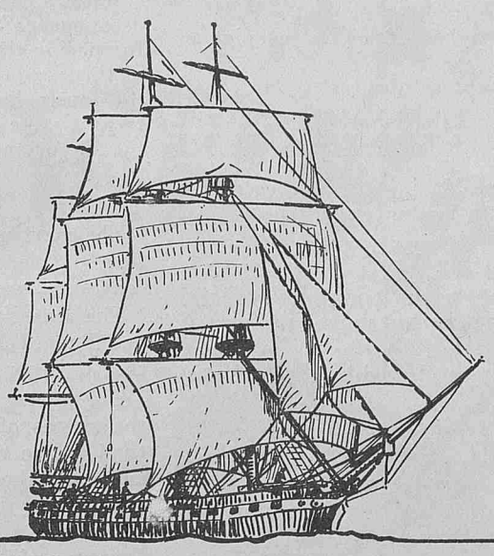


VOL. XI. No. 115. THE MARINE OBSERVER JULY 1934.

TABLE OF PRINCIPAL CONTENTS

WORK OF THE YEAR.

April 1st, 1933, to March 31st, 1934.

THE financial year is closing with a much more hopeful outlook than there has been for several years; and though as is inevitable, shipping is the last industry to profit by a revival of trade, and consequently the merchant service continues to suffer from unemployment, the voluntary work of marine meteorology at sea has never been done better.

In the Marine Division, we have greatly benefited by the plan of work commenced on January 1st, 1933.

With the number of observing ships kept at about 350, and consequently fewer returns to be dealt with, we have been able to do better justice to the work of the corps of voluntary marine observers at sea.

In no year since the Great War has the Marine Division been able to do more steadily progressive work than in the twelve months just ended.

Collection of Data during Year.

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

Of a total of 122 received these logs were classed as follows:—

Excellent	49
Very Good	73
Good	0
Not Classed	0
	122

These classifications include the Form 138, Wireless Weather register, in the case of Selected ships; and take into account recorded evidence of the practical application of the work to the navigation of the ship.

The classifications are made by comparison, so that the standard of "Excellent," which is limited to 40 per cent. of all logs received is set by the corps of voluntary marine observers themselves.

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 298 ships.

Of a total of 2,352 of these forms received, they were classed as follows:—

Excellent	713
Very Good	1,633
Good	1
Not Classed	5
	2,352

The same system of classification as for logs is used, the wireless register Form 138 being included, and consideration being given to evidence of practical application of the work.

The high standard of this classification obtained in competition amongst Form ships last year has been maintained, and the registers Forms 138 accompanying the records of Selected Ships have generally improved.

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. Observations were discontinued at five West India Stations, from which returns had been received for many years.

Nine cross channel steamers have made reports of observed conditions at mid channel throughout the year.

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 six ships for the Fisheries Laboratory at Lowestoft.

With a view to assisting the John Murray Expedition in its oceanographical survey of the Arabian Sea, and also with a view to furthering the investigations of the Marine Division into the currents of this region, arrangements have been made for 17 ships traversing the routes Perim to Bombay and Perim to Colombo, to collect and return water samples to the Port Officer at Port Said for analysis at the Egyptian University at Cairo.

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.

The seasonal changes in the current circulation of the Arabian Sea and Bay of Bengal have been further investigated, with the result that it is confirmed that the old conceptions were erroneous.

Our recent investigations show that the current circulation off the shores of the Arabian Sea and Bay of Bengal changes at the time of the change of the South West monsoon to the North East monsoon when the circulation becomes anti-clockwise; but that the change of the current to clockwise circulation occurs in about February in the Arabian Sea, and in the Bay of Bengal about January, while the North East monsoon still prevails.

A possible explanation of this seasonal set of the current against the wind in the latter part of the North East monsoon has been published in THE MARINE OBSERVER and the work of oceanographers is being carefully watched with a view to use being made of other researches in this connection.

The present system whereby the supervision by an officer of the Merchant Navy of the observational work of the merchant navy, the collection of observations recorded at sea, the computation of resultants or averages, and the charting and summarizing of the same, are all undertaken in one Division specially constituted for the purpose, together with the improvement in navigation, is steadily producing advance in knowledge of ocean currents and in marine meteorology.

By means of the wireless weather registers of Selected Ships records of 16,391 sets of synchronized observations made south of the Equator in the International Ships wireless weather telegraphy code, for the years 1930 to 1933, have been sent to South Africa and Australia for the use of the meteorological services of the British Empire in the southern hemisphere.

Special copies of 23,948 sets of observations recorded at 1200 G.M.T. in British Ships in the Northern Hemisphere, in the months of September, 1932, to August, 1933, have been made and sent to Germany for the purpose of constructing synchronous weather charts during the International Polar Year.

By means of Hollerith Cards the Dutch Meteorological Office have been supplied with 17,469 sets of observations made in the China Seas in the months of January to June during the years 1921 to 1930.

Good progress has been made during the year in the plan of work commenced on 1st January, 1933, whereby all observations received in meteorological logs are being extracted upon receipt, and some recovery of arrears of extraction is being made, not only of logs received since post-war reorganization, but with logs received between 1855 and 1920.

The table below gives details:—

	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 1921-1922.
Number of complete sets of observations extracted and punched on cards, with currents entered in data books and phenomena indexed. ...	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

	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 1921-1922.
Arrears of previous years recovered during 1932-34.	—	—	—	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.	82,602	17,798	—	—	—	—	—	—	—	—	—	—	—
Current observations from 1910 extracted and entered in data books...	4,850	6,118	8,609	7,980	10,913	2,626	3,496	8,242	8,210	5,746	4,259	1,826	—

Marsden's Chart No. I gives the distribution and number of observations collected and extracted since reorganization on 1st April, 1920.

Marsden's Chart No. II shows the distribution of sets of observations collected before 1920 which have been extracted since 1st January, 1933, for the purpose of completing the meteorological survey of the oceans.

Method of Supplying observations to Meteorological services of the British Empire and Foreign Countries.

The method of supplying observations in code by means of the registers of Selected Ships, by which, as shown above, a great deal of information has been made available to other services, has advantages.

These registers are necessary in order to ensure that the reports made by wireless telegraphy by British Selected Ships, in accordance with the Convention for Safety of Life at Sea, are properly coded, and to check communication.

After the registers have been examined and any necessary corrective measures taken, as the original observations are preserved in the meteorological record, Form 911, the registers Forms 138 are available for other services.

Thus nearly all synchronized observations made by British Selected Ships at sea can be sent without much work, and with very little expense, to other services.

The Hollerith system also provides a means by which observations recorded in accordance with ships' time may be printed and supplied to other services at small cost.

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, 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.

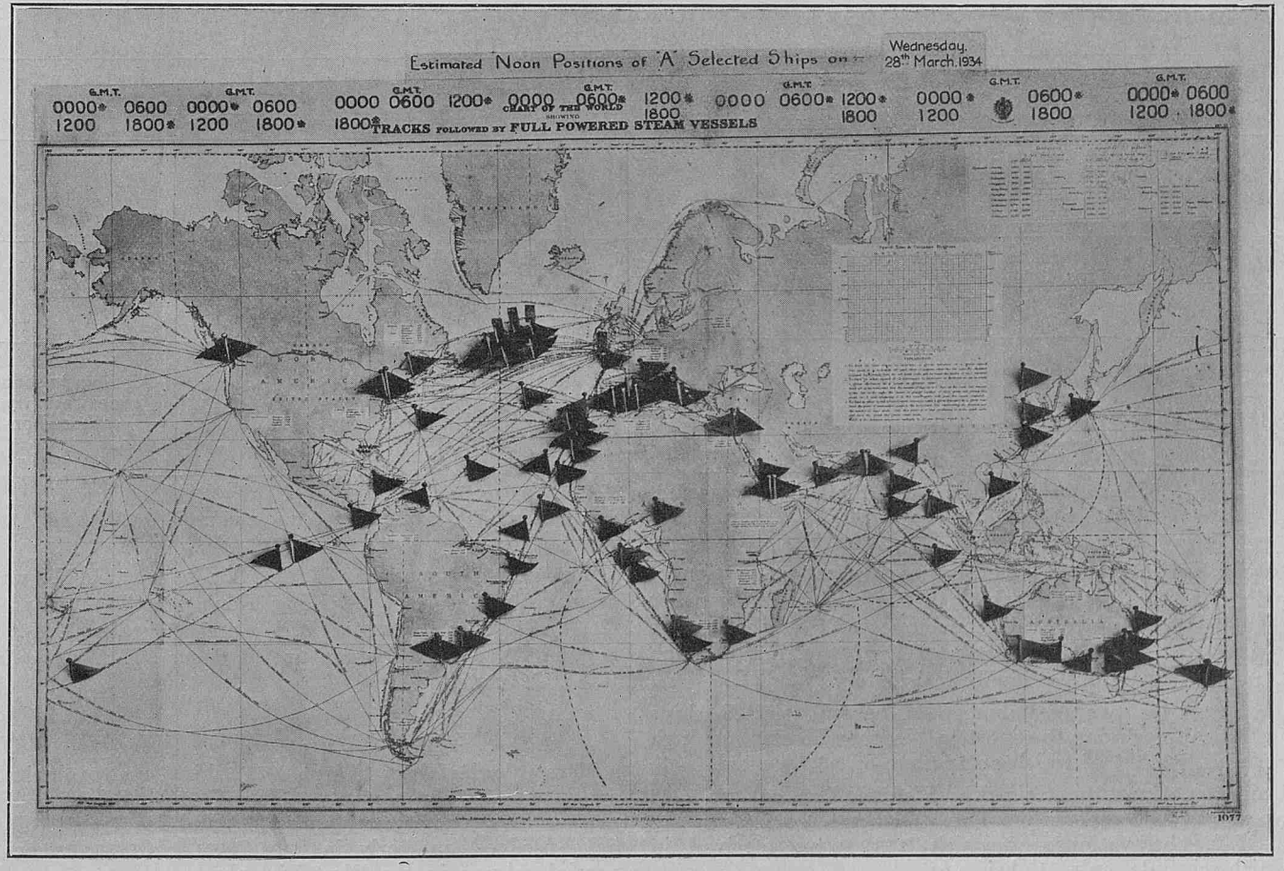
The Service of British Selected Ships.

The number of British Selected Ships was reduced from 299 to 292 on September 27th, 1933, 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, 1933, which is typical of the daily distribution throughout the year, is published herewith.

The photograph below of the position chart worked in the Marine Division shows the estimated positions of "A" Selected Ships at sea and in ports abroad, on March 28th, 1934. "B" Selected Ships are not indicated on this chart. At present the total number of "A" Selected Ships is 112.



The registers indicate that the commanders, officers and wireless operators of British Selected Ships carry out this service in a highly satisfactory manner.

Generally, the correct procedure of communicating routine wireless weather reports has been carried out by British Selected Ships, but largely owing to the inconvenience caused to British Selected Ships through reporting to a station which has since ceased to be one of those detailed to work with British Selected Ships, for a time there were irregularities in communication.

Since August there has been a marked improvement in communication, and the following table giving particulars for the month of October, 1933, for different parts of the world, indicates the satisfactory performance of "A" and "B" Selected Ships.

The remaining 1,984 reports containing 0000 and 1800 G.M.T. observations were reported not by schedule, but as circumstances would permit.

In January of this year, the description of this World wide scheme, and the instructions for the guidance of commanders of British Selected Ships and their observing officers and wireless operators were revised, clarified, and broadened, to meet the increased demands made upon the service since it was organized on May 1st, 1930.

Port Meteorological Officers and Merchant Navy Agents.

The Port Meteorological Officer and Merchant Navy Agents have carried out their work in a highly satisfactory way throughout the year.

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 time, 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. (2100 m. C.W.)	Oct. 1st to 31st, 1933.	11 "A"	133	50	41	68	24	Not known.	Not known.†
South Atlantic. Lat. 30° S. to 40° S. Long. 10° E. to 20° E. (600 m.)	Oct. 1st to 31st, 1933.	12 "B"	32	—	32	100	—	—	Not known.†
Southern Indian Ocean. PERTH, V.I.P. (2100 m. C.W.)	Oct. 1st to 31st, 1933.	8 "A"	43	27	12	91	—	Not known.	Not known.†
Southern Ocean. Lat. 30° S. to 40° S. Long. 70° E. to 80° E. (600 m.)	Oct. 1st to 31st, 1933.	1 "B"	1	—	1	100	—	—	Not known.
South Pacific. Lat. 30° S. to 40° S. Long. 170° W. to 180° W. WELLINGTON, Z.L.W. AUCKLAND, Z.L.D. (600 m.)	Oct. 1st to 31st, 1933.	4 "B"	10	1 to Z.L.D., 3 of the 9 sent to C.Q. also repeated to Weather Wellington.	9	100	—	—	Not known.†
Indian Ocean. COLOMBO, V.P.B. (2100 C.W.)	Oct. 1st to 31st, 1933.	14 "A"	139	88	31	86	19	Not known.	Not known.†
Arabian Sea. Lat. 10° N. to 20° N. Long. 50° E. to 60° E. (600 m.)	Oct. 1st to 31st, 1933.	34 "B"	116	—	93	80	2	—	Not known.†
Mediterranean Sea and Red Sea. Long. 0° to Long. 43° 30′ E. (2100 m. C.W.)	Oct. 1st to 31st, 1933.	30 "A"	327	—	250	77	32	40*	Not known.†
Eastern North Atlantic north of Lat. 38° N. worked by Roll Call. PORTISHEAD, G.K.U. (2100 m. C.W.)	Oct. 1st to 31st, 1933.	On roll call 225 "A"	450	328	—	73	181	509 All reports sent received by Weather London.	Not known.†

* Intercepted at Ismailia W.T. Station and forwarded to Meteor, Heliopolis.
† Weather Charts made on board British Ships in this region indicate that reports are received and used.

In the eastern North Atlantic, where there is great congestion of wireless traffic, and therefore the making of routine wireless weather reports is regulated by daily roll call, communicated from the Marine Division, the results of "A" Selected Ships, working through Portishead, have continued to be highly satisfactory.

During the year the average number of chosen selected ships indicated by roll call each day to report to Weather London, through GKU., Portishead, was 6·5 of which an average of 5·6 reported.

The total number of reports received by Weather London was 5,443 being an average of 14·9 reports per day. Of these, 3,459 were 0600 and 1200 G.M.T. observations, of which 3,344 were received in accordance with schedule, only 115 being late.

Lieutenant Commander E. H. C. BRANSON, R.N., was appointed merchant navy agent at Hong Kong vice Lieutenant Commander G. B. RUDYERD HELPMAN, R.N.; and Captain G. B. MERCER was appointed Joint Agent at Sydney, N.S.W., vice Captain R. G. BLAYNEY.

Acknowledgment, Appreciation and Awards.

Meteorological logs (Forms 915) ships' meteorological records of synchronized observations (Form 911) Selected Ships' W.T. meteorological registers (Forms 138) and Ice Reports (Forms 912) are acknowledged quarterly in THE MARINE OBSERVER by means of a special column in the Fleet List abreast the name of the observing

ship, with her Captain, Observing Officers, and senior W/T operator, in order that all may know who is responsible for this good work. Captains of observing ships are requested to take this acknowledgement in cordial thanks and grateful recognition to them and their observing officers and Wireless operators for the returns made and the voluntary services rendered in all parts of the world.

We now thank all again for the fine work done at sea in all parts of the world during the last twelve months, work which makes navigation safer and more economical, and contributes to the general service of the nation.

In recognition of very fine work the Meteorological Committee's awards of Specially bound volume of THE MARINE OBSERVER, in blue leather, with gilt lettering have been made to the Captains and Principal Observing Officers of meteorological log keeping and Selected Ships, whose names appear in the list which follows. A Summary of the work for the last eleven years is also given following that list.

MARINE SUPERINTENDENT.

April 5th, 1934.

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.*
ALMOND, J. G.	WILLIAMS, E. G.	*Middlesex.*
ANGIER, J.	BROOKS, R. W.	*Glengarry.*
ATTWOOD, J.	OAKLEY, J. F.	*Balmoral Castle.*
AVERN, J., Commr. R.N.R.	MILLER, L.	*Fordsdale.*
BARNETT, H.	VINCENT, J.	*Rangitiki.*
BARRON, A.	CLOSE, H.	*Edinburgh Castle.*
BESWICK, W., D.S.C., Commr. R.N.R.	NICHOLAS, H.	*Agamemnon.*
BICKFORD, C. N.	FARROW, L. H.	*Dunbar Castle.*
BONE, D. W.	MIDDLETON, A.	*Transylvania.*
BRITTEN, Sir E. T., Commr. R.N.R., R.D.	TAYLOR, E. R.	*Berengaria.*
BRITTEN, P. O.	ALLAN, H. S.	*Chitral.*
BROWN, A. H.	HILL, F. R.	*Planter.*
BROWN, J. F. S.	RICHARDS, D. H.	*Aorangi.*
BURET, T. J. C.	POPPLETON, R. H.	*Almanzora.*
BURTON DAVIES, J.	TIMBERLAKE, W. H.	*Hertford.*
CAPON, S. N.	DAY, A. F.	*Doric Star.*
CARTWRIGHT, H.	WILSON, P. C.	*City of Dieppe.*
CHRISTIE, D.	SAVILL, P.	*Coptic.*
CHRISTIE, S.	FREEMAN, J. G.	*Baronesa.*
CLARET, F. H., O.B.E., Commr. R.N.R.	MUMMERY, F.	*Minnewaska.*
CLARKE, E.	—	*Alcantara.*
CLAYTON, R. G., D.S.C., Commr. R.N.R., R.D.	SLINN, R. E.	*Highland Monarch.*
COATES, C. M.	COOKE, C. S.	*Corfu.*
COMPTON, R. W.	FREEMAN, J. G.	*Baronesa.*
COOPER, T.	LISTER, D. G.	*City of Singapore.*
COTCHING, W. A.	TRAVIS, J.	*Kaisar-i-Hind.*
CURRIE, S.	FRENCH, L. ST. J.	*Comliebank.*
DAVIES, D.	DAVIES, T. W. P.	*Fresno City.*
DAVIS, A. L.	OPPEN, F. C.	*Ixion.*
DENE, R. C.	WOOD, R. G.	*Baradine.*
DOUGHTY, J. H.	—	*Westernland.*
DRAPER, J. M.	HUTCHINGS, W. M. M.	*Appam.*
DURHAM, R. S., D.S.C.	MUNDAY, P. A. CRAVEN, L. E.	*Port Hunter.*
EGERTON, J. J.	MILNE, A. S.	*Recorder.*
EVANS, L.	LYONS, F. M.	*Alban.*
EVENS, E. H.	ROBINSON, J. C.	*Berwickshire.*
EWAN, W. B.	BROWNING, J. F. O.	*Glaucus.*
FRENCH, F. E., Capt. R.N.R., R.D.	COOKE, C. S.	*Corfu.*
FRIEND, A. B.	LOUGHEED, E. J.	*Princesa.*
FROST, C. R.	BRAMMALL, H. W.	*Duquesa.*
FULCHER, H. D.	JOHNSTON, T.	*Matheran.*
FURLONG, G. H. S., O.B.E., Capt. R.N.R., R.D.	MACLEAN, G. M.	*Ranpura.*
GALLOWAY, M.	ECKFORD, R.	*Orduna.*
GASKELL, J. H., Lieut. Commr. R.N.R., R.D.	BULL, L. R.	*Mataroa.*
GATES, T. F., C.B.E.	MCCARTNEY, H. E. D.	*Minnetonka.*
GEMMELL, W.	—	*Cameronia.*
GIBB, A. W. P.	KIRKWOOD, J. O. H.	*Banffshire.*
GIBBINGS, W. H.	EUSTANCE, W. S.	*Inanda.*
GILBERT, E. F.	HUNTER, F. A. G.	*Windsor Castle.*
GILCHRIST, J. W.	SPIERS, D. W.	*Manela.*
GILLING, W.	WALTON, A. L.	*Port Alma.*
GOODRICK, H. P.	BRADBURY, A.	*Upwey Grange.*
GORDON, H.	SANGWIN, G.	*Zealandic.*
GREEN, F. V.	SOLLY, W. F.	*Matiana.*
GRIFFITHS, E., Lieut. Commr. R.N.R.	PIGGOTT, A. H.	*Empress of Australia.*
HALL, G. S.	MOATE, J. S.	*Port Caroline.*
HANNAN, E. F., Commr. R.N.R., R.D.	DUNKLEY, J. L.	*Alipore.*
HAYTER, S. W.	GODDARD, J. C.	*Port Alma.*
HAZLEWOOD, H. W.	GAMER, R. B.	*Port Wellington.*
HEADLAM, P. C.	NANKIVELL, B. H.	*Rajputana.*
HEARN, G. W.	KNELL, A. J.	*Port Wellington.*
HERSCHEL, R. F.	STOCKLEY, E. L.	*Logician.*
HIGGS, W. G.	MUZZELL, N. M.	*Port Gisborne.*
HIGNETT, A. H., Commr. R.N.R., R.D.	KERRIDGE, R. S.	*Ranchi.*
HILL, T. V.	BILLINGHAM, J.	*Niagara.*
HOLLAND, E. A.	HILL, H.	*Remuera.*
HOLLOW, J.	SPENCER, D. T.	*Lahore.*
HOWELL PRICE, J., D.S.O., D.S.C.	FULCHER, L. W.	*Tekoa.*
HUDSON, J. J.	MCCLOUNAN, A.	*Port Darwin.*
IRVING, R. B., O.B.E., Capt. R.N.R., R.D.	DIVERS, E. A.	*Aquitania.*
JACK, H. M.	MANN, H. J.	*Carthage.*
JACOBSON, T. A.	TAYLOR, D. M.	*Cape of Good Hope.*
JOHNSON, J. W.	MORRIS, B. M.	*Taranaki.*
KELLEY, E. M. S.	STEWART, J.	*Birchbank.*
KEMP, E. R.	TIMBERLAKE, W. H.	*Hertford.*
KERSHAW, R. W.	PAISLEY, J. R.	*Mahsud.*
KINNELL, G.	WILSON, F. R. F.	*Ruahine.*
LAIRD, C. A. I.	MACMILLAN, P.	*Buteshire.*
LAIRD, J.	EDGECOMBE, C.	*Turakina.*
LATTA, R. G.	DUCK, N. W.	*Empress of Britain.*
LEE, O. J. P., Capt. R.N.R., R.D.	SAYERS, L. A.	*Stephen.*
LESLIE, G.	ELLAMS, S. G.	*Glaucus.*
LETTINGTON, A. E.	DEVITT, T. M.	*Cornwall.*
LIDBETTER, W.	SMITH, H.	*Worthing.*
LYND, W. L.	WALKER, H. B.	*Port Denison.*
MCINTOSH, A.	WINYARD, H.	*Tainui.*
MCNAMARA, T.	HAILSTONE, F. E.	*El Uruguayo.*
MCNISH, R. L. H., D.S.O., Lieut. Commr. R.N.R.	BLOCK, P. A.	*Norfolk.*
MACDONALD, D.	MADDEN, J. W. S. CRAWFORD, S. H.	*Makura.*
MALTBY, T. L.	MACKILLICAN, H. H. THOMAS, N. A.	*Cumberland.*
MARSHAM, T. B.	SANDERSON, H. H.	*Ixion.*
MARTIN, W.	BOURKE, L. P.	*Makura.*
MASON, W. S., D.S.C.	ELGAR, F. W.	*Port Dunedin.*
MATHESON, C. G., D.S.O., Commodore R.N.R., R.D.	MACKAY, E. M. PINCKNEY, C. W. C.	*Oronsay.*

Captain.	Principal Observing Officer.	Ship.
Morehouse, W. A. ...	—	*Westernland.*
Morton, A. J.	Sinclair, T. M. ...	*Mooltan.*
Moulton, E. W.	—	*Arandora Star.*
Needham, R.	Knell, A. J. ...	*Port Wellington.*
Newman, G. W. A. ...	White, C.	*Pacific Enterprise.*
Ohlson, B. J., D.S.O., Commr. R.N.R., R.D.	Baldwin-Wiseman, R. E.	*Strathnaver.*
Owen, G., Commr. R.N.R., R.D.	Gaubert, F. W. B.	*Empire Star.*
Owens, A. L., Capt. R.N.R., R.D.	—	*Orford.*
Paterson, G.	Weir, C. C. ...	*Chindwin.*
Patterson, L. D. ...	Baird, A. H. ...	*Matiana.*
Paul, H.	Paull, T. J. ...	*Tacoma City.*
Philip, A. J.	Collard, C. ...	*City of Roubaix.*
Pilcher, C. R.	Low, J. N. A. ...	*Somerset.*
Pretty, F. C., D.S.C. ...	Farrar, F.... ...	*Hurunui.*
Reilly, H. E., Lieut.-Commr. R.N.R.	Brown, A.... ...	*Cornwall.*
Reilly, J. V.	Warland, T. ...	*Nardana.*
Rhodes, H. R.	Flint, H. M. ...	*Mongolia.*
Richardson, L.	Martin, T. E. ...	*St. Julien.*
Roberts, E.	Hunter, L. L. ...	*Orcoma.*
Robinson, C. A.	Midwinter, C. E....	*Port Auckland.*
Robinson, F. W. ...	Williamson, H. P.	*Opawa.*
Robinson, R.	Tennent, W. B. ...	*Highland Patriot.*
Roche, C. B.	Flint, H. M. ...	*Mongolia.*
Rome, W. B.	Noble, J.	*Tuscania.*
Ross, J.	Bridson, R. ...	*Reina del Pacifico.*
Rowlands, W.	Cabbon, J. W. ...	*City of Auckland.*
Scutt, W.	Cameron, H. ...	*Australia.*
Shooter, J. C.	Ellis, R. B. ...	*Accra.*
Short, C. E.	Physick, E. P. ...	*Balranald.*
Sibbons, H.	Outram, L. ...	*Duchess of Bedford.*
Siggers, O.	Bateman, G. ...	*Chitral.*
Smart, R. W.	Adam, J. F. ...	*California.*
Smith, H. Elliott, Lieut. Commr. R.N.R.	McHattie, A. J. ...	*Cathay.*
Smith, W. D. C.	Wood, R. G. ...	*Baradine.*
Stuart, R. N., V.C.,D.S.O., Commr. R.N.R., R.D.	Gillett, T. L. ...	*Duchess of York.*
Sudell, F.,Commr. R.N.R. R.D.	Young, J. W. ...	*Narkunda.*
Summers, F. F., Commr. R.N.R., R.D.	Walker, J. H. ...	*Georgic.*
Taylor, F. J.	Steele, W. ...	*British Admiral.*
Thomas, B. D.	Davies, T. W. P. ...	*Fresno City.*
Thomson, S.	MacColl, J. A. C....	*Arracan.*
Townshend, W. P., Capt. R.N.R., R.D.	Hand, R. H. ...	*Strathaird.*
Trant, E. L.	O'Brien, R. B. ...	*Majestic.*
Trinick, F.	Sharman, L. ...	*Tactician.*
Turnbull, J., C.B.E., Commodore R.N.R.,R.D.	Bubb, J. R. ...	*Montclare.*
Upton, H. L., D.S.C., Commr. R.N.R., R.D.	Cathie, C. B. ...	*Northumberland.*
Vaughan, P. R., D.S.C., Commr. R.N.R., R.D.	—	*Britannic.*
West, W. F.	Crosscombe, H. R.	*Clan Mactaggart.*
White, R. W.	—	*Karapara.*
Wilde, J. H.	Trotter, J. ...	*Westmoreland.*
Wiles, N.	MacColl, J. A. C....	*Arracan.*
Williams, G.	Allen, J. G. ...	*Tamaroa.*
Williams, H.	Spurling, E. J. ...	*Balranald.*
Williams, J. V.	Mercer, L. ...	*Tasmania.*
Williams, R.	Trotter, J. ...	*Cambridge.*
Williams, R.	Bettess, R. ...	*Port Adelaide.*
Wood, C., D.S.C. ...	Pattison, R. ...	*Themistocles.*
Woodhead, T. H. ...	Robinson, H. ...	*Rother.*
Wyatt, F. N.	Rigden, H. T. ...	*Bendigo.*
—	Ardley, R. A. B. ...	R.R.S. *Discovery II.*
—	Reeves, W. D. L....	*Mashobra.*

DETAILS OF VOLUNTARY OBSERVING FLEET AND SUMMARY OF COLLECTION AND EXTRACTION OF DATA FOR LAST ELEVEN YEARS.

	At 31st March										
	1934.	1933.	1932.	1931.	1930.	1929.	1928.	1927.	1926.	1925.	1924.
No. of M.L. Ships	50	49	65	101	120	123	123	122	124	125	130
No. of Form 911 Ships	304	300	307	386	355	364	373	369	366	363	353
No. of Stationary Training Ships and Light Houses ...	5	10	10	10	10	10	10	10	10	10	10
Total No. of Observing Ships	359	359	382	497	485	497	506	501	500	498	493
No. of Form 911 Ships with whole or part Meteorological Office instrumental equipment ... ... S.	183	169	126	93	31	31	32	29	31	32	21
C.C.	9	10	10	10	10	10	10	10	10	10	10
No. of Selected Ships	292	299	306	312	290	289	268	—	—	—	—
No. of ships with Instruments on Board : returns overdue	0	0	0	1	0	0	0	0	0	0	0
No. of Coast Stations and Light Vessels equipped with instruments for Form 914.	18	18	18	30	31	31	32	32	34	34	35
No. of Barometer errors ascertained or checked	1,169	1,190	1,355	1,357	1,192	1,362	1,398	1,426	1,560	1,474	1,368
Meteorological Logs	122	126	221	285	286	275	279	274	264	274	256
Ships' Meteorological Records (Forms 911)	2,352	2,169	2,660	2,686	2,375	2,290	2,261	2,095	2,091	2,189	1,785
Forms 914 (Coast Observations)	216	216	353	363	372	371	383	367	406	402	404
No. of Wireless Weather Reports addressed to Weather London received through Portishead.	5,443	5,064	5,175	5,206*	—	—	—	—	—	—	—
Light-house Registers...	13	9	17	8	18	10	12	10	15	14	14
Home Waters Telegraphic Reports	838	972	875	720	701	751	773	674	767	802	820
Cadets Meteorological Log	9	7	11	8	9	9	7	10	9	9	9
Data Extraction.											
Logs collected since 1920 extracted	131	191	175	50	41	100	166	174	170	142	165
Logs collected before 1920 extracted	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.

CURRENTS ON THE WEST AND NORTH WEST COASTS OF AUSTRALIA.

THE following remarks have been received from Captain J. J. AIREY, Deputy Director of Navigation, Western Australia.

Phenomenal sets have, on many occasions, been experienced on this coast, but it is extremely difficult with the large rise and fall of tide prevailing on the north-west portion of the coast, to be definite on the point as to whether this set is attributable to tidal or ocean current influences.

In this connection I attach a summary of currents recorded in the Log-book of the Lighthouse steamer, *Kyogle* during the years 1929-31.

The strong currents prevailing on approaching the coastline near Fremantle are well known, the best example of which is that reported by the cable steamer *Patrol* in 1924 already published in THE MARINE OBSERVER of June, 1925.

It has also been reported on several occasions that strong southerly current or set towards the land is experienced at times off the west coast, between Cape Couvier and Bernier Island, particularly when approaching the Geographe Channel. This usually occurs prior to westerly or north-westerly winds. At the same time instances have occurred of vessels being set considerably ahead of their reckoning when bound south against prevailing southerly winds by the unusual set of the current when approaching this locality.

The currents experienced along the coast to the eastwards of North-west Cape are, I believe, in the absence of any definite recorded observations, tidal only, doubtless affected in direction by the configuration of the land and outlying islands.

I regret that I am unable to furnish more accurate information on these currents but very few observations of these have been made close along the coast.

Apart from the ocean currents, the tides on the north-west portion of this coastline are a subject which will probably require years of observation and study. Their behaviour is interesting from a scientific stand-point as well as of extreme importance to the navigator.

For instance, it is difficult to understand, or account for the fact that while there is but a small difference in time between the time of high water, full and change, at Onslow and all the other places on the north-west coast of this State to as far as Boudin Island (a stretch of considerably over 800 miles), there is a difference of about seven hours in time to high water, full and change, between the last-named island and Revely Island, these two islands, Boudin I. and Revely I., being about 165 miles apart.

Presumably the tidal wave is affected in some way by the equatorial ocean currents and the configuration of the coastline.

Australia—West and North-West Coast.

Currents recorded in log book, lighthouse steamer *Kyogle*, 1929—1931.

Date.	Locality.		Current Set.	Rate.
	From	To		
18.4.29 ...	Freemantle.	Geraldton.	S.W.	1·5 kts.
26.5.29 ...	Darwin.	11°16′S., 130°46′E.	S.E.	1·5 „
1.8.29 ...	Jarman Island.	Bedout Island.	N.E.	1·0 „
6.8.29 ...	Cape Bossut.	Broome.	S.W.	2·0 „
8.8.29 ...	Broome.	Cape Leveque.	S W.	2·0 „
15.8.29 ...	Medusa Bank.	Point Charles.	West	0·5 „
10.9.29 ...	Darwin.	12°18′S., 130°21′E.	N.W.	1·5 „
17.9.29 ...	Broome.	18°00′S., 121°58′E.	S. 60°W.	1·0 „
6.11.29 ...	Broome.	17°59′S., 122°09′E.	S. 50°E.	2·5 „
8.11.29 ...	16°40′S., 122°37′E.	Cape Leveque.	N. 45°E.	1·5 „
22.3.30 ...	Eclipse Island.	34°40′S., 115°25′E.	East	2·0 „
21.5.30 ...	Broome.	Cape Leveque.	N.E.	1·0 „
5.6.30 ...	Darwin.	12°03′S., 131°13′E.	N.E.	1·5 „
14.6.30 ...	Darwin.	12°33′S., 130°13′E.	N.W.	1·5 „
29.6.30 ...	Denham Channel.	Inner Bar, Shark Bay	N.W.	1·5 „
15.8.30 ...	Broome.	Cape Leveque.	N.E.	2·0 „
26.8.30 ...	Darwin.	12°25′S., 130°47′E.	N.W.	4·0 „
20.11.30...	Cape Don.	11°46′S., 131°35′E.	N. 20°W.	3·0 „
8.5.31 ...	Broome.	Cape Leveque.	N E.	2·0 „

CURRENT RIPS.

Caribbean Sea.

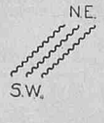
THE following is an extract from the Meteorological Record of S.S. *Inanda*, Captain W. H. GIBBINGS, Trinidad to Grenada B.W.I. Observer, Mr. D. C. BROWN, 3rd officer.

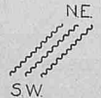
12th September, 1933, after clearing Boco de Huevos and entering open sea, a series of confused current rips were observed through which the vessel passed.

At 10.25 a.m. A.T.S. the first rip was encountered, sea at time of observation being slight. This rip which was running was of moderate intensity, and though the water was very broken, making a great noise as the vessel passed through it at an angle of 45°—it did not affect the helm in the least. At 10.28 a.m. A.T.S. vessel ran out of this first rip into perfectly calm water; on looking aft the disturbed water stretched as far as the eye could see.

At 10.32 a.m. A.T.S. vessel encountered the second rip, which could be seen approaching rapidly. This rip ran the vessel steering North (true) at the time was very soon through it (3 minutes), and except for a great deal of noise caused by the moderately rough sea occasioned by this rip, the vessel was quite unaffected. After this, perfectly calm water was again encountered, lasting for five minutes.

At 10.38 a.m. A.T.S. the third rip was encountered, running This appeared more like a bore than a tide rip, the sea was whipped up and the advancing waves were a full 5—very rough (Douglas scale). On meeting this the vessel's head swung rapidly to starboard and had to be checked quickly by liberal use of the port helm. This rip lasted exactly five minutes and stretched as far as could be seen. At 10.42 a.m. A.T.S. vessel ran out of this heavy rip and once again into perfectly smooth water. Thereafter small rips were encountered running in a general direction till 10.57 a.m. A.T.S. when no more were observed.





During the above periods the specific gravity of the water, which was of a dark green colour, was taken, the result being 1008. In Port of Spain at anchor two hours earlier the S.G. there had also been taken which gave 1010. The total set and drift experienced during this passage—distance 98 miles was—N.4°E. 10·5 miles.

Weather at time of observation:—Wind N.E. force 3. Slight sea and moderate E'ly swell. Air 83°. Sea 84°, Ci.-Cu. 2, Ci. 2.

Position of ship Latitude 10° 57′ N. Longitude 61° 45′ W. Course N. speed 14·6 knots.

PHOSPHORESCENCE.

South Atlantic.

THE following is an extract from the Meteorological Record of S.S. *Director*, Captain B. WORTHINGTON, London to South Africa. Observer, Mr. A. S. ROGERS, 3rd officer.

On August 26th, 1933, from 2325 to 2345 G.M.T. (11.05 to 11.25 p.m. at ship) we passed through large quantities of brilliant phosphorescence, lying mainly athwart the wind. Looking ahead, this gave the appearance of the ship being in heavy sweeping seas caused by a strong gale and that we would be swept by them at any moment. The brilliance was so strong as to obliterate the horizon. Temperatures Air 73°, Sea 72°. Wind S.E. by S., force 4. Swell S.S.E. 5.

Position of ship: Latitude 7° 07′ S. Longitude 4° 09′ W.

WHITE WATER.

Timor Sea.

THE following is an extract from the Meteorological Record of S.S. *Orari*, Captain J. G. ALMOND, Aden to Thursday Island. Observer, Mr. A. G. ROBINSON, 3rd officer.

On August 28th, 1933, early a.m., 150 miles east of Timor Island and to the northward of Sahul Bank, observed phenomenal luminosity of the sea water.

Vessel at the time was steering 069 degrees at 14·0 knots bound Torres Strait, weather was very fine and clear, with light easterly breeze, slight sea and no swell. Temperature of the air 79°, sea 80°, no moon, but stars very clear and visible almost to the horizon.

Phenomenon was first observed at midnight August 27th by a lightening in the sky to the eastward (a reflection from the sea on alto-cumulus cloud); this rapidly extended over the whole sky, the vessel entering dull luminous water at 00.30 A.T.S. August 28th in Latitude 9° 33′ S., Longitude 127° 56′ E.

By 01.00 A.T.S. the sky was inky black, no clouds and stars showing very bright; the sea in all directions was a bright consistent milky-white colour showing up the horizon clearly and lighting up the ship and atmosphere to the brilliancy of a full moon.

Speed was reduced and soundings taken as it appeared that the vessel might be in very shallow water, but no bottom was obtained at 120 fathoms.

The water during this period did not appear to be lit by phosphorescence but as if by some powerful light at a considerable depth, the water having a strange transparent look and the bow wave showing dark in comparison to the water below, the whole effect being most extraordinary.

These conditions continued with little change till 02.40 A.T.S. in Latitude 9° 24′ S., Longitude 128° 31′ E., when the sea became normal, the luminous bank passing to the westward showing up the western horizon and sky clearly as if lit by a full moon until 03.00 A.T.S.

Air and sea temperatures and density remained unchanged throughout, 79°, 80° and 1023·0 respectively.

WEATHER CHARTS MADE IN WEST INDIAN HURRICANE REGION.

A valuable aid to safe navigation.

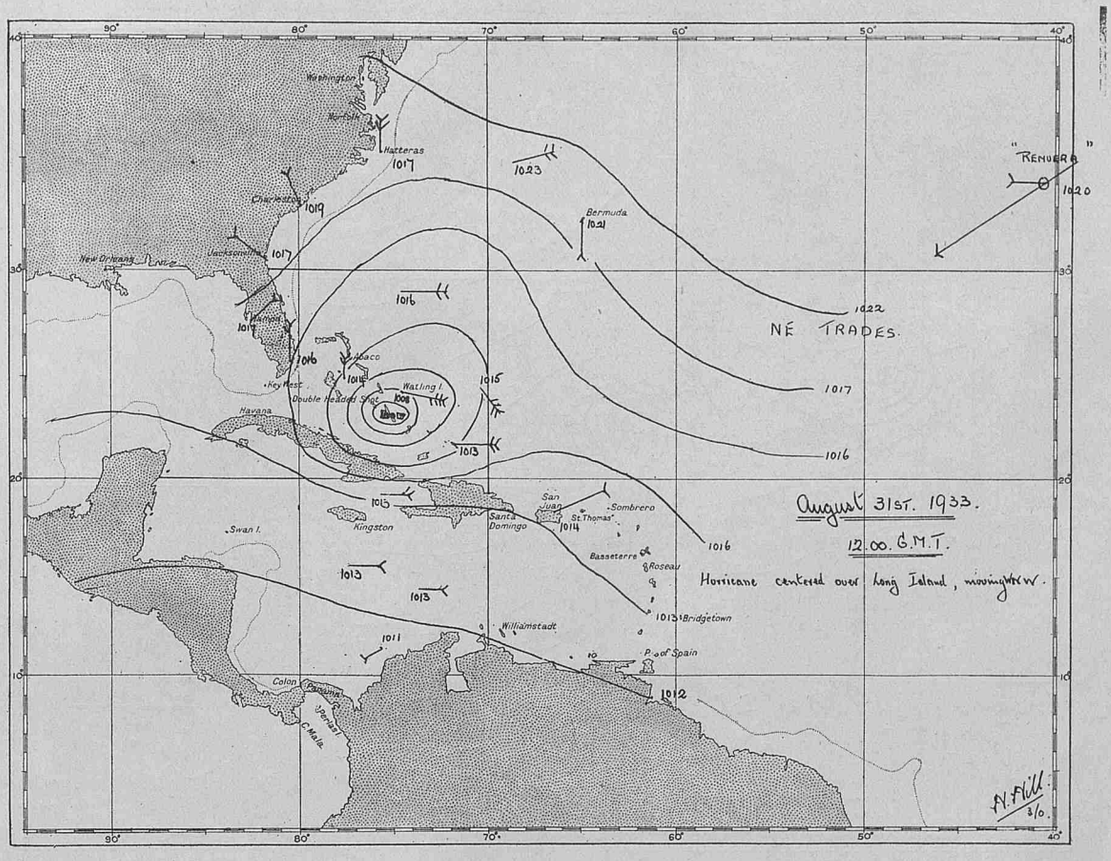
REMARKS and Weather Charts returned with the Meteorological Log of R.M.S. *Remuera*, Captain E. HOLLAND; Principal Observing Officer Lieutenant H. HILL, R.N.R., 3rd officer, which are good evidence of the value to safe navigation of information of hurricanes at a great distance.

