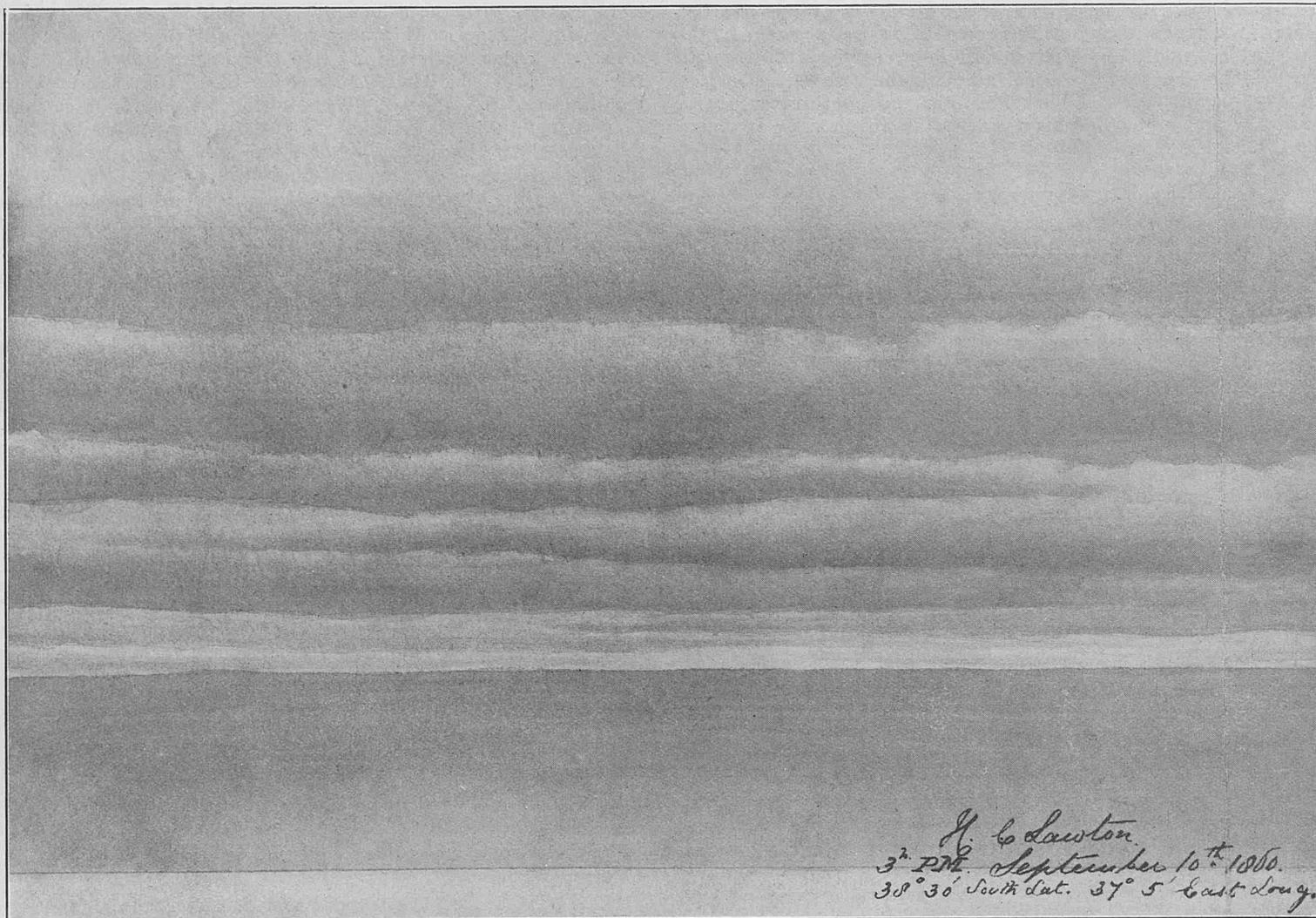
IN the log, No. 1358, of the Ship *Marlborough*, in 1861, Captain TOYNBEE made the following suggestions on the observation and naming of clouds:—

"By the aid of Mr. LAWTON, my 4th Officer, I am able to give a sketch of the kind of cloud which is very common with easterly winds. On September 10th, 1860, it will be noticed in the remarks that I have said: 'The clouds to-day are those long horizontal rolls with gleams of light between; these are very easterly-looking clouds.' I should suggest that these clouds be called rolled Strati and their sign R. Str. In my first journal of the Board of Trade these clouds were called Cum. Str. because they partake of concentration of the one and the elongation of the other, and I should prefer this name if it were not already in use.

"In cloud nomenclature I understand Cirrus to mean a light and feathery cloud, Stratus a thin cloud in horizontal line, and Cumulus a cloud in a concentrated heap. If these be the meaning of these names, then,

"Cir-Cum represents a light Cumulus,
"Cir-Str represents a light Stratus,

and Cum-Str should represent a concentrated Stratus which is just the cloud here represented.



“So far as I can understand, the name Cum-Str is given to a cloud which is between a Cumulus and Nimbus, on which there are a few black Strato, and from which there is frequently a little rain falling as in No. 7 of the above representations. Following the above rule, it seems that this should be called Nim-Cum. Applying the above rule to No. 8 representation, it might well be called Cum-Nim or a Nimbus concentrated with masses.”

TYPHOON IN THE CHINA SEA.

The following is an extract from the Meteorological Register, No. 2448, kept on board the Barque *Hope*, 453 tons, Captain HENRY HENDERSON, from Shanghai to Swatau, under date 23rd and 24th August, 1868:—

Date.	Hour.	Latitude DR.	Longitude DR.	Wind.		Barometer.		Clouds.		Weather.
				Direction.	Force.	Height.	Att. Ther.	Form.	Amount.	
VIII 23rd	1			E.N.E.	5	29.780	84½	Scud	2	
	2			N.E. by E.	6	.748	84	"	"	bmw.
	3			"	"	.726	84	"	"	"
	4			"	"	.720	84	"	"	"
	5			N.E.	7	.680	84	"	"	"
	6			"	"	.652	84	"	4	"
	7			"	"	.630	84	"	"	"
	8			"	"	.618	84	"	"	bcm.
	9			N.E. by N.	"	.596	84	"	"	"
	10			"	"	.562	84	"	7	"

Date.	Hour.	Latitude DR.	Longitude DR.	Wind.		Barometer.		Clouds.		Weather.
				Direction.	Force.	Height.	Att. Ther.	Form.	Amount.	
VIII 23rd	11	N. 28° 24'	E. 122° 45'	N.N.E.	9	29° 532	85	Scud	7	cpm.
	Noon			"	10	'500	86	"	"	"
	1			N. by E.	"	'460	86	"	"	"
	2			"	11	'436	86	"	"	"
	3			North	"	'408	86	"	"	"
	4			"	"	'340	86	"	"	"
	5			"	"	'316	86	"	"	"
	6			N. by W.	"	'300	86	"	8	"
	7			"	"	'308	86	"	"	"
	8			N.N.W.	"	'308	85	"	"	ctp.
	9			"	"	'290	85	"	"	"
24th	10	N. 28° 08'	E. 123° 30'	N.W. by N.	12	'278	84	Nym	1	op.
	11			N.W.	"	'258	84	"	"	"
	Midt.			"	"	'234	84	"	"	oc.
	1			N.W. by W.	"	'234	84	"	"	"
	2			"	"	'250	84	"	"	or.
	3			W.N.W.	"	'276	84	"	"	"
	4			"	"	'308	84	"	"	"
	5			W. by N.	"	"	"	"	"	"
	6			"	"	"	"	"	"	"
	7			West	"	'452	83	"	"	"
	8			"	11	'502	83	Scud	1	"
9	W. by S.	"	"	"	"	"	"			
10	"	"	'558	83	"	"	op.			
11	W.S.W.	10	"	"	"	"	"			
Noon	"	"	'568	83	"	"	"			
1	"	"	"	"	"	"	"			
2	"	9	'600	83	"	"	"			
3	"	"	"	"	"	"	"			
4	"	8	'663	83	"	"	"			
5	"	"	"	"	"	"	"			
6	S.W. by W.	7	'688	82½	"	"	"			
7	"	"	"	"	"	"	"			
8	"	8	'720	82	"	"	"			
9	"	"	"	"	"	"	"			
10	"	6	'740	83	"	9	"			
11	"	"	"	"	"	"	"			
Midt.	"	"	'760	82½	"	8	"			

" Remarks, August 23rd:—2 a.m. Furled top gallant sails and rove mast and yard ropes. Occasional banks of loose scud moving with wind. 4 a.m. In jib and mizen. 6 a.m. Strong breeze, bank in S.E. by E. but not threatening, sent down top gallant yards. 8 a.m. Struck fore top gallant mast. Furled mainsail. 10 a.m. Strong S.E. and N.E. sea, high and breaking.

" Noon. Furled upper topsails and foresail, squalls very heavy with sharp showers, banks of scud rise in S.E. moving with wind. 4 p.m. Wind and sea increasing rapidly. Barometer very low. As we are well clear of the centre and cannot carry much longer any sail and S.E. sea very dangerous, hove to head to ENE, under storm staysail. 4 to 8 p.m. Strong gale and bad cross sea. 8 p.m. to midnight, wind increased to a hurricane gradually veering. Westerly sea not so high as cross and breaking, sky filled with vapour, occasional sharp showers.

August 24th.—To 4 a.m. Incessant rain blowing with great violence and fierce rearing squalls. 6 a.m. More moderate. 8 a.m. to noon. gradually moderating; set closed reefed topsails, sky overcast and very bad sea. 6 p.m. Wore to southward set courses, etc. 8 p.m. Sky broke to south-eastward. 8 p.m. to midnight. Wind and weather very unsettled, blowing in gusts, very heavy south-westward and s'ly. sea, sky very heavy in N.W. gradually clearing to S.E. and overhead.

" For six days previous to this typhoon the weather had been very fine with moderate S.E. winds, cloudless sky, high barometer. The falling barometer and heavy S.E. swell were the only sure indications of its approach, for up to the time we hove to, the weather was relatively fine and for some hours afterwards. At sunset on the 22nd I saw a low bank in S.E. and when wind veered to E.N.E., barometer fell and S.E. swell became high and breaking.

" I made sure a typhoon was coming upon us and not being able to clear the Chusan Archipelago on starboard tack I ran to the southward, though the centre bore S.S.E. in order to get sea room and afterwards to the S.S.W. being in hopes of crossing in front, which we fortunately succeeded in doing. Had I been sure at first of crossing I might have kept more away and closed the land and probably have only had to heave to with moderate S.W. gale, the tail of the storm, but safety is the first consideration under such circumstances and we only go half speed with our foul bottom. The clouds all rose from a bank, the centre of which was the centre of storm, it seemed as if the top kept peeling off and still it came nearer. I think it was moving to the N.N.W. or more westerly and must have been of large diameter."

NOTE:—In the above remarks the word veering is used to denote a shift of wind to the left, not to the right as is now general in both hemispheres.

SOUNDING BALLOON ASCENT OVER THE NORTH SEA.

By COMMANDER L. G. GARBETT, R.N. (Retired), SUPERINTENDENT, NAVAL METEOROLOGICAL SERVICE.

In July, 1927, I was again fortunate enough to obtain permission of the Hydrographer of the Navy to go afloat in H.M.S. *Fitzroy* (Commander J. P. HARVEY, O.B.E., R.N.), to carry out further experiments with pilot and sounding balloons. I embarked at Gorleston on the 4th July and the ship proceeded to sea that afternoon; a moderate to fresh south-easterly wind was blowing with poor visibility and cloudy weather, but the weather conditions were generally unsettled.

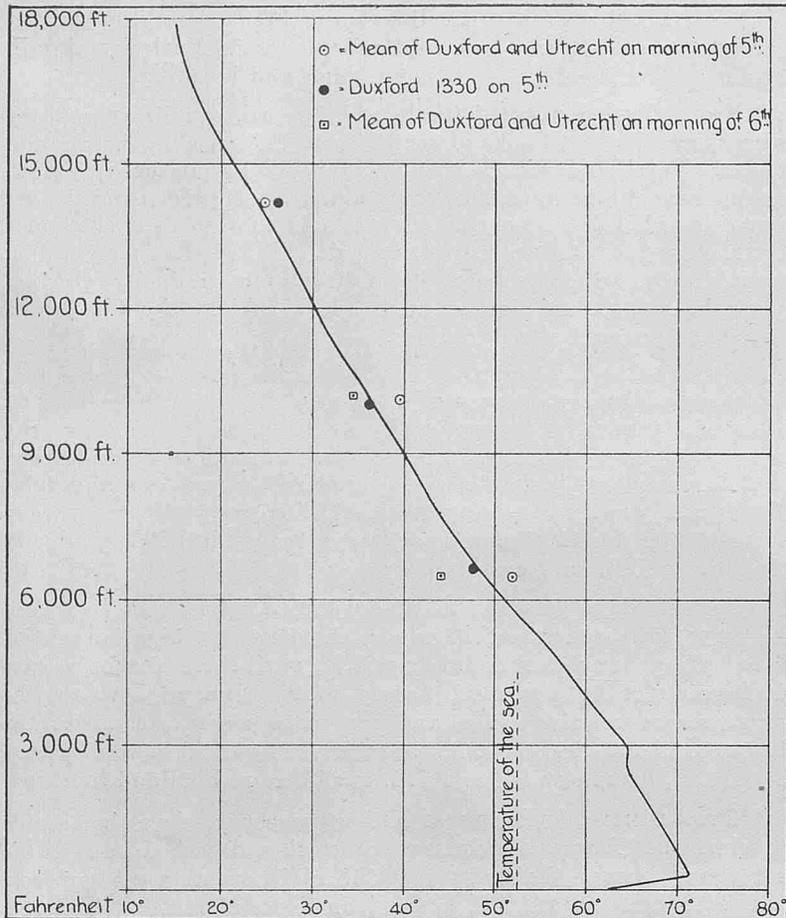
The pilot balloon observations were obtained in a similar way to those described from time to time in the pages of this Journal, but, in addition, experiments were made with the tail attachment and by this means an approximate check of the rate of ascent of these balloons was obtained. The tail method was described in THE MARINE OBSERVER, March, 1926, and I therefore do not propose to discuss it further in this note but will confine myself to describing a sounding balloon ascent made on July 5th.

The surface weather conditions were much the same on the morning of the 5th as they were on the preceding day. In order to obtain the direction and force of the wind in the upper layers a pilot balloon was sent up, the balloon, however, disappeared in a cloud on reaching a height of 2,500 feet and was not seen again. In the afternoon a report giving information of the upper winds was received from the Meteorological Office, which showed that the wind at 20,000 feet probably reached a speed of 60 m.p.h. In view, however, of the improving conditions on the surface during the late afternoon, a moderating wind and good visibility it was decided to take advantage of these favourable surface conditions and send up a sounding balloon.

The balloons were inflated on the fore deck, the upper one being given a lift of 7 lbs. and the lower a lift of 3½ lbs. During the operation of inflating, the ship was lying to with the wind on

North Sea 5th July, 1927. 1624 G.M.T.

Meteorograph found in Latitude 53° 20' N., Longitude 2° 15' E.



the starboard quarter. The meteorograph was mounted in a cage and the dropper set to release the upper balloon at about 18,000 feet. The apparatus was arranged in the same way as in previous years (see THE MARINE OBSERVER, February, 1925) and the same method of releasing it from the ship was adopted.

The apparatus was ready at 5.20 p.m. and was released from the ship off South Knoll Bell Buoy without difficulty. The apparatus first took a north-easterly course, gradually veering to the eastward as it increased its height. It was followed by means of a sextant for 11 minutes and then disappeared into the clouds, its estimated height at that time was about 7,000 feet. The balloons appeared to be travelling rapidly but gaining height slowly.

On the balloon being released the ship proceeded on a course 36°, about 9 knots. After steaming nearly 3 hours and covering a distance of about 30 miles and in view of the lateness of the hour and consequent decreasing visibility, it was decided to give up the chase, and as there were a large number of fishing vessels in the vicinity it was hoped that the instrument would be recovered.

On July 17th I received information that the meteorograph had been recovered by a trawler, it having been pulled up in her trawl from a depth of 12 fathoms where it must have been for 10 days. The instrument was little damaged and will be used again after adjusting and cleaning up.

The record has been examined by Mr. L. H. G. DINES at Kew Observatory and has been found to be quite legible—and gives a very remarkable surface temperature inversion as shown on the accompanying diagram. Mr. DINES was able to trace on the record the point when the instrument went into the sea where the pressure increased greatly; the temperature recorded at this point was 284.7a (53°.1 F.) and the temperature of the sea taken on board *Fitzroy* agrees favourably with this and verifies the accuracy of the record.

In examination of the weather chart for 1800, on the 5th July, it is noted that the temperature over France and Germany was much higher than that existing over the British Isles. The warm air, with a surface temperature of nearly 80°, having a lapse rate rather less than the dry adiabatic, flowed northward and in its progression over the North Sea was cooled by contact with a colder sea, and this cooler air was apparently spread upwards by turbulence through about 100 metres (328 feet).

It is known that inversions of temperature of this kind must frequently be formed over the sea during the summer months, but in the absence of direct measurement their presence can only be inferred. It is particularly fortunate that the instrument was ultimately recovered in the present case when such a striking example of an inversion of this type was encountered.

UNUSUAL CLOUDS.

By G. A. CLARKE, OF ABERDEEN OBSERVATORY.

IN an article upon "Clouds" in the last year's volume of THE MARINE OBSERVER I made mention of several forms of cloud that could not readily be assigned to any particular type in the International Classification, or whose appearance was unusual. Such clouds are usually associated with some local or particular weather condition, and it is my desire in the present article to describe some of these forms and arrangements of clouds so that observers at sea may readily recognise them and make notes and sketches or photographs of any such forms they may see. Some of these clouds are believed to be due to the effect of mountain ridges upon the smooth flow of the air; consequently any observations of such forms over the oceans and away from land will be of very great interest and importance. Other forms may be observed equally well over sea as over land.

One of the most characteristic forms associated with mountains is that known as the "Lenticular" cloud from its resemblance in shape to the cross-section of a lens. It is not often that an example is seen so perfect as the one shown in FIGURE 1, but the general appearance is some variation of this form; sometimes the cloudbanks are fused together, as in FIGURES 2 and 3, but when the banks are detached their form has been likened to that of airships, torpedoes, or cigars, while in the Antarctic these clouds seen in the neighbour-

hood of Mount Erebus were termed "Whalebacks." Very fine pictures of these last-mentioned clouds are to be found in recent books on Antarctic Expeditions.

Generally speaking, the lenticular clouds are of "Streamline" structure, and they differ from all other clouds in several respects. They are not clouds pure and simple which move with the air in which they float, but are really banks of small cloudlets massed together and are formed at certain places in the atmosphere on the lee side of the mountains. It is believed that the mountains give rise to a series of waves and large eddies in the air, as the latter passes over them, and that at the crests of these waves condensation occurs whenever the air is sufficiently moist, and thus the cloudbank is formed. Such waves are fairly persistent and therefore the cloudbanks, when observed, seem to be almost stationary in the air, though their shape is incessantly changing. FIGURES 2 and 3 show the remarkable changes that occurred in one such cloudsheets at Aberdeen within the space of only 10 minutes, yet the cloudbanks remained in that part of the sky for several hours. If, however, these cloudbanks are carefully watched, it will be seen that small cloudlets are forming rapidly at the weather side of the bank, and passing into the general mass, while at the lee side similar small cloudlets are passing out therefrom and

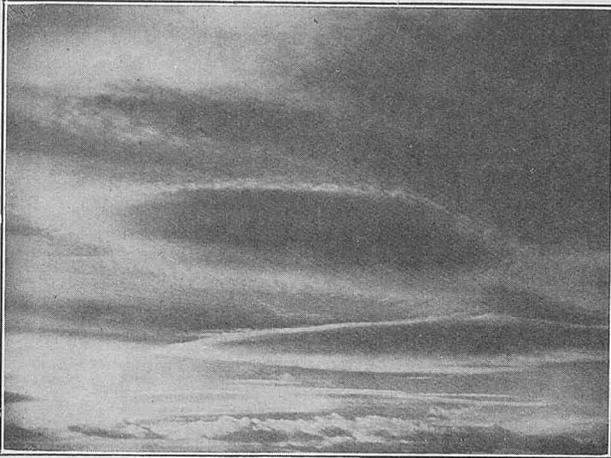


Figure 1.

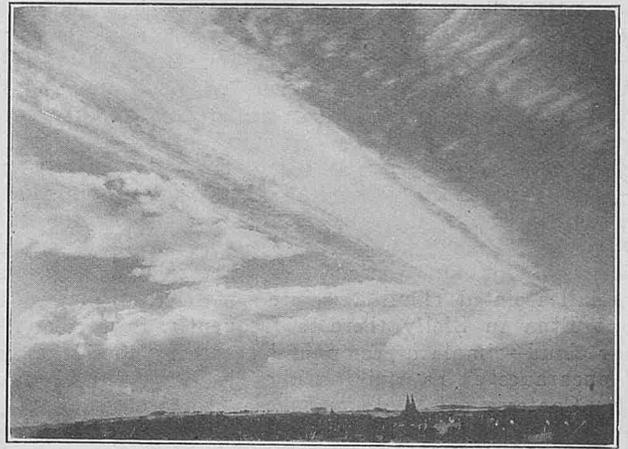


Figure 5.

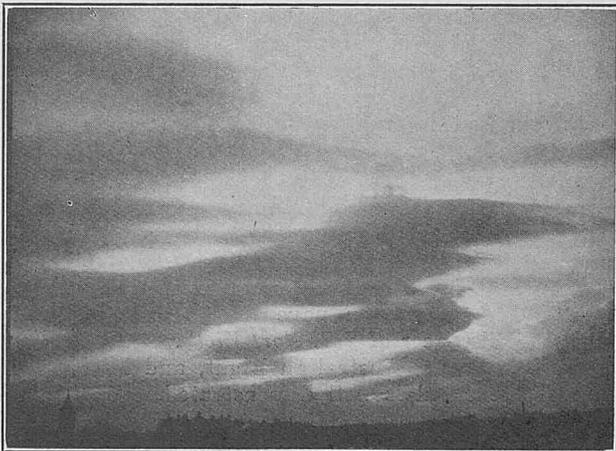


Figure 2.

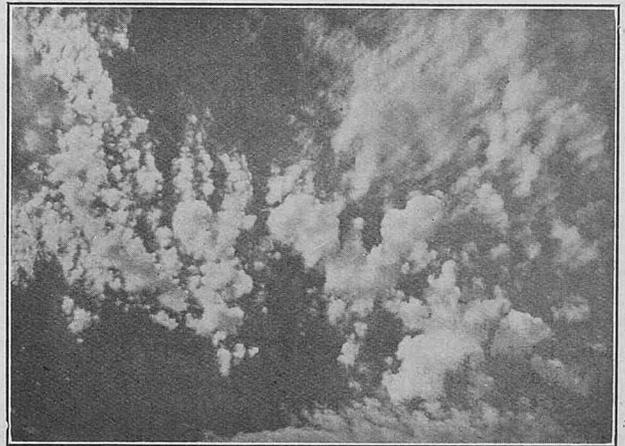


Figure 6.

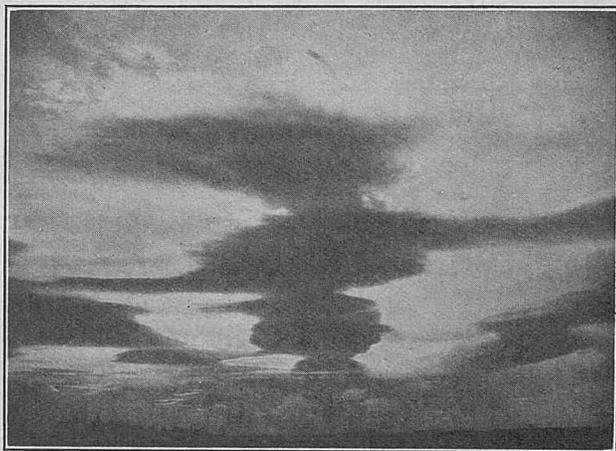


Figure 3.

