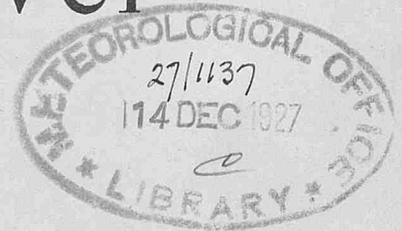


L.L.C.

The Marine Observer



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

Vol. V., 1928.

Published by the Authority of
the Meteorological Committee,
Air Ministry, London.



The

Observer

the review of the

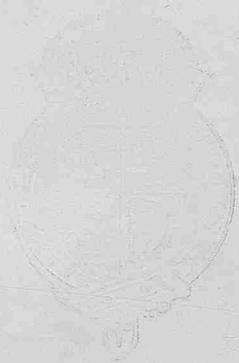
Marine Division of the Meteorological

Office, in co-operation with the

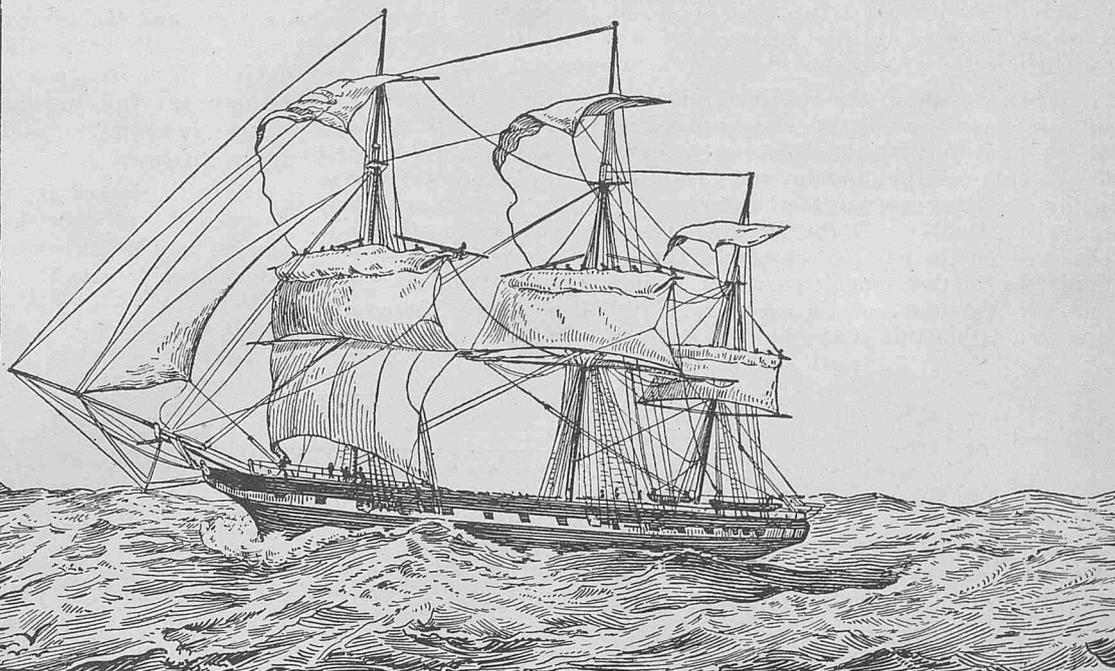
Marine Observers

Vol. V. 1908.

Published by the Authority of
the Meteorological Committee
Air Ministry, London.



250
128



VOL. V. No. 49.

THE MARINE OBSERVER.

JANUARY, 1928.

TABLE OF PRINCIPAL CONTENTS.

	PAGE.		PAGE.
Foreword to Volume V	1	Weather Signals :—	
The Marine Observer 1928	2	Ships' Wireless Weather Signals	16
The Marine Observer's Log (with illustrations)	3	Abridged Key to International Code	20
Captain H. W. BROADBENT	6	International Code Weather Telegraphy Tables	21
The Gyro Compass (with illustrations)	8	Lithographic Illustrations after page 24 :—	
The Extraction and Compilation of Marine Meteorological Data by Mechanical Methods (with illustrations)	10	South Pacific, Winds on the Tracks from Panama to Australian and New Zealand Ports (Eastern Portion) March.	
Local Winds, Indian Ocean and Eastern Archipelago :—		South Pacific, Currents on the Tracks from Panama to Australian and New Zealand Ports (Eastern Portion) February, March, April.	
I. South and East Coasts of Africa	14	Indian Ocean, Mean Sea Surface Temperatures, January.	

FOREWORD TO VOLUME V.

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

It is difficult to realise that THE MARINE OBSERVER has reached its fifth volume. When I look back on the short history of the journal I find a great deal to be thankful for. Volume I was prepared with many misgivings, but large hopes; Volume II with fewer misgivings and larger hopes; and with each succeeding volume the misgivings have decreased and the hopes have been realised, so that now we take up the preparation of Volume V without misgivings and with hopes replaced by confidence.

The success in the past and our confidence in the future are based almost entirely on the encouragement and help which we have received from our seamen colleagues. Seamen seem to depend so much on mutual help that they take it for granted, and I notice that in the remarks which Captain BROOKE SMITH has written to follow this Foreword he nowhere expresses thanks for what he has received; but like Oliver unashamedly asks for more. That, I suppose, is because he is a seaman writing to seamen. That is a spirit that I, as a landsman, admire but will not emulate; for I must express the gratitude not only of the Meteorological Office but of all meteorologists, without distinction of nationality, for the valuable

data which flow in a constant stream from all parts of the ocean, through the Marine Division, into our general store of knowledge. Without these data and without the admirable descriptions of weather phenomena which form such a marked feature of THE MARINE OBSERVER, we scientists would soon get out of touch with Nature and we should build up theories which would probably be shattered when first put to the test of practical use. An ounce of fact is worth a pound of theory, and as all meteorologists cannot spend their lives at sea they must depend on what information the seaman gives them. On the other hand it is equally true that a pound of fact may be much improved by an ounce of theory, and we try in the pages of THE MARINE OBSERVER to return our ounces of theory for the pounds of fact which we receive from the sea.

It is extremely encouraging to receive so much evidence of the advance of knowledge of scientific meteorology amongst seamen, and this is not confined to any one class of seamen. It may be a long stride from the skipper of a trawler in the North Sea listening to the "Weather Shipping" message from Daventry to the officer in the chart room of an Atlantic liner plotting a synoptic chart from

the weather messages he has received from surrounding ships and from shore stations; but they are united by the same ideas and by the same science. The skipper may only have a hazy idea of the meaning of a depression or ridge of high pressure; but he is becoming familiar with our terms, and it is not too much to hope that before many years are past meteorology will take its rightful place in the education of everyone destined for a career at sea.

I mentioned above the readiness of sailors to help one another; but this is only a partial statement of the fact, for they are as willing to help others as they are to help one another. This has clearly been brought out by the invaluable help they have given during the past summer to the daring aviators who have tried to cross the Atlantic and the Pacific. There have been no signs of reluctance on the part of captains of ships, but the very reverse, to supply the weather reports on which, in its present state of development, air transport over the oceans is entirely dependent. There can be no doubt that this demand on the sailor is going to increase. The

human race will never be content until the air is conquered over the oceans as it has been conquered over the land, and many more aeroplanes, and probably airships, will have fierce battles with the weather while the contest is in progress. The expanses of the ocean are great and the total number of ships few, while their distribution is not all that could be desired from the meteorological point of view. Thus if the aid which the aviators require is to be given them to the full, many demands will be made on shipping for weather information, and we have every confidence that it will be gladly given.

It is with sincere gratitude that I thank our corps of Voluntary Observers for all that they have done for *THE MARINE OBSERVER* in the past and look forward with renewed confidence to even greater success with Volume V.

DIRECTOR.

October 6th, 1927.

THE MARINE OBSERVER, 1928.

Greetings for 1928 to Marine Observers.

In this our Fifth Volume we are encouraged by the advancement made last year in the practical application of Marine Meteorology as a branch of seamanship by the British Corps of Voluntary Marine Observers.

There are now no less than 131 selected ships on our list regularly practising "Wireless and Weather an Aid to Navigation" along all the main trade routes of the globe, and we hope before 1928 is ended that all ships indicated in the Fleet list as "selected ships" invited to perform this most valuable voluntary service of making daily routine reports to all ships will be regularly so doing.

It is hoped that the second edition of the chapters on "Wireless and Weather an Aid to Navigation" published in Volume Four may be reprinted in separate book form during 1928 so as to be more generally available to the Merchant Service.

Letters from Commanders and Additional Remarks at the end of the Logs and Reports clearly indicate that the charted information of currents is being used extensively in navigation.

This year we intend to make a return to those Marine Observers who have long worked along the trade routes from Panama to Australia and New Zealand across the South Pacific.

Quarterly Charts of currents in three portions, Eastern, Middle and Western, will appear month by month, and wind charts for the same region for the mid-month of each quarter will accompany them.

These charts are constructed on a scale of two inches to 10° of longitude, and the arrows of the current roses and the wind roses are so made that 10 per cent. frequency in direction and velocity or force is equivalent to the length of a degree on the longitude scale of the chart. We find after years of investigation and trial that this scale and these roses will give the best arrangement for constructing charts for all oceans upon a uniform plan which will render more than one explanation of scales and roses unnecessary in atlases of the future.

The wind roses are constructed from averages computed by the Hollerith system, and therefore only include seven years' observations. The number of observations from which the roses are constructed are insufficient, but still they give a very good idea of the frequency of direction and the frequency of the different forces of the wind from those directions, and are the first wind charts ever published for the South Pacific giving these particulars of the frequency of the different forces.

They give another example of the value of the system of mechanical extraction and computation adopted in the post war reorganisation of the Marine Division, and as the proportional number of observing ships working in the Pacific has increased year by year since 1920, and now remains at a suitable number, in less than another decade we should be in a position to make charts to be relied upon.

Charts of mean sea surface temperatures of the Indian Ocean will be published each month, and during the West Indian hurricane

season the latest charted tracks of hurricanes will be reproduced from the work of Mr. C. L. MITCHELL, of the United States of America.

In this number we publish an article which describes our system of mechanical extraction, computation and exchange of Marine Meteorological Data which will not only serve to encourage all voluntary workers at sea, but which we hope may be of some service to those marine divisions and institutions engaged in the work of Marine Meteorology, who may not be familiar with our methods. Marine Observers by studying this article will see how much they can help us in our work by exercising care in entering their observations in the log in accordance with the instructions given in "The Marine Observer's Handbook," and if they will enter in the proper columns of the log the ship's position at the end of each watch they will be still further assisting in speeding up extraction.

"Local Winds" will be continued for the coasts of the Indian Ocean, articles upon subjects on Marine Meteorology by members of the Marine Division will appear, and as usual we hope to produce articles upon matters of special interest to seamen by technical experts who are so good in giving their voluntary labour and support to *THE MARINE OBSERVER*. A further effort is being made to improve and simplify the arrangement of weather signals; all of the decode tables of the International Code necessary for use at sea being placed in this number, which will save the turning over of pages in decoding the Weather Bulletins of those countries which follow International practice in these signals.

Last, but far from least—indeed it is the most important of all—in "The Marine Observer's Log" we shall continue to reproduce the most interesting of the remarks, photographs, weather charts, sketches and accounts sent in from the sea.

Such is the framework and plan of *THE MARINE OBSERVER* for 1928. It can be considerably improved, and by none better than by Commanders and Officers in ships at sea.

They are invited to send in papers, remarks, or accounts of all that they see at sea, of natural phenomena in air and sea, nautical instruments, and new methods of solving those old, old problems which have ever been a seaman's pride.

We would remind our readers that they will be doing a good service by sending in information of outstanding promotions, retirements and deaths of members of our Corps, and it is hoped that those officers who have been privileged to serve with Commanders who have performed outstanding service for the nation, and who have led in the Corps of Voluntary Marine Observers, will send in memoirs after retirement upon the lines of those published in former volumes.

MARINE SUPERINTENDENT.

London,

October 1st, 1927.

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.

CURRENT AND SEA TEMPERATURE.

North Pacific.

THE following is an extract from the Meteorological Log of C.S. *Dominia*, Captain V. CAMPOS, San Pedro to Panama. Observer, Mr. L. J. HEGARTY:—

“January 12th, 1927. Extraordinary variation in sea temperature between Latitude 15° 01' N., Longitude 98° 00' W., and Latitude 12° 40' N., Longitude 94° 00' W., which I personally checked. The currents experienced during that time were variable and strong—that at p.m. stars, being 2.0 knots—though, during the intervals preceding and following this variation there was no current. The density of the sea water rose to 1024 from 1022 and fell to 1022 the next day. Weather and all other conditions normal.

“Sea temperature, January 12th, 4 a.m., 72°, 8 a.m., 78°, Noon, 76°, 4 p.m., 71°, 8 p.m., 72°, Midt., 78°.”

CURRENT.

Red Sea.

THE following is an extract from the Meteorological Log of S.S. *Margha*, Commander R. A. MILNE, R.D., R.N.R., Aden to Suez. Observer, Mr. H. E. EVANS, 2nd officer:—

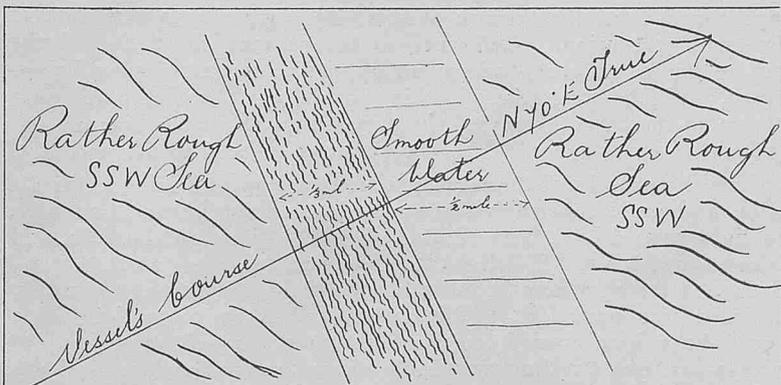
“Experienced rather an abnormal set in the Red Sea. Between noon, 4th January, 1927, Latitude 17° 19½' N., Longitude 40° 24' E., and 5.58 a.m., 5th January, Latitude 20° 32' N., Longitude 38° 29' E. (stellar observation), current set N. 35° W., 13 miles. At noon, 5th January, position was found to be Latitude 21° 27½' N., Longitude 37° 47' E., current having set S. 50° W., 7 miles in 6 hours. This was checked for Longitude at 3.15 p.m., and thinking possibly there might have been error due to refraction, a stellar observation was taken at 5.45 p.m., which gave Latitude 22° 30' N., Longitude 37° 13' E., vessel still being set to the westward, current between noon and 5.45 p.m. being N. 47° W., 5 miles, so that it is most probable that the abnormal current was felt between the observations at 5.58 a.m. and noon of the 5th.”

TIDE RIP.

East Coast of Australia.

THE following is an extract from the Meteorological Log of S.S. *Marsina*, Captain T. M. BROWN, Sydney to Lord Howe Island. Observer, Mr. R. W. HOLMES, 3rd officer:—

“10.55 a.m., January 30th, 1927, position, Latitude 32° 30' S., Longitude 156° 23' E., vessel ran through remarkable strong tide rip extending from horizon to horizon—which lasted for 3 minutes



in a N.N.W. and S.S.E. direction. Vessel then ran into smooth water for 4 minutes and out of that into rather rough sea again as before the occurrence. Wind, S.S.W., force 5. Sea disturbance 5. Swell, confused, rough. Vessel was with difficulty kept under influence of helm.”

PHOSPHORESCENCE.

South Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Glan Mackinnon*, Captain A. B. McCOMISH, London to Bombay, via Cape of Good Hope. Observer, Mr. W. F. ISAAC:—

“6th January, 1927, 1.15 a.m. (A.T.S.), Latitude 4° 15' S., Longitude 6° 45' W., course 143°, 10 knots, passed through streaks of luminescence. These streaks were very narrow and in almost parallel lines running S.E. by E. and N.W. by W. and having the appearance of small breakers such as caused by a vessel's wake in a narrow waterway. Closer inspection showed luminescence to be composed of small globules about ¼ inch in diameter radiating a dull greenish light for about 5 inches or 6 inches around itself. These globules were singly and in small groups of about three to six with an occasional larger group. The larger groups seemed to have in addition to surface globules others moving about below them. I counted at one time nine separate streaks, there were mainly four visible. About half an hour previously sky had been heavily overcast and a light drizzle had fallen. Sky had gradually cleared and beyond distant cloud on the horizon was practically cloudless. A dark night, stars clear and visible at low altitude although not excessively bright. The following observations were taken at the time. Wind, S.E., force 4. Sea, S.E., disturbance 3. Swell, S.E., slight. Barometer, 1012.4 mbs. Air temperature, dry 76°, wet 74.5°. Sea, 77°. An hour later a similar display took place, streaks on this occasion appeared to have a W.N.W'ly. movement. About 10 p.m., on 5th, ship had passed through brilliant luminescence, ship's wake being distinctly visible for about ¾ mile. A similar display took place about 2.15 a.m., on 7th. The direction of streaks was similar to previous ones. Wind, sea and swell S.E., much fresher than before. Stars brilliant, sky cloudless. I was particularly struck by the general trend of these streaks which was slightly off the wind and along the general trend of current observations which were, Noon to Noon, 5th to 6th, 294°, 8 miles; 6th to 7th, 281°, 15 miles.”

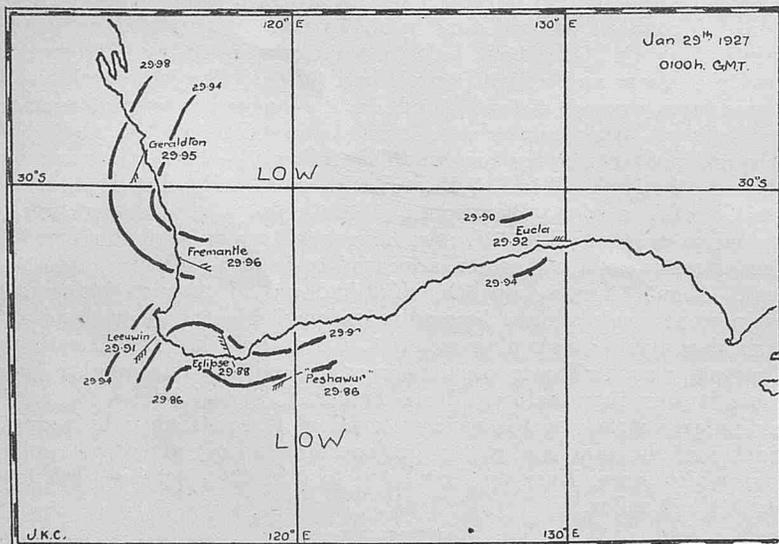
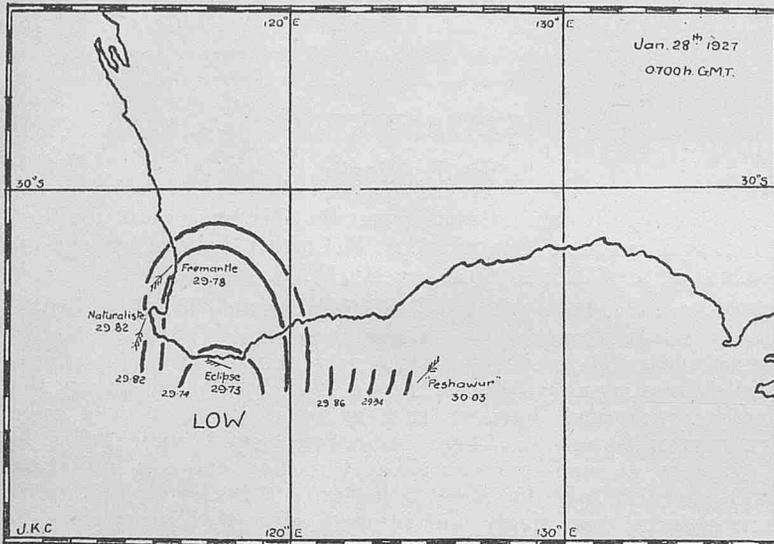
WEATHER CHARTS MADE AT SEA.

In Australian Waters.

THE accompanying remarks and weather charts are taken from the Meteorological Log of S.S. *Peshawur*, Captain H. G. WILDING, Melbourne to Fremantle, Observer, Mr. J. K. CRONE:—

“Depression off S.W. Coast of Australia, January 28th to 29th, 1927:—On the morning of January 28th, the wind was E.N.E. force 5 and backing. By Noon it was N.E. force 6, steady, and the barometer was falling, weather cloudy, visibility about 15 miles. Throughout the afternoon and evening the wind remained N.E. but freshened and the barometer continued to fall. Between 8.0 p.m., and Midnight, it fell very rapidly and the wind reached force 8 backing slightly. At 9.20 p.m. a W/T Weather Report was received from Perth, by the aid of which the first chart was drawn. From this it was concluded that the depression, centred south of Eclipse Isl., would pass to the southward of the ship, but that there would be no immediate improvement in the visibility. At 2.30 a.m. on the 29th, the wind backed suddenly to W.N.W., and then veered slowly

to north, easing considerably. Simultaneously, the barometer rose very rapidly. At 5.30 a.m. the wind again backed suddenly to W.S.W., force 4, causing a very confused sea. Throughout the forenoon watch it veered very gradually to west and freshened to force 5. At 12.20 p.m. another W/T Weather Report was received, and the second chart was drawn, from which it appeared that a shallow secondary had formed over the land. It was concluded that the wind would back to S.W., causing a heavy S.W. swell, improved visibility but no rain. At 2.0 p.m. high land was observed at an approximate distance of 43 miles. By Midnight the wind had backed to S.W."



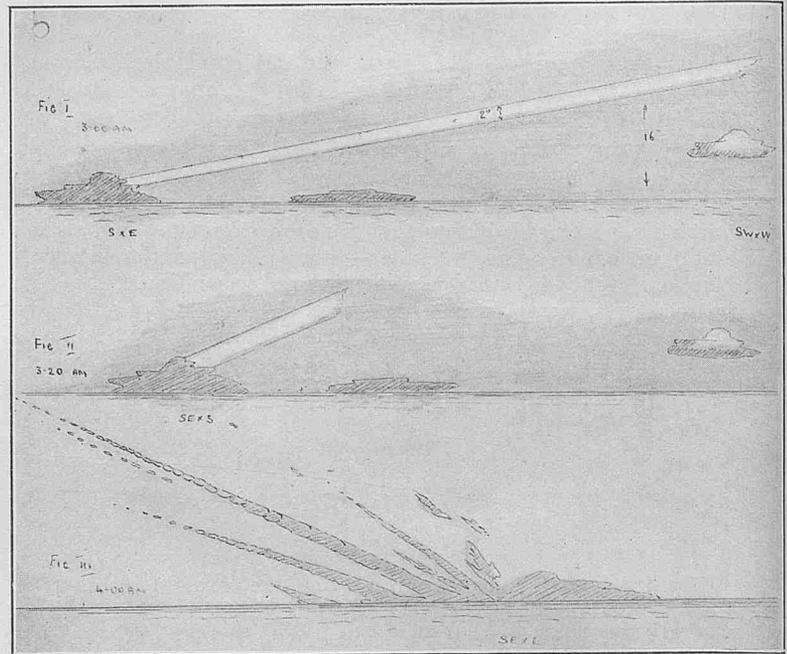
CLOUD FORMATION. South Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Euripides*, Captain P. J. COLLINS, O.B.E., Liverpool to Cape Town:—

"January 19th, 1927, at 3.0 a.m., S.T., (0210 G.M.T.) in Latitude $29^{\circ} 05' S.$, Longitude $13^{\circ} 52' E.$, observed a remarkable formation of Cirro-Cumulus cloud somewhat resembling the beam of a search-light, at first sight.

"The lower end commenced in a small bank of Stratus cloud low down on the horizon bearing S. by E., and arose to an altitude of about 16° bearing S.W. by W. at its upper extremity, in a clean cut white ribbon subtending an angle of about 2° in width at the middle, and slightly more at the top. (See FIGURE I.) At 3.20 a.m. it had arisen in altitude and was shortening in rapidly towards the base, and at the same time increasing in width, as depicted in FIGURE II. By 3.30 a.m., the ribbon had completely disappeared

and only the bank of Stratus cloud was visible. It was a fine and damp but very clear morning, with a bright moon bearing about N.N.W. at an altitude of 28° . Wind S.W. force 1/2, smooth sea, b.w., visibility 8, barometer 1018 mb. Temperature, dry bulb 65° , wet bulb 64° . Upper clouds, Cirrus and Cirro-Cumulus moving slowly from W.S.W. Lower clouds, Stratus, Strato-Cumulus and Cumulus, cloud amount 3. At 4.0 a.m., dawn was appearing and the cloud bank from which the ribbon had originated became visible in the peculiar formation depicted in FIGURE III, bearing S.E., by E."



REFRACTION.

Off the Coast of South Australia.

THE following report from S.S. *Baron Jedburgh*, Captain W. E. SOMMERVILLE, has been received through the International Hydrographic Bureau, Monaco:—

"I beg to bring to your notice an unusual case of excessive refraction which came within my experience early this year.

"The occasion was on making Spencer Gulf from the Westward, on January 9th and 10th, 1927. Position of ship, Noon January 9th, Latitude $35^{\circ} 32' S.$, Longitude $132^{\circ} 38' E.$ The weather at the time was clear and fine, light N.E'ly. wind and slight sea.

"During the three previous days while crossing the Australian Bight there had been no evidence of abnormal refraction or errors of importance in dead reckoning. Star observations were made on the morning of the 9th, and the position so obtained, when carried on to noon, agreed closely with the noon position by sun. A P.V. sight in the afternoon, however, put the ship 10 miles to the eastward. Check sights were taken by the Master and 2nd Officer, but these did not agree with each other or with the previous sight. The appearance about the horizon at this time gave rise to suspicion of abnormal refraction. Reference to the current chart showed the ship to be in an area 'where no appreciable current may be expected,' which strengthened this suspicion. Star sights were attempted in the evening, but the appearance about the horizon and its indefiniteness caused these observations to be discontinued.

"The distance from the noon position to Neptune Island was 171 miles, and under normal visibility and speed (10 knots) conditions the light should have been sighted about 2.45 a.m. on the 10th, and passed about 5 a.m. The light itself was in full view at 11.25 p.m., which put the ship now 34 miles ahead of the reckoning. Actually, the light was passed at 5 a.m. exactly when by the reckoning it should have been passed, so the light must have been sighted 57 miles away, or 34 miles beyond its normal range for height of eye 42 feet.

"An elevated horizon would, of course, have the effect of putting the ship to the eastward, both by the afternoon sun observations and by the supposed range of the light.

"It may be mentioned that there was a heat wave over South Australia at this time, which may have had something to do with the unusual refraction experienced."

TORNADO.

West Coast of Africa.

THE following is an extract from the Meteorological Report of S.S. *Port Wellington*, Captain F. FARMAR, Durban to Dunkirk. Observer, Mr. P. H. PEDRICK, 3rd Officer:—

"January 25th, 1927, at 10.30 a.m. A.T.S., in Latitude 1° 29' N., Longitude 10° 00' W., a tornado passed over the ship from a north-easterly direction. Its approach was indicated by a well-defined and regular arch of dark clouds. No thunder and only a little lightning was observed. No effect on the barometer was noticed.

"At 10.15 A.T.S. wind was southerly, force 4, temperature 78° F. At 10.20 A.T.S. wind backed through S.E. to E. where it remained through squall which reached force 7. The lowest temperature was recorded as squall passed over, viz., 72° F., a lull followed the tornado and while the wind resumed its moderate force and southerly direction, a period of one hour, a perpendicular stream of water descended. The ship took the tornado on her broadside and was forced out of her course 4°. It will be noticed that this tornado was experienced a fair distance from the coast."

SQUALLS IN THE DOLDRUMS.

Indian Ocean.

IN the additional remarks in the Meteorological Log of S.S. *Wangaratta*, Captain W. SCUTT, Mr. S. R. MILLARD, the observing officer, gives detailed observations of a squall which was experienced very near the Equator and of which extracts are given below. He suggests that possibly a cyclone was forming in Latitude 5° S., Longitude 85° E. It is known that a cyclone cannot form on or very near the Equator in any ocean, since the deflective force due to the Earth's rotation which causes a moving mass of air to take up a curved path is nil at the Equator. Speaking generally, tropical cyclones are formed between Latitudes of 8° and 15° and some even further from the Equator. Of the points of origin of all cyclones originating in the South Indian Ocean during the years 1886-1917, the nearest to the Equator were two in about 8° S., east of Longitude 70° E., and three in about 6° S., west of this Longitude. Insufficient data are available from other ships to construct a weather chart for midnight on January 5th, 1927, but so far as they go, the observations indicate that the pressure distribution was not very different from the normal one for the month. The position of S.S. *Wangaratta* at midnight on January 5th was about 3° south of the average northern limit of the N.W. monsoon for the month of January. The observations of other ships all north of the Equator also given below, show that squalls were being experienced on January 5th and 6th between Latitudes 11° N. and 2° N., but afford no evidence of a single disturbance progressing on a regular path. It is probable that the squall experienced by S.S. *Wangaratta* was of the ordinary type of equatorial squall.

Extract from the Meteorological Log of S.S. *Wangaratta*, Captain W. SCUTT, Adelaide to Colombo. Observer, Mr. S. R. MILLARD:—

January 4th, 1927.

"Noon position, D.R., Latitude 5° 42' S., Longitude 89° 20' E. Barometer 1009.2 mb., corrected for diurnal range 1008.9 mb. Wind N.N.E. force 2, sea N.N.E. slight. Swell south very slight. Temperature dry bulb 78° F., wet bulb 77° F. Clouds Cu-Nb/Nb, amount 10. Sun was obscured.

January 5th, 1927.

"Noon Position, Latitude 2° 07' S., Longitude 86° 24' E. Barometer 1008.9 mb., corrected for diurnal range 1008.6 mb. Wind west,

force 3, sea W. by N. slight, swell W. by N. slight to mod. Temperature, dry bulb 84° F., wet bulb 77° F., clouds Ci/Cu, amount 2-3.

"The weather continued fine and clear, with a steady barometer, the wind remained light with tendency to back; at 10.30 p.m. the sky clouded over from W.N.W., and lightning was seen in the west.

Midnight.

"Barometer 1010.8 mb., corrected for diurnal range 1009.9 mb., wind W.S.W., force 3, sea W. by S. slight, swell westerly, slight to moderate. Temperature, dry bulb 82° F., wet bulb 78° F., relative humidity 83 per cent. Clouds A-St/Cu-Nb, amount 10. Shortly after midnight heavy Nimbus was noticed in the N.W. and north, both moving towards the observer. At this time the lightning was vivid in the N.N.W., showing clearly the two advancing clouds. At 0.25 a.m., wind veered to N.W. by N., increased to force 4-5, and light misty rain set in. Barometer 1010.8 mb. Temperature, wet bulb 75° F., dry bulb 77° F., sea temperature 81.5° F., relative humidity 91 per cent.

"At 0.40 a.m.—violent rain squall commenced, wind force 6-7, during which the wind veered to N.N.W., and then backed to N.W., the visibility at this time being 1-2.

"At 1.15 a.m.—wind and rain moderated, and the horizon was again visible.

"At 2.00 a.m.—Barometer 1009.8 mb. Temperature dry bulb 77° F., wet bulb 74° F., relative humidity 88 per cent. Wind backed to W.N.W., force 2-3, light rain continued.

"At 3.00 a.m.—Barometer 1008.3 mb., the wind continued to back to W.S.W., force 3-4, and rain ceased.

