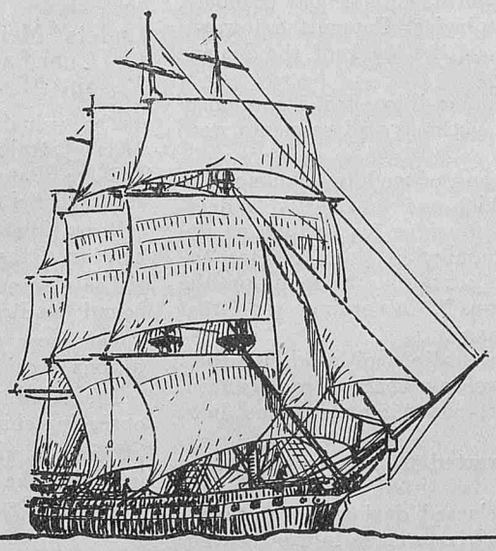


VOL. X. NO. 111. THE MARINE OBSERVER. JULY 1933.

TABLE OF PRINCIPAL CONTENTS

WORK OF THE YEAR.

April 1st, 1932, to March 31st, 1933.

THE Merchant Shipping (Safety and Load Line Conventions) Act, 1932, having become operative on January 1st, 1933, the meteorological services prescribed in Article 35 of the International Convention for Safety of Life at Sea have become a statutory obligation, the carrying out of which is entrusted to the Meteorological Office.

Last year steps were taken in the interests of national economy, and a plan was adopted by the Meteorological Committee towards the attainment of the original purpose of the work of the Marine Division.

This year has been spent mainly in putting into effect this plan of work, and on January 1st, 1933, all the necessary adjustments were completed.

The voluntary observing fleet has been reduced to a number of ships sufficient only to provide data which can be effectively dealt with; that is 50 meteorological log keeping ships for completing the survey of the oceans, and a sufficient number of ships keeping the meteorological record of synchronized observations to maintain the proper complement of "Selected Ships", according to Great Britain's proportion of the world's tonnage.

The number of stations recording observations of wind, weather, air and sea temperatures on the British coasts having been reduced, greater dependence is now placed upon observing ships and light vessels for this information.

THE MARINE OBSERVER has been converted from a monthly to a quarterly journal.

All meteorological logs received and classed during the past year have been extracted, and a good start has been made in the recovery of arrears of extraction of post war logs.

A commencement has been made upon the extraction of data from meteorological logs collected between 1855 and 1920 which had remained as received in the logs.

Meanwhile with good organization, the assistance of the Port Meteorological Officers and Merchant Navy Agents, and above all, the good will and fine spirit of the corps of voluntary marine observers, the high standard of the work of observation and record has been maintained at sea.

The plan of work commenced on January 1st, 1933, is to be reviewed in two years.

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 126 received:—

51	classed Excellent.
74	classed Very Good.
0	classed Good.
1	Not classed.
126	Total.

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 295 ships.

Of a total of 2,169 of these forms received, they were classed as follows:—

Excellent	674
Very Good	1,480
Good	0
Not classed	15
Total	2,169

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.

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".

Seven West India and Falkland Island Lighthouse stations have continued the return of routine observations.

The revised system of obtaining information of sea temperature round the British coasts has worked satisfactorily.

Ten 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.

The use made of the data collected.

The charting of currents in THE MARINE OBSERVER has been continued; and another large gap in the Atlas of Currents of the Indian Ocean under construction, has been filled in during the year, by the completion of the sections covering the Arabian Sea and Bay of Bengal, and the commencement of the sections covering the regions of the Roaring Forties.

This re-charting and investigation of currents continues to bring out facts which do not appear to have been recognized by past investigators, who had not the advantage of our present methods, made possible by the high standard of navigation obtaining in British voluntary observing ships.

An outstanding fact established during the year is that the current circulation, which is generally counter-clockwise off the shores of the Arabian Sea and Bay of Bengal during the height of the N.E. monsoon, changes generally to clockwise in February when the N.E. monsoon still blows, and some time before the advent of the S.W. monsoon.

By means of the wireless weather registers of "Selected Ships" records of 9,400 sets of synchronized observations made south of the Equator, in the International ships wireless weather telegraphy code, for the years 1930 to 1932, have been sent to Australia for the use of the meteorological services of the British Empire in the southern hemisphere.

Special copies of 1,989 sets of observations recorded at 1200 G.M.T. in British ships in the Northern Hemisphere, in the month of August, 1932, have been made and sent to Germany for the purpose of constructing synchronous weather charts during the International Polar Year.

In past years for the purpose of checking the whole system of observation, extraction, and computation, and to provide navigation with some useful meteorological information, observations of wind, fog, mist, and weather have been compiled into averages by the Hollerith system, and published in THE MARINE OBSERVER. This was useful for it has proved the system of extraction, and computation adopted to be sound, and has been the means of bringing about the plan which the Meteorological Committee has adopted to further the completion of the survey of the oceans.

These small investigations occupy time of men and machines which can now be more usefully expended in extracting data from meteorological logs to complete the survey of the oceans, and so provide fuller information in the future.

The survey of the oceans cannot be completed by small investigations. It is a matter which requires to be dealt with as a whole.

With the plan which was adopted last year, and which was brought into working effect by January 1st, 1933, a great improvement towards the effective use of data collected is being made.

The table below gives particulars of data extracted since the Hollerith system was commenced in June, 1921. It shows not only that all logs received and classed during the past year have been completely extracted, but also the arrears made good during the past year for post-war years. It also shows progress in making good arrears which had accumulated before 1920.

	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.
Percentage of logs received reaching the required standard completely extracted and phenomena indexed.	100	79	17	14	37	60	64	64	55	66	73	59
Number of complete sets of observations extracted and punched on cards, with currents entered in data books and phenomena indexed.	58,747	70,718	19,185	17,987	43,117	73,745	78,180	75,852	65,060	74,749	97,533	63,731
Arrears of previous years recovered during 1932-33.	—	—	19,080	3,296	—	—	—	—	—	—	—	—
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.	17,798	—	—	—	—	—	—	—	—	—	—	—
Current observations from 1910 extracted and entered in data books.	6,118	8,609	7,980	10,913	2,626	3,496	8,242	8,210	5,746	4,259	1,826	—

That is to say, by reducing the observing fleet to a number of ships consistent with the capacity of the Marine Division and making other adjustments, we have been able to extract all data received during the year, to recover arrears of data extracted from logs received during 1929 to 1931, and to make some progress in extracting data for the North Atlantic and North and South Pacific from meteorological logs collected before 1920.

Marsden Chart No. I shows the distribution of observations collected and extracted during the last twelve months and **Marsden Chart No. II** gives the distribution and number of observations collected and extracted since re-organization on April 1st, 1920.

The 17,798 part sets of observations extracted from logs received during 1915 to 1920 are well distributed over the North and South Pacific. These are not shown here on Marsden Charts.

In addition to the above work copies of observations have been supplied in response to enquiries regarding the state of the weather for the purpose of investigation and litigation regarding damage or loss of ships and cargoes; and oceanographic and meteorological information has been supplied to other Government Departments and to Dominion Meteorological services.

The Service of British Selected Ships.

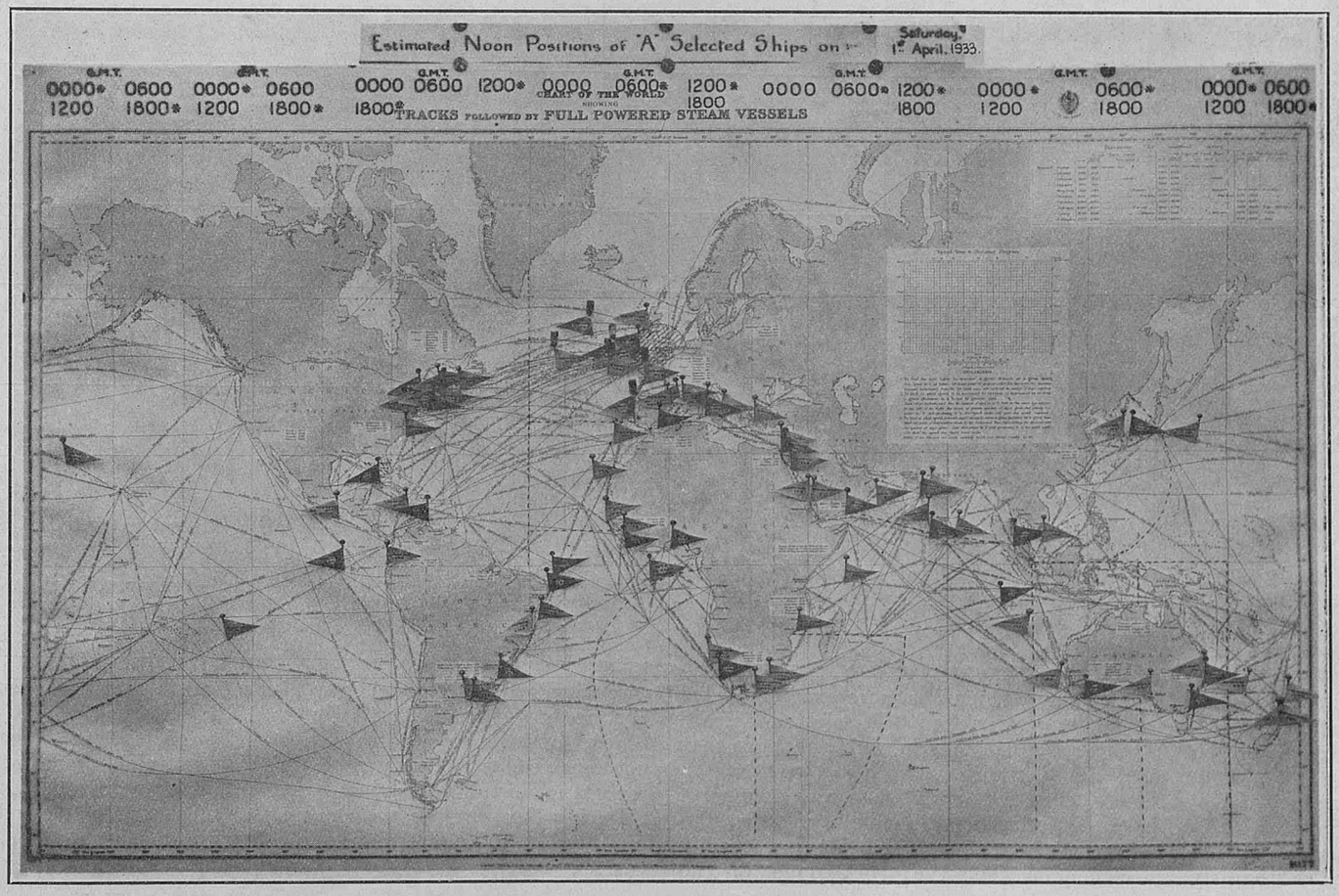
The British complement of "Selected Ships" was reduced from 306 to 299 on September 7th, 1932, to accord with our proportion of the world's tonnage.

Throughout the year the complement of British "Selected Ships" has been maintained in service. At present of 299 British "Selected Ships" 113 are "A Selected Ships."

In detailing observing ships as "Selected Ships," great care has been taken in selection, in order to maintain the best world wide distribution possible. **Chart III** shows the position of all British "Selected Ships" at sea on June 1st, 1932, which is typical of the daily distribution throughout the year.

The depressed state of trade and the North Atlantic passenger trade in particular, has made it difficult to maintain a sufficient service of "A Selected Ships" in the North Atlantic.

Below is a photograph of the position chart worked in the Marine Division. Upon it the flags indicate the estimated position of "A



Selected Ships " at sea and in ports abroad on April 1st, 1933. " B Selected Ships " are not indicated on this chart.

The registers indicate that the commanders, officers and wireless operators of British " Selected Ships " carry out this voluntary 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 it would be impossible for such a service to function without some deviations from the desired procedure; and in some parts of the world where stations detailed to receive reports have not conformed to the arrangements made, there have been some failures in communication.

As the registers are received and examined the times of transmission, addresses, and wave lengths recorded as used indicate that generally all over the world, British " Selected Ships " are carrying on in a highly efficient manner. It is not possible to analyse in detail the service of every " Selected Ship " throughout her voyages, but the following analysis made for 30-day periods of the work of " Selected Ships " in different parts of the world is sufficient to indicate the general satisfactory performance of both " A " and " B " Selected Ships.

Southern Indian Ocean in the region worked by Perth, V.I.P., appears to be particularly satisfactory, though we have not complete information as to how many of the 43 reports sent in November, 1932, were received by the station or ships in the region.

At the end of October, 1932, an " A Selected Ship " reported that the conditions at Slangkop, Z.S.C., between sunrise and when the sun was well up, were such that communication on C.W. with that station was difficult. " A Selected Ships " have accordingly been advised to use 600 metres and the schedule time for " B Selected Ships," when such difficulty arises in sending their reports to Met Pretoria, through Z.S.C.

The results shown for " A Selected Ships " in the South Atlantic working in the Slangkop area will doubtless be improved when this elasticity in the system of communication is applied. The necessary advice was passed to " Selected Ships " concerned as soon as possible through the Port Meteorological Officers and Merchant Navy Agents.

In the Eastern North Atlantic where there is probably greater congestion of wireless traffic than anywhere else at sea, and for which a roll call is made daily, the results by " A Selected Ships " working

Region and W.T. Station detailed to receive or intercept Selected Ships' reports.	30 days period.	No. of Selected Ships in region.	No. of reports desirable by schedule.	No. of reports made according to schedule.		Percentage of possible number of reports to be made, desired by schedule.	No. of additional reports of observations recorded at International times, reported at other than schedule times.	No. of reports received at Station.	No. of ships receiving reports.
				To Station.	To C.Q.				
South Atlantic. SLANGKOP, Z.S.C. (2100 m. C.W.)	Nov. 1st to 30th,1932.	8 " A "	78	15	20	45	1	Not known.	Not known.
South Atlantic. Lat. 30°S. to 40° S. Long. 10°E. to 20°E. (600 m.)	Nov. 1st to 30th,1932.	13 " B."	30	—	28	93	—	—	Not known.
Southern Indian Ocean. PERTH, V.I.P. (2100 m. C.W.)	Nov. 1st to 30th,1932.	9 " A "	46	25	18	94	—	Not known.	Not known.
Southern Ocean. Lat. 30°S. to 40°S. Long. 70°E. to 80°E. (600 m.)	Nov. 1st to 30th,1932.	1 " B "	4	—	4	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.)	Nov. 1st to 30th,1932.	6 " B "	16	3 of the 15 sent to C.Q. also *repeated* to Weather Wellington.	15	94	—	—	Not known.
Indian Ocean. COLOMBO V.P.B. (2100 m. C.W.)	Nov. 1st to 30th,1932.	16 " A "	163	65	64	79	21	Not known.	Not known.
Arabian Sea. Lat. 10°N. to 20°N. Long. 50°E. to 60°E. (600 m.)	Nov. 1st to 30th,1932.	17 " B "	51	—	46	90	—	—	Not known.
Eastern North Atlantic north of Lat. 38°N. worked by Roll Call.									
HORTA, Azores, C.T.H. (2400 m. C.W.)	Oct. 1st to 30th,1932.	On roll call 54 " A "	108	53	—	49	21	29 60 per cent. of reports sent not received by Horta.	Not known.
PORTISHEAD, G.K.U. (2100 m. C.W.)	Oct. 1st to 30th,1932.	On roll call 173 " A "	346	254	—	73	131	385 All reports sent received by Weather London.	Not known.

The communication of " A Selected Ships " is more exacting, since they communicate at much longer ranges than " B Selected Ships," and address their reports to specified stations in such a manner that they may also be intercepted by other ships.

The conduct of the work of the stations detailed to receive reports from " Selected Ships " naturally influences the manner in which the service is carried out; and of those regions which are not heavily congested with wireless communication, the work done in the through Portishead have been highly satisfactory. The small proportion of reports sent to Horta C.T.H. by British " A Selected Ships," and the large percentage of those reports sent to that station not received, is mainly due to the heavy wireless traffic of weather reports made to that station by ships of many nations.

During the year the average number of chosen " Selected Ships " indicated by roll call each day to report to Weather London, through G.K.U., Portishead, was 6.0, of which an average of 5.3 reported.

The total number of reports received by Weather London was 5,064, being an average of 13.9 reports per day. Of these, 3,277 were 0600 and 1200 G.M.T. observations, of which 3,104 were received in accordance with schedule, only 173 being late.

The remaining 1,787 reports containing 0000 and 1800 G.M.T. observations were reported not by schedule, but as circumstances would permit.

Port Meteorological Offices and Merchant Navy Agencies.

The improvement in voluntary Marine Meteorological work of late years and the recent reduction in the number of the observing fleet has made the number of agencies necessary for the conduct of the work also smaller. On July 1st, 1932, Captain J. W. McIntyre who had acted as agent in Northern Ireland since October 1st, 1926, having resigned, the Agency at Belfast was discontinued.

On May 9th, 1932, Captain Sir Benjamin Chave, K.B.E., was appointed Agent at Southampton, vice Mr. R. I. T. McEwan.

The Port Meteorological Officers and Merchant Navy Agents have given valuable assistance, and much credit is due to them for the high state of efficiency which exists in the British voluntary observing fleet.

Acknowledgment, Appreciation and Awards.

Meteorological logs (Forms 915), ships' Meteorological records of synchronized observations (Forms 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 acknowledgment 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—Ship owners, the wireless Telegraphy Companies and Authorities, and above all Commanders, Officers and W.T. operators of British ships—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, including aviation.

The Chief of the United States Weather Bureau has written expressing their thanks and appreciation of the fine service rendered by British "Selected Ships" in the Western North Atlantic. He says of weather reports received from British "Selected Ships" during 1932, that they have been of a high standard, promptly transmitted, and of great value to the United States Weather Bureau in its service for the benefit of marine interests and general forecasting.

In recognition of very fine work the Meteorological Committee has awarded specially bound volumes of The Marine Observer, in blue leather, with gilt lettering, to the Captains and Principal Observing Officers of meteorological log keeping and "Selected Ships," whose names appear in the list below.

London, April 3rd, 1933.

Marine Superintendent.

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

Captain.	Principal Observing Officer.	Ship.
Allin, C. H. C.	Crone, J. K.	*Moldavia.*
Almond, J. G.	Hocart, G. C.	*Middlesex.*
Andrews, C. M.	Congdon, M. P.	*Mahia.*
Aslin, E. P. C.	Clement, J. F.	*Piako.*
Barlow, F. P.	Whayman, J.	*Stephen.*
Barnett, H.	Hill, H. ... / Malcouronne, L. F.	*Rangitiki.*
Beswick, W., D.S.C., Commr. R.N.R.	Hole, W. K.	*Agamemnon.*
Biggs, J. H.	Kimpton, R. A. B.	*Peshawur.*
Bone, D. W.	Middleton, A.	*Transylvania.*
Buret, T. J. C.	Martin, E. W. / Osborne, A. R.	*Almanzora.*
Burton Davies, J.	Shakespeare, P. L.	*Hertford.*
Cadogan, A.	Davies, K. H.	*Musician.*
Caffyn, F.	Usher, A. H.	*Madura.*
Cameron, E. P., Capt. R.N.R., R.D.	Stannard, R. B.	*Oronsay.*
Capon, S. N.	Day, A. F.	*Doric Star.*
Carey, W. M., Commr. R.N.	Ardley, R. A. B.	R.R.S. *Discovery II.*
Carter, E. A. J. W., Commr. R.N.R., R.D.	—	*Alipore.*
Claret, F. H., O.B.E., Commr. R.N.R.	Pengelly, E.	*Minnewaska.*
Clarke, P. B.	Chaplin, G.	*Devon.*
Collie, A.	Walmsley, J. J.	*Caledonia.*
Collings, D.	Leech, G. E.	*Highland Princess.*
Compton, R. W.	Faulkner, J. R.	*Baronesa.*
Cotching, W. A.	Travis, T.	*Kaisar-i-Hind.*
Davies, A. L.	Oppen, F. C.	*Ixion.*
Davies, D.	Davies, T. W. P.	*Fresno City.*
Davis, J. King	Colbeck, W. R.	Auxy. Bque. *Discovery.*
Doughty, J. H.	Mackie, J. H. A.	*Westernland.*
Draper, J. M.	Hutchings, W. M. M.	*Appam.*
Durham, R. S., D.S.C.	Munday, P. A.	*Port Hunter.*
Egerton, J. J.	Milne, A. S.	*Recorder.*
Ellis, F., D.S.C.	Burch, J.	*El. Argentino.*
Evens, E. H.	—	*Berwickshire.*
Field, H. G. B.	Walter, M. T. D. / Roberts, C. W.	*Huntingdon.*
French, F. E., Capt. R.N.R., R.D.	Kerridge, R. S.	*Corfu.*
Friend, A. B.	Lougheed, E. J.	*Princesa.*
Galloway, M.	Eckford, R.	*Orduna.*
Gates, T. F., C.B.E.	McCartney, H. E. D.	*Minnetonka.*
Gemmell, W.	—	*Cameronia.*
Gibbings, Willis	Brown, D. C.	*Inanda.*
Gilbert, E. F.	—	*Windsor Castle.*
Good, W. J.	Sissons, R. H.	*Lobos.*
Goodrick, H. P.	Bradbury, A.	*Upwey Grange.*
Grayston, E. T., D.S.C., Commr. R.N.R., R.D.	Thowless, W.	*Tairoa.*
Green, F. V.	Bunn, L. A.	*Matiana.*
Griffiths, W.	Williams, T. E.	*Denis.*
Hall, G. S.	Rogerson, E. N.	*Port Denison.*
Halloway, J.	Dunford, C. J. H. / Baird, J.	*Malayan Prince.*
Hamilton, F. S.	Baldwin, G. D.	*Tongariro.*
Harris, F. C. P.	Thomas, M.	*Pancras.*
Harris, W. L.	Edwards, A. G.	*Jeypore.*
Hartman, W. H.	Bull, L. R.	*Tamaroa.*
Hatton, A. (Skipper)	—	s.t. *St. Minver.*
Hayter, S. W.	Roswell, E. E.	*Port Alma.*
Hearn, G. W.	Craven, L. E.	*Port Caroline.*
Herschel, R. F.	Stockley, E. L.	*Logician.*
Higgs, W. G.	Skailes, L. J.	*Port Gisborne.*
Holman, W. G.	Petherbridge, F. H.	*Clan Macnair.*
Howell Price, J., D.S.O., D.S.C.	Fulcher, L. W.	*Tekoa.*
Hudson, J. J.	Morgan, K. D.	*Port Darwin.*
Hunter, J. L. B.	Chadwick, D. H.	*Rangitata.*
Hutchings, A. H.	Goode, J. M.	*Llandaff Castle.*
Irvine, W.	Taylor, J. W.	*Chinese Prince.*
Jack, D. A.	Binks, G.	*Camito.*
Jackson, J.	Simmons, E. P.	*Counsellor.*

Captain.	Principal Observing Officer.	Ship.
James, D. F.	Day, W. R.	*Mantola.*
Johnson, J. W.	Bennett, M.	*Maimoa.*
Jones, W. C. H., Commr. R.N.R., R.D.	Thomas, R. D.	*Stephen.*
Kershaw, R. W.	Paisley, J. R.	*Mahsud.*
Kinnell, G.	Warren, R. L.	*Ruahine.*
Kitson, A. G.	Smail, J.	*Margha.*
Laird, J.	Williams, E. G.	*Turakina.*
Latta, R. G.	Duck, N. W.	*Empress of Britain.*
Lawson, J. H.	Morrs, E.	*Adda.*
Le Brocq, C.	Wilford, J. E. R.	*Llandaff Castle.*
Lettington, A. E.	Mackillican, H. H.	*Surrey.*
Ling, J. T.	Eustance, W. S.	*Planter.*
Linklater, H.	Lloyd, G. W.	*Llangibby Castle.*
McIntosh, A.	Winyard, H.	*Tainui.*
McKellar, A. W., Capt. R.N.R., R.D.	Brown, A.	*Rangitane.*
McNamara, T.	Hailstone, F. E.	*El Uruguayo.*
MacDonald, D.	Billingham, J. Bourke, L. P.	*Makura.*
Maltby, T. L.	Leggett, S. R. Chadwick, D. H.	*Cumberland.*
Martin, W.	Richards, D. H.	*Aorangi.*
Mason, W. S.	Duckling, H.	*Port Dunedin.*
Matheson, C. G., D.S.O., Capt. R.N.R., R.D.	Pinckney, C. W.	*Oronsay.*
Melling, C. F.	Saville, E.	*Tantalus.*
Miles, A. G.	Giller, E. N.	*Nagara.*
Miles, F. R., Capt. R.N.R. R.D.	Fletcher, R. N.	*Narenta.*
Miller, A. C.	Stephenson, G. C.	*Kenya.*
Molyneux, P. L.	Trotter, J.	*Limerick.*
Morgan, D. R.	Pattison, G.	*La Paz.*
Morton, A. J.	Richardson, R. M.	*Mooltan.*
Moulton, E. W.	—	*Arandora Star.*
Mulcahy, J. J.	Slade, S. S.	*Matheran.*
Newman, G. W. A.	White, C. G.	*Pacific Enterprise.*
O'Neill, J.	Hughes, W. H.	*Scotia.*
Oram, B. B., Commr. R.N.R., R.D.	Bridgewater, A.	*Scythia.*
Owen, G. Commr. R.N.R., R.D.	Thorne, R. Hunt, P. H.	*Empire Star.*
Owen, W. T.	O'Neill, W. F.	*Contractor.*
Owens, A. L., Capt. R.N.R., R.D.	Morrison, K. M.	*Orford.*
Parkin, J. W.	Hole, J. F. B.	*Mandala.*
Paul, H.	Paull, T. J.	*Tacoma City.*
Peel, R. V., Capt. R.N.R., R.D.	Crawford, R. H. C.	*Mauretania.*
Pilcher, C. R.	Edgecombe, C.	*Somerset.*
Pretty, F. C., D.S.C.	Farrar, T....	*Hurunui.*
Ramsay, N.	Allen, E.	*Cerinthus.*
Reilly, J. V.	Warland, T.	*Nardana.*
Rhodes, H. R.	Tee, H.	*Mongolia.*
Robinson, F. W.	Williamson, H. P.	*Opawa.*
Robinson, T.	Saunders, H.	*City of Canberra.*
Rothwell, A.	Gillett, T. L.	*Montcalm.*
Rowberry, W.	Hunt, W. H.	*Discoverer.*
Russell, H.	Richardson, J.	*Huntsman.*
Schlanbusch, O. V.	Peterson, L. T.	*Deseado.*
Scott-Smith, H. E. G., O.B.E., Lieut. Commr. R.N.R., R.D.	Dunphy, J. P.	*Clan Macindoe.*
Shaw, B.	Hill, E.	*Dieppe.*
Sherwood, R. H.	Robinson, H.	*Rother.*
Shooter, J. C.	Ellis, R. B.	*Accra.*
Sibbons, H.	Outram, L.	*Duchess of Bedford.*
Siggers, O.	Forbes, T. D.	*Chitral.*
Smiles, R.	Wetherall, J.	*Marquesa.*
Smith, H. Elliott, Lieut. Commr. R.N.R., R.D.	McHattie, A. J. Williamson, H. V.	*Cathay.* *Baradine.*
Staunton, H. G., O.B.E., Commr. R.N.R., R.D.	Coles, A. E.	*Otranto.*
Stringer, C. B. L.	Finch, B. C.	*Kwangchow.*
Stringer, R. H., O.B.E., Commr. R.N.R., R.D.	White, E. C.	*Rawalpindi.*
Stuart, R.N., V.C., D.S.O., Commr. R.N.R., R.D.	Parsons, D.	*Duchess of York.*
Sudell, F. Commr. R.N.R. R.D.	Young, J. O. V.	*Narkunda.*
Summers, F. F. Commr. R.N.R., R.D.	Walker, J. H.	*Georgic.*
Toten, A. T.	Ehlert, L. B.	*Monowai.*
Townshend, W. P., Capt. R.N.R., R.D.	Hand, R. H.	*Strathaird.*
Trant, E. L. Commr. R.N.R., R.D.	Stuart, E. A.	*Majestic.*
Trinick, F.	Sharman, L. G.	*Tactician.*
Upton, H. L., D.S.C., Commr. R.N.R., R.D.	Phillips, H. I.	*Northumberland.*
Vaughan, P. R., D.S.C., Commr. R.N.R., R.D.	Fisher, A. J.	*Britannic.*
Williams, G.	James, R. G.	*Coptic.*
Williams, R.	Elgar, F. W.	*Port Adelaide.*
Williams, R.	Devitt, T. M.	*Cambridge.*
Wilson, R. F.	Stott, F.	*Elpenor.*
Womersley, H.	Thacker, F. A. C.	*Natia.*
Wright, J. A.	Usher, A. H.	*Madura.*
Wyatt, F. N.	Rigden, H. T.	*Bendigo.*
Webb, C.	Hamblin, W. S.	*La Rosarina.*
West, W. F.	Houghton, F. J. E.	*Clan Mactaggart.*
Westropp, T. G.	MacMillan, P.	*Buteshire.*
White, R. W.	Jackman, C.	*Karapara.*
Wilde, H. J.	Wilson, A. D.	*Remuera.*
Young, A. D.	Morgan, H. Best, J. W.	*Themistocles.*
—	Duguid, G.	*Berengaria.*
—	Ferguson, J. A.	*Dunbar Castle.*

July, August and September.

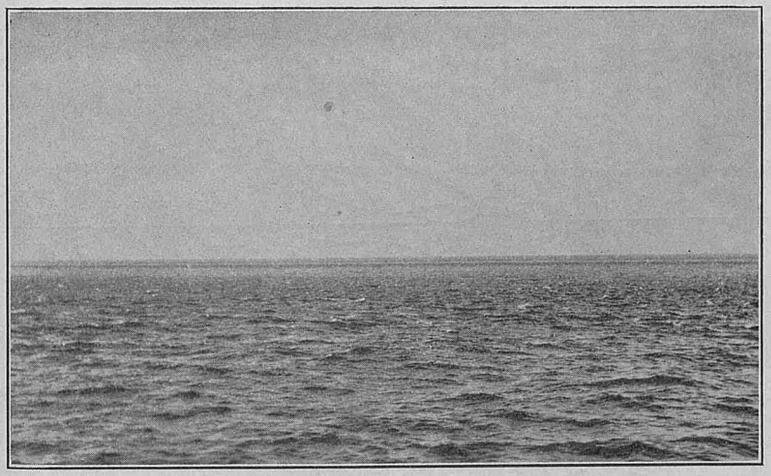
It is hoped that these pages will be filled each quarter with a selection of the contributions of Mariners in manuscript, or remarks from the Logs and Records of regular Marine Observers.
Responsibility for statements rests with the Contributor.

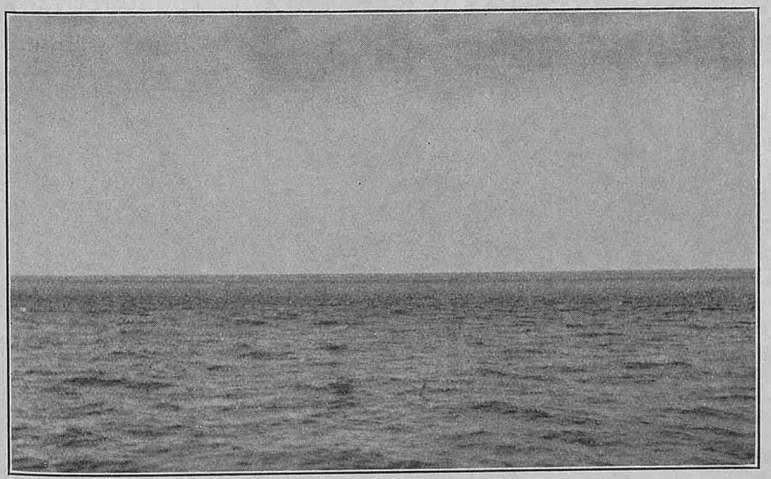
PHOTOGRAPHS OF CURRENT RIPS.

North Atlantic.

THE following remarks and photographs have been received with the Meteorological Record of S.S. *Buteshire*, Captain T. G. WESTROPP, Durban to London, observer Mr. P. MACMILLAN, 2nd Officer.

5th July, 1932, at 15.40 A.T.S. (1646 G.M.T.) to 15.57 A.T.S. passed through three current rips extending N.W. and S.E. These rips were about 500 feet apart. The first was very strong and was about 500 feet wide. The second was also strong and was about 400 feet wide. The third was only about 100 feet wide and appeared much weaker than the others. The water in these rips appeared to be travelling to the northwestward. West of rips sea temperature was 82°, specific gravity 1022. East of rips temperature was 81°, specific gravity 1021. Wind W.S.W. force 3. Barometer 1013.5 mb. Air temperature 81°.5.





The first photograph was taken at 15.37 and shows first rip fairly close bearing about N.N.E. The second photograph was taken at 15.48 and shows second and third rips bearing N.N.E. Position of ship 15.40, Latitude (D.R.) 8° 12′ N., Longitude (D.R.) 15° 19′ W. Course 321°, speed 12 knots.

DISCOLOURED WATER.

South African Waters.

THE following is an extract from the Meteorological Record of S.S. *Harmonides*, Captain F. R. ELWELL, Durban to Cape Town, observer Mr. J. O. H. KIRKWOOD, 3rd officer.

August 24th, 1932, 10.30 a.m. A.T.S. observed a strip of light-coloured water close inshore Position of ship—Latitude 33° 34′ S., Longitude 27° 12′ E. Great Fish Point Lighthouse bearing 298° distant 5½ miles, course 243°, speed 8½ knots. This strip of discoloured water widened and its outer edge extended gradually seaward from the shore until at 11.15 a.m. in position Latitude 33° 36′ S., Longitude 27° 06½′ E. the steamer crossed a tongue of it extending seaward, the density of which was found to be 1025 and temperature 61°.

This discoloured water did not however continue to extend seaward, but its outer edge ran parallel with the coast, at a distance of about 4½ miles.

With Great Fish Point Lt. House bearing 036°, distant 9 miles, its line of demarcation was less distinct, but gradually extending seaward until at 12.50 p.m. it reached in a S.E. direction to the horizon.

Its outer edge was then about 10 miles from the coast, sometimes visible, and sometimes below the horizon.

At 1.46 p.m. density was found to be the same, temperature 60°, air temperature 62°, with a long heavy S.W. swell.

At 2.16 p.m. in Latitude 33° 46′ S., Longitude 26° 45′ E., steamer ran out of discoloured water, which then had a well-defined line of demarcation extending right in to the coast.

No appreciable current was experienced during this period.

WEATHER CHARTS, STORM INFORMATION AND GOOD USE OF POWER.

The accompanying remarks and weather charts made at sea have been received with the Meteorological Record of s.s. *Duchess of York*, Commander R. N. STUART, V.C., D.S.O., R.D., R.N.R., observer, Mr. W. PARSONS, 4th officer.

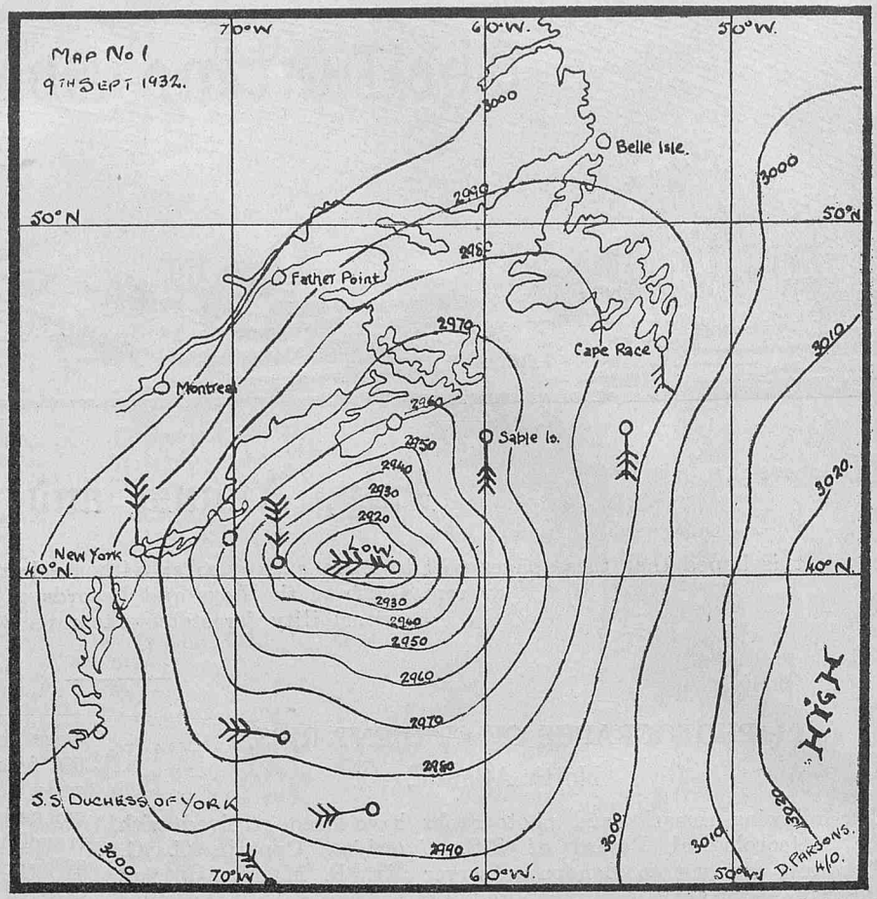
An interesting opportunity of illustrating the usefulness of weather forecasts occurred last voyage from Montreal to Liverpool, via the Straits of Belle Isle and Great Circle Track "G." Ship sailing from Montreal on Friday, 9th September, 1932.