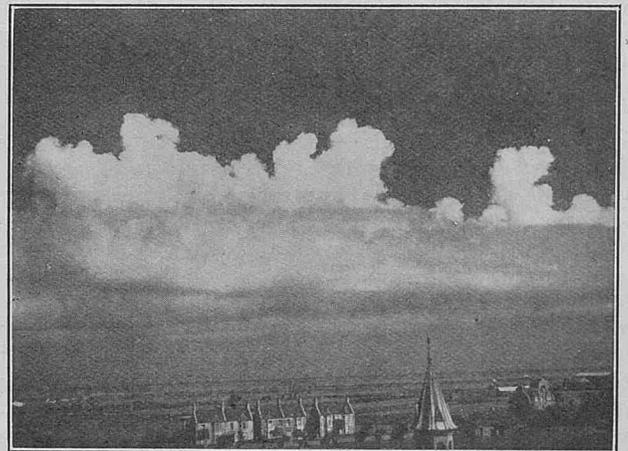


Figure 7.

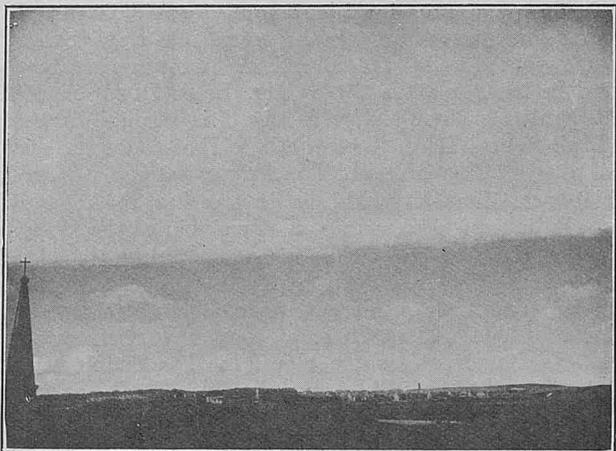


Figure 4.

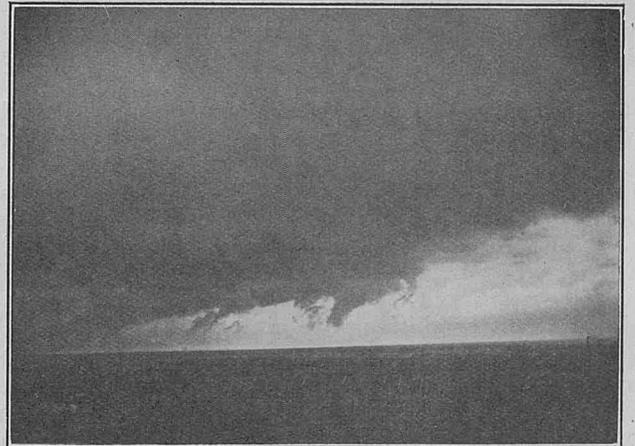


Figure 8.

evaporating rapidly. Consequently, though the cloudlets themselves may show a very rapid velocity of translation, the cloudbank as a whole persists in its place for a long time. As a rule such cloudbanks are formed in the intermediate and upper layers of the air, and occasionally they may be present at different levels simultaneously. When their undersurfaces are illuminated by the rays of the setting sun they often show beautifully rippled patterns, much resembling the æolian rippling found on sand-dunes.

Where there exists a ridge of mountains the complicated waves and eddies produced thereby give rise to a widespread display of lenticular clouds, but where there is an isolated peak, we often find a small isolated cloud associated with it. Thus, in the lee of Mount Etna in Sicily there is frequently formed an isolated lenticular cloud—simple or compound according to circumstances—whose appearance is so striking that it is known by the local name of "Contessa del Vento." In the Azores a somewhat similar cloud in the lee of Pico is known as the "Baleia." Both these clouds are found at some distance from the mountain that gives rise to them. On the crests and ridges of the mountains themselves we usually find another characteristic cloud that clings persistently to them like a cap. The best example of this type is the "Table Cloth" on Table Mountain.

The next form I wish to speak of is found chiefly in the intermediate and upper regions of the atmosphere, and consists of long bands of cloud or of widespread sheets with a very sharp edge on one side of them. These clouds may be found equally often over sea as over land, but are likely to be more frequent in the north and south middle latitudes between 40° and 60° North and South. They are generally associated with the presence of depressions and are strongly in evidence after the passage of the barometric minimum, and become visible on the clearing away of the lower Nimbus rainclouds.

Those who have read, in Chapter IX of "Wireless and Weather an Aid to Navigation," the description of the structure of a cyclonic depression according to the theory of Professor J. BJERKNES, will recall that the main feature of a depression according to this theory is the convergence of a warm and relatively moist wind from some southerly point (equatorial air) and of a cold, relatively dry wind from northward (polar air), with the consequence that the warm, moist air is forced to rise upwards along a slope over the colder air below it. The advancing edge of this wedge-like tongue of warm air generally shows as threads of Cirrus, thickening into Cirro-Stratus and Alto-Stratus as the depression advances towards the observer, but very often the lateral boundary of such a wedge takes the form of a very sharp, clear-cut cloud edge, often several hundred miles in length. A portion of such a cloudlayer is shown in FIGURE 4. The view is towards the West, and the cloud is a sheet of dense Cirro-Stratus which was moving from S.S.W.—i.e., from left to right in the picture—at a rather high velocity. Only this western edge of the cloud was visible, the rest of the sky being covered entirely with the cloudlayer. The depression associated with this sheet of cloud swept across our islands during the night and was accompanied by a fierce snow blizzard.

Sometimes, instead of a single sharp edge, there may be a series of parallel lines or bands of cloud detached from the main sheet, but obviously belonging to it. The type of cloud generally seen is a dense Cirro-Stratus or Alto-Stratus, but occasionally this may break up into Cirro-Cumulus and Alto-Cumulus if circumstances demand it, and some wonderful cloud displays are then to be seen.

On other occasions there may be seen only a single broad band of cloud, usually of the Cirrus type, like that shown in FIGURE 5 (where we have a type transitional between Cirrus and Cirro-Cumulus), which is moving from S.S.W. while the lower Cumulus cloud is moving from W.N.W. This difference of direction between the upper and lower clouds is very commonly found when the upper cloud is arranged in long bands stretching across the whole sky and it usually means that the air in which the upper cloud is found has had a different origin from the air below it.

During thundery weather; or more particularly preceding it, there are often to be seen in the upper regions of the air little rounded puff-like cloudlets resembling shell bursts, which usually develop until they assume the appearance of miniature thunderclouds at a high level. In the photograph, FIGURE 6, they are grouped

irregularly, but very often they occur more or less connected together into lines from which the individual cloudlets tower upwards in castellated forms, a characteristic that has earned for them the name of "Turret-cloud" ("Alto-Cumulus Castellatus" in the International Classification).

Their appearance in the sky indicates unusual instability of the air at the levels where the clouds are formed, and they may almost certainly be taken as the forerunners of a spell of thundery weather; it is not long before their appearance is followed by the formation of the large thunderclouds at the ordinary level. Sometimes these ordinary thunderclouds commence in a manner resembling the lines of "Turret cloud" as is shown in FIGURE 7, where we have columns of thundercloud rising vigorously from a general level sheet. Towering columns of Cumulus cloud are found best developed in the Dol-drums of the equatorial regions, many fine examples have been recorded from the East Indies, where the island-dotted seas give the ideal conditions of warmth and moisture-laden air that are necessary for vigorous convection.

As a contrast to the upward-rising domes of cloud we find occasionally a sky wherein the clouds seem to have been reversed, the domed portions hanging downward as though the cloud material were descending. This condition is found most often in the rear of thunderstorms, or else is associated with sudden changes of wind that are accompanied by sudden falls of temperature, much as occurs in line-squalls.

Such displays, which are often termed "Festoon Cloud" or "Pocky Cloud," and classified as "Mammato-Cumulus," are usually very transient, and confined to only one part of the sky, though the writer has seen one example that covered the whole visible sky. A very fine photograph of this type of cloud is shown in THE MARINE OBSERVER for August, 1927, on page 151. It was taken by Mr. L. M. R. BAYLY, 2nd Officer of S.S. *Port Victor*, in the Indian Ocean to the South of the Great Australian Bight, and in the picture the local nature of the cloud is well demonstrated.

But the most striking of all cloud phenomena is the long roll of cloud that occurs with a "Line-squall." With a really well developed squall this takes the form of a vast roll of Cumulus-like cloud stretching in a straight or curved line from one horizon to the other like a huge breaker. If a thunderstorm is associated with the squall, the cloud may increase upwards and develop into Cumulo-Nimbus. There are, however, many occasions when a line-squall is of only slight or medium intensity, and the cloud accompanying it appears simply as a heavy dark sheet with a fairly straight advancing front, the edges of which are rather ragged. One such cloudsheets is shown in FIGURE 8, the cloud-front having already passed overhead. At its edge there are to be seen pendent masses of condensation—these were whirling and twisting as if in a vortex. Occasionally this vortical motion becomes strongly established, and a "Waterspout" is formed; in the case of one well marked line-squall that passed over Aberdeen, accompanied by a long roll of Cumulus cloud, three waterspouts were formed when the cloud roll passed out over the sea.

The cloud sketches and photographs that have appeared in the 1927 volume of THE MARINE OBSERVER have been of very great interest indeed. A feature of the sketches is the remarkable number of waterspouts associated with Cumulo-Nimbus and squall clouds. The sketch on page 210, by Lieutenant D. W. DEANE, R.N., of H.M.S. *Flinders*, resembles very closely the appearance of the waterspouts seen during the Aberdeen line-squall already mentioned, and in that on page 171 by Mr. L. R. BULL, of S.S. *Chancellor*, the bank of Cumulo-Nimbus cloud is strongly suggestive of the cloud-roll found in a line-squall. The sketch of the arched squall on page 65, by Mr. M. ROBERTSON, of S.S. *Elpenor*, is a remarkable formation—if would be interesting to know what development it experienced subsequently; while the very precise description of the weather changes accompanying the cloud-sketch on page 168, made by Mr. F. R. SPURR, of S.S. *Macedonia*, off Ras Ara, seem to suggest the undercutting of the warm moist air over the sea by a sudden violent burst of cool dry air from the Yemen highlands. In its essentials the cloud in this sketch bears a fair resemblance to squall-cloud sketched by Mr. T. E. STEEL, of S.S. *Auditor*, and shown on page 149. On this same page there is a picture by Mr. O. F. PENNINGTON, S.S. *Empress of Scotland*, of a very remarkable long curved band of filmy Stratus. Waves of low

Stratus are not uncommonly seen at Aberdeen, but they are of very small size compared with Mr. PENNINGTON'S example. The cloud effect off South Georgia, sketched by Mr. T. W. GOODCHILD, R.R.S. Discovery, page 47, is probably an example of a compound lenticular cloud bank, somewhat of the nature of that shown in FIGURE 2 of the present article. The mountains of South Georgia, shown in the sketch, probably gave rise to the cloud.

I have already referred to the excellent picture of Mammato-Cumulus by Mr. BAYLY. Two other photographs which are very fine examples of cloud-types are those on page 48 by Mr. C. F. POSE, S.S. *Part Hunter*, and show Cumulus and Alto-Cumulus respectively. Among the many very artistic—almost Turner-esque—studies by Captain T. V. ROBERTS, of S.S. *Euripides*, on pages 6, 27, 48 and 49, there is a fine typical picture of Alto-Cumulus over Cumulus, taken on March 17th, 1926.

The following hints may be of assistance to Marine Observers who have cameras:—

If the cameras are "Plate" cameras, it is advisable to use plates of very slow speed, such as the "Ordinary" and "Process" types. Used without a screen these plates give excellent results because of their power of giving considerable contrast between the blue of the sky and the white of the cloud.

Fast plates, and the films now used so commonly, do not give such brilliant results in ordinary circumstances, but if a yellow filter is used on the lens, increasing the exposure from two to five times, much better results will be obtained. There will be no difficulty about the exposure—even very short exposures can still be given with a "Five-times" filter on the lens, because the light from the sky is about ten times that reflected from the ordinary landscape.

Best of all, however, are the panchromatic films or plates (both are now obtainable), since, by using these, an orange or even a red filter can be used over the lens, and very strong contrast thereby obtained. Most of the pictures illustrating this article were made by this means.

WEATHER SIGNALS.

CHINA SEA.

II.—WIRELESS WEATHER SIGNALS.

WIRELESS WEATHER BULLETINS.

The Key and Decode Tables of the International Weather Telegraphy Code will be found on pages 29 to 23 of Volume V No. 49. (The January, 1928 Number.)

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

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

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

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

FRENCH INDO-CHINA.

Mitho W/T Station, approximate Latitude $10^{\circ} 21' N.$, Longitude $106^{\circ} 21' E.$, call sign **HVM**, broadcasts weather bulletins at 0300 and 1330 G.M.T. on a wavelength of 600 metres, as follows:—

0300 G.M.T. Bulletin.

This bulletin commences with the words "Obs. 6 heures" and contains 2300 G.M.T. observations taken at the following stations:—

Fu Lien	... Latitude $20^{\circ} 49' N.$	Longitude $106^{\circ} 47' E.$	(approx.)
Tourane	... " $16^{\circ} 07' N.$	" $108^{\circ} 13' E.$	"
Cape St. James	" $10^{\circ} 20' N.$	" $107^{\circ} 05' E.$	"
Fort Bayard...	" $21^{\circ} 13' N.$	" $114^{\circ} 16' E.$	"

Form of bulletin. One seven-figure group for each station is broadcast in the order given above. The group for Fort Bayard has six figures only.

Code used. The bulletins (with the exception of the seventh figure of each group) are broadcast in International Code, represented by "Key" letters as follows:—

BBBDDFS'

S' = State of the sea. (Table XXXVI.)

The figure representing State of Sea is not broadcast for Fort Bayard.

Barometric readings are broadcast in mms. and tenths. See Table XXXVII to convert to mbs. and ins.

1330 G.M.T. Bulletin.

This bulletin is broadcast *en clair* and gives a summary of 0900 G.M.T. observations taken at Indo-China stations and 0600 G.M.T. weather conditions at Hong Kong. The observations of each station are broadcast in the following order:—

Barometric pressure, barometric tendency during the preceding 24 hours, wind direction and force (Beaufort), state of the sky, temperature and state of the sea.

The barometric tendency is given according to the following table:—

Barometer.			
mms.	ins.		
± 0 to 1	(.00-.04)=	Hausse (rise) or baisse (fall)	Légère (slight).
± 1 to 2	(.04-.08)=	" " " "	Faible (small).
± 2 to 3	(.08-.12)=	" " " "	Moderée (moderate).
± 3 to 4	(.12-.16)=	" " " "	Assez forte (rather quickly).
± 4 to 6	(.16-.24)=	" " " "	Forte (quickly).
± 6 to 8	(.24-.31)=	" " " "	Très forte (very quickly).

NOTE.—It has been said that there is a "Zone of silence" along the Anam Coast, between Padaran and Varella Point which renders the reception of W/T signals from Mitho W/T Station difficult.

HONG KONG.

Cape d'Aguilar W/T Station, Latitude $22^{\circ} 13' N.$, Longitude $114^{\circ} 15' E.$, call sign **VPS**, broadcasts weather bulletins in special code containing observations from various stations in the Far East at 0400, and, 1200 G.M.T. on a wavelength of 600 metres, repeated at 0500 G.M.T. on 2800 m. I.C.W. and at 1300 G.M.T. on 2000 m. I.C.W., after Time Signal.

The names of the observing stations included in these broadcasts, together with the hours at which the observations are taken are given in the lists below:—

As it has not been found possible to secure complete synchronisation, the barometer readings broadcast at 0400 G.M.T., will be reduced approximately to 2200 G.M.T. and those broadcast at 1200 G.M.T. to 0600 G.M.T.

0400 G.M.T. Bulletin.

No.	Station.	Position (approximate).		Time of observation (G.M.T.).
		Latitude.	Longitude.	
1.	Nagasaki ...	32° 45' N.	129° 53' E.	2100
2.	Oshima ...	—	—	2100
3.	Naha ...	26° 13' N.	127° 41' E.	2100
4.	Ishigakijima ...	24° 20' N.	124° 10' E.	2100
5.	Ichang ...	30° 42' N.	111° 16' E.	2200
6.	Hankow ...	30° 35' N.	114° 18' E.	2200
7.	Changsha ...	28° 22' N.	112° 50' E.	2200
8.	Shanghai ...	31° 15' N.	121° 30' E.	2200
9.	Sharp Peak ...	25° 59' N.	119° 27' E.	2300
10.	Amoy ...	24° 27' N.	118° 04' E.	2200
11.	Swatow ...	23° 23' N.	116° 42' E.	2200
12.	Taihoku ...	25° 02' N.	121° 31' E.	2100
13.	Koshun ...	—	—	2100
14.	Pescadores ...	23° 30' N.	119° 30' E.	2100
15.	Hong Kong ...	22° 18' N.	114° 10' E.	2200
16.	Pratas Island ...	20° 42' N.	116° 43' E.	2200
17.	Fu Lien ...	20° 49' N.	106° 47' E.	2300
18.	Tourane ...	16° 07' N.	108° 13' E.	2300
19.	Cape St. James ...	10° 20' N.	107° 05' E.	2300
20.	Basco ...	20° 26' N.	121° 58' E.	2200
21.	Aparri ...	18° 31' N.	122° 07' E.	2200
22.	Manila ...	14° 35' N.	120° 59' E.	2200
23.	Legaspi ...	13° 10' N.	123° 45' E.	2200
24.	Tacloban ...	11° 15' N.	125° 00' E.	2200
25.	Iloilo ...	10° 42' N.	122° 34' E.	2200
26.	Surigao ...	9° 48' N.	125° 29' E.	2200

Form of message. One group containing 12 figures is broadcast for each of the stations given in the list.

1st, 2nd, 3rd and 4th figures in each group give the corrected barometer reading.

5th and 6th figures in each group give the dry bulb temperature of the air.

7th and 8th figures in each group give the wet bulb temperature of the air.

9th and 10th figures in each group give the wind direction (00=N.; 04=E.; 08=S.; 12=W., etc.).

11th figure in each group gives the wind force by Beaufort scale, forces of 9 and above being sent as 9.

12th figure in each group gives the weather according to the following table:—

- 1 = fine; blue sky or detached clouds.
- 2 = cloudy or overcast.
- 3 = rain.
- 4 = fog.
- 5 = thunderstorm.
- Z = No observation.

A weather report and forecast follow the stations' reports.

1200 G.M.T. Bulletin.

No.	Station.	Position (approximate).		Time of observation (G.M.T.).
		Latitude.	Longitude.	
1.	Shanghai ...	31° 15' N.	121° 30' E.	0600
2.	Sharp Peak ...	25° 59' N.	119° 27' E.	0600
3.	Amoy ...	24° 27' N.	118° 04' E.	0600
4.	Swatow ...	23° 23' N.	116° 42' E.	0600
5.	Taihoku ...	25° 02' N.	121° 31' E.	0300
6.	Koshun ...	—	—	0300
7.	Pescadores ...	23° 30' N.	119° 30' E.	0300
8.	Hong Kong ...	22° 13' N.	114° 16' E.	0600

No.	Station.	Position (approximate).		Time of observation (G.M.T.).
		Latitude.	Longitude.	
9.	Pratas Island ...	20° 42' N.	116° 43' E.	0600
10.	Fu Lien ...	20° 49' N.	106° 47' E.	0700
11.	Tourane ...	16° 07' N.	108° 13' E.	0700
12.	Cape St. James ...	10° 20' N.	107° 05' E.	0700
13.	Basco ...	20° 26' N.	121° 58' E.	0600
14.	Aparri ...	18° 31' N.	122° 07' E.	0600
15.	Manila ...	14° 35' N.	120° 59' E.	0600
16.	Legaspi ...	13° 10' N.	123° 45' E.	0600
17.	Tacloban ...	11° 15' N.	125° 00' E.	0600
18.	Iloilo ...	10° 42' N.	122° 34' E.	0600
19.	Surigao ...	9° 48' N.	125° 29' E.	0600

Form of message. Same form as 0400 G.M.T. Bulletin.

A weather report and forecast follow the stations' reports.

I.—Ship's Wireless Weather Signals.

"Selected Ships," *i.e.*, ships in the Fleet List with the letters ML or M appearing in the equipment column, when at sea in the China Sea, are invited to make their routine weather reports to "All Ships" as usual.

The time of Wireless Weather Telegraphy **observation** for the China Sea is 2200 G.M.T.

When within range of **Cape d'Aguilar W/T Station** "Selected Ships" should address their reports to **VPS** as well as to **CQ**, making them on 2400 metres (C.W.).

Cape d'Aguilar W/T Station keeps continuous watch for ships' weather reports.

For particulars and sample of Ships' Wireless Weather reports see Chapter I of "Wireless and Weather an Aid to Navigation" and pages 16-18, Volume V, No. 49 of this Journal.

Hong Kong Observatory W/T Station, call sign **GOW** broadcasts weather reports at 0430 and 1145 G.M.T. on 300 m. (R/T).

CHINA.

Pratas Island.

Spark and C.W. Issues.

Pratas Island W/T Station, approximate Latitude 20° 42' N., Longitude 116° 43' E., call sign **XPI**, broadcasts a daily weather report and forecasts based upon observations from about 90 stations in the Far East at:—

0600 G.M.T. (based upon 2200 G.M.T. observations) wavelength 600m. (spk.).
1100 G.M.T. (" " 0600 " ") wavelength 600m. (spk.).

Repeated at 0610 and 1110 G.M.T. respectively, on a wavelength of 1450m. (C.W.).

The weather report and forecasts are broadcast *en clair* in English and are preceded by QST QST QST de XPI XPI XPI. The message is broadcast twice and contains the following information:—

Part I. Particulars regarding general atmospheric pressure distribution including the location of high and low pressure areas.

Part II. Location and expected direction of movement of depression, or typhoon, affecting the China Sea, Eastern Sea, Yellow Sea, Japan Sea (including the Pacific Ocean to the eastward) or S.E.

of the Philippine Islands extending northward from Guam and adjacent islands to Northern Japan.

Part III. Wind and weather forecast for Formosa Channel, China Sea and neighbouring areas.

Part IV. Wind direction and force, and state of the weather at Pratas Island.

Weather reports are also transmitted on request free of charge.

SHANGHAI.

Spark Issues.

Shanghai W/T Station, approximate Latitude 31° 12' N., Longitude 121° 26' E., call sign **FFZ**, broadcasts weather bulletins *en clair*, in French and English, for China and the China Seas, on a wavelength of 750 metres (spark) at:—

0300 G.M.T., after Time Signal, containing observations made at 0100 G.M.T.

0900 G.M.T., after Time Signal, containing observations made at 0700 G.M.T.

1400 and 1800 G.M.T., containing observations made at 1200 G.M.T.

NOTE.—Owing to the alleged existence of “ zones of silence ” along the China Coast which apparently make reception of W/T messages difficult from Shanghai W/T station, weather bulletins and storm warnings will also be broadcast on a short wavelength of 34 metres at 1130 G.M.T. preceded by the general call and the call sign of **Shanghai W/T Station FFZ**.

These zones are said to be as follows:—

- In the centre of Formosa Strait up to the Foochow Coast.
- In the Gulf of Pechili behind Shantung Promontory, and
- In the Yangtse-kiang river between Nanking and Chingkiang.