"At 4.00 a.m. barometer was 1008.1 mb. Wind W.S.W., force 3-4, sea and swell, slight confused. Temperature, dry bulb 78° F., wet bulb 74° F., relative humidity 82 per cent. Cloud Nb., amount 10.

"This squall was of considerable interest as the D.R. position at midnight was Latitude 0° 06' S., Longitude 85° 05' E. worked from a stellar fix at 6.25 p.m. The subsequent weather was a gradual improvement.

Extract from the Meteorological Log of S.S. *Risaldar*, Captain G. PARK, Calcutta to Bombay:—

"January 5th, 1927.—5.0 to 6.0 a.m., heavy rain. Estimated position at 6 a.m., Latitude 11° 06' N., Longitude 83° 47' E."

Extract from the Meteorological Log of S.S. *Newby Hall*, Captain J. BUTLER, Bombay to Rangoon:—

"Estimated position at noon on January 4th, Latitude 7° 22' N., Longitude 83° 27' E. Continuous heavy rain squalls midnight to noon. Noon position on the 5th Latitude 9° 33' N., Longitude 86° 25' E. At 0.50 p.m., fierce rain squall, after which weather became fairly settled. Clouds continually changing. At midnight (estimated position Latitude 10° 46' N., Longitude 87° 57' E) heavy bank of clouds passing, causing wind to blow gustily."

Extract from the Meteorological Log of S.S. *Khiva*, Captain C. P. COOPER, O.B.E., R.D., R.N.R. Penang to Colombo:—"Noon position on the 4th, Latitude 6° 09' N., Longitude 90° 17' E. At 5.0 a.m., sharp rain squall, wind backed W.N.W. 5.40 wind veered to N.E. Estimated position at midnight on the 4th, Latitude 6° 04' N., Longitude 87° 32' E. At 1.15 a.m. on the 5th, sky became overcast. 1.20 wind set in suddenly S.W., force 5, bringing light rain. 2.00 wind force 3, gradually died away to variable force 1."

Extract from the Meteorological Report of S.S. *Scholar*, Captain J. J. EGERTON, Beira to Liverpool via Suez:—"On the 5th and 6th frequent squalls throughout 24 hours. Position at 8 a.m. on the 5th, Latitude 2° 10' N., Longitude 47° 58' E., and at 8 p.m. on the 6th, Latitude 5° 24' N., Longitude 50° 39' E."

HURRICANES IN THE SOUTH PACIFIC, 1926.

THE reports by Mr. J. R. GREY, Master Mariner at Tahiti, and Mr. ANDREW THOMSON at Apia Observatory, given in "The Marine Observer's Log" in the January, 1927, MARINE OBSERVER under the heading of "Hurricane" (which should have been "Hurricanes"),

has led Mr. THOMSON to inform us that there were two cyclones at this time approximately 1,200 miles apart, and he remarks as follows:—

“Additional reports have shown that the Samoan cyclone had its origin within 5° of the Equator in the vicinity of the Union Group, Longitude 170° W., while the Papeete storm was first observed at Bora Bora, Latitude 16° 05' S., Longitude 151° 08' W.

“It would appear that in the Central South Pacific there is a tendency for two or more cyclones to develop at the same time, but quite independently of one another. Thus, in addition to those described, on December 17th, 1925, cyclones developed simultaneously in the Ellice Group and in the Union Group, the latter proving destructive in Rarotonga after it had travelled a distance of 1,300 miles. On March 26th, 1926, a cyclone developed in the Union Islands, passed to the east of Samoa, and becoming more intense south of Latitude 15°, started a tidal wave which devastated Palmerston Island and swept on through the Cook Group, causing damage to the foreshore at Avarua, Rarotonga. A light storm took place in the Society Islands at this time.

“When the barometric pressure becomes low over a great belt lying between the Equator and 15° S., and more especially from 5° to 10°, conditions become favourable for the development of cyclones and, with the high humidity prevailing, small incidents of wind may trigger off the cyclones at more than one point. In a recent book on cyclones in the Pacific, S. S. VISHNER mentions only three out of the total of 239 as having started within 10° of the Equator. Since three of the six occurring in the last season were well developed when crossing this parallel, it would seem that circular storms are of more frequent occurrence within 10° of the Equator than has hitherto been believed.

“The atmospherics produced by cyclones are found by the high-power wireless station at Apia to vary greatly. During the cyclones of December 17-23, 1925, atmospherics were so bad as to prevent the receiving or transmission of messages, while during the New Year's cyclone both transmission and reception were clear and good. On March 28th atmospherics were only slightly above normal. There were no outstanding differences in the circumstances which would explain the great variation in the electrical effects produced.

CAPTAIN H. W. BROADBENT.

By One of his Officers.

Mention was made in the June, 1927, number of THE MARINE OBSERVER, of the retirement of Captain H. W. BROADBENT, after being 28 years in the School Ship, H.M.S. *Conway*, as Chief Officer for five years and 23 years in command. It is a great pleasure to me to place on record my esteem for Captain BROADBENT, which is shared by “Old Conways,” many of whom are of the Corps of Voluntary Marine Observers.

HARVEY WILLIAM BROADBENT, eldest son of the late JOHN H. BROADBENT, Esq., British Consul at Dusseldorf, commenced his training for the sea as a Cadet in H.M.S. *Conway*, January, 1880, under the command of the late Rear-Admiral E. B. H. FRANKLIN, R.N., being the first cadet to leave in 1881 after the late Captain A. T. MILLER, R.N., took command. On leaving the *Conway*, having gained a Double Extra Certificate, he joined the firm of MESSRS. GALBRAITH PEMBROKE and Company, London, serving his apprenticeship in the fine ships *Helen Pembroke* and *Dunedin*, the *Dunedin* then carried stunsails. After passing for 2nd Mate he was for a short period an Officer in sail with another firm, returning to MESSRS. GALBRAITH PEMBROKE and Company, to join their steamers in the Eastern trade, serving as 3rd, 2nd and Chief Officer. Upon obtaining his Master's Certificate in 1891, he joined the BIBBY LINE, serving in that company until 1894, when he left to perform his training as an Officer of the Royal Naval Reserve in Her Majesty's Fleet and served as Acting Lieutenant for 16 months in the China Squadron. After completion of training he returned home and joined the CUNARD COMPANY, serving as 3rd and 2nd Officer in R.M.S. *Etruria* with distinction. In 1897, when 2nd Officer of the *Etruria*, the steamer *Milfield* was in distress off the south coast of Ireland; he assisted in the rescue of the crew. For his good seamanship and gallantry on this occasion he received the Liverpool Humane Society's Medal, the Board of Trade Medal, and Lloyd's Bronze Medal.

In October, 1898, he was appointed Chief Officer of the School Ship *Conway*. As Chief Officer he began the work for which he was so ably fitted; a strong personality, strict disciplinarian, and sympathetic towards everyone; his remarkable gift for remembering names and faces being a great asset. He quickly won the esteem of the staff and cadets. Taking a keen personal interest in the welfare of the cadets, he organised more recreation and games.

On April 5th, 1899, he married Miss MAUD WILSON, 5th daughter of the late THOMAS WILSON, Esq., of Messrs. WILSON and HULTON, solicitors, Preston, and Mrs. WILSON, whom he met on board R.M.S. *Etruria*. Among his many varied duties when Chief Officer, he took much interest in the Meteorological Log, which was then kept, teaching the cadets the use of the instruments and how to observe. He passed for Extra Master in September, 1899. His promotion in the Royal Naval Reserve being Lieutenant, September 11th, 1899; Com-

mander, April 12th, 1909; Captain, June 22nd, 1914, being one of the first to receive the rank of Captain.

Owing to Captain MILLER's failing health in 1902, Captain BROADBENT frequently acted as Captain, and after Captain MILLER died in May, 1903, he was appointed to permanent command. Having the experience of five years as Chief Officer he could all the more easily realise the necessary alterations for the benefit of the cadets, and continued to do so up to the time of his resignation. The outstanding improvements being the creation of proper playing fields and the building of Conway House, the Sanatorium. On board the ship there was lack of amusement for the cadets when he first took command, and he soon fitted a games room, and later added a cinema. He brought the gymnasium up to date. Games he considered absolutely essential for the training of boys and spent his spare time at the rigger matches, and he started a bantam XV for the small boys whom he coached. Boat sailing he was particularly keen on, and encouraged this among the cadets by obtaining two sailing dinghies and a sailing cutter, sailing races being held ever since during the Summer term.

During the Great War he carried on the ship with a reduced staff, the numbers on board being at the maximum and all cadets leaving received nominations direct into the R.N.R. Nearly 3,000 boys have passed through his hands and the record during the war, as shown on the Honours List and the Roll of Honour is one to be proud of. In 1920 the Cadets Meteorological Log was established and he readily accepted this, having made suggestions which were adopted in it. Under his command the *Conway's* Cadets Meteorological Log has been maintained at a high standard, being continuously classed “Excellent.” To keep “Old Conways” together he brought about the foundation of the Conway Club, which has a membership of over 1,085 and has been Honorary Secretary from the first year, and continues to be. He is President of the Seven Seas Club, and on retiring from the *Conway* was made a life member of the R.N.R. Officers' Club of Liverpool, better known as Sea Urchins.

On April 5th, 1924, Captain and Mrs. BROADBENT celebrated their silver wedding and also 25 years on the *Conway*. They were the recipients of valuable presentations from the staff, cadets and the Old Boys' Club. It is a coincidence that the day he handed over the command to Captain F. A. RICHARDSON, D.S.C., Cdr., R.N., was the anniversary of their wedding. During his career on board he was ably assisted by Mrs. BROADBENT, for whom all cadets and “Old Conways” have a great affection.

All “Old Conways,” of which there are many in the Voluntary Corps of Marine Observers, wish Captain and Mrs. BROADBENT every happiness in their retirement at Nuttree House, Brixham, South Devon.

C. E. L.



The Captain of H.M.S. *Conway*, School Ship,
1903-1926.

CAPTAIN H. W. BROADBENT, R.D., R.N.R.

THE GYRO COMPASS.

BY LIEUT.-COMMANDER ALFRED STEWART, R.D., R.N.R.

How the Earth's Rotation makes the Gyro Compass indicate True North.

A spinning mass which is universally mounted will tend to maintain its axle in a fixed direction in space, regardless of how its supporting medium may be moved or tilted.

This tendency is known as Fixity of Plane.

In the Gyro Compass this characteristic is manifested by the axle of the Gyro wheel changing its position in relation to the horizontal when set in an east-west direction. This is due to the Gyro maintaining its axle in a fixed direction in space while its supporting medium or base is being carried around the Earth's axis with the Earth's rotation.

If, in the case of the universally mounted Gyro wheel, a pressure be applied to the frame of the wheel tending to change the direction of its axis, the pressure will not be resisted, but the axle of the Gyro will move about an axis perpendicular to the one about which the pressure is being applied.

This characteristic is known as Precession.

When the axle of the Gyro wheel in the Gyro compass is displaced from the true north-south direction, the axle will tilt, since it tends to maintain its Fixity of Plane, and consequently some method whereby a force may be exerted which will cause the axle to return to the meridian must be provided.

A U-tube system, partially filled with mercury, mounted perpendicular to the plane of the Gyro wheel and connected to the bottom of the Gyro case, furnishes the necessary forces about the horizontal axis of the Gyro wheel to make it precess to the meridian.

This action of the compass is caused when the Gyro wheel maintains its Fixity of Plane, at which time this tilting causes a movement, due to gravity, of the mercury (weight) to the low side, applying a pressure downwardly on that side, resulting in a precessional movement of the Gyro axle towards the meridian, where the tilting stops. Here the Gyro rests, forming the directive element of a true north indication, a powerful directive force without variation or deviation. See FIGURES 1, 2, 3, and 4.

The Gyro Compass.

The principal unit around which the Gyro compass is built is the Gyro wheel. This wheel, which weighs 55 pounds, is mounted on an armature shaft and is driven at a speed of 6,000 r.p.m. Ordinary plain sleeve bearings are provided and a simple method of automatic oil ring lubrication is employed. The wheel is contained within an aluminium casing, which in turn is supported on horizontal bearings within a surrounding vertical ring. This ring is suspended from the compass head by means of very fine piano wire.

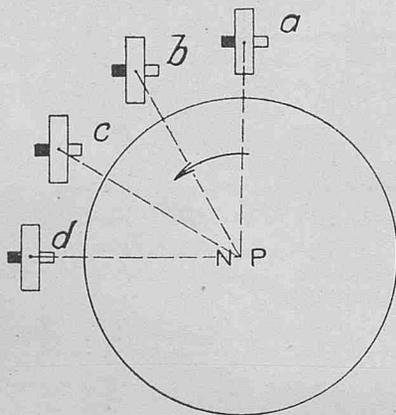


Figure 1.

A gyroscope universally mounted maintains its axle in a fixed direction in space. This is known as Fixity of Plane. Note that the axle of the simple gyroscope shown at a is parallel to the positions b, c, d, but relative to the earth its axle has apparently tilted.

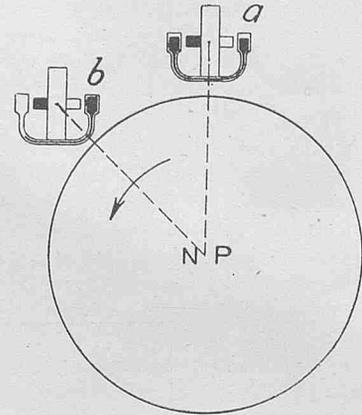


Figure 2.

With a mercury tube attached to the gyroscope, Fixity of Plane takes place and due to Gravity the mercury flows to the low side applying a downward pressure.

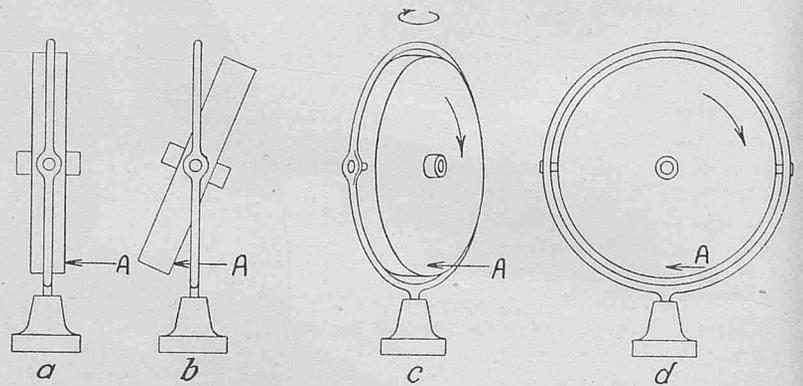


Figure 3.

a and b show the effect of an applied force A in a movement of the Gyro about its horizontal axis, when it is not spinning.

When the force A is applied to the spinning gyroscope, there will be a movement about the vertical axis as shown in c, which movement will continue until the gyroscope is revolving in the direction of the applied force as shown at d, after which there will be no further movement.

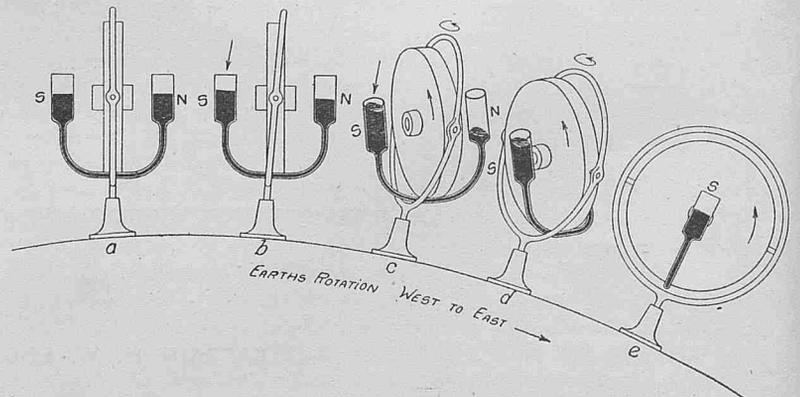


Figure 4.

The cycle of movements of the gyroscope starting from an east-west position a to settlement on the true meridian e, thus forming a Gyro-Compass.

It is held in place at the top and bottom by means of guide bearings enclosed within another vertical member called the phantom.

There is provided between the supporting and supported ring members of the compass, an electrical follow-up system, which causes the phantom ring to follow all the movements in azimuth of the vertical ring.

The Gyro compass card is attached to the phantom ring and is mounted so that the line through zero to 180° is in the same plane

as the Gyro axle when the follow-up system is in operation. It will be seen that through the medium of this follow-up system all move-

ments of the Gyro wheel and casing in azimuth are transmitted to the compass card. See FIGURES 5 and 6.

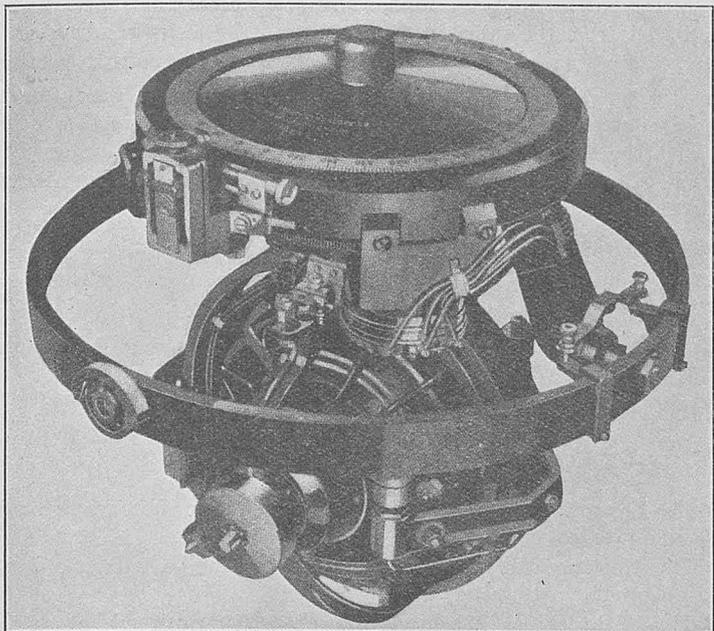


Figure 5.

THREE-QUARTER TOP VIEW OF MASTER-COMPASS REMOVED FROM BINNACLE STAND.

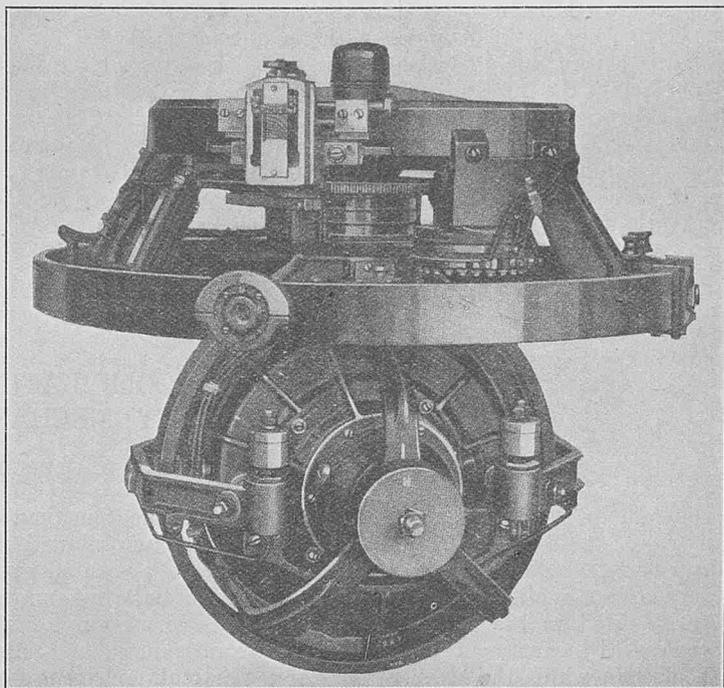


Figure 6.

COMPLETE COMPASS REMOVED FROM BINNACLE, AFT VIEW OF SPIDER, NORTH VIEW OF GYRO.

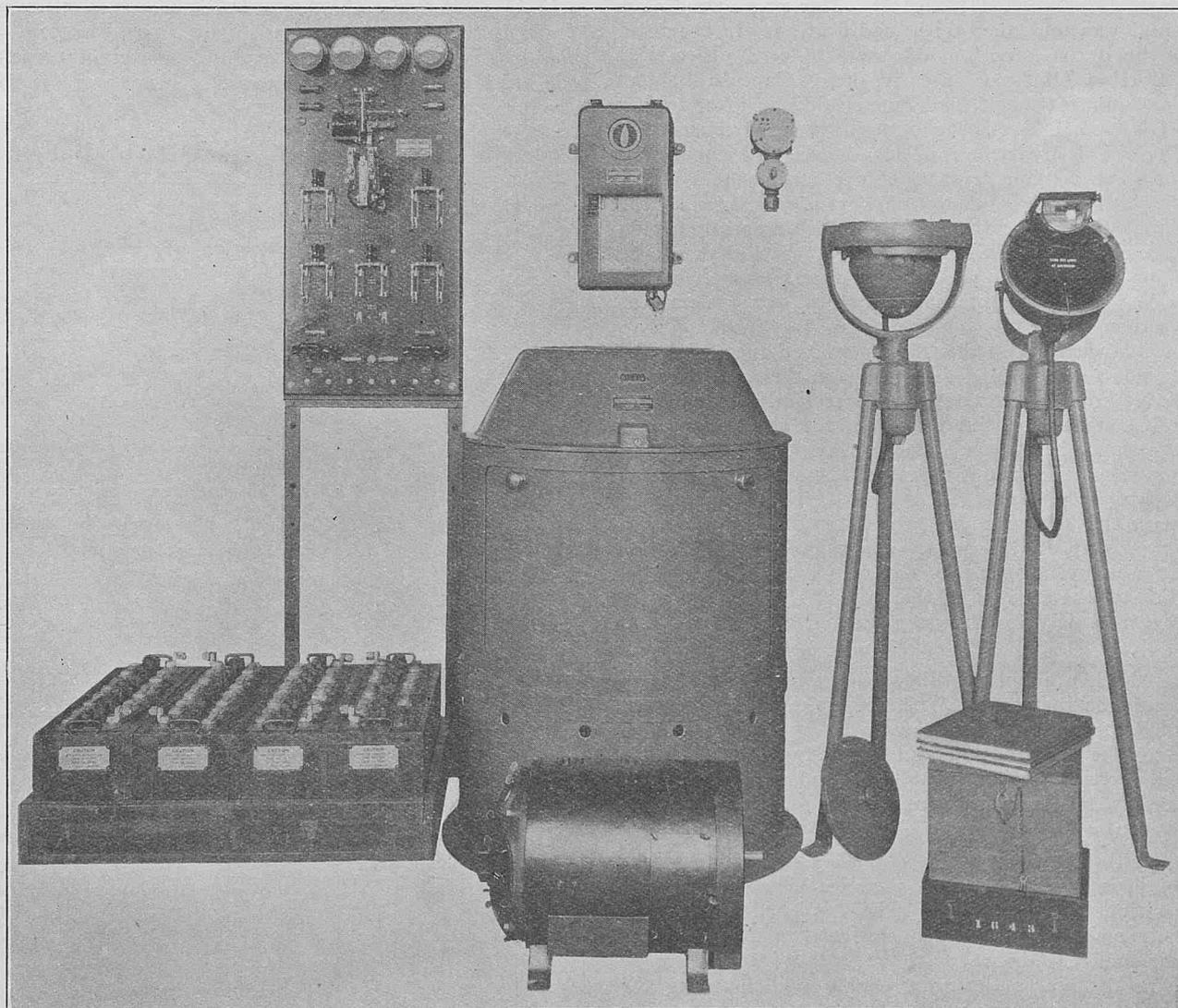


Figure 7.

(Reproduced through the kindness of Messrs. Sperry Gyroscope Co.)

The transmitter which operates the Repeater compasses is driven directly from a gear mounted below and attached concentrically to the compass card frame.

The Gyro compass is provided with an automatic device for correcting the errors due to latitude, speed and heading of the vessel, thus obviating the necessity of applying these corrections in the various Repeater compasses or in the readings taken from them.

The Master Gyro compass and its control panel may be installed in any position on the vessel where the heat and dirt are not excessive, and it is well to choose a place which can be reached conveniently from the bridge and from which the cable between the compass and bridge can be run with the least expense.

The repeater compass consists of a small step by step motor connected through gears to the repeater cards and is operated by the transmitter on the Master compass and any number of repeaters may be operated from the same transmitter, and the exact reading of the Master compass can be transmitted to any part of the ship desired.

Apart from the advantages which a Gyro compass gives for the purpose of steering a course, it is of special value for use in conjunction with the Wireless Direction Finder, of which Commander J. A. SLEE, R.N. (Ret.), has written several articles in THE MARINE OBSERVER.

A complete equipment is shown in FIGURE 7.

THE EXTRACTION AND COMPILATION OF MARINE METEOROLOGICAL DATA BY MECHANICAL METHODS.

PREPARED IN THE MARINE DIVISION BY H. T. SMITH, CLERICAL ASSISTANT.

The solution of the problem of finding a really efficient method of utilizing to their full extent the observations contributed by voluntary marine observers is one that has always presented great difficulty of accomplishment. Various methods of handling marine data were tried in the early years after the formation of the Meteorological Department in 1854. FITZROY introduced a "collection book" in which the observations for a particular element were entered. Later a system of copying each observation on a card was tried without success, and was superseded by Captain TOYNBEE'S system of data books (for details see "Marine Meteorology, History and Progress," Part II, Volume II, No. 18). This proved the most efficient of any, and was continued with modifications in the form of the data book until the adoption of the Hollerith Electrical Tabulating and Sorting Machines in May, 1921. Captain BROOKE SMITH, the Marine Superintendent, had remarked, soon after taking over the Marine Division in November, 1919, on the laboriousness of the task of copying out observations into data books, and commented that the work was more suitable for a machine than a man. Later, Mr. C. S. DURST, Senior Professional Assistant in the Marine Division, found that the Hollerith machine, which was already in use in the Air Ministry for making a census of the health of the Air Force, could be used equally well to make a "census" of the weather over the oceans. A preliminary trial of this system was made in an investigation of the conditions in the Indian Ocean adjacent to Cape Guardafui, and this having proved successful, the Hollerith System was taken into general use for the extraction of marine meteorological data. Two items did not lend themselves to inclusion on the Hollerith card, currents and, for obvious reasons, remarks on interesting phenomena. The method of dealing with ocean currents has been to compute the resultant current for small areas, and to group the currents for several of these small areas into a current rose, thus showing in the first instance the general trend of the current and in the second the vagaries which go to make it up. It was not convenient to include the information necessary to do this on the cards, and therefore the data books were retained, and are used solely for the extraction of the currents and remarks.

It was anticipated when adopting this system that the amount of data extracted would be increased. With the lessening of much of the drudgery which the data book system involved, more attention could be devoted to the examination and investigation of currents and remarks on interesting phenomena, also the encouragement and guidance so necessary to the work at sea by means of published results could be given.

Briefly the Hollerith System may be described as one in which given figures can be represented on a card by holes punched in corresponding positions on the card. The punched cards are inserted in delicate machinery in which electrical contact is made through the holes, enabling the cards to be sorted into groups or adding the columns of figures thus represented and counting the cards. It is worked by means of three machines, each representing a phase in the extraction and computation of marine meteorological data.

(1) The Key Punch by means of which the observations are punched on to cards.

(2) The Sorting Machine whereby the punched cards are sorted into appropriate groupings.

(3) The Tabulating Machine whereby the punched cards are totalled and counted.

Extraction of Marine Meteorological Data.

Since this system deals with figures only, it is obvious that meteorological observations cannot be dealt with just as they are received entered in the log. It is necessary that such elements as wind, sea and swell, clouds and their direction, also weather, should be represented by figures, and for this purpose the following code has been devised and is used for preparing the observations in logs for extraction on to the cards.

Code for Extraction of Marine Data by Hollerith Machine.

Column of Card.	Element.	Code.
1 & 2 ...	Year	The number of the log in which the observation is recorded is stamped on the back of the card. Last two figures. Thus: 1923=23
3... ..	Month	January = 1 July = 7 February = 2 August = 8 March = 3 September = 9 April = 4 October = 10 May = 5 November = 11 June = 6 December = 12
4, 5 & 6...	Marsden Square Number.	The globe is divided into ten degree squares according to the Marsden Chart, and the position of the observation is given by the Marsden square number from that chart. Thus: An observation taken between the limits of Lat. 20° 00' N. and Lat. 29° 59' N., and Long. 30° 00' W. and Long. 39° 59' W. is given the Marsden square number 076.
7 & 8 ...	Day of month ...	Thus: 25=25th day of the month.
9... ..	Watch... ..	The hour at which the observation was made is coded thus:— 4 a.m.=1 4 p.m.=4 8 a.m.=2 8 p.m.=5 Noon = 3 Midnight = 6
10 & 11...	Marsden Sub-square Number. (See FIGURE 4.)	Each Marsden square is sub-divided into 100 parts. The number of the "sub-square" is obtained by taking the last figure of the whole number of degrees of the latitude and the last figure of the whole number of degrees of longitude. Thus: An observation made in Lat. 27° 55' N., Long. 31° 28' W. would be given the Marsden Square Number 076 and the Marsden "sub-square" Number 71
12 & 13...	Wind Direction ...	Calm or light and variable airs=00 N x E = 01 S x W = 17 NNE = 02 SSW = 18 NE x N = 03 SW x S = 19 NE = 04 SW = 20 NE x E = 05 SW x W = 21 ENE = 06 WSW = 22 E x N = 07 W x S = 23 E = 08 W = 24 E x S = 09 W x N = 25 ESE = 10 WNW = 26 SE x E = 11 NW x W = 27 SE = 12 NW = 28 SE x S = 13 NW x N = 29 SSE = 14 NNW = 30 S x E = 15 N x W = 31 S = 16 N = 32 No observation = XX.

