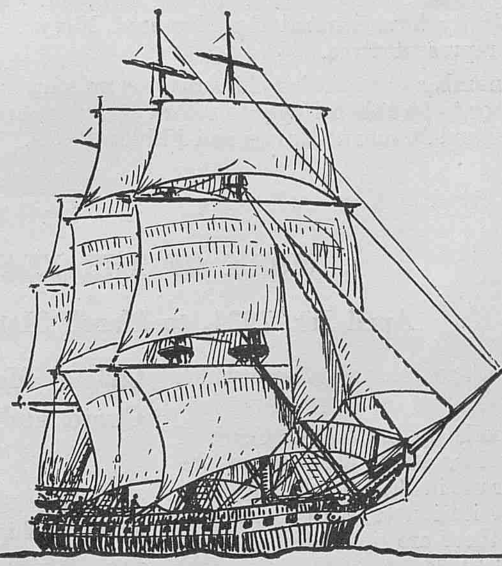

VOL. XII, No. 119. THE MARINE OBSERVER. JULY 1935.

THE MARINE OBSERVER

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HIS MAJESTY'S SILVER JUBILEE.

The 25th anniversary of His Majesty King George V's accession to the Throne has occurred while this number is going to press.

Marine Observers rejoice in the long reign of our Sailor King, who has ever been so mindful of the welfare of his seafaring subjects.

His Majesty has commanded the assembly of His Majesty's Fleet for His review at Spithead on July 16th, and with his permission the Admiralty have invited the Merchant Navy and Fishing Fleets to send representatives.

A number of observing ships may be present, and we hope in a later number to be able fittingly to record this great event for His Majesty's Royal and Merchant Navies and Fishing Fleets.

WORK OF THE YEAR.

April 1st, 1934, to March 31st, 1935.

There are two salient matters of the work at sea and ashore which stand out in the past year.

The first is that the steady progress made by the British Corps of voluntary Marine Observers since May 1st, 1930, has proved the soundness of the methods then adopted for use in British Selected Ships so well, that during the past year an invitation to British shipping to carry on the service, where and when there are not Selected Ships has been extended to the whole of the British Merchant Navy.

The second is that the Marine Division has by its work since January 1st, 1933, proved the soundness of the scheme of work then commenced, to extract all suitable data remaining in the logs as received since 1855, and to complete the charting of the oceans for climate.

Collection of Data during the Year.

Meteorological Log (4 hourly) kept with complete official instrumental equipment, kept by an average number of 50 ships.

Of a total of 119 received :—

48 classed Excellent.
71 classed Very Good.
0 classed Good.
0 not classed.

119 Total.

The method of classification given in last year's report remains the same.

Ships' Meteorological Record Form 911. Two to four sets of synchronized observations daily according to number of watch keeping officers carried, kept by an average number of 299 ships.

Of a total of 2,377 of these forms received, they were classed as follows :—

706 Excellent.
1,666 Very Good.
2 Good.
3 Not classed.

2,377 Total.

The system of classification is unchanged.

Cadets' Meteorological Logs, Lighthouse Registers, Coast Guard and Light Vessel Returns, Ice Reports, Form 912, and Miscellaneous Contributions.

The valuable work of training future marine observers by the officers' training ships *Conway* and *Worcester* and the Nautical College, Pangbourne, has continued, all Cadet Meteorological logs returned being " Excellent."

The lighthouse stations at Watling Island, West Indies and at Cape Pembroke, Falkland Islands, have continued to return routine observations.

The return of ice reports on Form 912 has been continued by observing ships sighting ice.

Information recorded in the Remarks Books of His Majesty's ships, including the set and drift of current experienced, has been received from the Hydrographer of the Navy.

Sea Water Samples and Surface Temperatures.

The work of collecting water samples and observations of sea surface temperatures in the North Atlantic has been continued in five ships for the Fisheries Laboratory at Lowestoft.

The work of assisting the John Murray Expedition in its oceanographical survey of the Arabian Sea, in which 24 British ships collected water samples under the guidance of the Marine Division of the Meteorological Office, was finished on September 30th, 1934, with satisfactory results to the work of that Expedition, for which the John Murray Committee expressed appreciation.

The collection of information since 1855 mainly provided by the British Merchant Navy has been the main source from which a Handbook of Weather, Currents and Ice for Seamen has been compiled and published this year.

The Use made of the Data collected.

The charting of currents in The Marine Observer and the construction of the Atlas of currents of the Indian Ocean have been continued.

Resulting from this work of charting the currents, the currents of the oceans have been summarized in the new handbook ; and revisions have been provided of the information of currents of the Indian Ocean In the Admiralty Books " Ocean Passages for the World," Australian Pilot, Volume V, and the South Indian Ocean Pilot.

Information of the obscurity of the atmosphere off the Western and Southern coasts of England, drifting ice in the Northern and Southern hemispheres, and information of currents in the Red Sea and in the Indian Ocean to the northward of Australia, have been compiled and published in The Marine Observer during the year.

Work done in the Marine Division towards the Use of Data collected.

On April 10th, 1931, a letter received by the President of the Board of Trade from the Honourable Company of Master Mariners, dated March 23rd, 1931, was referred to the Marine Division.

This letter pointed to the great return of meteorological logs made by British ships to the Marine Division of the Meteorological Office since 1854, the object of the work, the charts already compiled from it, and the need for efficient modern meteorological charts for each and every ocean, also the need of a manual for seamen.

On January 2nd, 1933, after reducing the number of the voluntary observing fleet, and making some internal adjustments in the Marine Division, a scheme of work was commenced with the same complement of personnel.

The result has been that a great deal more data has been extracted from meteorological logs collected before and since the Great War than has been the case since reorganization in 1920.

All observations in meteorological logs received since January 2nd, 1933, have been extracted.

Some of the arrears of extraction for the years 1921 to 1930 have been recovered, and we have gone some way in preparing for use observations received in meteorological logs before 1920 in the Pacific Ocean and the North Atlantic by punching them on cards.

This two years' work has proved that given the necessary additional staff for a time, all the necessary data can be extracted, and then the Marine Division will be in a position to complete the charting of the Oceans for Climate. Without temporary addition of clerks the load would be too heavy.

In view of certain re-organizations which are taking place in the Meteorological Office, the provision of the temporary additional staff in the Marine Division to complete the extraction of data expeditiously, is deferred for several months; meanwhile, the work continues as expeditiously as possible with every available clerk.

TABLE I at the end of this report gives the number of observations extracted during the past year, and for each year since 1921. It indicates the progress since 1932.

MARSDEN'S CHART NO. I gives the distribution and number of observations collected and extracted since re-organization on April 1st, 1920.

MARSDEN'S CHART NO. II shows the distribution of sets of observations collected before 1920 which have been punched on cards by clerks in the Marine Division since January 2nd, 1933, for the purpose of completing the meteorological survey of the oceans.

Enquiries.

In response to enquiries for information of the state of weather and/or the set and drift of the current where and when there have been maritime casualties or damage to ships or cargoes, if, when required, information cannot be provided by publications already made, hand-made copies of the appropriate observations recorded in British observing ships have been provided.

Charges have been made for the expense of copying in accordance with the scale laid down for all enquiries answered, except those of other British Government Departments, foreign Government Meteorological Institutions, and British Institutions whose members assist in providing the information collected in the Marine Division.

In this connection, the Board of Trade have been supplied with information of the number of days each month upon which Gales were reported in the North Atlantic during the winter months during the past five years.

The supply of unpublished observations to the Meteorological Services of the British Empire and Foreign Countries.

As copying observations by hand involves considerable time and work and so reduces the capacity of the Marine Division to produce results, as little as possible is done by this method.

During the year, for the purpose of supplying other meteorological institutions, it has only been necessary to copy by hand 1,062 sets of observations logged in the North Atlantic during 1909 and 1910 for the German Meteorological Service.

By means of the registers of British Selected Ships, observations in code have been supplied as follows :—

To South Africa, 5,390, recorded during the year 1933–34, South of the Equator, and mainly between the meridians of 30° W. to 80° E.

To Australia and New Zealand, 11,680, recorded during the year 1933–34, South of the Equator, mainly between the meridians of 80° E. and 70° W.

To Norway, 7,169, recorded during the period October 20th, 1932, to April 30th, 1933, South of the Equator.

To Germany, 6,116, recorded in the North Atlantic Latitude 10° to 40° N., Longitude 30° to 60° W. for the year 1932.

By means of the Hollerith system the following logged observations for the purpose of determining averages for climate, etc., were supplied as follows :—

To Holland, 22,233, for the months July to December, 1921, to 1930, in the China Sea.

To Germany, 1,189, recorded South of Latitude 60° S., for the years 1930 to 1934.

Marine Meteorological Publications.

THE MARINE OBSERVER continues to be a satisfactory medium for communication with the corps of voluntary marine observers.

Valuable information has been contributed to this publication by Vice-Admiral Sir ROBERT MANSELL, Deputy Master of Trinity House, J. P. BOWEN, Esq., Engineer-in-Chief of Trinity House, Captain J. GILLIES, the General Manager of Canadian Pacific Steamships, Ltd., Professor J. STANLEY GARDINER, Secretary of the John Murray Expedition, E. F. GREENLAND, Esq., Officer-in-Charge of Portishead Radio, the officers of the Merchant Navy, and the members of the Marine Division, including the Port Meteorological Officers.

The pamphlet, M.O.329, DECODE FOR USE WITH THE INTERNATIONAL CODE FOR WIRELESS WEATHER MESSAGES FROM SHIPS has been revised and brought up to date as a third edition.

A HANDBOOK OF WEATHER, CURRENTS AND ICE FOR SEAMEN has been published, M.O.379.

The stocks of nearly all the old meteorological atlases of the oceans have been exhausted, and enquiries have frequently been received as to when modern atlases will be available. These cannot be provided for some years, and until the arrears of data extraction already referred to have been completed.

The construction of a new atlas of currents for the Indian Ocean is nearing completion.

British Ships' Routine Wireless Weather Telegraphy in all parts of the world.

Early wireless telegraphy was used for communication between ships, and ships and the shore only; and naturally, distress signals, ship's business, navigation, and exchange of information of weather, currents and ice, formed the greater part of the wireless traffic in those days. There was a marine service only.

With the great developments which have since taken place, when the ether is heavily charged with every conceivable kind of message passing between land stations in all parts of the world, and, in doing so, girdling the earth, as well as the great wireless traffic between ships in all parts of the world, ships' wireless weather telegraphy stood a poor chance if not carefully fostered. To this end the Marine Division work with the Merchant Navy.

The Conference on Safety of Life at Sea in 1929 recognized this in Article 35 of its Convention, which is now embodied in the British Merchant Shipping Act.

The Selected Ship system, which has been worked up by the British Merchant Navy under the guidance of the Meteorological Office has proved so successful that during the past year invitation has been made by the Meteorological Office to the masters of all British ships fitted with wireless telegraphy to carry on the service where and when there are not Selected Ships.

The Chamber of Shipping of the United Kingdom, the Mercantile Marine Service Association, the Imperial Merchant Service Guild, and the Officers (Merchant Navy) Federation are co-operating in making known this invitation to the masters of British ships.

British Selected Ships continue to do the greatest part of this work. The regularity and accuracy of their work is a most valuable guide. They are the mainstay of weather telegraphy at sea, but shipping of all nations is so disposed that there are regions of the oceans where on some days there are not Selected Ships; and therefore it is necessary that on such days and in such regions, any ship should carry on the service.

As the methods of modern forecasting become more widely known, the desirability of a continuous service of weather reports in all parts of the ocean will become more generally apparent. Endeavour is being made by suitable means to give enlightenment, where it is welcomed, to the officers of the Merchant Navy in the methods which have been advocated since the pamphlet, "Weather Forecasting in the Eastern North Atlantic and Home Waters," was published in 1921.

The new Handbook already referred to is designed to further this end amongst British seamen in all parts of the world.

The Service of British Selected Ships.

The number of British Selected Ships was reduced from 292 to 287 on September 26th, 1934, to accord with our proportion of the world's tonnage.

Throughout the year not only was the full complement of British Selected Ships maintained in service, but the best geographical distribution possible has been maintained with the most suitable ships of the British Merchant Navy for this voluntary service.

To illustrate this a chart showing the position of all British Selected Ships at sea on June 1st, 1934, which is typical of the daily distribution throughout the year, is given at the end of this number.

A photograph of the position chart worked in the Marine Division is given below showing the estimated positions of "A" Selected Ships at sea and in ports abroad on Saturday, March 30th, 1935. "B" Selected Ships are not indicated on this chart. At present the total number of "A" Selected Ships is 107.

The registers indicate how highly satisfactorily the commanders, officers and wireless operators of British Selected Ships carry out this service.

The use of a schedule and specified wavelengths for communication for the two types of British Selected Ships has gone far to the making of the success of this system, because it enables ships at sea in all parts of the world to receive weather reports direct, and so generally renders the repetition of the same reports, or waiting until collective messages are made from a shore station some hours after observation time, unnecessary. The voluntary wireless discipline of British Selected Ships is of a very high order and by this fine example much good is being done.

At the end of this report, TABLE II gives particulars for the month of October, 1934, for different parts of the world, which gives a good idea of the regularity with which this service is performed by British Selected Ships.

In the eastern North Atlantic where there is great congestion of wireless traffic, and where a roll call is used, the work has continued to be highly satisfactory.

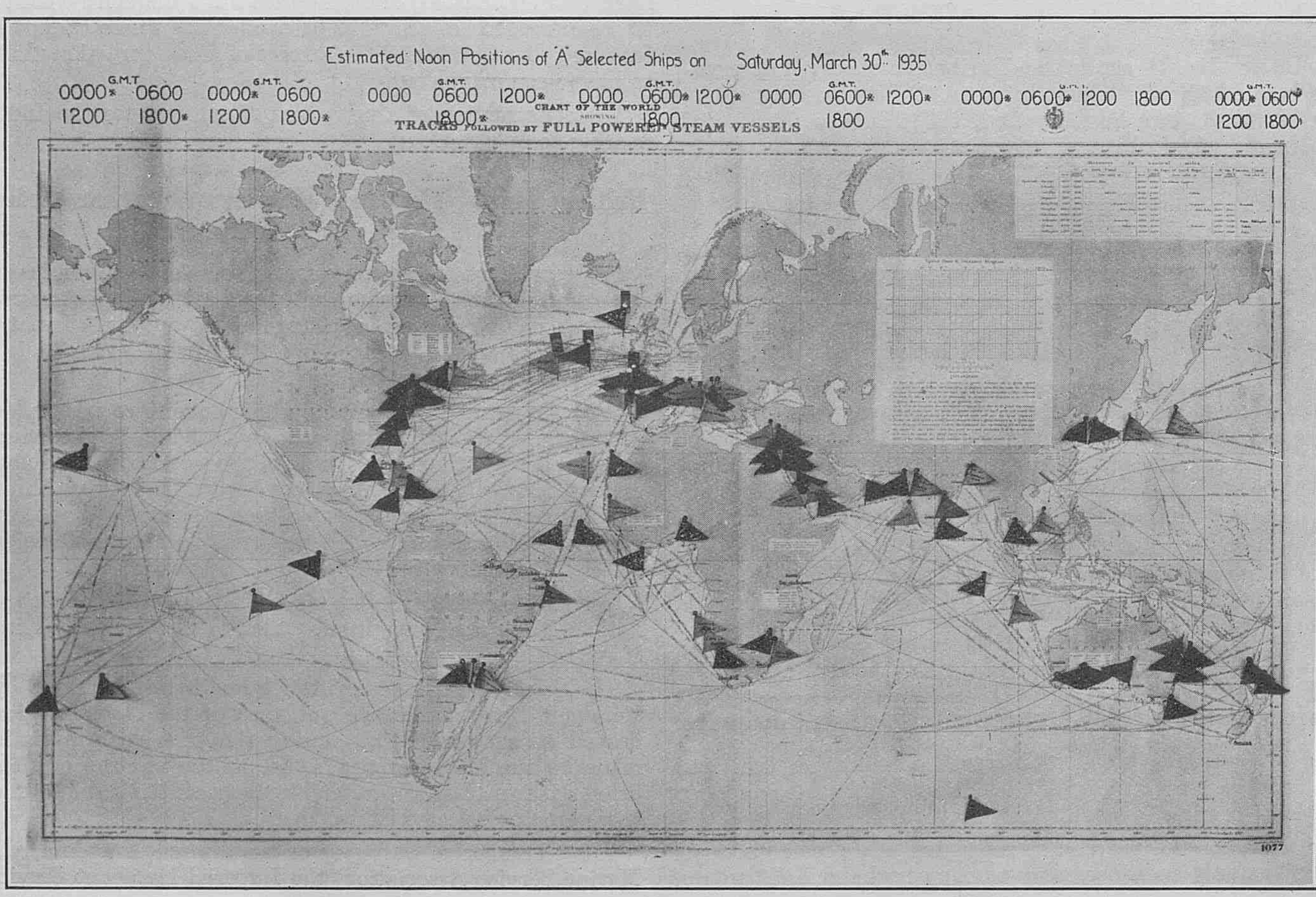
During the year the average number of ships on the roll call to report to Weather London through GKU was 6·6, of which an average of 5·7 reported.

TABLE III which follows this report gives the number of observations received by Weather London through Portishead Radio from British Selected Ships in the eastern North Atlantic and the North Sea for each month throughout the year.

Of this total, 5,595, which is an average of 15·3 reports per day, 3,534 were observations made at 0600 and 1200 G.M.T. and 3,477 of these were reported according to schedule, only 57 being late.

The remaining 2,061 reports were of observations made at 0000 and 1800 G.M.T., and these were transmitted as circumstances would permit, but generally at similar relative intervals following S.O.S. periods of silence.

A description of the general work of British wireless stations, and particularly of Burnham Radio GKU. the station which works with British "A" Selected Ships in the Eastern North Atlantic, was given



in the April, 1935, MARINE OBSERVER by the officer in charge of that station in which he explains the advantages of the different kinds of wavelengths, and why at present long wave is the most suitable for this work.

Weather Reports from Ships in Home Waters.

Since 1920, Cross Channel steam packets on the Guernsey-Weymouth, Kingstown-Holyhead, and Dieppe-Newhaven runs have made observations in mid-channel and reported them, either by land wire on arrival, or by W/T to Weather London.

This service has now been extended to the Guernsey-Southampton, Belfast-Heysham, and Hook of Holland-Harwich routes; and has been improved by the general use of wireless telegraphy.

The information of weather, sea and air temperature thus quickly received from ships in home waters being of assistance for forecasting visibility for the Weather Shipping Bulletin, and for the provision of information to the growing service of aviation over the British Isles and neighbouring seas.

TABLE IV at the end of this report indicates the number of weather reports received from British cross channel steam packets during each month of the past year.

Personnel.

The Fleet List published in THE MARINE OBSERVER giving the names of observing ships, indicating the different branches of the work for which they are detailed, with the names of their Captains, observing officers and senior wireless operators, commenced in 1924 with the publication of this journal, has proved a most happy innovation, and has been a great factor in promoting a good spirit in the work at sea.

It is now an indispensable part of our machinery for maintaining efficiency.

Great credit is due to the corps of voluntary marine observers all over the oceans. Notwithstanding their duties, and the constant vigil which is required in navigating ships, the corps of voluntary marine observers is not only observing the weather, currents, and ice, which is a natural part of a seaman's duty, but they are also regularly night and day writing up meteorological logs, records, and registers for the furtherance of meteorological investigation.

The service of wireless operators of British Selected Ships, of which this report has so much to say, has been of great assistance.

At the ports, the Port Meteorological Officers and Merchant Navy Agents have done much good work in the link they form between the corps of voluntary marine observers and the Marine Division.

Acknowledgment.

The written returns made—Logs, Records, Registers and Reports—by each observing ship have been acknowledged quarter by quarter in the Fleet List with the publication of each number of THE MARINE OBSERVER. These written returns result from a great deal of work at sea, careful patient accurate observation and communication, deep thought with loss of leisure. Only those who have done this work in addition to the work of a ship can fully realize what it entails. In the Marine Division of the Meteorological Office we know, and we are anxious, knowing what it means, not only to express our thanks adequately for all the good work done but as far as lies in our power to prevent the good will of the British Corps of Voluntary Marine Observers being misused by over collection or unnecessary duplication of weather work at sea. The Merchant Navy and the Meteorological Office are deeply in debt to the Corps of Voluntary Marine Observers for the work they have done in carrying out the services contracted for in the International Convention of Safety of Life at Sea.

In recognition of this fine work the Meteorological Committee are making awards to the Commanders and Principal Observing Officers of a large number of ships whose work has been classed excellent for not less than a certain period during the past year. Their names are given in the list which follows.

MARINE SUPERINTENDENT.

London, April 1st, 1935.

LIST OF CAPTAINS AND PRINCIPAL OBSERVING OFFICERS TO WHOM THE METEOROLOGICAL COMMITTEE HAVE MADE EXCELLENT AWARDS.

Captain.	Principal Observing Officer.	Ship.
ADCOCK, F.	—	*Nestor.*
ALLIN, C. H. C.	CRONE, J. K.	*Moldavia.*
ANDREWS, H.	WHITEHEAD, H.	*Clan Macbeth.*
ANGELL, A. J.	CLARKE, J. E.	*Limerick.*
AVERN, J., Commr. R.N.R.	MILLER, L. B.	*Fordsdale.*
BARNETT, H.	VINCENT, J. R.	*Rangitiki.*
BECK, B. B.	MAY, E. G.	*Rawalpindi.*
BEECHING, P. A.	—	*Dalgoma.*
BICKFORD, C. N.	HODSON, M. S.	*Edinburgh Castle.*
BISSET, J. G. P., Commr. R.N.R., R.D.	POLLITT, E. J. R.	*Ascania.*
BONE, D. W.	LEIPER, B. S.	*Transylvania.*
BRIDGES, E. A.	—	*Natia.*
BROWNE, R. H.	O'HEHIR, J. O.	*Clan Mcwhirter.*
BULMER, J. R.	HUGHES, J. F.	*Hibernia.*
BURET, T. J. C.	RANDLE, A. E. H.	*Almanzora.*
BURTON, E. A.	COEN, R. W.	*Westmoreland.*
BURTON DAVIES, J.	WILLMOTT, M.	*Hertford.*
CAFFYN, F.	CHRISTMAS, V. R.	*Malda.*
CAMERON, H.	THOMSON, H. F.	*Northern Coast.*
CAMERON, J. M.	CARROLL, C. L.	*Mahana.*
CAPON, S. N.	EVANS, G. L.	*Doric Star.*
CARTER, E. A. J. W., Capt., R.N.R., R.D.	KIMPTON, R. A. B.	*Strathaird.*
CARTWRIGHT, C. W., D.S.C.	TUCKER, R. E.	*Comorin.*
CARTWRIGHT, H.	HUDSON, J.	*City of Dieppe.*
CHRISTIE, D.	ROSOMAN, R.	*Coptic.*
CLARKE, E., Commr., R.N.R., R.D.	DOVELL, W.	*Alcantara.*
CLARKE, P. B., D.S.C.	MERCER, L.	*Tongariro.*
CLAYTON, R. G., D.S.C., Capt., R.N.R., R.D.	FITTON, J. H. SEATON, N. F.	*Highland Monarch.*
COLLIE, A.	BLAKE, R.	*Caledonia.*
COMPTON, R. W.	BRAMMALL, H. W. FAULKNER, J. R.	*Baronesa.*
CORNISH, N. P.	AUSTIN, A. E.	*Matra.*
COTTELL, S. C.	HENDERSON, W. D.	*Port Alma.*
COYLE, W. B., Commr., R.N.R., R.D.	STEWART, J.	*Duchess of York.*
CURRIE, S.	FRENCH, L., ST. J.	*Comliebank.*
DAWES, H., O.B.E., D.S.O.	GOODING, W.	*Masula.*
DURHAM, R. S., D.S.C.	RING, L. E. E.	*Port Hunter.*
EGERTON, H. C.	ROBSON, J. K.	*Vancouver City.*
EGERTON, J. J.	REES LLOYD, J.	*Recorder.*
ELLIOTT SMITH, H., Lieut.-Commr., R.N.R.	BATEMAN, G. L.	*Chitral.*
ELWELL, F. R.	GERREY, M. H.	*Harmonides.*
ENDERSBY, J.	DAY, W. R.	*Domala.*
EVANS, L.	RICHARDSON, A. S.	*Alban.*
FAILL, A.	EVANS, C. V.	*Apapa.*
FIELD, H. G. B.	ROBERTS, C. W.	*Huntingdon.*
FRENCH, F. E., Capt., R.N.R., R.D.	COOKE, C. S.	*Corfu.*
FRIEND, A. B.	LOUGHEED, E. J.	*Princesa.*
FROST, C. R.	MURRAY, D.	*Duquesa.*
FULCHER, H. D.	JOHNSTON, T.	*Matheran.*
FURLONG, G. H. S., O.B.E., Capt., R.N.R., R.D.	MORRISS, M. G.	*Ranpura.*
FURNER, F. S.	TAGGART, H. W.	*Stephen.*
GASKELL, J. H., Lieut.-Commr., R.N.R.	PATTINSON, R.	*Mataroa.*
GIBBINGS, W.	EUSTANCE, W. S.	*Inanda.*
GILLIES, D.	LINFIELD, G.	*Alynbank.*
GILLING, W.	WALTON, A. L.	*Port Alma.*
GOODRICK, H. P.	—	*Upwey Grange.*
GORDON, H.	SANGWIN, G.	*Zealandic.*
GREGORY, S. E. A.	MILBURN, T. B.	*Port Denison.*
HALL, G. S.	MOATE, J. S. GORMAN, S. R.	*Port Caroline.*
HANNAN, E. F., Commr., R.N.R., R.D.	COPELAND, G. D.	*Alipore.*
HARRIS, E.	WESTON, H. J. P.	*Hauraki.*
HARRISON, R., D.S.O., A.D.C., Capt., R.N.R., R.D.	MAYNE, C.	*Strathnaver.*
HATTON, A., Skipper	—	*S.T. St. Keverne.*
HAWKES, W. A., C.B.E., A.D.C., Capt., R.N.R., R.D.	MCCALLUM, A. D.	*Scythia.*
HAYTER, S. W.	MUNDAY, P. A.	*Port Chalmers.*
HEADLAM, P. C., Commr., R.N.R., R.D.	WILD, G. A.	*Rajputana.*
HEARN, G. W.	READ, E. C.	*Port Dunedin.*
HIGGS, W. G.	MCCLOUNAN, A.	*Port Gisborne.*
HIGNETT, A. H., Commr., R.N.R., R.D.	BALDWIN-WISEMAN, R. E.	*Ranchi.*
HILL, T. V.	BILLINGHAM, J.	*Niagara.*
HOLLAND, E.	HILL, H.	*Remuera.*
HOWARD, H. C.	WHITE, R.	*Almeda Star.*
HOWELL PRICE, J., D.S.O., D.S.C.	JARVIS, S. A. ROBINSON, R. C.	*Tekoa.*
HUDSON, J. J.	GORLEY, C.	*Port Darwin.*
HUNTER, J. L. B.	WILLIAMSON, H. P.	*Rangitata.*

Captain.	Principal Observing Officer.	Ship.
Jack, H. M.	Mann, H. J.	*Carthage.*
Jacobson, T. A.	Taylor, D. M.	*Cape of Good Hope.*
James, D. F.	Smail, J.	*Mantola.*
James, L. V., D.S.C.	Grandage, G. R.	*Otranto.*
Jeffery, H. C.	Walker, H. B.	*Port Denison.*
Johnson, J. W.	Morris, B. M.	*Taranaki.*
Kemp, E. R.	Goord, A. B.	*Hertford.*
Kinnell, G.	Wilson, F. R. F.	*Ruahine*
Laird, C. A. I.	MacMillan, P.	*Buteshire.*
Laird, J.	Coldwell, J. A.	*Turakina.*
Leask, L. W., Commr., R.N.R., R.D.	Wilson, P. M.	*Mulbera.*
Lee, O. J. P., Capt., R.N.R., R.D.	Caris, N.	*Aidan.*
Lettington, A. E.	Brown, A.	*Cornwall.*
McIntosh, A.	Winyard, H.	*Tainui.*
McKellar, A. W., Capt., R.N.R., R.D.	Cathie, C. B. Mercer, L.	*Rangitane.*
McNish, R.	Block, P. A.	*Norfolk.*
MacDonald, D.	Crawford, S. H.	*Makura.*
Maltby, T. L.	Thomas, N. A.	*Cumberland.*
Martin, W.	Menlove, D. A.	*Niagara.*
Matheson, C. G., D.S.O., Commodore, R.N.R., R.D.	Mackay, E. M.	*Oronsay.*
Mee, F. T.	Mobbs, E. G. G.	*Stirlingshire.*
Moore, H. A.	Parsons, D.	*Montcalm.*
Morton Betts, W.	Purse, C. R.	*Warwick Castle.*
Murray, M. F., Commr., R.N.R., R.D.	Roberts, W. J. P.	*Montrose.*
Nelson, A. L.	Hill, L. C.	*R. R. S. Discovery II.*
Northwood, N. R.	Holland, H. L.	*Llangibby Castle.*
Oram, B. B., Commr., R.N.R., R.D.	—	*Laconia.*
Oswald, S.	Durrant, E. T.	*Tairoa.*
Owens, A. L., Capt., R.N.R., R.D.	Sargent, P.	*Orford.*
Pilcher, C. R.	Low, J. N. A.	*Somerset.*
Plage, W. C. C.	Weir, C. C.	*Amarapoora.*
Pretty, F. C.	Davies, T. E.	*Hurunui.*
Quirk, W.	Darby, F.	*Eastern Coast.*
Rhodes, H. R.	Flint, H. M.	*Mongolia.*
Ridyard, A., O.B.E.	Eckford, R. D.	*Orduna.*
Robertson, R. M.	Browne, J.	*Clan Farquhar.*
Robinson, F. W.	Dawson, H. S.	*Opawa.*
Roche, C. B.	Farnfield, G. L.	*Cathay.*
Rome, W. B.	Noble, J.	*Tuscania.*
Rundle, G. G.	Studley, L.	*Titan.*
Salway, A. E.	Spencer, D. I.	*Lahore.*
Saxton, C.	Gerrard, A. A.	*Aidan.*
Shaw, B.	Smith, H. L.	*Worthing.*
Short, C. E.	King, I. K.	*Ranchi.*
Shooter, J. C.	Jones, O. E.	*Accra.*
Siggers, O., Commr., R.N.R., R.D.	Bateman, G. L.	*Chitral.*
Smith, W. D. C.	Wood, R. G.	*Baradine.*
Spring Brown, J. F.	Richards, D. H. Bourke, L. P.	*Aorangi.*
Spurring, R. R.	Jackson, G. R.	*City of Tokio.*
Starr, W. B., Commr., R.N.R., R.D.	Burt, W. G.	*Mamari.*
Stringer, R. H., O.B.E., Commr., R.N.R.	May, E. G.	*Rawalpindi.*
Stuart, R. N., V.C., D.S.O., Commr., R.N.R., R.D.	Harrisson, A. C.	*Empress of Britain.*
Sudell, F. Commr., R.N.R., R.D.	Slinn, H. C. Eade, W. N.	*Narkunda.*
Thompson, W.	Stuart, M. G.	*Otira.*
Thorne, G. G., Capt., R.N.R., R.D.	Manley, F. K.	*Orsova.*
Thurston, H. P.	Anthes, D. L.	*Maimoa.*
Townshend, W. P., Capt., R.N.R., R.D.	Hand, R. H.	*Straithaird.*
Turnbull, J., C.B.E., Commodore, R.N.R., R.D.	Outram, L. Oatridge, E. J.	*Duchess of Bedford.*
Tyson, T. A.	Froebel, V.	*Mahseer.*
Vaughan, P. R., D.S.C., Commr., R.N.R., R.D.	—	*Britannic.*
Vernon, R.	MacPherson, G. G.	*Andalucia Star.*
Watson, C. C.	Sargeant, T. A.	*Bendigo.*
Watson, C. J.	Sanderson, H. H.	*Ixion.*
Welsh, W. A. J.	Reeves, W. D. L.	*Mashobra.*
West, W. F.	Crosscombe, H. R. Helme, R. D.	*Clan Mactaggart.*
White, C. D.	Mulhallen, R. G.	*Nardana.*
Whitfield, G. J.	Mac Iver, P. G.	*Arundel Castle.*
Williams, G.	Allen, J. G.	*Tamaroa.*
Williams, R.	Trotter, J.	*Cambridge.*
Williams, T.	O'Hare, M. C.	*Royal Star.*
Wilson, G. F.	Raynor, E. G.	*Dunster Grange.*
Wood, C., D.S.C.	Pattinson, R.	*Themistocles.*
Woodhead, T. H.	Richardson, H. V.	*Dearne.*
Wyatt, F. N.	Sargeant, T. A.	*Bendigo.*
Young, G.	Graham, N. M.	*Clan Urquhart.*
—	Law, W. J.	*Silver Walnut.*
—	Farrow, L. H.	*Dunbar Castle.*

TABLE I.—The Number of Sets of Observations Extracted from Meteorological Logs during each Year from 1921.

	1934–35.	1933–34.	1932–33.	1931–32.	1930–31.	1929–30.	1928–29.	1927–28.	1926–27.	1925–26.	1924–25.	1923–24.	1922–23.	June, 1921–22.
Number of complete sets of observations extracted and punched on cards with currents entered in data books and phenomena indexed.	48,194	41,932	58,747	70,718	19,185	17,987	43,117	73,745	78,180	75,852	65,000	74,749	97,533	63,731
Arrears of previous years recovered during 1932–35.	—	9,546	—	—	28,497	6,826	—	—	3,702	1,212	—	—	—	—
Number of part-sets of observations in the Pacific and N. Atlantic previous to 1920 extracted and punched in one operation and phenomena indexed since January 1st, 1933.	126,217	82,602	17,798	—	—	—	—	—	—	—	—	—	—	—
Current observations from the year 1910 extracted from meteorological logs and Forms 911 and entered in data books.	4,821	4,850	6,118	8,609	7,980	10,913	2,626	3,496	8,242	8,210	5,746	4,259	1,826	—

TABLE II.—Particulars of Communication by British Selected Ships in Different Parts of the World during October, 1934.

Region and W.T. Station detailed to receive or intercept Selected Ships' reports.	31 days period.	No. of selected ships in region.	No. of reports desirable by schedule.	No. of reports made according to schedule		Percentage of possible number of reports to be made, desired by schedule.	No. of additional reports of observations recorded at International times reported at other than schedule times.	No. of reports received at station.	No. of ships receiving reports.
				To Station.	To C.Q.				
South Atlantic ... ... Slangkop, Z.S.C. (2100m. C.W.)	Oct. 1st to 31st, 1934.	11 "A"	119	42	41	70	—	Not known.	Not known.
South Atlantic ... ... Lat. 30° S. to 40° S. Long. 10° E. to 20° E. (600m.)	Oct. 1st to 31st, 1934.	15 "B"	33	—	27	82	1	—	Not known.
Southern Indian Ocean ... Perth, V.I.P. (2100m. C.W.)	Oct. 1st to 31st, 1934.	10 "A"	85	37	36	86	—	Not known.	Not known.
Southern Ocean ... ... Lat. 30° S. to 50° S. Long. 70° E. to 80° E. (600m.)	Oct. 1st to 31st, 1934.	7 "B"	16	—	16	100	—	—	Not known.
South Pacific ... ... Lat. 30° S. to 50° S. Long. 170° W. to 180° W. Wellington, Z.L.W. Auckland, Z.L.D. (600m.)	Oct. 1st to 31st, 1934.	4 "B"	14	2 to Z.L.W.	9	79	—	—	Not known.
Indian Ocean ... ... Colombo, V.P.B. (2100m. C.W.)	Oct. 1st to 31st, 1934.	18 "A"	189	68	90	84	19	Not known.	Not known.
Arabian Sea ... ... Lat. 10° N. to 20° N. Long. 50° E. to 60° E. (600m.)	Oct. 1st to 31st, 1934.	26 "B"	88	—	83	94	—	—	Not known.
Mediterranean Sea and Red Sea. Long. 0° to Long. 43° 30′ E. (2100m. C.W.)	Oct. 1st to 31st, 1934.	33 "A"	335	—	285	85	19	—	Not known.
Eastern North Atlantic, north of Lat. 38° N. worked by Roll Call. Portishead, G.K.U. (2100m. C.W.)	Oct. 1st to 31st, 1934.	On Roll Call 227 "A"	454	333	—	73	189	532 All reports sent received by Weather London.	Not known.