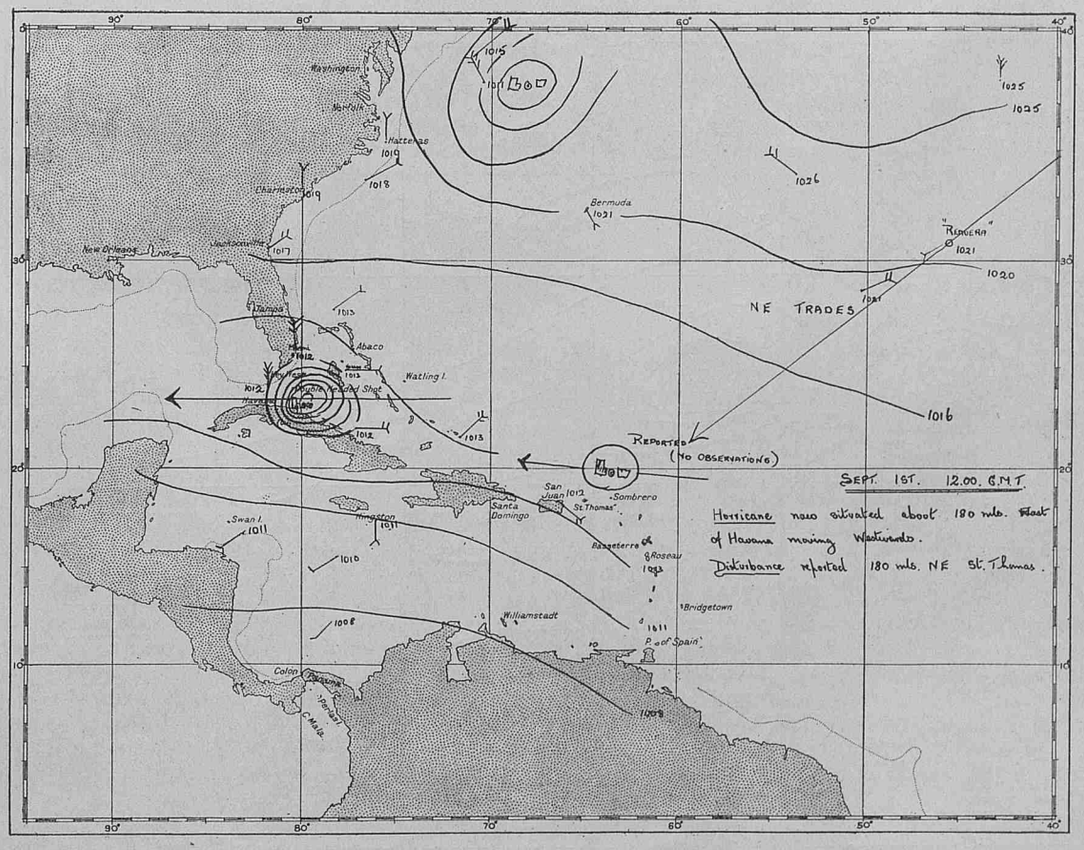
The accompanying weather charts from August 31st to September 4th, 1933, were made from weather reports collected at 1200 G.M.T.

As we were some distance from the West Indies and making for the Sombrero Passage, no alteration of course or speed was made as the hurricanes had passed over and were well clear of our intended route. Had we however been calling at Jamaica and using the Turks Is. or Crooked Is. passages, a considerable alteration would have been necessary.

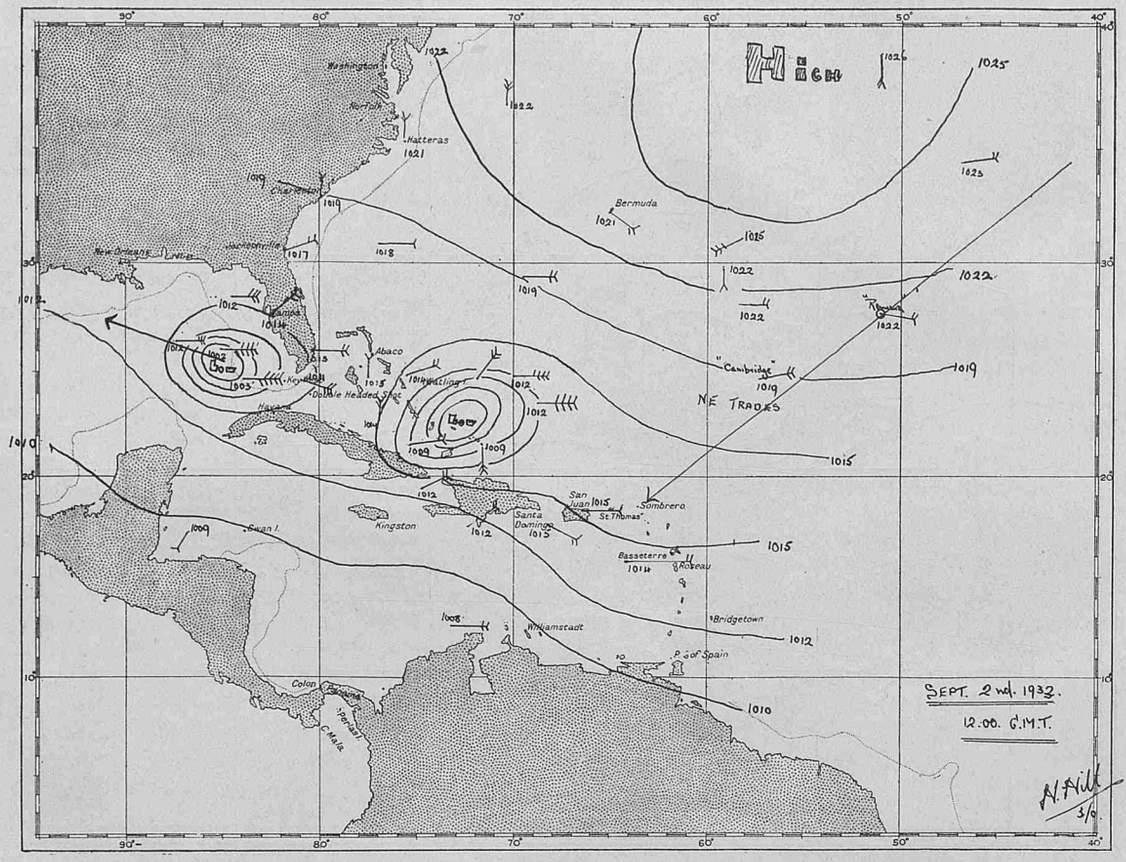
These reports and charts gave us valuable information and a clear sense of the conditions prevailing in the Hurricane area with the exact positions of the storm centres and their tracks.

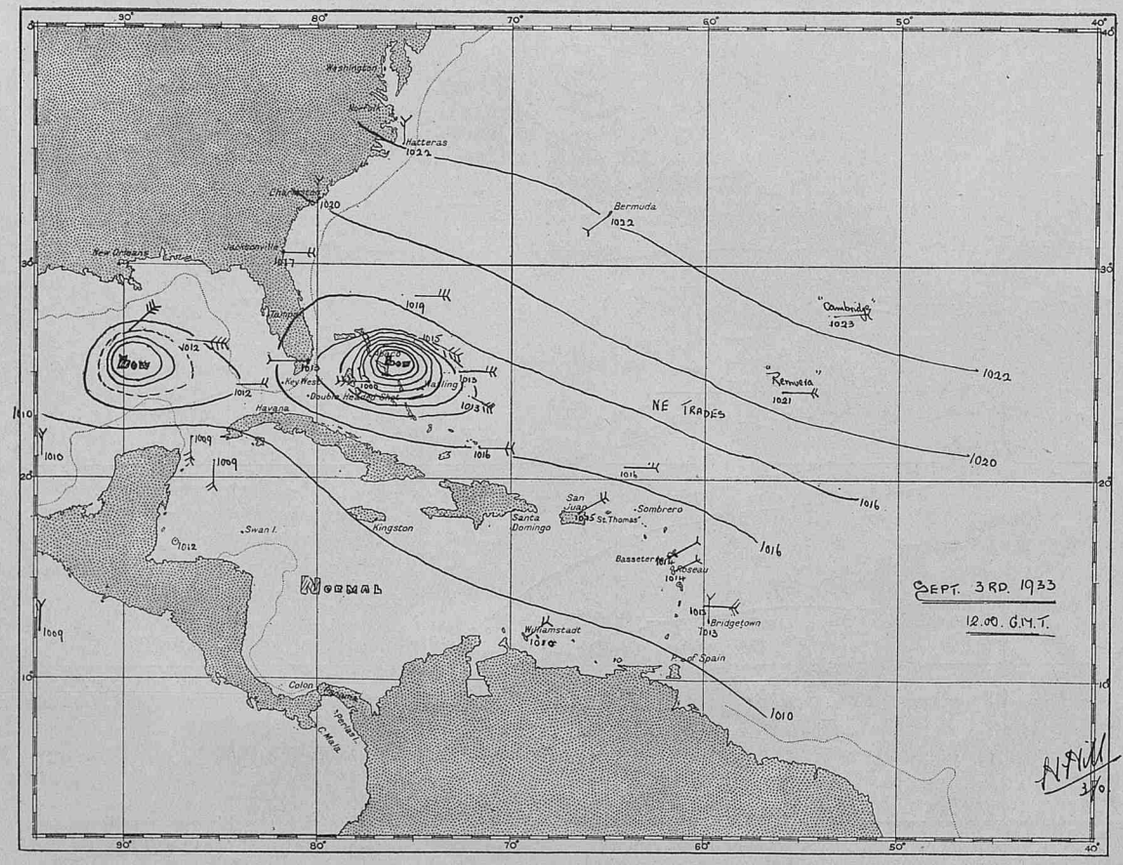
Weather Charts made in West Indian Hurricane Region—*continued.*



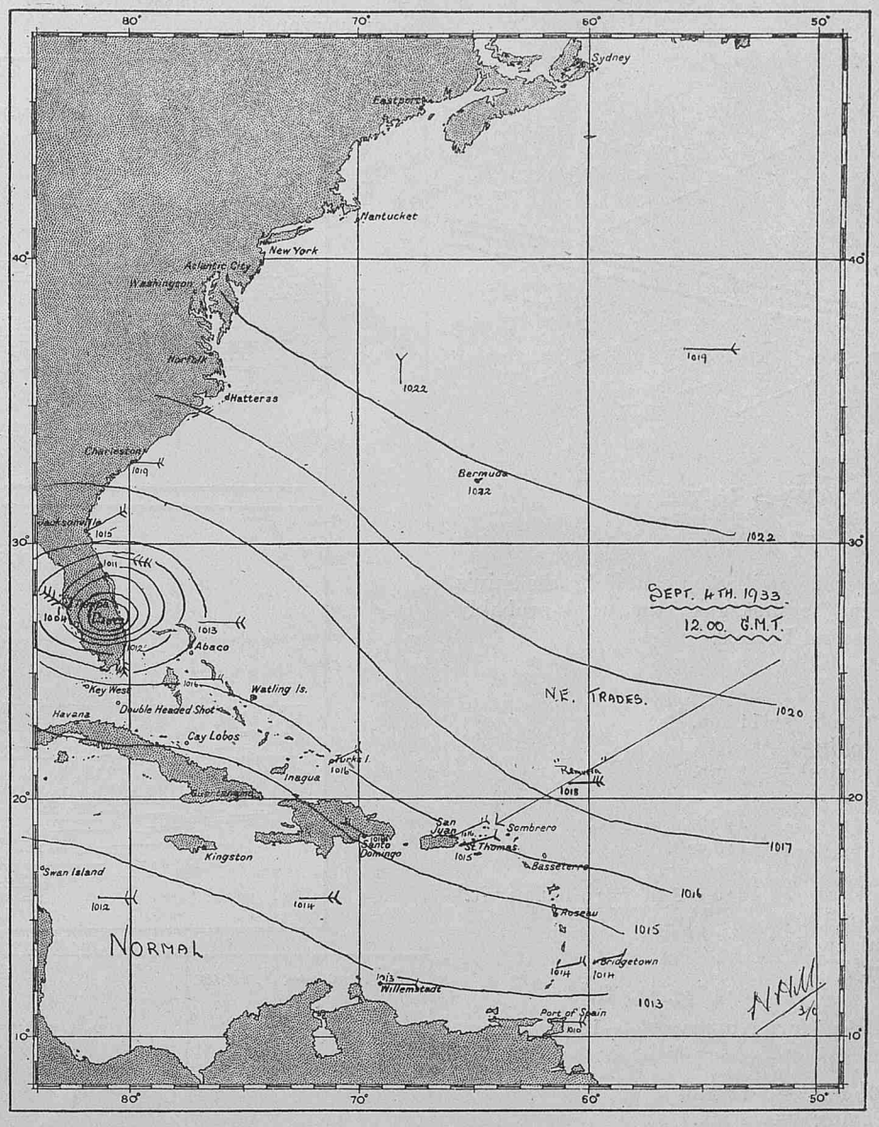


Weather Charts made in West Indian Hurricane Region—*continued*.





Weather Charts made in West Indian Hurricane Region—*continued.*

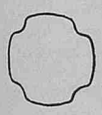


THUNDERSTORM.

Majorca.

THE following is an extract from the Meteorological Record of S.S. *Kemmendine*, Captain R. B. REID, at Anchor off Palma, Majorca. Observer, Mr. A. R. MCPHERSON, 4th officer.

September 21st, 1933, at 1240 G.M.T. while anchored off Palma, Majorca, the hill tops were observed to become covered with cumulo-nimbus which quickly spread to the southward, covering an otherwise cloudless sky from horizon to horizon and partially obscuring the sun. Thunder rolled incessantly for about four minutes accompanied with frequent flashes of vivid lightning while hail stones of about $\frac{3}{4}$ inch in diameter and $\frac{1}{4}$ inch depth continued to pour down. These were perfectly flat on one side and slightly concave on the other and resembled compressed snow. They gradually increased in size until they were the size of hen eggs and on examination were found to have comparatively soft centres of opaque ice shaped thus :—



while the ice surrounding this was remarkably transparent, the surface being deeply dented.

The wind which had been force 2 continued to blow steadily from N.N.W. increasing to force 5, while the glass stood at 29·60 in. Air temperature 74°.

By 1250 G.M.T. the squall had taken off and the weather conditions were as before—light breeze, slight sea, clear, fine weather.

PUMPING OF BAROMETER.

N.W. coast of Spain.

THE following is an extract from the Meteorological Record of S.S. *Moldavia*, Captain C. H. C. ALLIN, London to Mediterranean. Observer, Mr. J. K. CRONE, 2nd officer.

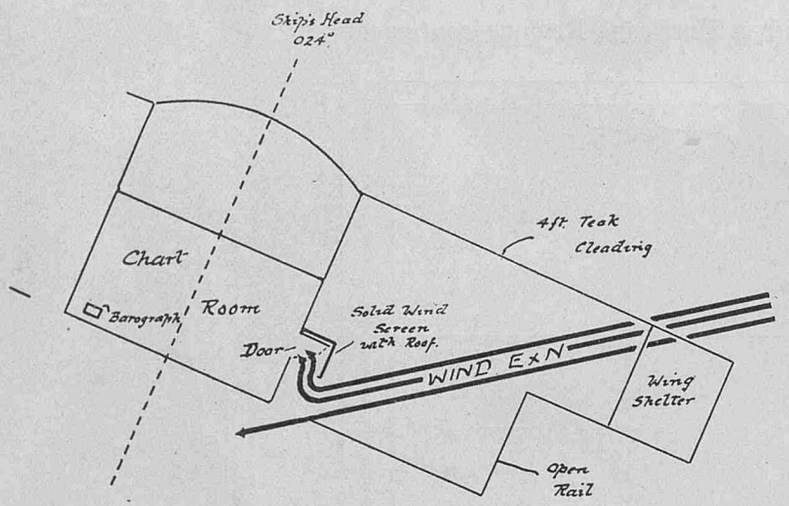
1st August, 1933, departure Coruna, was made at 2023 G.M.T., and after clearing Cape Prior, wind increased in force until at 2300 approx., it was estimated as E. by N. force 8 at times.

The weather door of the chartroom was open and the lee one closed, and it was noticed that the barograph was pumping to an unusual degree, due apparently to the fierce gusts of wind. In addition, the variations in the air pressure inside the chartroom could be felt on the drums of one's ears.

The weather door was then shut, and the lee door opened, and it was found that the oscillations of the arm decreased to about 2 mb., that is, the average caused by the movement of the ship in a heavy sea.

It appears, then, that the barograph under these conditions was acting as an anemometer, and that the oscillations above the mean graph gave the increase of pressure due to the gusts of wind. At 2245, approx., one isolated gust caused an excessive oscillation between 1020 and 1031 mb. Thereafter, they appear to have become more uniform and to have increased until 2315, approx., when they were between 1022 and 1029½ mb.

From this information, a rough calculation has been made to ascertain the probable increase of wind force in the two gusts,



— PLAN OF BRIDGE —
showing Path of Wind.

allowance being made for the average oscillation caused by the ship's movement. This shows that in the first gust, the wind probably attained Force 9-10, and in the second Force 8.

Gust at 2245.

Range ... 1020 — 1031 mb. = 11 mb.
Oscillation caused by lurching (assumed to synchronize) = 2 mb.

9 mb.
Half Range = 4·5 mb.

Extra pressure = $\frac{14{\cdot}5 \times 144 \times 4{\cdot}5}{1000}$ lbs. per ft.^{2}
(assuming Pressure of 1000 mb. is equivalent to 14·5 lbs. per in.^{2})
= 9·4 lbs. per ft.^{2}

Equivalent Beaufort Number = 9–10.

Gust at 2315.

Range ... 1022 — 1029½ mb. = 7½ mb.
Oscillation caused by lurching = 2 mb.

5·5 mb.
Half Range = 2·7 mb.

Extra pressure = $\frac{14{\cdot}5 \times 144 \times 2{\cdot}7}{1000}$ lbs. per ft.^{2}
= 5·6 lbs. per ft.^{2}

Equivalent Beaufort Number = 8.

MIRAGE.

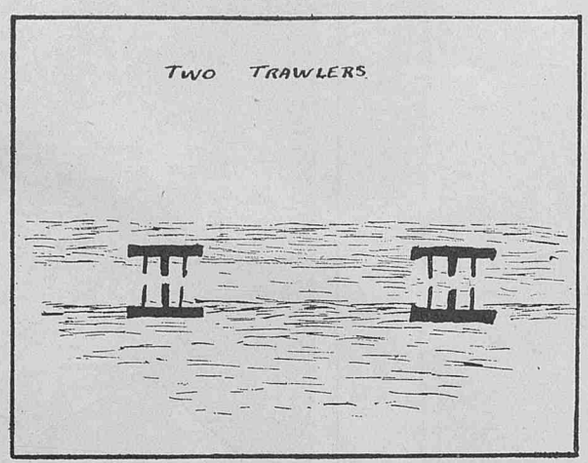
Bristol Channel.

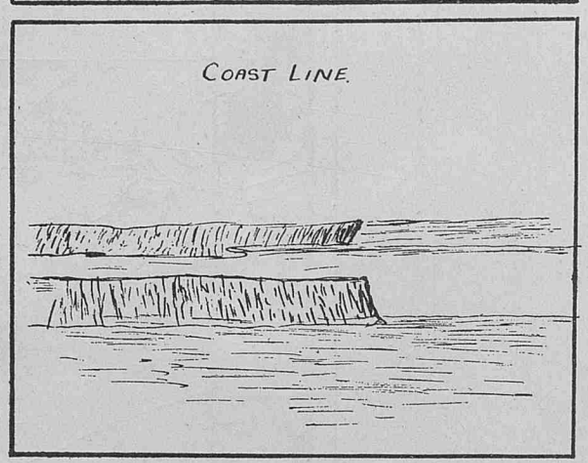
THE following is an extract from the Meteorological Record of S.S. *Harmonides*, Captain F. R. ELWELL, Cardiff to Colombo via Cape of Good Hope. Observer, Mr. E. E. AVERY, 3rd officer.

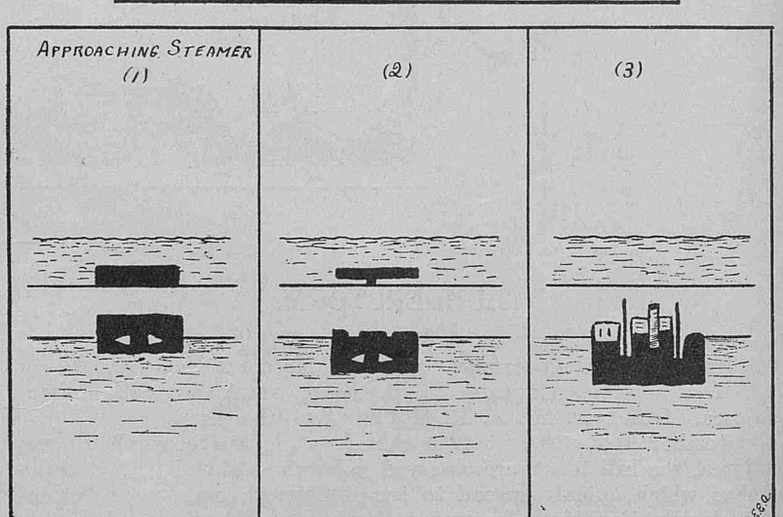
On July 4th, 1933, at 1805 G.M.T., within sight of St. Govens Light Vessel and steering S.E. to pass one mile south of same, experienced very abnormal refraction causing remarkable distortion of vessels and coast-line.

Air temperature 68°, sea 59°. Wind Northerly variable force 2. Upper clouds, scarce Cirrus, no middle or lower, smooth sea. Phenomenon first became apparent as a strip of the horizon raised above the normal demarcation being more clearly defined to the North and fading into haze to the South.

St. Goven Light Vessel was first observed when just below the lower horizon.







Vessels approaching from the Eastward appeared as square blocks when first observed on the raised horizon; gradually changing form until bisected by the blank area between horizons.

At 3 miles distant such vessels presented extremely peculiar appearances having elongated funnels and upper-works.

To the S.E. two trawlers were observed as being inverted upon themselves funnel to funnel, double horizons in this vicinity were not clearly defined.

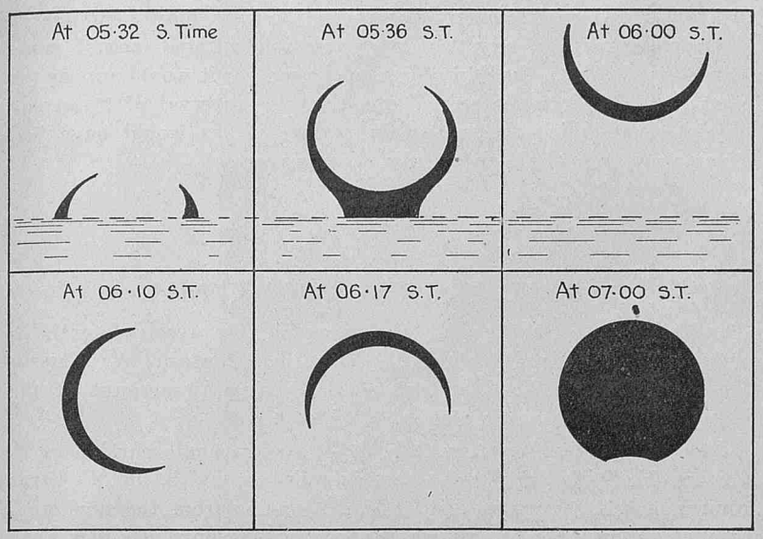
The cliff coast-line to the North appeared as being of double height, and divided by the extended vacant area between horizons.

These conditions continued until approximately 1830 G.M.T. when visibility became normal, with the exception of a slightly wavy horizon.

PARTIAL ECLIPSE OF THE SUN.

Mediterranean Sea.

THE following is an extract from the Meteorological Record of S.S. *Mongolia*, Captain C. B. ROCHE, London to Australia. Observer, Mr. H. M. FLINT, 3rd officer.



August 21st, 1933, in Latitude 32° 34½′ N., Longitude 29° 36½′ E., amplitude E.14° to 6° N., position fixed by stellar observations at sunrise at 05.03, the ship being in the direct path of an annular eclipse, and the first contact having taken place before sunrise the sun rose in the form of two horns as illustrated. The black portions represent parts of sun not eclipsed at various stages. The changes which took place between the different observations were rapid, as will be noticed by the approximate times given, with the exception of the last, between 06.17 and 07.00, when the moon passed slowly down across the face of the sun until the end of the eclipse at 07.03½.

At the last contact of 5 hrs. 3 m. 51 s. G.M.T. the R.A.'s of sun and moon being only 1 minute different it was possible to take an altitude of lower limb of sun and upper limb of moon —19° 07′ 50″ (uncorrected). Calculations of both lower limb of sun and upper limb of moon gave intercepts differing by 0.2′. Hence a definite check was obtained on ship's position, Position Line 177.4°, cutting position 32° 18.5′ N., 30° 01.6′ E. at 07.03½ ship's time.

NOTE.—The ship was not quite in the direct path of the central phase of the annular eclipse, but a little to the south of it. The eclipse was visible therefore as a large partial eclipse, but the complete ring formation was not observed.

HALO PHENOMENA.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Orduna*, Captain M. GALLOWAY, Havana to Bermuda. Observer, Mr. R. D. ECKFORD, 4th officer.

The sketch herewith gives a rough idea of the appearance of the moon July 12th, 1933, at 0340 G.M.T.

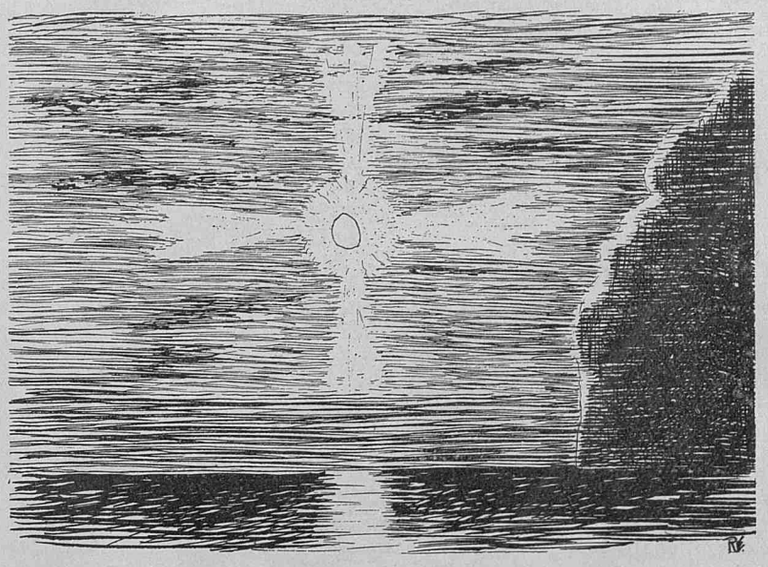
The rays were of white light; the aureole pale orange, deeper nearer the moon's limb.

Clouds in view at the time were Cu. 1/10, Cu.-Nb. 2/10, bearing S.E.; heavy and black; lighted at the edge adjacent to the moon. Frequent jagged lightning in this quarter. Cirrus scarce, some of which crossed the upper ray.

The following measurements were made by sextant:—Moon's altitude 12¼°. Upper ray approx. 7°, Lower ray 5½° approx. Left 9° approx. Right 9½° approx. Moon's bearing 096°. Diameter of aureole about 3½ times moon's diameter.

Position of ship Latitude 30° 27′ N., Longitude 68° 17′ W. A.T.S. 11d. 23h. 00m.

NOTE.—The phenomenon observed was that of the "cross" which is occasionally, but not very commonly, seen. The horizontal rays form a part of the mock moon ring, which if fully developed would be seen right round the sky, parallel to the horizon. The vertical ray is a moon pillar, similar to the sun pillar which is sometimes observed near the time of sunset.



UNUSUAL LUNAR HALO.

North Indian Ocean.

THE following is an extract from the Meteorological Record of S.S. *Mantua*, Captain J. M. LEGG, Colombo to Yokohama. Observer, Mr. J. E. HEATH, 4th officer.

11th September, 1933, 2100 observed halo round moon. The moon was about half full. It was seen that radius of halo was nearly twice as large on the circular side than on the "straight" side of the moon—where the edge of the halo appeared to be parallel to the moon. At 2200 the halo had become normal, the radius becoming constant, and the halo completely circular. Clouds Cu. and St.-Cu. amount 8.

Position of ship: Latitude 6° 00′ N. Longitude 86° 10′ E.

NOTE.—Haloes which are not circular have been occasionally observed but must be classed among the rarer phenomena.

METEOR.

North Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Ruahine*, Captain G. KINNELL, Plymouth to Curaçao. Observer, Mr. F. R. F. WILSON, 3rd officer.

27th July, 1933, at 2346 G.M.T. (9.00 p.m. Sat.) observed bearing Southwest at an altitude of about 25°, a meteor of orange hue moving very slowly across the heavens in an Easterly direction at the same time gaining in brilliancy and slowly losing altitude.

When bearing about South the colour changed, in one second, to a vivid emerald green and the meteor was then seen to splutter and throw off bright orange fragments, the latter falling to an altitude of about 12° before disappearing.

Finally after slowly moving to a bearing of about Southeast this object was lost to sight at an altitude of about 15°.

A remarkable fact of this meteor was its very slow progress, it taking about fifty seconds to change its bearing from South to Southeast; the total time it was visible being about one minute ten seconds.

Another exceptional feature was its rapid change of colour, namely from orange to green.

During this phenomenon the path was clearly defined by a luminous brown trail which remained visible quite some thirty seconds after the meteor had disappeared.

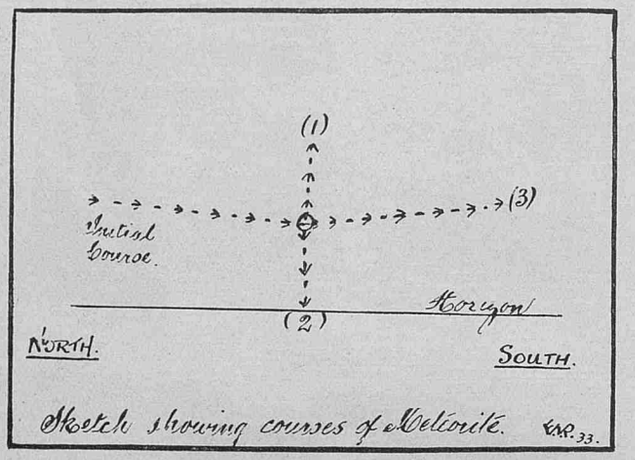
The sky at the time was cloudless. Air temperature 77°. Light southerly breeze. Visibility excellent. All bearings given are true.

Position of ship: Latitude 34° 29′ N. Longitude 41° 04′ W.

METEOR.

Red Sea.

THE following is an extract from the Meteorological Record of S.S. *Clan Sinclair*, Captain H. EVANS, Suez to Bombay. Observer, Mr. F. W. ROBERTSON, 3rd officer.



On the evening of August 26th, 1933, at 11.33 p.m. at ship, an exceptionally brilliant and very large meteor was observed to traverse a clear sky in a southerly direction from a point close to Vega.

After being visible for approximately three and a-half seconds, it burst into three portions, causing a very bright flash, and illuminating the district as would a nearby flash of lightning, but with very little dazzling effect.

The smallest part (1, in sketch) was thrown almost vertically upward, and extinguished within one second. The second part (2) about twice the size of the other, went earthward (or seaward) and *appeared* to go into the sea, while the main body (3) now half its original size (now about the size of "Venus" at its brightest) proceeded in a slightly upward direction, increasing in brilliance till it extinguished about two and a-half seconds later (at a point 150° South of that where it was first observed) leaving for nineteen seconds, a long stream of brilliant gases, which appeared to expand and change colour from the bright yellowish white, to pink red and various shades of blue.

From beginning to end the body appeared to travel very slowly.

Just as the luminous trail had disappeared, the observer had a strange sensation in the ears, similar to that experienced when a gun is fired, but no sound was actually heard, and it is left to more expert knowledge to say whether this was or could be due to the bursting of the fireball some 23 seconds previously.

NOTE.—The sensation of pressure in the ears may sometimes be experienced as the result of an explosion without actual sound being heard. From the description of the meteor it would appear that part of it fell into the sea. From the time interval of 23 seconds, the point at which the meteor burst into pieces would have been about four and a-half miles from the observer.

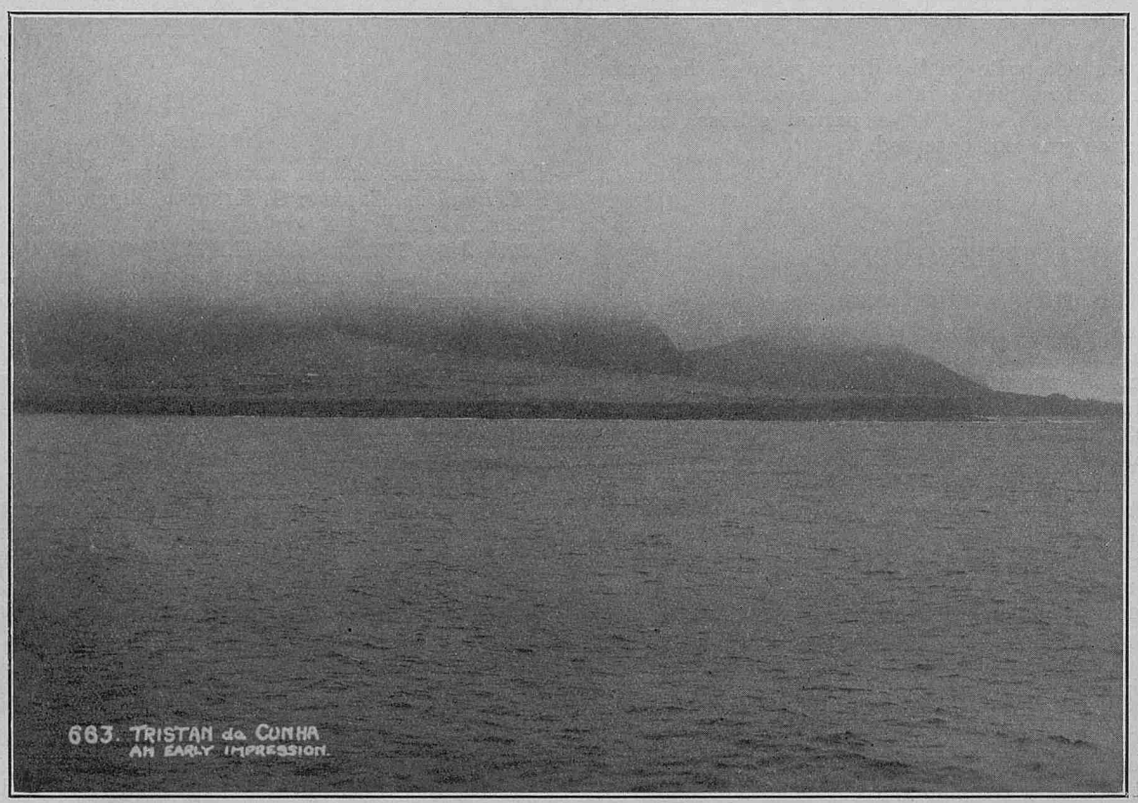
A CALL AT TRISTAN DA CUNHA.

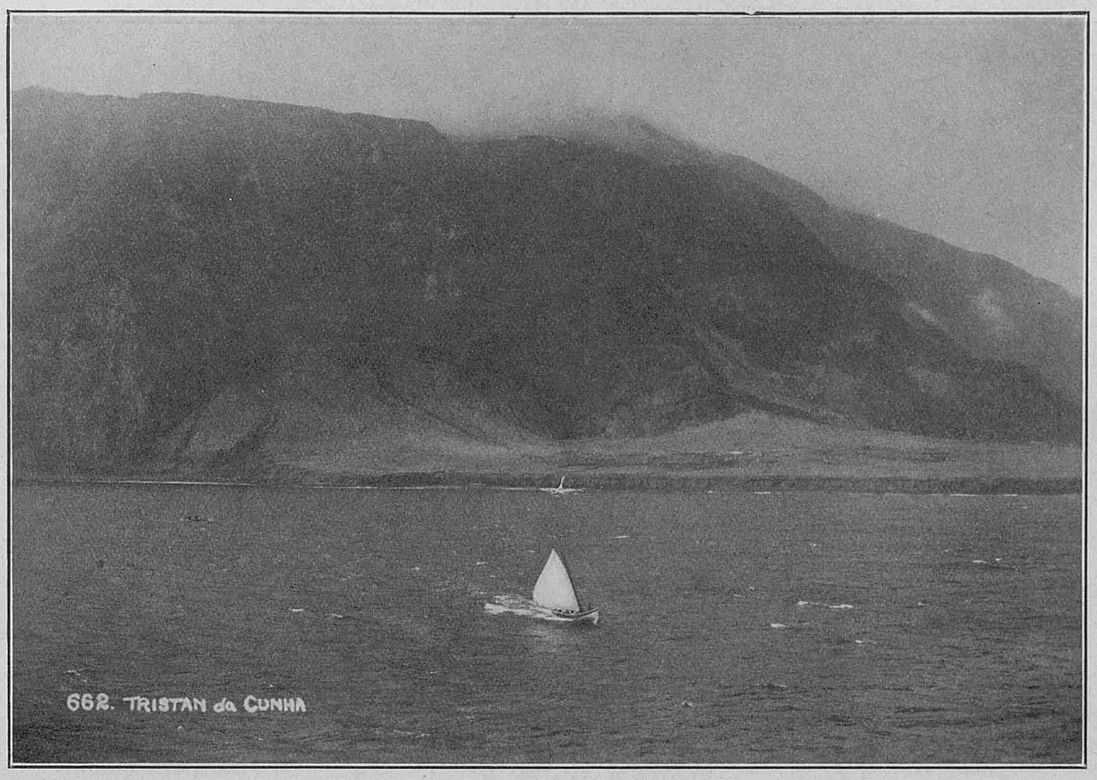
THE following remarks and photographs were received with the meteorological record of S.S. *Atlantis*, Captain A. PURVIS. Observer, Mr. J. W. CARR, 1st officer, giving an account of that ship's call at Tristan da Cunha.

At 6.40 a.m. on February 19th, 1934, a very small portion of the eastern bluff—Taylor Head—was sighted bearing S. 16° E. (true) approximately 11½ miles distant, i.e. 8½ miles from the anchorage. The cloud over the island was approximately only 700 feet above the sea, giving the island a most dismal and gloomy appearance. At 6.55 a.m. a cross bearing was obtained of Herald Point and Taylor Head and at 7.36 a.m. the ship was anchored in 30 fathoms with the waterfall (which is a very small one on the face of the lower cliff) bearing S. 9° E. (true) and Herald Point bearing S. 26° W. (true). There was some very thin kelp even in this position.

The islanders came off to meet the ship in boats of surf-boat build but constructed of canvas and apparently any odd pieces of wood they can find.