The range of the Shanghai W/T station short wave set has been ascertained to be approximately 2,000 miles.

JAPAN.

C.W. Issues.

The Central Meteorological Observatory, Tokyo, W/T Station, approximate Latitude 35° 39' N., Longitude 139° 44' E., call sign **JFRA**, broadcasts weather bulletins as follows:—

(1) **Synoptic data** messages giving a summary of the weather situation over Japan and the neighbouring seas by means of data, in special code (Japanese Meteorological) for twenty (or less) selected stations.

(2) **Storm warnings**, for particulars *see* p. 143.

Synoptic data messages are broadcast as follows:—

At 0010 G.M.T. containing observations taken at 2100 G.M.T. (previous day).

„ 0600 G.M.T. „ „ „ 0300 „

„ 1110 „ „ „ 0900 „

Wavelengths at 0010 and 0600 G.M.T. 4,000 metres (C.W.) repeated on 600 metres (I.C.W.).

„ „ at 1110 G.M.T., 4,000 metres (C.W.) repeated on 750 metres (I.C.W.).

Method of transmission at all times is as follows:—

- (1) Commencing signal: **■■■■■** transmitted once.
- (2) QST „ „ thrice.
- (3) “ de ”: **■■■** „ once.
- (4) Call sign **JFRA** „ once.
- (5) Message „ twice.
- (6) End of message **■■■■■** „ once.

List of Selected Meteorological Stations.

The synoptic data messages give the barometric reading, direction and force of the wind and the state of the weather, in code at the following twenty stations:—

Index Letter.	Name of Station.	Province.	Position (approx.).	
			Latitude.	Longitude.
A	Ishigakijima ...	Loochoo	24° 20' N.	124° 10' E.
B	Nafa ...	„	26° 13' N.	127° 41' E.
C	Nase ...	„	28° 23' N.	129° 31' E.
W	Kagoshima ...	Japan Proper	31° 34' N.	130° 33' E.
I	Murotozaki ...	„	33° 15' N.	134° 11' E.
F	Tomie ...	„	32° 37' N.	128° 46' E.
G	Sakai ...	„	35° 33' N.	133° 04' E.
V	Hamamatsu ...	„	34° 43' N.	137° 43' E.
H	Mera ...	„	34° 55' N.	139° 50' E.
J	Bonin Is. ...	„	27° 05' N.	142° 11' E.
K	Minatsuki ...	„	37° 22' N.	136° 45' E.
L	Ishinomaki ...	„	38° 26' N.	141° 19' E.
M	Hakodate ...	Hokkaido	41° 47' N.	140° 43' E.
N	Shana ...	„	45° 14' N.	147° 53' E.
O	Mokpo ...	Chosen (Korea)	34° 47' N.	126° 20' E.
S	Gensan (Wensan) ...	„	39° 11' N.	127° 26' E.
P	Yūki ...	„	42° 20' N.	130° 20' E.
Q	Dairen (Talien) ...	Manchuria	38° 54' N.	121° 36' E.
R	Changchun ...	„	43° 55' N.	125° 18' E.
T	Shanghai ...	China	31° 15' N.	121° 30' E.

When the information from one or more stations is lacking, data from the auxiliary stations in the following table will be broadcast in lieu.

List of Auxiliary Stations.

Index Letter.	Name of Station.	Province.	Position (approx.).	
			Latitude.	Longitude.
U	Taihoku ...	Formosa	25° 02' N.	121° 31' E.
D	Miyazaki ...	Kiushiu	31° 55' N.	131° 26' E.
Z	Nemuro ...	Hokkaido	43° 20' N.	145° 35' E.
X	Joshin ...	N. Chosen	40° 30' N.	129° 11' E.
Y	Mukden ...	S. Manchuria	41° 48' N.	123° 23' E.

Form of Messages.

The synoptic data messages are broadcast in a collection of *letters* forming 20 groups (or less), each group consists of five letters.

1st letter in each group is the index letter of the observation station.

2nd and 3rd letters in each group give the corrected barometer reading in mm., Table XXXVIII (To convert to mbs. and ins. *see* Table XXXVII).

4th letter in each group gives the wind force by Beaufort Scale and the state of the weather, Table XXXIX.

5th and last letter in each group gives the wind direction, Table XL.

**SPECIAL WEATHER TELEGRAPHY TABLES,
NOT NEW INTERNATIONAL CODE.**

Table XXXVI.

State of the Sea—Mitho bulletin.

Code figure.	Code figure.
0 = Calm.	5 = Rather rough.
1 = Very smooth.	6 = Rough.
2 = Smooth.	7 = High.
3 = Slight.	8 = Very high.
4 = Moderate.	9 = Phenomenal.

Table XXXVII.

Conversion of Millimetres into Millibars and Inches.

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

Japanese Meteorological Code.

Table XXXVIII.—Barometric Pressure.

Tenths.	0	1	2	3	4	5	6	7	8	9
Millimetres.	Code Letters.									
less than 711	AA	—	—	—	—	—	—	—	—	—
711 ...	AB	—	AC	—	AD	—	AE	—	AF	—
2 ...	AG	—	AH	—	AI	—	AJ	—	AK	—
3 ...	AL	—	AM	—	AN	—	AO	—	AP	—
4 ...	AQ	—	AR	—	AS	—	AT	—	AU	—
5 ...	AV	—	AW	—	AX	—	AY	—	AZ	—
6 ...	BA	—	BB	—	BC	—	BD	—	BE	—
7 ...	BF	—	BG	—	BH	—	BI	—	BJ	—
8 ...	BK	—	BL	—	BM	—	BN	—	BO	—
9 ...	BP	—	BQ	—	BR	—	BS	—	BT	—
730 ...	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD
1 ...	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN
2 ...	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX
3 ...	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH
4 ...	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR
5 ...	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB
6 ...	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL
7 ...	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV
8 ...	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF
9 ...	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP
730 ...	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ
1 ...	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ
2 ...	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT
3 ...	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD
4 ...	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN
5 ...	HO	HP	HQ	HR	HS	HT	HU	HV	HW	HX
6 ...	HY	HZ	IA	IB	IC	ID	IE	IF	IG	IH
7 ...	II	IJ	IK	IL	IM	IN	IO	IP	IQ	IR
8 ...	IS	IT	IU	IV	IW	IX	IY	IZ	JA	JB
9 ...	JC	JD	JE	JF	JG	JH	JI	JJ	JK	JL
740 ...	JM	JN	JO	JP	JQ	JR	JS	JT	JU	JV
1 ...	JW	JX	JY	JZ	KA	KB	KC	KD	KE	KF
2 ...	KG	KH	KI	KJ	KK	KL	KM	KN	KO	KP
3 ...	KQ	KR	KS	KT	KU	KV	KW	KX	KY	KZ
4 ...	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ
5 ...	LK	LL	LM	LN	LO	LP	LQ	LR	LS	LT
6 ...	LU	LV	LW	LX	LY	LZ	MA	MB	MC	MD
7 ...	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN
8 ...	MO	MP	MQ	MR	MS	MT	MU	MV	MW	MX
9 ...	MY	MZ	OA	OB	OC	OD	OE	OF	OG	OH
750 ...	OI	OJ	OK	OL	OM	ON	OP	OQ	OR	OS
1 ...	OT	OU	OV	OW	OX	OY	OZ	PA	PB	PC
2 ...	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM
3 ...	PN	PO	PP	PQ	PR	PS	PT	PU	PV	PW
4 ...	PX	PY	PZ	QA	QB	QC	QD	QE	QF	QG
5 ...	QH	QI	QJ	QK	QL	QM	QN	QO	QP	QQ

Table XXXVIII—Barometric Pressure—(continued)

Tenths.	0	1	2	3	4	5	6	7	8	9
Millimetres.	Code Letters.									
756 ...	QR	QS	QT	QU	QV	QW	QX	QY	QZ	RA
7 ...	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK
8 ...	RL	RM	RN	RO	RP	RQ	RR	RS	RT	RU
9 ...	RV	RW	RX	RY	RZ	SA	SB	SC	SD	SE
760 ...	SF	SG	SH	SI	SJ	SK	SL	SM	SN	SO
1 ...	SP	SQ	SR	SS	ST	SU	SV	SW	SX	SY
2 ...	SZ	TA	TB	TC	TD	TE	TF	TG	TH	TI
3 ...	TJ	TK	TL	TM	TN	TO	TP	TQ	TR	TS
4 ...	TT	TU	TV	TW	TX	TY	TZ	UA	UB	UC
5 ...	UD	UE	UF	UG	UH	UI	UJ	UK	UL	UM
6 ...	UN	UO	UP	UQ	UR	US	UT	UU	UV	UW
7 ...	UX	UY	UZ	VA	VB	VC	VD	VE	VF	VG
8 ...	VH	VI	VJ	VK	VL	VM	VN	VO	VP	VQ
9 ...	VR	VS	VT	VU	VV	VW	VX	VY	VZ	WA
770 ...	WB	WC	WD	WE	WF	WG	WH	WI	WJ	WK
1 ...	WL	WM	WN	WO	WP	WQ	WR	WS	WT	WU
2 ...	WV	WW	WX	WY	WZ	XA	XB	XC	XD	XE
3 ...	XF	XG	XH	XI	XJ	XK	XL	XM	XN	XO
4 ...	XP	XQ	XR	XS	XT	XU	XV	XW	XX	XY
5 ...	XZ	YA	YB	YC	YD	YE	YF	YG	YH	YI
6 ...	YJ	YK	YL	YM	YN	YO	YP	YQ	YR	YS
7 ...	YT	YU	YV	YW	YX	YY	YZ	ZA	ZB	ZC
8 ...	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM
9 ...	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZW
780 ...	ZX	ZY	—	—	—	—	—	—	—	—
more than 780.1	ZZ	—	—	—	—	—	—	—	—	—

Table XXXIX.—Force of the Wind and State of the Weather.

Wind Force	0-1	2-3	4-6	6-7	8-9	10 and over.
Weather.	Code Letters.					
Fair ...	A	A	B	C	D	E
Cloudy ...	F	F	G	H	I	J
Rain ...	K	K	L	M	N	P
Snow ...	Q	Q	R	S	T	U
Fog ...	V	V	W	X	Y	Z

Note.—Although the same signs are given for "Calms" and "Light Winds," the former is always meant when the direction of the wind is omitted.

Table XL.—Direction of the Wind.

Direction.	N.	NNE.	NE.	ENE.	E.	ESE.	SE.	SSE.	S.	SSW.	SW.	WSW.	W.	WNW.	NW.	NNW.	Calm.
Code Letter.	N	O	P	Q	E	F	G	H	S	T	U	V	W	X	Y	Z	C

WIRELESS STORM WARNINGS.

FRENCH INDO-CHINA.

Spark Issues.

Kien an W/T Station, approximate Latitude, 20° 48' N., Longitude, 106° 37' E., call sign **HVB**, broadcasts typhoon or storm warnings in a special code, immediately after the weather bulletins at 0300 and 1330 G.M.T. and at other times, as necessary, on a wavelength of 600 metres, spark.

Form of message:—

“Typhoon” LL1D₁D₁K or “Coup de Vent” D₁D₁Q.
followed by a check figure equal to the sum of the figures of the preceding group.

Code:—

LL = Latitude (given in whole degrees) of the centre of the typhoon.

ll = Longitude ditto.

D₁D₁ = Forecast of the direction the typhoon (or storm) is likely to travel. The same as DD in the International Code with the following additions:—

- 51—In formation.
- 52—Two centres.
- 53—Direction unknown.
- 54—Stationary, or very slow.
- 56—Turning.
- 58—Filling up.

K = Radius and force.

- 1—± 120 miles; intensity unknown.
- 2—± 120 miles; intensity violent.
- 3—± 60 miles; intensity unknown.
- 4—± 60 miles; intensity violent.
- 5—Increasing.
- 6—± 30 miles; intensity unknown.
- 7—± 30 miles; intensity violent.
- 8—Exceptional velocity.
- 9—Continental depression.
- 0—Position unknown.

Q = Area threatened.

- 1—Coasts of Anam.
- 2—Gulf of Tongking and Swatow.
- 3—Formosa channel.
- 4—Formosa to Yangtse.
- 5—Yangtse to Shangtung.
- 6—Gulf of Pechili to Gulf of Yalu.
- 7—Sea of Japan.
- 8—North of Hokkaido.
- 9—East coast of Japan.
- 0—South of Kyushu.

These warnings are also broadcast when necessary by the following W/T stations in French Indo-China.

W/T Station.	Position (approx.).		Call Sign.	Wavelength, Metres.
	Latitude.	Longitude.		
Fort Bayard ...	21° 13' N.	110° 23' E.	HVH	600
Tourane ...	16° 07' N.	108° 13' E.	HVI	600
Mitho ...	10° 21' N.	106° 21' E.	HVM	600

HONG KONG.

Cape d'Aguilar W/T Station, approximate Latitude 22° 13' N., Longitude 114° 15' E., call sign **VPS**, broadcasts typhoon warnings, at 18 minutes past every hour on 600 metres. These warnings are repeated by **Hong Kong Observatory W/T station**, call sign **GOW**, on 300 metres (R/T) at 48 minutes past every hour.

CHINA.

Spark Issues.

Pratas Island W/T Station, call sign **XPI**, broadcasts typhoon warnings for the China Sea when necessary. The warnings are broadcast *en clair* in English and are preceded by the Danger Signal TTT (— — —). They are issued as frequently as changes are observed, or at such intervals as may be deemed most expedient. Wave length, 600 metres (spark).

Shanghai W/T Station, call sign **FFZ**, broadcasts typhoon and gale warnings, when necessary after the weather bulletins described on p. 141 at 0300 (after Time Signal), 0900 (after Time Signal), 1400 and 1800 G.M.T. The warnings are broadcast *en clair* and give information concerning the position of the centres of typhoons or continental depressions, for China and the China Seas.

Wavelength 750 metres (spark).

Typhoon Warnings Broadcast on Short Wavelength and also on request by Shanghai W/T. FFZ.

For the benefit of ships who experience difficulty in the reception of W/T messages from **Shanghai W/T Station, FFZ**, owing to the alleged existence of “Zones of silence” along certain portions of the China coast these warnings will, if necessary, be broadcast on a short wavelength of 34 metres at 1130 G.M.T.

Ships are invited in case of difficulty, to ask Shanghai W/T station, **FFZ** for **special typhoon warnings** which will be transmitted **free of charge**.

Particulars of these “zones” are given on p. 141.

JAPAN.

C.W. Issues.

The **Central Meteorological Observatory, Tokyo, W/T Station** call sign, **JFRA**, broadcasts storm warnings, when necessary, *en clair*, in English after the weather bulletins explained on p. 141. The warnings contain the following information:—approximate position of typhoon (or cyclone), the direction in which it is moving, or expected movement, or information concerning severe gales, or duration of monsoon, over Japan and the neighbouring seas.

Time 0010 G.M.T. } Wavelength 4,000 metres (C.W.) repeated on
 ,, 0600 G.M.T. } 600 metres (I.C.W.).
 ,, 1110 G.M.T. Wavelength 4,000 metres (C.W.) repeated on
 750 metres (I.C.W.).

III.—WIRELESS TIME SIGNALS.

HONG KONG.

I.C.W. Issues.

Wireless time signals controlled by the Royal Observatory, Hong Kong are broadcast from **Cape d'Aguilar W/T Station**, Latitude 22° 12' 39" N., Longitude 114° 15' 11" E., call sign **VPS**, on a wavelength of 2,000 metres (I.C.W.) at the following times:—

G.M.T.

h. m. s. h. m. s.
 1 56 00 to 2 00 00
 and from 12 55 00 to 13 00 00

The time signals consist of dots (- - - - - etc.) each of about 0.2 seconds duration, sent at every second, the 28th, 29th, 54th, 55th, 56th, 57th, 58th, and 59th seconds being omitted for the purpose of identifying the signals.

Preliminary warning signals are transmitted between 1h. 54m. 00s. and 1h. 55m. 00s., and between 12h. 53m. 00s. and 12h. 54m. 00s., G.M.T., as follows:— “CQ de VPS Time wait.”

CHINA.

Wireless time signals controlled by Zikawei Observatory are broadcast by **Shanghai W/T Station**, Latitude 31° 13' 16" N., Longitude 121° 27' 47" E., call sign **FFZ**, on a wavelength of 600 metres, after the general call (CQ de FFZ) in the following manner:—

G.M.T.	
h. m. s.	h. m. s.
2 54 00 } and } 8 54 00 }	to { { { 2 54 50 } and } 8 54 50 }
----- etc.	
2 55 00 and 8 55 00	} ■ Time signal.
2 56 00 } and } 8 56 00 }	to { { { 2 56 50 } and } 8 56 50 }
----- etc.	
2 57 00 and 8 57 00	} ■ Time signal.
2 58 00 } and } 8 58 00 }	to { { { 2 58 50 } and } 8 58 50 }
----- etc.	
2 59 00 and 8 59 00	} ■ Time signal.

IV—VISUAL STORM WARNINGS.

Hong Kong.

Local Storm Signals.

In addition to the China seas storm signals, symbols from which are displayed when necessary at Blackhead Hill, Kowloon, the following system of local storm signals is in force at Hong Kong.

Day Signals.

Signal.	Symbol.	Signification.
1		A typhoon exists which may possibly cause a gale at Hong Kong within 24 hours.
2		Gale expected from the North (N.W. to N.E.).
3		Gale expected from the South (S.E. to S.W.).
4		Gale expected from the East (N.E. to S.E.).
5		Gale expected from the West (N.W. to S.W.).
6		Gale expected to increase.
7		Wind of typhoon force expected (any direction).

The symbol for Signal No. 1 is coloured *red*, the remaining symbols are *black*.

Signal No. 7 will be accompanied by three explosive bombs, fired at intervals of 10 seconds at the Water police station, and repeated at the Harbour Office.

The signals will be lowered when it is considered that all danger is over.

Day signals displayed at Harbour Office, H.M.S. *Tamar*, Gough Hill, W/T mast Royal Observatory. Green Island signal mast, a flagstaff on the premises of the Hong Kong and Kowloon Wharf and Godown Coy. at Kowloon, the Standard Oil Coy.'s flagstaff at Lai chi Kok, and a flagstaff near the field officers' quarters at Lye Mun.

Night Signals (Lights).

Signal No. 1	2	3	4	5	6	7
WHITE	WHITE	GREEN	GREEN	WHITE	GREEN	RED
WHITE	GREEN	WHITE	GREEN	WHITE	GREEN	GREEN
WHITE	GREEN	WHITE	WHITE	GREEN	GREEN	RED

Night signals displayed, at sunset, on the tower of the railway station, W/T mast Royal Observatory, H.M.S. *Tamar*, Gough Hill, and on the Harbour Office flagstaff. **They have the same signification as the day signals.**

Signal No. 7 will be accompanied by explosive bombs, as above, in the event of the information conveyed by this signal being first published at night.

Supplementary Warnings.

When local signals are displayed in the harbour, signals will be displayed at the following stations:—

Aberdeen	Sai kung
Cheung chow	Sha tau kok
Gap rock	Tai Po
Ping shan	Tsun wan
Stanley	Tai O
Sau ki wan	Waglan

to notify the fact to native craft and passing ocean vessels.

The signals displayed are as follows:—

When No. 1 signal is displayed in the harbour:

- Red **T** by day.
- 2 *red* lights vertically by night.

When Nos. 2 to 7 signals are displayed in the harbour:—

- Black cone by day.
- Two *green* lights vertically by night.

Further details can always be given to ocean vessels on demand, by signal from lighthouses.

The object of the system is to give at least 24 hours' warning of a gale (force 8 Beaufort scale) and also warnings of expected changes in the direction and force of the wind. Owing, however, to the uncertain movements of typhoons and to insufficient telegraphic observations it will occasionally happen that Signals 2 to 5 may be displayed without a gale occurring at Hong Kong, or even Gap rock, but the reverse is not likely to happen, except in the case of typhoons forming in the vicinity and travelling rapidly towards Hong Kong, or of a located typhoon increasing its rate of progression abnormally. Signal No. 1 is intended as a warning to "Stand by" and watch for the next signal.

NOTE.—The China seas storm signal system necessitates a mast-head symbol which should not be mistaken for a black signal of the local system.

PHILIPPINE ISLANDS.

Typhoon Warning Signals.

TYPHOON warning signals are displayed upon receipt of information from the Weather Bureau at Manila, as follows:—

Day Signals.—Black cylinder, 1½ feet in diameter, 2 feet high. Black cone, base 1½ feet in diameter, 2 feet high. Black sphere, 2 feet in diameter. Flag, 3 or 4 feet square, of any convenient colour.

Night Signals.—*Red* and *White* lights shown vertically or horizontally.

Signal No.	By Day.	By Night.	Meaning.
1			<p>Indicates (a) A distant typhoon the direction of whose movements is still unknown. The signal will be changed in case the typhoon approaches.</p> <p>(b) The direction of the distant typhoon is at present such that the storm may pass off without seriously affecting the archipelago.</p> <p>(c) A general warning, <i>viz.</i>, when the weather indications are dangerous but such as are not covered by any one of the other signals in use; for instance, when the typhoon recurves east of the archipelago. In such cases <i>see</i> the daily weather note posted at all the meteorological and telegraph stations and Custom houses.</p> <p>Precautions.—Vessels should prepare to strengthen their moorings and to get up steam. Small vessels, especially open launches, should not risk going far from port.</p>
2			<p>Indicates that the centre of the typhoon will pass (or is passing) to the northward at a considerable distance. Winds from west to south are to be expected, which may acquire considerable force and continue for several days.</p> <p>Precautions. — Vessels should strengthen their moorings. It is considered advisable that vessels should send down light yards and masts. Steam vessels should be ready to use their engines at short notice. Dangerous for small vessels to be in Manila bay.</p>
3			<p>Indicates that the centre of the typhoon will pass (or is passing) to the southward at a considerable distance. Winds from east to south are to be expected. These are generally less violent than those referred to in signal No. 2.</p> <p>Precautions.—As for signal No. 2.</p>
4			<p>Indicates that the location of the typhoon is dangerous for the place where the signal is hoisted, though the danger is not imminent. Look out for the next signal.</p> <p>Precautions. — Vessels should strengthen their moorings. Steam vessels must be ready to use their engines in case of sudden emergency. Small vessels must remain at their moorings.</p>

Signal No.	By Day.	By Night.	Meaning.
5			<p>Indicates that the centre of the typhoon will pass (or is passing) to the northward at a short distance. Strong winds from north, through west, to south are to be expected, which may become very violent.</p> <p>Precautions. — Vessels should strengthen their moorings as much as possible. Lower and secure all gear. Use steam to help anchors. Vessels outside Manila harbour may find it necessary to seek refuge in Kavite. No vessels should be under way while this signal is hoisted.</p>
6			<p>Indicates that the centre of the typhoon will pass (or is passing) to the southward at a short distance. Strong winds from north, through east, to south are to be expected, which may become very violent, though usually they are less severe than those referred to in signal No. 5.</p> <p>Precautions.—As for signal No. 5.</p>
7			<p>Indicates that the centre of the typhoon will pass over the place where the signal is hoisted.</p> <p>Precautions.—As for signal No. 5. It must be noted, however, that after the absolute or relative lull, due to the actual passing of the centre, the wind will suddenly change to a direction opposite to the one from which it came before the lull; also that it may often be more violent than before.</p>
8			<p>Indicates very high tides, and floods.</p> <p>Precautions.—Vessels of any description must not attempt to enter or leave a harbour or river, nor to move about inland waters while this signal is hoisted. The flag in this signal is of any convenient colour.</p>

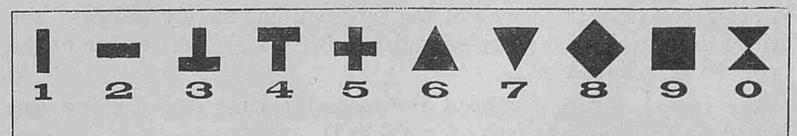
CHINA SEAS STORM SIGNAL SYSTEM.