TABLE III.—Number of Observations received by Weather London through Portishead Radio from British "A" Selected Ships.

April, 1934.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan., 1935.	Feb.	March.	The Year.
413	502	487	497	515	518	540	477	439	401	367	439	5,595

TABLE IV.—Number of Weather Reports received by Weather London from Ships in Home Waters.

April, 1934.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan., 1935.	Feb.	March.	The Year.
64	58	66	76	77	77	63	65	64	70	64	100	854

TABLE V.—Details of Voluntary Observing Fleet and Coast Stations.

	At 31st March.										
	1935.	1934.	1933.	1932.	1931.	1930.	1929.	1928.	1927.	1926.	1925
No. of M.L. Ships	49	50	49	65	101	120	123	123	122	124	125
No. of Form 911 Ships	298	304	300	307	386	355	364	373	369	366	363
No. of Stationary Training Ships and Lighthouses.	5	5	10	10	10	10	10	10	10	10	10
Total No. of Observing Ships	352	359	359	382	497	485	497	506	501	500	498
No. of Form 911 Ships with whole or part Meteorological Office instrumental equipment. S.	190	183	169	126	93	31	31	32	29	31	32
C.C.	17	9	10	10	10	10	10	10	10	10	10
No. of Selected Ships	287	292	299	306	312	290	289	268	—	—	—
No. of ships with Instruments on Board: returns overdue	0	0	0	0	1	0	0	0	0	0	0
No. of Coast Stations and Light Vessels equipped with instruments for Form 914.	18	18	18	18	30	31	31	32	32	34	34
No. of Barometer errors ascertained or checked.	1196	1169	1190	1355	1357	1192	1362	1398	1426	1560	1474
Meteorological Logs	119	122	126	221	285	286	275	279	274	264	274
Ships' Meteorological Records (Forms 911)...	2377	2352	2169	2660	2686	2375	2290	2261	2095	2091	2189
Forms 914 (Coast Observations)	215	216	216	353	363	372	371	383	367	406	402
No. of Wireless Weather Reports addressed to Weather London received through Portishead.	5595	5443	5064	5175	5206†	—	—	—	—	—	—
Lighthouse Registers	4	13	9	17	8	18	10	12	10	15	14
Home Waters Telegraphic Reports	854	838	972	875	720	701	751	773	674	767	802
Cadets Meteorological Log	9	9	7	11	8	9	9	7	10	9	9
DATA EXTRACTION.											
Logs collected since 1920 extracted... ...	137	131	191	175	50	41	100	166	174	170	142
Logs collected before 1920 extracted ...	309	441	97	—	—	—	—	—	—	—	—

† 11 months.

July, August and September.

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

CURRENT.

South Georgia.

The following is an extract from the Meteorological Log of R.R.S. *Discovery II*, Captain A. L. Nelson, observer Mr. L. C. Hill.

The current around South Georgia moves in an anti-clockwise direction and is felt as far off the island as 10-15 miles. Close inshore (1–4 miles off the land) it runs as much as $1\frac{1}{2}$ knots, though it is strengthened or weakened by the wind blowing.

A strong inset will usually be experienced off all the bays when about 2 miles off shore and should be guarded against.

Easterly Set near Cape Verde.

The following is an extract from the Meteorological Record of S.S. *Appam*, Captain J. M. Draper, West Africa to Liverpool, observer Mr. R. K. Palmer, 2nd officer.

On August 25th, 1934, encountered an unusual set to the eastward when north of Cape Verde. A good fix by visual bearings was obtained when off the cape, and a meridian altitude at noon, two hours later. The position was then Latitude 15° 10′ N., Longitude 17° 39′ W. The vessel was steering north true, speed thirteen knots. The wind was W.S.W. force 2, veering later to N. by W. force 2. The sea was slight, with a moderate to heavy N.N.Westerly swell, so little or no leeway was expected. The horizon was too hazy for sights to be obtained in the afternoon, and unfortunately the sky was overcast at twilight in the evening, so sights were not obtained until next morning, when the longitude by Sirius was found to be 17° 26′ W., the latitude by D.R. being 18° 55′ N. The longitude was confirmed later by reliable sights of the sun. The set and drift was found to be 061° 14 miles in seventeen hours. Such an abnormal set had not been experienced by Captain Draper or his officers before, in the course of many years experience on the same route. The particulars were sent out with the weather to all ships at 1800 G.M.T., as the weather being hazy, such a current might prove dangerous to vessels making Cape Verde from the north.

CURRENT.

Arabian Sea.

South West Monsoon Season.

The following is an extract from the Meteorological Record of S.S. *Clan Macfarlane*, Captain W. J. Hughes, Port Said to Colombo, observer Mr. J. H. Wright, 3rd officer.

At noon A.T.S. on September 24th, 1934, in Latitude 10° 09′ N., Longitude 56° 07′ E., the S.S. *Clan Macphee* was 87 miles astern. Until stellar observations at 6.28 p.m. a slight favourable current was experienced, but during the night a strong adverse set was met which reached a velocity of almost 5 knots. Between stellar observations on the morning of the 25th and noon, this set altered to the north-eastward and decreased in speed to 3·2 knots. From noon to noon our day's run was 212 miles, with 75 miles of adverse current, and it was rather a surprise to see the *Clan Macphee* bear in sight on the starboard quarter, distant 8 miles. Her run was 291 miles, and although only a matter of six miles to the northward of our course she had escaped the very strong adverse current experienced by ourselves.

TIDE RIP.

Manipa Strait.

The following is an extract from the Meteorological Log of S.S. *Deebank*, Captain J. Robertson, Raboul to Durban, observer Mr. T.C. Cormack, 3rd officer.

July 12th, 1934, whilst navigating Manipa Strait (Latitude 3° S., Longitude 127° E) immediately after clearing Suanggi Island strong tide rips were experienced. The first rip experienced ran in an E. to W. direction from side to side of the Strait and set the vessel swinging strongly to starboard. This lasted about 3 minutes, the time it took the vessel to cross the rip. The second rip, which occurred 15 minutes later, extended in a S.S.E. to N.N.W. direction and was much wider, taking over 7 minutes to cross, vessel making 10 knots. This rip set vessel swinging to port. The vessel's speed for the next 2 hours dropped to 8·5 knots as current or tide was experienced, setting north at 1·5 knots.

This was verified by land fixes.

PHOSPHORESCENCE.

Arabian Sea.

THE following is an extract from the Meteorological Record of S.S. *Amarapoora*, Captain W. C. C. PLAGE, United Kingdom to Rangoon; observers 2nd and 3rd Officers.

August 4th, 1934, 7 p.m. (G.M.T. 15.30). Weather, strong S.S.W. wind, rough sea, heavy short S.S.W. swell, sky one-third clouded, A.-St., Ci. and Ci.-St.

Vessel entered large patches of phosphorescent water. By 7.05 p.m. (Ship's Time) the sea had turned to milky white of intense luminosity. The impression given to the observer was that the vessel was in a snow-covered plain and also that the vessel was in shoal water. The position of the vessel confirmed that she was well over 100 fms. soundings. This milky white appearance of sea extended right round the horizon and the luminosity was so intense that the state of the sea and swell was entirely lost to visual observation. At 7.40 p.m. (Ship's Time) this phenomenon began to disappear gradually and by 7.50 p.m. the condition of the surrounding water became normal. Temperature air 77° F. Surface temperature of water 78° F.

Position of ship, Latitude 12° 48′ N., Longitude 57° 30′ E., course 100°, speed 12½ knots.

Again at 10.30 p.m. (19.00 G.M.T.) with same weather conditions a similar phenomenon appeared. By observation close to the vessel's side the phosphorescence appeared to be deep-seated. Temperature air 76° F. Temperature of surface water 78° F. At 1·00 a.m. the moon came up bearing E.N.E. and the milky white appearance of the sea commenced to disappear to the S.W. and by 1.20 a.m. the phenomenon cleared away.

Position of ship at 10.30 p.m., Latitude 12° 37′ N., Longitude 58° 20′ E.

Arabian Sea.

THE following is an extract from the Meteorological Record of S.S. *Taranaki*, Captain W. J. WILLIAMS, London to Australia *via* Suez; observer, Mr. B. M. MORRIS, 3rd Officer.

August 29th, 1934, at 18.00 what at first appeared to be a white mist coming over the sea, was afterwards found to be caused by the sea assuming a milky appearance, thus blending in its colour with that of the sky, and making the horizon undiscernible. The sea temperature dropped from 82° F. to 74° F., and that of the air from 80° F. to 75° F. —from 16.43 until 18.00—the wind dropped from S.S.E. force 4 (with rather rough sea) to S. by E. force 3 (with moderate sea). Sky cloudless, moderate dew.

At 18.20 the whitish diffused appearance of the sea commenced to fade. (At this time the moon was observed to be rising.) Wind S. by E., force 3, moderate sea, cloudless. Temperature: air 75° F., water 74° F.

At 18.25 the horizon was once more clearly defined.

Malabar Coast.

THE following is an extract from the Meteorological Record of S.S. *Narkunda*, Commander F. SUDELL, R.D., R.N.R., Colombo to Bombay; observer, Mr. P. G. LAWRENCE, 3rd Officer.

August 16th, 1934, 18.15 G.M.T., proceeding up Malabar Coast 8 miles distant, very dark night with overcast sky A.-St. and St.-Cu., moderate visibility owing to monsoon haze. Observed several bright lights 5° on the starboard bow, which on first appearing were taken to be lights ashore or a fleet of fishermen. Approaching closer the bright lighting effect, spread round the northern horizon to 20° on the port bow, increasing in brilliance until the whole horizon in the vicinity was brilliantly illuminated. The glaring lights first observed constantly showed above the main body, apparently twenty or thirty feet higher, completely enveloping the navigation lights of a ship approaching from the opposite direction, making it difficult to distinguish the same. We passed straight into the phosphorescent water, the ship being lit up by the glare. The main colours of the water were blue and green of variable shades. This continued for 10 or 15 minutes and was taken to be three or four miles in length and about four miles broad. Gradually the bright glare from the water diminished in intensity, the water still showing phosphorescent for another five miles.

Position of ship, Latitude 11° 47′ N. Longitude 75° 12′ E. Air temperature 77°; sea 74°.

Off Coast of Portugal.

THE following is an extract from the Meteorological Record of S.S. *Domala*, Captain J. ENDERSBY, London to Tangier; observer Mr. W. R. DAY, 2nd Officer.

At 02.52 G.M.T. on August 22nd, 1934, the ship passed through remarkable phosphorescent patches, like clouds in the water which were continually changing shape. Within these "clouds" were brighter patches of light which moved about rapidly in irregular directions, very similar in appearance to patches of light thrown by searchlight beams on to clouds. In the neighbourhood of these "clouds" the ship's bow-wave was very brilliant and shoals of fish left bright trails of light, but when passing through the actual "clouds" themselves the bow-wave almost vanished. This phenomenon lasted for about an hour. Clear weather, overcast sky, smooth sea, and light variable airs.

Position of ship, Latitude 40° 12′ N. Longitude 9° 42′ W.

WHALES.

Coast of Ceylon.

THE following is an extract from the Meteorological Record of S.S. *Logician*, Captain R. F. HERSCHEL, Madras to Port Said; observer Mr. T. W. KENT, 3rd Officer.

July 14th, 1934, whilst steaming along the south coast of Ceylon numerous whales of the square-nose variety were sighted, fifteen being seen in one watch between Little Basses Lighthouse and the Great Basses Reef Lighthouse. A few minutes before 10.00 A.T.S. one came to the surface a few yards ahead of steamer, which our stem apparently struck and the whale drifted down along the ship's side churning the water up for some distance astern. Whales seen in this vicinity may not be unusual, although the number sighted within a small area appears rather abnormal.

ABNORMAL MAGNETIC VARIATION.

Jurien Bay, Western Australia.

THE following report was received from Captain C. E. PARKES, S.S. *Querimba*:—

"Whilst in the vicinity of Escape Island, on August 22nd, 1934, between the hours of 10.00 a.m. and 11.30 a.m. and steering S. 8° E. (T) I experienced a most abnormal magnetic disturbance. All my compasses were rendered useless during this period, and the vessel had to be steered approximately by the lay of the land. At 11.10 a.m. Escape Island was abeam 8 miles. At 11.30 a.m. when this Island was bearing N. 61° E., 9 miles (T), the standard compass and bridge compass gradually became normal again, but my steering compass card still remained quite useless, and had to be changed for the time being.

"I am well aware that parts of the N.W. and West coast of Australia are subject to exercising local magnetic attraction on one's compasses if one passes close to the land at these places of influence; but have never before experienced such a very pronounced disturbance to the compasses; and never at all in this particular vicinity, although having passed off Escape Island many times at 9½ to 12 miles distance. I am not definitely sure in my mind if this disturbance was caused by some magnetic influence on Escape Island itself, or if I happened to pass directly over a thin line on the sea-bed, composed of some magnetic substance running approximately North and South, between say Latitude 30° 11′ S. and 30° 25′ S. and Longitude 114° 49′ E. and

114° 51′ E. I am rather inclined to the latter view, as my compasses behaved much the same as I have experienced them do, if one passes over an iron wreck in shoal water; only in this instance I was in about 27 fathoms of water, and the influence lasted fully 1½ hour."

NOTE.—*See* Admiralty Notice to Mariners, No. 1865 of November 3rd, 1934.

VOLCANIC ISLET.

Sunda Strait.

THE following is an extract from the Meteorological Log of M.V. *Malayan Prince*, Captain E. HARDCASTLE, Laurenço Marques towards Batavia, observer Mr. C. J. H. DUNFORD, 3rd officer.

August 30th, 1934, 9.30 a.m. the islet which has recently formed in a position about midway between the south point of Long Island and the east point of Verlaten Island, where formerly a bank with a depth of 15 fathoms on it was charted, was seen very distinctly, and the estimated height now appears to be between 15 and 20 feet. This islet is quite barren, and the volcanic earth of which it is made up, had large furrows leading down from the small rounded peak into the sea. Every now and then one can clearly see small clouds of smoke and steam arising from various points on the islet, but the majority seemed to come from the N.W. of the islet.

SUBMARINE VOLCANO.

Japanese Waters.

THE following is an extract from the Meteorological Log of S.S. *Empress of Japan*, Captain L. D. DOUGLAS, Shanghai to Kobe, observer Mr. J. S. CLARKE.

September 25th, 1934, when approaching Van Diemen Straits :— At 11.10 a.m. observed apparently a submarine volcano. Heavy clouds of steam rising from the water to the Eastward of Iwo Sima. Latitude 30° 49′ N., Longitude 130° 20′ E. Wind E. by S., force 6. Rough sea, overcast and clear.

FLOATING PUMICE STONE.

Japanese Waters.

THE following is an extract from the Meteorological Record of M.V. *Foylebank*, Captain C. D. LOGIE, Hong Kong to Yokohama, observer Mr. R. N. WILKIE, 2nd officer.

September 28th, 1934, at 2.30 p.m. (0540 G.M.T.) passed through what appeared to be a lane of floating pumice stone, about half to one mile in width. The lane stretched in an E.N.E. and W.S.W. direction as far as the eye could see. The average size of the pieces would be four or five inches in diameter, though several were much larger, probably two feet or more. A fair amount of weed and other marine matter was seen to be floating amongst the pumice. Pieces of scattered pumice were observed for several miles after passing through the main lane.

The stone was greyish-white in colour and would appear to have been released from the ocean bed as a result of some volcanic upheaval or disturbance.

Position of ship, Latitude 29° 49′ N., Longitude 130° 58′ E. Yakuno Sima Island just visible, bearing 318°.

DISCOLOURED RAIN.

Buenos Aires.

THE following is an extract from the Meteorological Record of S.S. *Dunster Grange*, Captain G. F. WILSON, at Buenos Aires, observer Mr. E. G. RAYNOR, 2nd officer.

Wednesday, September 6th, 1934, at Dock IV, Port of Buenos Aires.

Day opened with fresh easterly breeze, frequent heavy rain squalls. 8.0 a.m. Rain ceased. Wind backed slowly. Barometer unsteady, generally falling. 1.30 p.m. Wind reached gale force and settled at N.N.E. set in continuous rain with violent squalls. 8.15 p.m. Rain ceased and weather moderating.

The above is a brief synopsis of weather experienced during day of September 6th.

Next morning when weather had considerably moderated, it was observed that all white paintwork was very much discoloured, being practically a deep grey colour. The mainmast and after Samson posts were soiled, resembling the effects of a head wind when steaming. These, with all the boatdeck paintwork (boats, davits and houses) had all been freshly painted on the Tuesday and apparently were most affected. On washing, with ordinary soda, this dirt was found to come off easily, but left a stain on all places recently painted, so much so that the new paint had turned a distinct yellowy grey colour. Where water had been running across the deck, a black line was left, which only came out after holystoning later on.

Apropos to the above I should suggest that this discolouration was directly caused by the particles of carbon and oil in the atmosphere from the recent fire at Campana, which had burned fiercely from August 28th to September 3rd, destroying enormous quantities of various grades of oils. Campana is roughly 70 miles in a N.N.Westerly direction from Buenos Aires.

HURRICANE.

Spencer Gulf.

THE following is an extract from the Meteorological Record of S.S. *Nardana*, Captain C. DORKING WHITE, Middlesbrough to Port Pirie, observer Mr. R. G. MULHALLEN, 3rd officer.

August 14th, 1934, on rounding South Neptune Island at 6.21 a.m. S.A. Standard time, the wind blew W. by S., force 5, the barometer reading being 29.12 in. (corrected, 29.08 in., 984.7 mb.).

After a fierce rain squall lasting about 20 minutes, the wind suddenly veered to W.N.W. at 9.50 a.m. The wind gradually increased in strength throughout the day, finally developing into a moderate westerly gale.

These conditions continued until 4.45 p.m. when the sky suddenly became obscured with immense cumulo-nimbus clouds reducing visibility to a minimum and 15 minutes later a torrential rain squall struck the ship from the west. Conditions became so bad by 5.05 p.m. that it was deemed advisable to turn the ship and steam back on a south-westerly course.

From then till midnight a succession of terrific rain squalls struck the ship at frequent intervals, each squall lasting about 15 to 20 minutes. The wind, meanwhile, had attained a velocity which at a conservative estimate was considered to reach from 80 to 100 miles per hour. Some idea of the force of the wind may be gleaned from the fact that at this time while the ship was approaching the head of the Gulf, sounding operations disclosed that an additional one and a-half fathoms of water had been piled up in the Gulf. The barometer, which had steadfastly maintained a low reading, began to rise at 1 a.m. and the wind then rapidly backed to W.S.W. (5), the rain squalls abated to such an extent that by 6 a.m. the weather had cleared and the barometer was steady at 30.00 in.

At dawn, the sun rose out of a leaden sky to show a short choppy sea, but with visibility almost normal. It is interesting to note that on the morning of the 14th the W/T station at Adelaide reported the lowest barometric pressure ever recorded locally.

While the gale was at its height vessels in the port of Wallaroo found it necessary to slip their stern moorings and put out additional lines forward in order more adequately to combat the force of the wind and sea.

On arrival in Port Pirie a scene of desolation was unfolded. The pent up flood waters had eroded through the protecting breastworks with the result that the greater area of the residential portion of the town had become inundated to a depth of several feet, with the loss of several lives. Hundreds of people were rendered homeless and business was entirely disorganised. The local power station together with its reticulations was put out of action and the lack of lighting facilities hindered rescue work. A sense of gloom prevailed the whole district.

Barometer readings logged in Ship's Log Book :—

August 14th, 1934.

4 a.m. ...	... 29·22	(corrected	29·18 in	988·1 mb.)
8 a.m. ...	... 29·18	(,,	29·14 ,,	986·8 ,,)
10 a.m. ...	... 29·18	(,,	29·15 ,,	987·1 ,,)
Noon ...	... 29·20	(,,	29·17 ,,	987·8 ,,)
4 p.m. ...	... 29·33	(,,	29·30 ,,	992·2 ,,)
8 p.m. ...	... 29·52	(,,	29·50 ,,	999·0 ,,)
Midnight...	... 29·83	(,,	29·81 ,,	1009·5 ,,)

WHIRLWIND.

Singapore.

THE following is an extract from the Meteorological Log of M.V. *Javanese Prince*, Captain J. SMITH, at Singapore, observer, Mr. L. W. COOPER.

August 18th, 1934. In Singapore—vessel moored in Empire Dock—a whirlwind was observed at 1.45 p.m. moving very fast up from Singapore Roads—northward—hit end of jetty—knocking down, after having lifted up, two Chinese coolies—proceeded over a coal heap—scattered a large quantity of coal and then passed over sheds on pier tearing the galvanized roofs off and carried these sheets of steel up to 200 ft. into the air—and the whirlwind disappeared at 1.50 p.m. moving inland and decreasing in force.

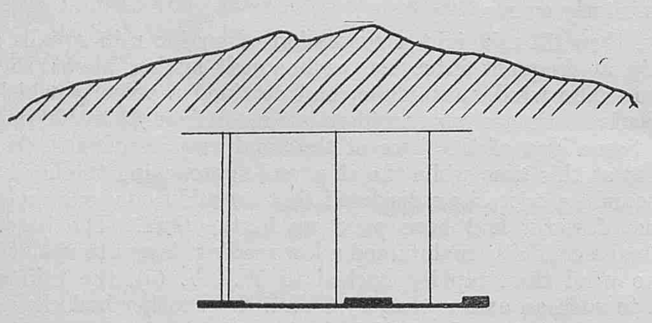
MIRAGE.

Off Cape Finisterre.

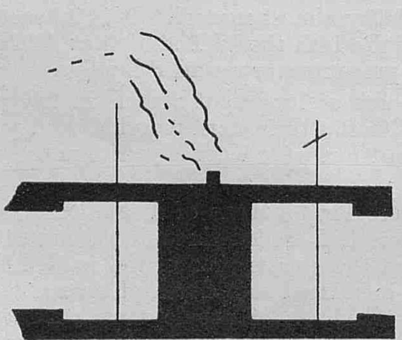
THE following is an extract from the Meteorological Record of S.S. *Discoverer*, Captain W. ROWBERRY, Marseilles to Middlesbrough, observer Mr. E. V. SIMMONS, 2nd officer.

July 16th, 1934, at 9.25 a.m. A.T.S. distance 15 miles off Cape Finisterre observed mirage on the coast. Several ships were seen to be greatly distorted, but owing to the distance the three rough sketches below were all that I was able to make.

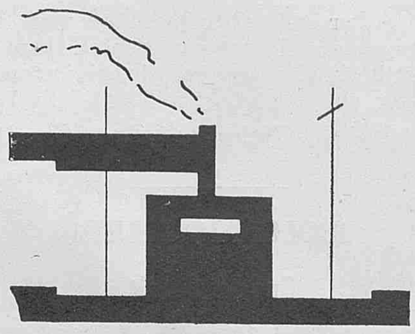
Wind N.E., force 3. No clouds. Air 68°, Sea 64°. Slight sea; low N'ly swell. Position of ship, Latitude 43° 00′ N., Longitude 9° 36′ W.



A Tanker with land at back.



A Passenger Steamer.

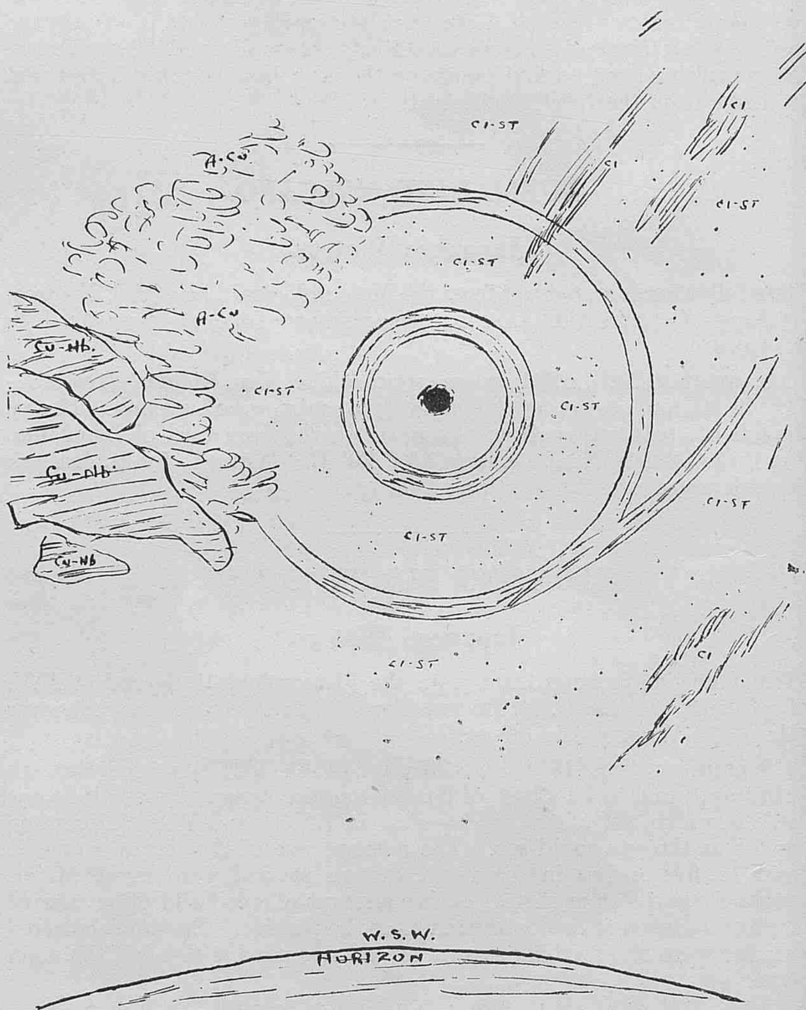


Same ship a few minutes later.

LUNAR HALO AND CORONA.

North Pacific Ocean.

THE following is an extract from the Meteorological Log of S.S. *Aorangi*, Captain J. F. SPRING-BROWN, Auckland to Suva, observer Mr. L. P. BOURKE, 3rd officer.



July 27th, 1934, at 1.30 a.m. observed lunar corona and halo with arc in contact, which I believe is an unusual coincidence. There was nothing unusual in colour or size of the phenomena. The Corona was faint, but showing the characteristic sequence of colour, while the halo and arc were white. Unfortunately the full halo was not observed owing to the presence of heavy A.-Cu. The phenomena were visible at intervals for half an hour.

Position of ship, Latitude $12\frac{1}{2}$° N., Longitude 163° W.

PARTIAL ECLIPSE OF THE MOON.

South Pacific.

THE following is an extract from the Meteorological Record of S.S. *Tekoa*, Captain J. HOWELL-PRICE. D,S.O., D.S.C., Liverpool to Auckland *via* Panama, observer Mr. L. W. FULCHER, 2nd officer.

July 26th, 1934, 1100 G.M.T. the partial eclipse of the moon due to commence at 1054 G.M.T. was observed this morning under the most favourable conditions, the sky being cloudless throughout the entire period of the phenomenon. The time of commencement was not obtained, the eclipse being first noticed at 1100 G.M.T. when the depth of the shadow was 06′, there remaining 28′ 30″ of the moon's surface untouched. One hour later the shadow had deepened to 22′, reaching its greatest depth at 1218 G.M.T. of 22′ 45″, and the eclipse finished at about 1345 G.M.T. During the whole period of the eclipse the darkened area of the moon was faintly visible, that part of the top right hand (where the shadow first encroached upon the moon's surface) being a faint red brown, gradually merging into grey and thence to black, the rim being at all times lighter than the interior and quite distinct.

By making use of different coloured Horizon and Index shades on the sextant it was possible to take accurate readings of the progress of the eclipse. Weather conditions remained normal and the Barometer steady throughout.

Position of ship, Latitude 8° 58′ S., Longitude 126° 20′ W.

The following is an extract from the Meteorological Log of S.S. *Ruahine*, Captain G. Kinnell, Auckland to Balboa. Observers, Messrs. A. Hocken, 2nd officer, and D. Martin, 4th officer.

July 26th, 1934, at 0312 A.T.S. (1056 G.M.T.) the commencement of a partial eclipse of the moon was observed, the earth's shadow moving slowly across the moon from the N.E. segment. At 0400 A.T.S. approximately half the moon was observed, the shaded portion being of a very dark colour and faintly reddish.

During the whole duration of the eclipse weather conditions were excellent for observation.

At 0430 A.T.S. the moon was three-quarters covered, this being the maximum amount of obscurity attained. At 0555, the commencement of morning twilight, the whole of the moon was visible.

Only very slight darkening was observed, while the moon was in penumbra, from 0210 A.T.S. until the beginning of the eclipse proper.

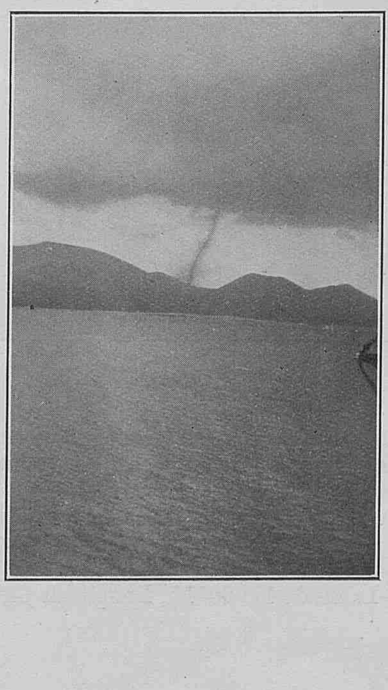
Position of ship, Latitude 19° 42′ S., Longitude 116° 51′ W.

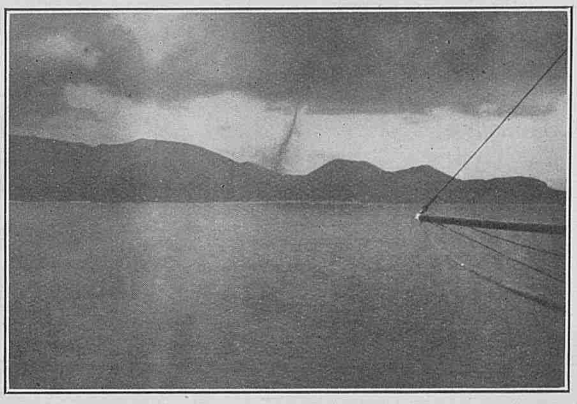
SAND SPOUTS.

Red Sea.

The following is an extract from the Meteorological Record of S.S. *Cathay*, Captain C. B. Roche, Australia to London *via* Suez, observer, Mr. G. L. Farnfield, 3rd officer.

On September 19th, 1934, at 0815 G.M.T. (1115 A.T.S.) this unusual phenomenon was observed when passing Zabal Zugar Island (Latitude 14° 00′ N., Longitude 42° 45′ E.). At the time of the observation we were two miles off the Island, visibility being excellent, clouds Cu., St.-Cu. 3/10, wind N.N.W. 1, barometer 1008 mb., temperature 90°.





On first sight one could only see a small sand cloud gradually drifting up the hillside on East Point. It then became stationary, increased in volume and assumed a thin vertical cylindrical whirl until it reached a heavy cumulus cloud which was passing rapidly over from N.N.W. It was held in this position for about five minutes, then gradually diminished in intensity until finally the lower half subsided and the upper half disappeared into the clouds.

During this time another minor sandspout formed a short distance away to the southward.

This phenomenon is all the more interesting as no apparent atmospheric disturbances were observed.

The photographs were taken after the sandspout had been suspended for about five minutes and is just about to break. It was not possible to obtain a photograph of the second sandspout.

METEORS.

North Atlantic Ocean.

The following is an extract from the Meteorological Log of M.V. *Malayan Prince*, Captain E. Hardcastle, New York to Trinidad, observer Mr. C. J. H. Dunford, 3rd officer.

July 13th, 1934, at 9.20 p.m. A.T.S. a very bright meteor was observed bearing S.S.W. at an altitude of 30°, after moving directly downwards, it suddenly took a more westerly direction, and later again moved downwards, disappearing at an altitude at 8°.

The period that it took to fall lasted 3 to 4 seconds during which time the whole of the sky was lit up with a brilliant bluish-white light, also as it moved it left a very luminous brown tail, so that the rather unusual path of the meteor was clearly observed.

Position of ship, Latitude 24° 05′ N., Longitude 65° 54′ W.

Gulf of Guinea.

The following is an extract from the Meteorological Record of S.S. *Doric Star*, Captain S. N. Capon, United Kingdom to Australia *via* Cape of Good Hope.

September 10th, 1934, at 2134 G.M.T., about 9.08 p.m. A.T.S., observed a brilliant meteor midway between Altair and Vega bearing about 233° (T). When first observed at commencement of path its altitude was about 50° and after falling vertically for about 3 seconds it reached an altitude of about 20° when it burst asunder and burnt out. In appearance it was like a large blue star shell having a long tapering reddish-coloured tail which was visible after the meteor had burnt out for nearly 3 seconds. The night was quite dark, no moon, and about half the heavens obscured by cumulus clouds but during the fall of the meteor objects could be made out on the bridge and fore deck of the vessel.

Position of ship, Latitude 3° 17′ S., Longitude 6° 45′ W.

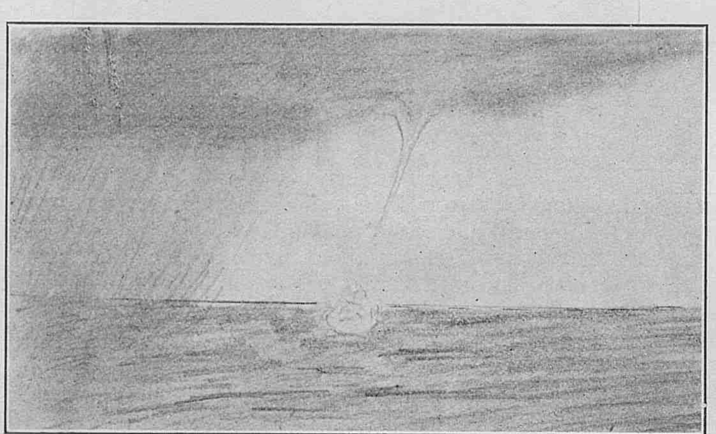
WATERSPOUT.

Caribbean Sea.