There was a certain amount of swell, making a rope ladder the only means of boarding. We had stores, mail and two lifeboats for them. The lifeboats and some of the mail had been out last year, but were not landed. We launched the lifeboats first and used them alongside the hatchways as lighters on to which to land the cargo,





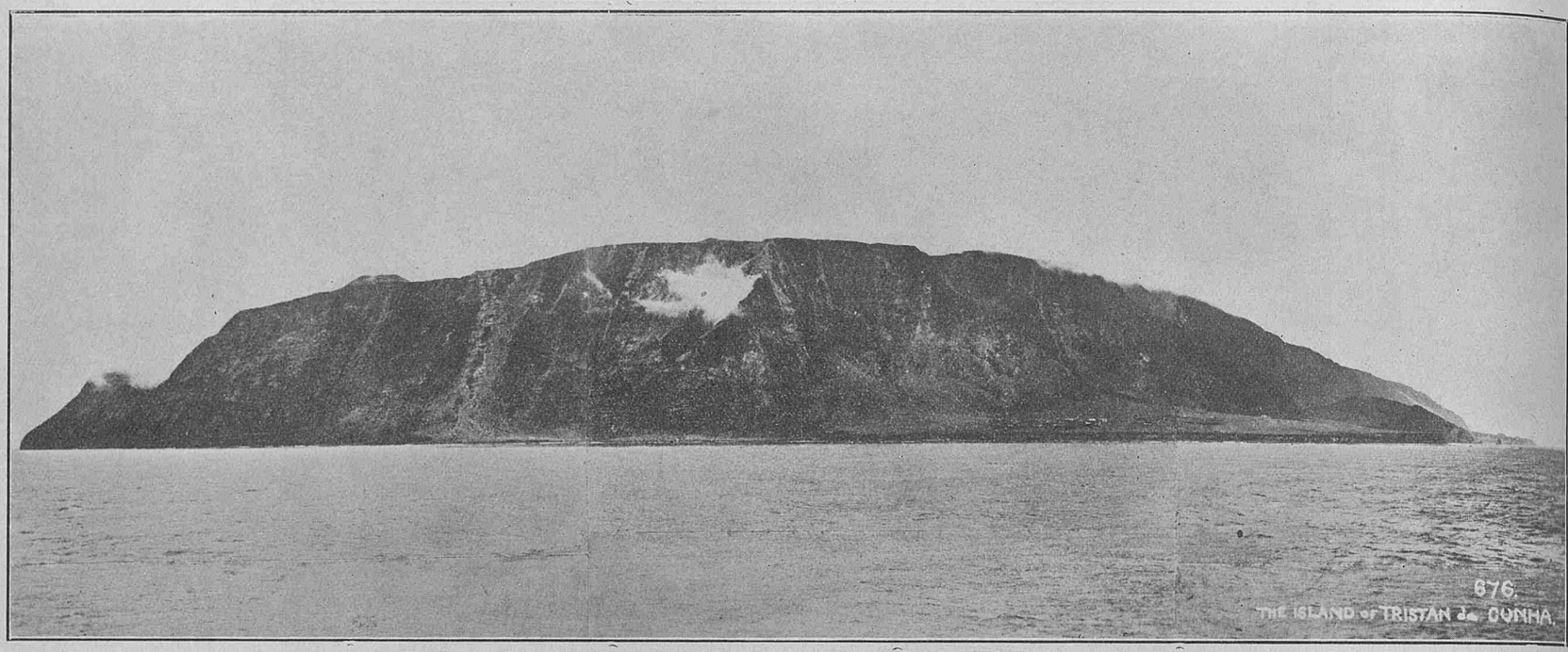
The waterfall is seen immediately above the boat's sail—to the right of the landing place.

transferring it thence to the surfboats which kept up a continuous service with the shore. Amongst the stores were 136 pieces of timber, which were made up into four compact rafts. All old boxes had been saved during the voyage, the people being pleased to receive them.

At 11 a.m. the Reverend WILDE disembarked to take up a three years' duty on the island. Owing to the swell, no other passenger from the ship was allowed to land.

At 2 p.m. when all cargo work was completed, an invitation was extended to the women and children to come on board. About 50 took advantage of it, and the passengers were very interested in them and exchanged clothing, ornaments, cigarettes, etc., for bits of rock, sheeps' horns, shells and albatross wings. Many of the passengers exchanged articles also for signatures.

The women and children were quite sea-sick whilst on board the ship, although there appeared to be little movement. They were



A composite picture—which, however, does not show that the island is covered in cloud,

given tea in the dining saloon but did not make a great success of it, the electric light, which was something new to them, being apparently of more interest than food.

Considering the conditions under which these people live, their dress was remarkably good, particularly that of the women folk. Needless to say, it was of simple variety and modest in the extreme. One was also struck by the similarity of countenance of the females, almost all of them having a somewhat thin face with what appeared to be extraordinary length from the forehead to the tip of the nose.

In general, the whole colony wore a forlorn sad look, probably indicative of the hard life they lead.

Fish (of which there was an abundance at the anchorage), potatoes and penguins' eggs appear to be the staple foods. There are a few sheep and a few cows and oxen. They have no money or currency of any sort, the life being entirely communal. Whatever foodstuff is sent to the island by interested people is divided according to the number of persons in a family.

Apparently there is no crime of any description.

The colony is composed of 168 persons under the Governorship of Mr. REPETTO—one of their own people—living in grey stone houses on a small plateau just above the sea, with cliffs 1,000 feet high immediately at the back of them, pestered by wild cats and rats—with no communication with the outside world other than a chance ship calling. And yet they will not leave it.

The attached table shows the currents and winds experienced during the passage.

To Tristan da Cunha from Rio de Janeiro.

1934 Date.	Lat. S.	Long. W.	Hours. Steaming.	Wind.	Set of current.	Drift of current.	Hourly Rate.	Position by
Feb. 14th	24°57′	39°44½′	13·83	N.E. 4	S. 34½°W.	9·7	0·7	Stars.
Feb. 15th	26°09′	36°56′	11·07	N.W. 4	East	3	0·27	Stars.
Feb. 16th	28°56′	30°54′	23·6	Var. N.E. to S.E. 1-2	S. 74°E.	11·1	0·47	Stars.
Feb. 17th	31°51′	25°01′	23·6	N.N.E. 2	S. 52°W.	3·3	0·14	Stars.
Feb. 18th	35°12′	17°03′	29·6	N.N.W. 2-3	S. 73°E.	20·7	0·7	Sun.
Feb. 19th	36°53′	12°18′	18·1	N.N.W. 3	S. 81½°E.	20·4	1·12	Sun.

Dep. Pos. :—4′S. of Maricas Is. 23°05′S., 42°55′W. Speed :—15 Knots by Revolutions.

RECENT ARCTIC RESCUES.

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

The remarkable rescue in April this year (1934), of the passengers and crew of the Russian steamer *Cheliuskin*, from an ice-floe on which they had been marooned by the loss of their ship, will be fresh in everyone's memory.

Many of our readers will recall to mind a similar affair happening in 1931, in which a British merchant ship was concerned. She was the *Baychimo*, Captain S. Cornwall of the Hudson's Bay Company, and she had at that time been for several years one of the ships regularly observing for the British Meteorological Office.

In both cases the people were brought out of the Arctic by aeroplanes, a very fine effort indeed on the part of the airmen who carried it out. Seamen can readily appreciate the difficulties and dangers of such work.

The Russian ship was sent last year on exploration work in the Arctic, and to relieve a party of scientists stationed on Wrangel Island, north-east of Siberia. On the passage south through pack ice in September, 1933, the *Cheliuskin* became frozen in, and was still fast in January, 1934. In the following month she was crushed and foundered, and her people, numbering 103, were forced to take to the ice, where they built a hut with gear from the ship. They were luckily able to save their wireless apparatus. Here they lived until April, when all were rescued by aeroplanes.

In August, 1931, the Hudson's Bay Company's steamer *Baychimo* was on her return passage from the Arctic with passengers and a cargo of furs from the Company's posts in northern Alaska. She was caught in close pack and frozen in, in Latitude 70° 49′ N., Longitude 159° 10′ W.

As she had received considerable damage to the hull and the propeller from the pressure of the ice, and was likely to founder if the pack opened and released her, she was abandoned. A camp was formed ashore with hatches and tarpaulins, within sight of the ship, which was close in-shore, and Captain Cornwall and his men prepared to spend the winter there. They brought the ship's wireless gear ashore with them. In October, 1931, the owners arranged for the passengers and eleven of the crew to be brought by air to Nome, Alaska, and this was done by three passenger 'planes before the end of the month.

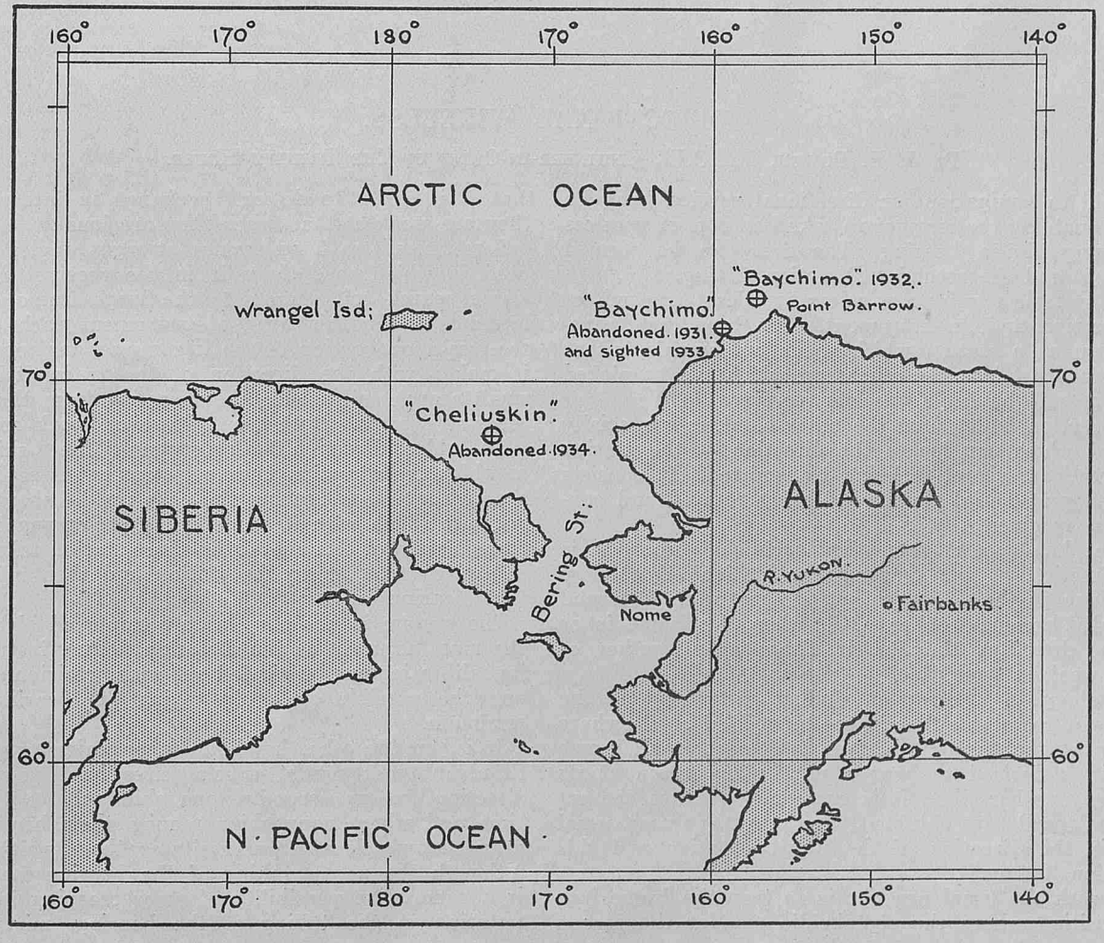
On December 2nd, 1931, the Winnipeg office of the Hudson's Bay Company reported the following message received concerning the *Baychimo*:—"November 26th, Heavy S.S.W. gale with very heavy snow drift; at 10 a.m. observed ship's masts above drift; noon gale moderated, visibility about half a mile but could not see any sign of ship from shore line. Observed very heavy ice pressure ridge in vicinity of where ship was; current was going N.E. and open water along the coast about 100 feet off shore with unusual high water. November 27th, 10 a.m., new ice formed enabling us to go out where ship was; the ice ridge is from 40 to 50 feet high, but could see no sign of ship. Searched coast 3 miles to the N'ward and found no sign of ship. Snowing hard all day, poor visibility. Furs and all freight still on board ship. November 28th, 10 a.m., heavy S.W. gale continued all day, visibility about 6 feet. Midnight, gale moderating. November 29th, 10 a.m., visibility good. Searched coast 10 miles to N'ward with dog team, saw no signs of ship.

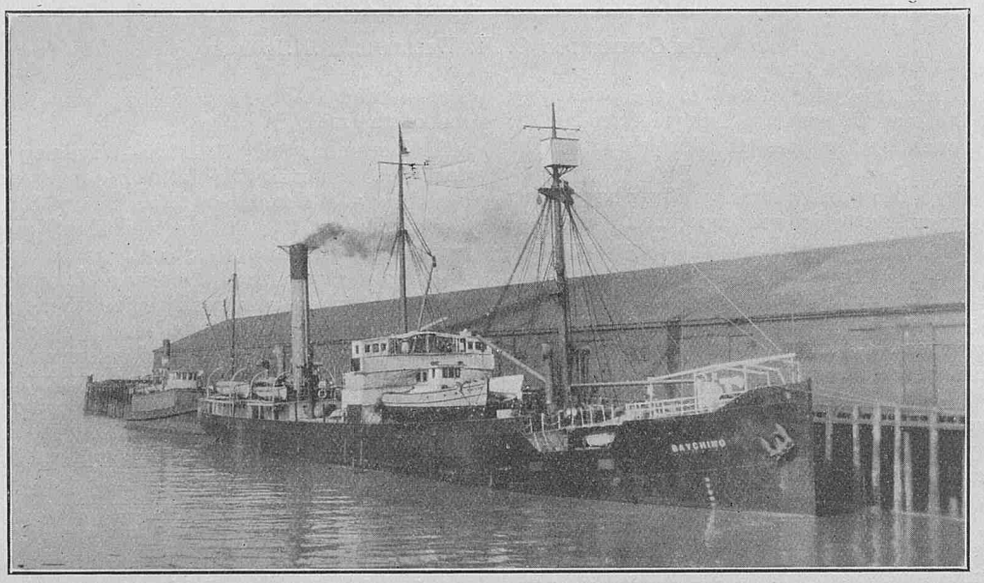
"Search was also made where ship was, without success."

A few days later an Eskimo trapper located the *Baychimo* held in an ice-floe about 45 miles away from her original position, and about 5 miles off shore. Trips were made to her by dog team, and a number of bales of furs salved. Two weeks later the Captain reported the ship in a dangerous position 15 miles off shore, propeller smashed, rudder twisted, a hole several feet long in her hull, and she was slightly listed and lifted up on the ice.

On January 13th, 1932, it was reported that "during strong N.E. wind on December 19th vessel disappeared when ice went off shore and has not been seen since. There is some possibility she may re-appear with change of wind."

In February an aeroplane made a two and a-half hour flight over the ice pack without finding any trace of the ship. The *Baychimo* was regarded as a total loss, and the captain and the remainder of the crew were flown to Fairbanks, Alaska.





S.S. " Baychimo," of the Hudson's Bay Company.

Reproduced by courtesy of Nautical Photo Agency, London.

That seemed like the end of the story, but strange to say, the ship was again sighted on March 18th, 10 miles off Point Barrow, Alaska, and was in view for some days before once more departing.

In May that year (1932) another attempt by aeroplane to find the ship was unsuccessful. Towards the end of August she re-appeared off Point Barrow, this time with 25 Eskimos aboard, who were endeavouring to salve the remaining furs. She soon drifted out of sight again.

Twelve months later, in August, 1933, the battered hulk of this stout old ship was again sighted, this time by the U.S. coastguard cutter *Northland*, about 10 miles off Wainwright, not far from where she was first frozen in.

So far this year there have been no reports of her, but it is possible that she has not yet foundered.

There can surely be few worse situations imaginable than that of men unexpectedly forced to winter in the Arctic or Antarctic through the loss of their ships. The case of the *Cheliuskin's* people was worse than that of the *Baychimo's*, for the latter were able to camp ashore, whereas the Russians had to live for months on the sea ice. Great ingenuity, leadership, and loyalty are needed to carry a crew through such a period of extreme hardship.

Both the above cases of disaster overtaking ships in the Polar ice demonstrate once more the great use to mankind of what are probably the greatest inventions of modern times; i.e., wireless telegraphy, and flying.

DIRECTIONAL WIRELESS.

By J. P. Bowen, M.I.C.E., Engineer-in-Chief of The Trinity House.

Wireless as an aid to navigation for directional services may be provided either for enabling the mariner to take bearings of wireless stations or by giving him a bearing. The first can be termed " Direction Finding " and the second " Direction Giving."

Direction finding systems require a wireless broadcast transmitter and a wireless direction finding instrument. The broadcast transmitter is well known as a station which sends out signals, either morse or speech, broadcast into the ether and which can be picked up by any station or ship having a wireless receiver.

The wireless " direction finder," on the other hand, is a specially designed instrument which can locate the direction of the station from which the broadcast signal is being transmitted. It consists usually of a single frame aerial capable of being rotated and connected to a wireless receiver.

This frame aerial has special properties such that when it is pointed in the direction of the transmitting station signals are heard in the receiver at their loudest but if the frame is turned the signals gradually become weaker until, when the frame is at right angles to the direction, they either disappear altogether or are heard at their weakest strength.

An everyday analogy to a direction finding instrument is the ordinary portable wireless set; either in the hinged lid or elsewhere in the case containing the wireless receiver is fitted a small frame aerial and when it is desired to hear a particular station at its loudest and cut out another, then it is customary to turn the set round until the best results are obtained. Actually the frame aerial is being pointed in the direction of the wanted station and this is in reality direction finding.

In navigational work the usual practice is to turn the frame into the right angle position where the signals die out for the reason that it is easier to detect the change in intensity of signals when they are weakest than when they are loudest.

Sometimes two fixed frames at right angles to one another are used in which case there is in the receiver itself a small single frame search coil similar to the large frame of the single frame instrument. In this form of instrument each of the large frames receives a proportion of the incoming signal according to the angle it makes with the direction of the transmitting station and the small search coil selects the direction from the components of the received signals. Both types, however, work on the same principle.

The oldest direction finding system is the " ship to shore " method in which the direction finding instrument is set up on shore. When a ship requires a bearing she calls up the shore station and having got into touch with it sends out a pre-arranged signal; during the transmission of this signal the shore station takes the bearing of the ship with relation to the station and then informs the ship what that bearing is.

The system is not now largely employed although it is probably the most accurate as the direction finding instrument is stationary, its calibration can be carried out with precision and remains constant and the possible errors in taking the bearing are reduced to a minimum.

It is, on the other hand, an inconvenient system and has several disadvantages; firstly, special sites have to be selected for the direction finder; secondly, one ship only can be dealt with at a time and when many ships require their bearing in fog this is a grave drawback as it necessitates them waiting in turn; thirdly, although the actual taking of the bearing may be accurate there is a cumulative possibility of error creeping in due to wrong computation in the taking of the bearing, misunderstanding of the

received bearing on the part of the operator on board and misinterpretation when the operator conveys the information to the master of the vessel.

If a mistake should occur there is no direct onus of responsibility as neither the master nor the navigating officer can carry out a direct check on the bearing.

The alternative and more modern method is " shore to ship " working, that is, to instal the direction finder on board and to establish on shore a series of special transmitting stations, called radio-beacons, sending out broadcast signals. These stations are arranged to transmit at regular intervals characteristic morse code signals each being allotted a different signal so that one can be differentiated from the other.

This method has many advantages. In the first place the instrument can be under the direct supervision and control of the master of the vessel as it should be and the navigating officer can take the wireless bearing himself and be responsible for its correctness in the same way that he takes visual bearings with the mariner's compass.

Then there is no question of the ship having to wait its turn but instead any ship within range can take bearings as often as she requires; further, if there is no radio-beacon within range bearings can be taken of any broadcast station whose location is known.

The installation of the direction finder on board also enables a ship to determine the direction of another ship in fog and what is perhaps still more valuable a ship in distress.

No careful selection of sites for the radio-beacons is necessary and as they transmit signals broadcast without relation to any zero they can be established on a floating body such as a lightship for directly marking a sandbank or shoal.

By proper regulation of the times of transmission and by suitably varying the wavelengths of these radio-beacons it is practicable to erect a number of them in a restricted space if need requires; in areas where they belong to different countries international agreements are entered into for their proper regulation and control so as to avoid interference.

The bearing taken with the direction finder whether installed on shore or on board ship is given relative to some zero line. On shore this line can be true north and south but on board another has to be chosen and the instrument is set up so as to give a zero on the fore and aft line of the vessel.

When taking a bearing on board it is necessary to read off simultaneously the direction of the ship's head so that the true bearing can be computed; unless the two are taken at precisely the same moment errors may arise due to a sudden movement of the ship's head, particularly in small ships which are liable to yaw in a seaway.

Another source of error to which the direction finder on board ship is liable, lies in the position of the instrument with relation to the ship's funnels, rigging, derricks and other shipwork. All these parts collect stray wireless currents and re-radiate them so that, unless compensated out or corrected for, distorted or erroneous bearings are liable to result. These errors will vary according to whether the ship is fully laden or light but they can usually be compensated for either automatically in the instrument itself or by correction tables; too great attention, however, cannot be paid to this point and the correction tables should always be applied and the direction finder periodically calibrated if reliable bearings are to be assured.

With the " shore to ship " system of direction finding it is possible to obtain position as well as direction.

As is commonly known and exemplified particularly during a thunderstorm light travels quicker than sound. Now wireless waves travel at the same rate as light or about 186,000 miles per second, but sound in sea water travels only at the rate of about one mile in a second and a quarter.

If, therefore, a wireless signal and an underwater or submarine sound signal are sent out together, the former will reach an observer almost instantaneously but the sound signal will not be heard till later; the interval of time which elapses between the receipt of the two will depend upon the distance away the observer is from the sending station.

This combination of signals is used for navigation and is termed " synchronous signalling." With the aid of a stop watch it is practicable to measure the time interval and so, if this is divided by one and a quarter, the distance off from the station can be calculated.

Not infrequently the distance is automatically recorded by transmitting from the wireless apparatus after the synchronised wireless signal a series of dots or dashes at intervals corresponding to the time the sound signal takes to travel each sea mile. If these wireless dots or dashes are counted the number heard up to the reception of the sound signal gives the distance off from the transmitting station.

Coming now to " direction giving " two systems have been tried out for marine navigation; one can be described as a " direct reading " method and the other a " timing " method.

The first of these is the beam system of Marconi operating on short waves in the neighbourhood of six metres. It employs a reflector made up of a series of vertical wire screens in the front or focus of which is placed the wireless aerial. The combination produces a wireless beam with definite directive properties somewhat akin to a beam of light.

The reflector with its aerials is made to revolve so that the wireless beam rotates and during the revolution as each point and quarter point of the compass is traversed a separate and distinct morse code signal is sent out, each individual signal representing a definite bearing. For the reception of the signals a special short wave receiving apparatus has to be employed.

The beam is slightly divergent or fanned and as it passes the observer a series of the signals is received their number depending upon the spread of the beam; the middle signal of this series is the one which indicates the true bearing of the ship with the transmitter.

The system has been in use experimentally but for the moment it has been discontinued though with future developments in wireless it seems possible that it may be reintroduced in another form.

The " timing " method employs a rotating frame aerial which transmits, as it revolves, a continuous signal. This type of aerial has exactly the same characteristics as the receiving frame aerial except that it transmits instead of receives; when the frame is pointed in the direction of an observer, signals from it are heard in a receiver at their loudest but if the frame is revolved while the observer remains stationary then the signals gradually reduce in strength until the frame stands in a position at right angles to the direction which the transmitter makes with the observer, when they die out altogether or are heard at their weakest.

This continuous signal with its varying strength would of itself convey no idea of direction unless some recognisable part of it were chosen for observation and a means provided for determining the angular position of the frame with relation to a zero line when the observer hears the recognisable part of the signal.

The part of the signal chosen for recognition is the minimum strength portion for the same reason as in the receiving frame aerial namely that the change of signal strength is more pronounced at the minimum than around the maximum; the zero is provided by sending out a special morse code indication signal when the minimum passes through true north.

To find the angular position of the frame with the zero line which is in fact the bearing of the observer with true north the " timing " method is introduced, a stop watch being employed. As soon as the observer hears the north point signal he starts the watch and keeps it running until the continuous signal dies out when he stops it and notes the time which has elapsed; if the angular speed of rotation of the frame is known then the product of time by speed gives the required bearing.

This system possesses advantages in that no special receiving instrument is required and errors due to the movement of the ship's head or local effects of the ship's structure do not arise. The taking of the bearing is however a delicate operation and the accuracy of its determination depends on the human ear being able to gauge the exact moment when the signal dies down to its minimum value. If the frame is rotating at a speed of one revolution a minute an error of three degrees will result if the observer's timing is out by half a second.

Among its disadvantages are that special sites have to be chosen for the location of the transmitter so that it may be free from local interference; in addition as the system requires a fixed zero for computing the bearing the transmitter can be placed on a floating body which due to tide movement has no permanent zero.

There are other directional systems but those described above are the ones which have so far been adopted for marine navigation generally.

April, 1934.

ATMOSPHERIC OBSCURITY IN THE ENGLISH CHANNEL AND THAMES APPROACHES.

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

The following graphs show the mean monthly percentage of hours of Atmospheric Obscurity experienced at some of the principal Light Houses and Light Vessels situated on or off the south coast of England and in the Thames Estuary and its approaches.

The positions of the stations for which graphs are given are shown in Figure 1.

The graphs are constructed from information supplied to the Meteorological Office by the Elder Brethren of Trinity House and cover the 23 years 1910 to 1932 except for those Light Vessels situated in the Thames Estuary or its approaches, namely the Shipwash, Galloper, Edinburgh and Nore which exclude the years 1915 to 1919 inclusive.

When examining the graphs it must be understood that they do not represent the hourly percentage of actual fog and mist experienced at the stations, but indicate the percentage periods during which fog signals were in operation at each respective station. The fog signals are operated at the discretion of the Keepers of Light Houses or Masters of Light Vessels when it is considered that the warning signal will prove of assistance to navigation during periods of poor visibility occasioned by fog, mist, falling snow, heavy rain, or other causes at the station itself, or within sight of it.

An examination of the graphs show that at the coast Light Houses with the exception of Beachy Head and Dungeness the greatest percentage frequencies of atmospheric obscurity are recorded during the spring and early summer. They generally show a rise in May followed by a drop in June with a slight tendency to increase in July or August.

During May the predominating winds from the S.W. are lighter in force, warmer and moister than in the preceding months. The sea temperature however has not risen greatly so that the conditions in this month are most favourable for the formation of true sea fog. In June there are relatively few warm S.W'ly winds and the fogs in this month show a decrease over those in May. In July and August there is a marked increase in warm winds but the sea temperature is now attaining its seasonal maximum, with consequent less tendency for the formation of sea fog. During the Autumn and Winter months the fogs experienced on the South coast are generally radiation fogs associated with anti-cyclonic conditions and occasionally spread a few miles seaward.

Unlike those of the Light Houses, the graphs of the Light Vessels, show a preponderance of atmospheric obscurity during the Winter months.

Light Vessels are small craft positioned to mark dangerous banks and shoals lying close to the fairway or shipping tracks and are not at times so easily discernible as a tall bulky object like a Light House which can generally be given a good offing when passing.

Though the atmospheric obscurity may not be so poor as to necessitate the reduction of a ship's speed for safe and cautious navigation, occasions arise when a Light Vessel's horn may be heard at a greater distance that the vessel herself or than her light can be picked up, and will give a welcome indication of her bearing to fast moving shipping.

Such conditions are frequently experienced in the Winter months during the passage of depressions and secondaries up Channel, when Light Vessels will keep their fog signals working, although no fog or mist in the true meteorological sense may exist. This together with the absence of suitable marks for judging visibility probably accounts to a large extent for the greater percentage of atmospheric obscurity recorded by the Light Vessels in the Winter compared with the Summer months. That such is the case is borne out by a comparison of the Wolf Rock and Eddystone Light House graphs with those of the Light Vessels. In both cases these Light Houses are tall bulky structures situated well out from the coast with deep water on all sides and not being subject to the fore-mentioned conditions their graphs conform very closely with those of the Light Houses situated on the coast.

It will be seen that the Light Vessels situated in the Thames Estuary and its approaches record a much greater percentage frequency of atmospheric obscurity than those in the English Channel. In this area the visibility is to a great extent affected by the smoke and haze of London being carried seaward with prevailing Westerly winds.

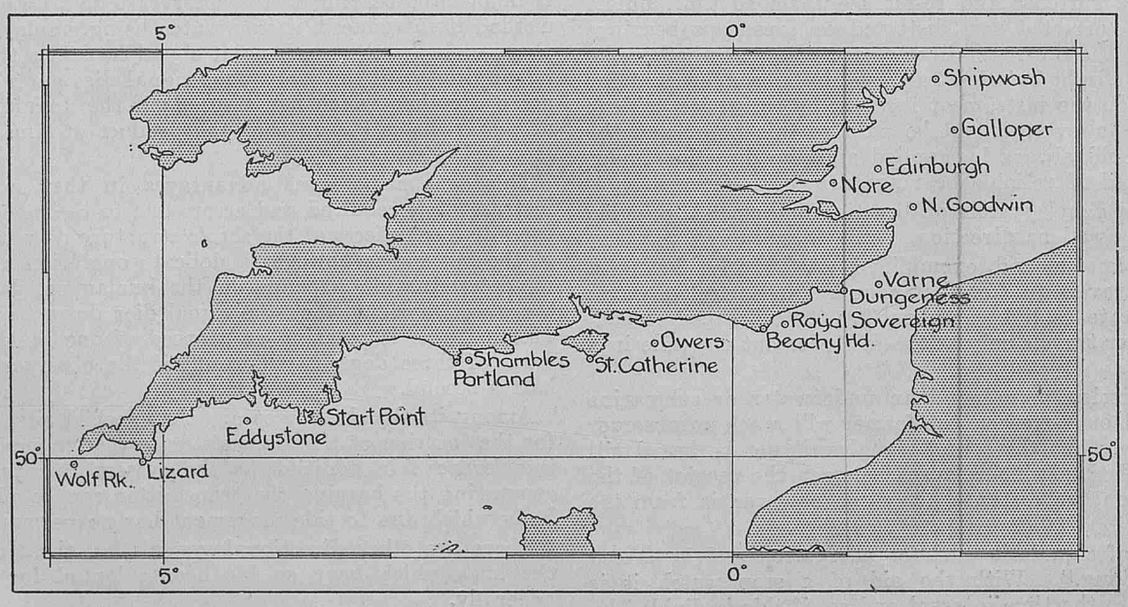
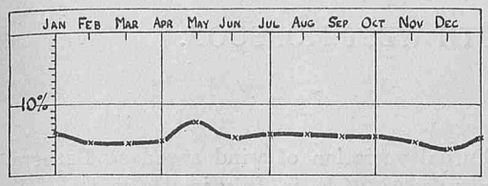
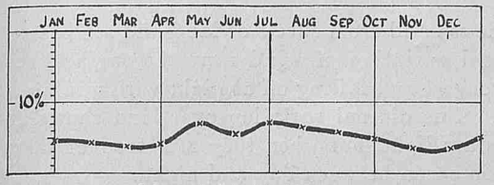


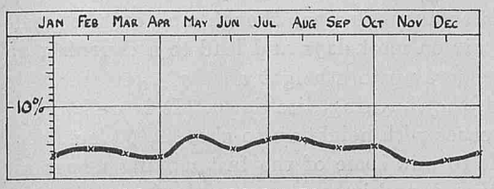
Figure 1.—Chart showing positions of Light Houses and Light Vessels.



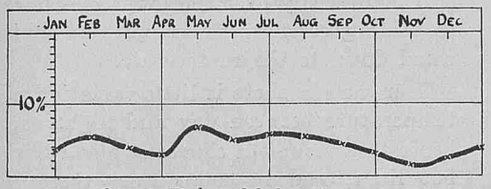
Wolf Rock Light House.



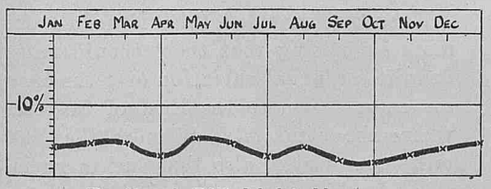
Lizard Light House.



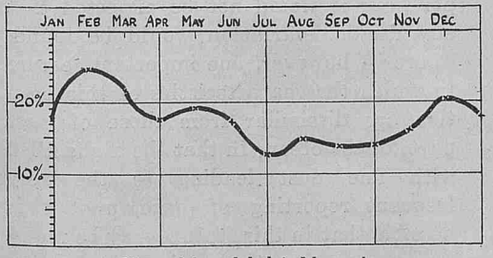
Eddystone Light House.



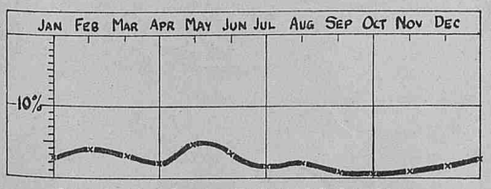
Start Point Light House.



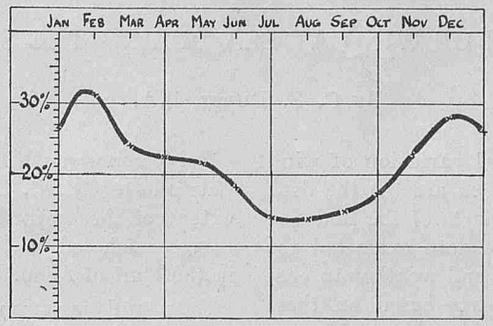
Portland Bill Light House.



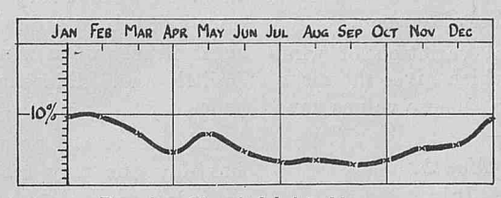
Shambles Light Vessel.



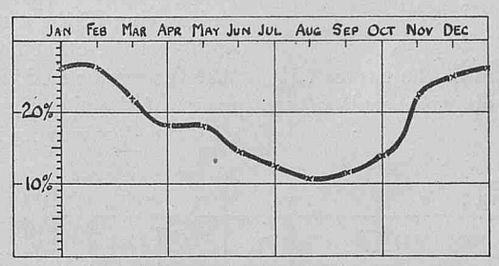
St. Catherine's Point Light House.



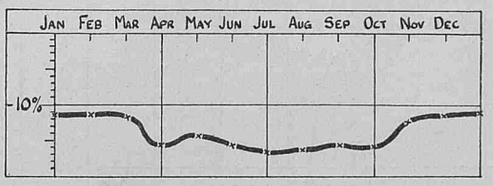
Owers Light Vessel.



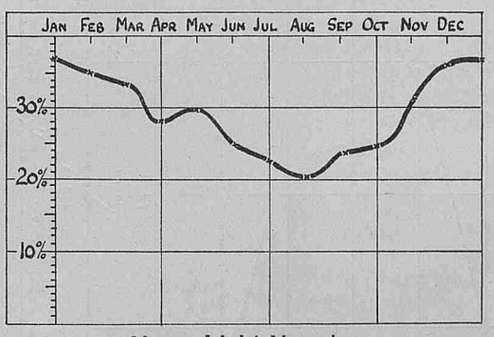
Beachy Head Light House.



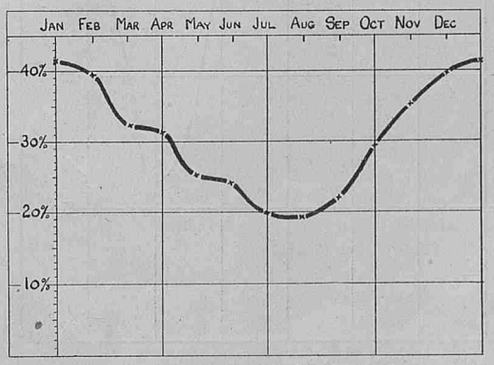
Royal Sovereign Light Vessel.



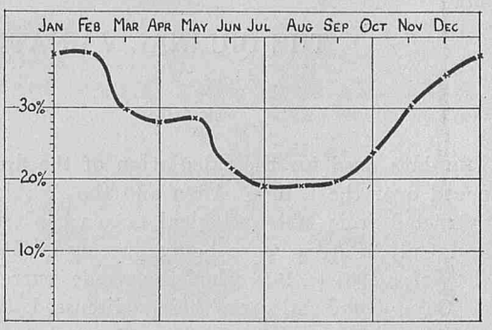
Dungeness Light House.



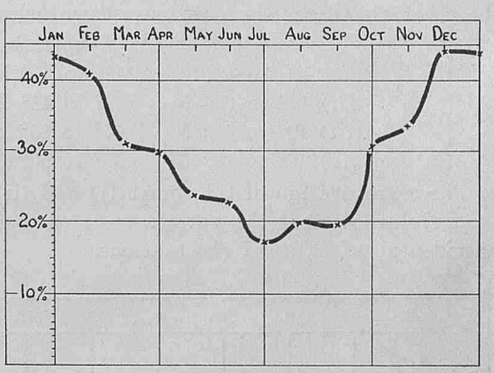
Varne Light Vessel.



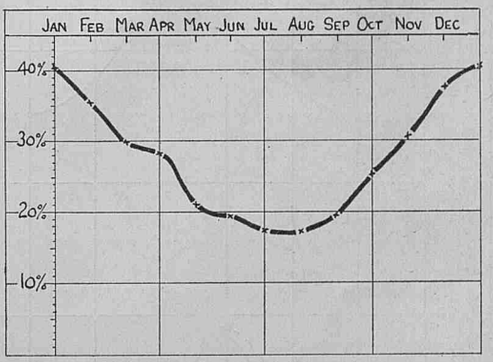
North Goodwin Light Vessel.



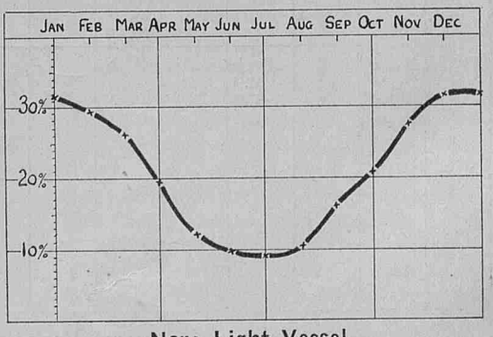
Galloper Light Vessel.



Shipwash Light Vessel.



Edinburgh Light Vessel.



Nore Light Vessel.

THE DIURNAL VARIATION OF WIND AT SEA DURING THE SOUTH WEST MONSOON.

By C. S. Durst, B.A.

The data used for the calculation of the diurnal variation of wind speed over the Gulf of Aden and the Arabian Sea are (*a*) the data extracted from Meteorological Logs when the charts of the Red Sea and Gulf of Aden were being prepared, (*b*) the data extracted for the years 1905 to 1919 when the winds, currents and weather to east of Cape Guadafui were being discussed. Charts based on these latter data have appeared on several occasions in The Marine Observer and show how very strong the winds in the neighbourhood of Socotra are during the height of the South-West Monsoon.

The results of this calculation of the diurnal variation of wind speed is remarkable as is seen from the figure which gives the mean speeds of the wind at the six hours of observation. These values have been calculated for the positions shown below:—

	Latitude.	*Longitude.*	*Month.*
(i)	12° to 13° N.	46° to 47° E.	July.
(ii)	12° to 13° N.	47° to 48° E.	July.
(iii)	12° to 13° N.	55° to 60° E.	July.
(iv)	12° to 13° N.	55° to 60° E.	August.

The corroboration of the curves (i) and (ii) and of the curves (iii) and (iv) show that the variations of wind are not the result of an accidental selection of observations.