Typhoon and Storm Signals.

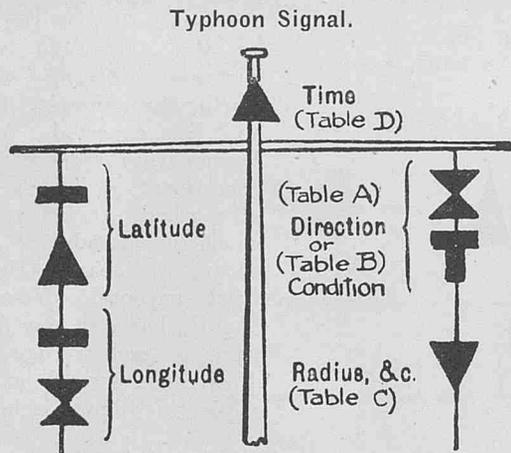
THE China seas storm signal system which has been drawn up by joint agreement between the observatories at Zi-ka-wei and Hanoi and the Chinese Maritime Customs, is now definitely adopted along the whole China coast, including Hong Kong and the Indo-China ports.

General Explanation.

The signals are made by means of certain symbols, each corresponding, for certain purposes, to a number:—



The symbols are hoisted at the yardarms and masthead of the storm-signal mast and have the general characteristics as shown below.



Meaning.—A severe typhoon within 30 miles of Lat. 26° N., Long. 120° E., travelling N.E. Warning issued this morning.

The two upper symbols, on one yardarm indicate latitude, 26°, the lower two figures longitude, the 100 being omitted, *i.e.*, 20 indicates longitude 120°.

The two upper symbols on the opposite yardarm indicate the direction in which a typhoon is travelling, *see* Table A.

TABLE A.

DIRECTION SIGNALS.													
⊥	⊗	⊗	⊗	⊗	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
—	—	⊥	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW
													NW
													NNW

(*Note.*—The numbers corresponding to the symbols indicate the number of points from North or alternatively certain conditions of the typhoon, *see* Table B.)

TABLE B.

CONDITION SIGNALS.					
+	+	+	+	+	+
⊥	⊥	⊥	⊥	⊥	⊥
Forming	Two centres	Direction unknown.	Stationary or very slow.	Recurring.	Filling up.

The lower symbol on this side indicates the radius of the circle in miles whose centre is shown by the latitude and longitude. This symbol may also indicate degree of intensity. In the case of a continental depression it indicates that it is such, and the corresponding latitude and longitude is the centre of an indefinite area affected. *See* Table C.

TABLE C.

RADIUS AND INTENSITY SIGNALS.									
Radius of position Circle.	120	60	30						
Intensity:	Unknown	Severe	Unknown	Severe	Deepening	Unknown	Severe	Excep. velocity	Contin. depres. uncertain

Note.—It should be clearly understood that the position indicated is not necessarily the centre of the typhoon, but merely indicates the centre of a circle of a specified radius within which the centre of the typhoon is believed to lie.

The signal at the masthead indicates the time the warning was issued by the Observatory. *See* Table D.

TABLE D.

TIME SIGNALS.			
■	◆	▲	▼
Yesterday morning.	Yesterday afternoon.	This morning.	This afternoon.

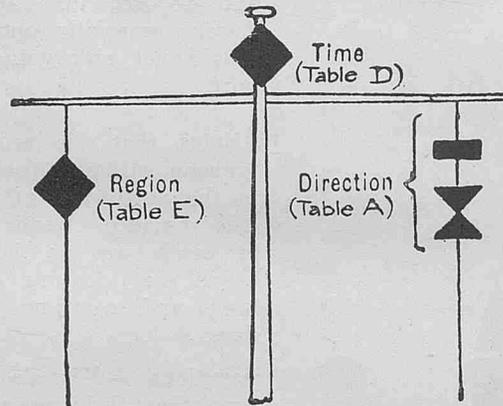
Note.—The position of the centre of the typhoon as signalled is the position according to the data possessed by the Observatory at the time of the issue of the warning; that data may be as much as 12 hours old. Thus, if the time signal indicates that the warning was issued "This morning," it may be that the position corresponds to data concerning yesterday afternoon.

If the signal "Deepening" is made, it indicates that there is reason to believe that the barometric gradient and, consequently, the intensity of the typhoon are increasing.

If the signal "Exceptional velocity" is made, it indicates that there is reason to believe that the rate of progression is 25 per cent. or more greater than the average rate.

If the signal "Position uncertain" is made, it indicates that the data possessed is unreliable and that the position signalled is a mere probability.

GALE SIGNALS.



Meaning.—The north coast of Hokkaido threatened by a gale from S.W. Warning issued yesterday afternoon.

The one symbol at one end of the yardarm shows the region threatened. *See* Table E.

TABLE E.

DISTRICT SIGNAL.								
⊥	—	⊥	⊥	+	▲	▼	◆	■
Coast of G. of Tongking	Formosa	Yangtze to G. of Yalu	Sea of Japan.	North of Hokkaido.	East Coast of Japan.	South of Kiusiu.		
Annam. to Swatow	Strait. to Yangtze.	Shantung. G. of Pechihll.						

The two symbols at the other yardarm show the direction from which the gale is expected to blow. *See* Table A.

The symbol at the masthead shows the time the warning was issued by the Observatory. *See* Table D.

Note.—In addition to the above general signals, local storm signals are displayed at Hong Kong. *See* p. 144.

JAPAN.

Storm Signals.—The storm signals made at various places on the coasts of Japan consist of General storm signals and Local storm signals. The former, shown on special masts, give the time, the position, the direction, the rate of progressive movement and intensity of the storm, while the latter only furnish a general idea of the character of the storm expected.

Chartlet indicating position of Storm Centre. Day Signals. Japan.



Local Storm Signals.

These signals are made by day with either a *red ball*, a *red cylinder*, or a *red cone*; and by night by coloured lights, which have the following significance:—

Day Signals.	Night Signals.	Signification.
A <i>red ball</i> ...	A <i>red light</i> ...	Strong winds or gales expected.
A <i>red cylinder</i> ...	A <i>green light</i> ...	Rain or snow storm.
A <i>red cone</i> ...	A <i>red light over a green light.</i>	Approach of a cyclonic storm of dangerous intensity.

Special Notices regarding Personnel.

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

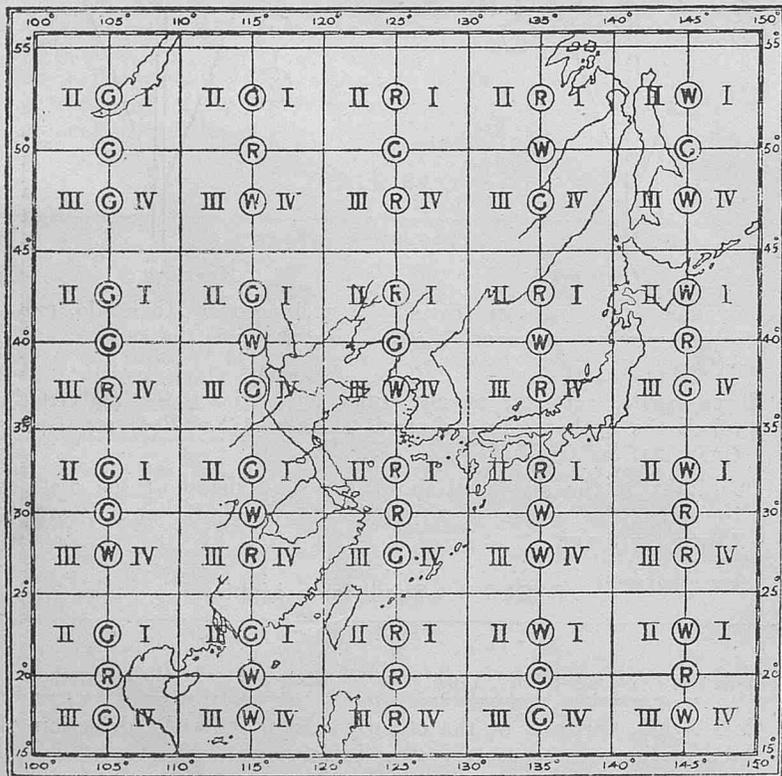
Captain C. J. Swanson.

Captain C. J. SWANSON, Commander of the British India S.S. *Nevasa* has retired after 43 years service afloat.

Captain SWANSON commenced his sea career as an apprentice in the Ship *Afghan Chief* which he joined in 1885. Joining the BRITISH INDIA STEAM NAVIGATION COMPANY as a Fourth Officer in 1890 he rose through the successive grades to command which he obtained in 1903, since when he has commanded no less than twenty-five of the company's Fleet.

A member of the Corps of Voluntary Marine Observers since 1924, Marine Observers join with the Marine Division in wishing Captain SWANSON long life and happiness in his well earned retirement.

Position Light Chartlet. Night Signals, Japan.



The letters W, R, G, denote White, Red, and Green, respectively.

Obituary.

The death of Captain JOHN MADDRELL, Commander of the S.S. *Hildebrand*, and Commodore of the BOOTH LINE, which took place on April 25th, in hospital at Falmouth, is noted with deep regret.

Captain MADDRELL commenced his sea career in 1883 and put in his time for Second Mate in the Barque *Albany* of Dundee and the four masted ship *Romsdal*. On obtaining his second mate's certificate he joined the Barque *Lurlei*, and after serving in her for eighteen months transferred to steam joining the ELDER DEMPSTER LINE as Second Officer of their S.S. *Akassa*. After five years service as an officer he was promoted to command in 1896. In 1906 he joined the BOOTH LINE as an officer and rose to command in this Company seven years later when he sailed as Master of the S.S. *Anthony*. In January 1923 he joined the *Hildebrand* in which ship he remained up to the time of his death.

Captain MADDRELL was a member of the Voluntary Corps of Marine Observers from 1924.

The death of Captain T. C. E. DAYAS of R.M.S. *Naldera*, which took place suddenly, on board his ship, on May 1st, when 200 miles out from Sydney, is noted with deep regret.

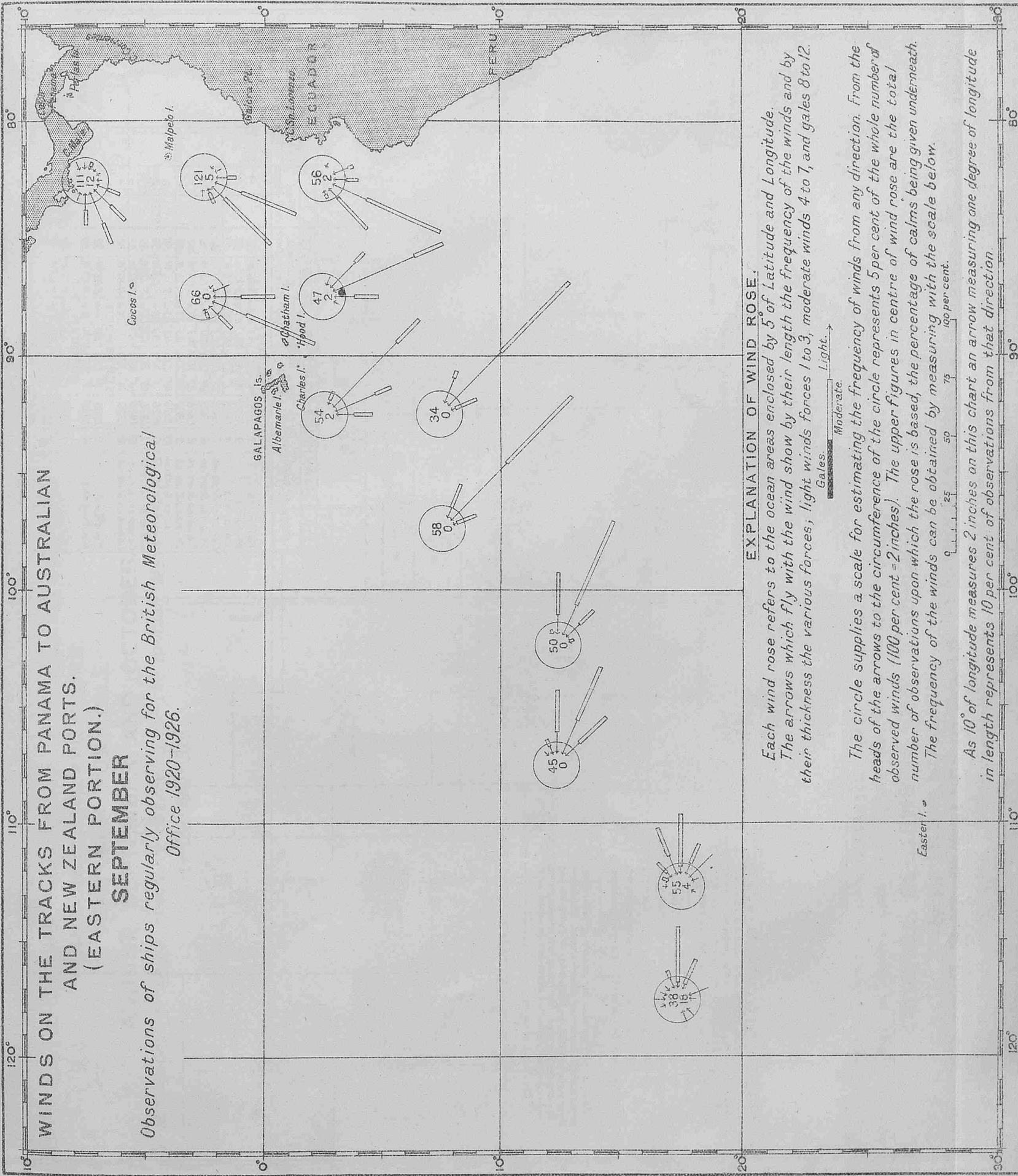
Captain DAYAS joined the PENINSULAR and ORIENTAL STEAM NAVIGATION COMPANY as Fifth Officer in 1895. Passing through the successive grades he attained the rank of Chief Officer in 1907 and was promoted to command in 1919, since when he has had in his charge six of the Company's vessels and was a member of the corps of Voluntary Marine Observers.

SOUTH PACIFIC.

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

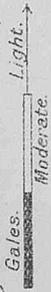
SEPTEMBER

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

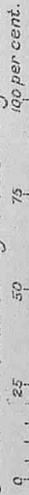


EXPLANATION OF WIND ROSE.

Each wind rose refers to the ocean areas enclosed by 5° of Latitude and Longitude. The arrows which fly with the wind 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 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 = 2 inches). The upper figures in centre of wind rose are the total number of observations upon which the rose is based, the percentage of calms being given underneath. The frequency of the winds can be obtained by measuring with the scale below.



As 10° of longitude measures 2 inches on this chart an arrow measuring one degree of longitude in length represents 10 per cent of observations from that direction.

CURRENTS ON THE TRACKS FROM PANAMA TO AUSTRALIAN AND NEW ZEALAND PORTS.
(EASTERN PORTION.)

AUGUST, SEPTEMBER AND OCTOBER.

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

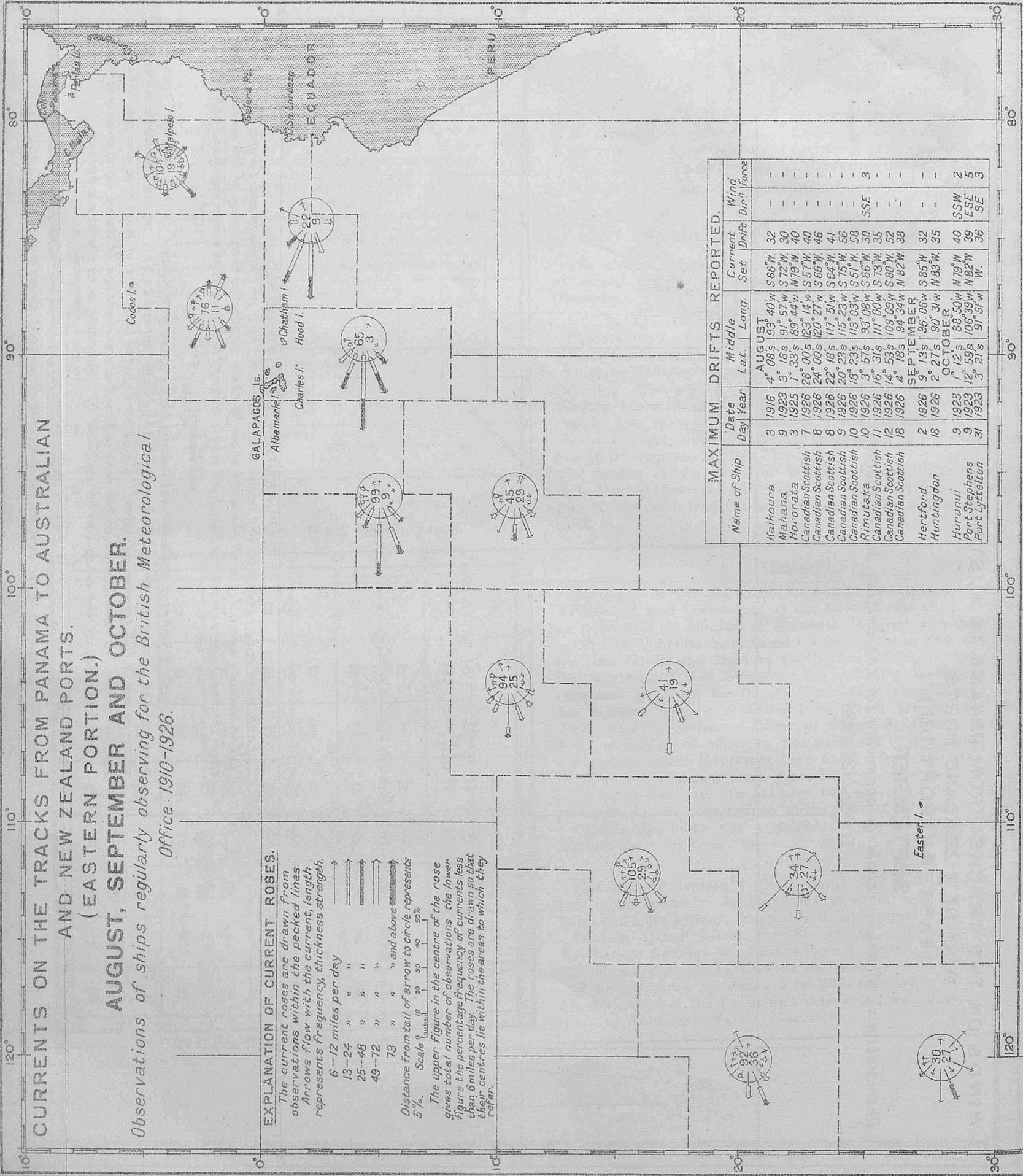
EXPLANATION OF CURRENT ROSES.

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

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

Distance from tail of arrow to circle represents 5/16. Scale 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1.

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



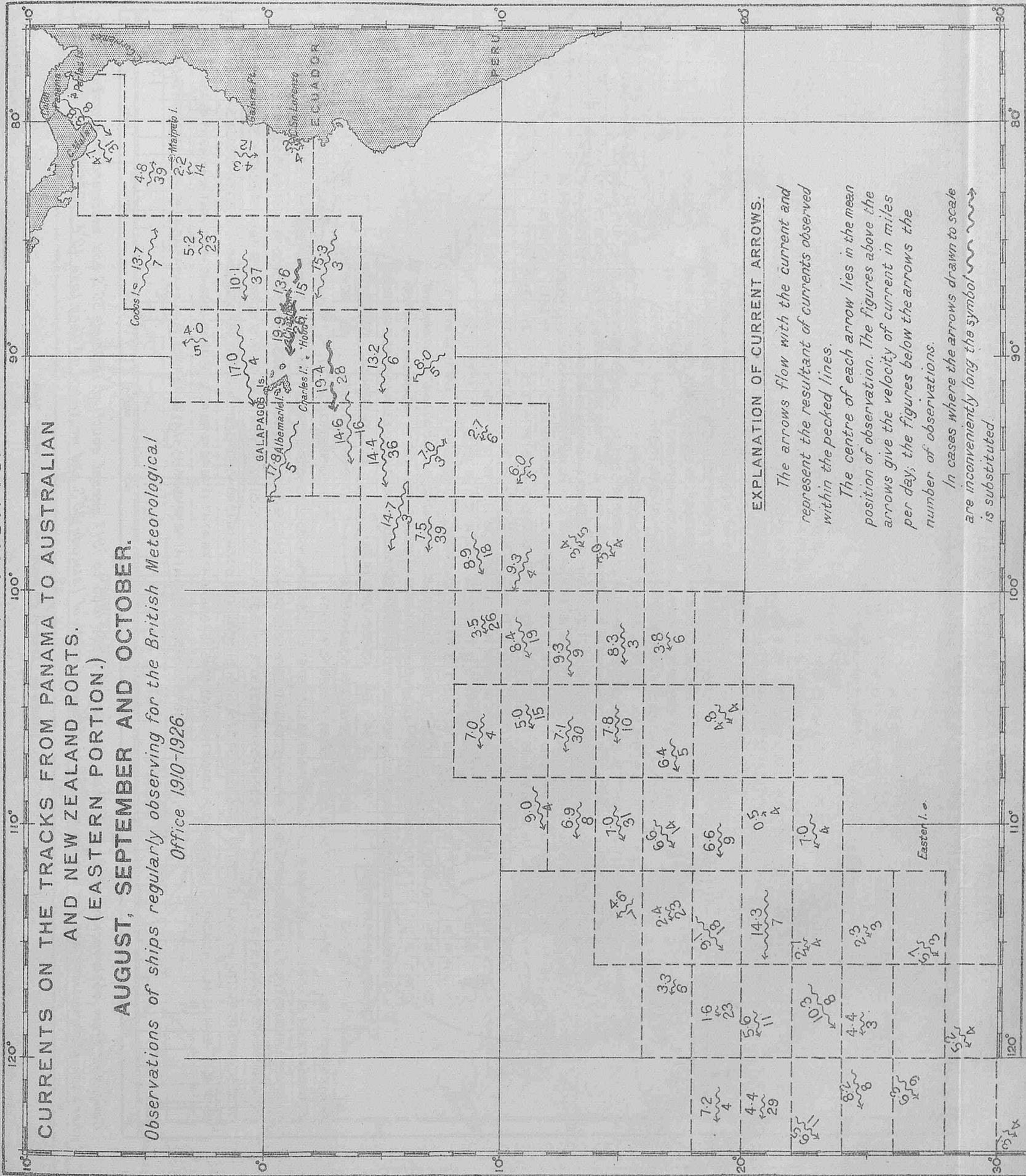
Name of Ship	Date Day Year	Middle		Current Set		Wind Dir	Force
		Lat.	Long.	Set	Drift		
Kaikoura	3/1916	4° 08' S	193° 40' W	S 66° W	32	-	-
	9/1923	3° 16' S	91° 57' W	S 72° W	30	-	-
	3/1925	1° 33' S	89° 44' W	N 79° W	40	-	-
	7/1926	26° 00' S	123° 14' W	S 57° W	40	-	-
Canadian Scottish	8/1926	24° 00' S	120° 27' W	S 65° W	45	-	-
	8/1926	22° 18' S	117° 51' W	S 64° W	41	-	-
Canadian Scottish	9/1926	20° 23' S	115° 23' W	S 75° W	56	-	-
	10/1926	19° 23' S	113° 03' W	S 51° W	58	-	-
Rimutaka	10/1926	3° 57' S	93° 08' W	S 66° W	30	SSE	3
	11/1926	18° 31' S	109° 09' W	S 73° W	35	-	-
Canadian Scottish	12/1926	14° 53' S	109° 09' W	S 80° W	52	-	-
	1/1926	4° 18' S	94° 34' W	N 82° W	38	-	-
Hertford	2/1926	9° 13' S	96° 06' W	S 85° W	32	-	-
	18/1926	2° 27' S	90° 31' W	N 83° W	35	-	-
Huntingdon	9/1923	1° 12' S	88° 50' W	N 79° W	40	SSW	2
	31/1923	12° 59' S	106° 39' W	N 82° W	39	ESE	5
Port Lyttelton	31/1923	3° 21' S	91° 51' W	W.	36	SE	3

SOUTH PACIFIC.