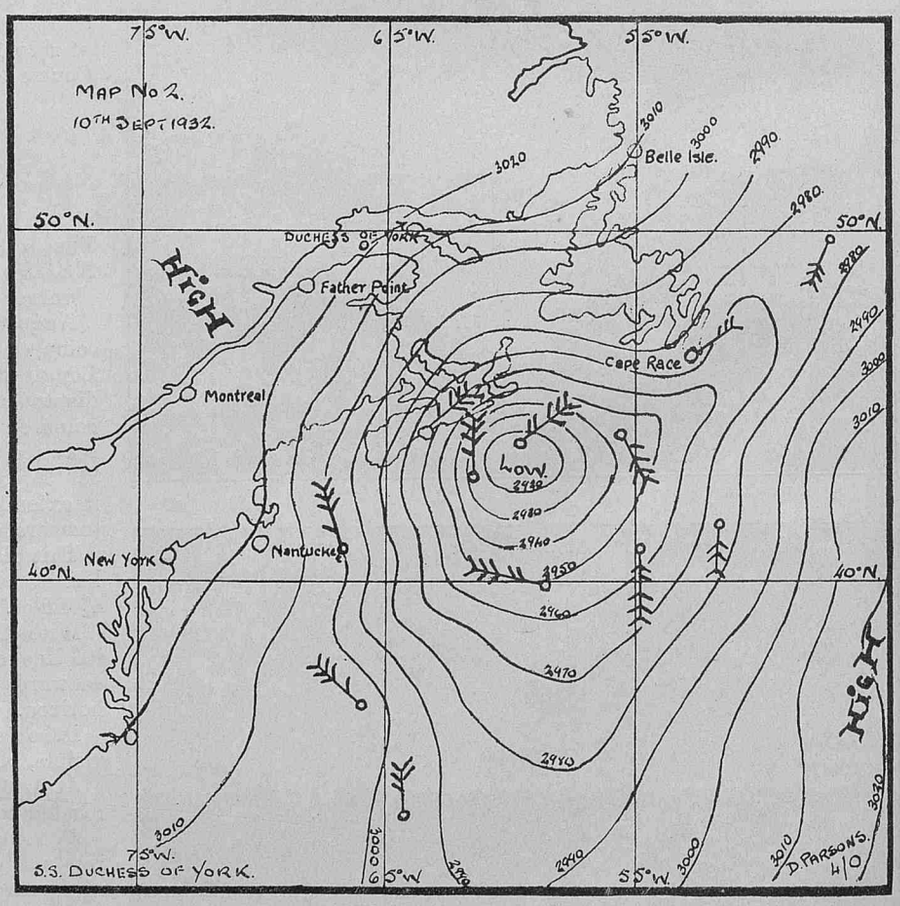
A storm of considerable intensity was observed on the day of sailing advancing northwards from the vicinity of Nantucket (Map I). Its daily progress was watched and plotted. (Maps II and III.) There was then little doubt that this storm was going to converge with the ship's track (Map IV).

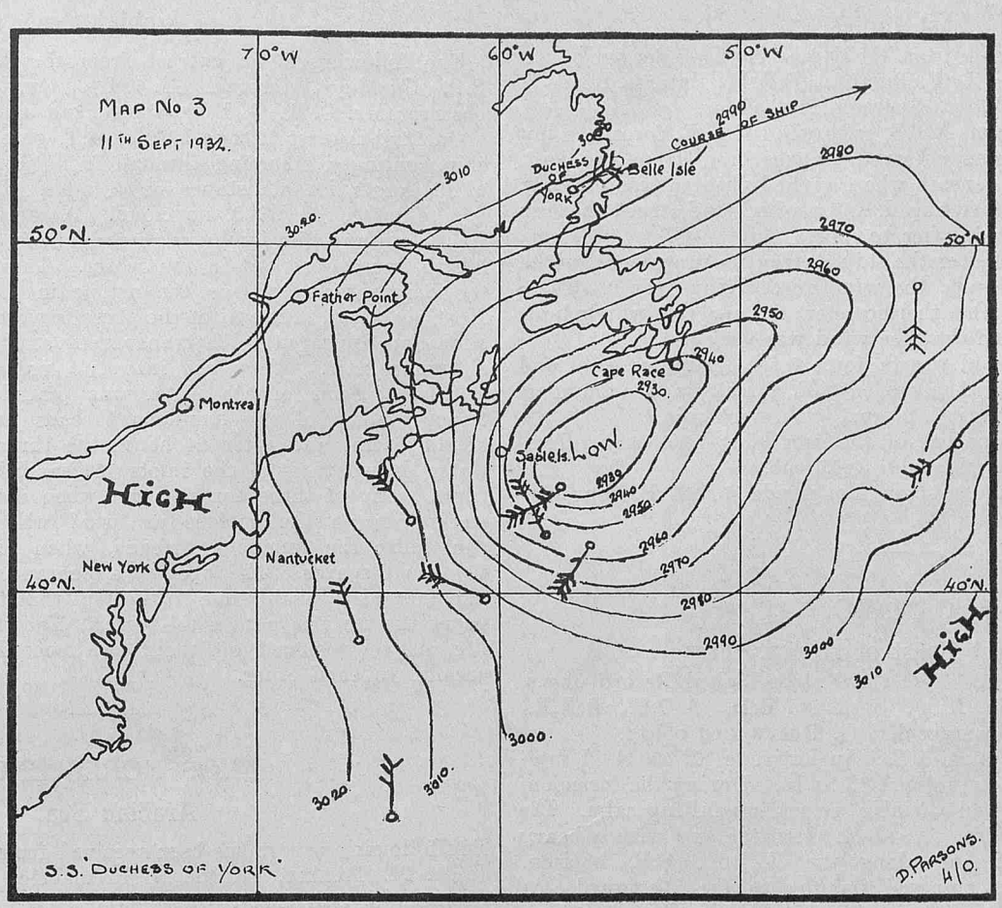
This valuable information enabled us to take all precautions in having the ship secured well before the storm reached us. We knew from the rate of progress of the storm that the freshening N.E. wind then adverse to us was soon to become a strong favourable gale, in which case it was to our advantage to maintain a speed that upheld our ordinary schedule (Map V). Knowledge of weather conditions of this nature has enabled us to increase horse power on two occasions which resulted in the saving of a day on the voyage in each case, thus more than repaying the slight additional outlay on oil in a substantial saving in running expenses. This is only a profitable venture, however, when the weather is going to be favourable, illustrating the value of knowing ahead what sort of weather will be encountered, in order that the most economical horse power may be used with the maximum efficiency.

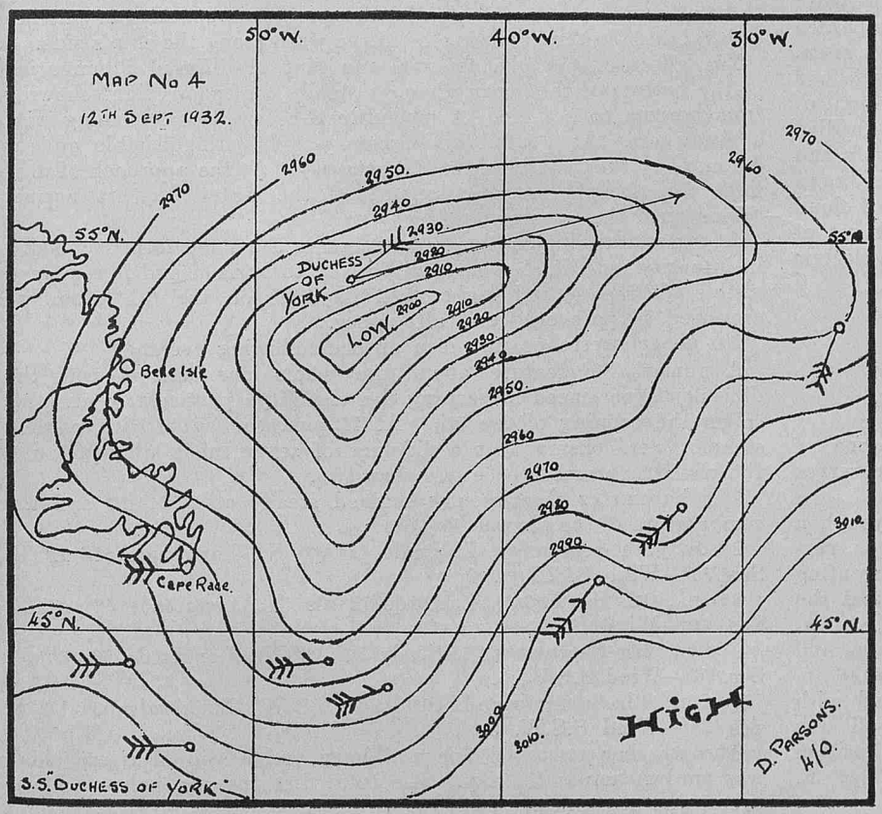
As a matter of interest this particular storm contained many characteristics of a tropical disturbance, its centre having actually passed over the ship. The wind decreased from force 6 to light airs while in an E.N.E. direction, with puffs and gusts at short intervals followed by calms, intermittent mist and drizzle. Half an hour later the sky cleared, moon and stars breaking through. The sea and swell were very confused, but not steep. Twenty minutes after this the wind rose from the S.W. by S. freshening gradually, with a rapidly rising barometer, reaching gale force from this direction $2\frac{3}{4}$ hours later.

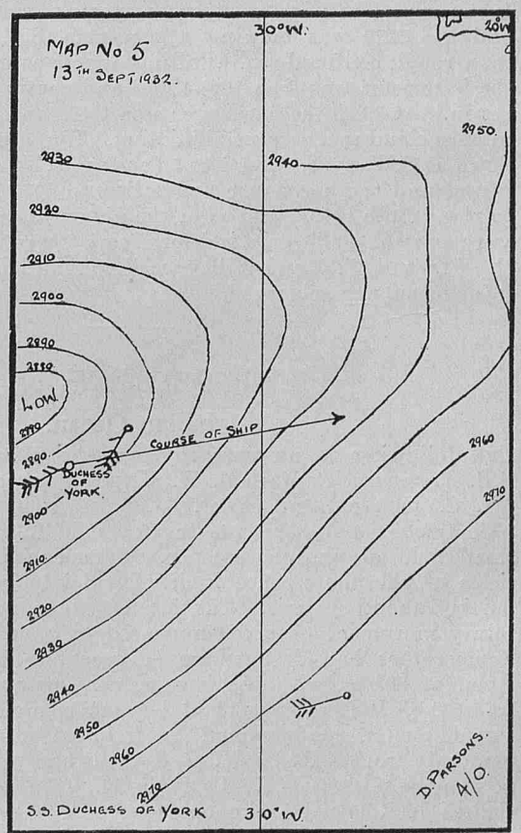
The strongest winds were encountered in the rear of the centre, the maximum being force 10, experienced six hours after the wind had risen from S.W. by S. while the maximum in front of the centre was force 6. During this period the barometer rose .12 in., the lowest recorded reading being 28.88 in. After this, the storm centre having reached Iceland, there followed an ordinary gale, veering slowly and finishing with westerly winds.






MAP No 3
11TH SEPT 1932.
70°W
60°W
50°W
50°N.
40°N.
DUCHESS OF YORK
COURSE OF SHIP
Belle Isle
Father Point
Montreal
Cape Race
Sable Is.
LOW.
HIGH
New York
Nantucket
HIGH
3000.
S.S. 'DUCHESS OF YORK'
D. PARSONS. 4/0.


MAP No 4
12TH SEPT 1932.
50°W.
40°W.
30°W.
55°N.
45°N.
DUCHESS OF YORK
LOW.
Belle Isle
Cape Race.
HIGH
D. PARSONS. 4/0.
S.S. DUCHESS OF YORK


MAP No 5
13TH SEPT 1932.
30°W.
LOW.
COURSE OF SHIP
DUCHESS OF YORK
D. PARSONS. 4/0.
S.S. DUCHESS OF YORK
30°W

WHIRLWIND.

East Indies.

THE following is an extract from the Meteorological Record of s.s. *Clan Macfarlane*, Captain L. F. REDFORD, R.N.R., Batavia Roads to Pasuran, observer Mr. W. W. SIMPSON, 2nd officer.

July 7th, 1932, at 1.20 a.m. A.T.S. with wind E.N.E. force 1, a low nimbus thunder cloud was observed approaching from the east, with a strip of clear sky beneath where vivid lightning was playing. At 1.22 a.m. a roar was heard ahead, and a whirlwind struck the ship on the starboard bow causing her to sheer.

Rain and spray whirled over the ship during its prevalence, which was no more than 40 seconds, the wind force being 8 or 9. There was no chance to read the thermometer during the whirlwind's passage, but it was noticed that the wind was very hot.

After its passage the wind was S. force 5 for 5 minutes, cold and with big drops of rain, it then settled S.E. force 3, and a thunderstorm took place lasting until 3.20 a.m., with much rain.

Barometer at the termination of the first blast 1008.4 mb. Temperature 82°. Barometer midnight 1009.1 mb.

Position of ship, Latitude 6° 15′ S., Longitude 110° 54′ E. approaching Mandalike Light, Java.

TORNADO.

West Coast of Africa.

THE following is an extract from the Meteorological Record of s.s. *Clan Macalister*, Captain F. J. STENSON, R.D., A.D.C., R.N.R., Birkenhead to Durban, observer Mr. G. DRAKE, 3rd officer.

July 31st 1932, at 11.15 a.m. A.T.S. in Latitude 10° 58′ N., Longitude 17° 50′ W., a " tornado " struck the ship. During the forenoon, the wind had been light and variable, sometimes falling calm. The sky was overcast with a thin veil of cirro-stratus and with a heavy threatening bank of nimbus along the E. to S.S.E. horizon. Slight showers had been observed passing to the Westward. At 11.15 the wind suddenly came away from E.S.E. and in less than two minutes, was blowing a fresh gale, followed immediately by torrential rain. The barometer reading at the moment of impact was 1013.0 mb. The thermometer fell from 81° to 74° F. The deluge of rain, driven nearly horizontally with great force, lasted for half-an-hour, when it eased to a moderate downpour, the wind at the same time easing to a fresh breeze. The barometer at 11.45 showed 1014.4 mb. The wind commenced veering and later freshened again and by 12.30 was blowing a moderate S.S.E. gale, accompanied by a rough confused sea. Falling almost as quickly as it had risen, the barometer was then 1013.4 mb. and continuous slight drizzle had set in. At 13.00 the barometer was 1012.4 mb. and the heavy pall of nimbus cloud was perceptibly lifting. By 15.00 the wind had steadied down at S.W. by S. force 4 to 5 (normal S.W. monsoon), the rain had ceased and the barometer had fallen to 1010.7 mb. whence it began to rise. Both before and after the disturbance, all the types of cloud were present and some indeterminate types. In the first burst of the " tornado ", the visibility was less than half a cable. No electric phenomena were observed.

PHOSPHORESCENT BEAMS.

Indian Ocean.

THE following is an extract from the Meteorological Record of S.S. *Karapara*, Captain R. W. WHITE, Rangoon to Penang, observer Mr. C. JACKMAN, 2nd officer.

September 9th 1932, 1948 to 1959 G.M.T., ship passed through a small field of phosphorescence. Commencing with numerous particles of phosphorescence it developed into beams of light rotating quickly about an axis. The intensity was not very great and the rotary movement observed appeared to have a clockwise direction. Temperature had dropped one degree on the arrival of rain and stood at 80° F. with the barometer remaining steady at 29.86 in. At 2030 G.M.T. the sky had become completely overclouded with cumulo-nimbus accompanied by frequent rain squalls. Swell was moderate from S.W. by W. throughout and sea was slight. Position of ship at 1948 G.M.T., Latitude 13° 44′ N., Longitude 96° 46′ E. Course 169°, speed 11 knots.

PHOSPHORESCENCE.

Arabian Sea.

The following is an extract from the Meteorological Record of S.S. *Carthage*, Captain H. M. JACK, London to Yokohama, observer Mr. C. T. O. RICHARDSON, 2nd officer.

On 22nd August 1932 at 1710 G.M.T. entered " white water " and ship continued steaming through it until 2030 G.M.T. at a speed of 16½ knots, i.e. a distance of 55 miles. Temperature Air 76°, Sea 75°, Wind S. by W. 3, no cloud. A sample of the surface water was taken and thin luminous threads, from one-eighth to one inch in length, were observed in the water. These threads were possibly the Salpae mentioned in the article in THE MARINE OBSERVER of November 1931. Several of the threads were placed on a microscope slide and appeared to be transparent and very much thinner than a human hair. When cut into two parts, both parts continued to glow. Some of the water was placed in a basin and after 3 hours some of the luminous threads had sunk to the bottom of the basin, and after 24 hours the threads did not glow. Salt water drawn through the inlets 15 feet below the surface did not contain any of these threads, but when disturbed, luminous sparks were seen on the surface as usual whereas the surface water, containing the luminous threads, when disturbed, did not show the usual sparks. The opaque appearance described as milky or like snow, is probably due to the fact that the light is *in* the water, below the surface, not *on* the water. The threads appeared to have life, as they moved on their own accord and also kept nearly parallel to each other.

PHOSPHORESCENCE.

Arabian Sea.

THE following report has been received from S.S. *Ballarat*, Captain J. M. M. TICKELL, London to Fremantle, observer Mr. D. H. F. ARMSTRONG, 3rd officer.

September 5th 1932 at 2 a.m. the ship entered an area of phosphorescence of an uncommon type. Our position at that time was about sixty miles north of Cape Guardafui, the weather being fine, overcast and hazy with a wind S.S.E. 3 veering and freshening as we approached the Monsoon and we were on the fringe of the current which sets north between Abd-al-Kuri and the mainland.

The phosphorescence was of a sub-surface character and seemed to be at some considerable depth; there were no sparkles or patches of brightness in the bow wave or in the wash along the ship's side.

The effect of the phenomenon was that of diffused illumination at the bottom of the ocean giving a steady continuous light showing from horizon to horizon. A moderate S.E. swell was running with a rising sea. At 3 a.m. the horizon was indistinguishable and at 4 a.m. the water was brighter than the sky. At the approach of daylight the phosphorescence waned and the water was its normal colour until the evening.

At 9 p.m. the illumination reappeared in the same form increasing in intensity until it showed from horizon to horizon and it remained visible on the second night until daylight on the 6th when we appeared to pass out of it altogether.

No phosphorescence was seen on the following evening.

A remarkable feature about the whole phenomenon was the difficulty experienced in gauging the visibility; particularly was this so on the evening of the 5th. At 11 p.m. the lights of a passing steamer were observed at a distance of seven miles when actually the visibility seemed to be less than two.

The barometer throughout remained steady at 29.74 in. and the temperature of the air was 80°-78°.

2 a.m., 5th September, Latitude 12° 53′ N., Longitude 51° 21′ E. Sea 85°—Wind S.S.E. 3.

8 a.m., 5th September, Latitude 12° 59′ N., Longitude 52° 46′ E. Sea 76°—Wind S. 5.

9 p.m., 5th September, Latitude 12° 26′ N., Longitude 56° 00′ E. Sea 76°—Wind S.S.W. 5.

5 a.m., 6th September, Latitude 12° 01′ N., Longitude 58° 17′ E. Sea 78°—Wind S.S.W. 5.

The weather remained fine and hazy and a veil of cirrus cloud was thrown across the sky. The total distance run between these times was 400 miles.

MAGNETIC DISTURBANCE.

Australian Waters.

THE following is an extract from the Meteorological Record of s.s. *Middlesex*, Captain J. G. ALMOND, Australian Ports, observer Mr. G. C. HOCART, 3rd officer.

September 4th, 1932, at 10 p.m., vessel rounding Cape Leeuwin, distance 10 miles, and making up for Fremantle, abnormal magnetic variation was experienced with standard and steering compasses (Kelvin Dry Card) swinging as much as 15° either side of the course line. This continued until the following morning, and when approaching and rounding Rottnest Island the compasses were swinging 25° and 30° either side of the course, ship's position and course being maintained by sextant bearings. Leaving Fremantle on the 9th September and steering to the North-West from Rottnest Is., no magnetic disturbances were felt.

AURORA.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of s.s. *Mourino*, Captain A. E. ASPINALL, Davis Strait to Hull, observer Mr. G. HODGSON.

August 9th, 1932, 0400 to 0600 G.M.T. streaks of aurora observed to the westward, commencing from 180° round to 290°, at about 10° of altitude, gradually reaching the zenith, where they became arched and dispersed. The streaks were of a bright whitish-yellow colour, and at times seemed to radiate streaks of brighter light passing at right angles to the first mentioned streaks.

Position of ship at 0600 G.M.T. Latitude 62° 30′ N., Longitude 59° 04′ E.

August 12th-13th, 1932, 2330-0100. In the region of Latitude 58° 40′ N., Longitude 26° 20′ W., aurora showed exceptionally brilliant from N. to W. giving a wonderful appearance to the sky. The majority appeared in rays and streaks, eventually formed into the shape of a fan. Before dispersing the whole merged into an arc, vanishing quickly at this period. During this time unusual meteors were observed shooting across the sky, mainly from N. to S. and vice versa. One of unusual brilliancy travelled from S.W. to N.E. very rapidly; on bursting the train was visible for approximately 1 min. 45 secs. The colour at first was a vivid white, which changed to a greenish shade before fading away; during its passage across the sky numerous sparks appeared to be thrown from it. The dazzling brilliancy can be judged by the fact that it showed much greater than the moon, the latter being only four days from full. The sky was almost cloudless at the time.

AURORA AUSTRALIS.

Southern Ocean.

THE following is an extract from the Meteorological Record of s.s. *Piako*, Captain E. P. C. ALLEN, Newport (Mon.) to New Zealand, observer Mr. J. F. CLEMENT, 3rd officer.

August 21st, 1932, at 7.45 p.m. A.T.S. an area of diffused whitish-green auroral light was observed to the southward, covering an arc of approximately 45° of the horizon, reaching an altitude of about 8°, which, spreading slowly until 9.30 p.m. formed a well-defined arc over 140° of the horizon , and extending to an altitude varying at intervals between 20° and 25°, the summit bearing S. by E., true.

At this time the display was of bright white light, with a faint tint of green giving a peculiar brilliant glitter to the sky and seeming to cause the stars in the neighbourhood to appear unusually bright.

The centre of the arc was deeply darkened by heavy cumulus and cumulo-nimbus, the outer edges of which stood clearly silhouetted and these clouds spreading slowly to the southward obscured the aurora by 10.45 p.m.

The intensity of the light is difficult to record, but seemed to equal that of the moon, although but faintly illuminating objects on board the vessel, a comparison being offered shortly afterwards, when the moon, in the last quarter, rose at 11.00 p.m.

Position of ship, Latitude 47° 56′ S., Longitude 124° 45′ E.

August 22nd, 1932. At 8.05 p.m. A.T.S. a break in the clouds appeared to the southeastward, through which an increasing blue-green diffused light was observed, followed at 8.06 p.m. by bright rays of light moving from east to west across the break, several being markedly curved and all apparently radiating from a point further to the southward.

At 8.10 p.m. the rays had disappeared, leaving only the faint diffused light seen at first.

From this time onward the sky commenced to clear slowly from the south-west revealing an arc of faint and steady pale green light extending over 90° of the horizon, and to an altitude of about 20°, the summit bearing south, true.

August 21st. First watch.

8.10 p.m. to 10.00 p.m.

10.15 p.m. to 11.00 p.m.

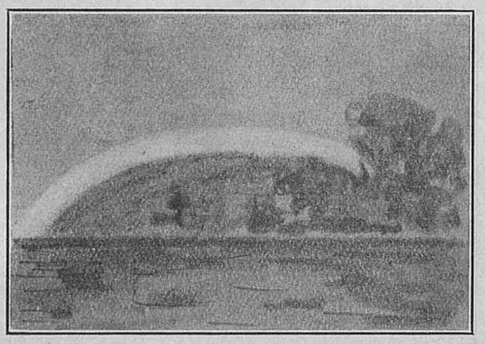
10.15 p.m. to 11.00 p.m.

These conditions continued until 10.00 p.m., when suddenly a well-defined band of bright blue-green light appeared around the rim of the arc, with slow ripples of still stronger light moving along it from east to west, causing the area beneath the arc to appear very heavily clouded, although on closer observation a number of stars were visible in the intense darkness.

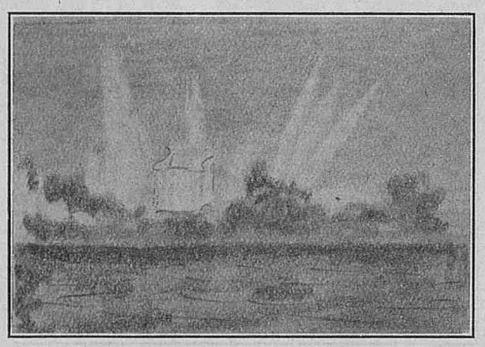
This display slowly faded to the former faint steady light by 10.15 p.m., when activity was again resumed and continued unceasingly in varying degrees of brilliancy until 11.00 p.m., the whole then fading and disappearing completely within ten minutes.

August 22nd. 8.05 p.m.

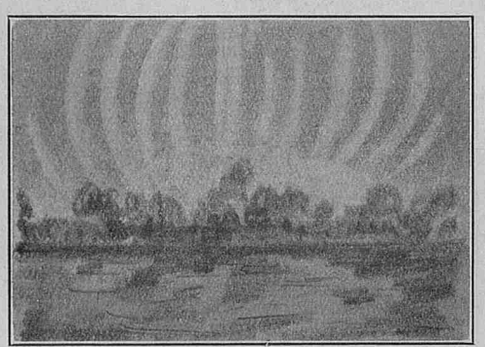
10.00 p.m. to 10.15 p.m.



10.15 p.m. to 11.00 p.m.



10.15 p.m. to 11.00 p.m.



During the period 10.15 p.m. to 11.00 p.m. three types of rays resembling gigantic searchlights formed the greater part of the display, the most prevalent being straight, a number curved, and others appearing like a feather quill.

They most frequently appeared close above the horizon to both east and west radiating from a point bearing south, true, and increasing in brilliancy as they approached the meridian, being but faint to an angle of about 30°, sometimes maintaining an even length, although more often darting at varying speeds towards the zenith, as the angle to the meridian decreased, then fading rapidly to be replaced by others in constant succession.

From 10.40 p.m. to 10.50 p.m. the display almost entirely consisted of curved rays swinging out from south, true, towards the east and west, then when reaching an altitude of approximately 45° sweeping back towards the meridian.

The type resembling feather quills, when seen, remained wavering and almost stationary to the south-east in groups of three.

At 10.20 p.m. for the period of about two minutes, a small, and well-defined slowly waving curtain of light was observed bearing south by east, true, the outline giving the crackling and sparking effect of an electric arc.

During the height of the display the rays extended into and occasionally well past the zenith, providing sufficient light to enable the horizon to be seen distinctly all around and also to pick out small details on board the vessel.

Throughout the entire display, from 8.05 p.m. till 11.10 p.m. the compasses remained apparently undisturbed.

Position of ship, Latitude 48° 01′ S., Longitude 131° 57′ E.

MIRAGE.

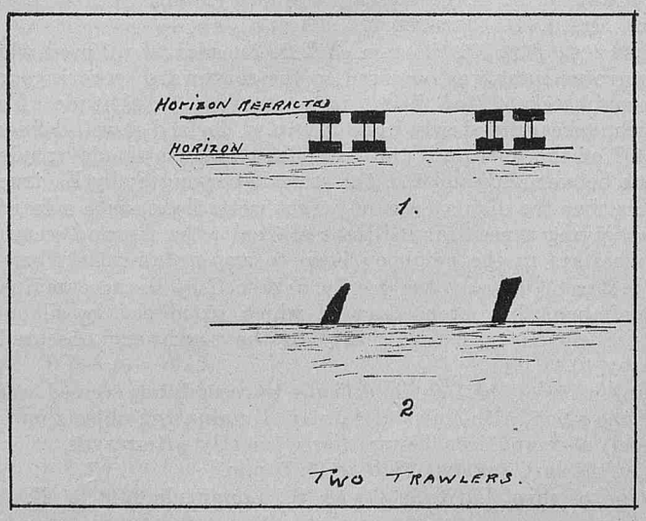
Portuguese Coast.

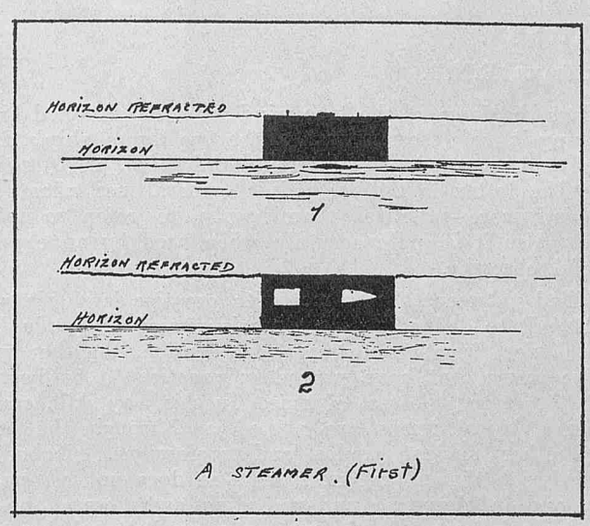
The following is an extract from the Meteorological Record of s.s. *Huntingdon*, Captain H. G. B. Field, Dakar to London, observer Mr. C. W. Roberts, 3rd officer.

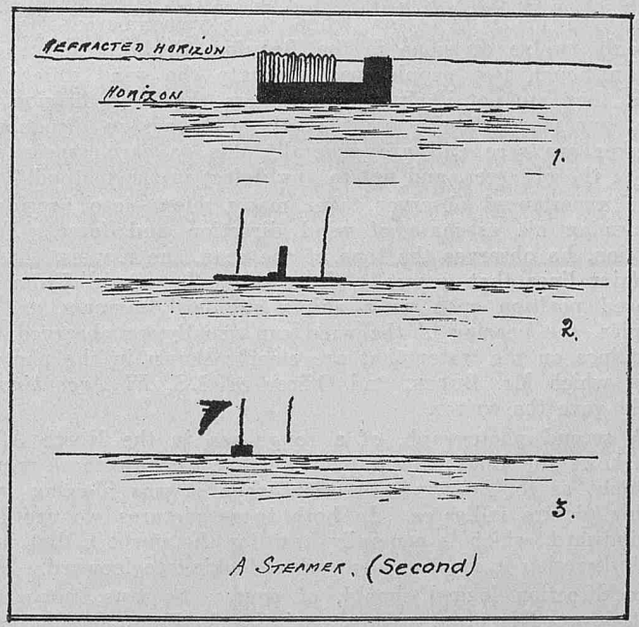
On August 17th, 1932, at 10.0 a.m. experienced a very abnormal refraction. The accompanying sketches show the appearance of several ships that were sighted. Wind N.E. force 2. Air temperature 68°, sea 65°. Lower clouds stratus 2/10, middle clouds altocumulus less than 1/10. No upper clouds. Smooth sea. Slight N'ly swell. Position of ship, Latitude 42° 28′ N., Longitude 9° 37′ W. Vessel steering to pass 8 miles off Cape Finisterre.

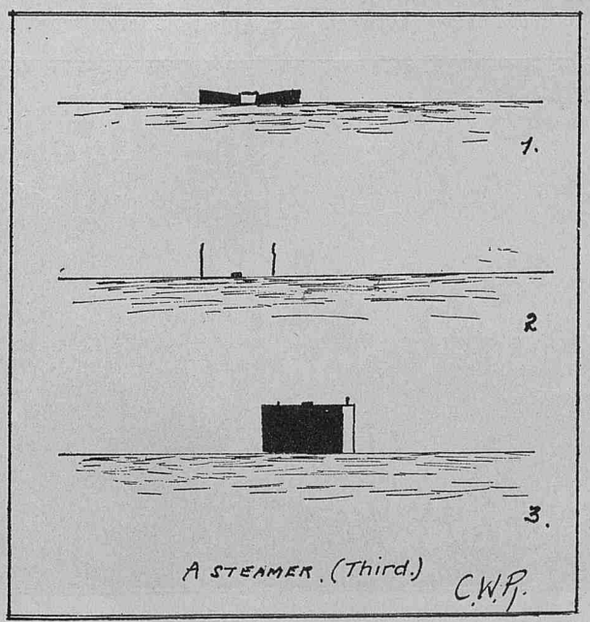
At 10.30 a.m. wind fell to light variable airs. When we sighted Cape Villano, it was refracted beyond all recognition; it appeared to change its shape several times in a minute. This phenomenon continued until 1.0 p.m. when conditions became normal. Cape Villano was abeam at 1.30 p.m.

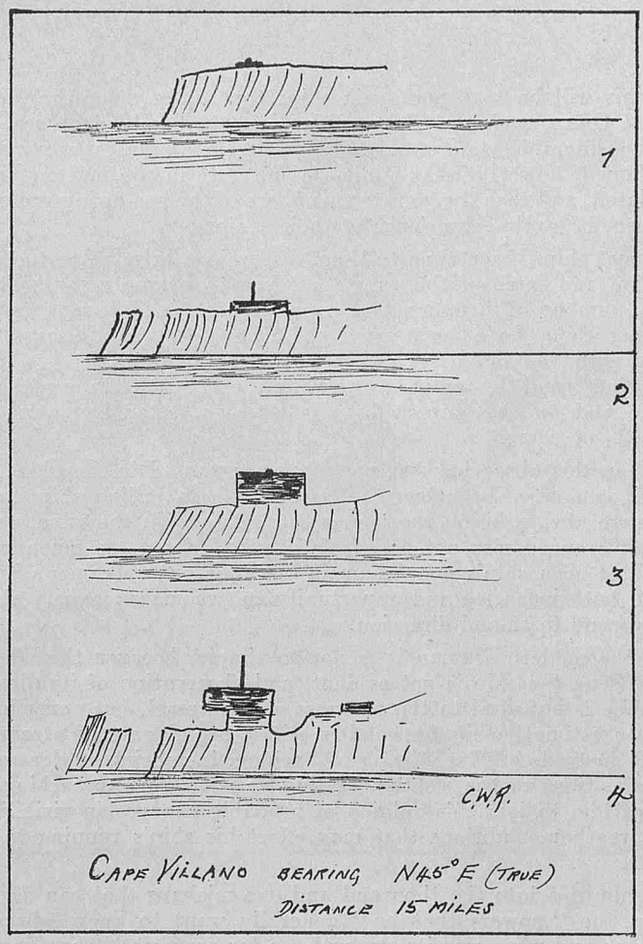
At noon wind was variable force 1 to 2. Temperature Air 71°, Sea 60°, smooth sea, slight N'ly swell. Colour of water changed slowly between 1.00 and 1.15 from blue to dark green.











LUNAR RAINBOW.

South Pacific.

THE following is an extract from the Meteorological Log of s.s. *Makura*, Captain D. MACDONALD, Rarotonga to Papeete, observer Mr. L. P. BOURKE, 3rd officer.

September 12th, 1932, at 2 a.m., observed very bright and unusual lunar rainbow.

The predominating colour was a deep brownish red, bordered on the *outer* side of the bow, by a narrow white streak, and on the inner side by a broad yellow streak.

Elevation of the centre of the arch 25°, the ends of the bow extending to the sea-surface on either bow, and estimated to be distant 5 miles. The phenomenon was visible for 5 minutes.

Moon's altitude 35°, bearing 270°.

Weather cloudy with occasional light passing showers.

Position of ship, Latitude 18° 06′ S., Longitude 151° 07′ W.

TOTAL ECLIPSE OF SUN.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of s.s. *City of Harvard*, Captain J. MCMILLAN, River Tyne to New York via Norfolk Va., observer Mr. E. BROOK WILLIAMS, 2nd officer.

August 31st, 1932, 15.05 A.T.S. (1928 G.M.T.) altitude 38° 30′, eclipse commenced on northern limb of sun. 16.15 A.T.S. 20h. 38m. 48s. G.M.T. altitude 26° 30′ totality commenced. Period of totality, 1m. 19s. At 17.16 A.T.S. 2140 G.M.T. altitude 14° 30′, eclipse ended. Very distinct irregular halo of rays seen during totality surrounding eclipsed sun.

Wind N.N.W. force 4, barometer 1013.7 mb. Temperature dry bulb 72° wet bulb 67°, clouds fracto-cumulus, amount 3/10, visibility very good.

Position of ship, Latitude 39° 53′ N., Longitude 66° 50′ W., course 248°, Speed 12.5 knots.

WIND OBSERVATION AT SEA.

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

As this will be read mainly in ships that observe for the Meteorological Office, and as it is a subject well understood at sea, it is with considerable deference that the following notes are written. It is hoped, however, that additional interest in the matter may be stimulated, and that the younger members of the sea-faring profession may benefit by the experience of their seniors.

In most ships, from time to time, discussions arise as to the exact direction and force of the wind, and how to estimate these at sea, and a number of ingenious diagrams, tables, and "gadgets" for deducing them have been produced. None, however, have found favour with the majority of practical seamen, and the system of estimating wind by actual observation of its effects on the sea surface and on the ship still holds its own, after being used for hundreds of years.

Skill in this observing was more easily acquired in the olden days than it is now. The officer of the watch in a sailing ship had, of course, to always be on the lookout for changes in the wind, and as the ship's speed was not as a rule great, and he was much nearer the water on a ship's poop than an officer is on a steamer's bridge, he had both incentive and opportunity to become an expert at estimating wind force and direction.

For the modern seaman it is not so simple, because the effect of the wind on the ship is not evident, and observation of its direction and force is not vital to the progress of the vessel, but nevertheless, accurate estimation of the wind is still a useful part of a seaman's "stock in trade". Its veering or backing, increasing or decreasing, are indications of the weather system he is in, or approaching, and it helps him to form his opinion of probable changes in visibility or other weather conditions that may effect his ship's running to time or tide.