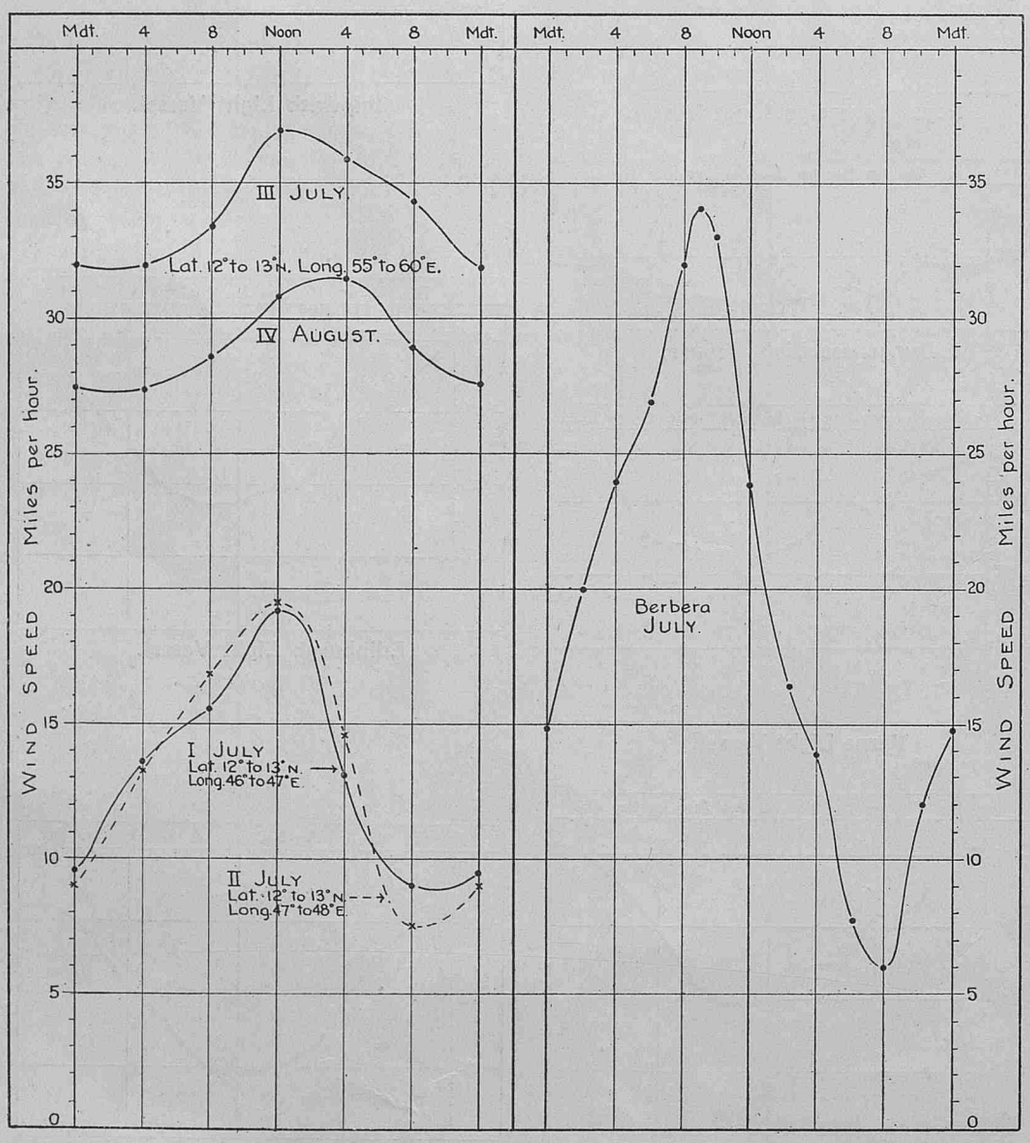
For comparison, the diurnal variation of wind speed at Berbera, Latitude 10° 27′ N., Longitude 45° 01′ E. in July is also shown. The extent of the variation at this place is exceptional and it was this curve which led to the examination of the variation over the sea in the Gulf of Aden.

Over land, far from the sea and from effects of land and sea breeze, there is a definite diurnal variation of wind near the surface, the day-time winds being strongest and falling off at night with minimum speed just before dawn. This diurnal variation over land shows up most clearly when winds are light, but when they are stronger there is little or no difference in speed between day and night.

The cause of this diurnal variation of wind over land is generally attributed to the greater stirring of the atmosphere by day. On a hot day one may see threads of hot ascending air rising over a macadam road; such ascending columns, though not on the same scale, are present in the air on most days and lead to a churning up and mixing of the atmosphere up to a height of, say, 2,000 feet. By night, on the other hand, the churning dies down. It is well known that the wind speed increases with height up to about 2,000 feet. The result of the churning is to mix some of the fast moving upper air with the slow moving lower air and in consequence the lower air gains in speed. On the other hand when churning ceases by night the upper layers slip more easily over the lower ones and so their greater speed is not communicated down to the surface air.

Over the sea, there is little variation in temperature between day and night and hence the amount of churning also varies but little, and in consequence there is generally little variation in the speed of the wind over the open sea from day to night.

When we consider this, it is all the more surprising that there should be so definite a diurnal variation over the open sea as is shown to the East of Socotra, where the wind fetch is more than 400 miles over water, also that such a variation should occur with wind speeds of such high velocity, for over the land when the velocity is more than 20 miles per hour it would not be expected that any decided variation would be found. There is, however, one important feature in which the characteristics of this position are dissimilar from those of most parts of the ocean, in that the air is filled with fine dust leading to the very frequent reporting of haze, and it is possible that in this feature may be found the reason for the variation of wind speed.



Diurnal Variation of Wind Speed.

NOTES ON SEA AND SWELL OBSERVATION.

Prepared by Commander C. H. Williams, R.N.R.

The incessant movement of the sea surface is such a commonplace occurrence to seamen, is so much part of their everyday life afloat, that they seldom consider it worth commenting on, beyond the customary Log-book remarks, usually no more than three or four words. Navigators are accustomed to observe and log the state of the sea and swell each watch, but they do not often make measurements of the height, length and speed of these waves. Many will be able to call to mind voyages in which they have experienced tremendous seas caused by a series of bad blows, and occasional cases in which the seas were phenomenal.

Those who have seen them from a small low freeboard vessel like a trawler are not likely to forget the sight; surely one of the grandest manifestations of the forces of nature.

Remembering the appearance of one of these huge waves as it approaches a small ship shutting out the horizon and making an observer feel as though looking up a slope of a hill, it is easy to understand how such obviously exaggerated terms as "mountainous" seas originated.

A height of from 35 to 40 feet from trough to crest and a wavelength of perhaps 600 or 700 feet between crests, is a very big swell, and appears colossal when seen from a deck only a few feet above the water. There is good evidence of swells being of even greater height on occasions, but 40 feet seems to be generally considered as about usual in bad gales.

Instances of estimated heights of 60, 70, and even the phenomenal height of 80 feet have been recorded. This latter height was measured under good conditions in R.M.S. *Majestic* in December, 1922, and will be referred to again later.

No seaman, of course, ever imagines the seas to really be "mountains high," but when there is nothing to compare the size with, great waves like those mentioned above certainly look overwhelming. If the horizon is obscured by rain or snow the apparent size of such swells is enhanced by the fact that only a few are visible between the observer and his limit of vision.

Articles on "Sea and Swell" written by Mr. H. Keeton, of the Marine Division of the Meteorological Office, have previously appeared in this journal. (See Marine Observer Vol. 2, No. 19, July, 1925, and Vol. 7, No. 77, May, 1930.) In those articles the theoretical structure of waves and the laws governing their movement were discussed, together with many instances of remarkably big seas recorded in ships. Mr. Keeton also mentioned the generally accepted formulas for calculating the length, period and velocity of waves. The formulas are repeated in these notes.

Although unusually big waves of ocean swell have from time to time been recorded in ships, comparatively few officers have attempted more than rough estimations by eye of the height, length and speed of these swells, or of the smaller seas. The reasons may be, (*a*) that few men afloat are aware that measurements of seas and swells are of any value beyond the scientific interest, and (*b*), the man in charge of a ship, especially a small ship, has other matters to attend to on the occasions of the vessel being in exceptionally heavy seas. In fine weather the waves are not often measured, probably for the reason that they are not then conspicuous.

In deep water, even in what is apparently a flat calm, there is nearly always a slight swell, sometimes of such small height in proportion to its length that it is only perceptible when some distant floating object, such as a patch of Gulf weed, is alternately seen and obscured.

To obtain really accurate measurements of sea and swell from a moving ship is no easy matter, and this also may partly account for the small number of measurements received from ships. As a rule, officers do not send in observations which are of doubtful accuracy, on the old principle that "if a thing is worth doing at all, it is worth doing well."

Doctor Vaughan Cornish, who has made a most careful study of waves for many years, records in his book "Waves of the sea, and other water waves," that although none of the Merchant Service officers whom he had questioned had ever actually made measurements of waves, their estimations by eye of wave *heights* were in remarkable closeness with the careful measurements made by himself and other scientific observers, but that as a rule the officers underestimated the wave *lengths*.

By careful observers the following facts regarding sea and swell have been ascertained. Wind effect on water is rapid; the waves formed travel before the wind and their size increases regularly from the weather shore. This increase in size with the "fetch," or distance from the weather shore, is only up to a point for a given wind force. For instance, in the North Pacific, although it is a larger ocean, the seas are no bigger than those in the Atlantic.

In deep water the "fetch" can be taken to mean the stretch of open water over which the wind has blown with a fairly uniform direction and force, and without sufficient "fetch" the seas can never attain their maximum size, no matter how hard it blows. It has been estimated that about six hundred miles is sufficient "fetch" to raise the biggest seas observed in the North Atlantic.

When the wind lulls the height of waves quickly diminishes, and increases rapidly when squalls occur.

The wave raising power of wind is much greater when operating on water already in waves than upon nearly smooth water.

During a strong gale in the North Atlantic Doctor Cornish estimated by eye (by tops of waves in line with the horizon), that swells commonly attained a height of 29 feet, and occasionally 43 feet. The majority of officers questioned by the writer consider 40 to 45 feet as about the height of the biggest swells encountered in ordinary North Atlantic gales. This is less than the beam of most modern tramp steamers, and there is little doubt that the swell exceeds this height on rare occasions.

When a sea and swell are running together the steeper sea waves obscure those of the swell, though both have combined to make the storm wave that dominates the eye. There used to be a saying at sea that every seventh wave was a big one. It is not at all likely that the "big 'uns" should arrive with the same regularity in all gales, irrespective of the relation of sea to swell, and there seems no evidence to support the idea.

The saying was probably the old "shellbacks'" attempt to account for the occasional big sea that broke aboard due to the crests of a sea and a swell coinciding and the ship rolling to windward at the right (or wrong) instant. Among sea wave heights of an average of 24 feet, an occasional wave of 35 feet has been measured, the extra 11 feet being due to a very long swell, where its crest happened to coincide with the crest of a sea.

In the open sea, when a gale is blowing its strongest, the wind is always swifter than the seas it has built up, but when the wind starts to take off, the seas retain the speed given them by the gale, and so may then be moving faster than the existing wind. During this stage they assume a change of appearance which is difficult to define, but which is familiar to seamen.

The long ocean swells travel at a great speed, and instances of wave velocity of between 60 and 70 knots have been recorded (that is, at the speed of wind force 11 to 12), showing that they must have been caused by wind of hurricane force.

Waves that have outrun the area in which they were formed have been observed to generally run in groups, as, on a small scale, the wash caused in a river by a passing ship, or, on a grand scale, the series of great seas built up by violent squalls in the open ocean. If a group is watched it will be seen that the leading wave will die out, and another wave will form in rear of the group. It has been found that the speed of the group is only half the speed of the individual waves forming it.

Doctor Cornish records having observed swells in the English Channel whose *group* speed was then 34 knots (individual waves 68 knots) that had been caused by a hurricane in the North Atlantic 1,700 miles distant, and had reached the Channel in 48 hours! This speed may sound incredible, but there seems good evidence of it. There is no doubt that long fast swells do easily overtake even 20 knot ships, running the length of the vessel in a few seconds, and Marine Observers may find it of interest to try to estimate the speed of such waves.

Wave speed is much reduced on entering shoal water.

The following are definitions of terms used in measuring waves:—

The term **Sea** means waves caused by the wind actually blowing at the time of observation.

The term **Swell** means waves caused by the wind elsewhere, or by wind in the locality previous to the time of observation.

Length is the horizontal distance from crest to crest, or from hollow to follow (in feet).

Height is the vertical distance from hollow to crest (in feet).

Period is the time between the passage of two succeeding wave crests past a *fixed* point (in seconds).

Velocity is the rate at which the crest travels forward (in feet per second). Obtained by dividing the length by the period.

Period of Encounter is the time between the passage of two succeeding wave crests past a point on the ship.

From careful observation and measurement of the behaviour of sea and swell waves in the ocean, and of small waves on lakes, theories of wave structure and movement have been formed.

The generally accepted idea of the profile of sea waves is that they are trochoid curves, a description of which was given in the articles written by Mr. KEETON that appeared in this journal in 1925 and 1930.

The water composing a wave does not, of course, move forward with it, but merely rises and falls as the wave advances. In fact the wave is simply the advancement of a form or shape, and its movement is quite different from that of the particles of water in it. According to the theory, particles of water in a wave revolve with a uniform speed in a circular orbit perpendicular to the wave ridge, and complete a revolution in the same time as the wave takes to advance its own length.

In this circular movement the particles move upward at mid-height on the forward slope, forward at the wave crest, downwards at mid-height on the after slope, and backwards in the hollow. It is easy to picture this if we imagine the successive movements of a cork floating on the sea surface as a wave passes under it.

The following are the theoretical relations between wave length and period of trochoidal waves:—

Length = Velocity × Period.

Period = Velocity ÷ 5·123.

Period = $\sqrt{\text{Length}} \div 5{\cdot}123$.

Thus, if one element is measured, the others can be calculated.

There is not, however, complete agreement on the matter, and it has been pointed out that "the theory of the trochoidal wave is a purely ideal hypothesis, involving many suppositions contrary to the physical limitations of actual wave motion. It assumes a perfect fluid not subject to viscosity or molecular friction, unlimited in depth and in extent, and traversed by a simple system of oscillating waves. It is in existence without beginning or end, and unchanging. The trochoidal wave requires all these conditions." They are obviously never absolutely fulfilled in the actual sea.

Seas in the open ocean actually under the influence of the wind forming them are seldom so steep as to be of less length than 13 to 15 times their height.

Recorded measurements and remarks from ships received in the Meteorological Office, though still small in number, indicate that deep sea waves do not always behave in exact agreement with theory. In most cases the observed wave-length is less than the calculated.

A large number of carefully made measurements may enable a future investigator to check and perhaps modify existing ideas on the subject.

It is believed that wave effect is only felt below the surface for a depth equal to about one wave length, so it is only the very biggest waves that affect the sea bottom deeper than a hundred fathoms. At this depth it is calculated that the movement of the particles of water due to a surface wave 600 feet long would revolve in a circle of less than an inch in diameter.

This is negligible, as far as we are concerned here, though even this small movement does facilitate the drift of sand, etc.; by the tides.

Beyond the 100 fathom line the bottom of the sea is of little practical interest to the navigator, and whether 500 fathoms or 2,500 fathoms deep it is simply "no bottom" and does not concern him. The 100 fathom contour line of soundings marks roughly the depths to which the edges of the continents are submerged, the depth increasing rapidly to seaward of that to the two thousand or more fathoms of the ocean bed. This is illustrated in the diagram below (Figure 1), which shows a section of the floor of the Atlantic, West from the Channel in about Latitude 50° N.

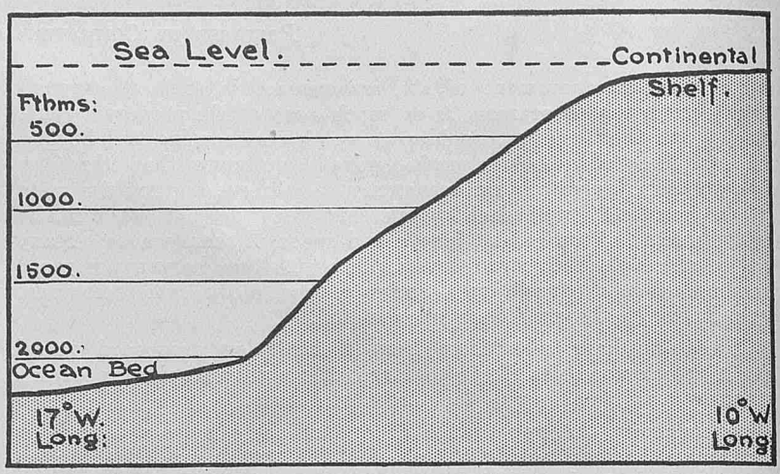


Figure 1.—Vertical scale considerably exaggerated for the sake of clearness.

The continental shelves in the other great oceans are similar.

Here the great swell of the open ocean begins to be affected by the ground, has its length and speed reduced, and through being thus telescoped, has its height increased somewhat.

The steep swell experienced on the edge of soundings is well known. It is this that has no doubt helped to give localities like the Bay of Biscay and Cape Agulhas a bad reputation, though the notoriously steep sea on the Agulhas bank is, of course, affected by the strong current as well as the shoal ground.

In the Northern hemisphere the highest seas are developed in the right hand rear quadrant of a cyclonic storm. The wind in this quadrant is blowing in about the same direction as the line of advance of the storm, and the seas while developing may remain within the storm area as it travels, so being continuously under the influence of wind from one direction for perhaps two or three days.

In this quadrant also, the violent squalls occur that are associated with the passage of the "cold front" (generally known to seamen as clearing squalls). These, blowing on a sea already rough, build up the groups of very high and fast seas that may later outrun the depression as long ocean swell.

Seas formed in the other quadrants of a cyclone, by moving in different directions to the storm track, are soon out of its influence, and so do not attain such great size. (See FIGURE 2.)

A series of large swells caused in a bad gale in the North Atlantic could reach a height of 40 feet and a wave-length of 600 feet or more. The individual waves of the group could attain a speed of say 36 knots (somewhat less than the speed of the wind that caused them), and in that case the speed of the group would be about 18 knots. If the storm area in which these waves were formed was becoming reduced in intensity or in speed of advance, or was changing its direction, such a group of swells would outrun the storm, and, keeping their speed and wave-length but becoming much reduced in height, appear hundreds or even thousands of miles away as a long, low swell. The chart on p. 107, illustrating an imaginary case (FIGURE 2) indicates how this may occur.

On reaching soundings these long waves would become reduced in speed and length, and increased in height, while their period would remain unchanged. The rollers at St. Helena and Ascension Islands are well known instances of this kind, as also is the heavy surf that suddenly breaks on the Western Coasts of America and Africa, often in fine weather and with no apparent cause. Groups of very long low swells of the open ocean, where they are scarcely noticeable among the seas caused by the existing wind, become quite suddenly formidable rollers and surf on encountering land.

The tremendously powerful effect of a long ocean swell may be gathered from the following. In February, 1904, Captain SCOTT'S *Discovery*, having wintered in the Antarctic, was fast in ice about seven feet thick and ten miles from open water. The chances of the ship getting clear that year were poor, unless a strong gale from the Southward sent the ice to sea within the next few weeks. No gale occurred, however, but by good luck a long swell set in from

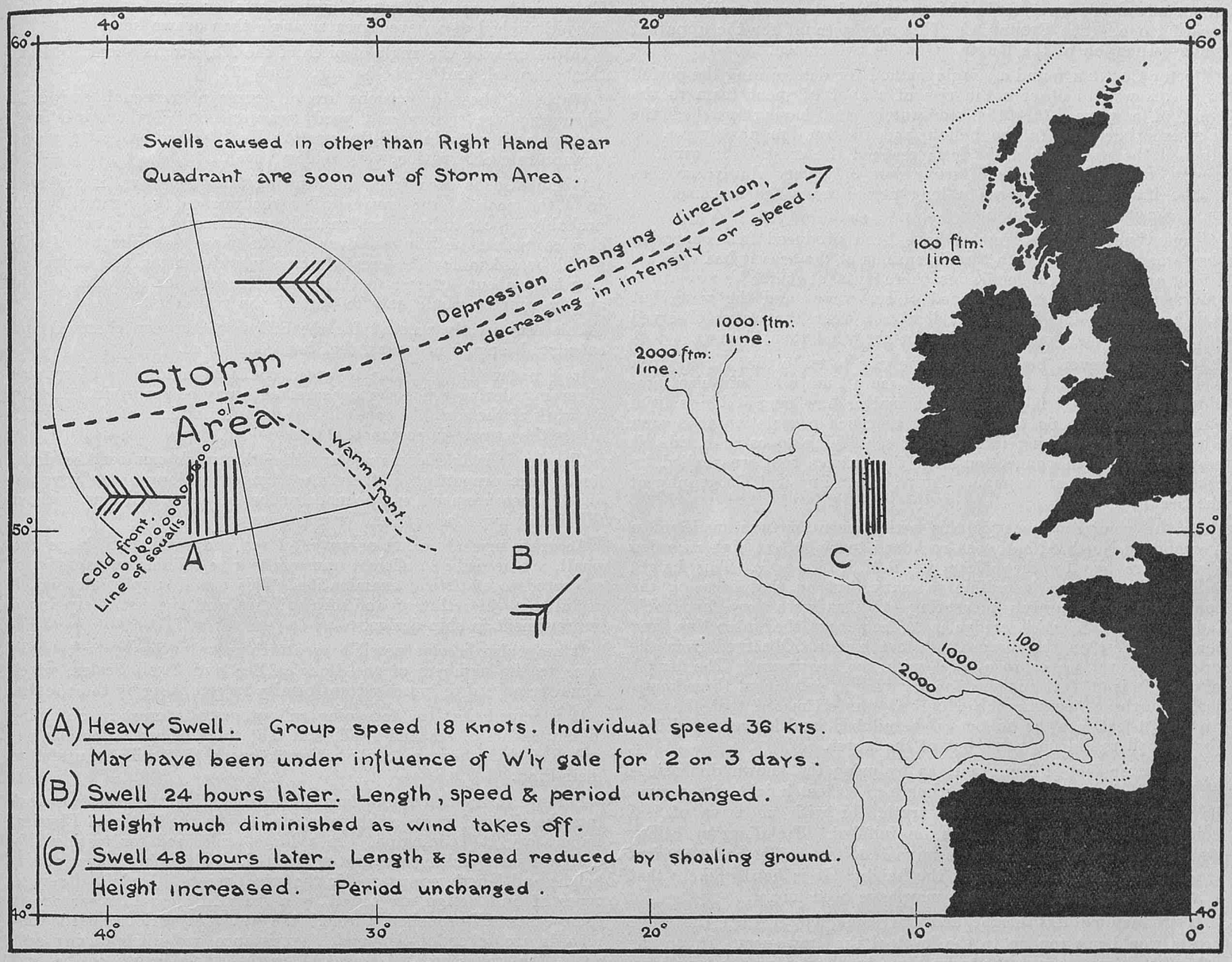


Figure 2.

the Northward, breaking the ten miles of thick fast ice in all directions as though it was made of paper.

When swell encounters land that is "steep to" it is sometimes reflected back to seaward again and by thus running counter to the "homeward bound" ones, piles up a very steep and unpleasant sea.

It appears that waves of all lengths are reduced to the same small speed by the time they break on a beach. Those originally long and swift are telescoped to a much greater extent than the slower ones, and therefore attain as breakers a greater increase in height.

In parts of the world where severe tropical revolving storms occur, the appearance of a long ocean swell has always been regarded by seamen as a warning. Even nowadays, when wireless reports of these storms are fairly general, the direction from which a long swell comes will be worth noting, as being a possible aid to deducing successive positions of the centre of the disturbance.

The extreme example of a wave of water so long as to be quite imperceptible is the great rythmical rise and fall of the ocean surface which constitutes the tide. At ocean islands it is only noticed as a slight rise and fall of about three or four feet, and causes no tidal currents. At intervals of somewhat more than twelve hours the crests of this vast though imperceptible wave of water must pass each point of the deep ocean with a speed of several hundred miles an hour! From crest to crest it is thousands of miles long, but the vertical height is only a few feet.

Observation.

Some methods of measuring seas and swells are suggested in THE MARINE OBSERVERS HANDBOOK, 5th Edition, page 52, for any readers who wish to try their hands at it. Looking from a ship at sea with the idea of making these measurements, the ship herself is the only object of known size that affords a scale to measure by.

For measuring the height, sensitive aneroids have been tried, but it is not a method likely to be used in ordinary practice at sea. The most practical way seems to be by taking the mean of a number of measurements of height by eye, by getting the wave tops in line with the horizon, as suggested in THE MARINE OBSERVERS HANDBOOK. Unfortunately, in big ships it is often not possible to get low enough to so observe any but the biggest seas. On the other hand, the improved stability and steadiness of modern big ships affords a better platform to observe from.

In trying to note the time taken by a wave in running the length of the ship, and the time interval elapsing between the arrival of successive waves, two observers will simplify the work, by assisting and checking each other. A stop-watch will be a great help. The effect of the ship's bow and stern waves must be reckoned with.

Timing the passage of a wave along the ship's side is difficult, as it is not always possible to keep the exact crest of a wave in view. With the larger swells the observer, unless stationed on the high bridge of a big ship, would probably take a spot on the shoulder

of an advancing wave to be the crest, and the same with the retreating one. (See FIGURE 3.) This may account for the apparent under-estimation of the length of swells by seamen.

Doctor CORNISH found a simple method for determining the period of waves was to observe the rise of a spot of spent foam to the crest of a wave, start the stop-watch, and having watched the foam spot descend to the hollow and rise on the next wave, he stopped the watch when the form reached the crest. The wind, of course, drifts these spots of foam, but only very slowly, so that in the few seconds of even a long period wave the movement of the foam would be negligible.

From time to time formulas have been produced for connecting the force of the wind with the dimensions of the seas it has created. Under absolutely ideal conditions, there must, of course be a relationship between the size and speed of sea waves and the wind, but it is practically impossible to tell at sea when the waves observed have reached their maximum size for the wind then blowing.

It may, however, be possible some day to state that for a given wind force the sea can never attain more than a certain size, provided the " fetch " is sufficient, no matter how long it blows from one direction. While this may not be much consolation to a man whose ship is punching into a head sea trying to catch a tide, it may be of use in connection with the science that was called by that great American seaman, MAURY, the " Physical Geography of the Sea."

At the commencement of this article mention was made of a tremendous North Atlantic sea reckoned to be 80 feet high recorded some years ago by the officers of R.M.S. *Majestic*. This height will no doubt seem incredible to many, but on that occasion the conditions for accurately measuring the seas were very favourable indeed. The *Majestic's* bridge is 90 feet above the water line, and the crows-nest on the foremast 20 feet higher. Observed from the bridge, several waves rose level with the crows-nest. The length of the ship is 915 feet and she was steaming at only about three knots, just enough to keep her head on. It was estimated that the bow dipped 30 feet into the hollow as she pitched, and it was noted that the propellers did not come out of the water.

This latter fact is important, as by using the known dimensions of the ship it seems that the estimate of 80 feet height of sea must have been somewhere near the truth, for with no wave of less height could all the conditions be fulfilled. The diagram below, which is drawn to scale, shows a wave of 80 feet height and 1,500 feet length ; that is about 19 times the height. It is hardly likely that it was steeper than that, but it may have been longer.

If we assume less height and the same length then the wave crests would not top up to the level of the crows-nest. If, on the other hand, we steepen the wave slope by shortening the length to, say 1,200 feet (15 times the height) then she would surely have pitched the screws out of the water.

The sea would not, of course, appear as the smooth curve in the drawing, but would have its shape partly obscured by smaller rough seas. Also, it is not a trochoid but is simply a flowing curve drawn freehand.

The four-masted barque is also drawn on the diagram to illustrate how it would be possible for a man standing on her forecastle head to see the next wave astern level with the mizzen lower-topsail yard! This might occur, of course, with a smaller sea, but only if the barque pitched at an even greater angle than drawn here.

In the drawing the angle of pitch of the *Majestic* is about 10° from the horizontal, and of the barque, about 12°.

Waves of these dimensions are of course phenomenal, and even when they are encountered good measurements of them are rare, because such suitable conditions as the *Majestic* had on that occasion for accurate observation, very seldom occur.

It can also be seen from the drawing that the wave, if observed from the poop of the barque when she was in the hollow, would probably appear to have less length between crests than it really had, because points on the shoulder of the wave (at about " AA ") would be taken for the crests, which would shorten the estimated length by about 400 feet in this case. The smaller seas that would also be running would help to obscure the real crest.

This may partly account for the difference between observed and calculated lengths of waves, that has been noted.

It is naturally advisable to avoid confused conditions of sea for observing, during which the measurements may be uncertain. As with all work of the sort, the care, discretion and patience of the observer are of the utmost importance.

Clearly, it is in Merchant ships that this work can best be done, for a large proportion of them are engaged on long ocean voyages, and the measurements can be made under the best conditions, without the modifying effect of land or shoal water.

Accurate measurements of waves of sea and swell, both large and small, are needed in sufficient numbers to give reliable averages when subjected to statistical examination. This would supply information useful to naval architects and ship builders, and so assist in continued improvement in ship design.

It may also become possible to attach more or less definite wave sizes to the numbers of the Douglas Sea and Swell Scales, which would be an aid to increased uniformity in recording by these scales.

It is hoped that the foregoing will promote interest in obtaining measurements of sea and swell, and that those officers attempting it will feel that they are contributing to work that will be useful to their kind.

Perhaps it is not out of place here to mention the research work into the effect of waves on ships carried out in the National Physical Laboratory at Teddington. In a large tank used for testing ship design a wave-making apparatus is fitted. This makes waves of any height and length necessary for the experiments. Models of several types of hull design are towed by a travelling carriage, or are in some cases self-propelled, through the waves at various speeds, and records are taken of the models' resistance and pitch during each run. The waves created travel along the whole length of the tank in accordance with the natural laws governing the propagation of gravity controlled waves. Great care is taken to reproduce in miniature for the models, the various types of sea and swell that real ships encounter.

The waves, after being reflected from the other end of the tank, travel back again to their starting place, where, the " wave-maker " being turned down out of the way, they are allowed to break on a shelving beach. Results of experiments of this sort have without doubt contributed to the improved efficiency and fuel economy of recent ship design.

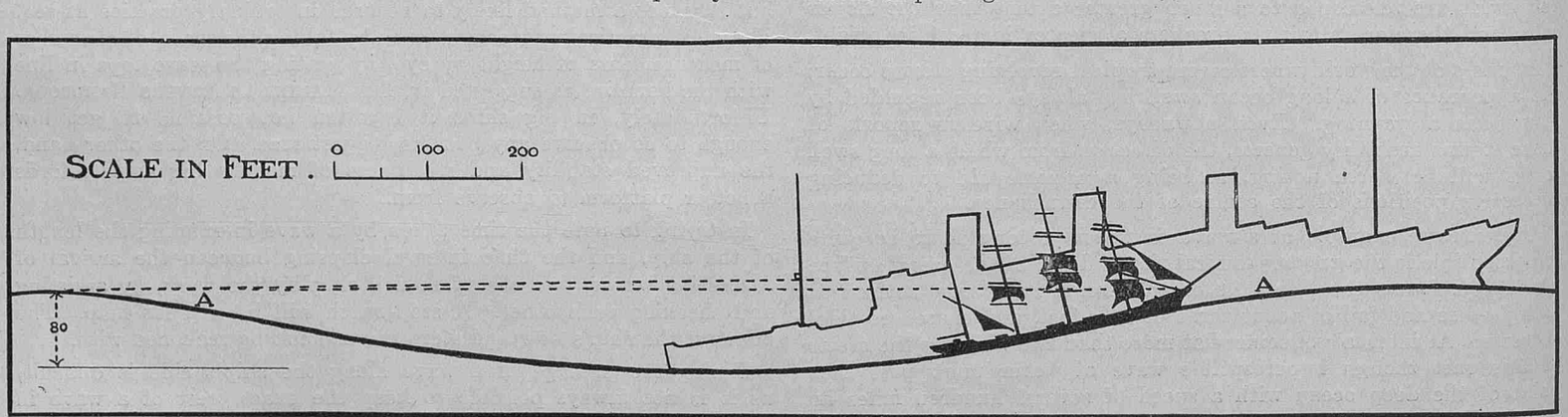


Figure 3.

THE JOHN MURRAY EXPEDITION.—II.

By Professor J. Stanley Gardiner, F.R.S.

The *Mabahiss* has since our last report completed three further voyages, during which 45 hydrographic stations were worked—the 100th on Christmas Day—the total to date being 135. The first voyage commenced on December 13 from Bombay to Mombasa, which was reached on January 1. Observations and water samples were obtained at 12 stations, the ship in such deep waters having to lie to for about half a day for each. Furthermore, a strong head current was encountered as the African coast was approached.

Near Bombay further indications of the lifeless bottom zone, found off Ras al Hadd, were met with showing that it extends right across this top part of the Arabian Sea. Its cause is still a complete mystery, no similar lifeless areas having as yet been found in any open ocean where water circulation is unrestricted, though common enough in deep waters with shallow sills such as the Red Sea, Black Sea and some of the deep pools found within the Malay Archipelago. The only cause at present suggested is the seepage of oil from the lands N., E. and W., all of which are oil bearing, but this theory is really one of desperation.

The flow of water in this same region has now been further traced, the main interest lying in the passage of water of high salinity out of the Persian Gulf to the S.E. At the head of the Gulf of Oman this mass of water lies at a depth of 110-160 fms. and when traced to the south is found to have attained a depth of 382 fms. off Bombay. So far as the topography was concerned, many blank areas were filled in, but in about Longitude 59° E., a little W. of the 1950 fms. marked on the Admiralty Chart, a depth of 1650 fms. was recorded, a ridge at least 4500 ft. high with depths of 2400 fms. to the N.E. and 2910 fms. to the S.W. This it will be seen later is probably part of a long mountain chain.

Mombasa proved very relaxing and mosquito ridden. It was Ramadan too, and the Egyptian crew of the *Mabahiss* were strict to obey the fast. In consequence of these conditions there was an outbreak of malaria and other sicknesses in the next cruise, which was laid out to be a series of zig-zags to the S. of Mombasa out into the deep waters to the E. Unfortunately the N.E. Monsoon gradually rose to gale force, the weather continuously heavy throughout January. For a part of the time the *Mabahiss* was confined to the shallower waters between Pemba and the mainland, where, however, the channel reaches a depth of over 470 fms. When attempting to take hydrographic stations in the deep waters to seaward, the confused and heavy seas tossed her about in every direction, and there were serious losses of deep sea thermometers and water bottles. While trawling within the shallower depths, her nets were badly torn by coral, but in spite of this rich hauls of the bottom life were obtained, mostly of the lower animals though in one haul over 114 fish were secured belonging to more than 20 species, with over 700 starfishes of different sorts in another haul. The general impression allies this fauna with that on the southern part of the Gulf of Aden rather than with that of the Arabian shore.

After coaling at Zanzibar, the third voyage, the seventh of the whole series, commenced. The hull of the *Mabahiss* was dirty; she had not her Welsh coal and the N.E. Monsoon was still heavy so that speed was reduced to 5-6 knots. The Seychelles, 900 miles to the E., most charming and beautiful of islands, granite peaks deeply cut into valleys and ravines covered by masses of palms and ferns, an ancient and peculiar vegetation of a past geological age, were visited for coal of which a small supply is stocked. Here there is an excellent harbour off Mahè closed in by islets and reefs, the islets about 153 square miles of land on a shallow bank of about 22,000 square miles. The granite is the alkaline granite of India, Madagascar and S. Africa, so that there is every probability that these lands are peaks left behind when the Gondwana continent was finally submerged in cretaceous times.

The weather on leaving improved and a course was set through the Kardiva Channel in the Maldives to Colombo. A good series of hydrographic stations were worked and the echo sounder was kept in activity all the way. The bottom proved irregular and in about lat. 1° 20′ S., long. 60° 30′ E., a low ridge was crossed, the water shoaling to 1,570 fms., increasing to 2,600 fms. to the E. The bottom then rose to a second ridge in long. 66° 00′ to 67° 30′ E., over which there was a general depth of 1,600 to 1,200 fms. with two patches at 900 fms. Between the latter a deep valley at 1,800 fms. (thus 5,400 ft. in depth below its mountain side) was discovered and bottom samples of rock obtained here were identified in Ceylon as a basaltic rock quite similar to that found in Deccan. These soundings with those on the last cruise and previous soundings indicate a ridge of shallower water extending from the Chagos to Sokotra, the real geographical boundary of the Arabian Sea to the S.W. At 2,352 fms. further towards the Maldives a yellow ooze was found to cover the bottom, this the Red Clay recorded by Sir John Murray as peculiar owing to the shallowness of the bottom, such a deposit not generally occurring above 3,000 fms.

In this voyage the hydrographic stations were most successfully worked. On the surface the water was streaming to the S.W. under the N.E. monsoon while immediately below this there was a counter current in the opposite direction round about 135 fms. At approximately 400 fms. the current was again moving to the W., but in long. 68° E., this mass of water was deflected downwards, its greater part pouring over the Chagos-Socotra ridge to the south-western basin. On either side of this ridge there is a still deeper water mass of low salinity and much lower temperature (thus of less specific gravity) that is almost certainly derived from the great Antarctic bottom drift.

In Colombo the *Mabahiss* was hauled up on to the slipway, scraped and generally cleaned up, a good rest being also secured for her crew. She left from there on 16th March, having recruited Major Glennie of the Indian Survey, for the Maldives, where magnetic and pendulum observations are to be made in the hope of ascertaining the depth and nature of the rocks underlying these coral formations.

CURRENTS OF THE RED SEA AND THE PART OF THE INDIAN OCEAN NORTH OF AUSTRALIA.

Prepared in the Marine Division by E. W. Barlow, B.Sc.

II.—Currents in the half-year, May to October.

In this article the information obtained from the present charting of the currents for May to October will be given. This period constitutes the Summer and Autumn seasons in the Red Sea and the Winter and Spring seasons in the Indian Ocean north of Australia.

Currents of the Red Sea.—The currents charted are mainly those experienced on the track from Suez to Perim, down the centre of the Red Sea, and coastal currents are therefore mostly excluded.

In both quarters currents flowing in any direction may be experienced throughout the whole extent of the Red Sea, but currents with sets between S. and S.E. predominate. The mean set of surface water in the Red Sea is therefore S.S.E., down the Sea, throughout the six months. The mean drifts are weak because of the frequency of currents flowing in all directions.

South of Latitude 20° N. the southerly drifts are a little stronger and rather more frequent than in the northern part of the Red Sea.

The currents experienced are comparatively strong; on the average, out of every three currents, one has a drift of 13 miles a day or more, one is between 6 and 12 miles a day and one is less than 6 miles a day. The strongest current observed during the period 1910 to 1933, in May to July, was that recorded by S.S. *Clan Lamont* on 15th July, 1927, at the rate of 50 miles per day, S. 36° E., in the mid-position, Latitude 13° 24′ N., Longitude 42° 07′ E. A 24-hour current of 48 miles per day, S. 19° E., was recorded by S.S. *Elpenor* on 31st July, 1921, in the mid-position, Latitude 13° 22′ N., Longitude 43° 05′ E. In August to October, currents at the rate of 42 miles per day were recorded both in the northern and southern parts of the Red Sea.

An examination of the charts for the two quarters will show that the roses in the northern and southern parts of the Red Sea are very nearly the same. Furthermore the northern roses of the two quarters are almost identical in every detail, and the same applies to the southern roses. In both quarters the chart of mean arrows show that the greatest tendency for a vessel to be set in some southerly direction occurs in the middle latitudes of the Red Sea, also in the extreme north and south of the Sea.

Differences from Previous Knowledge.—The information given above shows definite points of difference from the older knowledge, as set out in the April number of The Marine Observer. It was stated there that "from June to September, the S.W. Monsoon period, the currents in the northern part of the Red Sea are variable but sometimes set to N.N.W. at rates up to 1 knot. The prevailing current in the southern part of the Red Sea is S.S.E., rarely more than 1 knot except in the Straits of Bab-el-Mandeb, where it may reach 1½ knots." Actually the current in the southern part of the Red Sea during this period is just as variable as that in the northern part. Furthermore, southerly sets predominate in the northern part as well as in the southern part and may exceed 1½ knots between Latitude 25° N. and 27° N. The statement that N.N.W. sets occur at rates up to 1 knot in the southern part of the sea is confirmed but it is also seen that the southerly currents experienced in the region of the Straits of Bab-el-Mandeb are stronger than were previously stated and may reach or slightly exceed 2 knots.

Currents in the Indian Ocean North of Australia.—Between the parallels of 10° S. and 12° S., to the eastward of Christmas Island, the Equatorial Current sets to the westward during the months of May to October. It is also found between the parallels of 12° S. and 14° S., from Longitudes 112° E. to 120° E., in August to October, there being no information for May to July in this region.

The mean drifts in the Equatorial Current range from 10 to 22 miles a day but are mostly based upon only a small number of observations. The S.E. Monsoon is blowing throughout the period over this part of the Indian Ocean.

The strongest currents experienced in the period 1910 to 1933 were two of 37 miles per day, the first recorded by S.S. *Baron Tweedmouth*, S. 74° W., on July 15th, 1914, in the mid-position Latitude 12° 19′ S., Longitude 114° 54′ E., and the second recorded by S.S. *Clan Murdoch* on May 18th, 1928, N. 69° W., in the mid-position Latitude 12° 04′ S., Longitude 106° 31′ E.

Through the Torres Strait and in the Arafura Sea westerly sets predominate in August to October and occasionally exceed one knot. Westerly sets also predominate south of Latitude 14° S., between Longitude 116° E. and the coast of Australia, so that the currents tend to set away from the land, but the currents here are variable and rather weak. In May to July the currents in both these regions are more variable.