Column of Card.	Element.	Code.	Column of Card.	Element.	Code.
14 & 15...	Wind Force ...	By Beaufort Scale (<i>vide</i> Marine Observer's Handbook, M.O., 218, 4th edition), pp. 40-41: Calm =00 Light Winds { =01 =02 =03 =04 Moderate { =05 =06 =07 =08 =09 Gales { =10 =11 =12 No observation=XX.	35 & 36 contd.	Sea Direction ...	NW =28 from NW =78 NW×N =29 " NW×N =79 NNW =30 " NNW =80 N×W =31 " N×W =81 N =32 " N. =82
16 to 20...	Pressure ...	The pressure is given in Millibars to one place of decimals, corrected for temperature and gravity and reduced to M.S.L. Thus : 1017.6 mb=10176 No observation=XXXXX.	37 ...	Sea Amount ...	By Scale observed from 0 (=No disturbance) to 9 (=Precipitous sea). No observation=X.
21 & 22...	Dry Bulb Temperature.	In degrees Fahr. to nearest whole degree : No observation=XX.	38 & 39...	Swell direction ...	Same as for Sea directions.
23 & 24...	Wet Bulb Temperature.	In degrees Fahr. to nearest whole degree : No observation=XX.	40 ...	Swell Amount ...	0 (=No swell) to 9 (=Abnormal swell). No observation=X.
25 ...	Upper Cloud Type ...	Cirrus=1 No observation =X Ci-St.=2 No Upper Cloud=R. Ci-Cu.=3	41 & 42...	Sea Temperature ...	In degrees Fahr. to nearest whole degree. No observation=XX.
26 ...	Middle Cloud Type...	A.-Cu.=4 No observation =X A.-St.=5 No Middle Cloud=R.	43 & 44...	Cloud Motion ...	Stationary Upper Cloud=00 Stationary Middle Cloud=50 From N×E " " =01 From N×E " " =51 " NNE " " =02 " NNE " " =52 " NE×N " " =03 " NE×N " " =53 " NE " " =04 " NE " " =54 " NE×E " " =05 " NE×E " " =55 " ENE " " =06 " ENE " " =56 " E×N " " =07 " E×N " " =57 " E " " =08 " E " " =58 " E×S " " =09 " E×S " " =59 " ESE " " =10 " ESE " " =60 " SE×E " " =11 " SE×E " " =61 " SE " " =12 " SE " " =62 " SE×S " " =13 " SE×S " " =63 " SSE " " =14 " SSE " " =64 " S×E " " =15 " S×E " " =65 " S " " =16 " S " " =66 " S×W " " =17 " S×W " " =67 " SSW " " =18 " SSW " " =68 " SW×S " " =19 " SW×S " " =69 " SW " " =20 " SW " " =70 " SW×W " " =21 " SW×W " " =71 " WSW " " =22 " WSW " " =72 " W×S " " =23 " W×S " " =73 " W " " =24 " W " " =74 " W×N " " =25 " W×N " " =75 " WNW " " =26 " WNW " " =76 " N×W " " =27 " N×W " " =77 " N " " =31 " N " " =81 " N " " =32 " N " " =82 No observation=XX.
27 & 28...	Lower Cloud Type...	St.-Cu.=6 Cu-Nb=9 Nb.=7 St.=0 Cu 8 No observation =XX No lower cloud=RR.	45 ...	Marsden Sub-square.	The Marsden "Sub-square" is broken down still further in certain cases. When a ship is lying at anchor or hove to. The "Sub-square" is divided into 9 "sub-sub-squares" as shown by the following diagram below; 0 signifies the ship is underway :-
29 ...	Proportion of Sky Clouded.	As observed in tenths Thus : 3 of sky clouded =3 Sky overcast 10/10=R No observation =X			
30 ...	Weather (Visibility).	By Beaufort Notation (<i>vide</i> Marine Observer's Handbook M.O. 218, 4th edition, p. 53). Ordinary Visibility ... = 0 V (Exceptional Visibility) = 1 Z (Haze) ... = 2 M (Mist) ... = 3 F (Fog) ... = 4 No observation ... = X			
31 to 33...	Weather ...	By Beaufort Notation (<i>vide</i> Marine Observer's Handbook M.O. 218, 4th edition, page 53). S (Snow) ... =1 T (Thunder) ... =6 Q (Squalls) ... =2 H (Hail) ... =7 R (Rain) ... =3 W (Dew) ... =8 P (Passing showers)=4 F (Wet air) ... =9 D (Drizzle)... =5 L (Lightning) ... =R No observation=X. None of the above reported ... =0			
34 ...	Visibility ...	No observation=X.			
35 & 36...	Sea direction ...	No disturbance =00 Confused Sea =50 N×E =01 from N×E =51 NNE =02 " NNE =52 NE×N =03 " NE×N =53 NE =04 " NE =54 NE×E =05 " NE×E =55 ENE =06 " ENE =56 E×N =07 " E×N =57 E =08 " E =58 E×S =09 " E×S =59 ESE =10 " ESE =60 SE×E =11 " SE×E =61 SE =12 " SE =62 SE×S =13 " SE×S =63 SSE =14 " SSE =64 S×E =15 " S×E =65 S =16 " S =66 S×W =17 " S×W =67 SSW =18 " SSW =68 SW×S =19 " SW×S =69 SW =20 " SW =70 SW×W =21 " SW×W =71 WSW =22 " WSW =72 W×S =23 " W×S =73 W =24 " W =74 W×N =25 " W×N =75 WNW =26 " WNW =76 NW×W =27 " NW×W =77			

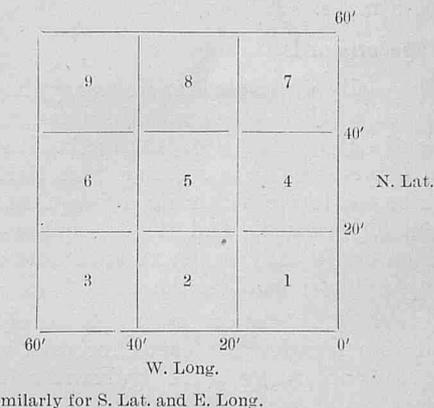


FIGURE 1 shows a set of observations coded, and FIGURE 2 shows the corresponding punched card. A separate card is punched for each set of observations made at the end of each four hours' watch.

Meteorological Log kept on board R.M.S. Empress of Russia Captain A.J. Holland R.N.R. from Vancouver to Hong Kong and Manila.

DATE	Latitude.		Longitude.		Current when determined at short intervals.	Wind at time of observation.		Barometer* No. <u>775</u>	True Atmospheric Pressure at Sea Level (Optional). The barometer reading corrected for temperature, height, gravity, etc. (see page 14-15, Marine Observer's Handbook, 2nd Edition).	Thermometers.		Clouds at time of observation.	Weather at time of observation.		Sea Surface.				Remarks.	Main list by page			
	Observed.	Dead Reckoning.	Observed.	Dead Reckoning.		Direction.	Force 0 to 12.			Dry Bulb.	Wet Bulb.		Upper.	Lower.	Direction from which the clouds are coming should be noted when determinable.	According to Beaufort Notation.	Waves.	Swell.			Temp. by No.	Spec. Grav. by No.	Time of Day.
Year 1925	Month <u>Oct</u>	Day <u>24</u>	Hour <u>1</u>	<u>8</u>	<u>9</u>	<u>169 22</u>	<u>5.70 W</u>	<u>76</u>	<u>SF</u>	<u>6</u>	<u>1003.6</u>	<u>28.7</u>	<u>1005.0</u>	<u>46</u>	<u>46</u>								
				<u>48 48</u>	<u>7</u>	<u>169 22</u>	<u>5.70 W</u>	<u>76</u>	<u>SF</u>	<u>6</u>	<u>1003.6</u>	<u>28.7</u>	<u>1005.0</u>	<u>46</u>	<u>46</u>								
				<u>48 31</u>	<u>67 52</u>	<u>166 22</u>	<u>5.70 W</u>	<u>66</u>	<u>WNW</u>	<u>7</u>	<u>1004.5</u>	<u>28.3</u>	<u>1006.6</u>	<u>46</u>	<u>44</u>								
				<u>48 08</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</u>	<u>5</u>	<u>1009.0</u>	<u>28.6</u>	<u>1010.5</u>	<u>49</u>	<u>46</u>								
				<u>48 04</u>	<u>166 22</u>	<u>166 22</u>	<u>5.68 W</u>	<u>68</u>	<u>NW×W</</u>														

A.M. Form 789.

Year	12 Square	Day	Watch	Sub-square	Wind Direction	Wind Force	Barometer	Dry Bulb	Wet Bulb	Wind	Thunder	Lightning	Cloud	Weather	Sea	Swell	Sea	Cloud	Location	
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88
99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99

The Smith Tabulating Machine Co., Ltd.

Figure 2.—Specimen of Corresponding Punched Card. 4 a.m. 24th October, 1925.

The Key Punch by which the cards are punched is shown in FIGURE 3.

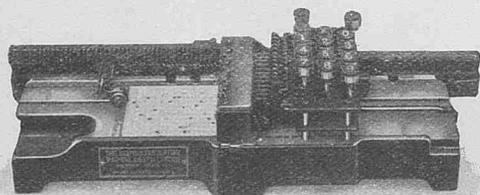


Figure 3.—Card Key Punch.

It is a small machine with a keyboard resembling that of a miniature typewriter. A card is inserted in the machine, and as each key is depressed, a hole is made in the card at a point where the corresponding number appears on the card and with the release of the key, the card is automatically carried along, so that the next column or field as it is called comes into position for punching. When the cards are punched they can be verified by being repunched on a "check-punch." On this check-punch machine if a key is depressed for which a corresponding hole has not been previously punched on the card, the machine locks, indicating that an error in punching has been made.

Stowage of Cards.

To be easily workable it is necessary that the punched cards should be stowed so that the observations can be readily located for position and date. Since 1867, the method used to identify the position of an observation in a manner least liable to confusion and error, has been to locate it in its 10° square numbered after the plan devised by MARSDEN and its sub-square as explained in the code. Marsden charts may be found in the June numbers of this journal accompanying "Work of the Year."

When therefore the cards for a batch of logs are punched, they are sorted into months. The cards for each month are sorted first into 10° squares according to the figures in columns 4, 5, and 6 and, since the averages of many elements are computed in 5° squares, the sub-squares (columns 10 and 11) are sorted into groups a, b, c, d, each group comprising a 5° square as shown in FIGURE 4.

The cards are stored in wooden boxes, each of which will hold about 2,000 cards, and kept in locked cupboards in a special store-room. It is essential that the cards should be kept as free from dust as possible, as dust tends to destroy the edges of the cards and spoil them for use in the sorting and tabulating machines. Thus all the cards for any particular month and for any particular square, that have been punched since the start in 1921, are stowed together in one box and can be readily found when they are required.

It must be noted that any change in the code used or any change in the order of the columns on the card would involve the commencing of a new series of cards and the two or more series would always have to be stowed separately and used separately in the computing machines. It is essential that as little change as possible should be made in the system in order to obtain the maximum efficiency from it.

90	91	92	93	94	95	96	97	98	99
80	81	82	83	84	85	86	87	88	89
70	71	72	73	74	75	76	77	78	79
60	61	62	63	64	65	66	67	68	69
50	51	52	53	54	55	56	57	58	59
40	41	42	43	44	45	46	47	48	49
30	31	32	33	34	35	36	37	38	39
20	21	22	23	24	25	26	27	28	29
10	11	12	13	14	15	16	17	18	19
00	01	02	03	04	05	06	07	08	09

Figure 4.—10° Square divided into sub-squares.

The Electrical Sorting Machine.

The sortings described above are carried out by the Electrical Sorting Machine shown in FIGURE 5.

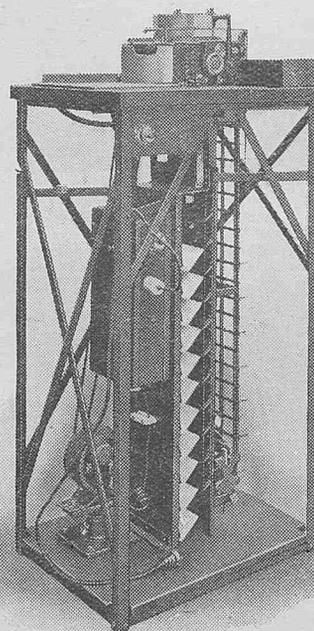


Figure 5.—"Hollerith" Electrical Sorting Machine.

This machine sorts the cards at the rate of 10,000 and in some of the latest types at the rate of 15,000 cards an hour. A pack of punched cards is placed at the top of the sorter. When the motor is started, each card is brought down in front of a magnetic brush. Where holes are punched in the card, the electric current passes through and opens a channel down which the card is carried on a revolving belt into the appropriate compartment. The twelve numbered compartments are situated up the front of the machine. The whole of one column is therefore sorted each time the cards are run through the machine.

By means of sortings and resortings through this machine the groupings under each direction and for various forces in the case of wind, sea and swell, where the percentage frequency is required to be known, are easily and quickly arrived at. Observations of weather and cloud can also be similarly dealt with. Also the relationship of the occurrence of one condition with the occurrence of another, as for example the occurrence of fog with winds from certain directions, can easily be ascertained.

Computation of Marine Meteorological Data.

For computing averages, the third machine, the Electrical Tabulating Machine (FIGURE 6) comes into use.

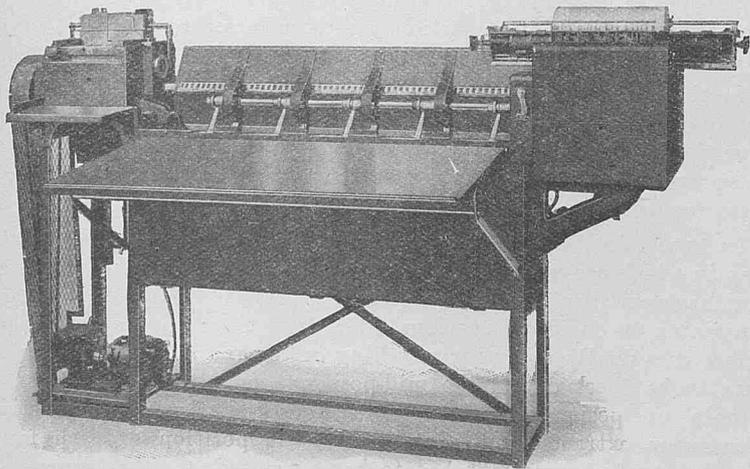


Figure 6.—“Hollerith” Electrical Tabulating, Printing and Listing Machine.

In this machine the electric current passing through the holes in the card operates a number of counters and by a process far too complicated to be described here, the columns are added up and the number of cards counted. Thus if the machine is set for columns 16, 17, 18, 19, 20 and the cards for a 5° square run through, the total of the barometer readings and the number of observations will be available in a few minutes. A simple division and the mean barometric pressure for that 5° square has been obtained.

The Printer Tabulator.

In addition, the latest Tabulating Machines are fitted with a printing attachment (shown on the right hand side in FIGURE 6), something after the nature of a typewriter, whereby the cards running through the machine are not only added and counted, but the actual figures punched on each card are printed on paper, several copies being made at once if so desired.

It is in the process of sorting and computation that the great saving of time and labour by this system is effected. The saving of time in extraction of observations on to cards instead of copying by hand into data books has not proved to be so great as was anticipated when the system was introduced. Nevertheless there is no doubt that when observations have been extracted over a sufficient number of years to make the compilation of average charts possible, the pro-

duction of the data for these charts will be so facilitated that it will be possible to produce them, with little or no break in the continued extraction of observations then being received.

Already it has been possible to carry out several investigations which have produced valuable information for the benefit of seamen. Using this system, tables of corrections for the diurnal range of the barometer have been computed for the North and South Tropics. A wind rose for the south-west approaches to the Channel with the frequency of fog occurring with each wind direction for all months of the year has been published. Charts of cloudiness over the Trans North Atlantic Tracks and charts showing the percentage frequency of fog and mist for the same areas have also been published, to quote a few examples. In this Number the first section of the chart of wind roses along the Panama to Australia and New Zealand Route for March has been constructed from the observations punched on to the cards, thus, in this instance, providing seamen with information of the variations of direction and force of wind which has never been produced before.

The fact that it has been possible to undertake and publish the results of such investigations when it is borne in mind that the Hollerith System was only started in 1921, does definitely show its utility in making a quick return to seamen for the observations they contribute, without dislocation of the work of the Marine Division and consequent prejudice to the assimilation of the observations flowing in while the investigation is being pursued.

International Exchange of Data.

Perhaps the greatest immediate advantage of this system of data extraction, and one not foreseen at the time of its adoption, is the facilities it offers to a ready exchange of data with other countries. Previously if any other country desired to obtain British marine meteorological observations—and there is a steadily increasing demand for them—it was only possible to supply the information by laboriously copying the observations from the meteorological logs, a process which occupied a considerable amount of time and consequently hampered and impeded the general routine work of the Marine Division. When the required observations were available on cards it became possible to send the observations abroad by simply sorting out the requisite cards, packing them securely in a box and posting them. This has been done successfully, and cards have been safely sent to and returned from Holland, where the Hollerith system is also in use, and Norway and France have also received data from us by this means.

Reciprocally the Dutch Meteorological Institute, who extract observations of current on to their cards, sent us some 15,000 cards which were tabulated and combined with British observations to construct the Current Charts along the Trans North Atlantic Tracks.

Towards the end of 1926, the possibility of printing observations by means of the Printer Tabulator was brought to our notice. Early in 1927 an inquiry for observations in the North Atlantic for certain dates was received from Germany. The necessary cards were sorted out and a trial was made in printing the observations by this machine. It proved successful and a specimen of the observations when listed by this machine is shown below.

Year.	Month.	Square.	Day.	Watch.	Sub-Square.	Wind Direction.	Wind Force.	Barometer.	Dry Bulb.	Wet Bulb.	Cloud.	Amount.	Weather.	Visibility.	Sea Direction.	Sea Amount.	Swell Direction.	Swell Amount.	Sea Temperature.	Cloud Motion.	Location.
25	3	110	13	6	43	08	06	10062	60	56	0080	4			08	6	32	4	61	00	0
25	3	110	13	2	14	05	04	10005	58	57	0490	9	0300		04	4	28	4	62	00	0
25	3	110	13	1	04	16	04	09997	60	58	0590	8	0300		20	5	28	4	61	00	0
25	3	110	13	3	24	10	05	10014	62	58	0080	7	0000		50	5	30	4	62	00	0
25	3	110	13	4	24	05	05	10021	62	57	0090	7	0000		04	5	04	5	62	00	0
25	3	110	13	5	33	08	06	10036	61	58	0090	9	0300		08	5	30	4	62	00	0
25	3	110	14	1	43	08	06	10057	59	55	0580	5	0000		08	6	02	5	61	00	0
25	3	110	17	6	23	10	04	10133	63	62	0060	7	0900		10	3	08	2	63	00	0
25	3	110	17	4	32	08	05	10157	66	61	1480	7	0900		08	3	08	3	61	00	0

NOTE:—The machine does not print R and X, therefore in this case there is some ambiguity in the columns headed Cloud and Cloud Motion, which will be remedied in future.

As a result, arrangements have been made with another Department of the British Government where these latest machines have been installed, so that observations required abroad may be similarly printed in future.

The advance which the use of such a process represents is very obvious. To a country requiring the observations, but which has not the Hollerith machines installed, the advantage of having the observations in print instead of having to decode each individual card is immense in the saving of time. Where a country already using the machines requires observations for combining with its own for purposes of averages, &c., it is an easy matter, taking very little time, to punch the printed observations received from another country on to cards and so use them in the sorting and tabulating machines. The most important point is **that there is no risk of the original cards, which represent a large expenditure of time and which would take time to replace, being damaged or lost in transit.** Incidentally, since more than one copy can be printed, it also allows of the same observations being supplied to more than one country at one and the same time.

British Empire Co-operation.

While the application of this system to the International exchange of data is an important one, the possibilities of this system of data extraction, if generally adopted throughout the far-flung commonwealth of nations which comprise the British Empire, is even of more importance. For with it Marine Divisions, when established in the Dominions, could become partners in the use of the great volume of marine meteorological data which is being provided by British seamen. Such British Empire co-operation would not only repay Britons, but would benefit all maritime nations.

Improvements for the Future.

It has previously been remarked that for the highest level of efficiency to be maintained it is essential that as few changes as possible, in either the code or the disposition of the elements on the card, should be made. Any change involves the starting of an entirely new series of cards which can never be mixed with the old cards when going through the machines for computation. The speed of the machines is only utilized to the full when large numbers of

cards are handled together. No system, however, can ever be entirely immune from modification at some time or other. The experience of seven years of this system, the strides that the development of marine meteorology has made in the direction of synoptic meteorology by the aid of wireless during those seven years, the development of the air routes particularly over long stretches of ocean where reliable observations taken at sea are essential, all these factors combined may make it necessary for slight modifications being made in the present card. For instance, it may be necessary in the interests of synoptic meteorology to fix the position of at least the noon observations more finely than to a degree of latitude and longitude as at present. It must ever be remembered that in mechanical methods of extraction and compilation to strive to obtain too much may be to reduce results.

In the past seven years there have been well over half a million observations punched on to cards. This, it is true, when spread out over the oceans, gives but a very small quota for each month in a 5° square, nevertheless it is a sure foundation and gives encouragement for what can be achieved in the future.

In conclusion, acknowledgment must be gratefully made to the way in which the work has been and is being facilitated by the care and neatness displayed in the logs by Marine Observers. A log containing 60 days' observations takes from three to four man-days before it is finally ready for punching on to the cards. The currents have to be checked and the mid-position computed to the nearest minute of position, the currents and remarks of interesting phenomena extracted into data books, the position of each four-hourly set of observations has to be computed to the degree of latitude and longitude, the log has to be coded and the coding checked. The work of extraction has been speeded up, and much of this speeding up is due to the greater care and neatness which Marine Observers now display in the voluntary work at sea in keeping Meteorological Logs. The greater number of observations we can extract, the greater volume of data we have at our command to return to seamen in the practical form of reliable charts and information.

Figures 3, 5 and 6 in this article have been reproduced from blocks kindly lent for the purpose by Messrs. The British Tabulating Machine Co., Ltd.

LOCAL WINDS, INDIAN OCEAN AND EASTERN ARCHIPELAGO.

PREPARED IN THE MARINE DIVISION BY H. KEETON, PRINCIPAL
CLERICAL ASSISTANT.

During the past two years a series of articles on the local winds of the Pacific and Atlantic Oceans has been published in this Journal; and the following is the first of a similar series, compiled from the same sources, dealing with the local winds of the East Indian Seas.

Owing to the geographical features the wind systems of the North Indian Ocean are more complicated than in any other ocean. The seas north of the Equator are enclosed by the great continental land masses of Asia and Africa, which influence the distribution of pressure to such a marked extent that the isobars of winter and summer are of an entirely different type, causing the seasonal monsoon winds.

In the South Indian Ocean, which is open to the south, the seasonal variations of pressure do not alter the general distribution; and there exists throughout the year a permanent anticyclone, which is most strongly developed during the southern winter, and moves north and south following the motion of the sun in declination. Blowing out of this high pressure system are the S.E. Trades, which extend from the West Australian coast to within a few degrees of the east coast of Madagascar.

Notes on average conditions for each month over the open ocean appeared in the 1925 numbers of this Journal, and it is here proposed to deal only with the conditions on the coasts and at the various islands.

I. South and East Coasts of Africa.

Cape of Good Hope to Algoa Bay.

During the southern summer, October to April, when the oceanic anticyclone is furthest south, and pressure is relatively low over Africa, south-easterly winds generally prevail, and frequently blow with the force of a gale, which may last three or four days and be followed by calms and light westerly winds. The weather accompanying these gales is however usually fine; except when they are related to the south-western side of a depression, when they are generally accompanied by bad weather, and are sometimes very severe.

In Simon's Bay, if the barometer standing at 1022 to 1026 mb (30.2 to 30.3 inches) falls rapidly to 1016 or 1014 mb (30.0 or 29.95 inches) a gale from S.S.E. almost certainly follows. A reliable indication of a S.E. wind is the appearance of a white cloud cap

on Muizenberg, while if the Hottentot Holland range on the east side of False Bay is similarly capped, the S.E. wind will probably be violent and of long duration.

When Simonsberg has a misty cloud on its summit, rain may be expected within two or three hours.

In strength the south-easterly winds are sometimes remarkably local, as they may be light at Cape Hangklip or Point Danger while it is blowing a heavy gale from the same quarter in Simon's Bay. There is frequently a marked change both in wind and weather off Cape Agulhas; and in fact the whole South African coast is noted for sudden and violent changes of wind and weather.

South-easterly winds, accompanied by rain and thick weather are known as "Black South-Easters," and are most frequent during October and November. They are of short duration but are sometimes violent.

Westerly winds are not uncommon during the summer season, and sometimes gales from this quarter are experienced, but seldom last long.

In winter, April to October, north-westerly winds predominate; and gales from a westerly direction are frequent, accompanied by rain, and associated with the passage eastward of depressions to the southward of the Cape. These gales commence at N.N.W., backing to W.N.W. and West, the wind finally backing rather suddenly to S.W. and moderating.

During this season S.E.'ly winds are infrequent, moderate, and of short duration, but occasionally a Black South-Easter is experienced.

Algoa Bay to Delagoa Bay.

As we proceed up the coast the character of the prevailing winds materially changes. In the vicinity of Algoa Bay the prevailing winds in summer are easterly to south-easterly, and in winter westerly to north-westerly.

At Port Natal the prevailing winds blow approximately parallel with the coast, namely, from N.E. to E. and from S. to S.W., in about equal proportions throughout the year; alternating in periods seldom exceeding a few days from either direction. From October to March is the wet season, and after a continuance of rain, an easterly gale may be expected, with a rising barometer, after which the weather clears.

Strong gales from eastward or westward occur during August to October, the most boisterous months; and may also be expected occasionally during the finest months, May to July, when usually a light breeze blows from seaward by day, followed by a land breeze during the night.

At Lourenço Marques the predominating direction of the wind throughout the year is from between south and east or N.E.

From October to April, although the hot and rainy season, the weather is mostly fine, accompanied by moderate or fresh sea breezes during the day, and light land breezes by night. Occasionally the land breeze fails for a few days, the sea breeze blowing throughout, but decreasing in strength during the night.

After some days of fine weather, the sea breeze fails, and rain comes on with winds between west and south, which sometimes reach gale force and may last 36 hours. The wind then backs to S.E. and later N.E., the weather becoming fine again.

From April to October the sea breezes blow with less force, and calms are more frequent.

Delagoa Bay to Cape Delgado.

This coast lies within latitudes where over the open ocean the S.E. Trades regularly prevail, but off the coast as Cape Delgado is approached the wind takes on more of a monsoon-like character.

From Delagoa Bay to Kiliman River winds from between south and east prevail all the year round, though at the latter place winds from west of south sometimes blow between January and March. The usual sea and land breezes are generally experienced along this coast.

Off the Mozambique coast the wind direction varies according to the monsoons, but the winds do not blow here with the same regularity as farther north. In the Mozambique Channel the northern monsoon season extends from October to April, but it is only from November to January that the north-easterly winds deserve the name of monsoon. During the remainder of the season calms or variable winds are most frequent, while on the coast the direction of the winds is modified by the action of land and sea breezes.

The southern monsoon blows from S.S.E. to S.S.W., attaining its greatest westing in May and June. From July it gradually backs to the eastward, and between September and November calms and light variable winds are prevalent until the northern monsoon is again established.

The change of seasons is generally accompanied by squally weather.

South Indian Ocean cyclones very occasionally cross the high land of Madagascar or pass north of the island, and reach the Mozambique Channel, doing damage along the African Coast.

Cape Delgado to Cape Guardafui.

Along this coast the winds consist of north-east and south-west monsoons.

The N.E. monsoon setting in over the Arabian Sea about the middle of October does not as a rule reach the African coast south of the Equator until the end of November. The changes of monsoon, which may occupy a fortnight or more, are accompanied by variable winds, calms, squalls of rain and overcast skies.

On the coast between Cape Delgado and the Equator in February and March the monsoon has a prevailing direction from E.N.E. to E.S.E., and the weather in this locality is then mostly fine, with occasional showers or thunderstorms, but no heavy squalls.

After an interval of calms and light winds the S.W. monsoon sets in, reaching Zanzibar about the end of March and Cape Guardafui about the end of April. Between Cape Delgado and Zanzibar it blows from between S.S.E. and S.S.W. strongly from May to July, and falling away to a light breeze in September and October. Between Zanzibar and Cape Guardafui, following the trend of the coast, it blows strongly from S.S.W., especially in July and August, when it frequently reaches gale force. In October the winds along this section of the coast are light from S.E. to E.

Close inshore during both monsoons the direction of the wind is influenced by the prevalence of land and sea breezes, which are common along this coast.

(To be continued.)

NOTE.—Plates produced by Lithographic process, including Charts and other large diagrams, will be found in each number after "Weather Signals."

WEATHER SIGNALS.

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

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

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

The decode tables of the International Code are printed altogether on pp. 21 to 23.

Decode tables which are not International Code will be given as necessary with the description of the Weather Signals of the particular country.

Request for Information to Meteorological Services of Maritime Countries.

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

Request for Information to the Weather Services of British Dominions and Colonies desiring British Ships' Wireless Weather Reports in plain language in Standard form.

Meteorological Services within the British Empire desiring to intercept weather reports made by "selected ships" with mercurial barometers, in the Fleet List in this Journal, addressed to "all ships" are invited to forward the following information in order that it may be made more generally known:—

- (1) The name of the receiving W/T Station, with call sign, latitude, longitude, and receiving wave length (600 m. Spark and 2,400 m. C.W. preferred).
- (2) The times at which the station will look out for these messages.
- (3) The telegraphic address of the service desiring to receive these ships' reports.

The reports referred to are described below, they are made for the purpose of the practical application at sea of Wireless and Weather as an Aid to Navigation and are of high order of accuracy, only those ships which have mercurial barometers being invited to make them.

With regard to (2), with a view to possible extended organisation the proposed times under the heading of "Zones and Times for Transmission," on page 54 of No. 39, Volume IV of this Journal, are submitted as approximates for consideration.

The reports made by "selected ships" contain observations made at the same Greenwich Mean Times as those of the nearest weather telegraphy stations, which are given opposite.

I. SHIPS' WIRELESS WEATHER SIGNALS.

WEATHER Reports between ships at sea and from ships to Weather offices are of three kinds:—

(1) Those which give information of conditions experienced during a passage or part of a passage with conditions prevailing at the time the message was drafted, no attempt being made to synchronise with other observations.

(2) Those which are based upon observations made at arranged times so that they provide synchronised data in a standard form but *not* in code.

(3) Those which are based upon observations made at arranged times so that they provide synchronised data *in code*.

(2) and (3) are essential for the system which was explained in "Wireless and Weather, an Aid to Navigation," in this Journal.

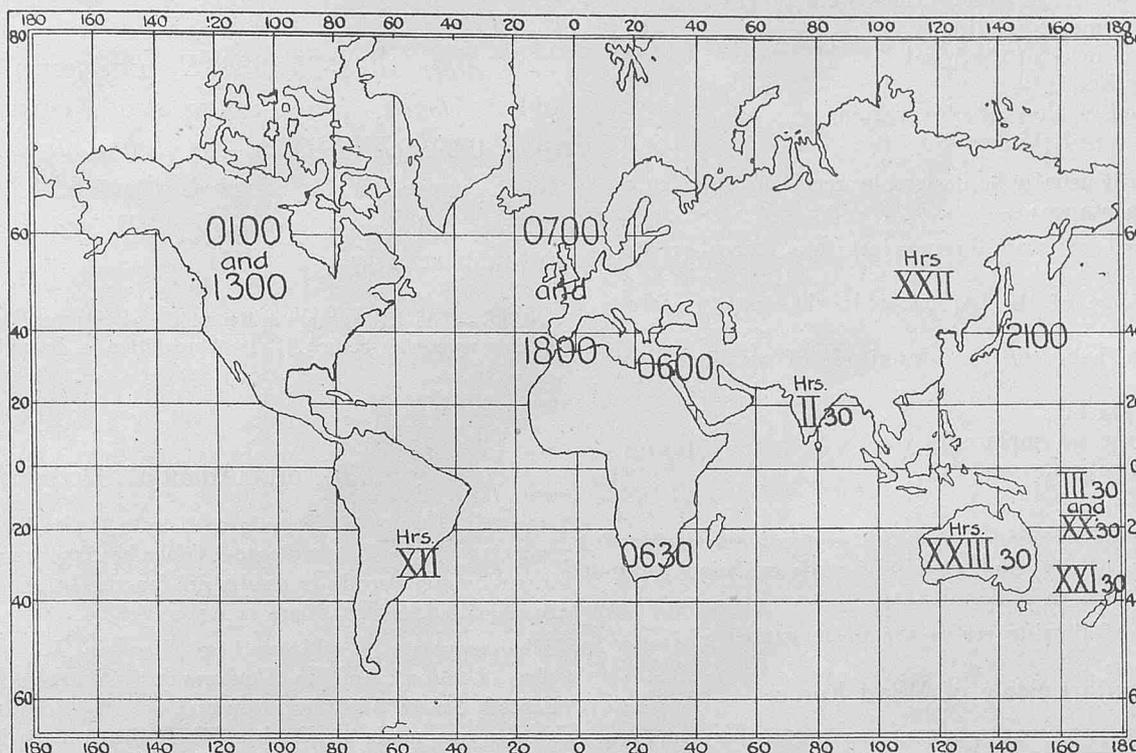
In order that synchronised data may be available over ocean areas, observations made for the purpose of Wireless Weather Reports should be taken at the same time as those of the nearest land weather service. These times are given upon the accompanying Chart of the World, and in the Table opposite.