CURRENTS ON THE TRACKS FROM PANAMA TO AUSTRALIAN AND NEW ZEALAND PORTS. (EASTERN PORTION.)

AUGUST, SEPTEMBER AND OCTOBER.

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



EXPLANATION OF CURRENT ARROWS.

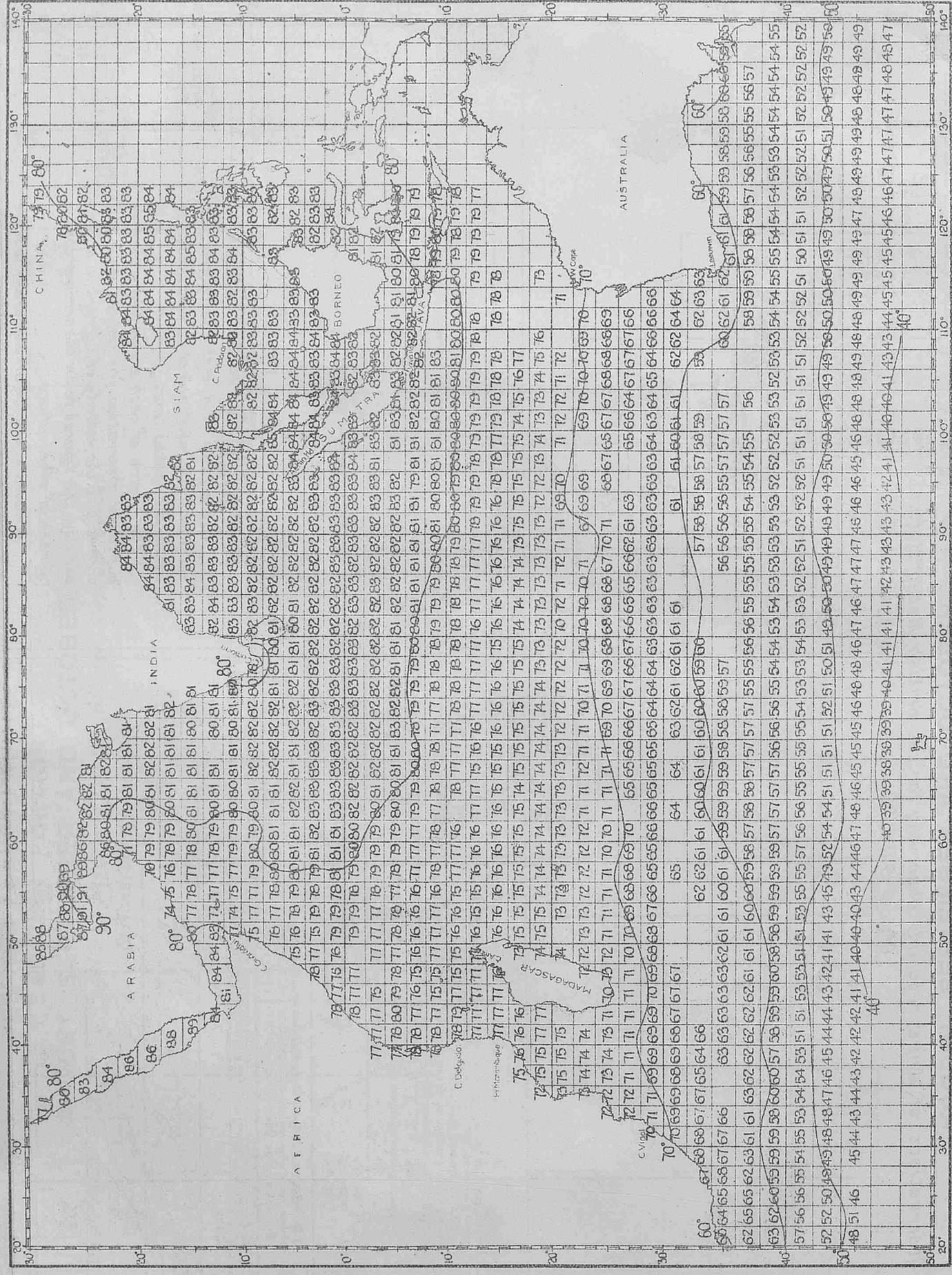
The arrows flow with the current and represent the resultant of currents observed within the pecked lines.

The centre of each arrow lies in the mean position of observation. The figures above the arrows give the velocity of current in miles per day; the figures below the arrows the number of observations.

In cases where the arrows drawn to scale are inconveniently long the symbol  is substituted.

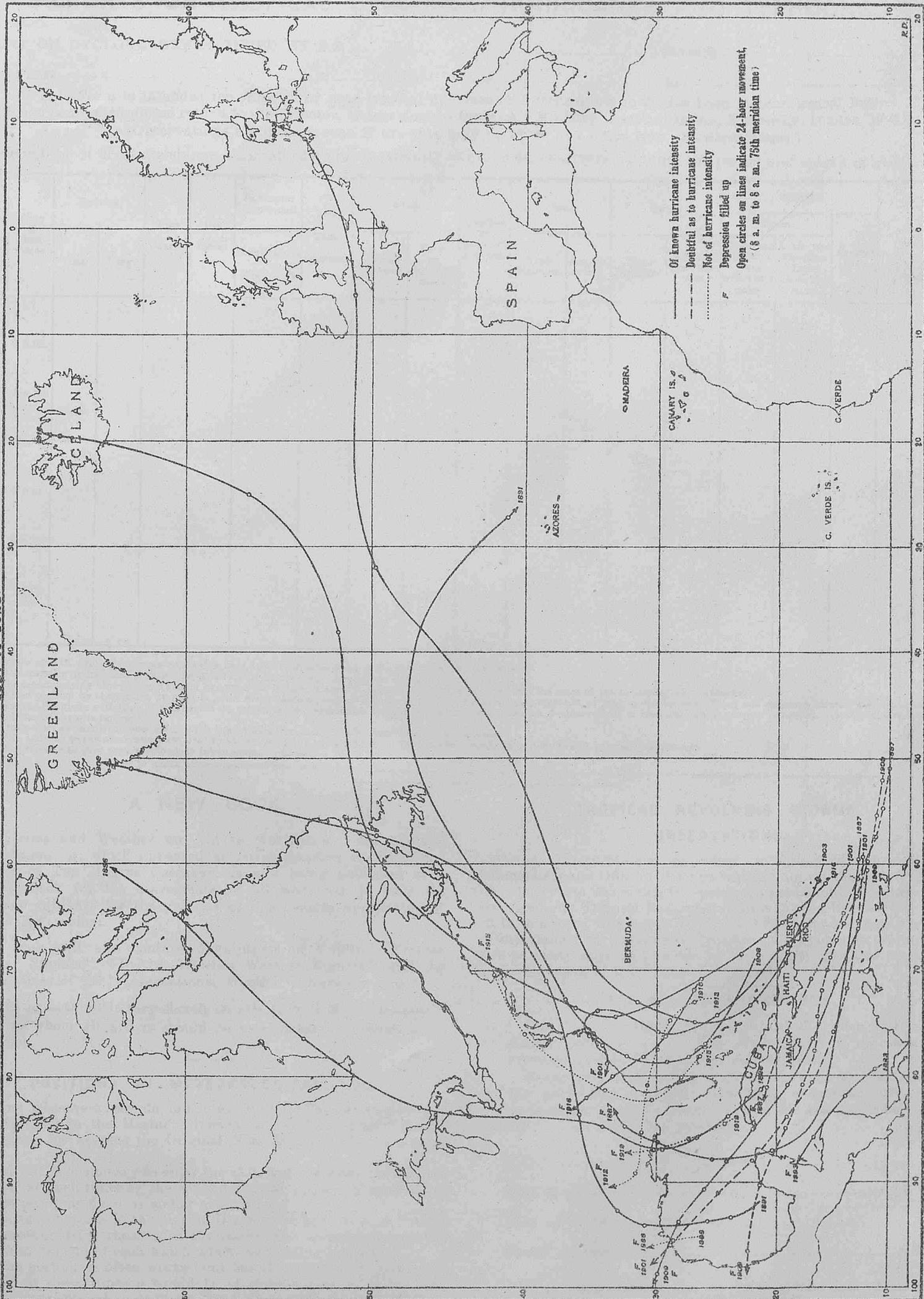
INDIAN OCEAN.

MEAN SEA SURFACE TEMPERATURES FOR MONTH OF JULY.



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

Tracks of Tropical Cyclones of North Atlantic, July 1887 to 1923.



From "West Indian Hurricanes & other Tropical Cyclones of the North Atlantic Ocean," by Charles L. Mitchell, published in "Monthly Weather Review," Supplement No. 24, of the U.S. Weather Bureau.

NOTICES.

REPORTS ON TROPICAL CYCLONES, HURRICANES AND TYPHOONS.

Form 905.

REPORT ON CYCLONE EXPERIENCED BY S.S. _____ Captain _____

Owners _____ from _____ to _____

This Form is intended for ships in or near tropical cyclones or hurricanes who do not keep meteorological logs. When completed please return to the Director, Meteorological Office, Air Ministry, Adastral House, Kingsway, London, W.C.2. (Observations are desired even if the ship may be up to 600 miles from the disturbance.)

It will be of great assistance, if, in all cases in the vicinity of cyclones, observers will note the period and length of swell

Date. 192...	Time of Observation.	Position.		True Course.	Dis-tance.	Barometer Uncorrected.	Attd. Ther-mometer.	Wind.		Weather by Beaufort Notation.	Sea.		Swell.		Clouds.			Remarks.	
		Lat.	Long.			Height above sea.....ft.		True Direction.	Force by Beaufort Scale.		True Direction.	Amount 0 to 9.	True Direction.	Amount Character-istic.	Types.		Amount 0-10.		
															Upper, and direction from which they move.	Lower, and direction from which they move.			
	4 a.m.																		
	8 a.m.																		
	Noon.																		
	4 p.m.																		
	8 p.m.																		
	Midt.																		

Copies of W/T. weather messages received or sent, from or to other ships or the shore, are specially desired. It is specially desired that it should be stated if the Barometer is Mercurial or Aneroid. The accompanying blue postcard should be completed in accordance with instructions thereon in order that the error of the barometer may be known. If the position by observation at noon is given when obtained, and by D.R. at noon when sights are not obtained, so long as the courses (True) and distances between each set of weather observations are given with time, it will enable the computers to ascertain the position of the ship when each set of observations is recorded, which is very important. Hourly observations are desirable near the storm centre. Please state at each Noon how much ship's time differs from G.M.T.; also state if ship's time is used. If in addition to the observations required by the above form a narrative of the experiences in cyclones is given it will be greatly appreciated. This report will give great assistance in investigating cyclones. Address to which acknowledgment may be sent _____

A NEW BOOK.

"Wireless and Weather an Aid to Navigation," the 1st and 2nd Editions of which appeared as serial chapters in Volumes I and IV of THE MARINE OBSERVER, is now being published as a separate book for the convenience of all who wish to have the necessary guidance for the practice of this modern application of Marine Meteorology.

The book will also contain descriptions of "Ships' Wireless Weather Signals," "British Wireless Weather Signals" and the decode tables of the "International Weather Telegraphy Code."

It will be obtainable very shortly on sale from H.M. Stationery Office, to whom all orders should be sent direct or through a bookseller.

POSITIONS IN METEOROLOGICAL LOG.

Marine Observers can do much to facilitate data extraction and research work in the Marine Division by carefully following the instructions for keeping the Original Note Book and Meteorological Log.

Usually it is customary to enter the D.R. and observed positions at noon and at such times as the set and drift of current is determined between positions fixed by stellar observations.

For many purposes in the Marine Division we have to work out the exact position from these with the course and distance run of the position at the end of each watch when the weather is logged.

As the position is often worked out for the purpose of navigating the ship at these times it would be of great assistance if the D.R. position were entered in columns 4 and 6 when the weather observations are entered at 4 a.m., 8 a.m., 4 p.m., 8 p.m. and midnight, particularly 8 a.m.

TROPICAL REVOLVING STORMS. OBSERVATIONS.

Marine Observers are requested to bring to the notice of Commanders and Officers of ships who are not on the Meteorological Office list, Form 905 which is reproduced above, and to request those who encounter Tropical Revolving Storms to send in observations set out in this form, which may be obtained from the Marine Agents.

Observations of Hurricanes, Cyclones and Typhoons are required from as many ships as possible in the vicinity of these storms for the development of the "Laws of Storms."

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 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.

IMPORTANT

ROUTE NOTICES.

For latest information re Tracks see copy of letter from Cunard S.S. Co. on this Chart and pages 73-4 of Vol. V, No. 52 of this Journal.

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.

- (B) From 14th April to 31st August, inclusive.
- (F) From 16th May to Opening of Belle Isle route, and to 30th November when not using the Belle Isle route.
- (F) Westbound, on approaching Cape Race steer a course to pass 10 miles S. of Cape Race.
- (F) Eastbound, steer from position 25 miles S. of Cape Race.
- (A) From the opening of the Straits of Belle Isle to 14th November.

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.

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat. Long.	Remarks.
July, —, 1890	S.S. Slavonia	48°53' N. 24°11' W.	Last remnants of berg.
" —, 1902	2 reports by Fishermen.	56°30' N. 6°30' W. approx.	40 to 50 ft. long, 15 ft. wide, 2 ft. 6 in. out of water.
" 31, 1909	S.S. Shimosa	36°59' N. 30°01' W.	25 ft. long, 3 to 8 ft. wide.
" 10, 1913	S.S. Lochian	37°27' N. 36°48' W.	Piece 6 ft. high, 50 ft. in cir.
" 18, 1916	U.S. Hydrographic Bulletin.	32°09' N. 54°28' W.	Piece of berg 3 or 4 ft. out of water.
" 23, 1916	S.S. San Giorgio	42°09' N. 65°24' W.	Berg, 60 ft. long.
" 23, 1918	U.S. Hyd. Bulletin	44°25' N. 35°01' W.	Large berg.
" 18, 1921	Do.	44°30' N. 39°28' W.	Small berg about 15 ft. sq.
" 21, 1921	Do.	39°09' N. 40°39' W.	Berg.
" 31, 1921	Do.	37°37' N. 27°29' W.	Berg.
" 10, 1926	S.S. Chelatos	42°42' N. 36°45' W.	2 pieces of ice.

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

LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 12th May, 1928, was received from the Superintendent, Canadian Signal Service, Quebec:—

"Belle Isle, heavy open ice everywhere. Point Amour, heavy close packed ice in shore. Other points, no ice in sight."

IMPORTANT

The following is a copy of a letter received from the Cunard S.S. Co. dated 13th April, 1928.

NORTH ATLANTIC TRACKS.

"We desire to inform you that in accordance with the terms of the general instructions contained in the North Atlantic Lane Routes Agreement, it has been decided that Track 'C' should be discontinued and Track 'B' brought into operation as from Saturday, 14th April, and the various parties to the above agreement have been notified to this effect."

Co-operation of Shipowners, Masters and Mates.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

For sample weather report message see page 18 of Vol. V., No. 49.

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 their. A suitable cover may be obtained from H.M. Stationery Office, price 2s.

Date.	Position.		Description.
	Latitude.	Longitude.	
NORTH SEA.			
5.5.28	S.30°E. (Mag.) 18 mls. from Flambro' Hd.		Apparently ship's mast, projecting 2 feet.
10.5.28	51°29'N. 2°46'E.		Large red spar buoy, marked "B." Cage and blue flag on top. Dangerous to navigation.
ENGLISH CHANNEL.			
14.5.28	20 mls. S.W. of St. Catherine Point.		Floating timber and other wreckage, spread over an area of 3 or 4 miles.
15.5.28	50°04'N. 3°15'W.		Mast, 9 ft. with a white band.
MEDITERRANEAN.			
9.5.28	35°50'N. 14°52'E.		Barge, dangerous to navigation.
11.5.28	35°42'N. 16°37'E.		Floating steel object, apparently target, four masts canvas, about 40 ft. long.
11.5.28	37°13'N. 10°59'E.		Large drifting buoy, cone surmounted with red diamond, four horizontal stripes, two white and two red with word "Orelles" in black letters. Dangerous to navigation.
18.5.28	37°05'N. 11°30'E.		Wooden sailing vessel bottom up, green, almost awash.
NORTH ATLANTIC.			
1.5.28	38°57'N. 72°45'W.		Tall nun buoy painted in red and black horizontal bands, no marks nor numbers.
1.5.28	40°44'N. 49°10'W.		Large white round topped buoy marked "Cab-e" in black letters.
1.5.28	34°42'N. 45°45'W.		Large heavily barnacled buoy.
2.5.28	42°52'N. 9°31'W.		Drifting buoy.
2.5.28	41°48'N. 69°35'W.		Upper part of a lighter with a small deck-house painted white and green.
3.5.28	32°28'N. 77°36'W.		Mast about 20 ft. high, painted white, flying a black flag with pennant above, and supported on a red buoy.
3.5.28	39°29'N. 64°23'W.		Gas and whistle buoy painted red.
6.5.28	47°42'N. 6°50'W.		Mast, upright, showing about 8 ft., evidently attached to small craft.
6.5.28	42°39'N. 44°58'W.		Log, about 50 ft. long.
8.5.28	39°21'N. 73°34'W.		Wreckage, about 30 ft. long and 20 ft. wide, apparently a section of a barge partly submerged.
9.5.28	48°55'N. 11°46'W.		Black can buoy.
9.5.28	39°07'N. 74°12'W.		Wreckage of small schooner or barge, after-house awash and 45 ft. of mainmast projecting above water.
10.5.28	49°43'N. 7°19'W.		Mast, attached to submerged wreckage.
12.5.28	41°53'N. 9°35'W.		Large wooden structure.
13.5.28	44°43'N. 17°26'W.		Large nun buoy, painted red with number "23" in black and covered with marine growth. Dangerous to navigation.
19.5.28	49°13'N. 13°30'W.		Partly submerged object projecting 3 ft. out of water. Dangerous to navigation.
GULF OF MEXICO.			
8.5.28	25°12'N. 85°08'W.		Upright spar, about 15 in. in diameter showing 10 ft. out of water and apparently fast to submerged wreckage.
NORTH PACIFIC.			
1.5.28	39°48'N. 124°26'W.		Large spar, about 1 ft. in diameter, projecting 10 ft. out of water, apparently fast to submerged wreckage.

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.
 Mr. W. T. GRIEVES, Visiting Officer for the Port of London.

LIVERPOOL ... Lieut. Commander M. CRESSWELL, R.N.R., Port Meteorological Officer, Dock Office.
 (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.
 GLYDE ... Captain M. C. CORRANCE, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow.
 (Telephone No.: Central 2283-4).

FREMANTLE.
 W. Australia.

HONG KONG,
 China.

HULL ...

LEITH ...

SOUTHAMPTON

SYDNEY,
 New South Wales.

TYNE ...

VANCOUVER,
 British Columbia.

Agents (contd.).

Captain J. J. AIREY, Deputy Director of Navigation, Dalgety's Buildings.
 (Telephone No.: B 1063).

Lieut. Commander O. C. G. LEVESON-GOWER, R.N., Superintendent, Admiralty Chart and Chronometer Depot, H.M. Dockyard.

Captain Geo. B. STURDY, c/o Mr. W. HAKES, Commercial Road.

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

Captain D. FORBES, Nautical Academy, 1, Albion Place.

Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation, Customs House.

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

Mr. T. S. H. SHEARMAN, 61, Exchange Building, 553, Granville Street.
 (Telephone No.: Seymour 3309).

LIST OF VOLUNTARY OBSERVING SHIPS

The following is a complete list of ships regularly contributing observations to the Meteorological Office.

The names of the Captains and Officers, as ascertained from logs and reports received, are given with the date and description of last log, register or report received up to the time of going to press.

Marine Observers are requested to take this as complete and grateful acknowledgment for the work they have contributed, as it has been found necessary to reduce as far as possible the correspondence of the Marine Superintendent, which was largely composed of letters acknowledging logs and reports, in order that more time may be devoted to obtaining results from the data received.

Only in special cases will individual letters be sent.

Excellent awards will be made at the end of the financial year. The names of Commanders and Officers gaining these awards will be published in a special list in THE MARINE OBSERVER.

Ships not contributing logs or reports within a reasonable period will automatically be removed from the list and the free issue of THE MARINE OBSERVER discontinued; it is, therefore, earnestly requested that changes of service, probable periods of lay up or transfer of Commanders may be notified whenever possible.

A waiting list is kept of the names of vessels whose Commanders have offered to regularly co-operate.

The number of voluntary observing ships is limited to a maximum total of 500.

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

Unless otherwise stated, vessels on the following list are s.s.

M.L. = Equipped with tested Instruments for keeping Meteorological Log.

W.T. = Equipped with tested Instruments for making coded W/T reports to the Meteorological Office, London.

No. = Keeps Ships' Meteorological Report Form 911 with ship's instruments. Letter M after No. indicates ship's barometer Mercurial; A. ship's barometer Aneroid.

C.C. = Equipped with tested Instruments for making Cross Channel Telegraphic Reports to the Meteorological Office, London.

The numbers which appear before the names of ships equipped for making coded W/T reports to the Meteorological Office, London, are used for the purpose of identification when the observations are re-transmitted in synoptic messages by Wireless or Cable.

Selected Ships.

Those ships in this list which have the letters M.L., W.T. or M. after their names in the equipment column are "Selected ships" invited to make by W/T, standard form reports of observations taken at arranged G.M. Times to "All Ships." See "Wireless and Weather an aid to Navigation."