In the Marine Observer's Log in the present number will be found details of currents observed on coastal voyages on the north-west coast of Australia, between the months of May and September, which have been received from Captain J. J. Airey.

SOUTHERN ICE REPORTS.

During the Year 1933.

July.

Year.	Day.	Position of Ice.		Description.	Remarks.	Name of Ship reporting.
		Latitude.	Longitude.			
1933	31	52° 29′ S.	143° 36′ W.	Berg	Approximately 100 feet high, 100 yards long and apparently 3 pinnacles.	S.S. *Maimoa*.

August.

None received.

September.

None received.

Reports of Ice previous to July, August and September, 1933, will be found in the Marine Observer, Vol. X, No. 111, p. 100.

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. 27–38 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 reports from "B Selected Ships" also in accordance with those instructions.

To decode these reports, and for ships other than "Selected Ships" to have 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. 30, paragraph (27), and p. 31, paragraph (34) of the January 1934 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 27 OF VOL. XI, NO. 113, JANUARY 1934 MARINE OBSERVER.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length.		Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
				For Station to call up "Selected Ships."	For "Selected Ships" to report to Station.				
North Atlantic and North Sea.	Portishead.	Lat. 51° 28′ 41″ N. Long. 2° 47′ 30″ W.	GKU.	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	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.,	Lat. 41° 42′ N. Long. 70° 00′ W.	WCC.						
	Sayville N.Y.	Lat. 40° 45′ N. Long. 73° 06′ W.	WSL.						
	Rockland.	Lat. 44° 09′ N. Long. 69° 13′ W.	WAG.		142·9 kc/s. (2098 metres).	North Atlantic West of Longitude 40° W.	Observer Washington.	Weather only. First four groups of observations taken at 0000 and 1200 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.
	West Palm Beach.	Lat. 26° 42′ N. Long. 80° 02′ W.	WMR.						
	Palm Beach.	Lat. 26° 42′ N. Long. 80° 02′ W.	WOE.						
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′ 51″ S. Long. 30° 58′ 38″ 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′ 51″ 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. 29, of the January 1934 number.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long. 114° 15′ 11″ E.	VPS.	8330 kc/s. (36 metres) or 500 kc/s. (600 metres).	143 kc/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. 73 and use wavelength 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. 29 of the January 1934 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° 35′ 00″ S. Long. 47° 18′ 45″ W.	PPL.	Meteoro Rio.	Weather only, including supplementary groups.	
	S. Luiz	Lat. 2° 31′ 48″ S. Long. 44° 16′ 51″ W.	PXM.			
	Fortaleza	Lat. 3° 46′ 21″ S. Long. 38° 32′ 26″ W.	PPC.			
	Natal	Lat. 5° 46′ 41″ S. Long. 35° 18′ 24″ W.	PXN.			
	F. Noronha	Lat. 3° 50′ 24″ S. Long. 32° 24′ 48″ W.	PXF.			
	Olinda	Lat. 8° 00′ 35″ S. Long. 34° 51′ 00″ W.	PPO.			
	Amaralina	Lat. 13° 00′ 12″ S. Long. 38° 30′ 45″ W.	PPA.			
	Abrolhos	Lat. 17° 57′ 30″ S. Long. 38° 41′ 05″ W.	PXH.			
	Victoria	Lat. 20° 10′ 00″ S. Long. 40° 17′ 46″ W.	PPT.			
	Rio	Lat. 22° 53′ 42″ S. Long. 43° 13′ 24″ W.	PPR.			
	Santos	Lat. 23° 56′ 27″ S. Long. 46° 19′ 28″ W.	PPS.			
	Floriano-polis.	Lat. 27° 36′ 00″ S. Long. 48° 30′ 18″ W.	PPF.			
	Juncçao	Lat. 32° 04′ 00″ S. Long. 52° 07′ 00″ W.	PPJ.			
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 51″ S. Long. 30° 58′ 38″ 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′ 51″ E.	VPQ	Weather Nairobi.		
	Dar-es-Salaam.	Lat. 6° 50′ 38″ S. Long. 39° 17′ 24″ E.	ZBZ	Weather Nairobi.		
	Mauritius.	Lat. 20° 23′ S. Long. 57° 35′ 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. 32° 01′ 51″ 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′ 36″ 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′ 27″ S. Long. 168°22′21″E.	ZLB.			
	Chatham Island.	Lat. 43° 57′ 02″ S. Long. 176°31′04″W.	ZLC.			
	Rarotonga.	Lat. 21° 11′ 54″ S. Long. 159°48′51″W.	ZKR.			
	Apia.	Lat. 13° 15′ 17″ S. Long.170′49′42″W.	ZMA.			
	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, obtainable from H.M. Stationery Office, price 3d.).

The Key letters are fully described on p. 35 of the January, 1934, 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.

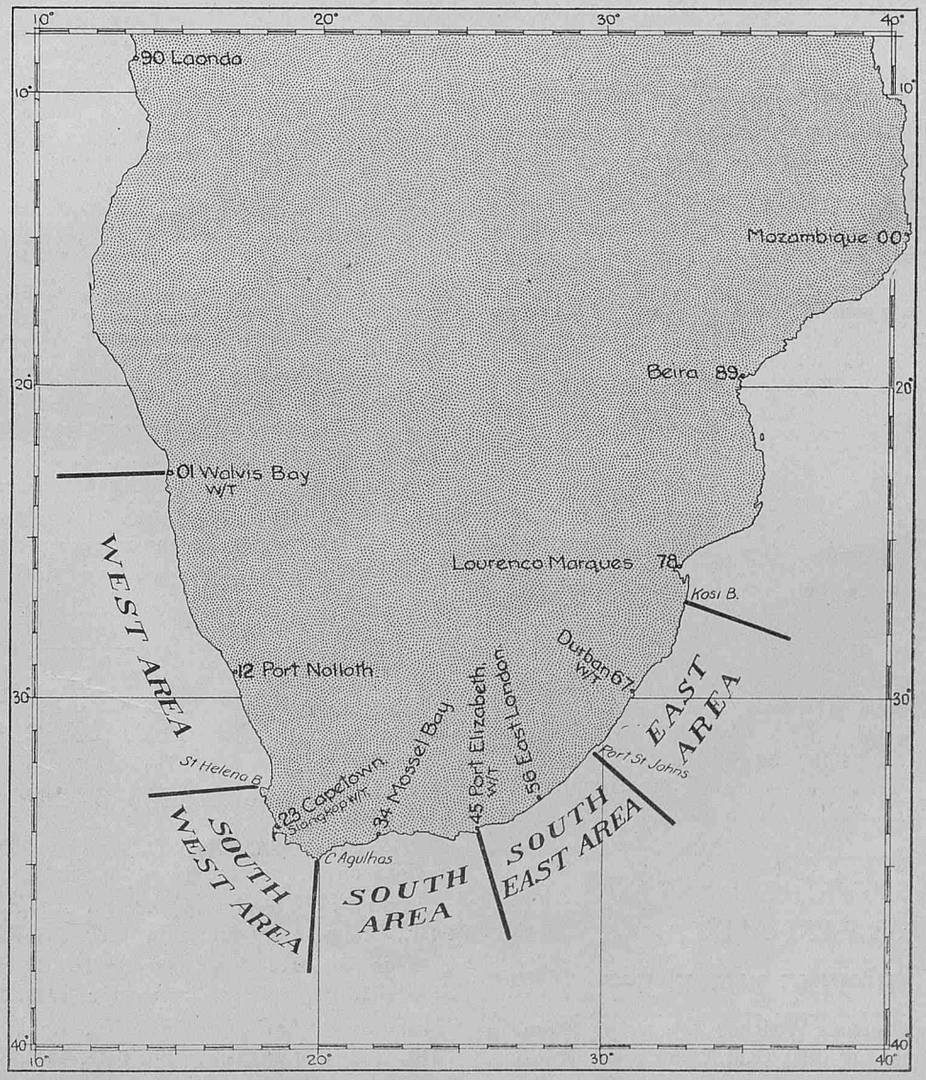
Key letters—IICAK DDFww BBVTT.

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.	Position approx. Lat-itude.	Long-itude.	Call Sign.	Times of Transmission. Station reports. G.M.T.	Forecasts. G.M.T.	Station distinguishing figures (see Chart p. 115).
Walvis Bay† ...	22°58′S.	14°30′E.	**ZSV**	0850	1250	23, 12, 01, 90.
Capetown (Slangkop).	34°09′S.	18°19′E.	**ZSC**	0930	1220	56, 45, 34, 23, 12, 01.
Port Elizabeth (Algoa Bay).	33°57′S.	25°35′E.	**ZSQ**	0820	1230	67, 56, 45, 34, 23.
Durban (Jacobs)...	29°56′S.	30°59′E.	**ZSD**	0850	1205	89, 78, 67, 56, 45.

† 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.

III.—WIRELESS TIME SIGNALS.

Cape Town 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.		G.M.T. 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 115.

W/T Station.	Position approx. Lat-itude.	Long-itude.	Call Sign.	Times of Transmission. Station reports. G.M.T.	Forecasts. G.M.T.	Station distinguishing figures (see Chart p. 115).
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 issued.	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.		G.M.T. 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 **V.R.S.**

Wavelength 600 metres.

Times of transmission (During cyclone season only—1st November to 15th May).

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. 35 of the January, 1934, 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.
Reunion	21° 20′ S.	55° 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 **G.Z.P.**

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.

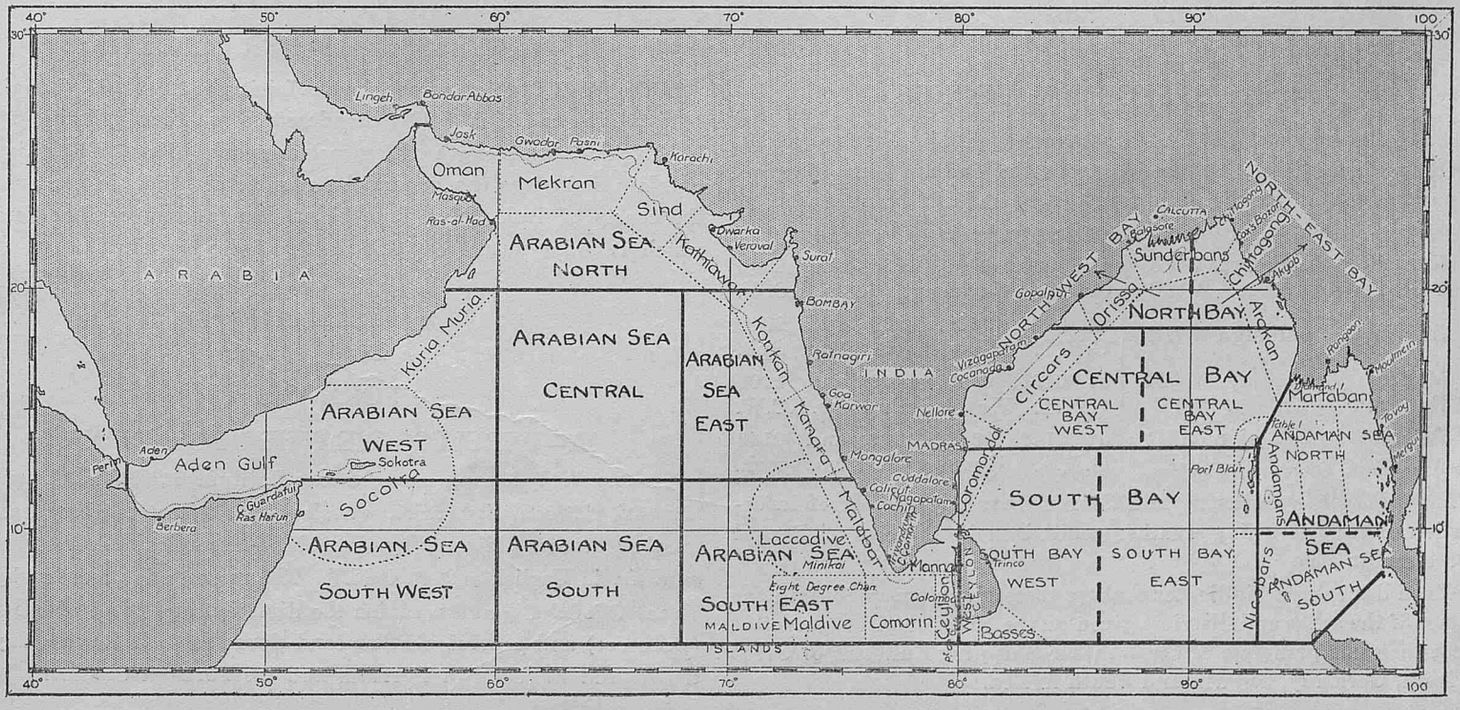
0800 G.M.T.—brief summary of weather conditions and a forecast for the following areas shown on the chart:—

"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. 35 of the January, 1934, 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.	Position approx. 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.	Stations.	Position (approx.). Latitude.	Position (approx.). Longitude.	Call Sign.	Wavelength, metres.
0830 and 1630	**Karachi** ...	24° 51′ N.	67° 03′ E.	**VWK**	1,550 (C.W.)†
0830 and 1630	**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.)
0900 and 1700	**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.)
0948 and 1748	**Matara** ...	6° 01′ N.	80° 36′ E.	**GZP**	2,000 ,,

* After the time signal.

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

During disturbed or stormy weather "Extra" messages preceded by the W/T Safety Signal (TTT), will be broadcast, if necessary, on 600 metres at the following times:—

0030 G.M.T.; by **Karachi**, and **Calcutta W/T Stations.**
0100 G.M.T.; by **Madras**, and **Rangoon W/T Stations.**
0000 G.M.T.; by **Bombay W/T Station.**
0148 G.M.T.; by **Aden** and **Matara W/T Stations.**

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 600m. I.C.W.
Calcutta	,, ,,	**VWC**	
Bombay	call sign	**VWB**	at 0000, 0400, 1200 and 2000 G.M.T. Wavelength 600m. Spk.
Madras	,, ,,	**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 600m. 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. 117 on some what 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.

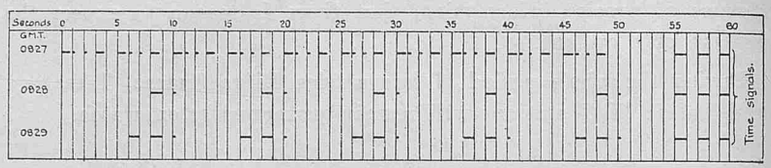


Figure 1.

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 sign **G.Z.O.**

Wavelengths 2650 m. C.W. and 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. 35 of the January 1934 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.	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.
GR	812	Gap Rock	21° 49′ N.	113° 56′ E.
PR	814	Pratas I.	20° 40′ N.	116° 47′ E.
PL	—	Phulien	20° 48′ N.	106° 37′ E.
TR	—	Tourane	16° 08′ N.	108° 17′ E.
CJ	—	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	—	Fort Bayard ...	21° 05′ N.	110° 30′ E.
DH	—	Dong Hoi	17° 33′ N.	106° 37′ E.
PD	—	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.

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. and on a wavelength of 2913 m. at 0500 and 1300 G.M.T. respectively.

Wireless Telephony, R/T Issues.

Victoria Peak, 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 to Gap Rock.

WIRELESS STORM WARNINGS.

Cape d'Aguilar W/T Station, approximate Latitude 22° 13′ N., Longitude 114° 15′ E., call sign **VPS**, broadcasts typhoon warnings on 600 metres I.C.W., on receipt and at the two subsequent hours, also at 0400 and 1200 G.M.T. The warnings are repeated at 0500 and 1300 G.M.T. on a wavelength of 2913 metres I.C.W.

When a typhoon is definitely threatening Hong Kong the warnings are sent every hour.

Wireless Telephony R/T Issues.

Victoria Peak 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, also at 0500 and 1200 G.M.T. When a typhoon is definitely threatening Hong Kong the warnings are sent every hour.

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 a wavelength of 2913 metres (I.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. 55m. and between 12h. 53m. and 12h. 55m., 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 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 Southeast 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. Wave length, 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.

Wavelength 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 28·5m. 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 650 metres, I.C.W. and **FFZI** on 36·5m. C.W. simultaneously after the general call (CQ de FFZ) " Shanghai time signal ", in the following manner:—

G.M.T. h. m. s.		G.M.T. h. m. s.	Signal.
28	55 00 to	28 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	— — -
28	59 55 „	39 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** call sign, **JGA**, broadcasts 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.

Time 2300 G.M.T.
„ 0450 G.M.T.
„ 1100 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 forecasts 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.

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

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.

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 waters, 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. 111 and 112.

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.

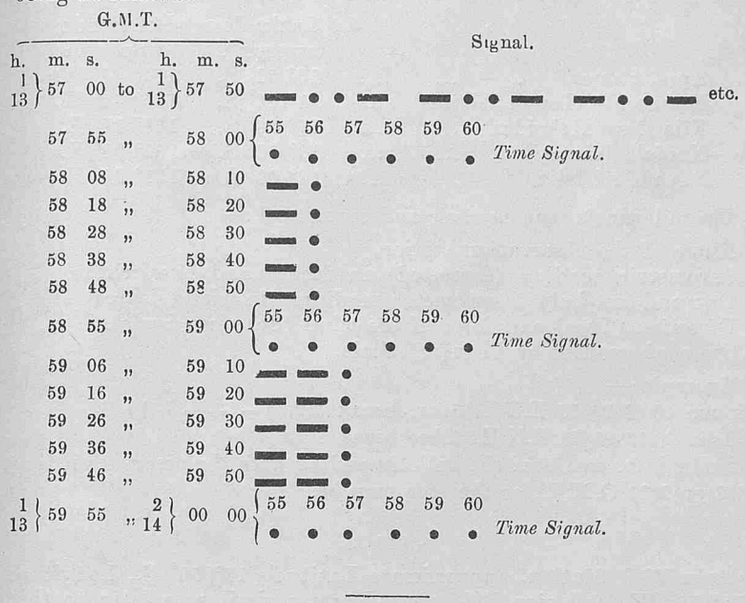
Station.	Call Sign.	Wave-length (metres).	G.M.T.	System.
Perth Lat. 32° 01′ 51″ S. Long. 115° 49′ 31″ E.	VIP	600 (I.C.W.).	0057–0100 1257–1300	(*See* Time Signal Figure, p. 118). Controlled by Perth Observatory.
Adelaide Lat. 34° 51′ 14″ S. Long. 138° 31′ 55″ E.	VIA	600 (I.C.W.).	0027–0030 1227–1230	(*See* Fig. 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.M.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:—



NEW ZEALAND.

II.—WIRELESS WEATHER BULLETIN.

Wellington W/T Station, approximate position Latitude 36° 51′ S., Longitude 174° 46′ E., call sign **ZLW,** broadcasts a weather bulletin *en clair* at 0930 G.M.T. on a wavelength of 800 metres I.C.W. giving a general statement of weather conditions for New Zealand waters followed by forecasts for New Zealand, New Zealand waters, and the Tasman Sea and actual observations of Barometric pressure (inches); Air temperature (°F); Wind direction and force; state of weather (Beaufort); and state of sea at the following stations:—

	Position approx.	
	Latitude.	*Longitude.*
Norfolk Island	29° 04′ S.	167° 58′ E.
C. Maria Van Diemen ...	34° 28′ S.	172° 39′ E.
Auckland	36° 50′ S.	174° 50′ E.
East Cape	37° 42′ S.	178° 33′ E.
Cape Egmont	39° 17′ S.	173° 46′ E.
Napier	39° 29′ S.	176° 55′ E.
Farewell Spit	40° 33′ S.	173° 01′ E.
Stephens I.	40° 40′ S.	174° 01′ E.
Wellington	41° 17′ S.	174° 46′ E.
Cape Campbell	41° 43′ S.	174° 17′ E.
Greymouth	42° 26′ S.	171° 13′ E.
Akaroa Lt. Ho.	43° 49′ S.	172° 59′ E.
Nugget Pt.	46° 27′ S.	169° 51′ E.
Puysegur Pt.	46° 10′ S.	166° 38′ E.
Chatham Is.	43° 52′ S.	176° 42′ E.
Sydney	33° 52′ S.	151° 12′ E.
Hobart	42° 53′ S.	147° 20′ E.

III.—WIRELESS TIME SIGNALS.

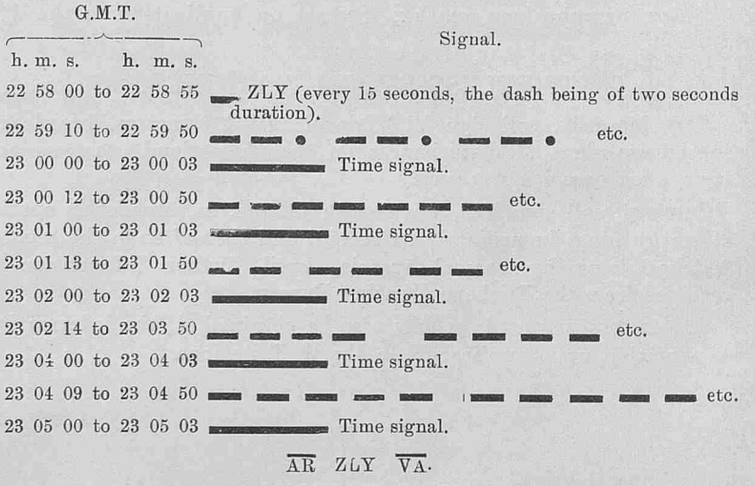
The Dominion Observatory, Wellington, Latitude 41° 17′ 04″ S., Longitude 174° 46′ 04″ E., call sign **ZLY,** broadcasts time signals daily, on 600 metres (I.C.W.) as follows:—

The transmitting key at the W/T station is automatically operated by the Standard Time Clock of the Dominion Observatory (Latitude 41° 17′ 03.8″ S., Longitude 174° 46′ 00.0″ E.).

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

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

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

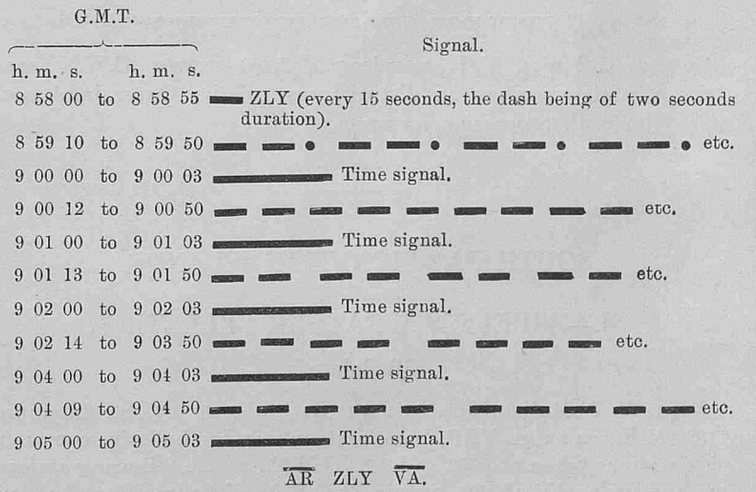


In addition to the above, the undermentioned time signals are broadcast on Tuesdays and Fridays, except on New Zealand Government holidays, by the Dominion Observatory, Wellington.

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

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

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



NOTE.—(1) Other signals which are transmitted by hand in addition to the automatic time signals must *not* be used as time signals.

(2) The signals are relayed by **Wellington W/T Station (VLW)** on 600m. I.C.W.

(3) All hand Key signals, except in the 58th minute, terminate on the 50th second, to enable the observer to take the signal accurately.

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.

Fiji Islands.

Suva W/T Station, approximate Latitude 18° 09′ S., Longitude 178° 28′ E., call sign **VRP**, broadcasts a weather bulletin, containing observations taken at 0330 and 2030 G.M.T., at the following stations, on a wavelength of 600 metres (I.C.W.), directly after the Apia broadcast (see below) at 0835 and 2335 G.M.T. (0835 G.M.T. only sent from 1st May to 31st October), Sundays 0845 only:—

	Latitude (approx.).	Longitude (approx.).
Apia, Samoa	13° 51′ S.	171° 48′ W.
Nukualofa (Tonga Islands) ...	21° 08′ S.	175° 12′ W.
Fila (New Hebrides)	17° 44′ S.	168° 19′ E.
Norfolk Island	28° 58′ S.	168° 03′ E.
Suva (Fiji Islands)	18° 09′ S.	178° 28′ E.

The bulletin is sent *en clair* and consists of:—

Name of the observation station.
Barometric reading (corrected) in inches and hundredths.
Dry and wet bulb thermometer readings (in whole degrees F.).
Direction (True) and force of the wind (Beaufort Scale).
State of weather by Beaufort Scale.

Example:—

Suva 30.08 79 75 E.N.E. 5 or, break sign **(– - - - –)**
Apia 30.16 80 78 E.N.E. 3 bc, break sign
Nukualofa, etc., etc., the bulletin ending with the observation time, 0330 or 2030 G.M.T., as the case may be.

Samoa.

Apia W/T Station, approximate Latitude 13° 50′ S., Longitude 171° 50′ W., call sign **ZMA**, broadcasts a similar bulletin to that explained above at 0830 and 2330 G.M.T. on a wavelength of 800 metres (I.C.W.) (Sundays excepted). The station observations are the same as in the Suva message with the addition of the following:—

	Latitude (approx.).	Longitude (approx.).
Vavau (Tonga Islands) ...	18° 39′ S.	173° 59′ W.
Rarotonga (Cook Islands) ...	21° 12′ S.	159° 48′ W.
Papeete	17° 29′ S.	149° 29′ W.

WIRELESS STORM WARNINGS.

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

Fiji Islands.

Suva W/T Station, call sign, **VPD**, broadcasts hurricane warnings, when necessary, immediately after the weather bulletins which are transmitted soon after 0835 and 2335 G.M.T., on a wavelength of 600 metres (I.C.W.).

Samoa.

Apia W/T Station, call sign **ZMA**, broadcasts, when necessary, information concerning hurricanes in addition to the weather bulletins at 0830 and 2330 G.M.T., on a wavelength of 800 metres (I.C.W.). The message is sent *en clair* and commences with the general call to all stations, e.g.:—

QST. "Hurricane centre 200 miles N.W. of Suva at noon, 27th February, Apia time and date, travelling south."

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 2,000 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 A. Freer, R.N.R.

Captain A. FREER, commander of the R.M.S. *Duchess of Richmond* has retired after 45 years' service at sea, 35 of which were spent with the Allan and Canadian Pacific Steamships Ltd.

At the age of 15 Captain FREER entered the Royal Navy as a boy seaman, but owing to a serious illness was invalided after 18 months' service. On his recovery he joined the Merchant Navy and served in the Barques *Bothnia* and *Graigisla*. Later he served as an officer in the Barques *West York*, *Condor* and *Loch Trool*.

Having obtained all his certificates Captain FREER transferred to steam in 1899 and joined the Allan Line as a junior officer. When the Canadian Pacific Steamships Ltd. took over the Allan Line fleet he went over with the ships. Shortly after the war, during which he served in the Royal Navy, Captain FREER was appointed to command the Canadian Pacific liner *Monmouth* and has since had charge of several units of their fleet including the *Sicilian*, *Metagama*, *Tunisian*, *Bothwell*, *Brandon*, *Marburn*, *Melita*, *Montroyal* and *Duchess of Richmond*.

Captain D. S. McQueen.

Captain DAVID SINCLAIR MCQUEEN, commander of the R.M.S. *Duchess of Atholl* has retired after 44 years' service afloat.

Commencing his apprenticeship in 1890 he served in the sailing ships *Highland Glen*, *Loch Ness* and *Wendur*. On obtaining his first certificate he sailed as second mate in the ship *East Lothian* and, later, as mate of the four masted barque *Pass of Melfort*.

In 1900 he left sail for steam, joining the Allan Line as a junior officer and shortly after obtained his master's certificate when he joined the Anchor Line, with whom he served for two and a half years before again transferring to the Allan Line, which company was later taken over by the Canadian Pacific Steamships Ltd.

In 1924, Captain MCQUEEN was appointed to command the S.S. *Bosworth*, since when he has had charge of the *Berwyn*, *Bolingbroke*, *Brandon*, *Balfour*, *Montnairn*, *Metagama*, *Bawtry*, *Mount Royal*, *Marburn*, *Marloch*, *Minnedosa* and *Duchess of Atholl*.

Captain J. V. Reilly.

Captain J. V. REILLY, Commander of the B.I.S.N. Company's cadet training ship *Nardana*, has retired from active service afloat to set up in business as a Marine Surveyor in Melbourne.

Commencing his sea career in 1892, Captain REILLY served his apprenticeship in the sailing ship *Yarama* of Greenock, and subsequently served in the fleet of Messrs. Lamport and Holts before joining the B.I.S.N. Company in 1898. In 1904 he transferred to the Cunard Line which he left two years later to take up business ashore in Canada.

In 1909 he returned to sea, rejoining the B.I.S.N. Company as second officer. Obtaining command in 1916, Captain REILLY has commanded the *Kistna*, *Carpentaria*, *Woodarra* and *Nardana*, the last three vessels being employed as sea-going "Cadet training ships" for the B.I.S.N. Company's service.

A regular member of our corps since 1916, Captain REILLY's name has appeared in the list of Captains to whom the Meteorological Committee have made excellent awards on no less than 11 occasions.

We wish these officers health and happiness in their retirement and thank them for their work as members of the Corps of Voluntary Marine Observers.

OBITUARY.

The death of Captain H. LINKLATER commander of the R.M.S. *Llangibby Castle* which recently took place in a London Nursing Home after a short illness is noted with regret.

Captain LINKLATER commenced his sea career in 1890 and served in the sailing ships *Argo* and *Pileus* voyaging from the United Kingdom to San Francisco. On obtaining his second mate's certificate he transferred to steam and remained in cargo vessels, until 1899 when he obtained his Master's certificate and joined the Union Castle Line as a junior officer.

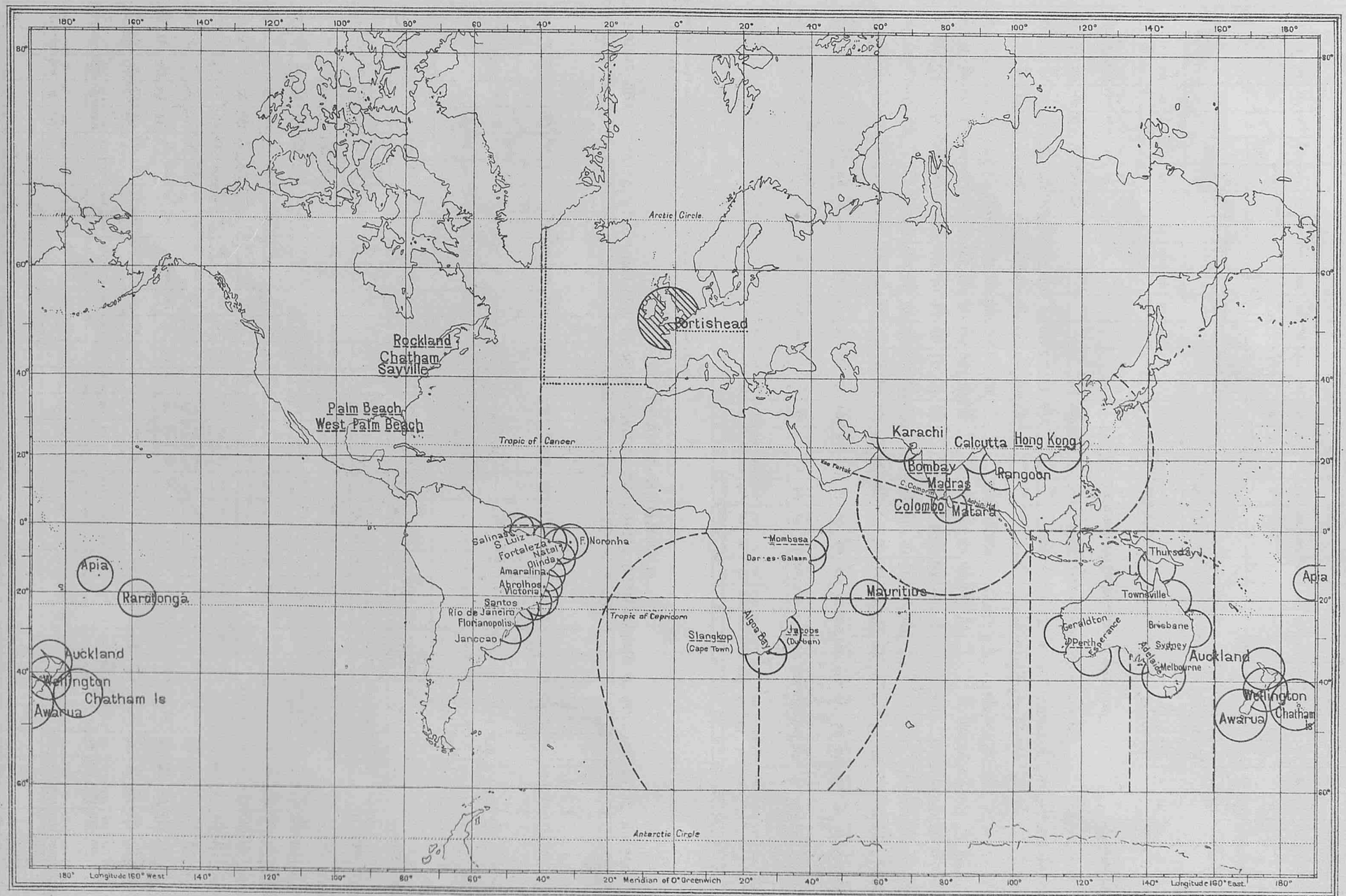
He was appointed to command in 1920 and has had in his charge several ships of the Union Castle Fleet including the *Dromore Castle*, *Garth Castle*, *Llandaff Castle*, and *Llangibby Castle*.

In 1913 when serving as Chief Officer of the *Cawdor Castle*, Captain LINKLATER was in charge of the lifeboat which rescued the crew of the sailing ship *Lucie* for which service he was awarded the Board of Trade silver medal for gallantry in saving life at sea.

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.

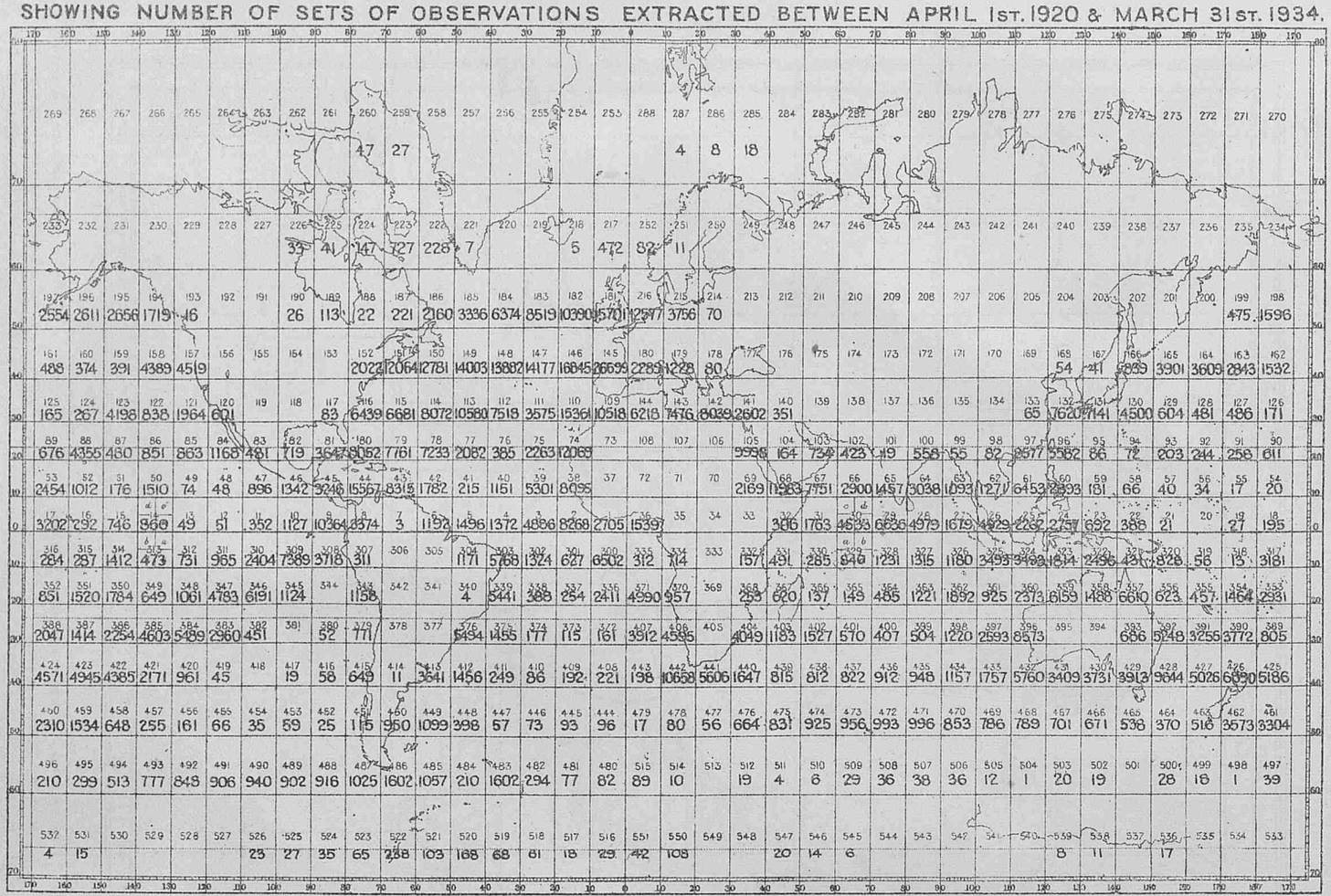
The small shaded areas round stations detailed to receive reports from "A Selected Ships" indicate where these ships should not report on account of congestion.

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

WORK OF THE YEAR.

MARSDEN CHART I

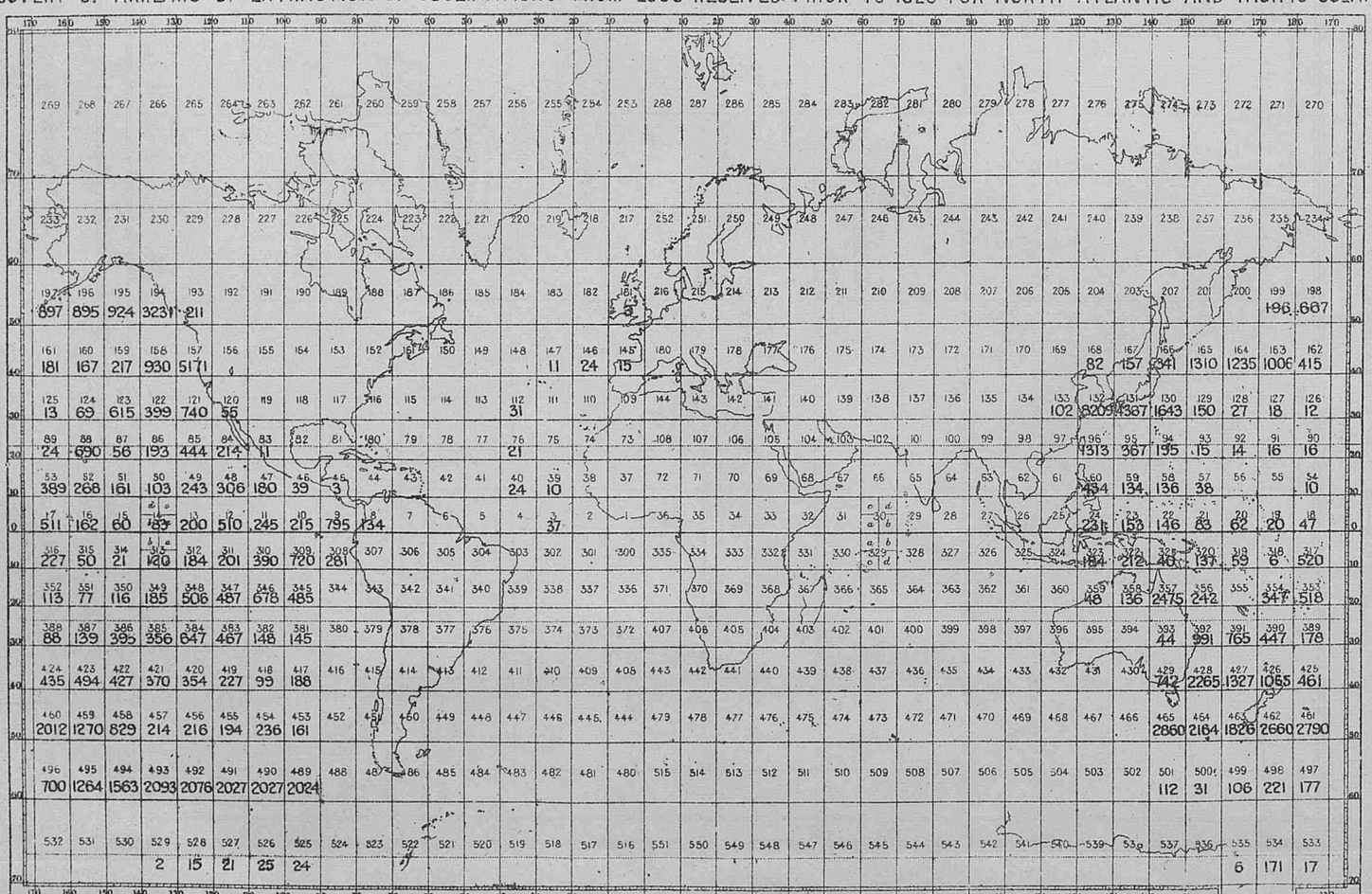
SHOWING NUMBER OF SETS OF OBSERVATIONS EXTRACTED BETWEEN APRIL 1ST. 1920 & MARCH 31ST. 1934.



