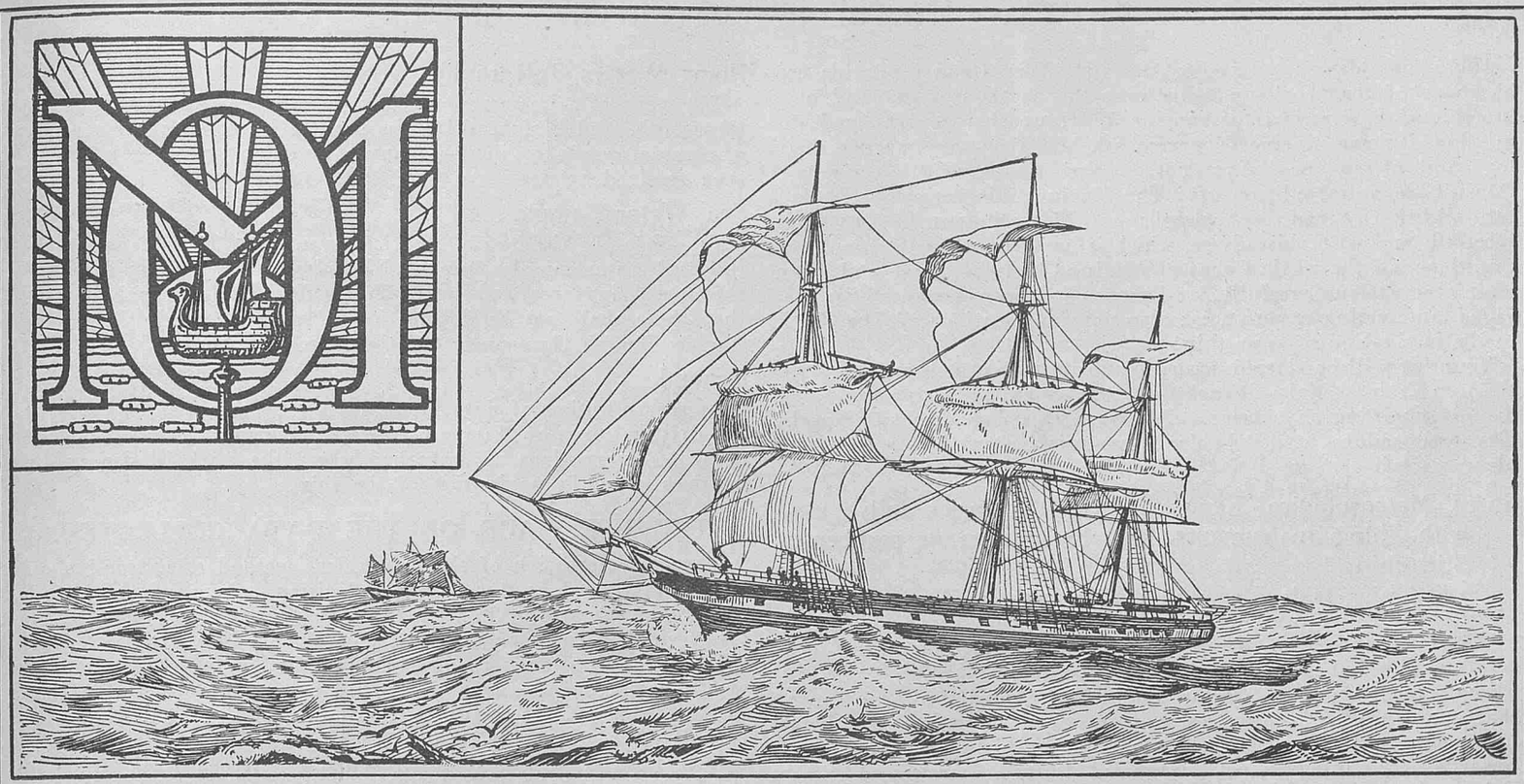


VOL. V. No. 54. THE MARINE OBSERVER. JUNE, 1928.

TABLE OF PRINCIPAL CONTENTS.

WORK OF THE YEAR.

April 1st, 1927, to March 31st, 1928.

THIS year will always be remembered.

HIS MAJESTY THE KING gave recognition of the splendid service to the Empire for many centuries, both in peace and war, of the British Merchant Navy and Fishing Fleets by appointing his eldest son H.R.H. THE PRINCE OF WALES our Master.

Every officer, man, boy, and woman, every crew, every ship, every fleet, every division, company and administration in our great service of the sea is honoured.

No one but our Sailor King could have shown such understanding of our feelings, traditions and pride.

The whole service is united under one Royal Master.

The Corps of Voluntary Marine Observers and Marine Division will be second to none in their devotion to The Master.

The general very high standard of the Work reached in 1926 has been maintained ever since, and during the past year progress has been made in Wireless and Weather an Aid to Navigation.

The record of the work done which follows is in itself a more eloquent tribute to Marine Observers than any praise which we can give and as such is far more valuable testimony. These are the facts:

COLLECTION OF DATA.

Meteorological Logs (4 hourly) used with Instruments lent by the Meteorological Office. Kept by an average number of 7 H.M. Ships and 115 Merchantmen.

Following the standard established on April 1st, 1926, by which about the best 40 logs in every 100, taking into consideration recorded evidence of the practical application of the work by means of Wireless Telegraphy, are classed "Excellent"; of 279 logs received the following table shows the classification gained by competition.

Excellent	115
Very Good	162
Good	2
Not classed	0
Total received	279

(1703) Wt. 52—9 1100 & 200 5/28 H. St. G. 4/ 1

Those logs classed "Excellent" and "Very Good" provide the backbone of the Work and this year the backbone is a solid one. More logs show records of routine W/T. weather reports made to all ships. Some Marine Observers ask how they can improve their logs and attain the "Excellent" classification. The answer is—Consult the latest edition of "The Marine Observer's Handbook" (4th Edition), read each number of THE MARINE OBSERVER as received, and with this advice, which is based upon the accumulated experience of the whole Corps of Marine Observers, make and enter your observations carefully, and record in the pages specially provided, interesting experiences; also note applications of **The Work** to the navigation of your ship.

Your log will be classed according to its merits as compared with the remainder. Make it as neat and complete as possible and avoid superfluous entries. Always remember what Captain TOYNBEE used to say, "A blank space is better than a doubtful observation."

Ships' Meteorological Reports, Form 911 (twice daily), used with Ship's Instruments, kept by an average number of 330 ships.

The following table shows the number and classification of these useful records received, which without the great expense involved in the maintenance of official instruments at sea, complete a network of recorded observations over all oceans.

The records show, in a space specially provided for the purpose, that many ships keeping these forms and having a mercurial barometer in their outfit have done much during the past year towards the progress of organised ships' Wireless Weather Telegraphy.

Classification.	1927–1928.	1926–1927.	1925–1926.
Excellent	456	439	416
Very Good	1,784	1,623	1,641
Good	16	33	32
Not Classed	5	0	2
Total Received ...	2,261	2,095	2,091

Ice Reports, Form 912.

The recording and returning of these reports during the past 12 months has been good, but the request made in "Work of the Year" last year to Marine Observers to make "Nil" reports when passing within the average limits, when no ice is seen, is again brought to notice.

Many valuable reports have been received, especially for the Southern Ocean, where there has been a phenomenal ice season.

Report of Tropical Revolving Storms, Form 905.

This form, when completed, is welcomed from any ship afloat, but is unnecessary for ships keeping the Meteorological Log. A number have been received during the year and are of considerable value.

Marine Observers and Agents will give great assistance by bringing these to the notice of Captain and Officers of ships not on our list. Accurate observations from every ship in and near the storm-field of severe Hurricanes, Cyclones and Typhoons are required for research in connection with the Laws of Storms. A supply of these forms is always available at the Agencies.

North Atlantic Wireless Telegraphy Weather Report Registers used with Instruments lent by the Meteorological Office, Ships' Coded Reports.

The comparative table below shows the number and classification of these registers received.

Classification.	1927–1928.	1926–1927.	1925–1926.
Excellent	168	212	157
Very Good	137	102	143
Good	0	0	0
Not Classed	0	0	0
Total Received ...	305	314	300

Home Waters Telegraphic Reports.

Ten Packet Steamers on the Newhaven-Dieppe, Guernsey-Weymouth, and Holyhead-Dublin services have made these reports of observations taken in mid-channel, and during the year 773 have been received.

Sea Water Samples.

Ten Ships in the South American and West Indian trades have collected water samples for the Fisheries Laboratory at Lowestoft, the work being arranged by the Port Officer at Liverpool to ensure that there shall not be duplication of marine observational work for the British Government in the Merchant Navy.

General.

In the collection of data from the sea by means of the work of the British Corps of Marine Observers, generally the best and most accurate observations are returned where the work is also applied practically to the navigation of the ship.

THE USE MADE OF THE DATA COLLECTED.

A CONCISE description of the mechanical method of extraction and compilation used in the Marine Division, along with the code, has been published in this Journal, so that not only may Marine Observers have a better idea of how their observations are dealt with, but also so that the Agents and all who can help to bring about a more generally uniform use of marine data may have full information. It should be clearly understood that only observations of a very high standard made and recorded in Meteorological Logs with official instruments are punched on Hollerith Cards.

The charting of ocean currents along the main trade routes in the North Atlantic by sections in THE MARINE OBSERVER having been carried as far as the observations available justify, the information assimilated by this method since the establishment of THE MARINE OBSERVER has been summarised and published as an article; and the compiling of an Atlas from these sections has been commenced. This experience, together with research work and charting done with the aid of the Hollerith Electric Sorting and Tabulating Machines has enabled us in commencing the charting of winds and currents in the South Pacific, to do so on a standard scale and plan which is suitable for charts of all oceans, reference to which was made in the January and May, 1928, Numbers.

For the purpose of litigation in the courts concerning claims brought for damage and loss due to bad weather at sea there have been many requests for copies of Meteorological Logs and Reports. This year has been a very heavy one for enquiries which have included requests for information of weather conditions at the time of the attempted flight of the North Atlantic by the late Captain NUNGESSER in May, 1927, and the loss of H.M.S. *Valerian* and S.S. *Eastway* during a Hurricane in October, 1926.

Data Extraction, Compilation and Research.

The comparative table below gives the data extracted during the last six years; MARSDEN CHART No. I shows the distribution of observations extracted during the last twelve months and MARSDEN CHART No. II gives the distribution and number of observations extracted since re-organisation on April 1st, 1920.

The results of our compilations and researches are to be found throughout the numbers of this Journal.

	1927–28.	1926–27.	1925–26.	1924–25.	1923–24.	1922–23.
Percentage of logs received reaching the required standard completely extracted and phenomena indexed.	60	64	64	55	66	73
Number of complete sets of observations extracted and punched on cards, with currents entered in data books and phenomena indexed.	73,745	78,180	75,852	65,060	74,749	97,533
Current observations prior to April, 1920, extracted and entered in data books.	3,496	8,242	8,210	5,746	4,259	1,826

Exchange of Data.

Last year more marine meteorological data were supplied to other services than ever before. This year another step with the Hollerith system has been made and it is now possible to print observations from the cards which enables us to send copies of these coded data without risk of loss of the cards. More information than last year has been provided this year to those requiring it and this includes—

To the Lindenburg Observatory, Germany, 1,333 sets of observations, North Atlantic, March 10th to 17th, 1925, and April 5th to 12th, 1925, by mechanical printing.

To The International Bureau of Vulcanology, Reports of submarine earthquake shocks, all months 1926.

To The International Upper Air Commission, 548 sets of observations South of the Equator for certain days in 1923.

To The Division for Aviation Meteorology, information of sea and swell on the route San Francisco to Honolulu, March to September, 1921, to 1927.

To The Scottish Fishery Board, 371 observations of current, North Atlantic, all months 1926.

To The Division for Airship Meteorology, observations of wind, fog and visibility, Belle Isle Strait, all months 1921-1927.

2,199 sets of observations along the projected Imperial Airship routes, May, July and October, 1924, and February, 1925, for a special investigation of conditions as they apply to Airship Navigation.

To The Dutch Meteorological Office, 1,150 sets of observations, selected squares in the Atlantic, Indian and Pacific Oceans, all months 1926, by mechanical printing and cards.

To " Reseau Mondial," an International publication compiled by the Division for Climate :—

Monthly means at certain West Indian and Falkland Island Light House Stations and in certain squares in the North Atlantic.

To the Indian Meteorological Department, observations in the Arabian Sea during a cyclone in November, 1926.

The remaining enquiries, many of them of importance, are too numerous to mention here. At present this exchange system involves more giving than taking, but we hope that ultimately we shall benefit by data received in return.

Coded Wireless Weather Reports from North Atlantic Liners.

These reports have been of great assistance throughout the year. They give information in Europe of weather coming from the westward and so give great aid to forecasting at the Meteorological Office.

During the last twelve months 4,292 weather reports were received from 32 North Atlantic liners specially detailed in our list for this service.

Upon examination of the registers in the Marine Division it was found that 1,273 reports were received within 1 hour of observation, 1,283 reports within 2 hours, 868 reports within 4 hours, while 868 reports were over 4 hours in transmission.

2,107 reports were sent by ships to the westward of Longitude 40° W. through American coast stations, direct, to the United States Weather Bureau. A selection of these re-transmitted to Europe are used with those received direct for obtaining the distribution of pressure and weather right across the North Atlantic.

The periods of transmission of reports from the Eastern North Atlantic have improved since last year, and a number of ships have followed the lead of the two ships specially mentioned last year as pioneers, in repeating the same observations in plain language, standard form reports to " All ships."

APPLICATION OF THE WORK AT SEA.

CHART III gives the positions of ships at sea on June 1st, 1927, invited to make routine Wireless Weather Reports to all ships, which, compared with Chart III, accompanying " Work of the Year " last year, shows that the number of " Selected ships " is increasing steadily if slowly; but what is of far more importance the distribution is improving.

On June 1st, 1927, there was a much better proportion of " Selected ships " in the Southern Hemisphere. These days are typical.

The response by 268 selected ships to the invitation given them to make routine reports is steadily increasing and on Saturday, March 31st, when we took stock of the recorded routine reports made to " All ships," the total number of " Selected ships " showing that they were regularly performing this service, was 165.

During the year the example set at sea by the pioneers of the practice advocated in " Wireless and Weather an Aid to Navigation " has been followed by many more Marine Observers and the time has arrived when we have been able to suggest a wider application of Marine Meteorology at Sea. This was done in the April Number and now that " Wireless and Weather an Aid to Navigation " will be available as a separate book to all who wish, an ever increasing number of ships will be able to properly use the information provided by " Selected ships."

Examples of Weather Charts made at sea with the results told by Marine Observers in their own words have been published during the year in " The Marine Observer's Log," and a selection was given in the last chapter of " Wireless and Weather an Aid to Navigation " to prove the mastery of this subject by British Seamen.

Last year we mentioned the names of some eight ships whose Commanders, Officers and Wireless Operators had done remarkably fine and consistent work in applying Ship's Weather Wireless Telegraphy to navigation. This year so many have done such fine work in this connection that it is not possible to single out for special mention, and great credit is due to a very large number. There are, however, three ships who deserve the special thanks of the entire Merchant Navy and these ships also deserve the gratitude of airmen and Meteorologists. They are :—

S.S. *Llandovery Castle*, Captain S. OWEN, principal Observing Officer, Lieutenant C. H. WILLIAMS, R.N.R.

S.S. *Ascanius*, Captain J. AGNEW, principal Observing Officer, Mr. C. HOUGHTON, and

R.M.S. *Naldera*, Captain C. DAYAS, principal Observing Officer, Mr. C. H. HAND.

In these ships the British Airship Mission to South Africa, Australia, New Zealand, Ceylon and India took passage.

The Meteorologist attached to the Mission was introduced to the Captain and Officers in each of these regular observing ships by one of the Nautical Officers or Marine Agents of the Meteorological Office. The courtesy privilege of use of the Bridge, Chart House, and Meteorological equipment while a passenger was most willingly accorded and much valuable work was done in co-operation with the ships' officers. Thus it is proved that where the traditions and customs of the Merchant Navy are duly observed its whole-hearted assistance in any useful development may be counted upon. In each of these ships the work was carried on as usual by the observing officers; they had the benefit of the expert advice of the Meteorologist who was also able to study the special problems of Airship Meteorology.

Safety of Life at Sea.

As has been said by those in the best position to judge, including the Chairman of the International Shipping Conference, held in London in 1924, Sir ALAN ANDERSON, the best safeguard at sea is a vigilant master. The unsinkable ship is a myth and a dangerous myth if it induces false confidence. Subdivision by bulkheads, load line, Wireless telegraphy, boats and life-saving gear all mitigate disaster. Observation is an essential to vigilance, and where Meteorological observation is properly used it may contribute to Safety of Life at Sea.

Meteorology if properly applied at sea not only helps to reduce the risk of disaster but steadily improves itself as a science. During the year, Marine Observers by the use of Marine Meteorology as a branch of Seamanship with Wireless Telegraphy have produced evidence in these pages which goes to prove it to be a real aid to safe navigation. If development is continued along these lines which are founded upon sea custom, there seems no doubt that greater safety of life at sea and safety of life in the air over the sea will be the outcome.

It must always be remembered that generally the Corps of Voluntary Marine Observers and Marine Division are the keenest advocates of the practice of Meteorology, and that the enthusiast will do best by not pressing others, but by leading by example and making the work as simple and seamanlike as possible.

Acknowledgment, Appreciation and Awards.

During the year steps have been taken to improve the service of the Agencies at the ports and special credit is due to Captain D. FORBES, the senior agent, who with his great experience at Southampton of this work dating back to Captain TOYNBEE'S time, put forward suggestions and made representations which have brought about desired reforms. At the agencies, Marine Observers may now see Meteorological Atlasses and books of reference, obtain first-hand information and replacement of official instruments.

The Commanders and officers of all regular observing ships are asked to have the Meteorological equipment supplied, kept in one place if possible in the Chart House when in port so that if the observing officers happen to be on leave the Agents or visiting officers may be able to sight all the gear when they visit the ship. If this is done, unnecessary correspondence and work may often be avoided. The Agents have by no means an easy task and we are grateful to them for all the trouble they have taken during the year in the furtherance of the work.

The foregoing report which is made especially for the information of Marine Observers shows the enormous amount of very fine voluntary work done at sea for the good of the whole community. The Director of the Meteorological Office bids me thank one and all for this work which is so highly prized and which is proving of such value to Meteorologists the World over.

As the Officer of the Merchant Navy directly responsible for the supervision and co-ordination of Voluntary Marine Meteorological work at Sea and for the compiling of this Journal, I would like to thank everyone concerned afloat, at the ports and in the Marine Division, not forgetting those who have by their written contribution helped THE MARINE OBSERVER, and especially those officers who have done so much to modernize the work along true seamanlike lines for their loyalty and support.

A list of commanders and principal officers to whom the Meteorological Committee have made "Excellent" awards as special recognition is appended.

MARINE SUPERINTENDENT.

London.
April 2nd, 1928.

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

Captain.	Principal Observing Officer.	Ship.
ADAMSON, B. W.	GOLDSWORTHY, J.A. / BRITTAIN, W. H.	*Shropshire.*
*AGNEW, J.	HOUGHTON, C. ...	*Ascanius.*
BARTER, H. O., Commr. R.N.R., R.D.	GREENFIELD, R. W. ...	C.S. *Norseman.*
BERRY, G.	THOMPSON, A. ...	*Celtic.*
*BRITTEN, E. T., Commr. R.N.R., R.D.	ASHCROFT, J. ...	*Laconia.*
BROWN, A. H.	BLOYE, N. H. B. ...	*Port Melbourne.*
BROWN, F. G., Capt. R.N.R., R.D.	WILLIAMS, P. L. ...	*Carmania.*
*BULMAN, J. B.	JACKMAN, W. F. ...	*Arabic.*
BURTON-DAVIES, J.	CANN, L. ... ... / QUICK, E. A. ...	*Hurunui.* / *Tongariro.*
BYERS, G.	——	*Kweiyang.*
CHARLES, Sir J. T. W., K.B.E., C.B., Commodore R.N.R., R.D.	MCLEAN, D.	*Aquitania.*
*CHARLTON, W. L. ...	CADWALLADER, C. ...	*Maihar.*
CLIFTON MOGG, W. P., Lieut.-Commr. R.N.R.	BAKER, E. T. ...	*Pakeha.*
COLLINS, P. J., O.B.E. ...	FISHER, K. D. ...	*Euripides.*
*COOPER, C. P., O.B.E., Capt. R.N.R., R.D.	WOOD, G. W. ...	*Khiva.*
CRAVEN, R.	LANGFORD, G. G. ...	*Port Hobart.*
CRAWFORD, R. ...	KIME, G. H. / WEBER, W. J.	*Aorangi.*
*DAYAS, T. C. E. ...	HAND, C. H. ...	*Naldera.*
DIGGLE, E. G., Capt. R.N.R., R.D.	DUGUID, G.	*Mauretania.*
DUNCAN, A. R.	LAIDLAW, A.... ...	*Elysia.*
*DUNCAN, S. S.	HENDERSON, J. ...	*Arracan.*
DURHAM, R. S.	SLOAN, J. H. ...	*Port Auckland.*
*FARMAR, F.	JONES, E. G. ...	*Port Dunedin.*
FERRIS, J.	HOWE, P. J. ...	*Port Denison.*
*FROST, C. R.	METCALFE, J. H. ...	*London Importer.*
*GARDENER, H. W. ...	SHEPHERD, G. A. ...	*Westmoreland.*
GEARY HILL, S. A., D.S.O., Capt. R.N.	LANSDOWN, C. S. E.	H.M.S. *Endeavour.*
GORDON, A. L.	ROBERTSON, M. ...	*Elpenor.*
*HARVEY, H.	JACKMAN, W. F. ...	*Arabic.*
*HASELFOOT, F. E. B., D.S.O., Capt. R.N.	WILLIAMS, D. G. V....	H.M.S. *Herald.*
*HAYLETT, E.	MORRICE, G. ...	*Actor.*
HEMMING, F. A. ...	SAUL, G. C.	*Rimutaka.*
HESTER, C., Commr. R.N.R., R.D.	ROCHE, C. B. / PIRIE, C. S. ...	*Khyber.*
HICKSON, V. W., Lieut.-Commr. R.N.R.	LUCAS, O. V. ...	*Adriatic.*
HIGGS, W. G. ...	BOYS SMITH, H. G. / KIDWELL, T. L.	*Port Sydney.*
*HILL, T. V. ...	HOOD, J. M. / ROLLO, D. ...	*Niagara.*
HOLME, A.	MORGAN, H. G. ...	*Homeric.*
HOSSACK, W. H., Capt. R.N.R., R.D.	HAYWARD, H. G. ...	*Caronia.*
HUNTER, J. L. B.	REES, R. G. ... / COOKE, F. ...	*Rotorua.*
ISAACSON, J. M.... ...	——	*Cristales.*
JACK, J. ...	MUNDAY, P. A. / NEWBURY, A. G.	*Port Nicholson.*
JACKSON, A. L., Commr. R.N.	JENKINS, H. L. ...	H.M.S. *Iroquois.*
KERSHAW, W. A. R. ...	NICOLL, J. J. ...	*Mataroa.*
KETTLEWELL, C. R. ...	CONNOLLY, P. J. ...	*Piako.*
LEA, W. H.	JONES, E. G. ...	*Port Dunedin.*
MACKAY, A. S., Commr. R.N.R., R.D.	COLLINSON, F. B. ...	*Culebra.*
MALIN, R. G., Lieut.-Commr. R.N.R.	WILLIAMS, C. S. ...	*Samaria.*
MARSHALL, W., C.B., D.S.O., Commodore R.N.R., A.D.C., R.D.	FISHER, A. J. ...	*Olympic.*
MATHESON, C. G., D.S.O., Capt. R.N.R., R.D.	BLAKE, C. K. ...	*Orama.*
MCCOMISH, A. B.	ISAAC, W. F. / INNES, J. W.	*Clan Mackinnon.*
MCKELLAR, A. W., Capt. R.N.R., R.D.	GLASSBOROW, W. J....	*Ruapehu.*
MCNEIL, S. G. S., Capt. R.N.R., R.D.	BULLOCK, S. A. T. ...	*Berengaria.*
METCALFE, G. R., Lieut.-Commr. R.N.R.	PEARSON, W. W. ...	*Majestic.*
MILNE, R. A., Commr. R.N.R., R.D.	EVANS, H. E. ...	*Margha.*
NEILL, G. A.	WIGHTMAN, H. V. ...	*Clan Malcolm.*
*ORAM, B. B., Commr. R.N.R., R.D.	RUSSELL, F. G. ...	*Lancastria.*
OWEN, W. T.	STEEL, T. E. ...	*Auditor.*
*OWENS, G.	WILLIAMS, C. H. ...	*Llandovery Castle.*
*POWER, J.	BAILEY, C. F. ...	*Titan.*

* Those marked with an asterisk appear in the list of "Excellent" Observers for the first time.

Captain.	Principal Observing Officer.	Ship.
*Rathkins, C. E. ...	Fletcher, R. N. ...	*Culebra.*
Reilly, J. V.	Smith, B. W. ...	*Woodarra.*
*Rice, W. V., D.S.O., D.S.C., Commr. R.N.	Price, H. P. ...	H.M.S. *Ormonde.*
Richards, J.	Fitz Simons, H. W.	*Astronomer.*
Robinson, F. W. ...	Renny, F. T. ...	*Opawa.*
*Rollo, W. ...	Alleyne, J. / Roche, C. B.	*Baradine.*
Rostron, Sir A. H., K.B.E., Capt. R.N.R., R.D.	Bullock, S. A. T. ...	*Berengaria.*
Rowe, J. P.	Cadwallader, C. ...	*Maihar.*
Sawbridge, J. R. ...	Hearn, S.	*Port Darwin.*
Scutt, W.	Millard, S. R. ...	*Wangaratta.*
Sibbons, H.	Antrobus, R. ...	*Montroyal.*
*Silk, H. V., Lieut.-Commr. R.N.	Williams, D. G. V....	H.M.S. *Herald.*
Smith, R. G.	Fieldwood, S. S. ...	*Cedric.*
*Stanley, W. F., Commr. R.N.R., R.D.	Tweddell, A. J. ...	*Windsor Castle.*
*Stenhouse, J. R., D.S.O., O.B.E., D.S.C., Commr. R.N.R.	Goodchild, T. W. ...	R.R.S. *Discovery.*
Strong, H., Commr. R.N.R., R.D.	Keeble, L. A. J. ...	*Windsor Castle.*
Swan, L. H.	Watson, J. B. ...	*Port Victor.*
*Thurston, H. P. ...	Dickson, J. ...	*Matakana.*
Townshend, W. P. ...	Ward, F.	*Balranald.*
*Tyers, W. O. ...	Cowie, W. ... / Spencer, W.	*Macharda.*
*Warner, S. C.	Dennis, A. D. ...	*Maloja.*
Waterhouse, J. ...	Robbie, W. A. ...	*Clan Macwhirter.*
*Westgarth, W.A., D.S.C.	Handley, R. F. ...	*Newfoundland.*
White, E. R., Commr. R.N.R., R.D.	Law, J.	*Baltic.*
Wilding, H. G. ...	Crone, J. R. ...	*Peshawur.*
*Williams, R.	Watson, J. B. ...	*Port Victor.*
*Williams, R. J.... ...	Howe, F.	*Tyndareus.*
Willis, M.	Christie, G. B. ...	*Arracan.*
*Wilson, C. A.	Robb, T.	*Ascanius.*
Yardley, H. A., D.S.C.	Bristow, S. J. ...	*Aba.*
——	Mansey, A.	*Montclare.*
——	Goater, N.	*Montnairn.*

* Those marked with an asterisk appear in the list of "Excellent" Observers for the first time.

THE MARINE OBSERVER'S LOG.

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

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

The following are replies to the Marine Superintendent's note which was published in Volume V., No. 51, under the above heading:—

Captain J. Burton Davies, S.S. "Tongariro."

"In my experience of the Panama Australia route I have found the currents off Galapagos Islands very uncertain.

"Owing to the possibility of a strong set to the westward which is too erratic to be allowed for with any confidence, I always steer from a position off Cape Mala to a position 20 miles S.E., of Hood Island.

"A vessel following the Great Circle from here to N.Z. ports would be likely, any time after Pitcairn, to encounter strong head winds and drifts and to altogether lose the favourable current which prevails further north.

"I consider a satisfactory route to be that from Hood Island passing through the Low Archipelago midway between Portland Bank ($4\frac{3}{4}$ fth.) to the north, and Oeno Island to the southward thence direct if bound to Wellington or southern ports; or passing in sight of Rapa if bound to Auckland or Sydney and from Rapa to a position 20′ north of MacDonald Rock, Kermadec Islands, thence direct if bound to Brisbane.

"Approaching Brisbane, one may steer direct for Cape Moreton Light as the constant southerly set will eliminate all danger from Flinders Reef if at all thick, and Light will generally be picked up to the northward when course can be altered to proceed between Smith Rock and the Cape where Pilot is picked up.

"The extra distance in keeping north across the Western half of the Pacific will be more than repaid by better weather conditions and avoiding the S.W. swell, and stronger and more certain currents.

"Homeward bound from New Zealand I consider the best plan to be to follow the Great Circle to a position on the Equator—85° W., if from Wellington or Southern ports, and a position in 5° S., and 90° W., thence to Equator and 85° if from Auckland thence to a safe position off Cape Mala, passing in sight of Malpelo Island.

"Following this course one may frequently dodge the contrary current until approaching the Equator or even a little later, but one must put up with the strong set usually experienced out of the Gulf of Panama."

Captain W. G. Higgs, S.S. "Port Sydney."

"Since the opening of the Panama Canal, the southern half of the Pacific has been used by steam shipping to an extent undreamed of in pre-Canal days. An accurate knowledge of its currents can only be arrived at after a continuous record of observations over a longer period than has yet elapsed—but already it is possible to make a few broad statements which later investigation may support and strengthen.

"From the latitude of the Canal to roughly 30° S.—excluding a sixty-mile belt of northerly drift on the S. American coast, and one of rather less breadth running in a southerly direction on the Australian seaboard—the general movement of the surface water throughout the year is in a westerly direction. This movement is perhaps at its strongest from September to March, inclusive. So regular is this drift that a given ship, in similar trim and with fuel of equal quality, will average from a knot to a knot and a half better on the passage from the Canal to Australasia than she will when bound in the opposite direction, to the north-east.

"South of the 30th parallel at all seasons, currents would seem to be variable; but—this is a special feature of the Pacific—south of the 40th parallel the drift is not so definitely easterly as it is in the S. Indian Ocean. During the passage from New Zealand to Cape Horn the navigator finds that he has less assistance from current than on the run between the Cape and Australia.

"The following suggestions as to passages between the Canal and Australia are advanced as being founded on the writer's experience, supplemented by information kindly supplied by other commanders on the route.

"Canal to Australia.—Brisbane or Sydney are customary ports of destination. On this passage the rhumb line from C. Mala is strongly recommended. Between Capes Mala and Moreton the distance by rhumb line is 7,657 miles, the track passing through the Marquesas, north of the Tongas, and south of the Fiji group. No difficulty need be apprehended in following this route, as the groups are well charted, and conditions for obtaining position frequently by astronomical observations are ideal. The shortest possible track between these two points—by G.C.—is 7,551 miles; but by the track usually taken (S. of Galapagos to Henderson Island by G.C., and again thence by G.C. to destination) the distance is 7,582 miles.