In September, 1926, The International Meteorological Committee passed resolutions recommending that the following universal observation times, with certain modifications, should be used in all parts of the world:—0100, 0700, 1300 and 1900 G.M.T.

It may be some time before these are generally adopted, and until further notice the times given opposite should be adhered to.

The Greenwich Times at which Weather observations are taken in the different countries, of which reports for coast stations may be

Chart showing Greenwich Mean Times of Shore Observations.



The Arabic figures represent Greenwich mean time at which observations are taken for Daily Weather Reports. Where observations for these reports are timed by local time, the approximate Greenwich mean time is given in Roman figures.

transmitted for the information of seamen are as follows, and observing ships are advised to take their observations for sending reports to all ships at the same time within the approximate limits suggested.

G.M.T. of Shore Observations.	Suggested approximate limits for observation times by regular voluntary observers making reports to "All Ships."
British Isles and Europe. 0700 and 1800	From Longitude 40° W. in the Atlantic Ocean to the west and north coasts of Europe to the Equator including the Mediterranean to Longitude 20° E.
Egypt ... 0600	In the Mediterranean eastward of Longitude 20° E. and in the Red Sea.
India ... 0230	Arabian Sea, Persian Gulf. Bay of Bengal and Indian Ocean north of the Equator.
China ... 2200	China Sea.
Japan ... 2100	From the east coast of Japan in the Pacific Ocean to Longitude 180° E., north of the Equator.
North America 0100 and 1300	From Longitude 40° W. in the Atlantic to the east coast of North America north of the Equator. From Longitude 180° W. in the Pacific to the west coast of America north of the Equator.
South Africa ... 0630	From Longitude 20° W. to the African Coast in the Atlantic Ocean south of the Equator. From Longitude 80° E. to the African Coast in the Indian Ocean south of the Equator.
Australia ... 2330	From Longitude 80° E. to the Australian Coast in the Indian Ocean south of the Equator. From Longitude 160° E. to the Australian Coast in the Pacific south of the Equator.

G.M.T. of Shore Observations.	Suggested approximate limits for observation times for regular voluntary observers making reports to "All Ships."
New Zealand ... 2130	From Longitude 160° E. to Longitude 130° W. south of Latitude 30° S.
Fiji ... 0330 and 2030	From Longitude 160° E. to Longitude 130° W. between the Equator and Latitude 30° S.
South America 1200	From Longitude 130° W. to the American Coast in the Pacific south of the Equator. From Longitude 20° W. to the American Coast in the Atlantic south of the Equator.

In order to ensure a regular service of reports which all ships may receive, each of the ships whose names appear in the list of Regular Observing Ships given at the end of each Number of this Journal is invited to make the report described in (2) below daily and to enter it in her Meteorological Log or Meteorological Report, Form 911.

Thus ships on the list with the letters M.L., M., and W.T., after their names are "selected ships" and upon them the efficiency of this voluntary service mainly depends.

(2) Standard Form not in Code.

TIMES of observation must not be confused with times of transmission of reports. So long as the observations are taken at these fixed times transmission of reports may follow as convenient. The reports should be addressed to "all ships," and made on the wavelength which the Captain considers most efficient for the purpose, usually 600 m. spark or 2,400 m. C.W.

Wireless Weather Reports should always contain—

- The position at which the observations were taken,
- The corrected barometer reading.
- The direction and force of the wind,
- The present weather,*
- The Greenwich mean time of observation,
- The date and name of ship sending.

Other information will usually be desired by receiving ships in the following order of importance:—

- Course and speed of ship during last two, three or four hours,
- Tendency or change of the barometer in the last two, three or four hours,
- Current found with latitude and longitude of positions From and To,
- Temperature of the air,
- Temperature of the sea surface,
- Swell and its direction,
- Past weather.

Without using a code, messages may be conveniently framed giving these elements briefly and concisely with sufficient standardisation to enable them to be easily read.

For this purpose the following scales are recommended:—

The Beaufort Scale of Wind Force.

Admiral Beaufort's numbers.	Seamen's description of wind.	Admiral Beaufort's numbers.	Seamen's description of wind.
0	Calm.	7	Moderate gale.
1	Light air.	8	Fresh gale.
2	Light breeze.	9	Strong gale.
3	Gentle breeze.	10	Whole gale.
4	Moderate breeze.	11	Storm.
5	Fresh breeze.	12	Hurricane.
6	Strong breeze.		

The Beaufort Notation of Weather.

(It is best to write words in the Message.)

b Blue sky.	p Passing showers.
c Cloudy.	q Squalls.
d Drizzle.	r Rain.
e Wet air.	rs Sleet.
f Fog.	s Snow.
fe Wet fog.	t Thunder.
g Gloomy.	tl Thunderstorm.
h Hail.	u Ugly.
kq Line squall.	v Unusual visibility.
l Lightning.	w Dew.
m Mist.	z Dust haze.
o Overcast sky.	

The International Weather Telegraphy Barometric Tendency Table.

Barometer steady. (The barometer has not fallen or risen more than 1/4 millibar in 3 hours).			
Do. rising slowly. (The barometer has risen 1 to 1 1/2 mb. ('03-'04 in.) in last 3 hours).	Do.	do. 2 to 3 1/2 "	('06-'10 in.) do.
Do. rising.	Do.	do. 4 to 6 "	('12-'18 in.) do.
Do. rising quickly.	Do.	do. over 6 "	('18 in.) do.
Do. rising very rapidly.	Do.	fallen 1 to 1 1/2 "	('03-'04 in.) do.
Do. falling slowly.	Do.	do. 2 to 3 1/2 "	('06-'10 in.) do.
Do. falling.	Do.	do. 4 to 6 "	('12-'18 in.) do.
Do. falling quickly.	Do.	do. over 6 "	('18 in.) do.
Do. falling very rapidly.	Do.		

* For the purpose of Aircraft it is important that exact information of cloud types and amount should be given.

The direction of movement of the Upper Clouds is of great importance.

Example of plain Language Wireless Weather Report in standard form, not in code, recommended.

To CQ.

Weather 0745N 8333E Barometer corrected 2980 SSW4 cloudy cirrus upper strato cumulus lower eight-tenths 0230 GMT thirty-first July course N56E 12 rising slowly current N32E 2 knots from 6N82E to 7N83E air 83 sea 83 swell moderate SW past weather overcast lightning Yorkshire.

NOTE—The date appears in the middle of this message, the most important elements appearing before it. If abbreviation is desired omit all after date.

(3) North Atlantic "Decode."

THE main groups of the code used by a limited number of ships for reporting to the Meteorological Office having been internationalised, the following Decode is published for the information of ships who are able to intercept these reports.

The reports are addressed to *Weather London* (Meteorological Office, London) and to *Government Observer, Washington, D.C.* (United States Weather Bureau). Those addressed to *Weather London* are made to Devizes W/T Station, call sign GKU, on a wavelength of 2,100 metres (C.W.). Those addressed to *Government Observer, Washington, D.C.*, are made to any of the following U.S. Navy radio stations at Bar Harbour, Me., call sign NBD, New York, N.Y., call sign NAH, Norfolk, Va., call sign NAM, or Charleston, S.C., call sign NAO, on a wavelength of 2,100 metres (C.W.). The respective transmissions take place as soon as possible after observation time.

Observations made between the 100-fathom line, British Isles, and 40° W. Longitude are reported to *Weather London*.

Observations made between Longitude 40° W. and a line, Belle Isle—Virgin Rocks—Sable Island—Cape Hatteras are reported to *Government Observer, Washington, D.C.*

The times of observation are:—

European *land* 0100, 0700, 1300 and 1800, G.M.T.

American *land* 0100, G.M.T. = 8 p.m. 75th Meridian Time. and 1300, G.M.T. = 8 a.m. 75th Meridian Time.

Ships at Sea from the 100-Fathom Line British Isles to 40° W. Longitude.

0700 and 1800, G.M.T.

Ships at Sea from Longitude 40° W. to a Line Belle Isle—Virgin Rocks—Sable Island—Cape Hatteras.

0100 and 1300, G.M.T.

ADDITIONAL reports may be made to *Weather London* eastward of Longitude 40° W., containing observations made at 0100 and 1300, G.M.T.

A message consisting of figures addressed to *Weather London* or *Government Observer, Washington D.C.*, may be decoded as follows:—

As the first four groups are international, these groups, in weather reports transmitted by wireless telegraphy to weather offices of maritime countries by ships of all nations, may usually be decoded in the same manner.

Rule up a form, a sample of which is given opposite, and write the groups of figures and words, in the order received, in the spaces.

To save space, the groups of figures and their meanings have been inserted in the sample decode form, in *italics*.

• DECODE FORM.

Code.	Code Figures.					Distinguishing Letter.	Number of Group.	Name of Element and how to decode the Figures.	Message decoded.	
	Column Numbers.									
	1	2	3	4	5					
								Addressed to “ ”.		
International Weather.	4	*	*	*	*	P	1	Day of Week, Table I.*	<i>Wednesday.</i>	
	*	1	*	*	*	Q		Name of Latitude and Longitude, Table II.	<i>North and West.</i>	
	*	*	4	5	*	LL		Latitude, degrees.	<i>45°.</i>	
	*	*	*	*	8	L		Latitude, approx. minutes (multiply code fig. by 6).	<i>48'</i>	
	3	0	*	*	*	ll	2	Longitude, degrees.	<i>33°.</i>	
	*	3	*	8	*	l		Longitude, approx. minutes (multiply code fig. by 6).	<i>48'</i>	
	*	*	*	0	7	GG		Greenwich Mean Time to nearest hour.	<i>07.</i>	
	2	4	*	*	*	BB	3	Barometer, prefix 9 or 10 to code figures and, if desired, convert to inches. (See Special Table XXIII, p. 24.)	<i>1024mb.</i>	
	*	*	1	6	*	DD		Wind direction true, Table III.	<i>South.</i>	
	*	*	*	*	2	F		Wind force, Table IV.	<i>2.</i>	
	1	1	*	*	*	ww	4	Present weather, Table V.	<i>No change, Cloudy.</i>	
	*	*	4	*	*	v		Visibility. Table VI.	<i>Very good.</i>	
	*	*	8	0	*	K		Swell. Table VII.	<i>Slight.</i>	
	*	*	*	*	4	d		Swell—direction from, Table VIII.	<i>South.</i>	
	Check.	0	*	*	*	*	x	5	Sum of Column 1, less tens.	
		*	9	*	*	*	x		Sum of Column 2, less tens.	
*		+3	1	*	*	x	Sum of Column 3, less tens.		<i>Check corrected.</i>	
*		*	+4	1	*	x	Sum of Column 4, less tens.			
*		*	*	*	1	x	Sum of Column 5, less tens.			
2		*	*	*	*	y	6	Sum of Group 1, less tens.		
*		1	*	*	*	y		Sum of Group 2, less tens.		
*		+3	5	*	*	y		Sum of Group 3, less tens.	<i>Check corrected.</i>	
*		*	*	4	*	y		Sum of Group 4, less tens.		
*		*	*	+4	2	y		Sum of Group 5, less tens.		
British M.O. Weather.	6	*	*	*	*	C	7	Cloud predominating, Table IX.	<i>Strato-Cumulus.</i>	
	*	7	*	*	*	N		Cloud amount, Table X.	<i>Seven-tenths.</i>	
	*	*	1	*	*	W		Past weather, Table XI.	<i>Cloudy.</i>	
	*	*	*	0	*	U		Unusual phenomena. (See Special Table XXII, p. 24.)	<i>None.</i>	
	*	*	*	*	4	y		Sum of Group 7, less tens.	<i>Group correct by check.</i>	
	6	8	*	*	*	TT	8	Air temperature, degrees.	<i>68° F.</i>	
	*	*	6	9	*	tt		Sea temperature, degrees.	<i>69° F.</i>	
	*	*	*	*	1	y		Sum of Group 8, less tens.	<i>An error in this group.</i>	
								Space for word if wind force greater than 9.		

The message now reads—*Wednesday, Latitude 45° 48' N., Longitude 33° 48' W., G.M.T. 07 hours, Barometer 1024mb, Wind south force 2, Cloudy weather, Visibility very good, slight swell from south (column check corrected) (Group check corrected), Cloud St.-Cu, amount $\frac{7}{10}$ ths; past weather, cloudy; No unusual phenomena; (Group correct by check) Air temperature 68° F., Sea temperature 69° F. (An error in group).*

* Tables I—XXI (International Code) will be found on pages 21—23.

Example.—The following message intercepted: *Weather London* 41458 30807 24162 11404 09111 21542 67104 68691.

These figures having been written in the appropriate spaces, errors made in transmission may be checked by adding together the figures in each *column* of the first four groups, *neglecting the tens*. If the message has been correctly transmitted, the sums of the columns will agree with the corresponding figures of Group 5. If the sums differ, write down (under the original figures in Group 5) the numbers which must be *added* to make them agree.

NOTE.—In all adjustments of check figures, tens and carrying figures must be disregarded entirely; thus for purposes of the check system $9 + 4 = 3$, not 13.

Next add together the figures in each group 1 to 5, separately (neglecting tens). These sums should agree with the figures from

left to right in Group 6. If they differ, write down (under the original figures in Group 6) the numbers which must be *added* to make them agree.

Group 5 now indicates the *columns* in which there are errors with the numbers to be added to the figures which are in error.

Group 6 indicates the *groups* in which these errors occur.

In the example given we find that 0 in the second column of Group 2 should be 3, and that 4 in the third column of Group 4 should be 8.

In the remaining groups of the message a *double check* is not provided, but the fifth figure in each group will represent the sum of the first four figures, neglecting tens, and if it does not agree it will be known that one or more figures are in error.

The message is next decoded by means of the Tables and Instructions given on the Decode Form.

In publishing "Weather Signals" in the Numbers which follow throughout the year for the maritime countries of the world every endeavour will be made to make the information accurate and up to date, at the same time giving it as tersely and conveniently as possible for mariners from the many available sources.

Every effort will be made to guard against error, and Marine Observers are asked to write in and point out any errors which may appear to them.

ABRIDGED KEY TO THE INTERNATIONAL CODE.

In view of the extension in the use of the International Code by weather services, the descriptions (where the International Code is used) are now published in a concise form by using key letters. Those used for marine work are given below with the necessary decode tables. Where the International Code is *not* used each group will be described in detail.

THE KEY LETTERS AND THEIR MEANINGS.

- A = Form of *predominating cloud lowest* in the Table of cloud forms.
- a = Form of *predominating cloud highest* in the Table of cloud forms when more than one type of cloud exists.
- BBB = Pressure in millibars and tenths (initial 9 or 10 omitted), or millimetres and tenths (initial 7 omitted). The values refer to sea level and include all corrections for index error, temperature and gravity.
- BB = Pressure in whole millibars or whole millimetres (initial 9, 10 or 7 omitted).
- b = Amount of barometric tendency during the three hours preceding the time of observation expressed in half-millibars or half-millimetres. For tendencies 10–19 the *second* figure only is reported and 33 is added to the wind direction number (DD). For tendencies 20–29 the *second* figure only is reported and 67 is added to the wind direction number. Tendencies greater than 29 are reported as 29.
- bb = Amount of barometric tendency during the three hours preceding the time of observation expressed in half-millibars or half-millimetres.
- C = Form of predominating cloud, according to the Table of cloud forms, when only one form is reported, as from ships at sea. (See Table IX.)
- c = Characteristic of barometric tendency during the period of three hours preceding the time of observation. (See Table XIII.)
- DD = Direction of the wind (True) near the surface. (See Table III.)
- d = Direction (True) from which swell comes. (See Table VIII.)
- F = Force of the wind on the Beaufort Scale. (Forces above 9 are reported as 9, with the actual force in a word at the end. (See Table IV.)
- GG = Greenwich Mean Time of observation (01=1 a.m., 12=noon, 13=1 p.m. &c.)

H = Relative humidity of the air. (See Table XIX.)

h = Height of base of lower predominating cloud present. (See Table XXI.)

I_nI_n = Index number of station.

jj = Meaning varies according to time of observation and between inland and coastal stations, as follows:—

	Inland Stations.	Coastal Stations.
At 0700 G.M.T. ...	jj = mm	jj = SV _s
At 1800 G.M.T. ...	jj = MM	jj = SV _s

K = The characteristic of the swell *in the open sea*. (See Table VII.)

K' = Amount and characteristic of barometric tendency expressed by a single figure. (See Table XII.)

L = Amount of sky (scale 0–10) covered by cloud form A and all forms of the same layer (*i.e.*, low, medium or high) as A, if "a" refers to a different layer.

LLL = Latitude in degrees and tenths, the tenths being obtained by dividing the number of minutes by 6 *and neglecting the remainder*.

lll = Longitude in degrees and tenths, the tenths being obtained as for latitude LLL.

MM = Maximum temperature in the interval of 11 hours ending at 18 h. G.M.T. (or at one of the hours 1 h., 7 h., 13 h., 18 h. G.M.T., following not less than 4 hours after noon, local time).

mm = Minimum temperature in the interval of 13 hours ending at 7 h. G.M.T. (or at the hour 13 hours after the time of reporting the maximum temperature).

N̄ = *Total amount of sky covered with cloud* (See Table X.)

P = Day of the week. (See Table I.)

Q = Quarter of globe in which ship is situated. (See Table II.)

RR = Rainfall (at 7 a.m. for preceding 13 hours and at 6 p.m. for preceding 11 hours). (See Table XVII.)

R = Amount of rainfall for the preceding 24 hours. (See Table XVI.)

r = Time of commencement of precipitation. (See Table XVIII.)

S = State of the sea and swell (coast stations). (See Table XX.)

TT = Temperature of the air in whole degrees Fahrenheit or Centigrade (50 added to negative values).

tt = Temperature of the sea (surface water) in whole degrees.
 TTT = Temperature of air in degrees and tenths Fahrenheit or Centigrade (500 added to negative values).
 ttt = Temperature of the sea (surface water) in degrees and tenths.
 V = Visibility or distance at which objects can be seen in daylight (or at which lights can be seen at night). (See Table XIV.)
 v = Visibility at sea from ships at sea. (See Table VI.)
 V_s = Visibility towards the sea (from coast stations). (See Table XIV.)

W = The weather in the interval preceding the time of observation. This interval is 5, 6 or 7 hours for reports at 0100, 0700, 1300 & 1800 G.M.T. (See Table XI.)
 ww = The actual weather at the time of observation with which is combined, whenever possible, the general character of the weather. (See Table V.)
 w₁ = The initial figure of the code ww, thus indicating the general state of the weather. (See Table XV.)
 YY = Day of month.

INTERNATIONAL CODE, WEATHER TELEGRAPHY TABLES.

Table I.

P.—Day of the Week.

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

Table II.

Q.—Quarter of the Globe.

Code Figure.	Lat.	Long.	} Barometer in millibars.
1	N.	W.	
2	N.	E.	} Barometer in millimetres.
3	S.	W.	
4	S.	E.	
5	N.	W.	} Barometer in millimetres.
6	N.	E.	
7	S.	W.	
8	S.	E.	

Table III.

DD.—Two Figure Compass. True (to nearest point).

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

Table IV.

F.—Wind Force.

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

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

Table V.

ww.—Present Weather Scale.

THE figures are grouped to refer to particular phenomena, for example 20 to 29, Fog or mist. In making these observations the following instruction is given to the observer:—

In selecting the appropriate number for reporting the general character of the weather, no account should be taken of phenomena which occurred more than one hour before the time of observation, but only of phenomena which occurred during the interval of one hour preceding the fixed time of observation.

In deciding on the appropriate term, observers should not be restricted to the difference between the conditions at the instant and the conditions one hour before, but should choose the term to give the best information of the changes taking place.

Code Figures.	Table V.
00	{ Cloud has decreased.
01	{ No apparent change.
02	{ Cloud has increased.
03	{ Blue sky
04	{ or some
05	{ cloud
06	{ (Cloud
07	{ 0-5)
08	{ After fog or mist or dust storm.
09	{ After rain or drizzle.
	{ After snow, sleet or hail.
	{ With or after thunder and lightning in
	{ After thunderstorm. [neighbourhood.
10	{ Cloud has decreased.
11	{ No apparent change.
12	{ Cloud has increased.
13	{ Cloudy or
14	{ overcast
15	{ (Cloud
16	{ 6-10)
17	{ After fog or mist or dust storm.
18	{ After rain or drizzle.
19	{ After snow, sleet or hail.
	{ With or after thunder and lightning in
	{ After thunderstorm. [neighbourhood.
20	{ But clear in zenith - }
21	{ And apparently overcast } Just begun.
22	{ But clear in zenith - }
23	{ And apparently overcast } Intermittent.
24	{ But clear in zenith - }
25	{ And apparently overcast } For some time.
26	{ But clear in zenith - }
27	{ And apparently overcast } Has become thinner.
28	{ But clear in zenith - }
29	{ And apparently overcast } For some time.
	{ But clear in zenith - }
	{ And apparently overcast } Has become thicker.
30	{ Slight with rain.
31	{ " hail or rain and hail.
32	{ " sleet.
33	{ " snow.
34	{ Passing showers } Heavy with rain has become better.
35	{ " rain.
36	{ " rain has become worse.
37	{ " hail or rain and hail.
38	{ " sleet.
39	{ " snow.

Code figures.

Table V.—*continued.*

40	Drizzle	Slight occasional.	
41		„ continuous.	
42		„ but has increased.	
43		Moderate but has decreased.	
44		„ occasional.	
45		„ continuous.	
46		„ but has increased.	
47		Thick but has decreased.	
48		„ occasional.	
49	„ continuous.		
50	Rain	Slight occasional.	
51		„ continuous.	
52		„ but has increased.	
53		Moderate but has decreased.	
54		Moderate occasional.	
55		„ continuous.	
56		„ but has increased.	
57		Heavy but has decreased.	
58		„ occasional.	
59	„ continuous.		
60	Snow or snow and hail	Slight occasional.	
61		„ continuous.	
62		„ but has increased.	
63		Moderate but has decreased.	
64		„ occasional.	
65		„ continuous.	
66		„ but has increased.	
67		Heavy but has decreased.	
68		„ occasional.	
69	„ continuous.		
70	Sleet or rain and snow	Slight occasional.	
71		„ continuous.	
72		„ but has increased.	
73		Moderate but has decreased.	
74		„ occasional.	
75		„ continuous.	
76		„ but has increased.	
77		Heavy but has decreased.	
78		„ occasional.	
79	„ continuous.		
80	Hail or rain and hail	Slight occasional.	
81		„ continuous.	
82		„ but has increased.	
83		Moderate but has decreased.	
84		„ occasional.	
85		„ continuous.	
86		„ but has increased.	
87		Heavy but has decreased.	
88		„ occasional.	
89	„ continuous.		
90	Thunderstorm (or Line Squall)	Slight thunderstorm without hail.	
91		„ „ with hail.	
92		Moderate thunderstorm without hail.	
93		„ „ with hail.	
94		Heavy thunderstorm without hail	} without gale.
95		„ „ with hail	
96		„ „ without hail	
97		„ „ with hail	} with gale.
98		Line squall without hail.	
99	„ „ with hail.		

Table VI.

v.—Visibility from Ships at Sea.

Code Figure.		
0	Dense fog	Objects not visible at 50 yards.
1	Thick fog	„ „ „ 1 cable.
2	Fog	„ „ „ 2 cables.

Code Figure.

Table VI.—*continued.*

3	Moderate fog	Objects not visible at ½ mile (nautical).
4	Mist or haze, or very poor visibility.	„ „ „ 1 mile (nautical).
5	Poor visibility	„ „ „ 2 miles (nautical).
6	Moderate visibility	„ „ „ 5 miles (nautical).
7	Good visibility	„ „ „ 10 miles (nautical).
8	Very good visibility	„ „ „ 30 miles (nautical).
9	Excellent visibility	Objects visible more than 30 miles (nautical).

Table VII.

K.—Swell.

Code Figure.

0	No, or slight swell	} and sea smooth to moderate.
1	Moderate swell	
2	Heavy swell	
3	Long low swell	
4	Confused swell	} and sea rough or above.
5	No, or slight swell	
6	Moderate swell	
7	Heavy swell	
8	Long low swell	
9	Confused swell	

Table VIII.

d.—One figure compass. (True.)

Code Figure:	Code Figure.	Code Figure.
0 = No Swell.	3 = S.E.	6 = W.
1 = N.E.	4 = S.	7 = N.W.
2 = E.	5 = S.W.	8 = N.

Table IX.

C.—Cloud Predominating.

Code Figure.	
1—Cirrus ...	Ci.
2—Cirro-Stratus ...	Ci.-St.
3—Cirro-Cumulus ...	Ci.-Cu.
4—Alto-Cumulus ...	A.-Cu.
5—Alto-Stratus ...	A.-St.
6—Strato-Cumulus ...	St.-Cu.
7—Nimbus ...	Nb.
8—Cumulus or Fracto-Cumulus ...	Cu. or Fr.-Cu.
9—Cumulo-Nimbus ...	Cu.-Nb.
0—Stratus or Fracto-Stratus ...	St. or Fr.-St.

Table X.

N.—Cloud Amount.

Code Figure.	Code Figure.
0 = No cloud.	6 = Sky 6/10ths covered.
1 = Sky 1/10th covered.	7 = „ 7/10ths „
2 = „ 2/10ths „	8 = „ 8/10ths „
3 = „ 3/10ths „	9 = „ 9/10ths „
4 = „ 4/10ths „	*0 = „ overcast.
5 = „ half „	

* Usually weather reported by Table V, will indicate which 0 applies here.

Table XI.

W.—Past Weather.

Code Figure.

Without precipitation	{	0 = Blue sky or blue sky and part cloudy (b or bc).
		1 = Cloudy.
		2 = Overcast continuously.
		3 = Fog or mist.
Precipitation	{	4 = Thick fog.
		5 = Passing showers.
		6 = Rain or drizzle.
		7 = Snow or sleet.
		8 = Hail or rain and hail.
9 = Thunderstorm.		

Table XII.

K'.—Barometric Tendency.

Code Figure.	0	Barometer steady. (The barometer has not fallen or risen more than ¼ millibar in 3 hours.)
1	Do.	rising slowly. (The barometer has risen 1 to 1½ mb. (.03-.04 in.) in last 3 hours.)
2	Do.	rising. Do. do. 2 to 3½ (.06-.10 in.) do.
3	Do.	rising quickly. Do. do. 4 to 6 (.12-.18 in.) do.
4	Do.	rising very rapidly. Do. do. over 6 (.18 in.) do.
5	Do.	falling slowly. Do. do. fallen 1 to 1½ (.03-.04 in.) do.
6	Do.	falling. Do. do. 2 to 3½ (.06-.10 in.) do.
7	Do.	falling quickly. Do. do. 4 to 6 (.12-.18 in.) do.
8	Do.	falling very rapidly. Do. do. over 6 (.18 in.) do.

Table XIII.

c.—Characteristic of Barometric tendency during last 3 hours.

Code Figure.	0 = 0 or +	Steady or rising	} The barometer is now higher than, or the same as, 3 hours ago.
1	= + 0	Rising then steady	
2	= + -	Rising then falling	
3	= - + or 0 +	Falling or steady then rising	
4	= Unsteady +	Unsteady but rising	} The barometer is now lower than, 3 hours ago.
5	= -	Falling	
6	= - 0	Falling then steady	
7	= - +	Falling then rising	
8	= 0 - or + -	Steady or rising then falling.	
9	= Unsteady -	Unsteady but falling	

Table XIV.

V and V_s—Visibility.

Code Figure.	0	= Objects not visible at 50 metres (55 yards).
1	=	" " " 200 metres (220 yards).
2	=	" " " 500 metres (550 yards).
3	=	" " " 1,000 metres (1,100 yards).
4	=	" " " 2,000 metres (1½ miles).
5	=	" " " 4,000 metres (2½ miles).
6	=	" " " 10,000 metres (6¼ miles).
7	=	" " " 20,000 metres (12½ miles).
8	=	" " " 50,000 metres (31¼ miles).
9	=	Objects visible at 50,000 metres or more.

Table XV.

w₁.—General state of the weather (abridged).

Code Figure.	0—Cloud amount 0-5.	Code Figure.	5—Rain.
1—Cloud amount 6-10.		6—Snow or Hail and Snow.	
2—Fog or mist.		7—Sleet or Rain and Snow.	
3—Passing showers.		8—Hail or Rain and Hail.	
4—Drizzle.		9—Thunderstorm.	

Table XVI.

R.—Rainfall during preceding 24 hours.

Code Figure.	0 = No rain.	Code Figure.	5 = 11-15 mm.
1 = Trace or 0.1 mm.		6 = 16-20 mm.	
2 = 0.2-2 mm.		7 = 21-30 mm.	
3 = 3-5 mm.		8 = 31-50 mm.	
4 = 6-10 mm.		9 = above 50 mm.	

Table XVII.

RR.—Rainfall during preceding 13 or 11 hours.

Code Figures.	91	...	...	...	0.1 mm.
	92	...	...	...	0.2 "
	93	...	...	...	0.3 "
	94	...	...	...	0.4 "
	95	...	...	...	0.5 "
	96	...	...	...	0.6 "
	97	...	...	...	Some rain, but not measurable.
	98	...	...	...	More than 90 millimetres.
	99	...	...	...	Measurement impossible or unreliable.

Amounts of 0.7 mm. or more are coded as whole millimetres, e.g., 17.2 mm. coded as 17.

Table XVIII.

r.—Time of commencement of precipitation.

Code Figure.	0	...	...	No rain.
1	...	...	...	0 to 1 hour before time of observation.
2	...	...	...	1 to 2 hours before time of observation.
3	...	...	...	2 to 3 " " "
4	...	...	...	3 to 4 " " "
5	...	...	...	4 to 5 " " "
6	...	...	...	5 to 6 " " "
7	...	...	...	6 to 8 " " "
8	...	...	...	8 to 10 " " "
9	...	...	...	Above 10 hours before time of observation.
-	...	...	...	No observation.

Table XIX.

H.—Relative humidity.

Code Figure.	0	...	...	...	95 to 100 per cent.
9	...	...	...	...	90 " 94 "
8	...	...	...	...	80 " 89 "
7	...	...	...	...	70 " 79 "
6	...	...	...	...	60 " 69 "
5	...	...	...	...	50 " 59 "
4	...	...	...	...	40 " 49 "
3	...	...	...	...	30 " 39 "
2	...	...	...	...	20 " 29 "
1	...	...	...	...	10 " 19 "

Table XX.

S.—State of Sea and Swell (Coast Stations).

Code Figure.	0	...	...	No swell	} Calm or slight sea.
1	...	...	...	Moderate swell	
2	...	...	...	Heavy swell	} Moderate sea.
3	...	...	...	No swell	
4	...	...	...	Moderate swell	
5	...	...	...	Heavy swell	
6	...	...	...	Rather rough sea.	
7	...	...	...	Rough sea.	
8	...	...	...	Very rough sea.	
9	...	...	...	Mountainous sea.	

Table XXI.

h.—Height of base of lower predominating cloud present.