Total observations extracted, 1920 - December 1929 — 682122
Total observations (New code) extracted, January 1st 1930 - March 31st 1934 — 222115
Grand Total since 1st April 1920 — 904237

MARSDEN CHART II.

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

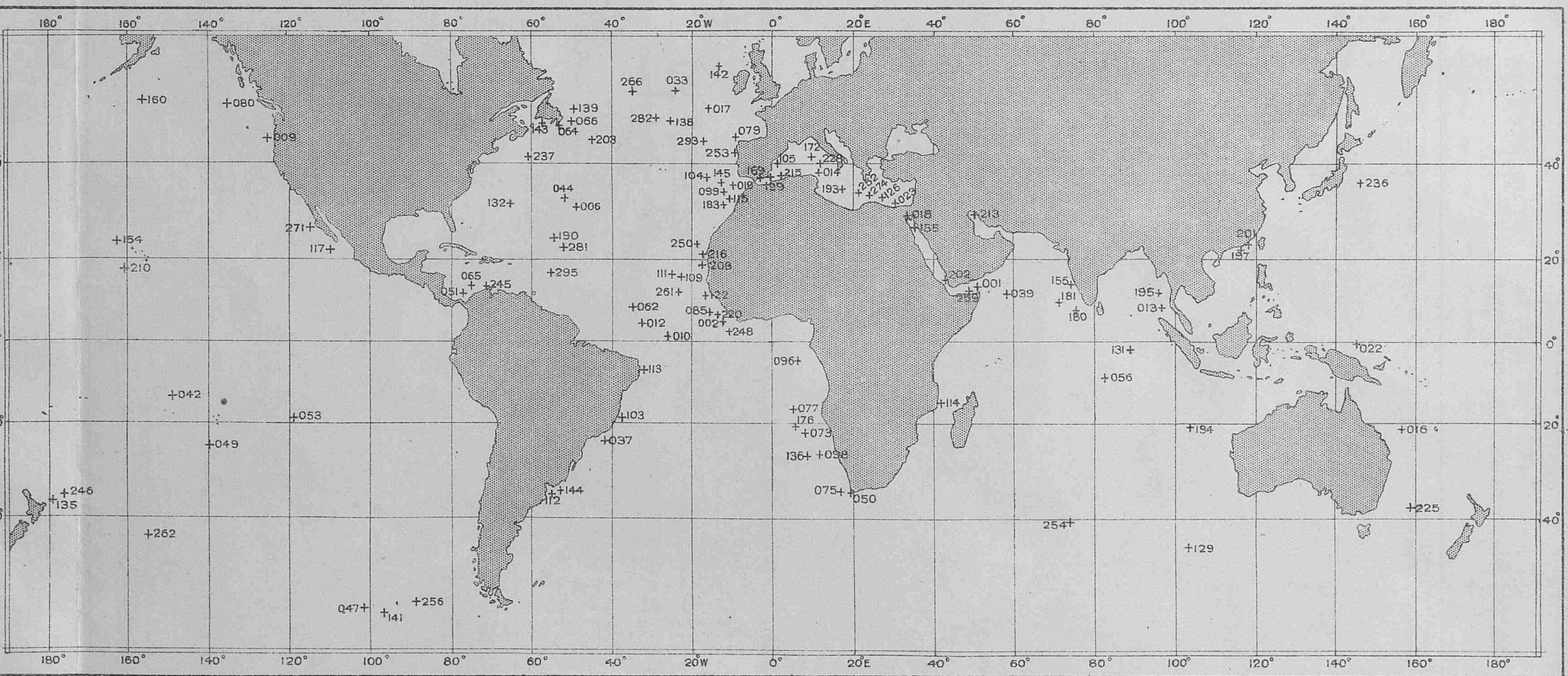


Total observations extracted, January 1st 1933 - March 31st 1934 for the years 1902 - 1919 = 100,400 observations.

WORK OF THE YEAR.

CHART III.

CHART OF THE WORLD SHOWING POSITION OF BRITISH SELECTED SHIPS AT SEA ON JUNE 1ST., 1933.



001. B. Clan Macphee.
002. B. Clan Macwhirter.
006. A. Coronado.
009. B. Elmworth M.V.
010. B. Port Fremantle M.V.
012. A. Almeda Star.
013. B. City of Cambridge.
014. B. Mahronda.
016. B. Comliebank M.V.
017. A. Aquitania.
018. B. Makalla.
019. A. Alcantara.
022. B. Alynbank.
023. B. Matheran
033. A. Scythia.
037. B. Baronesa.
039. B. Planter.
042. B. Maimoa.
044. B. Tacoma City.

047. B. Taranaki M.V.
049. B. Coptic M.V.
050. B. Clan Macalister.
051. B. Pacific Enterprise
053. B. Rotorua.
056. B. Westmoreland.
062. A. Asturias M.V.
064. A. Laurentic.
065. A. Akaroa.
066. A. Empress of Australia.
073. B. Nagara.
075. B. Hobson's Bay.
077. A. Edinburgh Castle.
079. A. Deseado.
080. B. Orari.
085. B. Governor
096. A. Windsor Castle.
098. A. Dunbar Castle. M.V.

099. A. Highland Monarch M.V.
103. A. Andalucia Star.
104. B. Marquesa.
105. A. Orsova.
109. B. El Paraguayo.
111. B. Hardwicke Grange.
112. B. La Rosarina.
113. B. Upwey Grange M.V.
114. B. Kenya.
115. A. Arandora Star.
117. B. Cape of Good Hope.
122. A. Accra M.V.
126. B. Glengarry M.V.
129. B. Port Wellington.
131. B. Port Darwin.
132. B. Reina del Pacifico M.V.
135. B. Port Hunter.
136. B. Doric Star.

138. A. Minnetonka.
139. A. Caliafornia.
141. B. Mahia.
142. A. Duchess of Atholl.
143. A. Duchess of York.
144. A. Arlanza.
145. B. Berwickshire.
154. A. Empress of Canada.
155. A. Carthage.
160. B. Ixion.
169. B. Dalgoma.
172. A. Oronsay.
176. B. Port Gisborne M.V.
180. B. Baradine.
181. B. Barrabool.
183. A. Bendigo.
185. A. Comorin.
190. B. Cambridge.

193. B. Lahore.
194. A. Moldavia.
195. A. Maloja.
197. A. Mantua.
199. A. Mongolia
201. A. Naldera.
202. A. Narkunda.
203. A. Minnewaska.
208. A. Winchester Castle M.V.
210. B. Niagara.
213. B. Barpeta.
215. B. Durenda M.V.
216. B. Llanstephan Castle.
220. A. City of Exeter.
225. B. Makura.
228. A. Ranchi.
236. B. Malayan Prince.
237. A. Berengaria.

245. B. Turakina.
246. B. Ruahine.
248. B. Banffshire.
250. A. Highland Princess M.V.
252. B. Devon.
253. B. Hertford.
254. B. Limerick.
256. B. Norfolk.
259. B. Clan Sinclair.
261. B. Huntingdon.
262. B. Hauraki M.V.
266. A. Cameronia.
271. B. City of Roubaix.
274. B. City of Harvard.
281. B. Auditor.
282. A. Carinthia.
293. B. Arignani.
295. A. Camito.

109 ships out of 299, in favourable positions to report, with about 190 in port or narrow waters.
This is typical and represents a fair average day. 36 per cent in position to report.

CURRENTS IN THE RED SEA.

AUGUST SEPTEMBER and OCTOBER.

Observations of ships regularly observing for the British Meteorological Office, 1910–1933.

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Currents Set	Currents Drift	Wind Dir.n	Wind Force
North of Latitude 20°N.								
AUGUST								
Khiva	2	1927	26°45′N	34°31′E	S 60°W	42*	NNW	3
Margha	30	1926	26°43′N	34°34′E	S 15°W	38*	NW by N	4
SEPTEMBER								
Clan Mackellar	16	1931	26°56′N	34°38′E	S 62°E	36*	NW by N	3

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 ⟹.

Distances from tail of arrow to circle represents 5%.

Scale. 0 10% 20% 30% 40%

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.

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 in miles per day; the figures below the arrows the number of observations.

MAXIMUM DRIFTS REPORTED.

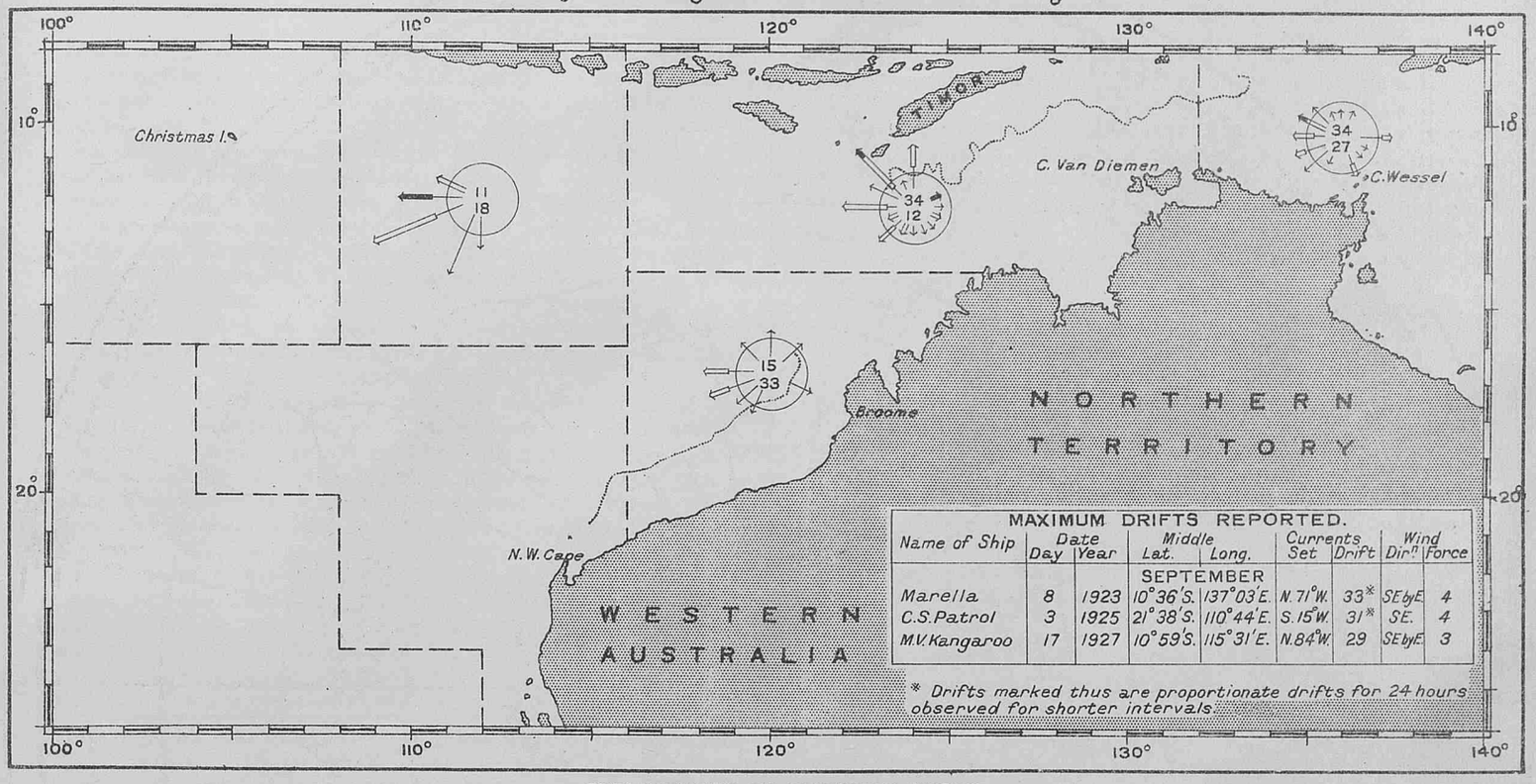
Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Currents Set	Currents Drift	Wind Dir.n	Wind Force
South of Latitude 20°N.								
AUGUST.								
Buteshire	7	1930	13°21′N.	43°05′E.	S. 3°W.	38*	NW.	3
SEPTEMBER.								
Ormonde	27	1924	16° 11′N.	41° 16′E.	S. 73°W.	40*	Var.	2
OCTOBER.								
Margha	14	1929	12°28′N.	43°59′E.	N. 85°W.	42*	ESE.	3

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

CURRENTS IN THE PORTION OF THE INDIAN OCEAN NORTH OF AUSTRALIA.

AUGUST SEPTEMBER and OCTOBER.

Observations of ships regularly observing for the British Meteorological Office, 1910–1933.



MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Currents Set	Currents Drift	Wind Dirn	Wind Force
			SEPTEMBER					
Marella	8	1923	10°36'S.	137°03'E.	N.71°W.	33*	SEbyE	4
C.S.Patrol	3	1925	21°38'S.	110°44'E.	S.15°W.	31*	SE.	4
M.V.Kangaroo	17	1927	10°59'S.	115°31'E.	N.84°W.	29	SEbyE	3

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

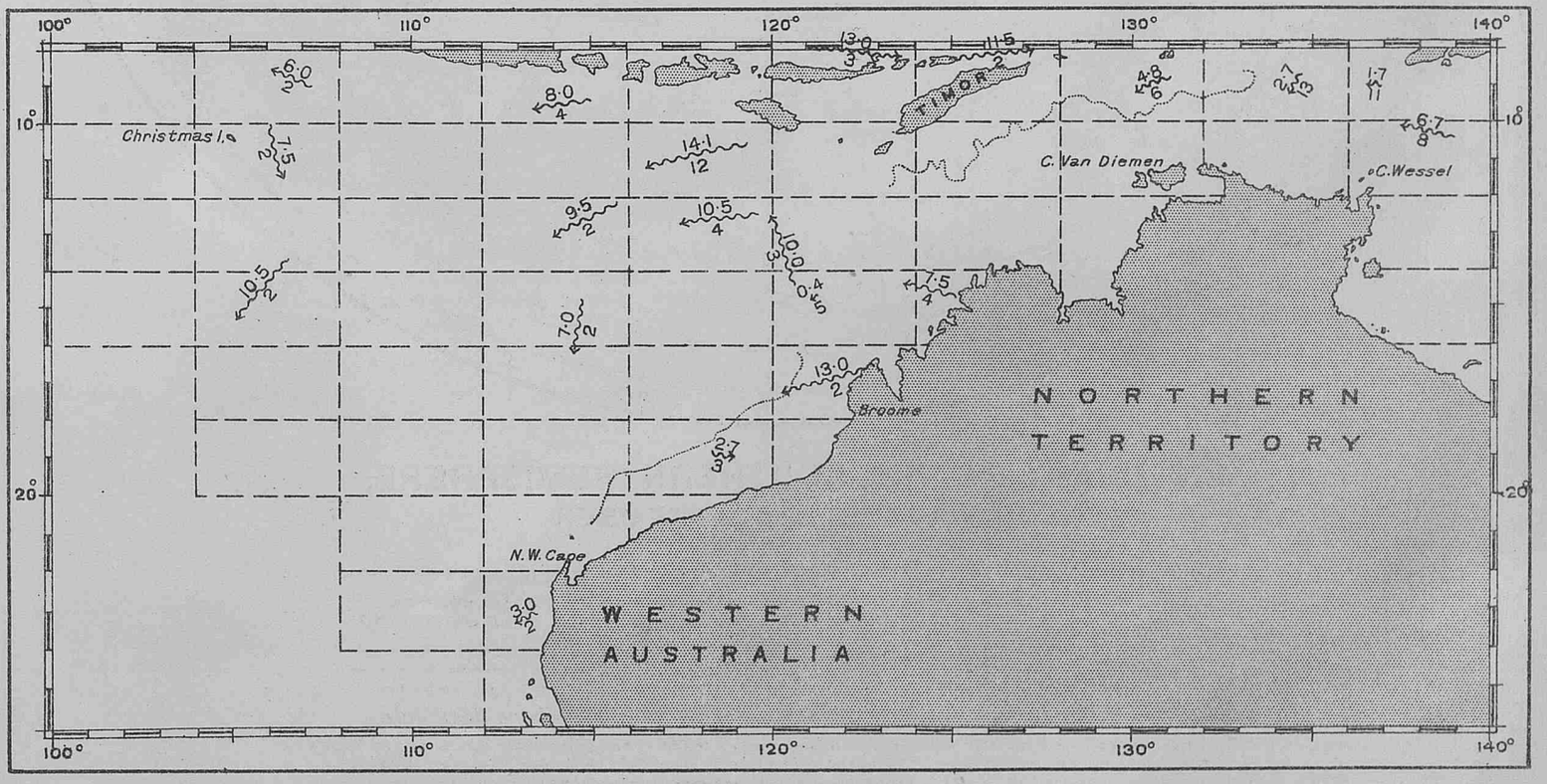
EXPLANATION OF CURRENT ROSES.

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 ➡.

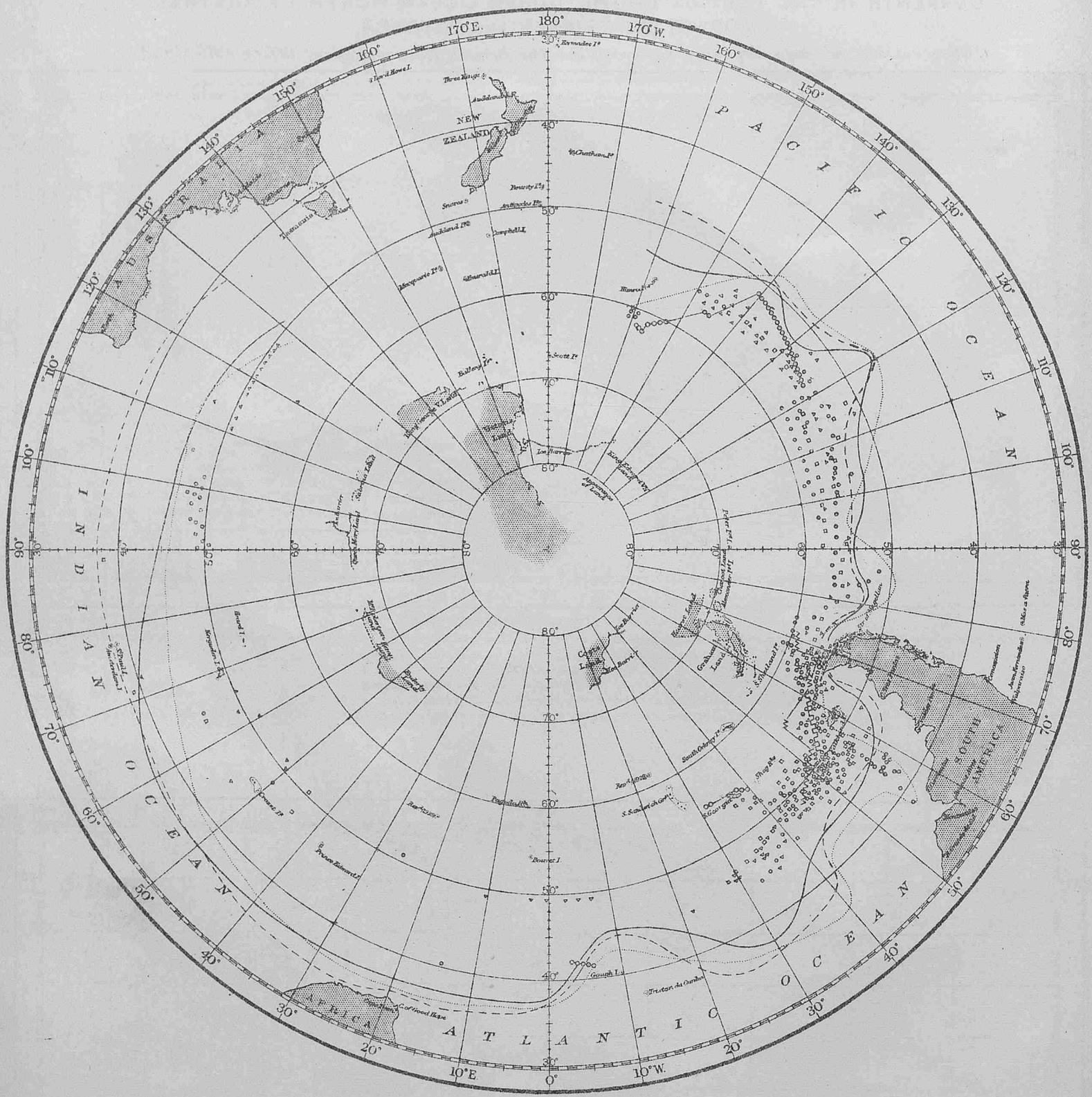
Distance from tail of arrow to circle represents 5%. Scale. 0 10 20 30 40 50%

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.



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, 1902–1933	Position of northernmost pack ice actually observed 1885–1933	Extreme limit of all ice, 1772–1933
July.	△	~~~~~~~~~~	————
August.	□	⊓⊓⊓⊓⊓⊓⊓⊓⊓⊓	— — — — — —
September	○	○-○-○-○-○-○-○	.....

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.

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

PS. B20/2736. Wt. 17A. D.22. Gp.908. 1250. 6/34.

NOTICES TO MARINE OBSERVERS.

CURRENT OBSERVATION.

It is very desirable that good current data should be recorded. Spaces are provided for current experienced throughout the day and for current determined at shorter intervals in Meteorological Logs, while Form 911 provides for either or both.

Generally the difference between the *Dead Reckoning Position* at noon, reckoned from previous noon, and the *Observed Position* has been accepted as attributable to a single current for the whole 24 hours.

It is necessary to make careful distinction between *Dead Reckoning Position* and *Estimated Position*, the former being the position as reckoned from the last fix by courses steered and distances run, corrected for all known errors and disturbances *except* current. When a fix cannot be obtained, an estimation for current (when one is known generally to exist) is sometimes applied to the D.R.; the result may then be conveniently termed the *Estimated Position*.

If this estimated position is given in the Meteorological Log or Form 911, *it should be clearly stated*, otherwise it may be misleading.

Currents of varying velocity and direction may be experienced along the track made in 24 hours; therefore, when reliable fixes such as by Stellar observations at twilight are obtained, the current should be determined for the intervals, and all should be checked with the noon to noon result. Each of these currents determined at shorter intervals than 24 hours should be entered in the Meteorological Log in the appropriate column, and the time and latitude and longitude of each observation position should be given in the latitude and longitude columns. The times given on Form 911 indicate the interval. The period of short interval currents should usually not be less than say, six hours. The best interval is probably from twilight to twilight.

It is desirable that whenever possible two methods of ascertaining the distance run through the water should be used, with one means of measuring the speed the inclination is to credit the ship. When possible it is recommended that both patent log and revolutions should be used.

For working out the set and drift of current the position *from* as well as the position *to* must always be *fixes*. Some observers have used an *estimated* position *from*, which makes the set and drift false. The same remarks apply to course allowances for set; the latter are naturally necessary to make an *estimated* course.

It is not only records of strong or abnormal currents that are desired. Records of the state of the current, no set, small sets, moderate sets and great sets at all times when the information can be obtained with reliability are necessary for completing current charts for all oceans and providing the information desired in the sailing directions.

Selected Ships.

In making their routine wireless weather reports to all ships (C.Q.) Selected ships may give material aid to navigation by including the set and drift of current found when considered reliable. This practice of broadcasting the set and drift of current found between Stellar fixes at sunset and dawn twilight in the next routine W/T weather report also helps in our investigation of the currents in all parts of the world and may be the means of improving knowledge of the causes, variations and peculiarities of currents.

When the set and drift is included the code message may be conveniently shortened thus:

C.Q. WEATHER 13167 55106 00000 16979 Current
From 15N. 52E To 16N. 54E.
58° one knot. *Dalgoma*

Example taken from Selected Ships' Register Form 138 of M.V. *Dalgoma* for March 5th 1933. supplementary groups of code figures being omitted.

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

LONDON ... ... Captain L. A. BROOKE SMITH, R.D., R.N.R., Marine Superintendent.
Commander J. HENNESSY, R.D., R.N.R., Senior Nautical Assistant.
Room 324, Adastral House, Kingsway, W.C.2.
(*Telephone No.: Holborn 3434 Extension 421*).
Nearest station Temple, District Railway.

THAMES ... ... Commander C. H. WILLIAMS, R.N.R., Port Meteorological Officer, P.L.A. Building, King George V Dock (south side), London, E.16.
(*Telephone No.: Albert Dock 2659. Telegraphic Address: Barometric Aldock, London*).

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

Agents.

BRISTOL CHANNEL — Captain T. JOHNSTON, Technical College, Cathays Park, Cardiff. (*Telephone No.: Cardiff 6813*).

Agents (*contd.*).

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

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

HONG KONG, China. — Lieut. Commander E. H. C. BRANSON, R.N., Chart Depot, H.M. Dockyard.
(*Telephone No.: 108 Dockyard*).

HUMBER ... ... Captain A. M. BROWN, Ellerman Wilson Line Office, Hull. (*Telephone No.: Central 16180*).

SOUTHAMPTON — Captain Sir BENJAMIN CHAVE, K.B.E. Room 35 Royal Mail Buildings.

SYDNEY, New South Wales. — Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R.
Captain G. B. MERCER.
Customs House. (*Telephone No.: B6421*).

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

DERELICTS AND FLOATING WRECKAGE.

Date.	Position. Latitude.	Position. Longitude.	Description.
IRISH SEA.			
18.6.34	6m. N.W. by W.½W. mag. from Lune Buoy.		Fork of tree trunk approx. 6 ft. square covered with bird offal.
NORTH ATLANTIC.			
2.6.34	35°37′N.	74°56′W.	Red nun buoy equipped with a ring bolt.
3.6.34	32°05′N.	70°41′W.	Large mooring buoy painted red.
3.6.34	47°21′N.	6°12′W.	Barrel with ropes attached. Close to this a mast vertical and about 30 ft. high with red flag and lantern attached.
North Atlantic—*contd.*			
4.6.34	36°21′N.	74°31′W.	Large piece of wreckage about 35 ft. long and 6 ft. wide, painted white.
7.6.34	44°22′N.	6°—′W.	Piece of wood painted white, 5 metres by 9·75 metres.
7.6.34	39°52′N.	73°53′W.	Buff-coloured metal life boat, bottom up; also a heavy green companion ladder and a hatch cover.
7.6.34	38°18′N.	74°22′W.	Buoy with steel framework surmounted by a cage.
11.6.34	48°02′N.	5°36′W.	Three conical buoys apparently drifting: dangerous to navigation.
14.6.34	44°23′N.	8°33′W.	Large log dangerous to navigation.
14.6.34	43°32′N.	10°16′W.	Floating iron cylinder about 15 ft. long, covered with rust; dangerous to navigation.

CHART OF THE WESTERN NORTH ATLANTIC.

Showing the North Atlantic Lane Routes in force during JULY as laid down by the Trans-Atlantic Track Convention. If at any time, owing to abnormal ice conditions, any alteration to the usual tracks is considered advisable by the track convention, particulars will be published on this chart. For full information concerning the North Atlantic Lane Routes see pages 57 and 58 of the April, 1934 number.

The periodic boundary within which ice has been observed is shown and a list of phenomenal positions of ice observed in the North Atlantic during JULY is given. Ice sighted between JUNE 1st and 22nd. 1934 is indicated by symbol in the position reported, the figure giving the day of the month in JUNE Information regarding ice conditions in Greenland waters and the Gulf of St. Lawrence will be published when available. Coastal wireless stations, with their call signs, which transmit ice signals are indicated by the symbol ⊕

Ice symbols used on the chart:— Iceberg, growler, Field or other flat ice.

LANE ROUTES IN FORCE DURING JULY.

(C) From 1st July to 10th April inclusive.

(F) From 16th May to opening of Belle Isle route. Westbound, on approaching Cape Race steer a course to pass 10 miles S. of Cape Race. Eastbound, steer from position 25 miles S. of Cape Race.

(G) From the opening of the Straits of Belle Isle to 14th November.

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat.	Long.	Remarks.
July, —, 1890	S.S. Slavonia ...	48°53'N.	24°11'W.	Last remnants of berg.
„ —, 1902	2 reports by Fisher men.	56°30'N. approx.	6°30'W.	40 to 50 ft. long, 15 ft. wide, 2 ft. 6 in. out of water.
„ 31, 1909	S.S. Shimosa ..	36°59'N.	30°01'W.	25 ft. long, 3 to 8 ft. wide.
„ 10, 1913	S.S. Lothian... ...	37°27'N.	36°48'W.	Piece 6 ft. high, 50 ft. in cir.
„ 18, 1916	U.S. Hydrographic Bulletin.	32°09'N.	54°26'W.	Piece of berg 3 or 4 ft. out of water.
„ 23, 1916	S.S. San Giorgio ..	42°09'N.	63°24'W.	Berg, 60 ft. long.
„ 23, 1918	U.S. Hyd. Bulletin...	44°25'N.	36°01'W.	Large berg.
„ 18, 1921	Do. ...	44°30'N.	39°26'W.	Small berg about 15 ft. sq.
„ 21, 1921	Do. ...	39°09'N.	40°39'W.	Berg.
„ 31, 1921	Do. ...	37°37'N.	27°29'W.	Berg.
„ 10, 1926	S.S. Chelatros ..	42°42'N.	36°45'W.	2 pieces of ice.
„ 16, 1933	S.S. Rein	52°32'N.	22°—'W.	Small piece of ice about 25 ft. long, 12 ft. wide.

LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 22nd June, 1934, was received from the Canadian Signal Service, Quebec.—

Belle Isle Strait open since 17th. June.
Ships report bergs and growlers only between 51° 02'N. 57°56'W. and 52°27'N. 53°34'W. Other points, no ice.

ICE IN GREENLAND WATERS.

INFORMATION RECEIVED BY CABLEGRAM FROM DANISH METEOROLOGICAL INSTITUTE, COPENHAGEN.

12th. June ..... Free of ice 30 miles off Cape Farewell.

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

JULY M.O., 1934.

Ps.820/2736. Wt.17A. D.22. Gp.908. 350.6/34.

NOTICES TO MARINE OBSERVERS.

AVOID UNNECESSARY DUPLICATION OR MULTIPLICATION OF VOLUNTARY WORK AT SEA.

The special attention of commanders of British ships is invited to THE MARINE OBSERVER'S HANDBOOK (1930) p. 10, paragraph 5 which reads as follows:—

> "All observations are available by mutual arrangement for exchange with colonial and foreign meteorological services, and are, therefore, made according to agreement reached through the International Commission for Marine Meteorology."

In order that voluntary meteorological work at sea should not be duplicated or multiplied, it was agreed in 1929 by the International Meteorological Conference that ships should only be asked to make written returns of routine observations to the Weather Office of the country in which they were registered. The Selected Ship System was agreed to internationally in order to secure better organization, uniformity of practice and prevention of unnecessary work being imposed upon the Commander, Officers or Wireless Operators of ships.

Commanders of British observing ships are accordingly requested to send in their written returns regularly through the appropriate Port Meteorological Officers and Agents or direct to the Meteorological Office, London (as indicated on those returns) and to adhere as far as possible to the advice given them, for the conduct of the work, in THE MARINE OBSERVER. The Commanders of British Observing Ships are advised to refer requests for written observations from other state institutions to the Meteorological Office, London.

POSTAL ARRANGEMENTS.

The quarterly numbers of the MARINE OBSERVER are published on the last Wednesdays of December, March, June and September, while the monthly supplements are published on the last Wednesday of the intervening months.

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

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

Port of Call.....

Date of Homeward Departure .....

Postal Address .....

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

DESPATCH OF INFORMATION REQUIRED IMMEDIATELY FOR THE CONDUCT OF THE WORK AT SEA.

Shipowners, Marine Superintendents and all concerned in the despatch of mails to Ships abroad are asked to kindly facilitate the despatch and delivery of postal matter received at their offices from the Meteorological Office and Air Ministry Publication Depot to their Ships abroad.

This matter addressed to the Commanders of Ships contains information which is required for the Conduct of Marine Meteorological Work at Sea and is most effective if received by the Commanders at the earliest possible date.

Much of the information referred to is published in the MARINE OBSERVER and Supplements, and is of a seasonal nature. This journal also contains advice to Regular Observing Ships which enables them to perform voluntary service by Wireless Communication for the benefit of all shipping.

ICE REPORTS (FORM 912).

Ice Report Forms are supplied with the MARINE OBSERVER or Supplement each month to all regular observing ships employed in the Trans North Atlantic and Southern Ocean trades. They may also be obtained by any British ship on application to the Port Meteorological Officers or Agents, addresses of whom are given on the front page of this ice chart.

Commanders of ships in these trades are asked to have this form completed and returned without delay at the end of each passage A nil return is desired should no ice be sighted.

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

LATE NOTICES

COLOMBO VPB

Attention is drawn to the change of Telegraphic Address of Meteorological Centre for Weather Reports transmitted to Colombo VPB, which is now "Weather" instead of "Obs".

See page 112 of this number.

FLEET LIST.

VOLUNTARY OBSERVING SHIPS.

The following is a complete list of British observing ships regularly carrying out voluntary services of marine meteorology with the guidance of the Marine Division of the Meteorological Office.

The names of the Captains and observing officers of observing ships, and the Senior Wireless Operators of Selected Ships are given, as ascertained from the last written return received.

Meteorological Logs, Records, and W/T Weather Registers received between the dates specified at the head of the seventh column are acknowledged by Form number, with commencing and ending dates of period covered by the returns; the date when the last return was received being given in the eighth column.

The Captains of observing ships are requested to take this acknowledgment in cordial thanks and grateful recognition to them and their observing officers and wireless operators for the returns made and the voluntary service rendered in all parts of the world.

The classification of meteorological logs and Selected Ships' records and registers will be notified to the Captains by post card Form 1343. Only in exceptional cases will individual letters be sent to the Captains of observing ships.

The Port Meteorological Officers and Merchant Navy Agents at the ports are advised as necessary, and they will, as necessary, communicate such advice verbally by personal call upon the Captain.

Excellent Awards will be made at the end of the financial year. The names of the Captains and Principal Observing officers gaining these awards will be published in a special list in the Marine Observer.

It is requested that prior notification of changes of service, probable periods of lay up, transfer of Captains, or other circumstances which may prevent the continuance of voluntary meteorological service at sea, may be made to the appropriate Port Meteorological Officer or Merchant Navy Agent.

Ships not making the appropriate written returns within a reasonable period will be removed from the list, steps taken to recover any instruments lent, and the free issue of the Marine Observer discontinued.

The number of voluntary observing ships is limited to a maximum total of 366.

The number of Selected Ships detailed to carry out the voluntary service provided for in Clause (C) of Article 35 of the Convention for Safety of Life at Sea, Merchant Shipping (Safety and Load Line Conventions) Act, 1932, is determined by the British proportion of the world's tonnage; and is at present 292.

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

Explanation of Abbreviations.

The number appearing before the name of an observing ship in this list is her number for the time being as a British Selected Ship.

†† indicates fitted with wireless telegraphic apparatus for long range, long wave, continuous wave transmission and reception.

*† indicates fitted with wireless telegraphic apparatus for transmission and reception; fitted for reception only of long range, long wave, continuous wave.

** indicates fitted with wireless telegraphic apparatus for transmission and reception: but not fitted for long range, long wave, continuous wave transmission or reception.

M.V. = Motor Vessel.

S.T. = Steam Trawler.

Ships having no such letters after their names are steamships.

M.L. = Equipped with a complete set of tested instruments lent by the Meteorological Office for keeping the meteorological log.

M. = Ships' own mercurial barometer, found to be sufficiently accurate and reliable for the purpose of observation for making wireless weather reports.

S. = Partly or wholly equipped with tested instruments lent by the Meteorological Office for the purpose of carrying out the duties of a Selected Ship, when detailed to do so.