"The extra mileage traversed along the rhumb line—75 to 106 miles—is more than made up by the uniformly favourable drift experienced on that track, with fair wind, dry atmosphere, and smooth sea.

"To New Zealand, lying as it does in higher latitudes, the rhumb line cannot be followed without greatly increasing the distance. The track favoured by the writer during the southern summer is—south of Galapagos group, thence by G.C. to Rapa, thence by rhumb line to port; but during the southern winter a modification is advisable in order to avoid boisterous adverse weather during the last third of the run. It will then be found advantageous to keep north of the 36th parallel until in Longitude 175° W., from which point a course may be shaped to destination.

"New Zealand to Canal.—On this run the navigator, having crossed the 30th parallel, must resign himself to meeting an adverse drift of from 5 to 20 miles per day to the Equator; north of which to C. Mala this will be likely to increase to 40 or 50 miles per day. It seems that this cannot by any means be avoided. The G.C. track from point of departure to the Equator in 83° W.—as recommended in the Admiralty publication, "Ocean Passages for the World"—has been recently tried by the writer, with disappointing results. This route passes roughly 200 miles S.E. of the Galapagos Islands, possibly with the object of avoiding the westerly drift which runs strongly around and through them. However, the current was running just as strongly on the recommended route, and the net result was that 50 (fifty) miles were added to our distance to no purpose."

CURRENT RIPS.

Off South Coast of Australia.

THE following is an extract from the Meteorological Report of S.S. *Dimboola*, Captain I. L. LLOYD, Adelaide to Fremantle. Observer, Mr. H. L. PRICE, 3rd Officer:—

"On 7th June, 1927, Noon A.T.S., in Latitude 35° 16′ S., Longitude 119° 55′ E., we ran through a decided tide or current rip. The line of the rip ran in a N.W., and S.E., direction but its progress (judging by froth-like wake) was at right-angles to this, i.e., N.E.

"The width of it was about 100 ft. and length as far as eye could see both to N.W. and S.E. Vessel set 9 miles north from previous Noon.

"Whilst vessel was actually passing across the rip, fifteen degrees of starboard helm was needed to keep vessel on course (west, true).

"Barometer 30.24 in., air temperature 60°. Light variable winds."

NOTE.—In THE MARINE OBSERVER, Volume II, No. 22, 1925, page 160, there is a note which gives a possible explanation of the sluggishness of a vessel in answering her helm, when crossing a tide or current rip.

TIDE RIP.

Off Brazilian Coast.

THE following is an extract from the Meteorological Report of S.S. *Clan Ranald*, Captain C. LAIRD, Cape Town to Baltimore. Observer, Mr. J. B. TEMPLEMAN, 4th Officer:—

"On June 1st, 1927, 9.30 a.m., to 11.30 a.m., A.T.S., between Latitude 1° 39′ N., and 1° 50′ N., Longitude 41° 27′ W., and 41° 43′ W., a tide rip started parallel to the vessel and at a distance of half a mile away, reaching as far as could be seen, but not coming any nearer. The water on both sides of the rip was of the same colour, and it disappeared as suddenly as it had appeared. The current experienced for the 24 hours from May 31st Noon, to June 1st Noon (S55° E., 26 miles) was in the opposite direction to that anticipated. The S.S. *Howick Hall*, steaming on a parallel course, 30 miles to the southward experienced a favourable current of 2 knots."

CYCLONE OFF QUEENSLAND COAST.

June 3rd and 4th, 1927.

THE following extract is taken from a report on a tropical disturbance in the vicinity of Capricorn Island, Queensland, on June 3rd and 4th, 1927, from H.M.A.S. *Moresby*, Captain J. A. EDGELL, O.B.E., R.N. Observer, Lieutenant W. H. MARTIN, R.A.N.:—

"On Saturday, 28th May, the ship was employed surveying in the Capricorn Group, the weather at the time being exceptionally fine. Towards sunset on the 28th, the sky became overcast and the atmosphere thick and heavy; there was a light breeze from west which died away to a calm before midnight.

"On the 29th, the weather showed signs of breaking up, wind south-easterly, force 3-4 and inclined to freshen.

"From Monday, 30th May, the weather became definitely unsettled with high winds, frequent rain squalls, poor visibility, overcast and threatening skies. The ship shifted berth and anchored under the lee of North West Islet, Capricorn Group, remaining there until daylight on Friday, 3rd June, when she proceeded to Gladstone (Port Curtis) and arrived there at 1530 the same day.

"Heavy rain commenced at 0530 on the 3rd June, eased a little at 0730 for about half an hour and then continued heavily until 1110 on Saturday, 4th. Visibility was extremely bad, in fact the land in Port Curtis was not seen until the ship was abreast of Gatcombe Head and inside the harbour.

"At 1100 on Saturday, 4th June, the wind, which had been fairly steady at south-west, suddenly backed to south-south-east and blew force 9 (42 m.p.h. by Anemometer) for fifteen minutes. With this sudden shift of wind the sky, which had been overcast, began to clear, and the visibility from bad became in a few minutes exceptionally good.

"Rain ceased at 1110.

"At 1100 the barometer suddenly fell from about 1009.0 mb. to 1004.5 mb. at 1130. It then rose to 1006.5 mb. at 1137 and thereafter fell rapidly to 1002.7 mb. where it remained steady from 1245-1430. At 1445 there was a slight rise and from 1545 a steady rise towards the normal with improving weather conditions.

"From 1115 the wind eased gradually till at noon it was force 4.

"The following weather reports were received by W/T.:—

(1) To S.S. *Houtman* from DALGETTY (Agents), Brisbane, via Rockhampton Radio. (Intercepted at 1220.)

'Weather report states cyclonic disturbance 0900 this morning 4th June centred E.N.E. from Cape Capricorn. At present not dangerous. Apparently moving S.S.W.'

(2) To 'All Ships.' From Brisbane Radio. Received 2230.

'Cyclone moving rapidly south-eastward. Centre at 2000, E.S.E. from Sandy Cape.'

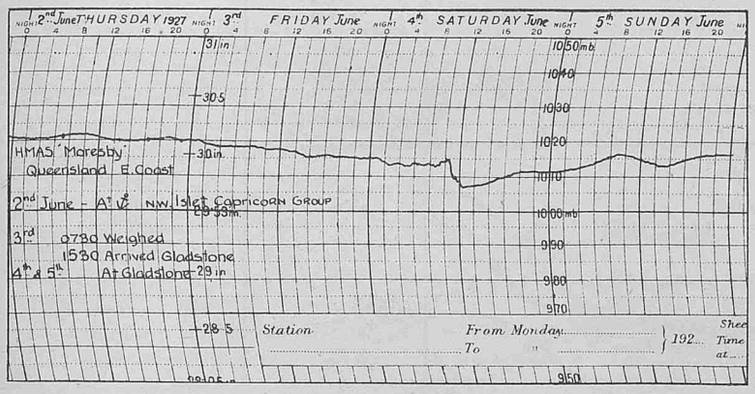
"On Sunday, 5th June, the weather was fine. There was practically no wind all day and the sky was cloudless.

"Conclusions.—It is probable that the mountains and hills around Gladstone affected the direction of the wind on Saturday

forenoon. This appears to be the only possible explanation of the S.W. wind which blew from 0915 till 1100.

"The path of the storm was first S.S.W. and then S.E. (from weather reports) the 'Cod' being E.N.E. of Gladstone. Gladstone felt the outer edge of the disturbance as the direction of the path changed, being in the front quadrant, when the shift of wind occurred at 1100. The trough passed Gladstone between 1245 and 1430, and that place probably experienced for a short period the full force of the wind on the outer edge of the strong wind circle.

"Points of interest which arise from this small but interesting tropical disturbance are (*a*) the prolonged south-easterly winds amounting almost to a moderate gale which prevailed for 5 days before the storm really formed and commenced to move, (*b*) the very gradual accumulation of evidence of the formation of an unusual meteorological disturbance, the appearance of the sky, the threat of rain which held off during Monday and Tuesday, 30th and 31st May, and did not set in until Tuesday night, (*c*) the steady movement of the barometer up to the 3rd June, (*d*) the jerky movement of the barometer and general downward tendency on the 3rd and 4th June and the culminating sudden vertical drop at the instant that the edge of the cyclone passed over the ship, (*e*) the extraordinary rapidity with which the clouds and rain cleared away and the phenomenal visibility which obtained immediately the rain ceased, (*f*) the complete absence of thunder and lightning either before or after the disturbance.



"With regard to (*e*), the contrast between the gradual thickening of the atmosphere during the days preceding the storm and the sudden clearing after it had passed, was most remarkable.

"The jerky movement of the barometer appears to be a characteristic of a minor disturbance in this part of the world. I have before remarked on it with reference to a very severe thunderstorm which occurred at the entrance to the Fitzroy River in the latter part of the year 1925, and to a lesser degree it has occurred just prior to and during several gales which were experienced in 1926.

"In conclusion, it would appear that the tropical disturbance under discussion was of small extent, of danger only to small craft, that it moved very rapidly as soon as it had definitely formed, and that it soon broke up. Its direction towards Sandy Cape was perhaps unusual, but was not exceptional."

NOTE.—The report of H.M.A.S. *Moresby* on the thunderstorm off the Queensland coast on October 21st, 1925, will be found in THE MARINE OBSERVER, Volume III, page 172.

The following extract is taken from the Meteorological Report of S.S. *Wonganella*, Captain H. SUFFERN, Melbourne to Nauru and Ocean Island. Observer Mr. G. F. PHILLIPS:—

"After leaving Melbourne at 4.30 p.m. on 3rd June we received various W/T warnings of a cyclone which left the Queensland coast about Sandy Cape.

"Passing C. Everard the swell was E., moderate but increased to rather rough by the time we rounded Gabo I. at 2.57 a.m., on 5th June. By the time we passed Montague I., at 11.10 a.m. it was rough, E.N.E. and remained so till we anchored in Pt. Kembla at midnight.

"On the following day, the 6th, the swell had dropped to moderate while the wind was W., 4-5.

"As the swell was running fairly into a small harbour, where we had known distances to deal with, and the ship anchored in a position where it was possible to follow the run of each swell from the moment of breaking on the end of the north breakwater till it broke again on the inshore sea wall, a distance of 3,000 ft. it occurred to me that such data as I could collect there might be of interest, even though it was not the true ocean swell in that it had to pass the obstructions caused by the two Islands off the entrance. I think the differences in the swell period may be fairly ascribed to the uneven bottom over which it had to pass inside the 20-fathom contour line.

"Neither the N. breakwater nor the inshore sea wall were over 8 feet high, if that, and though it was only the heavier swells which broke over the end of the breakwater, yet curiously enough some quite small and insignificant looking swells made a much heavier break and flung their spray higher on the inshore wall than did the comparatively heavy ones.

"I do not think the swell at any time exceeded four feet in height and only occasionally reached that. It was a decreasing swell and the observations were taken at about ¾ flood while the moon was in the first quarter.

"Both swell and flood were running dead against the wind.

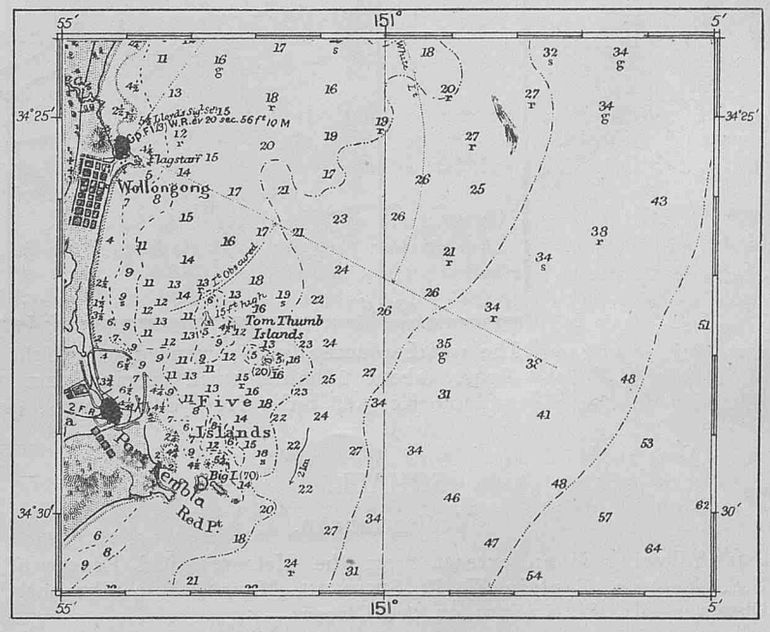
"For the 'period' I timed the swells with my watch as they broke on the end of the N. breakwater and found the greatest difference was between the smaller swells which were farther apart than the larger ones.

"The average time appeared to be about 15 seconds between swells though they varied from 13 seconds to 18 seconds.

"I give a series of 12 successive swell periods, 16, 17, 15, 14, 15, 13, 16, 13, 18, 14, 17, 17 seconds.

"From the end of the breakwater to the point where the swell broke on the sea wall is 3,000 feet and this the swell traversed in 1 minute 27 seconds, or 20.4 miles per hour.

"It would be interesting to know where the depression was centred and how far the swell had travelled."



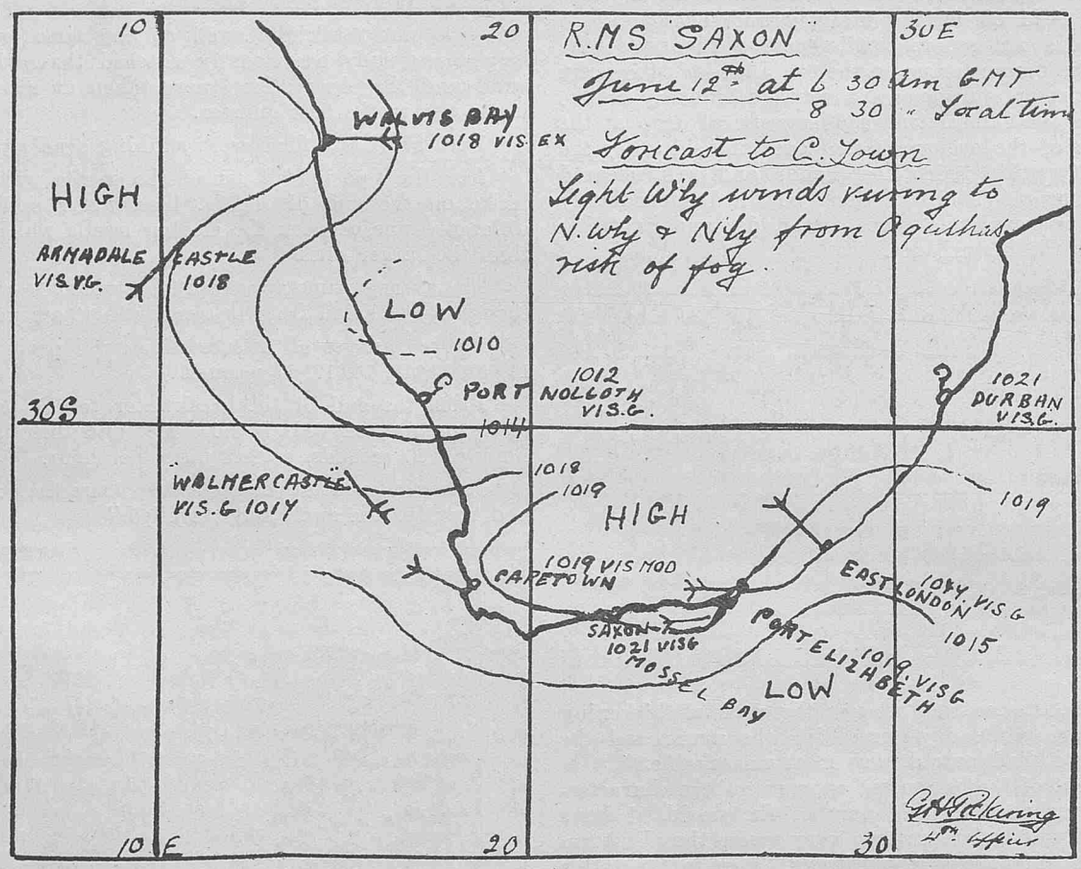
NOTE.—The amount of information available from ships is insufficient to enable synoptic charts of this cyclone to be drawn. The Weather Charts of Australia show an area of low pressure off the North Queensland coast on June 4th, the isobar for 1009 mb. meeting the coast just north of great Sandy Island. No chart is available for Sunday, June 5th, but on that of June 6th the cyclone seems to have nearly disappeared being represented by a small area enclosed by an isobar for 1012 mb. centred on Norfolk Island. The cyclone, therefore, as indicated by the report from H.M.A.S. *Moresby*, soon broke up. A gale experienced at Dunedin, N.Z., on June 7th was at first attributed to this tropical disturbance, but it is seen from the charts to be the result of a depression which passed from the Bight over New Zealand. The position of the decreasing tropical disturbance was approximately 800 miles E.N.E. of Port Kembla on June 6th when the observations of

swell were made. The main swell, from the rear of the storm would travel away from the Australian coast, but it is probable that what was observed was a lesser swell coming from the front of the disturbance. This in the open ocean at a distance of 800 miles would be very small but the shelving of the New South Wales coast is steep so that near the shore the height of the waves would be considerably increased and their velocity retarded. The velocity obtained by Mr. PHILLIPS is rather less than half that of individual waves in deep water. The part of Admiralty Chart No. 1020 showing Port Kembla is reproduced in the figure.

WEATHER CHART MADE AT SEA.

South African Waters.

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



"The weather actually experienced was, light westerly winds, fog approaching Agulhas, until past, (about 2 hours) wind veering, then to W.N.W. force 1–2, and light N'ly airs from Slang Kop (25 miles from Cape Town), visibility moderate to good."

SQUALL.

Mediterranean.

THE following is an extract from the Meteorological Report of S.S. *Mulbera*, Captain W. R. STEADMAN, Marseilles to Plymouth. Observer, Mr. E. H. SPRIGGE, 3rd Officer:—

"June 30th, 1927, Latitude 41° 01′ N., Longitude 2° 38′ E. At 8 p.m. a line of heavy Nimbus cloud was observed coming from the westward, barometer 29.68 in., wind S.W. by S., air temperature 73° F., sea temperature 70° F.

"At 8.30 the wind veered rapidly to W., and increased to force 7. The line of cloud came over in a line stretching right across the horizon moving rapidly. After it had passed, the barometer commenced rising rapidly and the wind decreased to force 4. The visibility which had been poor all day became exceptionally good on the passing of the line squall, as the land could be seen clearly against the last rays of twilight and also the loom of Barcelona light at a distance of 30 miles.

"The rest of the sky at the time of the line squall was comparatively clear."

AN INTERESTING WATCH.

South Pacific.

THE following is an extract from the Meteorological Log of S.S. *Port Melbourne*, Captain A. H. BROWN, Panama to Brisbane. Observer, Mr. N. H. B. BLOYE, 3rd Officer:—

"**Total Eclipse of Moon.** June 14th, 1927. 1958 to 2321 A.T.S.

"Ship's Position at Commencement of Total Eclipse, 2130 A.T.S.:—

Latitude 18° 46′ 30″ S.,	Course 240°.
Longitude 161° 42′ 00″ W.	Speed 13 knots.

"At the commencement of the Eclipse and when the moon entered Umbra, the sky was clouded in proportion of 7/8 with A-Cu and light Cu-Nb in the Zenith, and a heavy rain squall to the S.E., with heavy Nb., and St., round the horizon from S.S.W., to E.S.E., and travelling S.S.E. Wind S.S.E. 5.

"June 15th, 06-42-22 G.M.T.

"The moon started to shadow at June 15th, 06-42-22 G.M.T., at the lower right-hand edge (or approx. the S.S.E. edge) and gradually

moved up and over to the upper left-hand corner. FIGURE 1. Soon after the commencement the sky cleared from the S.S.E., and the moon which had been partially hidden up till then (1930 A.T.S.) came into full view. The horizon became clear, and the sky remained unclouded for the rest of the watch.

"When the shadow was about half-way over the moon, the lower right-hand edge began to show a distinct red brown tinge, which gradually increased in proportion to half the moon's face as the shadow increased. FIGURE 2.

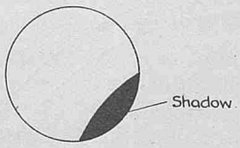


Figure 1.

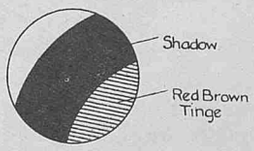


Figure 2.

"June 15th, 08-13-52 G.M.T.

"The Total Eclipse started at 08-13-52 G.M.T., at an altitude of 52-42 (approx.) by which time it had become very dark and the horizon was very indistinct, which rendered an exact altitude rather difficult. The red brown tinge had now spread over a good half of the moon's face and was very noticeable. FIGURE 3.

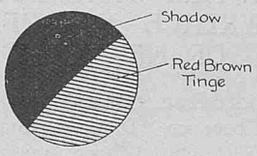


Figure 3.

"June 15th, 08-24-20 G.M.T.

"The Middle of the Total Eclipse occurred at 08-24-20 G.M.T., at an altitude of 58-40 at which time the moon was completely overshadowed, and the stars, in comparison with the light of an hour before were shining very brightly, and were visible very low down on the horizon when rising and setting.

"June 15th, 08-34-30 G.M.T.

"The Total Eclipse ended at 08-34-30 G.M.T., at an altitude of 64-3 at which time the moon started lighting again from the lower left-hand edge; FIGURE 4, the shadow receding back again in a direction opposite and 45/50 left of the direction it entered, making roughly the form of a right-angled triangle, FIGURE 5.

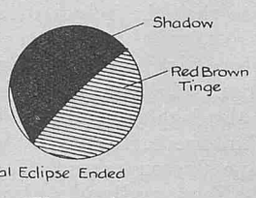


Figure 4.

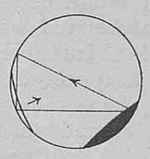


Figure 5.

"The red brown tinge still remaining noticeable and bright, but receding back in proportion and in the same direction as the shadow passed back.

"From now on it steadily grew lighter as the shadow diminished and at 2215 A.T.S., the wind, which had been a steady fresh breeze from the S.S.E., dropped to a gentle breeze but still from the same quarter, S.S.E.

"June 15th, 10-06-00 G.M.T.

"The moon was clear of all shadow at 10-06-00 G.M.T., at an altitude of 78-50, when normal light made the horizon clear and distinct again.

"Lunar Corona.

"Immediately the moon left Umbra at 10-06-00 G.M.T. a lunar corona formed round the moon.

"The corona was of 5° diameter and formed of three distinct colours. The inside ring (rather narrow) was of a pale yellow colour, and as such, against the moon seemed almost cream.

"The middle ring was a cross between a deep mauve and violet colour, and the outer ring, which was decidedly broader, was an unmistakable green. FIGURE 6.

"The corona lasted until 2345 A.T.S. when it gradually faded away.

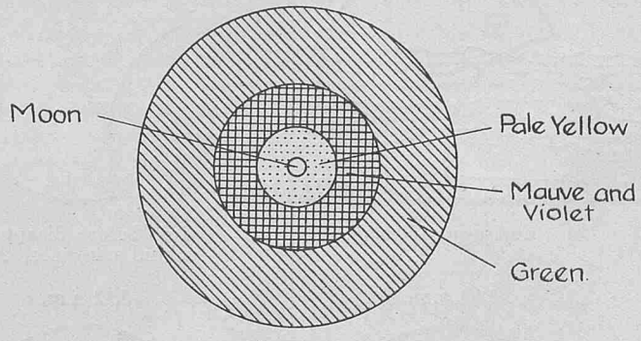
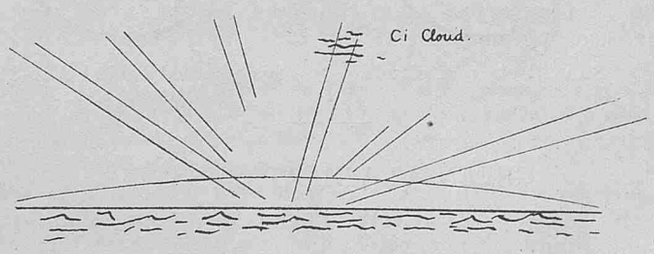


Figure 6.

"June 15th, 10-29-00 G.M.T.

"At 10-29-00 G.M.T., about 20 minutes after the moon left Umbra, rays of light were observed appearing and disappearing intermittently in a semi-circular formation from a common centre bearing W. by S. (True).



"The rays were all of the same colour which was white, and the horizon from W. by N. to S.W. by W. was noticeably lightened by the white light in a very similar fashion to the lighting of the horizon just before dawn.

"Some of the rays were very long, extending over half the sky, others very short, but all very narrow and just lasting for about one minute and then fading and reappearing at another angle. Some of the rays appeared just in the sky alone, not starting from the horizon but all pointed from the one centre.

"One ray in particular passing through a few wisps of Ci (the only cloud in the sky) gave one the impression of a searchlight playing on the clouds, and they were altogether somewhat similar to the Aurora Australis observed further south.

"These rays lasted for about 15 minutes finishing just after midnight (10-45 G.M.T.), when the wind backed to S.E. by S. and the sky started clouding again from the S.E. and brought to a close a very interesting watch."

ECLIPSE OF THE SUN.

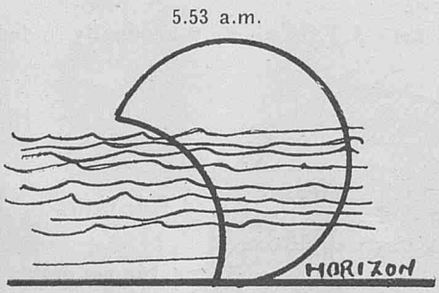
North Atlantic.

THE following report has been received from R.M.S. *Majestic*, Captain G. R. METCALFE, New York to Southampton. Observer, Mr. L. THOMPSON, D.S.C. 3rd Officer:—

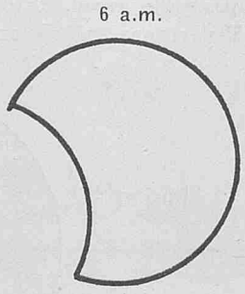
"June 29th, 1927, 5.53 a.m., position by stellar observations, Latitude 47° 19′ N., Longitude 26° 23′ W., height of eye, 90 feet. Barometer 1025.5 mbs. Air temperature 58°. Sea temperature 58°. Wind N. by W. force 3. Slight N'ly sea. Sky, Stratus and Alto-Stratus all round western horizon, 7/10ths of remaining sky covered by Alto-Cumulus and Cirro-Cumulus. Sun rose at 5.53 a.m., partly covered by Stratus, giving an appearance of rising behind land. At 6 a.m. the sun disappeared behind a layer of Stratus covering 2/3rd of it.

"At 6.08 a.m., all clouds clear of the sun and the eclipse again in full view.

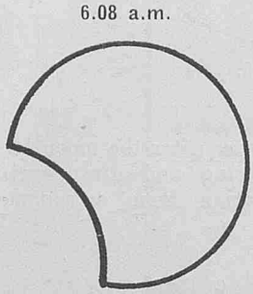
"6.12 a.m., sun disappeared behind Alto-Stratus with the eclipse almost over, at an altitude of 2° 45′, remaining covered for the rest of the time during the eclipse."



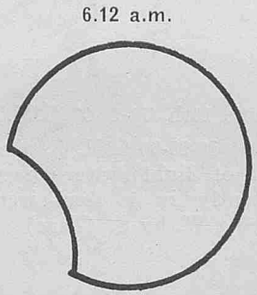
Sunrise at 5.53 a.m.



Just before disappearing behind a layer of Stratus.



Sun all clear of clouds.



Disappeared behind Alto-Stratus Altitude 2° 45′.

GREEN FLASH AT SUNSET.

N.W. Pacific.

THE following is an extract from the Meteorological Report of S.S. *Talthybius*, Captain J. HATFIELD, Yokohama to Victoria B.C. Observer, Mr. R. T. HARRIS, 4th Officer:—

"June 25th, 1927, 7.36 p.m., Latitude 43° 27′ N., Longitude 157° 36′ E. Immediately after sunset a vivid emerald green flash was observed from the horizon point of sunset to an altitude of about 80° in a southerly direction. The sky immediately above the horizon was covered with A-St clouds to an altitude of about 5°. The remainder of the sky was covered with Cu-Nb/St. Cu. clouds."

LIGHTNING.

East Indies.

THE following is an extract from the Meteorological Log of S.S. *Elpenor*, Captain A. L. GORDON, Manila to Singapore. Observer, Mr. M. ROBERTSON.

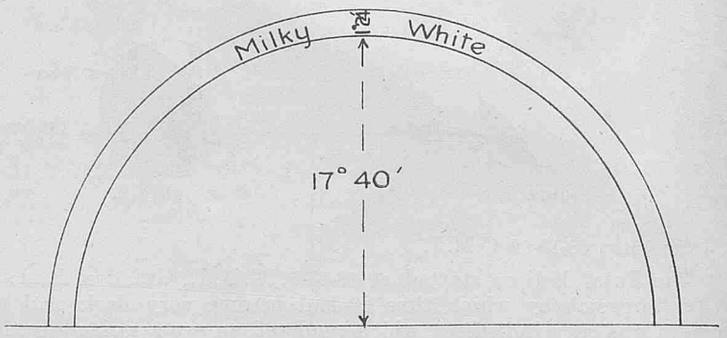
"19th June, 1927. At 0.05 a.m., Latitude 4° 16′ N., Longitude 105° 59′ E. Observed a peculiar dull red flash of lightning on horizon, resembling the loom from a lighthouse. It bore west throughout, and recurred about once a minute for a duration of 16 minutes. Sky was apparently cloudless in that quarter, and the visibility was exceptional. A squall with heavy Cu-Nb followed by Fracto-Cu had passed from S.S.W. a half hour previously."

LUNAR RAINBOW.

South Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Manchester Hero*, Captain J. E. RILEY, Montevideo to Manchester. Observer, Mr. H. ANDERTON, 2nd Officer:—

"On the morning of the 11th June, 1927, a lunar rainbow was seen absolutely perfect in arc and a very clear-cut milky-white in colour, and was visible for 20 minutes from 1.55 a.m. to 2.15 a.m. ship's time. The arc on the horizon spread from two points on the starboard bow to one point abaft the starboard beam, and the height of the arc from the horizon to the lower or inside edge of the rainbow measured 17° 40′ on the sextant, and the width of the arc 1° 24′. Very clear weather at the time, sky half-clouded with dark rain cloud. Aneroid barometer, 30.08 in., temperature, dry bulb 77° F., wet bulb 76° F. Position of ship, Latitude 3° 30′ S., Longitude 28° 06′ W. The whole arc appeared against a background of Stratus cloud."



REFRACTION AND VISIBILITY IN THE GULF OF ST. LAWRENCE AND OFF THE COASTS OF NEWFOUNDLAND.

THE following report from S.S. *Megantic*, Commander E. L. TRANT, R.D., R.N.R., Observer, Lieut.-Commander G. NORMAN JONES, D.S.O., R.D., R.N.R., 2nd Officer, has been received:—

"*Megantic* sailed from Quebec at 5 p.m. on June 18th, 1927, for Liverpool.