At enquiries into the thousand and one mishaps that can occur to a ship, the "powers that be" generally want to know where the wind was and what was its strength, so for centuries it has been the practice of navigators to record the wind in their Log Books and Private Journals.

The seamen of old naturally gauged the wind force by reference to the amount of sail their ships could carry, or to the speed, and so a series of terms describing the various wind forces came into common use at sea. In De Foe's account of the great gale of November, 1703, published in 1769, he gives what is described as "our sailors bald terms set down in a table of degrees" as follows:—

Stark calm.
Calm weather.
Little wind.
Fine breeze.
Small gale.
Fresh gale.
Topsail gale.
Blows fresh.
Hard gale of wind.
A fret of wind.
A storm.
A tempest.

It will be seen that this does not differ much from the scale devised by Admiral Beaufort in 1806 based on the terms in use in the Navy of Nelson's time, which terms are still in use to-day, so seamen have for at least a hundred and sixty years and probably much longer, described the wind force by means of a scale of about a dozen divisions.

The Beaufort Wind Scale is now in general use throughout the world, both afloat and ashore, and the International Hydrographic Bureau has published a chart of it in thirty-five languages. Although the criteria laid down by Beaufort for a "well conditioned man-o'-war" in 1806, and the International Deep Sea Criteria adapted to it in 1874 (also for sailing ships) may no longer have much meaning for the majority of officers, good judgment in the matter has been developed by observing the effect of the wind on the sea, instead of on the ship, and during the slow transition from sail to steam this method has taken the place of the older one.

Nowadays the force of the true wind must be obtained either by (*a*) deducing it from the resultant of the two forces, ship's direction and speed and apparent wind direction and speed, or (*b*) estimation by eye. The latter is the method in general use afloat, and is quicker and more practical than having to refer to tables or diagrams. Also it is quite accurate when used by an experienced and careful observer.

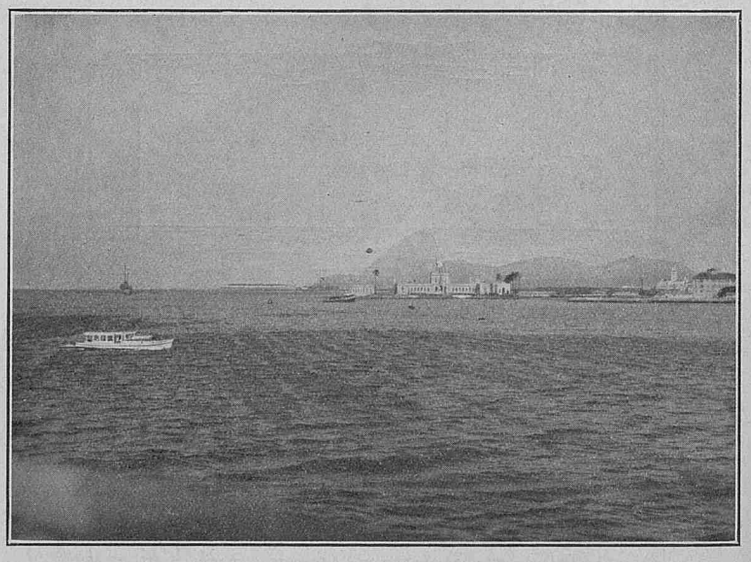
The skilled judgment that comes with practice is slowly acquired and is difficult to define, but it is surely passed on gradually from senior to junior, from generation to generation, together with the descriptive terms that have proved in practice to be best suited and that have stood the test of time. In this way skill, craftsmanship, and technical terms are passed on through the centuries in many other ancient trades and professions. Nobody lives more on his job than a sailor at sea; he does not escape it day or night, and in observing and recording every watch he cannot fail to acquire judgment in the matter, often better judgment than he himself realizes.

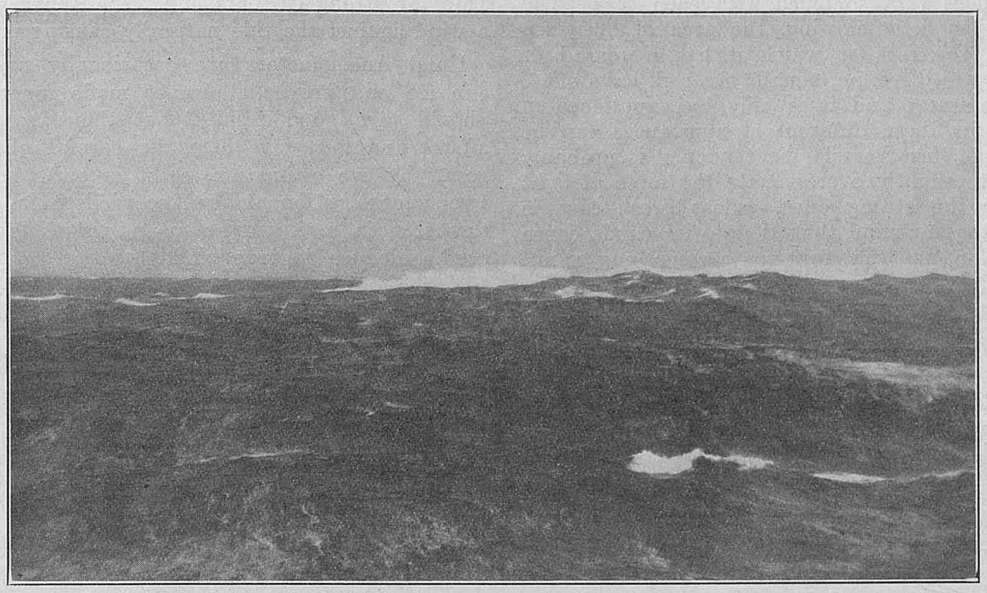
Practically all the wind observations made at sea in Merchant Ships for their own Log Books and for Meteorological Services have been made by eye. When it is remembered that there are only twelve divisions in the Beaufort Scale it seems certain that, although two people may estimate the wind differently at times, they are not likely to differ more than one division of the scale, nor more than a point of the Compass in direction, and mistakes are rare and are generally due to carelessness on the part of the observer, and not to any defect in the method.

The experienced observer takes many things into consideration in forming his estimate of wind direction and force. For the direction, he observes the tops of the seas, the ripples, the spray, the faint lines that generally show along the wind. From a well exposed position such as a ship's standard compass as a rule occupies, the bearing of the wind can usually be observed by the faint lines on the water that are clearly shown in the photograph below which Mr. Burch, 2nd Officer of S.S. *El Argentino*, very kindly gave the writer.

The second photograph, of a rough sea in the North Atlantic, also shows the lines caused by the wind, though there would be no doubt as to the wind direction when it was blowing as hard as this picture indicates. In both these pictures we are looking to windward, which is generally best for the purpose, but in some lights direction is more evident when looking to leeward.

The direction logged should, of course, be true, not compass. Floating weed is often a help, as it is usually strung out in lines along the wind. On very dark nights it is sometimes impossible to see the effect of a light wind, and then the true direction can only be arrived at by deducing it from the ship's course and speed and the apparent wind. In a fast moving ship considerable difference exists between the apparent and true directions





of the wind, and this difference, of course, varies with each angle on the bow, and each force of the wind, as is shown in **Figures 1 and 2** below.

To judge the force, the general appearance of the sea surface is the best indication. Experience in observing soon teaches us to associate different degrees of sea disturbance with the various wind forces. For instance, most officers have a good mental picture of what a force 5 wind " looks " like under normal conditions. Here the limits of wind velocity in knots equivalent to the Beaufort numbers, as laid down in the MARINE OBSERVER'S HANDBOOK, 5th Edition, are an aid to judgment, as on many occasions the known speed of the ship can be used as a " yard stick " to measure by. These limits of velocity were adapted to the Beaufort numbers after extensive experiments made some years ago by Dr. SIMPSON, the present Director of the British Meteorological Office, and were adopted by the International Meteorological Committee in 1926. Definite descriptions of the appearance of the sea surface to correspond with each number of the Beaufort scale cannot be

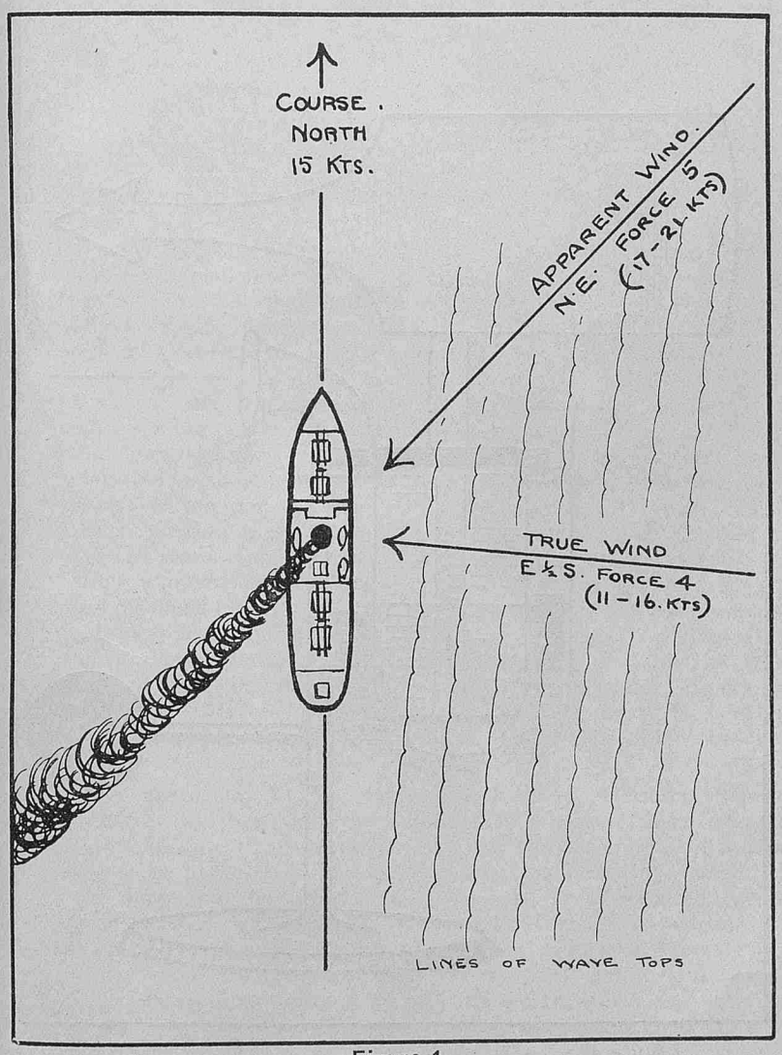


Figure 1.

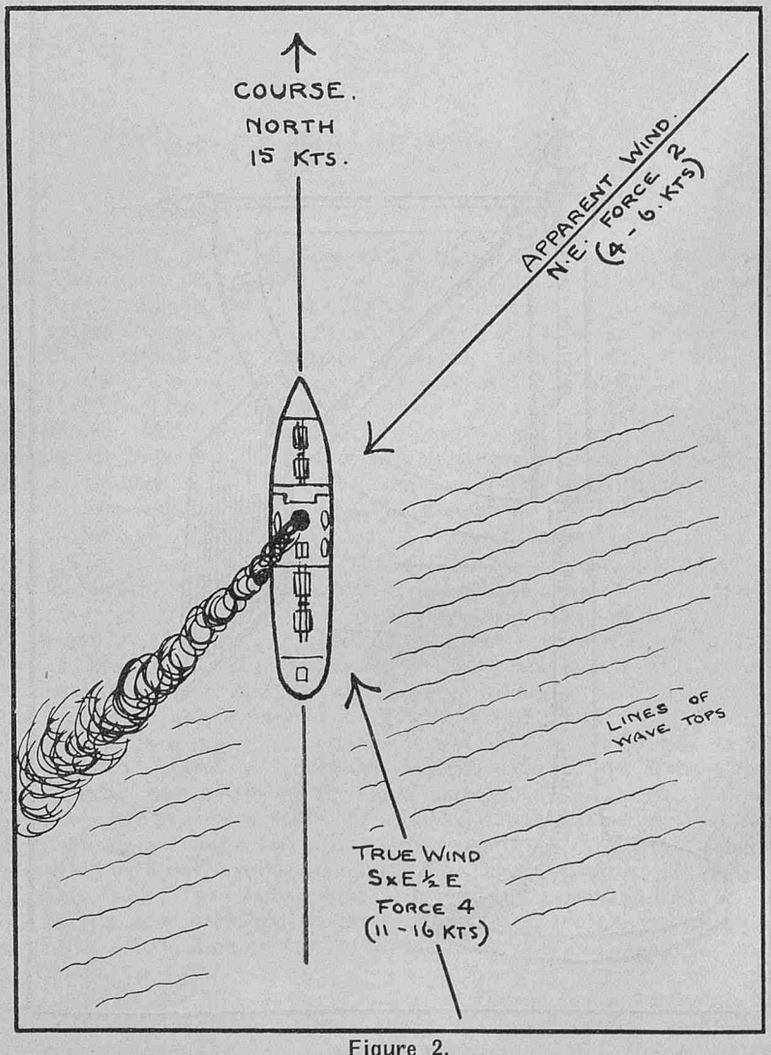


Figure 2.

devised, as the circumstances vary so much with each case. The length of time the wind has been blowing, the area of open sea over which it has blown, the rate at which it has increased or decreased its force, changes in direction, squalls etc. ; all have effect on the appearance of the water and it is only by experience in observing that allowance for these different circumstances can be made. In the modern large, fast vessels the tendency is probably for an unskilled observer to slightly overestimate the force of light winds, and underestimate the strong ones, unless great care is used. It should also be kept in mind that Equatorial winds cause less sea than Polar winds do, and that rain has a smoothing effect. Tides or strong currents effect the appearance of the sea surface, a wind against the tide naturally causing more "lop."

Hand Anemometers are occasionally used at sea, and if well exposed and proper allowance made for the motion of the ship, should give good results, but they are delicate and expensive affairs and in using them the careful observer would check the result by eye estimation, as it is quite possible for a completely wrong observation to be recorded from instrument readings of this sort in a moving ship, where tables or diagrams must be used to deduce the true wind.

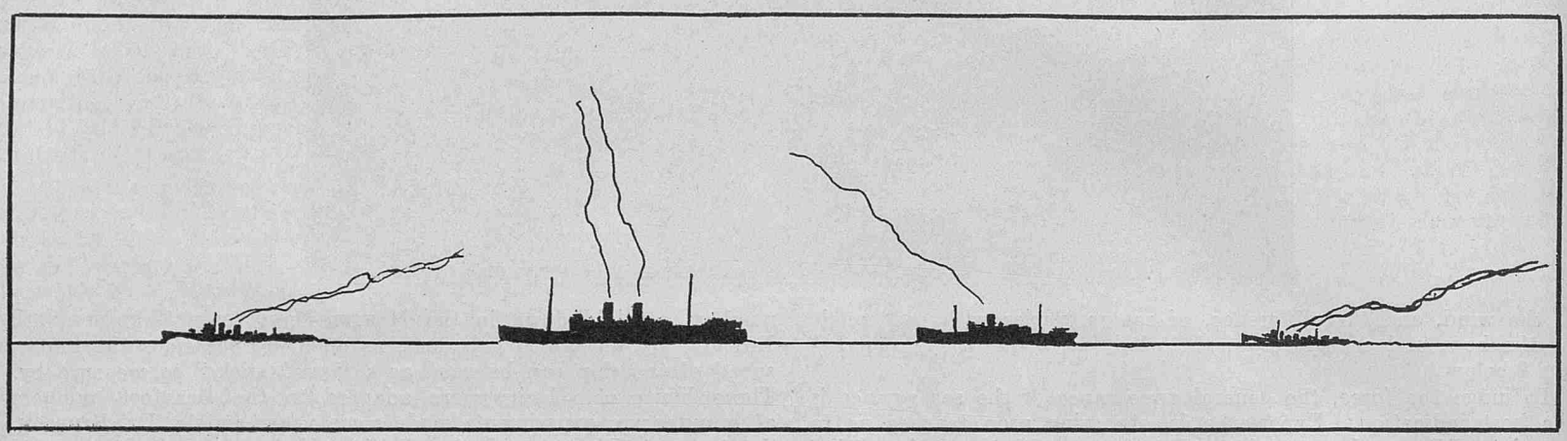


Figure 3.

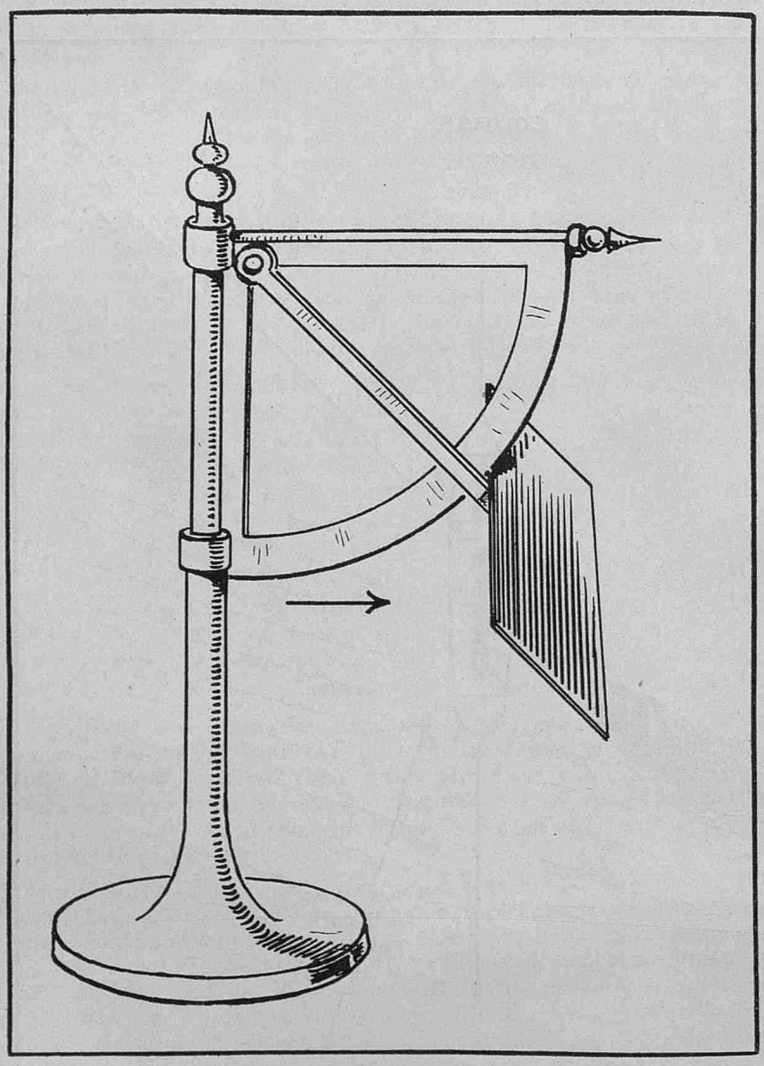


Figure 4.

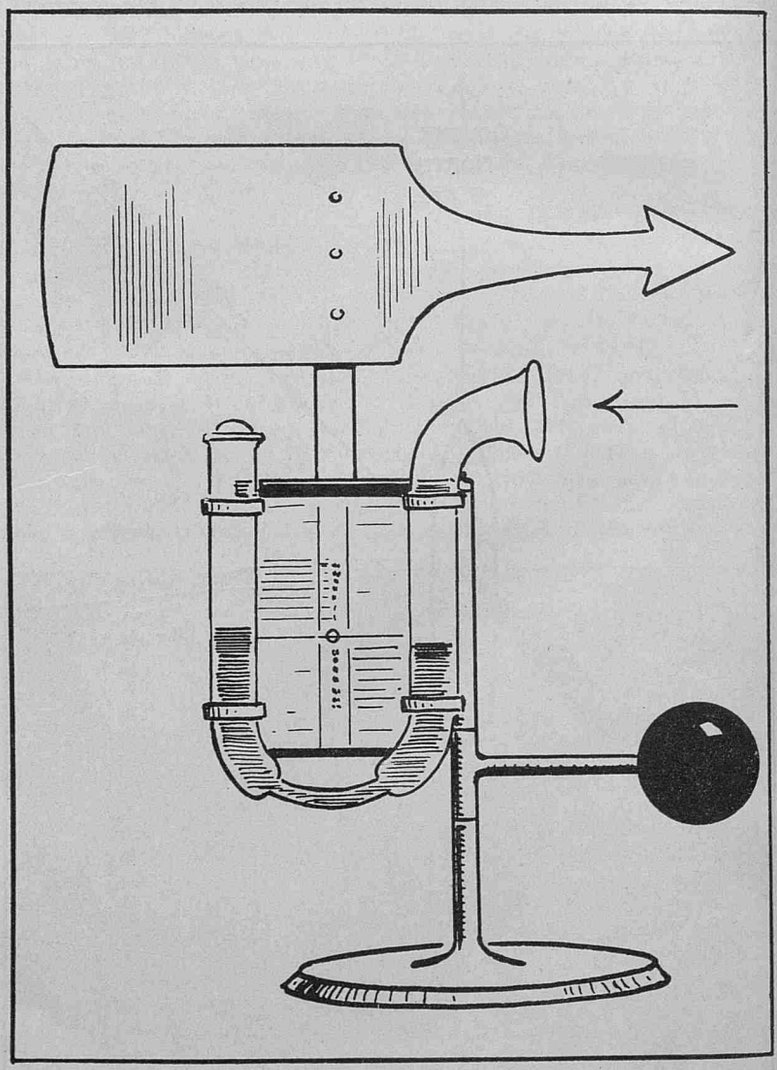


Figure 5.

For estimating the *force only* of following winds the funnel smoke may at times be of use by comparing its speed with the ship's speed. A good instance of this was noted in the English Channel a few months ago. Watching some ships all bound up Channel on about the same course, and knowing their probable speeds, the wind force was fairly obvious. One was a Mail Liner of about 17 knots, one a smaller passenger ship of say 13 or 14 knots, and two Destroyers steaming at least 20 knots (judging by the speed with which they passed the others). They all had the wind aft, or very nearly so, and they appeared as in **Figure 3.**

From their smoke the wind was estimated to be force 5, but it is obvious from the drawing that the smoke was quite useless for judging wind direction by eye.

As " gadgets " for measuring the wind have been mentioned, the following may be of interest. In the Science Museum at South Kensington, London, there are several devices designed long ago for this purpose, and drawings of some of them are reproduced in **Figures 4, 5 and 6.** They are all obviously quite unsuited for ordinary everyday use at sea.

Air Meters, such as the one illustrated in **Figure 6,** and Cup Anemometers, measure the " run " of air past the instrument, and so require a time interval to enable the observer to deduce the wind speed, or force.

Instruments for measuring wind are fitted in some of H.M. Ships, mainly for use in connection with gunnery, but they are never likely to be common in Merchant Ships, except in those liners that will in the future carry aeroplanes for launching at sea.

It is hoped that the foregoing will show that, in spite of the difficulties that the increased size and speed of ships has brought about in the matter, we cannot obtain better results for all concerned than by carrying on the careful observing and recording of wind that has for so long been the " ordinary practice of seamen."

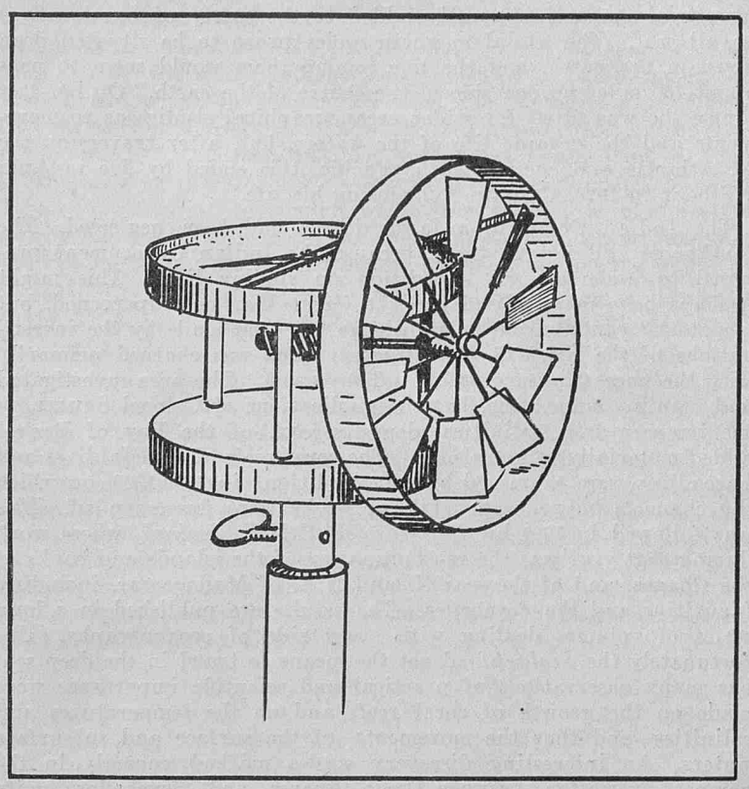


Figure 6.

THE PROPOSED JOHN MURRAY EXPEDITION TO THE ARABIAN SEA.

By Professor J. Stanley Gardiner, F.R.S. of the Zoological Laboratory, Cambridge.

The *Challenger* (1872-6) was the first of the great modern oceanographical expeditions, which, of course, differ from all earlier explorations in that they had the control of their operations that is implied by the possession of steam. The Atlantic, Pacific and Southern Oceans were visited and a great variety of animals were discovered at depths down to three miles below the surface of the sea. These were representatives of the same classes of animals as live in shallow waters, but many were of bizarre shape, usually due to an extraordinary development of feeding organs evidently in correlation with a scarcity of food in the deeps. The change of pressure (1 ton per sq. inch for every 1,000 fms of depth) did not apparently affect them, the pressures inside and outside their bodies being the same, nor were they seriously hampered in their lives by the low temperature of the deep sea, a temperature similar to that found off polar ice and believed to be carried by polar water creeping equatorwards on the floor of the ocean. The most striking visible effect was perhaps the phosphorescent organs of deep sea life, flashlights carried by many in a region of perpetual darkness. Many other results were obtained, particularly in respect of the surface waters, but they were of importance as suggesting subjects for subsequent enquiry.

Other great expeditions followed such as the German Plankton Expedition which studied the floating life of the northern Atlantic. This opened up a new field of life; and the food cycle of animals began to be understood, the fish that eats small floating prawns, the latter dependent on minute plants, whose green-coloured feeding matter is activated by sunlight. Another German expedition, the " Valdivia ", was more ambitious, passing down the Atlantic with one traverse of the Indian Ocean. On relatively small data it made a most praiseworthy attempt to plot the temperatures and salinities of these oceans at all depths, thus giving the factors producing the differences of densities on which depend the circulation of water in the oceans. Such physical and chemical enquiries became a prime feature in the researches of most marine laboratories, especially those concerned with fisheries, but these were of little value to navigators though of decided help to those responsible for surveys and the compilation of Sailing Directions. General interest was raised by the cruise of the *Michael Sars* down the Atlantic, so admirably told in "' The Depths of the Ocean " by John Murray and Johann Hjort. Reference, too, is necessary to the many cruises of the *Dana.* Schmidt discovered the life story of our freshwater eels going down to breed in the depths off Bermuda, these researches culminating in the circumnavigation of the world in a two years' cruise.

There were many South Polar Expeditions, and related to these in locality have been the well-conceived studies of the *Discovery* in the regions leading to S. Georgia, these directed to the understanding of the whales which by the operations of man are in danger of extinction. The results here would make this area safer to navigators, but, alas, the old clippers belong to past days—and the Panama canal is navigable. An incidental study of the Humboldt current is proving interesting; it was carried out by the *Scoresby,* a second vessel on the same investigation. The *Meteor,* again German, had meantime zigzagged across the S. Atlantic, which was supposed to have a relatively shallow central ridge, parallel to the continental coasts on either side, with long stretching basin-like areas with only very occasional peaks, rarely breaking the surface in tiny islets The *Meteor* was provided with echo-sounding, and her results show a bottom topography of ridges, plains, mountains and hills, a little simpler, but not dissimilar to that of rugged continental lands.

The many cruises of the American *Carnegie,* the non-magnetic ship, made this graceful yacht perhaps the most widely known of all survey vessels afloat, and by her intensive and practical study of

terrestrial magnetism greatly added to the safety of vessels afloat on all seas. The actual magnetic poles prove to be situated deep down in the earth, and the line joining them would seem to pass about 750 miles on one side of the centre of the earth. On her last cruise she was fitted for wider oceanographical studies as to movements and the organic life of the waters, but, after traversing the N. Atlantic and encircling the Pacific, this ended by fire in Apia Harbour in 1929, Captain AULT losing his life.

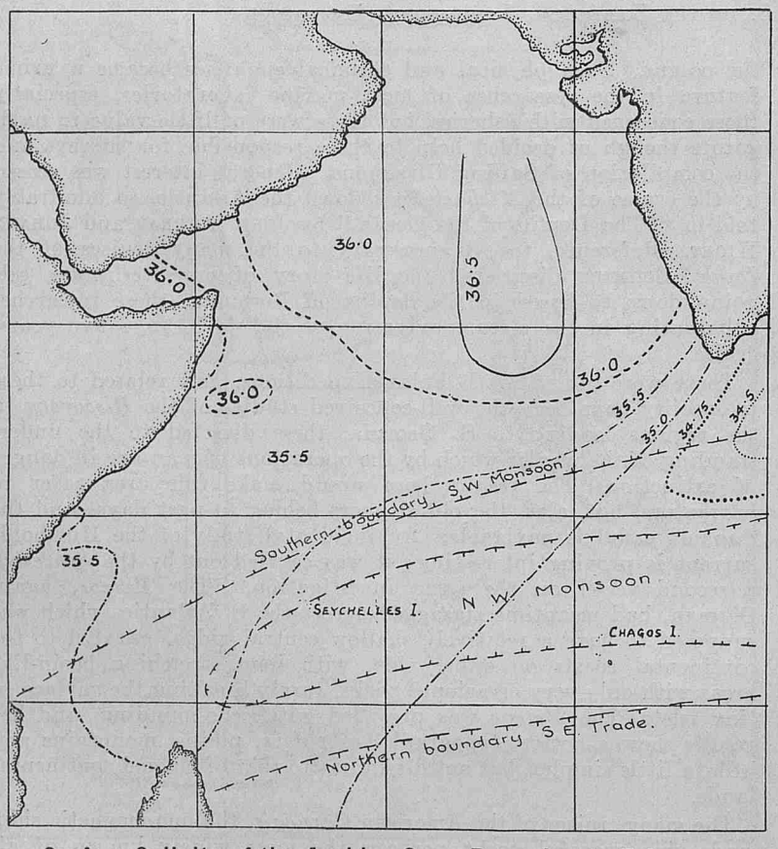
The Indian Ocean to a large degree had been neglected. The *Challenger* did not go there, because the Indian Government proposed to undertake an expedition on similar lines. This might perhaps have materialised had the Great War not supervened, but a material contribution to knowledge has been made by the investigations of the R.I.M.S. *Investigator* which was charged primarily with the necessary surveys off Indian coasts. The area investigated had been a confined one, but the publications of Colonel SEWELL on the temperatures, salinities, deposits, etc., of the Bay of Bengal added materially to knowledge. The coral reefs of the Maldives and Laccadives were examined by an expedition* in 1899-1900, on which the channels between the Maldive Atolls were first sounded. This was followed in 1905 by the cruise of H.M.S. *Sealark*, whose work during that year was the re-examination of the islands and banks of the Chagos, and of the seas N. and N.E. of Madagascar, including Mauritius and the Seychelles. The results are published in a long series of volumes dealing with every side of oceanography. Unfortunately the *Sealark* had not the means to trawl in the deep sea, but many observations of practical and scientific importance were made on the growth of coral reefs and on the temperatures and salinities—and thus the movements—of the surface and subsurface waters. An interesting discovery was a marked anomaly in the compass variation between Diego Suarez and Seychelles, quite sufficient to explain the wrecks which stud many reefs in those seas.

The late Sir JOHN MURRAY of *Challenger* fame had always looked forward to the extension of his work to the Indian Ocean. In his will he left certain monies to be applied to scientific work with a suggestion of an expedition. These funds his family allowed to accumulate, until in 1931 they sought the advice of scientific men. It would have been gratifying to the donor could he have seen that they selected the Indian Ocean for the venues of an expedition; but they decided, in view of the more elaborate and detailed research demanded to-day, that operations should be restricted to the Arabian Sea which is broadly speaking bounded to the south-east by the Maldive and Chagos Groups, and to the south by the latitude that passes through the Seychelles. It is an area almost unknown oceanographically, so far as the subsurface waters are concerned, while almost nothing is known of the life in its depths. In it originate the currents proceeding southwards along the African coast, and the icy current creeping northwards along its bed has not as yet been investigated. There are large areas in its central parts without a sounding authenticated by a knowledge of the bottom, and there are possibilities of the high lands to the north being continued in mountain ranges below the ocean. Arabia, East Africa and Western India have very different continental shelves, and the Arabian slope which is almost unaffected by land drainage should form a relatively simple area wherein views as to the edge of the shelf at about 100 fms., Murray's Mud Line, can be tested. Here, too, an examination of the changes, which produce Blue Mud and Green Sand (glauconite) as bottom deposits may prove of value, both of these manly dependent on chemical changes of material that makes its way into the sea from the land.

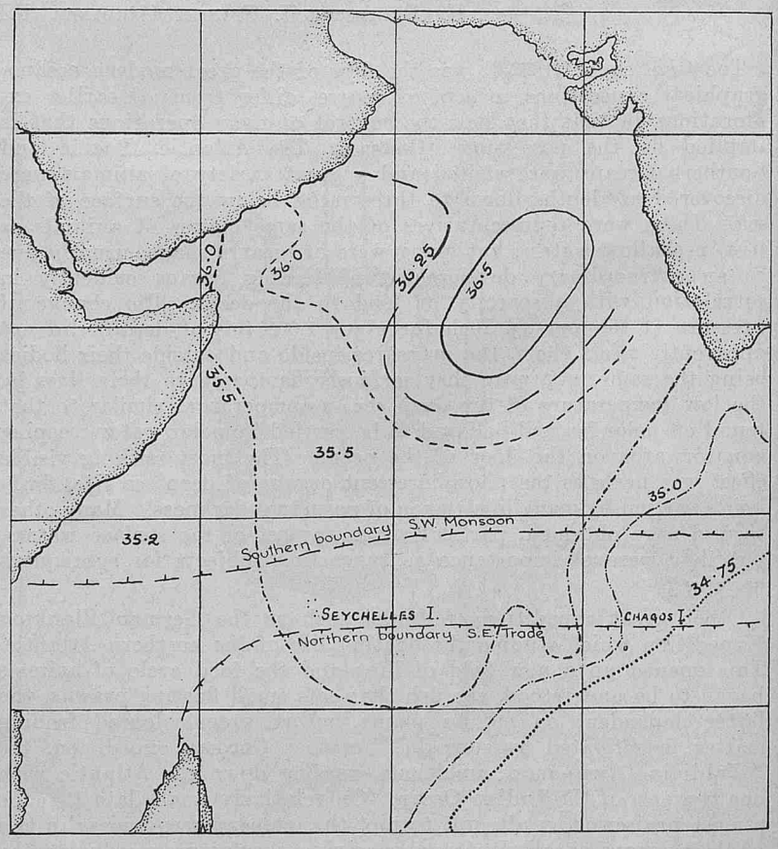
The leader of the Murray Expedition is Colonel SEYMOUR SEWELL, Sc.D., now Director of the Zoological Survey of India and for many years Surgeon Naturalist on the R.I.M.S. *Investigator*. For 30 years he has been concerned with these seas and he plans his attack by lines of sonic sounding across the ocean from W. to E. and E. to W., each line accompanied by vertical sections of the ocean water to the bottom, determined at intervals, for temperature, salinity, phosphates, and other constituents that indicate oceanic circulation. For this part of the work he will be accompanied by two chemists, while he will also have two biologists to deal with the organisms contained.

The Egyptian Government has most generously lent their trawler *Mabahiss* for the above Expedition, and the Admiralty is seconding a 1st Class Surveyor. The Expedition is fitting the ship with the Hughes-Admiralty Sonic Sounding Gear at Alexandria, where also certain alterations to turn the fish-hold into a Laboratory will be

* The writer of this article was a member.



Surface Salinity of the Arabian Sea—December to February.
(In parts per 1000 (after D. J. Matthews)).



Surface Salinity of the Arabian Sea—June to August.
(In parts per 1000 (after D. J. Matthews)).

carried out. Egypt has already founded a Marine Station at Ghardaga near the mouth of the Gulf of Suez, and her officers on this Expedition will learn the arts of oceanographic research. The Expedition will leave Alexandria about September 1 of the present year and return there in May 1934, thus utilising the whole of one monsoon.

The *Mabahiss* should then be in fine trim for further researches and Egypt proposes to take her place as an active participant in oceanic research in the winter of 1934-5. Her venue will be the Red Sea, of which little is known beyond what is required for the safety of ships at sea. Here she has almost home waters, for her ships annually took advantage of its seasonal changes in their regular trading voyages to the south some 4,000 years ago. It is, too, an extraordinary basin, its rim at Great Hanish Island less than 100 fms. deep. with 1,300 fms. to the north, the Gulf of Suez less than 100 fms. and that of Akaba 600 fms. Its heavy saline water passes out down the Gulf of Aden as an undercurrent, while the lighter water passes up over the surface through the Straits of Bab-el-Mandeb. This is not so constant or simple as it sounds, for the whole water circulation here must be concerned with a profoundly disturbed area found both north and south of the Guardfui-Socotra line. There is a convergence of current lines in this region that indicates vertical circulation. Surface effects are often seen in a lowering of temperature records in the water, but they are better determined by salinity, even small changes as from 36 to 35.5 per thousand being of importance. These were worked out by D. J. Matthews in connection with his analysis of over 1,600 surface water samples from the whole Indian Ocean collected in 1905-6, mostly by large liners acting in conjunction with the Meteorological Office. The charts reproduced here show the conditions here in the two monsoons. It would seem that the approaches to the Gulf of Aden are the meeting place of waters, low salinity from the surface along the east coast of Africa, similar water from the depths of the same area in the south-west monsoon, and high salinity water from the Red Sea on the one side and from the Arabian Sea on the other.