Code Figure.	0	...	...	Metres.	Feet.
	0	...	...	0 to 50	0 to 150
1	...	...	...	50 " 100	150 " 300
2	...	...	...	100 " 200	300 " 600
3	...	...	...	200 " 300	600 " 1,000
4	...	...	...	300 " 600	1,000 " 2,000
5	...	...	...	600 " 1,000	2,000 " 3,000
6	...	...	...	1,000 " 1,500	3,000 " 5,000
7	...	...	...	1,500 " 2,000	5,000 " 6,500
8	...	...	...	2,000 " 2,500	6,500 " 8,000
9	...	...	...	No low cloud.	No low cloud.

SPECIAL WEATHER TELEGRAPHY TABLES, NOT INTERNATIONAL CODE.

Table XXII.

U.—Unusual Phenomena.

Code Figure.

- 0 = None of the following remarks appropriate.
- 1 = Appearances indicate that a tropical storm has formed.
- 2 = Appearances indicate that a tropical storm is forming.
- 3 = Heavy squalls during last three hours.
- 4 = Squally weather.
- 5 = Barometer *falling* very rapidly (more than 2 millibars an hour).
- 6 = Barometer *rising* very rapidly (more than 2 millibars an hour).
- 7 = Wind has *increased* decidedly during the last hour.
- 8 = Wind has *decreased* decidedly during the last hour.
- 9 = Unusually red sunset (or sunrise).

Table XXIII.

Conversion of Millibars to Inches.

Equivalent in Mercury Inches at 32°, and Latitude 45° of Millibars

Mb.	In.	Mb.	In.	Mb.	In.	Mb.	In.	Mb.	In.	Mb.	In.	Mb.	In.
925	27.32	940	27.76	960	28.35	980	28.94	1000	29.53	1020	30.12	1040	30.71
926	27.35	941	27.79	961	28.38	981	28.97	1001	29.56	1021	30.15	1041	30.74
927	27.38	942	27.82	962	28.41	982	29.00	1002	29.59	1022	30.18	1042	30.77
928	27.41	943	27.85	963	28.44	983	29.03	1003	29.62	1023	30.21	1043	30.80
929	27.44	944	27.88	964	28.47	984	29.06	1004	29.65	1024	30.24	1044	30.83
930	27.46	945	27.91	965	28.50	985	29.09	1005	29.68	1025	30.27	1045	30.86
931	27.49	946	27.94	966	28.53	986	29.12	1006	29.71	1026	30.30	1046	30.89
932	27.52	947	27.97	967	28.56	987	29.15	1007	29.74	1027	30.33	1047	30.92
933	27.55	948	28.00	968	28.59	988	29.18	1008	29.77	1028	30.36	1048	30.95
934	27.58	949	28.03	969	28.62	989	29.21	1009	29.80	1029	30.39	1049	30.98
935	27.61	950	28.05	970	28.65	990	29.24	1010	29.83	1030	30.42	1050	31.01
936	27.64	951	28.08	971	28.67	991	29.26	1011	29.86	1031	30.45	1051	31.04
937	27.67	952	28.11	972	28.70	992	29.29	1012	29.89	1032	30.48	1052	31.07
938	27.70	953	28.14	973	28.73	993	29.32	1013	29.92	1033	30.51	1053	31.10
939	27.73	954	28.17	974	28.76	994	29.35	1014	29.94	1034	30.53	1054	31.13
		955	28.20	975	28.79	995	29.38	1015	29.97	1035	30.56		
		956	28.23	976	28.82	996	29.41	1016	30.00	1036	30.59		
		957	28.26	977	28.85	997	29.44	1017	30.03	1037	30.62		
		958	28.29	978	28.88	998	29.47	1018	30.06	1038	30.65		
		959	28.32	979	28.91	999	29.50	1019	30.09	1039	30.68		

Special Notices regarding Personnel.

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

Commander H. Strong, R.D., R.N.R.

Captain H. STRONG retired after 48 years' service at sea on November 16th, 1927. Born at Fort Beaufort, Cape Colony, Captain STRONG is one of a comparatively small number of British South Africans who have followed the calling of the sea.

After two years in H.M.S. *Worcester* he served his apprenticeship in the ships *Coriolanus* and *Western Miller*, owned by THE ROYAL EXCHANGE SHIPPING COMPANY. After Service in the East with the CHINA MANILA STEAMSHIP COMPANY he joined the old UNION STEAMSHIP COMPANY of Southampton, being appointed fourth officer of R.M.S. *Tartar*. He was Chief Officer of the *Mexican* in 1895 and later of the *Scot*.

In 1899 Captain STRONG gained his first command, S.S. *Gaiika*, and carried large numbers of troops in that ship during the second Boer War.

After the amalgamation of the UNION LINE and the CASTLE LINE he commanded many ships of the UNION-CASTLE LINE fleet and was afloat throughout the Great War. He completed his service in R.M. motorship *Carnarvon Castle*, succeeding Captain J. HAGUE in that ship as Commodore of the Company.

Captain STRONG was a member of the British Corps of Voluntary Marine Observers as far back as 1888 when fourth officer of R.M.S. *Moor*. His post-war work as a member of our Corps has been continuous since 1922 and the name of his ship has twice appeared in the annual list of "excellent" awards. He has made several interesting contributions to this journal and has been a strong advocate of the maintenance of seamanlike methods in the development of Marine Meteorology.

Marine Observers will join with the Marine Division in wishing him long life and happiness in his well-earned retirement.

Captain ARTHUR HOLME, Commander of the WHITE STAR Liner *Homeric*, has retired from active service after 45 years at sea, 30 of which being spent in the service of the WHITE STAR LINE.

Captain HOLME first went to sea in the wooden barque *Queen of Australia* in 1882, and after serving 15 years in sail joined the WHITE STAR LINE as a Junior Officer in 1897. His first command in the Company was the *Cufic*, since when he has commanded many of the big ships of the WHITE STAR Fleet.

Captain HOLME has been a member of the regular corps of Marine Observers since 1920, and Marine Observers will join with the Marine Division in wishing him long life and happiness in his well-earned retirement.

Obituary.

THE death of Commander CHARLES DOUGLAS BENNETT, R.D., R.N.R., which occurred in his 71st year at his residence, Thurloe Place, London, is noted with deep regret.

Captain BENNETT commenced his sea career in 1872 as an apprentice in DEVITT and MOORE's ship *Parramatta*. Completing his time he further served as fourth and third mate of the same ship.

In 1883 he joined the PENINSULAR and ORIENTAL STEAM NAVIGATION COMPANY's service as fifth officer and obtained his first command in 1898, since when he commanded many vessels of the Company's fleet up to the time of his retirement in 1916.

During his active service career he was a keen member of the Corps of Regular Marine Observers and contributed 32 Meteorological Logs, of which 19 were classed "excellent."

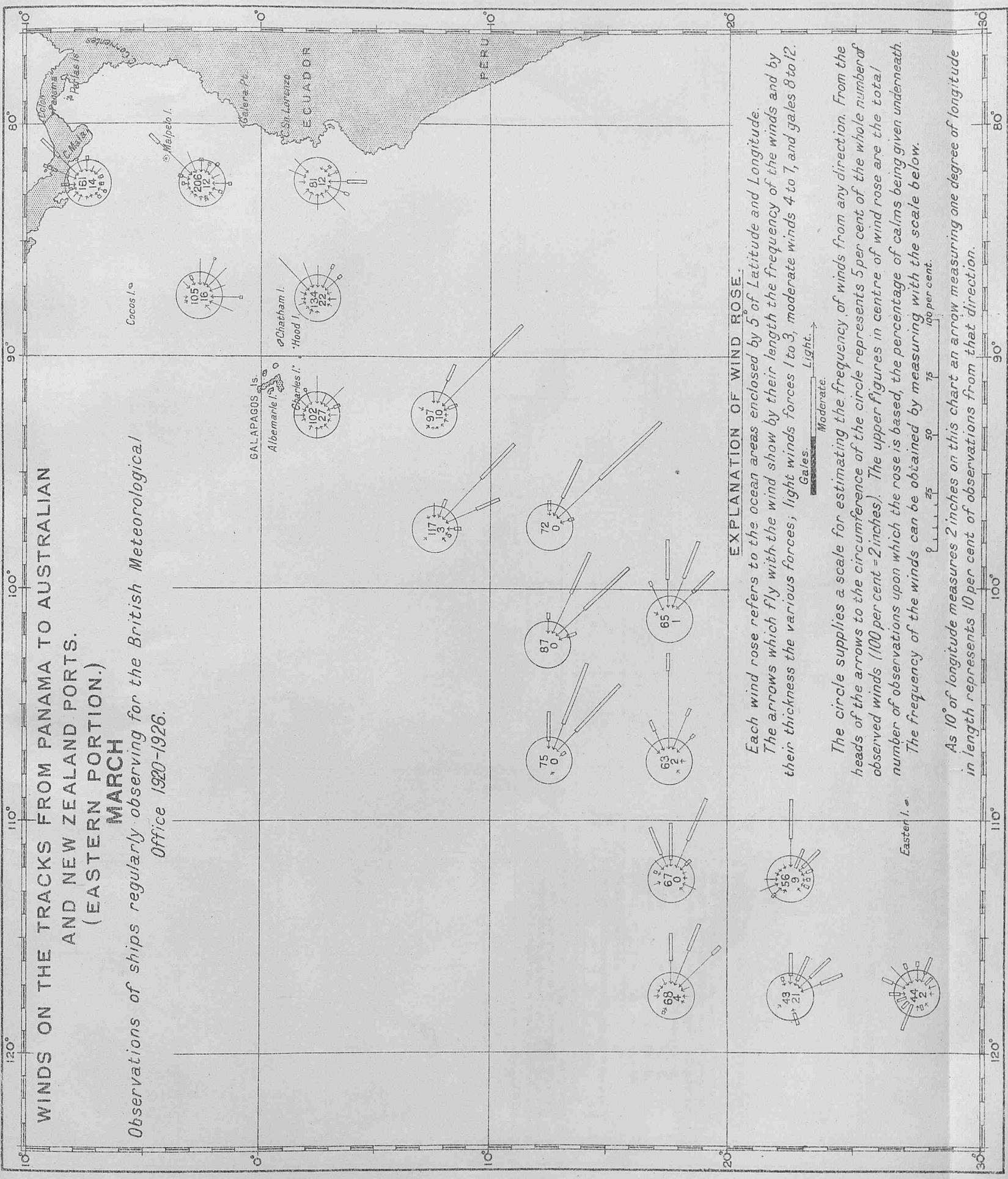
THE death of Captain ARTHUR C. SHOWMAN, S.S. *Niagara*, which took place in Sydney, on November 4th, is noted with regret.

Captain SHOWMAN joined the UNION STEAMSHIP COMPANY over 30 years ago and commanded several of the Company's ships, running between Australian and North American and Canadian Pacific ports. He had been a regular member of the Corps of Voluntary Marine Observers since 1921.

SOUTH PACIFIC.

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

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



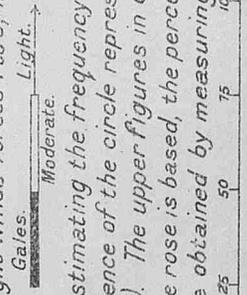
EXPLANATION OF WIND ROSE.

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.

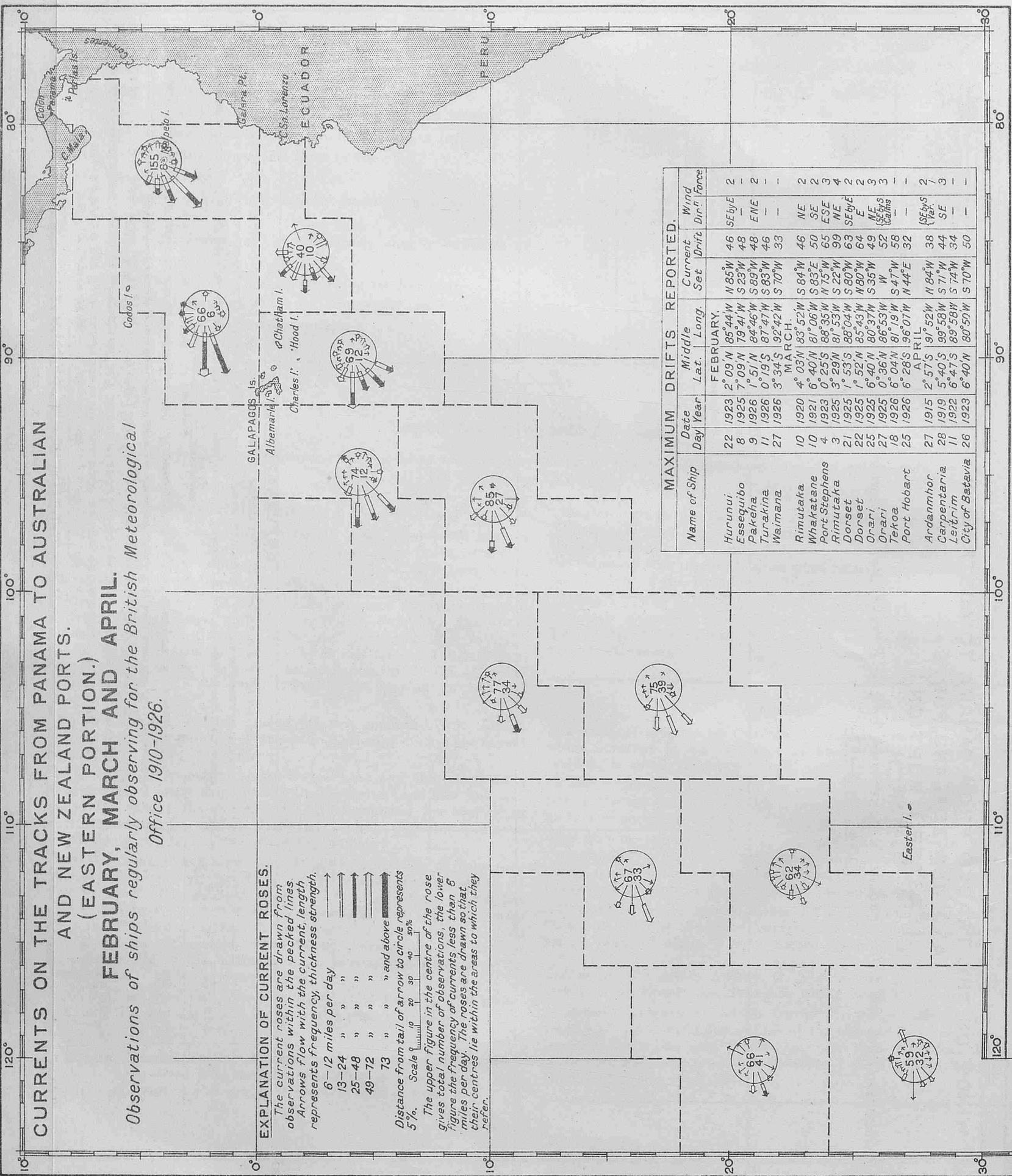
As 10° of longitude measures 2 inches on this chart an arrow measuring one degree of longitude in length represents 10 per cent of observations from that direction.



Easter I.

CURRENTS ON THE TRACKS FROM PANAMA TO AUSTRALIAN AND NEW ZEALAND PORTS.
 (EASTERN PORTION.)
FEBRUARY, MARCH AND APRIL.
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%. Scale 10 20 30 40 50%
 The upper figure in the centre of the rose gives total number of observations, the lower figure the frequency of currents less than 5 miles per day. The roses are drawn so that their centres lie within the areas to which they refer.



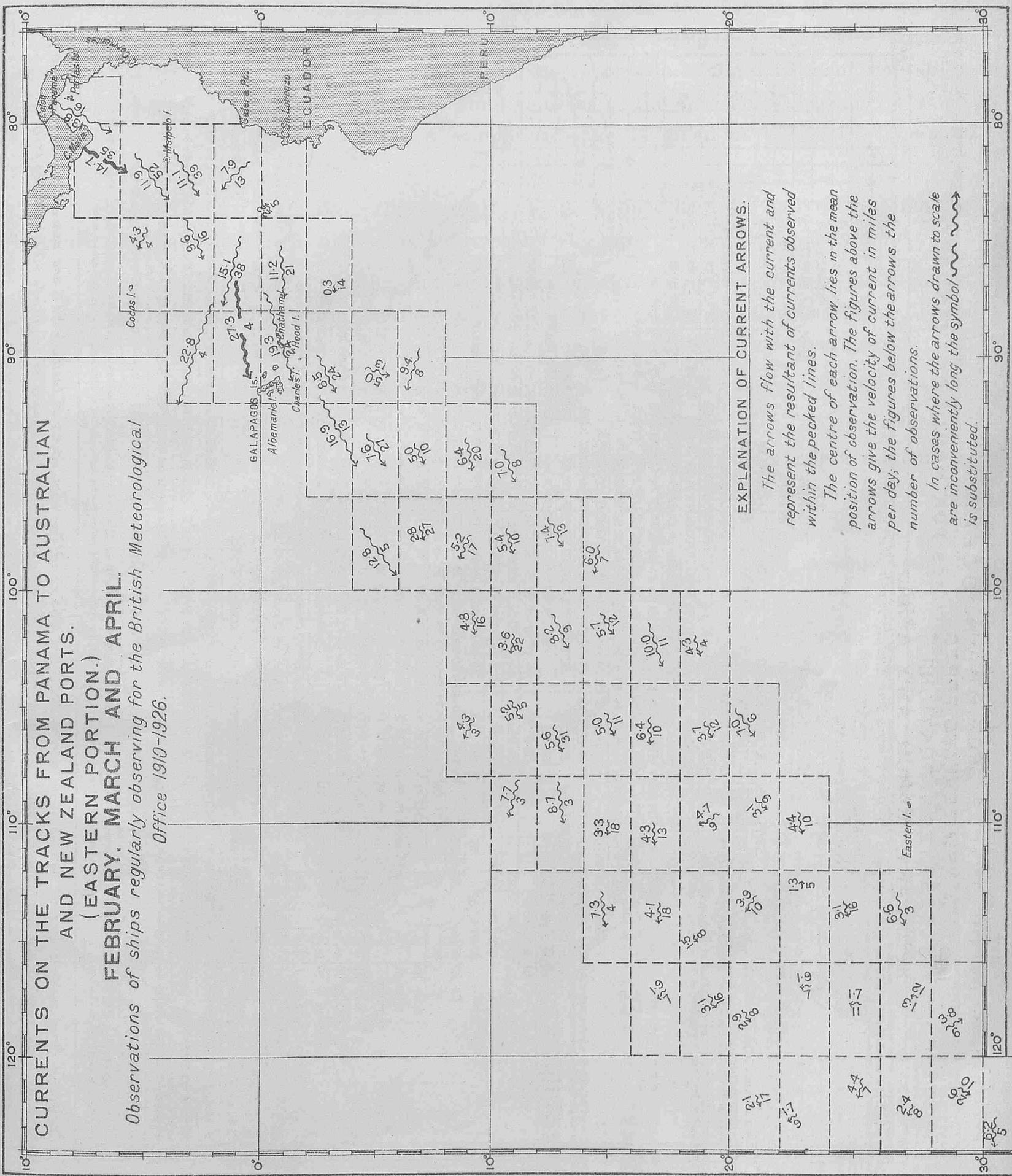
Name of Ship	Date Day Year	Middle		Current Set	Drift	Wind Dir. Force
		Lat.	Long.			
FEBRUARY.						
Hurunui	22 1923	2° 09' N	85° 44' W	N 85° W	46	SE by E 2
Essequibo	8 1925	7° 09' N	79° 41' W	S 23° W	48	- 2
Pakeha	9 1926	1° 51' N	84° 46' W	S 69° W	48	ENE 2
Turakina	11 1926	0° 19' S	87° 47' W	S 83° W	46	- 2
Waimana	27 1926	3° 34' S	92° 42' W	S 70° W	33	- 2
MARCH.						
Rimutaka	10 1920	4° 03' N	83° 52' W	S 84° W	46	NE 2
Whakatane	10 1921	6° 40' N	81° 06' W	S 83° E	50	SE 2
Port Stephens	4 1923	0° 25' S	88° 35' W	N 75° W	65	ESE 2
Rimutaka	3 1925	3° 29' N	81° 53' W	S 22° W	99	NE 4
Dorset	21 1925	1° 53' S	88° 04' W	S 80° W	63	SE by E 2
Dorset	22 1925	1° 52' N	85° 43' W	N 80° W	64	E 2
Dorset	25 1925	6° 40' N	80° 37' W	S 35° W	49	NE 3
Orari	27 1925	0° 36' N	86° 53' W	W	52	SE by S 3
Tekoa	18 1926	6° 04' N	81° 19' W	S 47° W	58	W 3
Port Hobart	25 1926	6° 28' S	96° 07' W	N 44° E	32	- 2
APRIL.						
Ardamhor	27 1915	2° 57' S	91° 52' W	N 84° W	38	SE by S 2
Carpentaria	28 1919	5° 40' S	99° 58' W	S 71° W	44	SE 3
Leitrim	11 1922	6° 47' S	89° 58' W	S 74° W	34	- 2
City of Batavia	26 1923	6° 40' N	80° 50' W	S 70° W	50	- 2

SOUTH PACIFIC.

CURRENTS ON THE TRACKS FROM PANAMA TO AUSTRALIAN AND NEW ZEALAND PORTS.

(EASTERN PORTION.)
FEBRUARY, MARCH AND APRIL.

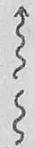
Observations of ships regularly observing for the British Meteorological Office 1910-1926.



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.

WIRELESS AND WEATHER AN AID TO NAVIGATION.

The Commanders of the ships whose names appear in the list at the end of THE MARINE OBSERVER with the letters M.L., M. or W.T. in the fourth column are "selected ships," and they are invited to make plain language reports in a standard form, containing observations taken at the same Greenwich Time as those of the Weather Telegraphy Stations of the nearest coast, to "all ships." A sample message is given in Weather Signals on page 18 in this number.

"Selected ships" by making these reports regularly once or twice daily will be making information available which will be valuable to all shipping.

When within range of stations known to be detailed to receive reports for Meteorological Centres in the Dominions and Colonies, these reports may be made to the station as well as to C.Q. with advantage. One message may then perform two or more services.

Eleven serial chapters were revised and published in the 1927 numbers of THE MARINE OBSERVER, giving complete information and guidance on the subject.

Marine Observers are requested to bring this to the notice of Commanders and Officers of ships not on our list, so that they may know what reports to look out for and how to use them to the best advantage.

Marine Observers in "selected ships" are requested to enter routine messages sent to "all ships" at the end of the Meteorological Log or on Form 911.

The development and maintenance of this system is mainly dependent upon the Corps of Voluntary Marine Observers and great credit is due to them for the progress made last year.

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.

CONVERSION TABLE. To Convert Inches into Millibars.

Inch.	mb.	Inch.	mb.	Inch.	mb.
27.50	931.2	28.65	970.2	29.85	1,010.8
27.55	932.9	28.70	971.9	29.90	1,012.5
27.60	934.6	28.75	973.6	29.95	1,014.2
27.65	936.3	28.80	975.3	30.00	1,015.9
27.70	938.0	28.85	976.9	30.05	1,017.6
27.75	939.7	28.90	978.6	30.10	1,019.3
27.80	941.4	28.95	980.3	30.15	1,021.0
27.85	943.1	29.00	982.0	30.20	1,022.7
27.90	944.8	29.05	983.7	30.25	1,024.4
27.95	946.5	29.10	985.4	30.30	1,026.1
28.00	948.2	29.15	987.1	30.35	1,027.7
28.05	949.9	29.20	988.8	30.40	1,029.4
28.10	951.6	29.25	990.5	30.45	1,031.1
28.15	953.2	29.30	992.2	30.50	1,032.8
28.20	954.9	29.35	993.9	30.55	1,034.5
28.25	956.6	29.40	995.6	30.60	1,036.2
28.30	958.3	29.45	997.3	30.65	1,037.9
28.35	960.0	29.50	999.0	30.70	1,039.6
28.40	961.7	29.55	1,000.7	30.75	1,041.3
28.45	963.4	29.60	1,002.4	30.80	1,043.0
28.50	965.1	29.65	1,004.0	30.85	1,044.7
28.55	966.8	29.70	1,005.7	30.90	1,046.4
28.60	968.5	29.75	1,007.4	30.95	1,048.1
		29.80	1,009.1		

ICE CHART. WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE.

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

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

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

ROUTE NOTICES.

For latest information re Tracks see pages 78-9, Vol. IV., No. 40, of this Journal.

SYMBOLS USED ON THE CHART.

- ▣ Iceberg.
- △ Floeberg.
- Growler.
- xxxx 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 DRIFTS OF ICE.

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

No reports of Ice, signifying the month of November, 1927, have been received at the Meteorological Office.

LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 12th November, 1927, was received from the Superintendent, Canadian Signal Service, Quebec:—
"All points report 'no ice in sight'".

MARINE METEOROLOGY.

Co-operation of Shipowners, Masters and Mates.

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

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

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

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

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

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

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

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

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

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

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

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

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

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 this number.

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

LATE PRESS.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
NORTH SEA.			
5.11.27	57°36'N.	0°21'E.	Drifting wreck.
8.11.27	57°42'N.	9°43'E.	Part of wooden vessel, presumed to be a sailing vessel, and floating deck cargo.
9.11.27	53°50'N.	6°35'E.	Drifting wreck, with mast stump projecting.
20.11.27	54°17'N.	0°02'E.	Disasted ketch.
20.11.27	54°35'N.	0°08'E.	Floating mast and wheel-house of a small vessel, apparently a trawler.
21.11.27	47 mls. NE by N of River Tyne.		Water-logged ship's boat, 30 feet long.
25.11.27	56°48'N.	2°10'E.	Spar projecting 4 feet above water, apparently attached to wreckage.
IRISH SEA.			
10.11.27	53°31'N.	3°21'W.	Large tree, dangerous to navigation.
18.11.27	54°18'N.	4°59'W.	Wooden ketch, drifting westward.
MEDITERRANEAN.			
4.11.27	31°50'N.	27°20'E.	Greek brigantine, <i>Marigo</i> , abandoned in sinking condition.
NORTH ATLANTIC.			
1.11.27	50°22'N.	34°30'W.	Wreckage.
1.11.27	39°27'N.	72°30'W.	Piece of timber, about 25 feet long and 2 feet square.
1.11.27	39°25'N.	74°00'W.	Newly-painted light and bell buoy, light extinguished, bell functioning.
2.11.27	30°18'N.	71°15'W.	Capsized schooner.
3.11.27	35°58'N.	62°39'W.	Four-masted schooner, <i>Maurice R. Thurlow</i> , abandoned, disasted, submerged up to the deck, very dangerous to navigation.
6.11.27	38°50'N.	74°34'W.	Grey upright spar, about 4 feet high, apparently stump of mast, attached to submerged wreckage.
7.11.27	30°10'N.	80°57'W.	Capsized vessel, apparently a schooner, about 250 feet long.
8.11.27	29°21'N.	64°12'W.	Abandoned schooner, <i>M. O. Crowell</i> , mainsail and fore-stay sail set very dangerous to navigation.
8.11.27	26°35'N.	68°48'W.	Large red can buoy.
11.11.27	35°15'N.	75°28'W.	Object resembling a can buoy, painted in black with white vertical stripes.
13.11.27	35°56'N.	70°15'W.	Considerable quantity of dressed pine boards over a distance of 25 miles.
21.11.27	40°20'N.	8°53'W.	Waterlogged steel lifeboat, dangerous to navigation.
22.11.27	44°16'N.	8°40'W.	Damaged waterlogged iron lifeboat marked <i>Nil Bordeaux</i> No. 6.
CARIBBEAN SEA.			
2.11.27	9°58'N.	78°40'W.	Partly submerged log, about 60 feet long, 6 feet in diameter, with limbs projecting about 5 feet out of water.
GULF OF MEXICO.			
6.11.27	22°27'N.	90°48'W.	Log about 1 foot in diameter, projecting 4 feet out of water, apparently attached to submerged wreckage.
7.11.27	26°36'N.	86°04'W.	Tree, about 30 feet long, 3 feet diameter, roots attached.
NORTH PACIFIC.			
5.11.27	7°14'N.	81°52'W.	Tree, about 30 feet long, with heavy roots.

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.
- CLYDE** ... Captain M. C. CORRANCE, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow.
 (Telephone No.: *Central 2283-4*).

Agents (contd.).

- FREMANTLE**, W. Australia. Captain J. J. AIREY, Deputy Director of Navigation, Dalgety's Buildings.
 (Telephone No.: *B 1063*).
- HONG KONG**, China. Lieut. Commander O. C. G. LEVESON-GOWER, R.N., Superintendent, Admiralty Chart and Chronometer Depot, H.M. Dockyard.
- HULL** ... Captain Geo. B. STURDY, c/o Mr. W. HAKES, Commercial Road.
- LEITH** ... Captains G. BLACK and C. G. BONNER, V.C., D.S.C., Leith Salvage and Towage Co., Ltd., 2, Commercial Street.
- SOUTHAMPTON** Captain D. FORBES, Nautical Academy, 1, Albion Place.
- SYDNEY**, New South Wales. Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation, Customs House.
- TYNE** ... Captain J. J. MCEWAN, Marine School, South Shields.
- VANCOUVER**, British Columbia. Mr. T. S. H. SHEARMAN, Room 40, Post Office Building.