"The weather was fine from the start; the barometer high and steady, the wind west, force 2. The following day, Sunday, June 19th, the weather continued fine with visibility good, though it was not unusual until evening when Brion Island and Bird Rock were seen at a great distance.

"Both islands were very much distorted by refraction, Bird Rock appearing to be of immense height and square in shape, like some gigantic hay-stack.

"Brion Island was abeam at 8.37 p.m., distant 22 miles. The light showed clearly, and the lighthouse itself was visible to the naked eye as daylight faded. Brion Island light is listed in the light book as 17 miles.

"Bird Rock light was abeam at 9.30, distant 12 miles. This light has a range of 18 miles.

"Here it would be as well to state that the height of eye at time lights were observed was 60 feet.

"By 10.45, Bird Rock light was becoming dim, and Brion Island light had disappeared. At 11.00 p.m., the ship being in Latitude 47° 49′ N., Longitude 60° 25′ W., the lights on Brion Island and Bird Rock showed up again with intense brilliancy. At the same time the lights on Cape North, Cape Breton Island, Cap Ray and Cape Anguille, on the coast of Newfoundland, also appeared distinctly.

"The ship was then distant 48 miles from Cape North, which has a normal visibility of 16 miles. From Cape Ray 47 miles; light visibility, 17 miles from light list. Cape Anguille was distant 41 miles; light visibility 16 miles. Brion Island was 44 miles away and Bird Rock 30 miles off. The lights above mentioned are all flashing with the exception of Bird Rock which occults.

"Bird Rock light presented a very fine appearance, for it was greatly elongated, with a slight division in the middle which gave the impression of two vertical lights very close together, both of which were very bright.

"All the above-mentioned lights were perfectly clear and showed well above the horizon.

"St. Paul's light, which is to the eastward of Cape North and was much nearer the track of the ship, never showed up, though we searched for it. This would seem rather strange since the visibility was so unusual in all other directions. The distance passed off St. Paul's was about 38 miles.

"The barometer at time these lights were observed read 30.15 in., air temperature 50° F., water 40° F. The sky was partially covered with Ci-St. through which the zenith stars only appeared and they but dimly. The wind was west, force 2.

"During Monday, June 20th, weather remained fine, visibility being good, but not unusual; at the same time mirage was very marked over St. Pierre and Miquelon, which were sighted at good distances.

"At 9.20 p.m., on Monday, the ship in Latitude 46° 44′ N., Longitude 51° 52′ W., Cape Race light was visible 49 miles distant. The normal range of the light is 17 miles.

"At midnight a flashing light; 3 ev. 15 seconds, was sighted abaft the port beam. The ship then being in Latitude 47° 05′ N., Longitude 51° 05′ W., a bearing of the light was taken which showed the light to be that on Cape Speare, near St. Johns, Newfoundland. The ship was distant by these bearings **69 miles from the light** which has a range of 15 miles only under normal conditions.

"This light was only visible for about ten minutes, but was clear and bright while in view, each flash being absolutely distinct.

"The barometer at this time was 30.38 inches, air temperature 45°, water 36° Fahrenheit. The weather was fine, wind west, force 2. Sky partly covered with Ci-St."

METEORS.

Indian Ocean.

THE following is an extract from the Meteorological Report of S.S. *Knight Companion* Captain B. T. COX, East Indies to Suez. Observer, Mr. A. LAMB, 4th Officer:—

"June 23rd, 1927, 7.55 p.m., Latitude 5°54′N., Longitude 83°20′E. At this time an exceptionally brilliant meteor appeared as a flash of lightning behind a mass of Cumulus cloud to the S.W., a ball of light fading to a dull red after passing below clouds, falling at an angle of about thirty-five degrees toward the westward and disappeared about 15 degrees above the horizon. This meteor was visible for a period of about 3 to 4 seconds."

West Indies.

THE following is an extract from the Meteorological Report of C.S. *Henry Holmes* Captain A. BICKER CAARTEN, cable work in the West Indies. Observer, Mr. M. A. GREEN, 2nd Officer:—

"3rd June, 1927 (3.58 G.M.T. 4th June) in the Port of St. Thomas, observed unusually bright meteor, with long tail like a comet, shoot upwards into the heavens like a rocket. Course from *Altair* towards *Polaris*. Disappeared without curving earthwards."

NOTE.—The apparent direction of flight of a meteor depends on its actual direction in space and on the point where it enters the earth's atmosphere, relative to the position of the observer. The great majority of meteors appear to take a downward path across the sky. In the present instance the meteor must have been directed from a point below the horizon and must also have been an unusually large one or it would not have remained luminous over such a long course through the atmosphere.

NAVIGATIONAL INSTRUMENTS.

THE following remarks are contributed, having regard to what was said in the Marine Superintendent's note in THE MARINE OBSERVER, Page 2, Volume IV, by Captain W. MORTON BETTS, S.S. *Llandaff Castle*:—

"This vessel is fitted with the Admiralty Echo Sounding machine, which is indeed a wonderful aid to navigation, as one is able to get soundings up to 135 fathoms with accuracy in a few seconds from the Chart Room. I have thoroughly tested and checked the machine at all depths to the limit, with the Kelvin Sounding machine, and assure you it is a great help when making a port like Beira, coming round the Bijouga Breakers to Cape Verde, passing Cape Blanco and making the Channel, to be able to take soundings oneself in a few seconds, and with the Patent log recorder in the Chart Room, check the Ship's position at any time.

"We are also fitted with Marconi's latest Direction Finder from which I have had splendid results. It is also fitted in the Chart Room, and very convenient, but in my humble opinion it is too much involved with the ship's wireless, and feel sure that in the near future we will have a Direction Finder in the Chart Room independent and self contained, to be worked at will by the Officer of the Watch."

CAPTAIN GEORGE S. WEBSTER.

BY ONE OF HIS OFFICERS.

At the termination of the year 1927, there retired one of the best known Commanders in the Canadian mail and passenger service.

GEORGE SALKERD WEBSTER was born at Formby in 1868, and at the early age of eleven joined the *Indefatigable* at Liverpool. After completing three years on board the training ship, he commenced his sea career in the *Shakespeare*, a beautiful little barque of 767 tons, owned by the old Liverpool firm of E. C. FRIEND & Co. Six years later he joined the *Ellerslie*, and thence passed to the full-rigged ship *Genista*, one of the clipper ships engaged in the Australian wool trade.

In passing, it is interesting to note the staunchness with which the old iron vessels of over 50 years ago were built, as the *Shakespeare* still survives under the Finnish flag, which fact came to light as she was recently chartered for the making of a sea film.

After ten years in sail he entered the BEAVER LINE of ELDER DEMPSTER & COMPANY in March, 1892. In the Winter of 1895, when Chief Officer of the *Assaye*, he was in charge of the lifeboat which rescued nineteen of the crew of a Norwegian steamer, during an Atlantic gale. The rescue was effected with great difficulty and danger, and he was awarded the medal of the Royal Humane Society.

In 1896 he obtained his first command, and seven years later transferred to the CANADIAN PACIFIC when that Company took over the BEAVER LINE in 1903, and commanded many of the finest ships in their fleet, including *Empress of Britain*, *Empress of India*, *Metagama*, and *Melita*, his last being the *Montclare*, their newest passenger steamer in service, to which he was appointed in March, 1923.

Of his early commands may be mentioned that epoch-making vessel the *Lake Champlain*, the first big ship to be fitted with Wireless Telegraphy apparatus in 1901. Also the *Milwaukee*, which during the second Boer War was employed as a transport, and took the second Canadian contingent to the Cape from Halifax. In this ship he also took 900 Boer prisoners of war, including General CRONJE and his staff to St. Helena.

During the Great War he was engaged trooping from August, 1914 to 1918. He was presented with a silver cigarette case by the Admiralty for carrying confidential mails during that period, and he also carried a large quantity of gold specie for the Treasury.

After the termination of the War, the CANADIAN PACIFIC acquired the surrendered ex-German *Prinz Friedrich Wilhelm*, and Captain Webster was appointed in command. This fine vessel was the one which sailed from New York after the outbreak of war, and successfully ran the blockade, reaching Germany in safety, only to be forced to remain throughout hostilities. In the post-war Canadian trade she was re-named *Empress of India*, and after several runs across the Atlantic, she was, tonnage being scarce, chartered by the CUNARD LINE for two voyages to New York, while their *Mauretania* was being renovated from the results of a disastrous fire. Except for Captain, Navigating and Engineer Officers, *Mauretania's* crew

The Master of the *Montclare*, 1923–1927.

CAPTAIN G. S. WEBSTER.

sailed the ship. A strike of dockside workers was in progress at New York during part of this time, but Captain WEBSTER organised the ship's company and discharged and loaded the vessel, in addition to loading *Aquitania's* mails and baggage, no mean feat as sailing was not delayed. At the end of the last homeward voyage of the charter the Cunard crew presented Captain WEBSTER with a magnificent silver rose bowl, and gave him an enthusiastic ovation in the form of a banquet upon the most lavish scale, a function which the writer, who was lucky enough to be present, will always remember.

Captain WEBSTER is a Lieutenant-Commander on the retired list of the Royal Naval Reserve, and reference to the December, 1927, "Navy List" shows that he headed the list of Officers authorised to fly the Blue Ensign, his warrant having been issued as far back as 1905. He has been a member of the Corps of Voluntary Marine Observers since 1903, and the ships under his command have contributed a large number of Coded Weather Reports, and his name has appeared in the list of "Excellent" awards upon several occasions.

With heart and mind devoted to ships and the sea, he always kept himself in the very forefront of all the latest developments of the seamen's calling. With his gyro compass, direction finder and station weather reports he kept his vessel's time with unsurpassed regularity, in spite of the fog and ice so frequently encountered on the Canadian route.

His good fortune afloat was indeed remarkable, as during his long life at sea he was never wrecked or involved in a serious accident. He had developed some wonderfully uncanny sixth sense which warned him when danger threatened his ship, as the writer personally experienced upon more than one occasion during the some twenty voyages under his command.

His association with the sea for nearly half a century was brought to a fitting conclusion when he was entertained as the guest of honour by Officials of the CANADIAN PACIFIC and members of the ship's company on board the *Montclare* in December last, at St. John, N.B.

Well liked and greatly esteemed, his genial personality will be greatly missed in the Canadian trade. May he enjoy the good health in his well-earned retirement that he did whilst upon active service, when the strain and responsibility of his arduous employment appeared only to stimulate him. He has settled down at his home at Waterloo, near Liverpool, and his link with the sea will be his sons, one of whom is twenty-three years of age and at sea, and his two younger ones are also expected to follow the calling of their father.

M. C.

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

PART I.

PREPARED IN THE MARINE DIVISION BY E. W. BARLOW, SENIOR PROFESSIONAL ASSISTANT.

THE charts of currents on the tracks from Panama to Australia and New Zealand Ports, which are being published in the present volume of THE MARINE OBSERVER, have been drawn from observations made during the years 1910-1926. The method employed in the construction of the charts showing the resultant current directions and also those giving the current roses is exactly the same as that adopted for the charts of the Atlantic Ocean published in previous volumes of THE MARINE OBSERVER. In the various articles descriptive of the Atlantic current charts cautions have been given with regard to the use of the charts. It will perhaps be advisable to restate these cautions here:—(1) The charts can only give information derived from observations made during the period of years to which they refer. Such information might differ, more or less, from that obtained from a considerably longer period. In the present state of our knowledge we have not yet definitely determined the best period from which the true current averages could be obtained. Possibly it would be something like 30 years. (2) It is not only the period of years used in making current charts which determines their accuracy. The total number of observations from which a current rose or a current arrow are drawn is also of the greatest importance. Thus an arrow based on 5 observations spread over a period of 30 years would probably be little, if any, better than one based on 5 observations obtained during a period of 5 years. It might, by chance, even be considerably further from the truth. (3) The resultant current shown by an arrow for any given region is a mean value, both as regards set and drift. The current experienced by the navigator in that region on any particular day may or may not be similar to the mean value. Even the steadiest of the great currents has a large element of variability and when regions of weak and variable currents are in question the current found on any particular day is much less likely to correspond with the mean value. It is in this connection that the current roses, which show both the frequency of different sets and the strength of these sets, are of such great value. The method adopted in THE MARINE OBSERVER charts of giving both arrows and roses is undoubtedly the best way of representing the information that we possess, and will remain so however much our knowledge is increased.

In regard to the Pacific Ocean, it is even more necessary to insist on these cautions than it was with the Atlantic Ocean, for it is, unfortunately, the case that the Pacific Ocean charts, while based on an equally long period, are drawn from considerably fewer observations, generally speaking, than were available for the Atlantic charts. As a result, a number of the areas, 2° of latitude in width and 4° of longitude in length, into which the charts are uniformly divided, are left blank for one or more quarters of the year. Few of the roses will be found missing because these always refer to considerably larger areas, in which the total number of observations is usually large enough for the rose to be drawn.

In the present article the chief characteristics of the charts for the two quarters of the year so far published will be dealt with as far as is possible, due care being taken not to draw conclusions from apparent seasonal changes in current depending on very few observations. The part of the Pacific Ocean under consideration is divided into three portions, the first extending from the American coast to Longitude 124° W., the second from Longitude 116° W. to Longitude 168° W., and the third from Longitude 160° W. to the Australian coast. In the South Atlantic Ocean and in that part of the North Atlantic covered by the trade routes the current system is fairly simple, consisting chiefly of a circulation round an area of high atmospheric pressure, but in the South Pacific Ocean the currents are more complex. A permanent area of high pressure of about the same size as that of the South Atlantic also exists in the South Pacific, and it is furthermore situated at about the same distance from the eastern shore of the Ocean in each case. On account of the much greater extent of the Pacific Ocean, however, this area is not roughly central in the Ocean, as it is in the South Atlantic, but lies right on the eastern side, as shown in the Charts of Pressure and Wind for January and July, given in Volume IV, No. 42 of this Journal. It is true that a belt of moderately high pressure does extend across to Australia, fairly wide in winter (July) but very much narrower, especially between New Zealand and Australia, in summer (January). The mean pressure in the central and western parts of the Ocean does not, however, exceed 1,013 mb. (29.9 in.) except during the winter months, when an anticyclone covers the Australian continent and the 1,016 mb. (30.0 in.) isobar extends out in the Ocean nearly to Longitude 170°E. A further point of difference between the South Pacific and the South Atlantic Oceans lies in the aggregation of small and scattered islands and reefs which, with the areas of comparatively shallow water round about them, occupy a considerable region of the South Pacific Ocean, mainly in its central and western portions.

Before we proceed to consider THE MARINE OBSERVER charts for the two quarters of the year so far published, it will therefore be desirable to make a brief general survey of the currents such as may be obtained from Sailing Directions or other works of reference. On the eastern side of the high pressure area, between it and the South American coast, is found the Peru or Humboldt Current which runs with considerable strength and is exactly analagous to the Benguela current in the South Atlantic Ocean. In the case of both these currents the drift is on the average somewhat stronger in more southerly latitudes, decreasing as the current moves northward. In the neighbourhood of Latitude 30°S. the Peru current begins to divide, the major portion gradually becoming a westerly set into the Ocean in accordance with the anticyclonic circulation round the high pressure area, but a considerable portion continues northward, following the coast line, as far as the Equator. This coastal current, which has no definite name, is also represented in the South Atlantic by a part of the Benguela current which follows the coasts of Angola and French Congo but which is outside the area covered by THE MARINE OBSERVER charts. The main westward branch of the Peru current, known as the South Equatorial Current, crosses the entire Ocean, the northerly part, between the Equator and about Latitude 14° S., reaching the Solomon Islands and the northern coasts of New Guinea, while the southerly part, to about Latitude 25° S. is said to become gradually W.S.W., S.W. and S.S.W. in set in accordance with the anticyclonic circulation. Much of the current is, however, dispersed among the innumerable islands and shoals which exist from the Taumoto or Low Archipelago westward, but a portion is believed to complete the circulation right round the southern edge of the high pressure area, from the eastern side of this Archipelago. The completion of the circulation on the eastern and southern sides is of a weak and indefinite character, so far as the observations go. It has no distinctive name.

So far the conditions are similar to those of the South Atlantic with the exception that in that Ocean the western side of the circulation, the Brazil current, is a strong current. In the Pacific, however, the circulation that has been described occupies only the eastern half and there is a definite second circulation, far beyond the direct influence of the main high pressure system. This is found between about Longitude 175° W. and the eastern coast of Australia, and may be considered, broadly speaking, to be centred on Norfolk Island. Along the northern side runs the warm Australian or New Holland current, setting about W.N.W., passing the island of New Caledonia and reaching the coast of Queensland in the vicinity of Sandy Cape, Latitude 25° S. From this point there is a narrow but strong and well-defined current called the East Australian Coast current, which follows the coast of New South Wales in a southerly direction as far as Latitude 40° S., abreast of Bass Strait. A general easterly and north-easterly flow of cooler water from this current and from the Southern Ocean General Drift, rather weak and variable in character, is said to pass up both sides of New Zealand and so complete the circulation. The only other point which need be noted is that in the wide area north of the New Holland Current, between it and the South Equatorial Current the general current trend is westerly, not very strong, but a considerable current passes from this area westward through the Torres Strait.

We might at first sight associate the Australian current system with the winds of the Australian high-pressure area in exactly the same way as we have associated the main oceanic systems with the winds of the great oceanic high-pressure areas. A difficulty, however, arises because, as we have seen, the Australian high-pressure area is well-developed only during the southern winter, and the region is therefore not one of permanent high-pressure in the sense that the main oceanic systems are. It will be remembered that by EKMAN'S theory the wind must be, broadly speaking, constant in direction through the year in order to produce, in conjunction with the great coastlines, the main currents which circulate round high-pressure areas. At the present stage, and particularly before THE MARINE OBSERVER Charts for the last two quarters of the year are published, it will be well not to attempt an exact explanation of the Australian currents. The character of the South Pacific Ocean high-pressure areas and currents being different to that of either the North or South Atlantic or North Pacific Oceans does, however, give us the opportunity of noting an interesting point. By EKMAN'S theory, if either the eastern or western sides of a permanent high-pressure area were not in comparatively close contact with an extended coastline, no strong current would be developed on that side, the condition for the strong currents as we know them being a steady wind blowing parallel to or obliquely over a coastline. In the Pacific Ocean we have precisely this state of affairs. On the eastern and coastal side of the oceanic high-pressure area we find the strong Peru current, and on the western and coastal side of the area of relatively high-pressure off Australia we find the strong East Australian Coast Current. On the other sides, which face each other across the ocean, the currents are weak and variable, though probably as a whole conforming to and completing the circulation.

"The Marine Observer" Charts.—Let us now examine the two quarters of THE MARINE OBSERVER charts. It will be noted that the charts are being published in the usual order, starting with the quarter February, March and April. As the charts are for the Southern Hemisphere, this quarter will be referred to as the Autumn quarter, while that for May, June and July will be referred to as the Winter quarter. The Australian and New Zealand tracks cut across the region, between Longitude 85° W. and Longitude 100° W., where the Peru current is setting westerly and becoming the South Equatorial Current. They then pass through the western part of the area actually covered by the high-pressure system and should encounter the weaker southerly and south-easterly sets on the western side of the system between about Longitudes 120° W. and 130° W. A region of weak and variable currents is next crossed, but on approaching Longitude 180° the north-easterly and northern sets on the eastern side of the Australian high-pressure should be experienced. The East Australian Coast Current is within the area shown in the charts, but the New Holland Current lies just to the northward of the tracks. It should also be noted that the bulk of the Pacific Islands lies to the northward of the region covered by the tracks.

Eastern Portion.—The South Equatorial Current is well shown in both the Autumn and Winter quarters, and several points of difference between these quarters may be determined. The current as a whole is slightly stronger during the Autumn quarter. It is also seen to have a seasonal change of set, having a marked south-westerly trend in autumn, becoming westerly in winter. The region closely N.W. of the Galapagos Islands, Latitude 0° to 2° N., Longitude 88° W. to 92° W., shows the greatest mean drift, 27.3 miles per day in Autumn, but this is based only on four observations. Another fact brought out by the charts is that south of the main part of the current, which extends to about Latitude 6° S., the general trend of the currents in the region of the tracks is westerly down to Latitude 18° or 20° S., with moderate or weak drifts, thus showing a very definite westerly circulation of which the strong South Equatorial current forms the northern part. In the interesting note on the tracks received from Captain J. BURTON DAVIES, S.S. *Tongariro*, published in "The Marine Observer's Log" of this Number, a more northerly route is recommended from Panama to Australia and New Zealand because this prevailing westerly current is found. Further south, to the west of Easter Island, the currents are weak and variable. Although THE MARINE OBSERVER charts for the South Atlantic do not cover the corresponding region of the high-pressure area it may be noted that this extended westerly set forms a feature of the Admiralty current charts in both Oceans. Another interesting feature shown on the Winter chart is the Counter-Equatorial Current flowing with considerable strength, easterly or south-easterly, in the region Latitude 2° N. to 6° N., Longitude 80° W. to 88° W., immediately north of the South Equatorial Current. It is entirely absent in the Autumn quarter, when south-westerly sets replace it. The Autumn quarter shows S.S.W. sets of considerable strength from the Bay of Panama and from the westward of Cape Mala, which are less strong in the Winter quarter. An indication of these currents and of the reduction in strength in the Winter quarter is also given by the Admiralty charts. As regards actual current drifts in the South Equatorial Current, four exceeding the rate of 60 miles per day have been reported in autumn, the greatest being that experienced by S.S. *Rimutaka*, at the rate of 99 miles per day, S. 22° W., on March 3rd, 1925, in Latitude 3° 29′ N., Longitude 81° 53′ W. For the Winter quarter three drifts exceeding 40 miles per day have been reported.

Middle Portion.—Little can be said at present about this portion. The currents are generally weak and variable. The Winter quarter

shows indications of an easterly current of moderate intensity, about Latitude 30° S., to the westward of, and in the neighbourhood of Rapa and Bass Islands. For the Autumn quarter several of the squares are blank, but in the vicinity of these islands the current has almost entirely disappeared. There is little evidence in the eastern longitudes of the charts for either quarter of the southerly or south-easterly currents required to complete the main circulation on the eastern side of the South Pacific.

Western Portion.—The East Australian Coast Current is shown in both quarters, most strongly in Autumn, which is in accordance with the general knowledge of this current. It is probable, however, that it is not represented at its full strength on THE MARINE OBSERVER charts as it is mainly confined to soundings, so that the smaller currents from positions in the same square seaward would reduce the mean value. There are, unfortunately, many blanks in this portion, but the available information does not produce any striking evidence of the north-easterly and northerly flows on the eastern side of the Australian system. Currents conforming to this circulation may, however, be found in isolated squares in both quarters.

THE PRIME MERIDIAN.

BY W. G. PERRIN.

The seaman of the present generation is so accustomed to see his charts graduated from Greenwich that it probably never occurs to him to ask why the nations of the world have taken Greenwich as the datum point for the measurement of longitude, when the Greenwich meridian was first used, and what were the meridians in use before Greenwich Observatory existed? Yet the answer to these questions is not without interest.

The latitude can be ascertained by measuring the height of the pole above the horizon. This is now a simple method in the northern hemisphere, for a prominent star indicates the position of the north pole fairly closely, but 2,000 years ago this star was about 10° distant from it; no bright star occupied its place, and it seems doubtful whether the ancients made use of polar observations. Instead of this they appear to have measured the co-latitude by erecting a vertical pillar or gnomon and measuring the lengths of the shadows at the summer and winter solstices and thence deducing the height of the celestial equator above the horizon. But the measurement of the longitude was a difficult problem that the ancients could not solve.

In order to ascertain the longitude it is necessary to compare the local time with the time of a standard meridian. Before the invention of the electric telegraph there were four possible means of doing this:—

(1) By the observation of eclipses; for which the eclipses of Jupiter's satellites were preferred on account of their frequency.

(2) By observing the position of the moon in relation to the stars (especially occultations of them, when available).

(3) By observing the passage of the moon across the local meridian.

(4) By carrying the time of the standard meridian in a clock that never varied, or varied only at a known rate.

The first three methods required delicate observations and numerous and lengthy calculations. At sea (1) and (3) were quite impracticable and (2) difficult and lacking in precision. The fourth method was practicable at sea as soon as somebody could invent a clock that kept time when it was moved about. Until this was actually done many scientists believed that it was a mechanical impossibility, and urged the need of closer study of the irregularities of the lunar motion, the compilation of more accurate tables, and improvements in methods and instruments of observation.

With the growth of sea communication, the necessity of finding readily the longitude at sea became so pressing that in 1713 the British Government offered a reward of £20,000 to anyone who could produce a practical solution of the problem. This reward was finally won by a Yorkshire carpenter, John Harrison, who in 1735 and the following years produced a series of timekeepers that surpassed in accuracy anything hitherto dreamt of. Harrison and his successors provided a solution of the great problem that had troubled the seafaring world for thousands of years. This solution is not likely to be superseded, though the invention of wireless telegraphy (which enables a standard time to be communicated broadcast) has provided a method that required the chronometer only as an auxiliary and not as a principal.

The fact that the Earth is a globe and not a plane surface was surmised by some of the early Greek philosophers, and it is possible that this had been realised by Pythagoras about 525 B.C. Even before that time there had been attempts to map the known surface, commencing perhaps with Anaximander *c.* 575 B.C., but the first to attempt to map the known surface in a scientific manner appears to have been Eratosthenes, who was born in 276 B.C., and became the librarian of the great library in Alexandria in 240 B.C., continuing there until his death in 196 B.C.

Eratosthenes attempted to measure the length of the Earth's circumference by estimating the length of an arc of meridian between Alexandria and Syene. In this he appears to have arrived at a result surpassing in accuracy anything achieved until comparatively recent times.

In order to divide the known world into equal portions on his map he drew a parallel of latitude through Rhodes. He supposed this to pass through the Straits of Messina, which lie over 2° to the North of it; through the Strait of the Columns (*i.e.*, Strait of Gibraltar), which in fact it nearly does; and through the Sacred Promontory (now called Cape St. Vincent), which actually lies 1° to the North. Other parallels were drawn through Alexandria, Syene (which he supposed to lie on the Tropic of Cancer) and Meroe. Eratosthenes naturally chose as his prime meridian that passing through Alexandria, which he supposed also passed through Rhodes, which lies really a degree and a half to the West, and Syene, which is about 3° to the East. He chose seven other meridians passing through important points such as Carthage, the Pillars of Hercules, etc. He supposed Rome to lie on the meridian of Carthage, though it is really 2° to the East. Despite the difficulties he had to contend with, his estimate of the length of the Mediterranean (which was about one-fourth too great) was more accurate than that in use by us in the middle of the seventeenth century.

Hipparchus, an eminent astronomer, who flourished at Rhodes some fifty years later, conceived the idea of mapping the Earth's known surface by first ascertaining from astronomical observations the latitude and longitude of every important point. This however was impracticable in those days, but he made some important rectifications in the Mediterranean, especially by drawing the Gibraltar-Rhodes parallel south of Syracuse.

The efforts of both Eratosthenes and Hipparchus to construct accurate maps were defeated because few reliable observations of the latitude had been made, most of the positions having been arrived at from a consideration of the lengths of the longest day at the places in question, and there was no practical means of ascertaining longitude. In order to estimate the longitude all they could do was to guess the distance from the time occupied in travelling between any two points east and west of each other, and they placed localities on the same meridian if the traveller appeared to go due north or south in journeying from one to the other.

No further progress was made for 300 years until the time of Marinus of Tyre and his successor Claudius Ptolemæus (*c.* A.D. 150). Ptolemy's great work on geography has survived, but we do not know how much he is indebted to Marinus. In order to construct his map, he drew up tables of positions by latitude and longitude. It is clear that he really based his longitudes on the meridian of Alexandria, but in order, apparently, to avoid longitudes of different signs he (or more probably Marinus) imagined

a prime meridian passing through the most westerly land then known—the Fortunate Islands (Canary Islands). He certainly did not know exactly where they were, for he makes the meridian of the Sacred Promontory (Cape St. Vincent) 2° 30′, although the nearest of the islands is about 4° 30′ to the west of it. He complains of the fewness of the observations made for latitude and says there had been none since the days of Hipparchus, but as he speaks of these as " elevations of the north pole " it is clear that this method of deriving latitude was then well known. Ptolemy gives the longitude of Alexandria as 60° 30′, or 58° from Cape St. Vincent, whereas in fact the difference is only about 39°. Unfortunately he had abandoned the more accurate estimate of Eratosthenes for a much less accurate one based on the works of Posidonius.

After the time of Ptolemy no further progress was made in the western world for over a thousand years. Meanwhile, the Arabs kept the torch of geographical learning alight. Though they do not seem to have done much in actual map construction, they drew up revised tables of positions and reduced Ptolemy's exaggerated estimate of the length of the Mediterranean, which was nearly half as long again as the reality, to something nearly approaching the truth. These results appear to have become known in western languages mainly, if not entirely, in astrological works, but it seems probable that the makers of the Mediterranean charts (known as *Portolani*) in the fourteenth and fifteenth centuries were indebted to them—as they certainly were to the magnetic compass also derived from the Arabs—for the superior accuracy of those charts.

With the renaissance of Greek learning in Europe, Ptolemy's original text (long known only in Arabic translations) was rediscovered. Early in the fifteenth century, Latin translations of it appeared in manuscript, and about 1472 appeared the first printed edition, which was accompanied with 26 maps. In a sense this discovery was unfortunate, for his great reputation caused these erroneous maps to be preferred to the more accurate *Portolani* charts, but it led to Columbus's voyage to America. The globe of Martin Behaim which was constructed in 1492 before the return of Columbus has an equator divided into 360 degrees, but these are not numbered and its only meridian is drawn 80° to the west of Lisbon. The globe discovered at Laon in 1859 which is believed to belong to this period has several meridians, one drawn through the Canary Islands.

The discoveries of Columbus gave a great impetus to map and globe making. Apparently the earliest of the post-Columbus globes with a definite prime meridian is one constructed about 1510 now at Cracow. This meridian is drawn through Ferro, the most westerly of the Canary Islands. In 1515 was constructed the Quirini globe at Paris, in which the prime meridian is placed further west and passes through the Cape Verde Islands.

In 1538 Gerhard Kremer (Mercator) produced his first map, a map of the world on the recently invented " double cordiform " projection. In this he drew his prime meridian vaguely through the position of the Canary Islands as Ptolemy had done, but in 1541 he produced a set of globe gores with this meridian precisely drawn through Fuertaventura, one of the easternmost of those islands. At this time he was still under the influence of Ptolemy, but had begun to reduce the excessive Mediterranean lengths.

In 1542 Alonzo de Santa Cruz also produced a gore map, on which he drew the meridian west of Fayal in the Azores, and 20° west of this he drew the line of demarcation between the spheres of discovery of Spain and Portugal—which by the Treaty of Tordesillas in 1494 had been fixed as 270 leagues west of Cape Verde. In the MS. map of Diego Ribero, 1529, this line is taken as the prime meridian.