Besides the above there are other anomalous phenomena reported at times from the Arabian and Red Seas and off the Persian Gulf. None of these can be sufficiently explained without vertical water sections, and these the Murray Expedition proposed to take. The surface waters must also be analysed for temperature, salinity and perhaps other chemical factors, and it is hoped that the Mercantile Marine will co-operate in procuring the necessary samples. In addition to the conditions known to navigators in these seas the writer is convinced that there are aberrant phenomena of turbulence and colour and of currents and temperatures known to many who sail in the western Indian Ocean and Red Sea. Any information as to such that he may be favoured with would be deeply appreciated and would undoubtedly help in preparing the plans for the Murray Expedition.

ICE IN THE NORTHERN HEMISPHERE.

Prepared in the Marine Division by Commander J. Hennessy, R.D., R.N.R.

The Arctic sea by which is meant that region bounded by the Northern coasts of Spitzbergen, Franz Josef Land, Northern Land, Siberia, Alaska, the Canadian Archipelago, and Greenland, contains The Arctic Basin within which lies the Pole.

The Arctic Basin is a deep ocean enclosed by the continental shelves of Europe, Asia, and Northern America. These shelves are continuous in all longitudes surrounding the basin with the exception of one small discontinuity between North Greenland and Spitzbergen where a submarine ridge separates the Arctic basin from the Greenland Sea.

Where explored the shelf has been found to be extremely flat with a steep edge to the deep basin. Soundings obtained by the *Jeannette* and *Maud* during their drifts over that part of the shelf between Bering Strait and the New Siberian Islands were mostly under 35 fathoms.

The greater part of the Arctic Basin remains unexplored and it is not known whether any continuation northward of the islands of the Canadian Archipelago exist or if any submarine ridges extend across the basin. Soundings have so far been obtained within it up to nearly 3,000 fathoms, and at the Pole itself Peary obtained a depth of 1,500 fathoms with no bottom.

Arctic Sea.—In Autumn the water freezes over the whole area of the Arctic Sea. An immovable belt of ice termed Fast Ice then commences to form along the coasts and spreads outward from the shore until the beginning of December, but continues to increase in thickness until the beginning of May. The region occupied by the Fast Ice lies between the shore and the 12 fathom line which is about 5 per cent. of the total area of the Arctic sea. It has its greatest width along the Siberian coast and opposite the mouth of the Yana river extends seawards for 270 miles.

Beyond the outer limit of the Fast ice there is a belt of moving Pack ice consisting partly of broken Fast ice and partly of new ice which has formed between these floating pieces. This belt of Pack ice occupies about 25 per cent. of the total area of the Arctic sea.

The remaining and major area of the Arctic Sea is covered with the Arctic Pack consisting of many years old ice which, due to rafting and hummocking, form massive ice fields of tremendous power and solidity.

The above-mentioned ice conditions exist over the Actic sea during ten months of the year. In the months of June and July the Fast ice partly disappears and that which remains becoming broken up and detached from the shore passes into the area occupied by the Pack ice, leaving stretches of open water between the outer margin of the Pack and the coast line. At the same time as a result of the telescoping and piling up of the ice within the Pack, leads and pools of open water appear. It is estimated in summer the Arctic Pack contains 10 per cent. of water area.

The winds experienced on the Asiatic side of the Arctic sea are governed by the great seasonal pressure changes of that continent and on the Atlantic side by the Icelandic low while there is an anticyclonic system around the Pole. These combined systems produce a general drift of air from some Easterly direction over the Arctic sea in all longitudes which is only interrupted occasionally by the passage of weak barometric depressions. Within the Arctic sea the winds are generally light. During the drift of the *Fram* across the Polar Basin from 1893 to 1896 the mean wind force was only 3.5 on the Beaufort scale with little variation in the mean of successive months.

The data concerning the currents in the Arctic sea is very indefinite. Two weak currents enter the sea from the Bering Strait, one flowing westward for a short distance along the Siberian coast while the other at first flowing along the American coast later turns and sets to the N.W. A strong current which has its origin in the Arctic Basin flowing in a S.E'ly direction passes between Spitzbergen and Greenland and continues as the East Greenland current. Another current originating in the Polar Basin flows in a S.W'ly direction to the North of Greenland and passes out into Robeson Channel and Smiths Sound.

To what extent the ice movement within the Arctic Sea is due to wind, current, or a combination of both is not known. From the drifts of ships caught in the ice and of special drift casks or buoys the general movement of the ice on the Asiatic side of the Polar Basin between Bering Strait and Franz Joseph Land has been found to be in a W.N.W. direction. On passing Franz Joseph Land the ice continues in a Westerly direction to Spitzbergen when coming under the influence of the East Greenland current its drift changes to a direction south of west and large masses pass between Greenland and Spitzbergen into the Greenland sea. It is estimated that it takes five years for a piece of ice to drift from the longitude of the Bering Strait to the Greenland sea.

Concerning the movement of the Arctic Pack on the American side of the Arctic sea there is little information. The prevailing winds and currents and the lay of the coast line cause the Pack to become densely compressed in places and subjected to great pressure and shock extending over many years, the ice rafts and hummocks, in some instances to a height of over 100 feet, forming what is known as Paleocrystic ice. It is the region of Paleocrystic ice on the north coast of Greenland and Grant land which has in the past proved so unassailable to many Polar expeditions. The great pressure exerted on the ice in this region forces it through Robeson channel and the several passages between the islands of the Canadian Archipelago, but the discharge of Polar ice here is not nearly so great as that which takes place through the outlet between Greenland and Spitzbergen where it is estimated that about one-third of the ice in the Polar Basin finds an outlet each year.

Other regions of Paleocrystic ice within the Arctic sea are situated along the coasts of Franz Josef Land and on the east coast of Novaya Zembya.

Kara Sea.—From September to July the Kara Sea is entirely frozen over. During the remaining months the state of the ice depends upon the then prevailing winds. Should there be a long spell of Northerly winds the sea will fill up with polar ice whereas southerly winds will free the sea by driving the ice north. In most years both the Kara sea and strait are open to navigation during the month of August.

Barents Sea.—During April the ice limit generally extends from a point south of Bear island in an easterly direction to about the 43rd meridian when it turns south meeting the Murman coast at Svyatoi Nos. During the following months the ice gradually recedes to the north and east until August when the limit occupies a line from Hope Island, Spitzbergen, to Cape Bear off the north coast of Novaya Zembya. During June long stretches of open water may be found on the west coast of Novaya Zembya as far north as Cape Nassau and from July to September the west coast is normally free of ice to Cape Nassau and sometimes as far north as Cape Mauritius. In very light ice years, ships have navigated round the island in the month of August. In the Matotshkin Strait the ice usually breaks up in July. The North East and East coasts of Spitzbergen are blocked with heavy ice throughout the year.

White Sea.—The ice of the White Sea is of local origin ; Polar ice or ice formed in higher latitudes never enters the White Sea. The ice commences to form at the beginning of November and lasts until the middle of May when the sea usually becomes ice free. The ice first forms in the south of the sea and gradually extends north. Fixed ice generally stretches from the shore seawards for a distance of from two to three miles, the remainder of the sea being occupied with drift ice, but during very severe winters the fixed ice may spread all over the sea. With the aid of icebreakers the White Sea is practically open to navigation throughout the year.

Greenland Sea.—The outlet from the Arctic Basin between Spitzbergen and Greenland is always filled with Arctic Pack ice drifting south in the East Greenland current. The Arctic Pack joining with the winter ice formed in the Greenland sea and the fast ice formed along the coast make up the East Greenland pack. The spread of the pack depends upon the wind, a prevalence of N.W'ly winds will cause the ice to drift far east towards the Norwegian coast while easterly winds will keep the ice well in to the Greenland coast. In April the average ice limit runs from Danes Island off the N.W. coast of Spitzbergen to the Jan Mayen island, thence to a position just north of Iceland when it turns west, across Denmark Strait towards Angmagsslik then S.W. to Cape Farewell. During the summer months the ice edge recedes to the westward and in August the average limit runs from Danes Island to Scoresby Sound with a narrow belt along the coast south to Cape Farewell. The outer edge of the ice is generally made up of loose ice inside of which are large icefields separated by wide leads. The ice fields contain heavy ice hummocked to a height of over 30 feet and when south of Franz Josef's Fiord numerous icebergs calved from the East Greenland glaciers take their place in the pack. The ice moves south towards Cape Farewell at the rate of about nine miles a day.

Davis Strait and Baffin Bay.—The first of the East Greenland pack arrives off Cape Farewell in January, but its advance up the west coast of Greenland depends on the then prevailing winds. A spell of northerly winds will drive the ice south of Cape Farewell leaving a strip of open water close in to the coast while easterly winds drive the pack far out into the Davis Strait. During spring and summer the prevailing winds are from a southerly direction when the pack moving north generally arrives off Fiskineas in April and in some years continues as far as Godthaab which it reaches a month later. The ice band is widest in May and June in the vicinity of Cape Farewell, when it may reach to 200 miles off shore. In July the sea ice decreases from north to south and during August completely disappears from the south-west coast of Greenland. The icebergs which round Cape Farewell drift north to about the 63rd parallel where they are caught in a westerly branch of the current and move into the centre of the Davis Strait. In the centre of the Strait the water is comparatively warm and the majority of the bergs disintegrate, very few of them reaching the Labrador coast.

In addition to the ice formed locally during the winter months in Baffin Bay masses of heavy Polar ice enter the Bay through Smith Sound and the several channels of the Canadian Archipelago. The ice conditions in Baffin Bay vary greatly from year to year. During severe winters the Bay may be completely filled with ice while in mild years numerous and extensive pools of water exist.

The currents of Davis Strait and Baffin Bay are of a cyclonic circulation. The East Greenland current rounding Cape Farewell sets up the west coast of Greenland and at the head of Baffin Bay turns west when it is joined by currents of Polar origin setting out of Smith and Lancaster Sounds. Flowing south down the west side of Baffin Bay and Davis Strait the current continues to set down the Labrador and Newfoundland coasts where it is known as the Labrador current.

The ice in Baffin Bay is known as " West Ice " and " Middle Ice " from the position which it occupies. The " West Ice " is the heavy Pack Ice which enters the Bay from Jones Sound, Lancaster Sound, and the west side of Smith Sound. This ice joining with the local coast ice off Baffin Land forms a heavy close packed area of impenetrable ice. The Middle Ice is composed chiefly of ice from Melville Bay and the east side of Smith Sound and represents the outer and lighter portion of the pack which collects in the central part of the Bay between 68° and 74° north.

The numerous glaciers on the west coast of Greenland north of the 68th parallel calve thousands of icebergs annually and from the break up of the fast ice in the spring which holds them throughout the winter, those which do not ground in the shallows of the bays drift in the current and pass down the west side of Baffin Bay and Davis Strait.

At the head of Baffin Bay there is an ice free area called " North Water " which to a lesser or greater extent is ice free throughout the year. It is believed that this pool of open water is maintained through the resistance of the Fast ice in Smith Sound to the current while the lighter ice formed immediately to the south of it is swept away leaving open water in between. In June and July when the Fast ice in Smith Sound breaks up it is carried across North Water diminishing its area for a time. North Water attains its greatest area during September.

The ice cover of Baffin Bay gradually decreases from March to September. From the end of May the Bay is generally navigable as far north as Upernivik and shortly after open water exists between the land ice and the pack ice in Melville Bay.

Hudson Bay.—Fast ice begins to form in Hudson Bay towards the end of October and by the middle of November all the harbours are frozen. The ice spreads from the shore outwards for a distance of about 6 miles leaving the Bay itself comparatively ice free throughout the winter. The ice commences to break up early in July and if not rafted by heavy winter gales melts very quickly, being of not more than 3 feet thick.

Hudson Strait.—Ice first appears at the western end of the Strait in November and soon reaches the eastern entrance. During the winter 85 per cent. of its area is ice covered and these conditions exist until May when the ice commences to dissipate and by the middle of July the Straits are navigable. The ice which chokes the Strait is not composed of local ice and ice from Hudson Bay alone. Large floes of the heavy Davis Strait pack on reaching Hudson Strait are swept in by the current along its north side for a distance

of over 100 miles when it recurves, and drifting eastward on the south side of the strait rejoins the Davis Strait pack flowing south. Masses of Arctic pack are also discharged into the Strait from the Gulf of Bothnia through Fury and Hecla Strait and Fox Basin.

With the development of Port Churchill in recent years as a commercial port the volume of shipping navigating Hudson Strait and Bay is expected to steadily increase and to assist shipping, direction finding stations have been erected at Resolution Island and Churchill.

Coasts of Labrador and Newfoundland.—The Davis Strait Pack drifting south in the Labrador current reaches Cape Chidley on the N.E. coast of Labrador early in November and arrives off the Newfoundland coast in January. At the same time fast ice forms along the shore and the bays and harbours freeze over. The pack in its journey south keeping to the continental shelf spreads off the Newfoundland coast and on arriving off Southern Newfoundland, generally about the beginning of February, separate into two streams, One stream rounding Cape Race moves south-west into what is known as the Gully and during severe ice years blocks the bays and harbours along the south coast. The second and heavier stream flows down the eastern side of the Grand Banks and arrives at the tail of the Bank about the end of March. The pack becomes more open and of a lighter nature as it moves south, but the fields found on the Grand Banks are often sufficiently large and formidable to impede navigation. With the approach of warmer weather the ice commences to melt and by the end of April or early in May the boundary of the pack ice has receded to the north of the Grand Banks. Towards the end of June the east coast of Newfoundland is clear of pack ice and during July the Labrador coast is generally navigable.

Gulf of St. Lawrence and Belle Isle Strait.—Towards the end of November the River St. Lawrence commences to freeze over and very soon after ice forms in the Gulf which with the addition of masses of Davis Strait Pack entering through Belle Isle Strait, closes the Gulf of St. Lawrence to navigation. Throughout the winter months the ice increases and forms extensive sheets which are sometimes broken across by the wind leaving leads of open water between the separated parts. At other times the wind presses the ice sheets together forming a close pack extending for many miles. At the break up of winter conditions towards the end of April the ice commences to move out of the Gulf mainly through Cabot Strait and spreads south towards Sable Island. Another stream moves in a south-westerly direction along the Nova Scotia Coast, but under the influence of the sun and warmer water the ice rapidly melts. Sometimes the ice moving out of the Gulf causes a block between St. Paul's Island and Cape Ray. This block is known as the Ridge and sometimes delays the opening of the Gulf to navigation for two or three weeks. The Gulf of St. Lawrence is usually open to navigation by way of Cabot Strait from the latter half of April to the early part of December. Owing to the indraft of Davis Strait ice into Belle Isle Strait this entrance is not usually navigable until the end of June. At the commencement of the season the Canadian Government maintains an ice patrol service for the benefit of shipping entering the Gulf.

Icebergs in the North Atlantic.—The Labrador current in the higher latitudes is to a large extent caused by the action of north and north-easterly winds. Such winds are predominant in spring when the current attains its maximum velocity. It is also at this time that the break up of the ice occurs and large numbers of bergs drift down from Baffin Bay through Davis Strait, along the coasts of Labrador and Newfoundland to the tail of the Bank where they finally disintegrate under the influence of the Gulf Stream.

The following table compiled from the records of the United States Hydrographic Office and those of the International Ice Patrol for the years 1900-1931 show the average number of bergs that drift south of the 48th parallel during each month of the year:—

Normal Number of Icebergs South of the 48th Parallel.
(Menace to the Cape Race Tracks.)

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept	Oct.	Nov.	Dec.
3	12	43	91	139	77	26	11	8	3	3	2

Normal Number of Icebergs South of the 43rd Parallel.
(Menace to the United States—Europe Tracks.)

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
0	1	4	9	16	13	3	2	1	0	0	0

It has been found that an average sized berg drifting in the mixed waters south of the Tail of the Bank takes from 12 to 14 days to disintegrate during April, May or June. In July, August, and September the time is shortened to from 10 to 12 days. The life of a similar sized berg actually within the Gulf Stream is about seven days. Bergs grounded on the south-west slope of the Grand Bank may last for a month or six weeks.

In the vicinity of the Grand Bank the average hourly drift of icebergs increases as the season advances owing to the strengthening of the Labrador current. Observations carried out by the International Ice Patrol show that in March the average drift of bergs is from 0.0 to 0.3 knots while in April a berg was observed drifting along the east side of the Grand Bank at the rate of 1.5 knots. The average drift of bergs, however, in the mixed waters around the Tail of the Bank is 0.4 to 0.7 knots and when in the waters of the northern edge of the Gulf Stream 0.8 to 1.4 knots.

Density and size of Icebergs.—The density of ice in icebergs is variable. In some the snow is not so completely transformed into ice as in others, while some carry appreciable loads of rock material. An iceberg if composed of pure ice only would float with approximately one-ninth of its mass above water, but owing to their large air content some bergs float with as much as one-third of their mass out of water.

Professor E. Von Drygalski measured 87 bergs shortly after calving from the Greenland glaciers and found the highest to be 449 feet above the surface. He found that the height of a berg decreases rapidly with the length of time that elapses after their formation, a difference of 13 feet being noticed in one instance after an interval of one week, and in another a decrease of 76 feet in about eight weeks. The highest berg measured by the International Ice Patrol was 262 feet above water while the longest berg measured 1,696 feet from end to end.

The apparent size of bergs when observed at sea at a distance of two or more miles may be very deceptive, there rarely being any object of known size near them with which they can be compared. It is especially difficult to estimate the size of bergs which are sighted floating in the mixed waters of the Gulf Stream and Labrador currents where abnormal refraction frequently cause them to loom large. Under such circumstances the Ice Patrol Cutter has sighted bergs not over 30 feet in height at a distance of 30 miles from a height of eye of 20 feet and on one occasion the white-painted cutter was reported to herself as a berg by a steamer passing 10 miles distant.

Detection of Bergs.—The practical utility of the work carried out by the U.S. Coastguard Cutters has greatly reduced the danger of ice to vessels trading between European and United States Ports, but the frequent long periods of fog and low visibility make it impossible for the Patrol to include the latest position of all bergs in their Radio reports; therefore the danger of collision with ice within the area where bergs are liable to exist remains a very real one. Experiments carried out by the Ice Patrol during recent years show that seamen can depend upon no fore-warning of ice beyond the limit of their visibility; the greatest safeguards are therefore the keeping of a sharp lookout and navigating at such a speed as will enable the ship to stop or sheer before striking a berg just visible ahead.

Up to the present there has been no instrument devised whereby the presence of ice can be detected in the dark hours or during fog. No reliance whatever can be attached to echoes from the steam whistle or syren giving a warning of ice, nor does the presence of a berg have any appreciable effect on the temperature of the air or water, but it has been found that when navigating in the vicinity of the Great Bank, if the temperature of the sea remains at or about 60° the chances of meeting ice are greatly reduced.

The approximate temperature of the warm water abutting the cold wall is as follows:—

Throughout the winter and up to April, 54°, April 54°-56°, May 58°-60°, and from June throughout the summer to November, 61°-63°, when it falls to a minimum in February. On ordinary clear days the average berg can be picked up by the masthead look-out when 18 miles distant and will be seen from the bridge when between 12 to 15 miles away. On a cloudy day with good visibility deduct about 2 miles from the foregoing.

In clear weather with hazy horizon the tops of bergs have been observed 11 miles. During light fog or drizzling rain, bergs are visible at from 2 to 3 miles. In light low fogs bergs are generally picked up by the look-out aloft before they can be observed from the bridge.

In dense fog a berg cannot be seen more than 200 yards ahead of ship, when, if the sun is shining, it appears as a luminous white mass. With no sun it first appears close aboard as a dark mass. In dense fog the bow look-out will probably first detect the ice, as the first visible sign is the wash and breaking of the sea on the base of the berg.

On a clear dark night a berg will not be seen with the naked eye further than one-quarter of a mile, but should the bearing be known it may be picked up with glasses when 1 mile distant.

The distance that a berg may be seen on a clear moonlight night depends upon (*a*) the altitude and age of the moon, and (*b*) the relative position of moon, berg and ship.

A berg placed between a ship and the moon when low is the most difficult to observe.

With a full moon at not less than 35° in altitude covered by a thin film of Cirro-Stratus clouds, a berg is visible to the naked eye at a distance of 5 miles, irrespective of the relative position of moon, berg and ship.

Observations carried out in the vessels of the Ice Patrol Service show the following average frequency of fog and low visibility experienced in the vicinity of the Great Bank:—

Month.	*Percentage of Fog.*	*Percentage of Fog and Low Visibility.*
April	29 ...	50
May	27 ...	39
June	44 ...	53

Bering Sea.—Throughout the winter months the whole of the Bering Sea north of a line from Cape Ottutorski to Uninaki Island is covered with an impenetrable ice barrier. Solid ice extends south to St. Matthew Island while the rest of the sea is covered with new ice and detached floes of broken ice, which northerly winds sometimes drive far southward.

During April the ice commences to recede northward, open water first appearing along the Asiatic coast and by the middle of May the ice edge generally stretches from Nunwak Island to Cape Navarin. In early June the sea is free of ice south of St. Lawrence Island and by the beginning of July the ice edge usually lies north of Bering Strait and Point Hope may be reached. In August, September and early October navigation is possible north of Bering Strait the ice edge having receded to the north of Point Barrow, but further east at Cross Island the ice lies close into the coast throughout the year. To the eastward of Point Barrow navigation becomes difficult early in September and in October when the ice commences to move south navigation should not be attempted north of Bering Strait.

Gulfs of Bothnia and Finland.—The period during which the Gulfs of Bothnia and Finland are obstructed by ice vary considerably from year to year, being dependent on the severity of the winter. The harbours usually commence to freeze over during November, but should there have been a mild autumn a number of ports remain navigable until late December or early January.

Sea ice commences to form in January and during severe winters covers the whole of the Gulfs. The action of current and winds cause the fields to break up and hummock and in places pile it on to the coast where it forms an impenetrable barrier. During early spring the drifting ice fields cause great obstruction and danger to navigation and when aided by the wind cause the Aland sea and harbours in the Gulfs to remain blocked until late in May.

Baltic Sea.—Fixed ice usually commences to form in the inner bays and harbours of the Baltic Sea during the latter half of December or in early January and persists until April. The fixed ice seldom extends far off the coast, but loose fields of drifting ice in the open sea cause considerable obstruction to shipping.

In severe winters during February and March the area between Möen and Bornholm and the Swedish coast may become filled with ice thereby blocking the southern entrance to the Sound. Kalma Sound is at times blocked by ice and navigation suspended between Oland and Gottland, but the harbours on the N.W. and East coasts of Gottland are generally ice free throughout the winter.

Icebreakers are used at many of the Baltic ports to keep them open to navigation in some cases throughout the winter.

The Kattegat Belts and Sound.—It is seldom that ice forms in the Kattegat, the Belts and Sound or in their harbours to such an extent as to entirely close them to navigation, but during most winters ice forms in sufficient quantities to impede shipping. During winter when Easterly winds (which are always accompanied by heavy frost) set in, ice commences to form in the southern part of the Great Belt, Little Belt and Sound, which gradually extends north over the Kattegat. The date of the commencement of frost varies from between the beginning of December to the beginning of February and continues to the beginning or end of March.

If the temperature be very low the ice forms rapidly and in the Kattegat increases by piling, especially in that area between Anholt and Morups Tänge and in the vicinity of the Paternosters where the current sets towards the coast.

In severe winters when the Kattegat becomes almost entirely frozen over navigation becomes very hazardous and in the contracted part of the channel southwards of Kullen the ice is impenetrable.

The thaw sets in with westerly winds when the western channel of the Kattegat and the Great Belt clears in from three to four days, but the Sound may remain blocked. A cessation of the westerly winds may cause a continuance of the frost and a return to the ice conditions.

Sea of Azov.—The ice in the Sea of Azov is of local origin and commences to form in November at the head of the sea on the broad shallow banks in Tagarrog Gulf. In some years the whole sea becomes frozen over with ice which attains a thickness of up to three feet, but in those years when the sea is only partially frozen over the remainder is covered with drift ice which in places is driven by the wind on to the coast where it rafts and hummocks to a height of several feet.

Ice conditions in the Kerch-Yenekale Strait are not generally so severe as in the Sea of Azov, but during spring the local ice may be joined by ice from the Sea of Azov. In some years the Strait remains navigable throughout the winter. The ice season in the Sea of Azov generally extends from November to April.

CURRENTS IN THE SOUTHERN INDIAN OCEAN, WINTER SEASON.

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

Summary of Previous Knowledge.—Our knowledge of the currents of the Southern Ocean has thus been described by Admiral Somerville in "Ocean Passages for the World":—"To the southward of the three main circulations of the Atlantic, Pacific and Indian Oceans, the Southern Ocean encircles the earth. Its current systems have not yet received full investigation, but between the latitudes of 40 and 50° S. the movement of the surface water is everywhere in an easterly direction; largely, if not entirely under the influence of the strong and constant westerly winds of these latitudes".

The Admiralty Current Charts indicate that in the Southern Indian Ocean the drifts experienced are stronger, and the sets less variable, in the western part of the ocean, from Longitude 20° E. to about 60° E., along the parallel of 40° S. The maximum drifts are given as 60 or 70 miles, and in one case 100 miles per day, in this region. While the currents appear to be stronger and less variable in some months than others it is not possible to deduce any definite seasonal variation from these charts.

Findlay in the Indian Ocean Directory, Fourth Edition, 1882, says:—"The recorded experience of currents by passing ships in these latitudes is unfortunately very scanty and it may be broadly stated that the maximum easterly drift is in about Lat. 48° to 50° S. By keeping between these parallels, a vessel will be benefited to the greatest amount by their influence. Farther to the North, it is probable that this drift may gradually merge into the warmer waters of the tropical current, impelled by the trade winds. . . . But at the same time it must be stated, as is well known to all sailors, that these drifts are much influenced by the prevalent wind, and that, therefore, a contrary wind will weaken or stop the eastward tendency, as a strong westerly wind may increase its velocity."

Maury believed that the currents of the Southern Ocean flowed more or less directly outwards from the Antarctic region and in Plate IX of his "Physical Geography of the Sea they are shown with northerly sets in all longitudes of the Southern Indian Ocean. These northerly sets were inferred from the known facts of the northward travel of ice from the Antarctic regions, but in more recent times it has been usual to represent the currents of the Roaring Forties as mainly easterly but with a tendency to the north, the sets indicated being between E. and E.N.E.

Findlay states that the continuity of the easterly drifts of the South Atlantic Ocean and the South Indian Ocean was indisputably proved by a drift bottle observation recorded by Captain Sir James Ross. This bottle was picked up on Cape Liptrap, South Australia. Findlay also quotes five other observations, four of which were drift bottles and the fifth a cask of blubber from a wreck. These observations refer to the South Atlantic and South Indian Oceans and in one case also part of the South Pacific Ocean. The average rates of drift, worked from the shortest possible distance traversed, varied from 8 to 11 miles per day. Findlay therefore inferred that in the Southern Ocean there is an average drift of at least 10 miles per day to the eastward, inclining to the north, on the parallel of 40°.

It is interesting to compare this value with those given from more recent observations in Mr. Tabor's article, "Drifts in the Indian and Pacific Oceans", published in Marine Observer, Vol. IX, No. 107, November, 1932. In the table of bottle papers given in this article, ten of the bottles were released in the South Indian Ocean south of Latitude 35° S., and the daily rates, assuming the shortest possible distance traversed, ranged from 1.2 to 5.8 miles per day. The case quoted of the buoy which drifted from the River Plate to the South Indian Ocean during the five years 1918 to 1923 works out at 4.7 miles per day. These values are all much less than those given by Findlay. The two derelict vessels in the South Indian Ocean quoted in Mr. Tabor's article give, however, higher rates, but in these cases the wind would have a much greater effect on the drift. In 1899 the *Waikato* drifted 2,056 miles in 102 days at an average rate of 20 miles per day for the direct distance. The derelict barge sighted by the *Barrabool* and the *Themistocles* in 1925 drifted 160 miles in 9 days, at an average rate of 18 miles per day.

The Marine Observer Charts.—In this article the currents in the two quarters May to July and August to October will be described. In the final article of this year's work the two quarters of the summer half-year will be dealt with and the results of special investigations for the whole year will be given.

The region of the Roaring Forties will first be considered, from Latitude 38° S. to Latitude 50° S. In each of the two quarters, May to July and August to October, there is no strong and steady easterly current flowing throughout the whole region from Longitude 20° E. to Longitude 110° E. The mean drifts are generally speaking weak and vary considerably in different regions. The mean set is easterly, lying mainly between N.E. and S.E. in different regions. Except for one or two areas in which the number of observations is small the strongest mean drift is 13 miles per day, in Latitude 38° S. to 40° S., Longitude 40° E. to 44° E. in the quarter August to October. Generally the mean current is stronger between Longitudes 20° E. and 84° E. than it is between Longitudes 84° E. and 108° E.

During the period 1910 to 1932 the strongest of the actual currents experienced during May to July was that recorded by S.S. *Ascanius* on June 19th, 1927, at the rate of 46 miles per day, N. 31° E., in the mid-position, Latitude 39° 49′ S., Longitude 62° 32′ E. The strongest current experienced during August to October was that recorded by S.S. *Port Stephens* on September 8th, 1922, at the rate of 64 miles per day, N. 74° E., in the mid-position, Latitude 39° 47′ S., Longitude 31° 07′ E.

There is no very clear evidence of the recurvature of part of the Agulhas current into the easterly current of the Roaring Forties. There are some southerly and south-easterly mean sets between Longitude 20° E. and 36° E., but there are no observations at all for a number of squares in this region.

Of the currents north of Latitude 38° S., in the high-pressure area, there is little to be said save that they are weak and variable, as would be expected. The strongest current experienced in this region during the period 1910 to 1932 was that recorded by S.S. *Clan Morrison* on July 23rd, 1925, N. 63° W., 42 miles per day, in the mid-position, Latitude 23° 03′ S., Longitude 61° 36′ E.

There is, however, one interesting feature which may be seen on the charts for both quarters. Between Longitudes 56° E. and 64° E. there is a northerly flow of current from the region of the Roaring Forties in Latitude 45° S. up to Latitude 34° S. In May to July this current flows in a curve, the mean sets being successively N.E., N. and N.W., but in August to October it continues due north as far as Latitude 34° S.

SOUTHERN ICE REPORT.

During the Year 1932.

July.

None received.

Reports of Ice previous to July, 1932, will be found in the Marine Observer, Vol. IX, No. 103, p. 136.

August.

None received.

Reports of Ice previous to August, 1932, will be found in the Marine Observer, Vol. IX, No. 104, p. 155.

September.

Year.	Day.	Position of Ice. Latitude.	Position of Ice. Longitude.	Description.	Remarks.	Name of Ship reporting
1932	8	60° 39′ S.	161° 10′ W.	Berg	Tabular and well-preserved. Measured 130 feet about centre, sloping to 85 feet at both ends, 2,500 feet long.	R.R.S. *Discovery II.*
	8	61° 11′ S.	160° 30′ W.	Berg	Tabular, 70 feet high, 1,200 feet long, level top. Much caverned along waterline.	do.
	8	61° 25′ S.	160° 01′ W.	Berg	Of moderate size and tabular	do.
	9	61° 45′ S.	159° 47′ W.	Berg	Of moderate size and tabular	do.
	9	From 62° 06′ S. To 62° 19′ S.	158° 52′ W. 158° 24′ W.	Sludge ice, pancake ice, light loose pack and 4 bergs.	Passed patches of thin sludge ice, newly frozen. These patches became larger as the ship proceeded south-eastward, and in 62° 11′ S., 158° 44′ W. light pancake ice, extending in every direction. The pans were at first very light and small, but became larger to the southward, till they averaged 3 feet in diameter and were several inches thick. In 62° 15′ S., 158° 32′ W. loose pack-ice was entered. The floes composing this pack were very variable, of all sizes and thicknesses from small pancakes to floes 20 feet across and four feet thick. The ice was very loose and scattered patches of open water were visible. In 62° 19′ S., 158° 24′ W. the ice was more solidly disposed, and a sprinkling of very heavy rafted floes was among the broken young-ice. The four bergs passed during this time were within 7 miles of track. All were tabular and from 70 to 110 feet in height. Two were large, about a mile in length, and the other two were of moderate size.	do.
	9	From 62° 19′ S. To 62° 13′ S.	158° 24′ W. 158° 09′ W.	Loose pack	Loose pack ice, mainly much broken up. A number of very heavy old floes, deeply overcut, was among it. In 62° 13′ S., 158° 09′ W. came to the edge of the ice, after traversing a strip of light pancake ice.	do.
	9	62° 12′ S.	158° 15′ W.	2 bergs	Both tabular, and both about half-a-mile long and 100 feet high.	do.
	9	From 62° 12′ S.	158° 09′ W.	Ice-free, except for fragments	No ice except for small fragments of floes dotted thinly about in places, was seen, but visibility was bad.	do.
	10	To 61° 44′ S.	156° 13′ W.			
	10	From 61° 44′ S. To 61° 54′ S.	156° 12′ W. 155° 42′ W.	Brash ice, drift ice, loose pack and 2 bergs	Met streams of small brash-ice, becoming heavier. In 61° 57′ S., 155° 46′ W. met loose pack, consisting of floes of various ages mainly young and about two feet thick, more compactly disposed to the southward. A fair number of very heavy, old pressured floes were among this ice. None of the floes of young ice were very large. Strong blink to Southward.	do.
	10	From 61° 54′ S. To 61° 36′ S.	155° 42′ W. 155° 00′ W.	Pack-ice, drift ice and 26 bergs	Drift and streams of pack. Most of this ice was young. About six belts of pack ice were crossed, each about half-a-mile in width. The sea was freezing in these belts, and the floes were held together by mushy sludge-ice. In the more open patches of sea, detached floes and fragments were everywhere dotted about. Of the bergs, two were large and tabular, each about half-a-mile long and 100 feet high; 16 were of moderate size, mainly broken down tabulars, and the remainder small and seaworn. All were within 10 miles of track.	do.
	10	From 61° 36′ S. To 61° 08′ S.	155° 00′ W. 154° 00′ W.	Drift ice and 25 bergs	Frequent streams and patches of drift ice. The sea was everywhere studded with detached floes and fragments, more straggling and broken up than that passed hitherto and frequent patches of very small brash were met. A number of very heavy, old, overcut floes were passed. The bergs were within 10 miles of track. Five large tabulars, each about 100 feet high, well preserved. Of the rest about half were tabular and half irregular and weathered, mainly of moderate size.	do.
	11	From 61° 07′ S. To 60° 23′ S.	153° 57′ W. 152° 59′ W.	Drift ice and 4 bergs	Occasional patches of much broken-up drift ice and brash. Most of this ice was small, but occasional heavy lumps were observed. Bergs were within 7 miles of track. Two were large tabulars, about 1,500 feet long, one moderate-sized tabular, and one weathered berg. The tabulars were about 120 feet in height.	do.
	10	From 60° 07′ S. To 59° 35′ S.	152° 30′ W. 151° 42′ W.	9 bergs	Broad stream of brash and wreckage of sea-ice. Bergs within ten miles of track. All were tabular, averaging 100 feet in height. The largest was about 2,000 feet long, the remainder all of moderate size.	do.
	11	From 59° 35′ S. To 59° 03′ S.	151° 42′ W. 151° 52′ W.	4 bergs	Within 10 miles of track. Two tabulars, one large, one of moderate size, and two small sea-worn bergs. Many growlers and bergy bits were passed this watch.	do.
	11	58° 53′ S.	150° 24′ W.	Berg	40 feet high, 250 feet long, pinnacled and much weathered	do.
	12	57° 47′ S.	148° 54′ W.	Berg	Small and much weathered	do.
	12	57° 28′ S.	148° 34′ W.	Berg	Broken down tabular. Large base, awash, flat-topped tabular centre 230 feet high.	do.
	12	56° 53′ S.	147° 45′ W.	Berg	Much weathered and broken down, with three peaks ...	do.
	12	56° 43′ S.	147° 21′ W.	Berg	Small and weathered, with two pinnacles	do.
	12	56° 26′ S.	147° 41′ W.	Bergy bit	Large	do.
	12	56° 22′ S.	147° 33′ W.	2 growlers	Awash	do.

Reports of Ice previous to September, 1932, will be found in the Marine Observer, Vol. IX, No. 105, p. 171.

WIRELESS WEATHER SIGNALS.

I.—SHIPS' WIRELESS WEATHER SIGNALS.

A full description of the system of communication for British "Selected Ships" with instructions was given on pp. 28–38 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. 39 of the January 1933 number of THE MARINE OBSERVER and in Board of Trade Notices to Mariners dated January 1st, 1933.