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.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 18.11.27.	Date Received.
<i>Aba</i> ...	Yardley, H. A., D.S.C.	S. J. Bristowe, O. E. Jones,	M.L.	Elder Dempster ...	Met. Log. 30.3.27 to 26.8.27 ...	15.9.27
<i>Abinsi</i> ...	Williams, T. E. ...	E. E. Roberts.	No. A.	" "	Form 911 29.12.26 to 23.2.27...	3.3.27
<i>Achilles</i> ...	Millson, H. E. ...	A. W. Bascombe ...	M.L.	A. Holt " ...	Met. Log. 27.12.26 to 1.5.27 ...	10.6.27
<i>Actor</i> ...	Wilson, C. A. ...	A. Gillard, A. M. Wright,	"	Harrison ...	" 7.5.27 to 17.8.27 ...	1.9.27
<i>Adda</i> ...	Haylett, E. ...	F. B. Allen,	"	"	"	"
<i>50 Adriatic</i> ...	Haylett, E. ...	A. Frew, J. McKay, G. Morrice,	"	"	"	"
<i>Aeneas</i> ...	Toft, J. T. ...	A. E. Longlen ...	M.L.	Elder Dempster ...	Form 911 11.5.27 to 19.6.27 ...	22.6.27
<i>Agapenor</i> ...	Hickson, V. W., Lieut. Commr. R.N.R.	R. G. Roberts, O. V. Lucas ...	W.T.	White Star ...	W.T. Reg. 17.10.27 to 5.11.27...	8.11.27
<i>Aidan</i> ...	Wallace, W. K. ...	E. R. Owen ...	No. A.	A. Holt ...	Form 911 1.9.27 to 29.9.27 ...	8.11.27
<i>Alban</i> ...	Ramsay, J. ...	S. G. Ellams ...	" A.	"	" 5.10.27 to 22.10.27 ...	31.10.27
<i>Alipore</i> ...	Pym, J. ...	J. S. Thompson ...	" A.	Booth ...	" 23.8.27 to 8.10.27 ...	20.10.27
<i>Almanzora</i> ...	Welch, A. ...	E. M. Lyons ...	" A.	"	" 23.9.27 to 7.10.27 ...	26.10.27
<i>63 Albertic</i> ...	Smith, H. E., R.D., Lt.-Commr., R.N.R.	D. A. C. Butler, C. H. Stokes	" M.	P. and O. ...	" 24.8.27 to 24.10.27...	14.11.27
<i>Alondra</i> ...	Clarke, E. C. ...	D. O. Llewellyn ...	" A.	R.M.S.P. ...	" 14.5.27 to 27.6.27 ...	29.6.27
<i>Alynbank</i> ...	Warner, G. E., R.D., Capt. R.N.R.	J. Farrell, R. Hawkins, J. W. Paine.	W.T.	White Star ...	" 9.10.27 to 29.10.27 ...	31.10.27
<i>Ampetco</i> ...	Scott, L. S. ...	H. Peters ...	No. A.	Yeoward ...	W.T. Reg 9.10.27 to 29.10.27 ...	1.11.27
<i>Andalucia</i> ...	Clayton, W. E. ...	R. Ardley ...	" A.	A. Weir & Co. ...	" 24.9.27 to 13.11.27 ...	15.11.27
<i>Anchises</i> ...	Vandenkerckhove, A. ...	F. H. Cichy ...	" A.	American Petroleum ...	Form 911 13.9.27 to 19.10.27 ...	14.11.27
<i>Andes</i> ...	Thomas, R. J. ...	C. W. Vaughan ...	" M.	Blue Star ...	" 20.9.27 to 4.10.27 ...	17.10.27
<i>Antiochus</i> ...	Woodgett, R. J. ...	"	" A.	A. Holt ...	" 21.7.27 to 6.9.27 ...	13.9.27
<i>Aorangi</i> ...	Smith, W. E., D.S.O., R.D., Capt. R.N.R.	G. H. Elliott, H. G. Whittle...	" M.	R.M.S.P. Co. ...	" 1.10.27 to 21.10.27...	14.11.27
<i>30 Aquitania</i> ...	Clark, J. W. ...	O. P. H. Wynne ...	" A.	A. Holt ...	" 13.9.27 to 27.10.27...	31.10.27
<i>62 Arabic</i> ...	Crawford, R. ...	G. H. Kime, E. Anderson, E. V. Bilger, D. Richards.	M.L.	Canadian- Australasian	Met. Log. 1.6.27 to 15.9.27 ...	11.10.27
<i>Arafura</i> ...	Charles, Sir J. T. W., K.B.E., C.B., R.D., Commodore R.N.R.	J. L. Croasdaile, J. Locke, D. MacLean.	W.T.	Cunard ...	W.T. Reg. 16.10.27 to 1.11.27...	3.11.27
<i>Arawa</i> ...	Bulman, J. B. ...	J. M. Appleby, W. Jackman, W. N. Jenkins.	"	White Star ...	" 17.10.27 to 5.11.27...	7.11.27
<i>Archimedes</i> ...	Gordon, A. S. ...	R. Lloyd Harry, C. G. Knight, B. W. Dun, C. Stratford.	M.L.	Eastern and Australian	Met. Log. 30.4.27 to 26.7.27 ...	5.10.27
<i>Argulshire</i> ...	Summers, W. G. ...	D. Aitchison, A. C. Jones, J. Jackson.	"	Shaw, Savill and Albion	" 30.3.27 to 28.7.27 ...	11.8.27
<i>Ariguani</i> ...	Downs, E. B. ...	E. R. Hartley ...	No. A.	Lampert & Holt ...	Form 911 22.8.27 to 12.9.27 ...	22.9.27
<i>Armada Castle</i> ...	Wallace, J. ...	J. M. Crone ...	" M.	Federal ...	" 26.9.27 to 14.10.27...	15.11.27
<i>Arracan</i> ...	Seadamore, J. H. H., D.S.C., R.D., Commr., R.N.R.	G. McKee, J. L. Owen, E. W. Jones.	M.L.	Elders & Fyffes ...	Met. Log. 24.5.27 to 17.9.27 ...	9.11.27
<i>Arundel</i> ...	Imlah, C. B. ...	A. B. Connon, G. D. Pennick, J. Lecky, H. Bunn.	"	Union Castle ...	" 7.5.27 to 30.10.27 ...	17.11.27
<i>Arundel Castle</i> ...	Duncan, S. S. ...	J. Summers, J. Henderson, C. C. Weir.	"	P. Henderson ...	" 5.5.27 to 19.9.27 ...	29.9.27
<i>Astronomer</i> ...	Short, H. ...	Mr. Hill ...	C.C.	Southern Rly. ...	Telegraphic Report 17.11.27 ...	17.11.27
<i>Ascanius</i> ...	Knights, A. ...	R. May ...	No. A.	Union Castle ...	Form 911 23.9.27 to 14.11.27...	15.11.27
<i>Athenic</i> ...	Richards, J. ...	A. Brown, C. C. Heaton, H. W. FitzSmian.	M.L.	Harrison ...	Met. Log. 15.7.27 to 17.10.27...	21.10.27
<i>Atreus</i> ...	Agnew, J. ...	C. Houghton, R. Singleton, J. B. Marshall.	"	A. Holt ...	" 22.5.27 to 26.9.27 ...	3.10.27
<i>Atsuta Maru</i> ...	Binks, J. W. ...	W. Hill ...	No. A.	White Star ...	Form 911 31.7.27 to 7.9.27 ...	12.9.27
<i>Auditor</i> ...	Salter, G. H. ...	J. C. Stratford ...	" A.	A. Holt ...	" 6.9.27 to 4.10.27 ...	8.10.27
<i>Autolyucus</i> ...	Shibutami, S. ...	A. Hurakami ...	" A.	Nippon Yusen Kaisha	" 12.2.27 to 13.6.27 ...	17.6.27
	Owen, W. T. ...	T. E. Steel ...	" M.	Harrison ...	" 2.7.27 to 22.7.27 ...	3.8.27
	Dunlop, J. K. ...	T. Bell ...	" A.	A. Holt ...	" 10.8.27 to 16.9.27 ...	17.10.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line	Last Log, Register, or Report Contributed. Received up to 18.11.27.	Date Received.
<i>Ausonia</i> ...	Stafford, W., D.S.C., R.D., Lt.-Commr., R.N.R.	J. J. Wiseman ...	No. A.	Cunard ...	Form 911 21.8.27 to 8.10.27 ...	11.10.27
<i>Avon</i> ...	Hannam, F. S.	E. S. Dunch ...	" M.	R.M.S.P. ...	" 10.11.26 to 20.1.27...	8.2.27
<i>Balfour</i> ...	Carr Jones, D. J.	W. J. Roberts ...	" A.	Canadian Pacific	" 21.9.27 to 18.10.27...	20.10.27
<i>Balaranald</i> ...	Townshend, W. P., Commr., R.N.R.	C. Hannen, F. Ward, — Cowell, — Davis.	M.L.	P. & O. Branch ...	Met. Log. 25.12.26 to 1.5.27 ...	7.5.27
51 <i>Baltic</i> ...	White, E. R., R.D., Commr., R.N.R.	J. Boyce, J. Law, N. E. Banks	W.T.	White Star ...	{ W.T. Reg. 3.10.27 to 22.10.27... Form 911 2.10.27 to 22.10.27...	25.10.27 25.10.27
<i>Bampton Castle</i> ...	Hutchings, A. H.	... ..	No. A.	Union Castle ...	" 17.9.27 to 14.10.27...	24.10.27
<i>Banbury Castle</i> ...	Swiney, W. A.	C. G. Cuthbertson ...	" A.	" ...	" 21.4.27 to 9.5.27 ...	9.6.27
<i>Banffshire</i> ...	Wynne, R. H.	W. F. Lockhead ...	" A.	Turnbull Martin ...	" 3.8.27 to 23.8.27 ...	26.9.27
<i>Baradine</i> ...	Rollo, W.	S. Gibson, C. Bowden, J. Alleyne, D. Buckley.	M.L.	P. & O. Branch ...	Met. Log. 17.3.27 to 22.6.27 ...	26.7.27
<i>Barpeta</i> ...	Strachan, J.	B. R. Faithfull ...	No. M.	British India ...	Form 911 28.9.27 to 27.10.27...	14.11.27
<i>Barrabool</i> ...	Rhodes, H. R.	C. W. Payne ...	" M.	P. & O. Branch ...	" 18.9.27 to 30.10.27...	3.11.27
<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, F. Clitty, F. Daxter	W.T.	Red Star ...	{ W.T. Reg. 10.10.27 to 29.10.27 Form 911 9.10.27 to 29.10.27...	1.11.27 1.11.27
<i>Beltana</i> ...	Allin, C. H. C.	D. M. Stafford ...	No. M.	P. & O. Branch ...	" 24.9.27 to 14.10.27...	7.11.27
<i>Benalder</i> ...	Cole, J. H., D.S.C.	A. J. Leckie ...	" A.	Ben Line ...	" 30.9.27 to 9.11.27 ...	14.11.27
<i>Bendigo</i> ...	Nicholl, R. N. C.	... ..	" M.	P. & O. Branch ...	" 14.10.27 to 25.10.27 ...	3.11.27
<i>Benefactor</i> ...	Jones, C. W.	A. Watson ...	" M.	Harrison ...	" 13.10.27 to 13.11.27 ...	15.11.27
<i>Bengloe</i> ...	McCorquodale	J. W. Gordon ...	" A.	Ben Line ...	" 8.9.27 to 17.9.27 ...	17.10.27
31 <i>Berengaria</i> ...	Rostron, A. H., Sir, K.B.E., R.D., Capt. R.N.R.	W. C. A. Robson, R. V. Youd, S. A. T. Bullock.	W.T.	Cunard ...	{ W.T. Reg. 3.10.27 to 18.10.27...	21.10.27
	McNeil, S. G. S., R.D., Capt. R.N.R.				" 23.10.27 to 8.11.27 ...		10.11.27
<i>Berrima</i> ...	Short, C. E.	A. Hughes ...	No. M.	P. & O. Branch ...	Form 911 7.10.27 to 12.11.27...	16.11.27
<i>Bervyn</i> ...	McCombie, G.	D. Dunn ...	" A.	Canadian Pacific ...	" 23.1.27 to 19.3.27 ...	24.3.27
<i>Binwang</i> ...	Morzer Bruyans, M. F.	M. C. Altins ...	" M.	Nederland ...	" 26.2.27 to 25.3.27 ...	29.3.27
<i>Bogota</i> ...	Pape, E. R.	S. E. Ayland ...	" M.	R.M.S.P. Co. ...	" 9.10.27 to 31.10.27...	4.11.27
<i>Bolngbroke</i> ...	Murray, M. F.	J. B. Hewson, F. G. Webster, N. Scallon, R. Davidson.	M.L.	Canadian Pacific ...	Met. Log. 16.9.26 to 23.3.27 ...	25.5.27
<i>Borda</i> ...	Holland, R.	... ..	No. M.	P. & O. Branch ...	Form 911 18.2.27 to 28.6.27 ...	7.7.27
<i>Bothwell</i> ...	Rothwell, A. J.	— Biggs ...	" A.	Canadian Pacific ...	" 6.3.27 to 14.4.27 ...	20.4.27
<i>Brecon</i> ...	Rothwell, A.	E. H. Coleman ...	" A.	" ...	" 5.5.27 to 6.6.27 ...	14.6.27
<i>Brenda</i> ...	Lamont, A.	N. Ross ...	" A.	Scottish Fishery Board.	" 12.10.27 to 31.10.27 ...	4.11.27
<i>Brighton</i> ...	Hill, A.	Mr. Munton ...	C.C.	Southern Railway ...	Telegraphic Report 2.10.27 ...	2.10.27
<i>British Engineer</i> ...	Joures, F. W.	W. Evans ...	No. M.	British Tankers ...	Form 911 11.2.27 to 26.2.27 ...	25.5.27
<i>British Enterprise</i> ...	Putt, R. O.	T. Seaman ...	" M.	" ...	" 30.4.27 to 18.7.27 ...	5.8.27
<i>British Soldier</i> ...	Putt, R. O.	H. J. Crangle ...	" A.	" ...	" 17.11.26 to 10.12.26 ...	3.1.27
<i>Bronie</i> ...	Crapper, J. S.	C. E. Legg ...	" A.	Lamport & Holt ...	" 10.8.27 to 5.9.27 ...	26.9.27
<i>Bulysses M.V.</i> ...	Crayer, J.	A. J. Clatworthy ...	" M.	Anglo-Saxon Petroleum Co. Eastern Tel. Co.	" ... ..	...
<i>Cambria C.S.</i> ...	Sherwood, C. A., D.S.C.	A. J. English, B. C. Farrow, C. F. St. John.	No.	Eastern Tel. Co. ...	Met. Log. 9.9.26 to 25.1.27 ...	23.2.27
<i>Cambria</i> ...	Telfer, J. E., O.B.E.	V. S. Phillips ...	C.C.	L.M. & S. Rly ...	Telegraphic Report 12.11.27 ...	12.11.27
<i>Cameroon</i> ...	Gemmell, W.	W. Black, R. Blake ...	No. A.	Anchor ...	Form 911 11.9.27 to 29.10.27...	2.11.27
<i>Camito</i> ...	Forrester, W. T., O.B.E.	H. H. Dunning, J. McIntyre, C. M. Schofield.	M.L.	Elders & Fyffes ...	Met. Log. 28.3.27 to 24.7.27 ...	29.7.27
<i>Canadian Importer</i> ...	Forson, A.	G. R. Randall ...	No. A.	Canadian Gov. Mercantile Marine.	Form 911 18.8.27 to 19.9.27 ...	20.10.27
<i>Canadian Inventor</i> ...	Boulton, F. W.	O. Dalcorn ...	" A.	" ...	" 5.7.27 to 8.8.27 ...	3.10.27
<i>Canadian Scottish</i> ...	Wallace, C.	... ..	" A.	" ...	" 26.5.27 to 11.7.27 ...	19.8.27
<i>Canadian Skirmisher.</i> ...	Millar, W. H.	... ..	" A.	" ...	" 19.11.26 to 5.1.27 ...	11.1.27
<i>Canadian Winner</i> ...	Hocking, N. P.	R. J. Watson ...	" M.	" ...	" 18.9.27 to 17.10.27...	11.11.27
<i>Canonessa</i> ...	Brodie, W. H.	F. W. Kent ...	" M.	Furness Houlder ...	" 3.10.27 to 15.10.27...	21.10.27
35 <i>Carmania</i> ...	Brown, F. G., R.D., Capt. R.N.R.	W. M. Stewart, P. L. Williams, D. E. Sibson.	W.T.	Cunard ...	{ W.T. Reg. 3.10.27 to 21.10.27... Form 911 7.8.27 to 26.8.27 ...	25.10.27 30.8.27
<i>Carnarvon Castle</i> ...	Hague, J. W., Commr., R.N.R.	B. Simpson, H. A. Causton, G. Gorrings, H. A. Deller.	M.L.	Union Castle ...	Met. Log. 20.4.27 to 21.8.27 ...	27.8.27
	Strong, H., R.D., Commr., R.N.R.					
34 <i>Caronia</i> ...	Hossack, W. H., R.D., Capt. R.N.R.	P. F. Collins, H. G. Hayward.	W.T.	Cunard ...	{ W.T. Reg. 23.9.27 to 4.11.27 ... Form 911 24.9.27 to 4.11.27 ...	17.11.27 17.11.27
<i>Casanare</i> ...	Steidelmann, H.	R. O. Jones ...	No. A.	Elders & Fyffes ...	" 25.6.27 to 11.9.27 ...	16.9.27
<i>Cavina</i> ...	Riseley, A. D.	W. J. Dodd ...	" A.	" ...	" 12.3.27 to 15.10.27 ...	18.10.27
52 <i>Cedric</i> ...	Smith, R. G.	S. S. Fieldwood, D. W. Chamberlain, F. Patchett.	W.T.	White Star ...	{ W.T. Reg. 11.10.27 to 30.10.27 Form 911 10.10.27 to 30.10.27	3.11.27 1.11.27
53 <i>Celtic</i> ...	Berry, G.	T. Pratt, A. Thompson ...	"	" ...	{ W.T. Reg. 26.9.27 to 13.11.27... Form 911 25.9.27 to 13.11.27...	15.11.27 15.11.27
<i>Centaur</i> ...	Rose, A. F.	L. Johnstone ...	No. M.	A. Holt & Co. ...	" 22.12.26 to 2.2.27 ...	14.3.27
<i>Ceramic</i> ...	Roberts, J., C.B.E., D.S.O., R.D., Capt. R.N.R.	H. J. Yates ...	" A.	White Star ...	" 14.4.27 to 20.5.27 ...	21.5.27
<i>Changte</i> ...	Gambrill, F. C.	D. D. Tyer, A. Johnston ...	M.L.	Yuill & Co. ...	Met. Log. 15.4.27 to 9.8.27 ...	5.10.27
<i>Changuinola</i> ...	Thorburn, R. A., R.D., Commr., R.N.R.	W. G. Chanter, M. H. Thomson.	No. A.	Elders & Fyffes ...	Form 911 5.9.27 to 7.10.27 ...	14.10.27
<i>China</i> ...	Sudell, F., R.D., Commr., R.N.R.	L. Porter ...	" M.	P. & O. ...	" 25.7.27 to 11.8.27 ...	8.10.27
<i>Chindwara</i> ...	Brooks, E. G.	J. J. Smith ...	" M.	British India ...	" 20.11.26 to 28.11.26 ...	29.12.26
<i>Chindwin</i> ...	Esslemont, C.	W. D. Tulloch ...	" A.	Henderson ...	" 22.1.27 to 8.4.27 ...	13.4.27
<i>Chirripo</i> ...	McColm, F.	... ..	No.	Elders & Fyffes ...	...	...
<i>City of Baroda</i> ...	McMillan, J.	A. Beaton, E. H. Routledge, — Field.	M.L.	Ellerman ...	Met. Log. 5.7.27 to 29.9.27 ...	10.11.27
<i>City of Benares</i> ...	Anderson, W. W.	F. Forsyth ...	No. A.	" ...	Form 911 4.8.27 to 3.9.27 ...	26.9.27
<i>City of Brisbane</i> ...	Seaborne, F. O., D.S.C.	D. W. F. Reilly ...	" A.	" ...	" 28.9.27 to 30.10.27...	4.11.27
<i>City of Canterbury</i> ...	Bremner, D. M.	R. H. Hodgson ...	" A.	" ...	" 18.9.27 to 26.10.27...	7.11.27
<i>City of Carlisle</i> ...	Mordue, J. A.	... ..	" A.	" ...	" 6.7.27 to 5.9.27 ...	17.10.27
<i>City of Chester</i> ...	Letton, F. W.	C. C. Duncan, A. J. Barnett, R. Mowbray.	M.L.	" ...	Met. Log. 28.4.27 to 22.9.27 ...	28.10.27
<i>City of Edinburgh</i> ...	Wyper, J.	G. Hummell ...	No. M.	" ...	Form 911 16.9.27 to 1.10.27 ...	31.10.27
<i>City of Hong Kong</i> ...	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	S. J. Nash ...	" A.	" ...	" 26.6.27 to 30.8.27 ...	1.9.27
<i>City of London</i> ...	Parker, F. W., R.D., Commr., R.N.R.	J. McHattie ...	" A.	" ...	" 26.2.27 to 8.5.27 ...	28.5.27
<i>City of Rangoon</i> ...	Jones, P.	E. R. Wildermoth, R. H. Stewart, G. T. Willet.	M.L.	" ...	Met. Log. 22.1.27 to 4.6.27 ...	29.6.27

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 18.11.27.	Date Received.
<i>City of Venice</i> ...	Lee, A. ...	...	No. A.	Ellerman ...	Form 911 2.3.27 to 17.3.27 ...	4.5.27
<i>City of Yokohama</i> ...	McDonald, W. D. ...	W. N. M. Faichney ...	" A.	" ...	" 14.5.27 to 28.6.27 ...	16.7.27
<i>Clan Alpine</i> ...	Lyall, A. B. ...	H. J. Winchester ...	" A.	Clan ...	" 17.6.27 to 6.7.27 ...	10.8.27
<i>Clan Lamont</i> ...	Urquhart, P., D.S.C.	P. de Gruchy ...	" A.	" ...	" 13.9.27 to 14.10.27...	21.10.27
<i>Clan Lindsay</i> ...	Giles, H. J., R.D., Commr., R.N.R.	E. P. Smith ...	" A.	" ...	" 17.9.27 to 4.10.27 ...	31.10.27
<i>Clan Macbeth</i> ...	Young, A. H., R.D., Lieut. - Commr R.N.R.	J. M. Lorimer ...	" A.	" ...	" 23.8.27 to 19.9.27 ...	5.10.27
<i>Clan Macfadyen</i> ...	Stenson, F. J. R.D., Capt. R.N.R.	C. M. B. Cumberlege ...	" A.	" ...	" 5.6.27 to 6.9.27 ...	17.10.27
<i>Clan Macgillivray</i> ...	West, W. F. ...	R. W. Roberts ...	" A.	" ...	" 27.4.27 to 24.5.27 ...	20.6.27
<i>Clan Macindoe</i> ...	West, W. F. ...	D. McAllister ...	" A.	" ...	" 23.9.27 to 15.10.27...	7.11.27
<i>Clan Mackellar</i> ...	Smith, W. P. ...	G. A. A. Grant ...	" A.	" ...	" 16.8.27 to 3.11.27 ...	10.11.27
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	D. S. Rae, A. F. Martin, W. A. Shewan.	M.L.	" ...	Met. Log. 14.5.26 to 2.5.27 ...	9.6.27
<i>Clan Maonaughton</i> ...	Simpson, A. W. ...	D. D. Ingram ...	No. A.	" ...	Form 911 14.8.27 to 11.9.27 ...	3.10.27
<i>Clan Mactaggart</i> ...	Mee, F. T. ...	E. A. Hewson ...	" A.	" ...	" 5.7.27 to 18.8.27 ...	8.10.27
<i>Clan Macwhirter</i> ...	Waterhouse, J. ...	W. A. Robbie, E. A. Brown, D. Timms.	M.L.	" ...	Met. Log. 11.2.27 to 15.8.27...	23.8.27
<i>Clan Macwilliam</i> ...	Thompson, W. ...	J. H. Mellor ...	No. A.	" ...	Form 911 13.8.27 to 26.9.27 ...	2.11.27
<i>Clan Malcolm</i> ...	Neill, G. A. ...	D. A. Stark, H. V. Whitman, A. R. Macdonald.	M.L.	" ...	Met. Log. 7.4.27 to 23.7.27 ...	27.8.27
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	L. C. Higgins ...	No. A.	" ...	Form 911 5.7.27 to 2.8.27 ...	3.8.27
<i>Clan Murdoch</i> ...	Miller, W. ...	H. F. M. Preston ...	" A.	" ...	" 13.7.27 to 18.8.27 ...	12.9.27
<i>Clan Ranald</i> ...	Laird, C. ...	...	" A.	" ...	" 15.9.27 to 11.10.27...	20.10.27
<i>Clan Ross</i> ...	Openshaw, L. G. ...	H. T. Booth ...	" A.	" ...	" 1.8.27 to 26.8.27 ...	19.9.27
<i>Clan Sinclair</i> ...	George, L. S. ...	N. Macleod ...	" A.	" ...	" 31.8.27 to 23.9.27 ...	7.11.27
<i>Clan Urquhart</i> ...	Baker, E. W. ...	F. E. Woodall ...	" A.	" ...	" 29.9.27 to 15.10.27...	18.10.27
<i>Colonian, C.S.</i> ...	Carlton, G. F., O.B.E., Commr., R.N.R.	W. E. Allen, W. F. Anderson, F. B. Bolingbroke.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 4.12.26 to 25.2.27 ...	8.3.27
<i>Colonian</i> ...	Gittins, R. P. ...	W. J. Wright ...	No. A.	Leyland ...	Form 911 2.10.27 to 25.10.27...	31.10.27
<i>Comorin</i> ...	Miller, E. C., R.D., Commr., R.N.R.	E. C. White ...	" M.	P. & O. ...	" 11.8.27 to 22.9.27 ...	26.9.27
<i>Concordia</i> ...	Telfer, J. H. ...	T. Philip, W. Law, L. H. Hobson.	M.L.	Anchor Donaldson ...	Met. Log. 5.2.27 to 11.7.27 ...	14.7.27
<i>Corinthic</i> ...	Hart, F. ...	E. Burt, M. Bennett, S. A. Maonaughton.	"	White Star ...	" 24.4.27 to 6.8.27 ...	10.8.27
<i>Cornwall</i> ...	Haines, F. P. ...	H. S. White ...	No. A.	Federal ...	Form 911 26.1.27 to 28.2.27 ...	12.4.27
<i>Craftsman</i> ...	Gibbins, W. ...	J. Williams ...	" A.	Harrison ...	" 18.8.27 to 8.11.27 ...	11.11.27
<i>Crawford Castle</i> ...	Morgan, A. O., R.D., Commr., R.N.R.	J. A. Wilson ...	" A.	Union Castle ...	" 22.7.27 to 4.9.27 ...	3.10.27
<i>Culebra</i> ...	Rathkins, C.E. ...	P. Cooper, R. N. Fletcher, G. Ferguson.	M.L.	R.M.S.P. Co. ...	Met. Log. 15.8.27 to 17.10.27...	4.11.27
<i>Cumberland</i> ...	Macmillan, D. ...	J. D. Marks ...	No. A.	Federal... ..	Form 911 13.7.27 to 20.8.27 ...	26.8.27
<i>Cuthbert</i> ...	Barlow, F. P. ...	...	" A.	Booth ...	" 25.8.27 to 18.9.27 ...	22.9.27
<i>Cyclops</i> ...	Cosker, W. ...	J. R. C. Evans ...	" A.	A. Holt ...	" 26.7.27 to 17.9.27 ...	22.9.27
<i>Dardanus</i> ...	Williams, D. T. ...	...	" A.	" ...	" 7.9.27 to 23.9.27 ...	24.10.27
<i>Darian</i> ...	Masters, W. ...	A. S. Holland ...	" A.	Leyland ...	" 15.10.27 to 25.10.27 ...	7.11.27
<i>Darro</i> ...	Matthews, G. P. ...	W. Halder-Campe ...	" M.	R.M.S.P. Co. ...	" 6.8.27 to 30.9.27 ...	3.10.27
<i>Demerara</i> ...	Shillitoe, B., R.D., Commr., R.N.R.	J. R. Baty ...	" M.	" ...	" 26.7.27 to 15.9.27 ...	21.9.27
<i>Demosthenes</i> ...	Ogilvy, A. ...	J. Cruickshank ...	" M.	Aberdeen ...	" 12.7.27 to 31.10.27...	2.11.27
<i>Desado</i> ...	Hannam, F. S. ...	L. D. Jennings, A. Barff ...	" M.	R.M.S.P. Co. ...	" 20.8.27 to 14.10.27...	25.10.27
<i>Desna</i> ...	Green, J. ...	L. G. Peterson ...	" M.	" ...	" 3.9.27 to 25.10.27 ...	3.11.27
<i>Deucalion</i> ...	Melling, C. F. ...	R. Wilson... ..	" A.	A. Holt... ..	" 22.9.27 to 20.10.27...	24.10.27
<i>Dieppe</i> ...	Marmery, S. ...	Mr. Parsons ...	C.C.	Southern Railway ...	Telegraphic Report 18.11.27...	18.11.27
<i>Dimboola</i> ...	Roy, C. M. ...	...	No. A.	Melbourne S.S. Co. ...	Form 911 3.9.27 to 27.9.27 ...	31.10.27
<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>Domimia, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr., R.N.R.	S. A. Garnham, C. Bullock, L. J. Hegarty, R. Johnson.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 11.9.26 to 4.2.27 ...	25.2.27
<i>Dominic</i> ...	Harris, F. C. P. ...	C. C. Beal... ..	No. A.	Booth ...	Form 911 22.7.27 to 5.8.27 ...	5.9.27
<i>61 Doric</i> ...	Summers, F. F., R.D., Commr., R.N.R.	H. R. Wilkinson ...	W.T.	White Star ...	" 2.10.27 to 22.10.27...	24.10.27
<i>Doric Star</i> ...	Thomas, R. T. ...	L. McDermott ...	No. A.	Blue Star ...	" 22.11.26 to 20.12.26 ...	10.1.27
<i>Dorington Court</i> ...	Clarke, E. J. ...	P. Jones ...	" A.	Haldin & Co. ...	" 19.6.27 to 29.9.27 ...	11.10.27
<i>Dromore Castle</i> ...	MacMahon, J. ...	D. P. Klaseen ...	" A.	Union Castle ...	" 8.10.27 to 20.10.27...	12.11.27
<i>Druden</i> ...	Major, T. W. ...	...	" M.	Lampart & Holt ...	" 3.10.27 to 22.10.27...	16.11.27
<i>Duendes</i> ...	Pape, E. R. ...	S. E. Ayland ...	" M.	P.S.N. Co. ...	" 9.7.27 to 23.7.27 ...	6.8.27
<i>Dunaff Head</i> ...	Milner, T. F., R.D., Lt.-Commr., R.N.R.	S. Duff ...	" A.	Ulster S.S. Co. ...	" 4.10.27 to 9.11.27 ...	11.11.27
<i>Dundrum Castle</i> ...	Weller, H. E. ...	H. H. F. Trew ...	" A.	Union Castle ...	" 21.8.27 to 23.9.27 ...	24.10.27
<i>Dunrobin</i> ...	Ramsay, J. D. ...	C. H. Kendall ...	" A.	Glen & Co. ...	" 17.9.27 to 21.10.27...	3.11.27
<i>Duquesa</i> ...	Ellis, F., D.S.C.	E. W. Denman ...	" M.	Furness Withy ...	" 25.8.27 to 18.10.27...	24.10.27
<i>Durenda</i> ...	Beeching, P. H. ...	...	" A.	British India... ..	...	...
<i>Edinburgh Castle</i> ...	Owen, S. ...	T. N. McAllen ...	No. A.	Union Castle ...	" 5.8.27 to 25.9.27 ...	3.10.27
<i>Egori</i> ...	Sola, P., D.S.O. ...	...	No.	Elder Dempster ...	...	...
<i>Egyptian Prince</i> ...	Ord, T. ...	...	" A.	Prince ...	" 13.1.27 to 7.3.27 ...	31.3.27
<i>El Paraguayo</i> ...	St. Pierre, P. ...	S. B. Wright ...	" M.	Houlder Bros. ...	" 22.5.27 to 13.7.27 ...	9.8.27
<i>Elyenor</i> ...	Gordon, A. L. ...	M. Robertson, C. Kavanagh ...	M.L.	A. Holt... ..	Met. Log. 27.3.27 to 30.7.27 ...	18.8.27
<i>Elysia</i> ...	Duncan, A. R. ...	A. Laidlaw, H. C. Fry, J. Herbert.	"	Anchor ...	" 28.7.27 to 2.10.27 ...	17.10.27
<i>Empress of Asia</i> ...	Douglas, L. D. R.D., Lt.-Commr., R.N.R.	R. H. Foley, L. C. Hogg, T. M. W. Golby, M. Fawcett.	"	Canadian Pacific ...	" 9.6.27 to 1.10.27 ...	4.11.27
<i>Empress of Canada</i> ...	Robinson, S., C.B.E., R.D., Commr., R.N.R.	...	"	" ...	" 26.2.27 to 18.6.27 ...	14.7.27
<i>Empress of France</i> ...	Hailey, A. J. ...	O. F. Pennington, E. Roberts, W. Ewens.	"	" ...	" 30.4.27 to 18.10.27...	31.10.27
<i>Empress of Russia</i> ...	Hosken, A. J. ...	F. A. R. Dobbin ...	"	" ...	" 25.12.26 to 8.5.27 ...	13.6.27
<i>Endeavour</i> ...	Commr. S. A. Geary- Hill, D.S.O., R.N.	C. S. E. Lansdown ...	M.L.	His Majesty's Ship... ..	" 14.3.27 to 11.7.27 ...	19.7.27
<i>Essequibo</i> ...	Kite, E. ...	J. E. Williams ...	No. M.	R.M.S.P. Co. ...	Form 911 11.8.27 to 27.9.27 ...	8.10.27
<i>Eumaeus</i> ...	Read, J. W. ...	...	" A.	A. Holt ...	" 28.9.27 to 21.10.27...	31.10.27
<i>Eurpides</i> ...	Collins, P. J., O.B.E.	H. S. Cox, K. D. Fisher, P. Congdon.	M.L.	Aberdeen ...	Met. Log. 1.1.27 to 8.5.27 ...	14.5.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 18.11.27.	Date Received.
<i>Euryades</i>	Stewart, J. R. ... ..	... ..	No. A.	A. Holt	Form 911 9.10.27 to 19.10.27... ..	27.10.27
<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, F. O. Sheehy	" A.	Scottish Fishery Board.	" 4.10.27 to 28.10.27... ..	3.11.27
<i>Ferndale</i>	Daniel, F.	C. P. Marquand	" M.	Commonwealth Govt.	" 24.8.27 to 29.9.27	10.11.27
<i>Flandria</i>	Maars, L.	T. Doornbosch	" M.	Holland Lloyd	" 15.4.27 to 2.6.27	9.6.27
<i>Francisco</i>	Scales, H.	F. Elgin	" A.	Ellerman Wilson	" 25.9.27 to 29.10.27... ..	3.11.27
<i>Freya</i>	Angus, W.	W. Pirrie	" A.	Scottish Fishery Board.	" 1.10.27 to 31.10.27... ..	7.11.27
<i>Gaika</i>	Jackson, C. R.	L. G. May	" A.	Union Castle	" 11.9.27 to 4.11.27	7.11.27
<i>Gallymore</i>	Yeoman, J. T.	R. B. Gurner	" M.	Furness Withy	" 27.5.27 to 5.6.27	27.8.27
<i>Garoot</i>	Visser, C. W.	C. J. Vandenboom	" M.	Rotterdam Lloyd	" 26.6.27 to 15.7.27	25.7.27
<i>Garth Castle</i>	Jackson, C. R.	W. S. J. Aldous	" A.	Union Castle	" 28.5.27 to 18.6.27	22.8.27
<i>Gebria</i>	Veldkamp, C. J.	J. Doornbosch	" M.	Holland Lloyd	" 16.9.27 to 3.11.27	7.11.27
<i>Geranium</i>	Bennett, H. T., D.S.O., Commr. R.A.N.	... ..	" M.	His Majesty's Australian Ship.	... ..	...
<i>Glamorganshire</i>	Spriddell, F. G., R.D., Commr. R.N.R.	T. G. S. Cairns	" M.	R.M.S.P. Co.	Form 911 1.10.27 to 20.10.27... ..	14.11.27
<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>Glenarry</i>	Angier, J.	C. S. Brewer	No. M.	"	" 6.9.27 to 30.10.27	2.11.27
<i>Glenluce</i>	Kennett, W. H.	H. B. Porter	" A.	"	" 21.8.27 to 7.9.27	13.10.27
<i>Glenshane</i>	Beer, E. ... ..	... ..	" A.	"	" 10.4.27 to 2.5.27	16.8.27
<i>Gloucestershire</i>	Robin, E.	H. R. Mackay	" A.	Bibby	" 3.7.27 to 11.9.27	15.9.27
<i>Gorgon</i>	Hughes, J. W.	A. E. Bowlt, E. W. Powell, J. M. T. Edward, A. McK. Wright.	M.L.	A. Holt & Co.	Met. Log. 15.4.27 to 2.9.27	26.10.27
<i>Grantully Castle</i>	Whitfield, G. T.	R. Wren	No. A.	Union Castle	Form 911 3.6.27 to 14.8.27	17.8.27
<i>Greenbrier</i>	McColm, F.	J. B. Wookey	" A.	Elders & Fyfes	" 24.7.27 to 28.8.27	5.9.27
<i>Halesius</i>	Samuels, C.	R. W. Cook	" A.	R. P. Houston	" 20.8.27 to 23.9.27	14.11.27
<i>Haliartius</i>	Marsh, L. V. ... ..	... ..	" A.	"	" 25.6.27 to 19.7.27	15.8.27
<i>Harmonides</i>	Hughes, W. F.	S. S. Davidson	" A.	"	" 10.4.27 to 2.5.27	16.8.27
<i>Hatimura</i>	Lane, S. R., R.D., Capt. R.N.R.	F. Dolton, K. G. Pullman	No. M.	British India	" 5.9.27 to 10.10.27	31.10.27
<i>Hauraki, M.V.</i>	Frew, J. D.	B. F. Fisher	M.L.	Union S.S. Co., N.Z.	Met. Log. 11.8.26 to 6.3.27	9.6.27
<i>Henry Holmes, C.S.</i>	Bicker Caarten, A.	M. A. Green	No. M.	W. I. & Panama Telegraph Co.	Form 911 6.9.27 to 14.10.27	3.11.27
<i>Herald</i>	Haselfoot, F.E.B., Capt. R.N.	D. G. V. Williams	M.L.	His Majesty's Ship	Met. Log. 21.6.27 to 17.10.27... ..	15.11.27
<i>Herefordshire</i>	Mann, R. P. ... ..	... ..	No. A.	Bibby	Form 911 14.7.26 to 28.8.27	1.9.27
<i>Herminius</i>	Roberts, T. V.	O. C. Hayles	" A.	Shaw, Savill & Albion	" 24.2.27 to 10.4.27	15.8.27
<i>Herschel</i>	Watson, W. W.	J. F. Maurey	" A.	Lampart & Holt	" 13.4.27 to 3.7.27	25.7.27
<i>Hertford</i>	Urquhart, D.	A. Robertson	" A.	Federal	" 22.5.27 to 13.6.27	25.7.27
<i>Hibernia</i>	Tanner, E. B., O.B.E.	R. Woodall	C.C.	L.M. & S. Railway	Telegraphic Report 17.11.27... ..	17.11.27
<i>Highland Laddie</i>	Jones, T. J.	N. F. Seaton	No. A.	Nelson	Form 911 1.8.27 to 17.9.27	26.9.27
" <i>Piper</i>	Collings, D.	S. E. Jackson, R. G. Owen, G. E. Leech.	M.L.	"	Met. Log. 11.10.26 to 12.5.27... ..	8.6.27
" <i>Pride</i>	Robinson, R. H.	F. B. Quelch	No. A.	"	Form 911 1.7.27 to 27.8.27	30.8.27
" <i>Prince</i>	Davies, J.	S. A. Wheaton	" A.	Prince	" 12.10.27 to 30.10.27	10.11.27
" <i>Rover</i>	Ashby Graves, F.	C. C. Legg	" A.	Nelson	" 17.7.27 to 3.9.27	22.9.27
<i>Hildebrand</i>	Maddrell, J. ... ..	... ..	" A.	Booth	" 17.9.27 to 30.10.27... ..	9.11.27
<i>Hobson's Bay</i>	Kydd, O. J.	R. Pearce, R. Bodman, G. Newton, H. Hendy.	M.L.	Commonwealth Govt.	Met. Log. 31.5.27 to 10.9.27	17.9.27
<i>Holbein</i>	Gough, W. A.	H. L. Rudd	No. A.	Lampart & Holt	Form 911 9.7.27 to 26.9.27	18.10.27
<i>54 Homerie</i>	Holme, A.	H. G. Morgan, S. B. Morfee, W. T. Poustie.	W.T.	White Star	W.T. Reg. 13.10.27 to 28.10.27	31.10.27
<i>Hororata</i>	Holland, E. ... ..	... ..	No. A.	New Zealand S.S. Co.	Form 911 4.6.27 to 6.10.27	17.10.27
<i>Hubert</i>	Evans, L. ... ..	... ..	" A.	Booth	" 16.9.27 to 23.10.27... ..	7.11.27
<i>Huntingdon</i>	Ashworth, W. ... ..	... ..	" A.	Federal	" 29.7.27 to 3.9.27	5.9.27
<i>Huntsman</i>	Russell, H.	J. Richardson	" M.	Harrison	" 1.8.27 to 12.10.27	20.10.27
<i>Hurumui</i>	Burton Davies, J.	J. Oxnard, F. Longheed, L. Cann, K. Goldsworthy.	M.L.	New Zealand S.S. Co.	Met. Log. 2.1.27 to 23.6.27	28.6.27
<i>Ingoma</i>	Barrow, R. K.	D. G. Russell	No. M.	Harrison	Form 911 19.8.27 to 2.10.27	5.10.27
<i>Inkum</i>	Meetham, J. T.	H. Johnson	" A.	J. H. Welsford	" 13.9.27 to 11.10.27... ..	17.10.27
<i>Iris, C.S.</i>	Hughes, H. R.	W. Oliver, D. Bruce, D. Mac- donald, T. Vickers.	M.L.	Pacific Cable Board... ..	Met. Log. 17.11.26 to 24.3.27... ..	11.10.27
<i>Iroquois</i>	Jackson, A. L. Commr. R.N.	H. L. Jenkins	"	His Majesty's Ship	" 4.4.27 to 1.8.27	13.9.27
<i>Ixion</i>	Reed, G. C.	E. C. Radford	No. A.	A. Holt	Form 911 9.10.27 to 20.10.27... ..	28.10.27
<i>Japanese Prince</i>	Naylor, E.	W. Venn	" A.	Prince	" 23.9.27 to 25.10.27... ..	12.11.27
<i>Jervis Bay</i>	Chaplin, W. R.	R. W. Laycock	" M.	Commonwealth Govt.	" 9.10.27 to 31.10.27... ..	9.11.27
<i>Kaisar-i-Hind</i>	Morton, A. J. ... ..	... ..	" M.	P. & O.	" 17.9.27 to 9.11.27	12.11.27
<i>Kalyan</i>	Cornwall Jones, B.	S. Gerranson	" M.	P. & O.	" 13.8.27 to 15.9.27	19.9.27
<i>Kamo Maru</i>	Enya, S. ... ..	... ..	" A.	Nippon Yusen Kaisha	Met. Log. 16.9.27 to 19.10.27	25.10.27
<i>Kangaroo</i>	Buckeridge, G.	E. Hutchinson, J. Kavanagh, H. Brackenridge.	M.L.	State Service Aus- tralia.	" 4.5.27 to 5.9.27	25.10.27
<i>Karapara</i>	Miller, A. C.	J. W. Knight	No. M.	British India	Form 911 24.11.26 to 7.1.27	24.1.27
<i>Kashmir</i>	Mallalae, R., R.D., Lt.-Commr. R.N.R.	A. J. McHattie	" M.	P. & O.	" 26.8.27 to 14.9.27	10.10.27
<i>Kenilworth Castle</i>	Chave, Sir B., K.B.E.	R. C. Longman, L. A. J. Keeble, W. Dryden, W. Wyeth.	M.L.	Union Castle	Met. Log. 18.4.27 to 8.8.27	19.10.27
<i>Khiva</i>	Cooper, C. P., O.B.E., R.D., Capt. R.N.R.	G. W. Wood, D. Meakle, E. Allen, V. A. Nicolls.	M.L.	P. & O.	" 8.6.27 to 14.8.27	19.8.27
<i>Khyber</i>	Hester, C. W., R.D., Commr. R.N.R.	C. S. Pirie, J. D. Hornidge, H. T. Toon.	"	P. & O.	" 29.7.27 to 6.11.27	16.11.27
<i>Kia Ora</i>	McIntosh, A.	E. A. Hickling	"	Shaw Savill & Albion	" 30.1.27 to 15.6.27	20.6.27
<i>Knight Companion</i>	Cox, B. T.	A. Lamb, D. W. Williams	No. M.	A. Holt	Form 911 16.3.27 to 31.7.27	3.8.27
<i>Koolinda, M.V.</i>	Norris, H.	J. S. Airey	" M.	State Service, Aus- tralia.	" 26.8.27 to 26.9.27	31.10.27
<i>Kovno</i>	Dossor, W. A.	A. Snowdon, S. N. Stokes, N. W. Glendenning.	M.L.	Ellerman Wilson	Met. Log. 30.10.26 to 13.6.27... ..	18.7.27
<i>37 Laconia</i>	Britten, E. T., R.D., Commr. R.N.R.	J. Ashcroft, E. W. Connell, G. Noonan.	W.T.	Cunard	W.T. Reg. 17.10.27 to 5.11.27... .. Form 911 16.10.27 to 6.11.27	8.11.27 9.11.27