A. = Ships' own aneroid.

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 8.3.34 to 6.6.34.	Date Last Return Received.
122 †† *Accra*, M.V. ...	J. C. Shooter	O. E. Jones, L. Collings ...	G. Arrowsmith...	M.-S.	Elder Dempster	Fms. 911 & 138 7.2.34 to 11.5.34	14.5.34
055 *† *Actor*	T. Chapman	E. Pearce, C. P. Vaughan, D. C. Brown.	W. Brawn ...	M.	Harrison ...	,, ,, 23.1.34 to 11.4.34	16.4.34
123 †† *Adda*, M.V. ...	J. H. Lawson	E. Moors, A. E. Jones ...	A. L. J. Edwards	M.-S.	Elder Dempster	,, ,, 22.2.34 to 26.5.34	1.6.34
273 *† *Adrastus* ...	W. A. Turner	W. M. Thomas, R. Blakey, R. T. Harries.	S. R. Purkiss ...	M.L.	A. Holt	Fm. 915 7.9.33 to 11.2.34	20.3.34
129 †† *Adriatic*... ...	C. P. Freeman, R.D., Commr., R.N.R.	A. Young, J. C. Boyce, V. E. Evans.	A. G. Hill ...	S.	White Star ...	Fms. 911 & 138 26.2.34 to 15.4.34	17.4.34
090 *† *Aeneas*	J. Hatfield	F. H. Barley, G. Edge, E. A. Gepp.	I. E. Jones ...	,,	A. Holt	,, ,, 8.12.33 to 20.2.34	16.3.34
166 *† *Agamemnon*, M.V.	J. G. Reynard	B. Baths, T. R. Phillips, F. Fisher.	A. C. Nevin ...	,,	,, ...	,, ,, 21.12.33 to 1.5.34	4.6.34
Aidan	F. C. P. Harris ...	H. O. Williams, S. Pollock, C. W. Smethurst.	... ...	M.L.	Booth	Fm. 915 13.9.33 to 5.5.34	1.6.34
065 †† *Akaroa*	W. G. Summers ...	G. H. Heywood, H. R. Dunnet, J. L. Stolls.	H. A. McGaskill	M.-S.	Shaw Savill ...	,, 7.10.33 to 14.1.34	19.1.34
932 †† *Alaunia*... ...	H. L. Bond, R.D., Capt., R.N.R.	L. N. MacMillan, H. L. Pryse, W. J. Foster.	R. L. Ottley ...	S.	Cunard	Fms. 911 & 138 14.5.34 to 2.6.34	6.6.34
Alban	L. Evans	F. R. Holman, R. Parry, A. S. Richardson.	... ...	M.L.	Booth	Fm. 915 8.1.34 to 1.4.34	10.4.34
135 †† *Alcantara*, M.V.	E. Clarke, R.D., Commr., R.N.R.	W. Dovell, J. W. Stephens, E. Hewitt.	W. Smith ...	S.	Royal Mail ...	Fms. 911 & 138 11.2.34 to 20.5..34	23.5.34
178 *† *Alipore* ...	E. F. Hannan, R.D. Commr., R.N.R.	W. T. C. Lethbridge, K. P. Naire, P. C. Mohindar.	E. T. Hutchings	M.	P. & O.	,, ,, 27.1.34 to 7.4.34	30.4.34
175 †† *Almanzora* ...	T. J. C. Buret	A.E.H. Randle, R. H. Popplewton, G. M. Fletcher.	J. Cadwell ...	S.	Royal Mail ...	,, 28.1.34 to 7.5.34	9.5.34

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 8.3.34 to 6.6.34.	Date Last Return Received.
012 †† *Almeda Star* ...	H. C. Howard	R. T. Hales, R. Simpson, R. McIlwraith.	R. N. Austin ...	M.	Blue Star ...	Fms. 911 & 138 21.1.34 to 2.5.34	4.5.34
022 *† *Alynbank* ...	D. Gillies	S. Morris, A. Hunter, E. Binfield.	... ...	M.L.	A. Weir	Fm. 915 ... 23.4.33 to 10.10.33	13.12.33
Amarapoora ...	W. C. C. Plage... ...	J. D. Graham	... ...	S.	Henderson ...	Fm. 911 25.3.34 to 24.4.34	28.5.34
103 †† *Andalucia Star*	R. Vernon	G. G. McPherson, R. M. Thorne, J. H. Mortimer.	F. E. Ash ...	M.	Blue Star ...	Fms. 911 & 138 4.3.34 to 18.4.34	20.4.34
209 †† *Aorangi*, M.V. ...	J. F. Spring-Brown ...	R. N. Turner, D. H. Richards, L. P. Bourke.	... ...	M.L.	Canadian-Australasian.	Fm. 915 9.11.33 to 23.2.34	14.5.34
120 †† *Apapa*, M.V. ...	A. Faith	C. V. Evans, R. Mercer ...	J. Rea	M.-S.	Elder Dempster	Fms. 911 & 138 7.3.34 to 15.4.34	19.4.34
029 †† *Appam*	J. M. Draper	R. K. Palmer, B. C. Haigh, R. Clark.	R. J. Dowling ...	S.	,, ,, ...	,, ,, 21.3.34 to 1.5.34	3.5.34
017 †† *Aquitania* ...	J. C. Townley, R.D., Capt., R.N.R.	C. B. Osborne, L. R. Sharp, E. A. Divers.	A. H. Farman ...	,,	Cunard	,, ,, 1.3.34 to 24.5.34	28.5.34
115 †† *Arandora Star* ...	E. W. Moulton... ...	L. S. Hassell, J. Brunton, E. Huntley Smith.	H. G. Warren ...	M.-S.	Blue Star ...	,, ,, 25.1.34 to 22.5.34	24.5.34
114 *† *Ariguani* ...	J. H. H. Scudamore, D.S.C., R.D., Commr., R.N.R.	W. J. Maxwell, T. Crane ...	E. M. Evans ...	S.	Elders & Fyffes	,, ,, 21.2.34 to 6.5.34	9.5.34
144 †† *Arlanza* ...	F. R. Miles, R.D., Capt., R.N.R.	G. D. Bonner, M. J. Morton, C. R. Brown.	G. Hunt ...	,,	Royal Mail ...	,, ,, 27.2.34 to 1.6.34	6.6.34
091 †† *Armadale Castle*	A. O. Morgan	C. Lloyd, W. R. Andrews, G. W. Lloyd.	E. P. Haslam ...	,,	Union Castle ...	,, ,, 10.2.34 to 3.6.34	6.6.34
127 *† *Arracan*... ...	N. Wiles	J. A. C. MacCall.	... ...	,,	Henderson ...	Fm. 911 20.11.33 to 11.4.34	18.5.34
095 †† *Arundel Castle*	G. J. Whitfield ...	L. G. May, P. G. McIver ...	W. A. Brown ...	,,	Union Castle ...	Fms. 911 & 138 17.2.34 to 8.4.34	10.4.34
233 †† *Ascania* ...	J. G. Bissett, R.D., Comm r.. R.N.R.	... ...	... ...	,,	Cunard	... ...	...
280 *† *Astronomer* ...	J. Richards	W. P. Baker, W. L. Sawee ...	I. Howard ...	M.	Harrison ...	,, ,, 3.1.34 to 14.3.34	13.4.34
061 †† *Atlantis*	A. Purvis	J. Smith, J. Chamberlain, A. Nicholls.	T. Bradfield ...	M.-S.	Royal Mail ...	,, ,, 27.1.34 to 15.5.34	28.5.34
281 *† *Auditor* ...	G. R. Windsor ...	L. F. Harriman, A. H. Thompson, W. A. Pemberton.	— Sharland ...	M.	Harrison	,, ,, 20.9.33 to 8.12.33	16.12.33
212 *† *Australia* ...	W. Scutt	L. W. Smith, H. Cameron, F. M. Jenvey.	C. Cunningham	,,	British India ...	,, ,, 13.6.33 to 26.10.33	31.10.33
133 †† *Avelona Star* ...	G. E. Hopper... ...	J. Coldwell, P. A. P. Clark, A. H. Pierce.	S. J. J. Scott ...	M.-S.	Blue Star ...	Fms. 911 & 138 11.12.33 to 6.3.34	9.3.34
124 †† *Avila Star* ...	R. J. Thomas	F. N. Johnson, E. Lowndes, J. Heggen.	B. King... ...	M.	,, ,, ...	,, ,, 18.2.34 to 30.5.34	31.5.34
068 †† *Balmoral Castle*	J. Attwood	A. C. G. Price, H. Bunn, N. Willcock.	J. Sharp ...	S.	Union Castle ...	,, ,, 7.3.34 to 6.5.34	8.5.34
179 *† *Balranald* ...	H. Williams	E. J. Spurling, J. C. Davies, C. S. Pirie.	J. R. C. Johnston	M.	P. & O. Branch	,, ,, 28.2.34 to 2.4.34	14.5.34
248 *† *Banffshire* ...	A. W. P. Gibb... ...	R. F. Buckley, F. H. Petherbridge, J. O. H. Kirkwood.	W. M. Ewing ...		Turnbull Martin	,, ,, 14.10.33 to 27.1.34	5.2.34
180 *† *Baradine* ...	W. D. C. Smith ...	R. G. Wood, G. W. Wood, A. E. Clay.	E. Howard ...		P. & O. Branch ...	,, 27.11.33 to 22.2.34	28.2.34
037 *† *Baronesa* ...	R. W. Compton ...	F. J. Kent, J. R. Faulkner, J. G. Freeman.	R. L. Solway ...	,,	Houlder	,, ,, 22.1.34 to 30.3.34	4.4.34
181 *† *Barrabool* ...	J. S. Sheepwash ...	J. D. Strike, A. Gething T. Watkins.	C. T. Seaton ...		P. & O. Branch ...	,, ,, 24.1.34 to 23.4.34	2.5.34
070 *† *Bayano* ...	A. W. Legge ...	C. M. Schofield, A. Crone ...	R. E. Blizzard ...	S.	Elders & Fyffes	,, ,, 1.3.34 to 12.5.34	17.5.34
183 †† *Bendigo* ...	F. N. Wyatt	H. P. Mallet, H. T. Rigden, D. West.	J. Kimminmouth	M.-S.	P. & O. Branch ...	,, ,, 18.2.34 to 24.5.34	28.5.34
237 †† *Berengaria* ...	Sir E. T. Britten, R.D., Capt., R.N.R.	R. H. C. Crawford, J. V. Locke, N. A. F. Kingscote.	J. N. Cragg ...	S.	Cunard	,, ,, 1.3.34 to 17.5.34	22.5.34
145 *† *Berwickshire* ...	E. H. Evens	E. Coulthart, J. C. Robertson, E. J. Brittain.	F. Smith ...	,,	Turnbull Martin...	Fms. 911 & 138 22.12.33 to 11.3.34	16.3.34
Birchbank ...	R. B. Ellis	J. Llewellyn, F. A. Munday, J. Mountain.	... ...	M.L.	A. Weir	Fm. 915 18.9.33 to 24.2.34	12.3.34
007 *† *Bradfyne* ...	J. O'Neill	P. Evans, F. W. Burn, O. E. Brown.	C. K. Castle ...	S.	Reardon Smith	Fm. 911 23.5.33 to 26.10.33	21.11.33
Brighton ...	A. Hill	E. Balcombe	S. Wood ...	,,	Southern Rly. ...	Telegraphic Report ... 28.5.34	28.5.34
057 †† *Britannic*, M.V...	P. R. Vaughan, D.S.C., R.D., Commr., R.N.R.	O. V. Lucas, W. Nicoll, A. E. Harvey.	J. B. Stone ...	,,	White Star ...	Fms. 911 & 138 19.2.34 to 12.5.34	16.5.34
269 *† *British Admiral*	F. I. Taylor	W. Steele, J. Aitken ...	C. A. Johnston...	M.	British Tankers ...	Fms. 911 & 138 9.2.34 to 22.3.34	27.3.34
038 *† *British Corporal*	R. O. Putt	A. H. Gordon, W. Hill, G. C. Stevenson.	J. E. Peachy ...	,,	,, ,, ...	,, ,, 10.3.34 to 1.5.34	10.5.34
British Enterprise	H. S. McMichael ...	J. T. Hamlyn	... ...	,,	,, ,, ...	Fm. 911 19.3.34 to 11.5.34	16.5.34
249 *† *Buteshire* ...	C. A. I. Laird	J. D. Elvish, P. McMillan, P. H. Hill.	E. B. Place ...	S.	Turnbull Martin	Fms. 911 & 138 17.1.34 to 24.3.34	16.4.34
031 †† *Caledonia* ...	A. Collie	— Johnston, R. Blake, T. K. McMillan.	J. F. Reid ...	S.	Anchor ...	,, ,, 11.3.34 to 27.5.34	29.5.34
						Fm. 912 8.4.34 to 27.5.34	29.5.34
139 †† *California* ...	R. W. Smart	J. F. Adams, R. L. Robertson, J. McIntosh.	W. Thompson ...	,,	,, ...	Fms. 911 & 138 17.2.34 to 5.5.34	14.5.34
						Fm. 912 29.4.34 to 5.5.34	14.5.34
Cambria ...	E. B. Turner	V. A. Phillips	J. Pritchard ...	,,	L.M. & S. Rly. ...	Telegraphic Report ... 2.6.34	2.6.34
Cambridge ...	R. Williams	P. Shakespeare, J. Trotter, V. Canton.	P. Fleming ...	M.L.	Federal ...	Fm. 915 4.11.33 to 5.3.34	10.3.34
266 †† *Cameronia* ...	W. Gemmel	D. Blair, E. Stormont, L. Taylor.	R. B. Jones ...	S.	Anchor ...	Fms. 911 & 138 25.2.34 to 13.5.34	16.5.34
						Fm. 912 23.4.34 to 13.5.34	16.5.34
086 *† *Camito*	S. Browne	J. C. Morgan, A. E. Leech, G. M. Roberts.	L. H. Fudge ...	,,	Elders & Fyffes ...	Fms. 911 & 138 9.11.33 to 3.3.34	5.3.34
259 *† *Canonesa* ...	W. H. Brodie ...	H. L. Sherwell, F. F. Flint, E. J. L. Stone.	C. J. Woolway	M.	Houlder ...	Fm. 911 1.3.34 to 5.4.34	17.5.34
117 *† *Cape of Good Hope*	T. A. Jacobson... ...	A. Peacock	F. Groves ...	S.	Lyle S.S. Co. ...	Fms. 911 & 138 30.1.34 to 30.5.34	6.6.34
190 †† *Carinthia* ...	P. A. Murchie, O.B.E., R.D., Capt., R.N.R.	J. Chapman, H. Hudson, G. S. Hutchison.	J. Harvey ...	,,	Cunard	,, ,, 18.4.34 to 23.4.34	27.4.34
092 †† *Carnarvon Castle*, M.V.	C. E. Stuart, R.D., Capt., R.N.R.	G. L. Clarke, J. M. Rayner...	D. Blow ...	,,	Union Castle ...	,, ,, 21.1.34 to 12.5.34	16.5.34
155 †† *Carthage* ...	H. M. Jack	H. J. Cholerton, H. J. Mann, J. L. Dunkley.	G. Bailey ...	M.-S.	P. & O.	,, ,, 19.2.34 to 23.5.34	29.5.34
184 †† *Cathay*	H. Elliot Smith, R.D., Lt.-Commr., R.N.R.	A. J. McHattie, E. Cowell, G. L. Farnfield.	H. Dawson ...	,,	,, ...	,, ,, 18.11.33 to 24.12.33	5.2.34
011 †† *Ceramic* ...	W. J. Saunders ...	R. G. Roberts, J. Collins ...	W. M. Ross ...	S.	White Star ...	,, ,, 27.1.34 to 13.5.34	16.5.34
191 *† *Chindwin* ...	G. Paterson	T. London, D. Frame, J. G. Aitken.	A. C. Headley ...	,,	Henderson ...	,, ,, 12.2.34 to 25.4.34	10.5.34
067 *† *Chinese Prince*	W. Irvine	B. J. Jenkins, I. P. Ellis, J. Hennessey.	D. T. Roberts ...	M.L.	Furness Withy ...	Fm. 915 20.10.33 to 16.1.34	7.3.34
192 †† *Chitral*	O. Siggers	G. L. Bateman, F. D. Shaw, J. Stansfield.	S. Norwood ...	M.-S.	P. & O.	Fms. 911 & 138 21.1.34 to 26.4.34	28.4.34

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 8.3.34 to 6.6.34.	Date Last Return Received.
051 *† *City of Auckland*	W. Rowlands	A. G. Freeman, J. W. Cubbon, A. H. Horan.	L. C. Cullimore...	S.	Ellerman ...	Fms. 911 & 138 19.12.33 to 14.4.34	30.4.34
City of Barcelona	W. Hill	J. McK. Arnot	... ...	M.	,, ...	Fm. 911 ... 25.2.34 to 29.4.34	28.5.34
265 *† *City of Baroda*	H. Percival	E. Jenkins, R. E. Hannaford, J. C. Barnes.	J. McMurran ...	S.	,, ...	Fms. 911 & 138 24.12.33 to 22.2.34	26.2.34
158 *† *City of Cairo* ...	E. G. Hoppins	J. H. Brown, H. Laird, D. M. Williams.	D. O'Leary ...	M.	,, ...	Fm. 911 3.3.34 to 2.5.34	11.5.34
013 *† *City of Cambridge*	R. E. Teague	W. Garrick, E. W. Nelson, J. Wood.	R. O. Garret ...	S.	,, ...	,, 25.3.34 to 14.4.34	15.5.34
City of Canton ...	J. H. Rutter	J. N. Pulford	.. ..	M.	,, ...	, 27.1.34 to 27.5.34	4.6.34
157 *† *City of Delhi* ...	J. Wyper	P. R. Winship, W. N. Piercy, J. Muir.	P. T. Dwane ...	S.	,, ...	Fms. 911 & 138 22.3.34 to 1.4.34	20.4.34
City of Dieppe	H. Cartwright	J. Hudson, J. P. A. Arthur, N. F. Ayres.	... ...	M.L.	,, ...	Fm. 915 5.12.33 to 25.3.34	28.4.34
City of Evansville	D. O. Evans	G. V. Conolly	... ...	M.	,, ...	Fm. 911 23.4.34 to 11.5.34	5.6.34
220 †† *City of Exeter* ...	D. M. Bremner ...	J. I. Andrew, N. Groundwater, E. A. Davidson.	T. Fleetwood ...	S.	,, ...	Fms. 911 & 138 12.2.34 to 15.4.34	23.4.34
089 *† *City of Hereford*	C. V. Avery	F. A. Waters, R. S. Webber, J. F. Lindell.	J. Murray ...	M.	,, ...	,, ,, 17.11.33 to 11.2.34	14.3.34
028 †† *City of London* ...	J. G. Brown	W. H. Matheson, B. E. Hooper, J. G. G. Fyfe.	C. Smith ...	S.	,, ...	,, ,, 28.3.34 to 28.5.34	1.6.34
256 *† *City of Lyons* ...	H. Johnston	R. S. Cowan, A. Potter, W. J. Reynolds.	L. Vaughan ...	M.	,, ...	,, ,, 28.1.34 to 16.4.34	24.4.34
066 †† *City of Nagpur*...	N. McNeil, O.B.E. ...	H. A. Hazeel, W. Kerr, W. V. Highton.	J. H. Jones ...	S.	,, ...	,, ,, 15.1.34 to 18.3.34	26.3.34
074 †† *City of Paris* ...	D. H. Lloyd	A. Hamilton, A. Macfie, T. Stewart.	A. Forbes ...	,,	,, ...	,, ,, 22.2.34 to 30.4.34	2.5.34
City of Perth ...	D. H. Metcalf	A. M. Westlake, J. Owen, R. F. Henry.	... ...	M.L.	,, ...	Fm. 915 14.4.33 to 8.9.33	9.10.33
271 *† *City of Roubaix*	W. Gray	C. Collard, W. H. Dalton, J. H. Owen.	J. W. Alexander	M.	,, ...	Fms. 911 & 138 31.1.34 to 2.4.34	19.4.34
272 *† *City of Singapore*	T. Cooper	G. T. Mathias, D. Pattison, S. Ayles.	W. E. Gilbert ...	,,	,, ...	,, ,, 26.4.34 to 26.5.34	1.6.34
035 *† *City of Sydney* ...	F. McKay	J. Kinley, R. W. May, R. A. Jones.	J. Brown ...	,,	,, ...	,, ,, 28.4.34 to 6.5.34	14.5.34
167 *† *City of Tokio* ...	H. G. Booth	C. F. Clarke	W. Connell ...	S.	,, ...	Fms. 911 & 138 1.3.34 to 8.4.34	30.5.34
125 *† *City of Windsor*	T. G. Hammersley ...	A. P. Sydney, E. H. Lynes, J. T. Wills.	E. L. Hume ...	,,	,, ...	,, ,, 2.3.34 to 23.3.34	13.4.34
160 *† *City of Winnipeg*	R. J. Ricketts	F. Tibbett, G. Longfield, D. W. Penberthy.	F. H. Portess...	,,	,, ...	,, ,, 2.11.33 to 18.2.34	7.3.34
City of Yokohama	J. A. Singleton ...	H. E. Roberts	... ...	,,	,, ...	Fm. 911 5.1.34 to 9.3.34	17.3.34
Clan Farquhar...	R. M. Robertson ...	H. G. Spalton	... ...	M.	Clan	,, 2.3.34 to 5.4.34	16.5.34
050 *† *Clan Macalister*	F. J. Stenson, R.D., A.D.C., Capt., R.N.R.	H. Duncan, S. G. Strange ...	E. Hervey ...	S.	,, ...	Fms. 911 & 138 18.3.34 to 6.5.34	28.5.34
241 *† *Clan Macbeth*	H. Andrews	H. Whitehead, A. V. Howard, P. N. Colepeper.	G. Barrett ...	,,	,, ...	,, ,, 19.11.33 to 5.2.34	9.3.34
222 *† *Clan Macdougall*	R. F. Redford, Lieut-Commr., R.N.R.	T. W. Ellis, D. F. Sutton, S. G. Cresswell.	A. V. Saunders...	,,	,, ...	,, ,, 27.12.33 to 4.4.34	7.5.34
287 *† *Clan Macfarlane*	W. J. Hughes	J. H. Wright, J. R. Moss, C. D. B. Mitchell.	A. G. Olson ...	,,	,, ...	,, ,, 15.2.33 to 8.4.34	28.5.34
118 *† *Clan Macindoe*	H. E. G. Scott-Smith, O.B.E., R.D., Lt.-Commr., R.N.R.	J. B. Sparkes, T. N. Soane, C. R. Wheat.	W. C. Munro ...	,,	,, ...	,, ,, 1.2.34 to 24.2.34	8.3.34
Clan Mackellar	N. J. Haynes	J. J. Stormont	E. Woolhouse ...	,,	,, ...	,, ,, 5.1.33 to 30.1.33	13.3.33
Clan Macnair...	W. G. Holman... ...	A. W. Daish	... ...	,,	,, ...	,, 6.3.34 to 30.3.34	4.4.34
255 *† *Clan Macneil* ...	A. Low	B. A. Hardinge, H. F. Town, B. H. Magill.	A. Huey ...	,,	,, ...	Fms. 911 & 138 19.11.33 to 21.1.34	5.3.34
001 *† *Clan Macphee* ...	W. Calderwood ...	J. Dulson, R. G. Bagnall, H. Hind.	J. D. Marshall...	,,	,, ...	,, ,, 12.3.34 to 18.4.34	22.5.34
168 *† *Clan Mactaggart*	W. F. West	H. R. Crosscombe, R. D. Helme.	G. L. Brown ...	,,	,, ...	,, ,, 17.1.34 to 1.5.34	8.5.34
002 *† *Clan Macwhirter*	P. Macfarlane	L. W. Evans, K. C. Simpson, A. S. Palethorp May.	J. G. Thompson	,,	,, ...	,, ,, 17.1.34 to 13.4.34	21.4.34
003 *† *Clan Malcolm* ...	H. Cater	W. Murray, K. Banks ...	A. P. Goodman	,,	,, ...	,, ,, 6.1.34 to 9.4.34	12.4.34
283 *† *Clan Morrison*...	R. P. Galer, R.D., Commr., R.N.R.	A. Hambly, E. Croucher, J. Brodie.	A. R. Cox ...	,,	,, ...	,, ,, 13.2.34 to 15.4.34	27.4.34
279 *† *Clan Urquhart* ...	G. Young	W. M. Graham	A. Butcher ...	M.	,, ...	Fms. 911 & 138 15.3.34 to 1.4.34	22.5.34
041 *† *Clydebank* M.V.	G. Sutherland	W. Mendus, F. J. Law, E. Needham.	A. Hastings ...	S.	A. Weir	,, ,, 26.2.34 to 29.4.34	22.5.34
Colonial... ...	W. E. Harraden ...	A. Smart	... ...	M.	Harrison ...	Fm. 911 26.11.33 to 12.2.34	15.2.34
187 *† *Comedian* ...	A. Cadogan	D. Fraser, T. S. Glover, Richardson.	C. De Freitas ...	S.	,, ...	Fms. 911 & 138 20.10.33 to 30.12.33	10.1.34
016 *† *Comliebank*, M.V.	S. Currie	C. R. Aitken, L. St. J. French, W. A. McMoreland.	M. Timlin ...	S.	A. Weir ... ( )	,, ,, 7.2.34 to 8.5.34 / Fm. 912 19.4.34 to 8.5.34	4.6.34 / 4.6.34
185 †† *Comorin* ...	C. W. Cartwright, D.S.C.	R. E. Tucker, D. Meikle, D. S. Charles.	R. V. Gregory...	M.-S.	P. & O.	Fms. 911 & 138 7.1.34 to 11.4.34	14.4.34
198 *† *Contractor* ...	D. L. Whyte	A. L. Cottier, J. H. Roberts, R. L. Bryde.	... ...	M.	Harrison ...	,, ,, 20.2.34 to 16.3.34	10.4.34
Coptic, M.V. ...	D. Christie	R. H. Barnes, S. Wallis, R. R. L. Rosoman.	... ...	M.L.	Shaw Savill & Albion.	Fm. 915 4.2.34 to 10.5.34	17.5.34
258 †† *Corfu*	F. E. French, R.D., Capt., R.N.R.	C. S. Cooke, D. M. F. Lombard, J. T. Sheffield.	A. S. Fraser ...	M.-S.	P. & O.	Fms. 911 & 138 17.3.34 to 18.4.34	22.5.34
Cornwall ...	H. E. Reilly	G. Dibley, A. Brown, W. W. Wakeford.	F. W. Dennis ...	M.L.	Federal	Fm. 915 13.11.33 to 16.3.34	22.3.34
006 *† *Coronado* ...	R. A. Thorburn, R.D., Commr., R.N.R.	A. Magill	W. Oakley ...	S.	Elders & Fyffes ...	Fms. 911 & 138 14.2.34 to 28.4.34	1.5.34
214 *† *Counsellor* ...	J. Jackson	E. B. Stephens, A. A. Heaton, G. Dewar.	A. L. Lane ...	M.	Harrison ...	,, ,, 2.3.34 to 19.5.34	24.5.34
036 *† *Cumberland* ...	T. L. Maltby	N. A. Thomas, N. A. Blount, R. A. Bellfield.	E. Slater ...	S.	Federal	,, ,, 14.2.34 to 16.5.34	24.5.34
285 *† *Custodian* ...	T. O'Connor	W. H. Slaughter, R. F. Hart	W. H. Goldsworthy.	M.	Harrison ...	,, ,, 4.12.33 to 20.4.34	24.4.34
169 *† *Dalgoma* ...	P. H. Beeching ...	H. E. Evans, B. F. Hall, J. Gibson.	— Mangan ...	M.	British India ...	,, ,, 29.1.34 to 2.5.34	30.5.34
Dearne ...	T. H. Woodhead ...	H. Robinson...	... ...	M.L.	Goole Stm. Shipping	... ...	...
Deebank ...	J. Robertson	D. I. C. Robertson, W. Olding, S. Eperon.	... ...	,,	A. Weir	Fm. 915 15.8.33 to 30.11.33	8.12.33
260 *† *Defender* ...	W. T. Owen	A. M. Dewar	A. D. Findlay ...	M.	Harrison ...	Fms. 911 & 138 10.12.33 to 28.2.34	16.3.34
079 †† *Deseado* ...	D. Collings	F. A. C. Thacker, A. Ballardie	A. W. Davey ...	M.-S.	Royal Mail ...	,, ,, 16.11.33 to 3.1.34	6.1.34
138 *† *Designer* ...	W. A. Hansen	G. J. Crispin	A. Gough ...	M	Harrison	,, ,, 12.2.34 to 7.5.34	18.5.34
Diplomat ...	R. Kinloch	J. H. Roberts, E. Whitehouse	... ...	,,	,, ...	Fm. 911 15.10.33 to 23.1.34	5.2.34

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 8.3.34 to 6.6.34.	Date Last Return Received.
284 *† *Director* ...	B. Worthington ...	A. E. Rogers, A. Robertson.	W. Hayes ...	M.	Harrison ...	Fms. 911 & 138 11.12.34 to 5.1.34	8.3.34
Discoverer ...	W. Rowberry	E. P. Simmons, J. M. White	... ...	,,	,, ...	Fm. 911 20.12.33 to 6.4.34	10.4.34
251 *† *R.R.S. Discovery II.*	A. L. Nelson	R. Walker, H. Kirkwood, L. C. Hill.	A. Morriss ...	M.L.	Falkland Is. Govt.	Fm. 915 21.10.33 to 30.1.34	2.4.34
Domala M.V. ...	J. Endersby	W. R. Day	... ...	M.	British India ...	Fm. 911 25.2.34 to 10.5.34	18.5.34
064 †† *Doric*	J. McRostie	R. Hawkins, R. Conway, F. E. Patchett.	G. H. Thomas ...	S.	White Star. ...	Fms. 911 & 138 18.4.34 to 27.5.34	31.5.34
136 *† *Doric Star* ...	S. N. Capon	G. L. Evans, M. C. O'Hare, E. A. Irvine.	G. A. Dobson ...	M	Blue Star ...	,, ,, 6.2.34 to 16.5.34	28.5.34
275 *† *Dramatist* ...	A. J. Meek	B. P. Longster, A. Dewar, C. V. Watts.	J. Olding ...	M.	Harrison ...	Fms. 911 & 138 24.3.34 to 21.4.34	15.5.34
142 †† *Duchess of Atholl*	G. F. McCombie ...	R. Walgate, C. E. Duggan, E. V. Glennie.	E. Murphy ...	M.-S.	Canadian Pacific	,, ,, 7.4.34 to 27.4.34	28.5.34
						Fm. 912 7.4.34 to 27.4.34	15.5.33
152 †† *Duchess of Bedford.*	J. Turnbull, C.B.E., R.D., Capt., R.N.R.	W. P. Hains, L. Outram, E. J. Oatridge.	S. H. Sinclair ...	M.-S.	,, ,,	Fms. 911 & 138 24.3.34 to 24.5.34	28.5.34
						Fm. 912 24.3.34 to 24.5.34	28.5.34
151 †† *Duchess of Richmond.*	A. Rothwell	A. Massey, W. P. P. Phillips, N. Scallan.	J. F. Yorstan ...	,,	,, ,,	Fms. 911 & 138 31.1.34 to 13.4.34	17.4.34
143 †† *Duchess of York*	R. N. Stuart, V.C., D.S.O., R.D., Commr., R.N.R.	C. D. Watt, J. Stewart, A. Mackie.	J. Potts ...	,,	,, ,,	Fms. 911 & 138 18.2.34 to 31.5.34	5.6.34
						Fm. 912 18.2.34 to 31.5.34	5.5.34
290 *† *Dumana* ...	H. T. Hudson, R.D., Commr., R.N.R.	W. M. Bain, A. H. Usher, A. W. Willis.	A. W. Davey ...	M.	British India ...	Fms. 911 & 138 6.3.34 to 28.3.34	23.4.34
098 †† *Dunbar Castle*, M.V.	C. N. Bickford ...	L. H. Farrow, D. McKenzie.	P. P. Williams...	S.	Union Castle ...	,, ,, 3.2.34 to 5.4.34	10.4.34
052 *† *Dunster Grange* M.V.	G. F. Wilson	E. G. Raynor, D. Murray, R. G. Williams.	W. Guthrie ...	M.	Houlder	,, ,, 15.1.34 to 21.3.34	24.3.34
102 *† *Duquesa* ...	C. R. Frost	A. McEwan, R. F. Martin, H. W. Bammall.	H. Croker ...	,,	Furness Withy ...	,, ,, 18.2.34 to 16.4.34	24.4.34
215 *† *Durenda*, M.V....	A. A. Parker	M. C. Williams, J. W. Douglas, T. E. Hardy.	T. F. Alexander	,,	British India ...	,, ,, 25.2.34 to 15.5.34	23.5.34
Eastern Coast ...	W. Quirk	... ...	... ...	M.L.	Coast Lines ...	... ...	...
077 †† *Edinburgh Castle*	H. B. Harvey	H. Close	A. Blow ...	S.	Union Castle ...	Fms. 911 & 138 28.1.34 to 19.5.34	22.5.34
107 *† *El Argentino*, M.V.	F. Ellis, D.S.C. ...	G. Brighton, C. G. Adlard ...	E. Lovelock ...	M.	Houlder	,, ,, 13.2.34 to 2.4.34	12.4.34
009 *† *Elmworth*, M.V.	J. Dick	R. Newlands	K. A. Allington	,,	R. S. Dalgleish ...	,, ,, 24.11.33 to 15.2.34	26.2.34
108 *† *Elstree Grange*...	W. E. Williams ...	C. Feaver, W. F. Heritage ...	J. Sharland ...	M.	Houlder	,, ,, 24.12.33 to 15.4.34	20.4.34
109 *† *El Paraguayo* ...	R. Owen	G. Fletcher, F. G. Rice, R. L. Aldridge.	J. Hunt ...	,,	,, ...	,, ,, 6.2.34 to 30.4.34	10.5.34
110 *† *El Uruguayo* ...	T. McNamara ...	F. E. Hailstone	A. Lewis ...	,,	,, ...	,, ,, 7.1.34 to 15.3.34	20.3.34
088 *† *Empire Star* ...	G. Owen, R.D., Commr., R.N.R.	J. L. Dawson, F. W. B. Gaubert, J. N. Wilson.	A. H. Walley ...	S.	Blue Star ...	,, ,, 21.11.33 to 18.2.34	9.3.34
282 †† *Empress of Australia.*	E. Griffith, Lt.-Commr., R.N.R.	O. F. Pennington, S. W. Keay, E. Roberts.	P. J. Rosney ...	S.	Canadian Pacific	,, ,, 14.2.34 to 18.5.34	22.5.34
						Fm. 912 29.4.34 to 18.5.34	22.5.34
034 †† *Empress of Britain.*	R. G. Latta	H. H. Saunders, D. Dunn, N. W. Duck,	L. B. Cleary ...	,,	,, ,,	Fms. 911 & 138 3.2.34 to 20.5.34	22.5.34
154 †† *Empress of Canada.*	A. J. Hailey, Lt.-Commr., R.N.R.	W. C. Halliday, G. E. Morrell, J. Marshall.	R. D. Thomas ...	M.L.	,, ,,	Fm. 915 2.12.33 to 27.3.34	5.6.34
153 †† *Empress of Japan*	L. D. Douglas, R.D., Lt.-Commr., R.N.R.	A. Kennedy, R. Wolfenden, J. S. Clarke.	J. McLure ...	,,	,, ,,	,, 4.11.33 to 4.4.34	8.5.34
134 *† *Esperance Bay*	R. McKenzie	H. P. Last, C. W. Jennings, R. Grant.	A. Hands ...	M.	Aberdeen Commonwealth.	Fms. 911 & 138 18.2.34 to 16.5.34	28.5.34
049 *† *Fordsdale* ...	J. Avern, Commr., R.N.R.	M. Bennett, L. B. Miller, D. Ashley-Emile.	P. H. Smythe ...	M.	Shaw Savill ...	,, ,, 4.12.33 to 1.3.34	6.3.34
239 *† *Foylebank* ...	C. S. Newton	H. Ingledew, R. N. Wilkee, J. MacCullum.	B. Cunliffe ...	S.	A. Weir	,, ,, 13.1.34 to 13.4.34	2.5.34
030 †† *Franconia* ...	J. C. Townley, R.D., Capt., R.N.R.	P. G. Britten, W. B. Tanner, J. Ashcroft.	J. Harvey ...	,,	Cunard	,, ,, 12.10.33 to 15.10.33	18.10.33
159 *† *Fresno City* ...	B. D. Thomas	B. E. Duffield, F. W. P. Davies, C. S. Whitticombe.	T. Prenton ...	,,	Reardon Smith ...	,, ,, 8.2.34 to 21.3.34	11.5.34
186 †† *Georgic*, M.V. ...	G. P. Freeman ...	J. Quayle, J. H. Walker, G. Kavanagh.	H. S. Reid ...	S.	White Star	,, ,, 27.3.34 to 26.5.34	29.5.34
						Fm. 912 9.4.34 to 28.4.34	2.5.34
234 *† *Glaucus* ...	W. B. Ewan	O. Thomas, F. O. Browning, J. A. A. Evans.	J. C. Wilson ...	M.L.	A. Holt	Fm. 915 2.8.33 to 27.12.33	14.2.34
026 *† *Glenbank*, M.V.	E. N. K. Blackmore ...	C. Sherwood, W. McBean, W. Thorne.	W. Williamson...	S.	A. Weir	Fms. 911 & 138 19.1.34 to 8.5.34	23.5.34
126 *† *Glengarry*, M.V.	J. Angier	R. W. Brooks, P. G. Neill, S. W. Bell.	C. N. Lawrence	M.	Glen	Fms. 911 & 138 1.1.34 to 13.4.34	22.5.34
085 *† *Governor* ...	D. Flynn	A. Watson, G. Greaves ...	J. Lord	,,	Harrison ...	,, ,, 8.1.34 to 24.4.34	30.4.34
111 *† *Hardwicke Grange*	W H. Fowler ...	W. L. Baker, A. O. Seybold, W. E. Ellis.	A. Turner ...	M.	Houlder ...	,, ,, 20.8.33 to 6.2.34	21.2.34
218 *† *Harmonides* ...	F. R. Elwell	E. E. Avery, C. Hare, L. C. Higgins.	W. S. Armstrong	S.	R. P. Houston	,, ,, 15.4.34 to 25.4.34	9.5.34
262 *† *Hauraki*, M.V.	A. T. Norton	D. McLeish, H. H. Pike, H. J. P. Weston.	W. R. Clark ...	M.L.	Union S.S. Co., N.Z.	Fm. 915 16.6.33 to 24.1.34	7.4.34
Hertford ...	E. R. Kemp	W. H. Timberlake, H. K. Cockerill, N. L. Warren.	P. Moroney ...	,,	Federal ...	Fms. 911 & 138 27.10.33 to 5.2.34	9.2.34
Hibernia ...	J. R. Bulmer ...	R. Woodall	... ...	S.	L.M & S. Railway	Telegraphic Report 19.5.34	19.5.34
182 †† *Highland Brigade*	C. A. Cocks, D.S.C., R.D., Capt., R.N.R.	W. Wrake, S. Woolley, J. I. James.	A. Morse ...	M.-S.	Royal Mail ...	Fms. 911 & 138 21.2.34 to 8.4.34	17.4.34
116 †† *Highland Chieftain* M.V.	E. A. Turner	P. R. Burrell, F. B. Collinson, W. L. Irving.	J. Malcolm ...	,,	,, ...	,, ,, 25.1.34 to 20.5.34	25.5.34
099 †† *Highland Monarch* M.V.	R. G. Clayton, D.S.C., R.D., Commr., R.N.R.	R. N. Fletcher, E. V. Scullard, J. H. Fitton.	E. F. Weatherhead.	,,	,, ...	,, ,, 19.3.34 to 7.5.34	14.5.34
230 †† *Highland Patriot*	R. A. Robinson ...	P. Yeatman, F. Dawson.	J. Hylton ...	,,	,, ...	,, ,, 7.3.34 to 22.4.34	27.4.34
250 †† *Highland Princess* M.V.	O. V. Schlanbusch ...	T. Stevens, L. J. Peterson, H. Davies.	H. Morgan ...	,,	,, ...	,, ,, 7.2.34 to 26.3.34	6.4.34
077 *† *Hobson's Bay* ...	T. V. Roberts, R.D., Commr., R.N.R.	F. Charnley, S. Masters, W. Williams.	A. R. Porter ...	M.	Aberdeen Commonwealth.	,, ,, 23.12.33 to 27.3.34	24.4.34
235 †† *Homeric* ...	F. A. Frank, D.S.C., R.D., Commr. R.N.R.	J. Warltire	... ...	S.	White Star ...	... ...	...
261 *† *Huntingdon* ...	H. G. B. Field	C. Cremin, C. W. Roberts, G. D. Gregory.	... ...	,,	Federal ...	,, ,, 1.3.34 to 3.4.34	16.4.34
200 *† *Huntsman* ...	H. Russell	J. Richardson, D. Goddard.	J. Taylor ...	M.	Harrison ...	,, ,, 22.11.33 to 14.2.34	21.2.34
89 *† *Inanda* ...	W. H Gibbings ...	T. B. Littlechild, W. S. Eustance, W. R. Jones.	E. J. Cook ...	,,	,, ...	,, ,, 4.2.34 to 10.5.34	14.5.34
Ingoma	J. T. Ling	D. Douglas-Kerr	... ...	,,	,, ...	Fm. 911 4.3.34 to 12.4.34	24.4.34