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 28 OF VOL. X, NO. 109, JANUARY MARINE OBSERVER.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length. For Station to call up "Selected Ships."	Frequency and Wave Length. For "Selected Ships" to report to Station.	Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
North Atlantic and North Sea.	Portishead.	Lat. 51° 28′ 41″ N. Long. 2° 47′ 30″ W.	GKU.	149 kc/s. (2013 metres).	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. and North of Latitude 38° N., but not within 300 miles of station. (see Chart IV.)	Weather London	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	Control system. "Selected Ships" chosen to report in given order notified by station daily at 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. Radio Horta—call sign of ships to report through CTH at schedule times on 2400 m.
	Chatham Mass.,	Lat. 41° 42′ N. Long. 70° 00′ W.	WCC.		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.
	Sayville N.Y.	Lat. 40° 45′ N. Long. 73° 06′ W.	WSL.						
	Rockland.	Lat. 44° 09′ N. Long. 69° 13′ W.	WAG.						
	West Palm Beach.	Lat. 26° 42′ N. Long. 80° 02′ W.	WMR.						
	Palm Beach.	Lat. 26° 42′ N. Long. 80° 02′ W.	WOE.						
	Horta, Azores.	Lat. 38° 32′ N. Long. 28° 38′ W.	CTH.	125 kc/s. (2400 metres).	125 kc/s. (2400 metres).	"A Selected Ships" indicated by roll call made through Portishead to report to Horta—E'n. N. Atlantic, east of long. 40° W. and N. of lat. 38° N. "A Selected Ships" S. of lat. 38° N.—N. Atlantic from lat. 10° to 38° N. eastward of long. 40° W.	Radio Horta.	Weather only, up to seven groups, preferably No. 3 Supplementary Croups.	"A Selected Ships" in the E'n. N. Atlantic, N. of lat. 38° N., chosen to report to Horta will be indicated by a special roll call made through Portishead daily at 2230, 0330 and 1030 G.M.T. immediately following the roll call of selected ships chosen to report to Weather London. These ships should report to CTH in the order indicated in accordance with schedule and on 2400 m. S. of 38° N., no control all British "A Selected Ships" within area should report in accordance with schedule.

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

(Continued.)

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.				
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.
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.	Obs.	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 I., p. 30, Vol. X. No. 109 (January).
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″N. Long. 114°15′11″E.	VPS.		125 kc/s. (2400 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.
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 I., p. 30, Vol. X. No. 109 (January).

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.

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
North Atlantic.	Horta, Azores.	Lat. 38° 32′ N. Long. 28° 38′ W.	CTH.	Radio Horta	Weather only, up to 7 groups, preferably No. 3 Supplementary Groups.	
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.

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteoro-logical 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, up to 7 groups.	
	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			
	Talcahuano	Lat. 36° 41′ 27″S. Long. 73° 06′ 19″W.	CCT	Meteo, Santiago.	Weather only, including supplementary groups.	
	Llanquihue	Lat. 41° 08′ 00″S. Long. 73° 02′ 00″W.	CCW			
	Juan Fernandez.	Lat. 33° 38′ 09″S. Long. 78° 47′ 50″W.	CCJ			
	Magallanes	Lat. 53° 10′ 00″S. Long. 70° 54′ 00″W.	CCN			

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, 1933, 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.

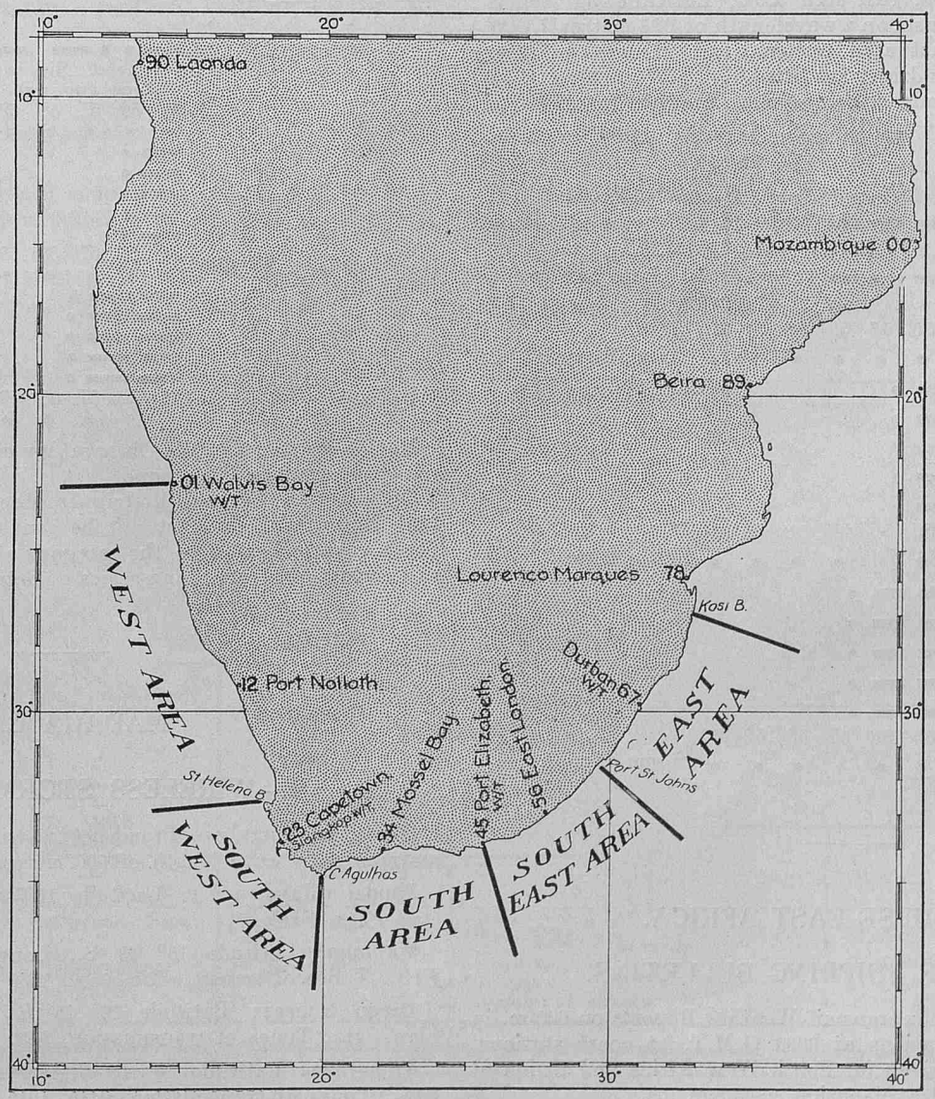
Key letters—IICAK DDFww BBVTT.

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. 105).
Walvis Bay ...	22°58′S.	14°30′E.	**ZSV**	0850	1250, 1955	23, 12, 01, 90.
Capetown (Slangkop).	34°09′S.	18°19′E.	**ZSC**	0830	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**	0810	1205	89, 78, 67, 56, 45.

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 625 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 105.

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. 105).
Lourenço Marques	25°58′S.	32°36′E.	**CQE**	0800	1310	56, 67, 78, 89.
Mozambique ...	15°02′S.	40°45′E.	**CQF**	0900	None issued.	00, 89, 78.

III.—WIRELESS TIME SIGNALS.

Delagoa Bay.—Lourenço Marques.—W/T time signals are transmitted automatically by means of the pendulum clock at Campos Rodrigues Observatory

The transmission of the signals is made simultaneously by **Ponta Vermelha W/T station**, Lat., 25° 58′ 05″ S., Long., 32° 35′ 39″ E., call sign **CQE**, wage 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., and 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:—

Zaudzi (Mayotta I.): Latitude 12° 47′ S., Longitude 45° 16′ E.. Call Sign **FIM.**

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 even hour 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, 1933, 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.

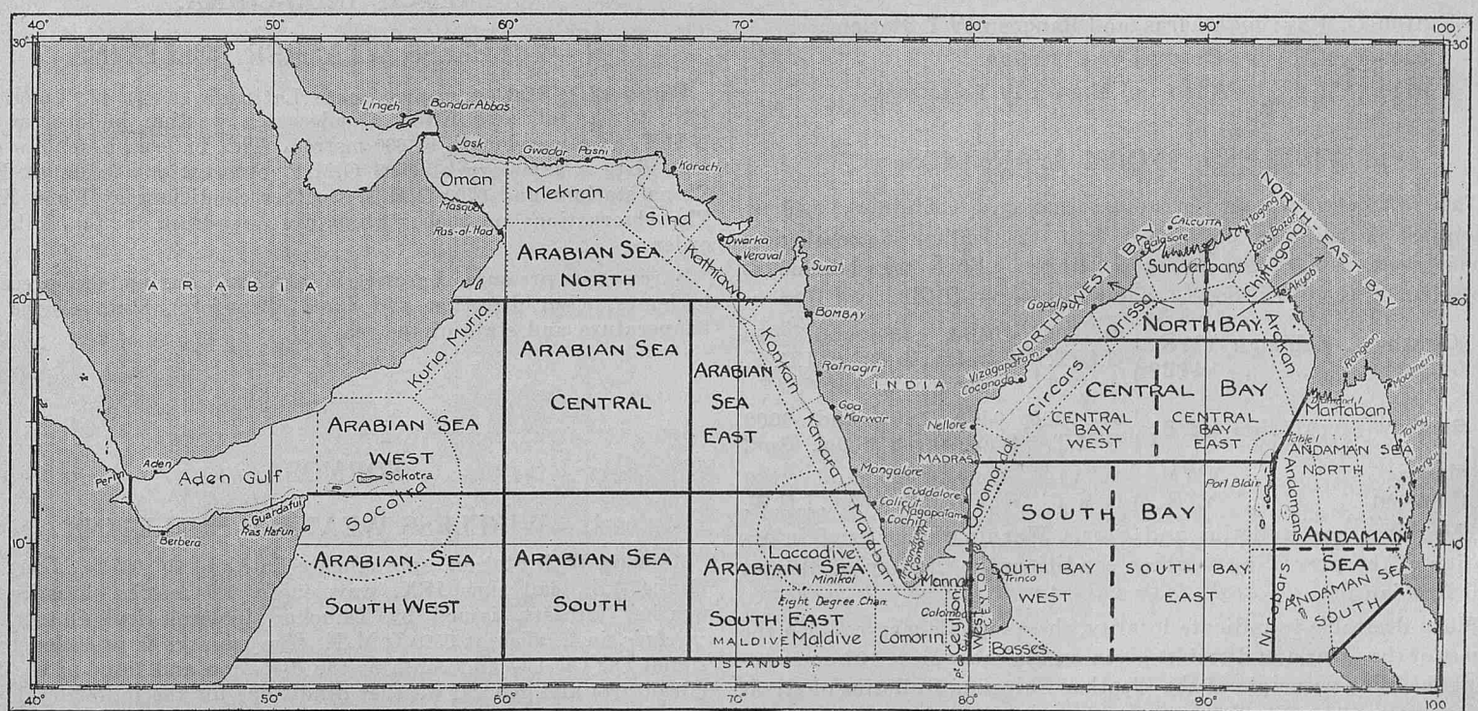
0800 G.M.T.—brief summary of weather conditions and a forecast for the following areas shown on the chart:—

"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, 1933, 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.
75	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.)†
	Calcutta*	22° 34′ N.	88° 20′ E.	**VWC**	2,000 (C.W.)
0800 and 1600	**Bombay** ...	19° 05′ N.	72° 50′ E.	**VWB**	1,000 (spk.)
0900 and 1700	**Madras** ...	12° 59′ N.	80° 11′ E.	**VWM**	1,000 (I.C.W.)
	Rangoon...	16° 46′ N.	96° 12′ E.	**VTR**	1,200 ,,
0948 and 1748	**Aden** ...	12° 49′ N.	45° 02′ E.	**GZQ**	2,000 (C.W.)
	Matara ...	6° 01′ N.	80° 36′ E.	**GZP**	2,000 ,,

* After the time signal.

† In the event of interruption on the wavelength of 1,550m. 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 (spark) 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. or spark.
Calcutta	,, ,,	**VWC**	
Bombay	call sign	**VWB**	at 0000, 0406, 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**	

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. 107 on somewhat the same principle of the Weather Shipping Bulletins of Great Britain, Germany, Sweden and South Africa.

III.—WIRELESS TIME SIGNALS.

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

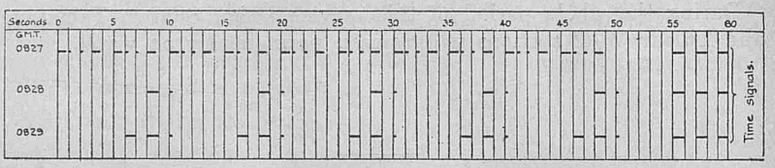


Figure 1.

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

(2) Signals automatically controlled from Alipore Observatory.

(3) Time Signal accurate to within 0.5 sec.

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

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

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

FRENCH INDO-CHINA.

II.—WIRELESS WEATHER BULLETINS.

Mitho W/T Station, approximate Latitude 10° 21′ N., Longitude 106° 22′ E., call sign **FRM**, broadcasts a weather bulletin at 1300 G.M.T. on a wavelength of 600 metres. This bulletin is sent *en clair* and gives a summary of 0900 G.M.T. observations taken at Indo-China stations and 0700 G.M.T. weather conditions at Hong Kong. The observations of each station are broadcast in the following order:—

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

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:—

0400 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 to Gap Rock.
D. Hong Kong to Hainan Straits.
E. North 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 1933 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 1200 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."

In the event of failure the time signals are transmitted 30 minutes later.

The signals are not transmitted on Sundays or Public Holidays.

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.).

Repeated on a wavelength of 1450m. (C.W.).

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.), repeated immediately on 1850 metres (I.C.W.), at 0300, 0500, 0900, 1400 and 1800 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), 0500, 0900 (after Time Signal), 1400 and 1800 G.M.T. The warnings are broadcast *en clair* and give information concerning the position of the centres of typhoons or continental depressions, for China and the China Seas.

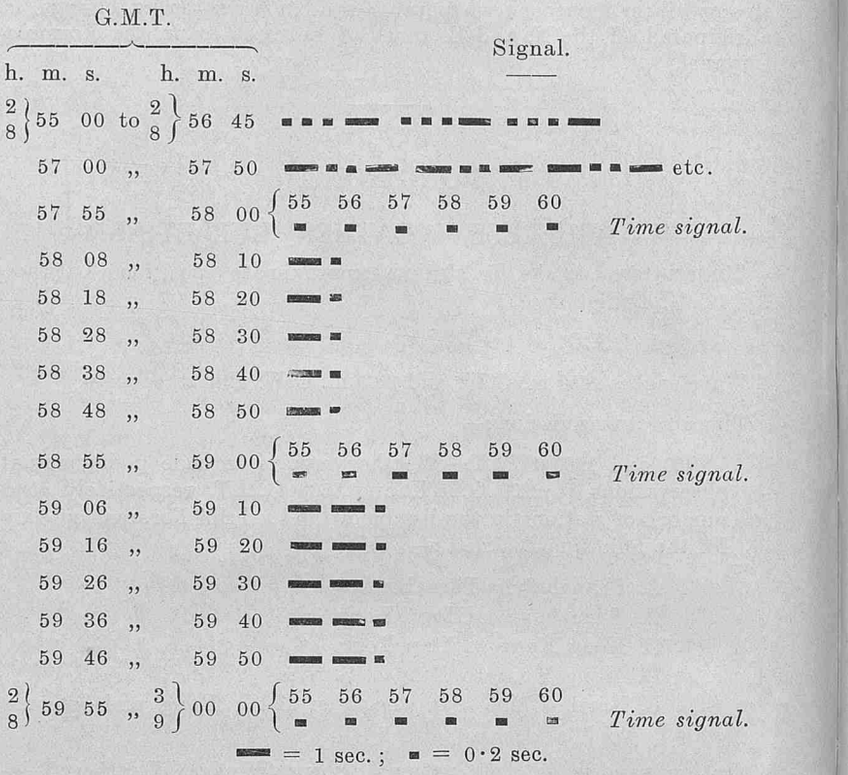
Wavelength 600 metres (I.C.W.), repeated immediately on 1850 metres (I.C.W.).

Typhoon Warnings Broadcast on Short Wavelength by Shanghai W/T FFZ1.

For the benefit of ships who experience difficulty in the reception of W/T messages from **Shanghai W/T Station FFZ**, these warnings will be broadcast on a short wavelength of 30·5 metres C.W. at 0945 and 1130 G.M.T. from **Shanghai W/T Station FFZ1**.

III.—WIRELESS TIME SIGNALS.

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



JAPAN.

II.—WIRELESS STORM WARNINGS.

The **Central Meteorological Observatory, Tokyo, W/T Station** call sign, **JFRA**, 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 2350 G.M.T.
„ 0550 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 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.

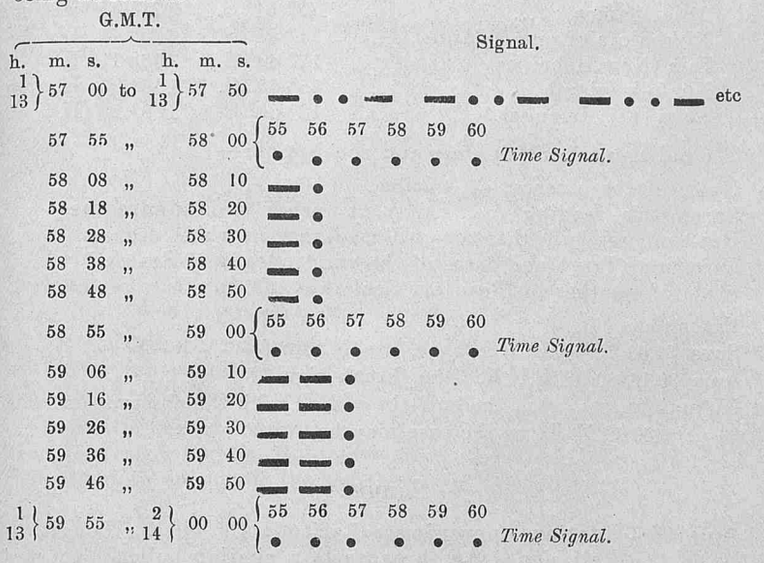
Station.	Call Sign.	Wave-length (metres).	G.M.T.	System.
Perth Lat. 32° 01′ 51″ S. Long. 115° 49′ 31″ E.	VIP	600 (I.C.W.).	0057–0100 1257–1300	(*See* Time Signal Figure, p. 108,). Controlled by Perth Observatory.
Adelaide Lat. 34° 51′ 14″ S. Long. 138° 31′ 55″ E.	VIA	600 (I.C.W.).	0027–0030 1227–1230	(*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.

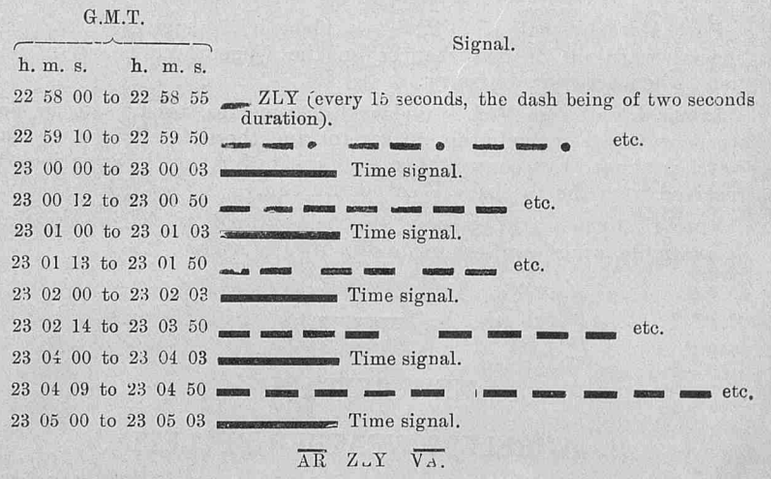
The Dominion Observatory, Wellington, Latitude 41° 17′ 04″ S., Longitude 174° 46′ 04″ E., call sign **ZLY**, broadcasts time signals daily, on 600 metres (I.C.W.) as follows:—

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:—

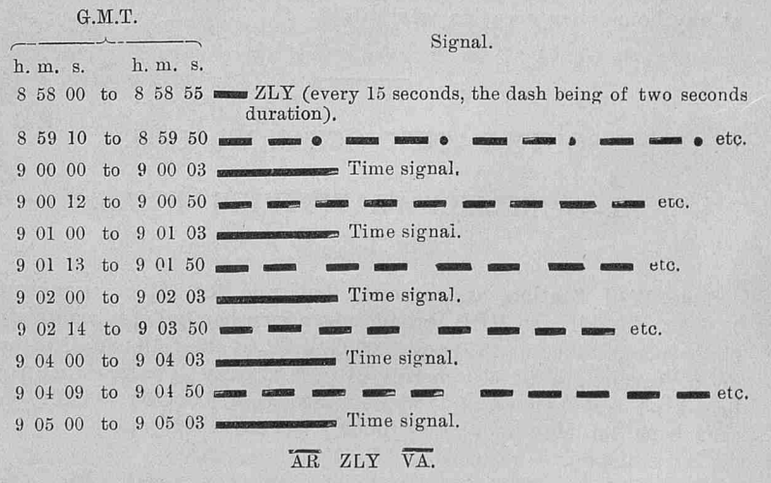


In addition to the above, the undermentioned time signals are broadcast on Tuesdays and Fridays, except on New Zealand Government holidays, by the Dominion Observatory, Wellington.

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)**.

(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 C. P. Copland.

Captain C. P. COPLAND, Commodore of the L.M.S. Holyhead-Kingstown steamers has retired from active service afloat after 37 years service with the company, during which time he has made more than 16,500 passages across the Irish Sea.

Captain COPLAND first went to sea in 1886 in the Ship, *City of Delhi* and after ten years service in both sail and steam joined the Railway Company's Marine Service.

In 1915 he was released from Naval Service to take command of the *Rosstrevor* on the Holyhead-Greenore service and in 1927 was appointed to command the mail steamer *Cambria.*

Captain R. Hume.

Captain R. HUME commander of the R.M.S. *Laurentic* has retired from active service afloat after 33 years service in the White Star Line.

After serving for some years in sail he joined the White Star Line in 1900 as 4th Officer of the *Tauric* and rising through the different grades was appointed to command in 1925, his first ship being the *Doric.* Since then he has commanded several of the company's vessels including the *Megantic, Cedric, Adriatic, Baltic,* and *Majestic.*

Captain W. Rollerson.

Captain W. ROLLERSON of the Leyland Line has retired from active service afloat after 32 years' service with the Company, 18 of which were spent in command.

After some years service in sail Captain ROLLERSON joined the Leyland Line in 1901 as a junior officer and rising through the various grades was appointed to command in 1915.

Captain W. T. Russell.

Captain W. T. RUSSELL commanding the S.S. *Almeda Star* and Commodore of the Blue Star Line has retired from active service afloat on reaching the age limit.

Captain RUSSELL first went to sea in 1888 when he commenced his apprenticeship in the Ship *Corolla.* In 1909 he obtained command of the Blue Star steamer *Broderick,* and has since commanded nearly every ship under the Blue Star Line House Flag. He became Commodore of the line in 1926 when his ship the *Almeda Star* inaugurated the entry of the Blue Star Line into the regular South American Passenger trade.

Commander H. G. Staunton, C.B.E., R.D., R.N.R.

Captain H. G. STAUNTON of R.M.S. *Otranto* and since 1929 Commodore of the Orient Line has recently retired.

HUGH GEOFFREY STAUNTON the fourth son of General GEORGE STAUNTON, C.B., Colonel of the Gordon Highlanders, was educated at Foster's, Stubbington House, Fareham, and trained in H.M.S. *Worcester.* He went to sea on October 14th, 1887, as an apprentice in Devitt & Moore's ship *Rodney* and completed his time for second mate in that ship and the *Tamar.*

He served as 2nd mate in the barques *Cooleen* and *Durisdeer,* also in the steamships *Orianda* and *Euskar* until he had completed his time for Master.

Upon passing the Board of Trade Examination for Master he joined the Orient Steam Navigation Company's service on March 24th, 1896, and was appointed 4th officer of R.M.S. *Lusitania.* His first appointment in command was to R.M.S. *Orient* on August 11th, 1908, and before the war he was also in command of *Ophir, Omrah, Orontes, Orsova* and *Osterley.*

During the war Captain STAUNTON served as Commander, R.N.R., and Navigating officer of H.M.S. *Otway* in the 10th cruiser squadron for 2½ years, after which he was Commodore of North Atlantic, Mediterranean and White Sea Convoys and was decorated with the order of Commander the British Empire for this service. After the Armistice he returned to the service of the Orient Line and since the war has commanded *Ormonde, Orama* and *Otranto.*

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 Commander W. M. CAREY, R.N. (Retired) Captain of the Royal Research Ship *Discovery II* which took place at sea on May 2nd after a long illness is noted with regret.

Commander CAREY entered H.M.S. *Britannia* as a cadet in 1902 and retired from the Royal Navy in 1929 in order to take command of *Discovery II* which had been built to investigate the problems of the whaling industry in high southern latitudes.

At the time of his death, Commander CAREY had nearly completed his second voyage in the ship during which he had circumnavigated Antarctica.

He was a keen member of the Corps of Voluntary Marine Observers and while under his command *Discovery II* contributed eight meteorological logs, all of which were Excellent.

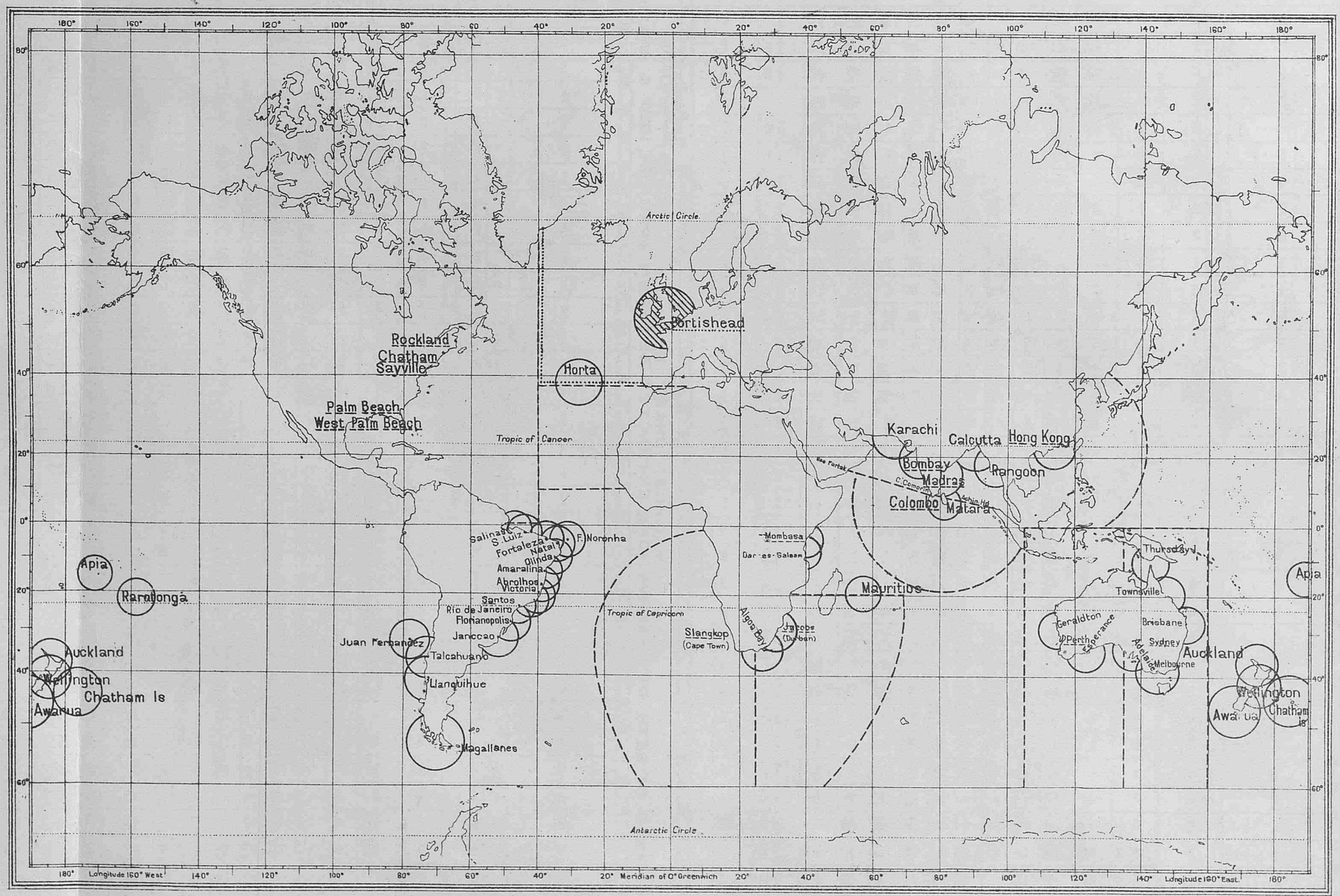
The death of Captain D. C. FITZ-HERBERT commander of the s.s. *Kenya* which took place on April 26th when on passage from Durban to Bombay is noted with regret.

Captain FITZ-HERBERT obtained command in the British India Steam Navigation Company in 1920 and has had charge of many vessels of their fleet including the *Bandra, Varsova, Vasna, Malda, Varela and Karanja.*

He became a member of the Corps of Voluntary Marine Observers in 1932.

Chart IV – SHIPS' WIRELESS WEATHER SIGNALS.

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

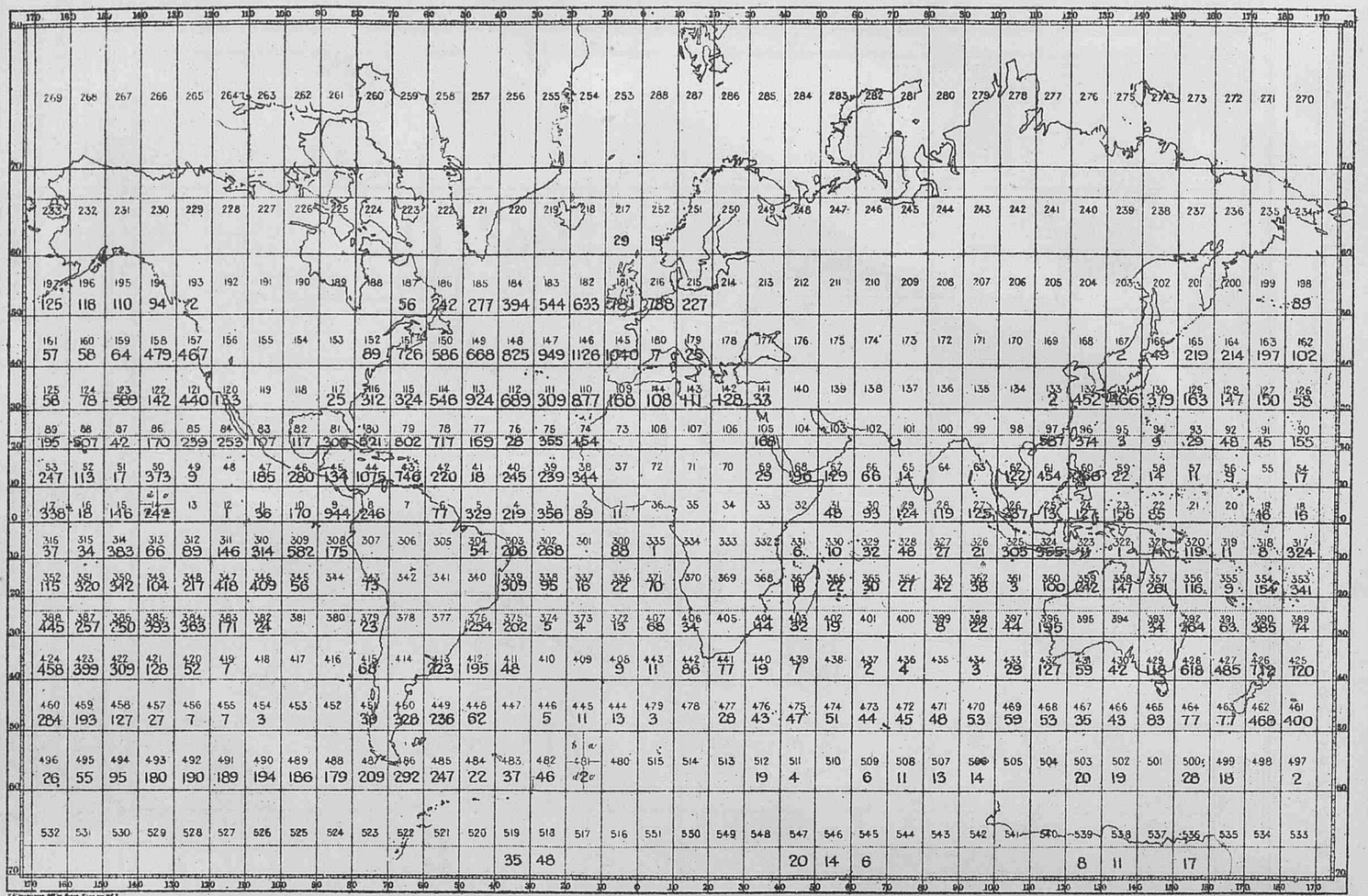
The small shaded areas round stations detailed to receive reports from "A Selected Ships" indicate where these ships should not report on account of congestion.

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

WORK OF THE YEAR.

MARSDEN CHART I.

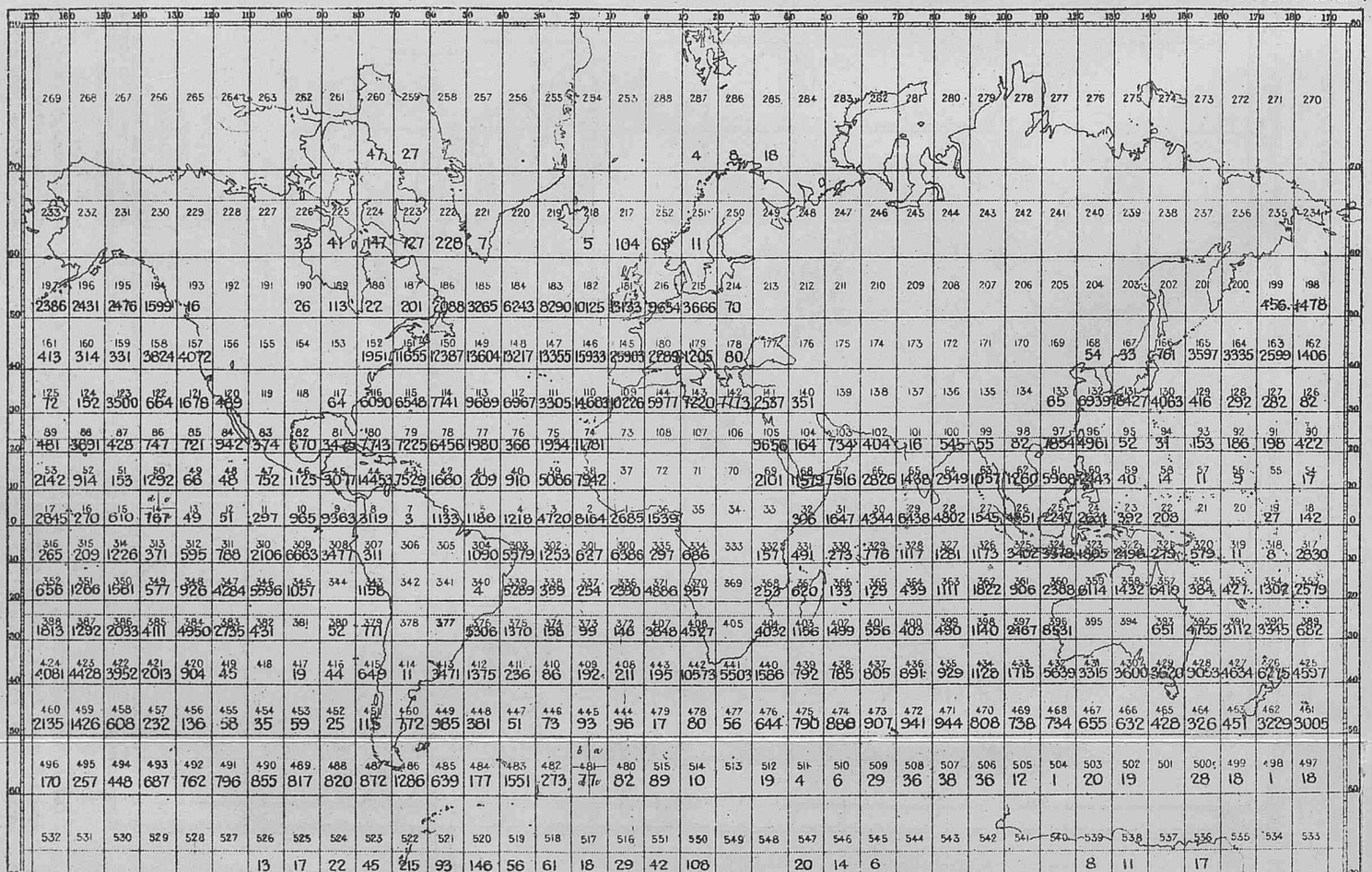
SHOWING NUMBER OF SETS OF OBSERVATIONS EXTRACTED BETWEEN APRIL 1ST. 1932 & MARCH 31ST. 1933.



Total observations 58,747

MARSDEN CHART II.

SHOWING NUMBER OF SETS OF OBSERVATIONS EXTRACTED BETWEEN APRIL 1ST. 1920 & MARCH 31ST. 1933.