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 18.11.27.	Date Received.
<i>Laquna</i> ...	Kirkwood, J. H. ...	R. H. A. Clark ...	No. A.	Pacific S.N. Co. ...	Form 911 19.10.27 to 6.11.27...	9.11.27
<i>Lahore</i> ...	Dawson, E. N. ...	W. G. Stevenson ...	" M.	P. & O. ...	27.11.26 to 31.12.26 ...	5.1.27
<i>Lalande</i> ...	Hamill, H. ...	A. E. Warburton ...	" A.	Lampport & Holt ...	" 18.7.27 to 18.10.27...	3.11.27
<i>Lancashire</i> ...	Griffiths, C. A. ...	R. Allen ...	" A.	Bibby ...	" 31.7.27 to 7.10.27 ...	12.10.27
36 <i>Lancastria</i> ...	Oram, B. B., R.D., Capt., R.N.R.	R. P. Cambell, L. R. Sharp, F. G. Russell.	W.T.	Cunard ...	W.T. Reg. 11.10.27 to 29.10.27 ...	7.11.27
<i>Laomedon</i> ...	Beswick, W., D.S.C., Lt.-Commr., R.N.R.	H. A. Standfield ...	No. A.	A. Holt... ..	Form 911 10.10.27 to 29.10.27 ...	8.11.27
<i>La Paz, M.V.</i> ...	Benson, C. W. ...	D. Beamer ...	" M.	Pacific S.N. Co. ...	" 18.9.27 to 3.10.27 ...	21.10.27
<i>Laplace</i> ...	Hickman, V. G. ...	A. L. Murray, R. D. Cottam ...	" A.	Lampport & Holt ...	" 15.4.26 to 28.6.27 ...	30.8.27
55 <i>Lapland</i> ...	Harvey, H. ...	Wills, J. C. Flett ...	W.T.	Red Star ...	W.T. Reg. 2.10.27 to 22.10.27...	25.10.27
<i>Lautaro, M.V.</i> ...	Dunn, R. E., O.B.E....	E. Sandon ...	No. M.	Pacific S.N. Co. ...	Form 911 29.6.27 to 25.7.27 ...	8.9.27
<i>Leicestershire</i> ...	Lyon, H. ...	J. Cullen, P. Hawkins, J. K. Gemmell, H. S. Vickers.	M.L.	Bibby ...	Met. Log. 21.5.27 to 1.8.27 ...	30.8.27
<i>Leighton, M.V.</i> ...	Lindesay, J. M. ...	J. T. A. Thomson ...	No. A.	Lampport & Holt ...	Form 911 22.7.27 to 10.8.27 ...	22.8.27
<i>Leitrim</i> ...	Kemp, E. R. ...	C. R. Brown ...	" A.	Dowie, J., & Co. ...	" 2.10.27 to 1.11.27 ...	9.11.27
<i>Llandaff Castle</i> ...	Morton Betts, W. ...	R. Bayer, M. J. Castle... ..	" A.	Union Castle ...	" 7.9.27 to 27.9.27 ...	28.10.27
<i>Llandovery Castle</i> ...	Kirby, ...	C. H. Williams, G. Moon, E. M. Betts.	M.L.	" ...	Met. Log. 25.8.27 to 9.11.27 ...	11.11.27
<i>Loch Katrine</i> ...	Buret, T. J. C. ...	W. Gelling ...	No. M.	R.M.S.P. Co. ...	Form 911 21.7.27 to 15.10.27...	9.11.27
<i>London Commerce</i> ...	Young, H. J., D.S.C....	W. Edmonds ...	" A.	Furness Withy ...	" 19.8.27 to 19.9.27 ...	28.9.27
<i>London Importer</i> ...	Fowler, W. H. ...	J. S. Williams, J. H. Metcalfe, J. G. Freeman.	M.L.	" ...	Met. Log. 19.5.27 to 5.8.27 ...	19.8.27
<i>Lora Antrim</i> ...	Jarvis, F. E. ...	L. G. Kirwan ...	No. A.	Ulster S.S. Co. ...	Form 911 27.4.27 to 10.5.27 ...	23.5.27
<i>Loriga, M.V.</i> ...	Clapham, E. C. ...	R. W. Gill ...	" A.	Pacific S.N. Co. ...	" 19.5.27 to 1.9.27 ...	5.9.27
<i>Losada, M.V.</i> ...	Ross, J. ...	J. T. Denley ...	" M.	" ...	" 29.6.27 to 1.10.27 ...	13.10.27
<i>Macedonia</i> ...	Potter, H. W., R.D., Commr., R.N.R.	C. J. L. Hayward ...	" M.	P. & O. ...	" 10.9.27 to 30.9.27 ...	24.10.27
<i>Macharda</i> ...	Tyers, W. O. ...	W. Cowie... ..	" M.	Brocklebank ...	" 15.9.27 to 6.10.27 ...	31.10.27
<i>Maharani</i> ...	Elliott, G. F. ...	M. Haslett ...	MI.	Asiatic S.N. Co. ...	Form 911 7.9.27 to 9.10.27 ...	31.10.27
<i>Maitbar</i> ...	Charlton, W. L. ...	C. Shaw, C. Cadwallader, S. S. Slade.	M.L.	Brocklebank ...	Met. Log. 9.6.27 to 31.8.27 ...	29.9.27
<i>Maimyo</i> ...	Smith, G. C. ...	H. M. Drummond ...	No. A.	Burns Philp ...	Form 911 16.7.27 to 8.10.27 ...	11.10.27
<i>Maiwara</i> ...	Brown, T. M. ...	" ...	M.L.	" ...	" ...	" ...
58 <i>Majestic</i> ...	Metcalfe, G. R. ...	W. W. Pearson, L. Thompson, W. T. Fitz Gerald.	W.T.	White Star ...	W.T. Reg. 6.10.27 to 10.11.27...	14.11.27
<i>Makambo</i> ...	Brown, T. M. ...	F. C. Vogelmann, R. W. Holmes, T. MacRae.	M.L.	Burns Philp ...	Met. Log. 15.3.27 to 15.8.27 ...	11.10.27
<i>Makura</i> ...	Mawson, J. ...	D. M. Todd, W. J. Weber, L. P. Bourke, L. Thomas, A. Gell.	"	Canadian- Australasian ...	Form 911 26.1.27 to 11.6.27 ...	1.9.27
<i>Malabar</i> ...	Hillman, E. J. ...	R. Morris ...	"	Burns, Philp & Co. ...	Met. Log. 6.1.27 to 9.5.27 ...	11.10.27
<i>Malakuta</i> ...	Adamson, F. L. ...	N. Grayson ...	No. M.	Brocklebank ...	Form 911 11.9.27 to 6.11.27 ...	16.11.27
<i>Malancha</i> ...	Whitham, F. O. ...	R. Humble, J. Butterworth, H. Kelly.	" M.	" ...	" 2.10.27 to 31.10.27...	11.11.27
<i>Malda</i> ...	Gray, T. N. ...	S. G. James ...	" M.	British India ...	" 3.9.27 to 11.10.27 ...	17.11.27
<i>Maloja</i> ...	Manley, G. ...	A. D. Dennis ...	" M.	P. & O. ...	" 24.7.27 to 5.10.27 ...	12.10.27
<i>Mamari</i> ...	Falconer, H. ...	P. Campbell ...	" A.	Shaw, Savill & Albion ...	" 19.7.27 to 22.9.27 ...	27.9.27
<i>Manchester Brigade</i> ...	Stott, C. H. ...	W. S. Eustance ...	" A.	Manchester Liners ...	" 24.9.27 to 23.10.27...	27.10.27
<i>Manchester Corporation</i> ...	Williams, H. ...	H. J. P. Nelson ...	" A.	" ...	" 18.9.27 to 30.10.27...	8.11.27
<i>Manchester Hero</i> ...	Riley, J. E. ...	H. Anderton ...	M.L.	" ...	Met. Log. 16.2.27 to 27.6.27 ...	7.7.27
<i>Manchester Regiment</i> ...	Foale, J. R. ...	P. D. Barr ...	No. A.	" ...	Form 911 1.10.27 to 29.10.27...	4.11.27
<i>Manchester Shipper</i> ...	Raper, E. W. ...	H. Swindells, C. A. Walker, W. R. Cullen.	M.L.	" ...	Met. Log. 10.12.26 to 16.6.27...	20.6.27
<i>Manipur</i> ...	Cochran, G. N. ...	R. Penston, C. Perry ...	No. M.	Brocklebank ...	Form 911 24.9.27 to 24.10.27...	14.11.27
<i>Manora</i> ...	Hudson, H. T., R.D., Commr., R.N.R.	" ...	" M.	British India... ..	" ...	" ...
<i>Mantua</i> ...	Randell, G. G. ...	D. B. Leader, H. Tee ...	" M.	P. & O. ...	Form 911 6.8.27 to 29.9.27 ...	3.10.27
<i>Marella</i> ...	Mortimer, S. ...	" ...	M.L.	Burns Philp ...	Met. Log. 6.12.26 to 3.5.27 ...	1.9.27
<i>Marengo</i> ...	Procter, A. ...	F. Barnard, H. Bryon, J. Ford ...	"	Ellerman Wilson ...	" 18.6.27 to 14.11.27...	17.11.27
<i>Maresfield</i> ...	Jones, T. E. ...	T. Conolly ...	No. A.	Woods, Tyler & Brown ...	Form 911 21.9.27 to 28.10.27...	31.10.27
<i>Margha</i> ...	Milne, R. A., R.D., Commr., R.N.R.	P. Wright, H. E. Evans, R. M. Wyatt, D. G. Woods.	M.L.	British India... ..	Met. Log. 2.7.27 to 1.10.27 ...	13.10.27
<i>Marquesa</i> ...	Smiles, E. S. ...	J. Hart, J. Dickson, C. E. Mayer.	No. M.	Furness Houlder ...	Form 911 8.9.27 to 27.10.27 ...	31.10.27
<i>Matakana</i> ...	Thurston, H. P. ...	" ...	M.L.	Shaw, Savill & Albion ...	Met. Log. 15.4.27 to 1.9.27 ...	5.9.27
<i>Mataram</i> ...	Voy, W. ...	V. V. Edmonds... ..	No. A.	Burns, Philp & Co. ...	Form 911 26.12.26 to 20.1.27...	28.2.27
<i>Mataroa</i> ...	Kershaw, W. A. R. ...	T. T. Oliver, J. J. Nicoll, G. Lindsay.	M.L.	Shaw, Savill & Albion ...	Met. Log. 25.3.27 to 10.7.27 ...	12.7.27
<i>Matheran</i> ...	Ison, W. A. ...	L. Jeans, H. Simpson, J. Richardson	"	Brocklebank ...	" 2.2.27 to 29.4.27 ...	30.5.27
<i>Matiana</i> ...	Green, F. V. ...	G. F. Du Santog ...	No. M.	British India... ..	Form 911 4.8.27 to 31.8.27 ...	3.10.27
<i>Mauganui</i> ...	Showman, A. C. ...	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 <i>Maurtania</i> ...	Davey, A. H. ...	J. A. Quarrie, G. Duguid, C. B. Osborne, M. Boston.	W.T.	Cunard ...	W.T. Reg. 9.10.27 to 24.10.27...	28.10.27
<i>Medic</i> ...	Diggle, E. G., R.D., Capt., R.N.R.	" ...	"	" ...	" 30.10.27 to 14.11.27 ...	17.11.27
<i>Megantic</i> ...	Jones, W. H. ...	W. Nicoll... ..	No. A.	White Star ...	Form 911 10.3.27 to 18.4.27 ...	21.4.27
22 <i>Melita</i> ...	Trant, E. L., R.D., Commr., R.N.R.	" ...	" A.	" ...	" 30.7.27 to 20.8.27 ...	24.8.27
<i>Mennon</i> ...	Stewart, A. ...	J. Shearer ...	W.T.	Canadian Pacific ...	W.T. Reg. 28.8.27 to 14.9.27 ...	20.9.27
21 <i>Metagama</i> ...	Dougall, W. T. ...	" ...	No. A.	A. Holt... ..	Form 911 23.10.27 to 6.11.27...	16.11.27
<i>Middlesex</i> ...	Freer, A., Capt., R.N.R.	R. Walker, T. Gillette, G. Mowatt.	W.T.	Canadian Pacific ...	W.T. Reg. 16.10.27 to 5.11.27...	8.11.27
<i>Minderoo</i> ...	MacRae, A., D.S.C., Lt.-Commr., R.N.R.	C. Roberts ...	No. M.	Federal... ..	Form 911 21.8.27 to 8.9.27 ...	13.10.27
<i>Minna</i> ...	Richardson, E. ...	B. J. Bennie, W. J. McPhedran, J. H. Oxtan.	" A.	West Australia Nav. Co.	Met. Log. 2.5.26 to 4.10.26 ...	1.12.26
<i>Minnesota</i> ...	Mackenzie, G. G. ...	A. M. Campbell ...	" A.	Scottish Fishery Board.	Form 911 28.9.27 to 23.10.27...	27.10.27
<i>Minnetonka</i> ...	Finch, E., Pollard, W. F., D.S.O., Capt., R.N.R.	A. J. Smith ...	No. M.	Atlantic Transport... ..	" 21.8.27 to 8.10.27 ...	11.11.27
<i>Mississippi</i> ...	Gates, T. F., C.B.E....	H. E. Macartney ...	" M.	" ...	" 25.9.27 to 12.11.27...	15.11.27
<i>Mirror, C.S.</i> ...	Claret, F. H., C.B.E., Commr., R.N.R.	" ...	" M.	" ...	" 10.10.27 to 29.10.27 ...	3.11.27
<i>Missouri</i> ...	Gibson, L. ...	A. G. Watts ...	" M.	Eastern Tel. Co. ...	" 8.3.27 to 17.3.27 ...	8.4.27
<i>Missouri</i> ...	Wylie, J. T. J. ...	S. C. Skinner ...	" A.	Atlantic Transport... ..	" 16.5.27 to 26.6.27 ...	8.7.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 18.11.27.	Date Received
Moldavia	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R.	W. L. Dobbin	No. M.	P. & O.	Form 911 8.9.27 to 19.10.27	24.10.27
Mongolian Prince	Edwards, W.	V. E. Palmer	" A.	Prince	19.4.27 to 5.9.27	19.9.27
24 Montcalm	Hamilton, G.	H. McFadyen	W.T.	Canadian Pacific	10.10.27 to 27.10.27	1.11.27
25 Montclare	Webster, G. S., R.D., Lt.-Commr., R.N.R.	A. Mansey, C. L. de H. Bell, A. Easton.	"	" "	25.9.27 to 11.11.27... ..	14.11.27
Montferland	Van Noppen, C.D.	" " " " " " " "	No. M.	Holland Lloyd	Form 911. 18.8.27 to 9.9.27	3.10.27
27 Montmairn	Notley, A. H., R.D., Commr., R.N.R.	N. A. Goater, J. Roche, K. Hutchings.	W.T.	Canadian Pacific	W.T. Reg. 8.10.27 to 26.10.27... ..	29.10.27
Montoro	Hillman, E. J.	R. M. Blunt	No. A.	Burns, Philp & Co.	Form 911 2.7.27 to 5.8.27	27.10.27
26 Montrose	Landy, E.	A. Watt	W.T.	Canadian Pacific	W.T. Reg. 4.9.27 to 20.10.27	3.11.27
20 Montroyal	Sibbons, H.	R. Antrobus	"	" " " " " " " "	27.9.27 to 8.11.27	12.11.27
Moresby	Edgell, J. A., O.B.E., Capt., R.N.	W. H. Martin	M.L.	His Majesty's Australian Ship.	Met. Log. 4.4.27 to 14.8.27	4.10.27
Morvada	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
Mulbera	Steadman, W. R.	S. Broomhead	" M.	" " " " " " " "	" 5.10.27 to 10.11.27... ..	16.11.27
Nagara	Foster, E.	J. Watson	" M.	R.M.S.P. Co.	" 15.1.27 to 24.5.27	1.6.27
Nagoya	Davis, H. C., D.S.C., R.D., Commr., R.N.R.	H. O. Case	" M.	P. & O.	" 11.6.27 to 7.9.27	12.9.27
Naldera	Dayas, C.	C. H. Hand, W. T. Banks, H. M. Askin.	M.L.	" " " " " " " "	Met. Log. 21.9.27 to 3.11.27	7.11.27
Nardana	Moth, F. L.	J. N. McMillan, F. G. Sharp... ..	No. M.	British India	Form 911 31.7.27 to 4.9.27	10.10.27
Nellore	Hignett, A. H., R.D., Lt.-Commr., R.N.R.	A. J. Brown	" M.	P. & O.	" 29.9.27 to 30.10.27... ..	1.11.27
Nerbudda	Williams, B. N.	J. W. B. Archibald, T. Barnard, J. H. Robottom,	" M.	British India	" 8.6.27 to 21.7.27	25.7.27
Nestor	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
Newby Hall	Butler, J.	E. M. Robertson, A. W. Wise, R. Y. Smith.	"	Ellerman	" 26.11.26 to 6.3.27	28.3.27
Newfoundland	Westgarth, W. A., D.S.C.	R. F. Handley, E. Sainty, S. Moore, E. B. Burke.	"	Furness Withy	" 20.5.27 to 29.9.27	5.10.27
Niagara	Showman, A. C.	T. Haulton, J. M. Hood, D. Rollo, R. N. Turner.	"	Canadian- Australasian	" 10.2.27 to 19.8.27	10.9.27
Ningchow	Beale, H. E.	R. A. Crozier	No. A.	A. Holt... ..	Form 911 16.7.27 to 13.9.27	14.11.27
Norfolk	Robinson, F. W.	J. W. Thompson, A. M. Downan.	" A.	Federal	" 3.10.27 to 18.10.27... ..	7.11.27
Norna	Wright, J. W.	T. R. Ness	" A.	Scottish Fishery Board	" 5.10.27 to 27.10.27... ..	31.10.27
Norseman, C.S.	Barter, H. O., R.D., Commr., R.N.R.	R. W. Greenfield	" M.	Western Tel. Co.	" 24.9.27 to 14.10.27... ..	7.11.27
Northumberland	Upton, H. L.	" " " " " " " "	M.L.	Federal	" " " " " " " "	" " " " " " " "
Northwestern Miller	Nuttall, E. L.	" " " " " " " "	No. A.	Furness Withy	Form 911 20.11.26 to 23.12.26	29.12.26
Nova Scotia	Furneaux, S.	" " " " " " " "	" A.	" " " " " " " "	" 21.9.27 to 17.10.27	18.10.27
Noushera	Schleicher, J. W.	W. D. L. Reeves	" M.	British India	" 31.7.27 to 19.8.27	31.10.27
Nubian	Watmough, T. M.	" " " " " " " "	" A.	Leyland	" 19.8.27 to 30.10.27... ..	11.11.27
Oaklands Grange	St. Clair, C., D.S.C.	C. F. Foxwell	" A.	Houlder Bros.	" 3.9.27 to 1.10.27	3.10.27
57 Olympic	Marshall, W., C.B., D.S.O., A.D.C., R.D., Commodore, R.N.R.	A. Fisher, H. J. C. Day, A. E. Weller.	W.T.	White Star	W.T. Reg. 29.9.27 to 3.11.27	7.11.27
Orama	Matheson, C. G., D.S.O., R.D., Capt., R.N.R.	W. Elliot, C. K. Blake, H. Tanner.	M.L.	Orient	Form 911 24.7.27 to 25.10.27... ..	1.11.27
Oranian	Hoskins, W.	W. R. Atkinson... ..	No. A.	Leyland	" 22.7.27 to 19.10.27... ..	25.10.27
Orbita	Dominy, R. H., C.B.E., Commr., R.N.R.	J. Lloyd Jones	" M.	R.M.S.P. Co.	" 9.8.27 to 17.10.27	28.10.27
Orcoma	Pearse, A. W.	T. Naylor, G. Gerety, R. T. Hales.	M.L.	Pacific S.N. Co.	Met. Log. 17.2.27 to 4.5.27	24.8.27
Orduna	Daniel, T.	E. Hicks	No. M.	R.M.S.P. Co.	Form 911 12.7.27 to 18.9.27	28.9.27
Orestes	Flynn, G. A.	" " " " " " " "	" A.	A. Holt... ..	" 5.10.27 to 20.10.27	14.11.27
Orita	Splatt, W. A.	D. W. Hutchinson, J. L. Jones, A. G. Litherhead, J. W. Milne.	M.L.	Pacific S.N. Co.	Met. Log. 22.12.26 to 30.5.27... ..	10.6.27
Ormonde	Rice, W. V., D.S.O., D.S.C., Commr., R.N.	J. Taylor, H. P. L. Tennent, C. F. Loveless, H. P. Price.	"	His Majesty's Ship	" 4.3.27 to 1.7.27	3.8.27
Ormonde	James, L. V., D.S.C.	B. W. Gorman	No. M.	Orient	Form 911 22.8.27 to 30.8.27	6.9.27
Oronsay	Owens, A. L., R.D., Commr., R.N.R.	R. K. Rogerson, R. S. Hawker, J. D. Archer.	M.L.	" " " " " " " "	Met. Log. 22.5.27 to 30.9.27	6.10.27
Oroya	Ridyard, A.	S. Lewis	No. M.	Pacific S.N. Co.	Form 911 28.8.27 to 31.10.27... ..	7.11.27
Orsova	Cameroñ, E. P., R.D., Commr., R.N.R.	L. E. Fordham, L. J. Vesty, A. Croft Cohen, H. A. Whittle.	M.L.	Orient	Met. Log. 3.4.27 to 7.7.27	13.7.27
Orvieto	O'Sullivan, F. R.	G. J. Carter, T. L. Shurrock, R. C. Warner.	"	" " " " " " " "	" 1.5.27 to 4.8.27	27.8.27
Osterley	Hayes, I. J., R.D., Commr., R.N.R.	S. Burnham	No. A.	" " " " " " " "	Form 911 25.8.26 to 28.9.27	5.10.27
Otaki	McNish, R.	C. R. Brown	" A.	New Zealand S.S. Co.	" 24.12.26 to 7.2.27	10.2.27
Otira	Wood, C., D.S.C.	D. N. MacGregor	" M.	Shaw, Savill & Albion	" 18.7.27 to 30.9.27	6.10.27
Otranto	Stanton, H. G., C.B.E., R.D., Commr., R.N.R.	" " " " " " " "	" M.	Orient	" 20.1.27 to 1.4.27	19.4.27
Oxfordshire	Forster, W. L.	M. D. Louttil	" A.	Bibby Bros.	" 16.7.27 to 24.9.27	27.9.27
Pacific Shipper, M.V.	Campbell, H.	" " " " " " " "	" A.	Furness Withy	" 25.8.27 to 29.9.27	20.10.27
Pacuaré	Sapsworth, S. A.	V. R. Watkins	" A.	Elders & Fyffes	" 17.9.27 to 4.10.27	28.10.27
Pakeha	W. P. Clifton Mogg	E. T. Baker, R. E. Nicholson, A. J. Elliot.	M.L.	Shaw, Savill & Albion	Met. Log. 21.12.26 to 29.4.27... ..	7.5.27
Pareora	Evans, J. O.	A. J. Ellis... ..	No. A.	Hain S.S. Co.	Form 911 6.7.27 to 2.8.27	15.9.27
Paris	Cook, C. L.	Mr. Biles	C.C.	Southern Ry.	Telegraphic Report. 31.7.27	31.7.27
Patia	Makepeace, S.	J. Kinsley	No. A.	Elders & Fyffes	Form 911 19.6.27 to 23.7.27	3.8.27
Patrol, C.S.	Welsh, T. K.	J. S. Browne	No.	Eastern Extension (A. & C.) Telegraph Co.	Met. Log. 18.10.26 to 15.11.26	9.2.27
Peisander	Slater, H.	D. L. Hoare	No. A.	A. Holt... ..	Form 911 19.9.27 to 17.10.27... ..	14.11.27
Pemland	Making, J. L.	L. A. Williams	No.	Red Star	" 24.10.27 to 12.11.27	14.11.27