In 1554 Mercator produced a map of Europe in which he cut down the Mediterranean length (which Ptolemy made 62°) still further from 58° to 53°. From a letter which he addressed to Charles V in 1553 it is clear that he had abandoned the Ptolemaic meridian and was intending to select a new datum point, that at which the compass showed no variation. The fact that there was a position of zero variation had been discovered by Columbus, but it was long before anyone realised that the variation underwent a slow secular change, or that the isogonic lines were mostly tortuous curves. In this map the prime meridian appears to be based on Ferro, but the map does not extend far enough to the S.W. to show this island.

Ten years later (1564) Ortelius produced a map of the world on a cordiform projection. In this he has drawn the prime meridian through the centre of Madeira and the eastern part of Tenerife. These two places are really about half a degree apart in longitude, but the exact positions of the various islands in the Atlantic were not known then nor for very many years afterwards.

In 1569 Mercator produced the work which made his name immortal. This was a map of the world constructed for the use of seamen on the celebrated projection which (as improved by Edward Wright in 1590) we call Mercator's projection. On this he drew the prime meridian through the Cape Verde Islands because, as he explains in a legend upon this map, he had consulted an experienced pilot of Dieppe who told him that the needle did not vary in certain of the islands. As a matter of fact he has actually drawn the line through St. Michael and St. Mary in the Azores, 3° west of Madeira, 1½° west of Ferro in the Canary Islands, and then between St. Jago and Bonavista in the Cape Verde Islands. A glance at a chart will show the considerable difference in longitude between the Azores and the Canary Islands. Evidently Mercator thought that the magnetic meridian was a meridian great circle.

For many years at this period the prime meridian wandered about in search of the isogonic zero line, and it may be as well to explain that the deep-sea navigators of this period found in the variations of the compass the only practical check over dead reckoning of longitude that was available to them. Even as late as 1700 it was worth while for Halley to spend two years at sea in order to prepare a general chart of magnetic variation for the use of mariners.

In 1570 Ortelius produced the first printed collection of maps in form of a modern atlas, to which he gave the name *Theatrum Orbis Terrarum.* In the world-map which precedes the set the zero meridian passes through the Azores and Cape Verde Islands. Shortly afterwards (1583-4) appeared the first collection of sea charts, the *Spieghel der Zeevaerdt* of Waghenaer, which was translated into English in 1588 as *The Mariners Mirrour.* This has only one map with the longitude marked upon it; and the prime meridian passes through the Canary Islands between Gomera and Tenerife.

In 1601 Hondius produced a terrestrial globe which is of especial interest to us because it contains upon it a memorandum on the longitude in which he explains that " We have begun our longitudes not as Ptolemy did from the Fortunate Islands but from those called Azores because there the compass needle points due north."

But the most interesting inscription is that upon the globe made by Blaeu in 1622, in which he gives his reasons for fixing upon the Peak of Tenerife.

This appears to be the first attempt to fix the meridian as passing through a precise geographical spot instead of vaguely through an island or group of islands. Blaeu had abandoned the idea of fixing a " natural " point indicated by the compass variation, but although he saw the isogonic zero line did not coincide with a terrestrial meridian, he does not appear to have known that the isogonic lines slowly changed their form and position. It was in this year that Gunter made the observation near London that showed that the variation there had decreased over 5° in forty-two years, but the fact does not appear to have been properly appreciated until Gellibrand made further observations in 1634.

Louis XIII on July 1st, 1634, issued a decree fixing the prime meridian of all French charts at the westernmost point of the Canary Islands in order to mark a clear line of demarcation for the hostilities going on at sea with Spain. It was a case of " no peace beyond the boundary," similar to the old " no peace beyond the line " with which our Elizabethan seamen were so well acquainted.

This decree certainly had the effect of encouraging the use of Ferro, but when in 1680, Louis XIV set two members of the Royal Academy of Sciences, the astronomers Picard and de la Hire, to correct the map of France it was found to be practically useless and the astronomers used Paris Observatory for their meridian, as the longitude of Ferro could not be exactly ascertained.

By this time most nations had given up the pursuit of the elusive prime meridian and made their own in their own country for local purposes, so that real measurements could be taken when necessary. Thus there was London (defined as St. Paul's Cathedral in large-scale maps a little later), Paris, Cadiz, Toledo, Freudenberg,

Konigsberg, Uranienburg, Copenhagen, and Bologna, though the older longitudes still appeared in the world maps.

In 1725 after fruitless attempts to get concordant results in measuring the difference of longitude between Paris Observatory and Ferro the French decided to assume it at 20°. This was really the final abandonment of Ferro and transfer of the prime meridian to Paris, but the convention remained for some years, the zero line being pushed into the ocean when it was discovered that the real difference was about 20°30′, and it will still be found on one or two charts in use to-day. In a French chart of the Bay of Biscay dated 1750 there are no less than six scales, one each for Paris, Madeira, the Lizard, London, Tenerife and Ferro. A legend upon it explains that this multiplicity of scales is to enable passing ships to communicate their supposed longitude the more readily.

The Royal Observatory was founded at Greenwich in 1675 by Charles II with a view to "the Rectifying of the Tables of the Motions of the Heavens and the Places of the Fixed Stars, in order to find out the so much desired Longitude at Sea." From that day it has been one of the foremost of the world's observatories, but it was long before even the British took the meridian of Greenwich for their prime meridian.

Greenvile Collins' *Great Britain's Coasting Pilot*, published in 1693, was the first collection of scientifically constructed charts published in England, but though many of these charts have scales of latitude not one has any scale of longitude.

In English charts of the early eighteenth century the zero meridian is usually either that of the Lizard, or London, or sometimes Ferro, but in large-scale local maps a local object was often taken. The earliest maps on which, so far, I have found the prime meridian based on Greenwich, are the two charts attached to the *Description of the Sea Coast . . .* published by Fearon and Eyes in 1738, and the *Survey of the County of Oxford*, by Thos. Jeffreys, published in 1769, but the meridian of London was still in use in the *New Hydrographical Survey of the British Channel*, published by Sayers and Bennett in 1777. In the *Atlantic Neptune* of Des Barres, which commenced publication in that year, the meridian of Greenwich was used, and thereafter it rapidly superseded all others in English maps and charts. It is probable that the starting of the Nautical Almanac in 1767 had a good deal to do with this.

Practical considerations had caused the abandonment of the idea of an international meridian based on a point in the extreme west of the Old World, and the various nations had each chosen their own datum, usually that of their principal observatory. Thus in 1870 the following meridians were in use: Greenwich, Paris, Cadiz, Naples, Christiania, Ferro, Pulkowa, Stockholm, Lisbon, Copenhagen, Rio de Janeiro, Washington and Amsterdam, and I do not think this exhausts the list. This multiplicity of prime meridians was a great nuisance to seamen, who had often to make use of charts of more than one nationality. Several conferences talked about it, and suggestions for the adoption of the meridian of Jerusalem, the Great Pyramid, or some other world-renowned spot were put forward.

At a Geodetic Conference which met in Rome in October, 1883, the question was discussed. A special committee which had examined the question put forward a report in which it stated "that the unification of longitudes and hours is as equally desirable in the interests of science as in those of navigation, commerce and international communication. The scientific and practical utility of this reform considerably outweighs the sacrifices and the trouble of arrangement to which it will put the minority of civilised nations." The report then went on to propose Greenwich as the initial meridian, and recommended that longitude should be reckoned "in the sole direction of from west to east." In giving reasons for the choice the report pointed out that the meridian of Greenwich was "by far the most extensively used," and asserted that "90 per cent. of the navigators throughout long voyages calculate their longitudes by the meridian of Greenwich." After a hot debate the report was accepted by the Conference which added a suggestion that, if the whole world agreed to the proposal, Great Britain should in turn adopt the metrical system, but this Congress had not sufficient weight to reconcile national susceptibilities and to force the Governments into action. A year later the United States Government called together an International Conference at Washington "for the purpose of fixing a Prime Meridian and a Universal Day." The United States had already abandoned Washington for Greenwich in its sea charts, and as soon as the Congress was open one of the U.S. delegates seized the bull by the horns and bluntly proposed the adoption of Greenwich. At first there was a good deal of opposition, and after a long and animated debate extending over two sessions on the question whether it was practically possible to find or fix a really "neutral" meridian, and on the need for having the prime meridian closely connected with an observatory, the resolution was put "that the initial meridian should have a character of absolute neutrality . . . and especially should cut no great continent—neither Europe nor America." It was lost by 3 votes against 21. After some further discussion a resolution was put "that the Conference proposes to the Governments here represented the adoption of the meridian passing through the transit instrument at the Observatory of Greenwich as the initial meridian for longitude." This was passed by 21 votes to 1 with two abstentions.

With the further discussions and resolutions of this Conference we are not now concerned, except to observe that it was decided that the longitude should be reckoned east and west of Greenwich up to 180°, and that the proposal to count it continuously from 0° to 360° was not agreed to; and to note that the decision taken regarding time has gradually led to the adoption of "zone time," by which the times in the various countries are made to differ from Greenwich time by an integral number of hours, which is a great practical convenience to travellers.

WEATHER SIGNALS.

WIRELESS WEATHER SIGNALS.

II.—WIRELESS WEATHER BULLETINS.

ARABIA.

Aden W/T Station, approximate Latitude 12° 49′ N., Longitude 45° 02′ E., call sign **BZF,** broadcasts weather bulletins, *en clair*, at 0948 and 1748 G.M.T. daily, on a wavelength of 2,000 metres I.C.W. The bulletins, which refer to the weather conditions in the eastern portion of the Arabian Sea are prefixed by the words "East Arabian Sea" and give information regarding storms, stormy winds, and the absence of storms. The words "Weather Normal" are frequently used in these bulletins and they mean:—

"As far as coast observations and available ships' reports indicate, there is no reason for thinking that a storm has formed or is forming."

When either disturbed or stormy weather is anticipated an additional weather bulletin will be broadcast at 0148 G.M.T. on a wavelength of 600 metres.

A special bulletin specified as "Immediate" will be broadcast, when necessary, on 600 metres (I.C.W.) as soon as received from the Indian Meteorological Department.

BRITISH INDIA.

Weather bulletins are broadcast twice daily, *en clair*, from stations in British India 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 (spk.)
0900 and 1700	**Bombay** ...	19° 05′ N.	72° 50′ E.	**VWB**	1,000 ,,
	Madras ...	12° 59′ N.	80° 11′ E.	**VWM**	1,000 ,,
	Rangoon...	16° 46′ N.	96° 12′ E.	**VTR**	1,200 ,,

* After the time signal.

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 **Bombay, Madras,** and **Rangoon W/T Stations.**

The foregoing messages are also supplemented when necessary by further messages under the TTT signal during stormy weather. (*See* W/T Storm Warnings.)

CEYLON.

Matara W/T Station, approximate Latitude 5° 59′ N., Longitude 80° 32′ E., call sign **BZE,** broadcasts weather bulletins, *en clair*, at 0948 and 1748 G.M.T. daily, on a wavelength of 2,000 metres I.C.W. These bulletins give information regarding weather conditions in the Bay of Bengal and Arabian Sea, being prefixed accordingly.

The word "Normal" is sometimes used in the bulletins and may be preceded by "Bay" or "Arabian Sea" according to which is referred to. It means:—

"As far as coast observations and available ships' reports indicate, there is no reason for thinking that a storm has formed or is forming."

When either disturbed or stormy weather is anticipated an additional weather bulletin will be broadcast at 0148 G.M.T. on a wavelength of 600 metres.

A special bulletin, specified as "Immediate" will be broadcast, when necessary, on 600 metres (I.C.W.), as soon as received from the Indian Meteorological Department.

Colombo W/T Station, approximate Latitude 6° 55′ N., Longitude 79° 53′ E., call sign **VPB,** broadcasts brief reports, on the weather conditions near Ceylon after the time signals at 0600 G.M.T. on a wavelength of 2,300 metres C.W. and at 1700 G.M.T. on a wavelength of 600 metres I.C.W.

WIRELESS STORM WARNINGS.

ARABIA.

Aden W/T Station, *see* Aden Weather Bulletin.

BRITISH INDIA.

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). Wavelength used, 600 metres spark:—

Karachi	call sign	**VWK**	}	at 0430, 1230 and 2030 G.M.T.
Calcutta	,,	,, **VWC**		
Port Blair (Andaman Is.)	,,	,, **VTP**		
Bombay	call sign	**VWB**	}	at 0500, 1300 and 2100 G.M.T.
Madras	,,	,, **VWM**		
Rangoon	,,	,, **VTR**		

CEYLON.

Matara W/T Station, *see* Matara Weather Bulletin.

III.—WIRELESS TIME SIGNALS.

BRITISH INDIA AND CEYLON.

Station.	Call Sign.	Wave length, metres.	G.M.T. of Time Signal.	System.
Calcutta. Lat. 22° 33′ 34″ N. Long. 88° 20′ 14″ E.	VWC	2,000spk.	0827–0830, 1627–1630	*See* FIGURE 1.
Colombo. Lat. 6° 55′ 05″ N. Long. 79° 52′ 53″ E.	VPB	2,300 C.W. 600 I.C.W.	0557–0600, 1657–1700	*See* FIGURE 1.

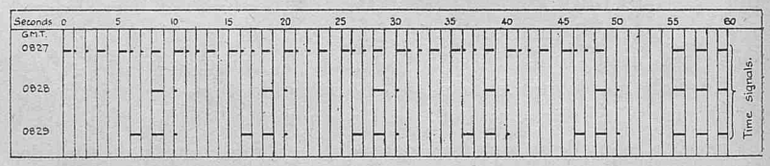


Figure 1.

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 0.2 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′ 18″ E.), the remaining signals being sent by hand.

IV.—VISUAL STORM WARNINGS.

ADEN AND BRITISH INDIA.

THE undermentioned storm signals known as general, general with additional signals, and brief systems have been adopted at Aden and at the various ports of British India.

Port Officers are kept informed, by the Indian Meteorological Department, of the latest information concerning all disturbances, and application can be made to them for information to supplement the storm signals.

General System.

Distant Signals.

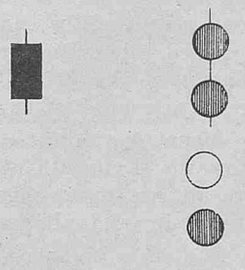
To indicate danger to vessels after they have left the harbour:—

Day. Night.

I. Cautionary.—There is a region of squally weather, in which a storm may be forming.

NOTE.—This signal will be hoisted at ports situated with reference to the disturbed weather such that a vessel leaving the port might run into danger during her voyage. It will also be hoisted at Arabian sea ports when a disturbance is crossing the peninsula of India which may develop into a cyclone after entering the Arabian Sea.

II. Warning.—A storm has formed.



NOTE.—This signal will be hoisted when there is no immediate danger of the port itself being affected, but vessels leaving the port might run into the storm.

NOTE.—Night Signals { *white* light represented by / *red* light represented by

Local Signals.

To indicate that the port and vessels in it are threatened:—

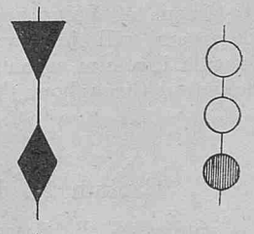
Day. Night.

III. Cautionary.—The port is threatened by squally weather.

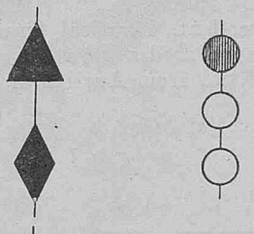
IV. Warning.—The port is threatened by a storm, but it does not appear that the danger is as yet sufficiently great to justify extreme measures of precaution.

The existence of a storm can often be determined before the direction of its movement can be fixed. In this case all those ports which the storm could possibly strike will be warned by this signal.

V. Danger.—The port will experience severe weather from a storm of slight or moderate intensity that is expected to cross the coast to the south of the port (or to the east in the case of Veraval, the Húgli ports, Diamond island, Bassein, Rangoon, and the Andamans).



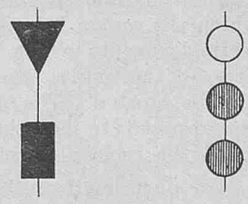
VI. Danger.—The port will experience severe weather from a storm of slight or moderate intensity that is expected to cross the coast to the north of the port (or to the west in the case of the Húgli ports, Chittagong, Rangoon, Moulmein, Karachi, and the Andamans).



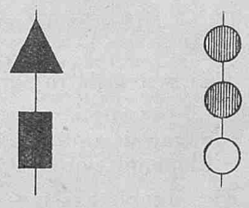
VII. Danger.—The port will experience severe weather from a storm of slight or moderate intensity that is expected to cross over or near to the port.

Day. Night.

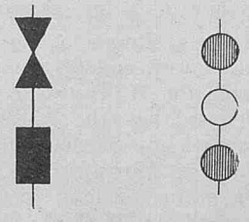
VIII. Great Danger.—The port will experience severe weather from a storm of great intensity that is expected to cross the coast to the south of the port (or to the east in the case of Veraval, the Húgli ports, Diamond island, Bassein, Rangoon and the Andamans).



IX. Great Danger.—The port will experience severe weather from a storm of great intensity that is expected to cross the coast to the north of the port (or to the west in the case of the Húgli ports, Chittagong, Rangoon, Moulmein, Karachi, and the Andamans).



X. Great Danger.—The port will experience severe weather from a storm of great intensity that is expected to cross over or near to the port.



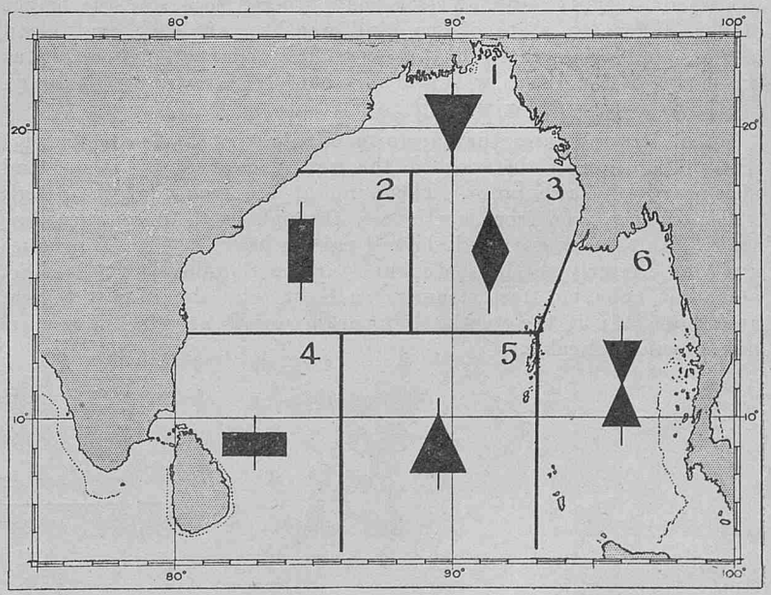
XI. Failure of Communications.—Communication with the Meteorological headquarters has broken down and the local officer considers that there is danger of bad weather.

General System with Additional Signals, Bay of Bengal.

It is possible to locate an area of squally weather or a storm in the Bay of Bengal with some degree of certainty, even though the disturbance may be far from the coast. At ports not threatened a "Section" signal for the area affected, as shown on the chartlet, is hoisted *under* the "Distant cautionary" or "Distant warning" signals (Signals I and II of the "General system") to indicate the position of the disturbance in the Bay.

The Bay of Bengal is divided into six sections, *see* Chartlet, thus, if there is squally weather in Section 5 of the Bay the signal, a cylinder placed horizontally over a cone, point upwards, would be hoisted at the various ports.

Chartlet showing "Section" storm signals, Bay of Bengal.



If a storm has formed in Section 2, the signal, two cylinders placed vertically one over the other, would be hoisted at all the ports which were not directly threatened. The ports threatened would hoist one or other of the local signals.

If the centre of the storm is near the boundary of a section, two locality signals will be given, the first indicating the section in which the centre is supposed to be, and the second the neighbouring section near to which it is. In the event of a storm centre being near to the angles where three sections meet, three locality signals will be hoisted. The first will give the section in which the storm is supposed to be, the second the nearest adjoining section, the third the remaining section.

If a port itself is threatened the appropriate "Local" signal of the "General system" would be hoisted.

If no disturbance exists in the Bay of Bengal a *ball* will be hoisted

This system is in force at the following ports:—

Negapatam, Porto Novo, Cuddalore, Madras, Cocanada, Sagar island, Chittagong, Akyab, Bassein, Diamond island, Elephant point, Rangoon and Table island.

The signals are not exhibited at the Sandheads, but information is available for passing vessels.

These signals are also exhibited at Sabang, Pulo Weh, off the north-west end of Sumatra; the data for the signals being received from the W/T station at Port Blair. Two balls, placed vertically, denote that the latest weather report has not been received, a request can be made for the last weather report received by means of flags, Morse signals, or W/T. Reply will be made free of charge by means of long distance signals or Morse signals; if the reply is made by W/T the charge will be made through Lloyd's agents at Sabang at the usual tariff.

Brief System.

In the brief system only the four following signals will be hoisted, but the Port officers will be kept informed of the progress of bad weather for the general information of shipping:—

Signal No. III. Cautionary Signal No. IV. Warning Signal No. VII. Danger Signal No. X. Great Danger	Meaning the same as the day and night signals as in the General System.

Special Signals used on the Rivers of the Ganges Delta, and River Húgli.

These signals are the same as those mentioned in the "General system," but a more detailed signification of certain of the signals is as follows:—

Signal V. indicates that a storm of slight or moderate severity will probably cross the coast to the eastward of Sagar island and westward of Chittagong. Vessels may proceed to sea if the height of the barometer, state of sea, and weather, are such as to lead masters and pilots to infer that there is no danger. The wind at the mouth of the Húgli will probably haul from north-east, through north, to north-west or west.

Signal VI. indicates that a storm of slight or moderate severity will probably cross the coast to the westward of Sagar island and northward of False point. The wind at the mouth of the Húgli will probably veer from north-east, through east, to south-east or south. As these easterly winds will raise a heavy swell and produce a strong westerly set in the channel at the Sandheads, it is advisable that none but fast steamers in light trim should put to sea, and those only if the weather appearances and state of the sea are not too unfavourable.

Signal VII. indicates the approach towards Sagar roads of a storm of slight or moderate intensity. It is advisable that no vessels, except fast vessels in light trim, should put to sea until the wind direction and force, the state of weather at sea, and the rise of the barometer indicate that the storm has either broken up or passed inland. It should be remembered that cyclonic storms of small extent in the Bay of Bengal sometimes blow with hurricane force, and raise a high sea near their centres.

Signal VIII. indicates that a storm of great intensity will cross the coast to the eastward of Sagar island and westward of Chittagong. No sailing vessels, nor deep-laden, nor slow-steaming vessels should go to sea. The wind at the mouth of the Húgli will probably shift from north-east to north, north-west, etc.

Signal IX. indicates that a storm of great intensity will cross the coast to the westward of Sagar island and northward of False point. No vessel should go to sea, and masters and pilots of vessels outward bound should be guided by the appearance of the weather and height of the barometer in deciding whether it is advisable to proceed below Diamond Harbour or Mud point. The wind at the mouth of the Húgli will probably veer from north-east, through east, to south-east or south.

Signal X. indicates the approach of a storm of great intensity towards the mouth of the Húgli, and Calcutta. No vessels should go to sea from Sagar island, or proceed down from Diamond Harbour, and all vessels should be properly secured.

The above signals are exhibited at Barisal, Goalunda, Noakhali, Narayanganj, Chandpur, Khulna, Sagar island, Mud point, Diamond Harbour, Calcutta (Port Commissioner's Office), Kidderpur Docks (Clock Tower), Budge Budge (Assistant Harbour Master's House).

Instructions to hoist the signals are sent by telegram from the Meteorological Department, Calcutta.

Special Notices regarding Personnel.

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

Captain W. R. Chaplin.

Captain W. R. CHAPLIN, Commander of the Australian Commonwealth Steamship *Jervis Bay*, has been elected an active Elder Brother of Trinity House. Captain CHAPLIN has been a member of the Corps of Voluntary Marine Observers since 1925, and Marine Observers will join with the Marine Division in heartily congratulating him upon his appointment to this position which is honoured throughout the Sea Services.

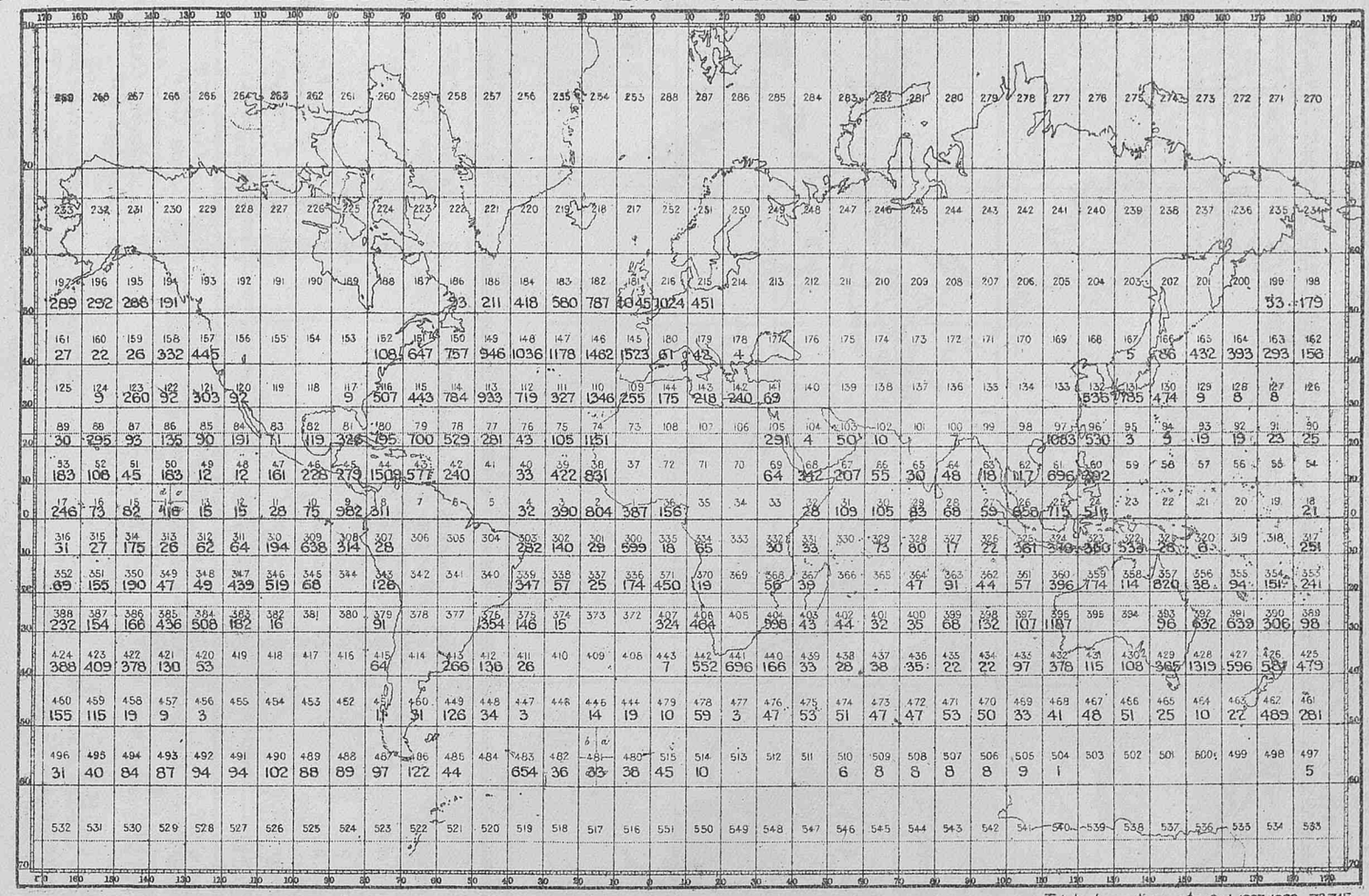
Captain M. B. Sayer, C.B.E., R.D., R.N.R.

Captain M. B. SAYER, C.B.E., R.D., R.N.R., Captain Superintendent, Nautical Training College, H.M.S. *Worcester*, has been appointed a Royal Naval Reserve Aide-de-Camp to HIS MAJESTY THE KING from April 10th, 1928.

"WORK OF THE YEAR."

MARSDEN CHART I.

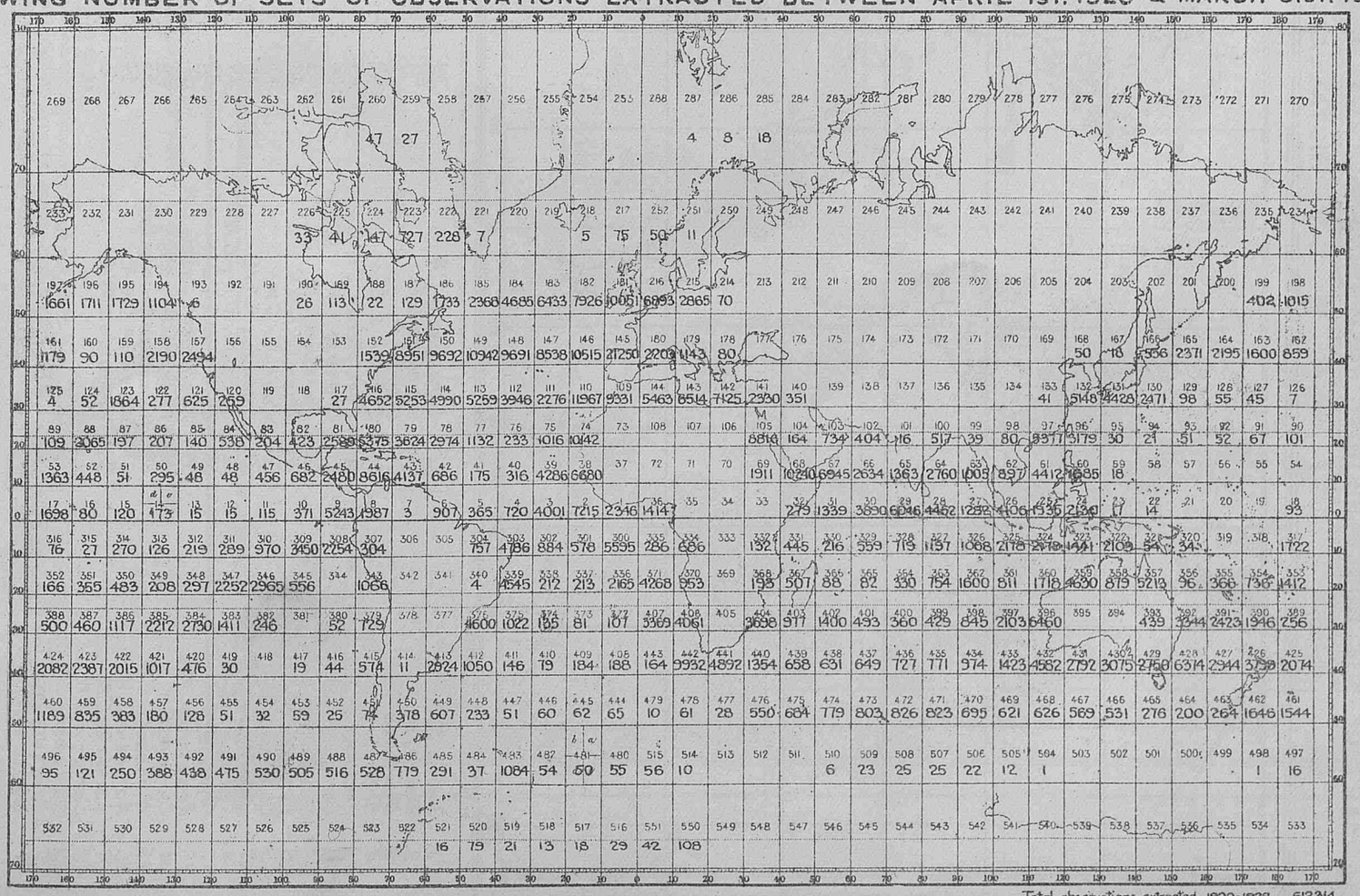
SHOWING NUMBER OF SETS OF OBSERVATIONS EXTRACTED BETWEEN APRIL 1st. 1927 & MARCH 31st. 1928.