Total observations extracted 1920 - December 1929 673,678

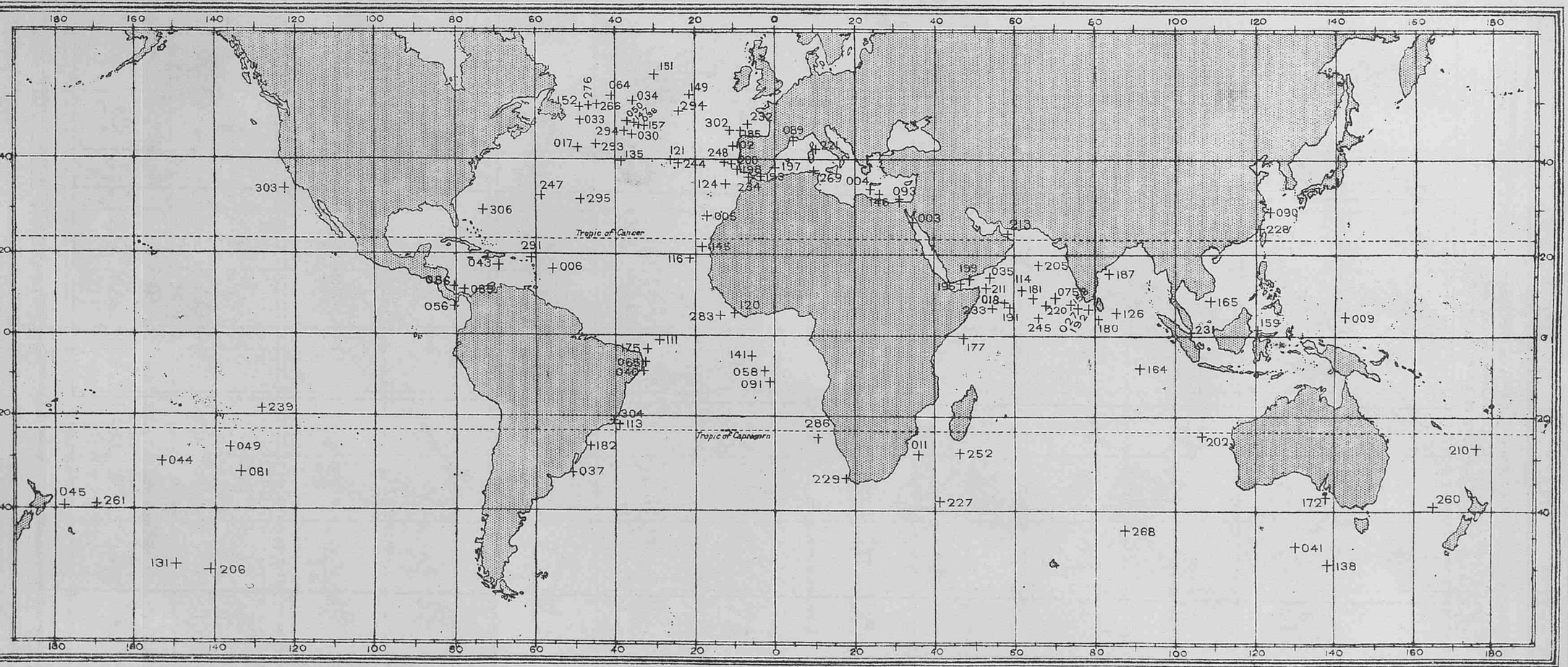
Total observations (New Code) extracted Jan. 1st 1930 - Mar. 31st 1933 170,766

Grand total since April 1st 1920. 844,444

WORK OF THE YEAR.

CHART III.

CHART OF THE WORLD SHOWING POSITION OF BRITISH SELECTED SHIPS AT SEA ON JUNE 1ST, 1932.



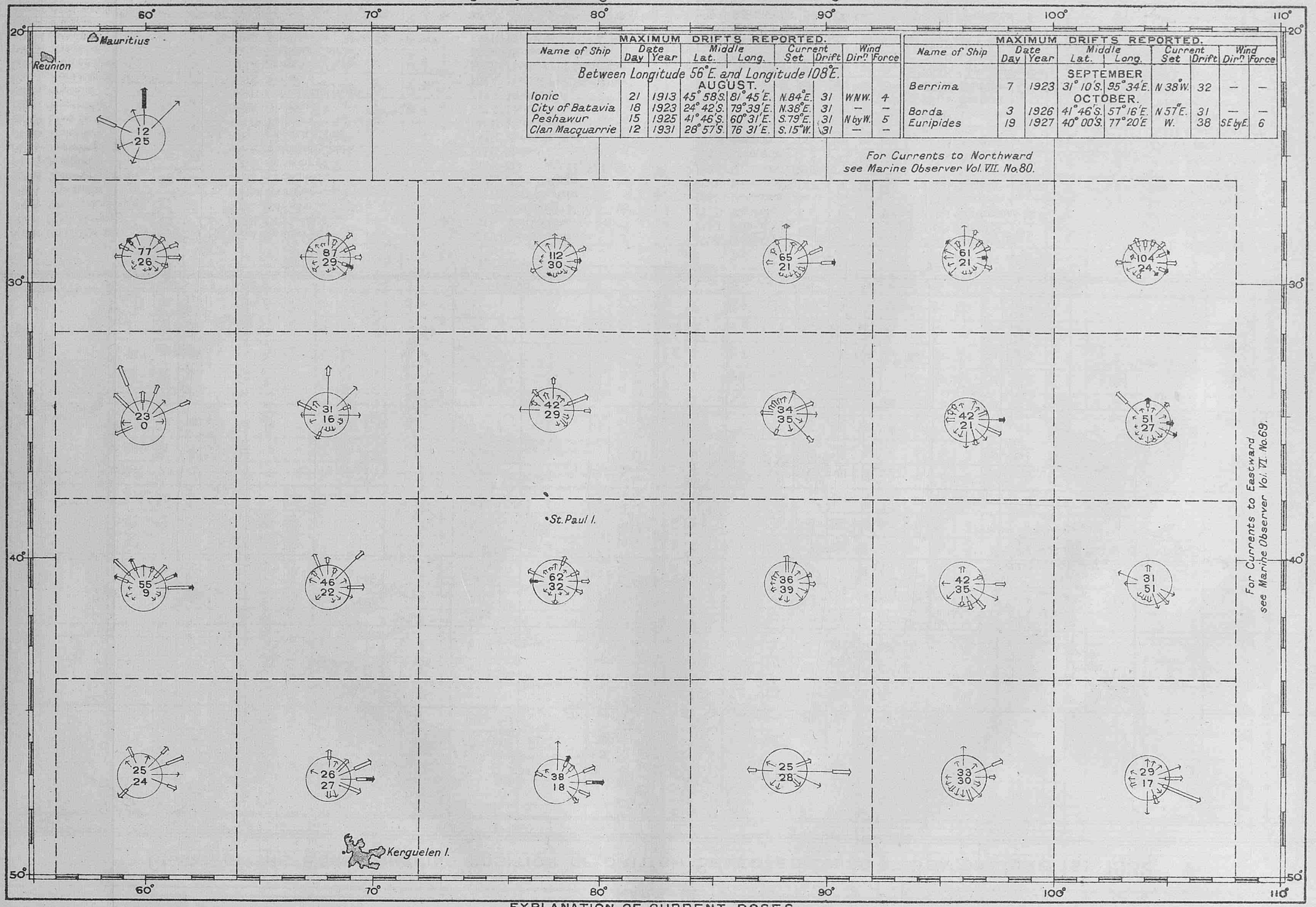
003B Clan Malcolm
004B Clan Macnair
005A Warwick Castle
006A Coronado
009B Elmworth M.V.
011A Euripides
017A Aquitania
018B Makalla
027B Clan Keith
030A Franconia
033A Scythia
034A Empress of Britain
035B City of Sydney
037B Baronesa
038A Samaria
039B Planter
040B Port Adelaide
041B Karamea M.V.
043B Zealandic M.V.
044A Mataroa
045A Tainui
049B Coptic M.V.
050A Adriatic
056B Westmoreland
064A Laurentic
065A Asturias M.V.
068A Balmoral Castle
075B Hobson's Bay
081B Tairoa
086A Orcoma
089B City of Hereford
090B Aeneas
091A Armadale Castle
093B Llandaff Castle
102B Duquesa
111B Hardwicke Grange
113B Upwey Grange M.V.
114B Kenya
116A Highland Chieftain M.V.
120A Appam
121B Siamese Prince
124A Avila Star
126B Glengarry M.V.
131B Port Darwin
135B Port Hunter
138B Discovery II, R.R.S.
141B Mahia
145B Berwickshire
146B Mandasor
147A Laconia
149A Montclare
151A Duchess of Richmond
152A Duchess of Bedford
157A Minnewaska
158B Elpenor
159B Fresno City
164A Mooltan
165B Tantalus M.V.
172A Oronsay
175A Almanzora
177B Mantola
180B Baradine
181B Barrabool
182A Highland Brigade
185A Comorin
187B Jeypore
191B Chindwin
192A Chitral
193B Lahore
196A Malwa
197A Mantua
198B Contractor
199A Mongolia
200B Huntsman
202A Narkunda
205A Rajputana
206B Herminius
210B Niagara
211B Shropshire M.V.
213B Barpeta
220B Manela
221B Manora
224A Minnetonka
227B Nardana
228A Ranchi
229B Tactician
231A Nuddea
232B Madura
233B Clan Mackellar
234B Glaucus
239B Remuera
244B Tongariro
245B Turakina
247B Recorder
248B Banffshire
252B Devon
260B Monowai
261B Huntingdon
266A Cameronia
268B Port Bowen
269B British Admiral
276A Tuscania
283B Clan Morrison
286B Natia
291B Scholar
293B Ariguani
294A Olympic
295A Camito
302A Darro
303B Malayan Prince
304A Deseado
306B Reina del Pacifico M.V.

112 ships out of 306 in favourable positions to report with about 194 in port or narrow waters.
This is typical and represents a fair average day. 37 per cent. in positions to report.

CURRENTS ON THE TRADE ROUTES IN THE SOUTHERN INDIAN OCEAN.

AUGUST SEPTEMBER and OCTOBER.

Observations of ships regularly observing for the British Meteorological Office, 1910 – 1932.



MAXIMUM DRIFTS REPORTED.

Between Longitude 56°E. and Longitude 108°E.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dir^{n}	Wind Force
AUGUST.								
Ionic	21	1913	45° 58'S.	81° 45'E.	N.84°E.	31	WNW.	4
City of Batavia	18	1923	24° 42'S.	79° 39'E.	N.38°E.	31	—	—
Peshawur	15	1925	41° 46'S.	60° 31'E.	S.79°E.	31	N by W.	5
Clan Macquarrie	12	1931	28° 57'S.	76 31'E.	S.15°W.	31	—	—

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dir^{n}	Wind Force
SEPTEMBER.								
Berrima	7	1923	31° 10'S.	95° 34'E.	N 38°W.	32	—	—
OCTOBER.								
Borda	3	1926	41° 46'S.	57° 16'E.	N 57°E.	31	—	—
Euripides	19	1927	40° 00'S.	77° 20'E	W.	38	SE by E.	6

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 ⟹.

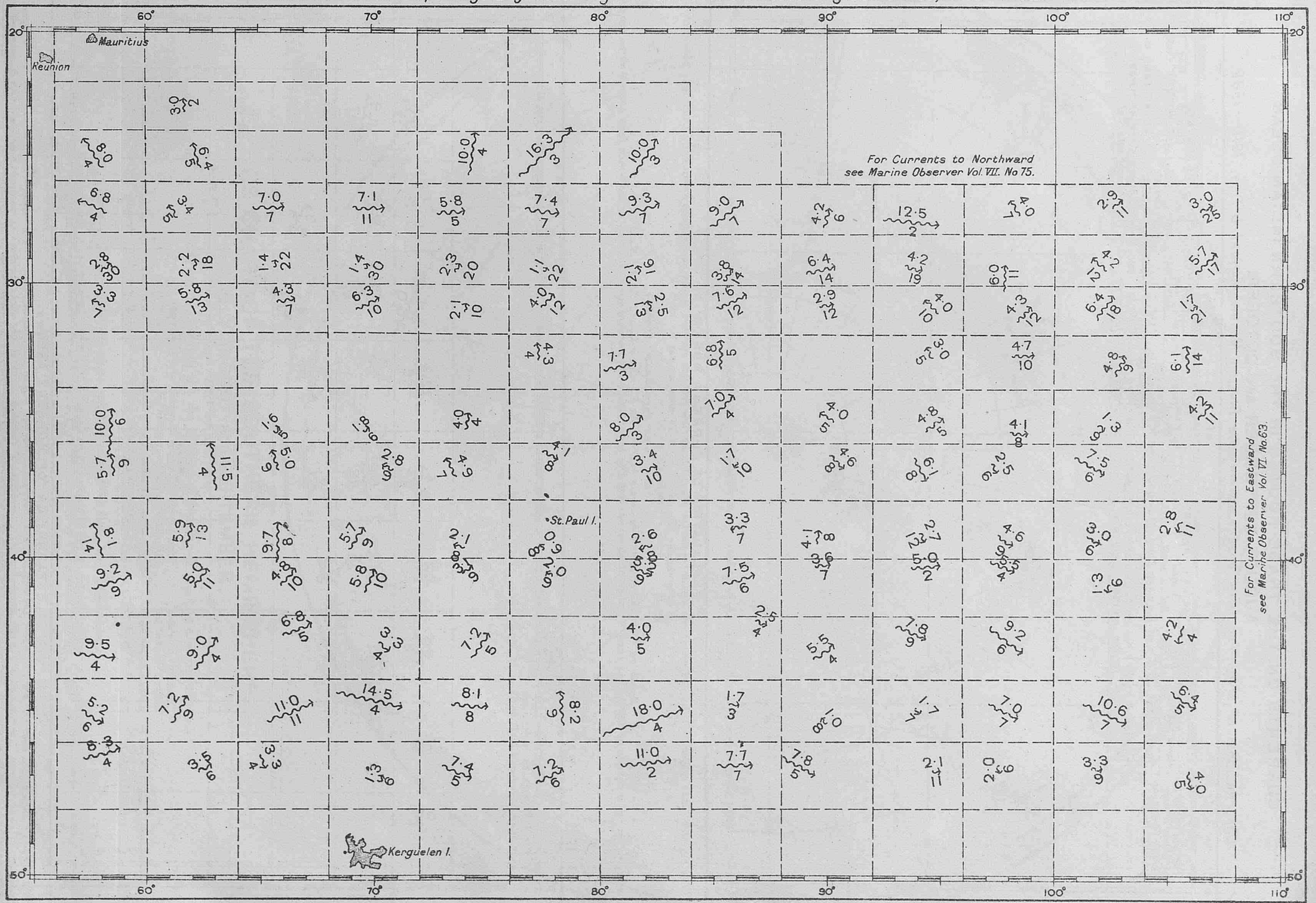
Distance from tail of arrow to circle represents 5%. Scale 0 1p 2p 3p 4p 5p%.

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

CURRENTS ON THE TRADE ROUTES IN THE SOUTHERN INDIAN OCEAN.

AUGUST SEPTEMBER and OCTOBER.

Observations of ships regularly observing for the British Meteorological Office, 1910 – 1932.



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.

CURRENTS ON THE TRADE ROUTES IN THE SOUTHERN INDIAN OCEAN.

AUGUST SEPTEMBER and OCTOBER.

Observations of ships regularly observing for the British Meteorological Office, 1910–1932.

For Currents to Northward see Marine Observer Vol. VIII, No. 93

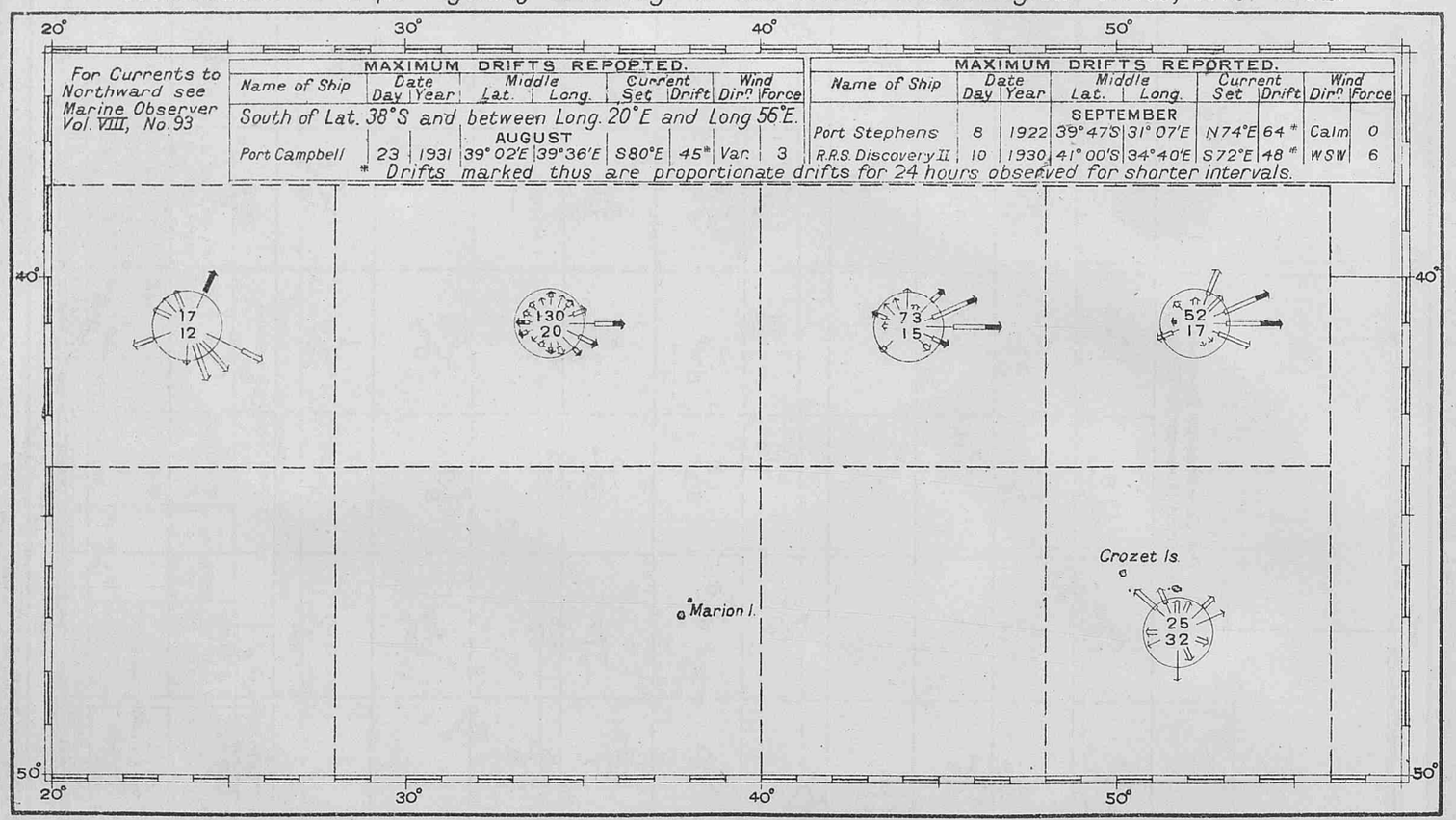
MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dir.n	Wind Force
South of Lat. 38°S and between Long. 20°E and Long 56°E.								
			AUGUST					
Port Campbell	23	1931	39° 02'E	39° 36'E	S 80°E	45*	Var.	3

MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dir.n	Wind Force
			SEPTEMBER					
Port Stephens	8	1922	39° 47'S	31° 07'E	N 74°E	64 *	Calm	0
R.R.S. Discovery II	10	1930	41° 00'S	34° 40'E	S 72°E	48 *	W S W	6

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



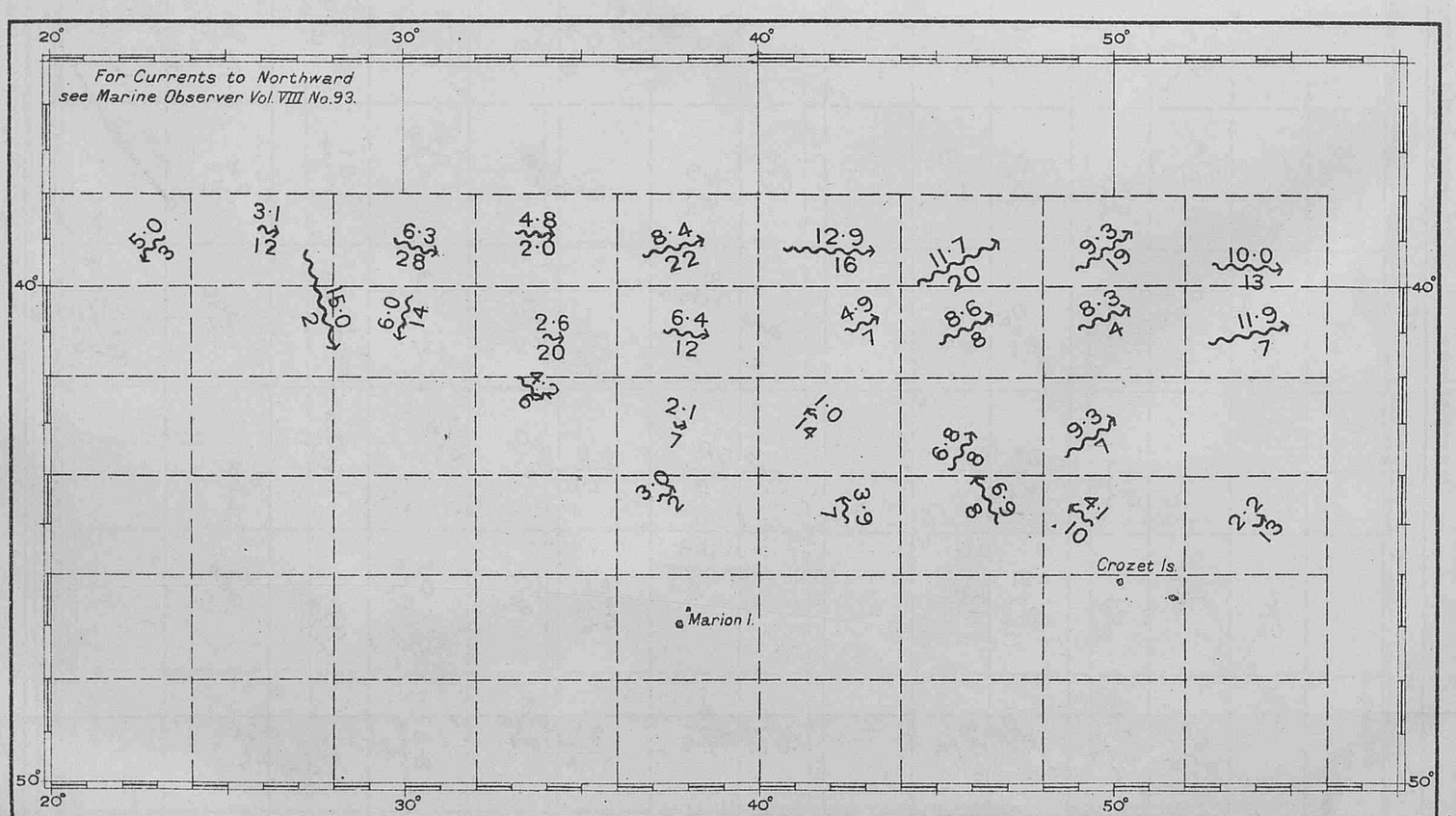
EXPLANATION OF CURRENT ROSES.

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 ⟹.

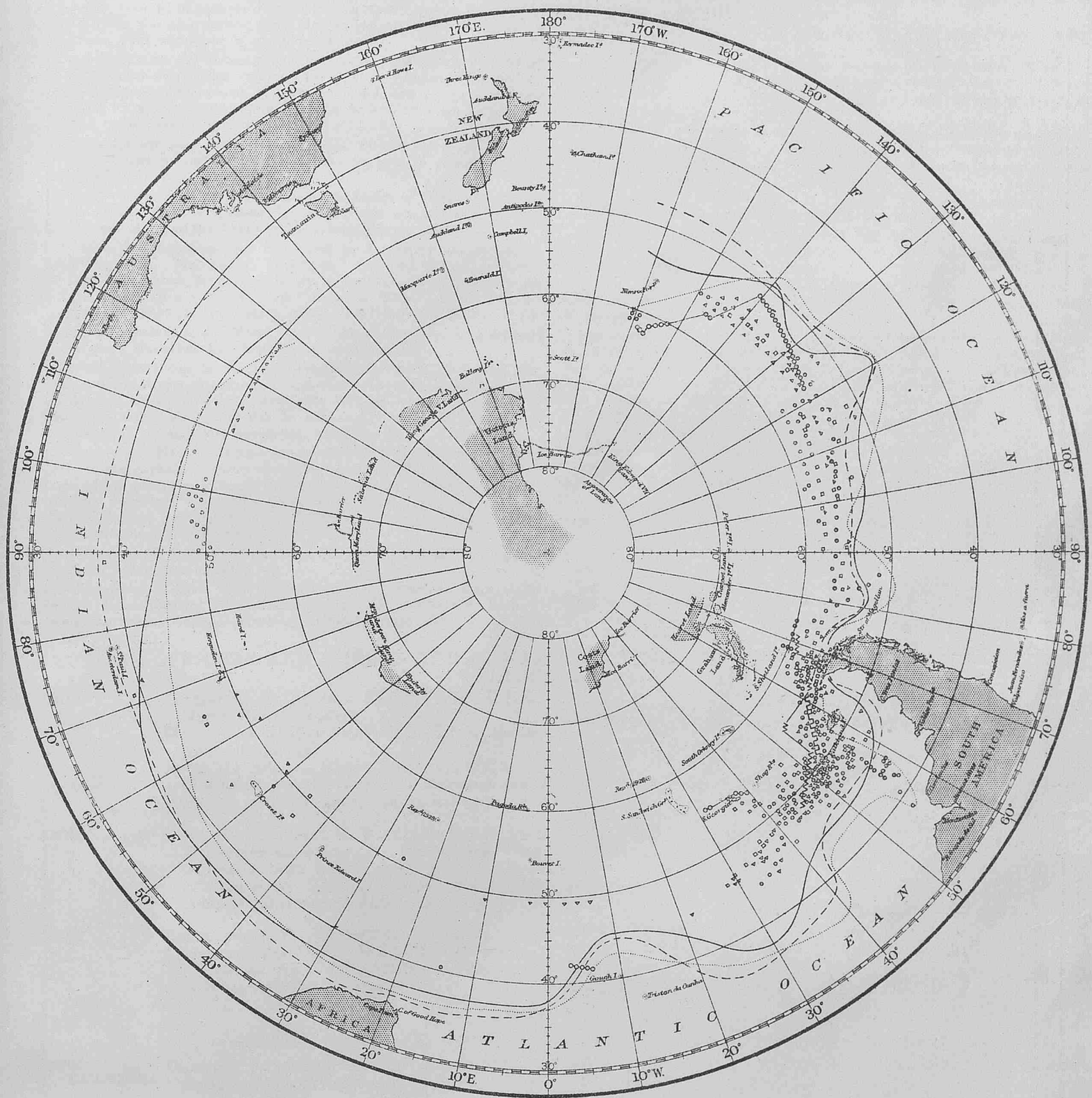
Distance from tail of arrow to circle represents 5%. Scale 0 10 20 30 40 50%.

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, 1902–1932.	Position of northernmost pack ice actually observed 1885–1932.	Extreme limit of all ice, 1772–1932.
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.810/2586. W.6. 81. A.D.22. Gp.908. 1250. 6/33.

MARINE METEOROLOGY.

Co-operation of Shipowners, Masters and Mates.

Captains and Officers of ships registered in Great Britain and Northern Ireland, who wish to co-operate regularly with the Meteorological Office should apply to the appropriate Port Meteorological Officer or Agent, a list of whom, with addresses, is given below.

In accordance with the International Convention for Safety of Life at Sea, the Meteorological Office arranges for certain "Selected Ships" to take meteorological observations at specified hours, and to transmit such observations by wireless telegraphy, for the benefit of other ships and the various meteorological services.

Arrangements are also made for a limited number of ships to keep meteorological logs in certain trades for the purpose of completing the meteorological survey of the oceans.

Ships performing these voluntary duties are known as Observing Ships; the whole as the Voluntary Observing Fleet; and the commanders and officers of these ships as the Corps of Voluntary Marine Observers.

At present the observing fleet is limited to a number not exceeding 366 observing ships. The number of British "Selected Ships" is determined upon the British proportion of world tonnage, on the assumption that there should be a total of 1,000 "Selected Ships" of all nations.

The observing fleet list indicating which are "Selected Ships," with the names of commanders, officers, and other particulars, is published in THE MARINE OBSERVER and kept up to date monthly.

A general description of marine meteorological work, including the particulars desired from intending marine observers, is given in Chapter I of THE MARINE OBSERVER'S HANDBOOK, 5th Edition, which is supplied to all observing ships, and may also be obtained from H.M. Stationery Office, direct, or through any bookseller, price 2s. 6d.

THE QUARTERLY MARINE OBSERVER or MONTHLY SUPPLEMENT is sent regularly to the captain of every observing ship, for the information and guidance of his observing officers, and in the case of "Selected Ships," the wireless operators also. The Captains of observing ships are also supplied on request with charts, and atlases, according to trade, if available, as meteorological equipment.

Ships keeping the Meteorological Log, Form 915, are lent a complete set of official tested instruments.

"Selected Ships," other than meteorological log keeping ships, keep the Ships' Meteorological Record, Form 911. All "Selected Ships" also keep the Ships' Wireless Weather Register, Form 138.

No observing ship is detailed as a "Selected Ship" unless she has on board a reliable mercurial barometer.

Official tested instruments are lent to "Selected Ships" when necessary.

The commanders of observing ships keeping the meteorological log are requested to return it (accompanied by Form 138 in the case of "Selected Ships") through the appropriate Port Meteorological Officer or Agent at intervals of not more than five months.

Commanders of observing ships keeping Forms 911 are requested to return them (accompanied by Form 138 in the case of "Selected Ships") by post direct to the Meteorological Office, London, at the end of each voyage, or at intervals of not more than two months.

These forms have the address and "On His Majesty's Service" printed upon them, and should be folded for posting accordingly.

The Port Meteorological Officers and Merchant Navy Agents inspect official instruments in Meteorological log ships half-yearly, and in "Selected Ships" quarterly, when possible; and they will replace defective gear. These officers will also check the accuracy of barometers in observing ships, but marine observers should themselves frequently check by comparison.

The work of the British observing fleet, that of the observing fleets of other nations party to the Convention for Safety of Life at Sea, together with Weather Shipping Bulletins and Gale and Hurricane Warnings conforming to the International Convention for Safety of Life at Sea, provide the necessary information for shipping. Thus a world wide service for all shipping, at the minimum cost to national funds, is provided. Shipowners are asked to facilitate this voluntary work which is done by the commanders and officers of their ships.

Shipowners will greatly assist by facilitating the forwarding of postal matter from the Air Ministry addressed to the Captains of ships.

All ships fitted with W/T are advised to procure the DECODE for use with the International Code for Wireless Weather Messages from Ships, M.O. Pubn. 329, which can be obtained from H.M. Stationery Office, price 3d. This gives a description of the system of communication of "Selected Ships," as well as the DECODE.

For guidance in the practical use of wireless weather intelligence, WIRELESS AND WEATHER AN AID TO NAVIGATION may be obtained from H.M. Stationery Office, through any bookseller, price 5s.

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 ... ... Lieut. 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., Assistant Commander, H.M. Dockyard.
(*Telephone No.: 108 Dockyard*).

HUMBER ... ... Captain A. M. BROWN, Ellerman Wilson Line Office, Hull. (*Telephone No.: Central 2180*).

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., Deputy Director of Navigation.
Captain R. G. BLAYNEY.
Customs House.
(*Telephone No.: B6421*).

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

DERELICTS AND FLOATING WRECKAGE.

Date.	Position. Latitude.	Longitude.	Description.
NORTH SEA.			
2.6.33	52°33′N.	3°32′E.	One big mast about 15 feet, and two small about 3 feet above water, dangerous to navigation.
NORTH ATLANTIC.			
4.6.33	43°24′N.	52°12′W.	Log about 20 feet long and 2 feet in diameter.
6.6.33	50°59′N.	23°48′W.	Large mooring buoy, painted grey, nearly submerged.
9.6.33	53°50′N.	11°30′W.	Large iron cylinder, dangerous to navigation.
9.6.33	54°46′N.	21°38′W.	Heavy log, 20 feet long and about 3 feet in diameter.
North Atlantic—*contd.*			
10.6.33	52°33′N.	21°16′W.	Red conical buoy.
16.6.33	50°41′N.	16°09′W.	Some wreckage, dangerous to navigation.
GULF OF MEXICO.			
3.6.33	28°33′N.	90°05′W.	Large tree trunk about 45 feet long and 3 feet in diameter with roots and branches showing out of water.
NORTH PACIFIC.			
1.6.33	40°55′N.	125°03′W.	Log about 40 feet long and 1 foot in diameter,

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 59 and 60 of the April, 1933 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, 1933 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 (Y)

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, and to 30th November when not using the 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.

Clarke City
Anticosti
Heath Pt. Lt.V.
Fame Pt. VCF
Father Pt.
GULF OF ST LAWRENCE
NEWFOUNDLAND
Magdalen Is.
Grindstone I.
VCN
St. Paul
C. Ray
Grosse I.
Quebec
Prince Edward Is.
St. Pierre
Cape Breton Is.
VCO
Sydney
VAS
Montreal
St. John
NOVA SCOTIA
Halifax
VAV
Lurcher L.V.
YDR
C. Sable
VCT
Sable Is.
Boston
NAD
New York
NAH
Nantucket Lt. V.
VCM
Belle Is.
VGL
P. Amour
C. Norman

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat.	Position. Long.	Remarks.
July, —, 1890	S.S. Slavonia ...	48°53′N.	24°11′W.	Last remnants of berg.
„ —, 1902	2 reports by Fishermen.	56°30′N. approx.	6°30′W.	40 to 50 ft. long, 15 ft. wide, 2 ft. 6 in. out of water.
„ 31, 1909	S.S. Shimosa ...	39°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.	35°01′W.	Large berg.
„ 18, 1921	Do. ...	44°30′N.	39°28′W.	Small berg about 15 ft. sq.
„ 21, 1921	Do. ...	39°09′N.	40°39′W.	Berg.
„ 31, 1921	Do. ...	37°37′N.	27°29′W.	Berg.
„ 10, 1926	S.S. Chelatros ...	42°42′N.	36°45′W.	2 pieces of ice.

LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 23rd June, 1933, was received from the Canadian Signal Service, Quebec :—

Point Amour and Belle Isle passable, numerous bergs and growlers. Other points safe.

Steamers keep (G) 10′N of this track Westbound / 10′S of this track Eastbound
Steamers keep (F) 10′N of this track Westbound / 10′S of this track Eastbound
Steamers keep (C) 10′N of this track Westbound / 10′S of this track Eastbound
Boundary within which ice has been reported to the Meteorological Office JULY 1933.
Virgin Rocks
VCE

ICE IN GREENLAND WATERS.

INFORMATION RECEIVED BY CABLEGRAM FROM DANISH METEOROLOGICAL INSTITUTE, COPENHAGEN.

5 June.....“Free of ice 75 miles off Cape Farewell, ice in Davis Strait extends to Fiskernæsset.”

7 June.....“Off Arsuk, ship turned 60 miles off shore passing through much, but easily penetrable ice. Ice edge 60 miles off shore extending northward beyond visibility. Two miles of open coastal water. Outer edge of ice compact, but open further in. Only a few bergs outside ‘storis’.”

17 June.....“Open ice edge 50 miles off Cape Farewell, farther in compact ice. Bergs met with in Longitude 42°W. In the Davis Strait the ice extends northwards to Ivigtut.”

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

Ps.810/2586. WL. Bl. A. D. 22. Gp. 908. 960. 6/33.

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.

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.

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 Supplement.

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

VOLUNTARY OBSERVING SHIPS' FLEET LIST.

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 299.