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 8.3.34 to 6.6.34.		Date Last Return Received.
189 †† *Ionic*	W. H. P. Jackson ...	N. E. Banks	S. A. Sorrell ...	S.	White Star ...	Fms. 911 & 138	18.1.34 to 17.4.34	20.4.34
Ixion ...	T. B. Marsham... ...	B. Kelly, H. E. Readshaw, H. H. Sanderson.	... ...	M.L.	A. Holt	Fm. 915	25.1.34 to 13.4.34	24.5.34
226 *† *Javanese Prince*, M.V	J. Smith	W. M. Henry, R. Scott, E. S. Oberdorf.	A. Norrie ...	M.L.	Prince	,,	20.8.33 to 21.12.33	31.1.34
188 †† *Kaisar-i-Hind* ...	W. A. Cotching ...	J. Travis, F. M. Squire, H. Toon.	W. Stevenson ...	M.-S.	P. & O.	Fms. 911 & 138	18.3.34 to 4.4.34	7.4.34
206 *† *Karamea*, M.V.	W. Dawson	W. Hill, N. S. Milne, R. J. McKenzie.	A. Strachan ...	S.	Shaw Savill & Albion.	Fm. 915	19.2.34 to 14.5.34	28.5.34
Kemmendine ...	R. B. Reid	C. R. Roy	... ...	M.	Henderson ...	Fm. 911	24.2.34 to 19.5.34	22.5.34
147 †† *Laconia* ...	B. B. Oram, R.D., Commr., R.N.R.	J. Ashcroft, E. W. Connell, E. Gleave.	K. Greenall ...	S.	Cunard	Fms. 911 & 138	22.1.34 to 19.5.34	23.5.34
193 *† *Lahore*	J. H. Hollow	F. Hull, D. I. Spencer, S. R. Eva.	A. J. Grace ...	M.	P. & O.	,, ,,	26.11.33 to 15.2.34	20.2.34
062 †† *Lancastria* ...	G. R. Dolphin, R.D., Commr. R.N.R.	J. C. Dawson, J. McKie, D. M. McLean.	R. M. Shore ...	S.	Cunard	,, ,,	31.3.34 to 17.5.34	22.5.34
082 *† *La Paz*, M.V. ...	W. J. Good	G. Pattison, S. E. Ayland ...	F. Tunnard ...	M.	Pacific S.N. Co.	,, ,,	3.1.34 to 4.4.34	10.4.34
076 *† *Largs Bay* ...	W. M. Jermyn ...	C. Meyer, N. Miller, H. Clark	S. P. Lewis ...	,,	Aberdeen Commonwealth.	,,	26.10.33 to 23.1.34	6.2.34
112 *† *La Rosarina* ...	C. Webb	W. S. Hamblin, T. C. Townsend, S. W. Howell.	H. Delve ...	,,	Houlder	,, ,,	5.3.34 to 27.4.34	2.5.34
267 *† *Lassell*	E. R. Williams ...	J. L. Boyd, R. L. Hagley ...	S. Foster ...	S.	Lamport & Holt	,, ,,	11.12.33 to 5.3.34	3.3.34
100 †† *Laurentic* ...	W. S. Quinn	S. Boden, J. Dray, A. Thompson.	W. Davies ...	,,	White Star	Fms. 911 & 138 Fm. 912	12.2.34 to 2.6.34 12.2.34 to 2.6.34	4.6.34 4.6.34
083 *† *Lautaro*, M.V. ...	J. H. Kirkwood ...	J. Williams, G. B. Wardale...	J. Chalmers ...	M.	Pacific S.N. Co....	Fms. 911 & 138	31.12.33 to 23.3.34	4.4.34
254 *† *Limerick* ...	P. L. Molyneux ...	T. Devitt, D. Chadwick, T. Windus.	E. K. Roberts ...	,,	Federal	,, ,,	1.5.33 to 30.9.33	10.10.33
093 *† *Llandaff Castle*...	C. Le Brocq	W. E. Clark	... ...	S.	Union Castle ...	,, ,,	5.1.34 to 23.5.34	31.5.34
094 *† *Llandovery Castle*	J. MacMahon, R.D., Commr., R.N.R.	A. G. Bidwell, H. S. Warren.	A. E. Hunter ...	,,	,, ,, ...	,, ,,	5.3.34 to 29.4.34	7.5.34
097 †† *Llangibby Castle*, M.V.	H. R. Northwood ...	H. L. Hollands	J. Gilbert ...	,,	,, ,, ...	,, ,,	27.1.34 to 30.3.34	16.4.34
216 *† *Llanstephan Castle*	W. Weller	S. S. Smith, J. A. Wilson ...	H. W. Langshaw	,,	,, ,, ...	,, ,,	18.3.34 to 21.5.34	28.5.34
084 *† *Lobos*, M.V. ...	R. E. Dunn, O.B.E. ...	E. F. Potter, H. Matthews ...	W. Armstrong	M.	Pacific S.N. Co....	,, ,,	12.10.33 to 22.12.33	28.12.33
137 *† *Logician* ...	R. J. Herschel ...	E. L. Stockley, L. Seddon, W. R. Mackenzie.	L. G. Lake ...	,,	Harrison ...	,, ,,	27.1.34 to 10.4.34	19.4.34
008 *† *Losada*, M.V. ...	R. E. Dunn, O.B.E. ...	D. W. Hutchison	R. Pickering ...	,,	Pacific S.N. Co....	,, ,,	1.3.34 to 15.3.34	3.4.34
232 *† *Madura* ...	J. A. Wright	H. J. Hall, S. Henderson, K. R. C. Letts.	H. O. Francis ...	M.	British India ...	,, ,,	15.2.34 to 5.5.34	14.5.34
078 *† *Magician* ...	A. G. Peterkin... ...	W. E. Shotton, J. Haycocks	J. Bunbury ...	,,	Harrison ...	,, ,,	15.2.34 to 3.5.34	8.5.34
231 *† *Mahana* ...	J. M. Cameron ...	H. M. Thompson, C. C. Good, C. L. Carroll.	... ...	S.	Shaw Savill & Albion	Fm. 915	3.12.33 to 9.4.34	16.4.34
101 *† *Mahia*	C. M. Andrews ...	R. A. Costa, H. C. Howe, B. D. Atkin.	G. Cain	,,	,, ,,	Fms. 911 & 138	22.10.33 to 27.2.34	7.3.34
140 *† *Mahratta* ...	W. Hill	H. F. Scoins, N. Grayson, W. J. Wilson.	H. Henshaw ...	M.	Brocklebank ...	,, ,,	23.1.34 to 31.3.34	4.4.34
014 *† *Mahronda* ...	R. G. Hanna	J. B. Leigh, H. Willington, G. Mansell.	... ...	,,	,, ...	,, ,,	12.4.34 to 30.4.34	22.5.34
242 *† *Mahseer* ...	T. A. Tyson	E. Williams	... ...	,,	,, ...	,, ,,	30.1.34 to 12.4.34	25.4.34
015 *† *Mahsud* ...	R. W. Kershaw ...	H. Gillespie, J. R. Paisley, C. A. Jackson.	G. D. Plant ...	,,	,, ...	,, ,,	5.1.34 to 15.3.34	19.3.34
042 *† *Maimoa* ...	H. P. Thurston ...	J. A. McNab, A. Turnbull, A. S. Anthes.	R. Small ...	S.	Shaw Savill & Albion.	,, ,,	12.10.33 to 30.1.34	22.2.34
054 †† *Majestic* ...	E. L. Trant, R.D., Commr., R.N.R.	R. B. O'Brien, E. A. Stuart, L. Thompson.	J. R. Thomson...	,,	White Star ...	,, ,,	16.2.34 to 31.5.34	4.6.34
018 *† *Makalla* ...	J. W. Maughan ...	J. Richardson, A. Hill, A. G. Gorham.	E. P. Hopkins	M.	Brocklebank ...	,, ,,	22.1.34 to 11.4.34	24.4.34
225 *† *Makura* ...	W. Martin	N. H. Pearson, S. H. Crawford, J. N. Collins.	R. Gough ...	M.L.	Canadian-Australasian	Fm. 915	28.9.33 to 13.1.34	15.3.34
236 *† *Malayan Prince*	E. Hardcastle	C. S. Smith, W. R. Harries, J. Baird.	A. A. Lees ...	,,	Prince	,,	14.12.33 to 27.3.34	2.5.34
219 *† *Malda*	F. Caffyn	V. R. Christmas, R. A. Crozin, L. A. Wintle.	— Littlecot ...	M.	British India ...	Fms. 911 & 138	13.1.34 to 5.4.34	12.4.34
195 †† *Maloja*	J. B. Browning, R.D., Commr., R.N.R.	J. D. Green, P. Howarth, H. M. Askin.	P. T. Darby ...	M.-S.	P. & O.	,, ,,	17.12.33 to 22.3.34	26.3.34
Manchester Brigade	F. D. Struss	... ...	... ...	M.L.	Manchester Liners	... ...	... ...	...
Manchester Commerce	J. E. Riley	... ...	... ...	,,	,, ,,	... ...	... ...	...
146 *† *Mandasor* ...	L. C. Shore	G. C. Cullen, F. C. Madden, W. Couling.	R. H. Jones ...	M.	Brocklebank ...	,, ,,	23.1.34 to 3.4.34	9.4.34
177 *† *Mantola* ...	D. F. James	J. Smail, J. Duncan, L. J. Kew.	G. Jones ...	,,	,, ,, ...	,, ,,	19.12.33 to 7.3.34	13.3.34
197 †† *Mantua* ...	J. M. Legg	J. Paice, N. W. Leach, W. Jolliffe.	F. Harvey ...	M.-S.	P. & O.	,, ,,	31.3.34 to 18.4.34	22.5.34
Maron, M.V. ...	J. A. Stewart	P. Purkis, D. W. Strond, M. Turner.	... ...	M.L.	A. Holt	... ...	... ...	...
104 *† *Marquesa* ...	R. Smiles	J. Wetherall	W. H. Jarvis ...	M.	Furness Houlder	,, ,,	21.3.34 to 25.5.34	29.5.34
213 †† *Mashobra* ...	G. E. Brooks	W. D. L. Reves, — Bird, — Cail.	R. Semple ...	M.-S.	British India ...	,, ,,	11.12.33 to 1.3.34	8.3.34
021 *† *Masula*	W. S. Williamson ...	R. A. Whitehead	J. F. Clark ...	M.	,, ,, ...	,, ,,	20.1.34 to 2.4.34	17.4.34
217 *† *Matakana* ...	W. G. West	W. A. Sims-Reeves, E. Johansen, G. Hawley.	W. L. T. Ellison	S.	Shaw Savill & Albion.	,, ,,	17.1.34 to 12.5.34	17.5.34
221 †† *Mataroa* ...	J. H. Gaskell, R.D., Lt. Commr., R.N.R.	L. R. Bull	... ...	,,	,, ,, ...	,, ,,	2.12.33 to 12.3.34	23.3.34
023 *† *Matheran* ...	H. D. Fulcher	W. Spencer, R. Penston, T. Johnston.	J. Heathcote ...	M.	Brocklebank ...	,, ,,	24.2.34 to 11.5.34	22.5.34
223 *† *Matiana* ...	L. D. Patterson ...	A. H. Baird, J. L. Marsland, J. Bridgman.	J. W. Quaid ...	,,	British India ...	,, ,,	15.3.34 to 16.4.34	31.5.34
024 *† *Matra*	N. P. Cornish	G. Shaw, W. Robertson, A. E. Austin.	H. W. Forster...	,,	Brocklebank ...	,, ,,	9.10.33 to 1.2.34	22.2.34

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 8.3.34 to 6.6.34.	Date Last Return Received.
278 *† *Middlesex* ...	H. T. Wilde	J. R. Ricketts, E. G. Williams, C. Coraran.	H. Haddon ...	S.	Federal	Fms. 911 & 138 9.9.33 to 20.12.33	25.1.34
194 †† *Moldavia* ...	C. H. C. Allin	J. K. Crone, E. J. Kerridge, W. H. Wood-Roe.	K. G. Barber ...	M.-S.	P. & O.	,, ,, 13.1.34 to 4.4.34	3.5.34
199 †† *Mongolia* ...	H. R. Rhodes	H. M. Flint, G. Aspinall, J. King.	R. V. McCrath...	,,	,, ...	,, ,, 3.12.33 to 6.3.34	15.3.34
148 †† *Montcalm* ...	W. B. Coyle, R.D., Capt., R.N.R.	R. Antrobus, D. Parsons, F. W. Roberts.	J. Biggins ...	,,	Canadian Pacific	,, ,, 11.3.34 to 3.6.34	5.6.34
149 †† *Montclare* ...	M. F. Murray	J. Soames, W. Thorburn, A. Tibbett.	H. A. Bowman	M.-S.	Canadian Pacific	Fm. 912 22.4.34 to 3.6.34 Fms. 911 & 138 4.3.34 to 18.5.34 Fm. 912 10.12.33 to 29.12.33	5.6.34 25.5.34 4.1.34
150 †† *Montrose* ...	... ...	C. D. Watt, A. C. Harrison, E. J. Oatridge.	A. G. Hill ...	,,	,, ,,	Fms. 911 & 138 25.2.34 to 16.3.34	22.3.34
164 †† *Mooltan*... ...	R. Harrison. D.S.O. A.D.C., Capt., R.N.R.	J. M. Sinclair, A. D. Dennis, N. Thompson.	J. E. Marsh ...	,,	P. & O.	,, ,, 15.1.34 to 18.4.34	21.4.34
196 †† *Mulbera*... ...	W. E. Grant	P. M. Wilson, E. J. Studart, E. Reed.	J. D. Lovelock	,,	British India ...	,, ,, 19.2.34 to 10.5.34	29.5.34
073 *† *Nagara*	S. Weller	H. A. Wright, F. Fraser, J. L. Smith.	T. Shaw ...	M.	Royal Mail ...	,, ,, 19.12.33 to 2.3.34	20.3.34
201 †† *Naldera* ...	R. C. Dene	E. J. R. North, R. D. W. Mackay, E. V. Lewis.	E. F. Whibley ...	S.	P. & O.	,, ,, 5.3.34 to 16.5.34	4.6.34
291 *† *Nankin*	M. B. Skinner	E. L. Birrell	... ...	M.L.	Eastern and Australian.	Fm. 915 1.11.33 to 21.1.34	13.4.34
227 *† *Nardana* ...	J. V. Reilly	T. Warland, H. Goater, W. Clarke.	R. Rawcliffe ...	M.	British India ...	Fms. 911 & 138 5.2.34 to 20.4.34	25.4.34
202 †† *Narkunda* ...	F. Sudell, R.D., Commr., R.N.R.	H. C. Slinn, G. Randall, P. G. Lawrence.	C. Hurbert ...	M.-S.	P. & O.	,, ,, 10.2.34 to 16.5.34	22.5.34
Nascopie ...	T. F. Smellie	T. O. Josh	... ...	S.	Hudson Bay Co.	Fm. 911 10.8.33 to 26.9.33	17.10.33
286 *† *Natia*	E. W. Bridges	T. Davies, N. F. Seaton, P. P. Matthews.	A. J. McNiven	M.	Royal Mail ...	Fms. 911 & 138 1.1.34 to 2.3.34	15.3.34
027 *† *Nebraska* ...	A. R. Murley	P. R. Cocks, G. B. Medlycott, — Smith.	— White ...	,,	,, ...	,, ,, 9.8.33 to 1.9.33	23.9.33
288 *† *Nellore*	C. H. G. Lorriard, M.C.	G. E. Smith, A. A. Stevenson, S. H. Nelson.	... ...	M.L.	Eastern and Australian.	Fm. 915 16.9.33 to 10.2.34	14.5.34
019 *† *Nerbudda* ...	A. A. Parker	F. D. Copeland	... ...	M.	British India ...	Fms. 911 & 138 2.12.33 to 31.12.33	6.1.34
162 *† *Nestor*	F. Adcock	R. Singleton, W. Pearse, T. Silcock.	C. F. Townsend	S.	A. Holt	,, ,, 25.1.34 to 3.5.34	8.5.34
210 *† *Niagara*... ...	W. Martin	G. H. Kime, D. A. Menlove, J. W. S. Madden.	G. M. Power ...	M.L.	Canadian-Australasian.	Fm. 915 12.10.33 to 27.1.34	7.4.34
Norfolk	R. L. H. McNish, D.S.O., Lt.-Commr., R.N.R.	H. N. Lawson, J. Knott, P. A. Block.	B. C. Wheeler ...	,,	Federal	,, 19.10.33 to 25.1.34	3.2.34
Northern Coast...	H. Cameron	... ...	... ...	,,	Coast Lines ...	... ...	...
Northumberland	H. L. Upton, D.S.C., R.D., Commr., R.N.R.	J. Marshall, D. Lyver, R. S. Miller.	M. Savage ...	,,	Federal	,, 5.11.33 to 20.2.34	19.3.34
Observer ...	J. Lowe...	K. H. Davies	... ...	M.	Harrison ...	Fm. 911 1.1.34 to 28.3.34	3.4.34
004 †† *Olympic* ...	J. W. Binks, R.D., Lt.-Commr., R.N.R.	W. Tugwell, G. Brooks, H. S. Law.	N. Clarke ...	S.	White Star ...	Fms. 911 & 138 23.2.34 to 23.5.34	25.5.34
243 *† *Opawa*, M.V. ...	F. W. Robinson ...	J. McCullock, J. C. Grose, H. S. Dawson.	F. W. Fowler ...	M.	New Zealand Shipping.	,, ,, 20.1.34 to 15.4.34	20.4.34
170 †† *Orama*	E. P. Cameron, R.D., Capt., R.N.R.	C. H. Denton, L. Sly, W. L. Mackay.	H. Varley ...	S.	Orient	Fms. 911 & 138 13.11.33 to 12.2.34	27.2.34
080 *† *Orari*	J. G. Almond	J. Lunnon, J. K. Macdonald, F. A. Wilson.	W. E. Fordham	M.	New Zealand Shipping.	Fm. 911 18.2.34 to 16.3.34	3.4.34
246 †† *Orbita*	D. R. Morgan	G. Gerety, A. Sissons ...	S. W. Mitchell	M.-S.	Pacific S.N. Co.	Fms. 911 & 138 27.12.33 to 24.5.34	31.5.34
087 †† *Orduna*	A. Ridyard, O.B.E. ...	W. Vickers, R. D. Eckford, T. R. Thomas.	G. Inglis ...	,,	,, ,,	,, ,, 14.2.34 to 15.4.34	19.4.34
171 †† *Orford*	A. L. Owens, R.D., Capt., R.N.R.	P. Sargent, K. M. Morrison, W. H. Barker.	A. F. Edwards	,,	Orient	,, ,, 22.1.34 to 25.4.34	28.4.34
174 †† *Ormonde* ...	M. J. Sarson	T. L. Shurrock, C. E. Coles, J. M. Swanson.	B. Baxter ...	S.	,, ...	,, ,, 10.12.33 to 14.3.34	16.3.34
172 †† *Oronsay* ...	C. G. Matheson, D.S.O., R.D., Commodore, R.N.R.	C. W. Pinckney, G. B. M. Jones, E. M. Mackay.	K. Alston ...	,,	... ...	,, 19.2.34 to 22.5.34	6.6.34
173 †† *Orontes* ...	F. R. O'Sullevan ...	F. S. Gray, R. W. Roberts, J. K. Johnson.	S. G. Boon ...	M.-S.	,, ...	,, 25.1.34 to 5.3.34	5.4.34
105 †† *Orsova* ...	R. L. F. Hubbard, R.D., Commr., R.N.R.	J. C. Dowding, R. Galpin, W. A. Ellison.	R. B. Knights ...	S.	,, ...	,, ,, 5.2.34 to 7.5.34	25.5.34
156 †† *Otranto* ...	L. V. James, D.S.C. ...	G. R. Grandage, J. Birch, L. L. Lloyd Jones.	H. Curry ...	M.-S.	Orient	,, ,, 7.1.34 to 10.4.34	19.4.33
Pacific Exporter	C. E. Holland, R.D., Commr., R.N.R.	W. Edmonds	C. North ...	S.	Furness Withy ...	Fm. 911 9.8.33 to 2.11.33	4.12.33
277 *† *Pakeha*	W. J. Williams ...	T. H. Davies, C. A. Knox, M. J. Caws.	H. Ridgeway ...	,,	Shaw Savill & Albion.	Fms. 911 & 138 19.2.34 to 26.3.34	14.5.34
Paris	B. Shaw	E. Hill, E. W. Smith ...	A. H. Jones ...	,,	Southern Rly. ...	Telegraphic Report ... 5.6.34	5.6.34
058 †† *Pennland* ...	H. Harvey	F. Willis, F. Good, — Cross...	P. Darley ...	,,	Red Star	Fms. 911 & 138 11.3.34 to 26.5.34 Fm. 912 6.5.34 to 26.5.34	26.5.34 28.5.34
204 *† *Peshawur* ...	E. P. Parfitt	T. C. Triscott, G. V. Legassick, J. H. Anderson.	... ...	M.	P. & O.	Fms. 911 & 138 1.3.34 to 15.4.34	22.5.34
Phemius ...	C. A. Lakin	G. W. Best	... ...	S.	A. Holt	Fm. 911 2.3.34 to 13.4.34	4.6.34
039 *† *Planter* ...	A. H. Brown	J. C. Sinclair, F. R. Hill, J. J. Devereux.	P. J. Aherne ...	,,	Harrison ...	Fms. 911 & 138 19.9.33 to 12.12.33	16.12.33
040 *† *Port Adelaide* ...	R. Williams	E. G. Jones, E. W. Dingle, G. Puttick.	F. Amott ...	S.	Commonwealth & Dominion.	,, ,, 3.7.33 to 16.11.33	2.12.33
238 *† *Port Alma* ...	W. Gilling	T. L. Kidwell, W. B. Hopkins, A. L. Walton.	... ...	,,	,, ,, ,,	Fm. 915 13.1.34 to 1.5.34	14.5.34
128 *† *Port Auckland* ...	C. A. Robinson ...	W. Easton, C. E. Midwinter, P. Bradnell.	S. Adams ...	,,	,, ,, ,,	Fms. 911 & 138 27.7.33 to 14.11.33	9.12.33
268 *† *Port Bowen* ...	A. H. Brown	R. Bettess, W. Craig, E. N. Howard.	... ...	,,	,, ,, ,,	,, ,, 14.12.33 to 12.4.34	1.6.34
130 *† *Port Caroline* ...	G. S. Hall	G. G. Langford, J. S. Moate, R. G. Gardner.	J. P. B. Jeffery.	,,	,, ,, ,,	,, ,, 22.9.33 to 6.1.34	20.1.34
131 *† *Port Darwin* ...	J. J. Hudson	P. Howe, H. Duckling, W. Wakefield.	J. S. Kinnaird ...	,,	,, ,, ,,	,, ,, 20.2.34 to 22.5.34	2.6.34
072 *† *Port Denison* ...	R. Needham	E. Wheeler, H. B. Walker, A. G. Russell.	C. Donaldson ...	,,	,, ,,	,, ,, 18.10.33 to 15.2.34	2.3.34
253 *† *Port Dunedin*, M.V	G. W. Hearne	L. C. Asser, F. W. Elgar, H. Duckling.	... ...	,,	,, ,,	Fm. 915 15.10.33 to 29.1.34	3.2.34

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 8.3.34 to 6.6.34.	Date Last Return Received.
010 *†	*Port Fremantle*, M.V.	W. J. Enright, R.D. Commr., R.N.R.	C. F. Post, G. F. Pannett, W. M. Clough.	H. Lothian ...	S.	Commonwealth & Dominion	Fm. 915 25.6.33 to 3.1.34	19.1.34
	Port Gisborne, M.V.	W. G. Higgs	R. B. Linklater, N. Muzzell, D. Watson.	... ...	M.L.	,, ,, ,,	,, 13.10.33 to 27.1.34	6.2.34
252 *†	*Port Hardy* ...	J. Jack	D. F. Morgan, J. G. Thorn, W. D. Henderson.	K. H. Bond ...	S.	,, ,, ,,	Fms. 911 & 138 2.12.33 to 31.3.34	18.4.34
	Port Hunter ...	R. S. Durham, D.S.C.	F. W. Bailey, P. G. M. Lee, L. E. Craven.	O. Reed ..	M.L.	,, ,, ,,	Fm. 915 15.12.33 to 31.3.34	4.4.34
	Port Wellington	G. W. Hearn	A. J. Knell, E. Rogerson, V. N. Ford.	A. Stratton ...	M.L.	,, ,, ,,	Fms. 911 & 138 6.10.33 to 24.1.34	8.2.34
106 *†	*Princesa* ...	A. B. Friend	E. Lougheed, O. S. Sheard, F. Poulson.	R. Shackleton ...	M.	Houlder	,, ,, 20.2.34 to 30.5.34	2.6.34
063 *†	*Queen City* ...	R. V. Arkwright ...	J. W. Botterill	... ...	S.	Reardon Smith ...	Fm. 911 3.12.33 to 27.2.34	4.4.34
205 ††	*Rajputana* ...	P. C. Headlam, R.D., Commr., R.N.R.	G. A. Webb, S. H. Baldwin, K. W. Richardson.	W. Banbury ...	M.-S.	P. & O.	Fms. 911 & 138 17.2.34 to 26.4.34	5.5.34
228 ††	*Ranchi*	A. H. Hignett, R.D., Commr., R.N.R.	R. E. Baldwin-Wiseman, T. T. Ferguson, J. P. McArthur.	P. Rowley ...	,,	,, ...	,, ,, 4.2.34 to 10.5.34	28.5.34
224 ††	*Rangitane* ...	A. W. Mackellar, R.D., Capt., R.N.R.	R. C. Aldridge, J. Clarke, S. R. Leggett.	W. Smith ...	,,	New Zealand Shipping	,, ,, 21.10.34 to 22.1.34	31.1.34
257 ††	*Rangitata*, M.V.	J. L. B. Hunter ...	R. L. Warren, O. Chadwick, M. Johnson.	C. E. Terry ...	,,	,, ,, ,,	,, ,, 18.11.33 to 21.2.34	6.3.34
240 ††	*Rangitiki*, M.V.	H. Barnett	T. M. Devitt, C. A. Jones, R. Vincent.	L. V. Horn ...	,,	,, ,, ,,	,, ,, 13.1.34 to 17.4.34	25.4.34
207 ††	*Ranpura* ...	G. H. S. Furlong, O.B.E., R.D., Capt., R.N.R.	G. Maclean, D. H. G. Weall, A. P. Godfrey.	J. S. Skinner ...	,,	P. & O.	,, ,, 10.12.33 to 12.3.34	19.3.34
071 ††	*Rawalpindi* ...	R. H. Stringer, O.B.E., R.D., Commr., R.N.R.	W. R. Stockdale, E. Bolton-Smith, E. G. May.	S. W. Sharp ...	,,	,, ...	,, ,, 24.12.34 to 22 3.34	5.4.34
247 *†	*Recorder* ...	J. J. Egerton	S. A. McCallum, A. S. Milne, V. E. Dunn.	D. McNeil ...	M.	Harrison ...	,, ,, 25.12.33 to 11.3.34	15.3.34
132 *†	*Reina del Pacifico*, M.V.	J. Ross	R. Bridson, J. K. Campbell, E. C. Hicks.	W. G. Sutherland	,,	Pacific S.N. Co....	,, ,, 22.1.34 to 28.3.34	4.4.34
	Remuera ...	E. A. Holland	H. Hill, D. H. Clegg, J. C. Baker.	H. Dedman ...	M.L.	New Zealand Shipping	Fm. 915 16.12.33 to 23.3.34	3.4.34
	Rhexenor ...	C. F. Melling	W. G. Smith, C. T. Morgan, W. F. Lockead.	J. E. McConnell	,,	A. Holt	,, 8.10.33 to 4.3.34	11.4.34
	Rotorua ...	C. B. Lamb	W. J. Glassborow, R. H. Chapman, R. H. Carter.	... ...	,,	New Zealand Shipping	,, 1.10.33 to 23.1.34	27.2.34
203 *†	*Royal Star* ...	W. Walsh	N. Clarkson, R. E. Winnall, H. Arton.	J. Walker ...	M.	Blue Star ...	Fms. 911 & 138 23.10.33 to 10.1.34	6.2.34
	Ruahine ...	G. Kinnell	F. R. F. Wilson, A. Hocken, N. Baddeley.	... ...	M.L.	New Zealand Shipping	Fm. 915 24.12.33 to 18.4.34	23.4.34
	St. Helier ...	R. Pitman	H. D. Freeman	... ...	S.	G.W. Railway ...	Telegraphic Report 5.6.34	5.6.34
	St. Julien ...	T. Richardson	... ...	... ...	,,	,, ,, ...	,, ,, 19.5.34	19.5.34
	St. Keverne, S.T.	A. Hatton	... ...	... ...	A.	Bunch Steam Fishing Co.	Fm. 911 11.2.34 to 21.5.34	28.5.34
							Fm. 912 11.2.34 to 1.4.34	6.4.34
	St. Patrick ...	C. W. Sanderson ...	T. D. Thomas	... ...	S.	G.W. Railway ...	Telegraphic Report 6.9.33	6.9.33
046 ††	*Samaria* ...	R. G. Malin, R.D., R.N.R.	J. H. Kenworthy	... ...	,,	Cunard	... ...	...
	Scotia	W. Hughes	W. H. Hughes	... ...	,,	L.M. & S. Railway	Telegraphic Report 6.6.34	6.6.34
033 ††	*Scythia*	W. A. Hawkes, R.D., Capt., R.N.R.	W. M. Stewart, A. B. Fasting, A. D. McCallum.	F. H. Williams...	,,	Cunard ...	Fms. 911 & 138 19.2.34 to 2.6.34	5.6.34
							Fm. 912 16.4.34 to 2.6.34	5.6.34
211 *†	*Shropshire*, M.V.	R. P. Mann	D. Hetherington, J. K. Gemmel, H. B. Peate.	D. McLellan ...	,,	Bibby	,, ,, 24.12.33 to 28.2.34	7.3.34
121 *†	*Siamese Prince*, M.V.	E. E. Litchfield ...	W. A. Niven, H. J. Steele ...	W. Childs ...	M.L.	Prince	Fm. 915 7.12.33 to 18.4.34	1.6.34
	Silverwalnut, M.V.	J. Smith, R.N.R. ...	H. Rowe, G. F. West, W. J. Law.	... ...	,,	Thompson ...	,, ,, 1.12.33 to 3.4.34	8.5.34
141 *†	*Somerset* ...	E. R. Pilcher	H. M. Knight, B. C. Hamilton, J. N. A. Low.	A. E. Howard ...	S.	Federal	Fms. 911 & 138 25.12.33 to 6.5.34	22.5.34
	Spero	W. A. Dossor	H. D. Vickers, A. Kirk ...	... ...	M.L.	Ellerman Wilson	Fm. 915 1.7.33 to 21.1.34	3.2.34
	Stephen ...	O. J. P. Lee, R.D., Capt., R.N.R.	H. Sapworth, L. A. Sayers ...	... ...	M.L.	Booth	Fm. 915 20.10.33 to 4.3.34	8.3.34
020 *†	*Stirlingshire* ...	F. T. Mee	F. J. E. Houghton, R. E. Smallbone, E. G. G. Mobbs	E. A. Tee ...	S.	Turnbull Martin	Fms. 911 & 138 15.1.34 to 25.3.34	14.5.34
270 ††	*Strathaird* ...	W. P. Townshend, R.D., Capt., R.N.R.	R. H. Hand, H. Fitzmarshall, L. T. Brown.	F. W. Helm ...	M.-S.	P. & O.	Fms. 911 & 138 24.2.34 to 30.5.34	4.6.34
059 ††	*Strathnaver* ...	B. J. Ohlson, D.S.O., R.D., Commr., R.N.R.	C. W. Mayne, C. B. Holmes, H. N. Thompson.	P. R. Hobbs ...	,,	,, ...	,, ,, 28.1.34 to 3.5.34	7.5.34
274 *†	*Sultan Star* ...	W. Bevan	J. Lewis	J. J. Winsor ...	M.	Blue Star ...	,, ,, 24.2.34 to 10.5.34	17.5.34
044 *†	*Tacoma City* ...	H. Paul	T. J. Paull, J. M. Hughes, C. K. Hughey.	R. Lea	M.L.	Reardon Smith...	Fm. 915 25.6.33 to 3.12.33	1.1.34
	Tacoma Star ...	W. Walsh	D. G. Rassell...	... ...	S.	Blue Star ...	Fm. 911 29.1.34 to 17.4.34	20.4.34
229 *†	*Tactician* ...	F. Trinick, O.B.E. ...	A. Frew, S. Leyland, L. J. Sharman.	A. Temple ...	M.	Harrison ...	Fms. 911 & 138 1.3.34 to 15.5.34	17.5.34
045 ††	*Tainui*	A. McIntosh	P. Campbell, H. Winyard, D. Pickersgill.	A. Bloxham ...	M.L.	Shaw Savill & Albion	Fm. 915 4.11.33 to 13.2.34	21.2.34
081 *†	*Tairoa*	S. Oswald	W. Thowless, E. T. Durrant, H. D. Pim.	H. Baylis ...	S.	,, ,, ,,	Fms. 911 & 138 8.12.33 to 7.4.34	21.4.34
264 *†	*Tanda*	F. R. Miller	E. Norquay, H. S. Nuzum, W. B. Williams.	W. Harris ...	M.L.	E. & A. S.S. Co....	Fm. 915 11.9.33 to 8.1.34	15.3.34
165 *†	*Tantalus*, M.V....	R. Brawn	J. H. Brawn, J. MacArthur. J. A. MacGregor.	J. Nicholas ...	S.	A. Holt	Fms. 911 & 138 14.2.34 to 13.3.34	3.4.34
047 *†	*Taranaki*, M.V.	J. W. Johnson	T. B. Marsdon, B. M. Norris, C. Stewart.	W. M. Shotter ...	,,	Shaw Savill & Albion.	,, ,, 6.12.33 to 2.3.34	15.3.34
069 *†	*Tekoa*	J. Howell Price, D.S.O., D.S.C.	L. W. Fulcher, S. A. Jarvis, A. Kirk.	F. Gardiner ...	M.	New Zealand Shipping	,, ,, 16.1.34 to 26.1.34	16.5.34
048 ††	*Themistocles* ...	C. Wood, D.S.C.	R. Pattison, R. Hamilton, W. Hart.	F. G. Lord ...	M.-S.	Aberdeen Commonwealth	,, ,, 20.11.33 to 11.3.34	7.4.34
161 *†	*Titan*	G. G. Rundle	G. Roberts, J. R. McCarthy, C. B. L. Wren.	S. Wingfield ...	S.	A. Holt	,, ,, 4.1.34 to 1.4.34	10.4.34
244 *†	*Tongariro* ...	P. B. Clarke, D.S.C. ...	G. W. Pring, L. Mercer, J. W. Leslie.	E. G. Stride ...	,,	New Zealand Shipping.	,, ,, 26.11.33 to 6.4.34	16.4.34
025 ††	*Transylvania* ...	D. W. Bone	T. O. Dunn, H. D. Campsie, A. Middleton.	J. McDonald ...	,,	Anchor	,, ,, 24.9.33 to 6.11.33	8.11.33

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 8.3.34 to 6.6.34.	Date Last Return Received.
119 *†	*Trojan Star* ...	D. H. Mills	M. D. Stacey, E. R. Pearce, A. Fowler.	H. D. C. Cox ...	M.	Blue Star ...	Fms. 911 & 138 29.6.33 to 24.9.33	26.9.33
245 *†	*Turakina* ...	J. Laird	H. G. Letts, J. Timms, G. E. Mason.	N. Hallett ...	,,	New Zealand Shipping.	,, ,, 19.10.33 to 12.2.34	12.2.34
76 ††	*Tuscania* ...	W. B. Rome	J. Noble, J. Gibson, D. Barclay.	J. Macdonald ...	S.	Anchor ...	,, ,, 29.4.34 to 20.5.34	22.5.34
	Tuscan Star, M.V.	G. Wilson	... ...	... ...	M.L.	Blue Star ...	Fm. 912 29.4.34 to 20.5.34	22.5.34
113 *†	*Upwey Grange*, M.V.	H. P. Goodrick ...	A. Bradbury, G. T. Hurst, P. J. Walker.	R. Tuck ...	M.	Houlder ...	Fms. 911 & 138 27.3.34 to 15.5.34	23.5.34
176 *†	*Vancouver City* M.V.	H. E. Egerton ...	J. K. Robson	S. W. Sloan ...	S.	Reardon Smith ...	Fm. 911 22.3.34 to 29.4.34	1.6.34
163 ††	*Vandyck* ...	P. Symonds	J. A. Baragwanath	F. Slater ...	,,	Lamport & Holt	Fms. 911 & 138 30.3.34 to 13.4.34	19.4.34
292 ††	*Viceroy of India*	E. J. Thornton, R.D., Commr., R.N.R.	F. E. Cox, D. Buckley, M. F. Shute.	V. A. K. Smith	M.-S.	P. & O.	,, ,, 21.2.34 to 17.5.34	23.5.34
053 ††	*Voltaire* ...	J. J. O'Connor... ...	F. J. Durrant...	W. Burnett ...	S.	Lamport & Holt	,, ,, 4.3.34 to 9.5.34	16.5.34
263 *†	*Wairuna* ...	R. L. Davies	J. Warwick, D. McKenzie, A. H. Dunnings.	E. P. Nichell ...	M.L.	Union S.S. Co. of N.Z.	Fm. 915 14.10.32 to 21.1.33	12.4.33
005 ††	*Warwick Castle*	W. M. Betts	T. C. Goldstone, P. Clissold, J. Oakley.	A. Maunder ...	S.	Union Castle ...	Fms. 911 & 138 10.3.34 to 28.4.34	30.4.34
060 ††	*Westernland* ...	W. A. Morehouse ...	D. Liggett, H. H. Grace, L. A. Williams.	J. C. R. Eustice	,,	Red Star	,, ,, 25.2.34 to 12.5.34	14.5.34
056 *†	*Westmoreland* ...	E. A. Burton	R. Coin, F. T. Renny, H. Forster.	R. Glover ...	,,	New Zealand Shipping.	Fm. 912 22.4.34 to 12.5.34 Fms. 911 & 138 24.2.34 to 27.3.34	14.5.34 3.4.34
208 ††	*Winchester Castle*, M.V.	J. H. Kerbey	R. F. Pembry, J. D. Crombie	W. A. Smith ...	,,	Union Castle ...	,, ,, 3.2.34 to 27.5.34	29.5.34
096 ††	*Windsor Castle*	A. Barrow	F. A. G. Hunter. N. Wilcock	G. Scurr ...	,,	,, ,,	,, ,, 5.3.34 to 22.4.34	24.4.34
	Worthing ...	W. Lidbetter	H. Smith	C. Kelley ...	,,	Southern Railway	Telegraphic Report ... 5.6.34	5.6.34
	Yoma	J. A. Wilson	J. Crawford, P. D. Barr, A. Driscoll.	... ...	M.	Henderson ...	Fm. 911 13.1.34 to 28.3.34	3.4.34
043 *†	*Zealandic*, M.V.	H. R. Gordon	K. Miller, G. Sangwin, T. Chapman.	W. Latimer ...	S.	Shaw Savill & Albion.	Fms. 911 & 138 26.11.33 to 15.3.34	21.3.34
	Conway, H.M.S.	F. A. Richardson, D.S.C., Commr., R.N.	The Senior Cadets	... ...	Cadets M.L.	... ...	Cadets' Met. Log. 28.1.34 to 25.3.34	3.4.34
	Pangbourne Nautical College.	A. F. G. Tracy, Commr., R.N.	,, ,, ...	... ...	,,	... ...	,, ,, 18.1.34 to 27.3.34	23.4.34
	Worcester, H.M.S.	G. C. Steele, V.C., Commr., R.N.	,, ...	... ...	,,	... ...	,, ,, 12.1.34 to 4.4.34	6.4.34
	Watling Island	... ...	The Keepers	... ...	Lighthouse Register	... ...	Lighthouse Register 1.5.33 to 31.10.33	3.2.34
	Cape Pembroke... (Falkland Is.)	... ...	,, ,, ...	... ...	,,	... ...	Lighthouse Register 1.7.33 to 31.12.33	3.2.34

SHIPS WATER SAMPLING THE NORTH ATLANTIC. FISHERIES LABORATORY, LOWESTOFT.

Name of Vessel.	Captain.	Observing Officer.	Line.	Received at Government Chemist, London.
Dakarian	W. Hannaford	A. A. Johnson	Leyland	30 Water Samples, 8.12.33.
Darian	J. Trickey. D.S.O.	F. Steventon	,, ...	30 ,, ,, 30.4.34.
Davisian	R. Thomas	A. F. Wood	,, ...	30 ,, ,, 24.4.34.
Dorelian	C. Hughan	W. Parry	,, ...	30 ,, ,, 26.3.34.
Hilary	W. C. H. Jones, R.D., Commr., R.N.R.	G. E. Freeman	Booth	30 ,, ,, 29.3.34.

SHIPS WATER SAMPLING THE ARABIAN SEA, JOHN MURRAY EXPEDITION.

Name of Vessel.	Captain.	Observing Officer.	Line.	Received at Port Office, Port Said.
Britannia	D. Munro	G. S. Sinclair	Anchor	2 cases of Water Samples, 30.4.34.
Castalia	G. B. Kelly	H. D. Campsie	,, ...	2 ,, ,, ,, 13.3.34.
Cheshire	J. E. Cullen	A. Beharrel	Bibby	2 ,, ,, ,, 30.4.34.
Clan Macbean	S. Lofthouse	C. M. Powell	Clan	
Clan Macvicar	M. H. Jones	L. S. Jones	,, ...	2 ,, ,, ,, 14.5.34.
Clan Ranald	H. Evans	R. W. Mayo	,, ...	
Elysia	F. M. Henderson	R. B. Clements Mitchell ...	Anchor	2 ,, ,, ,, 23.5.34.
Gloucestershire	C. A. Griffiths	I. D. Minto	Bibby	2 ,, ,, ,, 2.4.34.
Oxfordshire	H. Lyon	C. Powrie	,, ...	2 ,, ,, ,, 7.3.34.
Sagaing	E. Esslemont	C. Furgeson	Henderson	2 ,, ,, ,, 18.2.34.
Staffordshire	W. L. Forster	W. B. Boyer	Bibby	2 ,, ,, ,, 18.3.34.
Tarantia	J. B. Caithness	J. M. Cherry	Anchor	2 ,, ,, ,, 9.4.34.
Worcestershire	F. W. Beckett	A. Thomson	Bibby	2 ,, ,, ,, 14.4.34.
Yorkshire	F. W. L. Midgeley	J. F. Reed	,, ...	2 ,, ,, ,, 13.5.34.

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

MARINE METEOROLOGY, ATLASES AND BOOKS

CHARTS:—

ATLANTIC (NORTH AND SOUTH):—

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

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

ATLANTIC (NORTH):—

Atlas of Currents on the Main Trade Routes of the North Atlantic. (No. 323, 1930. 6*s.* 6*d.*) (29¼ × 19½ in.)

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

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

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

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

ATLANTIC (SOUTH):—

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

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

CHARTS:—*continued*

BAFFIN BAY AND DAVIS STRAIT:—

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

INDIAN OCEAN:—

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

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

PACIFIC OCEAN:—

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

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

RED SEA:—

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

SOUTHERN OCEAN:—

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

BOOKS:—

Wireless and Weather, An Aid to Navigation, with Appendices. (No. 297, 1928.) 5*s.* (4to.)

The Marine Observer's Handbook. Fifth Edition. (No. 218, 1930.) 2*s.* 6*d.* (8vo.)

PAMPHLET:—

Decode for use with the International Code for Wireless Weather Messages from Ships. Second Edition. (No. 329, 1933.) 3*d.* (8vo.)

The Admiralty Publications are on sale by J. D. POTTER, 145, Minories, London, E.1
The other Publications mentioned in this list, unless otherwise marked
can be purchased directly from
H.M. STATIONERY OFFICE at the following addresses
Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh 2; York Street, Manchester 1
1, St. Andrew's Crescent, Cardiff; 80, Chichester Street, Belfast
or through any Bookseller

[*To face page* viii

(23886—55) Wt. 17—22 950 & 300 Pt. I 6/34 P. St G. 4/1