Total observations extracted 1927-1928, 73,745.

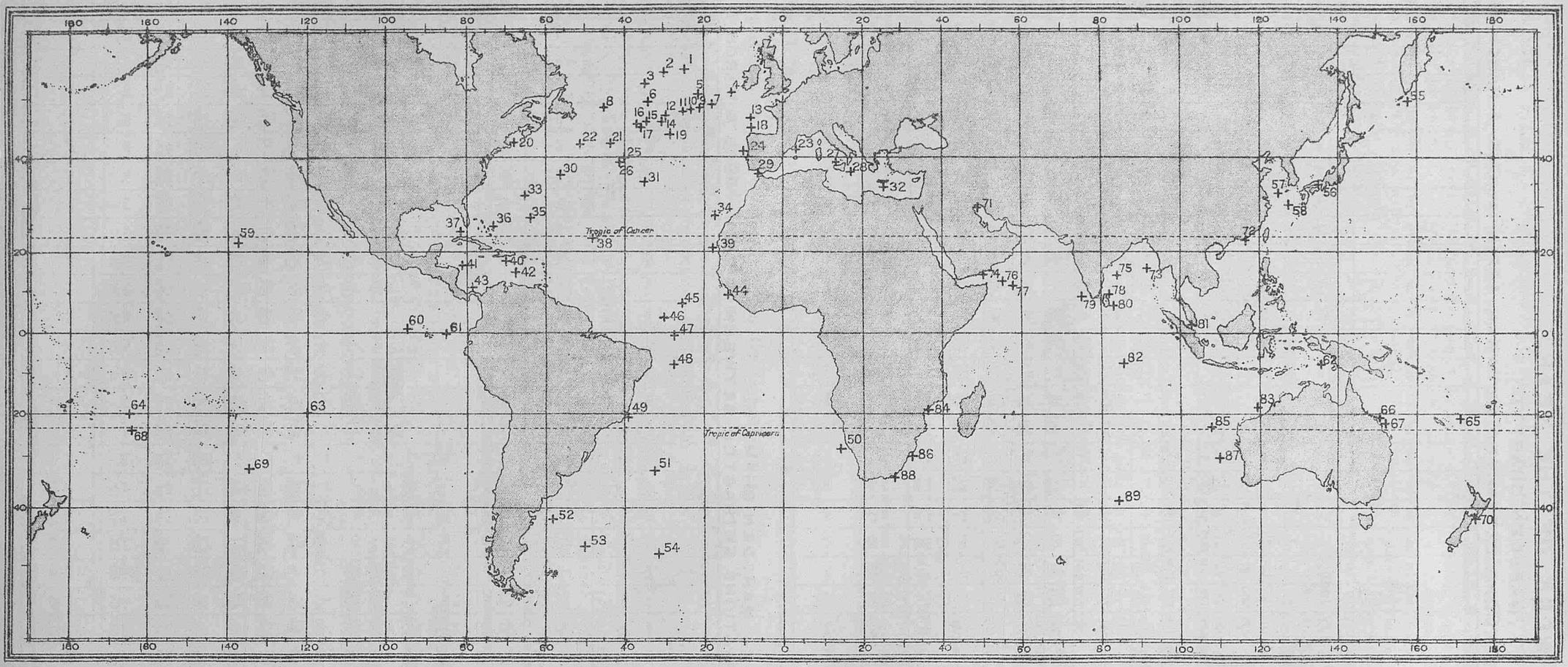
MARSDEN CHART II.

SHOWING NUMBER OF SETS OF OBSERVATIONS EXTRACTED BETWEEN APRIL 1st. 1920 & MARCH 31st. 1928.



Total observations extracted 1920-1928, 612,314.

Chart of the World showing position of Selected Ships at Sea with Mercurial Barometers and their Wireless Installation — June 1st 1927.



1 Melita C.W.
2 Metagama C.W.
3 Montrose C.W.
4 Bolingbroke C.W.R.
5 Empress of Scotland C.W.
6 Concordia C.W.R.
7 Lancastria C.W.
8 Empress of France C.W.
9 Samaria C.W.
10 Belgenland C.W.
11 Carmania C.W.
12 Olympic C.W.
13 Nowshera C.W.R.
14 Caronia C.W.
15 Minnesota C.W.
16 Adriatic C.W.
17 Laconia C.W.
18 Comorin C.W.
19 Galtymore C.W.R.
20 Newfoundland C.W.R.
21 Baltic C.W.
22 Berengaria C.W.
23 Morvada C.W.
24 City of Rangoon C.W.R.
25 Scholar C.W.R.
26 Port Victor C.W.R.
27 Oronsay C.W.
28 Ranpura C.W.
29 Domala C.W.R.
30 Ruapehu C.W.R.
31 Duendes C.W.R.
32 Leicestershire C.W.R.
33 Culebra C.W.R.
34 Kenilworth Castle C.W.
35 Oroya C.W.R.
36 Canadian Winner Spk.
37 Auditor C.W.R.
38 Ariguani C.W.R.
39 Aba C.W.
40 Port Dunedin C.W.R.
41 Essequibo C.W.R.
42 Traveller C.W.R.
43 London Importer C.W.R.
44 Elmina C.W.R.
45 Trematon C.W.R.
46 El Paraguayo C.W.R.
47 Port Hacking C.W.R.
48 Port Caroline C.W.R.
49 Demerara C.W.
50 Otira C.W.R.
51 Benefactor C.W.R.
52 Port Darwin C.W.R.
53 R.R.S. Discovery C.W.
54 R.S.S. William Scoresby C.W.
55 Achilles Spk.
56 Empress of Russia Spk.
57 Mantua C.W.
58 Titan Spk.
59 Hauraki Spk.
60 Port Melbourne C.W.R.
61 Hurunui Spk.
62 Changte Spk.
63 Tekoa C.W.R.
64 Arracan C.W.R.
65 Clan Macwhirter Spk.
66 Taiping Spk.
67 H.M.A.S. Moresby –
68 Makura C.W.R.
69 Middlesex C.W.R.
70 Corinthic C.W.
71 Barpeta C.W.R.
72 Empress of Canada C.W.
73 Maharani C.W.R.
74 Maloja C.W.
75 Discoverer C.W.R.
76 Nellore C.W.R.
77 Port Adelaide C.W.R.
78 Manipur C.W.R.
79 Alipore C.W.R.
80 City of Chester C.W.R.
81 H.M.S. Iroquois –
82 British Advocate C.W.R.
83 Centaur Spk.
84 Mulbera C.W.
85 Moldavia C.W.
86 Borda C.W.R.
87 Peshawur C.W.R.
88 Llandovery Castle C.W.R.
89 Bendigo C.W.

C.W. = Fitted for both transmission and reception on Continuous Wave (long range).
C.W.R.= Fitted for reception on Continuous Wave (long range) and Spark transmission.
Spk. = Fitted for both transmission and reception on Spark only.

89 Ships out of 254 in favourable positions to report, with about 165 in port or narrow waters. This is typical and represents a fair average day. 35 per cent in position to report.

"Work of the Year." Chart No. III.

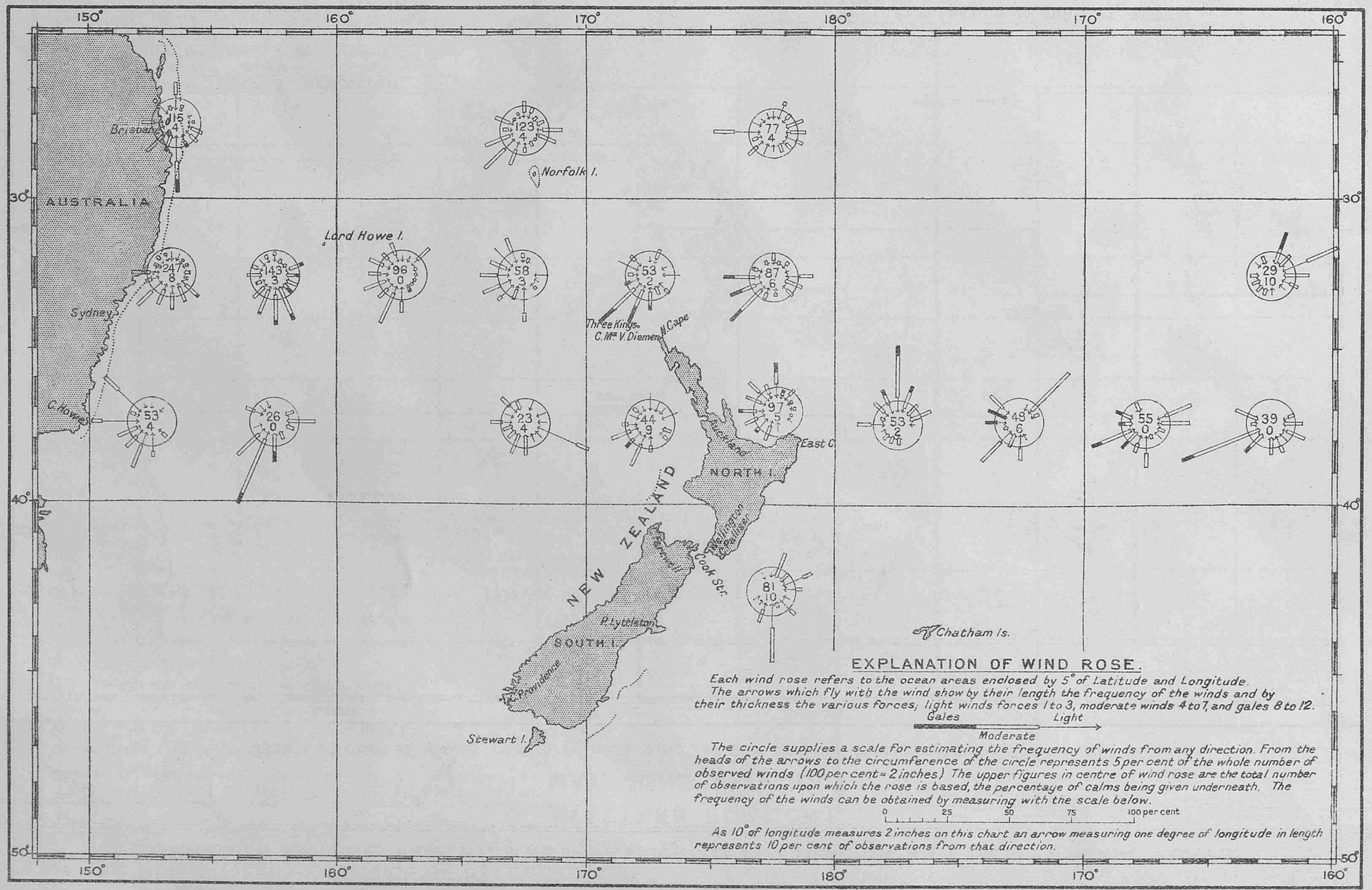
SOUTH PACIFIC.

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

(WESTERN PORTION.)

JUNE

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



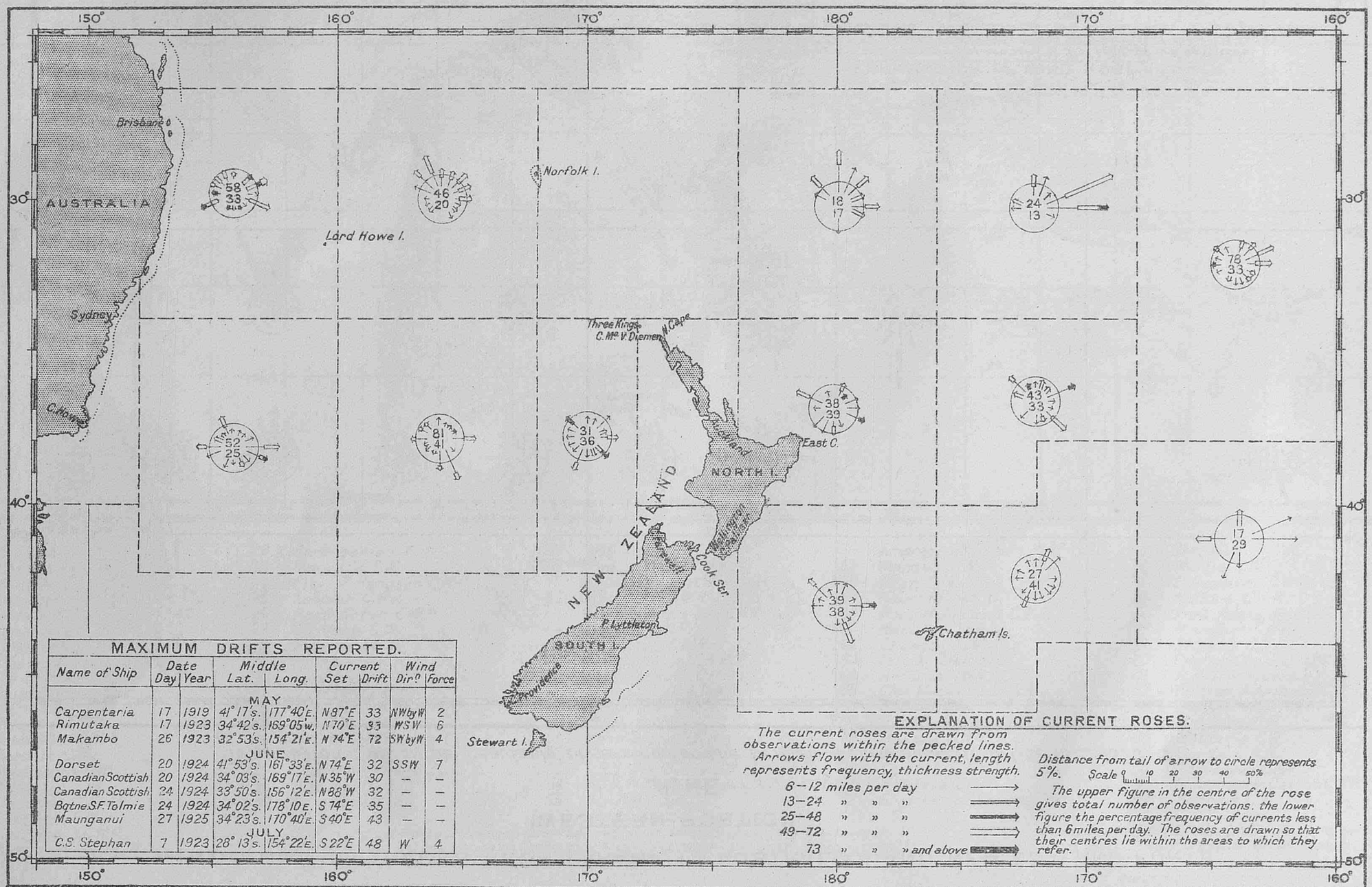
SOUTH PACIFIC.

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

(WESTERN PORTION.)

MAY, JUNE AND JULY.

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



MAXIMUM DRIFTS REPORTED.

Name of Ship	Date Day	Date Year	Middle Lat.	Middle Long.	Current Set	Current Drift	Wind Dirⁿ	Wind Force
			MAY					
Carpentaria	17	1919	41° 17′ S.	177° 40′ E.	N 87° E	33	NW by W	2
Rimutaka	17	1923	34° 42′ S.	169° 05′ W.	N 70° E	35	WSW	6
Makambo	26	1923	32° 53′ S.	154° 21′ E.	N 74° E	72	SW by W	4
			JUNE					
Dorset	20	1924	41° 53′ S.	161° 33′ E.	N 74° E	32	SSW	7
Canadian Scottish	20	1924	34° 03′ S.	169° 17′ E.	N 35° W	30	—	—
Canadian Scottish	24	1924	33° 50′ S.	156° 12′ E.	N 88° W	32	—	—
Bqtne. S.F. Tolmie	24	1924	34° 02′ S.	178° 10′ E.	S 74° E	35	—	—
Maunganui	27	1925	34° 23′ S.	170° 40′ E.	S 40° E	43	—	—
			JULY					
C.S. Stephan	7	1923	28° 13′ S.	154° 22′ E.	S 22° E	48	W	4

EXPLANATION OF CURRENT ROSES.

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

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

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

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

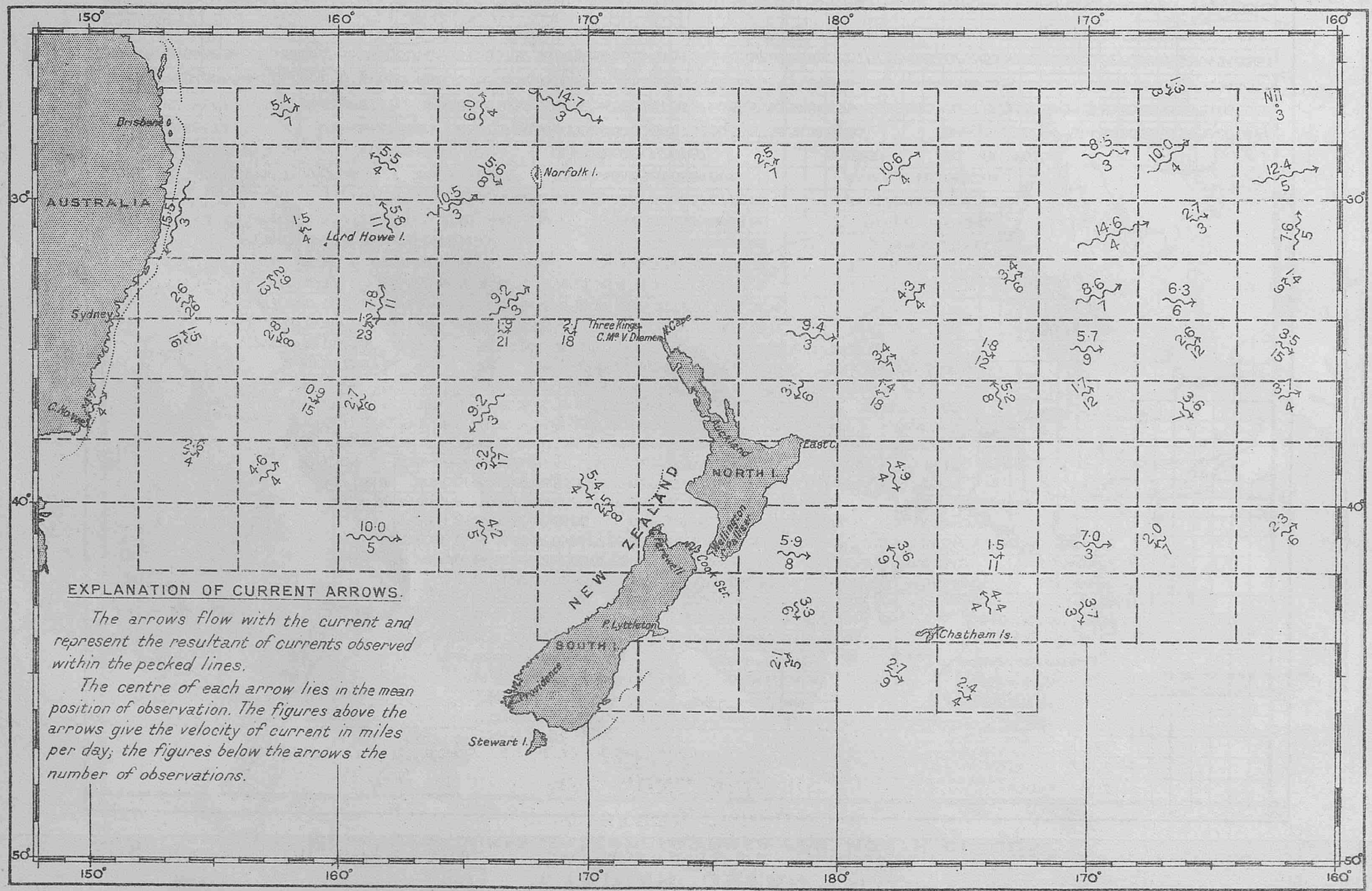
SOUTH PACIFIC.

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

(WESTERN PORTION.)

MAY, JUNE AND JULY.

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



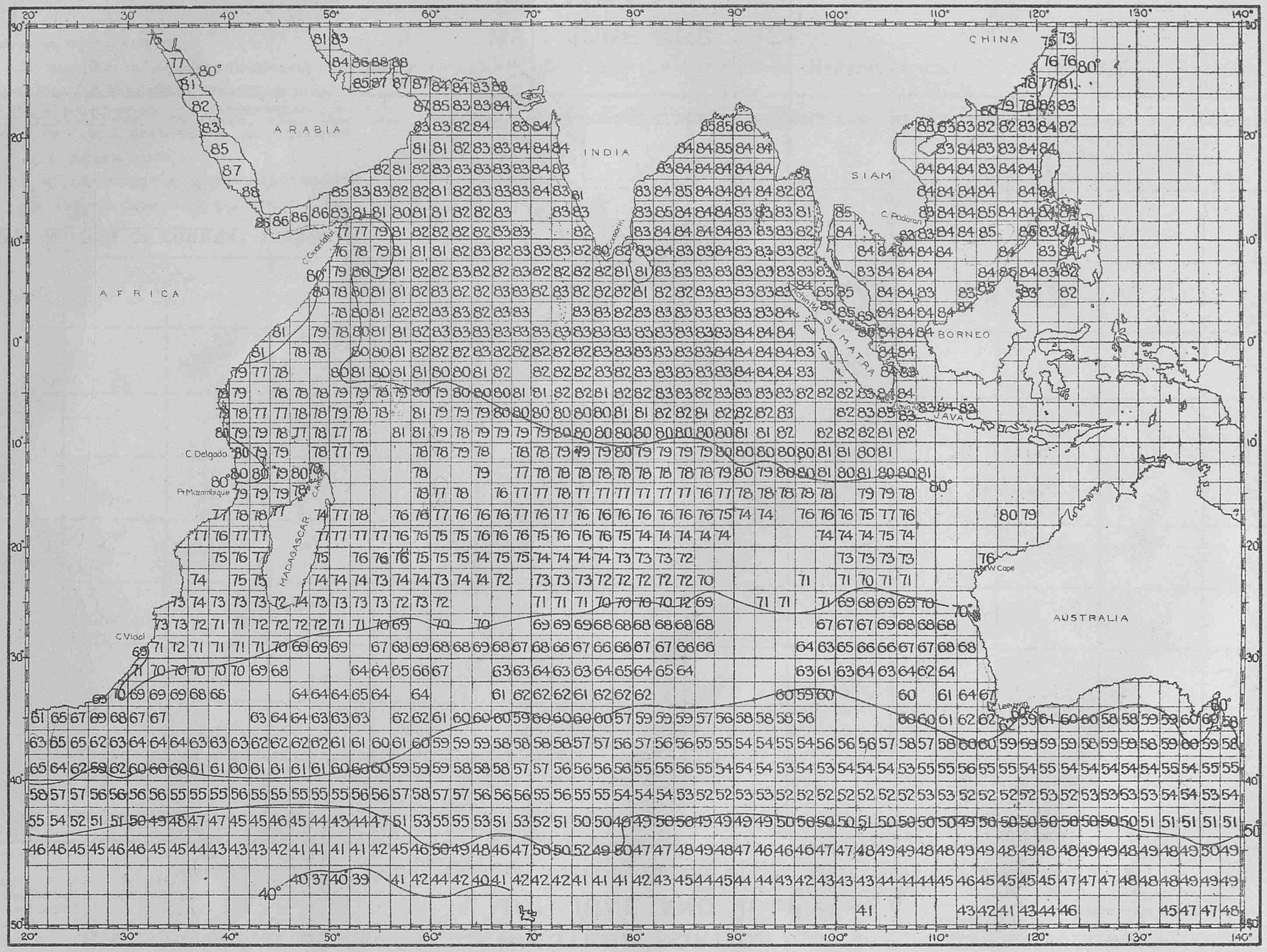
EXPLANATION OF CURRENT ARROWS.

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

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

INDIAN OCEAN.

MEAN SEA SURFACE TEMPERATURES FOR MONTH OF JUNE

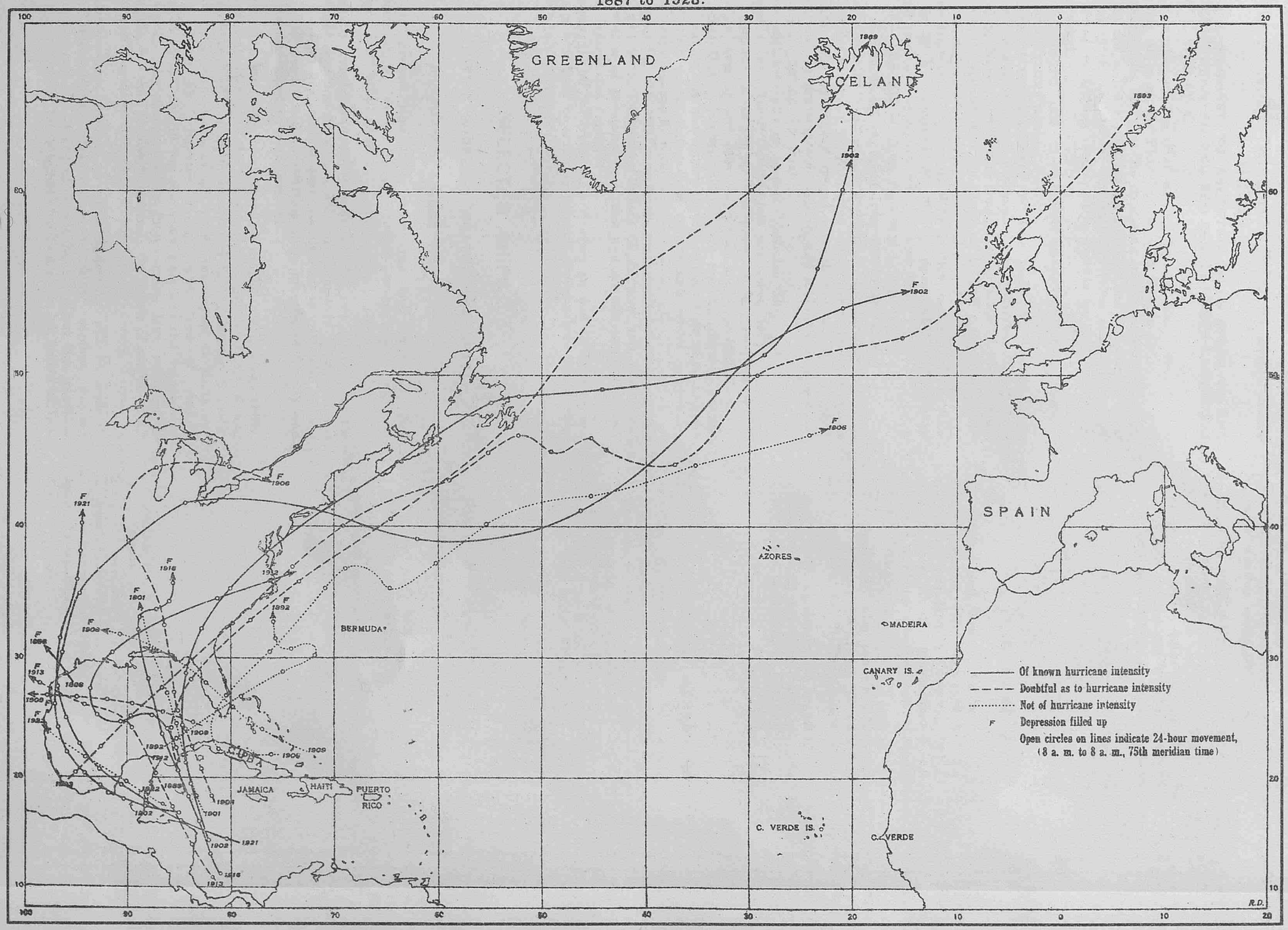


Computed from observations of British Ships during the years 1855 to 1917 except south of Latitude 30°S. and eastward of Longitude 40°E. where the observations are for the years 1855 to 1895; and south of Latitude 30°S. and westward of Longitude 40°E., 1855 to 1878.

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

Ps. 977/1680. We. 52A. D.9. 1300. 4/28.

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



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

NOTICES.

VERY IMPORTANT.

EXTENSION OF TRIAL NOTIFIED IN MAY, 1928, NUMBER.

SPECIAL REQUEST TO SELECTED SHIPS WHEN IN THE MEDITERRANEAN AND RED SEA, BETWEEN LONGITUDE 20° E. AND 40° E.

In extension of the trial notified in the May, 1928, MARINE OBSERVER, ships in the Fleet List in THE MARINE OBSERVER, with the letters M.L., W.T., or M. appearing in the equipment column, when at sea in the Mediterranean and Red Sea between the meridians of 20° E. and 40° E. and within wireless range of Ismalia, are invited to address their routine reports to "All Ships" to **CQ** as usual.

From June 1st, 1928, these reports should also be addressed to **GHK** until further notice.

A form of report is given on page 18 of the January, 1928, MARINE OBSERVER and also in Chapter I of "Wireless and Weather an Aid to Navigation." The time of observation in the Mediterranean to the Eastward of Longitude 20° E. and in the Red Sea, for these reports, is 0600 G.M.T.

From June 1st, 1928, **Ismalia W/T Station**, call sign **GHK**, Latitude 30° 35′ N., Longitude 32° 16′ E., approximate, will look out for and receive these reports until further notice.

On 2400 m. C.W. from 0618 to 0630 G.M.T.
and on 600 m. Spark from 0630 to 0645 G.M.T.

"Selected ships" will greatly assist in the furtherance of Wireless and Weather as an Aid to Navigation and in the general application of Meteorology by taking special care in the accuracy of their observations, in drafting their reports and in following closely the above advice during this trial.

There will generally be several "Selected Ships" within range of Ismalia, and their Commanders are asked to instruct their W/T operators to do all in their power in making these reports to obviate jamming each other during the above specified times.

The fact that "Selected Ships" are sending reliable weather reports during the above periods will enable other ships to know exactly when to listen for these reports and render unnecessary similar transmissions by them.

If successful, this trial may be the means of regulating a system which will be to the general benefit of shipping and seamen and which will be of assistance to airmen and all who require meteorological information from the sea.

Chapter III of "Wireless and Weather an Aid to Navigation" indicates how these reports may be made use of ashore and in ships and aircraft receiving them.

SELECTED SHIPS.

ROUTINE WIRELESS WEATHER REPORTS.

Importance of Logging Reports made.

At the present time it is more than ever important that "Selected ships" should log the routine weather reports made in standard form to all ships.