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. 9.3.33 to 7.6.33.	Date Last Return Received.
122 †† *Accra*, M.V. ...	Shooter, J. C.	R. B. Ellis	G. Arrowsmith...	M.-S.	Elder Dempster	Fms. 911 & 138 8.3.33 to 16.4.33	21.4.33
055 *† *Actor*	Chapman, T.	G. Penston, E. Pearce, P. Vaughan.	P. Smythe ...	M.	Harrison ...	,, ,, 5.12.32 to 18.2.33	27.2.33
123 †† *Adda*, M.V. ...	Lawson, J. H.	E. Moore, S. Baker	A. J. L. Edwards	M.-S.	Elder Dempster	,, ,, 26.1.33 to 30.4.33	4.5.33
273 *† *Adrastus* ...	Lloyd, R.	S. R. Evans, J. P. Makepeace, F. E. Jackson.	J. H. Nightingale	M.L.	A. Holt	Fm. 915 6.10.32 to 26.2.33	1.5.33
072 †† *Adriatic*	Freeman, C. P., R.D., Commr., R.N.R.	A. M. Cherry, W. S. Finlayson, B. S. Walker.	G. W. Ingle ...	S.	White Star ...	Fms. 911 & 138 27.2.33 to 19.3.33	22.3.33
090 *† *Aeneas*	Wallace, W. K ...	G. H. Smith, W. Williams, J. W. Lorains.	I. E. Jones ...	,,	A. Holt	,, ,, 30.1.33 to 17.5.33	22.5.33
166 *† *Agamemnon* ...	Beswick, W., D.S.C., Commr., R.N.R.	W. G. Harrison, O. Thomas, R. Fountain.	A. C. Nevin ...	,,	,,	,, ,, 13.3.33 to 4.4.33	8.5.33
Aidan	Barlow, F. P.	... ...	... ...	M.L.	Booth	... ...	...
065 †† *Akaroa*	Smith, F. M.	A. C. Jones, K. Miller, G. H. Heywood	H. A. McAskill...	,,	Shaw Savill ...	Fm. 915 ... 31.12.32 to 11.4.33	26.4.33
Alban	Evans, L.	R. Parry, F. M. Lyons ...	... ...	,,	Booth	,, ... 13.1.33 to 23.3.33	25.3.33
127 *† *Albion Star* ...	Walsh, W.	R. White, R. E Winnall, F. R. Tompsett.	H. Ison	M.	Blue Star ...	Fms. 911 & 138 22.1.33 to 24.3.33	27.4.33
019 †† *Alcantara* ...	Clarke, E., R.D. Commr., R.N.R.	A. E. H. Randle, F. J. Swallow, T. Buckney.	W. Smith ...	S.	Royal Mail ...	,, ,, 17.2.32 to 17.4.33	21.4.33
178 *† *Alipore* ...	Harman, E. F.... ...	J. L. Dunkley, H. Huq, H. P. Naire.	R. S. Evans ...	M.	P. & O.	,, ,, 4.11.32 to 15.4.33	6.6.33
175 †† *Almanzora* ...	Buret, T. J. C. ...	A. R. Osbourne, R. H. Popplelton, T. Davies.	J. Caldwell ...	S.	Royal Mail ...	,, ,, 29,1,33 to 22,5,33	24.5.33

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 9.3.33 to 7.6.33.		Date Last Return Received.
012 †† *Almeda Star* ...	Turner Russell, W. ...	R. Hales, D. G. Rossell, J. E. Mortimer.	R. N. Austin ...	M.	Blue Star ...	Fms. 911 & 138	20.3.33 to 3.5.33	10.5.33
022 *† *Alynbank* ...	Gillies.—.	... ...	... ...	M.L.	A. Weir	... ...	... ...	...
103 †† *Andalucia Star*	Vernon, R.	G. G. McPherson, A. Malcouronne, M. B. M. Tallack.	F. E. Ash ...	M.	Blue Star ...	Fms. 911 & 138	26.2.33 to 13.4.33	19.4.33
209 †† *Aorangi*, M.V. ...	Spring-Brown, J. F. ...	E. M. Anderson, S. H. Crawford, J. W. S Madden.	G. M. Power ...	M.L.	Canadian-Australasian.	Fm. 915	23.6.32 to 6.10.32	8.12.32
120 †† *Apapa*, M.V. ...	Spence, T.	C. V. Evans, R. Mercer ...	J. Rea	M.-S.	Elder Dempster	Fms. 911 & 138	8.2.33 to 12.5.33	16.5.33
029 †† *Appam*	Draper, J. M.	W. M. M. Hutchings, R. K. Palmer, B. C. Haigh.	R. J. Dowling ...	S.	,, ,,	,, ,,	22.2.33 to 29.5.33	30.5.33
017 †† *Aquitania* ...	Irving, R. B., O.B.E., R.D., Capt., R.N.R.	G. Jeffries, L. R. Sharp, E. A. Divers.	A. H. Farman ...	,,	Cunard	,, ,,	24.2.33 to 1.6.33	6.6.33
115 †† *Arandora Star* ...	Moulton, E. W. ...	R. Freaker, H. F. Partridge, J. Anderson.	C. W. Herbert	M.-S.	Blue Star ...	,, ,,	26.1.33 to 26.5.33	27.5.33
Architect ...	Mowatt, I.	G. Dewar	... ...	M.	Harrison ...	Fm. 911	8.3.33 to 20.5.33	27.5.33
293 *† *Ariguani* ...	Scudamore, J. H. H., D.S.C., R.D., Commr, R.N.R.	A. Sandham, P. S. Howlett	J. F. Clark ...	S.	Elders & Fyffes	Fms. 911 & 138	9.3.33 to 21.5.33	23.5.33
144 †† *Arlanza* ...	Huff, G. F.	M. J. Morton, H. V. Todd, R. C. Wooley.	G. Hunt ...	,,	Royal Mail ...	,, ,,	12.3.33 to 24.4.33	27.4.33
091 †† *Armadale Castle*	Harvey, H. B. ...	C. Lloyd, L. G. May, J. W. S. Brooks.	P. Haslam ...	,,	Union Castle ...	,, ,,	28.1.33 to 21.5.33	23.5.33
296 *† *Arracan*... ...	Thomson, S.	J. A. C. MacCall, M. M. Ramsay, J. J. Allen.	F. Fox	,,	P. Henderson ...	,, ,,	6.12.32 to 14.3.33	5.4.33
095 †† *Arundel Castle*	Whitfield, G. J. ...	G. L. Clarke, S. H. Parry ...	W. A. Brown ...	,,	Union Castle ...	,, ,,	5.2.23 to 27.5.33	30.5.33
280 *† *Astronomer* ...	Richards, J.	W. P. Baker, R. Williams, E. B. Stephens.	... ...	M.	Harrison ...	,, ,,	10.1.33 to 8.4.33	22.4.33
062 †† *Asturias*, M.V. ...	Shillitoe, B., R.D., Commr., R.N.R.	– Scott, – Stephens, – Smith	J. T. Williams ...	S.	Royal Mail ...	,, ,,	15.12.32 to 7.5.33	9.5.33
061 †† *Atlantis*	Purvis, A.	F. E. C. Cox, E. Hewitt, F. Jeyes.	... ...	M.-S.	,, ...	,, ,,	7.4.33 to 30.5.33	2.6.33
281 *† *Auditor* ...	Windsor, G. R. ...	L. Richardson	... ...	M.	Harrison	,, ,,	1.8.32 to 9.11.32	16.1.33
212 *† *Australia* ...	Galgey, J. H.	H. Cameron, E. H. Lidstone, F. M. Jenvey.	C. Cunningham	,,	British India ...	,, ,,	15.11.32 to 24.3.33	11.4.33
124 †† *Avila Star* ...	Thomas, R. J. ...	F. N. Johnson, W. Hall, E. Lowndes	B. King... ...	,,	Blue Star ...	,, ,,	5.2.33 to 25.5.33	31.5.33
068 †† *Balmoral Castle*	Attwood, J.	A. C. G. Price, G. F. Oakley, H. Bunn.	J. Sharp ...	S.	Union Castle ...	,, ,,	4.3.33 to 23.4.33	25.4.33
179 *† *Balranald* ...	Short, C. E.	E. R. Physick, F. W. J. Pearce, W. A. Mallett.	F. Arthurs ...	M.	P. & O. Branch	,, ,,	24.2.33 to 19.5.33	25.5.33
248 *† *Banffshire* ...	Gibb, A. W. P. ...	R. F. Buckley, A. Hunter, J. O. H. Kirkwood.	J. Ewing ...	,,	Turnbull Martin	,, ,,	18.2.33 to 24.3.33	31.3.33
180 *† *Baradine* ...	Dene, R. C.	G. W. Wood, G. E. Owen, A. E. Clay.	J. S. Skinner ...	,,	P. & O. Branch ...	,, ,,	28.11.32 to 21.2.33	4.3.33
037 *† *Baronesa* ...	Compton, R. W. ...	J. R. Faulkner, L. W. Kent, J. G. Freeman.	J. O. Brown ...	,,	Houlder	,, ,,	9.1.33 to 17.3.33	22.3.33
213 *† *Barpeta* ...	Davies, A. D.	G. E. Hopkins, J. Patterson, R. C. Davies.	C. Hobby ...	,,	British India ...	,, ,,	1.1.33 to 23.1.33	20.3.33
181 *† *Barrabool* ...	Sheepwash, J. S. ...	W. Elvy, A. Gething, T. Watkins.	R. Rowley ...	,,	P. & O. Branch ...	,, ,,	24.1.33 to 27.4.33	9.5.33
070 †† *Bayano* ...	Legge, A. W. ...	H. W. Mackey, F. I. Corner...	R. E. Blizzard ...	S.	Elders & Fyffes	,, ,,	2.2.33 to 27.5.33	30.5.33
059 †† *Belgenland* ...	Morehouse, W. A. ...	W. Wood, W. A. Fletcher, G. Boyle.	J. Caldwell ...	,,	Red Star {	,, ,,	19.3.33 to 25.3.33	27.3.33
					{	Fm. 912	19.3.33 to 25.3.33	27.3.33
183 †† *Bendigo* ...	Wyatt, F. N. ...	H. T. Rigden, S. Hopkins ...	F. W. Rose ...	M.-S.	P. & O. Branch ...	Fms. 911 & 138	27.2.33 to 3.4.33	8.5.33
237 †† *Berengaria* ...	Britten, E. T., R.D., Capt., R.N.R.	R. H. C. Crawford, N. Kingscote, S. Tayne.	J. N. Cragg ...	S.	Cunard ... {	,, ,,	16.4.33 to 23.5.33	25.5.33
					{	Fm. 912	16.4.33 to 23.5.33	24.5.33
145 *† *Berwickshire* ...	Evens, E. H.	E. Coulthart, J. C. Robertson, S. R. J. Wood.	H. Southgate ...	,,	Turnbull Martin...	Fms. 911 & 138	28.1.33 to 14.4.33	22.4.33
Birchbank ...	Skelly, E. H.	... ...	... ...	M.L.	A. Weir	... ...	... ...	...
Bradfyne ...	O'Neill, J.	P. Evans, F. W. Burn, O. E. Brown.	C. K. Castle ...	S.	Reardon Smith	Fm. 911	12.12.32 to 22.5.33	7.6.33
Brighton ...	Hill, A.	E. Balcombe, C. Munton ...	S. Wood ...	,,	Southern Rly. ...	Telegraphic Report 6.6.33	...	6.6.33
057 †† *Britannic* M.V....	Vaughan, P. R., D.S.C., R.D., Commr., R.N.R.	A. J. Fisher, O. V. Lucas, A. Harvey.	J. B. Stone ...	,,	White Star ...	Fms. 911 & 138	6.3.33 to 12.5.33	15.5.33
269 *† *British Admiral*	Taylor, F. I.	H. J. Were, C. Finch ...	G. Hughes ...	M.	British Tankers	,, ,,	18.2.33 to 27.5.33	6.6.33
249 *† *Buteshire* ...	Laird, C. A. I.	P. McMillan, S. W. Brown, J. D. Elvish.	T. Prenton ...	S.	Turnbull Martin	,, ,,	25.11.32 to 12.4.33	21.5.33
031 †† *Caledonia* ...	Collie, A.	J. O. Dunn, T. K. McMillan, R. Blake.	W. Stewart ...	S.	Anchor	Fms. 911 & 138	13.2.33 to 1.4.33	4.4.33
086 †† *Calgaric*... ...	Saunders, W. J R. ...	... ...	... ...	M.S.	White Star ...	... ...	... ...	...
139 †† *California* ...	Smart, R. W.	J. F. Adams, E. Richardson, R. L. Robertson.	D. Thompson ...	S.	Anchor ... {	Fms. 911 & 138	9.2.33 to 20.5.33	24.5.33
					{	Fm. 212	9.2.33 to 20.5.33	24.5.33
Cambria ...	Turner, T. B.	O. W. Ll. Jones	... ...	,,	L.M. & S. Rly. ...	Telegraphic Report 7.6.33	...	7.6.33
190 *† *Cambridge* ...	Williams, R.	H. Fryer, R. H. Carter, V. Canton.	P. Fleming ...	M.L.	Federal ...	Fm. 915	16.1.33 to 7.5.33	22.5.33
266 †† *Cameronia* ...	Gemmel, W.	E. Stormont, H. D. Campsie, D. Bone.	J. Fleming ...	S.	Anchor	Fms. 911 & 138	26.2.33 to 9.5.33	12.5.33
295 †† *Camito*	Jack, D. A.	J. McIntyre, R. Philpott, B. R. Coe.	L. Fudge ...	,,	Elders & Fyffes ...	,, ,,	16.2.33 to 29.4.33	2.5.33
Canonesa ...	Brodie, W. H.	E. J. L. Stone, F. F. Feint, W. N. Kerwell.	J. W. Rawlin ...	M.	Houlder ...	Fm. 911	9.1.33 to 18.4.33	18.4.33
117 *† *Cape of Good Hope*	Jacobson, T. A. ...	J. Adam	... ...	S.	Lyle S.S. Co. ...	,,	5.10.32 to 17.2.33	27.2.33
282 †† *Carinthia* ...	Murchie, P. A., O.B.E., R.D., Capt. R.N.R.	G. S. Hutchinson, J. A. Myles, H. Hudson.	J. Doyle ...	,,	Cunard	,,	23.1.33 to 3.6.33	6.6.33
092 †† *Carnarvon Castle* M.V.	Stewart, C. E.	E. Clancy. H. L. Shaw, D. D. Mackenzie.	J. Hodgson ...	,,	Union Castle ...	Fms. 911 & 138	12.3.33 to 30.4.33	3.5.33
155 †† *Carthage* ...	Jack, H. M.	C. T. O. Richardson, D. Buckley, G. Sparks.	A. Macbeth ...	M.-S.	P. & O.	,, ,,	27.11.32 to 2.3.33	7.3.33
184 †† *Cathay*	Elliot Smith, H., R.D., Lt.-Commr., R.N.R.	A. J. McHattie, M. C. C. Forsyth, E. Cowell.	S. W. Sharp ...	,,	,, ...	,, ,,	16.2.33 to 23.3.33	25.3.33
011 †† *Ceramic* ...	Saunders, W. J. ...	R. G. Roberts, J. Farrus ...	W. M. Ross ...	S.	White Star ...	,, ,,	11.4.33 to 15.5.33	24.5.33
191 *† *Chindwin* ...	Paterson, G.	D. M. Wilkie, J. G. Aitkin, D. Sinclair.	A. C. Headley ...	,,	Henderson ...	,, ,,	20.11.32 to 30.1.33	1.2.33
067 *† *Chinese Prince*	Irvine, W.	I. P. Ellis, J. W. Taylor, J. H. C. Torr.	M. Edwards ...	M.L.	Furness Withy ...	Fm. 915	7.12.32 to 12.3.33	19.5.33
192 †† *Chitral*	Britten, P. O.	W. Allen, J. Last, T. Child ...	E. L. Boyce ...	M.-S.	P. & O.	Fms. 911 & 138	19.2.33 to 22.5.33	6.6.33
City of Barcelona	Hill, W.	— . Cooper	... ...	M.	Ellerman... ...	... ...	... ...	...
265 *† *City of Baroda*	Percival, H.	J. L. Robertson, E. G. O'Driscoll, F. Hofmeyer.	W. R. Bain ...	S.	,, ...	Fms. 911 & 138	7.3.33 to 1.4.33	4.4.33
City of Cairo ...	Hoppins, E. G. ...	L. Herman	... ...	M.	,, ...	Fm. 911	11.2.33 to 29.3.33	22.5.33

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 9.3.33 to 7.6.33.		Date Last Return Received.
013 *†	*City of Cambridge*	Melville, A. G. ...	J. T. Keith	... ...	S.	Ellerman... ...	Fm. 911	5.12.32 to 10.2.33	24.2.33
	City of Canton ...	Lloyd, H.	R. A. Foort, A. G. Potter, G. V. Conolly.	.. ..	M.	,, ...	,,	13.2.33 to 8.4.33	8.5.33
157 *†	*City of Delhi* ...	Hogg, A, ...	A. Travis, F. H. Revell ...	S. Connell ...	S.	,, ...	Fms. 911 & 138	16.1.33 to 29.4.33	6.6.33
	City of Dieppe	Cartwright, H. ...	P. C. Wilson, D. J. Inglis ...	... ...	M.L.	,, ...	Fm. 915	9.12.32 to 11.4.33	1.5.33
	City of Evansville	Keasley, W.	F. W. Woods	... ...	M.	,, ...	Fm. 911	23.2.33 to 30.4.33	6.6.33
220 ††	*City of Exeter* ...	Bremner, D. M. ...	J. W. Wotherspoon, J. G. S. Fyfe, C. V. Brennan.	H. Allen ...	S.	,, ...	Fms. 911 & 138	15.1.33 to 19.3.33	30.3.33
089 *†	*City of Hereford*	Baker, J.	J. W. Nesbitt, D. Wood ...	R. W. Sherwood	M.	,, ...	,, ,,	10.3.33 to 30.5.33	6.6.33
	City of Lincoln	Readwin, E.	C. A. Chapman	... ...	,,	,, ...	Fm. 911	1.3.33 to 9.5.33	18.5.33
028 ††	*City of London* ...	Brown, J. G.	B. E. Hooper, E. W. Gillies, W. H. Charlton	... ...	S.	,, ...	Fms. 911 & 138	30.1.33 to 8.4.33	13.4.33
	City of Perth ...	Metcalf, D. H. ...	... ...	... ...	M.L.	,, ...	... ...	... ...	...
271 *†	*City of Roubaix*	Phillip, A. J.	B. S. Roberts, C. Collard, W. H. Dalton.	R. W. Garnham	M.	,, ...	Fms. 911 & 138	4.2.33 to 10.4.33	27.4.33
272 *†	*City of Singapore*	Cooper, T.	R. Pulford, D. G. Lister, C. G. Griffith.	J. W. Carroll ...	,,	,, ...	,, ,,	8.3.33 to 14.5.33	6.6.33
035 *†	*City of Sydney* ...	Booth, H. G.	W. A. Rogerson, L. H. Edmunds, R. A. Jones.	E. Eason ...	,,	,, ...	,, ,,	27.4.33 to 10.5.33	6.6.33
	City of Tokio ...	Spurring, R. R. ...	... ...	... ...	M.L.	,, ...	... ...	... ...	...
187 *†	*City of Valencia*	Nicoll, L.	A. Hamilton, A. McGregor, T. Lovell.	R. McGee ...	S.	,, ...	Fms. 911 & 138	6.3.33 to 24.5.33	27.5.33
125 *†	*City of Windsor*	Hammersley, E. G. ...	A. E. King, E. H. Lynes, R. W. A. Johns.	W. M. R. Aspin	,,	,, ...	,, ,,	1.2.33 to 29.4.33	15.5.33
	City af Winnepeg	Ricketts, R. J. ...	... ...	... ...	,,	,, ...	... ...	... ...	...
050 *†	*Clan Macalister*	Douglas, R.	G. Drake, A. Harris, L. Thomson.	E. Harvey ...	,,	Clan	Fms. 911 & 138	2.2.33 to 14.3.33	22.3.33
241 *†	*Clan Macbeth*	Andrews, H.	W. R. Woodriffe, J. C. Scott, P. N. Colepeper.	R. E. Tritton ...	,,	,, ...	,, ,,	1.11.32 to 18.2.33	23.2.33
	Clan Macdougall	Forrett, F.	G. L. Roe	... ...	,,	,, ...	Form 911	5.3.33 to 13.5.33	20.5.33
287 *†	*Clan Macfarlane*	Redford, L. F., Lt.-Commr, R.N.R.	W. W. Simpson	... ...	,,	,, ...	Fms. 911 & 138	1.3.33 to 24.3.33	31.3.33
118 *†	*Clan Macindoe*	Scott-Smith, H. E. G., O.B.E., R.D., Lt.-Commr., R.N.R.	J. C. Dunphy, D. W. Gibbon	J. Morrison ...	,,	,, ...	,, ,,	3.4.33 to 9.5.33	6.6.33
233 *†	*Clan Mackellar*...	Haynes, N. J.	J. J. Stormont	E. Woolhouse ...	,,	,, ...	Fm. 911	5.1.33 to 30.1.33	13.3.33
	Clan Macnair...	Holman, W. G. ...	I. A. Hall, H. W. Peletier, J. F. Vooght.	R. F. Kirk ...	,,	,, ...	Fms. 911 & 138	6.1.33 to 8.3.33	14.3.33
	Clan Macneil ...	Low, A....	J. E. Townrow, H. F. Town, B. H. Magill.	... ...	,,	,, ...	Fm. 911	6.2.33 to 9.5.33	12.5.33
001 *†	*Clan Macphee* ...	Giles, H. J., R.D., Capt., R.N.R.	R. G. Bagnall, H. Hind, S. W. Easterbrook.	J. R. McCash ...	,,	,, ...	Fms. 911 & 138	12.3.33 to 30.1.33	6.4.33
168 *†	*Clan Mactaggart*	West, W. F.	F. H. Houghton, H. R. Crosscombe.	W. T. Ash ...	,,	,, ...	,, ,,	31.10.32 to 24.1.33	31.1.33
002 *†	*Clan Macwhirter*	O'Byrne, C. E.... ...	P. L. Taylor, B. Hardinge, K. Simpson.	H. F. Baker ...	,,	,, ...	,, ,,	2.2.33 to 29.4.33	9.5.33
003 *†	*Clan Malcolm* ...	George, L. S.	K. Banks, N. N. Birtley, F. Hawkins.	W. B. Caldwell	,,	,, ...	,, ,,	11.10.32 to 10.1.33	16.1.33
283 *†	*Clan Morrison*...	Porterfield, W. M., Lt. Commr., R.N.R.	A. Hambley	J. P. Dempster	,,	,, ...	,, ,,	1.4.33 to 23.5.33	31.5.33
259 *†	*Clan Sinclair* ...	Evans, H.	R. R. Baxter	F. P. Drysdale...	,,	,, ...	Fm. 911	26.1.33 to 25.4.33	29.5.33
	Clan Urquhart ...	Young, G.	F. Cossar, C. Mills	... ...	M.	,, ...	,,	26.2.33 to 22.5.33	31.5.33
	Colonial... ...	Harraden, W. E. ...	W. Moore, A. P. Brown, A. Smart.	... ...	,,	Harrison ...	,,	4.12.32 to 25.2.33	28.2.33
298 *†	*Comedian* ...	Bostock, O.	T. Glover, E. McGuiness, E. Whitehouse.	G. Roberts ...	,,	,, ...	Fms. 911 & 138	28.2.33 to 8.5.33	12.5.33
016 *†	*Comliebank*, M.V.	Currie, S.	J. French	... ...	S.	A. Weir	Fm. 911	13.1.33 to 1.3.33	10.4.33
185 ††	*Comorin* ...	Cartwright, C. W.,D.S.C.	R. E. Tucker, D. Meikle, D. S. Charles.	E. Habicht ...	M.-S.	P. & O.	Fms. 911 & 138	22.1.33 to 26.4.33	29.4.33
198 *†	*Contractor* ...	Owen, W. T.	N. F. O'Neill, L. Siddon, R. Myles.	... ...	M.	Harrison ...	Fm. 911	10.2.33 to 21.2.33	8.5.33
049 *†	*Coptic*, M.V. ...	Christie, D.	P. Saville, W. G. Burt, G. A. Harvey.	P. M. Edwards	M.L.	Shaw, Savill & Albion.	Fms. 911 & 138	15.1.33 to 18.4.33	26.3.33
258 ††	*Corfu*	French, F. E., R.D., Captain, R.N.R.	W. T. Sheffield, D. Fitzgerald Lombard, S. C. Cooke.	A. Macfarlane ...	M.-S.	P. & O.	,, ,,	4.2.33 to 12.5.33	6.6.33
100 *†	*Cornwall* ...	Lettington, A. E. ...	G. Dibley, T. M. Devitt, N. Baddeley.	... ...	M.L.	Federal	Fm. 915	12.12.32 to 15.4.33	19.4.33
006 ††	*Coronado* ...	Thorburn, R. A., R.D., Commr., R.N.R.	H. J. Perrett, H. F. Leach, G. M. Binks.	R. A. Oakley ...	S.	Elders & Fyffes ...	Fms. 911 & 138	13.4.33 to 13.5.33	15.5.33
214 *†	*Counsellor* ...	Jackson, J.	A. A. Heaton, J. Davidson, E. B. Simmons.	W. Burns ...	M.	Harrison ...	,, ,,	15.1.33 to 30.4.33	3.5.33
036 *†	*Cumberland* ...	Maltby, T. L.	H. H. Mackillican, J. McCulloch, J. Brooke Smith	T. C. Bryant ...	S.	Federal ...	,, ,,	7.12.32 to 24.3.33	1.4.33
285 *†	*Custodian* ...	O'Connor, T.	W. H. Slaughter, J. L. Williams.	T. H. Martin ...	M.	Harrison ...	,, ,,	30.11.32 to 15.2.33	22.2.33
169 *†	*Dalgoma* ...	Beeching, P. H. ...	C. F. Okill, H. E. Evans, C. Maskell.	— Seaward ...	M.	British India ...	,, ,,	12.2.33 to 26.4.33	3.5.33
	Deebank ...	Robertson, J.	... ...	... ...	M.L.	A. Weir	... ...	... ...	...
260 *†	*Defender* ...	Kinloch, R.	A. M. Dewar	I. E. Jones ...	M.	Harrison ...	Fms. 911 & 138	19.12.32 to 17.5.33	22.5.33
	Delphic... ...	Starr, W. B., R.D., Commr., R.N.R.	R. Conway	... ...	,,	White Star ...	... ...	... ...	...
079 ††	*Deseado* ...	Schlanbusch, O. V. ...	F. A. C. Thacker	... ...	M.-S.	Royal Mail ...	... ...	... ...	...
	Designer ...	Hansen, W. A.... ...	D. Wolstenholm	... ...	M.	Harrison ...	Fm. 911	6.11.32 to 31.1.33	10.2.33
252 *†	*Devon*	Clarke, P. B., D.S.C.	G. Chaplin, G. Shepherd, R. Coen.	J. J. McCarthy...	,,	Federal	Fms. 911 & 138	6.11.32 to 10.12.32	20.12.32
	Diplomat ...	Brown, H. L.	J. H. Roberts	... ...	,,	Harrison ...	Fm. 911	19.3.33 to 14.4.33	9.5.33
284 *†	*Director* ...	Worthington, B. ...	A. E. Rogers, H. W. Jones	F. P. Thomas ...	,,	,, ...	Fms. 911 & 138	18.2.33 to 26.4.33	1.5.33
	Discoverer ...	Rowberry, W.	W. H. Hunt	... ...	,,	,, ...	Fm. 911	11.10.32 to 25.12.32	30.12.32
290 ††	*Doric*	Quinn, W. S.	... ...	... ...	S.	White Star ...	... ...	... ...	...
136 *†	*Doric Star* ...	Capon, S. N.	A. F. Day, E. T. Blaxland, G. McIntyre.	H. Glover ...	M.	Blue Star ...	Fms. 911 & 138	2.11.32 to 21.1.33	13.2.33
275 *†	*Dramatist* ...	Meek, A. J.	R. L. Bryde, W H. Howard, C. V. Watts.	A. McMarren ...	,,	Harrison ...	,, ,,	21.2.33 to 3.5.33	22.5.33
142 ††	*Duchess of Atholl*	McQueen, D. S. ...	A. E. Shergold, C. E. Duggan, E. V. Glennie.	E. Murphy ...	M.-S.	Canadian Pacific	,, ,,	15.4.33 to 1.6.33	7.6.33
							Fm. 912	15.4.33 to 1.6.33	7.6.33
152 ††	*Duchess of Bedford.*	Sibbons, H.	L. Outram, F. Stell	C. H. Sinclair ...	,,	,, ,,	Fms. 911 & 138	12.3.33 to 11.5.33	15.5.33
							Fm. 912	12.3.33 to 11.5.33	15.5.33

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 9.3.33 to 7.6.33.		Date Last Return Received.
151 ††	*Duchess of Richmond.*	Freer, A., R.D., Capt., R.N.R.	T. B. Hewson, N. C. H. Sedlon	— Gorstan ...	M.-S.	Canadian Pacific	Fms. 911 & 138	30.1.33 to 25.5.33	29.5.33
							Fm. 912	30.1.33 to 25.5.33	29.5.33
143 ††	*Duchess of York*	Stuart, R. N., V.C., D.S.O., R.D., Commr., R.N.R.	S. W. Keay, T. L. Gillett, A. E. Halbert.	J. Potts ...	,,	,, ,,	Fms. 911 & 138	5.3.33 to 18.5.33	22.5.33
							Fm. 912	5.3.33 to 18.5.33	29.5.33
098 ††	*Dunbar Castle,* M.V.	Vincent, E. S., R.D., Commr., R.N.R.	M. H. Williams, J. A. Ferguson, D. E. Payne.	P. P. Williams...	S.	Union Castle ...	,, ,,	22.2.33 to 9.3.33	13.3.33
052 *†	*Dunster Grange...*	Smiles, R.	E. G. Raynor, D. Murray, E. Monckton.	E. Seatter ...	M.	Houlder	Fms. 911 & 138	14.3.33 to 16.5.33	20.5.33
102 *†	*Duquesa* ...	Frost, C. R.	A. McEwan, R. F. Martin, H. W. Brammell.	F. E. Parsons ...	,,	Furness Withy ...	,, ,,	5.2.33 to 4.4.33	11.4.33
215 *†	*Durenda,* M.V....	Blencowe, J.	T. M. Robertson, J. L. Harsland, H. F. Vickers.	J. B. Cleave ...	,,	British India ...	,, ,,	27.3.33 to 18.4.33	29.5.33
077 ††	*Edinburgh Castle*	Barron, A.	H. Close	A. Blow ...	S.	Union Castle ...	,, ,,	19.3.33 to 7.5.33	10.5.33
107 *†	*El Argentino,* M.V.	Ellis, F., D.S.C. ...	W. Findlay, G. Brighton, C. G. Adlard.	E. Lovelock ...	M.	Houlder	,, ,,	16.1.33 to 20.3.33	28.3.33
009 *†	*Elmworth,* M.V.	Dick, J.	R. Newlands	K. A. Allington ,,		R. S. Dalgleish ...	,, ,,	18.2.33 to 16.5.33	2.6.33
158 *†	*Elpenor* ...	Wilson, R. J.	F. Stott, A. J. Peard, W. Stanger.	D. T. Perks ...	S.	A. Holt	,, ,,	3.9.32 to 22.12.32	29.12.32
108 *†	*Elstree Grange...*	Williams, W. E. ...	P. A. Hawkesworth, W. F. Heritage.	R. Tilzey ...	M.	Houlder	,, ,,	22.1.33 to 18.4.33	24.5.33
109 *†	*El Paraguayo* ...	Owen, R.	G. Fletcher, F. Rice, R. L. Aldridge.	A. W. Brackston ,,		,, ...	,, ,,	1.11.32 to 26.12.32	31.12.32
110 *†	*El Uruguayo* ...	McNamara, T.... ...	F. E. Hailstone	N. Mackay ...	,,	,, ...	,, ,,	18.3.33 to 12.5.33	17.5.33
088 *†	*Empire Star* ...	Owen, G., R.D., Lt.-Commr., R.N.R.	R. Thorne, R. McIlraith, P. H. Hunt.	C. Castle ...	S.	Blue Star ...	,, ,,	3.12.32 to 28.2.33	3.3.33
066 ††	*Empress of Australia.*	Griffith, E., Lt.-Commr., R.N.R.	D. F. Pennington, E. Roberts, A. H. Pigott.	J. B. Butler ...	,,	Canadian Pacific	,, ,,	21.1.33 to 4.5.33	6.5.33
034 ††	*Empress of Britain.*	Latta, R. G.	J. H. Tudor, N. W. Duck, D. Dunn.	L. B. Cleary ...	,,	,, ,,	Fms. 911 & 138	23.1.33 to 1.6.33	6.6.33
							Fm. 912	23.1.33 to 1.6.33	7.6.33
154 ††	*Empress of Canada.*	Hailey, A. J., Lt.-Commr., R.N.R.	G. W. R. Graves, W. C. Halliday, F. Poole.	R. D. Thomas ...	M.L.	,, ,,	Fm. 915	23.9.32 to 10.3.33	19.5.33
153 ††	*Empress of Japan*	Douglas, L. D., R.D., Lt.-Commr., R.N.R.	R. Wolfenden	... ...	,,	,, ,,	,,	1.7.32 to 10.12.32	6.2.33
	Explorer ...	Allan, J.	A. Stout, F. O. Sheeley ...	... ...	,,	Scottish Fishery Brd.	,,	1.6.32 to 16.11.32	6.12.32
074 *†	*Fordsdale* ...	Avern, J., Commr., R.N.R.	A. W. Simms-Reeve, H. P. H. P. Last, C. Knox.	T. Holden ...	M.	Aberdeen Commonwealth.	Fms. 911 & 138	2.12.32 to 4.3.33	24.3.33
030 ††	*Franconia* ...	Townley, J. C., R.D., Capt., R.N.R.	P. G. Britten, W. B. Tanner, J. Ashcroft.	J. Harvey ...	S.	Cunard	,, ,,	10.4.33 to 12.5.33	15.5.33
159 *†	*Fresno City* ...	Davies, D.	B. E. Duffield, R. E. Shilstone, F. W. P. Davies.	E. Torr ...	M.L.	Reardon Smith ...	Fm. 915	9.12.32 to 21.4.33	2.5.33
186 ††	*Georgic* ...	Freeman, C. P., R.D., Commr., R.N.R.	J. H. Walker, S. V. Boden, J. Law.	R. S. Reid ...	S.	White Star ...	Fms. 911 & 138	27.3.33 to 27.5.33	30.5.33
234 *†	*Glaucus* ...	Leslie, G.	S. G. Ellams, F. O. Browning.	G. T. B. Pearce	M.L.	A. Holt	Fm. 915	3.10.32 to 27.1.33	3.4.33
126 *†	*Glengarry,* M.V.	Angier, J.	R. W. Brooks, P. G. Neill, S. W. Bell.	W. Harris ...	M.	Glen	Fms. 911 & 138	10.10.32 to 20.1.33	24.1.33
085 *†	*Governor* ...	Flynn, D.	A. Watson, J. Stanhope ...	G. Shaw ...	,,	Harrison ...	,, ,,	4.12.32 to 17.1.33	27.1.33
111 *†	*Hardwicke Grange*	Fowler, W. H. ...	W. L. Baker, A. O. Seyvold, W. E. Ellis.	C. O'Sullivan ...	M.	Houlder ...	,, ,,	26.9.32 to 8.3.33	13.3.33
294 *†	*Harmonides* ...	Elwell, F. R.	C. E. Avery, C. Hare, T. G. Mitchell.	F. McCarthy ...	S.	R. P. Houston	,, ,,	16.2.33 to 9.4.33	2.5.33
262 **	*Hauraki,* M.V.	Jaunay, T. L. G. ...	L. McLeish, A. McGarry, F. L. Cockrane.	S. Stafford ...	M.L.	Union S.S. Co., N.Z.	Fm. 915	13.8.32 to 20.2.33	4.5.33
253 *†	*Hertford* ...	Burton Davies, J. ...	A. V. Pearce, W. H. Timberlake, P. A. Block.	P. Maroney ...	S.	Federal ...	,,	29.12.32 to 1.5.33	13.5.33
	Hibernia ...	Bulmer, J. R. ...	R. Woodall	... ...	,,	L.M & S. Railway	Telegraphic Report 3.6.33	...	3.6.33
182 ††	*Highland Brigade*	Miles, F. R., R.D. Capt., R.N.R.	W. Wrake, C. Brown ...	G. Grieve ...	M.-S.	Royal Mail ...	Fms. 911 & 138	19.2.33 to 11.4.33	19.4.33
116 ††	*Highland Chieftain* M.V.	Simmonds, P. S. ...	J. Hey, H. Chamberlain, J. James.	J. Malcolm ...	,,	,, ...	,, ,,	26.1.33 to 21.5.33	2.6.33
099 ††	*Highland Monarch* M.V.	Clayton, R. G., D.S.C., R.D., Commr., R.N.R.	R. N. Fletcher, E. V. Scullard, R. E. Slinn.	E. J. Atkin ...	,,	,, ...	,, ,,	20.3.33 to 10.5.33	19.5.33
230 ††	*Highland Patriot*	Robinson, R. H. ...	F. W. Collinson, G. E. Leech, G. Taggart.	A. S. Hylton ...	,,	,, ...	,, ,,	8.3.33 to 23.4.33	9.5.33
250 ††	*Highland Princess* M.V.	Collings, D.	W. Paine, J. H. Fitton, A. Nicholls.	H. Morgan ...	,,	,, ...	,, ,,	9.2.33 to 27.3.33	1.4.33
075 *†	*Hobson's Bay* ...	Roberts, T. V., R.D., Commr, R.N.R.	F. L. Grose	— Porter ...	M.	Aberdeen Commonwealth.	,, ,,	24.7.32 to 19.10.32	2.11.32
026 ††	*Homeric* ...	Frank, F. A., D.S.O., R.D., Commr., R.N.R.	B. Harrison, H. Morgan, J. Waltaire.	F. A. Bradfield...	S.	White Star ...	,, ,,	9.4.33 to 30.5.33	1.6.33
261 *†	*Huntingdon* ...	Field, H. G. B. ...	C. W. Roberts, T. K. Macdonald, A. R. Rae.	A. Mugridge ...	,,	Federal ...	,, ,,	15.10.32 to 29.1.33	10.2.33
200 *†	*Huntsman* ...	Russell, H. ...	J. Richardson	J. D. Lovelock...	M.	Harrison ...	,, ,,	14.11.32 to 13.3.33	18.3.33
235 *†	*Hurunui* ...	Pretty, F. C., D.S.C. ...	R. Dunning, T. Farrar, J. C. Cordran.	C. Beadell ...	S.	New Zealand Shipping.	,, ,,	13.1.33 to 25.2.33	4.4.33
289 *†	*Inanda* ...	Gibbings, W. H. ...	D. C. Brown, R. L. Williams, J. Haycocks.	E. J. Cook ...	M.	Harrison ...	,, ,,	5.3.33 to 11.4.33	18.4.33
	Ingoma	Richardson, P. ...	D. D. Kerr	... ...	,,	,, ...	Fm. 911	5.2.33 to 9.5.33	16.5.33
160 *†	*Ixion* ...	Davis, A. L.	F. C. Oppen, W. D. Smith, K. Higson.	A. E. Morgan ...	M.L.	A. Holt	Fm. 915	24.8.32 to 10.2.33	13.4.33
226 *†	*Javanese Prince,* M.V.	Smith, J.	W. M. Henry, V. C. Palmer, E. S. Oberdorf.	F. Compton ...	M.L.	Prince	,,	7.10.32 to 23.2.33	13.4.33
188 ††	*Kaisar-i-Hind* ...	Cotching, W. A. ...	J. Travis, F. M. Squire, J. K. Wright.	R. V. McCreath	M.-S.	P. & O.	Fms. 911 & 138	18.2.33 to 6.4.33	11.4.33
041 *†	*Karamea,* M.V.	Dawson, W.	H. A. Hill, N. S. Milne, C. W. Senoall.	T. Cheevers ...	S.	Shaw, Savill & Albion.	Fm. 915	23.9.32 to 19.1.33	23.1.33
217 *†	*Karapara* ...	White, R. W.	C. Jackman, H. Pearson, W. H. Williams.	L. C. Cox ...	M.	British India ...	Fms. 911 & 138	24.12.32 to 8.5.33	29.5.33
	Kemmendine ...	Plage, W. C. C. ...	J. H. Wilson	... ...	,,	Henderson ...	Fm. 911	3.12.32 to 15.2.33	3.3.33