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 16.5.28.	Date Received
<i>Aba</i>	Williams, T. E.	S. J. Bristowe, O. E. Jones, A. H. Perkins.	M.L.	Elder Dempster	Met. Log. 14.10.27 to 10.2.28	16.3.28
<i>Abinsi</i>	Millson, H. E.	G. M. de la Cour	No. A.	"	Form 911 21.3.28 to 29.4.28	5.5.28
<i>Achilles</i>	Dodds, R.	J. Powell, L. Hutchinson, G. M. Kirk, F. W. Hilton.	M.L.	A. Holt	Met. Log. 31.1.28 to 7.5.28	11.5.28
<i>Actor</i>	Haylett, E.	E. Pearce, F. M. Eales, G. Morrice.	"	Harrison	" 15.1.28 to 23.4.28	9.5.28
<i>Adda</i>	Toft, J. T.	A. B. Longlen, J. S. Turner, A. Kay	M.L.	Elder Dempster	Form 911 6.7.27 to 3.11.27	14.12.27
50 <i>Adriatic</i>	Hickson, V. W., Lieut-Commr. R.N.R.	R. G. Roberts, O. V. Lucas	W.T.	White Star	W.T. Reg. 4.4.28 to 21.4.28	24.4.28
<i>Aeneas</i>	Wallace, W. K.	E. R. Owen	No. A.	A. Holt	Form 911 2.3.28 to 9.5.28	12.5.28
<i>Agapenor</i>	Ramsay, J.	S. G. Ellams	" A.	"	" 7.1.28 to 3.2.28	13.2.28
<i>Aidan</i>	Evans, L.	R. A. Broad	" A.	Booth	" 9.2.28 to 25.3.28	2.4.28
<i>Alban</i>	Barlow, F. P.	E. M. Lyons	" A.	"	" 17.2.28 to 29.2.28	19.3.28
<i>Aleppo</i>	Leggott, W. G.	"	No. A.	Ellerman Wilson	" 28.2.28 to 25.3.28	28.3.28
<i>Alipore</i>	Smith, H. E., R.D., Lt.-Commr. R.N.R.	C. H. Stokes	" M.	P. and O.	" 9.1.28 to 19.3.28	11.4.28
<i>Almazora</i>	Clarke, E. G.	"	" A.	R.M.S.P.	" 25.3.28 to 9.4.28	10.4.28
63 <i>Albertic</i>	Summers, F. F., R.D., Commr. R.N.R.	J. W. Paine, A. E. Dyer, E. Smith.	W.T.	White Star	" 5.11.27 to 21.11.27	1.12.27
<i>Alondra</i>	Scott, L. S.	H. Peters	No. A.	Yeoward	W.T. Reg. 2.4.28 to 22.4.28	25.4.28
<i>Alybank</i>	Clayton, W. E.	R. Ardley	" A.	A. Weir & Co.	Form 911 24.3.28 to 12.5.28	16.5.28
<i>Ambascade</i>	Abbey, A. T., N., D.S.O., Commr. R.N.R.	F. G. Bullock	M.L.	His Majesty's Ship	" 26.2.28 to 12.4.28	8.5.28
<i>Ampetco</i>	Vandenkerckhove, A.	J. Abicht	No. A.	American Petroleum	Form 911 28.3.28 to 11.4.28	18.4.28
<i>Andalucia</i>	Thomas, R. J.	R. A. Brock	" M.	Blue Star	" 13.3.28 to 3.4.28	18.4.28
<i>Anchises</i>	Woodgett, R. J.	R. Fountain, G. Brown	" A.	A. Holt	" 25.3.28 to 13.4.28	8.5.28
<i>Andes</i>	Smith, W. E., D.S.O., R.D., Capt. R.N.R.	H. Whittle	M.L.	R.M.S.P. Co.	" 21.1.28 to 5.3.28	7.3.28
<i>Antillian</i>	Hannafor, W. T.	"	No. A.	Leyland	"	"
<i>Antiochus</i>	Salter, G. H.	O. P. H. Wynne	" A.	A. Holt	" 31.3.28 to 16.4.28	30.4.28
<i>Aorangi</i>	Crawford, R.	G. H. Kime, E. Anderson, E. V. Bilger, W. J. Weber.	M.L.	Canadian-Australasian	Met. Log. 21.9.27 to 5.1.28	7.2.28
30 <i>Aquitania</i>	Diggie, E. G., R.D., Capt. R.N.R.	J. L. Croasdaile, J. Locke, D. MacLean.	W.T.	Cunard	W.T. Reg. 8.4.28 to 24.4.28	28.4.28
62 <i>Arabic</i>	Bulman, J. B.	W. Jackman, T. W. Wills, W. N. Jenkins.	"	White Star	" 16.4.28 to 3.5.28	7.5.28
<i>Arafura</i>	Gordon, A. S.	F. O. Colvin, F. R. Miller, C. Stratford.	M.L.	Eastern and Australian	Met. Log. 29.7.27 to 25.10.27	17.12.27
<i>Arawa</i>	Diamond, S. L., Summers, W. G.	A. Chrystal, A. C. Jones, G. Campbell.	"	Shaw, Savill and Albion	" 13.12.27 to 17.4.28	30.4.28
<i>Archimedes</i>	Downs, E. B.	"	No. A.	Lampert & Holt	Form 911 10.10.27 to 5.1.28	18.1.28
<i>Argyllshire</i>	Wallace, J.	J. M. Crone	" M.	Federal	" 26.9.27 to 14.10.27	15.11.27
<i>Ariguaní</i>	Scudamore, J. H. H., D.S.O., R.D., Commr. R.N.R.	G. McKee, A. J. J. Moar, J. W. Dodd, W. Ireland.	M.L.	Elders & Fyffes	Met. Log. 12.2.28 to 29.4.28	3.5.28
<i>Ariosto</i>	Biggins, R. L.	F. E. Whitfield	No. A.	Ellerman Wilson	Form 911 25.12.27 to 21.1.28	13.2.28
<i>Armadale Castle</i>	Imlah, C. B.	E. Roach, G. D. Pennick, E. Fullick.	M.L.	Union Castle	Met. Log. 12.11.27 to 4.3.28	8.3.28
<i>Arracan</i>	Duncan, S. S.	J. Summers, J. Henderson, C. C. Weir.	"	P. Henderson	" 2.11.27 to 27.3.28	23.4.28
<i>Arundel</i>	Short, H.	Mr. Hill	C.C.	Southern Rly.	Telegraphic Report 30.3.28	30.3.28
<i>Arundel Castle</i>	Knight, A.	G. H. Pickering	No. A.	Union Castle	Form 911 28.1.28 to 18.3.28	23.3.28
<i>Astronomer</i>	Richards, J.	A. Browne, C. C. Heaton, H. W. FitzSimons.	M.L.	Harrison	Met. Log. 28.10.27 to 7.1.28	13.1.28
<i>Ascanius</i>	Wilson, C. A.	T. Robb, J. B. Marshall, W. Cook.	"	A. Holt	" 31.10.27 to 5.3.28	14.3.28
<i>Athenic</i>	Binks, J. W.	W. Hill	No. A.	White Star	Form 911 20.2.28 to 7.3.28	9.3.28
<i>Atreus</i>	Rundle, G. G.	H. Nicholas	" A.	A. Holt	" 18.3.28 to 5.4.28	24.4.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 16.5.28.	Date Received.
<i>Atsuta Maru</i> ...	Narui, N. ...	Y. Osada ...	No. A.	Nippon Yusen Kaisha	Form 911 16.3.28 to 16.4.28 ...	24.4.28
<i>Auditor</i> ...	Owen, W. T. ...	L. A. Bennett, W. Moore ...	" M.	Harrison ...	" 19.1.28 to 18.4.28 ...	5.5.28
<i>Autolycus</i> ...	Dunlop, J. K. ...	" ...	" A.	A. Holt ...	" 16.2.28 to 25.2.28 ...	10.4.28
<i>Ausonia</i> ...	Stafford, W. D.S.C., R.D., Lt.-Commr., R.N.R.	J. J. Wiseman ...	" A.	Cunard ...	" 21.8.27 to 8.10.27 ...	11.10.27
<i>Avon</i> ...	Spriddell, F. G., R.D., Commr., R.N.R.	R. H. East ...	" M.	R.M.S.P. ...	" 17.2.28 to 28.3.28 ...	29.3.28
<i>Balmoral Castle</i> ...	Chave, Sir B., K.B.E.	" ...	" A.	Union Castle ...	" 6.4.28 to 23.4.28 ...	24.4.28
<i>Balramala</i> ...	Townshend, W. P., Commr., R.N.R.	C. Hammen, F. Ward, R. E., Cowell, J. C. Davis, L. S. Bailey.	M.L.	P. & O. Branch ...	Met. Log. 9.6.27 to 13.10.27 ...	22.11.27
51 <i>Baltic</i> ...	Binks, J. W., R.D., Lt.-Commr., R.N.R.	F. L. Kean, A. Thompson, E. P. Hughes.	W.T.	White Star ...	W.T. Reg. 16.4.28 to 5.5.28 ...	10.5.28
<i>Bampton Castle</i> ...	Hutchings, A. H. ...	" ...	No. A.	Union Castle ...	Form 911 16.4.28 to 5.5.28 ...	10.5.28
<i>Banbury Castle</i> ...	Swiney, W. A. ...	C. G. Cuthbertson ...	" A.	" ...	" 17.9.27 to 14.10.27 ...	24.10.27
<i>Banffshire</i> ...	Wynne, R. H. ...	J. P. Malley ...	" A.	" ...	" 21.4.27 to 9.5.27 ...	9.6.27
<i>Baradine</i> ...	Rollo, W. ...	B. H. Pollitt, E. Bolton-Smith, G. C. Case, G. B. Roche.	M.L.	Turnbull Martin P. & O. Branch ...	Met. Log. 1.9.27 to 4.1.28 ...	11.1.28
<i>Barpeta</i> ...	Strachan, J. ...	B. R. Faithfull ...	No. M.	British India ...	Form 911 21.3.28 to 18.4.28 ...	8.5.28
<i>Barrabool</i> ...	Rhodes, H. R. ...	G. S. B. Collard ...	" M.	P. & O. Branch ...	" 2.2.28 to 20.4.28 ...	15.5.28
<i>Baychimo</i> ...	Cornwall, S. A. ...	W. H. Deans ...	" A.	Hudson's Bay Co. ...	" 7.7.27 to 14.9.27 ...	13.10.27
59 <i>Belgenland</i> ...	Morehouse, W. A. ...	F. Good, W. E. Hesketh, F. Clitty.	W.T.	Red Star ...	W.T. Reg. 4.5.28 to 10.5.28 ...	12.5.28
<i>Beltana</i> ...	Allin, C. H. C. ...	" ...	No. M.	P. & O. Branch ...	Form 911 3.5.28 to 10.5.28 ...	10.4.28
<i>Benalder</i> ...	Fairweather, J. J. ...	A. J. Leckie ...	" A.	Ben Line ...	" 3.3.28 to 21.3.28 ...	10.4.28
<i>Benalla</i> ...	Sheepwash, J. ...	S. W. Du Fosse ...	" M.	P. & O. Branch ...	" 4.4.28 to 20.4.28 ...	24.4.28
<i>Benigo</i> ...	Nicholl, R. N. C. ...	R. M. Richardson ...	" M.	" ...	" ...	...
<i>Benefactor</i> ...	Jones, C. W. ...	" ...	" M.	Harrison ...	" 17.2.28 to 3.4.28 ...	11.4.28
<i>Bengloe</i> ...	McCorquodale, A. ...	" ...	" A.	Ben Line ...	" 8.3.28 to 3.4.28 ...	28.4.28
31 <i>Berengaria</i> ...	Rostron, Sir A. H., K.B.E., R.D., Capt. R.N.R.	J. A. Myles, W. C. A. Robson, S. A. T. Bullock.	W.T.	Cunard ...	W.T. Reg. 28.2.28 to 3.4.28 ...	26.4.28
<i>Berrima</i> ...	Short, C. E. ...	A. Hughes ...	No. M.	P. & O. Branch ...	Form 911 9.12.27 to 13.4.28 ...	16.4.28
<i>Bogota</i> ...	Pape, E. R. ...	" ...	" M.	R.M.S.P. Co. ...	" 6.3.28 to 3.3.28 ...	11.4.28
<i>Borda</i> ...	Holland, R. ...	" ...	" M.	P. & O. Branch ...	" 18.2.27 to 28.6.27 ...	7.7.27
<i>Brecon</i> ...	Rothwell, A. ...	E. H. Coleman ...	" A.	Canadian Pacific ...	" 5.5.27 to 6.6.27 ...	14.6.27
<i>Brenda</i> ...	Lamont, A. ...	N. Ross ...	" A.	Scottish Fishery Board.	" 2.4.28 to 28.4.28 ...	5.5.28
<i>Brighton</i> ...	Hill, A. ...	Mr. Munton ...	C.C.	Southern Railway ...	Telegraphic Report 16.5.28 ...	16.5.28
<i>British Colonel</i> ...	Taylor, R. J. ...	S. H. Chaplain ...	No. M.	British Tankers ...	Form 911 26.1.28 to 15.3.28 ...	21.3.28
<i>British Consul</i> ...	Putt, R. O. ...	C. H. Humphries ...	" M.	" ...	" 23.3.28 to 9.5.28 ...	14.5.28
<i>Bronte</i> ...	Crappier, J. S. ...	J. B. Scott ...	" A.	Lampport & Holt ...	" 9.1.28 to 11.3.28 ...	26.3.28
<i>Bruyere</i> ...	Birch, A. ...	R. B. Langley ...	" A.	" ...	" 19.2.28 to 7.3.28 ...	16.4.28
<i>Bulysses M.V.</i> ...	Head, B. P. ...	A. J. Clatworthy ...	" M.	Anglo-Saxon Petroleum Co	" 5.3.28 to 29.3.28 ...	11.4.28
<i>Cambria</i> ...	Copland, C. P. ...	O. W. Ll. Jones ...	C.C.	L.M. & S. Rly ...	Telegraphic Report 21.4.28 ...	21.4.28
<i>Cameronia</i> ...	Gemmell, W. ...	" ...	M.L.	Anchor ...	Form 911 25.3.28 to 16.4.28 ...	18.4.28
<i>Camito</i> ...	Forrester, W. T., O.B.E.	H. H. Dunning, J. McIntyre, C. M. Schofield.	"	Elders & Fyffes ...	Met. Log. 2.8.27 to 26.11.27 ...	1.12.27
<i>Canadian Importer</i> ...	Forsan, A. ...	" ...	No. A.	Canadian Gov. Mercantile Marine.	Form 911 17.2.28 to 16.3.28 ...	10.4.28
<i>Canadian Inventor</i> ...	Boulton, F. W. ...	O. D. Alcorn ...	" A.	" ...	" 17.9.27 to 30.10.27 ...	19.11.27
<i>Canadian Scottish</i> ...	Wallace, C. ...	" ...	" A.	" ...	" 26.5.27 to 11.7.27 ...	19.8.27
<i>Canadian Winner</i> ...	Hocking, N. P. ...	R. J. Watson ...	" M.	" ...	" 21.3.28 to 24.4.28 ...	8.5.28
<i>Canonesa</i> ...	Brodie, W. H. ...	T. Wetherall ...	" M.	Furness Houlder ...	" 13.2.28 to 3.4.28 ...	11.4.28
<i>Cape of Good Hope</i> ...	Lamont, J. ...	J. J. Lewis ...	No. A.	Lyle S.S. Co. ...	" 3.2.28 to 19.3.28 ...	10.4.28
35 <i>Carmania</i> ...	Brown, F. G., R.D., Capt., R.N.R.	W. M. Stewart, E. Taylor, V. P. Britten.	W.T.	Cunard ...	W.T. Reg. 16.4.28 to 4.5.28 ...	7.5.28
<i>Carnarvon Castle</i> ...	Strong, H., R.D., Commr., R.N.R.	H. A. Deller, E. Fullick, W. G. Smith, J. B. McReynolds.	M.L.	Union Castle ...	Form 911 7.8.27 to 26.8.27 ...	30.8.27
34 <i>Caronia</i> ...	Hossack, W. H., R.D., Capt., R.N.R.	H. G. Hayward, D. McMillan, T. Parry.	W.T.	Cunard ...	W.T. Reg. 2.4.28 to 21.4.28 ...	25.4.28
<i>Casanare</i> ...	Steidelmann, H. ...	R. O. Jones ...	No. A.	Elders & Fyffes ...	Form 911 2.4.28 to 21.4.28 ...	24.4.28
<i>Cavina</i> ...	Riseley, A. D. ...	R. L. Stevenson ...	" A.	" ...	" 25.6.27 to 11.9.27 ...	16.9.27
52 <i>Cedric</i> ...	Smith, R. G. ...	N. E. Banks, H. A. Daman, S. Fieldwood.	W.T.	White Star ...	W.T. Reg. 10.3.28 to 15.4.28 ...	20.4.28
53 <i>Celtic</i> ...	Berry, G. ...	J. Law, D. K. Crawford, A. R. Stevens.	"	" ...	W.T. Reg. 23.4.28 to 12.5.28 ...	15.5.28
<i>Centaur</i> ...	Rose, A. F. ...	E. D. Potts, N. L. Thompson, J. Cockburn.	M.L.	A. Holt & Co. ...	Form 911 26.3.28 to 13.5.28 ...	15.5.28
<i>Ceramic</i> ...	Musgrave, T. ...	" ...	No. A.	White Star ...	W.T. Reg. 9.4.28 to 29.4.28 ...	4.5.28
<i>Change</i> ...	Gambrill, F. C. ...	— Thomas, — Tyer, — Allan.	M.L.	Yuill & Co. ...	Form 911 9.4.28 to 29.4.28 ...	5.5.28
<i>Changuinola</i> ...	Thorburn, R. A., R.D., Commr., R.N.R.	W. G. Chanter ...	No. A.	Elders & Fyffes ...	Met. Log. 21.8.27 to 6.2.28 ...	26.4.28
<i>Chindwin</i> ...	Esslemont, C. ...	" ...	" A.	Henderson ...	" 6.3.28 to 7.4.28 ...	16.4.28
<i>Chinkiang</i> ...	Stringer, C. ...	" ...	M.L.	China Navigation Co.	" 24.12.27 to 8.3.28 ...	28.3.28
<i>Chirripo</i> ...	McColm, F. ...	H. Rawston, R. Laycock ...	No. A.	Elders & Fyffes ...	" ...	...
<i>City of Baroda</i> ...	McMillan, J. ...	A. Beaton, — Hodgkinson, W. A. Lambert.	M.L.	Ellerman ...	Met. Log. 3.3.28 to 8.4.28 ...	27.4.28
<i>City of Benares</i> ...	Anderson, W. W. ...	F. Forsyth ...	No. A.	" ...	Met. Log. 17.11.27 to 1.2.28 ...	8.2.28
<i>City of Brisbane</i> ...	Seaborne, F. O., D.S.C.	R. Jones ...	" A.	" ...	Form 911 15.3.28 to 16.4.28 ...	19.4.28
<i>City of Canterbury</i> ...	Bremner, D. M. ...	R. H. Hodgson ...	" A.	" ...	" 3.2.28 to 1.4.28 ...	10.4.28
<i>City of Carlisle</i> ...	Mordue, J. A. ...	" ...	" A.	" ...	" 24.3.28 to 17.4.28 ...	5.5.28
<i>City of Chester</i> ...	Letton, F. W. ...	C. C. Duncan, A. J. Barnett, R. Mowbray.	M.L.	" ...	" 23.3.28 to 12.4.28 ...	26.4.28
<i>City of Edinburgh</i> ...	Wyper, J. ...	G. Hummell ...	No. M.	" ...	Met. Log. 22.10.27 to 26.2.28 ...	21.3.28
<i>City of Hong Kong</i> ...	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	" ...	" A.	" ...	Form 911 25.11.27 to 18.12.27 ...	9.1.28
<i>City of London</i> ...	Parker, F. W., R.D., Commr., R.N.R.	H. H. Asher ...	No. A.	" ...	" 18.2.28 to 9.3.28 ...	24.4.28
<i>City of Osaka</i> ...	Smith, W. H. ...	" ...	No.	" ...	Form 911 4.2.28 to 22.4.28 ...	27.4.28
<i>City of Rangoon</i> ...	Jones, P. ...	E. R. Wildermath, R. W. May, R. H. Stewart.	M.L.	" ...	Met. Log. ...	...
<i>City of Venice</i> ...	Lee, A. ...	" ...	No. A.	" ...	Met. Log. 4.7.27 to 5.1.28 ...	1.2.28
					Form 911 18.2.28 to 1.3.28 ...	12.3.28