Specially ruled columns are provided for this purpose at the end of the Meteorological Log and on Form 911. These columns form a useful key, so that correctly drafted reports will fit into them. The importance, in drafting these reports, of brevity and completeness cannot be overestimated.

With reference to the trial of which notification is given above, the Superintendents of the Meteorological Offices at Malta and Heliopolis have been requested to forward to the Marine Superintendent in London, copies of all reports intercepted at Malta and Ismalia made by "Selected ships," with time of receipt. "Selected ships" should log the exact time and the despatch of each report. By comparison to check errors, time occupied in transit, etc., we shall be able to ascertain the degree of success which this method may give.

Conferences are pending at which endeavour will be made to obtain international organization in ships' wireless weather telegraphy; and the Board of Trade have notified the intention to call a meeting of the International Committee on Safety of Life at Sea.

The work of "Selected ships" may therefore prove of great value in obtaining simplification and seamanlike methods in this matter of ships' weather telegraphy organization.

In many ships where continuous wireless watch is not kept, the times given above are not entirely suitable. This trial is voluntary, as is all the rest of **The Work**. By the sacrifice of a few minutes of a watch below during this trial, where that may be involved, the Officers and Wireless Operators of "Selected Ships" will be helping to straighten out an invaluable service.

A NEW BOOK.

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

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

It will be obtainable in the course of a few months, on sale from H.M. Stationery Office, to whom all orders should be sent direct or through a bookseller.

POSTAL ARRANGEMENTS.

THE MARINE OBSERVER is published, when circumstances permit, on the first Wednesday of the month previous to that to which the number refers.

If captains of observing ships will forward to the Office the particulars required hereunder, endeavour will be made as far as mails permit to post the latest number for use on their homeward passage.

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

Port of Call.....

Date of Homeward Departure.....

Postal Address.....

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

ICE REPORTS.

Commanders of ships in the Trans-North Atlantic and Southern Ocean Trades are earnestly requested to have the Ice Report Form 912 completed and returned at the end of each passage A nil return is desired if no ice is seen.

These forms are supplied with THE MARINE OBSERVER each month to regular observing ships in these Trades.

ICE CHART.

WESTERN NORTH ATLANTIC.

IMPORTANT

ROUTE NOTICES.

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

LETTERS OF TRANSATLANTIC TRACKS INDICATE.

NOTE.—In case of necessity owing to extreme southerly drift of ice, operative dates will be fixed for Track A.

(B) From 14th April to 31st August, inclusive.

(F) From 16th May to Opening of Belle Isle route, and to 30th November when not using the Belle Isle route.
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.

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

SYMBOLS USED ON THE CHART.

- Iceberg.
- Floeberg.
- Growler.
- Field Ice, Floe Ice, Pack Ice.
- Hummocky Ice, Bay Ice.
- Drift Ice, Brash Ice, Sludge Ice, Pancake Ice.
- Indicates W/T Ice Warning Station.

Steamers keep {10'N of this track Westbound / 10'S of this track Eastbound} (G)

Steamers keep {10'N of this track Westbound / 10'S of this track Eastbound} (F)

Steamers keep {10'N of this track Westbound / 10'S of this track Eastbound} (F)

Steamers keep {10'N of this track Westbound / 10'S of this track Eastbound} (F)

Steamers keep {10'N of this track Westbound / 10'S of this track Eastbound} (B)

Limit of ice reported to the Meteorological Office JUNE 1901 1927

LATEST ICE REPORTS FROM CANADA.

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

"Montreal to Quebec, river expected to open for navigation about 20th. Quebec to Fame point and Anticosti, no ice. Saguenay River expected to be open about 25th. Baie des Chaleurs, west end, ice still holding. St. Paul Island, strips of slob ice to westward, clear elsewhere. Cape Ray, heavy open ice everywhere. Point Amour, heavy close packed ice everywhere. Belle Isle, heavy close packed ice in straits, two bergs in sight. Government ice breaker *Montcalm* left Sydney last night for ice patrol in Gulf, reports considerable open ice in Cabot Straits. Gulf conditions appear about as usual."

A further cablegram, dated 20th April, 1928, was received:—

"Owing to continued cold weather navigation to Montreal will not open till about 25th."

PHENOMENAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat.	Position. Long.	Remarks.
June 25, 1886	Brig Blanch... ...	48°40'N.	15°22'W.	Large berg.
,, 5, 1907	S.S. Kingswell ...	39°37'N.	64°25'W.	Several bergs.
,, —, 1907	Bque. Silverstream..	80 miles Eastnet.	W. of	Berg.
,, 11, 1912	S.S. Valetta	37°30N.	74°24'W.	3 pieces of ice.
,, 7, 1913	S.S. Holtby	39°35'N.	64°50'W.	Berg, 10 ft. high.
,, 27, 1915	S.S. Stella	38°28'N.	57°45'W.	Small piece.
,, 30, 1921	U.S. Navy Dept. ...	33°20'N.	49°16'W.	Berg, 10 ft. high.
,, 16, 1924	S.S. West Irmo ...	38°03'N.	63°20'W.	Growler.
,, 25, 1926	S.S. Baxtergate ...	30°20'N.	62°32'W.	Large piece, about 30 ft. long and 15 ft. wide, showing about 3 ft. above water.

Reports of Ice sighted between April 1st and April 30th, 1928, which have been received by the Meteorological Office, are shown by the Symbols plotted in the position reported, the figures indicating the day of the month.

IMPORTANT

The following is a copy of a letter received from the Cunard S.S. Co. dated 18th April, 1928.

NORTH ATLANTIC TRACKS.

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

Ps.977/1680. We.52A. D.9. 1100. 4/28.

JUNE M.O., 1928. H.M.S.O. Press, Kingsway, W.C.2.

NOTICES.

MARINE METEOROLOGY.

Co-operation of Shipowners, Masters and Mates.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

LATE PRESS.

DERELICTS AND FLOATING WRECKAGE.

Date.	Position. Latitude.	Longitude.	Description.
	NORTH SEA.		
11.4.28	5mls. N.W. by N. from Newarp Lt- Vsl.		Large log of timber, 25 to 30 ft. long, 12 ins. square. Dangerous to navigation.
	ENGLISH CHANNEL.		
1.4.28	50°47′N.	0°42′E.	Submerged object.
31.4.28	156°, 10 mls. from Portland Bill.		Quantity of floating wreckage.
	NORTH ATLANTIC.		
2.4.28	41°43′N.	61°55′W.	Conical red buoy.
7.4.28	38°39′N.	74°33′W.	Heavy timber, about 24 ft. long.
7.4.28	41°28′N.	65°25′W.	Large whistle buoy.
7.4.28	39°29′N.	53°31′W.	Small black can buoy.
8.4.28	38°54′N.	69°39′W.	Large tree trunk, about 30 ft. in length.
10.4.28	42°04′N.	9°40′W.	Pontoon, about 300 ft. square.
10.4.28	43°46′N.	50°03′W.	Log, about 30 ft. long and 4 ft. in diameter.
10.4.28	41°55′N.	50°24′W.	Large gas buoy, painted red.
10.4.28	33°12′N.	65°30′W.	Large bell buoy.
13.4.28	39°00′N.	9°31′W.	Cylindrical tank, 20 ft. by 4 ft. Dangerous to navigation.
16.4.28	51°30′N.	7°10′W.	Schooner *Guiding Star*, abandoned in sinking condition. Dangerous to navigation.
19.4.28	19 mls. W. of Corrubedo.		Wreck dangerous to navigation, fishing vessel, emerging slightly.
21.4.28	41°18′N.	9°30′W.	Wreckage of mast with crosstree, probably attached to submerged wreck. Very dangerous to navigation.
	MEDITERRANEAN.		
4.4.28	4 mls. N.W. of Riou I.		Drifting wreck.
4.4.28	43°13′N.	15°18′E.	Derelict.
7.4.28	38°05′N.	5°54′E.	2 pieces of wooden wreckage 300 yards apart. Dangerous to navigation.
7.4.28	36°33′N.	0°56′E.	Log about 60 ft. long and 3 ft. in diameter.
15.4.28	37°51′N.	4°53′E.	Large log about 2 ft. in diameter, floating up, with about 4 ft. out of water.
	GULF OF MEXICO.		
12.4.28	28°06′N.	89°50′W.	Drifting target, constructed of four drums with heavy crossplanks, and mast with remnants of a signal.

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

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

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

Only in special cases will individual letters be sent.

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

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

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

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

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

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

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

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

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

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

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

Selected Ships.