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 9.3.33 to 7.6.33.	Date Last Return Received
114 *† *Kenya* ...	Fitzherbert, D. C. ...	G. E. Stephenson, P. Lusher, J. C. W. Hiffe.	G. E. Ellison ...	M.	British India ...	Fms. 911 & 138 26.1.33 to 5.5.33	6.6.33
218 *† *Khandalla* ...	Bannehr, V. O. ...	H. F. Stott, P. G. Sims, T. E. Evans.	T. W. Tynan ...	,,	,, ,, ...	,, ,, 10.12.32 to 27.3.33	18.4.33
147 †† *Laconia* ...	Hawkes, W. A., R.D., Capt., R.N.R.	J. D. Archer, M. Boston, G. Noonan.	W. McArdle ...	S.	Cunard	,, ,, 1.5.33 to 20.5.33	24.5.33
193 *† *Lahore*	Hollow, J. H.	J. G. K. Gregory, F. Hull, W. H. Prentice.	L. Arnold ...	M.	P. & O.	,, ,, 27.11.32 to 18.2.33	21.2.33
167 †† *Lancastria* ...	Dolphin, G. R., R.D., Commr., R.N.R.	R. V. Youd, D. M. Maclean, J. C. Dawsons.	R. M. Shore ...	S.	Cunard	,, ,, 4.4.33 to 1.6.33	7.6.33
082 *† *La Paz*, M.V. ...	Hough, R. J. ...	G. Pattison, R. Roberts, S. E. Ayland.	A. B. Carr ...	M.	Pacific S.N. Co.	,, ,, 1.11.32 to 21.2.33	1.3.33
134 †† *Lapland* ...	Harvey. H, ...	F. Good, —. Wood, W. A. Fletcher.	... ...	S.	Red Star ...	,, ,, 1.5.32 to 26.6.32	25.6.32
076 *† *Largs Bay* ...	Jermyn, W. M. ...	H. M. Howe, C. W. Tombs ...	S. P. Lewis ...	M.	Aberdeen Commonwealth.	,, ,, 14.10.32 to 15.1.33	7.2.33
112 *† *La Rosarina* ...	Webb, C.	W. S. Hamblin, T. C. Townsend, S. W. Howell.	J. Hunt ...	,,	Houlder	,, ,, 19.2.33 to 14.4.33	20.4.33
267 *† *Lassell*	Lindesay, J. M. ...	T. J. Sweeney, W. Gillespie, A. N. Blundell.	P. Haslam ...	S.	Lamport & Holt	,, ,, 1.1.33 to 8.4.33	12.4.33
064 †† *Laurentic* ...	Bate, C. H. R. Capt., R.N.R.	J. Dray, W. Nicholl, D. S. A. Hewett.	W. Davies ...	,,	White Star ...	,, ,, 29.4.33 to 20.5.33	22.5.33
083 *† *Lautaro*, M.V. ...	Kirkwood, J. H. ...	J. Williams, G. B. Wardale	D. Irwin ...	M.	Pacific S.N. Co....	,, ,, 22.2.33 to 19.4.33	22.4.33
254 *† *Limerick* ...	Molyneux, P. L. ...	J. Trotter, N. A. Thomas ...	E. K. Roberts ...	,,	Federal	,, ,, 8.10.32 to 13.11.32	28.11.32
093 *† *Llandaff Castle*...	Le Brocq, C.	J. E. R. Wilford	G. S. Lewis ...	S.	Union Castle ...	,, ,, 26.1.33 to 3.4.33	7.4.33
097 †† *Llangibby Castle*, M.V.	Linklater, H.	G. W. Lloyd	J. Gilbert ...	,,	,, ,, ...	,, ,, 13.3.33 to 17.3.33	22.5.33
094 *† *Llandovery Castle*	Morgan, A. O., R.D., Commr., R.N.R.	T. C. Goldstone, R. D. Cambridge, H. S. Warren.	A. E. Hunter ...	,,	,, ,, ...	,, ,, 28.3.33 to 28.5.33	6.7.33
216 *† *Llanstephan Castle*	Bickford, C. N. ...	S. S. Smith, W. F. Smuts ...	H. Langshaw ...	,,	,, ,, ...	,, ,, 19.2.33 to 15.4.33	27.4.33
084 *† *Lobos*, M.V. ...	Good, W. T.	E. F. Potter, E. C. Hicks ...	R. W. Currie ...	M.	Pacific S.N. Co....	,, ,, 7.2.33 to 3.3.33	9.3.33
137 *† *Logician* ...	Herschel, R. J. ...	E. L. Stockley, W. Moore, W. R. Mackenzie.	W. T. Sharpe ...	,,	Harrison ...	,, ,, 19.3.33 to 29.5.33	31.5.33
008 *† *Losada*, M.V. ...	Ridyard, A.	L. W. Hutchinson	G. McArthur ...	,,	Pacific S.N. Co....	,, ,, 4.4.33 to 26.4.33	20.5.33
232 *† *Madura* ...	Wright, J. A.	R. H. O'neil, R. T. Walton ...	H. O. Francis ...	M.	British India ...	Fms. 911 & 138 24.2.33 to 11.5.33	2.6.33
078 *† *Magician* ...	Bury, E. R.	W. E. Shotton, R. F. Hart ...	J. Whitfield ...	,,	Harrison ...	,, ,, 12.2.33 to 1.3.33	6.3.33
141 *† *Mahia*	Andrews, C. M. ...	C. C. Good, M. P. Congdon, J. Jackson.	C. D. White ...	S.	Shaw, Savill & Albion.	,, ,, 11.11.32 to 8.3.33	14.3.33
140 *† *Mahratta* ...	Adamson, F. L. ...	T. C. Eddy, H. F. Scoins, W. J. Wilson.	H. Henshaw ...	M.	Brocklebank ...	,, ,, 11.4.33 to 2.5.33	29.5.33
014 *† *Mahronda* ...	Hanna, P. G.	W. Le Brocq, M. Melville, H. Willington.	W. Pitch ...	,,	,, ...	,, ,, 13.3.33 to 12.4.33	8.5.33
242 *† *Mahseer* ...	Tyson, T. A.	J. W. Robertson, R. Humble, J. Henshaw.	... ...	,,	,, ...	,, ,, 26.11.32 to 13.2.33	22.2.33
015 *† *Mahsud* ...	Kershaw, R. W. ...	H. Gillespie, J. R. Paisley, C. A. Jackson.	G. D. Plant ...	,,	,, ...	,, ,, 3.1.33 to 27.4.33	1.5.33
042 *† *Maimoa* ...	Thurston, H. P. ...	J. A. McNab.	C. Barrett ...	S.	Shaw, Savill & Albion.	,, ,, 15.12.32 to 4.4.33	1.5.33
054 †† *Majestic* ...	Trant, E. L., R.D., Commr., R.N.R.	R. B. O'Brien, E. A. Stuart, T. Thompson.	J. R. Jacobs ...	,,	White Star ...	,, ,, 17.3.33 to 1.6.33	6.6.33
018 *† *Makalla* ...	Maughan, D. W. ...	A. C. Hocking, J. Richardson	B. J. Smith ...	M.	Brocklebank ...	,, ,, 3.3.33 to 1.4.33	4.4.33
225 ** *Makura* ...	Martin, W.	A. P. Cousin, L. P. Bourke, F. S. Bowman.	E. J. Gough ...	M.L.	Canadian-Australasian	Fm. 915 7.7.32 to 22.10.32	15.12.32
236 ** *Malayan Prince*	Halloway, J.	R. M. Dennis, G. P. Freeman, C. H. Dunford.	F. W. Williams...	,,	Prince	,, 28.6.32 to 4.12.32	23.1.33
219 *† *Malda*	Maples, S. H.	D. Macfadyen, P. Morley, L. A. Wintle.	L. Hugo ...	M.	British India ...	Fms. 911 & 138 24.9.32 to 15.12.32	22.12.32
195 †† *Maloja*	Browning, J. B., R.D., Commr., R.N.R.	J. D. Green, G. R. Peters, D. Buckle.	P. T. Darby ...	M.-S.	P. & O.	,, ,, 15.1.33 to 19.4.33	22.4.33
Manchester Brigade	Stott, G. H.	... ...	... ...	M.L.	Manchester Liners	... ...	...
146 *† *Mandasor* ...	Owen, L. T.	F. C. Madden, J. B. Leigh,	R. H. Jones ...	M.	Brocklebank ...	Fms. 911 & 138 11.2.33 to 27.4.33	5.5.33
Manela	Gilchrist, J. W. ...	A. A. Kay, D. W. Speirs, S. S. Styles.	A. T. Naylor ...	,,	British India ...	,, ,, 14.1.33 to 29.3.33	4.4.33
177 *† *Mantola* ...	James, D. F.	W. R. Day, S. Henderson, C. R. B. Mumford.	J. A. Vallance ...	,,	,, ,, ...	,, ,, 22.12.32 to 6.3.33	15.3.33
197 †† *Mantua* ...	Legg, J.	J. Heath	... ...	M.-S.	P. & O.	,, ,, 30.4.33 to 11.5.33	29.5.33
222 †† *Margha* ...	Kitson, G. A.	J. Small, P. Wright, P. Vaughan.	C. Harris ...	S.	British India ...	,, ,, 13.12.32 to 29.2.32	3.3.33
104 *† *Marquesa* ...	Stephenson, F.	J. Wetherall	P. Norwood ...	M.	Furness Houlder	,, ,, 27.2.33 to 4.5.33	8.5.33
299 †† *Mashobra* ...	Patterson, L. D. ...	W. D. L. Reves, A. J. Woodcock.	R. James ...	M.-S.	British India ...	,, ,, 6.3.33 to 25.5.33	31.5.33
021 *† *Masula*	Brady, E. H	T. Hodgkinson, L. West, C. Elson.	E. Green ...	M.	,, ,, ...	,, ,, 6.3.33 to 16.5.33	22.5.33
251 *† *Matakana* ...	West, W. G.	A. G. Collins, H. Thompson, A. Warren.	M. Griffen ...	S.	Shaw, Savill & Albion	,, ,, 5.1.33 to 15.2.33	11.5.33
221 †† *Mataroa* ...	Gaskell, J. H., R.D., Lt. Commr., R.N.R.	D. N. MacGregor, L. R. Bull, W. Hill.	G. H. Tuck ...	M.L.	,, ,, ,,	Fm. 915 7.10.32 to 16.1.33	20.1.33
023 *† *Matheran* ...	Fulcher, H. D.... ...	C. Shore, R. Penton, H. Kelly	A. Ryland ...	M.	Brocklebank ...	Fms. 911 & 138 27.3.33 to 26.4.33	22.5.33
223 *† *Matiana* ...	Green, F. V.	J. S. Thomson, W. F. Solly, J. Wills.	H. O. Wilson ...	,,	British India ...	,, ,, 12.3.33 to 17.4.33	26.5.33
024 *† *Matra*	Cornish, N. P.	G. Shaw, W. Robertson, G. Henshaw.	H. Parsons ...	,,	Brocklebank ...	,, ,, 22.11.32 to 30.3.33	4.4.33
032 †† *Mauretania* ...	Peel, R. V., R.D., Capt., R.N.R.	R. H. C. Crawford, E. W. Connell, L. R. Sharpe.	A. H. Farman ...	S.	Cunard	,, ,, 4.9.32 to 9.10.32	11.10.32
Melita	Coyle, W. B., R.D., Commr., R.N.R.	... ...	... ...	M.-S.	Canadian Pacific	... ...	...
278 *† *Middlesex* ...	Almond, J. G.	F. Bishop, J. R. Ricketts, E. G. Williams.	E. Lawrence ...	S.	Federal	Fms. 911 & 138 5.2.33 to 20.5.33	26.5.33
138 †† *Minnetonka* ...	Gates, T. F., C.B.E., ...	H. E. D. McCartney, W. S. Harrison, T. W. Pullan.	C. Forbes ...	M.-S.	Atlantic Transport	,, ,, 16.4.33 to 22.5.33 Fm. 912 16.4.33 to 3.6.33	7.6.33 6.6.33
203 †† *Minnewaska* ...	Claret, F. H., O.B.E., R.D., R.N.R.	H. L. Forster, C. D. Davis, E. Pengelly.	... ...	,,	,, ,,	,, ...	...
194 †† *Moldavia* ...	Allin, C. H. C.	J. K. Crone, E. J. Kerridge, W. H. Wood-Roe.	K. G. Barber ...	,,	P. & O.	Fms. 911 & 138 13.8.32 to 18.4.33	17.6.33
199 †† *Mongolia* ...	Rhodes, H. R. ...	H. C. Slinn, G. K. Fox, H. M. Flint.	A. Morris ...	,,	,, ...	,, ,, 13.1.33 to 24.5.33	27.5.33
148 †† *Montcalm* ...	Rothwell, A.	F. W. Roberts	J. Biggins ...	,,	Canadian Pacific	,, ,, 19.2.33 to 25.5.33 Fm. 912 19.2.33 to 25.5.33	2.6.33 2.6.33

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 9.3.33 to 7.6.33.		Date Last Return Received.
149	†† *Montclare* ...	Turnbull, J., C.B.E., R.D., Capt., R.N.R.	J. Soames, W. E. Bacon, J. R. Bubb.	A. G. Hill ...	M.-S.	Canadian Pacific	Fms. 911 & 138	12.3.33 to 1.6.33	6.6.33
150	†† *Montrose* ...	McCombie, G. F., R.D., R.N.R.	A. C. Harrison, K. Hutchings	S. Hewitt ...	,,	,, ,,	,, ,,	14.4.33 to 18.5.33	2.6.33
164	†† *Mooltan*... ...	Morton, A. J.	J. M. Sinclair, A. D. Dennis, N. Thompson.	J. E. Marsh ...	,,	P. & O.	Fm. 912	14.4.33 to 26.5.33	2.6.33
196	†† *Mulbera*... ...	Parkin, J. W.	N. T. Smith, P. M. Wilson, E. J. Studart.	C. H. Brett ...	,,	British India ...	Fms. 911 & 138	12.2.33 to 17.5.33	20.5.33
							,, ,,	16.2.33 to 26.4.33	2.5.33
073	*† *Nagara*	Falconer, A. C. ...	F. B. Collinson	W. Guthrie ...	M.	Royal Mail ...	Fms. 911 & 138	14.7.32 to 8.9.32	12.9.32
201	†† *Naldera* ...	Harrison, R., D.S.O., R.D., A.D.C., Capt. R.N.R.	E. J. R. North, R. D. W. Mackay, E. V. Lewis.	R. T. Soans ...	S.	P. & O.	,, ,,	31.12.32 to 5.4.33	15.5.33
291	*† *Nankin*	Skinner, M. B.... ...	H. Colvin, F. G. Harvey, G. Aspinall.	... ...	M.L.	Eastern and Australian.	Fm. 915	11.11.32 to 23.1.33	12.4.33
227	*† *Nardana* ...	Reilly, J. V.	T. Warland, H. Goater, A. Woodward.	R. Rawcliffe ...	M.	British India ...	Fms. 911 & 138	25.12.32 to 12.5.33	26.5.33
202	†† *Narkunda* ...	Sudell, F., R.D., Commr., R.N.R.	J. W. Young, G. Randall, G. Copeland.	W. Banbery ...	M.-S.	P. & O.	,, ,,	12.3.33 to 10.4.33	22.5.33
	Nascopie ...	Smellie, T. F.	T. O. Jost	... ...	S.	Hudson Bay Co.	... ...	... ...	...
286	*† *Natia*	Weller, S.	G. H. Gammon, C. C. Prosser, M. A. Murch.	J. Durrant ...	M.	Royal Mail ...	Fms. 911 & 138	4.2.33 to 27.3.33	4.4.33
027	*† *Nebraska* ...	Davies, B. J.	P. R. Cocks, G. B. Medlycott, G. Shearer.	D. De Witt ...	,,	,, ...	,, ,,	24.1.33 to 17.4.33	22.4.33
288	*† *Nellore*	Bright, H. A.	... ...	... ...	M.L.	Eastern and Australian.	... ...	... ...	...
	Nerbudda ...	Parker, A. A.	F. D. Copeland	... ...	M	British India ...	... ...	... ...	...
162	*† *Nestor*	Adcock, F.	A. V. Potter, P. Elder, W. Pearse.	C. F. Townsend	S.	A. Holt	Fms. 911 & 138	7.1.33 to 4.5.33	10.5.33
210	** *Niagara*... ...	Hill, T. V.	R. N. Turner, D. A. Menlove, J. Billingham.	C. F. G. Taylor	M.L.	Canadian-Australasian.	Fm. 915	15.9.32 to 27.1.33	4.5.33
256	*† *Norfolk*	McNish, R. L. H., D.S.O., Lt.-Commr., R.N.R.	E. A. Quick, G. D. Lyver, G. E. Mason.	B. G. Wheeler ...	,,	Federal	,,	20.8.32 to 10.1.33	14.1.33
297	*† *Northumberland*	Upton, H. L., D.S.C., R.D., Commr., R.N.R.	A. W. Marshall, H. I. Phillips, C. B. Cathie.	M. Savage ...	,,	,, ...	,,	25.11.32 to 12.3.33	16.3.33
231	*† *Nuddea* ...	Cockburn, M.	H. Stewart, D. A. Jones, B. Emmerson.	A. Wells ...	M.	British India ...	Fm. 912 Fms. 911 & 138	3.2.33 to 19.2.33 2.12.32 to 9.5.33	27.3.33 6.6.33
	Observer ...	Lowe, J.	J. Harnden, W. J. Wearing, G. Greaves.	... ...	M.	Harrison ...	Fm. 911	9.2.33 to 25.4.3	27.4.33
004	†† *Olympic* ...	Binks, J. W., R.D., Lt.-Commr., R.N.R.	W. Tugwell, G. Brooks, M. Morfee.	W. Clarke ...	S.	White Star ...	Fms. 911 & 138	3.3.33 to 18.5.33	20.5.33
243	*† *Opawa*, M.V. ...	Robinson, F. W. ...	H. D. Horwood, H. P. Williamson, R. H. Chapman.	F. W. Fowler ...	M.	New Zealand Shipping.	,, ,,	23.1.33 to 15.5.33	20.5.33
170	†† *Orama*	Cameron, E. P., R.D., Capt., R.N.R.	C. H. Denton, L. Sly, W. L. Mackay.	J. Willson ...	S.	Orient	Fm. 912 Fms. 911 & 138	23.1.33 to 15.5.33 20.2.33 to 23.5.33	20.5.33 31.5.33
080	*† *Orari*	Ashworth, F. ...	M. Johnson, J. H. Underwood, C. R. Brown.	W. E. Fordham	M.	New Zealand Shipping.	Fm. 911	6.8.32 to 14.12.32	24.1.33
087	†† *Orduna*	Galloway, M.	F. W. Hockey, W. Vickers, R. Eckford.	T. Tarlton ...	M.-S.	Pacific S.N. Co.	Fms. 911 & 138	5.2.33 to 16.4.33	18.4.33
171	†† *Orford*	Owens, A. L., R.D., Capt., R.N.R.	R. J. Galpin, K. M. Morrison, P Sargent.	H. Cheese ...	,,	Orient	,, ,,	25.1.33 to 4.5.33	6.5.33
174	†† *Ormonde* ...	James, L. V., D.S.C.	T. L. Shurrock	... ...	S.	,, ...	,, ,,	21.8.32 to 14.3.33	23.3.33
172	†† *Oronsay* ...	Matheson, C. G., D.S.O., R.D., Capt., R.N.R.	C. W. Pinckney, O. C. Davies, E. M. Mackay.	B. Baxter ...	,,	,, ...	,, ,,	13.11.32 to 15.2.33	23.2.33
173	†† *Orontes* ...	O'Sullevan, F. R. ...	F. S. Gray, J. M. Swanson, W. L. Mackay.	S. G. Boons ...	M.-S.	,, ...	,, ,,	23.1.33 to 25.4.33	3.5.33
105	†† *Orsova* ...	Sarson, M. J.	J. L. Skilling, J. D. Birch, E. V. Bilger.	R. Knights ...	S.	,, ...	,, ,,	6.2.33 to 9.5.33	18.5.33
206	*† *Otira*	Johnson, J. W. ...	A. J. Turnbull, K. Miller, D. Campbell.	G. Walters ...	M.	Shaw, Savill & Albion.	,, ,,	9.7.32 to 4.11.32	21.11.32
156	†† *Otranto* ...	Staunton, H. G., C.B.E., R.D., Commr., R.N.R	F. G. Addison, J. H. Stevenson, C. R. Grandage.	H. Curry ...	M.-S.	Orient	,, ,,	8.1.33 to 11.4.33	19.4.33
051	*† *Pacific Enterprise*	Newman, G. W. A. ...	S. C. White	D. Evans ...	S.	Furness Withy ...	Fms. 911 & 138	27.1.33 to 19.4.33	15.5.33
279	*† *Pacific Exporter*	Holland, C. E., R.D., Commr., R.N.R.	W. Edmonds	C. North ...	,,	,, ,, ...	,, ,,	5.11.32 to 25.1.33	1.3.33
	Paris	Shaw, B.	E. Hill	D. Smith ...	,,	Southern Rly. ...	Telegraphic Report. 29.5.33 ...		29.5.33
	Patrician ...	Lowe, J.	S. Diamond, W. E. Williams	... ...	M.	Harrison ...	Fm. 911	30.10.32 to 11.5.33	17.5.33
058	†† *Pennland* ...	Moorhouse, W. A. ...	W. A. Fletcher, G. L. Bayle, J. R. Loe.	R. Hammond ...	S.	Red Star	Fms. 911 & 138 Fm. 912	12.3.33 to 27.5.33 12.3.33 to 27.5.33	29.5.33 29.5.33
204	*† *Peshawur* ...	Biggs, J. H.	C. J. Triscott, G. V. Legassick, J. H. Andeson.	S. J. Evans ...	M.	P. & O.	Fms. 911 & 138	10.4.33 to 19.4.33	27.4.33
238	*† *Piako*	Aslin, E. P. C. ...	A. E. Williams, C. A. Cremin, J. F. Clement.	L. H. Leggett	M.	New Zealand Shipping.	Fms. 911 & 138	14.7.32 to 16.11.32	28.11.32
039	*† *Planter* ...	Ling, J. T.	J. C. Sinclair, F. R. Hill ...	J. F. Jackson ...	,,	Harrison ...	,, ,,	23.1.33 to 24.4.33	28.4.33
040	*† *Port Adelaide* ...	Williams, R.	D. F. Morgan, R. Bettess, D. Henderson.	H. Amott ...	S.	Commonwealth & Dominion.	,, ,,	2.1.33 to 8.5.33	30.5.33
255	*† *Port Alma* ...	Hayter, S. W.	E. E. Roswell, E. Wheeler, H. B. Walker.	G. J. Price ...	,,	,, ,, ,,	,, ,,	22.1.33 to 25.2.33	15.3.33
128	*† *Port Auckland* ...	Robinson, C. A. ...	G. C. Langford, A. Brown, W. Henderson.	E. Wrightson ...	,,	,, ,, ,,	Fm. 915	28.8.32 to 18.12.32	10.1.33
268	*† *Port Bowen* ...	Brown, A. H.	E. N. Howard	... ...	,,	,, ,, ,,	Fms. 911 & 138	18.12.32 to 6.5.33	25.5.33
130	*† *Port Caroline* ...	Hearn, G. W.	E. W. R. Young, L. E. Craven, V. N. Ford.	G. F. Price ...	,,	,, ,, ,,	,, ,,	18.11.32 to 16.3.33	21.3.33
131	*† *Port Darwin* ...	Hudson, J. J.	K. D. Morgan, G. W. Horton, L. B. Philpotts.	C. A. Wells ...	,,	,, ,, ,,	, ,,	5.9.32 to 29.12.32	23.1.33
	Port Denison ...	Hall, G. S.	R. S. Holloway, F. N. Rogers, L. Walton.	W. Gruthie ...	,,	,, ,, ,,	Fm. 915	31.10.32 to 22.3.33	13.4.33
133	*† *Port Dunedin*, M.V.	Mason, W. S., D.S.C. ...	G. Lovegrove, H. Duckling, C. Hodson.	T. T. Matthews...	M.L.	,, ,, ,,	,,	4.2.33 to 20.5.33	29.5.33

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 9.3.33 to 7.6.33.		Date Last Return Received.
010 *† *Port Fremantle*, M.V.	Gilling, W.	H. M. Post, G. F. Parnett C. J. Gorley.	H. West ...	M.L.	Commonwealth and Dominion	Fm. 915	30.9.32 to 19.1.33	25.1.32
176 *† *Port Gisborne*, M.V.	Higgs, W. G.	R. B. Linklater, N. Muzzell, D. Watson.	H. Olding ...	S.	,, ,, ,,	,,	7.1.33 to 30.4.33	2.5.33
135 *† *Port Hunter* ...	Durham, R. S., D.S.C.	G. T. C. Harris, C. R. Townshend, P. A. Mundy.	W. A. Bassom	M.L.	,, ,, ,,	Fm. 912	7.1.33 to 30.4.33	3.5.33
129 *† *Port Wellington*	Hazlewood, H. W. ...	A. T. C. Cooper, P. H. Pedrick, R. E. Garner.	R. T. A. Hawker	S.	,, ,, ,,	Fms. 911 & 138	1.12.32 to 30.3.33	6.4.33
106 *† *Princesa* ...	Friend, A. B.	E. Lougheed, O. S. Sheard, F. Poulson.	R. Shackleton ...	M.	Houlder	Fm. 911	12.7.32 to 17.8.32	19.9.32
163 *† *Protesilaus* ...	Williams, J. P. ...	W. Dods, A. Anderson, A. S. Brotherton.	F. C. Wall ...	M.L.	A. Holt	Fms. 911 & 138	2.4.33 to 27.5.33	6.6.33
						Fm. 915	5.5.32 to 11.10.32	3.12.32
205 †† *Rajputana* ...	Headlam, P. C., R.D., Commr., R.N.R.	B. N. Nankivell, D. C. Swabey, K. W. Richardson.	A. F. Edwards...	M.-S.	P. & O.	Fms. 911 & 138	28.12.32 to 25.5.33	29.5.33
063 *† *Rancher*... ...	McCullum, J.	D. Bryant, G. Harvey, A. O. Lewis.	R. C. Law ...	M.	Harrison ...	,, ,,	20.2.33 to 9.5.33	12.5.33
228 †† *Ranchi*	Hignett, A. H., R.D., Commr., R.N.R.	J. Paice, J. P. McArthur, C. B. Holmes.	H. S. Horn ...	M.-S.	P. & O.	,, ,,	5.3.33 to 31.5.33	6.6.33
224 †† *Rangitane* ...	Mackellar, A. W., R.D., Capt., R.N.R.	R. C. Aldridge, C. J. Guille, S. R. Leggett.	W. Smith ...	,,	New Zealand Shipping	,, ,,	11.2.33 to 15.5.33	20.5.33
257 †† *Rangitata*, M.V.	Hunter, J. L. B. ...	L. Griffiths, J. Clarke, A. Brown.	C. E. Terry ...	,,	,, ,, ,,	,, ,,	19.11.32 to 23.2.33	11.3.33
240 †† *Rangitiki*, M.V.	Barnett, H.	L. F. Malcouronne, T. E. Davies, F. S. Marchington.	L. V. Horn ...	,,	,, ,, ,,	,, ,,	15.1.33 to 16.4.33	25.4.33
207 †† *Ranpura* ...	Furlong, G. H. S., R.D., Capt. R.N.R.	G. Maclean, G. F. O'Bryen.	G. W. Bailey ...	,,	P. & O.	,, ,,	5.2.33 to 10.5.33	20.5.33
071 †† *Rawalpindi* ...	Stringer, R. H., O.B.E., R.D., Commr., R.N.R.	E. C. White, R. A. Perry, E. G. May.	J. D. Roll ...	,,	,, ...	,, ,,	1.1.33 to 27.4.33	10.5.33
247 *† *Recorder* ...	Egerton, J. J.	A. S. Milne, H. C. Blyth, A. Robertson.	A. Gregg ...	M.	Harrison ...	,, ,,	29.1.33 to 30.3.33	12.4.33
132 *† *Reina del Pacifico*, M.V.	Ross, J....	R. Bridson, J. K. Campbell, P. H. Ray.	S. W. Mitchell...	,,	Pacific S.N. Co....	,, ,,	23.1.33 to 24.3.33	3.4.33
239 *† *Remuera* ...	Holland, E. A.... ...	H. Hill, D. H. Clegg, R. C. Robinson.	H. Dedman ...	M.L.	New Zealand Shipping	Fm. 915	17.12.32 to 27.3.33	4.4.33
Rhexenor ...	Holden. W. R. F. ...	G. Edge	... ...	,,	A. Holt	Fm. 911	23.12.32 to 8.3.33	8.5.33
189 *† *Rother*	Woodhead, T. H. ...	H. Robinson, A. Hiley ...	P. Hornby ...	S.	Goole Steam Shipping	Fms. 911 & 138	4.3.33 to 22.4.33	25.4.33
053 *† *Rotorua* ...	Lamb, C. B.	S. C. Hoeart, W. J. Glassborow, H. Hastings.	E. Lawrence ...	M.L.	New Zealand Shipping	Fm. 915	26.12.32 to 17.4.33	22.4.33
246 *† *Ruahine* ...	Kinnell, G.	A. Hocken, R. Warren, L. Mercer.	F. G. Bedford ...	,,	,, ,, ,,	,,	23.10.32 to 13.2.33	18.2.33
St. Helier ...	Pitman, R.	H. D. Freeman	... ...	S.	G.W. Railway ...	Telegraphic Report	6.6.33	6.6.33
St. Julien ...	Richardson, L.... ...	H. O. Freeman, T. E. Martin	... ...	,,	,, ,, ...	,,	27.5.33	27.5.33
St. Minver, S.T.	Hatton, A.	... ...	... ...	A.	Bunch Steam Fishing Co.	Fm. 911	4.12.32 to 13.12.32	16.12.32
St. Patrick ...	Sanderson, C. W. ...	T. D. Thomas	... ...	S.	G.W. Railway ...	Telegraphic Report	13.7.32	13.7.32
038 †† *Samaria* ...	Malin, R. G., Lt.-Commr., R.N.R.	E. Gleave, F. P. Collins, J. F. Drake.	H. Booine ...	,,	Cunard ...	Fms. 911 & 138	27.2.33 to 18.3.33	23.3.33
Scotia	Hughes,W.	W. H. Hughes	... ...	,,	L.M. & S. Railway	Telegraphic Report	5.6.33	5.6.33
033 †† *Scythia*	Oram, B. B., R.D., Commr., R.N.R.	W. M. Stewart, A. Bridgewater A. B. Fasting.	F. H. Williams...	,,	Cunard ...	Fms. 911 & 138	20.2.33 to 6.5.33	15.5.33
211 *† *Shropshire*, M.V.	English, G. L.	D. Hetherington, J. D. Minton, G. W. Dobson.	D. McLellan ...	,,	Bibby	,, ,,	5.3.33 to 4.5.33	15.5.33
121 *† *Siamese Prince*, M.V.	Jones, E. E.	J. P. Wedgwood, R. A. Brock	A. N. Simpson...	M.L.	Prince	Fm. 915	25.8.32 to 18.1.33	3.4.33
Somerset ...	Pilcher, C. R.	D. Hughes, H. M. Knight, J. N. A. Low.	A. E. Howard ...	S.	Federal	,,	17.2.33 to 29.5.33	7.6.33
277 *† *Spero*	Montgomery, H. ...	H. D. Vickers, A. Kirk ...	H. V. Chamberlain.	M.L.	Ellerman Wilson	,,	10.9.32 to 8.1.33	12.1.33
Stephen ...	Jones, W. C. H., R.D., Commr., R.N.R.	A. Allan, R. D. Thomas, J. H. Stoker.	... ...	,,	Booth	,,	16.9.32 to 5.2.33	3.3.33
270 †† *Strathaird* ...	Townshend, W. P., R.D., Capt., R.N.R.	R. H. Hand, H. Fitzmarshall, L. T. Brown.	F. W. Helm ...	M.-S.	P. & O.	Fms. 911 & 138	25.2.33 to 1.6.33	2.6.33
044 *† *Tacoma City* ...	Paul, H.	H. T. Thomas, T. J. Paull, J. L. Barry.	R. Lea	M.L.	Reardon Smith...	Fm. 915	3.9.32 to 12.12.32	20.12.32
Tacoma Star ...	Williams, T.	... ...	... ...	S.	Blue Star ...	... ...	... ...	...
229 *† *Tactician* ...	Trinick, F., O.B.E. ...	A. Frew, S. Leyland, L. G. Sharman.	J. Bunbury ...	M.	Harrison ...	Fms. 911 & 138	3.10.32 to 18.12.32	26.12.32
045 †† *Tainui*	McIntosh, A.	P. Campbell, H. Winyard, D. Pickersgill.	A. Bloxham ...	M.L.	Shaw, Savill & Albion	Fm. 915	28.1.33 to 15.5.33	23.5.33
081 *† *Tairoa*	Oswald, S.	G. L. Almond, W. Thowless, L. B. Miller.	P. McKinley ...	S.	,, ,, ,,	Fms. 911 & 138	27.11.32 to 20.3.33	29.3.33
046 †† *Tamaroa* ...	Williams, G.	R. S. Pearce, R. H. Jones, A. S. Masters.	A. Lund ...	M.-S.	,, ,, ,,	,, ,,	19.12.32 to 12.3.33	28.3.33
264 ** *Tanda*	Pilcher, E. T., Lt.-Commr., R.N.R.	C. Stratford, G. Chadwick Smith, A. Wilcox.	W. Harris ...	M.L.	E. & A. S.S. Co....	Fm. 915	24.6.32 to 12.12.32	8.2.33
165 *† *Tantalus*, M.V....	Melling, C. F.	E. Saville, W. B. Hailstone, L. A. Munday.	J. Clarkson ...	S.	A. Holt	Fms. 911 & 138	11.3.33 to 3.4.33	24.4.33
047 *† *Taranaki*, M.V.	Johnson, —	B. M. Norris, C. Stewart. H. N. Lawson.	A. A. Grundy ...	,,	Shaw, Savill & Albion.	,, ,,	26.1.33 to 1.3.33	8.3.33
020 *† *Tasmania* ...	Williams, J. W. ...	... ...	... ...	,,	New Zealand Shipping	Fm. 911	16.7.32 to 25.1.33	8.2.33
069 *† *Tekoa*	Price, J. H.	R. Belfield, C. W. Fulcher, A. B. Goord.	F. Gardiner ...	M.	,, ,,	Fms. 911 & 138	30.7.32 to 29.11.32	14.12.33
048 †† *Themistocles* ...	Wood, C., D.S.C. ...	J. G. Allen, L. J. Hopkins, G. Sangwin.	W. G. Sutherland	M.-S.	Aberdeen Commonwealth	,, ,,	27.11.32 to 23.3.33	28.3.33
007 *† *Thistleglen* ...	Whitfield, G. A., O.B.E.	G. L. Hetherington, H. R. Mock, J. Mallum.	J. Keohane ...	M.	Allan Black & Co.	,, ,,	10.10.32 to 13.1.33	26.1.33

Name of Vessel.	Captain	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Line.	Logs, Registers, or Records Contributed. 9.3.33 to 7.6.33.	Date Last Return Received.
161 *† *Titan*	Rundle, G. G. ...	G. Roberts, E. Butler, G. Alder.	J. H. Nightingale	S.	A. Holt	Fms. 911 & 138 9.2.33 to 1.5.33	10.5.33
244 *† *Tongariro* ...	Hamilton, F. S. ...	G. D. Baldwin, J. Pring, H. Dawson.	E. G. Stride ...	,,	New Zealand Shipping.	Fm. 915 24.10.32 to 18.3.33	28.3.33
025 †† *Transylvania* ...	Bone, D. W.	J. O. Dunn, J. A. Lefevre, A. Middleton.	J. McDonald ...	,,	Anchor	Fms. 911 & 138 2.4.33 to 28.5.33	31.5.33
119 *† *Trojan Star* ...	Mills, D. H.	T. Gilchrist, E. R. Pearce, G. Wooler.	R. L. Baker ...	M.	Blue Star ...	,, ,, 12.2.33 to 27.3.33	15.5.33
245 *† *Turakina* ...	Laird, J.	C. Edgcombe, H. G. Letts, J. Reeve.	N. Hallett ...	M.L.	New Zealand Shipping.	,, ,, 12.3.33 to 5.1.33	22.4.33
276 †† *Tuscania* ...	Rome, W. B. ...	J. Noble, G. Squires, D. Wood.	J. Reid	S.	Anchor	,, ,, 1.3.33 to 17.4.33	19.4.33
113 *† *Upwey Grange*, M.V.	Goodrick, H. P. ...	A. Bradbury, G. T. Hurst, P. J. Walker.	H. Shaw ...	M.	Houlder ...	Fms. 911 & 138 15.2.33 to 17.4.33	22.4.33
274 †† *Vandyck* ...	Symonds, P.	... ...	... ...	S.	Lamport & Holt	... ...	...
292 †† *Viceroy of India*	Thornton, E. J., R.D., Capt., R.N.R. ...	F. E. Cox, R. H. Turner, M. F. Shute.	V. A. K. Smith	M.-S.	P. & O.	Fms. 911 & 138 5.2.33 to 6.5.33	11.5.33
101 †† *Voltaire* ...	Symons, P.	F. J. Durrant	W. Burnett ...	S.	Lamport & Holt	,, ,, 19.3.33 to 29.5.33	2.6.33
263 ** *Wairuna* ...	Davies, R. L.	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
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