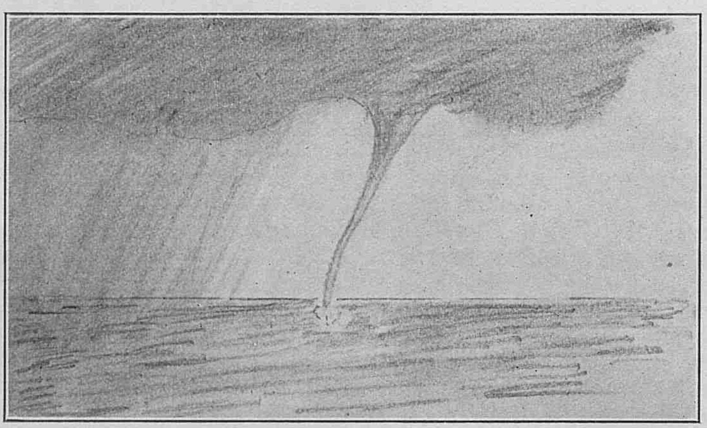
THE following is an extract from the Meteorological Log of S.S. *Remuera*, Captain E. HOLLAND, Plymouth to Curaçao, observer Mr. H. HILL, 3rd officer. The photographs were taken by Captain E. Holland.

September 4th, 1934, 11.45 a.m. Heavy rain squall approaching from Eastward; low, dark and heavy nimbus cloud.

11.52 a.m., observed a waterspout forming about half a mile in advance of squall, distance off, about 3¼ miles, bearing 185° (T). When completely formed, it appeared as a dark, tapering column, with the top moving faster than the disturbed water beneath.



11.52 a.m. A.T.S.

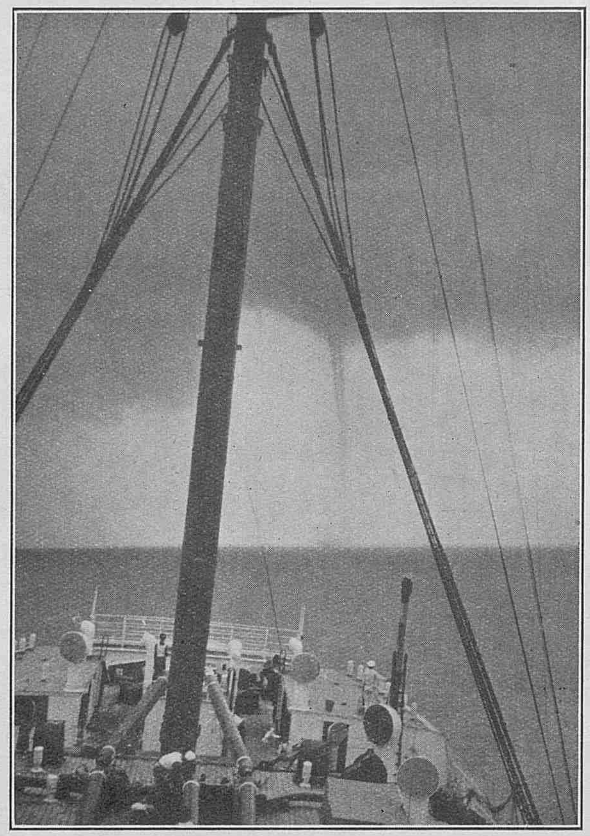


11.56 a.m. A.T.S.

11.56 a.m. Bearing 178° (T) distance 2¼ miles.

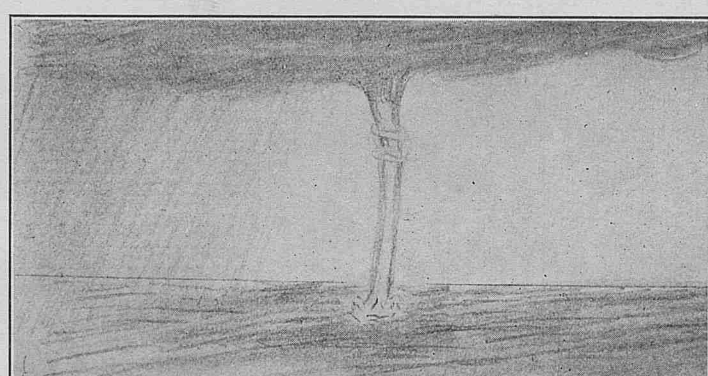
11.58 a.m., course altered to avoid spout and when seen between sun and observers, the following details were noted :—

Outsides of column very dark and sharply defined; inside of column transparent and water could clearly be observed ascending; height of disturbed water at base estimated about 80 feet; height of column estimated at 530 feet (1½ miles distance, observed angle 9° approx.). Base and top of column now moving at same speed, and travelling in a W.N.W. direction at about 5 knots over the surface.



11.59 a.m. Bearing 190° (T) distance 1½ miles.

12.02 p.m., peculiar formation of mist observed at about two-thirds of the height, moving in an upwards, spiral, and clockwise direction outside the column, the latter having now become more uniform and of greater circumference.

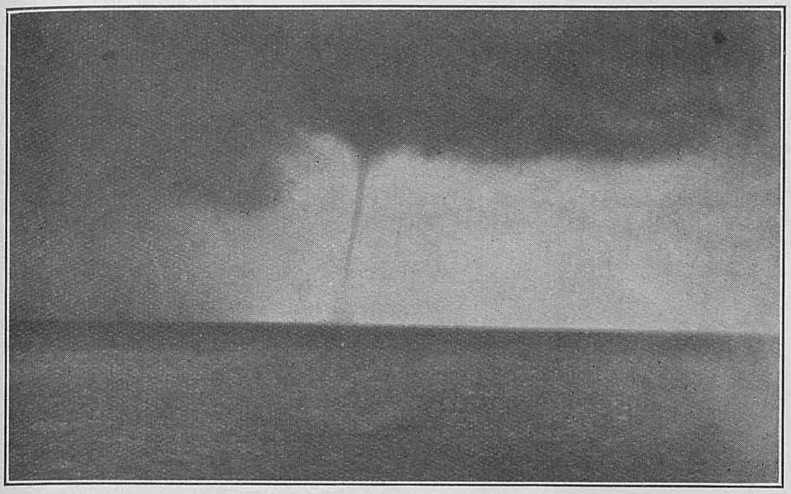


Noon to 12.02 p.m. A.T.S.

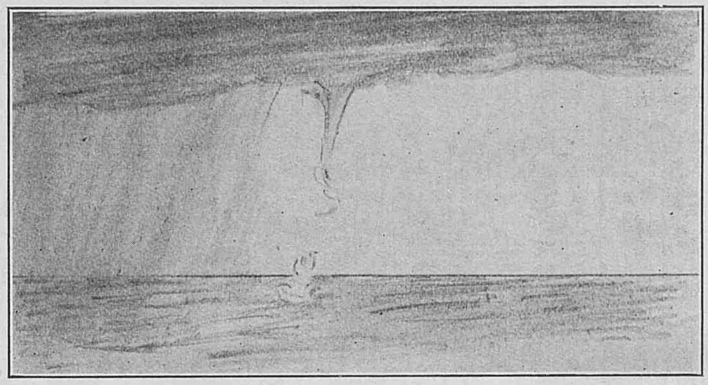
12.03 p.m., column thinned out, becoming more transparent, then broke at about one-third of distance up and reformed again about 10 seconds later.

12.04 p.m., column broke again at about same place, trunk drawn up into the cloud; followed by a very heavy rain squall of 10 minutes duration.

Noon Position, Latitude 17° 00′ N., Longitude 64° 33′ W.



12.03 p.m. Bearing 240° (T) distance $1\frac{1}{4}$ miles. Spiral formation of mist may be very faintly seen at about $\frac{2}{3}$rds of the height.



12.04 p.m. A.T.S.

By Commander C. H. Williams, R.N.R.

"He was more constant than ever anyone else in the greatest of adversity. He endured hunger better than all the others, and more accurately than any man in the world did he understand sea charts and navigation."

This was written of Magellan by Pigafetta, an Italian gentleman whose diary afforded the most complete record of the voyage. He accompanied Magellan on the great voyage, was with him when the leader was killed, and was one of the few who survived to complete the first circumnavigation of the globe.

Ferdinand Magellan was born in about 1480 at Sabrosa in the province of Traz-os-Montes, the only province in Portugal which has no sea-board. Little is known of his boyhood except that at the age of thirteen he left his mountainous home to be a page at the Royal Court at Lisbon. This indicates that his parents were people of some consequence. At court he would have received a good education, and would also have heard much of the new lands and seas discovered by the seamen of his country and of Spain. Portugal was then the foremost maritime power in the world.

At about the time that the young page arrived at the court in Lisbon, Columbus returned from his discovery of the land on the western side of the Atlantic which was believed to be the eastern coast of Asia.

In 1497, when Magellan was about seventeen, Vasco da Gama made his great voyage round the Cape and discovered the sea route to India.

The geography of the world was little known, as may be seen by the drawing below, Figure I, of the globe made by Martin Behaim in 1492. On it the great American continent does not exist! In ancient days (about 200 B.C.) the circumference of the earth had been measured with considerable accuracy as about 25,000 miles. (It is really 24,899 miles at the equator.)

Later, however, it was wrongly calculated as being 18,000 miles, which mistake was repeated in the year 150 A.D., was taught throughout the dark ages, and generally accepted right up to the time of Columbus and even later.

Thus Columbus believed the land he had discovered must be part of Asia. He could not know that after his passage across the western ocean to find India he was further from that country than when he left Spain!

It has been stated that even after Magellan's voyage the real circumference was not fully realized, for in 1534 Jacques Cartier after sailing up the St. Lawrence to a few miles beyond what is now Montreal, believed that he was in China!

Nowadays, with almost all the world accurately mapped and charted, it is impossible for us to imagine a world the greater part of which was unknown and to understand the tremendous urge of those days to geographical discovery. It is necessary to mention the inaccuracies of the old geographers so that we can fully appreciate Magellan's great achievement.

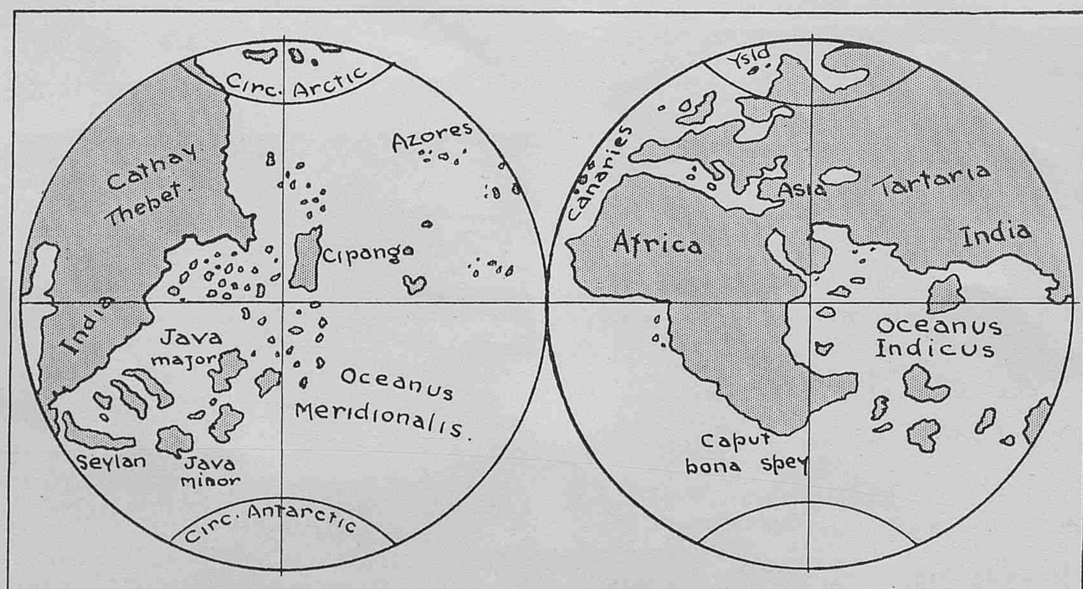


Figure I. World as shown on the Globe made by Martin Behaim in 1492.

To return to the story of MAGELLAN. KING MANUEL of Portugal despatched a fleet with the object of making secure his possessions in the East, and FRANCISCO D'ALMEIDA was made Viceroy of India with orders to proceed there and hold the country in the King's name. Among those who volunteered for service with this expedition was FERDINAND MAGELLAN, who obtained leave from the court to enlist as a seaman.

The fleet of about 20 ships sailed from the Tagus in the Spring of 1505, and that was the last of Portugal seen by MAGELLAN for seven years.

He saw plenty of active service in the East, and was wounded on two occasions, but little more is known of his life until about 1510, by which time he was an officer and in command of one of the ships in the fleet at the attacks and capture of Goa.

The next year his ship was present at the great battle lasting six weeks which resulted in the capture of Malacca by the Portuguese, thus opening up to them the route to the unknown spice islands and to China.

In June, 1512, MAGELLAN was back in Lisbon. Here for a year he remained at the court, studying navigation and yarning with the captains and pilots of ships returned from remote voyages.

Trouble arising with the Moors through a refusal by them to pay tribute to the King, a strong expedition was sent to Morocco, and with it went MAGELLAN, this time as a soldier. During the campaign he received a wound in the knee which made him lame for the rest of his life.

After this service he applied to KING MANUEL for promotion at court, but this was refused, and he was made to see that the King had little use for him.

The snub hurt MAGELLAN deeply, and was the cause of his renouncing his Portuguese nationality and taking service under KING CHARLES V of Spain.

Whether or not he had put before KING MANUEL his proposal to sail westward to the spice islands is uncertain, but it seems highly probable that he had.

MAGELLAN did not immediately leave Lisbon, but remained among the shipmasters and pilots whom he knew and who could give him information about the coast of Brazil and the land to the southward of it.

In that year, 1513, Captain VASCO NUNEZ DE BALBOA had crossed the isthmus of Panama and seen the great South Sea. We do not know when the idea of sailing westward to the spice islands of the East first took shape in MAGELLAN's mind, but at about this time he wrote to SERRAO, an old shipmate of his who had remained in the East, saying he would be with him soon "if not by way of Portugal, then by way of Spain." To appreciate the full meaning of these words it must be remembered that the world had been allotted by the Pope to Spain and Portugal in 1493. The Western hemisphere and all that lay therein should belong to Spain, and the Eastern hemisphere to Portugal, measured from a line drawn from pole to pole, passing 100 leagues to the westward of the Azores and the Cape Verde Islands, which were then thought to be on the same meridian.

At the request of the Portuguese this line was later shifted further to the westward, putting it roughly in about 45° west longitude.

Where the Eastern line of division fell geographical knowledge was not then sufficiently far advanced to discover. Upon which side of it the Moluccas were situated was unknown. MAGELLAN thought they would prove to be in the Spanish half.

It therefore seems highly probable that in writing "by way of Spain" he meant by the as yet undiscovered western route.

In Lisbon MAGELLAN became acquainted with FALEIRO, a scholar and astronomer well versed in the theory of navigation, and it was not long before the sailor had interested the scientist in the great project of sailing westward to get to the spice islands of the East.

MAGELLAN was convinced that there was either a strait or cape at the southern end of America that would lead to the South Sea, and he was prepared to go as far as Latitude 75° South in search of it. Whether or not he had any definite knowledge that such a strait existed, it is impossible now to say.

They worked out a joint scheme, and as there was little hope of it being favourably received by the King of Portugal, they decided to take it elsewhere, just as COLUMBUS had done.

MAGELLAN went to Spain in 1517 and from Seville he wrote to FALEIRO in Lisbon, telling him that he had been well received. FALEIRO soon went to Seville also, and as both were lonely men, who had kept their ideas to themselves, no notice was taken of their departure.

The partners managed, though not without considerable difficulty, to get the project put before the Lord Chancellor of the Kingdom, and through him to the King.

The great possibilities of such a venture were appreciated, and Captain MAGELLAN and his partner were given permission to equip an expedition with all speed. MAGELLAN and FALEIRO were to be equal in rank and command in the fleet. There was need for haste, for if the King of Portugal heard of it in time, he would surely do what he could to prevent or hinder matters, and would certainly take steps to defend his possessions in the far East from being annexed by Spain. KING MANUEL did, of course, hear of the proposed voyage long before it started, and did all he could to prevent it, advising KING CHARLES of Spain not to employ these two discontented Portuguese.

The preparations went on, however, in spite of strong opposition and obstruction, and the five ships chosen were hauled ashore for repair and refitting.

They were *Santo Antonio* of 120 tons, the *Trinidad* of 110 tons, the *Concepcion* of 90 tons, the *Victoria* of 85 tons, and the *Santiago* of 75 tons. MAGELLAN selected the *Trinidad* as his flagship.

Unfortunately, from our point of view as seamen, little is known of the rig or details of these ships.

Existing pictures of craft of the period were obviously drawn by artists with little or no knowledge of ships.

It can, however, be fairly safely assumed that MAGELLAN's ships would all be three masted vessels of the same general type as COLUMBUS' *Santa Maria* and FRANCIS DRAKE's *Pelecan*. Many models of these ships have been made in recent years and, although it seems doubtful if any of them are really authentic, they give us some idea of the ships' appearance.

Ships were built then by "rule of thumb," and very little important change in shape or rig occurred during the fifteenth and sixteenth centuries. They were very short and broad to our modern ideas, the length being only about three and a-half times the beam. The drawing at the head of this article shows a ship of the period.

The *Trinidad* would probably have been about 75 feet long (B.P.), 21 feet beam and 10 feet depth of hold.

Such were the terrors of the proposed voyage into totally unknown seas, that there was some difficulty in getting crews for the venture.

The ships were eventually manned by Spaniards, Portuguese, Sicilians, Frenchmen, Germans, Greeks, Basques, Neapolitans, Genoese, Negroes, Malays, and even an Englishman, one Master ANDREW of Bristol, who sailed as chief gunner of the *Trinidad*.

The preparations had taken much time, and it was not until August, 1519, that the ships dropped down the river from Seville. On September 20th, 1519, the five ships of the expedition sailed from Sanlucar.

They proceeded to Teneriffe, in the Canarys, where a depot of stores had been laid earlier in the year.

While these were being loaded, MAGELLAN received from a Spanish ship that must have sailed shortly after he did, a message warning him that there were rumours in Seville that some of his Captains were already plotting mutiny against him, and that the ringleader was CARTAGENA, Captain of the *Santo Antonio*.

Keeping well east of what the other Captains considered the proper course to Brazil, and passing to the eastward of the Cape Verde Islands, the fleet proceeded south. The disaffected Captains hailed the *Trinidad* to ask why the course was not more westerly. They were told, in effect, to "follow the flagship and ask no questions."

MAGELLAN was, of course, provided with few or no data in physical geography of the sea, except what he had learned by experience and in his talks with other navigators. He had no doubt formed his own opinion as to the best route to Brazil.

By crossing the Line not too far west he avoided the possibility of getting set to leeward of Cape San Roque by the Equatorial Current and by the South East Trades heading him off.

The ships of the period were not very weatherly, and would hardly have made good a course nearer the wind than eight or nine points, if as close as that.

There is also the possibility that he expected the Portuguese to try to intercept him at or west of the Cape Verde Islands. Except for this latter reason, it seems in the light of our modern knowledge that he kept unnecessarily far to the eastward, and got into the broad part of the doldrum calm belt. The fleet experienced twenty days calm and light airs with heavy rain, during which time little progress to the southward was made. Then followed a month of head winds and heavy squalls.

Captain CARTAGENA showed signs of insolence and insubordination shortly after leaving the Canaries, and before the fleet reached the equator MAGELLAN had found it necessary to put him in irons.

The coast of Brazil at Cape St. Augustine, near where now stands the town of Pernambuco, was sighted on November 29th, and following it to the southward, they anchored in the Bay of Rio on December 13th, eighty-four days out.

Continuing the voyage to the southward, they encountered more bad weather and ran into the River Plate for shelter. Thinking this might possibly be the strait that he sought, leading to the South Sea, MAGELLAN explored it. It soon turned out to be a great river and he returned to the sea. As the coast was absolutely uncharted and unknown, every likely opening was explored in the hope that it might be the entry to the strait.

Progress was slow. March, 1520, with the Southern winter rapidly approaching, found them still searching, and at about the end of the month the fleet anchored in St. Julian Bay. Port St. Julian is in about Latitude 49½° S. and does not experience really intense cold, but most of the crews were from warm countries, and they were not enjoying their first taste of Cape Horn weather.

MAGELLAN decided, though unwillingly, to winter there. He had hoped to be in the South Sea before the winter came on.

All hands were put on short rations, for the stores, either by mistake or more probably by fraud on the part of the contractors, were now evidently not enough for two years.

This measure of reducing the rations was, of course, very unpopular and, adding to the already great hardship and discontent, was probably the deciding factor in bringing about the mutiny which now occurred and which MAGELLAN knew had been long plotted.

QUESADA, Captain of the *Concepcion*, was the leader of the mutiny, assisted by Captain MENDOSA of the *Victoria* and by the one time Captain of the *Santo Antonio*, JUAN DE CARTAGENA, who had some time before been released from arrest and disrated to a seaman.

Except for the little *Santiago*, the other ships had turned against their leader.

The mutineers demanded the restoration of full rations and a return to Portugal. Their wish to return to Portugal and not to Spain indicates that the ringleaders of the revolt were in the service of KING MANUEL and wished to go to Lisbon to get their reward for bringing the work of MAGELLAN to nought.

MAGELLAN was one of those silent men who keep their own counsel until the time has come to strike. There seems no doubt that he had seen this trouble coming and was prepared for it.

The ringleader, QUESADA, feeling he had the upper hand, sent a boat across to the *Trinidad* asking the Captain General to come over and discuss matters.

MAGELLAN seized the boat and its crew, and later sent a boat in charge of the master of his armoury to the *Victoria*, with a note ordering Captain MENDOSA on board the flagship.

If he obeyed, well and good. If not he was to be instantly killed and the ship seized.

Another armed boat's crew quickly followed the first, and in a few minutes the *Victoria* was once more in MAGELLAN's command and MENDOSA was dead.

MAGELLAN had now three loyal ships against the mutineers' two, and he placed his ships across the harbour entrance. During the night the *Santo Antonio* dragged her anchors and fouled the flagship, whose men boarded and took her.

Only the *Concepcion* now remained to be dealt with, and at daybreak a boat was sent to her demanding surrender. CARTAGENA, whom QUESADA had put in command of her, seeing the hopelessness of the mutiny, surrendered and was taken prisoner.

The mutiny was over, and of the ringleaders, two were in irons and one, MENDOSA, was dead.

QUESADA was tried and sentenced to be executed. He was beheaded by his servant and his body was drawn and quartered. CARTAGENA was sentenced to be marooned on the shores of the bay, a fate hardly less terrible than the death penalty.

About forty others were sentenced to death, but the sentence was remitted by MAGELLAN.

Order once more established, all hands were kept busy during the remainder of the stay at Port St. Julian. The ships were careened, caulked and repaired.

Towards the end of April the *Santiago* Captain, SERRANO, was sent to explore the coast to the southward. She got driven ashore in bad weather and soon broke up.

Her crew, except one man, scrambled ashore and started to walk back to Port St. Julian. They were in a bad plight, for the land afforded little food but herbs and shell-fish.

Two men, whose names are not known, pushed on ahead to get help.

After eleven days they arrived at Port St. Julian like walking skeletons.

A relief expedition was sent with food, and Captain SERRANO and his men were rescued.

Before continuing his voyage, MAGELLAN put ashore the mutineer CARTAGENA together with a priest called REINA who had attempted to engineer a second mutiny.

On August 24th, 1520, the four ships sailed from Port St. Julian.

It is a remarkable fact that the next ships to follow MAGELLAN's route experienced similar happenings at this ill-omened spot. In the year 1578 an English fleet under Captain FRANCIS DRAKE in the *Pelican* anchored in Port St. Julian, and there THOMAS DOUGHTY was tried by a jury of the ships' crews, found guilty of inciting to mutiny and was executed.

MAGELLAN's fleet encountered bad weather, and spent some time sheltering in the bay of Santa Cruz, near where the *Santiago* had been lost. A good deal of the gear was recovered from the wreck.

Pushing south again in October they sighted a bold cape and beyond it a wide stretch of water, a broad channel continuing westward as far as they could see. As this might be just another great river, MAGELLAN sent two ships to explore while the flagship and the *Victoria* stood on and off to await the result. At the end of the fifth day the two reconnoitring ships returned with flags flying and guns firing, bringing news that this was no river, but a great strait of salt water.

The passage of the strait was begun.

When about half way through, a council of officers was held, and all but one were for carrying on to the westward. The one, GOMEZ, pilot of the *Santo Antonio*, was for returning to Spain so that a stronger and better provisioned fleet could be sent. MAGELLAN, who was evidently determined to continue the voyage in any case, replied, "We will go on, even if we have to eat the leather on the ships' yards."

The chroniclers of the voyage unfortunately gave small account of the passage of the straits from the navigator's point of view, but contented themselves with notes about fish and trees, etc.

During the exploration of the various channels, the *Santo Antonio* parted company and eventually returned to Spain. Though the others turned back and searched for her she could not be found, and had undoubtedly deserted. This was a bad blow for the expedition as she was the largest ship and carried the greatest store of the fleet's supplies.

On November 28th, 1520, the three little ships sailed out of the strait past Cape Pillar into the "South Sea," the first Europeans to enter that ocean from the eastward. The passage of the straits had taken them 38 days.

The real circumference of the earth was not known to MAGELLAN so he had no idea of the vastness of the great ocean before him. So inaccurate was the geography of the period, that on a globe made by SCHONER in 1520, Japan is shown as lying in about Longitude 130° West of Greenwich.

Between the explorer and the islands he sought lay about 150° of Longitude, instead of about 30° or 40° as he had reason to expect. (*See* FIGURES 1 and 2.)

Had he known the truth it seems doubtful if he would have attempted to cross the Pacific with his poorly provisioned ships.

In the Latitude of the straits the prevailing wind is westerly and after getting an offing the ships appear to have stood to the northward, close hauled on the Port tack.

The land was in sight for several days, though no attempt to survey it seems to have been made. On a lee shore and with the current setting towards the land we can understand that MAGELLAN had no desire to close it. We can assume that he only kept the coast in sight from necessity and that as soon as he had the wind free he stood N.W. on his course. He was now bound for the Moluccas with all possible speed.

They had not been long at sea before the shortage of food and water assumed a terrible aspect. They sailed on day after day and week after week, always hoping to sight land, but saw none.

The fine warm weather was a welcome change from the gales and cold of the South Atlantic. Magellan named the ocean Pacific. After picking up the South-East Trades he had a fair wind for the rest of the passage. Luckily for him he made the passage in summer (December, January and February) when the S.E. Trade wind prevails over the greater part of the ocean between the Equator and Latitude 30° South, and when gales are at their minimum.

For about two months no land was sighted. Then, on January 24th, 1521, a small island was seen. This was probably the one now known as Pukapuka, in the Tuamotu group, in Latitude 14° 50′ S., Longitude 138° 50′ W.

There were trees on the island but no fresh water nor edible fruits could be found, neither were there any inhabitants. The little ships with their starving crews sailed on.

Eleven days more and another small desolate island was made, probably what is now called Flint Island, in the Manihiki Group. It lies in Latitude 11° 20′ S., Longitude 151° 48′ W.

This also afforded neither food nor water.

They were in a desperate situation, for all were suffering from starvation, scurvy had broken out, and nineteen men died on this section of the voyage. Magellan's threat, that he would carry on to the westward even if they must eat the leather on the yards, came true. It was recorded by Pigafetta that "we also ate the oxhides which were nailed under the mainyard so that the yard should not scrape the rigging; they were very hard on account of the sun, rain and wind, and we left them four or five days in the sea and then put them a little on the embers, and so ate them." Rats were considered a delicacy, and the small allowance of water was gone bad and stinking.

After the second island was passed Magellan's course was altered to about north-west, as he had now decided to make for China, which country he had heard would be able better to supply his needs in provisions and gear than would the Moluccas. It was another month before land was again sighted. Several islands came into view. The one at which they anchored was probably Guam.

It was 98 days since they had left the strait and sailed out into a wholly unknown ocean. Remembering the poor sailing qualities of the ships of those days, that they must by this time have become very foul, and also the necessity of keeping in company, they did not make a bad passage. It is most remarkable that Magellan and his starving crews should have made so few landfalls in the South Pacific. They had chanced to sail between two groups of islands, the Marquesas and the Tuamotu groups, without sighting any but two useless ones. In either group there were several islands where provisions and water could have been obtained.

At Guam the natives swarmed aboard and stole everything they could lay their hands on. Force had to be used to drive them out of the ships, and several were killed. From this experience Magellan named the archipelago the Ladrones, meaning thieves.

The fresh provisions obtained at these islands greatly refreshed the crews, and the ships soon pushed on westward.

Seven days sailing brought them to the Philippines.

Tents were set up ashore and the sick men landed. In a week or two these were sufficiently recovered for the fleet to proceed to other islands of the group. Magellan had attained his object, reaching the spice islands of the East by sailing westward.

In spite of the great distance the ships had sailed across the Pacific, Magellan still believed that these islands lay in the western, or Spanish half of the world and he annexed the islands in the name of the King of Spain.

They are, of course, well within what was then the Portuguese hemisphere.

Although it was possible in those days to find the Latitude by meridian altitude of the sun by means of an instrument called a cross staff (the result of which was accurate within a degree or two), the Longitude could not be checked at sea, and was entirely estimated. On arriving at the Philippines Magellan's pilot Alvo was *many degrees in error in his Longitude!*

In a book on navigation written in 1590 the problem of determining Longitude at sea is dealt with as follows :—

"Now there be some that are very inquisitive to have a way to get the Longitude, but that is too tedious for seamen, since it requireth the deep knowledge of astronomy, wherefore I would not have any man think that the longitude is to be found at sea by any instrument; so let no seamen trouble themselves with any such rule, but (according to their accustomed manner) let them keep a perfect account and reckoning of the way of their ship."

Magellan made treaties with several of the local kings, trading was begun and the ships loaded cloves, cinnamon, pepper, ginger, nutmeg and a certain amount of gold.

To punish a local chief for an alleged insult, Magellan organized a punitive expedition. Most of his officers were altogether against it, pointing out that there was nothing to be gained, and that they had already lost a number of men. Nothing, it seems, ever made Magellan reconsider a determination, and if he took council with his officers at times it was merely for form's sake. They begged him not to go himself, but Magellan would not listen, and, good commander that he was, he led the attack in person.

At midnight, April 26th, 1521, he left Cebu with three boats manned by picked men from his fleet, and followed by thirty war canoes with about a thousand native fighting men led by the king. The attack was made at daybreak. Magellan seems to have thought that his men with their steel armour and muskets would be more than a match for any number of natives.

He landed with forty-nine men and was met by about 1,500 natives. The assistance of the thirty war canoes had been refused by the Spanish force. Magellan and his handful of men were attacked on three sides at once while attempting to land.

They were forced to retreat to their boats. The great Captain-General was killed fighting in the shallow water round the boats, and his body was captured.

Six of his men were also killed and many wounded.

Shortly after this affair other senior officers were treacherously murdered ashore in Cebu.

Captain Carvalho now assumed command of the fleet. Only 115 men remained of the 275 who had sailed from Spain twenty months before.

The *Concepcion* became leaky and had to be abandoned. Her crew and cargo were distributed between the *Trinidad* and the *Victoria.*

The loading continued at several of the islands and along the coast of Borneo, and in November 1521 the ships anchored off Tidore in the Moluccas, Magellan's original goal.

At great cost in hardship and loss of life, the expedition had succeeded in getting only two small shiploads of spices, but the greatest feat of navigation ever attempted had been accomplished.

These spice islands were the lure of the three greatest voyages in the history of discovery, for they were also the objectives of Columbus and of Vasco da Gama.

Magellan, the great discoverer, had perished, "his life wasted in a miserable skirmish with savages."

A week before Christmas the ships were loaded. The *Trinidad* now sprang a bad leak, and her cargo had to be discharged.

Her repairs were likely to take some time, and it was decided to leave her behind. She later attempted to re-cross the Pacific to Panama, but did not succeed.

The *Victoria*, under the command of Sebastian del Cano, sailed for home.

In her were 47 men of the original 275.

On the long passage home round the Cape starvation and scurvy were once more suffered. Sailing S.W. across the Indian ocean they reached a Latitude of about 41° and then stood westward. All this passage was, of course, in the Portuguese half of the world, and the Spanish ship dared not call at Mozambique or any other African harbour at which the Portuguese were established.

On standing to the Northward, thinking themselves to the westward of the Cape, they discovered that their Longitude was again considerably adrift, for on May 8th they sighted the coast of South Africa, and anchored at the mouth of the Keiskamma River. After experiencing bad weather while rounding the Cape, they crossed the Equator in the Atlantic in June, 1522, by which time men were dying every day.

Necessity forced del Cano to anchor at the Cape Verde Islands for food and water, Portuguese or no Portuguese.

The hands were warned to say they had come from America, but the secret of their cargo leaked out.

The Portuguese seized every man who was ashore, and sent out boats to capture the *Victoria*. Before they could board, del Cano weighed and escaped to sea.

They were now only 18 Europeans and 4 natives, barely enough to work the ship, as most of them were weak and ill. With this remnant of a crew the *Victoria* arrived at Seville on September 8th, 1522, the first ship to have sailed round the world.

It was twelve days short of three years since the fleet of five ships had sailed from Spain with considerable pomp and ceremony. The day after their arrival a handful of half starved and diseased men, all that were able to walk, marched barefoot to a shrine to give thanks for their return.

Magellan's fame rang through Europe. His wife and child had both died, and he was dead, but his name was to be immortal.

As a nautical feat Magellan's voyage stands supreme in the history of the sea. He crossed two great oceans, one largely and the other wholly uncharted, delimited a continent, and first showed the true relation of the great land and water areas of the world.

In 1546, only 24 years after the completion of the voyage, it was written of the newly discovered strait, "of which strait and voyage none had knowledge or remembrance until the renowned Captain Ferdinand Magellan discovered and showed it to us."

To get some idea of what his wonderful voyage meant to Europeans of his time, we must remember that when he was born, in 1480, no ship of Spain or Portugal, the two great Maritime powers, had ever sailed beyond the Atlantic. Columbus had not then discovered America nor had Bartholomew Diaz rounded the Cape of Good Hope. Little was known of the world.

Then in the short space of thirty-five years the world was made known by the courage and perseverance of a few great seamen.

The world was not circumnavigated again by any ship until nearly sixty years later.

It was accomplished then by the English ship *Pelecan* (renamed *Golden Hind* during the voyage), Captain Francis Drake.