LIST OF VOLUNTARY OBSERVING SHIPS

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 18.11.27.	Date Received
<i>Peshawur</i> ...	Wilding, H. G. ...	J. C. Mellonie, J. K. Crone, R. G. Wood.	M.L.	P. & O. ...	Met. Log. 27.4.27 to 28.9.27 ...	5.10.27
<i>Piako</i> ...	Kettlewell, C. R. ...	E. W. Smith, M. Rose, H. N. Lawson.	"	New Zealand S.S. Co.	" 7.12.26 to 20.5.27 ...	26.5.27
<i>Polycarp</i> ...	Jackson, T. H. ...	C. W. Smethurst ...	No. A.	Booth ...	Form 911 22.9.27 to 4.10.27 ...	31.10.27
<i>Port Adelaide</i> ...	Williams, R. ...	E. N. Rogerson ...	M.L.	Commonwealth & Dominion.	Met. Log. 13.1.27 to 20.6.27 ...	12.7.27
<i>Port Albany</i> ...	Robinson, C. A. ...	E. A. Leavett, W. Eastoe, J. Thom.	"	" " "	" 24.12.26 to 10.5.27... ..	23.5.27
<i>" Auckland</i> ...	Durham, R. S. ...	G. L. Hazlewood, C. F. Post, J. H. Sloan, H. E. Braine.	"	" " "	" 4.3.27 to 31.7.27	10.8.27
<i>" Bowen</i> ...	Hearn, G. W. ...	W. R. Johnston ...	No. A.	" " "	Form 911 24.3.27 to 29.9.27 ...	18.10.27
<i>" Caroline</i> ...	Hoad, A. C. ...	A. E. Fishwick, C. A. Hodson, J. Stannard.	M.L.	" " "	Met. Log. 6.7.27 to 5.11.27 ...	10.11.27
<i>" Darwin</i> ...	Sawbridge, I. R. ...	S. Hearn, W. Lynd, E. T. N. Lawrey.	"	" " "	" 28.1.27 to 29.6.27	4.7.27
<i>" Denison</i> ...	Ferris, J. ...	P. J. Howe ...	"	" " "	Form 911 25.5.27 to 7.7.27	9.7.27
<i>" Dunedin</i> ...	Farmar, F. ...	E. G. Jones, H. M. Post, N. M. Muzzell.	M.L.	" " "	Met. Log. 20.5.27 to 25.9.27 ...	28.9.27
<i>" Fremantle</i> ...	Kearney, F. J. ...	...	No.	" " "	...	...
<i>" Gisborne</i> ...	Hutchinson, ...	...	No. A.	" " "	...	...
<i>" Hacking</i> ...	Higgs, H. E. ...	F. W. Elgar, J. A. Fairbairn, E. Luker.	M.L.	" " "	Met. Log. 1.1.27 to 14.6.27 ...	16.6.27
<i>" Hobart</i> ...	Craven, R. ...	R. Carter, L. Copeland, G. G. Langford, C. L. Webb.	"	" " "	" 22.7.27 to 6.11.27	14.11.27
<i>" Hunter</i> ...	Cottell, S. C. ...	A. Cooper, A. McClounan, J. T. Weldin.	"	" " "	" 22.6.27 to 6.10.27	11.11.27
<i>" Huon</i> ...	Compton, J. ...	J. A. Fairbairn ...	No. A.	" " "	...	...
<i>" Melbourne</i> ...	Brown, A. H. ...	D. G. H. Bradley, L. H. B. Bloye, P. H. Pedrick, C. J. Galey.	M.L.	" " "	Met. Log. 31.3.27 to 12.10.27... ..	19.10.27
<i>" Napier</i> ...	Jones, C. N. ...	...	No. A.	" " "	Form 911 25.2.27 to 12.4.27	21.4.27
<i>" Nicholson</i> ...	Jack, J. ...	J. G. Lewis, G. L. H. Dean, P. A. Munday, C. Jolly.	M.L.	" " "	Met. Log. 26.2.27 to 24.7.27 ...	11.8.27
<i>" Pirie</i> ...	Kippins, T. ...	...	"	" " "	" 26.3.27 to 2.9.27	13.9.27
<i>" Sydney</i> ...	Higgs, W. G. ...	H. G. Boys Smith, E. E. Roswell, K. D. Morgan.	"	" " "	" 1.4.27 to 17.8.27	1.9.27
<i>" Victor</i> ...	Swan, L. H. ...	L. M. R. Bayly, J. B. Watson, A. Brown.	"	" " "	" 8.12.26 to 8.6.27	13.6.27
<i>" Wellington</i> ...	Hayter, S. W. ...	D. F. Morgan ...	No. A.	" " "	Form 911 16.7.27 to 20.8.27	26.9.27
<i>President Jackson</i> ...	Griffith, J. ...	P. Treanor ...	" A.	Pacific Mail S.S. Co...	" 25.5.27 to 9.6.27	22.7.27
<i>President Jefferson</i> ...	Nichols, F. R. ...	C. Hansson, C. H. Moen ...	" A.	Admiral Oriental Line	" 6.8.27 to 25.9.27	10.10.27
<i>Protea, H.M.S.A.S.</i> ...	Woodhouse, A. F. B., Lt.-Commr., R.N.	J. Schlee, R. J. Whitley, H. Leftwich, R. Pearson.	M.L.	South African Naval Service.	" 1.4.27 to 29.7.27	11.10.27
<i>Protesilaus</i> ...	Nelson, T. B. ...	...	" A.	A. Holt ...	Met. Log. 8.4.27 to 7.9.27	11.10.27
<i>Pyrrhus</i> ...	Elford, W. J. ...	R. E. Wilks ...	No. A.	" " "	Form 911 19.7.27 to 25.9.27	27.9.27
<i>Ranpara</i> ...	King, A. M., D.S.C.	H. Morgan ...	" M.	P. & O. ...	" 8.10.27 to 26.10.27	31.10.27
<i>60 Regina</i> ...	Davies, E. ...	F. W. Laws, V. Evans, R. G. Cochrane.	W.T.	White Star - Do- (minion)	" 16.10.27 to 5.11.27... ..	7.11.27
<i>Reindeer</i> ...	Langdon, C. ...	D. Hughes, P. L. Shakespear.	C.C.	G.W. Railway	W.T. Reg. 16.10.27 to 5.11.27... ..	7.11.27
<i>Remuera</i> ...	Canloner, J. J. ...	F. D. Betts ...	No. A.	New Zealand S.S. Co.	Form 911 6.5.27 to 20.8.27	24.8.27
<i>Rhodesian Transport</i> ...	Bullock, F. W. H. ...	...	" A.	Houlder Bros. ...	" 16.7.27 to 29.10.27... ..	3.11.27
<i>Rimutaka</i> ...	Hemming, F. A. ...	H. A. Fryer, M. A. D. Stewart, G. O. Saul, H. Vernon.	M.L.	New Zealand S.S. Co.	Met. Log. 10.6.27 to 19.10.27... ..	25.10.27
<i>Risaidar</i> ...	Matthews, E. G. ...	R. H. Friedlander ...	No. M.	Asiatic S.N. Co. ...	Form 911 24.8.27 to 10.9.27	3.10.27
<i>Rotorua</i> ...	Hunter, J. L. B. ...	B. Lawrence, R. G. Rees, H. Cockerill.	M.L.	New Zealand S.S. Co.	Met. Log. 9.4.27 to 26.7.27	5.8.27
<i>Royal Fusilier</i> ...	Dawson, J. ...	J. Fraser ...	No. A.	London & Edinburgh S.S. Co.	Form 911 19.5.27 to 7.7.27	11.7.27
<i>Royal Transport</i> ...	Dove, J. ...	R. W. Wass ...	" A.	Houlder Bros. ...	" 7.5.27 to 15.8.27	19.8.27
<i>Ruapahu</i> ...	McKellar, A. W., R.D., Capt., R.N.R.	H. M. Selmer, W. J. Glassborow, T. M. Devitt.	M.L.	New Zealand S.S. Co.	Met. Log. 4.2.27 to 9.6.27	15.6.27
<i>St. Albans</i> ...	Smith, G. L., Commr., R.A.N.R.	R. S. Millington, J. Kavanagh, R. L. Harry.	"	Eastern and Australian.	" 1.7.27 to 27.9.27	17.11.27
<i>St. Helier</i> ...	Mulhall, W. ...	C. Bell ...	C.C.	G.W. Railway ...	Telegraphic Report 25.10.27... ..	25.10.27
<i>St. Julien</i> ...	Langdon, C. H. ...	C. Joy ...	"	" ...	" 15.11.27... ..	15.11.27
<i>St. Andrew</i> ...	Bearpark, E. W. ...	...	No. A.	Rankin Gilmour ...	Form 911 24.8.27 to 19.9.27	31.10.27
<i>Salaga</i> ...	Jones, W. ...	C. V. Evans ...	" A.	Elder Dempster ...	" 19.3.27 to 4.6.27	15.6.27
<i>38 Samaria</i> ...	Malin, R. G., Lieut.-Commr., R.N.R.	A. B. Fasting, W. B. Tanner, J. O. Chambers.	W.T.	Cunard ...	" 3.10.27 to 23.10.27... ..	27.10.27
<i>Samarinda</i> ...	Flack, Z. W. ...	K. F. Kikhert ...	No. M.	Rotterdam Lloyd ...	W.T. Reg. 3.10.27 to 23.10.27... ..	27.10.27
<i>Sardinian Prince</i> ...	Brown, J. F. ...	J. F. Wedgwood ...	" A.	Prince ...	Form 911 5.7.27 to 2.8.27	10.11.27
<i>Saxon</i> ...	Gardner, G. F., O.B.E.	G. H. Pickering ...	" A.	Union Castle ...	" 7.9.27 to 7.10.27	20.10.27
<i>Scholar</i> ...	Egerton, J. J. ...	J. McLellan ...	" M.	Harrison ...	" 17.9.27 to 6.11.27	7.11.27
<i>Scotia</i> ...	Prichard, S. D., M.B.E.	O. W. L. Jones ...	C.C.	L.M. & S. Railway ...	" 25.5.27 to 8.8.27	10.8.27
<i>Scottish Bard</i> ...	McDonnell, S. ...	J. W. Lilley ...	No. A.	L.M. & S. Railway ...	Telegraphic Report 9.11.27	9.11.27
<i>33 Scythia</i> ...	Prothero, W. ...	G. Overton, G. H. Morris, P. G. Britten.	W.T.	Tankers Ltd. ...	Form 911 22.11.26 to 3.12.26... ..	3.1.27
<i>Sheaf Mount</i> ...	Groves, C. V. ...	W. Thomson ...	No. A.	Cunard ...	W.T. Reg. 26.9.27 to 30.10.27... ..	3.11.27
<i>Sheaf Spear</i> ...	Whitfield, G. A., O.B.E.	S. J. Dring, T. B. Fishley ...	M.L.	W. A. Souter ...	" 5.6.27 to 14.7.27	20.7.27
<i>Shropshire, M.V.</i> ...	Adamson, B. W. ...	W. L. Whiteside, R. V. Brown, W. H. Brittain, J. E. Goldsworthy.	"	" ...	Met. Log. 4.2.27 to 25.7.27	17.9.27
<i>Socrates</i> ...	Taylor, F. C. ...	W. E. Jordan ...	No. A.	Bibby ...	" 4.6.27 to 14.8.27	17.8.27
<i>Somerset</i> ...	Howell Price, J. ...	W. Redwood ...	" A.	Lampert & Holt ...	Form 911 2.7.27 to 14.9.27	26.9.27
<i>Spero</i> ...	Montgomery, H. ...	D. Millward ...	M.L.	Federal... ..	" 25.7.27 to 3.9.27	13.10.27
<i>Stockwell</i> ...	Thowless, E. ...	R. A. Kneen ...	No. A.	Ellerman Wilson ...	Met. Log. 24.12.26 to 3.7.27	8.7.27
<i>Surrey</i> ...	Lamb, C. B. ...	S. C. Bradley ...	" A.	Brocklebank ...	Form 911 8.8.27 to 7.10.27	14.10.27
<i>Suwa Maru</i> ...	Gotoh, M. ...	...	" A.	Federal... ..	" 28.3.27 to 15.8.27	19.8.27
<i>Sylvafield</i> ...	Biddick, E. ...	E. Holmes ...	" A.	Nippon Yusen Kaisha	" 26.8.27 to 25.7.27	4.8.27
<i>Tainui</i> ...	Elford, H. C. ...	P. S. Horwood ...	" A.	Hunting & Son ...	" 17.8.27 to 26.8.27	30.8.27
<i>Tahiti</i> ...	Aldwell, B. M. ...	G. M. Coote ...	" A.	Shaw, Savill & Albion	" 4.10.27 to 9.11.27	14.11.27
<i>Taipui</i> ...	Frame, A. M. ...	F. Stratford, S. Moore, A. C. Kennedy.	M.L.	Union S.S. Co. of N.Z.	" 10.8.27 to 29.9.27	13.10.27
<i>Talthybius</i> ...	Hatfield, J. ...	G. D. Jones ...	No. A.	Yuill & Co. ...	Met. Log. 15.1.27 to 8.6.27	15.9.27
<i>Tamara</i> ...	Hartman, W. H. ...	F. W. Lutyens ...	" M.	A. Holt ...	Form 911 4.9.27 to 27.9.27	13.10.27
<i>Tanaga</i> ...	Pilcher, E. T., Lieut.-Commr., R.N.R.	G. C. Smith, H. Munday, H. E. Nuzum, J. Heddle.	" M.	Shaw, Savill & Albion	" 27.8.27 to 2.10.27	6.10.27
<i>Tetresias</i> ...	Wilkinson, W. H. ...	...	" A.	E. & A. S.S. Co. ...	" 3.6.27 to 30.8.27	26.10.27
				A. Holt & Co. ...	9.4.27 to 7.8.27	12.8.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 18.11.27.	Date Received
<i>Tekoa</i>	Barnett, H. ... ..	... ..	No. M.	New Zealand S.S. Co.	Form 911 16.8.27 to 21.9.27	26.9.27
<i>Telamon</i>	Willecox, J. H. ... ..	... ..	" A.	A. Holt	" 4.8.27 to 16.8.27	19.9.27
<i>Tetela</i>	Bostock, R. J.	F. L. Brealby	" A.	Elders & Fyffes	" 2.10.27 to 5.11.27	11.11.27
<i>Teucer</i>	Hodgson, R. N.	R. N. Inkster	" A.	A. Holt	" 24.8.27 to 12.11.27	14.11.27
<i>Themistocles</i>	Jermyn, W. M.	H. C. Howe	" M.	Aberdeen	" 5.5.27 to 18.6.27	30.6.27
<i>Theseus</i>	Jones, E.	W. A. Fyffe	" A.	A. Holt	" 8.9.27 to 23.9.27	4.11.27
<i>Titan</i>	Power, J.	D. MacTavish, G. W. Best, C. F. Bailey.	M.L.	"	Met. Log. 4.4.27 to 10.8.27	5.9.27
<i>Tongariro</i>	Williams, J. M.	E. A. Quick	"	New Zealand S.S. Co.	Form 911 7.6.27 to 12.7.27	21.7.27
<i>Transylvania</i>	Bone, D. W.	P. Middleton	No. A	Anchor	" 2.10.27 to 23.10.27	26.10.27
<i>Traveller</i>	Worthington, B.	E. L. Stockley, R. L. Williams	" M.	T. & J. Harrison	" 31.7.27 to 29.10.27	1.11.27
<i>Trematon</i>	Evans, B.	J. Jenkyn, C. Warren, E. Griffin.	M.L.	Hain S.S. Co.	Met. Log. 20.5.27 to 6.9.27	14.9.27
<i>Turakina</i>	Hamilton, E. S.	A. N. Marshall	No. M.	New Zealand S.S. Co.	Form 911 21.3.27 to 12.7.27	3.8.27
<i>11 Tuscania</i>	Smart, R. W.	J. Hamilton	W.T.	Anchor	" 24.9.27 to 15.10.27	19.10.27
<i>Tyndareus</i>	Williams, R. J.	A. G. Phillips, F. Howe, A. R. McDavid.	M.L.	A. Holt	Met. Log. 16.12.26 to 18.5.27	2.7.27
<i>Ulmara</i>	Wylie, W. J.	C. Rasmussen	No. M.	Huddart Parker, Ltd.	Form 911 26.8.27 to 26.9.27	10.11.27
<i>Ulysses</i>	Owen, R. D., O.B.E.	A. Studholme	" A.	A. Holt	" 2.3.27 to 10.7.27	13.7.27
<i>Umvost</i>	Barnes, E. W.	R. A. Dyns	" A.	Bullard King	" 10.9.27 to 29.9.27	31.10.27
<i>Valacia</i>	Inch, F.	G. Meggitt	" M.	Cunard	" 28.7.27 to 26.8.27	1.9.27
<i>Vardulia</i>	Robinson, F. W., D.S.O., R.D., Commr., R.N.R.	L. D. W. Rand	" A.	"	" 16.7.27 to 24.10.27	14.11.27
<i>Vigilant</i>	Simpson, E. S. S.	J. Hunter	" A.	Scottish Fishery Board.	" 1.10.27 to 31.10.27	2.11.27
<i>Waiotapu</i>	Todd, D. ... ..	... ..	" M.	Canadian - Australasian.	" 13.7.27 to 19.8.27	12.9.27
<i>Wairuna</i>	Ryan, J.	C. C. Waters, G. H. George, L. B. Ehlert.	M.L.	Union S.S. Co. of N.Z.	Met. Log. 1.10.26 to 23.4.27	1.9.27
<i>Walmer Castle</i>	Owen, S. H.	A. E. Denn	No. A.	Union Castle	Form 911 27.5.27 to 17.7.27	19.7.27
<i>Wangaratta</i>	Scutt, W.	T. W. Worthingham, S. R. Millard, A. G. Brooks, J. K. Riden.	M.L.	British India	Met. Log. 3.4.27 to 27.8.27	3.9.27
<i>Warfield</i>	Steel, R.	C. M. Quick	No. A.	"	Form 911 9.9.27 to 23.9.27	3.10.27
<i>War Nizam</i>	Moneriff, T.	B. Kieran	" A.	British Tankers	" 19.9.27 to 30.10.27	9.11.27
<i>Westmoreland</i>	Gardner, H. W. ... ..	... ..	M.L.	Federal ... ..	" ... ..	...
<i>Windsor Castle</i>	Stanley, W. F., R.D., Commr., R.N.R.	A. J. Tweddell, F. Norfolk, — Montgomery.	"	Union Castle	Met. Log. 11.6.27 to 2.10.27	17.10.27
<i>Winifredian</i>	Harrocks, W.	A. Crone	No. M.	Leyland	Form 911 15.9.27 to 17.10.27	31.10.27
<i>Wonganella</i>	Suffern, H.	G. F. Phillips	"	W. Crossby & Sons	" 28.7.27 to 3.9.27	13.10.27
<i>Woodarra</i>	Reilley, J. V.	L. D. Graham, H. Goater, B. W. Smith	M.L.	British India	Met. Log. 23.10.26 to 18.4.27	1.5.27
<i>Yorkshire</i>	Millson, G. E.	W. M. C. Higginson, R. Allen	No. A.	Bibby	Form 911 23.4.27 to 4.7.27	9.7.27
<i>Conway H.M.S.</i>	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets	Cadets' M.L.	... ..	Cadets' Met. Log. 8.5.27 to 23.7.27	27.7.27
<i>Pangbourne Nautical College</i>	Tracy, A. F. G., Commr., R.N.	" ... ..	"	... ..	Cadets' Met. Log. 1.5.27 to 22.7.27	27.7.27
<i>Worcester, H.M.S.</i>	Sayer, M.B., C.B.E., R.D., Capt., R.N.R.	" ... ..	"	... ..	Cadets' Met. Log. 6.5.27 to 27.7.27	30.7.27
<i>Abaco</i> ... ..	... ..	The Keepers	Lighthouse Register.	... ..	Lighthouse Register 1.7.26 to 20.10.26	20.4.27
<i>Cay Lobos</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 1.1.27 to 11.7.27	29.9.27
<i>Double Headed Shot</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 1.7.26 to 31.12.26	20.4.27
<i>Inagua</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 24.1.27 to 3.7.27	29.9.27
<i>Sóbrero</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 1.1.27 to 30.6.27	10.8.27
<i>Watling Island</i> ... ..	... ..	" ... ..	"	... ..	Lighthouse Register 10.9.26 to 30.6.27	29.9.27
<i>Cape Pembroke</i> (Falkland Is.)	... ..	" ... ..	"	... ..	Lighthouse Register 1.1.27 to 30.6.27	12.10.27

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

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., received up to 31.10.27.	Date Received.
<i>Casanare</i>	Steidelman, H.	R. O. Jones	Elders & Fyffes	Water Samples	15.9.27
<i>Darro</i>	Matthews, G. P.	W. Halder-Campe	R.M.S.P. Co.	"	6.10.27
<i>Deseado</i>	Hannon, F. S.	J. N. Duncan	"	"	20.10.27
<i>Hildebrand</i>	Maddrell, J.	A. Allan	Booth	"	29.8.27
<i>Tetela</i>	Bostock, R. J.	J. S. Bell	Elders & Fyffes ... ..	" ... ..	...

January, M.O., 1928.

ADVERTISEMENTS

LIST OF SOME OF THE PUBLICATIONS PUBLISHED BY THE AUTHORITY OF
THE METEOROLOGICAL COMMITTEE AND BY THE HYDROGRAPHIC DEPARTMENT
OF THE ADMIRALTY.

MARINE METEOROLOGY, ATLASES AND MEMOIRS.

CHARTS:—

ATLANTIC:—

Monthly Current Charts for the Atlantic Ocean, from information collated and prepared in the Meteorological Office. (No. 132, 1897) (22½ × 18 in.) (Published by the Admiralty.)

Charts of Meteorological Data for the Nine 10° Squares of the Atlantic which lie between 20° N. and 10° S., and extend from 10° to 40° W., with accompanying Remarks, ending with the Best Routes across the Equator. (No. 27, 1876) 24s. (17 × 20 in.)

ATLANTIC (NORTH):—

Meteorological Charts of the North Atlantic for each month of the year, giving normals of Pressure, Air and Sea Surface Temperature and Ocean Currents, with Frequencies of Winds, also Ice Limits. (No. 149A, 1923) 1s. each (35 × 22½ in.). Sold by J. D. Potter, 145, Minories, E.1.

Synchronous Weather Charts of the North Atlantic and the adjacent Continents, 1st August, 1882, to 3rd September, 1883. Parts I to IV (33 sheets each). (No. 71, 1886) 17s. each Part. (26 × 22 in.)

Charts of Meteorological Data for Square 3, Lat. 0°-10° N., Long. 20°-30° W. (20 × 13½ in.) and Remarks to accompany the Monthly Charts, which show the Best Routes across the Equator for each Month, &c. (17 × 16½ in.) (No. 20, 1874) 20s.

Discussion of the Meteorology of that Part of the Atlantic lying North of 30° N., for the eleven days ending 8th February, 1870. With Charts (No. 13, 1872) 5s. (4to.)

ATLANTIC (SOUTH):—

Wind Charts for the Coastal Regions of South America, from information collated and prepared in the Meteorological Office. (No. 159, 1902.) (27 × 20½ in.) (Published by the Admiralty.)

The relation between Pressure, Temperature, and Air Circulation over the South Atlantic Ocean. By M. W. Campbell Hepworth, C.B., Commander R.N.R., Marine Superintendent. (No. 177, Second Edition, 1917.) 1s. (8vo.)

BAFFIN BAY AND DAVIS STRAIT:—

Monthly Meteorological Charts of Baffin Bay and Davis Strait. (No. 221, 1917.) 8s. (30 × 25½ in.)

INDIAN OCEAN:—

Meteorological Charts of the East Indian Seas for each month of the year, giving Normals of Pressure, Air and Sea Temperatures and Ocean Currents, with Frequencies of Winds. (No. 181A, 1923.) 1s. each. (35 × 22½ in.) Sold by J. D. Potter, 145, Minories, E.1.

Monthly Current Charts for the Indian Ocean, from information collated and prepared in the Meteorological Office. (No. 124, 1896.) (20 × 24½ in.) (Published by the Admiralty.)

CHARTS:—*continued.*

MEDITERRANEAN SEA:—

Atlas of Normal Monthly Values of the Meteorological Elements for the Mediterranean Sea and adjacent Lands. (No. 224, 1917.) 6s. (22½ × 17 in.)

PACIFIC OCEAN:—

Quarterly Current Charts for the Pacific Ocean, from information collated and prepared in the Meteorological Office. (No. 134, 1897.) (26½ × 28½ in.) (Published by the Admiralty.)

Wind Charts for the Coastal Regions of South America, from information collated and prepared in the Meteorological Office. (No. 159, 1902.) (27 × 20½ in.) (Published by the Admiralty.)

RED SEA:—

Meteorological Charts of the Red Sea. (No. 106, 1895.) 21s. (22 × 13½ in.)

SOUTHERN OCEAN:—

Meteorological Charts of the Southern Ocean between the Cape of Good Hope and New Zealand. (No. 123, 1917.) 7s. 6d. (12½ × 9½ in.)

GEOPHYSICAL MEMOIRS (4to.):—

12. Travel of Circular Depressions and Tornadoes and the Relation of Pressure to Wind for Circular Isobars. By Sir Napier Shaw, F.R.S. (No. 220b, 1917.) 9d.

19. Hurricanes and Tropical Revolving Storms. By Mrs. E. V. Newnham, M.Sc. With an Introduction on "The Birth and Death of Cyclones," by Sir Napier Shaw, F.R.S. (No. 220i, 1922.) 12s. 6d.

28. The Doldrums of the Atlantic. By C. S. Durst, B.A. (No. 254h, 1926.) 1s. 6d.

A Barometer Manual for the use of Seamen. A Text-Book of Marine Meteorology. With an Introduction and Appendices. Tenth Edition, 1925. (No. 61.) 1s. 6d. (8vo.)

The Marine Observer's Handbook. Fourth Edition. 1927. (No. 218.) 3s. (8vo.)

Report (to the Board of Trade) on the work carried out by the S.S. *Scotia*, 1913. (1914.) 4s. 6d. (Fcp.) Maps, charts and diagrams to illustrate the Report. (1914.) 2s. 6d. (Fcp.)

Report on the Gales experienced in the Ocean District adjacent to the Cape of Good Hope between Lat. 30° and 50° S., and Long. 10° and 40° E. By Capt. H. Toynbee, F.R.A.S. (No. 44, 1882.) 7s. 6d. (4to.)

Weather Map. An Introduction to Modern Meteorology. By Sir Napier Shaw, F.R.S. (Sixth Issue, 1925.) (No. 225i) 1s. 3d. (Royal 16mo.)

The Admiralty Publications are on sale by J. D. POTTER, 145, Minories, London, E.1.

The other Publications mentioned in this list, unless otherwise marked, can be purchased directly from

H.M. STATIONERY OFFICE at the following addresses:—

Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square West, Belfast;

or through any Bookseller.

[To face last page of matter