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 16.5.28.	Date Received.
<i>City of Yokohama</i>	Singleton, J. G.	R. Willott Leese	No. A.	Ellerman	Form 911 2.2.28 to 15.2.28	2.3.28
<i>Clan Alpine</i>	Lyall, A. B.	K. M. Banks	" A.	Clan	" 1.3.28 to 27.3.28	5.5.28
<i>Clan Lamont</i>	Urquhart, P., D.S.O.	P. de Gruchy	" A.	"	" 25.1.28 to 27.4.28	8.5.28
<i>Clan Lindsay</i>	Giles, H. J., R.D., Commr., R.N.R.	E. P. Smith	" A.	"	" 22.3.28 to 19.4.28	14.5.28
<i>Clan MacBean</i>	Worthington, J. H.	J. E. Clayton	" A.	"	" 2.3.28 to 17.3.28	16.4.28
<i>Clan Macbeth</i>	Pagan, Q. C.	T. A. Watkinson	" A.	"	" 1.2.28 to 27.2.28	14.3.28
<i>Clan Macduyen</i>	Stenson, F. J., R.D., Capt., R.N.R.	A. Dowds	" A.	"	" 24.2.28 to 22.3.28	16.4.28
<i>Clan Macfarlane</i>	Redford, L. F.	R. S. F. Notman	" A.	"	" 21.12.27 to 17.4.28	15.5.28
<i>Clan Macgillivray</i>	Law, A.	J. Garis	" A.	"	" 16.12.27 to 7.4.28	10.4.28
<i>Clan Macindoe</i>	West, W. F.	D. McAllister	" A.	"	" 20.11.27 to 30.12.27	2.1.28
<i>Clan Mackellar</i>	Smith, W. P.	G. A. A. Grant	" A.	"	" 20.3.28 to 27.4.28	16.5.28
<i>Clan Macphee</i>	Gourlay, J. B.	D. S. Rae, A. F. Martin, W. A. Shewan.	M.L.	"	Met. Log. 14.5.28 to 2.5.27	9.6.27
<i>Clan Macnaughton</i>	Simpson, A. W.	J. W. Fox	No. A.	"	Form 911 26.3.28 to 20.4.28	14.5.28
<i>Clan Mactaggart</i>	Makepeace, F.	E. A. Hewson	" A.	"	" 3.3.28 to 22.4.28	5.5.28
<i>Clan Macwhirter</i>	Waterhouse, J.	W. A. Robbie, E. A. Brown, S. W. Brown.	M.L.	"	Met. Log. 1.10.27 to 26.4.28	30.4.28
<i>Clan Malcolm</i>	Neill, G. A.	D. A. Stark, H. V. Wightman, M. Carlton.	"	"	" 28.8.27 to 24.12.27	11.2.28
<i>Clan Morrison</i>	Porterfield, W. M.	H. R. Crosscombe	No. A.	"	Form 911 5.3.28 to 11.4.28	30.4.28
<i>Clan Murdoch</i>	Neill, G. A.	W. J. Jones	" A.	"	" 20.2.28 to 10.3.28	10.4.28
<i>Clan Ranald</i>	Laird, C.	F. D. Bonney, T. O. Marr	" A.	"	" 10.12.27 to 29.3.28	10.4.28
<i>Clan Ross</i>	Openshaw, L. G.	R. K. Phillips	" A.	"	" 9.3.28 to 2.4.28	24.4.28
<i>Clan Sinclair</i>	George, L. S.	N. Macleod	" A.	"	" 20.12.27 to 13.1.28	21.1.28
<i>Clan Urquhart</i>	Baker, E. W.	W. A. Shewan	" A.	"	" 8.3.28 to 21.3.28	26.3.28
<i>Comorin</i>	Borland, J., McL., C.B., D.S.O., R.D., Capt., R.N.R.	E. C. White	" M.	P. & O.	" 27.1.28 to 7.3.28	24.4.28
<i>Corinthic</i>	Hart, F.	I. A. Macnaughton	M.L.	White Star	Met. Log. 17.9.27 to 8.1.28	10.1.28
<i>Cornwall</i>	Wilde, H. J.	H. M. Knight	No. A.	Federal	Form 911 27.3.28 to 9.5.28	15.5.28
<i>Crawford Castle</i>	Morgan, A. O., R.D., Commr., R.N.R.	J. A. Wilson	" A.	Union Castle	" 30.10.27 to 1.12.27	15.12.27
<i>Culebra</i>	Rathkings, C.E., R.D., Commr., R.N.R.	P. Cooper, R. N. Fletcher, W. S. Thomas.	M.L.	R.M.S.P. Co.	Met. Log. 4.2.28 to 12.4.28	20.4.28
<i>Cumberland</i>	Macmillan, D.	J. Marks	"	Federal	Form 911 25.2.28 to 3.4.28	24.4.28
<i>Cyclops</i>	Cosker, W.	"	No. A.	A. Holt	" 25.12.27 to 28.2.28	16.3.28
<i>Daga</i>	Wiles, N.	"	No. A.	P. Henderson	"	"
<i>Dakotian</i>	Robb, J.	"	" A.	Leyland	"	"
<i>Dardanus</i>	Clarke, J. W.	R. Millar	" A.	A. Holt	Form 911 4.2.28 to 11.4.28	18.4.28
<i>Darian</i>	Masters, W.	"	" A.	Leyland	" 12.11.27 to 24.11.27	5.12.27
<i>Darro</i>	Matthews, G. P.	A. T. Walker	" M.	R.M.S.P. Co.	" 9.3.28 to 23.4.28	5.5.28
<i>Demerara</i>	Willan, F. G. L., R.D., Capt., R.N.R.	F. Jeyes	" M.	"	" 20.2.28 to 12.4.28	16.4.28
<i>Demosthenes</i>	Ogilvy, A.	"	" M.	Aberdeen	" 14.3.28 to 23.4.28	28.4.28
<i>Denis</i>	Harris, F. C. P.	"	No.	Booth	"	"
<i>Deseado</i>	Hannan, F. S.	L. D. Jennings, A. Bariff	" M.	R.M.S.P. Co.	" 7.1.28 to 2.3.28	5.3.28
<i>Desna</i>	Green, J.	L. G. Peterson	" M.	"	" 24.1.28 to 14.3.28	23.3.28
<i>Devocation</i>	Melling, C. F.	R. Wilson	" A.	A. Holt	" 6.4.28 to 18.4.28	27.4.28
<i>Dieppe</i>	Marmery, S.	Mr. Parsons	C.C.	Southern Railway	Telegraphic Report 15.5.28	15.5.28
<i>Dimboola</i>	Roy, C. M.	H. L. Price	No. A.	Melbourne S.S. Co.	Form 911 16.2.28 to 10.4.28	14.5.28
<i>Discoverer</i>	Ling, J. T.	H. W. Gostage	" M.	Harrison	" 8.4.27 to 9.7.27	12.7.27
<i>Domala, M.V.</i>	Kitson, A. G.	J. G. Wallace	" M.	British India	" 8.7.27 to 18.9.27	10.10.27
<i>Dominia, C.S.</i>	Campos, V., O.B.E., Lt.-Commr., R.N.R.	H. Hutchins, T. J. C. Dexter, J. Dyer.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 4.1.28 to 24.1.28	1.3.28
<i>Dominic</i>	Saxton, C.	J. A. Moon	No. A.	Booth	Form 911 14.3.28 to 1.5.28	8.5.28
<i>Doric</i>	Bolton, S., D.S.O., R.D., Commr., R.N.R.	J. Farrell, G. T. Kavanagh, D. W. Chamberlain.	" M.	White Star	W.T.Reg. 7.4.28 to 24.4.28	26.4.28
<i>Dorington Court</i>	Clarke, E. J.	P. Jones	" A.	Haldin & Co.	" 28.10.27 to 28.2.28	14.3.28
<i>Dromore Castle</i>	MacMahon, J., R.D., Commr., R.N.R.	D. P. Klases	" A.	Union Castle	" 11.3.28 to 11.4.28	30.4.28
<i>Dryden</i>	Major, T. W.	E. W. Hardie	" M.	Lampport & Holt	" 6.4.28 to 1.5.28	5.5.28
<i>Dunaff Head</i>	Milner, T. F., R.D., Lt.-Commr., R.N.R.	S. Duff	" A.	Ulster S.S. Co.	" 2.2.28 to 15.2.28	26.3.28
<i>Dundrum Castle</i>	Goodacre, R.W., R.D., Commr., R.N.R.	A. R. J. Tilston	" A.	Union Castle	" 4.2.28 to 23.2.28	26.3.28
<i>Dunluce Castle</i>	Jackson, C. R.	F. O. Wilbraham	" A.	"	" 9.3.28 to 29.3.28	16.4.28
<i>Dunrobin</i>	Ramsay, J. D.	C. H. Kendall	" A.	Glen & Co.	" 6.3.28 to 23.4.28	5.5.28
<i>Duquesa</i>	Owen, R.	C. G. Adlard	" M.	Furness Withy	" 22.1.28 to 15.3.28	19.3.28
<i>Durenda</i>	Beeching, P. H.	"	" M.	British India	" 19.10.27 to 17.11.27	8.12.27
<i>Edinburgh Castle</i>	Owen, S. H.	G. H. Mayhew	" A.	Union Castle	" 10.2.28 to 1.4.28	2.4.28
<i>Egori</i>	Sola, P., D.S.O.	F. J. Croft	" A.	Elder Dempster	" 1.3.28 to 19.3.28	28.3.28
<i>El Paraguayo</i>	Fletcher, G.	F. F. Feint, D. Murray	" M.	Houlder Bros.	" 23.10.27 to 15.12.27	20.12.27
<i>Elpenor</i>	Gordon, A. L.	M. Robertson, C. Kavanagh	M.L.	A. Holt	Met. Log. 8.9.27 to 23.12.27	4.1.28
<i>Elystia</i>	Duncan, A. R.	A. Laidlaw, G. S. Sinclair, H. M. Sanders.	"	Anchor	" 15.2.28 to 19.4.28	28.4.28
<i>Empress of Asia</i>	Hailey, A. J., Lt.- Commr., R.N.R.	R. H. Foley, L. C. Hogg, D. Smith.	"	Canadian Pacific	" 14.10.27 to 12.2.28	19.3.28
<i>Empress of Canada</i>	Robinson, S., C.B.E., R.D., Commr., R.N.R.	A. G. Simmons	"	"	" 4.11.27 to 4.3.28	12.4.28
<i>Empress of France</i>	Griffiths, E.	E. Roberts, L. Outram, W. Griffith.	"	"	" 7.1.28 to 25.4.28	10.5.28
<i>Empress of Russia</i>	Hosken, A. J.	L. C. Barry, R. A. Leicester, J. S. Clarke, J. H. Reich.	"	"	" 19.5.27 to 9.11.27	16.12.27
<i>Endeavour</i>	Law, E. F. B., Commr., R.N.	C. S. E. Lansdown, A. Jones, M. L. Harrison, W. H. Dickinson.	"	His Majesty's Ship	" 15.11.27 to 13.3.28	16.4.28
<i>Essequibo</i>	Kirkwood, J. H.	J. H. E. Evans	No. M.	R.M.S.P. Co.	Form 911 29.1.28 to 11.3.28	30.3.28
<i>Eumaeus</i>	Read, J. W.	"	" A.	A. Holt	" 16.1.28 to 22.4.28	30.4.28
<i>Eurypides</i>	Collins, P. J., O.B.E.	K. D. Fisher, P. Congdon, A. J. Parry.	M.L.	Aberdeen	Met. Log. 17.9.27 to 24.1.28	2.2.28
<i>Euryades</i>	Findlay, J.	"	No. A.	A. Holt	Form 911 5.2.28 to 28.2.28	12.3.28
<i>Explorer</i>	Ling, J. T.	A. M. Hughes	" M.	Harrison	" 6.8.27 to 4.11.27	15.11.27
<i>Explorer</i>	Allan, J.	A. Stout	" A.	Scottish Fishery Board.	" 7.4.28 to 27.4.28	5.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 16.5.28.	Date Received.
<i>Ferndale</i>	Daniel, F. ... ..	... ..	No. M.	Commonwealth Govt.	Form 911 9.3.28 to 9.4.28	21.4.28
<i>Flandria</i>	Maars, L.	C. Van Otterloo	" M.	Holland Lloyd	" 24.2.28 to 15.4.28	16.4.28
<i>Francisco</i>	Scales, H.	F. Elgin	" A.	Ellerman Wilson	" 18.3.28 to 23.4.28	27.4.28
<i>Freya</i>	Angus, W.	W. Pirrie	" A.	Scottish Fishery Board.	" 1.4.28 to 30.4.28	5.5.28
<i>Gaika</i>	Jackson, C. R.	L. G. May	" A.	Union Castle	" 11.9.27 to 4.11.27	7.11.27
<i>Galtymore</i>	Yeoman, J. T. ... ..	... ..	" M.	Furness Withy	" 25.9.27 to 24.11.27... ..	1.12.27
<i>Garth Castle</i>	Jackson, C. R.	W. S. J. Aldous	" A.	Union Castle	" 28.5.27 to 18.6.27	22.6.27
<i>Gascogne</i>	Johnson, L. ... ..	... ..	M.L.	A. Holt & Co. ... ..	... ..	...
<i>Gelria</i>	Veldkamp, C. J. ... ..	... ..	No. M.	Holland Lloyd	Form 911 22.3.28 to 9.5.28	12.5.28
<i>Geranium</i>	Bennett, H. T., D.S.O., Commr. R.A.N.	... ..	M.L.	His Majesty's Australian Ship.	... ..	...
<i>Glamorganshire</i>	Clayton, R. G., D.S.C., R.D., Lt.-Commr., R.N.R.	K. H. Whitaker	No. M.	R.M.S.P. Co.	Form 911 5.2.28 to 23.2.28	21.3.28
<i>Glenamoy, M.V.</i>	Homan, C. E.	R. H. Bishop	M.L.	Glen Line	" 17.8.27 to 22.10.27... ..	4.11.27
<i>Glenarary</i>	Angier, J.	F. C. White	No. M.	"	" 18.2.28 to 5.3.28	3.4.28
<i>Glenluce</i>	Kennett, W. H.	H. B. Porter	" A.	"	" 26.2.28 to 7.5.28	16.5.28
<i>Glenshane</i>	Beer, E. ... ..	... ..	" A.	"	" 31.12.27 to 17.2.28... ..	19.3.28
<i>Glentworth</i>	Neil, P. G. ... ..	... ..	No.	R. S. Dalgleish ... ..	... ..	...
<i>Gloucestershire</i>	Kilgour, H. A. ... ..	... ..	" A.	Bibby	" 28.1.28 to 24.3.28	10.4.28
<i>Gloaxinia</i>	Robin, E.	C. F. Hicks	" A.	Stag Line	" 13.3.28 to 3.4.28	12.4.28
<i>Grantully Castle</i>	Pool, F. G. ... ..	... ..	" A.	Union Castle	" 3.6.27 to 14.8.27	17.8.27
<i>Halstus</i>	Whitfield, G. T.	R. Wren	" A.	R. P. Houston	" 28.1.28 to 2.3.28	26.3.28
<i>Haliartus</i>	Samuels, C.	R. W. Cook	" A.	"	" 5.2.28 to 29.2.28	2.4.28
<i>Harmonides</i>	Marsh, L. V.	W. H. Upton	" A.	"	" 21.2.28 to 8.3.28	23.3.28
<i>Hatimura</i>	Hughes, W. F.	K. T. Roper	" A.	British India	" 27.11.27 to 6.1.28	6.2.28
<i>Hawaki, M.V.</i>	Lane, S. R., R.D., Capt., R.N.R.	... ..	" M.	Union S.S. Co., N.Z.	Met. Log. 25.3.27 to 1.11.27	21.1.28
<i>Henry Holmes, C.S.</i>	Hannaford, J.	T. Marshall	M.L.	W. I. & Panama Telegraph Co.	Form 911 20.3.28 to 7.4.28	8.5.28
<i>Herald</i>	Frew, J. D.	M. A. Green	No. M.	His Majesty's Ship	Met. Log. 18.10.27 to 19.11.27	31.1.28
<i>Herefordshire</i>	Haselfoot, F.E.B., Capt., R.N.	D. G. V. Williams	M.L.	Bibby	Form 911 14.1.28 to 21.3.28	26.3.28
<i>Herminius</i>	Mann, R. P.	M. D. Loutill	No. A.	Shaw, Savill & Albion	" 5.2.28 to 28.2.28	16.4.28
<i>Herschel</i>	Roberts, T. V.	D. W. MacGregor	" A.	Lampont & Holt	" 24.7.27 to 11.1.28	20.1.28
<i>Hertford</i>	Watson, W. W.	J. F. Maurey	" A.	Federal	" 3.3.28 to 10.4.28	14.4.28
<i>Hibernia</i>	Urquhart, D.	J. R. Ricketts	" A.	L.M. & S. Railway	Telegraphic Report 15.5.28	15.5.28
<i>Highland Laddie</i>	Roberts, W. Ivor, M.B.E.	R. Woodall, A. Marsh	C.C.	Nelson	Form 911 31.1.28 to 23.3.28	16.4.28
<i>" Piper</i>	Jones, T. J.	E. F. Smart	No. A.	"	Met. Log. 13.5.27 to 4.11.27	1.12.27
<i>" Pride</i>	Collings, D.	S. E. Jackson, R. G. Owen, A. Southgate.	M.L.	Prince	Form 911 16.12.27 to 11.2.28... ..	14.2.28
<i>" Prince</i>	Robinson, R. H.	J. Harrison	No. A.	Nelson	" 13.3.28 to 8.4.28	16.4.28
<i>" Rover</i>	Davis, J.	C. C. Legg	" A.	Booth	" 19.2.28 to 7.3.28	19.3.28
<i>Hildebrand</i>	Ashby Graves, F. ... ..	... ..	" A.	Commonwealth Govt	Met. Log. 4.10.27 to 7.1.28	13.1.28
<i>Hobson's Bay</i>	Kydd, O. J.	R. Pearce, H. Benson, K. McKenzie.	M.L.	Lampont & Holt	Form 911 27.10.27 to 15.1.28... ..	18.1.28
<i>Holbein</i>	Leicester, F. S.	C. E. Legg, A. J. Corney	No. A.	White Star	W.T. Reg. 5.4.28 to 19.4.28	23.4.28
<i>54 Homerio</i>	Parker, W. H., C.B.E., R.D., Capt. R.N.R.	H. G. Morgan, S. B. Morfee, W. T. Postie.	W.T.	New Zealand S.S. Co.	Form 911 29.10.27 to 3.3.28	12.3.28
<i>Hororata</i>	Holland, E.	A. E. Bamforth	No. A.	Booth	" 27.3.28 to 9.4.28	14.5.28
<i>Hubert</i>	Briscoe, W.	E. C. McGuinness	" A.	Federal	" 8.3.28 to 15.4.28	18.4.28
<i>Huntingdon</i>	Ashworth, W.	H. G. Letts	" M.	Harrison	" 6.12.27 to 14.2.28	23.2.28
<i>Huntsman</i>	Russell, H.	J. Richardson	M.L.	New Zealand S.S. Co.	Met. Log. 12.8.27 to 5.2.28	10.2.28
<i>Hurumui</i>	Upton, E. C. S.	J. Oxnard, F. Longheed, G. R. Hogg, K. Goldsworthy.	No. M.	R. P. Houston ... ..	... ..	...
<i>Hydaspes</i>	Williams, — ... ..	... ..	" M.	Harrison	Form 911 12.2.28 to 25.3.28	28.3.28
<i>Ingoma</i>	Barrow, R. K.	D. G. Russell	" A.	J. H. Welsford	Met. Log. 28.3.28 to 12.4.28	28.4.28
<i>Inkum</i>	Meetham, J. T.	L. V. Vicker, D. MacDonald	M.L.	Pacific Cable Board... ..	" 25.8.27 to 3.10.27	21.3.28
<i>Iris, C.S.</i>	Hughes, H. R.	H. L. Jenkins	" A.	His Majesty's Ship	" 2.8.27 to 21.11.27	31.1.28
<i>Iroquois</i>	Jackson, A. L. Commr., R.N.	... ..	No. A.	A. Holt	Form 911 5.1.28 to 27.3.28	10.4.28
<i>Ixion</i>	Reed, G. C.	C. W. A. Murphy	" A.	Prince	" 1.2.28 to 6.3.28	26.3.28
<i>Javanese Prince</i>	Naylor, E.	W. Venn	" M.	Commonwealth Govt.	" 20.12.27 to 23.4.28	14.5.28
<i>Jervis Bay</i>	Chaplin, W. R.	R. W. Laycock	" A.	Booth	" 28.3.28 to 10.4.28	24.4.28
<i>Justin</i>	Bush, H.	G. E. Thomas	" A.	P. & O.	" 4.2.28 to 28.3.28	3.4.28
<i>Kaisar-i-Hind</i>	Manley, G.	R. H. Hand	" M.	P. & O.	" 18.2.28 to 13.5.28	15.5.28
<i>Kalyan</i>	Cornwall Jones, B.	S. Gerrans	" A.	Nippon Yusen Kaisha	Met. Log. 17.2.28 to 18.3.28	8.2.28
<i>Kamo Maru</i>	Enya, S.	E. Hutchinson, J. Kavanagh, H. Brackenridge.	M.L.	State Service Australia.	Met. Log. 4.5.27 to 5.9.27	25.10.27
<i>Kangaroo</i>	Buckeridge, G.	J. Ruddiman	No. M.	British India	Form 911 12.3.28 to 31.3.28	30.4.28
<i>Karapara</i>	Turner, J. E.	A. J. McHattie	" M.	P. & O.	" 8.3.28 to 17.4.28	24.4.28
<i>Kashmir</i>	Miller, A. C. ... ..	... ..	M.L.	Union Castle	Met. Log. 18.4.27 to 8.8.27	19.10.27
<i>Kashmir</i>	Mallalae, R., R.D., Lt.-Commr., R.N.R.	... ..	" M.	Federal	Form 911 21.12.27 to 24.1.28... ..	31.1.28
<i>Kenilworth Castle</i>	Chave, Sir B., K.B.E.	R. C. Longman, L. A. J. Keeble, W. Dryden, W. Wyeth.	No. A.	P. & O.	Met. Log. 13.10.27 to 14.4.28... ..	23.4.28
<i>Kent</i>	Matthews, C.	W. C. Wilkinson	" M.	P. & O.	" 16.12.27 to 24.3.28... ..	2.4.28
<i>Khiva</i>	Stringer, R. H., O.B.E., R.D., Commr., R.N.R.	G. W. Wood, D. Meakle, V. A. Nicolls, A. Robson.	M.L.	A. Holt	Form 911 24.3.28 to 17.4.28	14.5.28
<i>Khyber</i>	Hester, C. W., R.D., Commr., R.N.R.	C. S. Pirie	" M.	State Service, Australia.	" 2.3.28 to 16.3.28	24.4.28
<i>Knight Companion</i>	Cox, B. T., D.S.O.	J. H. Isherwood, J. R. Evans	No. M.	Ellerman Wilson	Met. Log. 18.6.27 to 20.12.27... ..	6.1.28
<i>Koolinda, M.V.</i>	Buckeridge, J. ... ..	... ..	" M.	Cunard	W.T. Reg. 2.1.28 to 8.1.28	25.1.28
<i>Kovno</i>	Dossor, W. A.	A. Snowdon, S. N. Stokes, N. W. Glendenning, S. Butcher.	M.L.	Pacific S.N. Co.	Form 911 15.1.28 to 28.3.28	2.4.28
<i>37 Laconia</i>	Britten, E. T., R.D., Commr., R.N.R.	J. Ashcroft, E. W. Connell, J. O. Chambers.	W.T.	P. & O.	Form 911 21.2.28 to 14.3.28	2.4.28
<i>Laguna</i>	Mander, T. ... ..	... ..	No. A.	... ..	... ..	...
<i>Lahore</i>	Gordon, L. M., R.D., Commr., R.N.R.	E. B. Elcoate	" M.	... ..	... ..	...