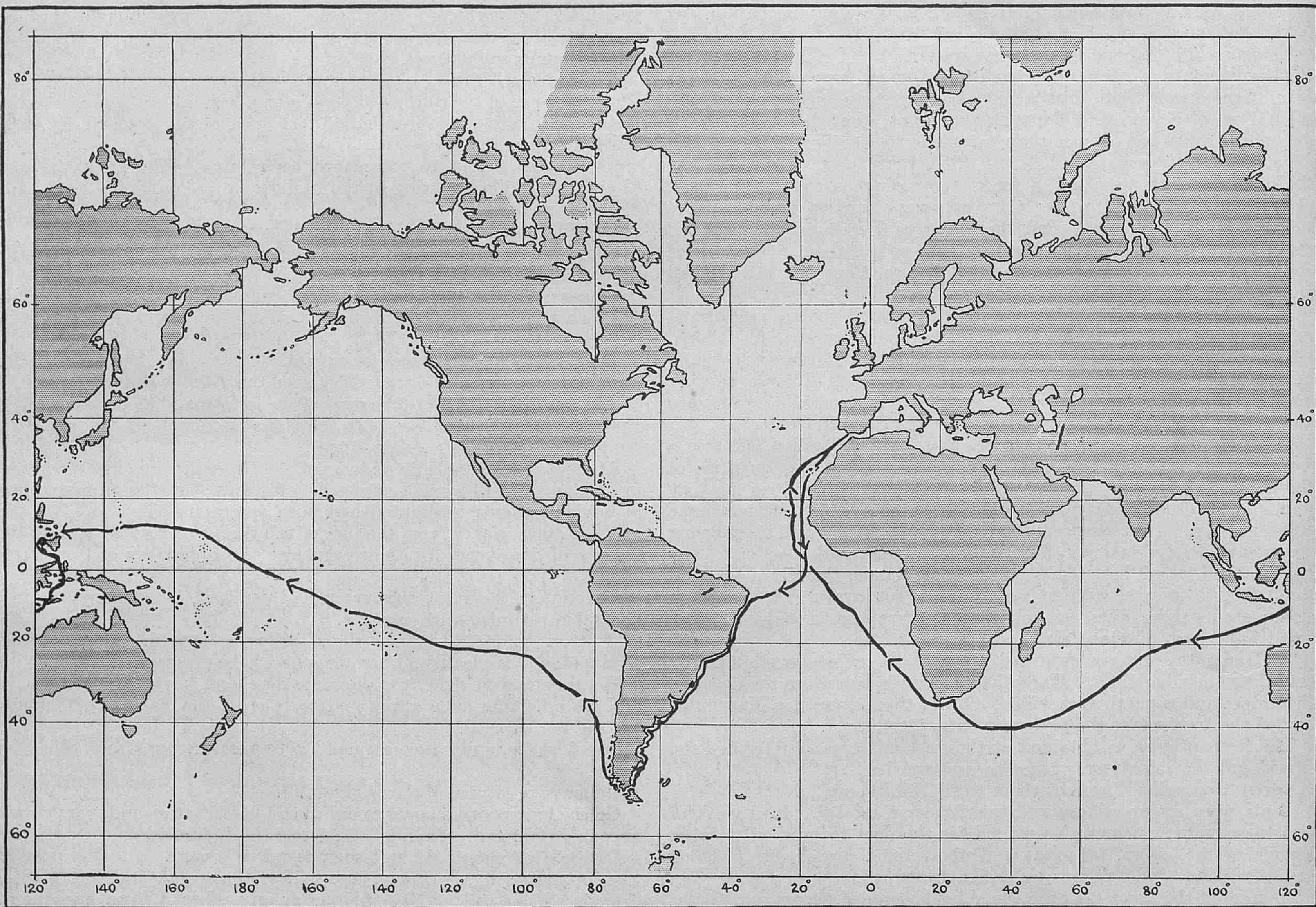


Figure 2.—Approximate Track of Magellan's Fleet.

HISTORY AND DEVELOPMENT OF ORGANISED MARINE METEOROLOGY.

III. Modern Developments.

After the War, the Marine Division in common with many other institutions was faced with the necessity of complete reconstruction. Captain Hepworth, who, although due to retire in 1916, had carried on despite ill-health to the end of the War, died in February, 1919. When the demobilization of Mercantile Marine Officers made the appointment of a new Marine Superintendent possible, Commander L. A. Brooke Smith, R.D., R.N.R., now Captain, R.N.R. (retired), who before the War had been in command of the Orient Liner R.M.S. *Orontes* and who had been an observer for the Meteorological Office for many years, was selected and took up the appointment in November, 1919.

The new Marine Superintendent was faced with the task of entirely reconstructing the collection of observations over the seas and of re-organizing marine meteorological work under sea conditions that were entirely different to those of his predecessors.

Early in 1920, a survey of the data over the oceans, already collected in the Marine Division, was made and it was evident from this survey that if complete and satisfactory charts showing the climate of the oceans upon which navigators could place dependance were to be constructed, then the collection of reliable observations by means of the Meteorological Log would have to be continued for a number of years.

With the great progress made in wireless communication at sea during the War years, a new and almost unexplored field in its application to weather work had opened up.

At sea, on the other hand, the advances made in ship construction and marine engineering had made the modern ocean liner better able to stand bad weather so that, while weather can never cease to interest the seaman, wind had ceased to have the significance it did for the sailing ship master. The improvement in wireless communication had further enhanced safety of life at sea and the importance of weather to the seaman was largely its effect on the economical running of the ship, which trade depression following the War had made imperative.

It follows that if the interest of the seaman was to be regained in the provision of weather observations required by the Meteorological Office, he would have to be assured that full use was being made of any observations he contributed in a Meteorological Log and that if his co-operation in the transmission of observations by wireless, so urgently required by meteorologists ashore, was to be ensured, some provision of reciprocal weather services by wireless from shore to ship would have to be inaugurated.

It was in recognition of this obligation of return for services rendered that any indiscriminate collection of data was rejected and the establishment of a corps of regular and keen marine observers, limited by a definite number of ships, was aimed at, the corps being the trained nucleus which would supply the material whereby any assistance marine meteorology could give to aid safe and economical navigation would be available to the whole merchant service.

On this understanding, a fleet of observing ships was recruited, the limit of the fleet being subsequently fixed at 500 ships, some being asked to undertake the work of keeping a full 4-hourly Meteorological Log, some as wireless reporting ships, others to keep the Meteorological Record.

It was also realized that if a high standard of observation was to be maintained in future years, early training in observing would be a great asset. A form of cadets' meteorological log was therefore drawn up, to be kept at the three principal cadet establishments, H.M.S. *Conway*, *Worcester* and Pangbourne Nautical College.

In pursuance of the policy of the utilization of observations for the benefit of navigation, it was decided to extract completely all logs immediately on receipt commencing from April 1st, 1920. For a start Toynbee's system of data books was used. While this system was perfectly sound in principle, it involved a great deal of monotonous labour for the man engaged in copying the observations, and if a method of data extraction could be found which obviated this laborious copying a great improvement could be effected.

A solution was found by the adoption of the Hollerith Electrical Tabulating and Sorting machines for the work of data extraction. In this system, the observations in the Meteorological Log are coded into figures and each complete set of 4-hourly observations is then punched on to a card by means of the Hand Punch shown in Figure 5, the figures being represented by the punched holes. When a number have been punched they can be sorted into any appropriate order by the Electrical Sorting Machine shown in Figure 6.

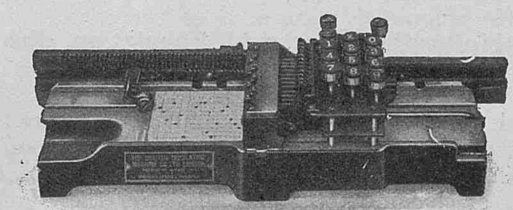


Figure 5.—Card Key Punch.

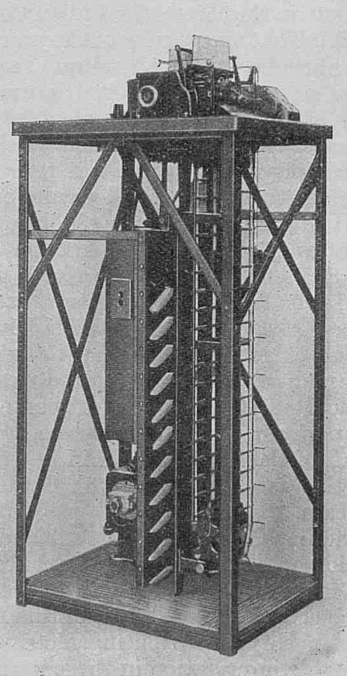


Figure 6.—" Hollerith " Electrical Sorting Machine.

This machine sorts at the rate of 10,000 cards per hour, while the latest type sorts at the rate of 24,000 cards per hour. Thus all the cards for a certain marsden square for a given month can be collated together. By further sortings, the wind can be grouped under direction and force, highest and lowest readings of other instrumental observations can be obtained, or frequencies of different types of weather can be grouped in a short time. Similarly on the Electrical Tabulating Machine, shown in Figure 7, totals of instrumental readings can be readily obtained.

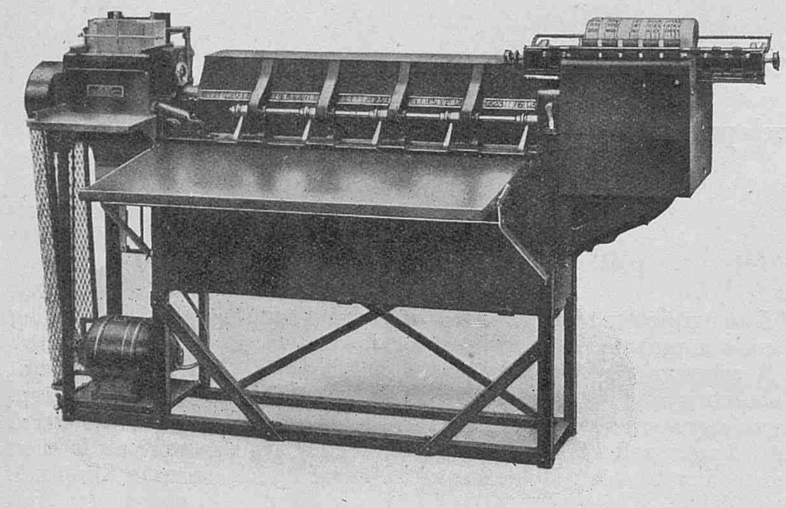


Figure 7.—" Hollerith " Electrical Tabulating, Printing and Listing Machine.

This method was adopted in May, 1921. It has been tested by various investigations, such as the computation of tables of corrections for diurnal variation in both the North and South Tropics, the percentage frequency of cloudiness, fog and mist over the North Atlantic, wind charts of the Panama to Australia and New Zealand Route, which have proved its capabilities to produce results quickly once the initial punching of observations on to cards has been accomplished.

So far, some 960,000 cards containing sets of observations distributed over the ocean, as shown in Marsden Chart No. 1 accompanying " Work of the Year " published in this number, have been punched.

Now the preparation of reliable ocean charts was the fundamental purpose for which the Meteorological Office was established and so far, as has been shown, only in the case of the Indian Ocean had this purpose been fully completed. That the passing of the years had not diminished the need for these charts became evident from requests for them from the Merchant Navy, crystallized in a petition from the Honourable Company of Master Mariners to the President of the Board of Trade asking that the work of completing such charts should be undertaken at the earliest opportunity. The letter was referred by the President of the Board of Trade to the Meteorological Committee and a sub-Committee was set up to consider the possibilities of carrying out this work. A scheme of work whereby the million sets of observations received between 1855 and 1920 in the North Atlantic and Pacific Oceans which had never been digested into a useable form, could be made available, was worked out in the Marine Division.

It was proposed to extract the essential elements of wind, air and sea temperature, humidity, cloud amount and weather on to Hollerith Cards in the Marine Division, the work of coding and punching the observations being performed in one operation. With the addition of six clerks to the staff of the Marine Division, it was estimated that the work of extracting this data on to Hollerith Cards could be completed in two and a-half years.

Unfortunately, the development of this scheme co-incided with the peak of the depression and, in view of the critical financial state of the country, the employment of any additional staff was out of the question.

By a re-arrangement of the work of the Marine Division and a reduction of the number of ships contributing Meteorological Logs to the bare essential to provide information in those parts of the ocean where observations were scarce, it was found possible to commence on January 2nd, 1933, the recovery of arrears of observations received prior to 1920. This programme was to be carried on for two years when the whole scheme would come up for review if improvement in the country's finances permitted.

Up to March 31st, 1935, some 200,000 sets of these observations in the Pacific and North Atlantic have been punched on cards covering the period 1898–1920. The scheme is due for review by the Meteorological Committee this year, and it is hoped, if additional staff can be made available, to complete the work of extraction and to commence the publication of reliable atlases of normals for all oceans on a uniform scale in the not too distant future.

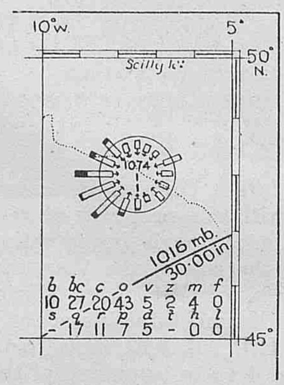
The form of the proposed charts is shown in FIGURE 8.

CLIMATE AVERAGES.

REGION SOUTH OF SCILLY ISLANDS.

FEBRUARY, FOR THE YEARS 1921–1933.

WIND ROSE, WEATHER AND BAROMETER.

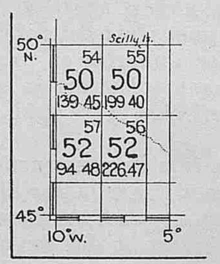


Wind Rose for region 5° Latitude, 5° Longitude.

Weather.—The percentage frequency of the different elements of weather is shown by the number under the letters of the Beaufort Weather Notation. — under a letter indicates no observation of that element of the weather reported. O under a letter indicates that less than 1 observation in 200 of that element of weather has been reported.

Barometer.—Mean pressure of the atmosphere at sea level is shown by isobars.

SEA SURFACE TEMPERATURES



Mean Sea Surface Temperatures are given for each area of 2° of latitude and longitude.

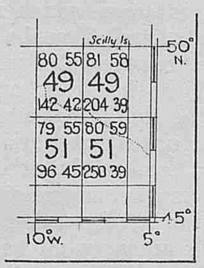
The mean sea surface temperature is indicated by the figure in the centre of the square.

The highest observed sea surface temperature is shown in the top right corner.

The lowest observed sea surface temperature is shown in the lower right corner.

The number of observations on which the mean is based is shown in the lower left corner.

AIR TEMPERATURES AND HUMIDITY



Mean Air Temperatures are given for each area of 2° of latitude and longitude.

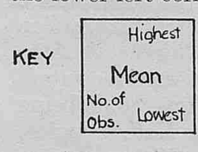
The mean air temperature is indicated by the figure in the centre of the square.

The highest observed air temperature is shown in the top right corner.

The lowest observed air temperature is shown in the lower right corner.

The Humidity is shown in the top left corner.

The number of observations on which the mean is based is shown in the lower left corner.



The number of observations gives an indication of the degree of reliance which may be placed upon the information.

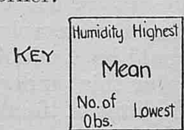


Figure 8.

The wind, weather and barometer will be shown on the face of the chart, while charts of sea surface temperature, air temperature and humidity will be shown on the reverse.

The aim of these charts will be to convey to the navigator all essential information while maintaining the utmost possible clarity of presentation.

During the past fifteen years great attention has been directed to the observation of Ocean Current. It was felt that some more exact representation of current was needed than the Admiralty Charts, published at the end of last century, gave. Moreover, the modern navigation which dates from about 1910 ensures more accurate individual observations and it was desirable that modern observations of current made since that time should be utilized. As has been pointed out in the previous article the method of constructing those charts does not permit of their revision by the addition of further observations and it was decided to commence the investigation of ocean currents afresh using modern observations made subsequent to 1910.

The method of presentation decided upon was to represent on one chart by an arrow the resultant current for small areas and on a second chart to show the variations of currents by means of a current rose. Thus, where definite stream currents exist, they are clearly brought out by the current arrows, while the current roses warn the navigator of the variations likely to be experienced even in the strongest drift currents.

In this manner, the currents along the tracks in the North Atlantic have been charted and published in an atlas in 1930. This year a survey of the currents of the Indian Ocean has been completed and will be published shortly in atlas form.

As each section of an ocean is completed it is published in THE MARINE OBSERVER in order that navigators may have the opportunity of criticism or of giving the Marine Division the benefit of any experiences contrary to the results arrived at, before the atlas is finally published.

The more exact computation of currents has led to fruitful results, and seasonal changes of current hitherto unsuspected have been made evident, and the reliance that can be placed on them is demonstrated by the fact that they have been accepted as evidence in the High Courts.

Of recent years, too, the practice of supplying information to the Admiralty for the revision of pilots has been revived and so any new or more complete information of currents that result from these investigations is made available by this means to the whole Merchant Navy.

The application of wireless to sea weather work has been developed along three lines, from ship to shore, shore to ship and between ship and ship. First it was essential that the service of wireless reports sent by ships in the Atlantic to *Weather, London*, which had been entirely suspended during the War, should be recommenced as soon as possible, in order to supply the Forecaster ashore with observations to the westward which are so necessary for the making of accurate forecasts for the British Isles. For this purpose it was necessary that a code should be drawn up which would give the maximum of information and at the same time retain a simplicity of character which would enable it to be easily and quickly handled by officers at sea. After long discussion by the International Meteorological Commission, a provisional code was agreed to, and a trial by a limited number of ships was inaugurated. The scope of the code was intended to be :—

"(1) For certain steamers to make reports to the Meteorological Office of weather conditions in the North Atlantic to the westward of the British Isles by W/T.

"(2) If found suitable after trial for (1) to enable all ships co-operating with the Meteorological Office who wish to, to exchange synchronous weather reports at sea."

To quote further from the Memorandum from which the above is taken and which was issued to the shipping companies invited to assist, early in 1921, it is pointed out that "By exchanging synchronous observations over an area at sea out of reach of weather forecast reporting stations officers may, by plotting these observations, be enabled to make forecasts with far greater accuracy than is possible for an isolated observer.

"These forecasts may be of great value :

"(*a*) to enable ships to keep clear of the dangerous part of the storm field in a tropical cyclone;

"(*b*) to have warning of approaching bad weather;

"(*c*) to foretell spells of settled fine weather ahead so that steamers may regulate speed to maintain their schedule with economy of fuel."

The matter of re-organization was not an easy one. The grave financial condition of the country after the vast expenditure of the War made it imperative that only the barest essential service should be maintained. Difficulties had arisen before the War in dealing with observations sent in by ships using their own instruments, where the error of the barometer was always a doubtful factor; while often the messages were received too late to be of any value to the Forecaster. It was considered, therefore, to be the best plan to equip a small fleet of Atlantic liners fitted for Continuous Wave Transmission with tested instruments. This eliminated any doubt as to the reliability of the observations, their regularity of programme ensured a fair distribution of data over the ocean with a minimum number of ships, while C.W. gave a range from as far as 40° W. This was carried into effect and the first coded weather report was received on March 27th, 1921.

The next consideration was the reciprocation between shore and ship. If the captain of a ship approaching coastal waters knows the general weather conditions prevailing, what the weather is likely to be in the next few hours and in particular the visibility in coastal waters, he can gauge the time of his arrival in port far more accurately and thereby effect economy. This information can best be supplied by the forecaster ashore with the large number of observations from near and distant stations. If in addition to a general forecast the ship approaching Great Britain could obtain observations from a number of shore stations, as well as ships in the vicinity, an accurate weather chart could be constructed on board which would show the details required. This was materialized by the broadcasting on 2,800 metres spark of a weather message from Poldhu at 0930 G.M.T. (Civil) and 2130 G.M.T. (Civil) commencing on June 15th, 1921. This message consisted of two parts :—

(1) a forecast for the Western Seaboard of the British Isles;

(2) a data message giving observations in code of the barometer, the direction and force of the wind, the visibility and tendency of the barometer for five coast stations, viz., Stornoway, Blacksod, Holyhead, Scilly and Dungeness.

If full use was to be made of this report, it was necessary that seamen should be advised and instructed as to the method of applying it. The backs of the monthly meteorological charts were the only means of communication between seamen afloat and the Marine Division ashore and as their circulation was practically limited to the Corps of Observers while the utilization of this report was of the utmost importance to the whole seafaring community, a small pamphlet, entitled "Weather Forecasting in the Eastern North Atlantic for Seamen" was prepared by Captain BROOKE SMITH and published in July, 1921. Before very long, the views expressed by captains and officers themselves made it apparent that the Poldhu report was of distinct benefit to seamen, and recommendations for the extension of broadcasted weather messages for other coasts were received from such influential bodies as the Chamber of Shipping of the United Kingdom, the North of England Shipowners' Association, and the Imperial Merchant Service Guild.

The trial with the Provisional International Wireless Weather Code was continued until June, 1924, when the New Code in accordance with the latest International agreement and revised from the experience gained since 1921, was brought into use. In August, 1924, observers making these coded weather reports to *Weather, London*, were asked with the permission of their owners, to extend their observations right across the Atlantic, co-operating with America by sending their observations west of 40° W. to the Government Observer, Washington, D.C.

The extension of the installation of C.W. reception to most ocean-going ships enabled a more comprehensive broadcast weather bulletin for the United Kingdom to be introduced, and the British Weather Shipping Bulletin which is described each year in the April number of THE MARINE OBSERVER was developed.

With the rapid development of wireless communication and the consequent increase of wireless traffic of all descriptions, it became evident that a more detailed organization of weather reports at sea would have to be devised. If a practical scheme were to be accomplished, then it was essential that the opinions and experience of the masters of ships should be obtained and utilized in its preparation. For some years this evidence was accumulated by personal contacts made by Captain BROOKE SMITH up and down the country when visiting ports, culminating in an informal conference held by the courtesy of the Royal Mail Steamship Company in their Board Room at Southampton in 1928 where a representative gathering of ship masters and the wireless and shipping interests approved a scheme for the world organization of weather reports at sea to be drawn up by Captain BROOKE SMITH in consultation with the Marconi

Company and the General Post Office and to be submitted to the International Commission for Maritime Meteorology. This was confirmed by a further informal conference in London of representatives of the Honourable Company of Master Mariners, the Chamber of Shipping of the United Kingdom and the Marconi Company.

Careful organization was also essential as the Convention for the Safety of Life at Sea was meeting in 1929, and the effect of any recommendation by that convention with regard to Meteorological services, which if ratified would become part of the Merchant Shipping Act, needed grave consideration.

The scheme evolved was briefly that a certain number of ships of each nation called "selected ships" should voluntarily transmit meteorological observations by W/T for the benefit of other ships and the various meteorological services at a definite schedule of times of observations and transmission. The number of "selected ships" of any nation was to be in accordance with that nation's proportion of the World's tonnage, steam and motor, of vessels over 100 tons. The messages would be transmitted in a universal code.

This scheme was placed before a small sub-commission of the International Meteorological Committee in Paris, in May, 1928.

The Convention of Safety of Life at Sea made recommendations which were subsequently embodied in Article 35 of the Merchant Shipping (Safety and Load Line Convention) Act, 1932, the full text of which is published each year in the January MARINE OBSERVER.

The scheme was placed before the International Meteorological Committee at their meeting in Copenhagen in 1929, and as a result the British Meteorological Office was asked to undertake a trial of the scheme before the schedules were finally adopted.

Commencing on May 1st, 1930, the "Scheme for British selected ships' Routine Wireless Weather Reports," as fully described in the January number of THE MARITIME OBSERVER each year and in the "Decode for use with the International Code for Wireless Weather Messages from ships," was put into operation.

Within the first year of operation the trial proved this scheme to be more successful than any other method previously tried. In the Eastern North Atlantic where wireless traffic is extremely congested, the control of wireless weather reports by the use of a roll-call from Portishead W/T Station is maintained and has resulted in a good distribution of weather reports almost invariably received punctually at schedule time. Elsewhere, as the analysis for October, 1934, given in Table II of Work of the Year, page 93 shows, the service of weather reports in other oceans is being well and regularly carried on.

Indeed so effectively has this "Selected Ship" system been developed by the British Merchant Navy during the past five years under the guidance of the Meteorological Office, that an invitation has been extended to the Masters of all ships fitted with Wireless Telegraphy to carry on the service when and where "Selected Ships" are not available.

It is a tribute to the British Merchant Navy that this voluntary service has been carried out so splendidly in conformity with the high standard of discipline prevailing amongst British seamen.

It will be interesting to see in future years, if, as is the present aim, this system of routine W/T weather reports becomes just a matter of the usual routine of the Merchant Navy.

To carry out this development of wireless weather work at sea and to improve the standard of observation for use with the Hollerith System, it was very necessary that information and guidance should be passed to the seaman in a form which facilitated ready reference and stimulated his interest. In the first place the backs of the Monthly Meteorological Charts were utilised for this purpose, but the awkwardness of the size of the charts precluded their use for ready reference or even for convenient reading. In addition it was felt to be very uneconomical to republish normal charts as monthly periodicals. In 1922, therefore, a proposal was put forward by the Marine Superintendent for the issue of a monthly magazine. After careful consideration, authority was given for the publication of THE MARINE OBSERVER, commencing in January, 1924.

Two of its prominent features are the publication of all interesting reports on phenomena experienced by observers under the title of "The Marine Observer's Log" and the publication of a Fleet List wherein the work done by the Voluntary Corps of Observers is suitably acknowledged.

Through its pages information and instruction has been given in the application of wireless weather messages as a practical aid to navigation at sea, the results of investigation of ocean currents, and articles of general interest pertaining to marine meteorology and navigation.

THE MARINE OBSERVER was continued as a monthly publication until 1933 when, with the re-organisation of the Marine Division to commence the recovery of arrears of pre-1920 data, it was felt that it had sufficiently well served its purpose to allow of it being published quarterly without adversely affecting the work at sea, and from January, 1933, it has appeared as a quarterly publication with a monthly supplement to give information of fleet changes and convey urgent information of ice, derelicts, etc.

Personal contact has been maintained by the appointment of two full-time nautical officers, one at London Docks and one at Liverpool, and through the medium of the part time services of master mariners at other ports.

For some long time, the necessity for a Handbook of weather, currents and ice for general use at sea and particularly for those officers who do not regularly receive THE MARINE OBSERVER has been apparent, and in 1929 the Honourable Company of Master Mariners suggested that such a manual should be published, especially as the Board of Trade have recently included the subject of marine meteorology in a more practical form in their examinations. Such a manual entitled "A Handbook of Weather Currents and Ice for Seamen" has been published, and it is hoped that this treatise based on the work done by seamen for the Marine Division of the Meteorological Office, in which too much scientific and technical detail has been avoided as far as possible, will prove of assistance to the Merchant Navy generally.

The work of the past fifteen years may be summed up as an endeavour to link the older forms of marine meteorology with modern developments, by the use of modern calculating machines to make effective the wealth of observations contributed to the Marine Division since its inception in 1854, and by careful organisation to enable the Merchant Navy to make use of the new era of wireless communication as applied to weather work, to the greatest advantage of safe and economical navigation. The final result of the first part of the work of the Marine Division has not yet been fully achieved, but of the second part it can be said that the foundation of an efficient service of wireless weather work at sea has been laid down.

FOG AND MIST IN THE WESTERN HALF OF THE ENGLISH CHANNEL.

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

To the large number of ships who daily approach the English Channel or Narrows the question of what visibility will be experienced when making a landfall becomes an all important one and it is then that the information contained in the Weather Shipping Bulletin for the Southern Area is most eagerly sought.

By the courtesy of the Elder Brethren of Trinity House, who permitted extracts to be taken from the logs of lighthouses under their control, an investigation has been made into the frequency of fog and mist with its relation to the direction and force of wind experienced in that district named Channel in the Weather Shipping Bulletin. This district extends westwards from St. Albans Head to the 100 fathom line.

In order to avoid as much as possible the effect of radiation fog over the land, those stations furthest seaward were chosen, namely Wolf Rock, Eddystone and Casquets. Their positions are shown on chartlet below.

The Wolf Rock Lighthouse, light 100 feet above high water, is situated 8 miles south of Lands End, 17 miles east of the Scillies and 22 miles west of Lizard Head. Eddystone Lighthouse, light 133 feet above high water, is situated 8 miles south of Rame Head, 20 miles east of Dodman Point and 19 miles west of Bolt Head. Casquets Lighthouse, light 120 feet above high water, is situated 14 miles north of Guernsey and 6 miles west of Alderney. Westward the lighthouse is open to seaward.

Entries are made in the logs every three hours, and the actual time that fog or mist prevail is recorded on the following scale: (1) Very Thick Fog, (2) Thick Fog, (3) Fog, (4) Mist. All entries recording atmospheric obscurity due to precipitation, haze, or to causes other than the condensation of the water vapour of the atmosphere were neglected, so that the fog roses or graphs shown on the following pages represent as nearly as possible the actual fog and mist experienced at the stations covering the five years 1929 to 1933. Graphs showing the Atmospheric Obscurity from all causes in this area were published in the July, 1934, number of THE MARINE OBSERVER.

The fog roses shown on FIGURE 1, give for each station the monthly percentage frequency of fog and mist associated with winds of different forces, from between each cardinal and quadrantal point of the compass.

The roses show that within this area the meteorological conditions may be such as to produce bad visibility with winds from any direction, but that the most frequent occurrence of fog is with winds from a southerly direction.

At the Eddystone more fog is experienced throughout the year with moderate to strong winds than with calm or light winds, it is only during the months of May, August and September that the reverse is the case. On the other hand at both the Wolf Rock and Casquets more fog is experienced throughout the year with calm or light winds, but at the Wolf Rock during the months from November to February the greater percentage frequency occurs, with moderate to strong winds. At the Casquets very little fog or mist is recorded with other than light winds and during the months from October to January this station is particularly free from fog.

FIGURE 2 gives the monthly percentage frequency of fog at each station. They show that the greatest frequency occurs during the spring and summer months with maxima at the beginning and end of this period. At this time of the year the prevailing winds are from a southerly direction and fog is thus readily formed by the passage of warm moist air over relatively cool water. During April there is a larger proportion of N.E. winds, hence there is a decrease of fog frequency during this month at all three stations. Similarly the percentage of N.W. winds increases during July with a consequent decrease of fog frequency during that month.

The situation of the Eddystone Lighthouse renders this station more liable to experience the effect of autumn and winter fogs formed over the land than the other two stations. This is shown by the increase of fog frequency at this station in October and December.

The following table gives the seasonal variation in the percentage frequency of fog at the three stations.

——	Winter.	Spring.	Summer.	Autumn.
Wolf ...	7·1	9·5	10·1	7·1
Eddystone...	7·5	8·4	7·7	7·3
Casquets ...	2·1	5·1	7·3	1·8
Total ...	16·7	23·0	25·1	16·2

Taking the district as a whole, the seasonal frequencies show that the amount of fog recorded during the summer months is a little in excess of that recorded during the spring while the autumn and winter frequencies are very similar. During the spring and summer season a little more fog is recorded at the Wolf than at the Eddystone but at these two stations the autumn and winter frequencies are of much the same value. At the Casquets on the other side of the Channel, much less fog is recorded than at either the Wolf or Eddystone, with the exception of during the three summer months.

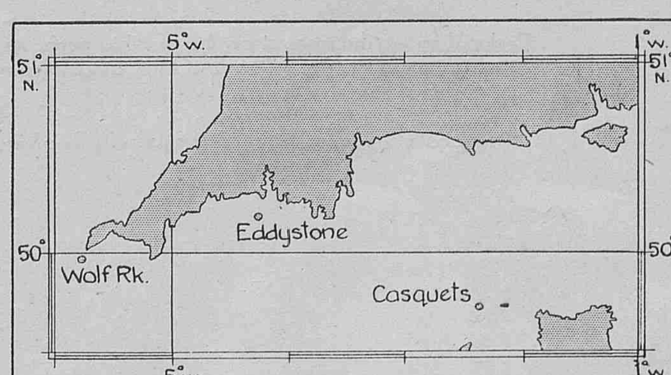
FIGURE 3 shows the diurnal variation of fog and mist experienced at each station and for the district as a whole, throughout the year.

There does not appear to be any well marked variation throughout the twenty-four hours at either station. At Wolf Rock a slightly greater frequency is experienced between the hours of nine in the morning and six in the evening which is in fair agreement with Casquets where the greatest frequency is between seven in the morning and and four in the afternoon, but at the Casquets the rise in frequency during these hours is more pronounced than at Wolf Rock. At the Eddystone more fog is experienced between the hours of one and eleven a.m. than at any other time of the day.

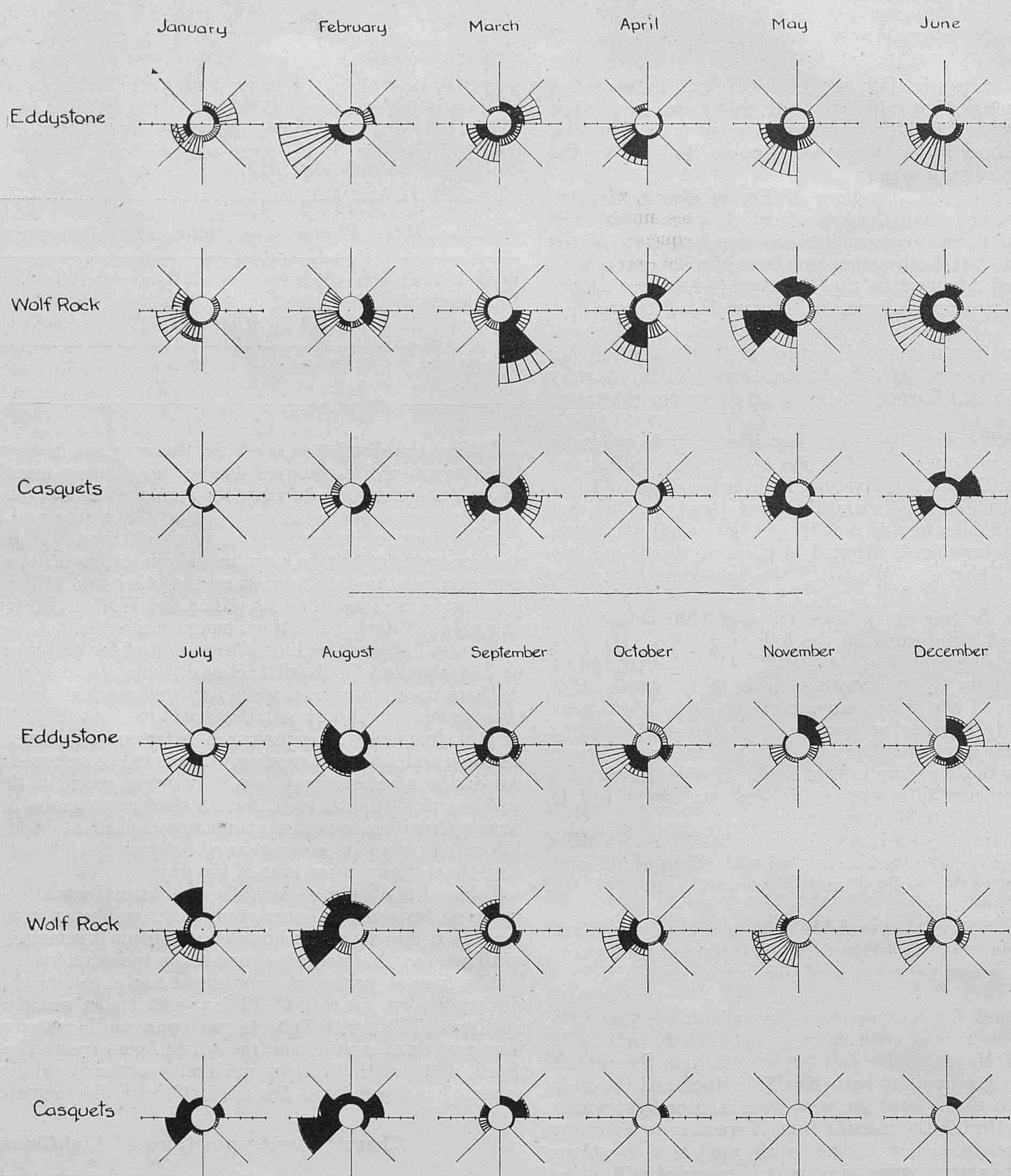
Taking the district as a whole, the diurnal variation very gradually increases between the hours of midnight and seven in the morning, and reaches a maximum an hour later, whence it remains fairly constant until noon and then slowly decreases up to midnight.

The longest period of continuous fog experienced in this district during the five years 1929–1933 was 62 hours, recorded at Wolf Rock in March, 1931, with light to moderate south-easterly winds. Other long periods of continuous fogs are 44 hours recorded at Eddystone in April, 1933, with light to moderate southerly winds, and 41 hours recorded at Casquets in August, 1932, with light north-westerly winds.