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

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 13.4.28.	Date Received.
Aba	Williams, T. E. ...	S. J. Bristowe, O. E. Jones, A. H Perkins.	M.L.	Elder Dempster ...	Met. Log. 14.10.27 to 10.2.28... ...	16.3.28
Abinsi	Millson, H. E. ...	G. M. de la Cour	No. A.	,, ,, ...	Form 911 25.1.28 to 4.3.28	9.3.28
Achilles	Dodds, R	J. Powell, L. Hutchinson, F. B. Allen, G. M. Kirk.	M.L.	A. Holt	Met. Log. 8.11.27 to 10.1.28	20.2.28
Actor	Haylett, E. ...	A. Frew, F. M. Eales, G. Morrice.	,,	Harrison	,, 10.9.27 to 20.12.27... ...	6.1.28
Adda	Toft, J. T.	A. E. Longlen, J. S. Turner, A. Kay	M.L.	Elder Dempster ...	Form 911 6.7.27 to 3.11.27	14.12.27
50 *Adriatic* ...	Hickson, V. W., Lieut.-Commr. R.N.R.	R. G. Roberts, O. V. Lucas ...	W.T.	White Star	W T. Reg. 15.2.28 to 3.3.28	13.3.28
Aeneas	Wallace, W. K. ...	E. R. Owen	No. A.	A. Holt	Form 911 9.2.28 to 28.2.28	10.4.28
Agapenor	Ramsay, J. ...	S. G. Ellams	,, A.	,, ...	,, 7.1.28 to 3.2.28	13.2.28
Aidan	Evans, L.	R. A. Broad	,, A.	Booth	,, 9.2.28 to 25.3.28	2.4.28
Alban	Barlow, F. P.... ...	E. M. Lyons	,, A.	,, ...	,, 17.2.28 to 29.2.28	19.3.28
Aleppo	Leggott, W. G. ...	... ...	No. A.	Ellerman Wilson ...	,, 28.2.28 to 25.3.28	28.3.28
Alipore	Smith, H. E., R.D., Lt.-Commr., R.N.R.	C. H. Stokes	,, M.	P. and O.	,, 9.1.28 to 19.3.28	11.4.28
Almanzora ...	Clarke, E. C.	... ...	,, A.	R.M.S.P.	,, 25.3.28 to 9.4.28	10.4.28
63 *Albertic*	Summers, F. F., R.D., Commr., R.N.R.	J. W. Paine, A. E. Dyer, E. Smith.	W T.	White Star ...	,, 5.11.27 to 21.11.27... ...	1.12.27
					W.T. Reg. 20.2.28 to 11.3.28 ...	14.3.28
Alondra	Scott, L. S.	H. Peters	No. A.	Yeoward	Form 911 26.2.28 to 17.3.28	21.3.28
Alynbank	Clayton, W. E. ...	R. Ardley	,, A.	A. Weir & Co. ...	,, 29.12.27 to 3.2.28	27.2.28
Ambuscade... ...	Abbay, A. T. N., D.S.O., Commr. R.N.	F. G. Bullock	M.L.	His Majesty's Ship...	... ...	...
Ampeteo ...	Vandenkerckhove, A.	J. Abicht	No. A.	American Petroleum	Form 911 29.2.28 to 16.3.28	10.4.28
Andalucia ...	Thomas, R. J. ...	C. W. Vaughan, B. May ...	,, M.	Blue Star	,, 11.12.27 to 27.12.27 ...	9.2.28
Anchises	Woodgett, R. J. ...	... ...	,, A.	A. Holt	,, 1.10.27 to 21.10.27... ...	14.11.27
Andes	Smith, W. E., D.S.O., R.D., Capt. R.N.R.	H. Whittle	M.L.	R.M.S.P. Co.	,, 21.1.28 to 5.3.28	7.3.28
Antilochus ...	Salter, G. H.	O. P. H. Wynne	No. A.	A. Holt	,, 10.2.28 to 30.3.28	10.4.28
Aorangi	Crawford, R. ...	G. H. Kime, E. Anderson, E. V. Bilger, W. J. Weber.	M.L.	Canadian-Australasian	Met. Log. 21.9.27 to 5.1.28	7.2.28
30 *Aquitania* ...	Diggle, E. G., R.D., Capt. R.N.R.	J. L. Croasdaile, J. Locke, D. MacLean.	W.T.	Cunard	W.T. Reg. 15.3.28 to 27.3.28	29.3.28
62 *Arabic*	Bulman, J. B. ...	W. Jackman, C. Cochran, W. N. Jenkins.	,,	White Star	,, 19.3.28 to 7.4.28	11.4.28
Arafura ... {	Gordon, A. S. ...	F. O. Colvin, F. R. Miller, C. Stratford.	M.L.	Eastern and Australian	Met. Log. 29.7.27 to 25.10.27... ...	17.12.27
Arawa	Summers, W. G. ...	D. Aitchison, A. C. Jones, J. Jackson.	,,	Shaw, Savill and Albion	,, 30.3.27 to 28.7.27	11.8.27
Archimedes ...	Downs, E. B. ...	... ...	No. A.	Lamport & Holt ...	Form 911 10.10.27 to 5.1.28	18.1.28
Argyllshire ...	Wallace, J. ...	J. M. Crone	,, M.	Federal	,, 26.9.27 to 14.10.27... ...	15.11.27
Ariguani	Scudamore, J. H. H., D.S.C., R.D., Commr., R.N.R.	G. McKee, J. L. Owen, S. K. Scott, A. J. J. Moar.	M.L.	Elders & Fyffes ...	Met. Log. 26.9.27 to 4.2.28	8.2.28
Ariosto	Biggins, R. L.	F. E. Whitfield...	No A.	Ellerman Wilson ...	Form 911 25.12.27 to 21.1.28... ...	13.2.28
Armadale Castle ...	Imlah, C. B. ...	E. Roach, G. D. Pennick, E. Fullick.	M.L.	Union Castle	Met. Log. 12.11.27 to 4.3.28	8.3.28
Arracan	Duncan, S. S.	J. Summers, J. Henderson, C. C. Weir.	,,	P. Henderson ...	,, 5.5.27 to 19.9.27	29.9.27
Arundel	Short, H.	Mr. Hill...	C.C.	Southern Rly. ...	Telegraphic Report 30.3.28	30.3.28
Arundel Castle ...	Knight, A.	G. H. Pickering	No. A.	Union Castle ...	Form 911 28.1.28 to 18.3.28	23.3.28
Astronomer ...	Richards, J. ...	A. Browne, C. C. Heaton, H. W. FitzSimons.	M.L.	Harrison	Met. Log. 28.10.27 to 7.1.28	13.1.28
Ascanius	Wilson, C. A.	T. Robb, J. B. Marshall, W. Cook.	,,	A. Holt	,, 31.10.27 to 5.3.28	14.3.28
Athenic	Binks, J. W ...	W. Hill	No. A.	White Star	Form 911 20.2.28 to 7.3.28	9.3.28
Atreus	Rundle, G. G. ...	H. Nicholas	,, A.	A. Holt	,, 16.2.28 to 17.3.28	28.3.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 13.4.28.	Date Received.
Atsuta Maru ...	Narui, N.	K. Fuse	No. A.	Nippon Yusen Kaisha	Form 911 16.7.27 to 15.8.27	19.11.27
Auditor	Owen, W. T. ...	L. A. Bennett	„ M.	Harrison	„ 13.9.27 to 13.12.27... ...	17.12.27
Autolycus	Dunlop, J. K. ..	... ...	„ A.	A. Holt...	„ 16.2.28 to 25.2.28	10.4.28
Ausonia	Stafford, W., D.S.C., R.D., Lt.-Commr., R.N.R.	J. J. Wiseman	„ A.	Cunard	„ 21.8.27 to 8.10.27	11.10.27
Avon	Spriddell, F. G., R.D., Commr., R.N.R.	R. H. East	„ M.	R.M.S.P.	„ 17.2.28 to 28.3.28	29.3.28
Balmoral Castle ...	Chave, Sir B., K.B.E.	C. S. Keen	„ A.	Union Castle	„ 30.12.27 to 16.1.28... ...	6.2.28
Balranald	Townshend, W. P., Commr., R.N.R.	C. Hannen, F. Ward, R. E., Cowell, J. C. Davis. L. S. Bailey.	M.L.	P. & O. Branch ...	Met. Log. 9.6.27 to 13.10.27	22.11.27
51 *Baltic*	White, E. R., R.D., Commr., R.N.R.	J. Law, H. Gray, F. Laws ...	W.T.	White Star ...	W.T. Reg. 5.3.28 to 24.3.28	28.3.28
					Form 911 5.3.28 to 25.3.28	28.3.28
Bampton Castle ...	Hutchings, A. H. ...	... ...	No. A.	Union Castle	„ 17.9.27 to 14.10.27... ...	24.10.27
Banbury Castle ...	Swiney, W. A. ...	C. G. Cuthbertson	„ A.	„	„ 21.4.27 to 9.5.27	9.6.27
Banffshire	Wynne, R. H.... ...	W. F. Lockhead	„ A.	Turnbull Martin ...	„ 10.1.28 to 28.1.28	20.2.28
Baradine	Rollo, W.	B. H. Pollitt, E. Bolton-Smith, G. C. Case, C. B. Roche.	M.L.	P. & O. Branch ...	Met. Log. 1.9.27 to 4.1.28	11.1.28
Barpeta	Strachan, J.	B. R. Faithfull	No. M.	British India	Form 911 15.2 28 to 15.3.28	3.4.28
Barrabool	Rhodes, H. R. ...	G. S. B. Collard...	„ M	P. & O. Branch ...	„ 13.1.28 to 29.1.28	5.3.28
Baychimo	Cornwall, S. A. ...	W. H Deans	„ A	Hudson's Bay Co. ...	„ 7.7.27 to 14.9.27	13.10.27
59 *Belgenland* ...	Morehouse, W. A. ...	F. Good, W. E. Hesketh ...	W T.	Red Star ...	W.T. Reg 5.12.27 to 11.12.27... ...	30.12.27
					Form 911 4.12.27 to 11.12 27... ...	30.12.27
Beltana	Allin, C. H. C. ...	... ...	No. M.	P. & O. Branch ...	„ 3 3.28 to 21.3.28	10.4.28
Benalder	Fairweather, J. J. ...	A. J. Leckie	„ A.	Ben Line	„ 20.2.28 to 3.4.28	10.4.28
Benalla	Sheepwash, J. ...	S. W. Du Fosse...	„ M.	P. & O. Branch ...	... ...	...
Bendigo	Nicholl, R. N. C. ...	R. M. Richardson	„ M.	„ „ ...	„ 17.2.28 to 3.4.28	11.4.28
Benefactor	Jones, C. W.	... ...	„ M.	Harrison	„ 19.1.28 to 5.3.28	26.3.28
Bengloe	McCorquodale, A. ...	J. Davidson	„ A.	Ben Line	„ 29.1.28 to 17.2.28	26.3.28
31 *Berengaria* ...	Rostron, Sir A. H., K.B.E., R.D., Capt. R.N.R.	J. A. Myles, W. C. A. Robson, S. A. T Bullock.	W.T.	Cunard	W.T. Reg. 25.3.28 to 10.4.28	13.4.28
Berrima	Short, C. E.	A. Hughes	No. M.	P. & O. Branch ...	Form 911 7.10.27 to 12.11.27... ...	16.11.27
Bogota	Pape, E. R.	... ...	„ M.	R.M.S.P. Co.	„ 6.3.28 to 30.3.28	11.4.28
Borda	Holland, R.	... ...	„ M.	P. & O. Branch ...	„ 18.2.27 to 28.6.27	7.7.27
Brecon	Rothwell, A.	E. H Coleman	„ A.	Canadian Pacific ...	„ 5.5.27 to 6.6.27	14.6.27
Brenda	Lamont, A.	N. Ross	„ A.	Scottish Fishery Board.	„ 1.3.28 to 30.3.28	4.4.28
Brighton	Hill, A.	Mr. Munton	C.C.	Southern Railway ...	Telegraphic Report 11.4.28	11.4.28
British Colonel ...	Taylor, R. J.	S. H. Chaplain	No. M.	British Tankers ...	Form 911 26.1.28 to 15.3.28	21.3.28
British Consul ...	Putt, R. O.	C. H. Humphries	„ M.	„ „ ...	„ 11.3.28 to 21.3.28	29.3.28
British Engineer	Joures, F. W.	W. Evans	„ M.	„ „ ...	„ 11.2.27 to 26.2.27	25.5.27
Bronte	Crapper, J. S.... ...	J. B. Scott	„ A.	Lamport & Holt ...	„ 9.1.28 to 11.3.28	26.3.28
Bruyere	Birch, A.	J. C. Turner	„ A.	„ „ ...	... ...	
Bulysses M.V. ...	Head, B. P.	A. J. Clatworthy	„ M.	Anglo-Saxon Petroleum Co.	„ 5.3.28 to 29.3.28	11.4.28
Cambria	Copland. C. P. ...	O. W. Ll. Jones	C.C.	L.M. & S. Rly	Telegraphic Report 7.4.28	7.4.28
Cameronia	Gemmell, W.	... ...	No. A.	Anchor	Form 911 22.2.28 to 11.3.28	16.3.28
Camito	Forrester, W. T., O.B.E.	H H. Dunning, J. McIntyre, C. M. Schofield.	M.L.	Elders & Fyffes ...	Met. Log. 2.8.27 to 26.11.27	1.12.27
Canadian Importer	Forson, A.	... ...	No. A.	Canadian Gov. Mercantile Marine.	Form 911 17.2.28 to 16.3.28	10.4 28
Canadian Inventor	Boulton, F. W. ...	O. D. Alcorn	„ A.	„ „ „	„ 17.9.27 to 30.10.27... ...	19.11.27
Canadian Scottish	Wallace, C.	... ...	„ A.	„ „ „	„ 26.5.27 to 11.7.27	19.8.27
Canadian Winner	Boulten, F. W. ...	... ...	„ M.	„ „ „	„ 14.1.28 to 9.2.28	5.3.28
Canonesa	Brodie, W. H. ...	T. Wetherall	„ M.	Furness Houlder ...	„ 13.2.28 to 3.4.28	11.4.28
Cape of Good Hope	Lamont, J.	J. J. Lewis	No. A.	Lyle S.S. Co.	„ 3.2.28 to 19.3.28	10.4.28
35 *Carmania* ...	Brown, F. G., R.D., Capt., R.N.R.	W. M. Stewart, F. R. Stewart, V. P. Britten.	W.T.	Cunard ...	W.T. Reg. 20.3.28 to 7.4.28	10.4.28
					Form 911 7.8.27 to 26.8.27	30.8.27
Carnarvon Castle ...	Strong, H., R.D., Commr., R.N.R. / Stanley, W. F., R.D., Commr., R.N.R.	H. A. Deller. E. Fullick, W. G. Smith, J. B. McReynolds.	M.L.	Union Castle ...	Met. Log. 2.9.27 to 27.2.28	6.3.28
34 *Caronia*	Hossack, W. H., R.D., Capt., R.N.R.	H. G. Hayward, D. McMillan, T. Parry.	W.T.	Cunard ...	W.T. Reg. 5.3.28 to 24.3.28	29.3.28
					Form 911 5.3.28 to 24.3.28	29.3.28
Casanare	Steidelmann, H. ...	R. O. Jones	No. A.	Elders & Fyffes ...	„ 25.6.27 to 11.9.27	16.9.27
Cavina	Riseley, A. D.... ...	R. L. Stevenson...	„ A.	„ „ ...	„ 29.1.28 to 3.3.28	7.3.28
52 *Cedric*	Smith, R. G.	N. E. Banks, H. A. Daman, N. L. Mackie.	W.T.	White Star ...	W.T. Reg. 27.2.28 to 18.3.28	21.3.28
					Form 911 26.2.28 to 18.3.28	21.3.28
53 *Celtic*	Berry. G.	A. Thompson, D. K. Crawford, A. R. Stevens.	„	„ „ ...	W.T. Reg. 11.3.28 to 1.4.28	4.4.28
					Form 911 12.3.28 to 1.4.28	4.4.28
Centaur	Rose, A. F.	L. Johnstone, E. D. Potts, N. L. Thompson.	M.L.	A. Holt & Co. ...	„ 11.3.27 to 20.8.27	11.1.28
Ceramic	Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R.	... ...	No. A.	White Star	„ 20.8.27 to 6.12.27	8.12.27
Changte	Gambrill, F. C. ...	— Thomas, A. Johnston, — Baigent.	M.L.	Yuill & Co.	Met. Log. 16.8.27 to 9.12.27	1.2.28
Changuinola ...	Thorburn, R. A., R.D., Commr., R.N.R.	W. G. Chanter	No. A.	Elders & Fyffes ...	Form 911 24.1.28 to 25.2.28	29.2.28
China	Sudell, F., R.D., Commr., R.N.R.	L. Porter	„ M.	P. & O.	„ 25.7.27 to 11.8.27	8.10.27
Chindwin	Esslemont, C. ...	... ...	„ A.	Henderson	„ 24.12.27 to 8.3.28	28.3.28
Chirripo	McColm, F.	H. Rawston, R. Laycock ...	„ A.	Elders & Fyffes ...	„ 22.1.28 to 26.2.28	5.3.28
City of Baroda ...	McMillan, J.	A. Beaton, — Hodgkinson, W. A. Lambert.	M.L.	Ellerman	Met. Log. 17.11.27 to 1.2.28	8.2.28
City of Benares ...	Anderson, W. W. ...	F. Forsyth	No. A.	„	Form 911 20.1.28 to 12.2.28	23.3.28
City of Brisbane ...	Seaborne, F. O., D.S.C.	R. Jones	„ A.	„	„ 3.2.28 to 1.4.28	10.4.28
City of Canterbury	Bremner, D. M. ...	R. H. Hodgson	„ A.	„	„ 24.1.28 to 25.2.28	12.3.28
City of Carlisle ...	Mordue, J. A. ...	... ...	„ A.	„	„ 14.2.28 to 9.3.28	29.3.28
City of Chester ...	Letton, F. W. ...	C. C. Duncan, A. J. Barnett, R. Mowbray.	M.L.	„	Met. Log. 22.10.27 to 26.2.28	21.3.28
City of Edinburgh	Wyper, J.	G. Hummell	No. M.	„	Form 911 25.11.27 to 18.12.27 ...	9.1.28
City of Hong Kong	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	... ...	„ A.	„	„ 6.10.27 to 4.11.27	29.12.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 13.4.28.	Date Received.
City of London ...	Parker, F. W., R.D., Commr., R.N.R.	H. D. Asher	No. A.	Ellerman	Form 911 28.9.27 to 22.12.27... ...	29.12.27
City of Osaka ...	Smith, W. H.	... ...	No.	„	... ...	...
City of Rangoon ...	Jones, P.	E. R Wildermath, R. W. May, R. H. Stewart.	M.L.	„	Met. Log. 4.7.27 to 5.1.28	1.2.28
City of Venice ...	Lee, A.	... ...	No. A.	„	Form 911 18.2.28 to 1.3.28	12.3.28
City of Yokohama	Singleton, J. G. ...	R. Willott Leese	„ A.	„	„ 2.2.28 to 15.2.28	2.3.28
Clan Alpine ...	Lyall, A. B.	K. M. Banks	„ A.	Clan	„ 25.1.28 to 14.2.28	12.3.28
Clan Lamont ...	Urquhart, P., D.S.C.	P. de Gruchy	„ A.	„	„ 19.11.27 to 26.12.27 ...	16.1.28
Clan Lindsay ...	Giles, H J., R.D., Commr., R.N.R.	E. P. Smith	„ A.	„	„ 13.1.28 to 6.2.28	27.2.28
Clan MacBean ...	Worthington, J. H. ...	... ...	No.	„	... ...	...
Clan Macbeth ...	Pagan, Q. C.	T A. Watkinson	„ A.	„	„ 1.2.28 to 27.2.28	14.3.28
Clan Macfadyen ...	Stenson, F. J. R.D., Capt. R.N.R.	A. Dowds	„ A.	„	„ 5.2.28 to 22.2.28	26.3.28
Clan Macfarlane ...	Redford, —	... ...	„ A.	. ...	... ...	...
Clan Macgillivray	Law, A.	J. Garis	„ A.	„	„ 16.12.27 to 7.4.28	10.4.28
Clan Macindoe ...	West, W. F.	D. McAllister	„ A.	„	„ 20.11.27 to 20.12.27 ...	2.1.28
Clan Mackellar ...	Smith, W. P.	G. A. A. Grant	„ A.	„	„ 24.12.27 to 23.1.28 ...	13.2.28
Clan Macphee ...	Gourlay, J. B. ...	D. S. Rae, A. F. Martin. W. A. Shewan.	M.L.	„	Met. Log. 14.5.26 to 2.5.27	9.6.27
Clan Macnaughton	Simpson, A. W. ...	D. D. Ingram	No. A.	„	Form 911 11.12.27 to 12.2.28... ...	14.2.28
Clan Mactaggart ...	Makepeace. F. ...	E. A. Hewson	„ A.	„	„ 8.1.28 to 1.2.28	27.2.28
Clan Macwhirter ...	Waterhouse, J. ...	W. A. Robbie, E. A. Brown. D. Timms.	M.L.	„	Met. Log. 11.2.27 to 15.8.27... ...	23.8.27
Clan Malcolm ...	Neill, G. A.	D. A. Stark, H. V. Wightman. M. Carlton.	„	„	„ 28.8.27 to 24.12.27... ...	11.2.28
Clan Morrison ...	Porterfield, W. M. ...	... ...	No. A.	„	Form 911 2.1.28 to 13.1.28	23.1.28
Clan Murdoch ...	Neill, G. A.	W. J. Jones	„ A.	„	„ 20.2.28 to 10.3.28	10.4.28
Clan Ranald ...	Laird, C.	F. D. Bonney, T. O. Marr ...	„ A.	„	„ 10.12.27 to 29.3.28... ...	10.4.28
Clan Ross	Openshaw, L. G. ...	J. R. Elliott	„ A.	„	„ 28.12.27 to 22.1.28 ...	26.1.28
Clan Sinclair ...	George, L. S.	N. Macleod	„ A.	„	„ 20.12.27 to 13.1.28 ...	21.1.28
Clan Urquhart ...	Baker, E. W.	W. A. Shewan	„ A.	„	„ 8.3.28 to 21.3.28	26.3.28
Comorin	Borland, J. Mc.I., C.B., D.S.O., R.D., Capt., R.N.R.	E. C. White, R. V. Alexander	„ M.	P. & O.	Form 911 30.11.27 to 12.1.28... ...	18.1.28
Corinthic	Hart, F.	I. A. Macnaughton	M.L.	White Star	Met. Log. 17.9.27 to 8.1.28	10.1.28
Cornwall	Wilde, H. J.	H. M. Knight	No. A.	Federal	Form 911 11.12.27 to 11.1.28... ...	13.2.28
Crawford Castle ...	Morgan, A. O., R.D., Commr., R.N.R.	J. A. Wilson	„ A.	Union Castle	„ 30.10.27 to 1.12.27... ...	15.12.27
Culebra	Rathkins C.E. ...	P. Cooper, R. N. Fletcher, W. S. Thomas.	M.L.	R.M.S.P. Co.	Met. Log. 5.11.27 to 12.1.28	24.1.28
Cumberland ...	Macmillan, D. ...	... ...	No. A.	Federal...	Form 911 31.10.27 to 8.12.27... ...	6.2.28
Cyclops	Cosker, W.	... ...	„ A.	A. Holt	„ 25.12.27 to 28.2.28... ...	16.3.28
Dakotian	Robb, J.	... ...	No. A.	Leyland	... ...	...
Dardanus	Clarke, J. W.	... ...	„ A.	A. Holt	Form 911 21.1.28 to 2.2.28	23.2.28
Darian	Masters, W.	... ...	„ A.	Leyland	„ 12.11.27 to 24.11.27 ...	5.12.27
Darro	Matthews, G. P. ...	... ...	„ A.	R.M.S.P. Co.	„ 30.12.27 to 15.2.28... ...	20.2.28
Demerara	Willan, F. G. L., R.D., Capt., R.N.R.	F Jeyes	„ A.	„	„ 13.12.27 to 4.2.28	7.2.28
Demosthenes ...	Ogilvy, A.	J. Cruickshank	„ M.	Aberdeen	„ 18.12.27 to 28.1.28... ...	5.3.28
Denis	Harris, F. C. P. ...	... ...	No.	Booth	... ...	...
Deseado	Hannam, F. S. ...	L. D. Jennings, A. Barff ...	„ M.	R.M.S.P. Co.	„ 7.1.28 to 2.3.28	5.3.28
Desna	Green, J.	L. G. Peterson	„ M.	„	„ 24.1.28 to 14.3.28	23.3.28
Deucalion	Melling, C. F.... ...	R. Wilson...	„ A.	A. Holt	„ 5.2.28 to 18.2.28	23.2.28
Dieppe	Marmery, S.	Mr. Parsons	C.C.	Southern Railway ...	Telegraphic Report 13.4.28 ...	13.4.28
Dimboola	Roy, C. M.	... ...	No. A.	Melbourne S.S. Co. ...	Form 911 21.1.28 to 15.2.28 ...	19.3.28
Discoverer	Ling, J. T.	H. W. Gostage	„ M.	Harrison	„ 8.4.27 to 9.7.27	12.7.27
Domala, M.V. ...	Kitson, A. G.	J. G. Wallace	„ M.	British India	„ 8.7.27 to 18.9.27	10.10.27
Dominia, C.S. ...	Campos, V., O.B.E., Lt.-Commr., R.N.R.	H. Hutchins, T. J. C. Dexter, J. Dyer.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 4.1.28 to 24.1.28	1.3.28
61 *Doric*	Bolton, S., D.S.C., R.D., Commr., R.N.R.	J. Farrell, G. T. Kavanagh. D. W. Chamberlain.	W.T.	White Star ...	W.T.Reg. 28.1.28 to 17.2.28 ... Form 911 28.1.28 to 30.3.28 ...	2.4.28 3.4.28
Dorington Court ...	Clarke, E. J.	P. Jones	No. A.	Haldin & Co.	„ 28.10.27 to 28.2.28... ...	14.3.28
Dromore Castle ...	MacMahon, J. ...	D. P. Klasen	„ A.	Union Castle	„ 8.10.27 to 20.10.27... ...	12.11.27
Dryden	Major, T. W.	... ...	„ M.	Lamport & Holt ...	„ 28.1.28 to 19.2.28	21.3.28
Dunaff Head ...	Milner, T. F. R.D., Lt.-Commr., R.N.R.	S. Duff	„ A.	Ulster S.S. Co. ...	„ 2.2.28 to 15.2.28	26.3.28
Dundrum Castle ...	Goodacre, R.W., R.D., Commr., R.N.R.	A. R. J. Tilston	„ A.	Union Castle	„ 4.2.28 to 23.2.28	26.3.28
Dunluce Castle ...	Gardner, G. F. ...	F. O. Wilbraham	„ A.	„ „	„ 6.1.28 to 25.1.28	27.1.28
Dunrobin	Ramsay, J. D. ...	C. H. Kendall	„ A.	Glen & Co.	„ 25.1.28 to 23.2.28	12.3.28
Duquesa	Owen, R.	C. G. Adlard	„ M.	Furness Withy ...	„ 22.1.28 to 15.3.28	19.3.28
Durenda	Beeching, P. H. ...	... ...	„ M.	British India	„ 19.10.27 to 17.11.27 ...	8.21.27
Edinburgh Castle	Owen, S. H.	G. H. Mayhew	„ A.	Union Castle	„ 10.2.28 to 1.4.28	2.4.28
Egori	Sola, P., D.S.O. ...	F. J. Croft	„ A.	Elder Dempster ...	„ 1.3.28 to 19.3.28	28.3.28
El Paraguayo ...	Fletcher, G.	F. F. Feint, D. Murray ...	„ M.	Houlder Bros. ...	„ 23.10.27 to 15.12.27 ...	20.12.27
Elpenor	Gordon, A. L.... ...	M. Robertson, C. Kavanagh	M.L	A. Holt	Met. Log. 8.9.27 to 23.12.27	4.1.28
Elysia	Duncan, A. R. ...	A Laidlaw, H. C. Fry, D. F White.	„	Anchor	„ 11.11.27 to 14.1.28... ...	25.1.28
Empress of Asia ...	Hailey, A. J., Lt.-Commr., R.N.R.	R. H. Foley, L. C. Hogg, D. Smith.	„	Canadian Pacific ...	„ 14.10.27 to 12.2.28... ...	19.3.28
Empress of Canada	Robinson, S., C.B.E., R.D., Commr., R.N.R.	A. G. Simmons	„	„ „ ...	„ 4.11.27 to 4.3.28	12.4.28
Empress of France	Griffiths, E.	O. F. Pennington, E. Roberts, W. Ewens.	„	„ „ ...	„ 30.4.27 to 18.4.27	31.10.27
Empress of Russia	Hosken, A. J.... ...	L. C. Barry, R. A. Leicester. J. S. Clarke, J. H. Reich.	„	„ „ ...	„ 19.5.27 to 9.11.27	16.12.27
Endeavour	Commr. S. A. Geary-Hill, D.S.O., R.N.	C. S. E. Lansdown	„	His Majesty's Ship ...	„ 14.3.27 to 11.7.27	19.7.27
Essequibo	Kirkwood, J. H. ...	J. H. E. Evans	No. M.	R.M.S.P. Co.	Form 911 29.1.28 to 11.3.28	30.3.28
Eumaeus	Read, J. W.	... ...	„ A.	A. Holt	„ 3.6.27 to 1.12.27	8.12.27
Euripides	Collins, P. J., O.B.E.	K. D. Fisher, P. Congdon, A. J. Parry.	M.L.	Aberdeen	Met. Log. 17.9.27 to 24.1.28	2.2.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 13.4.28.	Date Received.
Euryades	Findlay, J.	...	No. A.	A. Holt	Form 911 5.2.28 to 28.2.28	12.3.28
Explorer	Ling, J. T.	A. M. Hughes	„ M.	Harrison	„ 6.8.27 to 4.11.27	15.11.27
Explorer	Allan, J.	A. Stout	„ A.	Scottish Fishery Board.	„ 2.3.28 to 31.3.28	2.4.28
Ferndale	Daniel, F.	R. S. Hartrick	„ M.	Commonwealth Govt.	„ 21.12.27 to 23.1.28	5.3.28
Flandria	Maars, L.	C. Van Otterloo	„ M.	Holland Lloyd	„ 27.12.27 to 8.2.28	24.2.28
Francisco	Scales, H.	F. Elgin	„ A.	Ellerman Wilson	„ 24.1.28 to 1.3.28	16.3.28
Freya	Angus, W.	W. Pirrie	„ A.	Scottish Fishery Board.	„ 3.3.28 to 31.3.28	10.4.28
Gaika	Jackson, C. R.	L. G. May	„ A.	Union Castle	„ 11.9.27 to 4.11.27	7.11.27
Galtymore	Yeoman, J. T.		„ M.	Furness Withy	„ 25.9.27 to 24.11.27	1.12.27
Garth Castle	Jackson, C. R.	W. S. J. Aldous	„ A.	Union Castle	„ 28.5.27 to 18.6.27	22.6.27
Gascoyne	Johnson, L.		M.L.	A. Holt & Co.		
Gelria	Veldkamp, C. J.		No. M.	Holland Lloyd	Form 911 20.1.28 to 8.3.28	12.3.28
Geranium	Bennett, H. T., D.S.O., Commr. R.A.N.		M.L.	His Majesty's Australian Ship.		
Glamorganshire	Clayton, R. G., D.S.C., R.D., Lt.-Commr., R.N.R.	K. H. Whitaker	No. M.	R.M.S.P. Co.	Form 911 5.2.28 to 23.2.28	21.3.28
Glenamoy, M.V.	Homan, C. E.	R. H. Bishop	M.L.	Glen Line	„ 17.8.27 to 22.10.27	4.11.27
Glengarry	Angier, J.	F. C. White	No. M.	„	„ 18.2.28 to 5.3.28	3.4.28
Glenluce	Kennett, W. H.	H. B. Porter	„ A.	„	„ 26.1.28 to 14.2.28	12.3.28
Glenshane	Beer, E. / Neil, P. G.		„ A.	„	„ 31.12.27 to 17.2.28	19.3.28
Gloucestershire	Robin, E.	C. F. Hicks	„ A.	Bibby	„ 28.1.28 to 24.3.28	10.4.28
Gloxinia	Pool, F. G.		„ A.	Stag Line	„ 13.3.28 to 3.4.28	12.4.28
Grantully Castle	Whitfield, G. T.	R. Wren	„ A.	Union Castle	„ 3.6.27 to 14.8.27	17.8.27
Greenbrier	McColm, F.	J. B. Wookey	„ A.	Elders & Fyffes	„ 24.7.27 to 28.8.27	5.9.27
Halesius	Samuels, C.	R. W. Cook	„ A.	R. P. Houston	„ 28.1.28 to 2.3.28	26.3.28
Haliartius	Marsh, L. V.	W. H. Upton	„ A.	„ „	„ 5.2.28 to 29.2.28	2.4.28
Harmonides	Hughes, W. F.	K. T. Roper	„ A.	„ „	„ 21.2.28 to 8.3.28	23.3.28
Hatimura	Lane, S. R., R.D., Capt., R.N.R. / Hannaford, J.		„ M	British India	„ 27.11.27 to 6.1.28	6.2.28
Hauraki, M.V.	Frew, J. D.	T. Marshall	M.L.	Union S.S. Co., N.Z.	Met. Log. 25.3.27 to 1.11.27	21.1.28
Henry Holmes, C.S.	Bicker Caarten, A.	M. A. Green	No. M	W. I. & Panama Telegraph Co.	Form 911 20.1.28 to 18.3.28	11.4.28
Herald	Haselfoot, F.E.B., Capt., R.N.	D. G. V. Williams	M.L.	His Majesty's Ship	Met. Log. 18.10.27 to 19.11.27	31.1.28
Herefordshire	Mann, R. P.	M. D. Louttill	No. A.	Bibby	Form 911 14.1.28 to 21.3.28	26.3.28
Herminius	Roberts, T. V.	D. W. MacGregor	„ A.	Shaw, Savill & Albion	„ 17.1.28 to 4.2.28	27.2.28
Herschel	Watson, W. W.	J. F. Maurey	„ A.	Lamport & Holt	„ 24.7.27 to 11.1.28	20.1.28
Hertford	Urquhart, D.		„ A.	Federal	„ 13.12.27 to 3.1.28	13.2.28
Hibernia	Roberts, W. Ivor, M.B.E.	R. Woodall, A. Marsh	C.C.	L.M. & S. Railway	Telegraphic Report 31.3.28	31.3.28
Highland Laddie	Jones, T. J.	N. F. Seaton	No. A.	Nelson	Form 911 24.10.27 to 11.12.27	23.12.27
„ *Piper*	Collings, D.	S. E. Jackson, R. G. Owen, A. Southgate.	M.L.	„	Met. Log. 13.5.27 to 4.11.27	1.12.27
„ *Pride*	Robinson, R. H.		No. A.	„	Form 911 16.12.27 to 11.2.28	14.2.28
„ *Prince*	Marshall, J.	J. Harrison	„ A.	Prince	„ 13.1.28 to 1.2.28	6.3.28
„ *Rover*	Ashby Graves, F.	C. C. Legg	„ A.	Nelson	„ 19.2.28 to 7.3.28	19.3.28
Hildebrand	Maddrell, J.	A. G. Malcolm	„ A.	Booth	„ 16.11.27 to 30.12.27	2.1.28
Hobson's Bay	Kydd, O. J.	R. Pearce, H. Benson, K. McKenzie.	M.L.	Commonwealth Govt	Met. Log. 4.10.27 to 7.1.28	13.1.28
Holbein	Leicester, F. S.	C. E. Legg, A. J. Corney	No. A.	Lamport & Holt	Form 911 27.10.27 to 15.1.28	18.1.28
54 *Homeric*	Parker, W. H., C.B.E., R.D., Capt. R.N.R.	H. G. Morgan, S. B. Morfee, W. T. Poustie.	W.T.	White Star	W.T. Reg. 12.1.28 to 25.1.28	8.2.28
Hororata	Holland, E.	A. E. Bamforth	No. A.	New Zealand S.S. Co.	Form 911 29.10.27 to 8.3.28	12.3.28
Hubert	Briscoe, W.	E. C. McGuinness	„ A.	Booth	„ 28.1.28 to 14.3.28	26.3.28
Huntingdon	Ashworth, W.	H. G. Letts	„ A.	Federal	„ 29.11.27 to 21.12.27	6.2.28
Huntsman	Russell, H.	J. Richardson	„ M.	Harrison	„ 6.12.27 to 14.2.28	23.2.28
Hurunui	Upton, E. C. S.	J. Oxnard, F. Longheed, G. R. Hogg, K. Goldsworthy.	M.L.	New Zealand S.S. Co.	Met. Log. 12.8.27 to 5.2.28	10.2.28
Hydaspes	Williams, —		No. M.	R. P. Houston		
Ingoma	Barrow, R. K.	D. G. Russell	„ M.	Harrison	Form 911 12.2.28 to 25.3.28	28.3.28
Inkum	Meetham, J. T.	H. Johnson	„ A.	J. H. Welsford	„ 7.1.28 to 21.1.28	24.1.28
Iris, C.S.	Hughes, H. R.	L. V. Vicker, D. MacDonald	M.L.	Pacific Cable Board	Met. Log. 25.8.27 to 3.10.27	21.3.28
Iroquois	Jackson, A. L. Commr., R.N.	H. L. Jenkins	„	His Majesty's Ship	„ 2.8.27 to 21.11.27	31.1.28
Ixion	Reed, G. C.	C. W. A. Murphy	No. A.	A. Holt	Form 911 5.1.28 to 27.3.28	10.4.28
Javanese Prince	Naylor, E.	W. Venn	„ A.	Prince	„ 1.2.28 to 6.3.28	26.3.28
Jervis Bay	Chaplin, W. R.	R. W. Laycock	„ M.	Commonwealth Govt.	„ 10.12.27 to 19.12.27	9.1.28
Justin	Bush, H.	A. Blewett	„ A.	Booth	„ 4.1.28 to 20.1.28	25.1.28
Kaisar-i-Hind	Manley, G.	R. H. Hand	„ M.	P. & O.	„ 4.2.28 to 28.3.28	3.4.28
Kalyan	Cornewall Jones, B.	S. Gerrans	„ M.	P. & O.	„ 14.1.28 to 17.2.28	3.4.28
Kamo Maru	Enya, S.		„ A.	Nippon Yusen Kaisha	„ 17.2.28 to 18.3.28	8.2.28
Kangaroo	Buckeridge, G. / Turner, J. E.	E. Hutchinson, J. Kavanagh, H Brackenridge.	M.L.	State Service Australia.	Met. Log. 4.5.27 to 5.9.27	25.10.27
Karapara	Miller, A. C.	J. Ruddiman	No. M.	British India	Form 911 15.2.28 to 6.3.28	26.3.28
Kashmir	Mallalue, R., R.D., Lt.-Commr., R.N.R.	A. J. McHattie	„ M.	P. & O.	„ 5.2.28 to 21.2.28	28.3.28
Kenilworth Castle	Chave, Sir B., K.B.E.	R. C. Longman, L. A. J. Keeble, W. Dryden, W. Wyeth.	M.L.	Union Castle	Met. Log. 18.4.27 to 8.8.27	19.10.27
Kent	Matthews, C.	W. C. Wilkinson	No. A.	Federal	Form 911 21.12.27 to 24.1.28	31.1.28
Khiva	Cooper, C. P., O.B.E., R.D., Capt., R.N.R.	G. W. Wood, D. Meakle, E. Allen, V. A. Nicolls.	M.L.	P. & O.	Met. Log. 8.6.27 to 14.8.27	19.8.27
Khyber	Hester, C. W., R.D., Commr., R.N.R.	C. S. Pirie	„	P. & O.	„ 16.12.27 to 24.3.28	2.4.28
Knight Companion	Cox, B. T., D.S.O.	J. H. Isherwood, J. R. Evans	No. M.	A. Holt	Form 911 12.3.28 to 22.3.28	11.4.28
Koolinda, M.V.	Buckeridge, J.		„ M.	State Service, Australia.	„ 2.2.28 to 22.2.28	11.4.28
Kovno	Dossor, W. A.	A. Snowdon, S. N. Stokes, N. W. Glendenning, S. Butcher.	M.L.	Ellerman Wilson	Met. Log. 18.6.27 to 20.12.27	6.1.28
37 *Laconia*	Britten, E. T., R.D., Commr., R.N.R.	J. Ashcroft, E. W. Connell, J. O. Chambers.	W.T.	Cunard	W.T. Reg. 2.1.28 to 8.1.28 / Form 911 15.1.28 to 28.3.28	25.1.28 / 2.4.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteoro-logical Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 13.4.28.	Date Received.
Laguna	Mander, T.	... ...	No. A.	Pacific S.N. Co. ...	Form 911 21.2.28 to 14.3.28	2.4.28
Lahore	Gordon, L. M., R.D., Commr. R.N.R.	E. B. Elcoate	„ M.	P. & O.	„ 25.2.28 to 11.3.28	11.4.28
Lalande	Hamill, H.	A. E. Warburton	„ A.	Lamport & Holt ...	„ 5.11.27 to 27.1.28	20.2.28
Lancashire	Crumplin, W. E. ...	R. Allen	„ A.	Bibby	„ 6.11.27 to 12.1.28	17.1.28
36 *Lancastria* ...	Oram, B.B., R.D., Commr., R.N.R.	R. P. Cambell, L. R. Sharp, F. G. Russell.	W.T.	Cunard	W.T. Reg. 16.12.27 to 7.1.28 ... ... Form 911 3.3.28 to 26.3.28 ...	13.1.28 28.3.28
Laomedon	Beswick, W., D.S.C., Lt.-Commr., R.N.R.	H. A. Standfield	No. A.	A. Holt...	„ 12.3.28 to 21.3.28	29.3.28
La Paz, M.V. ...	Benson, C. W... ...	D. Beamer	„ M.	Pacific S.N. Co. ...	„ 30.11.27 to 19.12.27 ...	4.1.28
Laplace	Hickman, V. G. ...	A. L. Murray, R. D. Cottam	„ A.	Lamport & Holt ...	„ 15.4.26 to 28.6.27	30.8.27
55 *Lapland* ...	Thomas, A. J. ...	F. Wills, L. A. Williams, J. Flett.	W.T.	Red Star	W.T. Reg. 27.2.28 to 17.3.28 ... ... Form 911 26.2.28 to 17.3.28 ...	20.3.28 21.3.28
64 *Laurentic* ...	Hyde, W. ... ... Trant, E. L., R.D., Commr. R.N.R.	J. W. Peters, E. A. A. Crowley	„	White Star	W.T. Reg. 2.1.28 to 26.2.28 ... ... Form 911 23.2.28 to 15.3.28 ...	21.3.28 21.3.28
Lautaro, M.V. ...	Dunn, R. E., O.B.E....	... ...	No. M.	Pacific S.N. Co. ...	„ 24.11.27 to 11.3.28... ...	29.3.28
Leicestershire ...	de Legh, P.	R. S. Evans. H. G. Walton, J. K. Gemmell, G.W. Hunter.	M.L.	Bibby	Met. Log. 18.12.27 to 22.2.28... ...	7.3.28
Leighton, M.V. ...	Lindesay, J. M. ...	R. L. Hagley	No. A.	Lamport & Holt ...	Form 911 4.1.28 to 21.1.28	9.2.28
Leitrim	Kemp, E. R.	C. R. Brown	„ A.	Dowie, J., & Co. ...	„ 2.11.27 to 17.11.27... ...	23.11.27
Lepanto	Williams, J. C. ...	G. W. Revell	„ A.	Ellerman Wilson ...	„ 6.1.28 to 16.2.28	23.2.28
Llandaff Castle ...	Morton Betts, W. ...	R. Bayer	„ A.	Union Castle	„ 29.12.27 to 15.1.28... ...	14.2.28