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 16.5.28.	Date Received.
Lalande ...	Hamill, H. ...	A. E. Warburton ...	No. A.	Lampport & Holt ...	Form 911 5.11.27 to 27.1.28 ...	20.2.28
Lancashire ...	Crumplin, W. E. ...	R. Allen ...	" A.	Bibby ...	12.2.28 to 18.4.28 ...	24.4.28
36 Lancastria ...	Oram, B.B., R.D., Commr., R.N.R.	E. P. Cambell, L. R. Sharp, F. G. Russell.	W.T.	Cunard ...	W.T. Reg. 13.4.28 to 12.5.28 ...	15.5.28
Laomedon ...	Beswick, W., D.S.C., Lt.-Commr., R.N.R.	H. A. Standfield ...	No. A.	A. Holt... ...	Form 911 31.3.28 to 13.5.28 ...	15.5.28
La Paz, M.V. ...	Benson, C. W. ...	J. W. Richards ...	" M.	Pacific S.N. Co. ...	" 31.1.28 to 10.5.28 ...	16.5.28
Laplace ...	Hickman, V. G. ...	A. L. Murray, R. D. Cottam	" A.	Lampport & Holt ...	" 15.4.26 to 28.6.27 ...	30.8.27
55 Lapland ...	Harvey, H. ...	L. A. Williams, J. Flett ...	W.T.	Red Star ...	W.T. Reg. 9.4.28 to 27.4.28 ...	3.5.28
64 Laurentic ...	Trant, E. L., R.D., Commr. R.N.R.	J. W. Peters, E. A. A. Crowley	"	White Star ...	Form 911 9.4.28 to 28.4.28 ...	30.4.28
Lautaro, M.V. ...	Dunn, R. E., O.B.E., De Legh, P.	R. S. Evans, H. G. Walton, J. K. Gemmill, G. W. Hunter.	No. M. M.L.	Pacific S.N. Co. ...	W.T. Reg. 26.2.28 to 15.4.28 ...	18.4.28
Leighton, M.V. ...	Lindesay, J. M. ...	R. L. Hagley ...	No. A.	Lampport & Holt ...	Form 911 24.11.27 to 11.3.28 ...	29.3.28
Leirim ...	Kemp, E. R. ...	C. R. Brown ...	" A.	Dowie, J., & Co. ...	Met. Log. 18.12.27 to 22.2.28 ...	7.3.28
Lepanto ...	Williams, J. C. ...	G. W. Revell ...	" A.	Ellerman Wilson ...	" 2.11.27 to 17.11.27 ...	23.11.27
Limerick ...	Molyneux, P. L. ...	" ...	" M.	Federal... ...	" 2.3.28 to 5.4.28 ...	16.4.28
Llandaff Castle ...	Morton Betts, W. ...	R. Bayer ...	" A.	Union Castle ...	Form 911 29.12.27 to 15.1.28 ...	14.2.28
Llandovery Castle ...	Kerby, J. H. ...	C. H. Williams, G. Moon, E. M. Betts.	M.L.	" ...	Met. Log. 15.12.27 to 20.2.28 ...	1.3.28
Loch Katrine ...	Buret, T. J. C. ...	R. A. Stenhouse ...	No. A.	R.M.S.P. Co. ...	Form 911 11.11.27 to 3.2.28 ...	16.2.28
London Commerce ...	Young, H. J., D.S.C., Fowler, W. H.	W. Edmonds ... F. F. Feint, J. H. Metcalfe, J. G. Freeman.	" A. M.L.	Furness Withy ...	" 19.2.27 to 19.9.27 ...	26.9.27
London Importer ...	" ...	" ...	"	" ...	Met. Log. 8.1.28 to 31.3.28 ...	14.4.28
Loriga, M.V. ...	Clapham, E. C. ...	R. W. Gill ...	No. A.	Pacific S.N. Co. ...	Form 911 23.12.27 to 17.2.28 ...	20.2.28
Losada, M.V. ...	Ross, J. ...	D. Beamer ...	" M.	" ...	" 3.4.28 to 20.4.28 ...	8.5.28
Macedonia ...	Potter, H. W., R.D., Commr., R.N.R.	C. J. L. Hayward ...	" M.	P. & O. ...	" 28.2.28 to 4.4.28 ...	16.4.28
Macharda ...	Hanna, R. G. ...	T. Johnston ...	" M.	Brocklebank ...	" 4.3.28 to 31.3.28 ...	16.4.28
Mahia ...	McIntosh, A. ...	" ...	M.L.	Shaw, Savill & Albion ...	" ...	"
Mahronda ...	Addy, M. J. ...	J. Kettlewell ...	No. M.	Brocklebank ...	Form 911 18.3.28 to 13.4.28 ...	14.5.28
Mahar ...	Charlton, W. L. ...	C. Shaw, C. Cadwallader, S. S. Slade.	M.L.	" ...	Met. Log. 1.10.27 to 25.12.27 ...	2.1.28
Maimyo ...	Smith, G. C. ...	H. M. Drummond ...	No. A.	" ...	Form 911 16.7.27 to 8.10.27 ...	11.10.27
Maivara ...	Blain, A. W. ...	J. J. Skinner, A. M. Stanton	No. A.	Burns Philp ...	" 14.2.28 to 3.3.28 ...	26.4.28
58 Majestic ...	White, E. R., R.D., Commr. R.N.R.	W. W. Pearson, L. Thompson, W. T. Fitz Gerald.	W.T.	White Star ...	W.T. Reg. 12.4.28 to 26.4.28 ...	30.4.28
Makalla ...	Maugham, J. W. ...	J. B. Newman ...	No. M.	Brocklebank ...	Form 911 28.3.28 to 24.4.28 ...	14.5.28
Makambo ...	Blain, A. W. ...	R. Perry, R. W. Holmes, T. MacRae.	M.L.	Burns Philp ...	Met. Log. 20.8.27 to 22.1.28 ...	20.3.28
Makura ...	Spring Brown, J. P. ...	A. Champion, D. Burgess, A. Gell.	"	Canadian- Australasian	" 6.10.27 to 21.1.28 ...	20.3.28
Malabar ...	Hillman, E. J. ...	" ...	"	Burns, Philp & Co. ...	Met. Log. 11.5.27 to 22.11.27 ...	29.2.28
Malakuta ...	Adamson, F. L. ...	N. Grayson ...	No. M.	Brocklebank ...	Form 911 26.2.28 to 23.4.28 ...	28.4.28
Malancha ...	Whitham, F. ...	R. Humble ...	" M.	" ...	" 30.1.28 to 27.2.28 ...	9.3.28
Malda ...	Gray, T. N. ...	S. G. James ...	" M.	British India ...	" 8.2.28 to 16.3.28 ...	26.3.28
Maloja ...	Warner, S. C. ...	A. D. Dennis ...	" M.	P. & O. ...	" 22.12.27 to 26.1.28 ...	31.1.28
Malwa ...	Norman, W. A. ...	" ...	" M.	" ...	" 25.3.28 to 12.4.28 ...	8.5.28
Mamari ...	Falconer, H. ...	B. Rudkin ...	" A.	Shaw, Savill & Albion ...	" 11.2.28 to 21.3.28 ...	14.5.28
Manchester Brigade	Stott, C. H. ...	W. S. Eustance ...	M.L.	Manchester Liners ...	" 10.1.28 to 18.2.28 ...	23.2.28
Manchester Corporation	Williams, H. ...	" ...	No. A.	" ...	" 16.1.28 to 2.3.28 ...	19.3.28
Manchester Hero ...	Riley, J. E. ...	H. Anderton, J. H. Emmett, A. W. Hanchett.	M.L.	" ...	Met. Log. 6.9.27 to 18.2.28 ...	23.2.28
Manchester Producer	Struss, F. ...	J. W. Moss ...	No. A.	" ...	Form 911 19.3.28 to 24.4.28 ...	30.4.28
Manchester Regiment	Foale, J. R. ...	P. D. Barr ...	" A.	" ...	Form 911 4.2.28 to 9.3.28 ...	14.3.28
Manipur ...	Cochran, G. N. ...	R. Penston, G. B. Falconer ...	No. M.	Brocklebank ...	" 23.1.28 to 21.2.28 ...	12.3.28
Manistee ...	Steidemann, H. ...	" ...	M.L.	Elders & Fyffes ...	" ...	"
Manora ...	Hudson, H. T., R.D., Commr., R.N.R.	W. H. Cruse ...	No. M.	British India... ...	Form 911 9.1.28 to 14.3.28 ...	3.4.28
Mantua ...	Randell, G. G. ...	" ...	" M.	P. & O. ...	Form 911 27.3.28 to 2.5.28 ...	8.5.28
Marcella ...	Mortimer, S. ...	A. G. Hill, R. Duddell, A. G. Thomas.	M.L.	Burns Philp ...	Met. Log. 4.5.27 to 28.9.27 ...	28.11.27
Marengo ...	Curle, J. ...	H. Bryan, J. Ford, F. Barnard, T. Connolly ...	"	Ellerman Wilson ...	" 2.12.27 to 12.3.28 ...	16.3.28
Maresfield ...	Berry, V. ...	" ...	No. A.	Woods, Tyler & Brown ...	Form 911 10.3.28 to 4.4.28 ...	30.4.28
Margha ...	Baird, S. K. ...	P. Wright, H. E. Evans, C. C. Hughes, C. G. ...	M.L.	British India... ...	Met. Log. 6.11.27 to 4.2.28 ...	15.2.28
Marquesa ...	Smiles, R. S. ...	E. Monckton ...	No. M.	Furness Houlder ...	Form 911 28.1.28 to 23.3.28 ...	4.4.28
Matakama ...	Thurston, H. P. ...	J. Hart, J. Dickson, C. E. Mayer.	M.L.	Shaw, Savill & Albion ...	Met. Log. 17.10.27 to 27.2.28 ...	2.3.28
Matheran ...	Ison, W. A. ...	" ...	No. M.	Brocklebank ...	Form 911 15.2.28 to 9.4.28 ...	21.4.28
Matiana ...	Green, F. V. ...	J. R. Precious ...	No. M.	British India... ...	Form 911 20.12.27 to 12.2.28 ...	20.2.28
Matra ...	Cornish, N. P. ...	W. Gibson ...	" M.	Brocklebank ...	" 25.2.28 to 23.3.28 ...	16.4.28
Maungani ...	Davey, A. H. ...	F. Gibson, V. Knight, H. Kemp.	" M.	Union S.S. Co. of N.Z.	" 29.4.27 to 22.7.27 ...	5.9.27
32 Mauretania ...	McNeil, S.G.S., R.D., Capt., R.N.R.	J. A. Quarrie, G. Duguid, C. B. Osborne, B. J. P. Tuck	W.T.	Cunard ...	W.T. Reg. 1.4.28 to 16.4.28 ...	20.4.28
Megantic ...	Trant, E. L., R.D., Commr., R.N.R.	" ...	No. A.	White Star ...	" 22.1.28 to 7.5.28 ...	10.5.28
22 Melita ...	Stewart, A. ...	J. Shearer, T. Gillette ...	W.T.	Canadian Pacific ...	Form 911 30.7.27 to 20.8.27 ...	24.8.27
Memnon ...	Dougall, W. T. ...	J. A. C. MacGregor ...	No. A.	A. Holt... ...	W.T. Reg. 16.4.28 to 8.5.28 ...	14.5.28
21 Metagama ...	Freer, A., Capt., R.N.R.	A. M. Watt, W. P. Haines ...	W.T.	Canadian Pacific ...	Form 911 24.3.28 to 5.4.28 ...	10.4.28
Middlesex ...	MacRae, A., D.S.C., Lt.-Commr., R.N.R.	C. Roberts ...	No. M.	Federal... ...	W.T. Reg. 26.3.28 to 14.4.28 ...	24.4.28
Minna ...	Mackenzie, G. G. ...	A. M. Campbell ...	" A.	Scottish Fishery Board.	Form 911 23.3.28 to 7.5.28 ...	12.5.28
Minnesota ...	Finch, E. ...	" ...	" M.	Atlantic Transport... ..	Form 911 21.2.28 to 2.4.28 ...	4.4.28
Minnetonka ...	Gates, T. F., C.B.E. ...	H. E. McCartney ...	" M.	" ...	" 15.4.28 to 6.5.28 ...	8.5.28
Minnewaska ...	Claret, F. H., C.B.E., Commr., R.N.R.	F. J. Mummery ...	" M.	" ...	" 24.4.28 to 12.5.28 ...	15.5.28
Mirror, C.S. ...	Jones, T., M.B.E. ...	J. G. West ...	" M.	Eastern Tel. Co. ...	" 11.4.28 to 27.4.28 ...	5.5.28
Mississippi ...	Wylie, J. T. J. ...	" ...	No. A.	Atlantic Transport ...	Form 911 13.2.28 to 18.3.28 ...	10.4.28
Modasa ...	Gilchrist, J. W. ...	R. E. T. Parsons ...	" M.	British India ...	Form 911 6.11.27 to 15.11.27 ...	26.11.27
Moldavia ...	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R.	W. L. Dobbin ...	" M.	P. & O. ...	Form 911 24.3.28 to 24.4.28 ...	24.4.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 16.5.28.	Date Received
<i>Mongolia</i>	Furlong, G. H. S., R.D., Capt., R.N.R.	... ..	No. M.	P. & O. ... ..	... ..	...
<i>Mongolian Prince</i>	Edwards, W.	V. E. Palmer	" A.	Prince	Form 911 26.3.28 to 30.3.28	14.5.28
24 <i>Montcalm</i>	Hamilton, G.	H. McFadyen	W.T.	Canadian Pacific	W.T. Reg. 1.4.28 to 20.4.28	23.4.28
25 <i>Montclare</i>	Griffiths, J. N.	A. Mansey, F. E. Bevis, C. Draper.	"	"	" 15.4.28 to 8.5.28	10.5.28
27 <i>Montnairn</i>	Notley, A. H., R.D., Commr., R.N.R.	K. Hutchings, E. A. Shergold, W. S. Roberts.	W.T.	Canadian Pacific	W.T. Reg. 26.3.28 to 12.4.28	16.4.28
<i>Montoro</i>	Williams, D. J.	J. Campbell	M.L.	Burns, Philp & Co.	Form 911 25.3.28 to 12.5.28	14.5.28
26 <i>Montrose</i>	Landy, E.	A. Watt	W.T.	Canadian Pacific	Form 911 31.1.28 to 6.3.28	10.4.28
20 <i>Montroyal</i>	Sibbons, H.	J. Tudor	"	"	W.T. Reg. 25.12.27 to 12.1.28	17.1.28
<i>Moresby</i>	Edgell, J. A., O.B.E., Capt., R.N.	W. H. Martin	M.L.	His Majesty's Australian Ship.	Met. Log. 16.4.28 to 2.5.28	7.5.28
	Henderson, D. A., Commr., R.N.				Met. Log. 29.8.27 to 15.12.27	23.1.28
<i>Morvada</i>	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	D. S. Johnston	No. M.	British India	Form 911 20.7.27 to 16.10.27	24.10.27
<i>Mulbera</i>	Steadman, W. R.	J. Rose	" M.	"	" 8.2.28 to 12.3.28	21.3.28
<i>Nagara</i>	Foster, E.	C. K. Brown	" M.	R.M.S.P. Co.	" 26.8.27 to 21.1.28	26.1.28
<i>Nagoya</i>	Bedwell, L. A.	T. A. Sergeant	" M.	P. & O.	" 5.2.28 to 12.3.28	11.4.28
<i>Naldera</i>	Dayas, C. T. E.	C. H. Hand, W. T. Banks, H. M. Askin.	M.L.	"	Met. Log. 19.11.27 to 23.2.28	23.2.28
<i>Nardana</i>	Moth, F. L.	S. C. T. Smith	No. M.	British India	Form 911 17.3.28 to 20.4.28	30.4.28
<i>Nellore</i>	Hignett, A. H., R.D., Lt.-Commr., R.N.R.	A. J. Brown	" M.	P. & O.	" 30.12.27 to 6.4.28	11.4.28
<i>Nervudda</i>	Williams, B. N.	J. H. Robotham	" M.	British India	" 25.1.28 to 27.2.28	5.3.28
<i>Nestor</i>	Houghton, G. K.	J. Milhench, G. Shennan, N. Anderson.	M.L.	A. Holt	Met. Log. 16.7.27 to 5.11.27	10.11.27
<i>Newby Hall</i>	Storey, J. K. ... ..	... ..	"	Ellerman	" 16.4.27 to 14.10.27	1.12.27
<i>Newfoundland</i>	Westgarth, W. A., D.S.C.	R. F. Handley, E. Sainty, E. B. Burke.	"	Furness Withy	" 6.10.27 to 11.2.28	29.2.28
<i>Niagara</i>	Hill, T. V.	R. N. Turner, V. Knight, L. B. Ehlert.	"	Canadian-Australasian	" 14.12.27 to 30.3.28	28.4.28
<i>Ningchow</i>	Beale, H. E. ... ..	... ..	No. A.	A. Holt	Form 911 24.1.28 to 31.3.28	30.4.28
<i>Norfolk</i>	Robinson, F. W.	E. M. Foster	" A.	Federal	" 14.1.28 to 28.2.28	9.2.28
<i>Norna</i>	Wright, J. W.	T. R. Ness	" A.	Scottish Fishery Board	" 22.3.28 to 14.4.28	24.4.28
<i>Norseman, C.S.</i>	Douglas, W.	R. W. Greenfield	" M.	Western Tel. Co.	" 18.3.28 to 29.3.28	30.4.28
<i>Northumberland</i>	Upton, H. L., D.S.C., R.D., Lt.-Commr., R.N.R.	A. J. Robertson, A. Weatherall, J. F. Clements.	M.L.	Federal	Met. Log. 30.10.27 to 25.3.28	17.4.28
<i>Nova Scotia</i>	Foxworthy, ... ..	... ..	No. A.	Furness Withy	Form 911 23.3.28 to 20.4.28	24.4.28
<i>Nowshera</i>	Rowe, S. N.	W. D. L. Reeves	" M.	British India	" 22.1.28 to 27.2.28	11.4.28
<i>Nubian</i>	Watmough, T. M. ... ..	... ..	" A.	Leyland	" 19.8.27 to 30.10.27	11.11.27
<i>Nuddea</i>	Morrison, N. C. ... ..	... ..	" M.	British India	" 11.3.28 to 29.3.28	8.5.28
<i>Oaklands Grange</i>	St. Clair, C., D.S.C.	C. F. Foxwell	" A.	Houlder Bros.	Form 911 1.4.28 to 28.4.28	30.4.28
57 <i>Olympic</i>	Marshall, W., C.B., D.S.O., R.D., Commadore, R.N.R.	A. Fisher, H. J. C. Day, A. E. Weller.	W.T.	White Star	W.T. Reg. 29.3.28 to 12.4.28	16.4.28
					Form 911 19.4.28 to 3.5.28	7.5.28
					Form 911 29.3.28 to 3.5.28	8.5.28
<i>Orama</i>	Matheson, C. G., D.S.O., R.D., Capt., R.N.R.	H. Tanner, W. Elliot, C. K. Blake.	M.L.	Orient	" 13.11.27 to 14.2.28	1.3.28
<i>Oranian</i>	Hoskins, W. ... ..	... ..	No. A.	Leyland	" 5.12.27 to 3.2.28	15.2.28
<i>Orbita</i>	Dominy, R. H., C.B.E., Commr., R.N.R.	J. Lloyd Jones	" M.	R.M.S.P. Co.	" 7.2.28 to 15.4.28	30.4.28
<i>Oreoma</i>	Pearse, A. W.	W. M. Horsfall, J. N. Laylor, D. L. Jones.	M.L.	Pacific S.N. Co.	Met. Log. 21.9.27 to 16.2.28	27.2.28
<i>Ordana</i>	Daniel, T.	R. D. Eckford	No. M.	R.M.S.P. Co.	Form 911 7.1.28 to 22.3.28	28.3.28
<i>Orestes</i>	Flynn, G. A. ... ..	... ..	" A.	A. Holt	" 5.10.27 to 20.10.27	14.11.27
<i>Orita</i>	Duncan, E. E.	D. W. Hutchinson, F. Carter, H. D. Griffiths.	M.L.	Pacific S.N. Co.	Met. Log. 20.6.27 to 1.12.27	8.12.27
<i>Ormonde</i>	Rice, W. V., D.S.O., D.S.C., Commr., R.N.	H. P. Price	"	His Majesty's Ship	" 30.10.27 to 26.2.28	2.5.28
<i>Ormonde</i>	Sarson, M. J. ... ..	... ..	No. A.	Orient	Form 911 8.10.27 to 30.10.27	5.12.27
<i>Oronsay</i>	Shelford, W. S., Lt.-Commr., R.N.R.	... ..	M.L.	"	Met. Log. 5.2.28 to 8.5.28	12.5.28
<i>Oroya</i>	Ridyard, A.	P. H. Ray	No. M.	Pacific S.N. Co.	Form 911 22.2.28 to 30.4.28	8.5.28
<i>Orsova</i>	Cameron, E. P., R.D., Commr., R.N.R.	H. Schofield, L. J. Vesty, A. Croft Cohen, H. A. Whittle, A. Addison.	M.L.	Orient	Met. Log. 11.12.27 to 13.3.28	20.3.28
<i>Orvieto</i>	O'Sullivan, F. R.	J. G. Goldsworthy, G. L. Carter, T. Fox Russell, N. Smith.	"	"	" 25.12.27 to 27.3.28	16.4.28
<i>Osterley</i>	McRitchie, W. M., O.B.E., R.D., Lt.-Commr., R.N.R.	R. J. Galpin	No. A.	"	Form 911 3.1.28 to 1.2.28	7.2.28
<i>Otaki</i>	McNish, R.	J. McCulloch	" A.	New Zealand S.S. Co.	" 30.3.28 to 7.5.28	12.5.28
<i>Otira</i>	Wood, C., D.S.C.	S. Winton	" M.	Shaw, Savill & Albion	" 22.3.28 to 28.4.28	8.5.28
<i>Otranto</i>	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	O. C. Davies	" M.	Orient	" 29.1.28 to 30.3.28	14.4.28
<i>Oxfordshire</i>	Foster, W. L.	E. A. Insley	" A.	Bibby Bros.	" 4.2.28 to 11.4.28	18.4.28
<i>Pacific Shipper, M.V.</i>	Fairclough, H. ... ..	... ..	" A.	Furness Withy	" 27.12.27 to 22.3.28	16.4.28
<i>Pacuare</i>	Sapsworth, S. A.	V. R. Watkins	" A.	Elders & Fyffes	" 17.12.27 to 20.1.28	24.1.28
<i>Pakeha</i>	W. P. Clifton Mogg, Lt.-Commr., R.N.R.	E. T. Baker, R. E. Nicholson, G. Lindsay	M.L.	Shaw, Savill & Albion	Met. Log. 23.7.27 to 17.12.27	23.12.27
<i>Pancras</i>	Peregrine D. ... ..	... ..	M.L.	Booth ... ..	... ..	...
<i>Parora</i>	Evans, J. O.	J. Greenaway	No. A.	Hain S.S. Co.	Form 911 13.1.28 to 11.2.28	10.4.28
<i>Paris</i>	Cook, C. L.	Mr. Biles	C.C.	Southern Rly.	Telegraphic Report, 31.7.27	31.7.27
<i>Patia</i>	Makepeace, S.	R. W. King	No. A.	Elders & Fyffes	Form 911 3.3.28 to 8.4.28	12.4.28
<i>Peisander</i>	Slater, H.	D. L. Hoare	" A.	A. Holt	" 19.2.28 to 1.5.28	5.5.28
65 <i>Pennland</i>	Doughty, G.	C. J. Murray, E. Cornellie, Lewis.	W.T.	Red Star	W.T. Reg. 2.4.28 to 21.4.28	23.4.28
<i>Peshawur</i>	Wilding, H. G.	J. C. Mellonie, S. H. Baldwin, A. M. Tolfree.	M.L.	P. & O.	Met. Log. 19.11.27 to 25.3.28	11.4.28
<i>Piako</i>	Kettlewell, C. R.	P. J. Connolly, T. K. McDonald, H. N. Lawson.	"	New Zealand S.S. Co.	Met. Log. 3.7.27 to 5.12.27	12.12.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 16.5.28.	Date Received.
<i>Tanāia</i>	Pilcher, E. T., Lieut.-Commr., R.N.R.	G. C. Smith, H. Munday, J. W. Kavanagh, R. Millington.	M.L.	E. & A. S.S. Co. ...	Met. Log 2.9.27 to 31.1.28	3.4.28
<i>Taranaki</i>	Kershaw, W. A. R.	Shaw, Savill & Albion
<i>Tarantia</i>	Munro, D.	No. A.	Anchor ...	Form 911 10.3.28 to 5.4.28	14.4.28
<i>Tetrestas</i>	Wilkinson, W. H. ...	R. Singleton ...	" A.	A. Holt & Co. ...	" 12.2.28 to 1.3.28	10.4.28
<i>Tekoa</i>	Barnett, H.	" M.	New Zealand S.S. Co.	" 19.2.28 to 17.3.28	28.3.28
<i>Telamon</i>	Willcox, J. H.	" A.	A. Holt ...	" 20.2.28 to 14.3.28	2.4.28
<i>Tetela</i>	Brice, E. H.	" A.	Elders & Fyffes ...	" 25.3.28 to 28.4.28	5.5.28
<i>Teucer</i>	Dodds, R.	" A.	A. Holt ...	" 21.3.28 to 4.4.28	10.5.28
<i>Themistocles</i>	Young, A. D.	" M.	Aberdeen ...	" 4.2.28 to 22.2.28	16.4.28
<i>Theseus</i>	Jones, E.	" A.	A. Holt ...	" 31.3.28 to 15.4.28	24.4.28
<i>Titan</i>	Power, J. ...	D. Hey, D. MacFavish, G. W. Best, C. F. Bailey.	M.L.	" ...	Met. Log. 17.9.27 to 6.1.28	18.1.28
<i>Tongariro</i>	Burton Davies, J. ...	F. C. Pretty, A. E. Williams, E. A. Quick, D. Baldwin.	"	New Zealand S.S. Co.	Form 911 18.9.27 to 28.1.28	2.2.28
<i>Transylvania</i>	Bone, D. W. ...	P. Middleton ...	No. A.	Anchor ...	" 7.4.28 to 29.4.28	30.4.28
<i>Traveller</i>	Worthington, B. ...	E. L. Stockley ...	" M.	T. & J. Harrison ...	" 3.12.27 to 29.2.28	5.3.28
<i>Trefusis</i>	Cordy, C. ...	R. H. Silley ...	" A.	Hain S.S. Co. ...	" 9.3.28 to 31.3.28	28.4.28
<i>Trematon</i>	Evans, B. ...	J. Jenkyn, C. Warren, R. Kitson.	M.L.	Hain S.S. Co. ...	Met. Log. 25.1.28 to 5.5.28	11.5.28
<i>Turakina</i>	Hamilton, E. S. ...	A. W. Marshall ...	No. M.	New Zealand S.S. Co.	Form 911 19.12.27 to 8.1.28	27.1.28
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					Form 911 7.4.28 to 29.4.28	8.5.28
<i>Tyndareus</i>	Williams, R. J., Williams, D. H., Christie, W.	A. G. Phillips, T. R. Phillips, F. H. Gray.	M.L.	A. Holt ...	Met. Log. 14.6.27 to 7.11.27	16.12.27
<i>Ulimaroa</i>	Wylie, W. J. ...	A. N. Robertson ...	No. M.	Huddart Parker, Ltd.	Form 911 3.2.28 to 27.2.28	11.4.28
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<i>Umvolsi</i>	Barnes, E. W. ...	R. Dyns ...	" A.	Bullard King ...	" 9.2.28 to 29.2.28	26.3.28
<i>Valacia</i>	Inch, F. ...	G. Meggitt ...	" M.	Cunard ...	" 23.2.28 to 25.3.28	11.4.28
<i>Yardulia</i>	Gronow, S. ...	W. H. Barker ...	" A.	" ...	" 24.1.28 to 2.3.28	10.4.28
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<i>Wangaratta</i>	Stuart, C. B. ...	Scutt, W. ...	M.L.	British India ...	Met. Log. 2.10.27 to 29.2.28	2.3.28
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July, M.O., 1928.

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