Chart Showing positions of Lighthouses.

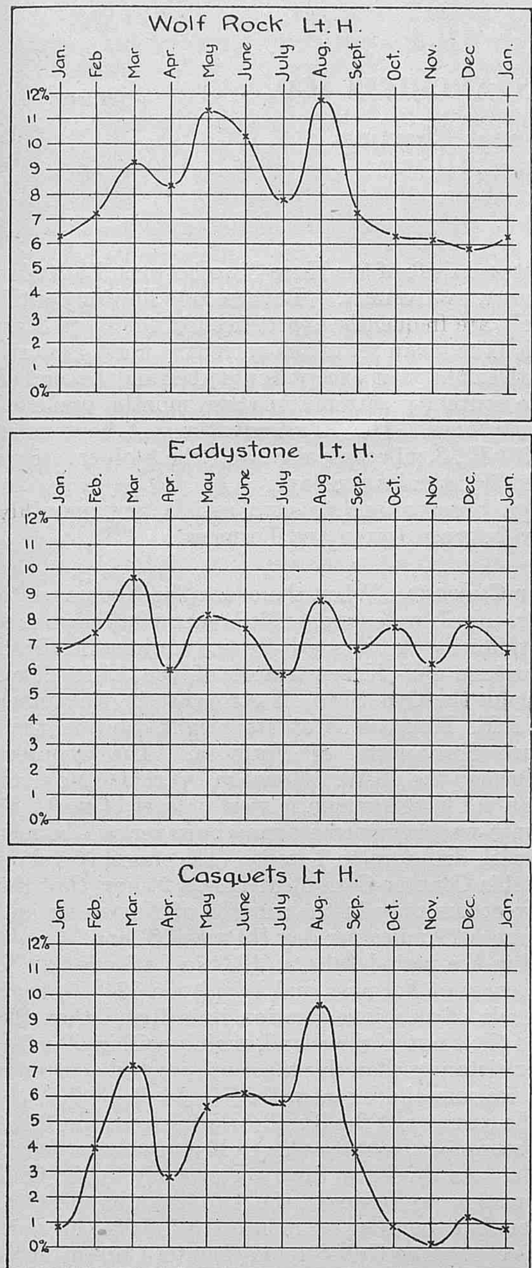


Monthly Percentage Frequency of Fog and Mist with Winds of different directions and forces—1929 to 1933.

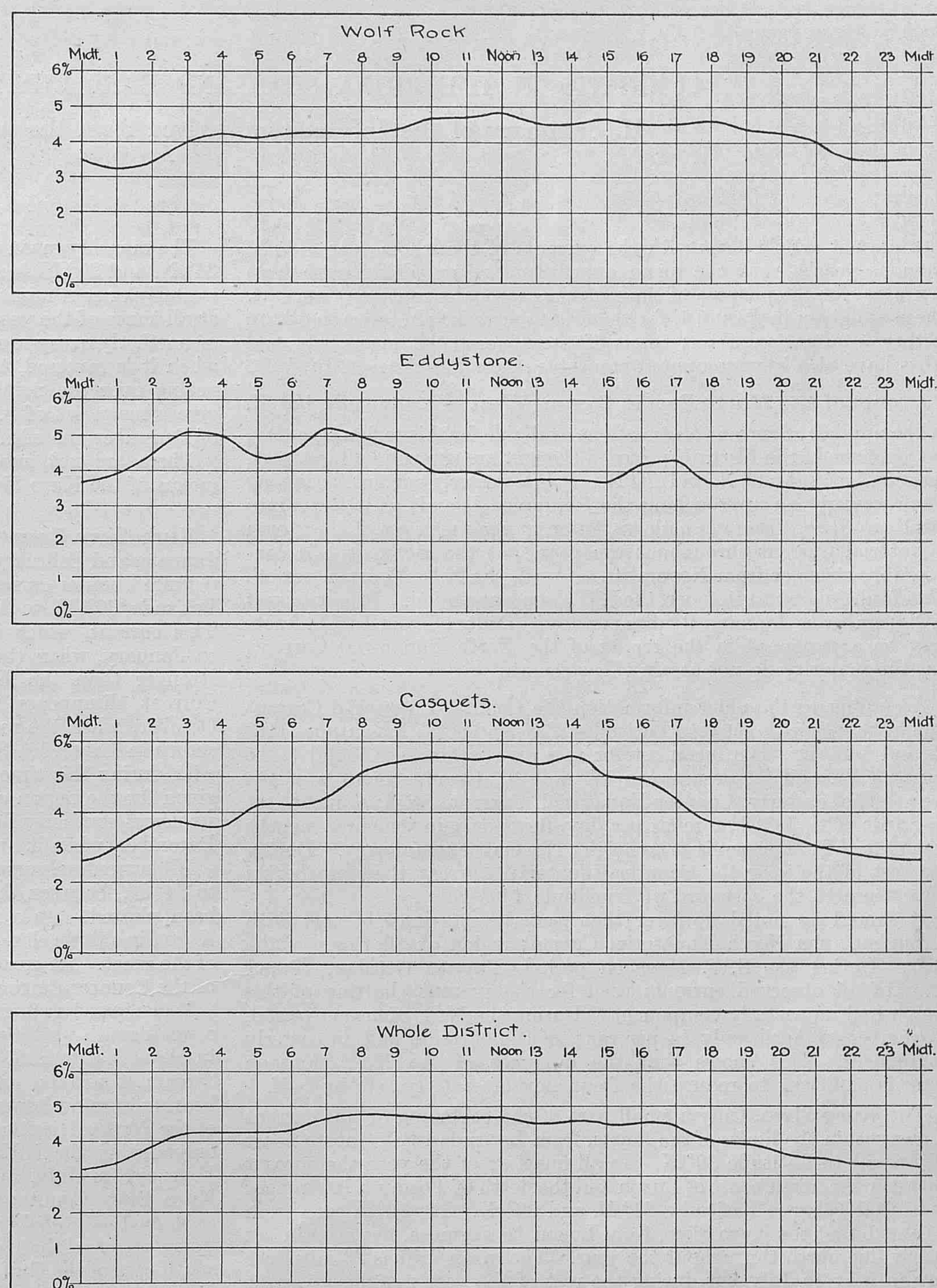


Explanation – The roses show the monthly percentage frequency of Fog and Mist with winds of different forces in the half quadrants. – Fog and Mist associated with light winds, forces 0–3 shown thus –
" " moderate " 4–7 " –
" " gales " 8–12 " –
The scale of percentage frequency is given on the east-west line, each division from the circle being 1%

Figure 1.



Monthly Percentage frequency of Fog and Mist, 1929-1933.
Figure 2.



Decimal Variation of Fog.
Figure 3.

CURRENTS IN THE CHINA SEAS AND EAST INDIAN ARCHIPELAGO.

II. Summary of the Information derived from the present Charting.

The present article deals with the currents of the whole year. As in previous year's work the mean quarterly sets and drifts have been computed for the purpose of showing the seasonal variation of current. These are given in Table 1, for the areas selected. In order to obtain further information about some of these areas the mean sets and drifts have also been computed monthly; these are given in Table 2.

Currents of the North Pacific Ocean, West of Longitude 140° E.

The number of current observations available for this region is scanty, but portions of the North Equatorial Current are shown in all quarters, between Latitudes 8° N. and 20° N. It is a westerly current, becoming north-westerly on approaching the Philippine Islands as it turns into the Kuro Siwo. There is little variation in the mean set of the North Equatorial Current throughout the year, but the mean drift is considerably stronger from November to April, the N.E. Monsoon period, than from August to October, the S.W. Monsoon period. It is strongest in November to January, 9 miles per day. Drifts of from 1 to 1½ knots may be experienced in the region of the North Equatorial Current, but the majority do not attain this strength.

According to the older information the Counter-Equatorial Current should be met with between Latitudes 2° N. and 8° N., Longitudes 128° E. and 140° E. The mean set for this area is however found to be between W. and S., or between W. and N., for nine months of the year. The easterly Counter-Equatorial Current, with a mean set and drift of N. 59° E., 6 miles per day, flows only in the three months when the N.E. Monsoon is at its height, November to January. During the rest of the year the Counter-Equatorial Current therefore begins somewhere to the eastward of Longitude 140° E.

It should be noted however that easterly sets may be met with throughout the North Equatorial Current region at all times of the year. During the S.W. Monsoon period, May to October, 27 per cent. of all observed currents used for the present charting of this region had an easterly component. During the N.E. Monsoon period, November to April, only 14 per cent. of the currents had an easterly component. This shows that the influence of the N.E. Monsoon wind is sufficient to reduce the frequency of easterly sets by half.

The Kuro Siwo. Only a small part of the beginning of this current comes within the limits of the charts, from Latitude 18° N. (north coast of Luzon) to Latitude 30° N. In all quarters of the year the current between the north coast of Luzon and the north of Formosa is stronger than that between Latitudes 24° N. and 30° N. It will be seen from Table 1 that the Kuro Siwo, from Luzon to Formosa, has a mean set nearly due north throughout the year. The mean drift is 23 miles per day in May to July but during the rest of the year remains constant at half this strength, 12 or 13 miles per day. There is also one quarter in which the Kuro Siwo north of Latitude 24° N. is strongest, February to April, with a mean drift of 16 miles per day, and during the rest of the year it flows at less than half this strength, 4 to 7 miles a day. The mean set of this part of the current is between N. and E. throughout the year.

The Kuro Siwo south of Formosa is therefore strongest during the S.W. Monsoon period; north of Formosa it is strongest during the N.E. Monsoon period. It must be noted however that the total number of observations available from Luzon to Formosa is only 48 for the whole year; north of Formosa there are 135 observations for the year. The two strongest currents observed in the period 1910 to 1934 were N. 37° E., at the rate of 48 miles per day, recorded by S.S. *Siamese Prince* on April 12th, 1934, in the mid-position Latitude 23° 56′ N., Longitude 121° 53′ E., and N. 38° W., at the rate of 47 miles per day, recorded by S.S. *Knight Companion* on May 24th, 1927, in the mid-position Latitude 19° 26′ N., Longitude 122° 50′ E. There is thus no evidence, from the 48 current observations available, of the occurrence of drifts of from 3½ to 4½ knots off the south-east coast of Formosa, as stated in the older works.

The monthly mean set and drift of the Kuro Siwo between Latitudes 24° N. and 30° N. is shown in Table 2. Reverse sets flowing south-westerly or south-easterly are frequently experienced in the Kuro Siwo at all times of the year. The mean set of the current is north-easterly or northerly every month in the year except September and December when it is reversed, the southerly currents in these months predominating over the northerly ones. The 13 observations of September give a mean set of S. 76° E., 3 miles per day, and the 8 observations of December one of S. 8° W., 4 miles per day.

There are not enough observations to give satisfactory monthly means of the Kuro Siwo between Luzon and Formosa.

Kuro Siwo Counter-Current. When the charts for November to January and February to April are examined it is seen that there is a definite counter-current flowing in a south-westerly direction from Latitude 30° N. to Latitude 20° N., eastwards of the Kuro Siwo. This current, which is not the Oya Siwo, is strongest in November to January, when the N.E. Monsoon is at its height, and is then stronger than the Kuro Siwo north of Formosa. The Counter-Current disappears during the S.W. Monsoon period, May to October, when the mean set in this region is west or east of north as shown in Table 1. South-westerly currents may however still be met with during this time, with drifts up to 1 knot. The monthly values given for the region of this Counter-Current in Table 2 show that the strongest southerly flow occurs only in the months of November and December, when it averages 17 miles per day, between S. and W.

All currents observed in the period 1910 to 1934 in Latitude 22° N. to 24° N., between the coast of Formosa and Longitude 124° E. have been plotted. As a result of this investigation it is found that the Kuro Siwo flows close to the coast of the island, mainly within 60 miles of the coast. At greater distances than this the south-westerly currents of the Counter-Current are sometimes met with.

When investigating the currents of the North Atlantic Ocean in 1927, a weak south-westerly counter-current to the Gulf Stream was found in about Latitude 30° N. As the Kuro Siwo corresponds to the Gulf Stream it will be interesting to compare the two counter-currents, bearing in mind however that there are no monsoon winds in this part of the North Atlantic Ocean. The Gulf Stream Counter-Current flows only during the half-year when the Gulf Stream is strongest, from February to July, and it is never so strong or so extensive as the Kuro Siwo Counter-Current is in November to January. It was explained as probably caused by the slope of the sea surface from the warm water of the Gulf Stream downwards to the cooler water to the south-east of the Gulf Stream. The Kuro Siwo Counter-Current may be caused in the same way but the Kuro Siwo is a weaker current than the Gulf Stream in similar latitudes and it is probable that the Counter-Current is mainly due to the N.E. Monsoon wind. There is at any rate not sufficient slope of the sea surface to cause the Counter-Current to flow against the S.W. Monsoon wind in the half-year May to October.

The well-known cold counter-current to the Kuro Siwo, known as the Kamchatka Current or Oya Siwo, does not come within the limits of the present charts. This current flows west of the Kuro Siwo, southwards from the Bering Sea, to about Latitude 38° N., where it meets the Kuro Siwo off the Japanese coast.

Currents of the China Sea, Formosa Channel and Eastern Sea.

During the months of November to January, when the N.E. Monsoon is at its height, a well-marked and fairly strong monsoon current flows down the coasts of China and Annam, the set being generally south-westerly, from Latitude 30° N. to Latitude 4° N. There the set becomes southerly and south-easterly as it passes through the Carimata Strait into the Java Sea. The course of this current has been divided into four parts in Table 1 and the monthly variations are shown in Table 2 for three of these areas, there being insufficient observations to give monthly results for the region between Latitude 4° N. and 2° S.

In May to July, when the S.W. Monsoon prevails, an equally well-marked but weaker current flows in the reverse direction along the same course. Fewer observations are available for the central and eastern parts of the China Sea and some of the areas on the charts are blank, especially during the S.W. Monsoon period. It is clearly shown, however, by the mean arrows and by the roses for the regions Latitude 10° N. to 16° N., Longitude 112° E. to 120° E. and Latitude 16° N. to 22° N., between the same longitudes, that the currents caused by both monsoons are much weaker in the central and eastern parts of the China Sea. The monsoon currents of the China Sea are therefore comparatively narrow streams. The S.W. Monsoon Drift is more variable than the N.E. Monsoon Drift, but reverse drifts up to or exceeding one knot may be experienced in the main streams of these currents during both monsoons. Strong reverse drifts are most likely to be experienced in May to July, in Formosa Channel. The rose, referred to above, for Latitude 10° N. to 16° N., Longitude 112° E. to 120° E., illustrates the currents of the central part of the China Sea very well. In November to January, current in this area may set in any direction, but the frequency of each of the directions, W., W.S.W., and S.W. is greater than that of any other single direction, showing the influence of the N.E. Monsoon. Yet, on the total, the currents setting between W. and S.W. are in the minority. Precisely the same thing is seen on the chart for May to July, where the greatest frequencies are found in directions from N.E. to S.E., but currents in all other directions total to a slightly greater frequency.

Drifts exceeding 2 knots occur in any part of the N.E. Monsoon Drift and in several cases equal or exceed 60 miles per day, as shown by the maximum drift tables on the charts. The strongest south-westerly current during the period 1910–1934 was, however, recorded in the transition month of October, S. 70° W., at the rate of 75 miles per day, observed by S.S. *Kwangchow* on October 14th, 1931, in the mid-position Latitude 12° 16′ N., Longitude 110° 08′ E. Only three currents in the period 1910–1934 equalled or exceeded 60 miles per day in the S.W. Monsoon period, but one of these is the strongest current of the whole year, N. 73° E., 79 miles per day, recorded by S.S. *Zanoni* on August 7th, 1913, in the mid-position Latitude 10° 30′ N., Longitude 110° 30′ E. The strongest drifts during the S.W. Monsoon period are experienced between Latitude 6° N. and 16° N.

China Sea currents in February to April are similar to those of November to January, but weaker, as the monsoon weakens during this period and the transition month of April is included. The chart of mean arrows for August to October shows a transition from the S.W. Monsoon Drift to the N.E. Monsoon Drift, the mean currents in some areas being still N. or N.E. while in others they are S. and S.W. The rose for Formosa Channel and that for the coastal region immediately north of it show the transition very clearly, north-easterly and south-westerly currents being both frequent. Strong north-easterly currents are still experienced off the Annamese Coast between Latitudes 10° N. and 14° N., while immediately to the northwards southerly currents predominate.

TABLE 2 clearly shows how the currents change in various latitudes of the China and Eastern Seas. From Latitude 22° N. to 30° N. the

Table 1.
China Seas and East Indian Archipelago.
Mean Quarterly Currents. (Drifts in Miles per Day.)

Region.	November to January.		February to April.		May to July.		August to October.	
	Mean Set and Drift.	No. of observations.	Mean Set and Drift.	No. of observations.	Mean Set and Drift.	No. of observations.	Mean Set and Drift.	No. of observations.
Kuro Siwo, Latitude 24° N.–30° N.	N. 56° E. 4	35	N. 50° E. 16	30	N. 22° E. 6	41	N. 48° E. 7	43
Kuro Siwo, Latitude 18° N.–24° N.	N. 9° W. 13	11	N. 2° W. 12	12	N. 1° E. 23	12	N. 3° E. 12	13
Kuro Siwo, Counter-Current	S. 61° W. 9	16	S. 59° W. 4	23	N. 51° W. 3	21	N. 54° E. 5	15
Monsoon Drift, China Sea, Latitude 22° N.–30° N.	S. 44° W. 11	160	S. 43° W. 6	136	N. 37° E. 9	166	N. 47° E. 1	205
Monsoon Drift, China Sea, Latitude 14° N.–22° N.	S. 61° W. 13	139	S. 82° W. 4	139	N. 35° E. 4	87	S. 50° W. 5	139
Monsoon Drift, China Sea, Latitude 4° N.–14° N.	S. 38° W. 16	462	S. 61° W. 6	433	N. 57° E. 7	355	N. 74° E. 8	383
Monsoon Drift, China Sea, Latitude 2° S.–4° N.	S. 2° E. 10	67	S. 8° E. 9	61	N. 1° W. 10	61	N. 5° E. 7	65
North Equatorial Current, Latitude 8° N.–20° N.	S. 83° W. 9	29	N. 79° W. 7	40	S. 81° W. 6	30	S. 85° W. 3	34
Counter-Equatorial Current, Latitude 2° N.–8° N.	N. 59° E. 6	16	S. 37° W. 4	10	N. 64° W. 5	3	S. 17° W. 12	5
Java Sea, Longitude 104° E.–120° E.	S. 68° E. 6	25	S. 10° W. 13	11	S. 83° W. 13	30	S. 51° W. 6	20
Sulu Sea	N. 87° W. 10	15	S. 70° W. 9	15	N. 37° E. 4	21	S. 47° E. 6	9
Celebes Sea	S. 13° W. 12	23	S. 74° W. 9	22	S. 54° W. 4	17	W. 6	23

Table 2.
Mean Monthly Current. (Drift in Miles per Day.)

Month.	Kuro Siwo Latitude 24° N.–30° N.		Kuro Siwo Counter-Current.		Monsoon Drift China Sea, Latitude 22° N.–30° N.		Monsoon Drift China Sea, Latitude 14° N.–22° N.		Monsoon Drift China Sea, Latitude 4° N.–14° N.	
	Mean Set and Drift.	No. of observations.	Mean Set and Drift.	No. of observations.	Mean Set and Drift.	No. of observations.	Mean Set and Drift.	No. of observations.	Mean Set and Drift.	No. of observations.
November	N. 43° E. 8	12	S. 70° W. 18	3	S. 40° W. 8	53	S. 65° W. 16	45	S. 46° W. 13	127
December	S. 8° W. 4	8	S. 49° W. 16	7	S. 43° W. 13	54	S. 61° W. 13	41	S. 37° W. 17	143
January	N. 45° E. 5	15	N. 11° E. 3	6	S. 49° W. 13	53	S. 54° W. 10	53	S. 44° W. 15	192
February	N. 59° E. 15	12	S. 67° W. 5	10	S. 38° W. 7	50	S. 45° W. 9	41	S. 51° W. 11	132
March	N. 28° E. 20	8	N. 61° W. 4	8	S. 51° W. 7	44	N. 61° W. 5	63	S. 56° W. 6	157
April	N. 29° E. 16	10	S. 8	5	S. 42° W. 4	42	N. 29° E. 2	35	N. 56° W. 3	144
May...	N. 5° W. 6	20	N. 75° W. 2	11	N. 9° W. 3	59	N. 13° E. 4	31	N. 44° E. 4	115
June	N. 39° E. 6	8	N. 85° E. 1	6	N. 43° E. 14	57	N. 74° E. 4	22	N. 62° E. 8	133
July...	N. 47° E. 8	13	N. 42° W. 9	4	N. 31° E. 13	50	N. 35° E. 5	34	N. 56° E. 10	107
August	N. 39° E. 14	17	E. 1	2	N. 44° E. 9	83	S. 51° E. 3	48	N. 55° E. 14	154
September	S. 76° E. 3	13	N. 5° W. 9	5	N. 42° E. 1	65	S. 67° W. 5	44	N. 65° E. 9	129
October	N. 51° E. 4	13	S. 87° E. 7	8	S. 43° W. 11	57	S. 61° W. 10	47	S. 7° W. 9	100

N.E. Monsoon Drift flows south-westerly from October to April inclusive and the S.W. Monsoon Drift north-easterly from June to August inclusive, May and September being the transition months. From Latitude 14° N. to 22° N. the N.E. Monsoon Drift flows from September to February, the S.W. Monsoon Drift from April to July, March and August being transition months. From Latitude 4° N. to 14° N., the N.E. Monsoon Drift flows from October to March, the S.W. Monsoon Drift from May to September, April being a transition month. The change from September to October is sudden. These differences will be more readily shown by TABLE 3.

Table 3.

Seasonal Currents in various latitudes of the China and Eastern Seas.

Latitude.	S.W. Current.	Transition.	N.E. Current.	Transition.
22° N.–30° N. ...	October–April.	May.	June–August.	September.
14° N.–22° N. ...	September–February.	March.	April–July.	August.
4° N.–14° N. ...	October–March.	April.	May–September.	—

The seasonal change of current, therefore, occurs earlier in Latitude 14° N. to 22° N. than in latitudes north or south of this region. There is as much as two months' difference in the time of establishment of the S.W. Monsoon Drift in the region of Latitude 14° N. to 22° N. and that of Latitude 22° N. to 30° N. TABLE 4 represents the winds of the three regions, taken from the Monthly Meteorological Charts of the East Indian Seas.

Table 4.

Seasonal Winds in various latitudes of the China and Eastern Seas.

Latitude.	N.E. Monsoon.	Transition.	S.W. Monsoon.	Transition.
22° N.–30° N. ...	October–April.	May.	June–August.	September.
14° N.–22° N. ...	October–March.	April.	May–August.	September.
4° N.–14° N. ...	November–April.	—	May–September.	October.

In the northern region the wind and current changes exactly agree. In the middle region, the S.W. and N.E. currents become established during the months of wind transition and in the southern region the S.W. current becomes established during October, the month of wind transition. The charts of mean sea surface temperature for the Indian Ocean and China Sea published in MARINE OBSERVER, Volume V., 1928, show that from January to April there is a very large difference of mean temperature between the cooler sea at the northern limit of the present current charts, Latitude 28° N. to 30° N., and the warmer sea in the neighbourhood of 15° N. and lower latitudes. For these three months the difference is 26° F., decreasing to a minimum of 2° F. in August. This is due to the cooling effect of the N.E. Monsoon. It is possible that the N.E. current starts in April in Latitude 14° N. to 22° N., as a temperature current caused by the steep gradient of sea surface temperature northwards.

Currents of the East Indian Archipelago. During November to January when the N.E. Monsoon Drift in the China Sea is strong, the current passes through the Carimata Strait and continues as an easterly current in the Java Sea, where the N.W. Monsoon is blowing. During the rest of the year the current in the Java Sea is between W. and S. Only a comparatively small number of observations is available for the Java Sea, between Longitudes 104° E. and 120° E., 86 for the whole year, but these observations show that the current is strongest from February to July, with a mean drift of 13 miles per day. As stated in the first article, the S.E. Monsoon blows over this region from April to September, so that this wind has more effect in producing current than the N.W. Monsoon.

In the small deep-water area, Latitude 6° S. to the island of Flores, Longitude 120° to 124° E., the mean current flows nearly due east throughout the year. There are only 16 observations for the year, so that this area is not included in TABLE 1. The strongest mean drift is in May to July, N. 88° E., 19 miles per day, based on five observations.

Between Latitudes 0° and 4° S., including the Carimata Strait, the chart for August to October shows a south-easterly current averaging about 20 miles per day from five observations, in opposition to the main flow of current through the Java Sea and up the China Sea. The water in this region is shallow and these observations may be affected by tidal influences.

Southerly flows are shown in Macassar Strait during November to January and May to July, there being no information for this region in February to April. Through the Molucca Passage the flow is southerly from November to April and northerly from May to October.

A striking feature of the chart for November to January is the flow of water in a south-westerly direction from the North Equatorial Current into the Celebes Sea, whence, becoming southerly, it passes through the Macassar Strait as above stated. During this quarter there is also a westerly set through the Sulu Sea. According to the older statements, part of the water from the North Equatorial Current should recurve into the Counter-Equatorial Current.

Summary.

1. The monsoon drifts of the China Sea have been shown to be comparatively narrow streams, unlike those of the Arabian Sea which cover the greater part of it.

2. The strength of the Kuro Siwo up to Latitude 30° N. is not as great as has been represented, and north of Formosa its speed is considerably reduced by the strength of the N.E. Monsoon during November to January.

3. Two currents have been found which do not appear to be described in the older works, a counter-current flowing south-westwards east of the Kuro Siwo during November to April and a circulation from the North Equatorial Current, south-westerly and southerly through the Celebes Sea and Macassar Strait into the waters of the East Indian Archipelago in November to January.

4. The easterly Counter-Equatorial Current does not originate westwards of Longitude 140° E., except in the months of November to January.

5. The current of the Java Sea, so far as observations are available, is about twice as strong in the S.E. Monsoon period as in the N.W. Monsoon period.

SOUTHERN ICE REPORTS.

During the year 1934.

July.

None received.

August.

Year.	Day.	Latitude.	Longitude.	Description.	Remarks.	Name of Ship reporting.
1934	12	50° 54′ S.	8° 26′ W.	1 berg	Large and irregular and about 5 miles distant	R.R.S. *Discovery II.*
	13	51° 36′ S.	10° 02′ W.	1 berg	Small and irregular and about 5 miles distant	do.
	14	52° 11′ S.	11° 47′ W.	1 berg	...	do.
		52° 33′ S.	12° 37′ W.	1 berg	...	do.
	15	53° 13′ S.	13° 53′ W.	Brash and several growlers	Probably remains of a broken up berg	do.
	16	From 54° 15′ S.	16° 14′ W.	5 bergs	Mostly small and irregular	do.
		To 54° 18′ S.	16° 38′ W.			
		From 54° 18′ S.	16° 38′ W.	12 bergs	do. do.	do.
		To 54° 36′ S.	17° 08′ W.			
		From 54° 36′ S.	17° 08′ W.	30 bergs	do. do.	do.
		To 54° 53′ S.	17° 44′ W.			
		From 54° 53′ S.	17° 44′ W.	4 bergs and several small growlers	do. do.	do.
		To 54° 56′ S.	17° 49′ W.			
	17	From 54° 56′ S.	17° 49′ W.	43 bergs and pack ice	Bergs mostly small and irregular. From second position pack ice was encountered and was skirted on a N.W'ly course till last position.	do.
		To 54° 57′ S.	18° 04′ W.			
		To 54° 56′ S.	18° 14′ W.			
		From 54° 56′ S.	18° 14′ W.	87 bergs	All small and irregular	do.
		To 55° 01′ S.	19° 04′ W.			
		From 55° 01′ S.	19° 04′ W.			
		To 55° 21′ S.	20° 03′ W.	Pack ice and about 200 bergs	Light pack ice streams	do.
		To 55° 19′ S.	20° 23′ W.		Icebergs very numerous within about 2 miles of track.	
	18	From 55° 19′ S.	20° 23′ W.	60 bergs and several growlers	Small and irregular	do.
		To 54° 37′ S.	20° 30′ W.			
		From 54° 37′ S.	20° 30′ W.	80 bergs	do. do.	do.
		To 53° 39′ S.	20° 57′ W.			
	19	From 53° 36′ S.	20° 59′ W.	14 bergs	Within 5 miles of track. All small and irregular	do.
		To 52° 52′ S.	21° 25′ W.			
		From 52° 52′ S.	21° 25′ W.	17 bergs	All small	do.
		To 51° 54′ S.	22° 00′ W.			
		From 51° 54′ S.	22° 00′ W.	2 bergs	...	do.
		To 51° 31′ S.	22° 15′ W.			
	23	49° 29′ S.	26° 25′ W.	1 growler	...	do.
	24	51° 51′ S.	30° 08′ W.	1 berg and growler	...	do.
		51° 59′ S.	30° 25′ W.	1 small berg	...	do.
		52° 25′ S.	31° 06′ W.	1 small berg	...	do.
		From 52° 25′ S.	31° 06′ W.	2 bergs and 1 growler	...	do.
		To 52° 45′ S.	31° 36′ W.			
	24	From 53° 04′ S.	32° 08′ W.	2 bergs	Both small and tabular	do.
		To 53° 31′ S.	32° 50′ W.			
		54° 07′ S.	33° 46′ W.	1 berg	Medium sized tabular	do.
		54° 23′ S.	34° 09′ W.	1 berg	3 miles distant, small and tabular	do.
		54° 23′ S.	34° 25′ W.	1 berg	Tabular and about 1 mile long	do.

September

Year.	Day.	Latitude.	Longitude.	Description.	Remarks.	Name of Ship reporting.
1934	1	54° 00′ S.	36° 44′ W.	1 berg	Large and irregular	do.
	2	53° 11′ S.	37° 43′ W.	1 berg	Medium sized tabular	do.
		53° 25′ S.	38° 00′ W.	1 berg	Medium sized irregular	do.
	5	56° 16′ S.	45° 46′ W.	Numerous growlers and bergy bits	...	do.
	6	From 59° 05′ S.	52° 37′ W.	Drift ice	Heavy hummocky and new	do.
	7	To 59° 09′ S.	52° 44′ W.			
		To 59° 10′ S.	53° 03′ W.			
		From 59° 31′ S.	55° 00′ W.	Pancake ice	Large expanse. Several pieces of kelp were observed in this ice.	do.
		To 59° 31′ S.	55° 09′ W.			
	9	From 61° 49′ S.	60° 34′ W.	Pancake ice	...	do.
		To 62° 01′ S.	63° 02′ W.			
	10	From 62° 01′ S.	63° 02′ W.	Pancake ice	Intermittent patches of light pancake ice	do.
		To 62° 25′ S.	65° 06′ W.			
		To 62° 39′ S.	66° 18′ W.			
	11	From 63° 12′ S.	69° 03′ W.	Slush and pancake ice	The prevailing W'ly swell and the S'ly wind combined to keep the sea in motion and to prevent the slush from becoming a solid sheet.	do.
		To 63° 27′ S.	70° 09′ W.			
		To 63° 44′ S.	71° 11′ W.			
		To 63° 48′ S.	72° 17′ W.		From about second position heavier pancake ice was met with. This continued in large areas for the greater part of the day. The course was altered to West and N.W. until finally the edge of the ice was reached in last position.	do.
	12	From 63° 46′ S.	73° 28′ W.	Pancake ice		
		To 63° 47′ S.	74° 06′ W.			
		To 63° 56′ S.	75° 41′ W.			
		To 63° 42′ S.	76° 46′ W.			
	28	From 59° 57′ S.	51° 34′ W.	3 bergs, 5 growlers and drift ice	2 medium sized tabular bergs and one irregular berg. The drift ice was very scattered owing to the heavy sea.	do.
		To 59° 51′ S.	50° 51′ W.			
		From 59° 40′ S.	49° 50′ W.	Heavy drift ice	From first position very heavy loose ice was encountered. At first the sea was merely strewn with these heavy lumps, but at third position fairly large belts were encountered. This persisted until sixth position. From thence the ice became more scattered. The ice in all cases was composed of several large and old hummocky floes, stained brown with diatoms, and could often be described as bergy bits with angry projecting under water spurs. At seventh position a stream of such ice was encountered. A heavy W'ly swell was running making navigation extremely difficult.	
		To 59° 38′ S.	49° 42′ W.			
		To 59° 23′ S.	49° 37′ W.			
		To 59° 11 S.	49° 29′ W.			
	29	To 59° 03′ S.	49° 18′ W.			
		To 58° 48′ S.	48° 40′ W.			
		To 58° 34′ S.	48° 55′ W.			
		To 58° 27′ S.	48° 21′ W.			
	30	57° 55′ S.	46° 37′ W.	Numerous heavy growlers	...	do.
		From 57° 50′ S.	46° 21′ W.	Heavy drift ice	Another stream of very heavy and hummocky ice. The high W'ly swell which was running again made navigation extremely difficult.	do.
		To 57° 44′ S.	46° 14′ W			
	26	57° 10′ S.	123° 25′ W.	Small berg	Approximate dimensions as measured by sextant angles, height 75 ft. length 357 feet.	S.S. *Port Gisborne*

Reports of ice previous to July, August and September, 1934, will be found in "The Marine Observer," Vol. XI, No. 115, p. 110.

WIRELESS WEATHER SIGNALS.

I.—SHIPS' WIRELESS WEATHER SIGNALS.

A full description of the world wide system of voluntary "Selected Ships" routine weather reports with instructions was given on pp. 30–41 of the January number of this volume of The Marine Observer.

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

To decode these reports, and for information of the system of communication of "Selected Ships", all concerned are referred to the Pamphlet, M.O. 329, concerning which special notice to the masters of British ships will be found on p. 33, paragraph (27), and p. 34, paragraph (34) of the January 1935 number of The Marine Observer.

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

Request for Information.

The attention of Meteorological Services is invited to the invitation given on page 30 of Vol. XII No. 117, January 1935 Marine Observer.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length. For Station to call up "Selected Ships."	Frequency and Wave Length. For "Selected Ships" to report to Station.	Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
North Atlantic and North Sea.	Portishead.	Lat. 51° 28′ 41″ N. Long. 2° 47′ 30″ W.	GKU.	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. and North of Latitude 38° N., but not within 300 miles of station. (*see* Chart of the World.)	Weather London.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	Control system. "Selected Ships" chosen to report in given order notified by station daily at 2230, 0330, and 1030 G.M.T. Roll call thus—Weather London—call sign of chosen "Selected Ships" to report through GKU at schedule times on 2100 m.
	Chatham Mass. Sayville N.Y. Thomaston. Jupiter. Palm Beach.	Lat. 41° 43′ N. Long. 70° 47′ W. Lat. 40° 45′ N. Long. 73° 06′ W. Lat. 44° 01′ N. Long. 69° 13′ W. Lat. 26° 42′ N. Long. 80° 02′ W. Lat. 26° 42′ N. Long. 80° 02′ W.	WCC. WSL. WAG. WMR. WOE.		142·9kc/s. (2098 metres).	North Atlantic West of Longitude 40° W.	Observer Washington	Weather only. First four groups of observations taken at 0000 and 1200 G.M.T. only required.	No control. All British "A Selected Ships" within area to address their 0000 and 1200 G.M.T. observations to Observer Washington and their 1800 G.M.T. observations to CQ in accordance with schedule.
Mediterranean and Red Sea.									
South Atlantic.	Slangkop (Cape Town)	Lat. 34° 08′ 46″ S. Long. 18° 19′ 18″ E.	ZSC	—	143 kc/s. (2100 metres).	South Atlantic Westward of 25° E. and within a range of about 2,000 miles of station.	Met.	Weather only. Four universal groups and first group of No. 6 Supplementary groups.	No control. Only 0600 G.M.T. observation required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.