Llandovery Castle	Kerbey, J. H. ...	C. H. Williams, G. Moon, E. M. Betts.	M.L.	„ „	Met. Log. 15.12.27 to 20.2.28... ...	1.3.28
Loch Katrine ...	Buret, T. J. C. ...	R. A. Stenhouse	No. A.	R.M.S.P. Co.	Form 911 11.11.27 to 3.2.28	16.2.28
London Commerce	Young, H. J., D.S.C....	W. Edmonds	„ A.	Furness Withy ...	„ 19.8.27 to 19.9.27	26.9.27
London Importer ...	Frost, C. R.	H. J. Anstice, J. H. Metcalfe, J. G. Freeman.	M.L.	„ „ ...	Met. Log. 8.9.27 to 3.12.27	13.12.27
Lord Antrim ...	Jarvis, F. E.	L. G. Kirwan	No. A.	Ulster S.S. Co. ...	Form 911 27.4.27 to 10.5.27	23.5.27
Loriga, M.V. ...	Clapham, E. C. ...	R. W. Gill	„ A.	Pacific S.N. Co. ...	„ 23.12.27 to 17.2.28... ...	20.2.28
Losada, M.V. ...	Ross, J....	J. T. Denley	„ M.	„ „ ...	„ 15.11.27 to 28.2.28... ...	21.3.28
Macedonia	Potter, H. W., R.D., Commr., R.N.R.	C. J. L. Hayward	„ M.	P. & O.	„ 22.1.28 to 9.2.28	12.3.28
Macharda	Tyers, W. O.	W. Spencer	„ M.	Brocklebank	„ 10.11.27 to 6.12.27... ...	12.12.27
Mahia	McIntosh, A.... ...	... ...	M.L.	Shaw, Savill & Albion	... ...	...
Mahronda	Addy, M. J.	... ...	No. M.	Brocklebank	... ...	...
Maihar	Charlton, W. L. ...	C. Shaw, C. Cadwallader, S. S. Slade.	M.L.	„	Met. Log. 1.10.27 to 25.12.27... ...	2.1.28
Maimyo	Smith, G. C.	H. M. Drummond	No. A.	„ ...	Form 911 16.7.27 to 8.10.27	11.10.27
Maivara	Blain, A. W.	... ...	M.L.	Burns Philp	Met. Log. 1.3.26 to 27.4.26	29.2.28
58 *Majestic*	Metcalfe, G. R. ...	W. W. Pearson, L. Thompson, W. T. Fitz Gerald.	W.T.	White Star	W.T. Reg. 1.3.28 to 15.3.28 ... ... „ 22.3.28 to 5.4.28	19.3.28 11.4.28
Makalla	Maugham, J. W.	... ...	No. M.	Brocklebank	... ...	...
Makambo ...	Blain, A. W. ... ... Brown, T. M.... ...	R. Perry, R. W. Holmes, T. MacRae.	M.L.	Burns Philp	Met. Log. 20.8.27 to 22.1.28	20.3.28
Makura	Spring Brown, J. F....	A. Champion, D. Burgess, A. Gell.	„	Canadian-Australasian	„ 6.10.27 to 21.1.28	20.3.28
Malabar	Hillman, E. J. ...	... ...	„	Burns, Philp & Co. ...	Met. Log. 11.5.27 to 22.11.27... ...	29.2.28
Malakuta	Adamson, F. L. ...	N. Grayson	No. M.	Brocklebank	Form 911 6.2.28 to 25.2.28	5.3.28
Malancha	Whitham, F.	R. Humble	„ M.	„ ...	„ 30.1.28 to 27.2.28	9.3.28
Malda	Gray, T. N.	S. G. James	„ M.	British India ...	„ 8.2.28 to 16.3.28	26.3.28
Maloja	Warner, S. C.... ...	A. D. Dennis	„ M.	P. & O.	„ 22.12.27 to 26.1.28... ...	31.1.28
Malwa	Norman, W. A. ...	... ...	„ M.	„	... ...	...
Mamari	Falconer, H.	P. Campbell	„ A.	Shaw, Savill & Albion	„ 19.7.27 to 22.9.27	27.9.27
Manchester Brigade	Stott, C. H.	W. S. Eustance	M.L.	Manchester Liners ...	„ 10.1.28 to 18.2.28	23.2.28
Manchester Corporation.	Williams, H.	... ...	No. A.	„ „ ...	„ 16.1.28 to 2.3.28	19.3.28
Manchester Hero ...	Riley, J. E.	H. Anderton, J. H. Emmett, A. W. Hanchett.	M.L.	„ „ ...	Met. Log. 6.9.27 to 18.2.28	23.2.28
Manchester Producer	Struss, F.	... ...	No. A.	„ „ ...	... ...	...
Manchester Regiment	Foale, J. R.	P. D. Barr	„ A.	„ „ ...	Form 911 4.2.28 to 9.3.28	14.3.28
Manipur	Cochran, G. N. ...	R. Penston, G. B. Falconer ...	No. M.	Brocklebank	„ 23.1.28 to 21.2.28	12.3.28
Manistee	Steidelmann, H. ...	... ...	M.L.	Elders & Fyffes ...	... ...	...
Manora	Hudson, H. T., R.D., Commr., R.N.R.	W. H. Cruse	No. M.	British India... ...	Form 911 9.1.28 to 14.3.28	3.4.28
Mantua	Randell, G. G. ...	D. B. Leader, H. Tee ...	„ M.	P. & O.	Form 911 6.8.27 to 29.9.27	3.10.27
Marella	Mortimer, S.	A. G. Hill, R. Duddell, A. G. Thomas.	M.L.	Burns Philp	Met. Log. 4.5.27 to 28.9.27	28.11.27
Marengo	Curle, J.	H. Bryan, J. Ford, F. Barnard,	„	Ellerman Wilson ...	„ 2.12.27 to 12.3.28	16.3.28
Maresfield	Jones, T. E.	... ...	No. A.	Woods, Tyler & Brown	Form 911 14.1.28 to 14.2.28	9.3.28
Margha ...	Baird, S. K. ... ... Hughes, C. G... ...	P. Wright, H. E Evans, C. C. Taylor, A. G. Earl.	M.L.	British India... ...	Met. Log. 6.11.27 to 4.2.28	15.2.28
Marquesa	Smiles, R. S.	E. Monckton	No. M.	Furness Houlder ...	Form 911 28.1.28 to 23.3.28	4.4.28
Matakana	Thurston, H. P. ...	J. Hart, J. Dickson, C. E. Mayer.	M.L.	Shaw, Savill & Albion	Met. Log. 17.10.27 to 27.2.28... ...	2.3.28
Mataroa	Kershaw, W. A. R. ...	T. T. Oliver, J. J. Nicoll, J. Worrall.	M.L.	Shaw, Savill & Albion	Met. Log. 19.8.27 to 5.12.27	10.12.27
Matheran	Ison, W. A.	L. Jeans, H. Simpson, J. Richardson	No. M.	Brocklebank	„ 7.6.27 to 4.1.28	10.1.28
Matiana	Green, F. V.	J. R. Precious	No. M	British India... ...	Form 911 20.12.27 to 12.2.28... ...	20.2.28
Matra	Cornish, N. P. ...	... ...	„ M.	Brocklebank	... ...	...
Maunganui... ...	Davey, A. H.	F. Gibson, V. Knight, H. Kemp.	„ M.	Union S.S. Co. of N.Z	„ 29.4.27 to 22.7.27	5.9.27
32 *Mauretania* ...	McNeil, S.G.S., R.D., Capt., R.N.R.	J. A. Quarrie, G. Duguid, C. B. Osborne.	W.T.	Cunard	W.T. Reg. 9.2.28 to 27.2.28	6.3.28
Megantic	Trant, E. L., R.D., Commr., R.N.R.	... ...	No. A.	White Star	Form 911 30.7.27 to 20.8.27	24.8.27
22 *Melita*	Stewart, A.	J. Shearer, T. Gillette ...	W.T.	Canadian Pacific ...	W.T. Reg. 9.3.28 to 6.4.28	13.4.28
Memnon	Dougall, W. T. ...	J. A. C. MacGregor	No. A.	A. Holt...	Form 911 24.3.28 to 5.4.28	10.4.28
21 *Metagama* ...	Freer, A., Capt., R.N.R.	A. M. Watt, W. P. Haines ...	W.T.	Canadian Pacific ...	W.T. Reg. 27.2.28 to 17.3.28	23.3.28
Middlesex	MacRae, A., D.S.C., Lt.-Commr., R.N.R.	C. Roberts	No. M.	Federal...	Form 911 10.1.28 to 29.1.28	21.3.28
Minna	Mackenzie, G. G. ...	A. M. Campbell	„ A.	Scottish Fishery Board.	Form 911 21.2.28 to 2.4.28	4.4.28
Minnesota	Finch, E.	... ...	„ M.	Atlantic Transport...	„ 19.3.28 to 8.4.28	10.4.28
Minnetonka ...	Gates, T. F., C.B.E....	H. E. McCartney	„ M.	„ „ ...	„ 11.3.28 to 31.3.28	3.4.28
Minnewaska ...	Claret, F. H., C.B.E., Commr., R.N.R.	F. J. Mummery	„ M.	„ „ ...	„ 27.2.28 to 17.3.28	26.3.28
Mirror, C.S. ...	Jones, T., M.B.E. ...	J. G. West	„ M.	Eastern Tel. Co. ...	„ 13.2.28 to 18.3.28	10.4.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 13.4.28.	Date Received
Mississippi	Wylie, J. T. J.... ...	... ...	No. A.	Atlantic Transport ...	Form 911 6.11.27 to 15.11.27... ...	26.11.27
Modasa	Gilchrist, J. W. ...	R. E. T. Parsons	„ M.	British India	... ...	...
Moldavia	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R.	W. L. Dobbin	„ M.	P. & O.	Form 911 24.2.28 to 14.3.28	11.4.28
Mongolia	Furlong, G. H. S., R.D., Capt., R.N.R..	... ...	„ M.	„ „	... ...	...
Mongolian Prince	Edwards, W.... ...	V. E. Palmer	„ A.	Prince	Form 911 17.2.28 to 8.3.28	10.4.28
24 *Montcalm* ...	Hamilton, G.	H. McFadyen	W.T.	Canadian Pacific ...	W.T. Reg. 4.3.28 to 23.3.28	27.3.28
25 *Montclare* ...	Griffiths, J. N. ...	A. Mansey, F. E. Bevis, C. Draper.	„	„ „ ...	„ 18.3.28 to 6.4.28	12.4.28
27 *Montnairn* ...	Notley, A. H., R.D., Commr., R.N.R.	K. Hutchings, E. A. Shergold, W. S. Roberts.	W.T.	Canadian Pacific	W.T. Reg. 20.2.28 to 8.3.28 ... ... Form 911 18.2.28 to 8.3.28	14.3.28 12.3.28
Montoro	Williams, D. J. ...	J. Campbell	No. A.	Burns, Philp & Co. ...	Form 911 31.1.28 to 6.3.28	10.4.28
26 *Montrose* ...	Landy, E.	A. Watt	W.T.	Canadian Pacific ...	W.T. Reg. 25.12.27 to 12.1.28... ...	17.1.28
20 *Montroyal* ...	Sibbons, H.	R. Antrobus	„	„ „ ...	„ 27.9.27 to 8.11.27	12.11.27
Moresby ...	Edgell, J. A., O.B.E., Capt., R.N. Henderson, D. A., Commr., R.N.	W. H. Martin	M.L.	His Majesty's Australian Ship.	Met. Log. 29.8.27 to 15.12.27... ...	23.1.28
Morvada	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	D. S. Johnston	No. M.	British India	Form 911 20.7.27 to 16.10.27... ...	24.10.27
Mulbera	Steadman, W. R. ...	J. Rose	„ M.	„	„ 8.2.28 to 12.3.28	21.3.28
Nagara	Foster, E.	C. K. Brown	„ M.	R.M.S.P. Co.	„ 26.8.27 to 21.1.28	26.1.28
Nagoya	Bedwell, L. A. ...	T. A. Sergeant	„ M.	P. & O.	„ 5.2.28 to 12.3.28	11.4.28
Naldera	Dayas, C. T. E. ...	C. H. Hand, W. T. Banks, H. M. Askin.	M.L.	„	Met. Log. 19.11.27 to 23.2.28... ...	29.2.28
Nardana	Moth, F. L.	F. G. Shay	No. M.	British India	Form 911 18.12.27 to 26.1.28... ...	5.3.28
Nellore	Hignett, A. H., R.D., Lt.-Commr., R.N.R.	A. J. Brown	„ M.	P. & O.	„ 30.12.27 to 6.4.28	11.4.28
Nerbudda	Williams, B. N. ...	J. H. Robotham	„ M.	British India	„ 25.1.28 to 27.2.28	5.3.28
Nestor	Houghton, G. K. ...	J. Milhench, G. Shennan, N. Anderson.	M.L.	A. Holt	Met. Log. 16.7.27 to 5.11.27	10.11.27
Newby Hall ...	Storey, J. K.	... ...	„	Ellerman	„ 16.4.27 to 14.10.27... ...	1.12.27
Newfoundland ...	Westgarth, W. A., D.S.C.	R. F. Handley, E. Sainty, E. B. Burke.	„	Furness Withy ...	„ 6.10.27 to 11.2.28	29.2.28
Niagara	A. C. Showman, T. V. Hill.	R. N. Turner, D. Rollo, V. Knight.	„	Canadian-Australasian	„ 24.8.27 to 9.12.27	10.1.28
Ningchow	Beale, H. E.	M. H. Vincent	No. A.	A. Holt...	Form 911 6.1.28 to 24.1.28	12.3.28
Norfolk	Robinson, F. W. ...	E. M. Foster	„ A.	Federal	„ 14.1.28 to 18.2.28	9.2.28
Norna	Wright, J. W.... ...	T. R. Ness	„ A.	Scottish Fishery Board	„ 23.2.28 to 18.3.28	23.3.28
Norseman, C.S. ...	Douglas. W.	R. W. Greenfield	„ M.	Western Tel. Co. ...	„ 29.2.28 to 14.3.28	11.4.28
Northumberland ...	Upton, H. L.	... ...	M.L.	Federal	... ...	...
Nova Scotia ...	Furneaux, S.	... ...	No. A	Furness Withy ...	Form 911 8.2.28 to 9.3.28	12.3.28
Nowshera	Rowe, S. N.	W. D. L. Reeves	„ M.	British India	„ 22.1.28 to 27.2.28	11.4.28
Nubian	Watmough, T. M. ...	... ...	„ A.	Leyland	„ 19.8.27 to 30.10.27... ...	11.11.27
Nuddea	Morrison, N. C. ...	... ...	„ M.	British India... ...	„ 20.2.28 to 10.3.28	3.4.28
Oaklands Grange	St. Clair, C., D.S.C. ...	C. F. Foxwell	„ A.	Houlder Bros. ...	Form 911 4.2.28 to 1.3.28	26.3.28
57 *Olympic*	Marshall, W., C.B., D.S.O., R.D., Commodore. R.N.R.	A. Fisher, H. J. C. Day, A. E. Weller.	W.T.	White Star ...	W.T. Reg. 8.3.28 to 22.3.28 ... ... Form 911 7.3.28 to 22.3.28	26.3.28 26.3.28
Orama	Matheson, C. G., D.S.O., R.D., Capt., R.N.R.	H. Tanner, W. Elliot, C. K. Blake.	M.L.	Orient	„ 13.11.27 to 14.2.28... ...	1.3.28
Oranian	Hoskins, W.	.. ..	No. A.	Leyland	„ 5.12.27 to 3.2.28	15.2.28
Orbita	Dominy, R. H., C.B.E. Commr., R.N.R.	J. Lloyd Jones	„ M.	R.M.S.P. Co.	„ 8.11.27 to 16.1.28	25.1.28
Orcoma	Pearse, A. W.	W. M. Horsfall, J. N. Laylor, D. L. Jones.	M.L.	Pacific S.N. Co. ...	Met. Log. 21.9.27 to 16.2.28	27.2.28
Orduna	Daniel, T.	R. D. Eckford	No. M.	R.M.S.P. Co.	Form 911 7.1.28 to 22.3.28	28.3.28
Orestes	Flynn, G. A.	... ...	„ A.	A. Holt...	„ 5.10.27 to 20.10.27... ...	14.11.27
Orita	Duncan, E. E. ...	D. W. Hutchinson, F. Carter, H. D. Griffiths.	M.L.	Pacific S.N. Co. ...	Met. Log. 20.6 27 to 1.12.27	8.12.27
Ormonde	Rice, W. V., D.S.O., D.S.C., Commr. R.N.	H. P. Price	„	His Majesty's Ship ...	„ 2.7.27 to 29.10.27	28.11.27
Ormonde	Sarson, M. J.	... ...	No. M.	Orient	Form 911 8.10.27 to 30.10.27... ...	5.12.27
Oronsay	Shelford, W. S., Lt.-Commr., R.N.R.	Burnand, C., R. S. Hawker. J. D. Archer.	M.L.	„	Met. Log. 16.10.27 to 17.1.28... ...	21.1.28
Oroya	Ridyard, A.	C. H. Ray	No. M.	Pacific S.N. Co. ...	Form 911 22.11.27 to 31.1.28... ...	9.2.28
Orsova	Cameron, E. P., R.D., Commr., R.N.R.	H. Schofield, L. J. Vesty, A. Croft Cohen, H. A. Whittle, A. Addison.	M.L.	Orient	Met. Log. 11.12.27 to 13.3.28... ...	20.3.28
Orvieto	O'Sullevan, F. R. ...	G. L. Carter, T. Fox Russell, R. C. Warner.	„	„	„ 4.9.27 to 6.12.27	29.12.27
Osterley	McRitchie, W. M., O.B.E., R.D., Lt.-Commr., R.N.R.	R. J. Galpin	No. A.	„	Form 911 3.1.28 to 1.2.28	7.2.28
Otaki	McNish, R.	J. McBulloch	„ A.	New Zealand S.S. Co.	„ 18.12.27 to 6.1.28	13.2.28
Otira	Wood, C., D.S.C. ...	S. Winton	„ M.	Shaw, Savill & Albion	„ 8.1.28 to 26.1.28	5.3.28
Otranto	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	O. C. Davies	„ M.	Orient	„ 8.1.28 to 27.1.28	12.4.28
Oxfordshire ...	Foster, W. L.	... ...	„ A.	Bibby Bros.	„ 22.10.27 to 31.12.27 ...	12.1.28
Pacific Shipper, M.V.	Campbell, H.... ...	... ...	„ A.	Furness Withy ...	„ 12.10.27 to 25.11.27 ...	5.12.27
Pacuare	Sapsworth, S. A. ...	V. R. Watkins	„ A.	Elders & Fyffes ...	„ 17.12.27 to 20.1.28... ...	24.1 28
Pakeha	W. P. Clifton Mogg, Lt.-Commr., R.N.R.	E. T. Baker, R. E. Nicholson, G. Lindsay	M.L.	Shaw, Savill & Albion	Met. Log. 23.7.27 to 17.12.27... ...	23.12.27
Pancras	Peregrine D.... ...	... ...	M.L.	Booth	... ...	...
Pareora	Evans, J. O.	J. Greenaway	No. A.	Hain S.S. Co.	Form 911 13.1.28 to 11.2.28	10.4.28
Paris	Cook, C. L.	Mr. Biles	C.C.	Southern Rly. ...	Telegraphic Report. 31.7.27 ...	31.7.27
Patia	Makepeace, S. ...	R. W. King	No. A.	Elders & Fyffes ...	Form 911 3.3.28 to 8.4.28	12.4.28
Peisander	Slater. H.	D. L. Hoare	„ A.	A. Holt...	„ 2.2.28 to 20.2.28	19 3.28
65 *Pennland*... ...	Harvey, H.	C. J. Murray, E. Cornellie ...	W.T.	Red Star	„ 21.11.27 to 9.1.28	11.1.28
Peshawur	Wilding, H. G. ...	J. C. Mellonie. S. H. Baldwin, A. M. Tolfree.	M.L.	P. & O.	Met. Log. 19.11.27 to 25.3.28... ...	11.4 28
Piako	Kettlewell, C. R. ...	P. J. Connolly, T. K. McDonald, H. N. Lawson.	„	New Zealand S.S. Co.	Met. Log. 3.7.27 to 5.12.27	12.12.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 13.4.28.	Date Received
Polycarp	Jackson, T. H. ...	C. W. Smethurst	No. A.	Booth	Form 911 25.2.28 to 10.3.28	19.3.28
Port Adelaide ...	Swan, L. H.	E. N. Rogerson, F. J. Lavers, L. H. Potter.	M.L.	Commonwealth & Dominion.	Met. Log. 20.8.27 to 17.12.27... ...	28.1.28
,, *Albany* ...	Needham, R.... ...	G. W. Horton	,,	,, ,, ,,	,, 1.6.27 to 25.11.27	8.12.27
,, *Auckland* ...	Durham, R. S. ...	G. L. Hazlewood, C. F. Post, J. H. Sloan, H. E. Braine.	,,	,, ,, ,,	,, 10.9.27 to 25.1.28	15.2.28
,, *Bowen* ...	Hearn, G. W.	W. R. Johnston	No. A.	,, ,, ,,	Form 911 28.10.27 to 15.12.27 ...	6.1.28
,, *Campbell* ...	Reynolds, P. J. ...	G. T. C. Harris	,,	,, ,, ,,	... ...	...
,, *Caroline* ...	Hoad, A. C.	A. E. Fishwick, C. A. Hodson, J. Stannard.	M.L.	,, ,, ,,	Met. Log. 6.7.27 to 5.11.27	10.11.27
,, *Darwin* ...	Sawbridge, I. R. ...	S. Hearn, E. M. Fenton, J. S. Moare.	,,	,, ,, ,,	,, 13.8.27 to 9.1.28	13.1.28
,, *Denison* ...	Ferris, J.	E. T. N. Lawrey, G. W. B. Lovegrove, P. J. Howe, L. W. Cady.	,,	,, ,, ,,	Form 911 23.7.27 to 25.2.28	28.2.28
,, *Dunedin* ...	Farmar, F.	E. G. Jones, H. M. Post, N. M. Muzzell.	,,	,, ,, ,,	Met. Log. 5.11.27 to 1.3.28	14.3.28
,, *Fremantle* ...	Kearney, F. J. ...	A. G. Rhind	No. A.	,, ,, ,,	Form 911 31.12.27 to 2.2.28	7.2.28
,, *Gisborne* ...	Hutchinson, T. ...	... ...	,, A.	,, ,, ,,	,, 21.8.27 to 23.12.27... ...	2.1.28
,, *Hobart* ...	Craven, R.	R. Carter, L. Copeland, G. G. Langford, C. L. Webb.	M.L.	,, ,, ,,	Met. Log. 22.7.27 to 6.11.27	14.11.27
,, *Hunter* ...	Cottell, S. C.	A. Cooper, A. McClounan, J. T. Weldin.	,,	,, ,, ,,	,, 22.6.27 to 6.10.27	11.11.27
,, *Huon*	Compton, J.	J. A. Fairbairn	No. A.	,, ,, ,,	Form 911 3.12.27 to 6.1.28	20.2.28
,, *Melbourne* ...	Hudson, J. J.	A. R. Martin, L. H. B. Bloye, W. E. Simpson.	M.L.	,, ,, ,,	Met. Log. 12.11.27 to 1.4.28	10.4.28
,, *Nicholson* ...	Jack, J.	J. G. Lewis, G. L. H. Dean, A. G. Newbury, W. B. Hopkins.	M.L.	,, ,, ,,	Met. Log. 17.9.27 to 17.1.28	6.2.28
,, *Pirie*	Kippins, T.	W. G. Jones, J. F. Martin, E. O. Round.	,,	,, ,, ,,	,, 12.10.27 to 27.3.28... ...	12.4.28
,, *Sydney* ...	Higgs, W. G.	T. L. Kidwell, E. E. Roswell, K. D. Morgan.	,,	,, ,, ,,	,, 21.9.27 to 3.3.28	8.3.28
,, *Victor* ...	Williams, R.	R. Stannard, J. B. Watson, A. Brown.	,,	,, ,, ,,	,, 16.7.27 to 28.11.27... ...	15.12.27
,, *Wellington* ...	Jones, C.	D. F. Morgan	No. A.	,, ,, ,,	Form 911 26.1.28 to 25.2.28	21.3.28
President Jackson	Griffith, J.	J. A. Cartwright	,, A.	Pacific Mail S.S. Co...	,, 31.1.28 to 16.2.28	23.3.28
President Jefferson	Nichols, F. R	C. H. Moen, S. Hansson ...	,, A.	Admiral Oriental Line	,, 5.1.28 to 29.1.28	20.2.28
Protea, H.M.S.A.S.	Woodhouse, A. F. B., Lt.-Commr., R.N.	R. J. Whitley	M.L.	South African Naval Service.	,, 30.7.27 to 7.11.27	20.12.27
Protesilaus	Nelson, T. B.	... ...	,,	A. Holt	Met. Log. 8.4.27 to 7.9.27	11.10.27
Pyrrhus	Elford, W. J.	R. E. Wilks	No. A.	,, ...	Form 911 25.2.28 to 13.3.28	29.3.28
Rancher	Gibbings, W.	... ...	No. M.	Harrison	,, 16.1.28 to 3.4.28	4.4.28
Ranpura	King, A. M., D.S.C. ...	E. J. Spurling	,, M.	P. & O.	,, 18.2.28 to 8.3.28	28.3.28
Rawalpindi ...	Thornton, E. J. ...	A. G. Stansfield...	,, M.	,, ...	... ...	...
60 *Regina*	Davies, E.	F. W. Laws, H. C. Gray, J. C. Boyce.	W.T.	White Star - Dominion	,, 6.2.28 to 26.2.28	27.2.28
					W.T. Reg. 6.2.28 to 26.2.28 ...	29.2.28
Reindeer	Pitman, R. R.... ...	... ...	C.C.	G.W. Railway ...	Telegraphic Report 23.2.28	23.2.28
Remuera	Cameron, J. J. ...	D. Hughes	No. A.	New Zealand S.S. Co.	Form 911 30.9.27 to 19.1.28	24.1.28
Rhexenor	Stout, G. I.	A. Yarwood	,, A.	A. Holt...	,, 5.1.28 to 25.3.28	2.4.28
Rhodesian Transport.	Bullock, F. W. H. ...	F. D. Betts	,, A.	Houlder Bros. ...	,, 3.12.27 to 17.3.28	10.4.28
Rimutaka	Hemming, F. A. ...	H. A. Fryer, M. A. D. Stewart, G. C. Saul, H. Vernon.	M.L.	New Zealand S.S. Co.	Met. Log. 11.11.27 to 15.3.28... ...	21.3.28
Risaldar	Matthews, E. G. ...	R. H. Friedlander	No. M	Asiatic S.N. Co. ...	Form 911 4.11.27 to 19.11.27... ...	12.12.27
Rona...	Wallis, J. A.	... ...	No.	Colonial Sugar Refining Co.	... ...	...
Rother	Woodhead, T. H. ...	... ...	No. A.	Goole Steam Shipping	,, 3.2.28 to 10.3.28	14.3.28
Rotorua	Hunter, J. L. B. ...	E. Lawrence, F. Cooke, H. Cockerill.	M.L.	New Zealand S.S. Co.	Met. Log. 3.9.27 to 15.12.27	19.12.27
Royal Fusilier ...	Dawson, J.	J. Fraser	No. A.	London & Edinburgh S.S. Co.	Form 911 19.5.27 to 7.7.27	11.7.27
Royal Transport ...	Dove, J.	R. W. Wass	,, A.	Houlder Bros. ...	,, 7.5.27 to 15.8.27	19.8.27
Ruapehu	McKellar, A. W., R.D., Capt., R.N.R.	A. Landles, W. J. Glassborow, W. J. Newton.	M.L.	New Zealand S.S. Co.	Met. Log. 9.9.27 to 5.1.28	10.1.28
St. Albans	Smith, G. L., Commr., R.A.N.R.	R. S. Millington, J. Kavanagh, R. L. Harry.	,,	Eastern and Australian.	,, 1.7.27 to 27.9.27	17.11.27
St. Helier	... ...	C. Bell	C.C.	G.W. Railway ...	Telegraphic Report 12.4.28	12.4.28
St. Julien	Richardson, L. ...	C. W. Sanderson	,,	,, ,, ...	,, ,, 10.4.28	10.4.28
St. Andrew ...	Bearpark, E. W. ...	H. W. Smith	No. A.	Rankin Gilmour ...	Form 911 2.2.28 to 27.2.28	14.3.28
Salaga	Jones, W.	C. V. Evans	,, A.	Elder Dempster ...	,, 19.3.27 to 4.6.27	15.6.27
38 *Samaria*	Malin, R. G., Lieut.-Commr., R.N.R.	C. S. Williams, A. B. Fasting, W. B. Tanner.	W.T.	Cunard	,, 16.1.28 to 23.1.28	13.2.28
					W.T. Reg. 31.10.27 to 20.11.27 ...	24.11.27
Sardinian Prince ...	Brown, J. F.	W. O. Young	No. A.	Prince	Form 911 19.1.28 to 24.3.28	10.4.28
Saxon	Gardner, G. F., O.B.E.	R. May	,, A.	Union Castle	,, 20.1.28 to 11.3.28	14.3.28
Scholar	Whyte, D. L.	... ...	,, M.	Harrison	,, 7.3.28 to 23.3.28	11.4.28
Scotia	Prichard, S. D., M.B.E.	W. T. Griffith	C.C	L.M. & S. Railway ...	Telegraphic Report 12.4.28	12.4.28
33 *Scythia*	Prothero, W.	G. Overton, G. H. Morris, J. G. Bradley	W.T.	Cunard	W.T. Reg. 9.1.28 to 23.3.28	3.4.28
Sheaf Mount ...	Groves, C. V.	W. Thomson	No. A.	W. A. Souter	,, 5.6.27 to 14.7.27	20.7.27
Sheaf Spear ...	Whitfield, G. A., O.B.E.	S. J. Dring, T. B. Fishley ...	M.L.	,, ...	Met. Log. 4.2.27 to 25.7.27	17.9.27
Shropshire, M.V....	Adamson, B. W. ...	W. L. Whiteside, R. Cuming, W. H. Brittain, L. McDermott.	,,	Bibby	,, 31.12.27 to 9.3.28	13.3.28
Socrates	Taylor, F. C.	W. E. Jordan	No. A.	Lamport & Holt ...	Form 911 1.10.27 to 21.12.27... ...	27.1.28
Somerset	Howell Price, J. ...	W. Redwood	,, A.	Federal...	,, 16.11.27 to 20.12.27 ...	11.1.28
Spero	Montgomery, H. ...	D. Millward	M.L.	Ellerman Wilson ...	Met. Log. 9.7.27 to 31.12.27	6.1.28
Statesman	Mowat, J.	... ...	No. M.	Harrison	... ...	...
Stephen	Evans, L. G.	G. G. Roberts	No. A.	Booth	Form 911 25.12.27 to 12.2.28... ...	16.2.28
Stockwell	Smith, W.	R. A. Kneen	,, A.	Brocklebank	,, 14.3.28 to 26.3.28	10.4.28
Surrey	Lamb, C. B.	S. C. Bradley	,, A.	Federal...	,, 26.1.28 to 3.3.28	12.3.28
Suwa Maru	Gotoh, M.	... ...	,, A.	Nippon Yusen Kaisha	,, 27.11.27 to 25.12.27 ...	30.12.27
Sylvafield, M.V ...	Biddick, E.	A. Sully	,, A.	Hunting & Son ...	,, 29.2.28 to 30.3.28	4.4.28
Tainui	Elford, H. C.	L. J. Hopkins	,, A.	Shaw, Savill & Albion	,, 16.2.28 to 22.3.28	28.3.28
Tahiti	Aldwell, B. M. ...	G. M. Coote	,, A.	Union S.S. Co. of N.Z.	,, 30.11.27 to 19.1.28... ...	7.2.28
Taiping	Frame, A. M.	F. Stratford, S. Moore, A. C. Kennedy, R. Bargent.	M.L.	Yuill & Co.	Met. Log. 11.6.27 to 4.11.27	4.1.28
Takada	Baird, S. K.	... ...	No. M.	British India... ...	... ...	...
Talthybius	Hatfield, J.	G. D. Jones	,, A.	A. Holt...	Form 911 11.1.28 to 13.3.28	2.4.28
Tamaroa	Hartman, W. H. ...	F. W. Lutyens	,, M.	Shaw, Savill & Albion	,, 21.1.28 to 26.2.28	5.3.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 13.4.28.	Date Received.
Tanda	Pilcher, E. T., Lieut.-Commr., R.N.R.	G. C. Smith, H. Munday, J. W. Kavanagh, R. Millington.	M.L.	E. & A. S.S. Co. ...	Met. Log 2.9.27 to 31.1.28	3.4.28
Tarantia	Munro, D.	... ...	No. A.	Anchor	Form 911 21.1.28 to 1.2.28	8.2.28
Teiresias	Wilkinson, W. H. ...	R. Singleton	„ A.	A. Holt & Co.	„ 12.2.28 to 1.3.28	10.4.28
Tekoa	Barnett. H.	... ...	„ M.	New Zealand S.S. Co.	„ 19.2.28 to 17.3.28	28.3.28
Telamon	Willcox, J. H.... ...	F. A. Brown	„ A.	A. Holt	„ 20.2.28 to 14.3.28	2.4.28
Tetela	Brice, E. H.	... ...	„ A.	Elders & Fyffes ...	„ 19.2.28 to 18.3.28	21.3.28
Teucer	Hodgson, R. N. ...	R. N. Inkster	„ A.	A. Holt	„ 24.8.27 to 12.11.27... ...	14.11.27
Themistocles ...	Young, A. D.	H. C. Howe	„ M.	Aberdeen	„ 20.1.28 to 2.2.28	27.2.28
Theseus	Jones, E.	W. A. Fyffe	„ A.	A. Holt	„ 16.2.28 to 2.3.28	2.4.28
Titan	Power, J.	D. Hey, D. MacTavish, G. W. Best, C. F. Bailey.	M.L.	„	Met. Log. 17.9.27 to 6.1.28	18.1.28
Tongariro	Burton Davies, J. ...	F. C. Pretty, A. E. Williams, E. A. Quick, D. Baldwin.	„	New Zealand S.S. Co.	Form 911 18.9.27 to 28.1.28	2.2.28
Transylvania ...	Bone, D. W.	P. Middleton	No. A	Anchor	„ 16.3.28 to 21.3.28	28.3.28
Traveller	Worthington, B. ...	E. L. Stockley	„ M.	T. & J. Harrison ...	„ 3.12.27 to 29.2.28	5.3.28
Trefusis	Cordy, —	... ...	No.	Hain S.S. Co.	... ...	...
Trematon	Evans, B.	J. Jenkyn, C. Warren, L. Griffin.	M.L.	Hain S.S. Co.	Met. Log. 16.9.27 to 20.12.27... ...	13.1.28
Turakina	Hamilton, E. S. ...	A. W. Marshall	No. M.	New Zealand S.S. Co.	Form 911 19.12.27 to 8.1.28	27.1.28
11 *Tuscania*	Rome, W.	J. Hamilton	W.T.	Anchor	„ 24.9.27 to 15.10.27... ...	19.10.27
Tyndareus ...	Williams, R. J., Williams, D. H., Christie, W.	A. G. Phillips, T. R. Phillips, F. H. Gray.	M.L.	A. Holt	Met. Log. 14.6.27 to 7.11.27	16.12.27
Ulimaroa	Wylie, W. J.	A. N. Robertson	No. M.	Huddart Parker, Ltd.	Form 911 3.2.28 to 27.2.28	11.4.28
Ulysses	Owen, R. D., O.B.E....	W. E. Ford	„ A.	A. Holt	„ 13.2.28 to 3.3.28	26.3.28
Umvolosi	Barnes, E. W.... ...	R. Dyns	„ A.	Bullard King	„ 9.2.28 to 29.2.28	26.3.28
Valacia	Inch, F....	G. Meggitt	„ M.	Cunard	„ 23.2.28 to 25.3.28	11.4.28
Vardulia	Gronow, S.	W. H. Barker	„ A.	„	„ 24.1.28 to 2.3.28	10.4.28
Vigilant	Simpson, E. S. S. ...	J. Hunter	„ A.	Scottish Fishery Board.	„ 3.3.28 to 30.3.28	2.4.28
Waiotapu	Todd, D.	A. J. McKenzie	„ M.	Canadian - Australasian.	„ 4.1.28 to 27.1.28	2.3.28
Wairuna	Ryan, J.	J. E. Broughton, R. Tulloch, J. Ritchie.	M.L.	Union S.S. Co. of N.Z.	Met. Log. 14.10.27 to 20.1.28... ...	20.3.28
Walmer Castle	Lang, T. W. ... ... Stuart, C. B.	A. E. Denn	No. A.	Union Castle	Form 911 30.9.27 to 20.11.27... ...	22.11.27
Wangaratta ...	Scutt, W.	T. W. Wordingham, S. R. Millard, A. G. Brooks, M. Harvey.	M.L.	British India	Met. Log. 2.10.27 to 29.2.28	2.3.28
Warfield	Steel, R.	... ...	No. A.	„ „	Form 911 2.3.28 to 9.3.28	26.3.28
War Nizam ...	Moncrieff, T.	B. Kieran	„ M.	British Tankers ...	„ 8.2.28 to 14.3.28	28.3.28
Westmoreland ...	Gardner, H. W. ...	C. P. Jackson, A. L. Warren, G. A. Shepherd.	M.L.	Federal...	Met. Log. 11.7.27 to 16.11.27... ...	22.11.27
William Scoresby, R.S.S.	De la Motte, J. B. B., Lieut., R.N.	... ...	„	Falkland Islands Government.	... ...	...
Windsor Castle ...	Chave, Sir B., K.B.E.	A. J. Tweddell, J. Montgomery, P. G. McIver, A. G. Bedwell.	„	Union Castle	„ 15.10.27 to 5.2.28	15.2.28
Winifredian ...	Harrocks W.	A. Crone	No. M.	Leyland	Form 911 30.10.27 to 22.12.27 ...	6.1.28
Wonganella ...	Suffern, H.	G. F. Phillips	„	W. Crossby & Sons ...	„ 26.9.27 to 8.11.27	20.12.27
Woodarra	Reilly, J. V.	H. Goater, B. W. Smith D. B. Lattin, G. F. Alexander.	M.L.	British India... ...	Met. Log. 26.6.27 to 18.11.27... ...	24.11.27
Yorkshire	Millson, G. E.... ...	W. M. C. Higginson, R. Allen	No. A.	Bibby	Form 911 23.4.27 to 4.7.27	9.7.27
Zent	Roberts, —	... ...	„	Elders & Fyffes ...	... ...	...
Conway, H.M.S ...	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets	Cadets' M.L.	... ...	Cadets' Met. Log. 22.1.28 to 31.3.28	11.4.28
Pangbourne Nautical College	Tracy, A. F. G., Commr., R.N.	„ „	„	... ...	Cadets' Met. Log. 18.1.28 to 27.3.28	13.4.28
Worcester, H.M.S.	Sayer, M.B., C.B.E., A.D.C., R.D., Capt., R.N.R.	„ „	„	... ...	Cadets' Met. Log. 23.9.27 to 14.12.27	19.12.27
Abaco	... ...	The Keepers	Lighthouse Register.	... ...	Lighthouse Register 1.7.26 to 20.10.26	20.4.27
Cay Lobos	... ...	„	„	... ...	Lighthouse Register 1.1.27 to 11.7.27	29.9.27
Double Headed Shot	... ...	„	„	... ...	Lighthouse Register 1.7.26 to 31.12.26	20.4.27
Inagua	... ...	„	„	... ...	Lighthouse Register 24.1.27 to 3.7.27	29.9.27
Sombrero	... ...	„	„	... ...	Lighthouse Register 1.7.27 to 31.12.27	7.2.28
Watling Island ...	... ...	„	„	... ...	Lighthouse Register 10.9.26 to 30.6.27	29.9.27
Cape Pembroke ... (Falkland Is.).	... ...	„	„	... ...	Lighthouse Register 1.7.27 to 31.12.27	21.2.28

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Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., received up to 31.3.28.	Date Received.
Chirripo	McColm, F.	H. Rawstron	Elders & Fyffes	Water Samples	21.3.28
Dakotian	Robb, J.	... ...	Leyland	„ „	...
Darro	Matthews, G. P.	A. F. Walker	R.M.S.P. Co.	„ „	27.2.28
Deseado	Hannon, F. S....	J. N. Duncan	„	„ „	10.3.28
Hildebrand...	Maddrell, J.	A. G. Malcolm	Booth	„ „	7.1.28
Oranian	Hoskins, W.	... ...	Leyland	„ „	...

June, M.O., 1928.

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MARINE METEOROLOGY, ATLASES AND MEMOIRS.

CHARTS:—

ATLANTIC:—

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

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

ATLANTIC (NORTH):—

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

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

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

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

ATLANTIC (SOUTH):—

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

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

BAFFIN BAY AND DAVIS STRAIT:—

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

INDIAN OCEAN:—

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

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

CHARTS:—*continued.*

MEDITERRANEAN SEA:—

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

PACIFIC OCEAN:—

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

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

RED SEA:—

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

SOUTHERN OCEAN:—

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

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

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

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

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

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

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

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

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

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