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

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length. For Station to call up "Selected Ships."	Frequency and Wave Length. For "Selected Ships" to report to Station.	Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 40″ S. Long. 30° 58′ 50″E.	ZSD	—	143 kc/s. (2100 metres).	Indian Ocean S. of 20° S. and Eastward of 25° E. and within a range of about 2,000 miles of station.	Met.	Weather only. Four universal groups and first group of No. 6 Supplementary groups.	No control. Only 0600 G.M.T. observations required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.
	Bombay.	Lat. 19° 04′ 55″ N. Long. 72° 49′ 54″E.	VWB	—	143 kc/s. (2100 metres).	Arabian Sea N. of line C. Comorin to Ras Fartak.	Weather.	Weather only. No. 6 Supplementary groups.	All British "A Selected Ships" are requested, when convenient, to report 0000 G.M.T. observations commencing at 0018 G.M.T. in addition to schedule times.
	Madras.	Lat. 12° 59′ 17″ N. Long. 80° 10′ 56″E.	VWM	—	143 kc/s. (2100 metres).	Bay of Bengal N. of line C. Comorin to Achin Head.	Weather.	Weather only. No. 6 Supplementary groups.	All British "A Selected Ships" are requested, when convenient, to report 1200 G.M.T. observations commencing at 1218 G.M.T. in addition to schedule times.
	Colombo.	Lat. 6° 55′ 14″ N. Long. 79° 52′ 46″E.	VPB	130 kc/s. (2300 metres).	143 kc/s. (2100 metres).	Indian Ocean South of a line Ras Fartak, C. Comorin and Achin Head, and within a range of about 1500 miles.	Weather.	Weather only. No. 6 Supplementary groups preferred.	No control—all British "A Selected Ships" within area should report in accordance with Schedule.
	Mombasa.	Lat. 4° 03′ 11″ S. Long. 39° 39′ 49″E.	VPQ	—	125 kc/s. (2400 metres).	From Ras Hafun to Lat. 20° S. when westward of the Colombo area.	Weather Nairobi.	Weather only. No. 6 Supplementary groups.	No control—all British "A Selected Ships" within area should report 0600 G.M.T. observations.
	Perth.	Lat. 32° 01′ 51″ S. Long. 115° 49′ 31″E.	VIP	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	Indian Ocean and Southern Ocean between Long. 105° and 135° E.; but not within 100 miles of the coast.	Weather.	Weather only. No. 6 Supplementary groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart, p. 32, of the January 1935 number.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long. 114° 15′ 11″E.	VPS.	8330kc/s. (36 metres) or 500 kc/s. (600 metres).	143kc/s.* (2100 metres).	China Sea and North Pacific to about 1,500 miles from station.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule. *Alternatively see particulars on p. 121 and use wave length and times for "B Selected Ships."
South Pacific.	Sydney.	Lat. 33° 46′ 00″ S. Long. 151° 03′ 09″E.	VIS	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	S. Pacific Coral and Tasman Seas and Southern Ocean between Long. 135° and 160° E.; but not within 100 miles of the coast.	Weather.	Weather only. No. 6 Supplementary groups.	No control—all British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart, p. 32, of the January 1935 number.
	New Zealand.	—	—	—	—	—	Weather Wellington.	Weather only, four universal groups.	The Meteorological Office Wellington, will be glad to receive routine reports from British Selected Ships within range of New Zealand W/T Stations through the normal commercial channels.

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

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

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Atlantic.						
South Atlantic.	Salinas	Lat. 0° 37′ 00″ S. Long. 47° 23′ 00″ W.	PPL.	Meteoro Rio.	Weather only, including supplementary groups.	
	S. Luiz	Lat. 2° 31′ 28″ S. Long. 44° 16′ 30″ W.	PXM.			
	Fortaleza	Lat. 3° 42′ 49″ S. Long. 38° 30′ 56″ W.	PPC.			
	Natal	Lat. 5° 46′ 30″ S. Long. 35° 16′ 20″ W.	PXN.			
	Olinda	Lat. 8° 00′ 55″ S. Long. 34° 50′ 40″ W.	PPO.			
	Amaralina	Lat. 13° 00′ 50″ S. Long. 38° 28′ 27″ W.	PPA.			
	Abrolhos	Lat. 17° 57′ 35″ S. Long. 38° 42′ 00″ W.	PXH.			
	Victoria	Lat. 20° 18′ 52″ S. Long. 40° 19′ 06″ W.	PPT.			
	Rio	Lat. 22° 59′ 19″ S. Long. 43° 11′ 26″ W.	PPR.			
	Santos	Lat. 23° 59′ 22″ S. Long. 46° 18′ 18″ W.	PPS.			
	Floriano-polis	Lat. 27° 35′ 22″ S. Long. 48° 34′ 17″ W.	PPF.			
	Juncçao	Lat. 32° 03′ 22″ S. Long. 52° 08′ 13″ W.	PPJ.			
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 40″ S. Long. 30° 58′ 50″ E.	ZSD	Met.	Weather only, 4 universal groups and first group of No. 6 Supplementary groups.	
	Algoa Bay (Port Elizabeth).	Lat. 33° 57′ 16″ S. Long. 25° 35′ 30″ E.	ZSQ	Met.	Weather only, 4 universal groups and first group of No. 6 Supplementary groups.	
	Calcutta.	Lat. 22° 33′ 31″ N. Long. 88° 20′ 16″ E.	VWC.	Weather.	Weather only up to 6 groups, No. 6 Supplementary Groups preferred.	
	Rangoon.	Lat. 16° 45′ 57″ N. Long. 96° 11′ 51″ E.	VTR.			
	Madras.	Lat. 12° 59′ 17″ N. Long. 80° 10′ 56″ E.	VWM.			
	Bombay.	Lat. 19° 04′ 55″ N. Long. 72° 49′ 54″ E.	VWB.			
	Karachi.	Lat. 24° 51′ 05″ N. Long. 67° 02′ 32″ E.	VWK.			
	Matara.	Lat. 6° 01′ 07″ N. Long. 80° 35′ 39″ E.	GZP.			
	Mombasa.	Lat. 4° 03′ 11″ S. Long. 39° 39′ 49″ E.	VPQ	Weather Nairobi.		
	Dar-es-Salaam.	Lat. 6° 50′ 38″ S. Long. 39° 17′ 24″ E.	ZBZ	Weather Nairobi.		
	Mauritius.	Lat. 20° 23′ 41″ S. Long. 57° 35′ 25″ E.	VRS.	Observatory Mauritius.	Weather 4 universal groups and first of No. 6 Supplementary Groups.	
	Geraldton.	Lat. 28° 47′ 15″ S. Long. 114° 36′ 24″E.	VIN	Weather.	Weather only, including No. 6 Supplementary Groups.	
	Esperance.	Lat. 33° 52′ 40″ S. Long.121° 53′ 34″ E.	VIE			

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

(Continued.)

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

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long. 114° 15′ 11″ E.	VPS.	Royal Observatory.	Weather only, preferably No. 6 Supplementary Groups.	
South Pacific.	Auckland.	Lat. 36° 50′ 37″ S. Long. 174° 46′ 08″ E.	ZLD.	Weather Wellington.	Weather only, four universal groups.	The Meteorological Office, Wellington, will be glad to receive routine reports from British Selected Ships within range of New Zealand W/T Stations through the normal commercial channels.
	Wellington.	Lat. 41° 16′ 26″ S. Long. 174° 45′ 55″ E.	ZLW.			
	Awarua.	Lat. 46° 30′ 47″ S. Long. 168° 22′ 24″ E.	ZLB.			
	Chatham Island.	Lat. 43° 57′ 28″ S. Long. 176° 34′ 25″ W.	ZLC.			
	Rarotonga.	Lat. 21° 11′ 52″ S. Long. 159° 48′ 52″ W.	ZKR.			
	Apia.	Lat. 13° 50′ 17″ S. Long. 171° 49′ 42″ W.	ZMA.			
	Thursday I.	Lat. 10° 35′ 14″ S. Long. 142° 12′ 43″ E.	VII	Weather.	Weather only, including No. 6 Supplementary Groups.	
	Townsville.	Lat. 19° 16′ 09″ S. Long. 146° 49′ 47″ E.	VIT			
	Brisbane.	Lat. 27° 25′ 34″ S. Long. 153° 07′ 19″ E.	VIB			
	Melbourne.	Lat. 37° 46′ 56″ S. Long. 144° 52′ 09″ E.	VIM			
	Adelaide.	Lat. 34° 51′ 14″ S. Long. 138° 31′ 55″ E.	VIA			

II.—WIRELESS WEATHER SIGNALS.

Bulletins.

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

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

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

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

SOUTH WEST AFRICA AND UNION OF SOUTH AFRICA. WEATHER SHIPPING BULLETINS.

The following W/T stations transmit weather Reports on 600 m. in code giving actual observations at 0630 G.M.T. at coast stations and Forecasts of Weather in plain language for coastal areas indicated on the Chart below.

Station reports are made in the International Ships Wireless Weather Telegraphy Code in three five-figure groups.

Instructions for decoding.

To decode these reports the tables given in M.O. 329 are required (Decode for Use with International Code for Wireless Weather messages from ships [Third edition], obtainable from H.M. Stationery Office, price 6d.).

The Key letters are fully described on p. 38 of the January, 1935, number, and in M.O. 329, with the exception of symbol II. II = the distinguishing figures of the coast stations, which are given on the chart.

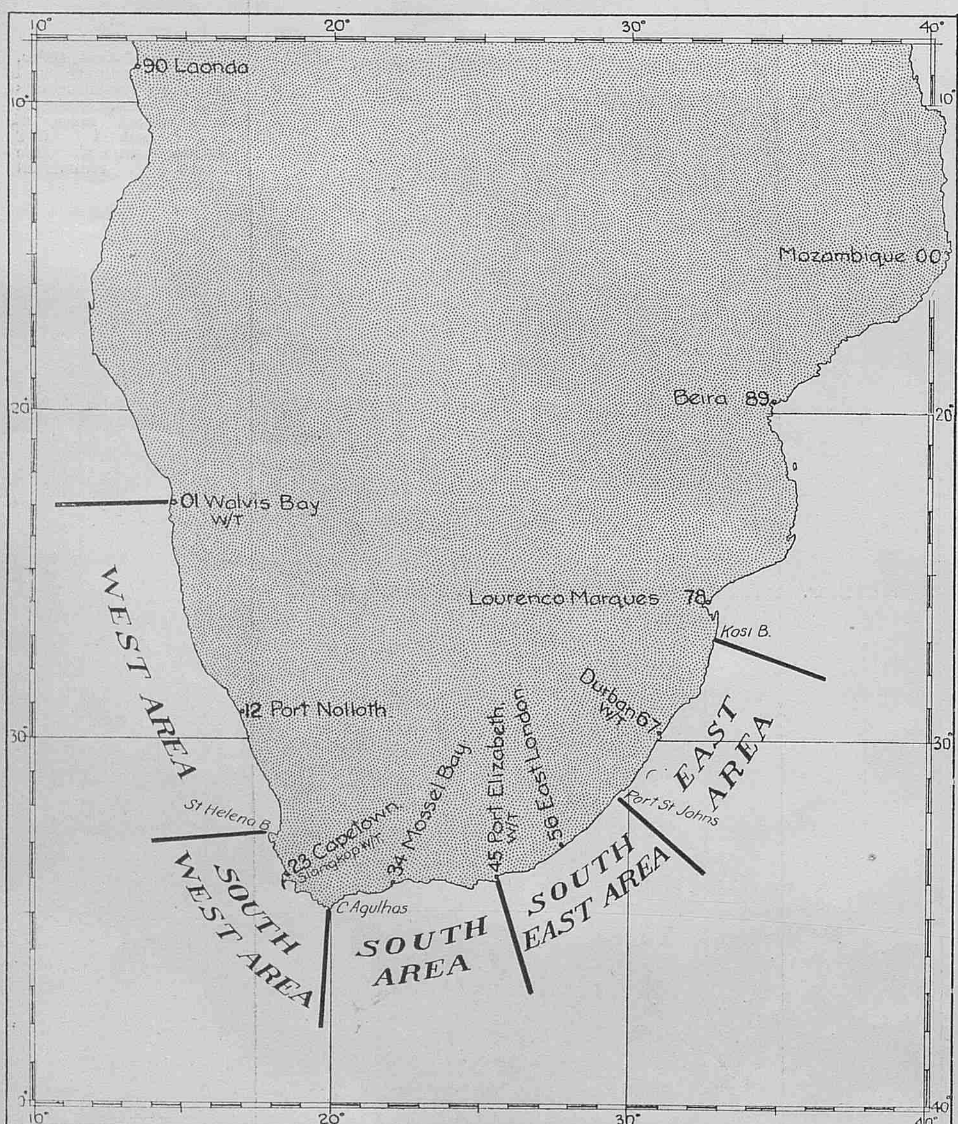
Key letters—IICAK DDFww BBVTT.

Explanation of Chart.

The numbers alongside the names of the stations on the chart are distinguishing numbers.

The Areas for which weather forecasts are made are indicated in large print.

Chart showing Stations and Forecast Areas for Weather Shipping Bulletins South West Africa and Union of South Africa and Stations for Portuguese East Africa.



W/T Station and Position approx.		Call Sign.	Times of Transmission.		Station distinguishing figures (*see* Chart p. 122).
Latitude.	Longitude.		Station reports. G.M.T.	Forecasts. G.M.T.	
Walvis Bay† ...		**ZSV**	0850	1250	23, 12, 01, 90.
22° 58′ S.	14° 30′ E.				
Capetown (Slangkop)		**ZSC**	0930	1220	56, 45, 34, 23, 12, 01.
34° 09′ S.	18° 19′ E.				
Port Elizabeth (Algoa Bay).		**ZSQ**	0820	1230	67, 56, 45, 34, 23.
33° 57′ S.	25° 35′ E.				
Durban (Jacobs) ...		**ZSD**	0850	1205	89, 78, 67, 56, 45.
29° 56′ S.	30° 59′ E.				

† Wave length 625m.

Sample Message.

(Broadcast by Capetown, Slangkop W/T, 29th March, 1933.)

Station Reports.

56520	*20300*	*13772*
45910	*00003*	*13670*
34001	*28205*	*13666*
23021	*08103*	*13563*
12012	*28104*	*16155*
0100X	*00003*	*14667*

Forecast.

Coast forecast, Wednesday 29th March, Cloudy with local fogs in west, southwest, south and southeast, fine in east, light to moderate, northwesterly to southwesterly winds, sea slight to moderate.

Weather Reports giving actual observations taken at the stations shown on the chart, coded in the same form as above, are included in messages transmitted on a wavelength of 2100m. C.W. from :—

Capetown (Slangkop) W/T Station ZSC at 0935 G.M.T.

Durban (Jacobs) W/T Station ZSD at 0900 G.M.T.

III.—WIRELESS TIME SIGNALS.

Cape Town (Slangkop) W/T Station, call sign **ZSC,** Latitude 34° 09′ S., 18° 19′ E. (approx.), broadcasts on a wavelength of 600 metres (I.C.W.) time signals which are actuated automatically from the Royal Observatory at the Cape by direct land line.

The time signals are broadcast according to the New International System of W/T time signals and the procedure is as follows :—

G.M.T. H. M. S.		H. M. S.	
20 56 05	to	20 56 50	— — — repeated 5 times at 10 second intervals.
57 00	,,	57 50	— • • — repeated 10 times at 5 second intervals.
57 55	,,	58 00	55 56 57 58 59 60 • • • • • • Time Signal.
58 08	,,	58 10	— •
58 18	,,	58 20	— •
58 28	,,	58 30	— •
58 38	,,	58 40	— •
58 48	,,	58 50	— •
58 55	,,	59 00	55 56 57 58 59 60 • • • • • • Time Signal.
59 06	,,	59 10	— — •
59 16	,,	59 20	— — •
59 26	,,	59 30	— — •
59 36	,,	59 40	— — •
59 46	,,	59 50	— — •
20 59 55	,,	21 00 00	55 56 57 58 59 60 • • • • • • Time Signal.

PORTUGUESE EAST AFRICA.

II.—WEATHER SHIPPING BULLETINS.

The following W/T Stations transmit Weather Reports on 600 m. in code, giving actual observations at 0630 G.M.T. at coast stations, in the same way as those given for South West Africa and Union of South Africa. For key and explanation *see* page 122.

W/T Station.	Position approx.		Call Sign.	Times of Transmission.		Station distinguishing figures (*see* Chart p. 122).
	Latitude.	Longitude.		Station reports. G.M.T.	Forecasts. G.M.T.	
Lourenço Marques	25° 58′ S.	32° 36′ E.	**CQE**	0910	1310	56, 67, 78, 89.
Mozambique ...	15° 02′ S.	40° 45′ E.	**CQF**	0900	None.	00, 89, 78.

III.—WIRELESS TIME SIGNALS.

Lourenço Marques, W/T station, Lat., 25° 58′ 05″ S., Long., 32° 35′ 39″ E., call sign **CQE,** wave length 600 metres, and **Polana W/T station,** Lat., 25° 57′ 40″ S., Long., 32° 35′ 59″ E., call sign **CRAP** wave length 2,400 metres, C.W., transmit, simultaneously, time signals automatically by means of the pendulum clock at Campos Rodrigues Observatory. The new International system of W/T time signals is used.

The transmitting times are :—

	G.M.T. h. m. s.		h. m. s.
From	7 57 00	to	8 00 00
,,	18 57 00	,,	19 00 00

The procedure as regards each series of signals is as follows :—

G.M.T. h. m. s.		h. m. s.	Signal.
7 / 18 57 00	to	7 / 18 57 50	— • • — — • • — — • • — Prevenção. Sinais feitos à mão (Prepare. Time signal coming).
57 55	,,	58 00	55 56 57 58 59 60 • • • • • • *Time signal.*
58 08	,,	58 10	— •
58 18	,,	58 20	— •
58 28	,,	58 30	— •
58 38	,,	58 40	— •
58 48	,,	58 50	— •
58 55	,,	59 00	55 56 57 58 59 60 • • • • • • *Time signal.*
59 06	,,	59 10	— — •
59 16	,,	59 20	— — •
59 26	,,	59 30	— — •
59 36	,,	59 40	— — •
59 46	,,	59 50	— — •
7 / 18 59 55	,,	8 / 19 00 00	55 56 57 58 59 60 • • • • • • *Time signal.*

Note.—The error of the Observatory clock is stated never to exceed a few hundredths of a second.

Occasionally Campos Rodrigues observatory will transmit other time signals, which must not be confused with those given above. These signals belong to the category of rhythmic time signals, and will consist of several long series of dots.

MADAGASCAR.

II.—WIRELESS STORM WARNINGS.

Cyclone warnings are broadcast when necessary by the following stations on a wave length of 600 metres, in each case :—

Majunga : Latitude 15° 43′ S., Longitude 46° 20′ E., Call Sign **FIO.,** Times of transmission, 0500, 1630 G.M.T.

Diégo Suarez : Latitude 12° 15′ S., Longitude 49° 26′ E., Call Sign **FIL.,** Times of transmission, 0430, 1600 G.M.T.

Tamatave : Latitude 18° 09′ S., Longitude 49° 26′ E., Call Sign **FIS.,** Times of transmission, 0415, 1615 G.M.T.

Tulear : Approx. Latitude 23° 21′ S., Longitude 43° 40′ E., Call sign **FIT** Times of transmission 0445, 1645 G.M.T.

The warning, originating from the observatory at Antananarivo, will be broadcast at every odd hour, in addition to the above times, during the probable passage of the cyclone when within the range of the W/T stations, by Majunga W/T station and Tulear W/T station, alternately, in the case of a cyclone affecting the Mozambique Channel, and alternately by Diégo Suarez and Tamatave W/T stations in the case of a cyclone affecting the area north-east and east of Madagascar.

The warning will be preceded by the Safety Signal **TTT (— — —)** repeated ten times at short intervals on full power. The warning will be broadcast one minute after the Safety Signal, and will be repeated three times at intervals of ten minutes.

If the safety Signal *only* is broadcast it will indicate, in the absence of precise information, that there is reason to expect the passage of a cyclone.

During the whole period of this service Diégo Suarez, Tamatave and Tulear W/T stations will remain permanently on watch.

MAURITIUS.

II.—WIRELESS WEATHER BULLETINS.

Mauritius W/T Station approx, position Latitude 20° 24′ S., Longitude 57° 35′ E.

Call sign **VRS.**

Wave length 600 metres.

Times of transmission (during cyclone season only November to April).

0830 G.M.T.—Weather report in code giving 0500 G.M.T. observations at the stations given below, followed by a general statement of existing weather conditions.

Station reports in International Ships Wireless Weather Telegraphy Code in two five-figure groups preceded by name of station.

To decode these reports the tables given in M.O. 329 are required. The Key Letters are fully described on p. 38 of the January, 1935, number, and in M.O. 329.

Key letters—DDFww BBVTT.

Observation stations :—

Station.	*Position (approx.)* *Latitude.*	*Longitude.*
Seychelles	4° 34′ S.	55° 28′ E.
Mauritius	20° 11′ S.	57° 27′ E.
Rodrigues	19° 40′ S.	63° 30′ E.

Note.—When the weather is cyclonic additional messages are issued when fresh information becomes available.

INDIA, CEYLON AND BURMA.

II.—WIRELESS WEATHER BULLETINS.

Matara W/T Station, approximate position Latitude 6° 01′ N., Longitude 80° 36′ E.

Call sign **GZP.**

Wavelength 2000 m. C.W.

Times of transmission :—

0530 G.M.T.—Weather report in code giving 0230 G.M.T. observations at the stations given below.

0800 G.M.T.—Brief summary of weather conditions and a forecast for the following areas shown on the chart :—

"Maldive", "Comorin", "Ceylon West", "Basses", "Mannar" and "South Bay West" (south of latitude 10° N.).

Station reports in International Ships Wireless Weather Telegraphy Code in three five-figure groups.

To decode these reports the tables given in M.O. 329 are required. The Key letters are fully described on p. 38 of the January, 1935, number, and in M.O. 329, with the exception of II. II = index figure of coast station.

Key letters—IICKW DDFww BBVTT.

Observation stations :—

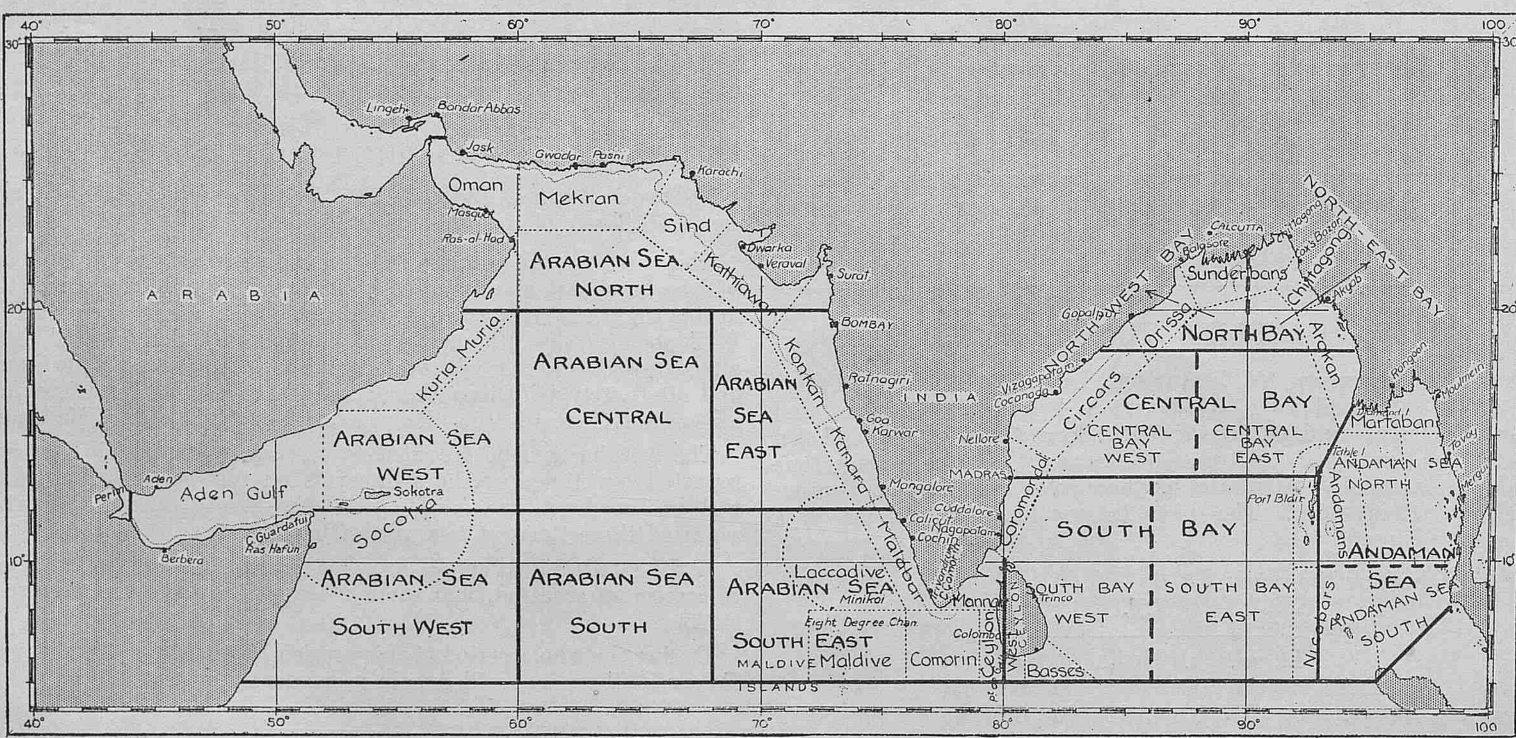
Index figures.	Station	Position (approx.)	
		Latitude.	Longitude.
71	Colombo ...	6° 56′ N.	79° 56′ E.
74	Trincomalee ...	8° 34′ N.	81° 08′ E.
76	Hambantota ...	6° 07′ N.	81° 07′ E.
33	Pamban ...	9° 17′ N.	79° 15′ E.

Weather information is broadcast twice daily *en clair* from stations below at the following times :—

Time G.M.T.	Station.	Position (approx.).		Call Sign.	Wavelength, metres.
		Latitude.	Longitude.		
0830 and 1630	**Karachi...**	24° 51′ N	67° 03′ E	**VWK**	1,550 (C.W.)†
	Calcutta*	22° 34′ N.	88° 20′ E.	**VWC**	2,000 (C.W.)
0800 and 1600	**Bombay...**	19° 05′ N.	72° 50′ E.	**VWB**	1,000 (spk.)
0900 and 1700	**Madras ...**	12° 59′ N.	80° 11′ E.	**VWM**	1,000 (I.C.W.)
	Rangoon	16° 46′ N.	96° 12′ E.	**VTR**	1,200 ,,
0948 and 1748	**Aden ...**	12° 49′ N.	45° 02′ E.	**GZQ**	2,000 (C.W.)
	Matara ...	6° 01′ N.	80° 36′ E.	**GZP**	2,000 ,,

* After the time signal.

† In the event of interruption on the wavelength of 1,550 m. the message will be broadcast on 600 m. (I.C.W.).



WIRELESS STORM WARNINGS.

The following stations broadcast messages containing cyclone warnings immediately on receipt from the Indian Meteorological Department and at the following times. Each transmission is preceded by the W/T Safety Signal — — — (TTT).

Karachi	call sign	**VWK**	at 0030, 0430, 1230 and 2030 G.M.T. Wavelength 600 m. I.C.W.
Calcutta	,, ,,	**VWC**	
Bombay	call sign	**VWB**	at 0000, 0400, 1200 and 2000 G.M.T. Wavelength 600 m. Spk.
Madras	call sign	**VWM**	at 0100, 0500, 1300 and 2100 G.M.T. Wavelength 600m. I.C.W.
Rangoon	,, ,,	**VTR**	
Aden	call sign	**GZQ**	at 0148, 0548, 1348 and 2148 G.M.T. Wavelength 600 m. spark.
Matara	,, ,,	**GZP**	

These Weather Bulletins and Storm Warnings give brief information of the prevailing weather conditions in the Bay of Bengal and Arabian Sea.

When desirable to indicate locality, these signals may contain the names of the areas and districts given on the chart on p. 124 on somewhat the same principle of the Weather Shipping Bulletins of Great Britain, Germany, Sweden and South Africa.

III.—WIRELESS TIME SIGNALS.

Station.	Call Sign.	Wave length, metres.	G.M.T. of Time Signal.	System.
Calcutta. Lat. 22° 33′ 31″ N. Long. 88° 20′ 16″ E.	**VWC**	2,000 C.W.	0827–0830 1627–1630	*See* FIGURE 1.
Colombo. Lat. 6° 55′ 14″ N. Long. 79° 52′ 46″ E.	**VPB**	2,300 C.W. 600 I.C.W.	0557–0600 1657–1700	*See* FIGURE 1.

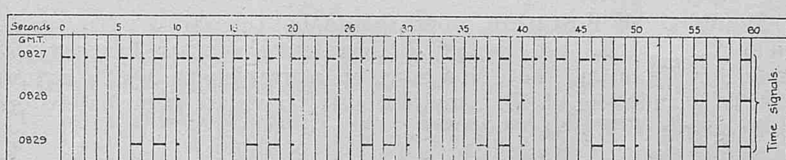


Figure 1.

NOTE.—*Calcutta*.—(1) Preliminary signals sent two minutes before transmission of Time Signal proper, the words " Ordinary time signals," and the signal " Wait " (▪ ▬ ▪ ▪ ▪); all sent by hand.

(2) Signals automatically controlled from Alipore Observatory.

(3) Time Signal accurate to within 0·5 sec.

(4) Should there be any inaccuracy, the Time Signal will be followed by the " erase " signal and the words " signal failed."

Colombo.—(1) Preliminary signals sent two minutes before transmission of Time Signal proper, CQ de VPB (repeated 3 times) " Time Signal, Wait " (▪ ▬ ▪ ▪ ▪).

(2) Actual time signals automatically controlled from Colombo Observatory (Lat. 6° 54′ 18″ N., Long. 79° 52′ 10″ E.), the remaining signals being sent by hand.

FRENCH INDO-CHINA.

II.—WIRELESS WEATHER BULLETINS.

Mitho W/T Station, approximate Latitude 10° 21′ N., Longitude 106° 22′ E., call sign **FRM,** broadcasts a weather bulletin at 1320 G.M.T. on a wavelength of 600 metres spark. This bulletin is sent *en clair* and gives the general barometric situation in the area off the coasts of Indo-China and China Sea, and a weather forecast which is valid until 0900 G.M.T. the following day.

FORMOSA.

II.—WIRELESS WEATHER BULLETINS.

Keelung W/T Station, approximate Latitude 25° 08′ N., Longitude 121° 45′ E., call sign **JFK,** wavelength 600 metres, broadcasts a weather forecast, issued by Taihoku Meteorological Observatory, *en clair*, in English, at 0520 G.M.T. The message is preceded by the signal CQ CQ CQ and contains the direction and force of the wind (Beaufort) and general weather conditions for the following day for the N. and E. coasts of Formosa and the Formosa Channel.

Garanbi W/T Station, approx. Latitude 21° 55′ N., Longitude 120° 51′ E., call sign **JFG** repeats the above forecast on 600 m. I.C.W. at 0620 G.M.T.

Example.—N.E. Monsoon moderate, cloudy, some rain, Northern and Eastern coast areas ; N.E. Monsoon strong, cloudy Formosa Channel.

WIRELESS STORM WARNINGS.

Keelung W/T Station, call sign **JFK,** wavelength 600 metres, at 1230 G.M.T., broadcasts storm warnings *en clair* in English commencing CQ CQ CQ, giving date and hour of observation, type of storm, position of centre, direction of motion and brief remarks. The message may also contain information concerning strong winter monsoons whenever a sudden threatening change is anticipated off the N. and E. coast of Formosa or in the Formosa Channel.

HONG KONG.

II.—WIRELESS WEATHER BULLETINS.

Stonecutters I. W/T station approximate position Latitude 22° 19′ N., Longitude 114° 09′ E.

Call signs **GYP,** Wavelengths 2650 m. C.W.
GZO, 6, Wavelength 35.5 m. C.W. } simultaneously.

Times of transmission :—

0300 and 1200 G.M.T.—Weather reports in code giving actual observations at 2200 G.M.T. and 0600 G.M.T. respectively at a number of stations in the list below and a brief Forecast *en clair* for the following Districts :—

A. Shanghai to Turnabout.
B. Turnabout to Hong Kong.
C. Hong Kong and neighbourhood.
D. Hong Kong to Hainan Straits.
E. North part of China Sea (between Hong Kong and latitude 16° N.).

Station reports in International Ships Wireless Weather Telegraphy Code. To decode these reports the tables given in the Decode M.O. 329 are required. The Key letters are fully described on p. 38 of the January, 1935, number and in M.O. 329 with the exception of III.

III = station distinguishing figures.

Key letters used for station reports :—IIIAW DDFww BBVTT.

Observation Stations.

Code Letter.	Code No.	Station.	Position. Latitude.	Position. Longitude.
CH	—	Chemulpo	37° 26′ N.	126° 37′ E.
TI	734	Tientsin	39° 09′ N.	117° 09′ E.
NG	—	Nagasaki	32° 44′ N.	129° 52′ E.
OS	—	Oshima	28° 23′ N.	129° 30′ E.
GL	769	Gutzlaff	30° 48′ N.	122° 10′ E.
HW	772	Hankow	30° 36′ N.	114° 20′ E.
BO	—	Bonin I.	27° 05′ N.	142° 11′ E.
IS	—	Ishigakijima ...	24° 20′ N.	124° 10′ E.
CS	781	Changsha	28° 12′ N.	112° 47′ E.
AM	803	Amoy	24° 28′ N.	118° 05′ E.
TK	—	Taihoku	25° 02′ N.	121° 31′ E.
PD	—	Pescadores	23° 32′ N.	119° 33′ E.

Code Letter.	Code No.	Station.	Position.	
			Latitude.	Longitude.
GR	812	Gap Rock	21° 49′ N.	113° 56′ E.
PR	814	Pratas I.	20° 40′ N.	116° 47′ E.
PL	621	Phulien	20° 48′ N.	106° 37′ E.
TR	625	Tourane	16° 08′ N.	108° 17′ E.
CJ	620	Cape St. James ...	10° 20′ N.	107° 05′ E.
BS	850	Basco	20° 28′ N.	121° 59′ E.
MN	864	Manila	14° 35′ N.	120° 58′ E.
SU	890	Surigao	9° 48′ N.	125° 29′ E.
		Alternative.		
YU	—	Yuensan	39° 11′ N.	127° 26′ E.
TT	744	Tsingtao	36° 03′ N.	120° 20′ E.
QU	—	Quelpart	33° 20′ N.	126° 30′ E.
KA	—	Kagoshima ...	31° 34′ N.	130° 33′ E.
NK	763	Nanking	32° 07′ N.	118° 47′ E.
IC	770	Ichang	30° 42′ N.	111° 16′ E.
SA	—	Saipan	15° 14′ N.	145° 46′ E.
NA	—	Naha	26° 13′ N.	127° 41′ E.
KK	777	Kiukiang	29° 44′ N.	116° 08′ E.
SP	801	Foochow(Sharp Peak)	26° 03′ N.	119° 39′ E.
TA	—	Taichu	24° 09′ N.	120° 41′ E.
KH	—	Koshun	22° 00′ N.	120° 45′ E.
HK	810	Hong Kong ...	22° 18′ N.	114° 10′ E.
FB	984	Fort Bayard ...	21° 05′ N.	110° 30′ E.
DH	638	Dong Hoi	17° 33′ N.	106° 37′ E.
PD	639	Padaran	11° 21′ N.	109° 02′ E.
AP	852	Aparri	18° 22′ N.	121° 38′ E.
IL	887	Iloilo	10° 42′ N.	122° 34′ E.
—	807	Canton	23° 08′ N.	113° 27′ E.
—	811	Macao	22° 11′ N.	113° 33′ E.

Cape d'Aguilar W/T Station, approximate position Latitude 22° 13′ N., Longitude 114° 15′ E. Call sign **V.P.S.** repeats the forecast *en clair* given by **Stonecutters I. W/T** station on a wavelength of 600 m. I.C.W. at 0400 and 1200 G.M.T.

Wireless Telephony, R/T Issues.

Hong Kong, W/T Station, approximate Latitude 22° 17′ N., Longitude 114° 09′ E., call sign **ZBW,** broadcasts by word of mouth weather reports and forecasts at 0500 and 1200 G.M.T. on 355 m. (R.T.) for the district Hong Kong and neighbourhood.

WIRELESS STORM WARNINGS.

Stonecutters I. W/T Station call sign **GZO** broadcasts Typhoon warnings with the weather bulletins sent out at 0300 and 1200 G.M.T.

Cape d'Aguilar W/T Station, approximate Latitude 22° 13′ N., Longitude 114° 15′ E., call sign **VPS,** broadcasts typhoon warnings on 600 m. I.C.W. and 36 m. C.W., on receipt and at 18 minutes past each of the two subsequent hours.

Wireless Telephony R/T Issues.

Hong Kong W/T Station, approximate Latitude 22° 17′ N., Longitude 114° 09′ E., call sign **ZBW,** wavelength 355 m. R/T, broadcasts by word of mouth typhoon warnings on receipt and at the two subsequent hours. When a typhoon is definitely threatening Hong Kong the warnings are sent as frequently as possible, usually at two hourly intervals.

III.—WIRELESS TIME SIGNALS.

Wireless time signals controlled by the Royal Observatory, Hong Kong, are broadcast from **Cape d'Aguilar W/T Station,** Latitude 22° 12′ 39″ N., Longitude 114° 15′ 19″ E., call sign **VPS,** on wave lengths of 600 m. I.C.W. and 36 m. C.W. at the following times :—

	G.M.T.						
	h.	m.	s.		h.	m.	s.
	1	55	00	to	2	00	00
and from	12	55	00	to	13	00	00

The time signals consist of dots (▪ ▪ ▪ ▪ ▪ etc.) each of about 0·2 seconds duration, sent at every second, the 28th, 29th, 54th, 55th, 56th, 57th, 58th and 59th seconds being omitted for the purpose of identifying the signals.

Preliminary warning signals are transmitted between 1h. 53m. and 1h. 54m., and between 12h. 53m. and 12h. 54m., G.M.T., as follows :—" CQ de VPS. HK Time wait."

CHINA.

II.—WIRELESS WEATHER BULLETINS.

Pratas Island W/T Station, approximately Latitude 20° 42′ N., Longitude 116° 43′ E., call sign **XPI,** broadcasts a daily weather Bulletin at :—

0330 G.M.T. (based upon 2200 G.M.T. observations) wavelength 600m. (spk.).

1100 G.M.T. (,, ,, 0600 ,, ,,) wavelength 600m. (spk.).

0330 G.M.T. repeated on a wavelength of 1450m. (C.W.) and 24·5m.

1100 G.M.T. ,, ,, ,, ,, 47m.

The Weather Bulletins are broadcast *en clair* in English and are preceded by CQ CQ CQ de XPI XPI XPI. They contain the following information :—

Part I. The location of high and low pressure areas.

Part II. Location and expected direction of movement of depression, or typhoon, affecting the China Sea, Eastern Sea, Yellow Sea, Japan Sea (including the Pacific Ocean to the eastward) or S.E. of the Philippine Islands extending northward from Guam and adjacent islands to Northern Japan.

Part III. Wind and weather forecast for South-east coast of China and northern portion of China Sea.

Part IV. Wind direction and force, visibility, state of sea, and state of the weather at Pratas Island during previous six hours.

Shanghai W/T Station, approximate Latitude 31° 12′ N., Longitude 121° 26′ E., call sign **FFZ,** broadcasts weather forecasts *en clair*, for China and the China Seas, on a wavelength of 600 metres (I.C.W.), and 36m. C.W. simultaneously, repeated immediately on 2100 metres (C.W.), at 0300, 0900, 1400 and 2000 G.M.T.

WIRELESS STORM WARNINGS.

Pratas Island W/T Station call sign **XPI,** broadcasts typhoon warnings for the China Sea when necessary. The warnings are broadcast *en clair* in English and are preceded by the Safety Signal TTT (▬ ▬ ▬). They are issued as frequently as changes are observed. Wavelength, 600 metres.

Shanghai W/T Station, call sign **FFZ,** broadcasts typhoon and gale warnings, when necessary after the weather bulletins at 0300 (after Time Signal), 0900 (after Time Signal), 1400 and 2000 G.M.T. The warnings are broadcast *en clair* and give information concerning the position of the centres of typhoons or continental depressions, for China and the China Seas.

Wave length 600 metres (I.C.W.), and 36m. C.W. simultaneously, repeated immediately on 2100 metres (C.W.).

The warnings are also broadcast at 0945 G.M.T. on a wavelength of 30·5m. C.W.

III.—WIRELESS TIME SIGNALS.

Wireless time signals controlled by Zikawei Observatory are broadcast by **Shanghai W/T Station,** Latitude 31° 13′ 16″ N., Longitude 121° 27′ 47″ E., call sign **FFZ,** on a wavelength of 600 metres, I.C.W. and **FFZI** on 36·5m. C.W. simultaneously after the general call (QST de FFZ) " Shanghai time signal ", in the following manner :—

G.M.T. h.	m.	s.		h.	m.	s.	Signal.
2, 8	55	00	to	2, 8	56	45	▪ ▪ ▪ ▬ ▪ ▪ ▪ ▬ ▪ ▪ ▪ ▬
	57	00	,,		57	50	▬ ▪ ▪ ▬ ▬ ▪ ▪ ▬ ▬ ▪ ▪ ▬ etc.
	57	55	,,		58	00	55 ▪ 56 ▪ 57 ▪ 58 ▪ 59 ▪ 60 ▪ *Time signal.*
	58	08	,,		58	10	▬ ▪
	58	18	,,		58	20	▬ ▪
	58	28	,,		58	30	▬ ▪
	58	38	,,		58	40	▬ ▪
	58	48	,,		58	50	▬ ▪
	58	55	,,		59	00	55 ▪ 56 ▪ 57 ▪ 58 ▪ 59 ▪ 60 ▪ *Time signal.*
	59	06	,,		59	10	▬ ▬ ▪
	59	16	,,		59	20	▬ ▬ ▪
	59	26	,,		59	30	▬ ▬ ▪
	59	36	,,		59	40	▬ ▬ ▪
	59	46	,,		59	50	▬ ▬ ▪
2, 8	59	55	,,	3, 9	00	00	55 ▪ 56 ▪ 57 ▪ 58 ▪ 59 ▪ 60 ▪ *Time signal.*

▬ = 1 sec.; ▪ = 0·2 sec.

JAPAN.

II.—WIRELESS STORM WARNINGS.

The **Central Meteorological Observatory, Tokyo, W/T Station,** Latitude 35° 39′ N., Longitude 139° 45′ E., call sign, **JGA,** and Kobe Marine Observatory W/T Station, Latitude 34° 41′ N., Longitude 135° 11′ E., call sign **JTJ,** broadcast storm warnings *en clair,* in English after the weather bulletins. The warnings contain the following information :—approximate position of typhoon (or cyclone), the direction in which it is moving, or expected movement, or information concerning severe gales, or duration of monsoon, over Japan and the neighbouring seas.

Tokyo, JGA.
Time 2300, 0450 and 1100 G.M.T.
Kobe, J.T.J.
Time 0530, 1130 and 2330 G.M.T.
} Wavelength 4000 metres (C.W.).

In cases of urgency they will be broadcast immediately on 600 metres I.C.W. and repeated at the end of the next compulsory silent period.

AUSTRALIA.

II.—WIRELESS WEATHER BULLETINS.

Weather reports and forecasts issued by the Commonwealth Meteorological Bureau are broadcast *en clair* by Australian W/T stations as follows, special reports and warnings being broadcast immediately on receipt by the W/T Stations serving the area affected, when dangerous weather prevails or is expected.

Perth W/T Station.

Approximate, Latitude 32° 02′ S. Longitude 115° 50′ E.
Call sign, **VIP.,** Wavelength 600 metres (I.C.W.).
At 0415 and 1100 G.M.T., Mondays to Saturdays, inclusive, weather forecasts are broadcast.

Each forecast is for the following 24 hours, except on Saturdays when it is for 48 hours.

In addition to the above, 0100 and 0700 G.M.T. observations of barometric pressure, wind direction and force, weather, and state of the sea at Fremantle and Cape Leeuwin on week-days and 0100 and 1000 G.M.T. observations of the same elements on Sundays, are broadcast. Other coastal reports and reports from shipping are included when necessary.*

At 0030 G.M.T., on 2,400 metres (C.W.), weather forecast of the previous evening is broadcast for the information of distant shipping.

Geraldton W/T Station.

Approximate, Latitude 28° 47′ S. Longitude 114° 36′ E.
Call sign, **VIN.,** Wavelength 670 metres.
At 0200 and 1200 G.M.T., Mondays to Fridays, inclusive, weather forecasts for the following 24 hours are broadcast.

At 0200 G.M.T. on Saturdays, a weather forecast for the following 48 hours is broadcast.

In addition to the above 0000 and 0600 G.M.T. observations of barometric pressure, wind direction and force, weather and state of the sea, at Fremantle and Cape Leeuwin are broadcast, Mondays to Fridays; 0000 G.M.T. observations on Saturdays; 0000 and 0900 G.M.T. observations on Sundays.*

Broome W/T Station.

Approximate, Latitude 17° 58′ S. Longitude 122° 14′ E.
Call sign, **VIO,** Wavelength 600 metres.
Weather forecasts are broadcast at 1400 G.M.T.*

From 16th April to 16th December no separate forecast is broadcast for Sundays; the forecast issued on Saturdays is therefore for the following 48 hours.

Wyndham W/T Station.

Approximate, Latitude 15° 27′ S. Longitude 128° 07′ E.
Call sign, **VIW,** Wavelength 720 metres (I.C.W.).
At 0130 and 1130 G.M.T., Mondays to Fridays, inclusive, weather forcasts for the following 24 hours are broadcast.*

At 0130 G.M.T. on Saturdays, a weather forecast for the following 48 hours is broadcast.

Darwin W/T Station.

Approximate, Latitude 12° 27′ S. Longitude 130° 50′ E.
Call sign, **VID,** Wavelength 600 metres.
At 1200 G.M.T. broadcasts a 24 hours Weather forecast for the N.W. coast of Western Australia, Gulf of Carpentaria and E. coast of Queensland. From 16th April to 16th December the Sunday weather report and forecast for the coast of Queensland are suspended and the forecast broadcast on Saturdays is therefore for the following 48 hours.

Thursday Island W/T Station.

Approximate, Latitude 10° 35′ S. Longitude 142° 13′ E.
Call sign, **VII,** Wavelength 720 metres (I.C.W.). Ships may obtain the 0500 G.M.T. weather report for the coast of Queensland and a forecast for the ensuing 24 hours upon application to the above W/T Station.

Cooktown W/T Station.

Approximate, Latitude 15° 28′ S. Longitude 145° 16′ E.
Call Sign, **VIC,** Wavelength 760 metres.
Ships may obtain weather information similar to above (Thursday I.) upon application to Cooktown W/T Station.

Townsville W/T Station.

Approximate, Latitude 19° 16′ S. Longitude 146° 50′ E.
Call sign, **VIT,** Wavelength 600 metres (I.C.W.).
At 1100 G.M.T. The 0500 G.M.T. weather report for the coast of Queensland and a forecast for the following 24 hours is broadcast daily, except Sundays.

At 1100 G.M.T. on Sundays, from 16th December to 16th April, only, the 2300 G.M.T. weather report for the coast of Queensland, and a 24 hours' forecast issued by the Brisbane Weather Bureau are broadcast. If an atmospheric disturbance is reported the broadcast is made immediately upon receipt of the information from the Weather Bureau. The forecasts on Saturdays from 16th April to 16th December are for the ensuing 48 hours.

* When available, the 0000 G.M.T. observations of barometric pressure, wind and weather at Kupang (Timor) are also broadcast from these stations.

* When available, the 0000 G.M.T. observations of barometric pressure, wind and weather at Kupang (Timor) are also broadcast from these stations.

Willis Islets W/T Station.

Approximate, Latitude 16° 18′ S. Longitude 149° 59′ E.
Call sign, **VIQ,** Wavelength 730 metres.
From about mid November to 30th April this W/T station broadcasts particulars of barometric pressure, wind direction and force, amount of cloud, weather, state of sea and swell at Willis Island, *en clair*, as follows :—

At 0645 G.M.T., containing observations of 0600 G.M.T.
At 1045 G.M.T., ,, ,, ,, 0800 ,,
At 2330 G.M.T., ,, ,, ,, 2200 ,,

During stormy weather the 1045 G.M.T. broadcast will contain 1000 G.M.T. observations.

Rockhampton W/T Station.

Approximate, Latitude 23° 24′ S. Longitude 150° 30′ E.
Call sign, **VIR,** Wavelength 720 metres.
Ships may obtain the 0500 G.M.T. weather report for the coast of Queensland and a forecast for the ensuing 24 hours, upon application to the above W/T Station.

Brisbane W/T Station.

Approximate, Latitude 27° 26′ S. Longitude 153° 07′ E.
Call sign, **VIB,** Wavelength 600 metres (I.C.W.).
Between 0200 and 0230 G.M.T., broadcasts, the 2300 G.M.T. coastal weather report and a 6 hours' forecast. Ships can also obtain this information on request.
At about 1200 G.M.T. daily (except Sundays), or earlier if requested, the 0500 G.M.T. coastal weather report and a forecast for the ensuing 24 hours are broadcast. On Saturday the forecast is for 48 hours.

Sydney, W/T Station.

Approximate, Latitude, 33° 46′ S. Longitude 151° 03′ E.
Call sign, **VIS,** Wavelengths as given below.
Between 2300 and 0030 G.M.T. this W/T station broadcasts on a wavelength of 600 metres (I.C.W.) a weather report of coastal conditions and a 24 hours' forecast if the Weather Bureau is in receipt of sufficient information in time; if not, the report and forecast will be broadcast between 0200 and 0330 G.M.T. on a wavelength of 2,400 metres (C.W.). The foregoing broadcasts are made daily, except Sundays.
At 1030 G.M.T., repeated at 2230 G.M.T., on wavelengths of 2,400 metres (C.W.) and 600 metres (I.C.W.), respectively, a summary of the coastal weather reports and a 24 hours' forecast are broadcast daily. Ships may also obtain this information on application to Sydney W/T Station after 0630 G.M.T., except on Saturdays and Sundays.

Melbourne W/T Station.

Approximate, Latitude 37° 47′ S. Longitude 144° 52′ E.
Call sign, **VIM,** Wavelength 600 metres (I.C.W.).
At 0200 G.M.T. (1) The 2300 G.M.T. observations of barometric pressure, wind direction and force, weather, state of the sea at Cape Borda, Cape Northumberland, Wilson's Promontory, Bruni Island and Jervis Bay. Reports from other coastal stations or from ships are on occasion broadcast in lieu of reports from one or more of the usual stations, or may be supplied in addition thereto.
(2) Brief information regarding any disturbance affecting, or likely to affect, weather in the Great Australian Bight, south-eastern Australian water, or the Tasman Sea.
(3) A forecast for the ensuing 24 hours.
The foregoing broadcasts are made daily except on Sundays.
At 1100 G.M.T. daily, including Sundays, a weather forecast for the ensuing 24 hours is broadcast. In special circumstances this forecast is accompanied by reports from selected coastal stations.

King Island W/T Station.

Approximate, Latitude 39° 56′ S. Longitude 143° 52′ E.
Call sign, **VIK,** Wavelength 760 metres.
Transmits weather report on request.

Hobart (Tasmania) W/T Station.

Approximate, Latitude 42° 52′ S. Longitude 147° 19′ E.
Call sign, **VIH,** Wavelength 720 metres (spark).
Ships may obtain a summary of 2300 G.M.T. coastal weather reports on application to the W/T Station, after about 0030 G.M.T., daily (Sundays excepted). A 24 hours' forecast may also be obtained on application after about 0330 G.M.T. The forecast issued on Saturdays is for the ensuing 48 hours.

Adelaide W/T Station.

Approximate, Latitude 34° 51′ S. Longitude 138° 32′ E.
Call sign, **VIA,** Wavelength 600 metres (I.C.W.).
Ships may obtain a summary of 2330 G.M.T. coastal weather reports and a 24 hours' forecast on application to the W/T Station, after 0200 G.M.T. daily, except on Sundays.
A later forecast is broadcast at 1130 G.M.T. for the following 24 hours preceded by a statement of meteorological conditions at 0530. On Saturdays the forecast is for 48 hours and the statement omitted.

Esperance W/T Station.

Approximate, Latitude 33° 52′ S. Longitude 121° 54′ E.
Call sign, **VIE.** Wavelength 680 metres.
At 0300 and 1300 G.M.T., Mondays to Fridays, inclusive; Saturdays at 0300 only; broadcasts weather forecasts for the following 24 hours. Saturday's forecast is for the following 48 hours.
In addition to the forecasts, observations of barometric pressure, wind direction and force, weather, state of the sea at Fremantle and Cape Leeuwin are broadcast. These observations are taken at 0100 and 0700 G.M.T., Mondays to Fridays; at 0100 G.M.T. on Saturdays; and at 0100 and 1000 G.M.T. on Sundays.

WIRELESS STORM WARNINGS.

Storm warnings are broadcast by the Australian W/T stations as follows :—
For approximate positions of the Stations *see* pp. 127 and 128.

Perth, call sign **VIP,** wavelengths 600 metres (I.C.W.) and 2400 metres (C.W.).

Geraldton, call sign **VIN,** wavelength 670 metres.
Broome, ,, **VIO,** ,, 600 ,,
Wyndham, ,, **VIW,** ,, 720 ,, (I.C.W.).
Darwin, ,, **VID,** ,, 600 ,,

The above W/T Stations broadcast special warnings of the approach of cyclonic storms of tropical origin, including information regarding barometric pressure at stations on the N.W. coast of W. Australia, immediately upon receipt from the Weather Bureau.

Thursday Island, call sign **VII,** wavelength 720 metres (I.C.W.).
Cooktown, ,, **VIC,** ,, 760 ,,
Rockhampton, ,, **VIR,** ,, 720 ,,
Brisbane, ,, **VIB,** ,, 600 ,, (I.C.W.).

The above W/T Stations broadcast special storm warnings, immediately upon receipt from the Weather Bureau, and thereafter during the regular W/T watches kept by coastal vessels until receipt of later information from Brisbane Weather Bureau.
Special storm warnings may also be obtained, if the information is available, upon application to any of the above W/T stations.

Willis Islets, call sign **VIQ,** wavelength 730 metres, broadcasts storm warnings during the months November to April inclusive.

Sydney, call sign **VIS,** wavelength 600 metres I.C.W., broadcasts special storm warnings, immediately on receipt. They are repeated at intervals until receipt of later information from the Weather Bureau.

Melbourne, call sign **VIM,** wavelength 600 metres (I.C.W.), broadcasts special storm warnings immediately on receipt from the Weather Bureau.

Flinders Island, call sign **VIL,** wavelength 740 metres (I.C.W.), broadcasts storm warnings immediately on receipt.

King Island, call sign **VIK,** wavelength 760 metres, broadcasts storm warnings immediately on receipt.

Hobart (Tasmania), call sign **VIH,** wavelength 720 metres, broadcasts special storm warnings, immediately on receipt from the Weather Bureau and at hourly intervals thereafter until 1000 G.M.T.

Adelaide, call sign **VIA,** wavelength 600 metres.
Esperance, ,, **VIE,** ,, 680 ,,
broadcast special storm warnings immediately on receipt from the Weather Bureau.

III.—WIRELESS TIME SIGNALS.

Station.	Call Sign.	Wave-length (metres).	G.M.T.	System.
Perth Lat. 32° 01′ 51″ S. Long. 115° 49′ 31″ E.	VIP	600 (I.C.W.).	0057–0100 1257–1300	(*See* Time Signal Figure, p. 125.) Controlled by Perth Observatory.
Adelaide Lat. 34° 51′ 14″ S. Long. 138° 31′ 55″ E.	VIA	600 (I.C.W.).	0027–0030 1227–1230	(*See* Figure as above.) Transmitted automatically by the standard clock of the Adelaide Observatory.

Melbourne W/T Station, Latitude 37° 46′ 56″ S., Longitude 144° 52′ 09″ E., call sign, **VIM,** wavelength 600 metres (I.C.W.).

Wireless time signals are broadcast from Melbourne W/T Station in accordance with the New International System of W/T time signals at the following times :—

G. .T.

h.	m.	s.		h.	m.	s.
1	57	00	to	2	00	00
13	57	00	,,	14	00	00

The transmission of each series of signals is similar, the procedure being as follows :—

G.M.T. h.	m.	s.		h.	m.	s.	Signal.
1 / 13	57	00	to	1 / 13	57	50	— • • — — • • — — • • — etc.
	57	55	,,		58	00	55 56 57 58 59 60 • • • • • • *Time Signal.*
	58	08	,,		58	10	— •
	58	18	,,		58	20	— •
	58	28	,,		58	30	— •
	58	38	,,		58	40	— •
	58	48	,,		58	50	— •
	58	55	,,		59	00	55 56 57 58 59 60 • • • • • • *Time Signal.*
	59	06	,,		59	10	— — •
	59	16	,,		59	20	— — •
	59	26	,,		59	30	— — •
	59	36	,,		59	40	— — •
	59	46	,,		59	50	— — •
1 / 13	59	55	,,	2 / 14	00	00	55 56 57 58 59 60 • • • • • • *Time Signal.*

NEW ZEALAND.

II.—WIRELESS WEATHER BULLETIN.

Wellington W/T Station, Latitude 41° 16′ S. Longitude 174° 46′ E. Call sign **ZLW.**

Wavelength 800m. I.C.W. (375 kc/s.). Time of transmission 0930 G.M.T.

General statement of weather conditions for New Zealand waters.

Forecast for New Zealand, New Zealand Waters and the eastern Tasman Sea.

Weather Report in code giving actual observations at the stations below.

The International Ships Wireless Weather Telegraphy Code with *a local addition* is used and on this account special care is necessary. To decode these reports the tables given in M.O. 329 are required (Decode for use with International Code for Wireless Weather messages from ships [Third Edition], obtainable from His Majesty's Stationery Office, price 6d.)

The Key letters are fully described on page 38 of the January, 1935, number and in M.O. 329, with the exception of symbol III meaning the distinguishing figures of the coast stations and S which gives the state of the sea according to the Douglas Scale. *Not swell* which is the only scale for waves in the International Ships Wireless Weather Telegraphy Code, 1929, published for general use of British Shipping.

Key letters IIIAS, DDFWW, BBVTT.

Distinguishing Figures.	*Station.*	*Position approx. Latitude.*	*Longitude.*
495	Norfolk Island ...	29° 04′ S.	167° 58′ E.
505	C. Maria Van Diemen	34° 29′ S.	172° 39′ E.
510	Auckland	36° 51′ S.	174° 47′ E.
515	East Cape	37° 41′ S.	178° 33′ E.
520	Cape Egmont... ...	39° 17′ S.	173° 45′ E.
524	Napier	39° 29′ S.	176° 56′ E.
525	Wanganui	—	—
532	Farewell Spit ...	40° 33′ S.	173° 01′ E.
534	Stephens I.	40° 41′ S.	174° 01′ E.
537	Wellington	41° 16′ S.	174° 46′ E.
540	Cape Campbell ...	41° 43′ S.	174° 17′ E.
542	Westport	—	—
545	Greymouth	42° 27′ S.	171° 12′ E.
550	Akaroa Lt. Ho. ...	43° 48′ S.	172° 59′ E.
558	Nugget Pt.	46° 26′ S.	169° 50′ E.
565	Puysegur Pt. ...	46° 10′ S.	166° 38′ E.
570	Chatham Is.	43° 52′ S.	176° 42′ E.
326	Sydney	33° 51′ S.	151° 13′ E.
394	Hobart	42° 53′ S.	147° 20′ E.
560	Bluff*	46° 37′ S.	168° 21′ E.
506	Russell*	35° 15′ S.	174° 07′ E.

* Stations may be added.

III.—WIRELESS TIME SIGNALS.

Wellington W/T Station Latitude 41° 16′ 26″ S., Longitude 174° 45′ 55″ E., call sign **ZLW,** broadcasts time signals daily, on 600 metres (I.C.W.) as follows :—

The transmission is a relay of the time signal from Dominion Observatory, call sign ZMO, which is automatically operated by the Standard Time Clock at the Observatory (Latitude 41° 17′ 03·8″ S., Longitude 174° 46′ 00·0″ E.).

The first time signal is at 23 h. 00 m. 00 s., G.M.T., and is repeated at the 1st, 2nd, 4th and 5th minutes.

There is no time signal at 23 h. 03 m. 00 s.

Each time signal commences exactly at the beginning of the minute and lasts for *three seconds*, approximately :—

G.M.T. h.	m.	s.		h.	m.	s.	Signal.
22	58	00	to	22	58	55	— ZMO (every 15 seconds, the dash being of two seconds duration.)
22	59	10	,,	22	59	50	— — • — — • — — • etc.
23	00	00	,,	23	00	03	——— Time signal.
23	00	12	,,	23	00	50	— — — — — — — etc.
23	01	00	,,	23	01	03	——— Time signal.
23	01	13	,,	23	01	50	— — — — — — etc.
23	02	00	,,	23	02	03	——— Time signal.
23	02	14	,,	23	03	50	— — — — — — — — etc.
23	04	00	,,	23	04	03	——— Time signal.
23	04	09	,,	23	04	50	— — — — — — — — — — etc.
23	05	00	,,	23	05	03	——— Time signal.

$\overline{\text{AR}}$ $\overline{\text{ZMO}}$ $\overline{\text{VA}}$.

In addition to the above, the undermentioned time signals are broadcast on Tuesdays and Fridays, except on New Zealand Government holidays, by the Dominion Observatory, Wellington.

The conditions governing the transmission are similar to those given above.

The first time signal is at 9 h. 00 m. 00 s. (G.M.T.), and is repeated at the 1st, 2nd, 4th and 5th minutes.

There is no time signal at 9 h. 03 m. 00 s. Each signal commences exactly at the beginning of the minute, and lasts for *three seconds*, approximately.

G.M.T. h.	m.	s.		h.	m.	s.	Signal.
8	58	00	to	8	58	55	— ZMO (every 15 seconds, the dash being of two seconds duration.)
8	59	10	,,	8	59	50	— — · — — · — — · — — · etc.
9	00	00	,,	9	00	03	——— Time signal.
9	00	12	,,	9	00	50	— — — — — — — — — — etc.
9	01	00	,,	9	01	03	——— Time signal.
9	01	13	,,	9	01	50	— — — — — — — — — — etc.
9	02	00	,,	9	02	03	——— Time signal.
9	02	14	,,	9	03	50	— — — — — — — — — etc.
9	04	00	,,	9	04	03	——— Time signal.
9	04	09	,,	9	04	50	— — — — — — — — — — — — etc.
9	05	00	,,	9	05	03	——— Time signal.
							AR ZMO VA

NOTE.—All hand Key signals, except in the 58th minute, terminate on the 50th second, to enable the observer to take the signal accurately. The hand signals must *not* be used as time signals.

BRITISH NEW GUINEA (PAPUA).

II.—WIRELESS WEATHER BULLETINS.

Samarai W/T Station, approximate, Latitude 10° 36′ S., Longitude 150° 40′ E.

Call sign, **VIJ.** Wavelength 720 metres.

Ships may obtain a weather forecast on application to the W/T Station.

WIRELESS STORM WARNINGS.

Port Moresby, call sign **VIG,** wavelength 720 metres, broadcasts special warnings of disturbances on the Queensland coast on any hour when occasion warrants.

Samarai, call sign **VIJ,** wavelength 720 metres, broadcasts special storm warnings immediately on receipt and thereafter in the regular watches kept by coastal vessels, until further information is received from the Brisbane Weather Bureau.

Special storm warnings may also be obtained, if the information is available, upon application to the W/T stations.

NEW BRITAIN.

II.—WIRELESS WEATHER BULLETIN.

Rabaul (Bitapaka) W/T Station, approximate, Latitude 4° 24′ S., Longitude 152° 19′ E.

Call sign **VJZ.** Wavelength 2,400 metres (C.W.).

At about 0600 G.M.T., daily. The 2300 G.M.T. weather report for the coast of Queensland and a 24 hours' forecast are broadcast. Ships may also obtain this information on application to the W/T Station. From 16th April to 16th December, no forecast is broadcast on Sundays; the forecast issued on Saturdays is therefore for 48 hours.

WIRELESS STORM WARNINGS.

Rabaul, call sign **VJZ,** wavelength, 2,400 metres (C.W.) broadcasts special warnings of disturbances on the Queensland coast at any hour when occasion warrants.

SOUTH PACIFIC OCEAN ISLANDS.

II.—WIRELESS WEATHER BULLETINS.

Western Area.

Suva (Fiji) W/T Station, Latitude 18° 09′ S. Longitude 178° 28′ E. Call sign **VRP.**

Wavelength 800 m. I.C.W.

Times of transmission: 0005 G.M.T.,
0830 G.M.T. (November 1st to April 30th).

Observations taken at 0200 G.M.T. included in 0005 G.M.T. transmission, and observations at 0200 G.M.T. in 0830 G.M.T. transmission.

Weather report in code giving actual observations at the stations numbered 431, 435, 443, 446, 447, 450, 451, 454, 455, 456, 459, 460, 461, 462 and 463 on the Chart below.

The International Ships Wireless Telegraphy Code is used.

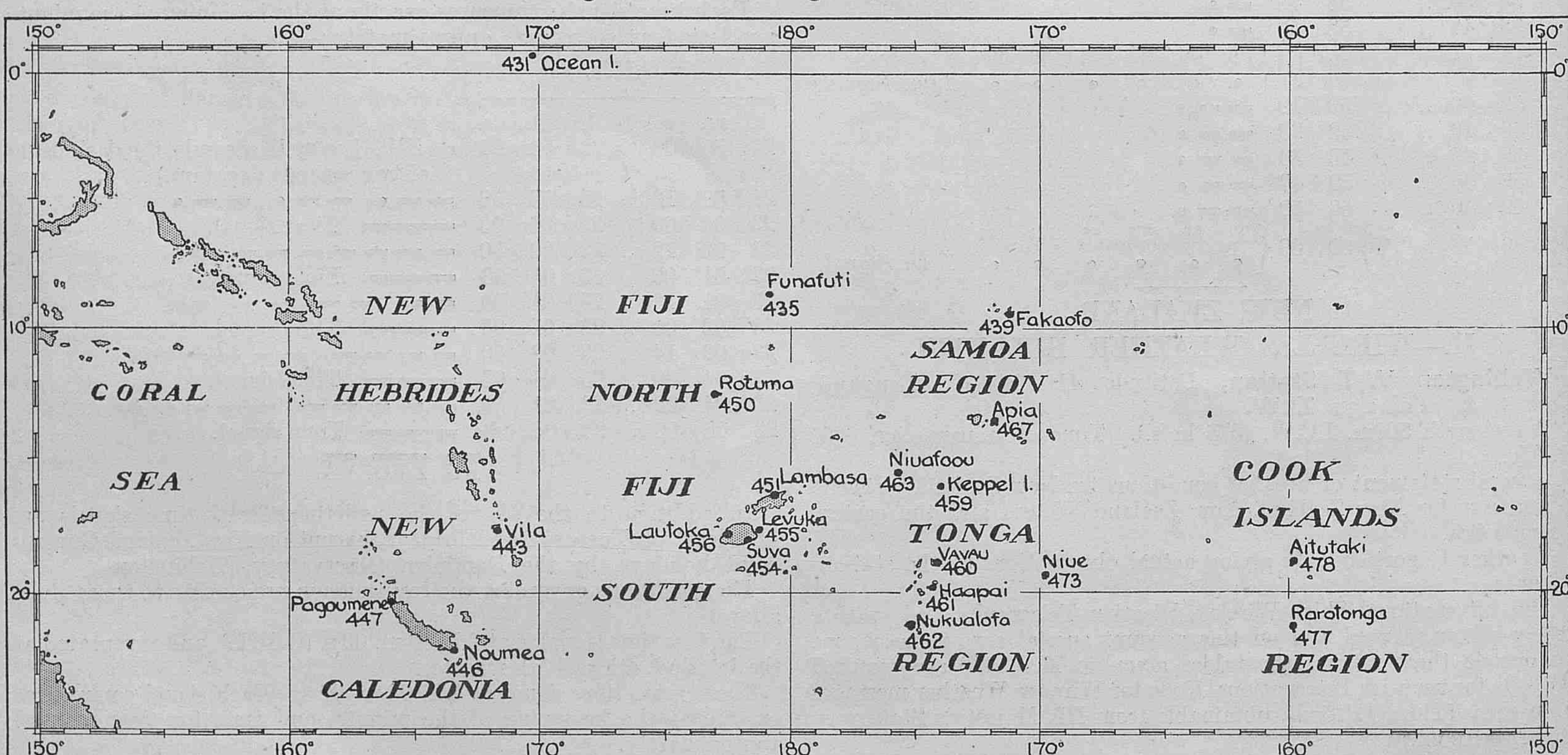
To decode these reports the tables given in M.O. 329 are required (Decode for use with International Code for Wireless Weather messages for ships [Third Edition], obtainable from His Majesty's Stationery Office, price 6d.)

The Key letters are fully described on page 38 of the January, 1935, number and in M.O. 329, with the exception of the symbol III which means the distinguishing figures of the coast stations.

Key letters IIICW DDFww BBVTT.

Barometer tendency is added " en clair " when necessary.

Chart showing Stations and Regions, South Pacific Islands.



Central and Eastern Areas.

Apia (Samoa) W/T Station, Latitude 13° 50′ S. Longitude 171° 50′ W. Call sign **ZMA**

Wavelength 800 m. I.C.W.

Times of transmission ; 0100 G.M.T.

0930 G.M.T. (November 1st to April 30th).

Observations taken at 2000 G.M.T. included in 0100 transmission, and observations at 0200 G.M.T. in 0930 G.M.T. transmission.

Weather report in code giving actual observations at the stations numbered 439, 467, 473, 477 and 478 on the Chart below.

The Key and Code is the same as for Suva above.

A General statement of weather conditions in plain language is added when necessary and the various regions of the South Pacific will be referred to by the names shown on the chart below.

WIRELESS STORM WARNINGS.

During the Hurricane Season (November 1st to April 30th).

Suva W/T Station call sign **VRP** and **Apia W/T Station** call sign **ZMA** broadcast storm warnings when necessary on 800 m. I.C.W. immediately after the Weather reports given above.

Chart showing Stations and Regions, South Pacific Islands.

French Oceania.

Papeete (Tahiti), approximate Latitude 17° 29′ S., Longitude 149° 29′ W., call sign **FPB,** broadcasts information concerning hurricanes, &c., at any hour when necessary on a wavelength of 600 metres (spark). The safety signal **TTT,** repeated at short intervals ten times on full power, is first sent out followed by the message which is repeated three times with intervals of ten minutes.

PERSONNEL.

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

Captain E. Griffith.

Captain E. Griffith, commander of the R.M.S. *Empress of Australia* has retired from the sea after 47 years service afloat.

Commencing his sea career at the early age of 13 in a 53-ton schooner he remained in the coastal service for three years, and then spent the next ten years in deep-water sailing ships, ending his career in sail as Mate of the Ship, *M. E. Watson.*

In 1899 he joined Messrs. Elder Dempsters' Beaver Line as a junior officer, and transferred to the Canadian Pacific Steam Ship Co. when the ships of the Beaver Line were acquired by them in 1903. Given his first command, the *Milwaukee,* in 1907, Captain Griffith has since commanded several vessels of the company's North Atlantic Fleet, including the *Empress of France* for nine years and the *Empress of Australia* for five years. He had made two world cruises in the *Empress of France* and one in the *Empress of Australia,* and during each cruise paid a visit to the island of Tristan da Cunha.

Captain W. P. Townshend, R.D., R.N.R.

Captain W. P. Townshend, commander of the R.M.S. *Strathaird,* has retired from active service afloat after 38 years service with the Peninsular and Oriental Steam Ship Company.

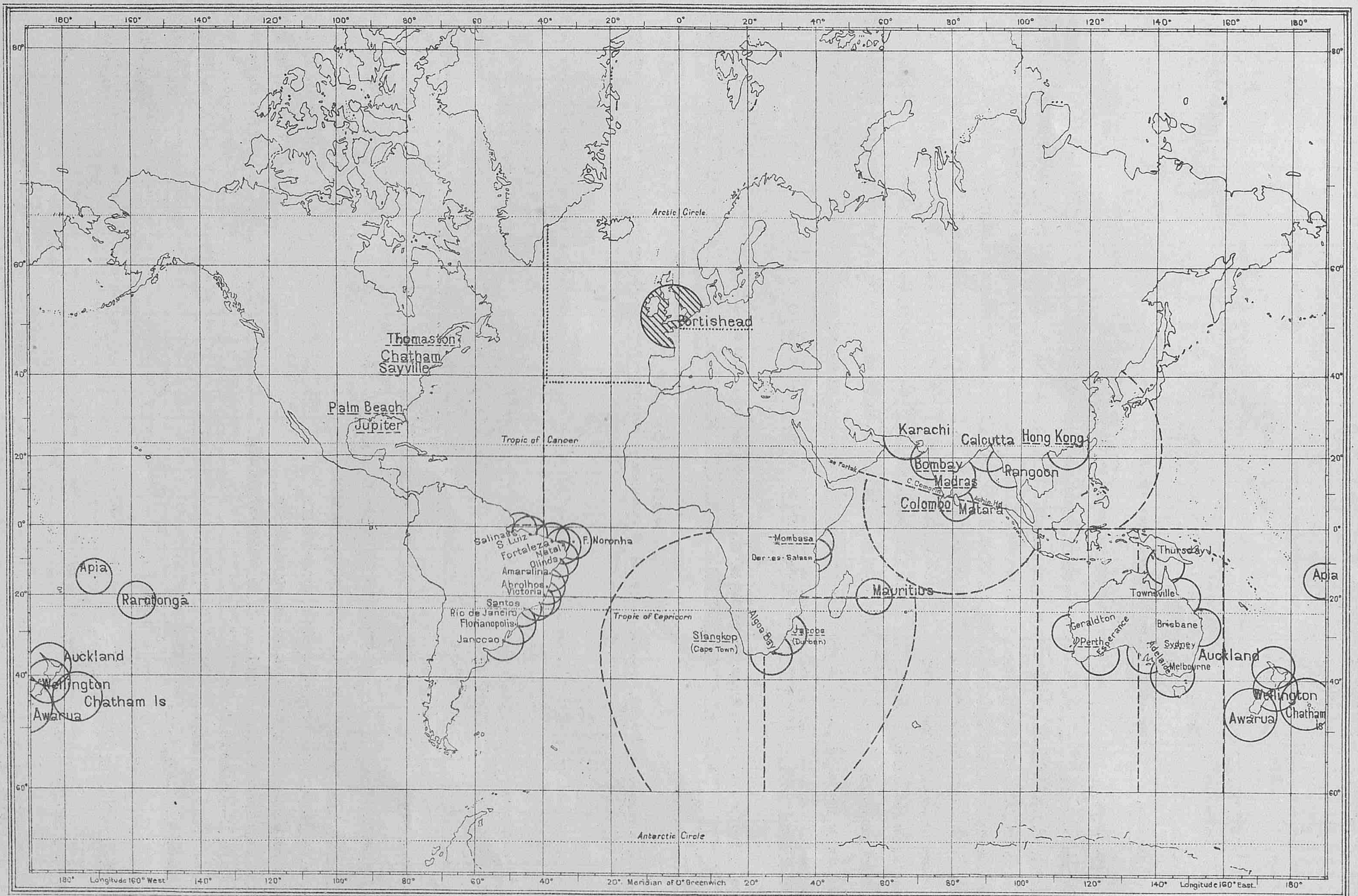
Captain Townshend served his apprenticeship in the sailing ships of Messrs. John Herron & Co. of Liverpool and in 1897 entered the service of the P. & O. Company as a junior officer. In 1923 he was appointed master of the S.S. *Kidderpore* since when he has commanded several of the company's fleet, including the *Jeypore, Berrima, Balranald, Delta, Comorin, Mooltan, Malwa, Viceroy of India* and *Strathaird.*

When in command of the *Viceroy of India* Captain Townshend was awarded a silver medal and diploma by the Greek Government for rescue work in connection with the Greek steamer *Theodoros Bulgaris,* which was in distress in the Bay of Biscay in December 1930.

Captain Townshend served throughout the Great War in the Royal Navy. During the Armistice with Turkey he was appointed Captain of the Port at Constantinople and was not demobolised until 1922, when he rejoined the P. & O. Company.

SHIPS' WIRELESS WEATHER SIGNALS.
CHART OF THE WORLD.

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



The dotted line indicates the area in which British "A Selected Ships" report under control to Portishead.

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

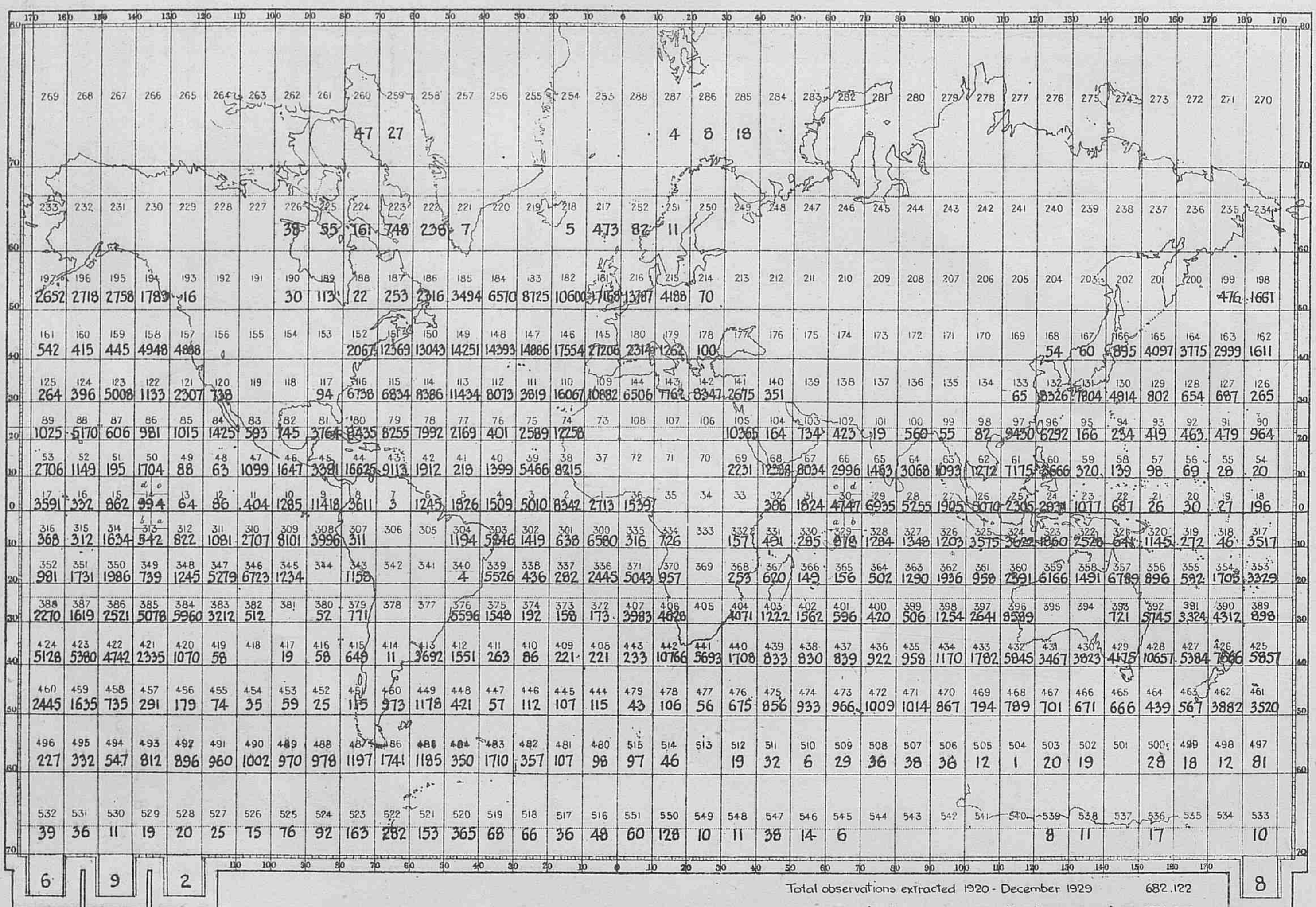
The small shaded areas round stations detailed to receive reports from "A Selected Ships" indicate where these ships should not report on account of congestion.

The full circles indicate the areas round islands and coast stations which are detailed to intercept "B Selected Ships" reports made to G.Q. on 600 metres.

WORK OF THE YEAR.

MARSDEN CHART I.

NUMBER OF SETS OF OBSERVATIONS EXTRACTED BETWEEN APRIL 1st. 1920 & MARCH 31st. 1935.



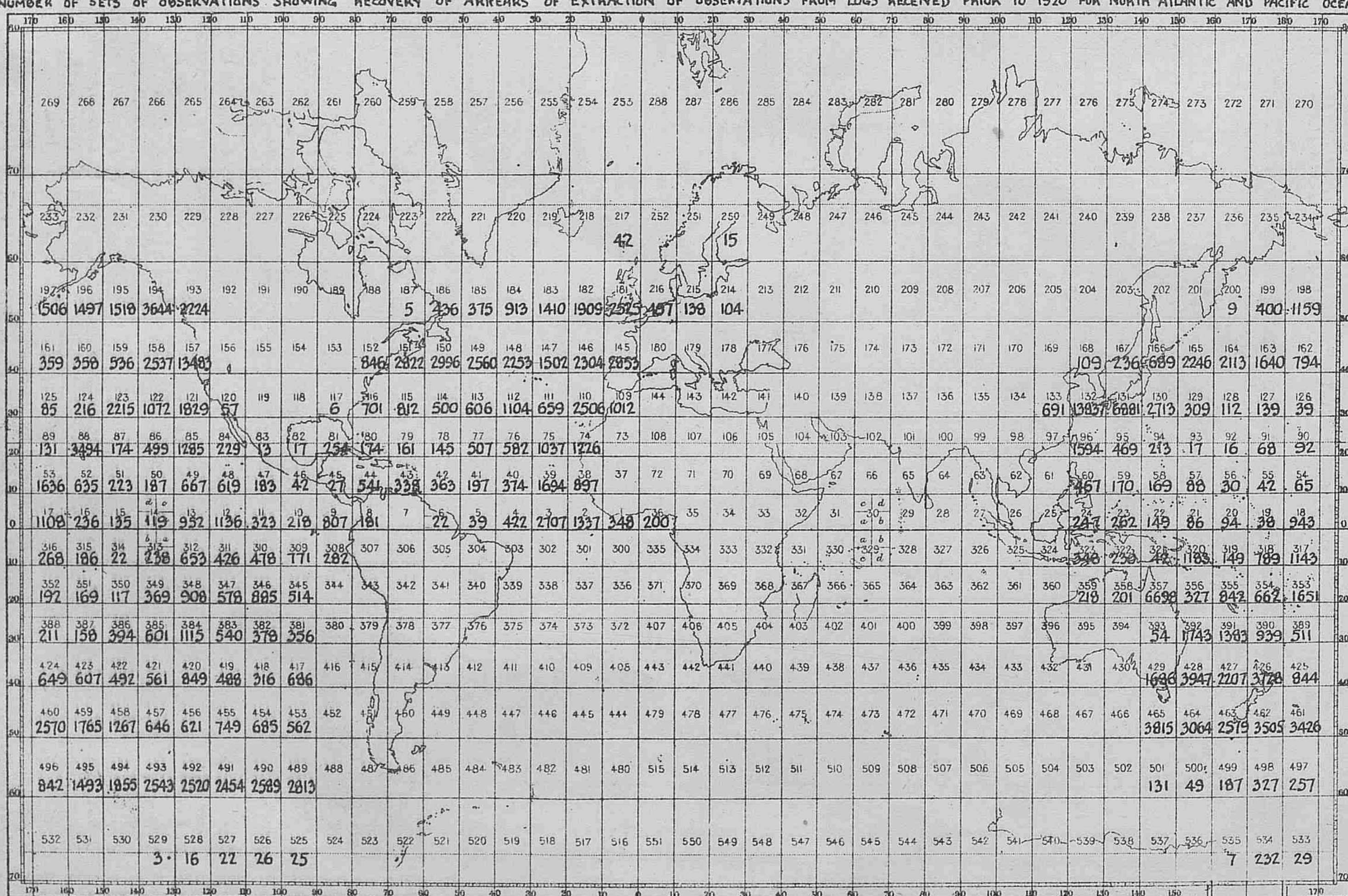
Total observations extracted 1920 - December 1929 682,122

Total observations (new code) extracted Jan. 1st 1930 - Mar. 31st 1935 279,855

Grand Total since 1st Apr. 1920 961,977

MARSDEN CHART II.

NUMBER OF SETS OF OBSERVATIONS SHOWING RECOVERY OF ARREARS OF EXTRACTION OF OBSERVATIONS FROM LOGS RECEIVED PRIOR TO 1920 FOR NORTH ATLANTIC AND PACIFIC OCEANS.

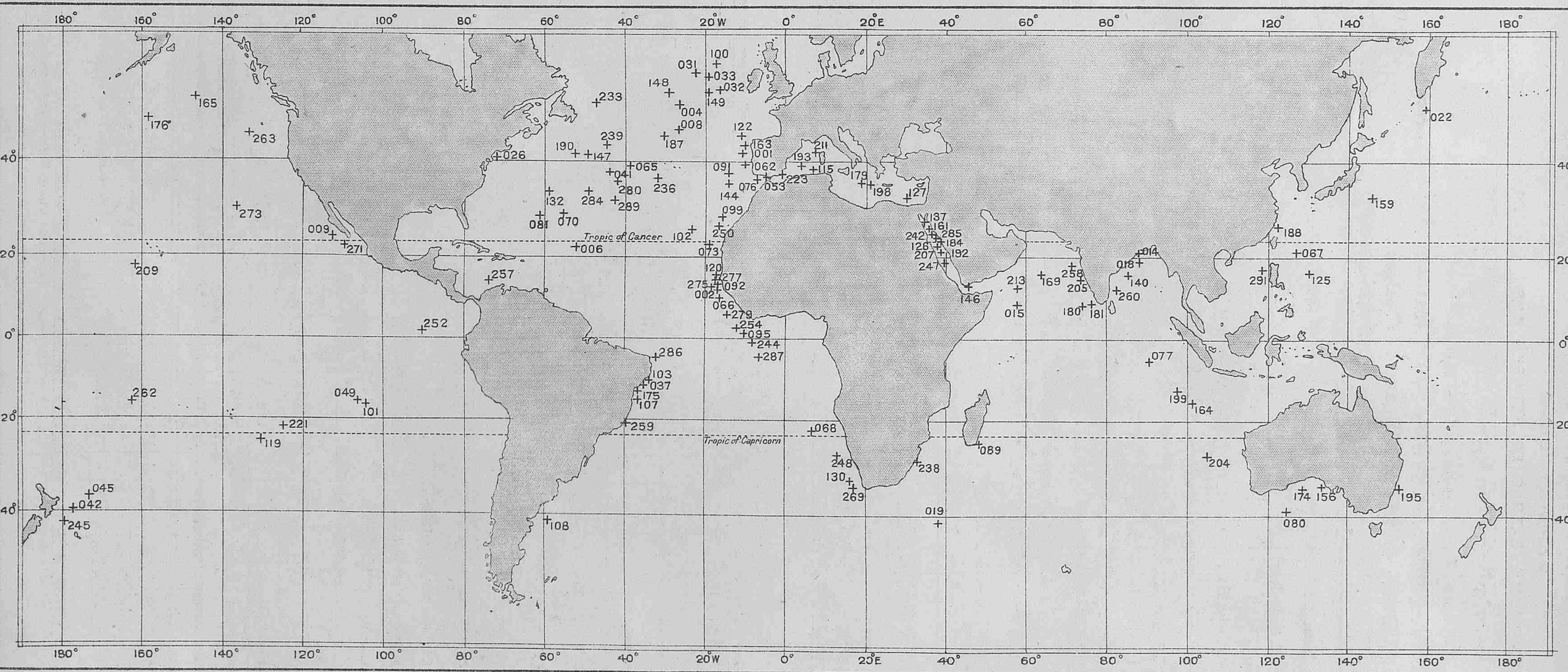


Total observations extracted, January 1st 1933 - March 31st 1935 for the years 1897 - 1919 = 226,617 observations

WORK OF THE YEAR.

CHART III.

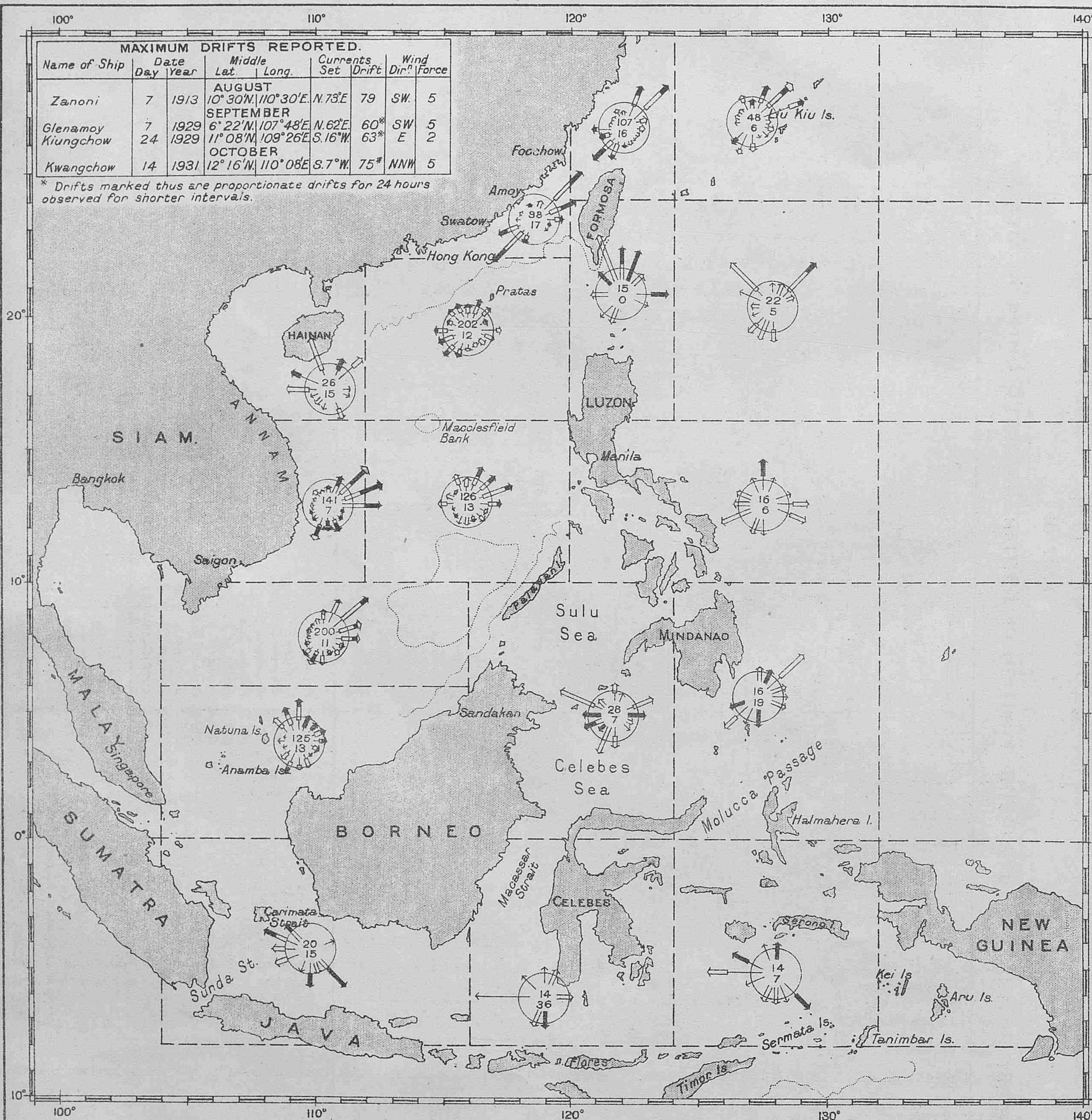
CHART OF THE WORLD SHOWING POSITION OF BRITISH SELECTED SHIPS AT SEA ON JUNE 1ST., 1934.



001. B. Clan Macphee.
002. B. Clan Macwhirter.
004. A. Olympic.
006. B. Coronado.
008. B. Losada. M. V.
009. B. Elmworth. M. V.
014. B. Mahronda.
015. B. Mahsud.
018. B. Makalla.
019. B. Nerbudda.
022. B. Alynbank.
026. B. Glenbank.
031. A. Caledonia.
032. A. Alaunia.
033. A. Scythia.
037. B. Baronesa.
041. B. Clydebank. M. V.
042. B. Maimoa.
045. A. Tainui.
049. B. Fordsdale.
053. A. Voltaire.
062. A. Lancastria.
065. A. Akaroa.
066. A. City of Nagpur.
067. B. Chinese Prince.
068. A. Balmoral Castle.
070. B. Bayano.
073. B. Nagara.
076. B. Largs Bay.
077. B. Hobson's Bay.
080. B. Orari.
081. B. Tairoa.
089. B. City of Hereford.
091. A. Armadale Castle.
092. A. Carnarvon Castle.
095. A. Arundel Castle.
099. A. Highland Monarch. M. V.
100. A. Laurentic.
101. B. Mahia.
102. B. Duquesa.
103. A. Andalucia Star.
107. B. El Argentino.
108. B. Elstree Grange.
115. A. Arandora Star.
119. B. Trojan. Star.
120. A. Apapa M. V.
122. A. Accra M. V.
125. B. City of Windsor.
126. B. Glengarry. M. V.
127. B. Arracan.
130. B. Port Caroline.
132. B. Reina del Pacifico. M. V.
137. B. Logician.
140. B. Mahratta.
144. A. Arlanza.
146. B. Mandasor.
147. A. Laconia.
148. A. Moncalm.
149. A. Montclare.
156. A. Otranto.
159. B. Fresno City.
161. B. Titan.
163. A. Vandyck.
164. A. Mooltan.
165. B. Tantalus. M. V.
169. B. Dalgoma.
174. A. Ormonde.
175. A. Almanzora.
176. B. Vancover City. M. V.
179. B. Balranald
180. B. Baradine.
181. B. Barrabool.
184. A. Cathay
187. B. Comedian.
188. A. Kaisar-i-Hind.
190. A. Carinthia.
192. A. Chitral.
193. B. Lahore.
195. A. Maloja.
198. B. Contractor.
199. A. Mongolia.
204. B. Peshawar.
205. A. Rajputana.
207. A. Ranpura.
209. A. Aorangi. M. V.
211. B. Shropshire M. V.
213. A. Mashobra.
221. A. Mataroa.
223. B. Matiana.
233. A. Ascania.
236. B. Malayan Prince.
238. B. Piako.
239. B. Foylebank.
242. B. Mahseer.
244. B. Tongariro.
245. B. Turakina.
247. B. Recorder.
248. B. Banffshire.
250. A. Highland Princess. M. V.
252. B. Port Hardy.
254. B. Limerick.
257. A. Rangitata. M.V.
258. B. Corfu.
259. B. Canonesa.
260. B. Defender.
262. B. Hauraki M. V.
263. B. Wairuna.
269. B. British Admiral.
271. B. City of Roubaix.
273. B. Adrastus.
275. B. Dramatist.
277. B. Pakeha.
279. B. Clan Urquhart.
280. B. Astronomer.
284. B. Director.
285. B. Custodian.
286. B. Natia.
287. B. Clan Macfarlane.
289. B. Inanda.
291. B. Nankin.

120 ships out of 292, in favourable positions to report, with about 172 in port or narrow waters.

Currents in the China Seas and East Indian Archipelago.
AUGUST SEPTEMBER and OCTOBER.
Observations of ships regularly observing for the British Meteorological Office, 1910 - 1934.



MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Currents Set	Currents Drift	Wind Dir.ⁿ	Wind Force
			AUGUST					
Zanoni	7	1913	10° 30'N.	110° 30'E.	N. 73°E.	79	SW.	5
			SEPTEMBER					
Glenamoy	7	1929	6° 22'N.	107° 48'E.	N. 62°E.	60*	SW	5
Kiungchow	24	1929	11° 08'N.	109° 26'E.	S. 16°W.	63*	E	2
			OCTOBER					
Kwangchow	14	1931	12° 16'N.	110° 06'E.	S. 7°W.	75*	NNW	5

* Drifts marked thus are proportionate drifts for 24 hours observed for shorter intervals.

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,:-

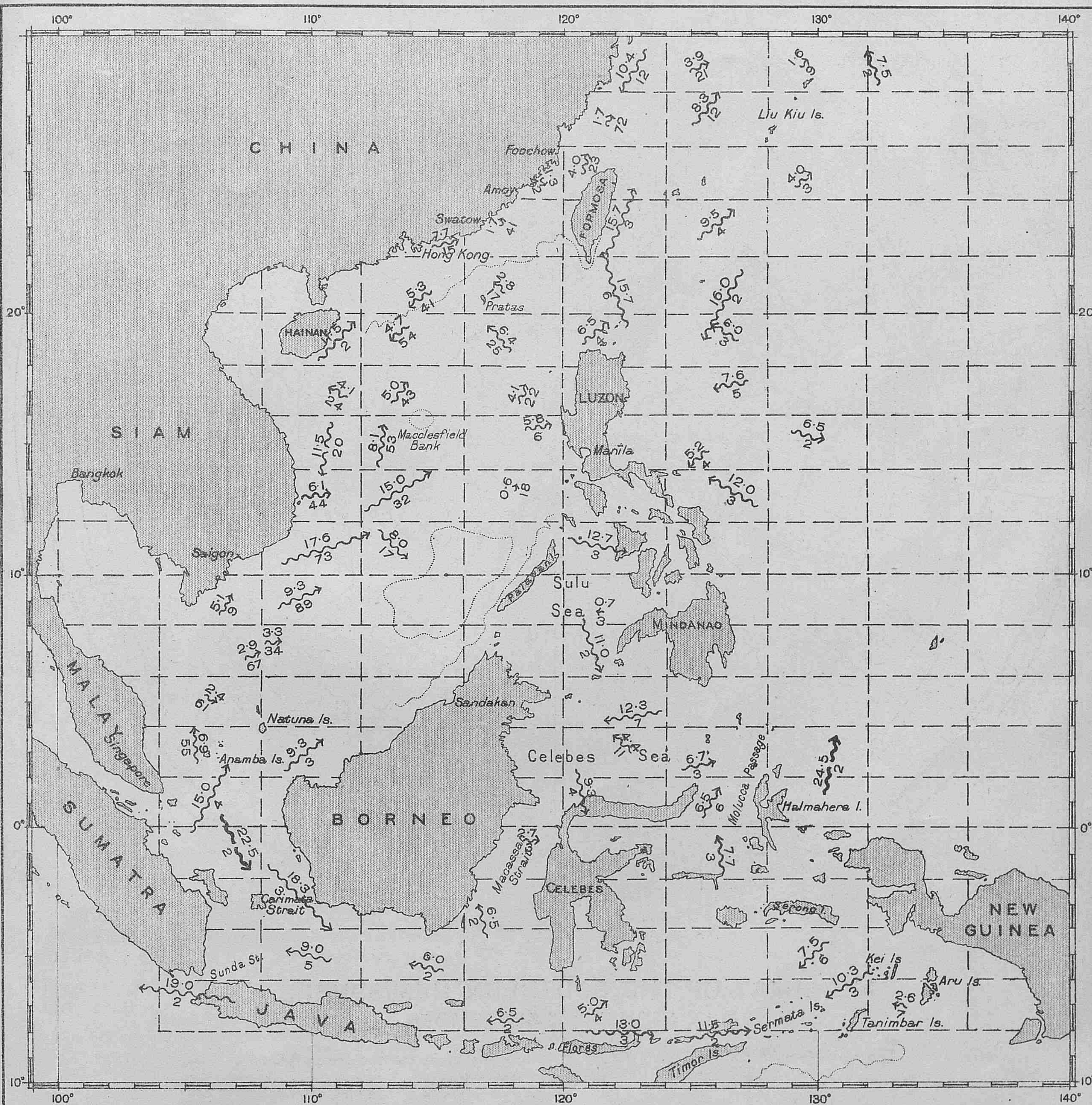
6 - 12 miles per day ⟶, *13-24 miles per day* ⟹,
25-48 " " " ➡, *49-72 " " "* ⟹,
73 miles per day and above ➡.

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

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

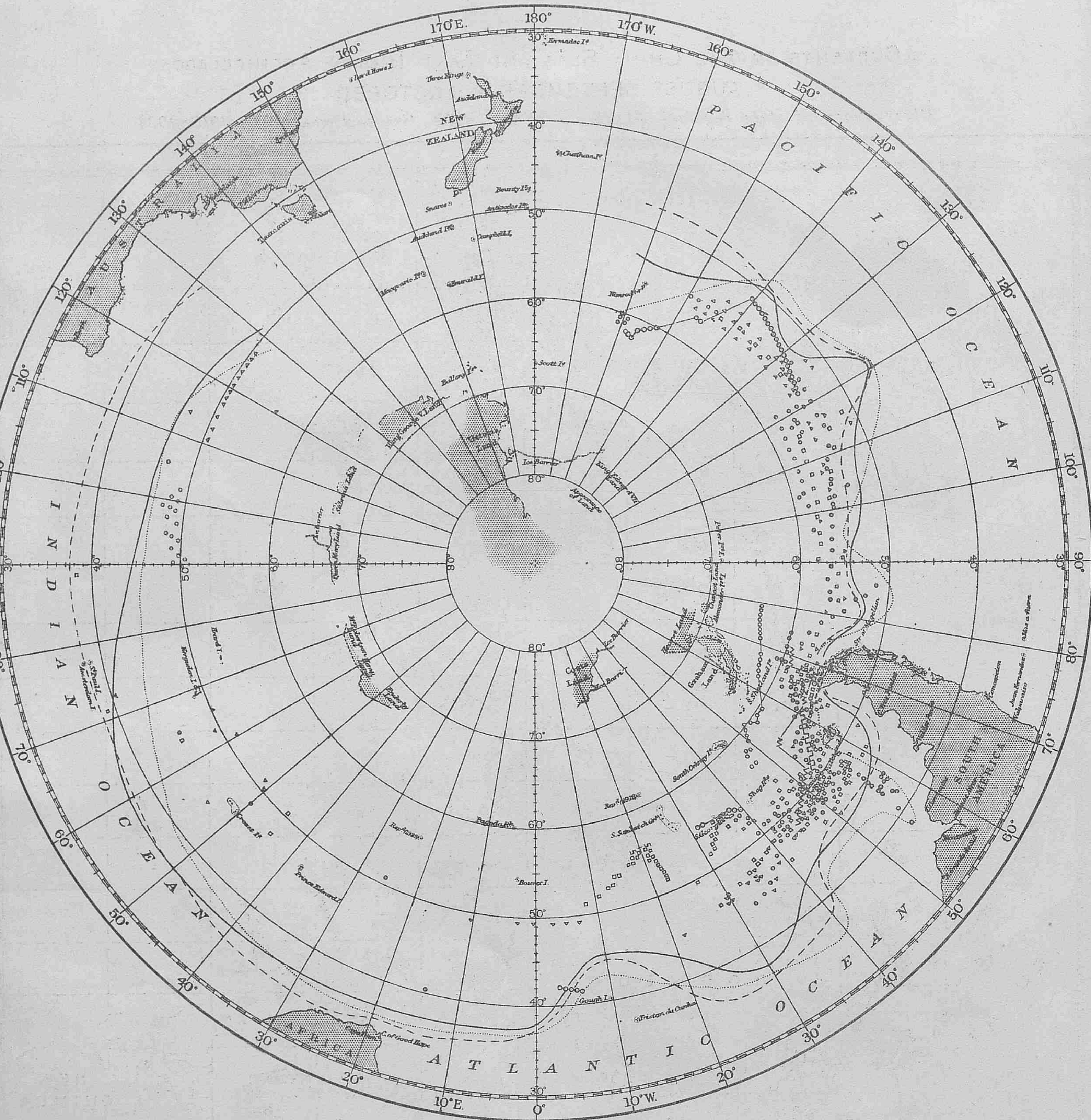
CURRENTS IN THE CHINA SEAS AND EAST INDIAN ARCHIPELAGO.
AUGUST SEPTEMBER and OCTOBER.

Observations of ships regularly observing for the British Meteorological Office, 1910-1934.



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.



ICE CHART OF THE SOUTHERN HEMISPHERE,

JULY AUGUST and SEPTEMBER

EXPLANATION.

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

	Bergs, 1902-1934.	Position of northernmost pack ice actually observed 1885-1934.	Extreme limit of all ice, 1772-1934.
July.	△	(zigzag line)	(solid line)
August.	□	(square-wave line)	(dashed line)
September	○	–o–o–o–o–o–o–o–	(dotted line)

Note — The symbols for pack ice are joined by hair line where desirable.

The coast line of the Antarctic continent as shown on this chart is not completely corrected to accord with the latest survey information. It is intended in a later volume of The Marine Observer, after the Admiralty Ice chart of the Southern Hemisphere Nº 1241 has been revised, to again publish this chart in The Marine Observer with coast lines as complete as possible and to bring the ice information up to date annually.

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